

# Rate Constants for Reactions of Aliphatic Carbon-Centered Radicals in Aqueous Solution

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# Rate Constants for Reactions of Aliphatic Carbon-Centered Radicals in Aqueous Solution

Pedatsur Neta and Jan Grodkowski<sup>a)</sup>

Chemical Kinetics and Thermodynamics Division, National Institute of Standards and Technology, Gaithersburg, Maryland 20899

Alberta B. Ross

Radiation Chemistry Data Center, Radiation Laboratory, University of Notre Dame, Notre Dame, Indiana 46556

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Absolute rate constants for reactions of aliphatic carbon-centered radicals in aqueous solutions have been compiled and evaluated from the literature. Rate constants are included for reactions of radicals with inorganic and organic compounds and for decay by radical-radical reactions. The radicals were generated by radiolysis, photolysis, or other techniques, and their rate constants were determined generally by kinetic spectrophotometry. The tables include data for over 2,500 reactions of 373 radicals from 740 literature references. © 1996 American Institute of Physics and American Chemical Society.

Key words: Alkyl radicals; aminoalkyl radicals; aqueous solution; benzyl radicals; chemical kinetics; haloalkyl radicals; hydroxyalkyl radicals; photolysis; radiolysis; rate constants.

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<sup>a)</sup>On leave from Institute of Nuclear Chemistry and Technology, Warsaw, Poland

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## 1. Introduction

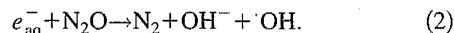
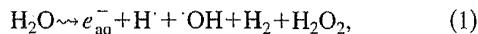
Alkyl radicals and substituted alkyl radicals are important reactive intermediates formed in certain reductions and oxidations of organic and biological materials. Because of their importance in biological systems, in atmospheric reactions,

and in industrial processes, they have been the topic of numerous investigations. Earlier studies have been discussed in several reviews<sup>1,2</sup> and the kinetic results were summarized in several compilations.<sup>3,4</sup> Many direct measurements of absolute rate constants for reactions of carbon-centered radicals in solution have been reported. The present compilation is intended to evaluate the available rate constants in aqueous solution and to present them in a concise and readily accessible form. The tables include over 2,500 reactions of 373 radicals, compiled from 740 literature references. The data presented here are also included in the NDRL/NIST Solution Kinetics Database.<sup>5</sup> A brief description of the methods of production of the radicals and of determination of their rate constants, as well as the general patterns of radical reactions, are given below.

## 2. Production of Aliphatic Carbon-Centered Radicals

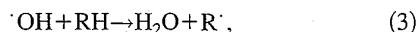
### 2.1. Radiolyesis

Alkyl and substituted alkyl radicals are produced in irradiated aqueous solutions by the reactions of  $e_{aq}^-$ , H $^+$ , or ·OH radicals with various organic compounds. If the ·OH radical is to be used, the solutions typically contain N<sub>2</sub>O to convert the  $e_{aq}^-$  into ·OH, thus increasing the yield of the desired alkyl radical and reducing possible complications arising from other reactions of the electron.



If the hydrated electron is to be used to produce the desired alkyl radical, the ·OH radical cannot be converted readily to the hydrated electron, but often can be converted to a reducing radical capable of producing more of the desired alkyl radical. Otherwise, if the ·OH is scavenged by an additive to form a nonreducing radical, the secondary products arising from the ·OH must be taken into account in the kinetic analysis.

(a) Many alkyl radicals have been formed by hydrogen abstraction from a solute upon reaction with ·OH and H $^+$ .



This can result in a mixture of several alkyl radicals, depending upon the structure of the solute and the selectivity of the reacting radicals. The ·OH radical is very nonselective and is used primarily to produce radicals from simple precursors, for example methanol, acetone or acetonitrile, each of which produces only one alkyl radical. For 2-propanol, which is slightly more complex, 86% of the alkyl radicals will be secondary while 13% will be primary. When ·OH is allowed to react with precursors containing unsaturated bonds or aromatic moieties, the situation may be even more complex, with the formation of OH-adduct radicals along with radicals formed by abstraction. Rate constants for a large number of hydroxyl radical reactions are summarized in a recent compilation<sup>6</sup> and in the Solution Kinetics Database.<sup>5</sup> Hydro-

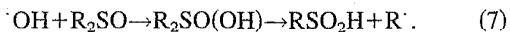
gen atoms are somewhat more selective than ·OH radicals in their reaction at different sites of a solute molecule, but because of their lower yield in the radiolysis of water they have a smaller contribution to the total yield of radicals.

(b) Certain carbon-centered radicals were produced by the addition of H $^+$  or ·OH to unsaturated aliphatic compounds.



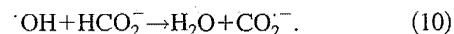
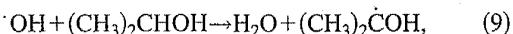
This method was used in a limited number of cases and suffers from two restrictions: (1) to produce a single radical the compound has to be symmetric about the double bond, and (2) if the molecule contains reactive sites such as allylic or doubly allylic, hydrogen abstraction may occur with a substantial yield to form a different radical. Reaction of ·OH with a triple bond forms a hydroxyvinyl radical which isomerizes to an oxoalkyl radical.

(c) Many simple alkyl radicals can be formed by the reaction of ·OH with alkyl sulfoxides via an addition/fragmentation mechanism.<sup>7</sup>

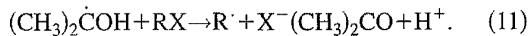


Since the rate constants for reaction of ·OH with the sulfoxides are  $>10^9 \text{ L mol}^{-1} \text{ s}^{-1}$  and the lifetimes of the OH adducts are  $<200 \text{ ns}$ , the radicals R $^-$  are produced in  $<1 \times 10^{-6} \text{ s}$  after the pulse in 0.01 mol L $^{-1}$  sulfoxide solutions. With the higher alkyl sulfoxides, a fraction of the ·OH radicals may react via H abstraction.

(d) Alkyl radicals are also produced by reaction of  $e_{aq}^-$  with halogenated organic compounds, leading to reductive elimination of a halide ion. The ·OH radicals can be removed by scavenging them with 2-PrOH, Eq. (9), or with formate ions, Eq. (10).

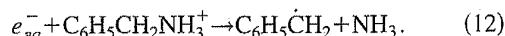


The radical from 2-PrOH will reduce some halogenated compounds (such as CCl<sub>4</sub> or CH<sub>3</sub>I) to produce more of the desired radical.<sup>8</sup>



Many halogenated compounds, however, do not react rapidly with (CH<sub>3</sub>)<sub>2</sub>COH. The reaction of CO<sub>2</sub><sup>-</sup> with halogenated compounds is slow, even that with CCl<sub>4</sub>.

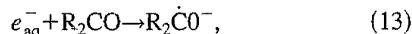
(e) Alkyl radicals have been produced also by reaction of  $e_{aq}^-$  with alkylammonium derivatives, a reaction that proceeds by reductive elimination of ammonia.<sup>9</sup>



Elimination of ammonia occurs only when the amino group is protonated and the  $\alpha$ -carbon bears an electron withdrawing group such as carbonyl or phenyl. However, the process is not always quantitative; diphenylmethylammonium deaminates to 95%, but benzylammonium undergoes deamination

corresponding to only 70% of the  $e_{aq}^-$ . The rest of the hydrated electron reactions occur via ring addition and protonation to give an H adduct.

(f) Hydroxyalkyl radicals have been produced also by the addition of  $e_{aq}^-$  to a carbonyl group, followed by protonation.

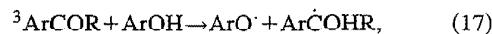
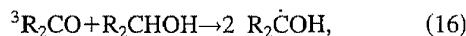


## 2.2. Photolysis

The main photochemical method for production of alkyl radicals, employed in the studies summarized here, is the photolysis of alkyl-metal complexes,<sup>10</sup> e.g.,



Other photochemical methods include the reductive quenching of triplet ketones with an alcohol, amine, or phenol,<sup>11-13</sup> e.g.,



and



followed by,



Other methods which have been used are oxidative decarboxylation of benzilic acid photosensitized by uranyl ion,<sup>14</sup> photolysis of 2,4-dihydroxy-2,4-dimethyl-3-pentanone,<sup>15</sup> and the photolysis of  $H_2O_2$  followed by reaction of  $\cdot OH$  with an organic solute.<sup>16</sup>

## 2.3. Chemical Methods

Chemical methods also have been used to produce certain alkyl radicals. These include Fenton-like systems, where  $Fe^{II}$  or  $Ti^{III}$  ions react with  $H_2O_2$  to produce  $\cdot OH$  radicals, which then react with organic solutes to form other radicals. Alkyl radicals have also been generated by thermal homolysis of organometallic compounds, such as certain chromium species<sup>17</sup> containing alkyl or substituted alkyl groups attached to the chromium by a carbon-metal bond.

## 3. Determination of Rate Constants

### 3.1. Time-Resolved Methods

Most of the rate constants compiled here were determined by kinetic spectrophotometric methods, i.e., by following the increase in the optical absorption of a product (p.b.k.) or the decrease in the optical absorption of a reactant (d.k.), either the radical or the reacting molecule. In those cases where neither the reactants nor the products exhibit sufficient absorption in a range that can be monitored under the applied conditions, the rate constants were determined by one of the following methods. Another reactant is added as an indicator

molecule, or a probe, which is an absorbing species that can be monitored, or which reacts to yield an absorbing species that is readily monitored. When the indicator is present at a constant concentration and the reactant of interest is added at various concentrations, one can derive the rate constant from a linear plot of the observed rate vs concentration.<sup>18</sup> Alternatively, the rate constants were determined by competition kinetics (c.k.), where a reference reactant (R), that reacts with a known rate constant ( $k_R$ ) and yields an absorbing species, is added as a competitor and the optical absorbance after the reaction is determined at various concentrations of the two reactants. From the absorbance in the absence ( $A_0$ ) and in the presence ( $A$ ) of various concentrations of a compound (S) one calculates its rate constant ( $k_S$ ) from the equation:  $A_0/A - 1 = (k_S[S])/(k_R[R])$ .<sup>17,19,20</sup>

A number of rate constants were determined by using other monitoring techniques. Several studies utilized the esr signal of a radical to follow its formation or decay.<sup>21,22</sup> In several cases, changes in the conductance of the solution were monitored. This method is particularly suitable for reactions that involve changes in concentration of the strongly conducting species  $H^+$  and  $OH^-$ .<sup>23,24</sup>

### 3.2. Other Methods

The time-resolved methods outlined above utilize optical absorption, conductance, or esr signals to follow the changes in concentration as the reaction progresses. The initial concentration of radicals in these methods generally is in the micromolar range or higher, so that radical-radical reactions may have a significant contribution and may limit the ability to monitor relatively slow radical-molecule reactions. Rate constants for such reactions often have been determined or estimated from steady-state experiments, where the radical concentration is relatively low. Rate constants were determined from yields of products based on competition kinetics using a reference compound or based on competition with radical-radical termination reactions. In some of these studies, the steady-state concentration of a radical was obtained from esr measurements and the rate constant derived from the assumed mechanism and the termination rates.

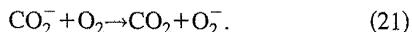
## 4. Reactions of Aliphatic Carbon-Centered Radicals

All of the radicals included in this compilation are short-lived and react relatively rapidly with other molecules present in solution or with each other. Most radical-radical reactions take place with rate constants generally in the range of  $10^8$  to  $10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ , except for highly charged species which decay more slowly due to electrostatic repulsion. Therefore, reactions of radicals with solutes can be observed only if they effectively compete with the second-order decay. In the pulse radiolysis and flash photolysis experiments used in most of the studies compiled here, the radical concentrations that can be monitored generally are between  $10^{-6}$  and

$10^{-4}$  mol L $^{-1}$  so that their half-lives are in the microsecond to millisecond time range. Considering that the concentration of the reacting solute may be limited due to solubility or to prevent undesired reactions, the lower limit of the rate constants that can be measured by these methods is generally  $10^5$  L mol $^{-1}$  s $^{-1}$  or higher. Only a few rate constants lower than this have been reported and they have been measured or estimated by other techniques.

#### 4.1. Reactions With Oxygen

Most of the radicals included here react very rapidly with O $_2$  with  $k$  of the order of  $10^9$  L mol $^{-1}$  s $^{-1}$ . In most cases the reaction is via addition to form a peroxy radical, but in the case of CO $_2^-$  the reaction may be via electron transfer to yield O $_2^-$  directly.



Certain hydroxyalkyl and aminoalkyl radicals react with O $_2$  by addition to form peroxy radicals, but these are unstable and eliminate O $_2^-$ .

#### 4.2. Reduction of Substrate

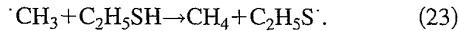
The majority of the rate constants reported in this compilation are for reduction of inorganic and organic compounds by the strongly reducing radicals CO $_2^-$ , (CH $_3$ ) $_2\dot{\text{C}}\text{OH}$ , (CH $_3$ ) $_2\dot{\text{C}}\text{O}^-$ , and similar radicals derived from methanol and ethanol. In general, alkyl radicals that have a hydroxy or an amino group<sup>25</sup> on the same carbon as the unpaired electron have reduction potentials in the range of -1 to -2 V vs NHE<sup>26</sup> and thus can reduce many compounds [quinones (Q), nitro compounds, porphyrins, higher oxidation state metal ions and complexes, etc.], e.g.,



The reduction was assumed to take place in general via electron transfer, but in a number of cases it has been shown to occur via an addition-elimination mechanism.<sup>24,27</sup>

#### 4.3. Hydrogen Abstraction

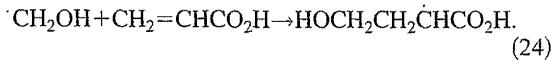
H abstraction was reported mainly for weakly bonded H atoms, such as those in SH groups.<sup>28</sup>



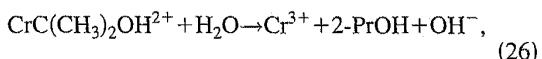
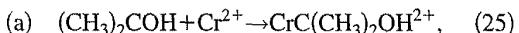
These reactions are generally slower than the reductions mentioned above.

#### 4.4. Addition to Substrate

Alkyl radicals also react by addition to unsaturated bonds.<sup>29</sup>

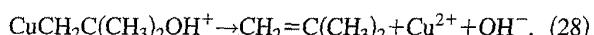
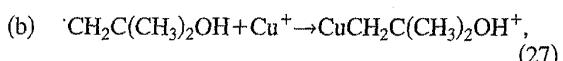


These reactions are generally slow. Alkyl radicals react rapidly with many reduced metal ions via addition to form organometallic compounds. Some of these adducts are relatively stable whereas others may decompose rapidly by various mechanisms.<sup>30</sup>



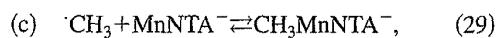
$$k(25) = 5 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1},$$

$$k(26) = 1.5 \text{ s}^{-1} \text{ at pH } 5^{31}.$$



$$k(27) = 4.5 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1},$$

$$k(28) = 2.2 \times 10^5 \text{ s}^{-1} \text{ at pH } 2.7^{32}.$$

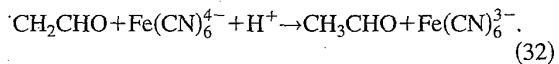
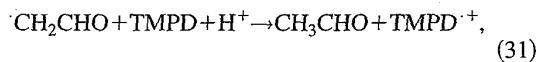
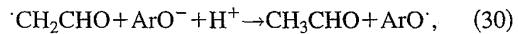


$$k(29) = 1.5 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}, \text{ and}$$

$$k(-29) = 1.2 \times 10^5 \text{ s}^{-1}^{33}.$$

#### 4.5. Oxidation of Substrate

Carbon-centered radicals containing a carbonyl group at position  $\beta$ , such as CH $_2$ CHO, due to partial spin density on the oxygen, are oxidants toward phenoxide ions, TMPD (*N,N,N',N'*-tetramethyl-*p*-phenylenediamine), ascorbate, ferrocyanide, and other reductants.<sup>34,35</sup>



#### 5. Arrangement of the Tables

Tables 1–6 cover unsubstituted alkyl radicals containing only carbon and hydrogen. Tables 7–11 cover halogen substituted alkyl radicals. Tables 12–17 contain reactions of monohydroxyalkyl radicals; other hydroxyalkyl radicals are collected in Table 27. Tables 18–25 include alkyl radicals substituted with alkoxy, carboxy, and hydroxy groups. Table 26 contains data for the radical from formate (carboxyl radical, carbon dioxide radical anion). Reactions of other substituted alkyl radicals have been collected in Table 27. Benzyl and ketyl radicals, having an aromatic moiety adjacent to the radical site, are collected in Tables 28–30.

Reactions for a radical with inorganic substrates, arranged alphabetically in order of the principal element, are followed by reactions with organics arranged in alphabetical order by name. Systematic names have been used whenever possible. The Chemical Name Index (Sec. 11) contains names and

synonyms for both radical and substrate as an aid in locating specific reactants. When more than one radical may be involved the radicals are identified only by their origin and given a name such as "Radicals from glucose."

The reactions are given in column 2 by the use of line formulas whenever possible, or else abbreviations and symbols. The name of the substrate is given with each numbered entry. The name of the radical is given in the table heading. Tables 6, 11, 27, 29, and 30 contain more than one radical and the arrangement is alphabetical by the name of the radical. Products are listed only for those reactions for which evidence has been obtained on the nature of the products; in some cases only the reaction type is given, e.g., addition, electron transfer, etc.

Values of  $k$  are in units of  $\text{L mol}^{-1} \text{s}^{-1}$  which is given at the top of the column; the unit of  $\text{s}^{-1}$  is given with the value of  $k$  when it refers to a first-order reaction or a bimolecular reaction with water. Rate constants have been rounded to two significant figures and the author's error limits have been omitted. Most of the rate constants in these tables have uncertainties of  $\pm 10\%$  to  $\pm 20\%$ . In cases where the quoted error is large, the value has been rounded to one significant figure. Upper and lower limits are indicated when reported. Rate constants for second-order decay of the radicals are given as  $k$  (not  $2k$ ) where  $-dR/dt = 2k[R]^2$  has been determined. The molar absorptivity,  $\epsilon$ , used to calculate  $k$  in optical studies is given in the Comments column. Rate constants for certain reactions have been determined with reference to the rate constant of another reaction; in those cases the reference values and the reference reactions are listed in the Comments column.

The pH and ionic strength are quoted whenever they have been reported; in some cases the  $pK_a$  of the substrate is given in the Comments column as an indication of the possible ionic forms of the substrate. The  $pK_a$ 's have not been evaluated by the present authors. In some entries,  $pK_a$ 's for the radicals have been quoted when reactions of the radicals in different ionic forms are presented. Temperature is assumed to be ambient when not otherwise specified.

The Method column indicates the method for generation of the transient and in the Comments column the method of measurement is given along with the source of the transient and other data such as activation energy, activation enthalpy, activation entropy, activation volume, etc. When the symbol R is used in a Comment, such as in  $G(R)$  or  $k(R+R)$ , it refers to the radical of the same entry.

References to the tables are listed by the serial number from the Radiation Chemistry Data Center bibliographic data base, from which the reference list (Sec. 9) was generated. The first two digits of the serial number represent the year in which the work was published.

Indexes have been produced for the radicals and substrates by (1) molecular formula (Sec. 10) and (2) chemical names and synonyms (Sec. 11). The indexes follow the tables and refer to the entry in the tables in which the chemical species is a reactant.

## 6. List of Abbreviations and Symbols

A	frequency factor
abs.	absorption
abstr.	abstraction
ABTS	2,2'-azinobis(3-ethylbenzothiazoline-6-sulfonate)
Ac	acetyl
AcOH	acetic acid
addn.	addition
alk.	alkaline
anal.	analysis
bpy	2,2'-bipyridine
bpz	2,2'-bipyrazine
BuOH	butanol
tert-BuOH	tert-butyl alcohol (2-methyl-2-propanol)
calcd.	calculated
chem.	chemical
c.k.	competition kinetics
condy.	conductivity
contg.	containing
cor.	corrected
CTAB	hexadecyltrimethylammonium bromide
cyclam	1,4,8,11-tetraazacyclotetradecane
detc.	determined
4,11-dieneN <sub>4</sub>	5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene
d.k.	decay kinetics
dmg	dimethylglyoxime
DMSO	dimethyl sulfoxide
$\epsilon$	extinction coefficient (molar absorptivity)
$E_a$	activation energy
EDTA	ethylenediaminetetraacetate
elec.	electrolysis, electrochemical method
e-r.	electron radiolysis
esr	electron spin resonance
estd.	estimated
Et	ethyl
EtOH	ethanol
formn.	formation
f.p.	flash photolysis
f.p./rq	flash photolysis/reductive quenching
f.p./oq	flash photolysis/oxidative quenching
$\gamma$ -r.	gamma radiolysis
$G$	radiation yield (molecules per 100 eV)
$\Delta H^\ddagger$	activation enthalpy
I	ionic strength
J	joules (4.184 J=1 cal)
K	equilibrium constant
$k$	rate constant
$k_f$	rate constant of the forward reaction
$k_r$	rate constant of the reverse reaction
L	ligand
MB	methylene blue
meas.	measured
MeOH	methanol

MV <sup>2+</sup>	methyl viologen (1,1'-dimethyl-4,4'-bipyridinium)	<sup>3</sup> A. B. Ross and P. Neta, Natl. Stand. Ref. Data Ser., Natl. Bur. Stand. (U.S.) <b>70</b> (1982). [82Z097]
NTA obs.	nitrilotriacetate observed	<sup>4</sup> A. L. J. Beckwith, D. Griller, and J. P. Lorand, Landolt-Bornstein Numerical Data and Functional Relationships in Science and Technology, New Ser., Group II, Vol. 13a (1984); K.-D. Asmus and M. Bonifacic, <i>ibid.</i> , Vol. 13b (1984); [84Z222, 84Z378]; <i>ibid.</i> , Vols. 18a and 18b (1995).
opt.	optical absorption	<sup>5</sup> A. B. Ross, W. G. Mallard, W. P. Helman, G. V. Buxton, R. E. Huie, and P. Neta, NDRL/NIST Solution Kinetics Database: Ver. 3.0, National Institute of Standards and Technology, Gaithersburg, MD (1995).
Pa	pascals (N m <sup>-2</sup> )	<sup>6</sup> G. V. Buxton, C. L. Greenstock, W. P. Helman, and A. B. Ross, <i>J. Phys. Chem. Ref. Data</i> <b>17</b> , 513 (1988). [88Z081]
p.b.k.	product buildup kinetics	<sup>7</sup> D. Veltwisch, E. Janata, and K.-D. Asmus, <i>J. Chem. Soc., Perkin Trans. 2</i> , 146 (1980). [80A014]
phen	1,10-phenanthroline	<sup>8</sup> D. Brault and P. Neta, <i>J. Phys. Chem.</i> <b>88</b> , 2857 (1984). [84A178]
phot.	photolysis	<sup>9</sup> L. J. Mittal and J. P. Mittal, <i>Radiat. Phys. Chem.</i> <b>28</b> , 363 (1986). [86A410]
pK <sub>a</sub>	negative logarithm of the acid dissociation constant, where AH + H <sub>2</sub> O ⇌ A <sup>-</sup> + H <sub>3</sub> O <sup>+</sup>	<sup>10</sup> D. G. Kelley, A. Marchaj, A. Bakac, and J. H. Espenson, <i>J. Am. Chem. Soc.</i> <b>113</b> , 7583 (1991). [91A515]
PNAP	p-nitroacetophenone	<sup>11</sup> M. Lehni and H. Fischer, <i>Int. J. Chem. Kinet.</i> <b>15</b> , 733 (1983). [83A159]
PANBCo <sup>III</sup>	p-nitrobenzoato(pentaammine)cobalt(III) ion	<sup>12</sup> S. Baral Tosh, S. K. Chattopadhyay, and P. K. Das, <i>J. Phys. Chem.</i> <b>88</b> , 1404 (1984). [84B033]
p.r.	pulse radiolysis	<sup>13</sup> A. Beckett and G. Porter, <i>Trans. Faraday Soc.</i> <b>59</b> , 2038 (1963). [63F024]
prod.	product	<sup>14</sup> T. J. Kemp and L. J. A. Martins, <i>J. Chem. Soc., Perkin Trans. 2</i> , 1708 (1980). [80A320]
PrOH	propanol	<sup>15</sup> L.-M. Wu, E. Roduner and H. Fischer, <i>Appl. Magn. Reson.</i> <b>1</b> , 128 (1990). [90A514]
py.	pyridine	<sup>16</sup> B. C. Gilbert, R. O. C. Norman, P. S. Williams, and J. N. Winter, <i>J. Chem. Soc., Perkin Trans. 2</i> , 1439 (1982). [82D287]
Q	1,4-benzoquinone	<sup>17</sup> R. C. McHatton, J. H. Espenson, and A. Bakac, <i>J. Am. Chem. Soc.</i> <b>108</b> , 5885 (1986). [86M354]
redu.	reduction	<sup>18</sup> J. H. Espenson, A. Bakac, and J.-H. Kim, <i>Inorg. Chem.</i> <b>30</b> , 4830 (1991). [91A428]
rel.	relative	<sup>19</sup> R. L. Willson, <i>Trans. Faraday Soc.</i> <b>67</b> , 3008 (1971). [71O618]
resp.	respectively	<sup>20</sup> R. Mertens and C. von Sonntag, <i>Angew. Chem., Int. Ed. Engl.</i> <b>33</b> , 1262 (1994). [94A221]
ΔS‡	activation entropy	<sup>21</sup> K. P. Madden and H. Taniguchi, <i>J. Am. Chem. Soc.</i> <b>113</b> , 5541 (1991). [91D097]
satd.	saturated	<sup>22</sup> D. Behar, R. W. Fessenden, and J. P. Hornak, <i>Radiat. Phys. Chem.</i> <b>20</b> , 267 (1982). [82A328]
SDS	sodium dodecylsulfate	<sup>23</sup> R. Koester and K.-D. Asmus, <i>Z. Naturforsch. Teil B</i> <b>26</b> , 1104 (1971). [71O778]
s.f.	stopped-flow	<sup>24</sup> V. Jagannadham and S. Steenken, <i>J. Am. Chem. Soc.</i> <b>106</b> , 6542-51 (1984). [84A305]
soln.	solution	<sup>25</sup> K.-O. Hiller and K.-D. Asmus, <i>J. Phys. Chem.</i> <b>87</b> , 3682-8 (1983). [83A200]
TAN	2,2,6,6-tetramethyl-4-piperidone N-oxyl	<sup>26</sup> P. Wardman, <i>J. Phys. Chem. Ref. Data</i> <b>18</b> , 1637 (1989). [89Z199]
TEOA	triethanolamine	<sup>27</sup> V. Jagannadham and S. Steenken, <i>J. Am. Chem. Soc.</i> <b>110</b> , 2188 (1988). [88A099]
TNM	tetraniromethane	<sup>28</sup> P. Huston, J. H. Espenson, and A. Bakac, <i>J. Am. Chem. Soc.</i> <b>114</b> , 9510 (1992). [92A401]
TPPS	tetrakis(4-sulfonatophenyl)porphine	<sup>29</sup> B. C. Gilbert, J. R. L. Smith, E. C. Milne, A. C. Whitwood, and P. Taylor, <i>J. Chem. Soc., Perkin Trans. 2</i> , 2025 (1993). [93D265]
ΔV‡	activation volume	<sup>30</sup> G. V. Buxton, Q. G. Mulazzani, and A. B. Ross, <i>J. Phys. Chem. Ref. Data</i> <b>24</b> (1995).
X-r.	X-radiolysis	<sup>31</sup> H. Cohen and D. Meyerstein, <i>Inorg. Chem.</i> <b>23</b> , 84 (1984). [84A036]
		<sup>32</sup> H. Cohen and D. Meyerstein, <i>J. Chem. Soc., Faraday Trans. 1</i> <b>84</b> , 4157 (1988). [88A410]
		<sup>33</sup> H. Cohen and D. Meyerstein, <i>Inorg. Chem.</i> <b>27</b> , 3429 (1988). [88A426]
		<sup>34</sup> S. Steenken and P. Neta, <i>J. Phys. Chem.</i> <b>86</b> , 3661 (1982). [82A253]
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## 8. References

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<sup>2</sup>A. J. Swallow, *Prog. React. Kinet.* **9**, 195 (1978). [78Z107]

TABLE I. Methyl

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T (K)	Method	Comment	Ref.
<b>1.1 Methyl</b>							
	$^{\bullet}\text{CH}_3 + ^{\bullet}\text{CH}_3 \rightarrow \text{C}_2\text{H}_6$	$9 \times 10^8$	~7		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.0014 mol L <sup>-1</sup> CH <sub>4</sub> ; ε(215 nm) = 1500 L mol <sup>-1</sup> cm <sup>-1</sup> .	89G082
		$1.6 \times 10^9$	4.4	298	p.r.	D.k. at 210-220 nm in soln. contg. 0.04 mol L <sup>-1</sup> CH <sub>4</sub> (30 atm) and $2.5 \times 10^{-3}$ mol L <sup>-1</sup> N <sub>2</sub> O; ε = 1600 and 975 L mol <sup>-1</sup> cm <sup>-1</sup> at 213 and 220 nm., resp.; <i>E<sub>a</sub></i> = 16 kJ mol <sup>-1</sup> , studied at 280-340 K.	751055
		$1.2 \times 10^9$	5.5		p.r.	D.k. in soln. contg. 0.01 mol L <sup>-1</sup> CH <sub>4</sub> and 0.25 mol L <sup>-1</sup> N <sub>2</sub> O; ε = 850 L mol <sup>-1</sup> cm <sup>-1</sup> at 220 nm.	720445
<b>1.2 Carbon monoxide</b>							
	$^{\bullet}\text{CH}_3 + \text{CO} \rightarrow \text{CH}_3\dot{\text{C}}\text{O}$	$2.3 \times 10^6$			chem.	C.k. in CO-satd. soln. contg. Co(cyclam) <sup>2+</sup> and <i>tert</i> -butyl hydroperoxide; rel. to <i>k</i> ( $^{\bullet}\text{CH}_3 + \text{Co}(\text{cyclam})^{2+}$ ) = $1.6 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> .	92A424
		$1.8 \times 10^6$			chem.	C.k. in CO-satd. soln. contg. Co(Me <sub>6</sub> [14]aneN <sub>4</sub> ) <sup>2+</sup> and <i>tert</i> -butyl hydroperoxide; rel. to <i>k</i> ( $^{\bullet}\text{CH}_3 + \text{Co}(\text{Me}_6[14]\text{aneN}_4)^{2+}$ ) = $4.2 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> .	92A424
		$2.0 \times 10^6$	1-2	298	chem.	Estd. in soln. contg. <i>tert</i> -butyl hydroperoxide and Co(cyclam) <sup>2+</sup> or Co(Me <sub>6</sub> [14]aneN <sub>4</sub> ) <sup>2+</sup> .	91M189
<b>1.3 Aqua(1,4,8,11-tetraazacyclotetradecane)cobalt(II) ion</b>							
	$^{\bullet}\text{CH}_3 + \text{Co}(\text{cyclam})^{2+} \rightarrow \text{CH}_3\text{Co}(\text{cyclam})^{2+}$	$1.6 \times 10^7$	<2	297	f.p.	D.k. at 600 nm in soln. contg. MV <sup>++</sup> as indicator and CH <sub>3</sub> Co(cyclam) <sup>2+</sup> and Co(cyclam) <sup>2+</sup> .	89A338
<b>1.4 5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradecanecobalt(II) ion</b>							
	$^{\bullet}\text{CH}_3 + \text{Co}(\text{Me}_6[14]\text{aneN}_4)^{2+} \rightarrow \text{CH}_3\text{Co}(\text{Me}_6[14]\text{aneN}_4)^{2+}$	$4.2 \times 10^7$	7	296	f.p.	D.k. at 600 nm in soln. contg. MV <sup>++</sup> as indicator and CH <sub>3</sub> Co(cyclam) <sup>2+</sup> .	89A530
<b>1.5 2,3,9,10-Tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraenecobalt(II) ion</b>							
	$^{\bullet}\text{CH}_3 + \text{Co}(\text{Me}_4\text{tetraeneN}_4)^{2+} \rightarrow \text{CH}_3\text{Co}(\text{Me}_4\text{tetraeneN}_4)^{2+}$	$\sim 5 \times 10^7$	1.3-7	296	f.p.	D.k. in soln. contg. CH <sub>3</sub> Co(cyclam) <sup>2+</sup> .	89A530
<b>1.6 <i>N</i>-rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion</b>							
	$^{\bullet}\text{CH}_3 + \text{N-rac-Co}(4,11\text{-dieneN}_4)^{2+} \rightarrow \text{CH}_3\text{Co}(4,11\text{-dieneN}_4)^{2+}$	$6 \times 10^7$	7	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> DMSO.	91A513
		$\sim 1 \times 10^8$		336			
		$7.3 \times 10^7$	1.3-7	296	f.p.	D.k. in soln. contg. CH <sub>3</sub> Co(cyclam) <sup>2+</sup> .	89A530
<b>1.7 <i>N</i>-meso-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion</b>							
	$^{\bullet}\text{CH}_3 + \text{N-meso-Co}(4,11\text{-dieneN}_4)^{2+} \rightarrow \text{CH}_3\text{Co}(4,11\text{-dieneN}_4)^{2+}$	$2.3 \times 10^8$	1.3-7	296	f.p.	D.k. at 600 nm in soln. contg. MV <sup>++</sup> as indicator and CH <sub>3</sub> Co(cyclam) <sup>2+</sup> .	89A530
		$\sim 1.5 \times 10^8$	9.5		p.r.	D.k. at 330 nm (Co <sup>II</sup> ) as well as p.b.k. at 280 nm in Ar-satd. soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH and $5 \times 10^{-3}$ mol L <sup>-1</sup> CH <sub>3</sub> I.	761203
		$7 \times 10^8$	1		f.p.	Abs. changes in soln. contg. Co(NH <sub>3</sub> ) <sub>5</sub> (OAc) <sup>2+</sup> and HClO <sub>4</sub> .	74F644
<b>1.8 <i>N</i>-rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene(methyl)cobalt(III) ion</b>							
	$^{\bullet}\text{CH}_3 + \text{N-rac-CH}_3\text{Co}(4,11\text{-dieneN}_4)^{2+} \rightarrow \text{C}_2\text{H}_6 + \text{N-rac-Co}(4,11\text{-dieneN}_4)^{2+}$	$4.1 \times 10^7$		296	f.p.	D.k. at 650 nm in deaerated soln. contg. ABTS <sup>+</sup> as indicator and CH <sub>3</sub> Co(4,11-dieneN <sub>4</sub> ) <sup>2+</sup> .	90A401
<b>1.9 (Acetato)pentaamminecobalt(III) ion</b>							
	$^{\bullet}\text{CH}_3 + \text{Co}(\text{NH}_3)_5(\text{OAc})^{2+} \rightarrow$	$4 \times 10^3$			phot.	Estd. from intensity dependence of CH <sub>4</sub> and C <sub>2</sub> H <sub>6</sub> formn. in soln. contg. 0.005 mol L <sup>-1</sup> Co(NH <sub>3</sub> ) <sub>5</sub> (OAc) <sup>2+</sup> assuming <i>k</i> (R + R) = $2 \times 10^{10}$ L mol <sup>-1</sup> s <sup>-1</sup> .	71F579
<b>1.10 Nitrilotriacetatocobaltate(II) ion</b>							
	$^{\bullet}\text{CH}_3 + \text{CoNTA}^- \rightarrow \text{CH}_3\text{CoNTA}^-$	$4 \times 10^7$		293	p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. DMSO.	94A367

TABLE I. Methyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T (K)	Method	Comment	Ref.
1.10	Nitrilotriacetatocobaltate(II) ion — Continued						
		$1.9 \times 10^8$	6.5		p.r.	P.b.k. at 264 nm in N <sub>2</sub> O-satd. soln. contg. (1-5) × 10 <sup>-3</sup> mol L <sup>-1</sup> CoSO <sub>4</sub> , 6 × 10 <sup>-3</sup> mol L <sup>-1</sup> NTA, 0.1 mol L <sup>-1</sup> DMSO and 1.2 × 10 <sup>-4</sup> mol L <sup>-1</sup> O <sub>2</sub> ; ΔV <sub>‡</sub> = 6.0 cm <sup>3</sup> mol <sup>-1</sup> , studied at 0.1 and 150 MPa.	91A443
		$1.6 \times 10^8$	4.0-9.7		p.r.	P.b.k. at 320 nm in N <sub>2</sub> O-satd. soln. contg. (5-100) × 10 <sup>-5</sup> mol L <sup>-1</sup> CoSO <sub>4</sub> , (1-5) × 10 <sup>-3</sup> mol L <sup>-1</sup> NTA, and 0.2-1 mol L <sup>-1</sup> DMSO	88A343
1.11	Bis(dimethylglyoximato)(pyridine)cobalt(II)						
	${}^{\bullet}\text{CH}_3 + \text{Co}(\text{dmgH})_2\text{py} \rightarrow \text{CH}_3\text{Co}(\text{dmgH})_2(\text{py})$	$\sim 5 \times 10^7$			f.p.	D.k. following irrad.-induced Co-CH <sub>3</sub> homolysis of pyridiniomethylbis(dimethylglyoximato)cobalt(III); back reaction.	777005
1.12	3,10,17,24-Tetrasulfophthalocyaninecobalt(II) ion						
	${}^{\bullet}\text{CH}_3 + \text{Co}(\text{tspc})^{4-} \rightarrow \text{CH}_3\text{Co}(\text{tspc})^{4-}$	$>5 \times 10^9$	3-12		p.r.	P.b.k. at 450 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> DMSO.	89A150
1.13	5,10,15,20-Tetrakis(4-sulfonophenyl)porphinatocobaltate(II) ion						
	${}^{\bullet}\text{CH}_3 + \text{CoTPPS}^{4-} \rightarrow \text{CH}_3\text{CoTPPS}^{4-}$	$1.5 \times 10^9$	13		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. CH <sub>3</sub> I; methyl radical from DMSO gave $k = 1.2 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> ; at pH 8 $k = 1.7 \times 10^9$ (CH <sub>3</sub> I) and $1.4 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> (DMSO).	83A088
1.14	Cobal(II)amin						
	${}^{\bullet}\text{CH}_3 + \text{B12r} \rightarrow (\text{CH}_3)\text{B12}$	$4.2 \times 10^8$	1.3-7	296	f.p.	D.k. at 470 nm, as well as p.b.k. at 520 nm, in soln. contg. CH <sub>3</sub> Co(cyclam) <sup>2+</sup> and cobal(II)amin.	89A530
		$4.4 \times 10^8$	7	296	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and CH <sub>3</sub> Co(cyclam) <sup>2+</sup> .	89A530
1.15	Methyl(nitrilotriacetato)cobaltate(III) ion						
	${}^{\bullet}\text{CH}_3 + \text{CH}_3\text{CoNTA}^- \rightarrow \text{CoNTA}^- + \text{C}_2\text{H}_6$	$3.8 \times 10^7$			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. CoSO <sub>4</sub> , NTA and DMSO.	89A204 88A343
1.16	Chromium(II) ion						
	${}^{\bullet}\text{CH}_3 + \text{Cr}^{2+} \rightarrow \text{CrCH}_3^{2+}$	$2.2 \times 10^8$	~3	293	p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> Cr <sup>2+</sup> and DMSO; ΔV <sub>‡</sub> = 6.3 cm <sup>3</sup> mol <sup>-1</sup> , studied at 0.1-150 MPa.	92A361
		$2.2 \times 10^8$	<2	297	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and CH <sub>3</sub> Co(cyclam) <sup>2+</sup> .	89A338
1.17	1,4,8,12-Tetraazacyclopentadecanechromium(II) ion						
	${}^{\bullet}\text{CH}_3 + \text{Cr}([15]\text{janeN}_4)_2^{2+} \rightarrow \text{CH}_3\text{Cr}([15]\text{janeN}_4)_2^{2+}$	$1.6 \times 10^8$		298	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and CH <sub>3</sub> Co(dmgH) <sub>2</sub> .	91A427
1.18	Copper(I) ion						
	${}^{\bullet}\text{CH}_3 + \text{Cu}^+ \rightarrow \text{CuCH}_3^+$	$3.5 \times 10^9$	0.7-5.0		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. (5-30) × 10 <sup>-4</sup> mol L <sup>-1</sup> CuSO <sub>4</sub> , (2-20) × 10 <sup>-5</sup> mol L <sup>-1</sup> Cr <sup>3+</sup> , (2-20) × 10 <sup>-5</sup> mol L <sup>-1</sup> Cu <sup>+</sup> and 0.1-1.0 mol L <sup>-1</sup> DMSO; Cu <sup>+</sup> prepared from Cu <sup>2+</sup> + Cr <sup>2+</sup> .	86A115
1.19	Copper(II) ion						
	${}^{\bullet}\text{CH}_3 + \text{Cu}^{2+} \rightarrow \text{CuCH}_3^{2+}$	$7.4 \times 10^5$	~2		f.p.	P.b.k. in soln. contg. 0.01 mol L <sup>-1</sup> HClO <sub>4</sub> , 0.01-0.2 mol L <sup>-1</sup> Cu <sup>2+</sup> and Co(NH <sub>3</sub> ) <sub>5</sub> (OAc) <sup>2+</sup> .	78F301
1.20	cis-Diaqua(nitrilotriacetato)copper(II) ion						
	${}^{\bullet}\text{CH}_3 + \text{cis}-[\text{Cu}(\text{NTA})(\text{H}_2\text{O})_2]^- \rightarrow \text{cis}-[\text{CH}_3\text{Cu}(\text{NTA})(\text{H}_2\text{O})]^-$	$3.5 \times 10^7$	5-8		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. CuSO <sub>4</sub> , nitrilotriacetate ion and DMSO.	86B151

TABLE I. Methyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T (K)	Method	Comment	Ref.
1.21	Bis(glycinato)methylcopper(III) ion $\cdot\text{CH}_3 + (\text{Gly})_2\text{CuCH}_3 \rightarrow \text{Cu}(\text{Gly})_2 + \text{C}_2\text{H}_6$	$>5 \times 10^9$			γ-r.	Estd. from yield of ethane in low-dose experiments.	90A421
1.22	Nitrilotriacetatoferrate(II) ion $\cdot\text{CH}_3 + \text{FeNTA}^- \rightarrow \text{CH}_3\text{FeNTA}^-$	$1 \times 10^7$ $2.1 \times 10^7$ $5.3 \times 10^6$		293	p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. DMSO; $\Delta V_f^\ddagger = -0.3 \text{ cm}^3 \text{ mol}^{-1}$ , P range not given.	94A367
			4.0-8.0	10.5	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.002-0.006 mol L <sup>-1</sup> NTA, (0.05-5.0) $\times 10^{-3}$ mol L <sup>-1</sup> FeSO <sub>4</sub> and 0.1-0.5 mol L <sup>-1</sup> DMSO; $k_t = 9 \times 10^3$ and $1 \times 10^3$ s <sup>-1</sup> at pH 4-8 and 10.5, resp.	88A426
1.23	Iron(II) deuteroporphyrin IX $\cdot\text{CH}_3 + \text{Fe(II)DP} \rightarrow \text{addn.}$	$3.9 \times 10^9$	7		p.r.	Abs. changes in soln. contg. deuterohemin, chemically reduced by dithionite, and methyl chloride.	81A123
1.24	(Methyl)nitrilotriacetatoferrate(III) ion $\cdot\text{CH}_3 + \text{CH}_3\text{FeNTA}^- \rightarrow \text{C}_2\text{H}_6 + \text{FeNTA}^-$	$5.5 \times 10^8$ $-2 \times 10^7$	4.0-8.0 10.5		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.002-0.006 mol L <sup>-1</sup> NTA, (0.05-5.0) $\times 10^{-3}$ mol L <sup>-1</sup> FeSO <sub>4</sub> and 0.1-0.5 mol L <sup>-1</sup> DMSO; second-order kinetics.	88A426
1.25	Tris(1,10-phenanthroline)iron(III) ion $\cdot\text{CH}_3 + \text{Fe}(\text{phen})_3^{3+} \rightarrow \text{redn.}$	$-3 \times 10^8$	~1		p.r.	P.b.k. at 490 nm in soln. contg. CH <sub>3</sub> Br; result unaffected by presence of <i>tert</i> -BuOH, therefore ·CH <sub>2</sub> Br must react much more slowly; probably inner-sphere mechanism.	85A284
1.26	Ferricyanide ion $\cdot\text{CH}_3 + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{Fe}(\text{CN})_6^{4-} + \text{other prod.}$	$5 \times 10^6$	4-6	295	p.r.	D.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. DMSO.	82A041
1.27	Iron(III) deuteroporphyrin IX $\cdot\text{CH}_3 + \text{Fe(III)DP} \rightarrow \text{addn.}$	$2.3 \times 10^9$ $-1.3 \times 10^9$	~13 7		p.r.	Abs. changes in soln. contg. 6.5 mol L <sup>-1</sup> 2-PrOH and $4.1 \times 10^{-3}$ mol L <sup>-1</sup> methyl iodide.	81A123
1.28	Iodine $\cdot\text{CH}_3 + \text{I}_2 \rightarrow [\text{CH}_3\text{I}_2]^*$	$6.0 \times 10^9$			p.r.	C.k. in soln. contg. MeI; rel. to $k(\cdot\text{CH}_3 + \text{O}_2) = 4.7 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	670041
1.29	Hexachloroiridate(IV) ion $\cdot\text{CH}_3 + \text{IrCl}_6^{2-} \rightarrow \text{CH}_3\text{Cl} + \text{IrCl}_5^{2-}$	$1.2 \times 10^9$	4-6	295	p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln.; radical from DMSO.	82A041
1.30	Aquanitrilotriacetatomanganate(II) ion $\cdot\text{CH}_3 + \text{MnNTA}^- \rightarrow \text{CH}_3\text{MnNTA}^-$	$1.5 \times 10^8$	4.0-8.0		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.002-0.006 mol L <sup>-1</sup> NTA, (0.05-5.0) $\times 10^{-3}$ mol L <sup>-1</sup> MnSO <sub>4</sub> and 0.1-0.5 mol L <sup>-1</sup> DMSO; $k_t = 1.2 \times 10^5 \text{ s}^{-1} \text{ L mol}^{-1} \text{ s}^{-1}$ .	88A426
1.31	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatomanganate(II) ion $\cdot\text{CH}_3 + \text{MnTPPS}^{4-} \rightarrow \text{CH}_3\text{MnTPPS}^{4-}$	$9.7 \times 10^8$	8.8	295	p.r.	P.b.k. of Mn(III)TPPS in N <sub>2</sub> O-satd. soln. contg. DMSO. Mechanism of oxidation suggested to involve addn. of CH <sub>3</sub> to Mn.	92A391
1.32	(Methyl)nitrilotriacetatoferrate(III) ion $\cdot\text{CH}_3 + \text{CH}_3\text{MnNTA}^- \rightarrow \text{C}_2\text{H}_6 + \text{MnNTA}^-$	$1.6 \times 10^9$	4.0-8.0		p.r.	Calcd. from concn. dependence of d.k. in N <sub>2</sub> O-satd. soln. contg. 0.002-0.006 mol L <sup>-1</sup> NTA, (0.05-5.0) $\times 10^{-3}$ mol L <sup>-1</sup> MnSO <sub>4</sub> and 0.1-0.5 mol L <sup>-1</sup> DMSO; second-order kinetics.	88A426

TABLE I. Methyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T(K)	Method	Comment	Ref.
1.33	Permanganate ion $\cdot\text{CH}_3 + \text{MnO}_4^- \rightarrow$	$1.1 \times 10^9$	4-6	295	p.r.	D.k. at 545 nm in N <sub>2</sub> O-satd. soln.; radical from DMSO.	82A041
1.34	$\alpha$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion $\cdot\text{CH}_3 + \alpha\text{-Ni(cyclam)}^{2+} \rightarrow$	$1.1 \times 10^9$	0	298	f.p.	D.k. at 650 nm in deaerated soln. contg. ABTS <sup>+</sup> as indicator and CH <sub>3</sub> Co(4,11-dieneN <sub>4</sub> ) <sup>2+</sup> .	91A515
	$\alpha\text{-CH}_3\text{Ni(cyclam)}^{2+}$		3		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> DMSO and 0.001 mol L <sup>-1</sup> Ni(cyclam) <sup>2+</sup> ; $\Delta V_f^\ddagger = -4.0 \text{ cm}^3 \text{ mol}^{-1}$ , studied at 5-150 MPa.	90A321
		$6.5 \times 10^8$	3-10		p.r.	P.b.k. at 300-360 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> DMSO and (1-10) $\times 10^{-4}$ mol L <sup>-1</sup> Ni(cyclam) <sup>2+</sup> ; $k_t = 57 \text{ s}^{-1}$ .	88A444
1.35	$\beta$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion $\cdot\text{CH}_3 + \beta\text{-Ni(cyclam)}^{2+} + \text{H}_2\text{O} \rightarrow$	$7.3 \times 10^8$	0	298	f.p.	D.k. at 650 nm in deaerated soln. contg. ABTS <sup>+</sup> as indicator and alkylcobalt(III) complex.	91A515
1.36	$\alpha$ -Aquamethyl(1,4,8,11-tetraazacyclotetradecane)nickel(III) ion $\cdot\text{CH}_3 + \alpha\text{-CH}_3\text{Ni(cyclam)}^{2+} \rightarrow \text{C}_2\text{H}_6 +$	$4 \times 10^7$	3-10		p.r.	D.k. at 300 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> DMSO and (1-10) $\times 10^{-4}$ mol L <sup>-1</sup> Ni(cyclam) <sup>2+</sup> ; $k_t = 57 \text{ s}^{-1}$ .	88A444
1.37	Hydrogen peroxide $\cdot\text{CH}_3 + \text{H}_2\text{O}_2 \rightarrow$	$\leq 10^6$			p.r.	Addn. of 10 <sup>-3</sup> and 10 <sup>-2</sup> mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> had no effect on second order d.k. of $\cdot\text{CH}_3$ . Suggested that reaction is slow compared to R + R and may form HO <sub>2</sub> .	751055
1.38	Oxygen $\cdot\text{CH}_3 + \text{O}_2 \rightarrow \text{CH}_3\text{OO}^\cdot$	$4.1 \times 10^9$	1	298	f.p.	D.k. at 650 nm in deaerated soln. contg. ABTS <sup>+</sup> as indicator and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> O <sub>2</sub> or RCo(cyclam)H <sub>2</sub> O <sup>2+</sup> .	91A176
		$4.1 \times 10^9$	0	298	f.p.	C.k. in soln. contg. 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> O <sub>2</sub> or RCo(cyclam)H <sub>2</sub> O <sup>2+</sup> ; rel. to $k(\cdot\text{CH}_3 + \text{Ni(cyclam)}^{2+}) = 6.5 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	91A176
		$3 \times 10^9$	6.2-6.5		p.r.	Calcd. from increase in abs. at 310 nm due to formn. of NTACoOOCH <sub>3</sub> <sup>+</sup> in N <sub>2</sub> O-satd. soln. contg. DMSO, 5 $\times 10^{-5}$ mol L <sup>-1</sup> O <sub>2</sub> and varied [CoNTA <sup>-</sup> ] or N <sub>2</sub> O-satd soln. contg. DMSO, 0.001 mol L <sup>-1</sup> CoNTA <sup>-</sup> and varied [O <sub>2</sub> ].	89A204
		$3.7 \times 10^9$	3		p.r.	C.k. in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. 0.1 mol L <sup>-1</sup> DMSO, 1 $\times 10^{-3}$ mol L <sup>-1</sup> HClO <sub>4</sub> and Ni(cyclam) <sup>2+</sup> ; rel. to $k(\cdot\text{CH}_3 + \text{Ni(cyclam)}^{2+}) = 6.5 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	88A444
		$4.7 \times 10^9$		296	p.r.	P.b.k. at 260 nm in soln. contg. CH <sub>3</sub> Br, O <sub>2</sub> and SCN <sup>-</sup> ; $E_a = 14.6 \text{ kJ mol}^{-1}$ .	670041
1.39	Hydrogen peroxomonosulfate ion $\cdot\text{CH}_3 + \text{HSO}_5^- \rightarrow$	$1.2 \times 10^5$			chem.	Esr study in soln. contg. Ti(III) sulfate, H <sub>2</sub> O <sub>2</sub> , HSO <sub>5</sub> <sup>-</sup> and DMSO.	90D226
1.40	Peroxodisulfate ion $\cdot\text{CH}_3 + \text{S}_2\text{O}_8^{2-} \rightarrow \text{SO}_4^{2-} + \text{SO}_4^{2-} +$ other prod.	$3.3 \times 10^4$		~293	chem.	Esr study in soln. contg. 0.008 mol L <sup>-1</sup> Ti(III), 0.01 mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> , (0-0.025) mol L <sup>-1</sup> S <sub>2</sub> O <sub>8</sub> <sup>2-</sup> and ~0.01 mol L <sup>-1</sup> DMSO.	84D044
1.41	Uranium(III) ion $\cdot\text{CH}_3 + \text{U}^{3+} \rightarrow \text{UCH}_3^{3+}$	$1.5 \times 10^9$	0.3		p.r.	D.k. at 355 nm in He-satd. soln. contg. 0.5 mol L <sup>-1</sup> HClO <sub>4</sub> and 0.1 mol L <sup>-1</sup> DMSO.	85A122

TABLE I. Methyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	T (K)	Method	Comment	Ref.
1.42	Vanadium(II) ion $^{\cdot}\text{CH}_3 + \text{V}^{2+} + \text{H}^+ \rightarrow \text{CH}_4 + \text{V}^{3+}$	$6.2 \times 10^5$	2	296	f.p.	D.k. at 600 nm using $\text{MV}^{2+}$ as indicator in soln. contg. 0.01-0.03 mol $\text{L}^{-1}$ $\text{H}^+$ , $(1.5) \times 10^{-4}$ mol $\text{L}^{-1}$ $\text{CH}_3\text{Co}(\text{dmgH})_2$ or $\text{CH}_3\text{Co}(\text{cyclam})^{2+}$ , $(5.60) \times 10^{-6}$ mol $\text{L}^{-1}$ $\text{MV}^{2+}$ , and 0.01-0.06 mol $\text{L}^{-1}$ $\text{V}^{2+}$ ; $k = 2.1 \times 10^5 \text{ L mol}^{-1} \text{s}^{-1}$ in $\text{D}_2\text{O}$ .	91A428
1.43	Acetic acid $^{\cdot}\text{CH}_3 + \text{CH}_3\text{CO}_2\text{H} \rightarrow \text{CH}_4 + ^{\cdot}\text{CH}_2\text{CO}_2\text{H}$	$6 \times 10^2$			phot.	C.k. in soln. contg. 0.3 mol $\text{L}^{-1}$ $\text{AcOH}$ and 0.5 mol $\text{L}^{-1}$ $\text{Na}_2\text{S}_2\text{O}_8$ ; assuming $2k$ for radical termination $= 1.8 \times 10^3 \text{ L mol}^{-1} \text{s}^{-1}$ .	85D168
		$2 \times 10^2$	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in $\text{Ti}^{III}-\text{H}_2\text{O}_2$ soln.	755188
1.44	Acetone $^{\cdot}\text{CH}_3 + \text{CH}_3\text{COCH}_3 \rightarrow \text{CH}_4 + \text{CH}_3\text{CO}\dot{\text{C}}\text{H}_2$	$\sim 1 \times 10^3$			phot.	Obs. yields of $\text{CH}_4$ and $\text{C}_2\text{H}_6$ ; rel. to $k(^{\cdot}\text{CH}_3 + ^{\cdot}\text{CH}_3) = 1.4 \times 10^0 \text{ L mol}^{-1} \text{s}^{-1}$ .	697176
		$\sim 1 \times 10^3$			phot.	Estd. from quantum yields of $\text{CH}_4$ , $\text{CO}$ , and $\text{C}_2\text{H}_6$ ; rel. to $k(^{\cdot}\text{CH}_3 + ^{\cdot}\text{CH}_3) = 1.4 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	60F004
1.45	Acetonitrile $^{\cdot}\text{CH}_3 + \text{CH}_3\text{CN} \rightarrow \text{CH}_4 + ^{\cdot}\text{CH}_2\text{CN}$	$< 3 \times 10^2$	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in $\text{Ti}^{III}-\text{H}_2\text{O}_2$ soln.	755188
1.46	Acrylate ion $^{\cdot}\text{CH}_3 + \text{CH}_2=\text{CHCO}_2^- \rightarrow \text{addn.}$	$7 \times 10^5$	~9		chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol $\text{L}^{-1}$ $\text{Ti}(\text{III})$ , $1.67 \times 10^{-3}$ mol $\text{L}^{-1}$ $\text{H}_2\text{O}_2$ and DMSO; calcd. using $2k(R + R) - 2.5 \times 10^3 \text{ L mol}^{-1} \text{s}^{-1}$ .	93D265
1.47	Acrylic acid $^{\cdot}\text{CH}_3 + \text{H}_2\text{C}=\text{CHCO}_2\text{H} \rightarrow \text{addn.}$	$3.0 \times 10^6$	-2		chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol $\text{L}^{-1}$ $\text{Ti}(\text{III})$ , $1.67 \times 10^{-3}$ mol $\text{L}^{-1}$ $\text{H}_2\text{O}_2$ and DMSO; calcd. using $2k(R + R) = 2.5 \times 10^3 \text{ L mol}^{-1} \text{s}^{-1}$ .	93D265
1.48	2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion $^{\cdot}\text{CH}_3 + \text{ABTS}^{\cdot-} \rightarrow \text{addn.}$	$1.2 \times 10^9$	0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>·-</sup> (from $\text{ABTS}^{2-} + \text{Br}_2$ ) and alkylcobalt(III) complex.	91A515
1.49	1,4-Benzoquinone $^{\cdot}\text{CH}_3 + Q \rightarrow \text{addn.}$	$4.5 \times 10^7$	5.4		p.r.	P.b.k. at 430 nm as well as condy. changes in $\text{N}_2\text{O}$ -satd. soln. contg. 0.2 mol $\text{L}^{-1}$ DMSO; mechanism suggested to involve addn.	82A284
1.50	Butadiene $^{\cdot}\text{CH}_3 + \text{H}_2\text{C}=\text{CHCH}=\text{CH}_2 \rightarrow \text{addn.}$	$1.2 \times 10^6$			$\gamma$ -r.	C.k. with MeOH in soln. contg. MeI; obs. $G(\text{CH}_4)$ ; rel. to $k(^{\cdot}\text{CH}_3 + \text{O}_2) = 4.7 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	670041
1.51	1-Butene $^{\cdot}\text{CH}_3 + \text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2 \rightarrow \text{addn.}$	$3.0 \times 10^4$			$\gamma$ -r.	C.k. with MeOH in soln. contg. MeI; obs. $G(\text{CH}_4)$ ; rel. to $k(^{\cdot}\text{CH}_3 + \text{O}_2) = 4.7 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	670041
1.52	3-Carboxamido-2,2,5,5-tetramethylpyrrolidin-1-yloxy $^{\cdot}\text{CH}_3 + \text{NX-s} \rightarrow$	$7.5 \times 10^8$	3.0		p.r.	Cond. changes in $\text{N}_2\text{O}$ -satd. soln. contg. $10^{-2}$ - $10^{-1}$ mol $\text{L}^{-1}$ DMSO; addn. reaction.	761152
1.53	3-Carboxamido-2,2,5,5-tetramethyl-3-pyrrolin-1-yloxy $^{\cdot}\text{CH}_3 + \text{NX-u} \rightarrow$	$7.8 \times 10^8$	acid.		p.r.	Cond. changes in $\text{N}_2\text{O}$ -satd. soln. contg. $10^{-2}$ - $10^{-1}$ mol $\text{L}^{-1}$ DMSO; addn. reaction.	761152

TABLE I. Methyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T (K)	Method	Comment	Ref.
1.54	Chloroacetic acid $\cdot\text{CH}_3 + \text{ClCH}_2\text{CO}_2\text{H} \rightarrow \text{CH}_4 + \cdot\text{CHClCO}_2\text{H}$	$3.0 \times 10^3$	-1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti <sup>III</sup> -H <sub>2</sub> O <sub>2</sub> soln.	755188
1.55	Crotonic acid $\cdot\text{CH}_3 + \text{CH}_3\text{CH}=\text{CHCO}_2\text{H} \rightarrow \text{addn.}$	$1 \times 10^5$	-2		chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and DMSO; calcd. using $2k(R + R) = 2.5 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	93D265
1.56	Cyanoacetic acid $\cdot\text{CH}_3 + \text{NCCH}_2\text{CO}_2\text{H} \rightarrow \text{CH}_4 + \text{NCCHCO}_2\text{H}$	$>6.6 \times 10^3$	-1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti <sup>III</sup> -H <sub>2</sub> O <sub>2</sub> soln.	755188
1.57	Cysteine $\cdot\text{CH}_3 + \text{CysSH} \rightarrow \text{CH}_4 + \text{CysS}^\bullet$	$7.4 \times 10^7$	7.0	-298	f.p.	P.b.k. at 650 nm using ABTS <sup>2-</sup> as indicator in soln. contg. ABTS <sup>2-</sup> and CH <sub>3</sub> Co(cyclam) <sup>2+</sup> .	92A401 92A223
1.58	Deuteroporphyrin, dimethyl ester $\cdot\text{CH}_3 + \text{DPDME} \rightarrow$	$-1.5 \times 10^7$	-13		p.r.	Estd. from abs. changes in soln. contg. 6.5 mol L <sup>-1</sup> 2-PrOH, 0.7 mol L <sup>-1</sup> acetone and $2.3 \times 10^{-2}$ mol L <sup>-1</sup> ClI <sub>3</sub> I; cor. for $\cdot\text{ClI}_3 + \cdot\text{ClI}_3$ .	81A123
1.59	1,6-Diazabicyclo[4.4.4]tetradecane radical cation $\cdot\text{CH}_3 + \text{DABCT}^{+} \rightarrow \text{H abstr.}$	$1.6 \times 10^9$	-4		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.5 mol DMSO and $(0.2-10) \times 10^{-4}$ mol L <sup>-1</sup> radical cation.	86A272
1.60	3,5-Dibromo-4-nitrosobenzenesulfonate ion $\cdot\text{CH}_3 + \text{DBNBS} \rightarrow \text{DBNBS-CH}_3$	$1.6 \times 10^9$	8.0-8.5		p.r.	C.k. rel. to $k(\cdot\text{CH}_3 + \text{H}_2\text{TPPS}^{4-}) = 3.2 \times 10^{10}$ L mol <sup>-1</sup> s <sup>-1</sup> .	92A304
		$2.8 \times 10^9$	8.0-8.5		p.r.	C.k.; rel. to $k(\cdot\text{CH}_3 + \text{O}_2) = 4.7 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	92A304
1.61	1,1'-Dimethyl-4,4'-bipyridinium radical cation $\cdot\text{CH}_3 + \text{MV}^{+} \rightarrow \text{CH}_3\text{MV}^{+}$	$1.5 \times 10^9$		298	f.p.	D.k. at 600 nm in soln. contg. CH <sub>3</sub> Co(dmgH) <sub>2</sub> .	91A427
		$1.5 \times 10^9$	2	296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L <sup>-1</sup> H <sup>+</sup> , (1-5) $\times 10^{-4}$ mol L <sup>-1</sup> CH <sub>3</sub> Co(dmgH) <sub>2</sub> or CH <sub>3</sub> Co(cyclam) <sup>2+</sup> , (5-38) $\times 10^{-6}$ mol L <sup>-1</sup> MV <sup>+*</sup> ; $k = 1.3 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> in D <sub>2</sub> O.	91A428
		$1.2 \times 10^9$	<2	297	f.p.	D.k. at 600 nm (MV <sup>+*</sup> , $\epsilon = 1.37 \times 10^4$ L mol <sup>-1</sup> cm <sup>-1</sup> , 0.01-0.1 mol L <sup>-1</sup> ); MV <sup>+*</sup> from Zn/Hg redn. of MV <sup>2+</sup> ; (2-4) $\times 10^{-6}$ mol L <sup>-1</sup> radical from photolysis of CH <sub>3</sub> Co(cyclam) <sup>2+</sup> .	89A338
1.62	Ergothioneine $\cdot\text{CH}_3 + \text{ETH} \rightarrow$	$<10^5$	7.0	293	p.r.	Abs. changes in soln. contg. DMSO; no reaction obs.	89R263
1.63	Ethanethiol $\cdot\text{CH}_3 + \text{C}_2\text{H}_5\text{SH} \rightarrow \text{CH}_4 + \text{C}_2\text{H}_5\text{S}^\bullet$	$4.0 \times 10^7$	1.0	298	f.p.	P.b.k. at 650 nm using ABTS <sup>2-</sup> as indicator in soln. contg. ABTS <sup>2-</sup> and CH <sub>3</sub> Co(cyclam) <sup>2+</sup> .	92A401 92A223
1.64	Ethanol $\cdot\text{CH}_3 + \text{EtOH} \rightarrow \text{CH}_4 + \text{CH}_3\dot{\text{C}}\text{HOH}$	$5.9 \times 10^2$			γ-r.	C.k. in soln. contg. MeI; rel. to $k(\cdot\text{CH}_3 + \text{O}_2) = 4.7 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	670041
1.65	Ethyl acetate $\cdot\text{CH}_3 + \text{CH}_3\text{CO}_2\text{C}_2\text{H}_5 \rightarrow \text{CH}_4 + \text{CH}_3\text{CO}_2\dot{\text{C}}\text{HCH}_3$	$<1.7 \times 10^3$	-1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti <sup>III</sup> -H <sub>2</sub> O <sub>2</sub> soln.	755188

TABLE I. Methyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T (K)	Method	Comment	Ref.	
1.66	Ethylene							
	'CH <sub>3</sub> + H <sub>2</sub> C=CH <sub>2</sub> → 'CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>	4.9 × 10 <sup>3</sup>			γ-r.	C.k. with 2-PrOH in soln. contg. MeI; obs. G(CH <sub>4</sub> ); rel. to <i>k</i> ('CH <sub>3</sub> + O <sub>2</sub> ) = 4.7 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	670041	
1.67	Glutathione							
	'CH <sub>3</sub> + GSH → CH <sub>4</sub> + GS <sup>·</sup>	7.1 × 10 <sup>7</sup>	7.0	~298	f.p.	P.b.k. at 650 nm using ABTS <sup>2-</sup> as indicator in soln. contg. ABTS <sup>2-</sup> and CH <sub>3</sub> Co(cyclam) <sup>2+</sup> .	92A401	
		5 × 10 <sup>7</sup>	7.0	293	p.r.	Abs. changes in soln. contg. DMSO.	92A223 89R263	
1.68	Glutathione, negative ion							
	'CH <sub>3</sub> + GS <sup>·-</sup> →	<10 <sup>6</sup>		12.5	293	p.r.	Abs. changes in soln. contg. DMSO; no reaction obs.	89R263
1.69	Glycine							
	'CH <sub>3</sub> + GlyH →	~4			phot.	Calcd. from yields of CH <sub>4</sub> and C <sub>2</sub> H <sub>6</sub> ; assumed 2 <i>k</i> (R + R) = 2 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> ; 'CH <sub>3</sub> from cumene hydroperoxide; <i>k</i> <sub>H</sub> / <i>k</i> <sub>D</sub> = 10.5 at pH 11.5 [747528].	707280	
1.70	Glycine, negative ion							
	'CH <sub>3</sub> + Gly <sup>·-</sup> → CH <sub>4</sub> + H <sub>2</sub> NCHCO <sub>2</sub> <sup>·-</sup>	~1.2 × 10 <sup>2</sup>	~10		phot.	Calcd. from yields of CH <sub>4</sub> and C <sub>2</sub> H <sub>6</sub> ; assumed 2 <i>k</i> (R + R) = 2 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> ; 'CH <sub>3</sub> from cumene hydroperoxide.	707280	
1.71	Glycolic acid							
	'CH <sub>3</sub> + HOCH <sub>2</sub> CO <sub>2</sub> H → CH <sub>4</sub> + 'CHOHCO <sub>2</sub> H	3.6 × 10 <sup>3</sup>	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti <sup>III</sup> -H <sub>2</sub> O <sub>2</sub> soln.	755188	
1.72	3-Hydroxypropionitrile							
	'CH <sub>3</sub> + HOCH <sub>2</sub> CH <sub>2</sub> CN → CH <sub>4</sub> + 'CHOHCH <sub>2</sub> CH <sub>2</sub> CN	<1.6 × 10 <sup>3</sup>	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti <sup>III</sup> -H <sub>2</sub> O <sub>2</sub> soln.	755188	
1.73	Lactic acid							
	'CH <sub>3</sub> + CH <sub>3</sub> CH(OH)CO <sub>2</sub> H → CH <sub>4</sub> + CH <sub>3</sub> COHCO <sub>2</sub> H	1.2 × 10 <sup>4</sup>	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti <sup>III</sup> -H <sub>2</sub> O <sub>2</sub> soln.	755188	
1.74	2-Mercapto-1-methylimidazole							
	'CH <sub>3</sub> + MMI →	<10 <sup>6</sup>	7.0, 12.5	293	p.r.	Abs. changes in soln. contg. DMSO; no reaction obs.	89R263	
1.75	Methacrylic acid							
	'CH <sub>3</sub> + H <sub>2</sub> C=C(CH <sub>3</sub> )CO <sub>2</sub> H → addn.	5.8 × 10 <sup>6</sup>	~2		chem.	Esr study in soln. contg. 1.67 × 10 <sup>-3</sup> mol L <sup>-1</sup> Ti(III), 1.67 × 10 <sup>-3</sup> mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and DMSO; calcd. using 2 <i>k</i> (R + R) = 2.5 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	93D265	
1.76	Methanethiol							
	'CH <sub>3</sub> + CH <sub>3</sub> SH → CH <sub>4</sub> + CH <sub>3</sub> S <sup>·</sup>	7.4 × 10 <sup>7</sup>	11		p.r.	P.b.k. (RSSR <sup>2-</sup> ) in Ar-satd. soln.; radical from e <sub>aq</sub> <sup>·-</sup> reaction with CH <sub>3</sub> SH.	690553	
1.77	Methanol							
	'CH <sub>3</sub> + MeOH → CH <sub>4</sub> + 'CH <sub>2</sub> OH	≥1 × 10 <sup>2</sup>	1		phot.	Estd. from effect of addn. of MeOH on CH <sub>4</sub> and C <sub>2</sub> H <sub>6</sub> yields. Radical from Co(NH <sub>3</sub> ) <sub>5</sub> O <sub>2</sub> CCH <sub>3</sub> <sup>2+</sup> .	71F579	
		2.2 × 10 <sup>2</sup>			γ-r.	C.k. in soln. contg. MeI; rel. to <i>k</i> ('CH <sub>3</sub> + O <sub>2</sub> ) = 4.7 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	670041	
1.78	4-Methoxybenzenethiol							
	'CH <sub>3</sub> + 4-CH <sub>3</sub> OC <sub>6</sub> H <sub>4</sub> SH → CH <sub>4</sub> + 4-CH <sub>3</sub> OC <sub>6</sub> H <sub>4</sub> S <sup>·</sup>	1.3 × 10 <sup>8</sup>	3.0	293	p.r.	Abs. changes in soln. contg. DMSO.	89R263	

TABLE I. Methyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T (K)	Method	Comment	Ref.
1.79	4-Methoxybenzenethiolate ion $\cdot^{\text{CH}_3} + 4\text{-CH}_3\text{OC}_6\text{H}_4\text{S}^- \rightarrow$	<10 <sup>5</sup>	9.0	293	p.r.	Abs. changes in soln. contg. DMSO; no reaction obs.	89R263
1.80	2-Methyl-2-nitrosopropane $\cdot^{\text{CH}_3} + (\text{CH}_3)_3\text{CNO} \rightarrow \text{addn.}$	$1.7 \times 10^7$	~7	~291	p.r.	P.b.k. (esr) in unbuffered N <sub>2</sub> O-satd. soln. contg. 1.0 mol L <sup>-1</sup> DMSO and (0.25-15) $\times 10^{-3}$ mol L <sup>-1</sup> MNP (assuming complete dimer dissociation).	91D097
1.81	2-Methylpropene $\cdot^{\text{CH}_3} + \text{CH}_2=\text{C}(\text{CH}_3)_2 \rightarrow \text{addn.}$	$3.9 \times 10^4$			$\gamma\text{-r.}$	C.k. with MeOH in soln. contg. MeI; obs. <i>G</i> (CH <sub>4</sub> ); rel. to <i>k</i> ( $\cdot^{\text{CH}_3} + \text{O}_2$ ) = $4.7 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup>	670041
1.82	Methyl propionate $\cdot^{\text{CH}_3} + \text{C}_2\text{H}_5\text{CO}_2\text{CH}_3 \rightarrow \text{CH}_4 + \text{CH}_3\text{CHCO}_2\text{CH}_3$	$2.9 \times 10^3$	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti <sup>III</sup> -H <sub>2</sub> O <sub>2</sub> soln.	755188
1.83	2-Methylpropionic acid $\cdot^{\text{CH}_3} + (\text{CH}_3)_2\text{CHCO}_2\text{H} \rightarrow \text{CH}_4 + \cdot^{\text{C}(\text{CH}_3)_2\text{CO}_2\text{H}}$	$9.0 \times 10^3$	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti <sup>III</sup> -H <sub>2</sub> O <sub>2</sub> soln.	755188
1.84	2-Methylpropionitrile $\cdot^{\text{CH}_3} + (\text{CH}_3)_2\text{CHCN} \rightarrow \text{CH}_4 + \cdot^{\text{C}(\text{CH}_3)_2\text{CN}}$	$4.5 \times 10^3$	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti <sup>III</sup> -H <sub>2</sub> O <sub>2</sub> soln.	755188
1.85	aci-Nitroethane, negative ion $\cdot^{\text{CH}_3} + \text{CH}_3\text{CH}=\text{NO}_2^- \rightarrow (\text{CH}_3)_2\text{CHNO}_2^-$	$1.6 \times 10^7$	10.6		p.r.	P.b.k. at 270 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> DMSO and 5 $\times 10^{-4}$ mol L <sup>-1</sup> nitroalkane.	82A283
1.86	aci-Nitromethane anion $\cdot^{\text{CH}_3} + \text{CH}_2\text{NO}_2^- \rightarrow \text{CH}_3\text{CH}_2\text{NO}_2^-$	$1.0 \times 10^8$	11.3	~285	p.r.	P.b.k. (esr) in N <sub>2</sub> O-satd. soln. contg. (0.5-5) $\times 10^{-3}$ mol L <sup>-1</sup> nitromethane and 0.5 mol L <sup>-1</sup> DMSO.	88D069
		$1.4 \times 10^8$	11.1		p.r.	P.b.k. at 270 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> DMSO and 5 $\times 10^{-4}$ mol L <sup>-1</sup> nitroalkane.	82A283
1.87	aci-1-Nitropropane, negative ion $\cdot^{\text{CH}_3} + \text{CH}_3\text{CH}_2\text{CH}=\text{NO}_2^- \rightarrow \text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{NO}_2^-$	$1.4 \times 10^7$	10.7		p.r.	P.b.k. at 270 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> DMSO and 5 $\times 10^{-4}$ mol L <sup>-1</sup> nitroalkane.	82A283
1.88	aci-2-Nitropropane, negative ion $\cdot^{\text{CH}_3} + (\text{CH}_3)_2\text{C}=\text{NO}_2^- \rightarrow (\text{CH}_3)_3\text{CNO}_2^-$	$2.4 \times 10^6$	10.7		p.r.	P.b.k. at 270 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> DMSO and 5 $\times 10^{-4}$ mol L <sup>-1</sup> nitroalkane.	82A283
1.89	3-Pentanone $\cdot^{\text{CH}_3} + \text{C}_2\text{H}_5\text{COC}_2\text{H}_5 \rightarrow \text{CH}_4 + \text{CH}_3\text{CHCOC}_2\text{H}_5$	$1.4 \times 10^4$	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti <sup>III</sup> -H <sub>2</sub> O <sub>2</sub> soln.	755188
1.90	2-Propanol $\cdot^{\text{CH}_3} + 2\text{-PrOH} \rightarrow \text{CH}_4 + (\text{CH}_3)_2\text{COH}$	$\geq 1.6 \times 10^3$	1		phot.	Estd. from effect of addn. of 2-PrOH on CH <sub>4</sub> and C <sub>2</sub> H <sub>6</sub> yields in photolysis of Co(NH <sub>3</sub> ) <sub>5</sub> O <sub>2</sub> CCH <sub>3</sub> <sup>2+</sup> .	71F579
		$3.4 \times 10^3$			$\gamma\text{-r.}$	C.k. in soln. contg. MeI; rel. to <i>k</i> ( $\cdot^{\text{CH}_3} + \text{O}_2$ ) = 4.7 $\times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	670041
1.91	Propionic acid $\cdot^{\text{CH}_3} + \text{C}_2\text{H}_5\text{CO}_2\text{H} \rightarrow \text{CH}_4 + \text{CH}_3\text{CHCO}_2\text{H}$	$3.0 \times 10^3$	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti <sup>III</sup> -H <sub>2</sub> O <sub>2</sub> soln.	755188
1.92	Propionitrile $\cdot^{\text{CH}_3} + \text{C}_2\text{H}_5\text{CN} \rightarrow \text{CH}_4 + \text{CH}_3\text{CHCN}$	$1.2 \times 10^3$	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti <sup>III</sup> -H <sub>2</sub> O <sub>2</sub> soln.	755188

TABLE I. Methyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T(K)	Method	Comment	Ref.
1.93	Propylene						
	$^{\bullet}\text{CH}_3 + \text{CH}_3\text{CH}=\text{CH}_2 \rightarrow \text{addn.}$	$5.3 \times 10^3$			$\gamma$ -r.	C.k. with 2-PrOH in soln. contg. MeI; obs. $G(\text{CH}_4)$ ; rel. to $k(^{\bullet}\text{CH}_3 + \text{O}_2) = 4.7 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	670041
1.94	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphine						
	$^{\bullet}\text{CH}_3 + \text{H}_2\text{TPPS}^{4-} \rightarrow$	$3.2 \times 10^{10}$	8.0-8.5		p.r.	No experimental details given. Value appears too high.	92A304
1.95	Deoxyribonucleic acid						
	$^{\bullet}\text{CH}_3 + \text{DNA} \rightarrow$	$8.8 \times 10^4$	7		$\gamma$ -r.	C.k. in soln. contg. DMSO; estd. from effect of [DMSO] and [DNA] on single-strand breaks; rel. to $k(^{\bullet}\text{CH}_3 + \text{O}_2) = 5 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	94R034

TABLE 2. Ethyl

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T (K)	Method	Comment	Ref.
<b>2.1 Ethyl</b>							
	'CH <sub>2</sub> CH <sub>3</sub> + 'CH <sub>2</sub> CH <sub>3</sub> → <i>n</i> -C <sub>4</sub> H <sub>10</sub>	7 × 10 <sup>8</sup>	-7		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.0019 mol L <sup>-1</sup> ethane; ε(204 nm) = 980 L mol <sup>-1</sup> cm <sup>-1</sup> .	89G082
		1.2 × 10 <sup>9</sup>	4.4	298	p.r.	D.k. in soln. contg. 0.05 mol L <sup>-1</sup> ethane (30 atm) and 2.5 × 10 <sup>-3</sup> mol L <sup>-1</sup> N <sub>2</sub> O; ε = 790, 750, 700, 545 and 375 L mol <sup>-1</sup> cm <sup>-1</sup> at 210, 215, 220, 230 and 250 nm, resp.; <i>E<sub>a</sub></i> = 16 kJ mol <sup>-1</sup> , studied at 278–341 K.	751055
		9.6 × 10 <sup>6</sup>	5.5		p.r.	D.k. in soln. contg. 10 <sup>-2</sup> mol L <sup>-1</sup> ethane and 10 <sup>-3</sup> mol L <sup>-1</sup> N <sub>2</sub> O; ε = 520 and 330 L mol <sup>-1</sup> cm <sup>-1</sup> at 220 and 250 nm, resp.	720445
<b>2.2 Diaqua(1,4,8,11-tetraazacyclotetradecane)cobalt(II) ion</b>							
	'CH <sub>2</sub> CH <sub>3</sub> + Co(cyclam) <sup>2+</sup> → C <sub>2</sub> H <sub>5</sub> Co(cyclam) <sup>2+</sup>	1.1 × 10 <sup>7</sup>	<2	297	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and CH <sub>3</sub> CH <sub>2</sub> Co(cyclam) <sup>2+</sup> and Co(cyclam) <sup>2+</sup> .	89A338
<b>2.3 5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradecanecobalt(II) ion</b>							
	'CH <sub>2</sub> CH <sub>3</sub> + Co(Me <sub>6</sub> [14]aneN <sub>4</sub> ) <sup>2+</sup> → CH <sub>3</sub> CH <sub>2</sub> Co(Me <sub>6</sub> [14]aneN <sub>4</sub> ) <sup>2+</sup>	2.9 × 10 <sup>7</sup>	1.7–7	296	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and CH <sub>3</sub> CH <sub>2</sub> Co(cyclam) <sup>2+</sup> .	89A530
<b>2.4 Cobal(II)amin</b>							
	'CH <sub>2</sub> CH <sub>3</sub> + B12r → (CH <sub>3</sub> CH <sub>2</sub> )B12	5.1 × 10 <sup>8</sup>	7	296	f.p.	D.k. at 470 nm, as well as p.b.k. at 520 nm, in soln. contg. CH <sub>3</sub> CH <sub>2</sub> Co(cyclam) <sup>2+</sup> and cobal(II)amin.	89A530
<b>2.5 Pentaammine(aqua)cobalt(III) ion</b>							
	'CH <sub>2</sub> CH <sub>3</sub> + Co(NH <sub>3</sub> ) <sub>5</sub> <sup>3+</sup> → EtOH + Co(NH <sub>3</sub> ) <sub>5</sub> <sup>2+</sup> + H <sup>+</sup>	<2 × 10 <sup>5</sup>	-1	296	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator and C <sub>2</sub> H <sub>5</sub> Co(dmgH) <sub>2</sub> .	90A403
<b>2.6 Pentaammine(bromo)cobalt(III) ion</b>							
	'CH <sub>2</sub> CH <sub>3</sub> + Co(NH <sub>3</sub> ) <sub>5</sub> Br <sup>2+</sup> → C <sub>2</sub> H <sub>5</sub> Br + Co(NH <sub>3</sub> ) <sub>5</sub> <sup>2+</sup>	3.0 × 10 <sup>6</sup>	-1	296	f.p.	C.k. in deaerated soln. contg. C <sub>2</sub> H <sub>5</sub> Co(dmgH) <sub>2</sub> OH <sub>2</sub> , assuming <i>k</i> ('CH <sub>2</sub> CH <sub>3</sub> + 'CH <sub>2</sub> CH <sub>3</sub> ) = 1.2 × 10 <sup>9</sup> ; rel. to <i>k</i> ('CH <sub>2</sub> CH <sub>3</sub> + IrCl <sub>6</sub> <sup>2-</sup> ) = 2.8 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	90A403
		2.6 × 10 <sup>6</sup>	-1	296	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator and C <sub>2</sub> H <sub>5</sub> Co(dmgH) <sub>2</sub> .	90A403
<b>2.7 Pentaammine(chloro)cobalt(III) ion</b>							
	'CH <sub>2</sub> CH <sub>3</sub> + Co(NH <sub>3</sub> ) <sub>5</sub> Cl <sup>2+</sup> → C <sub>2</sub> H <sub>5</sub> Cl + Co(NH <sub>3</sub> ) <sub>5</sub> <sup>2+</sup>	<3 × 10 <sup>5</sup>	-1	296	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator and C <sub>2</sub> H <sub>5</sub> Co(dmgH) <sub>2</sub> .	90A403
<b>2.8 Pentaammine(fluoro)cobalt(III) ion</b>							
	'CH <sub>2</sub> CH <sub>3</sub> + Co(NH <sub>3</sub> ) <sub>5</sub> F <sup>2+</sup> → CH <sub>3</sub> CH <sub>2</sub> F + Co(NH <sub>3</sub> ) <sub>5</sub> <sup>2+</sup>	<2 × 10 <sup>5</sup>	-1	296	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator and C <sub>2</sub> H <sub>5</sub> Co(dmgH) <sub>2</sub> .	90A403
<b>2.9 Pentaammine(azido)cobalt(III) ion</b>							
	'CH <sub>2</sub> CH <sub>3</sub> + Co(NH <sub>3</sub> ) <sub>5</sub> (N <sub>3</sub> ) <sup>2+</sup> → CH <sub>3</sub> CH <sub>2</sub> N <sub>3</sub> + Co(NH <sub>3</sub> ) <sub>5</sub> <sup>2+</sup>	3.7 × 10 <sup>7</sup>	-1	296	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator and C <sub>2</sub> H <sub>5</sub> Co(dmgH) <sub>2</sub> .	90A403
<b>2.10 Pentaammine(thiocyanato-<i>N</i>)cobalt(III) ion</b>							
	'CH <sub>2</sub> CH <sub>3</sub> + Co(NH <sub>3</sub> ) <sub>5</sub> (NCS) <sup>2+</sup> → C <sub>2</sub> H <sub>5</sub> NCS + Co(NH <sub>3</sub> ) <sub>5</sub> <sup>2+</sup>	<2 × 10 <sup>5</sup>	-1	296	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator and C <sub>2</sub> H <sub>5</sub> Co(dmgH) <sub>2</sub> .	90A403
<b>2.11 Pentaammine(thiocyanato-<i>S</i>)cobalt(III) ion</b>							
	'CH <sub>2</sub> CH <sub>3</sub> + Co(NH <sub>3</sub> ) <sub>5</sub> SCN <sup>2+</sup> → C <sub>2</sub> H <sub>5</sub> SCN + Co(NH <sub>3</sub> ) <sub>5</sub> <sup>2+</sup>	1.4 × 10 <sup>7</sup>	-1	296	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator and C <sub>2</sub> H <sub>5</sub> Co(dmgH) <sub>2</sub> .	90A403
<b>2.12 Pentaammine(cyano)cobalt(III) ion</b>							
	'CH <sub>2</sub> CH <sub>3</sub> + Co(NH <sub>3</sub> ) <sub>5</sub> (CN) <sup>2+</sup> → C <sub>2</sub> H <sub>5</sub> CN + Co(NH <sub>3</sub> ) <sub>5</sub> <sup>2+</sup>	<4 × 10 <sup>5</sup>	-1	296	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator and C <sub>2</sub> H <sub>5</sub> Co(dmgH) <sub>2</sub> .	90A403

TABLE 2. Ethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T (K)	Method	Comment	Ref.
2.13	<i>cis</i> -Aquachlorobis(ethylenediamine)cobalt(III) ion $\cdot\text{CH}_2\text{CH}_3 + \text{cis-}\text{Co}(\text{en})_2(\text{H}_2\text{O})\text{Cl}^{2+} \rightarrow \text{C}_2\text{H}_5\text{Cl} + \text{cis-}\text{Co}(\text{en})_2(\text{H}_2\text{O})^{2+}$	$<3 \times 10^5$	~1	296	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>+</sup> as indicator and $\text{C}_2\text{H}_5\text{Co}(\text{dmgH})_2$ .	90A403
2.14	<i>trans</i> -Dichlorobis(ethylenediamine)cobalt(III) ion $\cdot\text{CH}_2\text{CH}_3 + \text{trans-}\text{Co}(\text{en})_2\text{Cl}_2^{+} \rightarrow \text{C}_2\text{H}_5\text{Cl} + \text{trans-}\text{Co}(\text{en})_2\text{Cl}^{+}$	$6 \times 10^5$	~1	296	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>+</sup> as indicator and $\text{C}_2\text{H}_5\text{Co}(\text{dmgH})_2$ .	90A403
2.15	<i>cis</i> -Dichlorobis(ethylenediamine)cobalt(III) ion $\cdot\text{CH}_2\text{CH}_3 + \text{cis-}\text{Co}(\text{en})_2\text{Cl}_2^{+} \rightarrow \text{C}_2\text{H}_5\text{Cl} + \text{cis-}\text{Co}(\text{en})_2\text{Cl}^{+}$	$<2 \times 10^5$	~1	296	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>+</sup> as indicator and $\text{C}_2\text{H}_5\text{Co}(\text{dmgH})_2$ .	90A403
2.16	Aquachlorobis(dimethylglyoximato)cobalt(III) $\cdot\text{CH}_2\text{CH}_3 + \text{ClCo}(\text{dmgH})_2 \rightarrow \text{C}_2\text{H}_5\text{Cl} + \text{Co}(\text{dmgH})_2$	$2.3 \times 10^6$	~1	296	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>+</sup> as indicator and $\text{C}_2\text{H}_5\text{Co}(\text{dmgH})_2$ .	90A403
2.17	Dibromobis(dimethylglyoximato)cobaltate(III) ion $\cdot\text{CH}_2\text{CH}_3 + \text{Co}(\text{dmgH})_2\text{Br}_2^{-} \rightarrow \text{C}_2\text{H}_5\text{Br} + \text{Co}(\text{dmgH})_2\text{Br}^{-}$	$5.3 \times 10^8$	~1	296	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>+</sup> as indicator and $\text{C}_2\text{H}_5\text{Co}(\text{dmgH})_2$ .	90A403
2.18	Dichlorobis(dimethylglyoximato)cobaltate(III) ion $\cdot\text{CH}_2\text{CH}_3 + \text{Co}(\text{dmgH})_2\text{Cl}_2^{-} \rightarrow \text{C}_2\text{H}_5\text{Cl} + \text{Co}(\text{dmgH})_2\text{Cl}^{-}$	$1.1 \times 10^7$	~1	296	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>+</sup> as indicator and $\text{C}_2\text{H}_5\text{Co}(\text{dmgH})_2$ .	90A403
2.19	Acetonitrile(bromo)bis(dimethylglyoximato)cobalt(III) $\cdot\text{CH}_2\text{CH}_3 + \text{BrCo}(\text{dmgH})_2\text{NCCH}_3 \rightarrow \text{C}_2\text{H}_5\text{Br} + \text{Co}(\text{dmgH})_2\text{NCCH}_3$	$1.6 \times 10^8$	~1	296	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>+</sup> as indicator and $\text{C}_2\text{H}_5\text{Co}(\text{dmgH})_2$ .	90A403
2.20	Chromium(II) ion $\cdot\text{CH}_2\text{CH}_3 + \text{Cr}^{2+} \rightarrow \text{CrCH}_2\text{CH}_3^{2+}$	$1.9 \times 10^8$	<2	297	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and $\text{CH}_3\text{CH}_2\text{Co}(\text{cyclam})^{2+}$ .	89A338
2.21	1,4,8,12-Tetraazacyclopentadecanechromium(II) ion $\cdot\text{CH}_2\text{CH}_3 + \text{Cr}([15]\text{aneN}_4)_2^{2+} \rightarrow \text{C}_2\text{H}_5\text{CH}_2\text{Cr}([15]\text{aneN}_4)_2^{2+}$	$1 \times 10^8$		298	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and $\text{CH}_3\text{CH}_2\text{Co}(\text{dmgH})_2$ .	91A427
2.22	Tris(2,2'-bipyridine)chromium(III) ion $\cdot\text{CH}_2\text{CH}_3 + \text{Cr}(\text{bpy})_3^{3+} \rightarrow$	$1.8 \times 10^7$		296	f.p.	D.k. in deaerated soln. contg. $\text{C}_2\text{H}_5\text{Co}(\text{dmgH})_2\text{OH}_2$ , assuming $k(\cdot\text{CH}_2\text{CH}_3 + \cdot\text{CH}_2\text{CH}_3) = 1.2 \times 10^9$ . Product obs. at 560 nm suggested to be ring addn.	90A403
2.23	Tris(2,2'-bipyridine)iron(III) ion $\cdot\text{CH}_2\text{CH}_3 + \text{Fe}(\text{bpy})_3^{3+} \rightarrow \text{H}_2\text{C}=\text{CH}_2 + \text{Fe}(\text{bpy})_3^{2+} + \text{H}^+$	$9.2 \times 10^8$	~1	296	f.p.	D.k. in deaerated soln. contg. $\text{C}_2\text{H}_5\text{Co}([14]\text{aneN}_4)_2^{2+}$ assuming $k(\cdot\text{CH}_2\text{CH}_3 + \cdot\text{CH}_2\text{CH}_3) = 1.2 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	90A403
2.24	Tris(1,10-phenanthroline)iron(III) ion $\cdot\text{CH}_2\text{CH}_3 + \text{Fe}(\text{phen})_3^{3+} \rightarrow \text{H}_2\text{C}=\text{CH}_2 + \text{Fe}(\text{phen})_3^{2+} + \text{H}^+$	$1.5 \times 10^9$		296	f.p.	D.k. in deaerated soln. contg. $\text{C}_2\text{H}_5\text{Co}(\text{dmgH})_2\text{OH}_2$ , assuming $k(\cdot\text{CH}_2\text{CH}_3 + \cdot\text{CH}_2\text{CH}_3) = 1.2 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	90A403
		$1.0 \times 10^9$	~1		p.r.	P.b.k. at 490 nm in soln. contg. ethane; probably inner-sphere mechanism.	85A284
2.25	Ferricyanide ion $\cdot\text{CH}_2\text{CH}_3 + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{Fe}(\text{CN})_6^{4-} + \text{other prod.}$	$5.0 \times 10^7$	4-6	295	p.r.	D.k. at 420 nm in $\text{N}_2\text{O}$ -satd. soln. contg. diethyl sulfoxide.	82A041
2.26	Hexachloroiridate(IV) ion $\cdot\text{CH}_2\text{CH}_3 + \text{IrCl}_6^{2-} \rightarrow \text{C}_2\text{H}_5\text{Cl} + \text{IrCl}_5^{2-}$	$2.8 \times 10^9$		296	f.p.	D.k. in deaerated soln. contg. $\text{C}_2\text{H}_5\text{Co}(\text{dmgH})_2\text{OH}_2$ , assuming $k(\cdot\text{CH}_2\text{CH}_3 + \cdot\text{CH}_2\text{CH}_3) = 1.2 \times 10^9$ .	90A403

TABLE 2. Ethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T(K)	Method	Comment	Ref.	
2.26	Hexachloroiridate(IV) ion — Continued	$3.1 \times 10^9$	4-6	295	p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. diethyl sulfoxide or ethyl chloride.	82A041	
2.27	Permanganate ion	$^{\bullet}\text{CH}_2\text{CH}_3 + \text{MnO}_4^- \rightarrow \text{MnO}_4^{2-} + \text{other prod.}$	$-2 \times 10^9$	4-6	295	p.r.	D.k. at 545 nm in N <sub>2</sub> O-satd. soln. contg. diethyl sulfoxide or ethyl chloride.	82A041
2.28	$\alpha$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion	$^{\bullet}\text{CH}_2\text{CH}_3 + \alpha\text{-Ni(cyclam)}^{2+} \rightarrow \alpha\text{-CH}_3\text{CH}_2\text{Ni(cyclam)}^{2+}$	$2.3 \times 10^8$	0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>—</sup> as indicator, alkylcobalt(III) complex and 6.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
2.29	$\beta$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion	$^{\bullet}\text{CH}_2\text{CH}_3 + \beta\text{-Ni(cyclam)}^{2+} \rightarrow \beta\text{-CH}_3\text{CH}_2\text{Ni(cyclam)}^{2+}$	$1.3 \times 10^7$	0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>—</sup> as indicator, alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
2.30	Oxygen	$^{\bullet}\text{CH}_2\text{CH}_3 + \text{O}_2 \rightarrow \text{C}_2\text{H}_5\text{OO}^{\bullet}$	$2.1 \times 10^9$	0	298	f.p.	C.k. in soln. contg. 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> or RCo(cyclam) <sup>2+</sup> ; rel. to $k(^{\bullet}\text{CH}_2\text{CH}_3 + \beta\text{-Ni(cyclam)}^{2+}) = 1.3 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ .	91A176
			$2.9 \times 10^9$			p.r.	P.b.k. at 270 nm in soln. contg. $6 \times 10^{-5}$ mol L <sup>-1</sup> O <sub>2</sub> and cthanc.	751055
2.31	Pentaammine(bromo)ruthenium(III) ion	$^{\bullet}\text{CH}_2\text{CH}_3 + \text{Ru(NH}_3)_5\text{Br}^{2+} \rightarrow \text{C}_2\text{H}_5\text{Br} + \text{Ru(NH}_3)_5^{2+}$	$1.6 \times 10^7$	~1	296	f.p.	C.k. in deaerated soln. contg. C <sub>2</sub> H <sub>5</sub> Co(dmgH) <sub>2</sub> OH <sub>2</sub> , assuming $k(^{\bullet}\text{CH}_2\text{CH}_3 + ^{\bullet}\text{CH}_2\text{CH}_3) = 1.2 \times 10^9$ ; rel. to $k(^{\bullet}\text{CH}_2\text{CH}_3 + \text{IrCl}_6^{2-}) = 2.8 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	90A403
			$2.2 \times 10^7$	1	296	chem.	C.k. in deaerated soln. contg. $1.3 \times 10^{-4}$ mol L <sup>-1</sup> (H <sub>2</sub> O) <sub>5</sub> CrC <sub>2</sub> H <sub>5</sub> <sup>2+</sup> , $4.0 \times 10^{-4}$ mol L <sup>-1</sup> Fe(bpy) <sub>3</sub> <sup>3+</sup> , $5.0 \times 10^{-3}$ mol L <sup>-1</sup> Ru(NH <sub>3</sub> ) <sub>5</sub> Br <sup>2+</sup> and 0.10 mol L <sup>-1</sup> HClO <sub>4</sub> ; rel. to $k(^{\bullet}\text{CH}_2\text{CH}_3 + \text{Fe(bpy)}_3^{3+}) = 9.2 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	90A403
2.32	Hydrogen peroxomonosulfate ion	$^{\bullet}\text{CH}_2\text{CH}_3 + \text{HSO}_5^- \rightarrow$	$3.8 \times 10^5$			chem.	Esr study in soln. contg. Ti(III) sulfate, H <sub>2</sub> O <sub>2</sub> , HSO <sub>5</sub> <sup>—</sup> and diethyl sulfoxide.	90D226
2.33	Peroxodisulfate ion	$^{\bullet}\text{CH}_2\text{CH}_3 + \text{S}_2\text{O}_8^{2-} \rightarrow \text{SO}_4^{2-} + \text{SO}_4^{2-} + \text{other prod.}$	$7.4 \times 10^4$	~293	chem.	Esr study in soln. contg. 0.008 mol L <sup>-1</sup> Ti(III), 0.01 mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> , (0-0.025) mol L <sup>-1</sup> S <sub>2</sub> O <sub>8</sub> <sup>2-</sup> and ~0.01 mol L <sup>-1</sup> Et <sub>2</sub> SO.	84D044	
2.34	Vanadium(II) ion	$^{\bullet}\text{CH}_2\text{CH}_3 + \text{V}^{2+} + \text{H}^+ \rightarrow \text{C}_2\text{H}_6 + \text{V}^{3+}$	$4.3 \times 10^5$	2	296	f.p.	D.k. at 600 nm in soln. contg. MV <sup>2+</sup> as indicator, 0.01-0.03 mol L <sup>-1</sup> H <sup>+</sup> , (1-5) $\times 10^{-4}$ mol L <sup>-1</sup> CH <sub>3</sub> CH <sub>2</sub> Co(dmgH) or CH <sub>3</sub> CH <sub>2</sub> Co(cyclam) <sup>2+</sup> , (5-38) $\times 10^{-6}$ mol L <sup>-1</sup> MV <sup>2+</sup> , and 0.01-0.06 mol L <sup>-1</sup> V <sup>2+</sup> .	91A428
			$\sim 6 \times 10^5$		298	chem.	Calcd. from product anal. in soln. contg. V <sup>2+</sup> and C <sub>2</sub> H <sub>5</sub> C(CH <sub>3</sub> ) <sub>2</sub> O <sub>2</sub> H and (CH <sub>3</sub> ) <sub>2</sub> CHI knowing $k(^{\bullet}\text{CH}_2\text{CH}_2 + ^{\bullet}\text{CH}_2\text{CH}_2)$ .	86A020
2.35	2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion	$^{\bullet}\text{CH}_2\text{CH}_3 + \text{ABTS}^{—} \rightarrow \text{addn.}$	$1.1 \times 10^9$	0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>—</sup> (from ABTS <sup>2-</sup> + Br <sub>2</sub> ) and alkylcobalt(III) complex.	91A515

TABLE 2. Ethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T (K)	Method	Comment	Ref.
<b>2.35 2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion — Continued</b>							
		$9.2 \times 10^8$		296	f.p.	D.k. at 650 nm in deaerated soln. contg. C <sub>2</sub> H <sub>5</sub> Co(dmgh) <sub>2</sub> OH <sub>2</sub> , ABTS <sup>2-</sup> and Ce(IV), assuming $k(\cdot\text{CH}_2\text{CH}_3 + \cdot\text{CH}_2\text{CH}_3) = 1.2 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	90A403
<b>2.36 1,1'-Dimethyl-4,4'-bipyridinium radical cation</b>							
	'CH <sub>2</sub> CH <sub>3</sub> + MV <sup>+</sup> → addn.	$1.0 \times 10^9$	2	296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L <sup>-1</sup> H <sup>+</sup> , (1-5) × 10 <sup>-4</sup> mol L <sup>-1</sup> CH <sub>3</sub> CH <sub>2</sub> Co(dmgh) or CH <sub>3</sub> CH <sub>2</sub> Co(cyclam) <sup>2+</sup> , (5-38) × 10 <sup>-6</sup> mol L <sup>-1</sup> MV <sup>+</sup> ; also see [91A427].	91A428
		$1.2 \times 10^9$		296	f.p.	D.k. in deaerated soln. contg. C <sub>2</sub> H <sub>5</sub> Co(dmgh) <sub>2</sub> OH <sub>2</sub> , assuming $k(\cdot\text{CH}_2\text{CH}_3 + \cdot\text{CH}_2\text{CH}_3) = 1.2 \times 10^9$ .	90A403
		$1.0 \times 10^9$	<2	297	f.p.	D.k. at 600 nm (MV <sup>++</sup> , ε = 1.37 × 10 <sup>4</sup> L mol <sup>-1</sup> cm <sup>-1</sup> , 0.01-0.1 mol L <sup>-1</sup> ); MV <sup>+</sup> from Zn/Hg redn. of MV <sup>2+</sup> ; (2-4) × 10 <sup>-6</sup> mol L <sup>-1</sup> radical from photolysis of CH <sub>3</sub> CH <sub>2</sub> Co(cyclam) <sup>2+</sup> .	89A338
<b>2.37 Ethanethiol</b>							
	'CH <sub>2</sub> CH <sub>3</sub> + C <sub>2</sub> H <sub>5</sub> SH → C <sub>2</sub> H <sub>6</sub> + C <sub>2</sub> H <sub>5</sub> S'	$2.8 \times 10^7$	7.0	-298	f.p.	P.b.k. at 650 nm using ABTS <sup>2-</sup> as indicator in soln. contg. ABTS <sup>2-</sup> and CH <sub>3</sub> CH <sub>2</sub> Co(cyclam) <sup>2+</sup> .	92A401 92A223
<b>2.38 2-Iodopropane</b>							
	'CH <sub>2</sub> CH <sub>3</sub> + (CH <sub>3</sub> ) <sub>2</sub> CHI → (CH <sub>3</sub> ) <sub>2</sub> CH + C <sub>2</sub> H <sub>5</sub> I	$-6 \times 10^5$		298	chem.	Calcd. from product anal. in soln. contg. V <sup>2+</sup> and C <sub>2</sub> H <sub>5</sub> C(CH <sub>3</sub> ) <sub>2</sub> O <sub>2</sub> H and excess (CH <sub>3</sub> ) <sub>2</sub> CHI; rel. to $k(\cdot\text{CH}_2\text{CH}_3 + \text{V}^{2+}) = -6 \times 10^5 \text{ L mol}^{-1} \text{ s}^{-1}$ .	86A020
<b>2.39 2-Methyl-2-nitrosopropane</b>							
	'CH <sub>2</sub> CH <sub>3</sub> + (CH <sub>3</sub> ) <sub>3</sub> CNO → addn.	$5.3 \times 10^7$	-7	-291	p.r.	P.b.k. (esr) in unbuffered N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> diethyl sulfoxide and (0.25-15) × 10 <sup>-3</sup> mol L <sup>-1</sup> MNP (assuming complete dimer dissociation).	91D097

TABLE 3. Propyl

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T (K)	Method	Comment	Ref.
3.1	<b>Propyl</b>						
	'CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub> + 'CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub> →	6.3 × 10 <sup>8</sup>			p.r.	D.k.	91A117
3.2	<i>N-meso</i> -5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion						
	'CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub> + N-meso-Co(4,11-dieneN <sub>4</sub> ) <sup>2+</sup> → CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> Co(4,11-dieneN <sub>4</sub> ) <sup>2+</sup>	1.4 × 10 <sup>8</sup>	1.3-7	296	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> Co(cyclam) <sup>2+</sup> .	89A530
3.3	<b>Cobal(II)amin</b>						
	'CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub> + B12r → addn.	6.1 × 10 <sup>8</sup>	7	296	f.p.	D.k. at 470 nm, as well as p.b.k. at 520 nm, in soln. contg. CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> Co(cyclam) <sup>2+</sup> and cobal(II)amin.	89A530
3.4	<b>Chromium(II) ion</b>						
	'CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub> + Cr <sup>2+</sup> → CrCH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub> <sup>2+</sup>	2.2 × 10 <sup>8</sup>	<2	297	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> Co(cyclam) <sup>2+</sup> .	89A338
3.5	<b>1,4,8,12-Tetraazacyclopentadecanechromium(II) ion</b>						
	'CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub> + Cr([15]aneN <sub>4</sub> ) <sup>2+</sup> → C <sub>2</sub> H <sub>5</sub> CH <sub>2</sub> Cr([15]aneN <sub>4</sub> ) <sup>2+</sup>	8.5 × 10 <sup>7</sup>		298	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and RCo(dmgH) <sub>2</sub> .	91A427
3.6	<b>α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion</b>						
	'CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub> + α-Ni(cyclam) <sup>2+</sup> → α-CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> Ni(cyclam) <sup>2+</sup>	1.7 × 10 <sup>8</sup>	0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator, alkylcobalt(III) complex and 6.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
3.7	<b>β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion</b>						
	'CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub> + β-Ni(cyclam) <sup>2+</sup> → β-CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> Ni(cyclam) <sup>2+</sup>	1.0 × 10 <sup>7</sup>	0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator, alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
3.8	<b>Oxygen</b>						
	'CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub> + O <sub>2</sub> → CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> OO'	1.9 × 10 <sup>9</sup>	8.5		p.r.	P.b.k. at 250 nm in soln. contg. propane, 2.8 × 10 <sup>-3</sup> mol L <sup>-1</sup> N <sub>2</sub> O and 1.25 × 10 <sup>-3</sup> mol L <sup>-1</sup> O <sub>2</sub> .	91A117
		3.5 × 10 <sup>9</sup>	0	298	f.p.	C.k. in soln. contg. 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> or RCo(cyclam) <sup>2+</sup> ; rel. to <i>k</i> ('CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub> + β-Ni(cyclam) <sup>2+</sup> ) = 1.0 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	91A176
3.9	<b>Vanadium(II) ion</b>						
	'CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub> + V <sup>2+</sup> + H <sup>+</sup> → CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> V <sup>3+</sup>	2.4 × 10 <sup>5</sup>	2	296	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator, 0.01-0.03 mol L <sup>-1</sup> H <sup>+</sup> , (1-5) × 10 <sup>-4</sup> mol L <sup>-1</sup> CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> Co(dmgH) <sub>2</sub> or CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> Co(cyclam) <sup>2+</sup> and 0.01-0.06 mol L <sup>-1</sup> V <sup>2+</sup> .	91A428
3.10	<b>2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion</b>						
	'CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub> + ABTS <sup>−</sup> → addn.	1.2 × 10 <sup>9</sup> 1.0 × 10 <sup>9</sup>	0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> (from ABTS <sup>2-</sup> + Br <sub>2</sub> ), alkylcobalt(III) complex and 1.0 or 6.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
3.11	<b>1,1'-Dimethyl-4,4'-bipyridinium radical cation</b>						
	'CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub> + MV <sup>+</sup> → CH <sub>3</sub> (CH <sub>2</sub> ) <sub>2</sub> MV <sup>+</sup>	1.0 × 10 <sup>9</sup>		298	f.p.	D.k. at 600 nm in soln. contg. RCo(dmgH) <sub>2</sub> and (1-8) × 10 <sup>-5</sup> mol L <sup>-1</sup> MV <sup>+</sup> .	91A427
		1.2 × 10 <sup>9</sup>	2	296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L <sup>-1</sup> H <sup>+</sup> , (1-5) × 10 <sup>-4</sup> mol L <sup>-1</sup> CH <sub>3</sub> (CH <sub>2</sub> ) <sub>2</sub> Co(dmgH) <sub>2</sub> or CH <sub>3</sub> (CH <sub>2</sub> ) <sub>2</sub> Co(cyclam) <sup>2+</sup> , (5-38) × 10 <sup>-6</sup> mol L <sup>-1</sup> MV <sup>+</sup> .	91A428
		1.2 × 10 <sup>9</sup>	<2	297	f.p.	D.k. at 600 nm (MV <sup>+</sup> , ε = 1.37 × 10 <sup>4</sup> L mol <sup>-1</sup> cm <sup>-1</sup> , 0.01-0.1 mol L <sup>-1</sup> ); MV <sup>+</sup> from Zn/Hg redn. of MV <sup>2+</sup> ; (2-4) × 10 <sup>-6</sup> mol L <sup>-1</sup> radical from photolysis of CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> Co(cyclam) <sup>2+</sup> .	89A338

TABLE 3. Propyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T(K)	Method	Comment	Ref.
<b>3.12 2-Methyl-2-nitrosopropane</b>							
	$\cdot\text{CH}_2\text{CH}_2\text{CH}_3 + (\text{CH}_3)_3\text{CNO} \rightarrow \text{addn.}$	$6.9 \times 10^7$	-7	-291	p.r.	P.b.k. (esr) in unbuffered N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> dipropyl sulfoxide and (0.25-15) × 10 <sup>-3</sup> mol L <sup>-1</sup> MNP (assuming complete dimer dissociation).	91D097

TABLE 4. 1-Methylethyl

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
4.1	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatocobaltate(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{H} + \text{CoTPPS}^{4-} \rightarrow$ $(\text{CH}_3)_2\text{CHCoTPPS}^{4-}$	$1.9 \times 10^9$ $2.0 \times 10^9$	8 13		294	p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.02 mol L <sup>-1</sup> [(CH <sub>3</sub> ) <sub>2</sub> CH] <sub>2</sub> SO.	83A088
4.2	1,4,8,12-Tetraazacyclopentadecanechromium(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{H} + \text{Cr}([\text{15}]\text{aneN}_4)^{2+} \rightarrow$ $(\text{CH}_3)_2\text{CHCr}([\text{15}]\text{aneN}_4)^{2+}$	$6.1 \times 10^7$			298	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and RCo(dmgH) <sub>2</sub> .	91A427
4.3	Copper(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{H} + \text{Cu}^{2+} + \text{H}_2\text{O} \rightarrow$ $(\text{CH}_3)_2\text{CHOH} + \text{Cu}^+ + \text{H}^+$	$4 \times 10^6$	1	1-1.3	298	chem.	C.k. in soln. contg. $(6-10) \times 10^{-4}$ mol L <sup>-1</sup> CrCH(CH <sub>3</sub> ) <sub>2</sub> <sup>2+</sup> , 0.02-0.4 mol L <sup>-1</sup> Cu <sup>2+</sup> and oxygen; rel. to $k' \text{CH}(\text{CH}_3)_2 + \text{O}_2 = 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	82A479
4.4	Ferricyanide ion $(\text{CH}_3)_2\dot{\text{C}}\text{H} + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{Fe}(\text{CN})_6^{4-} +$ other prod.	$1.3 \times 10^9$	4-6		295	p.r.	D.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. di-(1-methylethyl) sulfoxide.	82A041
4.5	Hexachloroiridate(IV) ion $(\text{CH}_3)_2\dot{\text{C}}\text{H} + \text{IrCl}_6^{2-} \rightarrow$	$3.6 \times 10^9$	4-6		295	p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. di-(1-methylethyl) sulfoxide; both <i>e</i> -transfer and chlorine transfer.	82A041
4.6	1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(I) ion $(\text{CH}_3)_2\dot{\text{C}}\text{H} + \text{Ni}(\text{Me}_4[\text{14}]\text{aneN}_4)^+ \rightarrow$ addn.	$\sim 10^6$				phot.	Estd. from product yields.	86M180
4.7	$\alpha$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{H} + \alpha\text{-Ni}(\text{cyclam})^{2+} + \text{H}_2\text{O} \rightarrow$ $\alpha\text{-}(\text{CH}_3)_2\text{CHNi}(\text{cyclam})(\text{H}_2\text{O})^{2+}$	$6.2 \times 10^6$	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> as indicator and alkylcobalt(III) complex.	91A515
4.8	$\beta$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{H} + \beta\text{-Ni}(\text{cyclam})^{2+} \rightarrow$	$<2 \times 10^5$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> as indicator and alkylcobalt(III) complex.	91A515
4.9	Oxygen $(\text{CH}_3)_2\dot{\text{C}}\text{H} + \text{O}_2 \rightarrow (\text{CH}_3)_2\text{CHOO}^\bullet$	$3.8 \times 10^9$	1		298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> as indicator and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> or RCo(cyclam) <sup>2+</sup> .	91A176
4.10	Vanadium(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{H} + \text{V}^{2+} + \text{H}^+ \rightarrow \text{CH}_3\text{CH}_2\text{CH}_3$ + V <sup>3+</sup>	$2.4 \times 10^5$	2		296	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator, 0.01-0.03 mol L <sup>-1</sup> H <sup>+</sup> , (1-5) $\times 10^{-4}$ mol L <sup>-1</sup> (CH <sub>3</sub> ) <sub>2</sub> CHCo(dmgH) or (CH <sub>3</sub> ) <sub>2</sub> CHCo(cyclam) <sup>2+</sup> , (5-38) $\times 10^{-6}$ mol L <sup>-1</sup> MV <sup>•+</sup> , and 0.01-0.06 mol L <sup>-1</sup> V <sup>2+</sup> ;	91A428
4.11	2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion $(\text{CH}_3)_2\dot{\text{C}}\text{H} + \text{ABTS}^{•-} \rightarrow$ addn.	$1.4 \times 10^9$ $9.0 \times 10^8$	0 6.0	1.0 6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> (from ABTS <sup>2-</sup> + Br <sub>2</sub> ), alkylcobalt(III) complex and 1.0 or 6.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
4.12	1,1'-Dimethyl-4,4'-bipyridinium radical cation $(\text{CH}_3)_2\dot{\text{C}}\text{H} + \text{MV}^{•+} \rightarrow (\text{CH}_3)_2\text{CHMV}^{•+}$	$1.2 \times 10^9$ $1.5 \times 10^9$			298 296	f.p. f.p.	D.k. at 600 nm in soln. contg. RCo(dmgH) <sub>2</sub> and (1-8) $\times 10^{-5}$ mol L <sup>-1</sup> MV <sup>•+</sup> . D.k. in soln. contg. 0.01-0.03 mol L <sup>-1</sup> H <sup>+</sup> , (1-5) $\times 10^{-4}$ mol L <sup>-1</sup> (CH <sub>3</sub> ) <sub>2</sub> CHCo(dmgH) <sub>2</sub> or (CH <sub>3</sub> ) <sub>2</sub> CHCo(cyclam) <sup>2+</sup> and (5-38) $\times 10^{-6}$ mol L <sup>-1</sup> MV <sup>•+</sup> .	91A427 91A428

TABLE 4. 1-Methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
4.13	2-Methyl-2-nitrosopropane $(\text{CH}_3)_2\dot{\text{C}}\text{H} + (\text{CH}_3)_3\text{CNO} \rightarrow \text{addn.}$	$4.6 \times 10^7$	~7		~291	p.r.	P.b.k. (esr) in unbuffered N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> diisopropyl sulfoxide and (0.25-15) × 10 <sup>-3</sup> mol L <sup>-1</sup> MNP (assuming complete dimer dissociation).	91D097

TABLE 5. Cyclopentyl

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	I	T (K)	Method	Comment	Ref.
5.1	Cyclopentyl $c\text{-}\dot{\text{C}}_5\text{H}_9 + c\text{-}\dot{\text{C}}_5\text{H}_9 \rightarrow$	$1.0 \times 10^9$	7			p.r.	D.k. in soln. contg. N <sub>2</sub> O and $1.3 \times 10^{-5}$ mol L <sup>-1</sup> cyclopentane; $\epsilon = 480$ L mol <sup>-1</sup> cm <sup>-1</sup> at 248 nm; products are bicyclopentyl, cyclopentane and cyclopentene.	741051
		$2.0 \times 10^9$	10			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. cyclopentane.	741052
5.2	Chromium(II) ion $c\text{-}\dot{\text{C}}_5\text{H}_9 + \text{Cr}^{2+} \rightarrow \text{Cr-}c\text{-C}_5\text{H}_9^{2+}$	$8 \times 10^7$	3.3-4.0		295	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. $\sim 0.01$ mol L <sup>-1</sup> cyclopentane and $(2\text{-}10) \times 10^{-4}$ mol L <sup>-1</sup> Cr <sup>2+</sup> .	83A345
5.3	1,4,8,12-Tetraazacyclopentadecanecromium(II) ion $c\text{-}\dot{\text{C}}_5\text{H}_9 + \text{Cr}([15]\text{aneN}_4)_2^{2+} \rightarrow c\text{-C}_5\text{H}_9\text{Cr}([15]\text{aneN}_4)_2^{2+}$	$7.1 \times 10^7$	2		298	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator, $0.01\text{-}0.03$ mol L <sup>-1</sup> H <sup>+</sup> , $c\text{-C}_5\text{H}_9\text{Co(dmgH)}_2$ and $(1\text{-}8) \times 10^{-5}$ mol L <sup>-1</sup> MV <sup>+</sup> .	91A427
5.4	Nickel(I) ion $c\text{-}\dot{\text{C}}_5\text{H}_9 + \text{Ni}^{+} \rightarrow c\text{-C}_5\text{H}_9\text{Ni}^{+}$	$2.8 \times 10^9$				p.r.	D.k. at 300 nm (as well as p.b.k.) in soln. contg. NiSO <sub>4</sub> and cyclopentane.	741037
5.5	1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(I) ion $c\text{-}\dot{\text{C}}_5\text{H}_9 + \text{Ni}(\text{Me}_4[14]\text{aneN}_4)^+ \rightarrow \text{addn.}$	$\sim 10^5$	11			phot.	Estd. from ratio of products formed from radical.	86M180
5.6	$\alpha$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion $c\text{-}\dot{\text{C}}_5\text{H}_9 + \alpha\text{-Ni(cyclam)}^{2+} + \text{H}_2\text{O} \rightarrow \alpha\text{-}c\text{-C}_5\text{H}_9\text{Ni(cyclam)}(\text{H}_2\text{O})^{2+}$	$1.0 \times 10^7$	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator and alkylcobalt(III) complex.	91A515
5.7	$\beta$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion $c\text{-}\dot{\text{C}}_5\text{H}_9 + \beta\text{-Ni(cyclam)}^{2+} \rightarrow$	$<2 \times 10^5$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator and alkylcobalt(III) complex.	91A515
5.8	Hydrogen peroxide $c\text{-}\dot{\text{C}}_5\text{H}_9 + \text{H}_2\text{O}_2 \rightarrow$	$4.6 \times 10^4$				$\gamma$ -r.	Estd. from dose rate effect on G(H <sub>2</sub> O <sub>2</sub> ), assuming $2k(R + R) = 2 \times 10^9$ in soln. contg. $2.5 \times 10^{-3}$ mol L <sup>-1</sup> cyclopentane and $0.01$ mol L <sup>-1</sup> N <sub>2</sub> O.	76A254
5.9	Oxygen $c\text{-}\dot{\text{C}}_5\text{H}_9 + \text{O}_2 \rightarrow c\text{-C}_5\text{H}_9\text{OO}^\cdot$	$3.5 \times 10^9$	1		298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator and $0.1$ mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> or RCo(cyclam) <sup>2+</sup> .	91A176
		$4.9 \times 10^9$	7			p.r.	P.b.k. at 270 nm in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. cyclopentane.	741051
5.10	Vanadium(II) ion $c\text{-}\dot{\text{C}}_5\text{H}_9 + \text{V}^{2+} \rightarrow c\text{-C}_5\text{H}_{10} + \text{V}^{3+}$	$\sim 1 \times 10^5$	2		296	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator, $0.01\text{-}0.03$ mol L <sup>-1</sup> H <sup>+</sup> , $(1\text{-}5) \times 10^{-4}$ mol L <sup>-1</sup> $c\text{-C}_5\text{H}_9\text{Cu}(\text{dmgH})_2$ or $c\text{-C}_5\text{H}_9\text{Co}(\text{cyclam})^{2+}$ , $(5\text{-}38) \times 10^{-6}$ mol L <sup>-1</sup> MV <sup>+</sup> , and $0.01\text{-}0.06$ mol L <sup>-1</sup> V <sup>2+</sup> .	91A428
5.11	2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion $c\text{-}\dot{\text{C}}_5\text{H}_9 + \text{ABTS}^{\cdot-} \rightarrow \text{addn.}$	$1.2 \times 10^9$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> (from ABTS <sup>2-</sup> + Br <sub>2</sub> ), alkylcobalt(III) complex and $1.0$ or $6.0$ mol L <sup>-1</sup> HClO <sub>4</sub>	91A515
		$9.1 \times 10^8$		6.0				
5.12	3-Carboxamido-2,2,5,5-tetramethylpyrrolidin-1-yloxy $c\text{-}\dot{\text{C}}_5\text{H}_9 + \text{NX-s} \rightarrow \text{addn.}$	$3.5 \times 10^8$	acid			p.r.	Cond. changes in N <sub>2</sub> O-satd. soln. contg. $0.01\text{-}0.1$ mol L <sup>-1</sup> cyclopentane.	761152

TABLE 5. Cyclopentyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T(\text{K})$	Method	Comment	Ref.
5.13	3-Carboxamido-2,2,5,5-tetramethyl-3-pyrrolin-1-yloxy							
	$c\text{-C}_5\text{H}_9 + \text{NX-u} \rightarrow \text{addn.}$	$3.6 \times 10^8$	acid			p.r.	Cond. changes in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01-0.1 mol $\text{L}^{-1}$ cyclopentane.	761152
5.14	1,1'-Dimethyl-4,4'-bipyridinium radical cation							
	$c\text{-C}_5\text{H}_9 + \text{MV}^{+} \rightarrow \text{addn.}$	$9.1 \times 10^8$	2		298	f.p.	D.k. at 600 nm in soln. contg. 0.01 mol $\text{L}^{-1}$ $\text{H}^+$ , $c\text{-C}_5\text{H}_9\text{Co}(\text{dmgH})_2$ and $(1-5) \times 10^{-5}$ mol $\text{L}^{-1}$ $\text{MV}^{+}$ .	91A427
		$1.2 \times 10^9$	2		296	f.p.	D.K. at 600 nm in soln. contg. 0.01-0.03 mol $\text{L}^{-1}$ $\text{H}^+$ , $(1-5) \times 10^{-4}$ mol $\text{L}^{-1}$ $c\text{-C}_5\text{H}_9\text{Co}(\text{dmgH})_2$ or $c\text{-C}_5\text{H}_9\text{Co}(\text{cyclam})^{2+}$ and $(5-38) \times 10^{-6}$ mol $\text{L}^{-1}$ $\text{MV}^{+}$ .	91A428
5.15	2,2,6,6-Tetramethylpiperidine-N-oxyl							
	$c\text{-C}_5\text{H}_9 + \text{TMPN} \rightarrow$	$4.3 \times 10^8$	acid			p.r.	Cond. changes in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol $\text{L}^{-1}$ cyclopentane; addn. reaction.	761067
5.16	2,2,6,6-Tetramethyl-4-piperidone N-oxyl							
	$c\text{-C}_5\text{H}_9 + \text{TAN} \rightarrow$	$4.0 \times 10^8$	acid			p.r.	Cond. changes in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol $\text{L}^{-1}$ cyclopentane; addn. reaction.	761067

TABLE 6. Miscellaneous Unsubstituted Alkyl and Alkenyl Radicals

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
<b>6.1 1-Butyl</b>								
6.1.1	1-Butyl							
	'CH <sub>2</sub> (CH <sub>2</sub> ) <sub>2</sub> CH <sub>3</sub> + 'CH <sub>2</sub> (CH <sub>2</sub> ) <sub>2</sub> CH <sub>3</sub> →	5 × 10 <sup>8</sup>	8.5			p.r.	D.k.	91A117
6.1.2	1,4,8,12-Tetraazacyclopentadecanechromium(II) ion							
	'CH <sub>2</sub> (CH <sub>2</sub> ) <sub>2</sub> CH <sub>3</sub> + Cr([15]aneN <sub>4</sub> ) <sup>2+</sup> →	8.2 × 10 <sup>7</sup>			298	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and RCo(dmgH) <sub>2</sub> .	91A427
6.1.3	α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion							
	'CH <sub>2</sub> (CH <sub>2</sub> ) <sub>2</sub> CH <sub>3</sub> + α-Ni(cyclam) <sup>2+</sup> →	2.3 × 10 <sup>8</sup>	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator, alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
6.1.4	β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion							
	'CH <sub>2</sub> (CH <sub>2</sub> ) <sub>2</sub> CH <sub>3</sub> + β-Ni(cyclam) <sup>2+</sup> →	1.0 × 10 <sup>7</sup>	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator, alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
6.1.5	Oxygen							
	'CH <sub>2</sub> (CH <sub>2</sub> ) <sub>2</sub> CH <sub>3</sub> + O <sub>2</sub> →	1.3 × 10 <sup>9</sup>	8.5			p.r.	P.h.k. at 250 nm in soln. contg. butane, 2.8 × 10 <sup>-3</sup> mol L <sup>-1</sup> N <sub>2</sub> O and 1.25 × 10 <sup>-3</sup> mol L <sup>-1</sup> O <sub>2</sub> .	91A117
		1.8 × 10 <sup>9</sup>	0		298	f.p.	C.k. in soln. contg. 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> or RCo(cyclam) <sup>2+</sup> , rel. to k('CH <sub>2</sub> (CH <sub>2</sub> ) <sub>2</sub> CH <sub>3</sub> + β-Ni(cyclam) <sup>2+</sup> ) = 1.0 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	91A176
6.1.6	Vanadium(II) ion							
	'CH <sub>2</sub> (CH <sub>2</sub> ) <sub>2</sub> CH <sub>3</sub> + V <sup>2+</sup> + H <sup>+</sup> →	2.5 × 10 <sup>5</sup>	2		296	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator, 0.01-0.03 mol L <sup>-1</sup> H <sup>+</sup> , (1-5) × 10 <sup>-4</sup> mol L <sup>-1</sup> CH <sub>3</sub> (CH <sub>2</sub> ) <sub>3</sub> Co(dmgH) <sub>2</sub> or CH <sub>3</sub> (CH <sub>2</sub> ) <sub>3</sub> Co(cyclam) <sup>2+</sup> and 0.01-0.06 mol L <sup>-1</sup> V <sup>2+</sup> .	91A428
6.1.7	2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion							
	'CH <sub>2</sub> (CH <sub>2</sub> ) <sub>2</sub> CH <sub>3</sub> + ABTS <sup>−</sup> → addn.	1.3 × 10 <sup>9</sup>	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> (from ABTS <sup>2-</sup> + Br <sub>2</sub> ), alkylcobalt(III) complex and 1.0 or 6.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
		8.4 × 10 <sup>8</sup>		6.0				
6.1.8	1,1'-Dimethyl-4,4'-bipyridinium radical cation							
	'CH <sub>2</sub> (CH <sub>2</sub> ) <sub>2</sub> CH <sub>3</sub> + MV <sup>+</sup> →	1.1 × 10 <sup>9</sup>	2		296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L <sup>-1</sup> H <sup>+</sup> , (1-5) × 10 <sup>-4</sup> mol L <sup>-1</sup> CH <sub>3</sub> (CH <sub>2</sub> ) <sub>3</sub> Co(dmgH) <sub>2</sub> or CH <sub>3</sub> (CH <sub>2</sub> ) <sub>3</sub> Co(cyclam) <sup>2+</sup> , (5-38) × 10 <sup>-6</sup> mol L <sup>-1</sup> MV <sup>+</sup> .	91A428
		1.2 × 10 <sup>9</sup>			298	f.p.	D.k. at 600 nm in soln. contg. RCo(dmgH) <sub>2</sub> and (1-8) × 10 <sup>-5</sup> mol L <sup>-1</sup> MV <sup>+</sup> .	91A427
<b>6.2 <i>tert</i>-Butyl</b>								
6.2.1	<i>tert</i> -Butyl							
	'C(CH <sub>3</sub> ) <sub>3</sub> + 'C(CH <sub>3</sub> ) <sub>3</sub> →	1.4 × 10 <sup>9</sup>				p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. <i>tert</i> -butyl sulfoxide.	80A014
6.2.2	Ferricyanide ion							
	'C(CH <sub>3</sub> ) <sub>3</sub> + Fe(CN) <sub>6</sub> <sup>3-</sup> → Fe(CN) <sub>6</sub> <sup>4-</sup> +	3.6 × 10 <sup>9</sup>	4-6			p.r.	D.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. di-( <i>tert</i> -butyl) sulfoxide.	82A041
6.2.3	Hexachloroiridate(IV) ion							
	'C(CH <sub>3</sub> ) <sub>3</sub> + IrCl <sub>6</sub> <sup>2-</sup> →	3.8 × 10 <sup>9</sup>	4-6			p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. di-( <i>tert</i> -butyl) sulfoxide; both <i>e</i> -transfer and Cl transfer.	82A041

TABLE 6. Miscellaneous Unsubstituted Alkyl and Alkenyl Radicals — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T(K)	Method	Comment	Ref.
<b>6.3 Cyclohexenyl</b>								
<b>6.3.1 Cyclohexenyl</b>								
$c\text{-C}_6\text{H}_9 + c\text{-C}_6\text{H}_9 \rightarrow$								
		$8 \times 10^8$		>13		p.r.	D.k. at 250 nm in N <sub>2</sub> O-satd. soln. contg. cyclohexene and 0.3 mol L <sup>-1</sup> KOH; used $G(\text{radical}) = 6.0$ .	741077
<b>6.4 Cyclohexyl</b>								
<b>6.4.1 Cyclohexyl</b>								
$c\text{-C}_6\text{H}_{11} + c\text{-C}_6\text{H}_{11} \rightarrow$								
		$6 \times 10^8$		-10.5		p.r.	D.k. at 250 nm in N <sub>2</sub> O-satd. soln. contg. cyclohexane; $\epsilon = 920 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	741077
		$7 \times 10^8$				p.r.	D.k. at 240 nm in N <sub>2</sub> O-satd. soln. contg. cyclohexane; $\epsilon = 1480 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	680385
<b>6.4.2 1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(I) ion</b>								
$c\text{-C}_6\text{H}_{11} + \text{Ni}(\text{Me}_4[\text{14}]\text{aneN}_4)^+ \rightarrow$								
		$\sim 10^5$				phot.	Estd. from product yields.	86M180
<b>6.5 Cyclopentenyl</b>								
<b>6.5.1 Cyclopentenyl</b>								
$c\text{-C}_5\text{H}_7 + c\text{-C}_5\text{H}_7 \rightarrow$								
		$1.5 \times 10^9$		14		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. cyclopentene; used $G(\text{radical}) = 6.0$ .	741052
<b>6.6 2,2-Dimethylpropyl</b>								
<b>6.6.1 1,4,8,12-Tetraazacyclopentadecanechromium(II) ion</b>								
${}^*\text{CH}_2\text{C}(\text{CH}_3)_3 + \text{Cr}([\text{15}]\text{aneN}_4)^{2+} \rightarrow$								
		$6.3 \times 10^7$			298	f.p.	D.k. at 600 nm in soln. contg. MV <sup>•+</sup> as indicator and RCo(dmgH) <sub>2</sub> .	91A427
<b>6.6.2 <math>\alpha</math>-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion</b>								
${}^*\text{CH}_2\text{C}(\text{CH}_3)_3 + \alpha\text{-Ni}(\text{cyclam})^{2+} \rightarrow$								
		$8.0 \times 10^6$	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> as indicator, alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
<b>6.6.3 Oxygen</b>								
${}^*\text{CH}_2\text{C}(\text{CH}_3)_3 + \text{O}_2 \rightarrow (\text{CH}_3)_3\text{CCH}_2\text{OO}^\cdot$								
		$2.7 \times 10^9$	1		298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> as indicator and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> or RCo(cyclam) <sup>2+</sup> .	91A176
<b>6.6.4 Vanadium(II) ion</b>								
${}^*\text{CH}_2\text{C}(\text{CH}_3)_3 + \text{V}^{2+} + \text{H}^+ \rightarrow$								
		$3.5 \times 10^5$	2		296	f.p.	D.k. at 600 nm in soln. contg. MV <sup>•+</sup> as indicator, 0.01-0.03 mol L <sup>-1</sup> H <sup>+</sup> , (1-5) $\times 10^{-4}$ mol L <sup>-1</sup> (CH <sub>3</sub> ) <sub>3</sub> CCH <sub>2</sub> Co(dmgH) <sub>2</sub> or (CH <sub>3</sub> ) <sub>3</sub> CCH <sub>2</sub> Co(cyclam) <sup>2+</sup> and 0.01-0.06 mol L <sup>-1</sup> V <sup>2+</sup> .	91A428
<b>6.6.5 2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion</b>								
${}^*\text{CH}_2\text{C}(\text{CH}_3)_3 + \text{ABTS}^{\bullet-} \rightarrow \text{addn.}$								
		$7.4 \times 10^8$	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> (from ABTS <sup>2-</sup> + Br <sub>2</sub> ), alkylcobalt(III) complex and 6.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
<b>6.6.6 1,1'-Dimethyl-4,4'-bipyridinium radical cation</b>								
${}^*\text{CH}_2\text{C}(\text{CH}_3)_3 + \text{MV}^{•+} \rightarrow \text{addn.}$								
		$9.7 \times 10^8$	2		296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L <sup>-1</sup> H <sup>+</sup> , (1-5) $\times 10^{-4}$ mol L <sup>-1</sup> (CH <sub>3</sub> ) <sub>3</sub> CCH <sub>2</sub> Co(dmgH) <sub>2</sub> or (CH <sub>3</sub> ) <sub>3</sub> CCH <sub>2</sub> Co(cyclam) <sup>2+</sup> , (5-38) $\times 10^{-6}$ mol L <sup>-1</sup> MV <sup>•+</sup> .	91A428
		$7.6 \times 10^8$			298	f.p.	D.k. at 600 nm in soln. contg. RCo(dmgH) <sub>2</sub> and (1-8) $\times 10^{-5}$ mol L <sup>-1</sup> MV <sup>•+</sup> .	91A427
<b>6.7 Heptyl</b>								
<b>6.7.1 <math>\beta</math>-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion</b>								
${}^*\text{CH}_2(\text{CH}_2)_5\text{CH}_3 + \beta\text{-Ni}(\text{cyclam})^{2+} \rightarrow$								
		$7.8 \times 10^6$	0	1.0		f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> as indicator, alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515

TABLE 6. Miscellaneous Unsubstituted Alkyl and Alkenyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>6.7 Heptyl — Continued</b>								
<b>6.7.2 Oxygen</b>								
	$^{\bullet}\text{CH}_2(\text{CH}_2)_5\text{CH}_3 + \text{O}_2 \rightarrow \text{CH}_3(\text{CH}_2)_5\text{CH}_2\text{OO}^{\bullet}$	$1.6 \times 10^9$	0		298	f.p.	C.k. in soln. contg. 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> or RCo(cyclam) <sup>2+</sup> ; rel. to $k(^{\bullet}\text{CH}_2(\text{CH}_2)_5\text{CH}_3 + \beta\text{-Ni(cyclam)}^{2+}) = 7.8 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ .	91A176
<b>6.7.3 2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion</b>								
	$^{\bullet}\text{CH}_2(\text{CH}_2)_5\text{CH}_3 + \text{ABTS}^{\bullet-} \rightarrow \text{addn.}$	$1.2 \times 10^9$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> (from ABTS <sup>2-</sup> + Br <sub>2</sub> ), alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A315
<b>6.8 5-Hexenyl</b>								
<b>6.8.1 1,4,8,12-Tetraazacyclopentadecanechromium(II) ion</b>								
	$^{\bullet}\text{CH}_2(\text{CH}_2)_3\text{CH}=\text{CH}_2 + \text{Cr([15]aneN}_4)^{2+} \rightarrow \text{CH}_2=\text{CH}(\text{CH}_2)_3\text{CH}_2\text{Cr([15]aneN}_4)^{2+}$	$9 \times 10^6$				chem.	Calcd. from product anal. in soln. contg. Cr([15]aneN <sub>4</sub> ) <sup>2+</sup> and 6-bromo-1-hexene; $k(^{\bullet}\text{CH}_2(\text{CH}_2)_3\text{CH}=\text{CH}_2 \rightarrow c\text{-C}_5\text{H}_9\dot{\text{C}}\text{H}_2) = 1 \times 10^5 \text{ s}^{-1}$ .	79A461
<b>6.8.2 1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(I) ion</b>								
	$^{\bullet}\text{CH}_2(\text{CH}_2)_3\text{CH}=\text{CH}_2 + \text{Ni}(\text{Me}_4[14]\text{aneN}_4)^+ \rightarrow \text{CH}_2=\text{CH}(\text{CH}_2)_3\text{CH}_2\text{Ni}(\text{Me}_4[14]\text{aneN}_4)^+$	$4 \times 10^7$	alk.		273	chem.	Calcd. from product anal. in soln. contg. Ni(Me <sub>4</sub> [14]aneN <sub>4</sub> ) <sup>+</sup> and 6-bromo-1-hexene.	86A229
		$6 \times 10^7$			298			
		$\sim 3 \times 10^7$				phot.	Estd. from product yields.	86M180
<b>6.9 Hexyl</b>								
<b>6.9.1 Hexyl</b>								
	$^{\bullet}\text{CH}_2(\text{CH}_2)_4\text{CH}_3 + ^{\bullet}\text{CH}_2(\text{CH}_2)_4\text{CH}_3 \rightarrow$	$6 \times 10^8$				p.r.	D.k. at 240 nm in N <sub>2</sub> O-satd. soln. contg. hexane; $\epsilon = 960 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	680385
<b>6.9.2 <math>\beta</math>-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion</b>								
	$^{\bullet}\text{CH}_2(\text{CH}_2)_4\text{CH}_3 + \beta\text{-Ni(cyclam)}^{2+} \rightarrow \beta\text{-CH}_3(\text{CH}_2)_4\text{CH}_2\text{Ni}(\text{cyclam})^{2+}$	$9.0 \times 10^6$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> as indicator, alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
<b>6.9.3 Oxygen</b>								
	$^{\bullet}\text{CH}_2(\text{CH}_2)_4\text{CH}_3 + \text{O}_2 \rightarrow \text{CH}_3(\text{CH}_2)_4\text{CH}_2\text{OO}^{\bullet}$	$3.9 \times 10^9$	0		298	f.p.	C.k. in soln. contg. 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> or RCo(cyclam) <sup>2+</sup> ; rel. to $k(^{\bullet}\text{CH}_2(\text{CH}_2)_4\text{CH}_3 + \beta\text{-Ni(cyclam)}^{2+}) = 9.0 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ .	91A176
<b>6.9.4 2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion</b>								
	$^{\bullet}\text{CH}_2(\text{CH}_2)_4\text{CH}_3 + \text{ABTS}^{\bullet-} \rightarrow \text{addn.}$	$1.1 \times 10^9$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> (from ABTS <sup>2-</sup> + Br <sub>2</sub> ), alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
<b>6.10 1-Methylheptyl</b>								
<b>6.10.1 <math>\alpha</math>-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion</b>								
	$^{\bullet}\text{CH}(\text{CH}_3)(\text{CH}_2)_5\text{CH}_3 + \alpha\text{-Ni(cyclam)}^{2+} \rightarrow \alpha\text{-CH}_3(\text{CH}_2)_5\text{CH}(\text{CH}_3)\text{Ni}(\text{cyclam})^{2+}$	$1.0 \times 10^7$	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> as indicator, alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
<b>6.10.2 Oxygen</b>								
	$^{\bullet}\text{CH}(\text{CH}_3)(\text{CH}_2)_5\text{CH}_3 + \text{O}_2 \rightarrow \text{CH}_3(\text{CH}_2)_5\text{CH}(\text{CH}_3)\text{OO}^{\bullet}$	$3.7 \times 10^9$	1		298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> as indicator and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> or RCo(cyclam) <sup>2+</sup> .	91A176
<b>6.10.3 2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion</b>								
	$^{\bullet}\text{CH}(\text{CH}_3)(\text{CH}_2)_5\text{CH}_3 + \text{ABTS}^{\bullet-} \rightarrow \text{addn.}$	$1.0 \times 10^9$	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> (from ABTS <sup>2-</sup> + Br <sub>2</sub> ), alkylcobalt(III) complex and 6.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515

TABLE 6. Miscellaneous Unsubstituted Alkyl and Alkenyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>6.11 1-Methylpropyl</b>								
6.11.1	1,4,8,12-Tetraazacyclopentadecanechromium(II) ion							
	$\cdot\text{CH}(\text{CH}_3)\text{C}_2\text{H}_5 + \text{Cr}([\text{15}]\text{aneN}_4)^{2+} \rightarrow \text{C}_2\text{H}_5\text{CH}(\text{CH}_3)\text{Cr}([\text{15}]\text{aneN}_4)^{2+}$	$3.9 \times 10^7$			298	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and RCo(dmgH) <sub>2</sub> .	91A427
6.11.2	$\alpha$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion							
	$\cdot\text{CH}(\text{CH}_3)\text{C}_2\text{H}_5 + \alpha\text{-Ni}(\text{cyclam})^{2+} \rightarrow \alpha\text{-C}_2\text{H}_5\text{CH}(\text{CH}_3)\text{Ni}(\text{cyclam})^{2+}$	$6.5 \times 10^6$	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator, alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
6.11.3	Oxygen							
	$\cdot\text{CH}(\text{CH}_3)\text{C}_2\text{H}_5 + \text{O}_2 \rightarrow \text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{OO}^\cdot$	$3.2 \times 10^9$	1		298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> or RCo(cyclam) <sup>2+</sup> .	91A176
6.11.4	2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion							
	$\cdot\text{CH}(\text{CH}_3)\text{C}_2\text{H}_5 + \text{ABTS}^{2-} \rightarrow \text{addn.}$	$1.1 \times 10^9$	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>2-</sup> (from ABTS <sup>2-</sup> + Br <sub>2</sub> ), alkylcobalt(III) complex and 6.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
6.11.5	1,1'-Dimethyl-4,4'-bipyridinium radical cation							
	$\cdot\text{CH}(\text{CH}_3)\text{C}_2\text{H}_5 + \text{MV}^{2+} \rightarrow \text{addn.}$	$1.1 \times 10^9$			298	f.p.	D.k. at 600 nm in soln. contg. RCo(dmgH) <sub>2</sub> and $(1-8) \times 10^{-5}$ mol L <sup>-1</sup> MV <sup>+</sup> .	91A427
<b>6.12 2-Methylpropyl</b>								
6.12.1	1,4,8,12-Tetraazacyclopentadecanechromium(II) ion							
	$\cdot\text{CH}_2\text{CH}(\text{CH}_3)_2 + \text{Cr}([\text{15}]\text{aneN}_4)^{2+} \rightarrow (\text{CH}_3)_2\text{CHCH}_2\text{Cr}([\text{15}]\text{aneN}_4)^{2+}$	$7.3 \times 10^7$			298	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and RCo(dmgH) <sub>2</sub> .	91A427
6.12.2	$\alpha$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion							
	$\cdot\text{CH}_2\text{CH}(\text{CH}_3)_2 + \alpha\text{-Ni}(\text{cyclam})^{2+} \rightarrow \alpha\text{-}(\text{CH}_3)_2\text{CHCH}_2\text{Ni}(\text{cyclam})^{2+}$	$3.4 \times 10^7$	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator, alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
6.12.3	$\beta$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion							
	$\cdot\text{CH}_2\text{CH}(\text{CH}_3)_2 + \beta\text{-Ni}(\text{cyclam})^{2+} \rightarrow <2 \times 10^5$	0	1.0		298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator, alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
6.12.4	Oxygen							
	$\cdot\text{CH}_2\text{CH}(\text{CH}_3)_2 + \text{O}_2 \rightarrow (\text{CH}_3)_2\text{CHCH}_2\text{OO}^\cdot$	$3.2 \times 10^9$	1		298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> or RCo(cyclam) <sup>2+</sup> .	91A176
6.12.5	Vanadium(II) ion							
	$\cdot\text{CH}_2\text{CH}(\text{CH}_3)_2 + \text{V}^{2+} + \text{H}^+ \rightarrow (\text{CH}_3)_2\text{CHCH}_3 + \text{V}^{3+}$	$3.5 \times 10^5$	2		296	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator, $0.01-0.03$ mol L <sup>-1</sup> H <sup>+</sup> , $(1-5) \times 10^{-4}$ mol L <sup>-1</sup> ( $\text{CH}_3)_2\text{CHCH}_2\text{Co}(\text{dmgH})_2$ or ( $\text{CH}_3)_2\text{CHCH}_2\text{Co}(\text{cyclam})^{2+}$ and $0.01-0.06$ mol L <sup>-1</sup> V <sup>2+</sup> .	91A428
6.12.6	2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion							
	$\cdot\text{CH}_2\text{CH}(\text{CH}_3)_2 + \text{ABTS}^{2-} \rightarrow \text{addn.}$	$1.1 \times 10^9$ $8.7 \times 10^8$	0 6.0	1.0 6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>2-</sup> (from ABTS <sup>2-</sup> + Br <sub>2</sub> ), alkylcobalt(III) complex and 1.0 or 6.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
6.12.7	1,1'-Dimethyl-4,4'-bipyridinium radical cation							
	$\cdot\text{CH}_2\text{CH}(\text{CH}_3)_2 + \text{MV}^{2+} \rightarrow \text{addn.}$	$9.2 \times 10^8$			298	f.p.	D.k. at 600 nm in soln. contg. RCo(dmgH) <sub>2</sub> and $(1-8) \times 10^{-5}$ mol L <sup>-1</sup> MV <sup>+</sup> .	91A427
		$1.2 \times 10^9$	2		296	f.p.	D.k. in soln. contg. $0.01-0.03$ mol L <sup>-1</sup> H <sup>+</sup> , $(1-5) \times 10^{-4}$ mol L <sup>-1</sup> ( $\text{CH}_3)_2\text{CHCH}_2\text{Co}(\text{dmgH})_2$ or ( $\text{CH}_3)_2\text{CHCH}_2\text{Co}(\text{cyclam})^{2+}$ , $(5-38) \times 10^{-6}$ mol L <sup>-1</sup> MV <sup>+</sup> .	91A428

TABLE 6. Miscellaneous Unsubstituted Alkyl and Alkenyl Radicals --- Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T$ (K)	Method	Comment	Ref.
<b>6.13 Octyl</b>								
<b>6.13.1 <math>\alpha</math>-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion</b>								
	${}^{\circ}\text{CH}_2(\text{CH}_2)_6\text{CH}_3 + \alpha\text{-Ni(cyclam)}^{2+} \rightarrow {}^{\circ}\text{CH}_3(\text{CH}_2)_6\text{CH}_2\text{Ni(cyclam)}^{2+}$	$1.6 \times 10^8$	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> as indicator, alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
<b>6.13.2 <math>\beta</math>-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion</b>								
	${}^{\circ}\text{CH}_2(\text{CH}_2)_6\text{CH}_3 + \beta\text{-Ni(cyclam)}^{2+} \rightarrow {}^{\circ}\text{CH}_3(\text{CH}_2)_6\text{CH}_2\text{Ni(cyclam)}^{2+}$	$8.1 \times 10^6$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> as indicator, alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
<b>6.13.3 Oxygen</b>								
	${}^{\circ}\text{CH}_2(\text{CH}_2)_6\text{CH}_3 + \text{O}_2 \rightarrow \text{CH}_3(\text{CH}_2)_6\text{CH}_2\text{OO}^{\bullet}$	$2.4 \times 10^9$	0		298	f.p.	C.k. in soln. contg. 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> or RCo(cyclam) <sup>2+</sup> ; rel. to $k({}^{\circ}\text{CH}_2(\text{CH}_2)_6\text{CH}_3 + \beta\text{-Ni(cyclam)}^{2+}) = 8.1 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ .	91A176
<b>6.13.4 2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion</b>								
	${}^{\circ}\text{CH}_2(\text{CH}_2)_6\text{CH}_3 + \text{ABTS}^{\bullet-} \rightarrow \text{addn.}$	$1.3 \times 10^9$ $1.1 \times 10^9$	0 6.0	1.0 6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> (from ABTS <sup>2-</sup> + Br <sub>2</sub> ), alkylcobalt(III) complex and 1.0 or 6.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
<b>6.14 Pentyl</b>								
<b>6.14.1 Pentyl</b>								
	${}^{\circ}\text{CH}_2(\text{CH}_2)_3\text{CH}_3 + {}^{\circ}\text{CH}_2(\text{CH}_2)_3\text{CH}_3 \rightarrow$	$1.2 \times 10^9$			297	p.r.	D.k. at 234 nm in N <sub>2</sub> O-satd. soln. contg. pentane.	741019
<b>6.14.2 <math>\beta</math>-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion</b>								
	${}^{\circ}\text{CH}_2(\text{CH}_2)_3\text{CH}_3 + \beta\text{-Ni(cyclam)}^{2+} \rightarrow {}^{\circ}\text{CH}_3(\text{CH}_2)_3\text{CH}_2\text{Ni(cyclam)}^{2+}$	$8.6 \times 10^6$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> as indicator, alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
<b>6.14.3 Oxygen</b>								
	${}^{\circ}\text{CH}_2(\text{CH}_2)_3\text{CH}_3 + \text{O}_2 \rightarrow \text{CH}_3(\text{CH}_2)_3\text{CH}_2\text{OO}^{\bullet}$	$3.8 \times 10^9$	0		298	f.p.	C.k. in soln. contg. 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> or RCo(cyclam) <sup>2+</sup> ; rel. to $k({}^{\circ}\text{CH}_2(\text{CH}_2)_3\text{CH}_3 + \beta\text{-Ni(cyclam)}^{2+}) = 8.6 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ .	91A176
<b>6.14.4 2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion</b>								
	${}^{\circ}\text{CH}_2(\text{CH}_2)_3\text{CH}_3 + \text{ABTS}^{\bullet-} \rightarrow \text{addn.}$	$1.2 \times 10^9$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> (from ABTS <sup>2-</sup> + Br <sub>2</sub> ), alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
<b>6.15 Radicals from pentane</b>								
<b>6.15.1 Hydrogen peroxide</b>								
	${}^{\circ}\text{C}_5\text{H}_{11} + \text{H}_2\text{O}_2 \rightarrow$	$3.4 \times 10^4$				$\gamma$ -r.	Estd. from dose rate effect on $G(\text{H}_2\text{O}_2)$ , assuming $2k(R + R) \approx 2 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ in soln. contg. $5 \times 10^{-3}$ mol L <sup>-1</sup> pentane and 0.01 mol L <sup>-1</sup> N <sub>2</sub> O.	76A254
<b>6.16 2-Phenylethyl</b>								
<b>6.16.1 2-Phenylethyl</b>								
	$\text{C}_6\text{H}_5\text{CH}_2\dot{\text{C}}\text{H}_2 + \text{C}_6\text{H}_5\text{CH}_2\dot{\text{C}}\text{H}_2 \rightarrow$	$\sim 2 \times 10^9$				p.r.	D.k. at 309 nm; $\epsilon = 4300-4000 \text{ L mol}^{-1} \text{ cm}^{-1}$ ; radical from 3-phenylpropanoic acid.	81A236
<b>6.17 2-Propenyl</b>								
<b>6.17.1 1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(I) ion</b>								
	${}^{\circ}\text{CH}_2\text{CH}=\text{CH}_2 + \text{Ni(Me}_4[14]\text{aneN}_4)^+ \rightarrow <10^6$					phot.	Estd. from product yields.	86M180

TABLE 6. Miscellaneous Unsubstituted Alkyl and Alkenyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
<b>6.18 Trimethylcyclopropenyl</b>								
<b>6.18.1 Trimethylcyclopropenium cation</b>								
	Cy <sup>·</sup> + Cy <sup>+</sup> → Cy <sub>2</sub> <sup>+</sup>	8.3 × 10 <sup>8</sup>		5.1		298	p.r.	P.b.k. in soln. contg. 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH 82A395 and trimethylcyclopropenyl fluoroborate.
<b>6.19 Vinyl</b>								
<b>6.19.1 Oxygen</b>								
	'CH=CH <sub>2</sub> + O <sub>2</sub> → H <sub>2</sub> C=CHOO <sup>·</sup>	4.6 × 10 <sup>9</sup>				p.r.	P.b.k. in Ar/O <sub>2</sub> (9:1) satd. soln. contg. vinyl bromide.	94A221
<b>6.19.2 2-Propanol</b>								
	'CH=CH <sub>2</sub> + 2-PrOH → H <sub>2</sub> C=CH <sub>2</sub> + (CH <sub>3</sub> ) <sub>2</sub> COH	2.0 × 10 <sup>5</sup>				p.r.	C.k. in Ar/O <sub>2</sub> (10:1) satd. soln. contg. vinyl bromide and 2-PrOH; rel. to <i>k</i> ('CH=CH <sub>2</sub> + O <sub>2</sub> ) = 4.6 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	94A221

TABLE 7. Bromomethyl

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	I	T (K)	Method	Comment	Ref.
7.1	<i>N</i> -meso-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion $^*\text{CH}_2\text{Br} + N\text{-meso-Co}(4,11\text{-dieneN}_4)^{2+} \rightarrow \text{BrCH}_2\text{Co}(4,11\text{-dieneN}_4)^{2+}$	$1.5 \times 10^8$	1.3-7	296	f.p.	D.k. at 650 nm in soln. contg. MV <sup>++</sup> as indicator and BrCH <sub>2</sub> Co(cyclam) <sup>2+</sup> .	89A530	
7.2	Cobal(II)amin $^*\text{CH}_2\text{Br} + \text{B12r} \rightarrow \text{addn.}$	$9.1 \times 10^8$	7	296	f.p.	D.k. at 470 nm, as well as p.b.k. at 520 nm, in soln. contg. BrCH <sub>2</sub> Co(cyclam) <sup>2+</sup> and cobal(II)amin.	89A530	
7.3	Chromium(II) ion $^*\text{CH}_2\text{Br} + \text{Cr}^{2+} \rightarrow \text{CrCH}_2\text{Br}^{2+}$	$2.2 \times 10^8$	<2	297	f.p.	D.k. at 650 nm in soln. contg. MV <sup>++</sup> as indicator and BrCH <sub>2</sub> Co(cyclam) <sup>2+</sup> .	89A338	
7.4	1,4,8,12-Tetraazacyclopentadecanechromium(II) ion $^*\text{CH}_2\text{Br} + \text{Cr}([15]\text{janeN}_4)^{2+} \rightarrow \text{BrCH}_2\text{Cr}([15]\text{janeN}_4)^{2+}$	$1.3 \times 10^8$		298	f.p.	D.k. at 650 nm in soln. contg. MV <sup>++</sup> as indicator and BrCH <sub>2</sub> Co(cyclam) <sup>2+</sup> .	91A427	
7.5	Tris(1,10-phenanthroline)iron(III) ion $^*\text{CH}_2\text{Br} + \text{Fe}(\text{phen})_3^{3+} \rightarrow \text{redn.}$	$\leq 10^7$	~1		p.r.	P.b.k. at 490 nm in soln. contg. CH <sub>3</sub> Br; result unaffected by presence of <i>tert</i> -BuOH, therefore main reaction is with $^*\text{CH}_3$ .	85A284	
7.6	$\alpha$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion $^*\text{CH}_2\text{Br} + \alpha\text{-Ni}(\text{cyclam})^{2+} \rightarrow \alpha\text{-BrCH}_2\text{Ni}(\text{cyclam})(\text{H}_2\text{O})^{2+}$	$3.7 \times 10^8$	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>--</sup> as indicator, alkylcobalt(III) complex and 6.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
7.7	$\beta$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion $^*\text{CH}_2\text{Br} + \beta\text{-Ni}(\text{cyclam})^{2+} \rightarrow \beta\text{-BrCH}_2\text{Ni}(\text{cyclam})(\text{H}_2\text{O})^{2+}$	$4.8 \times 10^7$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>--</sup> as indicator, alkylcobalt(III) complex and 6.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
7.8	Oxygen $^*\text{CH}_2\text{Br} + \text{O}_2 \rightarrow \text{CH}_2\text{BrOO}^*$	$2.0 \times 10^9$	0		298	f.p.	C.k. in soln. contg. 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> or RCo(cyclam) <sup>2+</sup> ; rel. to $k(^*\text{CH}_2\text{Br} + \beta\text{-Ni}(\text{cyclam})^{2+}) = 4.8 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ .	91A176
7.9	Vanadium(II) ion $^*\text{CH}_2\text{Br} + \text{V}^{2+} + \text{H}^+ \rightarrow \text{CH}_3\text{Br} + \text{V}^{3+}$	$3.1 \times 10^5$	2		296	f.p.	D.k. at 650 nm in soln. contg. MV <sup>++</sup> as indicator, 0.01-0.03 mol L <sup>-1</sup> H <sup>+</sup> , (1-5) $\times 10^{-4}$ mol L <sup>-1</sup> BrCH <sub>2</sub> Co(dmgH) <sub>2</sub> or BrCH <sub>2</sub> Co(cyclam) <sup>2+</sup> , (5-38) $\times 10^{-6}$ mol L <sup>-1</sup> MV <sup>++</sup> , and 0.01-0.06 mol L <sup>-1</sup> V <sup>2+</sup> .	91A428
7.10	2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion $^*\text{CH}_2\text{Br} + \text{ABTS}^{--} \rightarrow \text{addn.}$	$2.0 \times 10^9$ $2.3 \times 10^9$	0 6.0	1.0 6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>--</sup> (from ABTS <sup>2-</sup> + Br <sub>2</sub> ), alkylcobalt(III) complex and 1.0 or 6.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
7.11	1,1'-Dimethyl-4,4'-bipyridinium radical cation $^*\text{CH}_2\text{Br} + \text{MV}^{++} \rightarrow$	$2.1 \times 10^9$  $1.5 \times 10^9$  $2.1 \times 10^9$	2  ~2	296  298  297	f.p.  f.p.  f.p.	D.k. in soln. contg. 0.01-0.03 mol L <sup>-1</sup> H <sup>+</sup> , (1-5) $\times 10^{-4}$ mol L <sup>-1</sup> BrCH <sub>2</sub> Co(dmgH) <sub>2</sub> or BrCH <sub>2</sub> Co(cyclam) <sup>2+</sup> , (5-38) $\times 10^{-6}$ mol L <sup>-1</sup> MV <sup>++</sup> . D.k. at 600 nm in N <sub>2</sub> O-satd. soln. contg. RCo(dmgH) <sub>2</sub> and (1-8) $\times 10^{-5}$ mol L <sup>-1</sup> MV <sup>++</sup> . D.k. at 600 nm (MV <sup>++</sup> , $\epsilon = 1.37 \times 10^4 \text{ L mol}^{-1} \text{ cm}^{-1}$ , 0.01-0.1 mol L <sup>-1</sup> ); MV <sup>++</sup> from Zn/Hg redn. of MV <sup>2+</sup> ; (2-4) $\times 10^{-6}$ mol L <sup>-1</sup> radical from photolysis of BrCH <sub>2</sub> Co(cyclam)(H <sub>2</sub> O) <sup>2+</sup> .	91A428 91A427 89A338	

TABLE 8. Chloromethyl

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T(K)	Method	Comment	Ref.
8.1	Cobal(II)amin $\cdot\text{CH}_2\text{Cl} + \text{B12r} \rightarrow \text{addn.}$	$5.8 \times 10^8$	7		296	f.p.	D.k. at 470 nm, as well as p.b.k. at 520 nm, in soln. contg. $\text{ClCH}_2\text{Co}(\text{cyclam})^{2+}$ and cobal(II)amin.	89A530
8.2	Chromium(II) ion $\cdot\text{CH}_2\text{Cl} + \text{Cr}^{2+} \rightarrow \text{CrCH}_2\text{Cl}^{2+}$	$2.4 \times 10^8$	<2		297	f.p.	D.k. at 600 nm in soln. contg. $\text{MV}^{+}$ as indicator and $\text{ClCH}_2\text{Co}(\text{cyclam})^{2+}$ .	89A338
8.3	1,4,8,12-Tetraazacyclopentadecanechromium(II) ion $\cdot\text{CH}_2\text{Cl} + \text{Cr}([\text{15}]\text{aneN}_4)^{2+} \rightarrow \text{ClCH}_2\text{Cr}([\text{15}]\text{aneN}_4)^{2+}$	$9.3 \times 10^7$			298	f.p.	D.k. at 600 nm in soln. contg. $\text{MV}^{+}$ as indicator and $\text{RCO}(\text{dmgH})_2$ .	91A427
8.4	Iron(II) deuteroporphyrin IX $\cdot\text{CH}_2\text{Cl} + \text{Fe(II)DP} \rightarrow$	$2 \times 10^9$	7.2			p.r.	Abs. changes in soln. contg. deuterohemin (chemically reduced by dithionite), 0.04 mol L <sup>-1</sup> $\text{CH}_2\text{Cl}_2$ and 6.5 mol L <sup>-1</sup> 2-PrOH.	80A011
8.5	Ferricyanide ion $\cdot\text{CH}_2\text{Cl} + \text{Fe}(\text{CN})_6^{3-} \rightarrow$	$<5 \times 10^5$	4-6		295	p.r.	D.k. at 420 nm in $\text{N}_2\text{O}$ -saturated soln. contg. dichloromethane.	82A041
8.6	Hexachloroiridate(IV) ion $\cdot\text{CH}_2\text{Cl} + \text{IrCl}_6^{2-} \rightarrow \text{CH}_2\text{Cl}_2 + \text{IrCl}_5^{2-}$	$\sim 1 \times 10^9$	4-6		295	p.r.	D.k. at 490 nm in $\text{N}_2\text{O}$ -saturated soln. contg. dichloromethane.	82A041
8.7	Permanganate ion $\cdot\text{CH}_2\text{Cl} + \text{MnO}_4^- \rightarrow$	$\sim 1 \times 10^9$	4-6		295	p.r.	D.k. at 545 nm in $\text{N}_2\text{O}$ -saturated soln. contg. dichloromethane.	82A041
8.8	$\alpha$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion $\cdot\text{CH}_2\text{Cl} + \alpha\text{-Ni}(\text{cyclam})^{2+} \rightarrow \alpha\text{-ClCH}_2\text{Ni}(\text{cyclam})(\text{H}_2\text{O})^{2+}$	$2.1 \times 10^8$	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>+</sup> as indicator and alkylcobalt(III) complex.	91A515
8.9	$\beta$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion $\cdot\text{CH}_2\text{Cl} + \beta\text{-Ni}(\text{cyclam})^{2+} \rightarrow \beta\text{-ClCH}_2\text{Ni}(\text{cyclam})(\text{H}_2\text{O})^{2+}$	$1.9 \times 10^7$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>+</sup> as indicator and alkylcobalt(III) complex.	91A515
8.10	Oxygen $\cdot\text{CH}_2\text{Cl} + \text{O}_2 \rightarrow \text{ClCH}_2\text{OO}^\cdot$	$1.9 \times 10^9$	0		298	f.p.	C.k. in $\text{O}_2$ contg. 1.0 mol L <sup>-1</sup> $\text{HClO}_4$ ; alkyl radical from $\text{RCO}(\text{dmgH})_2\text{OH}_2$ or $\text{RCO}(\text{cyclam})\text{H}_2\text{O}^{2+}$ ; rel. to $k(\cdot\text{CH}_2\text{Cl} + \beta\text{-Ni}(\text{cyclam})^{2+}) = 1.9 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ .	91A176
8.11	Vanadium(II) ion $\cdot\text{CH}_2\text{Cl} + \text{V}^{2+} + \text{H}^+ \rightarrow \text{CH}_3\text{Cl} + \text{V}^{3+}$	$1.5 \times 10^5$	2		296	f.p.	D.k. at 600 nm in soln. contg. $\text{MV}^{+}$ as indicator, 0.01-0.03 mol L <sup>-1</sup> $\text{H}^+$ , $(1.5) \times 10^{-4}$ mol L <sup>-1</sup> $\text{ClCH}_2\text{Co}(\text{dmgH})_2$ or $\text{ClCH}_2\text{Co}(\text{cyclam})^{2+}$ and 0.01-0.06 mol L <sup>-1</sup> $\text{V}^{2+}$ .	91A428
8.12	2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion $\cdot\text{CH}_2\text{Cl} + \text{ABTS}^{2-} \rightarrow \text{addn.}$	$1.2 \times 10^9$	0	1.0, 6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>2-</sup> (from $\text{ABTS}^{2-} + \text{Br}_2$ ), alkylcobalt(III) complex and 1.0 or 6.0 mol L <sup>-1</sup> $\text{HClO}_4$ .	91A515
8.13	1,1'-Dimethyl-4,4'-bipyridinium radical cation $\cdot\text{CH}_2\text{Cl} + \text{MV}^{+} \rightarrow$	$1.2 \times 10^9$	2		296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L <sup>-1</sup> $\text{H}^+$ , $(1.5) \times 10^{-4}$ mol L <sup>-1</sup> $\text{ClCH}_2\text{Co}(\text{dmgH})_2$ or $\text{ClCH}_2\text{Co}(\text{cyclam})^{2+}$ , $(5.38) \times 10^{-6}$ mol L <sup>-1</sup> $\text{MV}^{+}$ .	91A428

TABLE 8. Chloromethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>8.13 1,1'-Dimethyl-4,4'-bipyridinium radical cation — Continued</b>								
		$1.1 \times 10^9$		298	f.p.	D.k. at 600 nm in N <sub>2</sub> O-satd. soln. contg. RCO(dmgH) <sub>2</sub> and (1-8) × 10 <sup>-5</sup> mol L <sup>-1</sup> MV <sup>•+</sup> .	91A427	
		$1.4 \times 10^9$	<2	297	f.p.	D.k. at 600 nm (MV <sup>•+</sup> , $\epsilon = 1.37 \times 10^4$ L mol <sup>-1</sup> cm <sup>-1</sup> , 0.1-1 × 10 <sup>-1</sup> mol L <sup>-1</sup> ); MV <sup>•+</sup> from Zn/Hg redn. of MV <sup>2+</sup> ; 2-4 × 10 <sup>-6</sup> mol L <sup>-1</sup> radical from photolysis of ClCH <sub>2</sub> Co(cyclam)(H <sub>2</sub> O) <sup>2+</sup> .	89A338	

TABLE 9. Trifluoromethyl

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T$ (K)	Method	Comment	Ref.
9.1	Iron(II) deuteroporphyrin IX $^{\bullet}\text{CF}_3 + \text{DPFe}^{\text{II}} \rightarrow \text{CF}_3\text{Fe}^{\text{III}}\text{DP}$	$2.0 \times 10^9$	alk.			p.r.	P.b.k. at 460 nm in $\text{CF}_3\text{Br}$ satd. soln. contg. $6.5 \text{ mol L}^{-1}$ 2-PrOH, $10^{-4} \text{ mol L}^{-1}$ $\text{DPFe}^{\text{II}}$ and $0.05 \text{ mol L}^{-1}$ NaOH.	87A232
9.2	Iron(III) deuteroporphyrin IX $^{\bullet}\text{CF}_3 + \text{DPFe}^{\text{III}} \rightarrow$	$4.5 \times 10^8$	alk.			p.r.	D.k. at 520 nm in $\text{CF}_3\text{Br}$ satd. soln. contg. $6.5 \text{ mol L}^{-1}$ 2-PrOH, $10^{-4} \text{ mol L}^{-1}$ $\text{DPFe}^{\text{III}}$ and $0.05 \text{ mol L}^{-1}$ NaOH.	87A232
9.3	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatomanganese(III) ion $^{\bullet}\text{CF}_3 + \text{MnTPPS}^{3-} \rightarrow \text{addn.}$	$9.2 \times 10^7$	11.4		295	p.r.	Absorption changes at 530 and 590 nm in soln. contg. $\text{CF}_3\text{Br}$ , 1% 2-PrOH, and $5 \times 10^{-5} \text{ mol L}^{-1}$ MnTPPS <sup>3-</sup> .	92A391
9.4	Aniline $^{\bullet}\text{CF}_3 + \text{C}_6\text{H}_5\text{NH}_2 \rightarrow \text{addn.}$	$5.6 \times 10^6$	9-10			p.r.	C.k.; rel. to $k(^{\bullet}\text{CF}_3 + \text{HCO}_2^-) = 3.4 \times 10^5 \text{ L mol}^{-1} \text{s}^{-1}$ .	700407
		$4.7 \times 10^6$	9-10			p.r.	P.b.k. at 330 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $\text{CF}_3\text{Cl}$ .	700407
9.5	Butadiene $^{\bullet}\text{CF}_3 + \text{H}_2\text{C}=\text{CHCH=CH}_2 \rightarrow \text{addn.}$	$5.8 \times 10^8$	9-10			$\gamma$ -r.	C.k. with 2-PrOH in soln. contg. $\text{CF}_3\text{Cl}$ ; rel. to $k(^{\bullet}\text{CF}_3 + \text{HCO}_2^-) = 3.4 \times 10^5 \text{ L mol}^{-1} \text{s}^{-1}$ .	700407
9.6	1-Butene $^{\bullet}\text{CF}_3 + \text{CH}_3\text{CH}_2\text{CH=CH}_2 \rightarrow \text{addn.}$	$5.3 \times 10^7$	9-10			$\gamma$ -r.	C.k. with 2-PrOH in soln. contg. $\text{CF}_3\text{Cl}$ ; rel. to $k(^{\bullet}\text{CF}_3 + \text{HCO}_2^-) = 3.4 \times 10^5 \text{ L mol}^{-1} \text{s}^{-1}$ .	700407
9.7	Ethanol $^{\bullet}\text{CF}_3 + \text{EtOH} \rightarrow \text{CF}_3\text{H} + \text{CH}_3\text{CHOH}$	$4.6 \times 10^4$	9-10			$\gamma$ -r.	C.k. with propylene; rel. to $k(^{\bullet}\text{CF}_3 + \text{HCO}_2^-) = 3.4 \times 10^5 \text{ L mol}^{-1} \text{s}^{-1}$ .	700407
9.8	Ethylene $^{\bullet}\text{CF}_3 + \text{H}_2\text{C=CH}_2 \rightarrow \text{CF}_3\text{CH}_2\dot{\text{C}}\text{H}_2$	$\sim 7 \times 10^8$	5.9			p.r.	Estd. from yields and condy. meas. in soln. contg. $\text{CF}_3\text{Cl}$ and ethylene.	710026
		$4.0 \times 10^7$	9-10			$\gamma$ -r.	C.k. with 2-PrOH; rel. to $k(^{\bullet}\text{CF}_3 + \text{HCO}_2^-) = 3.4 \times 10^5 \text{ L mol}^{-1} \text{s}^{-1}$ .	700407
9.9	Formate ion $^{\bullet}\text{CF}_3 + \text{HCO}_2^- \rightarrow \text{CF}_3\text{H} + ^{\bullet}\text{CO}_2^-$	$3.4 \times 10^5$	9-10			p.r.	P.b.k. at 270 nm; radical from $\text{CF}_3\text{Cl} + e_{\text{aq}}$ .	700407
9.10	Fumarate ion $^{\bullet}\text{CF}_3 + \text{trans-}^{\bullet}\text{O}_2\text{CCH=CHCO}_2^- \rightarrow \text{O}_2\text{CCHCH}(\text{CF}_3)\text{CO}_2^-$	$\sim 10^8$				e-r.	Estd. from esr measurements of $^{\bullet}\text{CF}_3$ trapping by $0.001 \text{ mol L}^{-1}$ fumarate ion.	710284
9.11	Methanol $^{\bullet}\text{CF}_3 + \text{MeOH} \rightarrow \text{CF}_3\text{H} + ^{\bullet}\text{CH}_2\text{OH}$	$8 \times 10^3$	9-10			$\gamma$ -r.	C.k. with propylene; rel. to $k(^{\bullet}\text{CF}_3 + \text{HCO}_2^-) = 3.4 \times 10^5 \text{ L mol}^{-1} \text{s}^{-1}$ .	700407
9.12	aci-Nitromethane anion $^{\bullet}\text{CF}_3 + \text{CH}_2\text{NO}_2^- \rightarrow \text{CF}_3\text{CH}_2\dot{\text{N}}\text{O}_2^-$	$5 \times 10^8$				$\gamma$ -r.	C.k. in soln. contg. $1 \text{ mol L}^{-1}$ 2-PrOH and $\text{CF}_3\text{Cl}$ ; product radical identified by esr; rel. to $k(^{\bullet}\text{CF}_3 + 2\text{-PrOH}) = 9 \times 10^4 \text{ L mol}^{-1} \text{s}^{-1}$ .	720244
9.13	1-Propanol $^{\bullet}\text{CF}_3 + 1\text{-PrOH} \rightarrow$	$4.4 \times 10^4$	9-10			$\gamma$ -r.	C.k. with propylene; rel. to $k(^{\bullet}\text{CF}_3 + \text{HCO}_2^-) = 3.4 \times 10^5 \text{ L mol}^{-1} \text{s}^{-1}$ .	700407
9.14	2-Propanol $^{\bullet}\text{CF}_3 + 2\text{-PrOH} \rightarrow \text{CF}_3\text{H} + (\text{CH}_3)_2\text{COH}$	$9.2 \times 10^4$	9-10			$\gamma$ -r.	C.k. with propylene; rel. to $k(^{\bullet}\text{CF}_3 + \text{HCO}_2^-) = 3.4 \times 10^5 \text{ L mol}^{-1} \text{s}^{-1}$ .	700407

TABLE 9. Trifluoromethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
9.15	Propylene $^{\bullet}\text{CF}_3 + \text{CH}_3\text{CH}=\text{CH}_2 \rightarrow \text{addn.}$	$7.2 \times 10^7$	9-10			$\gamma$ -r.	C.k. with 2-PrOH; radical from $\text{CF}_3\text{Cl}$ ; rel. to $k(^{\bullet}\text{CF}_3 + \text{HCO}_2^-) = 3.4 \times 10^5 \text{ L mol}^{-1} \text{ s}^{-1}$ .	700407

TABLE 10. Trichloromethyl

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>J</i>	T(K)	Method	Comment	Ref.
10.1	Trichloromethyl $^{*}\text{CCl}_3 + ^{*}\text{CCl}_3 \rightarrow \text{CCl}_3\text{CCl}_3$	$3.7 \times 10^8$	5.5-12			p.r.	D.k. at 230 nm in soln. contg. $10^{-4}$ mol L <sup>-1</sup> CCl <sub>4</sub> ; $\epsilon = 2300$ L mol <sup>-1</sup> cm <sup>-1</sup> .	741043
10.2	Copper(II) ion $^{*}\text{CCl}_3 + \text{Cu}^{2+} \rightarrow \text{CuCCl}_3^{2+}$	$\sim 3 \times 10^7$	6			p.r.	P.b.k. in Ar-satd. soln. contg. $(2\text{-}10) \times 10^{-5}$ mol L <sup>-1</sup> CuSO <sub>4</sub> and $(1\text{-}10) \times 10^{-2}$ mol L <sup>-1</sup> CHCl <sub>3</sub> . Adduct yields Cu <sup>+</sup> .	80A277
10.3	Iron(II) deuteroporphyrin IX $^{*}\text{CCl}_3 + \text{DPFe}^{\text{II}} \rightarrow$	$\sim 2 \times 10^9$	7.2			p.r.	Abs. changes in soln. contg. 50% 2-PrOH, 0.032 mol L <sup>-1</sup> acetone, CCl <sub>4</sub> , and deuterohemin, the latter reduced by (CH <sub>3</sub> ) <sub>2</sub> COH.	80A011
10.4	Iron(III) deuteroporphyrin IX $^{*}\text{CCl}_3 + \text{DPFe}^{\text{III}} \rightarrow$	$\leq 10^6$	7.2			p.r.	No spectral change in soln. contg. 50% 2-PrOH, 0.005 mol L <sup>-1</sup> CCl <sub>4</sub> and $10^{-4}$ mol L <sup>-1</sup> deuterohemin.	80A011
10.5	Hexachloroiridate(IV) ion $^{*}\text{CCl}_3 + \text{IrCl}_6^{2-} \rightarrow \text{IrCl}_5^{2-} + \text{CCl}_4$	$2.8 \times 10^7$	4-6	295	p.r.		D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. carbon tetrachloride.	82A041
10.6	Permanganate ion $^{*}\text{CCl}_3 + \text{MnO}_4^- \rightarrow \text{MnO}_4^{2-} + \text{other prod.}$	$4 \times 10^8$	4-6	295	p.r.		D.k. at 545 nm in N <sub>2</sub> O-satd. soln. contg. carbon tetrachloride.	82A041
10.7	Oxygen $^{*}\text{CCl}_3 + \text{O}_2 \rightarrow \text{CCl}_3\text{OO}^{\cdot}$	$3.3 \times 10^9$				p.r.	Eval. from leveling off of rate of reactions with metiazinic acid at high concn. of substrate in air-satd. soln. contg. 30% 2-PrOH, 10% acetone and 0.04 mol L <sup>-1</sup> carbon tetrachloride.	83G216
10.8	Diethyl ether $^{*}\text{CCl}_3 + (\text{C}_2\text{H}_5)_2\text{O} \rightarrow \text{CHCl}_3 + \text{CH}_3\text{CHOC}_2\text{H}_5$	$3 \times 10^1$				$\gamma$ -r.	Calcd. from dependence of G(Cl <sup>-</sup> ) on dose rate in soln. contg. CCl <sub>4</sub> and ethyl ether assuming $2k(^{*}\text{CCl}_3 + ^{*}\text{CCl}_3) = 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	710778
10.9	2-Propanol $^{*}\text{CCl}_3 + 2\text{-PrOH} \rightarrow \text{CHCl}_3 + (\text{CH}_3)_2\text{COH}$	$8 \times 10^1$				$\gamma$ -r.	Calcd. from dependence of G(Cl <sup>-</sup> ) on dose rate in soln. contg. CCl <sub>4</sub> and 2-PrOH assuming $2k(^{*}\text{CCl}_3 + ^{*}\text{CCl}_3) = 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	710778
10.10	Tetrahydrofuran $^{*}\text{CCl}_3 + \text{THF} \rightarrow$	$5 \times 10^1$				$\gamma$ -r.	Calcd. from dependence of G(Cl <sup>-</sup> ) on dose rate in soln. contg. CCl <sub>4</sub> and tetrahydrofuran assuming $2k(^{*}\text{CCl}_3 + ^{*}\text{CCl}_3) = 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	710778

TABLE 11. Miscellaneous haloalkyl and haloalkenyl radicals

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T(K)	Method	Comment	Ref.
<b>11.1 2-Bromo-1,2-difluoroethyl</b>							
<b>11.1.1 First-order reaction</b>							
$\text{CHBrFCHF} \rightarrow \text{CHF=CHF} + \text{Br}^{\cdot}$	$5.5 \times 10^5 \text{ s}^{-1}$				p.r.	Derived from buildup of $\text{Br}_2^{\cdot\cdot}$ in $\text{N}_2$ -saturated soln. contg. 40% <i>tert</i> -BuOH, 1,2-dibromo-1,2-difluoroethane and bromide ion.	93A578
<b>11.2 2-Bromoethyl</b>							
<b>11.2.1 First-order reaction</b>							
${}^{\cdot}\text{CH}_2\text{CH}_2\text{Br} \rightarrow \text{H}_2\text{C=CH}_2 + \text{Br}^{\cdot}$	$3.8 \times 10^6 \text{ s}^{-1}$				p.r.	Derived from absorbance buildup of promethazine radical cation (from $\text{Br}^{\cdot}$ + promethazine) in Ar-saturated soln. contg. 1,2-dibromoethane.	94A309
	$6.3 \times 10^5 \text{ s}^{-1}$				p.r.	Derived from buildup of $\text{Br}_2^{\cdot\cdot}$ in $\text{N}_2$ -saturated soln. contg. 40% <i>tert</i> -BuOH, 1,2-dibromoethane and bromide ion.	93A578
	$2.8 \times 10^6 \text{ s}^{-1}$				p.r.	Derived from buildup of $\text{Br}_2^{\cdot\cdot}$ in $\text{N}_2$ -saturated soln. contg. 10% <i>tert</i> -BuOH, 1,2-dibromoethane and bromide ion.	86A581
<b>11.2.2 Tris(1,10-phenanthroline)iron(III) ion</b>							
${}^{\cdot}\text{CH}_2\text{CH}_2\text{Br} + \text{Fe}(\text{phen})_3^{3+} \rightarrow$	$\sim 1 \times 10^9$	-1			p.r.	P.b.k. at 490 nm in soln. contg. $\text{CH}_3\text{CH}_2\text{Br}$ ; also contains $\text{CH}_3\dot{\text{C}}\text{HBr}$ and $\text{CH}_3\dot{\text{C}}\text{H}_2$ (from H reaction).	85A284
<b>11.2.3 Oxygen</b>							
${}^{\cdot}\text{CH}_2\text{CH}_2\text{Br} + \text{O}_2 \rightarrow \text{BrCH}_2\text{CH}_2\text{OO}^{\cdot}$	$1.6 \times 10^9$	4			p.r.	Derived from buildup of $\text{Br}_2^{\cdot\cdot}$ in $\text{N}_2/\text{O}_2$ -saturated soln. contg. 40% <i>tert</i> -BuOH, 0.02 mol L <sup>-1</sup> 1,2-dibromoethane 4 × 10 <sup>-4</sup> mol L <sup>-1</sup> bromide ion and varied [O <sub>2</sub> ].	93A578
<b>11.3 1-(Bromomethyl)ethyl</b>							
<b>11.3.1 Water</b>							
$\text{CH}_3\dot{\text{C}}\text{HCH}_2\text{Br} + \text{H}_2\text{O} \rightarrow \text{H}^{\cdot} + \text{Br}^{\cdot\cdot} +$ $\text{CH}_3\dot{\text{C}}\text{HCH}_2\text{OH}$	$7 \times 10^3 \text{ s}^{-1}$	4.5-5	292	p.r.	Cond. changes in $\text{N}_2\text{O}$ -saturated soln. contg. 0.001-0.01 mol L <sup>-1</sup> 1- or 2-bromopropane.	82A350	
<b>11.4 1-(Bromomethyl)propyl</b>							
<b>11.4.1 Water</b>							
$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCH}_2\text{Br} + \text{H}_2\text{O} \rightarrow \text{H}^{\cdot} + \text{Br}^{\cdot\cdot} +$ $+ \text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCH}_2\text{OH}$	$10^4 \text{ s}^{-1}$	4.5-5	292	p.r.	Cond. changes in $\text{N}_2\text{O}$ -saturated soln. contg. 0.001-0.01 mol L <sup>-1</sup> 1-bromobutane.	82A350	
<b>11.5 2-Bromo-1-methylpropyl</b>							
<b>11.5.1 First-order reaction</b>							
$\text{CH}_3\dot{\text{C}}\text{HCHBrCH}_3 \rightarrow \text{CH}_3\text{CH=CHCH}_3 + \text{Br}^{\cdot\cdot}$ + $\text{Br}^{\cdot}$	$5.0 \times 10^5 \text{ s}^{-1}$				p.r.	Derived from buildup of $\text{Br}_2^{\cdot\cdot}$ in $\text{N}_2$ -saturated soln. contg. 40% <i>tert</i> -BuOH, 2,3-dibromobutane and bromide ion.	93A578
<b>11.5.2 Water</b>							
$\text{CH}_3\dot{\text{C}}\text{HCHBrCH}_3 + \text{H}_2\text{O} \rightarrow \text{H}^{\cdot} + \text{Br}^{\cdot\cdot} +$ $\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)\text{OH}$	$\geq 10^6 \text{ s}^{-1}$	4.5-5	292	p.r.	Cond. changes in $\text{N}_2\text{O}$ -saturated soln. contg. 0.001-0.01 mol L <sup>-1</sup> 2-bromobutane.	82A350	
<b>11.6 2-Chlorocyclohexyl</b>							
<b>11.6.1 Water</b>							
$c\text{-C}_6\text{H}_{10}\text{Cl} + \text{H}_2\text{O} \rightarrow \text{H}^{\cdot} + \text{Cl}^{\cdot\cdot} +$ $\text{-CHCHOH(CH}_2)_4\text{-}$	$\geq 10^6 \text{ s}^{-1}$	4.5-5	292	p.r.	Cond. changes in $\text{N}_2\text{O}$ -saturated soln. contg. 0.001-0.01 mol L <sup>-1</sup> chlorocyclohexane.	82A350	
<b>11.7 1-Chloroethyl</b>							
<b>11.7.1 Oxygen</b>							
$\text{CH}_3\dot{\text{C}}\text{HCl} + \text{O}_2 \rightarrow \text{CH}_3\text{CHClOO}^{\cdot}$	$9.0 \times 10^8$				p.r.	Eval. from leveling off of rate of reaction of peroxy radical with ABTS, chlorpromazine, promethazine, ascorbate and propyl gallate at high concn. of substrates in air-saturated soln. contg. 0.5-1 mol L <sup>-1</sup> <i>tert</i> -BuOH and 1,1-dichloroethane.	88A364

TABLE 11. Miscellaneous haloalkyl and haloalkenyl radicals — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T (K)	Method	Comment	Ref.
11.8	2-Chloroethyl						
11.8.1	Hexachloroiridate(IV) ion						
	$\cdot\text{CH}_2\text{CH}_2\text{Cl} + \text{IrCl}_6^{2-} \rightarrow \text{IrCl}_5(\text{H}_2\text{O})^{2-} + \text{Cl}\cdot$	$\sim 1 \times 10^9$	4-6		p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. 1,2-dichloroethane.	82A041
11.9	1-(1-Chloroethyl)ethyl						
11.9.1	Water						
	$\text{CH}_3\dot{\text{C}}\text{HClIClCH}_3 + \text{H}_2\text{O} \rightarrow \text{H}^+ + \text{Cl}\cdot + \text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)\text{OH}$	$3.5 \times 10^5 \text{ s}^{-1}$	4.5-5	292	p.r.	Cond. changes in N <sub>2</sub> O satd. soln. contg. 0.001-0.01 mol L <sup>-1</sup> 2-chlorobutane; same result following reaction of $e_{aq}^-$ with 2,3-dichlorobutane.	82A350
11.10	1-(Chloromethyl)ethyl						
11.10.1	First-order reaction						
	$\text{CH}_3\dot{\text{C}}\text{HCH}_2\text{Cl} \rightarrow$	$<10^2 \text{ s}^{-1}$	4.5-5	292	p.r.	Cond. changes; acid formn. in N <sub>2</sub> O-satd. soln. of 1-chloropropane.	82A350
11.11	1-(Chloromethyl)-1-methylethyl						
11.11.1	Water						
	$(\text{CH}_3)_2\dot{\text{C}}\text{CH}_2\text{Cl} + \text{H}_2\text{O} \rightarrow \text{H}^+ + \text{Cl}\cdot + (\text{CH}_3)_2\dot{\text{C}}\text{CH}_2\text{OH}$	$3.5 \times 10^4 \text{ s}^{-1}$	4.5-5	292	p.r.	Cond. changes in N <sub>2</sub> O-satd. soln. contg. 0.001-0.01 mol L <sup>-1</sup> 1-chloro-2-methylpropane.	82A350
11.12	1-(Chloromethyl)propyl						
11.12.1	First-order reaction						
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCH}_2\text{Cl} \rightarrow$	$<10^2 \text{ s}^{-1}$	4.5-5	292	p.r.	Cond. changes; acid formn. in N <sub>2</sub> O-satd. soln. of 1-chlorobutane.	82A350
11.13	1-Chloro-2,2,2-trifluoroethyl						
11.13.1	Iron(II) deuteroporphyrin IX						
	$\text{CF}_3\dot{\text{C}}\text{HCl} + \text{Fe(II)DP} \rightarrow \text{CF}_3\dot{\text{C}}\text{HClFe(III)DP}$	$7 \times 10^9$	$\sim 13$		p.r.	Changes in absorbance at 540 nm in soln. contg. 0.0034 mol L <sup>-1</sup> halothane, 0.05 mol L <sup>-1</sup> NaOH, 0.68 mol L <sup>-1</sup> acetone and 6.5 mol L <sup>-1</sup> 2-PrOH.	82A222
11.13.2	Iron(II) deuteroporphyrin, dimethyl ester						
	$\text{CF}_3\dot{\text{C}}\text{HCl} + \text{DPDMEFe}^{\text{II}} \rightarrow \text{DPDMEFe}^{\text{III}}\text{CF}_3\text{CHCl}$	$1.4 \times 10^{10}$	$\sim 3$		p.r.	Changes in absorbance at 540 nm in soln. contg. 0.0034 mol L <sup>-1</sup> halothane, 1.2 $\times 10^{-3}$ mol L <sup>-1</sup> HClO <sub>4</sub> , 0.68 mol L <sup>-1</sup> acetone and 6.5 mol L <sup>-1</sup> 2-PrOH.	82A222
11.13.3	Iron(III) deuteroporphyrin IX						
	$\text{CF}_3\dot{\text{C}}\text{HCl} + \text{Fe(III)DP} \rightarrow$	$\leq 10^6$	$\sim 13$		p.r.	No reaction obs.	82A222
11.13.4	Iron(III) deuteroporphyrin, dimethyl ester						
	$\text{CF}_3\dot{\text{C}}\text{HCl} + \text{DPDMEFe}^{\text{III}} \rightarrow$	$\leq 10^6$	$\sim 3$		p.r.	No reaction obs. in soln. contg. 6.5 mol L <sup>-1</sup> 2-PrOH.	82A222
11.13.5	Oxygen						
	$\text{CF}_3\dot{\text{C}}\text{HCl} + \text{O}_2 \rightarrow \text{CF}_3\text{CHClOO}\cdot$	$1.3 \times 10^9$			p.r.	Eval. from leveling off of rate of reactions with ABTS, ascorbate and propyl gallate at high concn. of substrates in air-satd. soln. contg. $10^{-2}$ mol L <sup>-1</sup> halothane.	83A195
11.13.6	Ascorbate ion						
	$\text{CF}_3\dot{\text{C}}\text{HCl} + \text{AH}^- \rightarrow$	$<10^5$	7		p.r.	No abs. detected in deaerated 10% <i>tert</i> -BuOH soln.	83A195
11.13.7	2,2'-Azobis(3-ethylbenzothiazoline-6-sulfonate ion)						
	$\text{CF}_3\dot{\text{C}}\text{HCl} + \text{ABTS}^{2-} \rightarrow$	$<10^5$	7		p.r.	No abs. detected in deaerated 10% <i>tert</i> -BuOH soln.	83A195
11.13.8	Ethanol						
	$\text{CF}_3\dot{\text{C}}\text{HCl} + \text{EtOH} \rightarrow \text{CF}_3\text{CH}_2\text{Cl} + \text{CH}_3\text{CHOH}$	$1.3 \times 10^2$	4		$\gamma$ -r.	Estd. from $G(\text{Br}^-)$ of chain reaction in N <sub>2</sub> -satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH and 0.001 mol L <sup>-1</sup> halothane using $2k(R + R) = 1 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	84G166

TABLE 11. Miscellaneous haloalkyl and haloalkenyl radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T(K)	Method	Comment	Ref.
<b>11.13 1-Chloro-2,2,2-trifluoroethyl — Continued</b>							
11.13.9	<b>Formate ion</b>						
	$\text{CF}_3\dot{\text{C}}\text{HCl} + \text{HCO}_2^- \rightarrow \text{CF}_3\text{CH}_2\text{Cl} + \cdot\text{CO}_2^-$	$2.9 \times 10^3$	4		γ-r.	Estd. from $G(\text{Br}^-)$ of chain reaction in $\text{N}_2$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and 0.001 mol L <sup>-1</sup> halothane using $2k(R+R) = 1 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	84G166
<b>11.13.10 Methanol</b>							
	$\text{CF}_3\dot{\text{C}}\text{HCl} + \text{MeOH} \rightarrow \text{CF}_3\text{CH}_2\text{Cl} + \cdot\text{CH}_2\text{OH}$	$2.7 \times 10^1$	4		γ-r.	Estd. from $G(\text{Br}^-)$ of chain reaction in $\text{N}_2$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH and 0.001 mol L <sup>-1</sup> halothane using $2k(R+K) = 1 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	84G166
<b>11.13.11 2-Propanol</b>							
	$\text{CF}_3\dot{\text{C}}\text{HCl} + 2\text{-PrOH} \rightarrow \text{CF}_3\text{CH}_2\text{Cl} + (\text{CH}_3)_2\dot{\text{C}}\text{OH}$	$6.7 \times 10^2$	4		γ-r.	Estd. from $G(\text{Br}^-)$ of chain reaction in $\text{N}_2$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and 0.001 mol L <sup>-1</sup> halothane using $2k(R+R) = 1 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	84G166
<b>11.13.12 Propyl 3,4,5-trihydroxybenzoate</b>							
	$\text{CF}_3\dot{\text{C}}\text{HCl} + 3,4,5\text{-(HO)}_3\text{C}_6\text{H}_2\text{CO}_2\text{C}_3\text{H}_7 \rightarrow$	$<10^5$	7		p.r.	No abs. detected in deaerated 10% <i>tert</i> -BuOH soln.	83A195
<b>11.14 2-Chlorovinyl</b>							
11.14.1	<b>Oxygen</b>						
	$\cdot\text{CH=CHCl} + \text{O}_2 \rightarrow \text{CHCl=CHO}\cdot$	$4.6 \times 10^9$			p.r.	P.b.k. in Ar/O <sub>2</sub> (9:1) satd. soln. contg. <i>trans</i> -1,2-dichloroethylene.	94A221
11.14.2	<b>Methanol</b>						
	$\cdot\text{CH=CHCl} + \text{MeOH} \rightarrow \text{H}_2\text{C=CHCl} + \cdot\text{CH}_2\text{OH}$	$2.1 \times 10^5$			p.r.	C.k. in Ar/O <sub>2</sub> (10:1) satd. soln. contg. <i>trans</i> -dichloroethylene and MeOH; rel. to $k(\cdot\text{CH=CHCl} + \text{O}_2) = 4.6 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ ;	94A221
11.14.3	<b>2-Propanol</b>						
	$\cdot\text{CH=CHCl} + 2\text{-PrOH} \rightarrow \text{H}_2\text{C=CHCl} + (\text{CH}_3)_2\dot{\text{C}}\text{OH}$	$5.6 \times 10^6$			p.r.	C.k. in Ar/O <sub>2</sub> (10:1) satd. soln. contg. <i>trans</i> -dichloroethylene and 2-PrOH; rel. to $k(\cdot\text{CH=CHCl} + \text{O}_2) = 4.6 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ ;	94A221
<b>11.15 1,2-Dibromoethyl</b>							
11.15.1	<b>First-order reaction</b>						
	$\text{CH}_2\text{Br}\dot{\text{C}}\text{HBr} \rightarrow \text{Br}\cdot + \text{H}_2\text{C=CHBr}$	$\sim 10^6 \text{ s}^{-1}$	5.7		p.r.	Derived from buildup of $\text{Br}_2\cdot$ in $\text{N}_2\text{O}$ -satd. soln. contg. 1,2-dibromoethane and bromide ion.	86A581
<b>11.16 Dibromomethyl</b>							
11.16.1	<b>Ethanol</b>						
	$\cdot\text{CHBr}_2 + \text{EtOH} \rightarrow \text{CH}_2\text{Br}_2 + \cdot\text{CH}_3\text{CHOH}$	$1 \times 10^2$	6.8		γ-r.	Estd. from $G(\text{Br}^-)$ in $\text{N}_2\text{O}$ - or Ar-satd. soln. contg. $\text{CHBr}_3$ and varied [EtOH] using $k(R+R) \sim 1 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	88G086
11.16.2	<b>Methanol</b>						
	$\cdot\text{CHBr}_2 + \text{MeOH} \rightarrow \text{CH}_2\text{Br}_2 + \cdot\text{CH}_2\text{OH}$	$6 \times 10^1$	6.8		γ-r.	Estd. from $G(\text{Br}^-)$ in $\text{N}_2\text{O}$ -satd. soln. contg. $\text{CHBr}_3$ and varied [MeOH] using $k(R+R) \sim 1 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	88G086
11.16.3	<b>2-Propanol</b>						
	$\cdot\text{CHBr}_2 + 2\text{-PrOH} \rightarrow \text{CH}_2\text{Br}_2 + (\text{CH}_3)_2\dot{\text{C}}\text{OH}$	$5 \times 10^2$	6.8		γ-r.	Estd. from $G(\text{Br}^-)$ in $\text{N}_2\text{O}$ - or Ar-satd. soln. contg. $\text{CHBr}_3$ and varied [2-PrOH] using $k(R+R) \sim 1 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	88G086
<b>11.17 1,1-Dichloroethyl</b>							
11.17.1	<b>Oxygen</b>						
	$\text{CH}_3\dot{\text{C}}\text{Cl}_2 + \text{O}_2 \rightarrow \text{CH}_3\text{CCl}_2\text{OO}\cdot$	$1.5 \times 10^9$			p.r.	Eval. from leveling off of rate of reaction of peroxy radical with ABTS, chlorpromazine, promethazine, ascorbate and propyl gallate at high concn. of substrates in air-satd. soln. contg. 0.5-1 mol L <sup>-1</sup> <i>tert</i> -BuOH and 1,1,1-trichloroethane.	88A364

TABLE II. Miscellaneous haloalkyl and haloalkenyl radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T(K)	Method	Comment	Ref.
<b>11.18 1,2-Dichloroethyl</b>							
<b>11.18.1 Oxygen</b>							
	$\text{CH}_2\dot{\text{C}}\text{l}\text{CHCl} + \text{O}_2 \rightarrow \text{CH}_2\text{ClCHClOO}'$	$9.7 \times 10^8$			p.r.	Eval. from leveling off of rate of reaction of peroxy radical with ABTS, chlorpromazine, promethazine, ascorbate and propyl gallate at high concn. of substrates in air-satd. soln. contg. 0.5-1 mol L <sup>-1</sup> <i>tert</i> -BuOH and 1,1,2-trichloroethane.	88A364
<b>11.19 Dichlorofluoromethyl</b>							
<b>11.19.1 Ethylene</b>							
	$^*\text{CFCl}_2 + \text{H}_2\text{C}=\text{CH}_2 \rightarrow \text{CFCl}_2\text{CH}_2\dot{\text{C}}\text{H}_2$	$\sim 4 \times 10^7$	5.9		p.r.	Estd. from condy. changes in soln. contg. $\text{CFCl}_3$ .	710026
<b>11.20 Dichloromethyl</b>							
<b>11.20.1 Copper(II) ion</b>							
	$^*\text{CHCl}_2 + \text{Cu}^{2+} \rightarrow \text{CuCHCl}_2^{2+}$	$\sim 3 \times 10^7$	6	295	p.r.	P.b.k. in Ar-satd. soln. contg. $(2\text{-}10) \times 10^{-5}$ mol L <sup>-1</sup> $\text{CuSO}_4$ and $(1\text{-}10) \times 10^{-2}$ mol L <sup>-1</sup> $\text{CHCl}_3$ ; also includes $^*\text{CCl}_3$ reaction.	80A277
<b>11.20.2 Ferricyanide ion</b>							
	$^*\text{CHCl}_2 + \text{Fe}(\text{CN})_6^{3-} \rightarrow$	$<5 \times 10^5$	4-6		p.r.	D.k. at 420 nm in $\text{N}_2\text{O}$ -satd. soln. contg. chloroform.	82A041
<b>11.20.3 Hexachloroiridate(IV) ion</b>							
	$^*\text{CHCl}_2 + \text{IrCl}_6^{2-} \rightarrow \text{IrCl}_5(\text{H}_2\text{O})^{2-} + \text{CHCl}_3$	$\sim 5 \times 10^8$	4-6	295	p.r.	D.k. at 490 nm in soln. contg. chloroform.	82A041
<b>11.20.4 Permanganate ion</b>							
	$^*\text{CHCl}_2 + \text{MnO}_4^- \rightarrow$	$\sim 1 \times 10^9$	4-6		p.r.	D.k. at 545 nm in $\text{N}_2\text{O}$ -satd. soln. contg. chloroform.	82A041
<b>11.20.5 Ribonuclease</b>							
	$^*\text{CHCl}_2 + \text{RNase} \rightarrow$	$6 \times 10^8$	11		p.r.	P.b.k. in soln. contg. $\text{CHCl}_3$ and <i>tert</i> -BuOH.	731140
<b>11.21 1,2-Dichloro-1,2,2-trifluoroethyl</b>							
<b>11.21.1 Oxygen</b>							
	$\text{CClF}_2\dot{\text{C}}\text{ClF} + \text{O}_2 \rightarrow \text{CClF}_2\text{CClFOO}'$	$1.6 \times 10^9$			p.r.	Eval. from leveling off of rate of reaction of peroxy radical with ABTS, chlorpromazine, promethazine, ascorbate and propyl gallate at high concn. of substrates in air-satd. soln. contg. 0.5-1 mol L <sup>-1</sup> <i>tert</i> -BuOH and 1,1,2-trichloro-1,2,2-trifluoroethane; includes $\text{CCl}_2\text{FCF}_2 + \text{O}_2 \rightarrow \text{CCl}_2\text{FCF}_2\text{OO}'$	88A364
<b>11.22 Dichlorovinyl</b>							
<b>11.22.1 Oxygen</b>							
	$^*\text{CCl}=\text{CHCl} + \text{O}_2 \rightarrow \text{CHCl}=\text{CClOO}'$	$4.3 \times 10^9$			p.r.	P.b.k. in Ar/O <sub>2</sub> (9:1) satd. soln. contg. trichloroethylene; radical mixture contains 25% $^*\text{CH}=\text{CCl}_2$ .	94A221
<b>11.22.2 Methanol</b>							
	$^*\text{CCl}=\text{CHCl} + \text{MeOH} \rightarrow \text{ClCH}=\text{CHCl} + \text{CH}_2\text{OH}$	$6.3 \times 10^5$			p.r.	C.k. in Ar/O <sub>2</sub> (10:1) satd. soln. contg. trichloroethylene and MeOH; $8.4 \times 10^6$ L mol <sup>-1</sup> s <sup>-1</sup> is also quoted; radical mixture contains 25% $^*\text{CH}=\text{CCl}_2$ ; rel. to $k(^*\text{CCl}=\text{CHCl} + \text{O}_2) = 4.3 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	94A221
<b>11.22.3 2-Propanol</b>							
	$^*\text{CCl}=\text{CHCl} + 2\text{-PrOH} \rightarrow \text{ClCH}=\text{CHCl} + (\text{CH}_3)_2\text{COH}$	$6.3 \times 10^6$			p.r.	C.k. in Ar/O <sub>2</sub> (10:1) satd. soln. contg. trichloroethylene and 2-PrOH; $8.4 \times 10^6$ L mol <sup>-1</sup> s <sup>-1</sup> is also quoted; radical mixture contains 25% $^*\text{CH}=\text{CCl}_2$ ; rel. to $k(^*\text{CCl}=\text{CHCl} + \text{O}_2) = 4.3 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	94A221

TABLE 11. Miscellaneous haloalkyl and haloalkenyl radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	T(K)	Method	Comment	Ref.
<b>11.23 Pentachloroethyl</b>							
<b>11.23.1 Oxygen</b>							
	$\text{CCl}_3\dot{\text{C}}\text{Cl}_2 + \text{O}_2 \rightarrow \text{CCl}_3\text{CCl}_2\text{OO}^*$	$2.1 \times 10^9$			p.r.	Eval. from leveling off of rate of reaction of peroxy radical with ABTS, chlorpromazine, promethazine and propyl gallate at high concn. of substrates in air-satd. soln. ( $[\text{O}_2] = 6.8 \times 10^{-4}$ mol L <sup>-1</sup> ) contg. 40% <i>tert</i> -BuOH and hexachloroethane.	88A364
<b>11.24 1,2,2-Tribromoethyl</b>							
<b>11.24.1 First-order reaction</b>							
	$\text{CHBr}_2\dot{\text{C}}\text{HBr} \rightarrow \text{CHBr}=\text{CHBr} + \text{Br}^*$	$2.7 \times 10^5 \text{ s}^{-1}$			p.r.	Derived from buildup of $\text{Br}_2^{*-}$ in N <sub>2</sub> -satd. soln. contg. 40% <i>tert</i> -BuOH, 1,1,2,2-tetrabromoethane and bromide ion.	93A578
<b>11.25 2,2,2-Tribromoethyl</b>							
<b>11.25.1 First-order reaction</b>							
	$\text{CBr}_3\dot{\text{C}}\text{H}_2 \rightarrow \text{CBr}_2=\text{CH}_2 + \text{Br}^*$	$1.2 \times 10^5 \text{ s}^{-1}$			p.r.	Derived from buildup of $\text{Br}_2^{*-}$ in N <sub>2</sub> -satd. soln. contg. 40% <i>tert</i> -BuOH, 1,1,1,2-tetrabromoethane and bromide ion; radical mixture with 1,1,2-tribromoethyl.	93A578
<b>11.26 Tribromomethyl</b>							
<b>11.26.1 Iron(III) deuteroporphyrin IX</b>							
	$^*\text{CBr}_3 + \text{Fe(III)DP} \rightarrow$	$<10^6$	alk.		p.r.	No reaction in CBr <sub>4</sub> satd. soln. contg. 6.5 mol L <sup>-1</sup> 2-PrOH.	87A232
<b>11.27 Trichlorovinyl</b>							
<b>11.27.1 Oxygen</b>							
	$\text{CCl}_2\dot{\text{C}}\text{Cl} + \text{O}_2 \rightarrow \text{Cl}_2\text{C}=\text{CClOO}^*$	$3.8 \times 10^9$			p.r.	P.b.k. at 580 nm in Ar/O <sub>2</sub> (9:1) satd. soln. contg. tetrachloroethylene.	94A221
<b>11.27.2 Methanol</b>							
	$\text{CCl}_2\dot{\text{C}}\text{Cl} + \text{MeOH} \rightarrow \text{ClCH}=\text{CCl}_2 + \text{CH}_2\text{OH}$	$2.9 \times 10^6$			p.r.	C.k. in Ar/O <sub>2</sub> (10:1) satd. soln. contg. tetrachloroethylene and MeOH; rel. to $k(^*\text{CCl}=\text{CCl}_2 + \text{O}_2) = 3.8 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	94A221
<b>11.27.3 2-Propanol</b>							
	$\text{CCl}_2\dot{\text{C}}\text{Cl} + 2\text{-PrOH} \rightarrow \text{ClCH}=\text{CCl}_2 + (\text{CH}_3)_2\dot{\text{C}}\text{OH}$	$2.4 \times 10^7$			p.r.	C.k. in Ar/O <sub>2</sub> (10:1) satd. soln. contg. tetrachloroethylene and 2-PrOH; rel. to $k(^*\text{CCl}=\text{CCl}_2 + \text{O}_2) = 3.8 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	94A221
<b>11.27.4 2-Methyl-2-propanol</b>							
	$\text{CCl}_2\dot{\text{C}}\text{Cl} + \text{tert-BuOH} \rightarrow \text{ClCH}=\text{CCl}_2 + \text{CH}_2\text{C}(\text{CH}_3)_2\text{OH}$	$1.6 \times 10^5$			p.r.	C.k. in Ar/O <sub>2</sub> (10:1) satd. soln. contg. tetrachloroethylene and <i>tert</i> -BuOH; rel. to $k(^*\text{CCl}=\text{CCl}_2 + \text{O}_2) = 3.8 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	94A221

TABLE 12. Hydroxymethyl

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T(\text{K})$	Method	Comment	Ref.
<b>12.1 Hydroxymethyl</b>								
	$^{\bullet}\text{CH}_2\text{OH} + ^{\bullet}\text{CH}_2\text{OH} \rightarrow$	$1.5 \times 10^9$				p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. MeOH; $\epsilon = 270 \text{ L mol}^{-1} \text{ cm}^{-1}$ at 310 nm.	771011
		$1.2 \times 10^9$	6			p.r.	D.k. at 280 nm, in $\text{N}_2\text{O}$ -satd. soln. contg. MeOH; $2k/e = 6.2 \times 10^6 \text{ cm s}^{-1}$ ; $\text{p}K_a = 10.7$ [660074].	690419
<b>12.2 Hydroxymethyl, conjugate base</b>								
	$\text{CH}_2\text{O}^- + ^{\bullet}\text{CH}_2\text{O}^- \rightarrow$	$4.5 \times 10^8$	12			p.r.	D.k. at 350 nm, in $\text{N}_2\text{O}$ -satd. soln. contg. MeOH; $2k/e = 1.5 \times 10^6 \text{ cm s}^{-1}$ .	690419
<b>12.3 Silver(I) ion, complex with <math>\text{Ag}^0</math></b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Ag}_2^+ \rightarrow \text{Ag}_2\text{CH}_2\text{OH}^+$	$5.0 \times 10^9$				p.r.	Calcd. from increase in condy. as function of time in soln. contg. $0.1 \text{ mol L}^{-1}$ MeOH and $5 \times 10^{-4} \text{ mol L}^{-1}$ $\text{AgClO}_4$ . Products are $\text{CH}_2\text{O}^-$ and $\text{Ag}_2$ .	78A410
<b>12.4 Silver(I) ion</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Ag}^+ \rightarrow$					p.r.	No reaction to give $\text{Ag}^0$ in soln. contg. $0.1 \text{ mol L}^{-1}$ MeOH.	78A410
<b>12.5 Bismuth(III) ion</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Bi}^{3+} \rightarrow \text{BiCH}_2\text{OH}^{3+}$	$4 \times 10^5$	<0			p.r.	P.b.k. at $\sim 400$ nm in Ar-satd. soln. contg. $5 \text{ mol L}^{-1}$ $\text{HClO}_4$ and MeOH.	88A493
<b>12.6 Cadmium(I) ions</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Cd}^+ \rightarrow \text{CdCH}_2\text{OH}^+$	$2 \times 10^8$				p.r.	D.k. at 300 nm ( $\text{Cd}^+$ ) in soln. contg. MeOH and $\text{Cd}^{2+}$ , as well as condy., and p.b.k. at 240 nm ( $\text{Cd}_2^{2+}$ ); assumed $k(\text{Cd}^+ + \text{H}_2\text{O}_2) = 1.5 \times 10^9$ , $k(\text{R} + \text{R}) = 1.2 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	751064
<b>12.7 Cadmium(II) ion</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Cd}^{2+} \rightarrow$	$<10^2$		298	p.r.	Estd. from lack of increase in $\text{Cd}^+$ in soln. contg. $0.1 \text{ mol L}^{-1}$ $\text{Cd}^{2+}$ upon addn. of $0.1 \text{ mol L}^{-1}$ MeOH.	751027	
<b>12.8 Cobalt(II) ion</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Co}^{2+} \rightarrow$	$<10^2$		298	p.r.	Estd. from lack of increase in $\text{Co}^+$ in soln. contg. $0.1 \text{ mol L}^{-1}$ $\text{Co}^{2+}$ upon addn. of $0.1 \text{ mol L}^{-1}$ MeOH.	751027	
<b>12.9 <i>N</i>-rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion</b>								
	$^{\bullet}\text{CH}_2\text{OH} + N\text{-rac-Co}(4,11\text{-dieneN}_4)_2^{2+} \rightarrow \text{HOCH}_2\text{Co}(4,11\text{-dieneN}_4)_2^{2+}$	$7 \times 10^7$	1-6			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $1 \text{ mol L}^{-1}$ MeOH.	78A200
<b>12.10 (Nitrilotriacetato)cobaltate(II) ion</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{CoNTA}^- \rightarrow$	$9.7 \times 10^7$	4-7	280	p.r.	P.b.k. at 260 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $(1-50) \times 10^{-4} \text{ mol L}^{-1}$ CoNTA and $0.2-1 \text{ mol L}^{-1}$ MeOH; $\Delta H^\ddagger = 20.1 \text{ kJ mol}^{-1}$ , $\Delta S^\ddagger = -19.2 \text{ J K}^{-1} \text{ mol}^{-1}$ , studied at 280-328 K.	88A343	
	$\text{HOCH}_2\text{CoNTA}^-$	$2.0 \times 10^8$		295				
		$4.1 \times 10^8$		325				
<b>12.11 <i>N</i>-(Hydroxyethyl)ethylenediaminetriacetatocobaltate(II) ion</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{CoHEDTA}^- \rightarrow$	$1.3 \times 10^7$		298	p.r.	P.b.k.		88A343
	$\text{HOCH}_2\text{CoHEDTA}^-$							
<b>12.12 5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatocobaltate(II) ion</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{CoTPPS}^{4-} \rightarrow$	$1.1 \times 10^9$	8	294	p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $1.5 \text{ mol L}^{-1}$ MeOH.	83A088	
	$\text{HOCH}_2\text{CoTPPS}^{4-}$							

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
12.13	3,10,17,24-Tetrasulfophthalocyaninecobaltate(II) ion dimer $\cdot\text{CH}_2\text{OH} + [\text{Co}(\text{tspc})_2]^{8-} \rightarrow$	$2.2 \times 10^8$	9			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.1-0.2 mol L <sup>-1</sup> MeOH; mechanism suggested to involve ligand-radical formation, followed by metal redn. and dimer splitting to give (Co <sup>+</sup> tspc) <sup>5-</sup> .	80A146
12.14	Hexaamminecobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow \text{HCHO} + \text{H}^+$	$1.4 \times 10^8$ $1.4 \times 10^8$ $6 \times 10^7$ $4.5 \times 10^7$ $\leq 1 \times 10^7$ $1.4 \times 10^8$	6.1 5.75 4.9 4.5 3.5 5-6			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> MeOH.	771100
	$\cdot\text{CH}_2\text{O}^- + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow \text{HCHO} + \text{Co}(\text{NH}_3)_6^{2+}$	$9.0 \times 10^9$	12			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> MeOH.	72A018
12.15	Pentaammine(aqua)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{Co}(\text{NH}_3)_5(\text{H}_2\text{O})^{3+} \rightarrow \text{redn.}$	$1.5 \times 10^6$	3.5-4			$\gamma$ -r.	Calcd. from $G(\text{Co}^{2+})$ , dose rate and $k(\text{R} + \text{R}) = 2.4 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	771100
12.16	Pentaammine(bromo)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{Co}(\text{NH}_3)_5\text{Br}^{2+} \rightarrow$	$9.0 \times 10^7$ $2.5 \times 10^7$ $2.0 \times 10^7$ $1.8 \times 10^7$ $1.8 \times 10^7$ $1.8 \times 10^7$	6.1 4.9 4.5 3.5 2.0 1.0			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> MeOH.	771100
12.17	Pentaammine(chloro)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{Co}(\text{NH}_3)_5\text{Cl}^{2+} \rightarrow$	$3 \times 10^6$	3.5-4			$\gamma$ -r.	Estd. from effect of complex concn. on $G(\text{Co}^{2+})$ assuming $2k(\text{R} + \text{R}) = 2.4 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	771100
12.18	Pentaammine(fluoro)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{Co}(\text{NH}_3)_5\text{F}^{2+} \rightarrow$	$5.5 \times 10^5$	3.5-4			$\gamma$ -r.	Estd. from effect of complex concn. on $G(\text{Co}^{2+})$ assuming $2k(\text{R} + \text{R}) = 2.4 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	771100
12.19	Tris(ethylenediamine)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{Co}(\text{en})_3^{3+} \rightarrow$	$<10^3$	2.5	298		chem.	Estd. in N <sub>2</sub> -satd. soln. contg. $6.2 \times 10^{-4}$ mol L <sup>-1</sup> CrCH <sub>2</sub> C <sub>6</sub> H <sub>5</sub> <sup>2+</sup> , $6.4 \times 10^{-4}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and 0.81-3.5 mol L <sup>-1</sup> MeOH.	82A480
			3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. MeOH; no reaction.	771100
12.20	cis-Aquachlorobis(ethylenediamine)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{cis}-\text{Co}(\text{en})_2(\text{H}_2\text{O})\text{Cl}^{2+} \rightarrow$	$1.8 \times 10^6$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. MeOH.	771100
12.21	cis-Amminechlorobis(ethylenediamine)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{cis}-\text{Co}(\text{en})_2(\text{NH}_3)\text{Cl}^{2+} \rightarrow$	$\leq 2 \times 10^6$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. MeOH.	771100
12.22	cis-Bromobis(ethylenediamine)fluorocobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{Co}(\text{en})_2\text{BrF}^+ \rightarrow$	$\leq 2 \times 10^6$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. MeOH.	771100
12.23	trans-Dibromobis(ethylenediamine)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{Co}(\text{en})_2\text{Br}_2^+ \rightarrow$	$2.6 \times 10^8$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. MeOH.	771100
12.24	trans-Dichlorobis(ethylenediamine)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{trans}-\text{Co}(\text{en})_2\text{Cl}_2^+ \rightarrow$	$8 \times 10^6$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. MeOH.	771100

TABLE 12. Hydroxymethyl — Continued

Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
12.25 <i>cis</i> -Dichlorobis(ethylenediamine)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{cis-}\text{Co}(\text{en})_2\text{Cl}_2^+ \rightarrow$	$\leq 5 \times 10^6$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. MeOH.	771100
12.26 Bis(ethylenediamine)difluorocobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{Co}(\text{en})_2\text{F}_2^+ \rightarrow$		3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. MeOH; no reaction.	771100
12.27 Benzylbis(dimethylglyoximato)(pyridine)cobaltate(III) $\cdot\text{CH}_2\text{O}^- + \text{C}_6\text{H}_5\text{CH}_2\text{Co}(\text{dmgH})_2(\text{py}) \rightarrow$	$2 \times 10^8$	11.3			p.r.	P.b.k. at 700 nm in deoxygenated soln. contg. MeOH.	94A288
HCHO + C <sub>6</sub> H <sub>5</sub> CH <sub>2</sub> Co(dmgh) <sub>2</sub> (py) <sup>-</sup>							
12.28 Tris(2,2'-bipyridine)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{Co}(\text{bpy})_3^{3+} \rightarrow \text{HCHO} + \text{H}^+$	$2 \times 10^8$	1.7			p.r.	P.b.k. at 326 nm in N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> MeOH.	79A034
+ Co(bpy) <sub>3</sub> <sup>2+</sup>							
12.29 Tris(1,10-phenanthroline)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{Co}(\text{phen})_3^{3+} \rightarrow$ addn. to ligand	$8 \times 10^8$	1.7			p.r.	P.b.k. at 475 nm in N <sub>2</sub> O-satd. soln. contg. 2.5 mol L <sup>-1</sup> MeOH.	80A227
	$7 \times 10^8$	1.7			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 2.5 mol L <sup>-1</sup> MeOH; rel. to $k(\cdot\text{CH}_2\text{OH} + \text{O}_2) = 4.2 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	80A227
12.30 Tris(5,6-dimethyl-1,10-phenanthroline)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{Co}(5,6\text{-Me}_2\text{phen})_3^{3+} \rightarrow$	$4.9 \times 10^8$	~7			p.r.	P.b.k., as well as d.k. at 380 nm in N <sub>2</sub> O-satd. soln. contg. 2.5 mol L <sup>-1</sup> MeOH.	80A227
HCHO + H <sup>+</sup> + Co(5,6-Me <sub>2</sub> phen) <sub>3</sub> <sup>2+</sup>							
12.31 Decakis(cyano)-μ-superoxidodicobaltate(III) ion $\cdot\text{CH}_2\text{OH} + \text{O}_2[\text{Co}(\text{CN})_5]_2^{5-} \rightarrow \text{H}^+ +$	$2.8 \times 10^8$	-5.0			p.r.	P.b.k. as well as d.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	81A009
O <sub>2</sub> [\text{Co}(\text{CN}) <sub>5</sub> ] <sub>2</sub> <sup>6-</sup> + HCHO							
12.32 μ-Amido-μ-superoxidotetrakis(ethylenediamine)dicobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{NH}_2[\text{Co}(\text{en})_2]_2(\text{O}_2)^{4+} \rightarrow \text{H}^+ +$	$4 \times 10^7$	-5.0			p.r.	P.b.k. as well as d.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	81A009
+ NH <sub>2</sub> [\text{Co}(\text{en}) <sub>2</sub> ] <sub>2</sub> (O <sub>2</sub> ) <sup>3+</sup> + HCHO							
12.33 μ-Amido-μ-superoxidoctakisamminedicobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{NH}_2[\text{Co}(\text{NH}_3)_4]_2(\text{O}_2)^{4+} \rightarrow$	$1.2 \times 10^8$	-5.0			p.r.	P.b.k. as well as d.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	81A009
H <sup>+</sup> + NH <sub>2</sub> [\text{Co}(\text{NH}_3)_4]_2(O <sub>2</sub> ) <sup>3+</sup> + HCHO							
12.34 Chromium(II) ion $\cdot\text{CH}_2\text{OH} + \text{Cr}^{2+} \rightarrow \text{CrCH}_2\text{OH}^{2+}$	$2 \times 10^8$	0-6.2			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.01-2 mol L <sup>-1</sup> MeOH, (1-20) $\times 10^{-4}$ mol L <sup>-1</sup> Cr <sup>2+</sup> and (9-100) $\times 10^{-4}$ AcO <sup>-</sup> /AcOH.	84A036
	$1.6 \times 10^8$	-1			p.r.	P.b.k. in Ar-satd. soln. contg. MeOH and HClO <sub>4</sub> .	741146
12.35 1,4,8,12-Tetraazacyclopentadecanechromium(II) ion $\cdot\text{CH}_2\text{OH} + \text{Cr}([15]\text{aneN}_4)_2^{2+} \rightarrow$	$1.2 \times 10^8$	4.4-5.3			p.r.	P.b.k. at 320 nm in N <sub>2</sub> O-satd. soln. contg. (0.2-11.0) $\times 10^{-3}$ mol L <sup>-1</sup> [15]aneN <sub>4</sub> , (0.16-1.0) $\times 10^{-3}$ mol L <sup>-1</sup> Cr <sup>2+</sup> , 0-0.009 mol L <sup>-1</sup> acetate and 1.0 mol L <sup>-1</sup> MeOH.	85A499
HOCH <sub>2</sub> Cr([15]aneN <sub>4</sub> ) <sub>2</sub> <sup>2+</sup>							
12.36 <i>cis</i> -Diaqua(nitrilotriacetato)chromate(II) ion $\cdot\text{CH}_2\text{OH} + \text{cis-}[\text{CrNTA}(\text{H}_2\text{O})_2]^- \rightarrow$	$2.2 \times 10^8$	5.6			p.r.	P.b.k. at 325 nm in He-satd. soln. contg. 0.055 mol L <sup>-1</sup> NTA, (2-5) $\times 10^{-4}$ mol L <sup>-1</sup> Cr <sup>2+</sup> , 0.009 mol L <sup>-1</sup> acetate, 0.001 mol L <sup>-1</sup> Cr(NTA)(H <sub>2</sub> O) <sub>2</sub> and 2.2 mol L <sup>-1</sup> MeOH.	85A499
cis-[HOCH <sub>2</sub> CrNTA(H <sub>2</sub> O)] <sup>-</sup> + H <sub>2</sub> O							
12.37 Copper(I) ion $\cdot\text{CH}_2\text{OH} + \text{Cu}^+ \rightarrow \text{CuCH}_2\text{OH}^+$	$\sim 6 \times 10^9$	4.0			p.r.	Estd. from growth and decay of absorption in soln. contg. MeOH and Cu <sup>2+</sup> .	80A278

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
12.37	Copper(I) ion — Continued							
		~10 <sup>10</sup>	4.5		298	p.r.	Estd. from growth and decay of absorption in soln. contg. MeOH and Cu <sup>2+</sup> .	78A322
12.38	Copper(II) ion							
	'CH <sub>2</sub> OH + Cu <sup>2+</sup> → Cu <sup>+</sup> + HCHO + H <sup>+</sup>	1.6 × 10 <sup>8</sup>	6			p.r.	D.k. at ~300 nm (radical) in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	80A277
		1.9 × 10 <sup>8</sup>	≤ 3		298	p.r.	D.k. at 240-300 nm (radical) in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	78A322
		1.6 × 10 <sup>8</sup>	2-5		298	p.r.	P.b.k. at 320 nm (Cu <sup>l</sup> CH <sub>2</sub> CHCONH <sub>2</sub> ) in soln. contg. MeOH and 0.01 mol L <sup>-1</sup> acrylamide.	78A322
		1.1 × 10 <sup>8</sup>	5-6			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> MeOH.	72A018
12.39	5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecopper(II) ion							
	'CH <sub>2</sub> OH + Cu(4,11-dieneN <sub>4</sub> ) <sup>2+</sup> → Cu(4,11-dieneN <sub>4</sub> ) <sup>+</sup> + HCHO + H <sup>+</sup>	≤ 2 × 10 <sup>6</sup>	3.5-			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH; product ident. with that from e <sub>aq</sub> <sup>-</sup> .	80A189
			10					
	'CH <sub>2</sub> O <sup>-</sup> + Cu(4,11-dieneN <sub>4</sub> ) <sup>2+</sup> → Cu(4,11-dieneN <sub>4</sub> ) <sup>+</sup> + HCHO	9.0 × 10 <sup>8</sup>	12.0			p.r.	P.b.k. at 410 nm; no reduction obs. in neutral soln.; in methanolic soln. <i>k</i> = 2.2 × 10 <sup>4</sup> L mol <sup>-1</sup> s <sup>-1</sup> was detd. by f.p. (p.b.k. at 415 nm).	761039
12.40	cis-Diaqua(nitrilotriacetato)copper(II) ion							
	'CH <sub>2</sub> OH + cis-[Cu(NTA)(H <sub>2</sub> O) <sub>2</sub> ] <sup>-</sup> → cis-[HOCH <sub>2</sub> Cu(NTA)(H <sub>2</sub> O)] <sup>-</sup>	1.9 × 10 <sup>8</sup>	5-8			p.r.	P.b.k. at 425 nm in N <sub>2</sub> O-satd. soln. contg. (1-100) × 10 <sup>-5</sup> mol L <sup>-1</sup> CuSO <sub>4</sub> , 1 × 10 <sup>-3</sup> mol L <sup>-1</sup> nitrilotriacetate ion and 0.1 mol L <sup>-1</sup> MeOH.	86B151
12.41	Copper(II) tetraglycine							
	'CH <sub>2</sub> OH + Cu(Gly <sub>4</sub> ) <sup>2-</sup> → H <sup>+</sup> + Cu(Gly <sub>4</sub> ) <sup>3-</sup> + HCHO	8.6 × 10 <sup>7</sup>	7.3-			p.r.	D.k. at 290-330 nm in soln. contg. 1 mol L <sup>-1</sup> MeOH.	80A304
			10					
12.42	Iron(II) protoporphyrin							
	'CH <sub>2</sub> OH + Fe(II)PP → addn.	2.5 × 10 <sup>8</sup>	10.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2 × 10 <sup>-5</sup> mol L <sup>-1</sup> Fe(II)PP and 0.1 mol L <sup>-1</sup> methanol.	85A006
12.43	Iron(III) ion							
	'CH <sub>2</sub> OH + Fe <sup>3+</sup> → Fe <sup>2+</sup> + HCHO + H <sup>+</sup>	8 × 10 <sup>7</sup>					Unpubl. data, C.N.Barnes and G.V.Buxton.	78A322
		1 × 10 <sup>8</sup>	~ 1			γ-r.	C.k.; obs. C(NO <sub>3</sub> ) <sub>3</sub> <sup>-</sup> and Fe <sup>2+</sup> yields; rel. to k('CH <sub>2</sub> OH + C(NO <sub>2</sub> ) <sub>4</sub> ) = 5 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	77G411
12.44	Pentacyano(nitrosyl)ferrate(III) ion							
	'CH <sub>2</sub> OH + Fe(CN) <sub>5</sub> (NO) <sup>2-</sup> → HCHO + H <sup>+</sup> + Fe(CN) <sub>5</sub> NO <sup>3-</sup>	6.0 × 10 <sup>8</sup>	8.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> MeOH.	771120
12.45	Ferricyanide ion							
	'CH <sub>2</sub> OH + Fe(CN) <sub>6</sub> <sup>3-</sup> → HCHO + H <sup>+</sup> + Fe(CN) <sub>6</sub> <sup>4-</sup>	3.8 × 10 <sup>9</sup>	9		298	p.r.	D.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> MeOH, 0.001 mol L <sup>-1</sup> Na borate and (1-2) × 10 <sup>-4</sup> mol L <sup>-1</sup> ferricyanide; E <sub>a</sub> = 4.8 kJ mol <sup>-1</sup> , studied at 293-353 K.	89A421
		4.2 × 10 <sup>9</sup>	~ 5			p.r.	Cond. changes in N <sub>2</sub> O-satd. soln. contg. MeOH.	700254
		4.0 × 10 <sup>9</sup>	7			p.r.	D.k. at 410 nm (ferricyanide) in soln. contg. MeOH.	680308 690522
	'CH <sub>2</sub> O <sup>-</sup> + Fe(CN) <sub>6</sub> <sup>3-</sup> → HCHO + Fe(CN) <sub>6</sub> <sup>4-</sup>	3.1 × 10 <sup>9</sup>	13			p.r.	D.k. at 410 nm (ferricyanide) in soln. contg. MeOH.	680308
12.46	Diethylenetriaminepentaacetatoferate(III) ion							
	'CH <sub>2</sub> OH + FeDTPA <sup>2-</sup> →	3.8 × 10 <sup>8</sup>	11.0			p.r.	D.k.; no intermediate detected, reduction to Fe(II).	89A135

TABLE 12. Hydroxymethyl — Continued

Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
12.47 Tri(1,10-phenanthroline)iron(III) ion $^{\cdot}\text{CH}_2\text{OH} + \text{Fe}(\text{phen})_3^{3+} \rightarrow$	$5 \times 10^9$		-1		p.r.	P.b.k. at 490 nm in soln. contg. 0.1-1 mol L <sup>-1</sup> MeOH and (0.4-1.0) × 10 <sup>-4</sup> mol L <sup>-1</sup> complex; outer-sphere electron transfer.	85A284
12.48 5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatoferate(III) ion $^{\cdot}\text{CH}_2\text{OH} + \text{FeTPPS}^{3-} \rightarrow \text{HCHO} +$ $\text{FeTPPS}^{4-} + \text{H}^+$	$8.1 \times 10^8$ $8.4 \times 10^8$	3.2 5.3			p.r.	Cond. buildup as well as p.b.k. at 550 nm in soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	91A186
12.49 Dihydroxytetrakis(4-sulfonatophenyl)porphinatoferate(III)- $\beta$ -cyclodextrin complex $^{\cdot}\text{CH}_2\text{OH} + \text{FeTPPS(OH)}_2(\text{CD})_4^{5-} \rightarrow$ $\text{HCHO} + \text{FeTPPS(OH)}(\text{H}_2\text{O})(\text{CD})_4^{5-}$	$6.1 \times 10^8$	10.2			p.r.	P.b.k. at 550 nm in soln. contg. 0.1 mol L <sup>-1</sup> MeOH and 0.001 mol L <sup>-1</sup> $\beta$ -cyclodextrin.	91A186
12.50 5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatoiron(III) ion $^{\cdot}\text{CH}_2\text{OH} + \text{FeTMpyP}^{5+} \rightarrow \text{HCHO} + \text{H}^+$ + FeTMpyP <sup>4+</sup>	$8.5 \times 10^8$ 9.5 $1.4 \times 10^9$ $9 \times 10^8$	8.5- 9.5 5.6 8.1			p.r.	D.k. at 497 nm, as well as p.b.k. at 562 nm, in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> MeOH. D.k. at 420 as well as p.b.k. at 445 and 560 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	91A380 82A119
12.51 Dicyanotetrakis(1-methylpyridinium-4-yl)porphineiron(III) ion $^{\cdot}\text{CH}_2\text{OH} + \text{FeTMpyP}(\text{CN})_2^{3+} \rightarrow \text{HCHO}$ + H <sup>+</sup> + FeTMpyP(CN) <sub>2</sub> <sup>2+</sup>	$1.2 \times 10^9$	10.1			p.r.	D.k. at 435 as well as p.b.k. at 470 nm in soln. contg. 0.002 mol L <sup>-1</sup> KCN and (1-5) × 10 <sup>-5</sup> mol L <sup>-1</sup> Fe <sup>III</sup> complex.	82A119
12.52 $\alpha,\alpha,\alpha,\beta$ -Tetrakis( <i>N</i> -methylisonicotinamidophenyl)porphinatoiron(III) ion $^{\cdot}\text{CH}_2\text{OH} + \text{FePFP}^{5+} \rightarrow \text{FePFP}^{4+} + \text{H}^+$ HCHO	$2.2 \times 10^9$ $1.2 \times 10^9$	5.8 7.9			p.r.	D.k. at 420 nm (Fe <sup>III</sup> complex) as well as p.b.k. at 440 nm (Fe <sup>II</sup> complex) in soln. contg. (5-50) × 10 <sup>-6</sup> mol L <sup>-1</sup> Fe <sup>III</sup> complex.	86A154
12.53 Dicyano- $\alpha,\alpha,\alpha,\beta$ -tetrakis( <i>N</i> -methylisonicotinamidophenyl)porphinatoiron(III) ion $^{\cdot}\text{CH}_2\text{OH} + \text{FePFP}(\text{CN})_2^{3+} \rightarrow$ FePFP(CN) <sub>2</sub> <sup>2+</sup> + H <sup>+</sup> + HCHO	$1.5 \times 10^9$	10.2			p.r.	D.k. at 420 nm (Fe <sup>III</sup> complex) as well as p.b.k. at 440 nm (Fe <sup>II</sup> complex) in soln. contg. (10-50) × 10 <sup>-6</sup> mol L <sup>-1</sup> Fe <sup>III</sup> complex, 10 <sup>-3</sup> mol L <sup>-1</sup> carbonate, 5 × 10 <sup>-4</sup> mol L <sup>-1</sup> KCN.	86A154
12.54 Bis(1-methylimidazole)- $\alpha,\alpha,\alpha,\beta$ -tetrakis( <i>N</i> -methylisonicotinamidophenyl)porphinatoiron(III) ion $^{\cdot}\text{CH}_2\text{OH} + \text{FePFP(1-MeIm)}_2^{5+} \rightarrow$ FePFP(1-MeIm) <sub>2</sub> <sup>4+</sup> + H <sup>+</sup> + HCHO	$1.3 \times 10^9$	5.8- 7.9			p.r.	P.b.k. at 434 nm (Fe <sup>II</sup> complex) in N <sub>2</sub> O-satd. soln. contg. (5-50) × 10 <sup>-6</sup> mol L <sup>-1</sup> Fe <sup>III</sup> complex, and 3.4 × 10 <sup>-2</sup> mol L <sup>-1</sup> ligand (pK <sub>a</sub> 1-MeIm = 7.0).	86A154
12.55 Gallium(II) ions $^{\cdot}\text{CH}_2\text{OH} + \text{Ga}^{2+} \rightarrow \text{HCHO} + \text{H}^+ + \text{Ga}^+$	$1.1 \times 10^9$	2.3	→0		p.r.	D.k. in soln. contg. MeOH; Ga(II) formed from e <sub>aq</sub> <sup>-</sup> + Ga(III).	79A190
12.56 Hydroxygallium(II) ion $^{\cdot}\text{CH}_2\text{OH} + \text{GaOH}^+ \rightarrow \text{HCHO} + \text{H}_2\text{O} +$ Ga <sup>+</sup>	$1.0 \times 10^9$	2.9	→0		p.r.	D.k. in soln. contg. MeOH; Ga(II) formed from e <sub>aq</sub> <sup>-</sup> + Ga(III).	79A190
12.57 Hexahydroxygallate(II) ion $^{\cdot}\text{CH}_2\text{O}^- + \text{Ga(OH)}_6^{4-} \rightarrow$	$7.8 \times 10^8$	12.0	→0		p.r.	D.k. in soln. contg. MeOH; Ga(II) formed from e <sub>aq</sub> <sup>-</sup> + Ga(III).	79A190
12.58 Hydrogen ion $^{\cdot}\text{CH}_2\text{OH} + \text{H}^+ \rightarrow \cdot\text{CH}_2\text{OH}_2^+$	$3.2 \times 10^7$ $3.6 \times 10^7$			303 phot.	chem.	Esr study in soln. contg. Ti(III), H <sub>2</sub> O <sub>2</sub> and MeOH; log A = 9.5, E <sub>q</sub> = 12 kJ mol <sup>-1</sup> , studied at 279-314 K. Esr study in soln. contg. 10% acetone and 5% MeOH.	689058 66D162

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
12.58	Hydrogen ion — Continued							
		$1.8 \times 10^8$				chem.	Esr study in soln. contg. Ti(III), H <sub>2</sub> O <sub>2</sub> and MeOH.	655040
12.59	Mercury(I) cyanide							
	$\cdot\text{CH}_2\text{OH} + \text{HgCN} \rightarrow$	$4.0 \times 10^9$				p.r.	Calcd. from increase in decay rate at 285 nm in soln. contg. MeOH and Hg(CN) <sub>2</sub> ; used $2k(\text{HgCN} + \text{HgCN}) = 3.4 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	751203
12.60	Indium(II) ion							
	$\cdot\text{CH}_2\text{OH} + \text{In}^{2+} \rightarrow$	$1.9 \times 10^9$	1.5-	2.2		p.r.	D.k. ( $\text{In}^{2+}$ ) in Ar-satd. soln. contg. ~0.1 mol L <sup>-1</sup> MeOH and (0.2-2) $\times 10^{-3}$ mol L <sup>-1</sup> $\text{In}^{3+}$ .	83A206
12.61	Indium(III) ion							
	$\cdot\text{CH}_2\text{OH} + \text{In}^{3+} \rightarrow$	$<5 \times 10^4$	2			p.r.	No reaction obs.	83A206
12.62	Hexachloroiridate(IV) ion							
	$\cdot\text{CH}_2\text{OH} + \text{IrCl}_6^{2-} \rightarrow \text{HCHO} + \text{H}^+$ + $\text{IrCl}_6^{3-}$	$6.0 \times 10^9$	4-6			p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. MeOH.	82A041
12.63	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(III) ion							
	$\cdot\text{CH}_2\text{OH} + \text{MnTMpyP}^{5+} \rightarrow \text{HCHO} + \text{H}^+$ + $\text{MnTMpyP}^{4+}$	$2.1 \times 10^9$	6.7-	9.3		p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313
12.64	5,10,15,20-Tetrakis[4-( <i>N,N,N</i> -trimethylammonio)phenyl]porphinatomanganese(III) ion							
	$\cdot\text{CH}_2\text{OH} + \text{MnTAPP}^{5+} \rightarrow \text{HCHO} + \text{H}^+$ + $\text{MnTAPP}^{4+}$	$2.0 \times 10^9$	6.7			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313
12.65	$\alpha,\alpha,\alpha,\beta$ -Tetrakis[2-( <i>N</i> -methylisonicotinamido)phenyl]porphinatomanganese(III) ion							
	$\cdot\text{CH}_2\text{OH} + \text{MnPFP}^{5+} \rightarrow \text{HCHO} + \text{H}^+$ + $\text{MnPFP}^{4+}$	$1.0 \times 10^9$	7.0			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313
12.66	18-Molybdodiphosphate ion(6-)							
	$\cdot\text{CH}_2\text{OH} + \text{P}_2\text{Mo}_{18}\text{O}_{62}^{6-} \rightarrow \text{HP}_2\text{Mo}_{18}\text{O}_{62}^{6-}$ + HCHO	$3.7 \times 10^9$	2	295	p.r.	P.b.k. in N <sub>2</sub> O-satd. (2.5 $\times 10^{-2}$ mol L <sup>-1</sup> ) soln. contg. 0.5 mol L <sup>-1</sup> MeOH and $\sim 10^{-4}$ mol L <sup>-1</sup> heteropoly molybdophosphate.	82A107	
12.67	Nickel(I) ion							
	$\cdot\text{CH}_2\text{OH} + \text{Ni}^+ \rightarrow \text{NiCH}_2\text{OH}^+$	$4.2 \times 10^9$				p.r.	D.k. at 300 nm (as well as p.b.k. at 250 nm) in soln. contg. NiSO <sub>4</sub> and MeOH; used $G(\text{Ni}^+) = G(\text{R}) = 3.2$ .	741037
12.68	Nickel(II) ion							
	$\cdot\text{CH}_2\text{OH} + \text{Ni}^{2+} \rightarrow$	$<10^2$		298	p.r.	Estd. from lack of increase in Ni <sup>+</sup> in soln. contg. 0.1 mol L <sup>-1</sup> Ni <sup>2+</sup> on addn. of 0.1 mol L <sup>-1</sup> MeOH.	751027	
12.69	3,14-Dimethyl-4,7,10,13-tetraazahexadeca-3,13-diene-2,15-dione dioximatonickel(IV) ion							
	$\cdot\text{CH}_2\text{OH} + \text{Ni}^{IV}\text{L}^{2+} \rightarrow \text{HCHO} + \text{H}^+$ + $[\text{Ni}^{III}\text{L}]^+$	$3.5 \times 10^9$	2.5	294	p.r.	P.b.k. at 500 or 430 nm in N <sub>2</sub> O-satd. soln. contg. MeOH.	85A354	
12.70	Hydrogen peroxide							
	$\cdot\text{CH}_2\text{OH} + \text{H}_2\text{O}_2 \rightarrow \text{HCHO} + \text{H}_2\text{O} + \cdot\text{OH}$	$1.8 \times 10^5$	6.8			p.r.	Steady state; obs. $G(\text{H}_2\text{O}_2)$ in N <sub>2</sub> O-satd. soln. contg. MeOH.	87G036
		$2.3 \times 10^4$				chem.	Calcd. from esr of Ti(III)-H <sub>2</sub> O <sub>2</sub> soln. contg. MeOH and <i>tert</i> -BuOH; used $2k(\text{R} + \text{R}) = 2 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	745144
		$4.0 \times 10^4$				p.r.	Calcd. from dose rate effect on H <sub>2</sub> O <sub>2</sub> redn. in soln. contg. 0.99 mol L <sup>-1</sup> MeOH; used $2k(\text{R} + \text{R}) = 2.4 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	700338

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T(\text{K})$	Method	Comment	Ref.
<b>12.71 Oxygen</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{O}_2 \rightarrow \text{HOCH}_2\text{OO}^{\bullet}$	$4.2 \times 10^9$		10.7		p.r.	P.b.k. at 248 nm ( $\text{O}_2^-$ formn.) in $\text{N}_2\text{O}/\text{O}_2$ satd. soln. contg. MeOH.	741099
		$4.9 \times 10^9$		7		p.r.	C.k. in $\text{N}_2\text{O}/\text{O}_2$ satd. soln. contg. 0.1 mol $\text{L}^{-1}$ MeOH and ferricyanide; rel. to $k(\text{R} + \text{Fe}(\text{CN})_6^{3-}) = 4.0 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	690522
<b>12.72 Lead(II) ions</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Pb}^{2+} \rightarrow \text{PbCH}_2\text{OH}^+$	$2.9 \times 10^9$				p.r.	D.k. at 300 nm ( $\text{Pb}^{2+}$ ) in soln. contg. $\text{Pb}^{2+}$ and MeOH, knowing initial $[\text{R}]$ and $[\text{Pb}^{2+}]$ ; cor. for $k(\text{R} + \text{R})$ .	761170
<b>12.73 Palladium(II) ion</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Pd}^{2+} \rightarrow \text{PdCH}_2\text{OH}^+ \rightarrow \text{Pd}^+ + \text{H}^+ + \text{HCHO}$	$3.5 \times 10^7$	0			p.r.	P.b.k. at 290 nm in soln. contg. 0.1-1 mol $\text{L}^{-1}$ MeOH, $(5-30) \times 10^{-5} \text{ mol L}^{-1} \text{ Pd}^{2+}$ and 1 mol $\text{L}^{-1} \text{ HClO}_4$ .	94A518
		$2.1 \times 10^7$	0			p.r.	P.b.k. at 290 nm in soln. contg. MeOH and $(5-30) \times 10^{-5} \text{ mol L}^{-1} \text{ Pd}^{2+}$ and 1 mol $\text{L}^{-1} \text{ HClO}_4$ .	94A210
<b>12.74 Dichlorobis(ethylenediamine)platinum(IV) ion</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Pt}(\text{en})_2\text{Cl}_2^{2+} \rightarrow \text{redn.}$	$6.9 \times 10^8$	7			p.r.	P.b.k. at 240-340 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 1-4 mol $\text{L}^{-1}$ MeOH.	751188
<b>12.75 Tris(2,2'-bipyridine)rhodium(III) ion</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Rh}(\text{bpy})_3^{3+} \rightarrow$	$\sim 2 \times 10^8$				p.r.	P.b.k.; reaction involves addn. of radical to ligand, at least in part.	81A134
		$2.2 \times 10^8$	7			p.r.	P.b.k.	741167
<b>12.76 Tris(1,10-phenanthroline)rhodium(III) ion</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Rh}(\text{phen})_3^{3+} \rightarrow \text{addn. to ligand}$	$4 \times 10^8$				p.r.	P.b.k. at 475 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2.5 mol $\text{L}^{-1}$ MeOH.	80A227
<b>12.77 Dihydroxy-5,10,15,20-tetrakis(4-sulfonatophenyl)porphimerhodate(III) ion</b>								
	$^{\bullet}\text{CH}_2\text{O}^- + \text{RhtPPS(OH)}_2^{5-} \rightarrow \text{RhtPPS(OH)}_2^{6-} + \text{HCHO}$	$1.6 \times 10^8$	13			p.r.	$\text{N}_2\text{O}$ -satd. soln. contg. 1 mol $\text{L}^{-1}$ MeOH.	85A114
<b>12.78 Tris(2,2'-bipyridine)ruthenium(II) ion</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Ru}(\text{bpy})_3^{2+} \rightarrow$	$< 10^6$	7			p.r.	No reduction.	78A068
	$^{\bullet}\text{CH}_2\text{O}^- + \text{Ru}(\text{bpy})_3^{2+} \rightarrow \text{HCHO} + \text{Ru}(\text{bpy})_3^+$	$1.6 \times 10^9$	13	0.1		p.r.	P.b.k. at 510 nm in $\text{N}_2\text{O}$ -satd. soln. contg. MeOH.	91A218
		$2.9 \times 10^9$	11-13			p.r.	P.b.k.	78A068
<b>12.79 Tris(1,10-phenanthroline)ruthenium(II) ion</b>								
	$^{\bullet}\text{CH}_2\text{O}^- + \text{Ru}(\text{phen})_3^{2+} \rightarrow \text{HCHO} + \text{Ru}(\text{phen})_3^+$	$5.2 \times 10^9$	11			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2.5 mol $\text{L}^{-1}$ MeOH.	80A227
<b>12.80 Hexaammineruthenium(III) ion</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Ru}(\text{NH}_3)_6^{3+} \rightarrow \text{HCHO} + \text{H}^+ + \text{Ru}(\text{NH}_3)_6^{2+}$	$4.1 \times 10^7$	5-6			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol $\text{L}^{-1}$ MeOH.	72A018
<b>12.81 Pentaammine(chloro)ruthenium(III) ion</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Ru}(\text{NH}_3)_5\text{Cl}^{2+} \rightarrow$	$1.2 \times 10^8$	3.4-5			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.5-1 mol $\text{L}^{-1}$ methanol.	771100
<b>12.82 Hydrogen sulfide</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{H}_2\text{S} \rightarrow \text{H}_2\dot{\text{S}}\text{CH}_2\text{OH}$		6			p.r.	P.b.k. at 360 nm; $k(\text{adduct} \rightarrow \text{MeOH} + \text{SH}) = 2.3 \times 10^5 \text{ s}^{-1}$ .	670262

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>12.83 Hydrogen peroxomonosulfate ion</b>								
	$\text{^CH}_2\text{OH} + \text{HSO}_5^- \rightarrow$	$1.8 \times 10^6$				chem.	Esr study in soln. contg. Ti(III) sulfate, $\text{H}_2\text{O}_2$ , $\text{HSO}_5^-$ and MeOH.	90D226
<b>12.84 Peroxodisulfate ion</b>								
	$\text{^CH}_2\text{OH} + \text{S}_2\text{O}_8^{2-} + \text{SO}_4^{2-} \rightarrow \text{HCHO} + \text{H}^+ +$	$\sim 7 \times 10^4$			273	$\gamma$ -r.	Derived from product anal. in soln. contg. peroxydisulfate and MeOH by computer simulation.	88G043
		$1.3 \times 10^5$			-293	chem.	Esr study in soln. contg. $0.008 \text{ mol L}^{-1}$ Ti(III), $0.01 \text{ mol L}^{-1}$ $\text{H}_2\text{O}_2$ , ( $0-0.025$ ) $\text{mol L}^{-1}$ $\text{S}_2\text{O}_8^{2-}$ and $\sim 0.01 \text{ mol L}^{-1}$ MeOH.	84D044
<b>12.85 5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatotin(IV) ion</b>								
	$\text{^CH}_2\text{O}^- + \text{SnTMpyP}^{6+} \rightarrow \text{HCHO} +$	$6 \times 10^9$	13			p.r.	P.b.k. at 700 nm in soln. contg. MeOH.	84A121
<b>12.86 Titanium(III)</b>								
	$\text{^CH}_2\text{OH} + \text{Ti(III)} \rightarrow$					p.r.	No reaction in soln. contg. $1 \text{ mol L}^{-1}$ MeOH and $0.01 \text{ mol L}^{-1}$ Ti(III).	731057
<b>12.87 Thallium(I) ion</b>								
	$\text{^CH}_2\text{O}^- + \text{Tl}^+ \rightarrow \text{Tl}^0 + \text{HCHO}$	$1.5 \times 10^4$	12	0.2		p.r.	P.b.k. at 325, 420 and 450 nm in soln. contg. $0.001 \text{ mol L}^{-1}$ formaldehyde, $0.5 \text{ mol L}^{-1}$ MeOH, $0.19 \text{ mol L}^{-1}$ $\text{Tl}^+$ and $[\text{OH}^-] = 0.01 \text{ mol L}^{-1}$ .	89C001
<b>12.88 Thallium(I) ion, complex with Tl(0)</b>								
	$\text{^CH}_2\text{OH} + \text{Tl}_2^+ + \text{H}^+ \rightarrow \text{MeOH} + 2 \text{Tl}^+$	$4.0 \times 10^9$	6			p.r.	Calcd. from d.k. at 420 nm. and condy. changes in soln. contg. alcohol and $\text{Tl}^+$ assuming values for $2k(\text{Tl}_2^+ + \text{Tl}^+)$ , $k(\text{Tl}_2^+ + \text{H}_2\text{O}_2)$ and $2k(R + R)$ .	80A123
<b>12.89 Uranium(III) ion</b>								
	$\text{^CH}_2\text{OH} + \text{U}^{3+} \rightarrow$	$\leq 2 \times 10^7$	0.3			p.r.	D.k. at 350 nm in He-satd. soln. contg. $0.5 \text{ mol L}^{-1}$ $\text{HClO}_4$ and $0.1-1 \text{ mol L}^{-1}$ MeOH.	85A122
<b>12.90 Uranyl(VI) ion</b>								
	$\text{^CH}_2\text{OH} + \text{UO}_2^{2+} \rightarrow \text{HCHO} + \text{H}^+ +$	$\leq 4 \times 10^7$				p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. MeOH.	89A327
<b>12.91 12-Tungstate ion(6-), dihydrogen</b>								
	$\text{^CH}_2\text{OH} + \text{H}_2\text{W}_{12}\text{O}_{40}^{6-} \rightarrow \text{HCHO} + \text{H}^+ + \text{H}_2\text{W}_{12}\text{O}_{40}^{7-}$	$\leq 1.3 \times 10^7$	5-6			p.r.	P.b.k. at 650 nm in $\text{N}_2\text{O}$ -satd. soln. contg. MeOH.	82A271
<b>12.92 12-Tungstoferrate ion(5-)</b>								
	$\text{^CH}_2\text{OH} + \text{FeW}_{12}\text{O}_{40}^{5-} \rightarrow \text{HCHO} + \text{H}^+ + \text{FeW}_{12}\text{O}_{40}^{6-}$	$2.2 \times 10^8$	5-6			p.r.	P.b.k. at 650 nm in $\text{N}_2\text{O}$ -satd. soln. contg. MeOH.	82A271
<b>12.93 12-Tungstophosphate ion(3-)</b>								
	$\text{^CH}_2\text{OH} + \text{PW}_{12}\text{O}_{40}^{3-} \rightarrow \text{HCHO} + \text{H}^+ + \text{PW}_{12}\text{O}_{40}^{4-}$	$2.2 \times 10^9$	$\sim 1$			p.r.	P.b.k. at 650 nm in $\text{N}_2\text{O}$ -satd. soln. contg. MeOH and $\text{HClO}_4$ .	82A271
<b>12.94 Diphosphooctadecatungstate ion(6-)</b>								
	$\text{^CH}_2\text{OH} + \text{P}_2\text{W}_{18}\text{O}_{62}^{6-} \rightarrow \text{P}_2\text{W}_{18}\text{O}_{62}^{7-} + \text{H}^+ + \text{HCHO}$	$2.6 \times 10^9$	2		295	p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. ( $2.5 \times 10^{-2} \text{ mol L}^{-1}$ ) soln. contg. $0.5 \text{ mol L}^{-1}$ MeOH and $\sim 10^{-4} \text{ mol L}^{-1}$ heteropolytungstophosphate.	82A107
		$\sim 10^9$	1.5			p.r.	P.b.k. in deaerated soln. contg. $0.1 \text{ mol L}^{-1}$ MeOH.	81A385

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
12.95	12-Tungstosilicate ion(4-) $\cdot\text{CH}_2\text{OH} + \text{SiW}_{12}\text{O}_{40}^{4-} \rightarrow \text{HCHO} + \text{H}^+$ + $\text{SiW}_{12}\text{O}_{40}^{5-}$	$9.1 \times 10^8$	5.6			p.r.	P.b.k. at 650 nm in N <sub>2</sub> O-satd. soln. contg. MeOH.	82A271
12.96	Zinc(I) ion $\cdot\text{CH}_2\text{OH} + \text{Zn}^+ + \text{H}^+ \rightarrow \text{Zn}^{2+} + \text{MeOH}$	$2.5 \times 10^9$	7		295	p.r.	Calcd. from d.k. at 310 nm ( $\text{Zn}^+$ ) in N <sub>2</sub> O-satd. soln. contg. MeOH and ZnSO <sub>4</sub> ; used $k(\text{Zn}^+ + \text{Zn}^+) = 4.5 \times 10^8$ , $k(\text{Zn}^+ + \text{H}_2\text{O}_2) = 2.4 \times 10^9$ , $k(\text{Zn}^+ + \text{N}_2\text{O}) = 1.6 \times 10^7$ and $k(R + R) = 1.5 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	771011
12.97	Zinc(II) ion $\cdot\text{CH}_2\text{OH} + \text{Zn}^{2+} \rightarrow$	<10 <sup>2</sup>			298	p.r.	Estd. from lack of increase in $\text{Zn}^+$ in soln. contg. 0.1 mol L <sup>-1</sup> $\text{Zn}^{2+}$ upon addn. of 0.1 mol L <sup>-1</sup> MeOH.	751027
12.98	Acridinium $\cdot\text{CH}_2\text{OH} + \text{AcH}^+ \rightarrow$	$5.0 \times 10^8$	2.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. MeOH; ~30% $e$ -transfer; no reaction at pH 7.6; $pK_a = 5.6$ .	741127
12.99	Acrylamide $\cdot\text{CH}_2\text{OH} + \text{H}_2\text{C}=\text{CHCONH}_2 \rightarrow$ addn.	$2.6 \times 10^7$	2.5		298	p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. MeOH and $\text{Cu}^{2+}$ ; rel. to $k(\cdot\text{CH}_2\text{OH} + \text{Cu}^{2+}) = 1.6 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> .	78A322
12.100	Acrylate ion $\cdot\text{CH}_2\text{OH} + \text{CH}_2=\text{CHCO}_2^- \rightarrow$ addn.	$5 \times 10^5$	~9			chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> $\text{H}_2\text{O}_2$ and MeOH; calcd. using $2k(R + R) = 2.4 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	93D265
12.101	Acrylic acid $\cdot\text{CH}_2\text{OH} + \text{H}_2\text{C}=\text{CHCO}_2\text{H} \rightarrow$ addn.	$9.5 \times 10^6$	~2			chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> $\text{H}_2\text{O}_2$ and MeOH; calcd. using $2k(R + R) = 2.4 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	93D265
		$8.1 \times 10^6$	1			Fenton	rel. to $k(\cdot\text{CH}_2\text{OH} + \text{Fe}^{3+}) = 1.0 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> .	739341
12.102	Adenine, conjugate acid $\cdot\text{CH}_2\text{OH} + \text{AH}^+ \rightarrow$ addn.	$4.8 \times 10^6$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. MeOH.	94A368
12.103	Adenosine, conjugate acid $\cdot\text{CH}_2\text{OH} + \text{AH}^+ \rightarrow$ addn.	$-3 \times 10^6$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. MeOH.	94A368
12.104	Ascorbate ion $\cdot\text{CH}_2\text{OH} + \text{AH}^- \rightarrow$	<10 <sup>6</sup>	11			p.r.	No reaction in soln. contg. $8.4 \times 10^{-4}$ mol L <sup>-1</sup> ascorbate and 0.025 mol L <sup>-1</sup> MeOH.	771036
12.105	Azobenzene $\cdot\text{CH}_2\text{O}^- + \text{C}_6\text{H}_5\text{N}=\text{NC}_6\text{H}_5 \rightarrow \text{HCHO} + [\text{C}_6\text{H}_5\text{N}=\text{NC}_6\text{H}_5]^-$	$1 \times 10^9$	14			p.r.	P.b.k. at 380 nm in soln. contg. MeOH; $k$ same for <i>syn</i> - and <i>anti</i> - isomers.	771169
12.106	Benzophenone $\cdot\text{CH}_2\text{O}^- + (\text{C}_6\text{H}_5)_2\text{CO} \rightarrow \text{HCHO} + (\text{C}_6\text{H}_5)_2\dot{\text{C}}\text{O}^-$	$1.2 \times 10^8$	13			p.r.	P.b.k. at 610 nm in N <sub>2</sub> O-satd. soln. 1 mol L <sup>-1</sup> MeOH.	751125

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T(\text{K})$	Method	Comment	Ref.
12.107	1,4-Benzoquinone							
	$^{\bullet}\text{CH}_2\text{OH} + \text{Q} \rightarrow \text{HCHO} + \text{H}^+ + \text{Q}^{\bullet-}$	$2.9 \times 10^9$				γ-r.	C.k. in soln. contg. 1 mol $\text{L}^{-1}$ $\text{H}_2\text{SO}_4$ , $1.5 \times 10^{-4}$ mol $\text{L}^{-1}$ benzoquinone and 1 mol $\text{L}^{-1}$ MeOH with varied $[\text{O}_2]$ ; rel. to $k(^{\bullet}\text{CH}_2\text{OH} + \text{O}_2) = 4.2 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	86G034
		$4.8 \times 10^9$	6.2			p.r.	P.b.k. at 430 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol $\text{L}^{-1}$ MeOH.	730049
		$6.1 \times 10^9$				p.r.	P.b.k. at 430 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol $\text{L}^{-1}$ MeOH.	710619
12.108	Biacetyl							
	$^{\bullet}\text{CH}_2\text{OH} + \text{CH}_3\text{COCOCH}_3 \rightarrow \text{HCHO} + \text{H}^+ + [\text{CH}_3\text{COCOCH}_3]^{\bullet-}$	$6.5 \times 10^7$	5-6			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol $\text{L}^{-1}$ MeOH.	72A018
		$1.1 \times 10^8$				p.r.	P.b.k. at 300 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol $\text{L}^{-1}$ MeOH.	680249
12.109	2,2'-Bipyridine							
	$^{\bullet}\text{CH}_2\text{OH} + \text{bpy} \rightarrow$	$<10^6$	7			p.r.	P.b.k.; no reaction.	79A148
	$^{\bullet}\text{CH}_2\text{O}^- + \text{bpy} \rightarrow$	$<10^6$	alk.			p.r.	P.b.k.; no reaction.	79A148
12.110	Carbon tetrachloride							
	$^{\bullet}\text{CH}_2\text{OH} + \text{CCl}_4 \rightarrow ^{\bullet}\text{CCl}_3 + \text{Cl}^- + \text{HCHO} + \text{H}^+$	$\leq 10^6$				p.r.	Cond. changes; $G(\text{Cl}^-) = 0.3G(^{\bullet}\text{CH}_2\text{OH})$ .	710778
12.111	3-Carboxamido-2,2,5,5-tetramethylpyrrolidin-1-yloxy							
	$^{\bullet}\text{CH}_2\text{OH} + \text{NX-s} \rightarrow \text{addn.}$	$4.6 \times 10^8$	acid			p.r.	Cond. changes in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ MeOH.	761152
12.112	3-Carboxamido-2,2,5,5-tetramethyl-3-pyrrolin-1-yloxy							
	$^{\bullet}\text{CH}_2\text{OH} + \text{NX-u} \rightarrow \text{addn.}$	$3.5 \times 10^8$	acid			p.r.	Cond. changes in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ MeOH.	761152
12.113	4-Carboxy-1-methylpyridinium							
	$^{\bullet}\text{CH}_2\text{O}^- + 4\text{-py}^+(\text{CH}_3)\text{CO}_2^- \rightarrow$	$3.8 \times 10^9$	12.7			p.r.	P.b.k. at 395 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ MeOH.	79A051
12.114	4-Chlorobenzenediazonium cation							
	$^{\bullet}\text{CH}_2\text{OH} + 4\text{-ClC}_6\text{H}_4\text{N}_2^+ \rightarrow 4\text{-ClC}_6\text{H}_4^- + \text{HCHO} + \text{N}_2 + \text{H}^+$	$4.2 \times 10^9$	4			p.r.	Cond. changes in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol $\text{L}^{-1}$ MeOH and $\text{HClO}_4$ .	81A297
12.115	Crotonic acid							
	$^{\bullet}\text{CH}_2\text{OH} + \text{CH}_3\text{CH=CHCO}_2\text{H} \rightarrow \text{addn.}$	$4 \times 10^5$	~2			chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol $\text{L}^{-1}$ Ti(III), $1.67 \times 10^{-3}$ mol $\text{L}^{-1}$ $\text{H}_2\text{O}_2$ and MeOH; calcd. using $2k(R + R) = 2.4 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	93D265
12.116	4-Cyanophenyl- <i>N</i> - <i>tert</i> -butylnitronc							
	$^{\bullet}\text{CH}_2\text{OH} + 4\text{-CN-PBN} \rightarrow$	$7.5 \times 10^8$				p.r.	C.k. in $\text{N}_2\text{O}$ -satd. soln. contg. <i>p</i> -nitroacetophenone and MeOH; rel. to $k(^{\bullet}\text{CH}_2\text{OH} + \text{PNAP}) = 1 \times 10^8 \text{ L mol}^{-1} \text{s}^{-1}$ .	82A184
12.117	Cysteamine, conjugate acid							
	$^{\bullet}\text{CH}_2\text{OH} + \text{H}_3\text{N}^+\text{CH}_2\text{CH}_2\text{SH} \rightarrow \text{MeOH} + \text{H}_3\text{N}^+\text{CH}_2\text{CH}_2\text{S}^-$	$6.5 \times 10^7$	4			p.r.	P.b.k. at 415 nm in $\text{N}_2\text{O}$ -satd. soln. contg. MeOH, cysteamine and ABTS <sup>2-</sup> ; the latter reacts with RS <sup>·</sup> to give ABTS <sup>3-</sup> which is observed.	82Z335
		$2.9 \times 10^7$	7			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. MeOH; ESR gating technique.	723003
		$6.8 \times 10^7$	7.6			p.r.	P.b.k. at 410 nm ( $\text{RSSR}^-$ ) in $\text{N}_2\text{O}$ -satd. soln. contg. MeOH; $pK_a = 8.27, 10.53$ .	680132
		$1 \times 10^7$	12					

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
12.118	Cysteine $\cdot\text{CH}_2\text{OH} + \text{CysSH} \rightarrow \text{MeOH} + \text{CysS}^\bullet$	$1 \times 10^8$				p.r.	P.b.k. at 415 nm in N <sub>2</sub> O-satd. soln. contg. MeOH, cysteine and ABTS <sup>2-</sup> ; the latter reacts with RS <sup>•</sup> to give ABTS <sup>+</sup> which is observed.	82Z335
		$4.2 \times 10^7$	7			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. MeOH; esr gating technique.	723003
12.119	2'-Deoxyadenosine, conjugate acid $\cdot\text{CH}_2\text{OH} + \text{dAH}^+ \rightarrow \text{addn.}$	$5.5 \times 10^6$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. MeOH.	94A368
12.120	2'-Deoxyguanosine, conjugate acid $\cdot\text{CH}_2\text{OH} + \text{dGH}^+ \rightarrow \text{addn.}$	$\sim 4 \times 10^6$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. MeOH.	94A368
12.121	1,6-Diazabicyclo[4.4.4]tetradecane radical cation $\cdot\text{CH}_2\text{OH} + \text{DABCT}^+ \rightarrow \text{H abstr.}$	$1.5 \times 10^9$	~4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol MeOH and $(0.2\text{--}12) \times 10^{-4}$ mol L <sup>-1</sup> radical cation; 100% H abstr.; product analysis supported by condy. measurements.	86A272
12.122	3,5-Dibromo-4-nitrosobenzenesulfonate ion $\cdot\text{CH}_2\text{OH} + \text{DBNBS} \rightarrow$	$2.6 \times 10^8$	8.0- 8.5			p.r.	C.k.; rel. to $k(\cdot\text{CH}_2\text{OH} + \text{H}_2\text{TPPS}^{4-}) = 1.1 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> .	92A304
12.123	2,6-Dichloroindophenolate ion $\cdot\text{Cl}_2\text{OII} + \text{DCIP}^\bullet \rightarrow \text{HCHO} + \text{H}^+ + \text{DCIP}^{2-}$	$3.2 \times 10^9$	7			p.r.	D.k. at 600 nm in N <sub>2</sub> O-satd. soln. contg. MeOH; 99% e-transfer.	731078
12.124	1,4-Dicyanobenzene $\cdot\text{CH}_2\text{OH} + \text{DCNB} \rightarrow \text{HCHO} + \text{H}^+ + [\text{DCNB}]^\bullet$	$1.4 \times 10^8$	~7			p.r.	P.b.k. at 345 nm in N <sub>2</sub> O-satd. soln. contg. MeOH.	91A229
12.125	(E)-4,5-Dihydroxy-1,2-dithiane $\cdot\text{CH}_2\text{O}^- + [\text{SSCH}_2(\text{CHOH})_2\text{CH}_2] \rightarrow$ $\text{HCHO} + [\text{S}^-\text{SCH}_2(\text{CHOH})_2\text{CH}_2]$	$1.5 \times 10^8$ $2.4 \times 10^8$ $3.2 \times 10^8$	13.5 298 333	273	p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. $(1\text{--}10) \times 10^{-4}$ mol L <sup>-1</sup> DTT-ox and 0.1-0.5 mol L <sup>-1</sup> methanol; mechanism suggested to be addn. followed by decomp. to radical anion.	89A167	
	$\cdot\text{CH}_2\text{OH} + [\text{SSCH}_2(\text{CHOH})_2\text{CH}_2] \rightarrow$ $\text{HCHO} + \text{H}^+ + [\text{S}^-\text{SCH}_2(\text{CHOH})_2\text{CH}_2]$	$1.1 \times 10^8$	10.8		p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> MeOH.	86A363	
12.126	Dihydroxymethane $\cdot\text{CH}_2\text{OH} + \text{CH}_2(\text{OH})_2 \rightarrow \text{MeOH} +$ $\cdot\text{CH}(\text{OH})_2$	$3.4 \times 10^3$ $\sim 10^4\text{--}10^5$			γ-r.	Estd. from product anal.	90G138	
					γ-r.	Estd. from dose effects on yields in soln. contg. MeOH.	710929	
12.127	3,3-Dimethylacrylic acid $\cdot\text{CH}_2\text{OH} + (\text{CH}_3)_2\text{C=CHCO}_2\text{H} \rightarrow \text{addn.}$	$9 \times 10^4$	~2		chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and MeOH; calcd. using $2k(R + R) = 2.4 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	93D265	
12.128	4-( <i>N,N</i> -Dimethylamino)benzenediazonium cation $\cdot\text{CH}_2\text{OH} + 4-(\text{CH}_3)_2\text{NC}_6\text{H}_4\text{N}_2^+ \rightarrow$ $\text{HCHO} + 4-(\text{CH}_3)_2\text{NC}_6\text{H}_4 + \text{N}_2 + \text{H}^+$	$<4 \times 10^6$	4		p.r.	Condy. changes in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> MeOH and HClO <sub>4</sub> .	81A297	

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
12.129	1,1'-Dimethyl-4,4'-bipyridinium ·CH <sub>2</sub> OH + MV <sup>2+</sup> → HCHO + H <sup>+</sup> + MV <sup>+</sup>	3 × 10 <sup>8</sup>				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 3% MeOH.	771177
12.130	N,N-Dimethyl-4-nitrosoaniline ·CH <sub>2</sub> OH + 4-Me <sub>2</sub> NC <sub>6</sub> H <sub>4</sub> NO →	2.7 × 10 <sup>8</sup>				p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 4.9 mol L <sup>-1</sup> MeOH and (1-5) × 10 <sup>-5</sup> mol L <sup>-1</sup> N,N-dimethyl-4-nitrosoaniline.	94A511
		7.9 × 10 <sup>8</sup>	7			p.r.	D.k. at 440 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> MeOH.	690156
12.131	1,3-Dimethyluracil ·CH <sub>2</sub> OH + 1,3-DMU → [1,3-DMU-6-CH <sub>2</sub> OH] <sup>·</sup>	~10 <sup>4</sup>				γ-r.	Estd. in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> MeOH and 0.001 mol L <sup>-1</sup> dimethyluracil.	86G178
12.132	1,4-Dinitrobenzene ·CH <sub>2</sub> OH + 1,4-C <sub>6</sub> H <sub>4</sub> (NO <sub>2</sub> ) <sub>2</sub> → HOCH <sub>2</sub> ON(O)C <sub>6</sub> H <sub>4</sub> -4-NO <sub>2</sub> ·ClI <sub>2</sub> O <sup>·-</sup> + 1,4-C <sub>6</sub> H <sub>4</sub> (NO <sub>2</sub> ) <sub>2</sub> → IIClIO + [1,4-C <sub>6</sub> H <sub>4</sub> (NO <sub>2</sub> ) <sub>2</sub> ] <sup>·-</sup>	2.0 × 10 <sup>8</sup>	4-5	293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> MeOH.	84A305	
		~3 × 10 <sup>9</sup>	-11.5	293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> MeOH.	84A305	
12.133	Dithiothreitol ·CH <sub>2</sub> OH + HSCH <sub>2</sub> (CHOH) <sub>2</sub> CH <sub>2</sub> SH → HSCH <sub>2</sub> (CHOH) <sub>2</sub> CH <sub>2</sub> S <sup>·</sup> + MeOH	6.5 × 10 <sup>7</sup>	7.4			p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. dithiothreitol and methanol.	87A250
		6.5 × 10 <sup>7</sup>	7.2	293	p.r.	P.b.k. at 400 nm (cyclized radical anion) in N <sub>2</sub> O-satd. soln. contg. DTT and MeOH.	87G007	
		8.0 × 10 <sup>7</sup>	7.3			p.r.	P.b.k. at 390 nm (RSSR <sup>·-</sup> ) in N <sub>2</sub> O-satd. soln. contg. 5 × 10 <sup>-4</sup> mol L <sup>-1</sup> DTT and 1 mol L <sup>-1</sup> MeOH.	85A220
		1.0 × 10 <sup>8</sup>	4			p.r.	P.b.k. at 415 nm in N <sub>2</sub> O-satd. soln. contg. MeOH, DTT and ABTS <sup>2-</sup> ; the latter reacts with RS <sup>·</sup> to give ABTS <sup>·-</sup> which is observed.	82Z335
		6.8 × 10 <sup>7</sup>	7			p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> MeOH.	731020
12.134	Ethylene glycol ·CH <sub>2</sub> OH + HOCH <sub>2</sub> CH <sub>2</sub> OH → MeOH + ·CHOCH <sub>2</sub> OH	~10 <sup>3</sup>				γ-r.	Estd. from dose effect on yields in MeOH soln.	710929
12.135	N-Ethylmaleimide ·CH <sub>2</sub> OH + NEM → addn.	2.4 × 10 <sup>9</sup>	6-7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. MeOH; 15% e-transfer, 85% addn. based on abs. spectra.	720144
12.136	Fullerene-C <sub>60</sub> -γ-cyclodextrin complex ·CH <sub>2</sub> OH + γ-CD/C <sub>60</sub> → HCHO + H <sup>+</sup> + 5 × 10 <sup>7</sup> γ-CD/C <sub>60</sub> <sup>·-</sup>					p.r.	D.k. at 331 nm, as well as p.b.k. at 302 nm, in N <sub>2</sub> O-satd. soln. contg. 10% MeOH.	93A433
12.137	Fumarate ion ·CH <sub>2</sub> OH + trans-O <sub>2</sub> CCH=CHCO <sub>2</sub> <sup>·-</sup> → -O <sub>2</sub> CCH(CH <sub>2</sub> OH)CO <sub>2</sub> <sup>·-</sup>	~10 <sup>7</sup>				e-r.	Esr study of dose rate effect on ·CH <sub>2</sub> OH and adduct radical (in soln. contg. 1 mol L <sup>-1</sup> MeOH and 0.01 mol L <sup>-1</sup> fumarate) assuming 2k(R + R) = 2.4 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	710284
12.138	Fumaric acid ·CH <sub>2</sub> OH + trans-HO <sub>2</sub> CCH=CHCO <sub>2</sub> H →	6 × 10 <sup>7</sup>	1			Fenton	rel. to k(·CH <sub>2</sub> OH + Fe <sup>3+</sup> ) = 1.0 × 10 <sup>8</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	739341
12.139	Glutathione ·CH <sub>2</sub> OH + GSH → MeOH + GS <sup>·</sup>	1.0 × 10 <sup>8</sup>	8-10			p.r.	P.b.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. MeOH and glutathione.	88A144

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	I	T (K)	Method	Comment	Ref.
12.139	Glutathione — Continued							
		$4.0 \times 10^7$	8.4			p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> MeOH and glutathione.	84A012
		$5.9 \times 10^7$	4			p.r.	P.b.k. at 415 nm in N <sub>2</sub> O-satd. soln. contg. MeOH, glutathione and ABTS <sup>2-</sup> ; the latter reacts with RS <sup>•</sup> to give ABTS <sup>+</sup> which is observed.	82Z335
12.140	Guanine, conjugate acid $^{\bullet}\text{CH}_2\text{OH} + \text{GH}^+ \rightarrow \text{addn.}$	$\sim 4 \times 10^6$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. MeOH.	94A368
12.141	Guanosine, conjugate acid $^{\bullet}\text{CH}_2\text{OH} + \text{GH}^+ \rightarrow \text{addn.}$	$5.7 \times 10^6$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. MeOH.	94A368
12.142	Hematoxylin IX $^{\bullet}\text{CH}_2\text{O}^- + \text{HP} \rightarrow \text{HCHO} + \text{HP}^{+}$	$3.3 \times 10^8$	13.0			p.r.	P.b.k. at 600-650 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	741040
	$^{\bullet}\text{CH}_2\text{OH} + \text{HP} \rightarrow \text{HCHO} + \text{HP}^{+} + \text{H}^+$	$\leq 1 \times 10^7$	7.0			p.r.	P.b.k. at 600-650 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	741040
12.143	Hexafluorobenzene $^{\bullet}\text{CH}_2\text{O}^- + \text{C}_6\text{F}_6 \rightarrow \text{HCHO} + \text{C}_6\text{F}_6^{+}$	$4.4 \times 10^5$	14			p.r.	P.b.k. at 310 nm in N <sub>2</sub> O-satd. soln. contg. 60% MeOH and 1.0 mol L <sup>-1</sup> KOH.	93A041
12.144	1-(2-Hydroxyethyl)-2-methyl-5-nitroimidazole $^{\bullet}\text{CH}_2\text{OH} + (\text{ImH})-\text{NO}_2 \rightarrow$	$10^8$				p.r.	D.k. at 320 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	741135
12.145	Hypoxanthine, conjugate acid $^{\bullet}\text{CH}_2\text{OH} + \text{HxOH}_2^+ \rightarrow \text{addn.}$	$\sim 5 \times 10^6$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. MeOH.	94A368
12.146	Indigodisulfonate ion $^{\bullet}\text{CH}_2\text{OH} + \text{IDS}^{2-} \rightarrow$	$2.0 \times 10^9$ $1.9 \times 10^9$	7 9			p.r.	D.k. at 610 nm in N <sub>2</sub> O-satd. soln. contg. MeOH; 75% e-transfer at pH 7 and 62% at pH 9.	731078
12.147	Indigotetrasulfonate ion $^{\bullet}\text{CH}_2\text{OH} + \text{ITS}^{4-} \rightarrow$	$3.0 \times 10^9$	7			p.r.	D.k. at 610 nm in N <sub>2</sub> O-satd. soln. contg. MeOH; 80% e-transfer.	731078
12.148	Indophenolate ion $^{\bullet}\text{CH}_2\text{OH} + \text{O=C}_6\text{H}_4=\text{NC}_6\text{H}_4\text{O}^- \rightarrow$	$3.1 \times 10^9$	9			p.r.	D.k. at 610 nm in N <sub>2</sub> O-satd. soln. contg. MeOH; 92% e-transfer.	731078
12.149	Inosine, conjugate acid $^{\bullet}\text{CH}_2\text{OH} + \text{InoH}^+ \rightarrow \text{addn.}$	$\sim 8 \times 10^6$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. MeOH.	94A368
12.150	Iodoacetic acid $^{\bullet}\text{CH}_2\text{OH} + \text{ICH}_2\text{CO}_2\text{H} \rightarrow ^{\bullet}\text{CH}_2\text{CO}_2\text{H} +$ other prod.	$2.1 \times 10^8$	1	293	chem.	Estd. from esr meas. in Ti <sup>III</sup> -H <sub>2</sub> O <sub>2</sub> soln. contg. MeOH; rel. to $2k(^{\bullet}\text{CH}_2\text{CO}_2\text{H} + ^{\bullet}\text{CH}_2\text{CO}_2\text{H}) = 1.8 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	745286	
		$< 3.5 \times 10^8$		293	p.r.	P.b.k. at 330 nm.	745286	
12.151	3-Iodopropionic acid $^{\bullet}\text{CH}_2\text{OH} + \text{ICH}_2\text{CH}_2\text{CO}_2\text{H} \rightarrow$ other prod.	$1.0 \times 10^5$	1	293	chem.	Estd. from esr meas. in Ti <sup>III</sup> -H <sub>2</sub> O <sub>2</sub> soln. contg. MeOH; rel. to $2k(^{\bullet}\text{CH}_2\text{CH}_2\text{CO}_2\text{H} + ^{\bullet}\text{CH}_2\text{CH}_2\text{CO}_2\text{H}) = 2.4 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	745286	

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.	
12.152	Lipoamide								
	$\cdot\text{CH}_2\text{OH} + \text{LS}_2 \rightarrow \text{LS}_2^{\cdot-} + \text{HCHO} + \text{H}^+$	$3.6 \times 10^8$		10.8		p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> MeOH.	86A363	
12.153	Maleic acid								
	$\cdot\text{CH}_2\text{OH} + \text{cis}-\text{HO}_2\text{CCH}=\text{CHCO}_2\text{H} \rightarrow$	$2.7 \times 10^7$		1		Fenton	rel. to $k(\cdot\text{CH}_2\text{OH} + \text{Fe}^{3+}) = 1.0 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$	739341	
12.154	2-Mercaptoethanol								
	$\cdot\text{CH}_2\text{OH} + \text{HSCH}_2\text{CH}_2\text{OH} \rightarrow \text{MeOH} +$	$1.3 \times 10^8$		10		p.r.	P.b.k. (RSSR <sup>·-</sup> ) in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	690553	
	$\cdot\text{SCH}_2\text{CH}_2\text{OH}$								
12.155	2-Mercaptopropionylglycine								
	$\cdot\text{CH}_2\text{OH} +$	$9.6 \times 10^7$				p.r.	P.b.k. at 415 nm in N <sub>2</sub> O-satd. soln. contg. MeOH, 2-mercaptopropionylglycine and ABTS <sup>2+</sup> ; the latter reacts with RS <sup>·</sup> to give ABTS <sup>·-</sup> which is observed.	82Z335	
	$\text{HSCH}(\text{CH}_3)\text{CONHCH}_2\text{CO}_2\text{H} \rightarrow$								
	$\text{MeOH} + \cdot\text{SCH}(\text{CH}_3)\text{CONHCH}_2\text{CO}_2\text{H}$								
12.156	Methacrylic acid								
	$\cdot\text{CH}_2\text{OH} + \text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2\text{H} \rightarrow \text{addn.}$	$6.0 \times 10^6$		-2		chem.	Esr study in soln. contg. $1.67 \times 10^{-3} \text{ mol L}^{-1}$ Ti(III), $1.67 \times 10^{-3} \text{ mol L}^{-1}$ H <sub>2</sub> O <sub>2</sub> and MeOH; calcd. using $2k(R + R) = 2.4 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$	93D265	
12.157	4-Methoxybenzenediazonium cation								
	$\cdot\text{CH}_2\text{OH} + 4-\text{CH}_3\text{OC}_6\text{H}_4\text{N}_2^+ \rightarrow \text{HCHO}$	$1.9 \times 10^9$		4		p.r.	D.k. at 330 nm in N <sub>2</sub> O-satd. soln. contg. $2 \times 10^{-3} \text{ mol L}^{-1}$ MeOH.	81A297	
	$+ 4-\text{CH}_3\text{OC}_6\text{H}_4 + \text{N}_2 + \text{H}^+$								
12.158	4-Methoxyphenyl- <i>N</i> - <i>tert</i> -butylnitronone								
	$\cdot\text{CH}_2\text{OH} + 4-\text{CH}_3\text{O-PBN} \rightarrow$	$2.9 \times 10^7$				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. <i>p</i> -nitroacetophenone and MeOH; rel. to $k(\cdot\text{CH}_2\text{OH} + \text{PNAP}) = 1 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	82A184	
12.159	4-Methylbenzenediazonium cation								
	$\cdot\text{CH}_2\text{OH} + 4-\text{CH}_3\text{C}_6\text{H}_4\text{N}_2^+ \rightarrow$	$1.8 \times 10^9$		4		p.r.	Cond. changes in N <sub>2</sub> O-satd. soln. contg. $0.01 \text{ mol L}^{-1}$ MeOH and HClO <sub>4</sub> ; also bleaching at 285 nm.	81A297	
	$4-\text{CH}_3\text{C}_6\text{H}_4 + \text{HCHO} + \text{N}_2 + \text{H}^+$								
12.160	Methylene Blue cation								
	$\cdot\text{CH}_2\text{OH} + \text{MB}^+ \rightarrow \text{HCHO} + \text{H}^+ + \cdot\text{MB}$	$3.4 \times 10^9$		7		p.r.	D.k. at 580 nm in N <sub>2</sub> O-satd. soln. contg. MeOH; 91% <i>e</i> -transfer.	731078	
12.161	2-Methyl-1,4-naphthoquinone								
	$\cdot\text{CH}_2\text{O}^- + 2-\text{CH}_3\text{NQ} \rightarrow \text{HCHO} +$	$4.4 \times 10^9$		12.4		p.r.	P.b.k. at 395 nm in soln. contg. $0.05 \text{ mol L}^{-1}$ MeOH; 92% <i>e</i> -transfer.	731047	
	$[2-\text{CH}_3\text{NQ}]^{\cdot-}$								
	$\cdot\text{CH}_2\text{OH} + 2-\text{CH}_3\text{NQ} \rightarrow \text{HCHO} +$	$3.7 \times 10^9$		7.0		p.r.	P.b.k. at 395 nm in $0.05 \text{ mol L}^{-1}$ MeOH; 88% <i>e</i> -transfer.	731047	
	$[2-\text{CH}_3\text{NQ}]^{\cdot-} + \text{H}^+$								
12.162	Methyl 4-nitrobenzenesulfonate								
	$\cdot\text{CH}_2\text{OH} + 4-\text{O}_2\text{NC}_6\text{H}_4\text{SO}_3\text{CH}_3 \rightarrow$	$1.2 \times 10^8$		4-5		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. $1 \text{ mol L}^{-1}$ MeOH.	84A305
	$\text{HOCH}_2\text{ON}(\text{O})\text{C}_6\text{H}_4-4-\text{SO}_3\text{CH}_3$								
	$\cdot\text{CH}_2\text{O}^- + 4-\text{O}_2\text{NC}_6\text{H}_4\text{SO}_3\text{CH}_3 \rightarrow$	$\sim 3 \times 10^9$		-11.5		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. $1 \text{ mol L}^{-1}$ MeOH.	84A305
	$\text{HCHO} + [4-\text{O}_2\text{NC}_6\text{H}_4\text{SO}_3\text{CH}_3]^{\cdot-}$								
12.163	Methyl 4-nitrobenzoate								
	$\cdot\text{CH}_2\text{OH} + 4-\text{O}_2\text{NC}_6\text{H}_4\text{CO}_2\text{CH}_3 \rightarrow$	$6.6 \times 10^7$		4-5		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. $1 \text{ mol L}^{-1}$ MeOH.	84A305
	$\text{HOCH}_2\text{ON}(\text{O})\text{C}_6\text{H}_4-4-\text{CO}_2\text{CH}_3$								
	$\cdot\text{CH}_2\text{O}^- + 4-\text{O}_2\text{NC}_6\text{H}_4\text{CO}_2\text{CH}_3 \rightarrow$	$\sim 3 \times 10^9$		-11.5		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. $1 \text{ mol L}^{-1}$ MeOH.	84A305
	$\text{HCHO} + [4-\text{O}_2\text{NC}_6\text{H}_4\text{CO}_2\text{CH}_3]^{\cdot-}$								

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	T (K)	Method	Comment	Ref.
12.164	2-Methyl-2-nitrosopropane $^{\bullet}\text{CH}_2\text{OH} + (\text{CH}_3)_3\text{CNO} \rightarrow \text{addn.}$	$1.4 \times 10^8$	-7		-291	p.r.	P.b.k. (esr) in unbuffered $\text{N}_2\text{O}$ -satd. soln. contg. 0.25 mol $\text{L}^{-1}$ methanol and (0.25-15) $\times 10^{-3}$ mol $\text{L}^{-1}$ MNP (assuming complete dimer dissociation).	91D097
12.165	1-Methyl-1'-octadecyl-4,4'-bipyridinium $^{\bullet}\text{CH}_2\text{OH} + \text{MSV}^{2+} \rightarrow \text{MSV}^{+} + \text{HCHO} + \text{H}^+$	$2 \times 10^8$	3			p.r.	Abs. changes in Ar-satd. soln. contg. 1 mol $\text{L}^{-1}$ MeOH.	82N168
12.166	4-Methylphenyl- <i>N</i> - <i>tert</i> -butylnitronite $^{\bullet}\text{CH}_2\text{OH} + 4\text{-CH}_3\text{-PBN} \rightarrow$	$2.5 \times 10^7$				p.r.	C.k. in $\text{N}_2\text{O}$ -satd. soln. contg. <i>p</i> -nitroacetophenone and MeOH; rel. to $k(^{\bullet}\text{CH}_2\text{OH} + \text{PNAP}) = 1 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	82A184
12.167	3-Methylpterin, conjugate acid $^{\bullet}\text{CH}_2\text{OH} + 3\text{-MPTH}^+ \rightarrow$	$6 \times 10^7$	0.8			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. MeOH; -45% $e$ -transfer.	761060
12.168	Nicotinamide adenine dinucleotide $^{\bullet}\text{CH}_2\text{OH} + \text{NAD}^+ \rightarrow \text{HCHO} + \text{H}^+ + \text{NAD}^-$	$1.0 \times 10^9$	6.0			p.r.	P.b.k.	731104
12.169	Nifuroxime $^{\bullet}\text{CH}_2\text{OH} + \text{NF} \rightarrow \text{NF}^- + \text{HCHO} + \text{H}^+$	$8 \times 10^8$	7			p.r.	P.b.k. at 390 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.2 mol $\text{L}^{-1}$ MeOH; 90% $e$ -transfer.	731099
12.170	4-Nitroacetophenone $^{\bullet}\text{CH}_2\text{OH} + \text{PNAP} \rightarrow \text{HOCH}_2\text{ON}(\text{O})\text{C}_6\text{H}_4\text{-4-COCH}_3$	$8.6 \times 10^7$	4.6		293	p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol $\text{L}^{-1}$ MeOH; $\Delta H^\ddagger = 6.9 \text{ kJ mol}^{-1}$ , $\Delta S^\ddagger = -69.5 \text{ J K}^{-1} \text{ mol}^{-1}$ , studied at 273-333 K; adduct decomposes to radical anion; see also [730122].	88A099 84A305
	$^{\bullet}\text{CH}_2\text{O}^- + \text{PNAP} \rightarrow \text{HCHO} + [\text{PNAP}]^{\bullet-}$	$4.7 \times 10^9$	13			p.r.	P.b.k. at 550 nm in $\text{N}_2\text{O}$ -satd. soln. contg. MeOH.	730122
12.171	4-Nitrobenzaldehyde $^{\bullet}\text{CH}_2\text{OH} + 4\text{-O}_2\text{NC}_6\text{H}_4\text{CHO} \rightarrow \text{HOCH}_2\text{ON}(\text{O})\text{C}_6\text{H}_4\text{-4-CHO}$	$9.1 \times 10^7$	4.5		293	p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol $\text{L}^{-1}$ MeOH.	84A305
	$^{\bullet}\text{CH}_2\text{O}^- + 4\text{-O}_2\text{NC}_6\text{H}_4\text{CHO} \rightarrow \text{HCHO} + [\text{4-O}_2\text{NC}_6\text{H}_4\text{CHO}]^{\bullet-}$	$\sim 3 \times 10^9$	-11.5		293	p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol $\text{L}^{-1}$ MeOH.	84A305
12.172	4-Nitrobenzamide $\text{CH}_2\text{OH} + 4\text{-O}_2\text{NC}_6\text{H}_4\text{CONH}_2 \rightarrow \text{HOCH}_2\text{ON}(\text{O})\text{C}_6\text{H}_4\text{-4-CONH}_2$	$7.3 \times 10^7$	4.6		293	p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol $\text{L}^{-1}$ MeOH; $\Delta H^\ddagger = 7.6 \text{ kJ mol}^{-1}$ , $\Delta S^\ddagger = -67 \text{ J K}^{-1} \text{ mol}^{-1}$ , studied at 273-333 K.	88A099 84A305
	$^{\bullet}\text{CH}_2\text{O}^- + 4\text{-O}_2\text{NC}_6\text{H}_4\text{CONH}_2 \rightarrow \text{HCHO} + [\text{4-O}_2\text{NC}_6\text{H}_4\text{CONH}_2]^{\bullet-}$	$\sim 3 \times 10^9$	-11.5		293	p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol $\text{L}^{-1}$ MeOH.	84A305
12.173	Nitrobenzene $^{\bullet}\text{CH}_2\text{OH} + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$	$6.0 \times 10^7$	5.6			p.r.	Abs. changes in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ MeOH.	72A018
		$<10^7$	7			p.r.	P.b.k. at 285 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ MeOH.	660432
	$^{\bullet}\text{CH}_2\text{O}^- + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow \text{HCHO} + [\text{C}_6\text{H}_5\text{NO}_2]^{\bullet-}$	$2.7 \times 10^9$	13			p.r.	P.b.k. at 285 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ MeOH.	660432
12.174	4-Nitrobenzenediazonium ion $^{\bullet}\text{CH}_2\text{OH} + 4\text{-NO}_2\text{C}_6\text{H}_4\text{N}_2^+ \rightarrow 4\text{-NO}_2\text{C}_6\text{H}_4\text{N} + \text{N}_2 + \text{HCHO} + \text{H}^+$	$5.2 \times 10^9$	4			p.r.	Cond. changes in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol $\text{L}^{-1}$ MeOH and $\text{HClO}_4$ .	81A297

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$\text{I}$	T(K)	Method	Comment	Ref.
12.175	4-Nitrobenzenesulfonamide							
	'CH <sub>2</sub> OH + 4-O <sub>2</sub> NC <sub>6</sub> H <sub>4</sub> SO <sub>2</sub> NH <sub>2</sub> → HOCH <sub>2</sub> ON(O)C <sub>6</sub> H <sub>4</sub> -4-SO <sub>2</sub> NH <sub>2</sub>	$8.6 \times 10^7$	4-6		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> MeOH; $\Delta H^\ddagger = 4.4 \text{ kJ mol}^{-1}$ , $\Delta S^\ddagger = -81 \text{ J K}^{-1} \text{ mol}^{-1}$ , studied at 273-333 K.	88A099 84A305
	'CH <sub>2</sub> O <sup>-</sup> + 4-O <sub>2</sub> NC <sub>6</sub> H <sub>4</sub> SO <sub>2</sub> NH <sub>2</sub> → HCHO + [4-O <sub>2</sub> NC <sub>6</sub> H <sub>4</sub> SO <sub>2</sub> NH <sub>2</sub> ] <sup>-</sup>	$\sim 3 \times 10^9$	~11.5		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> MeOH.	84A305
12.176	4-Nitrobenzonitrile							
	'CH <sub>2</sub> OH + 4-O <sub>2</sub> NC <sub>6</sub> H <sub>4</sub> CN → HOCH <sub>2</sub> ON(O)C <sub>6</sub> H <sub>4</sub> -4-CN	$1.0 \times 10^8$	4-6		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> MeOH; $\Delta H^\ddagger = 7.1 \text{ kJ mol}^{-1}$ , $\Delta S^\ddagger = -67 \text{ J K}^{-1} \text{ mol}^{-1}$ in D <sub>2</sub> O.	88A099 84A305
	'CH <sub>2</sub> O <sup>-</sup> + 4-O <sub>2</sub> NC <sub>6</sub> H <sub>4</sub> CN → HCHO + [4-O <sub>2</sub> NC <sub>6</sub> H <sub>4</sub> CN] <sup>-</sup>	$\sim 3 \times 10^9$	~11.5		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> MeOH.	84A305
12.177	aci-Nitromethane anion							
	'CH <sub>2</sub> O <sup>-</sup> + CH <sub>2</sub> NO <sub>2</sub> <sup>-</sup> → adduct formation	$2.1 \times 10^7$	11.3		-285	p.r.	P.b.k. (esr) in N <sub>2</sub> O-satd. soln. contg. (0.5-5) × 10 <sup>-3</sup> mol L <sup>-1</sup> nitromethane and 0.5 mol L <sup>-1</sup> MeOH; d.k. gave $k = 2.6 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ ; $k = 2.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ for electron transfer.	88D069
12.178	4-Nitroperoxybenzoic acid							
	'CH <sub>2</sub> OH + 4-O <sub>2</sub> NC <sub>6</sub> H <sub>4</sub> CO <sub>3</sub> H → HCHO + H <sup>+</sup> + [4-O <sub>2</sub> NC <sub>6</sub> H <sub>4</sub> CO <sub>3</sub> H] <sup>-</sup>	$2 \times 10^8$				p.r.	P.b.k. at 330 nm in N <sub>2</sub> O-satd. soln. contg. MeOH; 20% e-transfer based on condy. changes, also adduct formn.	741078
12.179	4-Nitrophenyl- <i>N</i> -tert-butylnitronate							
	'CH <sub>2</sub> OH + 4-NO <sub>2</sub> -PBN →	$1.2 \times 10^9$				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. <i>p</i> -nitroacetophenone and MeOH; rel. to $k(\text{'CH}_2\text{OH} + \text{PNAP}) = 1 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	82A184
12.180	Nitrosobenzene							
	'CH <sub>2</sub> O <sup>-</sup> + C <sub>6</sub> H <sub>5</sub> NO → HCHO + C <sub>6</sub> H <sub>5</sub> NO <sup>-</sup>	$6.8 \times 10^9$	13.0			p.r.	P.b.k. at 450 nm in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> MeOH.	660433
	'CH <sub>2</sub> OH + C <sub>6</sub> H <sub>5</sub> NO → HCHO + C <sub>6</sub> H <sub>5</sub> NOH	$3.2 \times 10^9$	7.0			p.r.	P.b.k. at 450 nm in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> MeOH.	660433
12.181	<i>p</i> -Nitro- $\alpha,\alpha,\alpha$ -trifluorotoluene							
	'CH <sub>2</sub> OH + 4-CF <sub>3</sub> C <sub>6</sub> H <sub>4</sub> NO <sub>2</sub> → HOCH <sub>2</sub> ON(O)C <sub>6</sub> H <sub>4</sub> -4-CF <sub>3</sub>	$1.2 \times 10^8$	4.5-6		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> MeOH; $\Delta H^\ddagger = 9.2 \text{ kJ mol}^{-1}$ , $\Delta S^\ddagger = -60 \text{ J K}^{-1} \text{ mol}^{-1}$ , studied at 273-333 K.	88A099
12.182	Penicillamine							
	'CH <sub>2</sub> OH + PenSH → MeOH + PenS <sup>-</sup>	$3.4 \times 10^7$				p.r.	P.b.k. at 415 nm in N <sub>2</sub> O-satd. soln. contg. MeOH, penicillamine and ABTS <sup>2+</sup> ; the latter reacts with RS <sup>-</sup> to give ABTS <sup>-</sup> which is observed.	82Z335
		$1.1 \times 10^8$				p.r.	P.b.k. at 450 nm in soln. contg. 0.5 or 1 mol L <sup>-1</sup> MeOH.	731073
12.183	1,10-Phenanthroline							
	'CH <sub>2</sub> O <sup>-</sup> + phen →	$<1 \times 10^7$	~13			p.r.	P.b.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> MeOH.	80A115
		$<10^6$	13			p.r.	P.b.k. in soln. contg. 0.2 mol L <sup>-1</sup> MeOH; no reaction.	79A148
	'CH <sub>2</sub> OH + phen →	$<10^6$	7			p.r.	P.b.k. in soln. contg. 0.2 mol L <sup>-1</sup> MeOH; no reaction.	79A148
12.184	Phenosaframine cation							
	'CH <sub>2</sub> OH + PSF <sup>+</sup> →	$1.2 \times 10^9$	7			p.r.	D.k. at 520 nm in N <sub>2</sub> O-satd. soln. contg. MeOH; 22% e-transfer.	731078

TABLE 12. Hydroxymethyl — Continued

Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T(\text{K})$	Method	Comment	Ref.
12.185 Phenyl- <i>N-tert</i> -butylnitrone							
·CH <sub>2</sub> O <sup>-</sup> + PBN →	$1.2 \times 10^7$	alk.			p.r.	C.k.; rel. to $k(\cdot\text{CH}_2\text{O}^- + \text{PNAP}) = 4.7 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	82A184
·CH <sub>2</sub> OH + PBN →	$4.3 \times 10^7$				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. <i>p</i> -nitroacetophenone and MeOH; rel. to $k(\cdot\text{CH}_2\text{OH} + \text{PNAP}) = 1 \times 10^8 \text{ L mol}^{-1} \text{s}^{-1}$ .	82A184
12.186 1-Propylimidazole							
·CH <sub>2</sub> OH + PIA →	$1.1 \times 10^7$				γ-r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 4.9 mol L <sup>-1</sup> MeOH. rel. to $k(\cdot\text{CH}_2\text{OH} + 4\text{-Me}_2\text{NC}_6\text{H}_4\text{NO}) = 2.7 \times 10^8 \text{ L mol}^{-1} \text{s}^{-1}$ .	94A511
12.187 Pteridine							
·CH <sub>2</sub> OH + C <sub>6</sub> H <sub>4</sub> N <sub>4</sub> →	$3.6 \times 10^8$	6.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. MeOH.	761060
12.188 Pterin							
·CH <sub>2</sub> OH + PnH →	$\ll 10^7$	7.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. MeOH.	761060
12.189 Pterin, conjugate acid							
·CH <sub>2</sub> OH + PnH <sub>2</sub> <sup>+</sup> →	$9.0 \times 10^7$	0.8			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. MeOH; ~40% e-transfer.	761060
12.190 Pterin, conjugate base							
·CH <sub>2</sub> O <sup>-</sup> + Pn <sup>-</sup> →	$6.0 \times 10^8$	13.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. MeOH; 100% e-transfer.	761060
12.191 Pyrene							
·CH <sub>2</sub> O <sup>-</sup> + Py →		13			p.r.	No reaction obs.; buildup of Py <sup>-</sup> in micellar soln. contg. 0.2 mol L <sup>-1</sup> MeOH after photolysis attributed to triplet pyrene, $k(\cdot\text{CH}_2\text{O}^- + {}^3\text{Py}) = 1.8 \times 10^{10} \text{ L mol}^{-1} \text{s}^{-1}$ .	761062
12.192 Tetrafluoro-1,4-benzoquinone							
·CH <sub>2</sub> OH + F <sub>4</sub> Q → HCHO + H <sup>+</sup> + F <sub>4</sub> Q <sup>·-</sup>	$3.1 \times 10^9$	5.8			p.r.	P.b.k. at 435 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> MeOH.	94A417
12.193 5,10,15,20-Tetrakis(4-sulfonatophenyl)porphine							
·CH <sub>2</sub> OH + H <sub>2</sub> TPPS <sup>4-</sup> → H <sub>2</sub> TPPS(H) <sup>4-</sup>	$1.1 \times 10^8$	8.0			p.r.	Abs. changes in soln. contg. MeOH.	92A304
+ HCHO		8.5					
	$1.9 \times 10^8$	10.4			p.r.	P.b.k. at 700 nm in Ar-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	92A009
·CH <sub>2</sub> OH + H <sub>4</sub> TPPS <sup>2-</sup> → H <sub>4</sub> TPPS <sup>3-</sup> +	$1.0 \times 10^9$	3.5			p.r.	D.k. at 650 nm, as well as p.b.k. above 700 nm and below 550 nm, and condy. changes in Ar-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	92A009
H <sup>+</sup> + HCHO							
·CH <sub>2</sub> O <sup>-</sup> + (H <sub>2</sub> TPPS <sup>4-</sup> ) <sub>2</sub> →	$1.5 \times 10^9$	13			p.r.	P.b.k. at 700 nm in Ar-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	92A009
(H <sub>2</sub> TPPS) <sub>2</sub> <sup>9-</sup> + HCHO							
12.194 2,2,6,6-Tetramethylpiperidine- <i>N</i> -oxyl							
·CH <sub>2</sub> OH + TMPN → addn.	$4.4 \times 10^8$	acid			p.r.	Cond. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	761067
12.195 2,2,6,6-Tetramethyl-4-piperidone <i>N</i> -oxyl							
·CH <sub>2</sub> OH + TAN → addn.	$7.2 \times 10^8$	acid			p.r.	Cond. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	761067
	$7.2 \times 10^8$	5.6			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> MeOH; rel. to $k(\cdot\text{CH}_2\text{OH} + \text{ferricyanide}) = 4.0 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	710618

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>12.196 Tetranitromethane</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{C}(\text{NO}_2)_4 \rightarrow \text{HCHO} + ^{\bullet}\text{NO}_2 + \text{H}^+ + \text{C}(\text{NO}_2)_3^-$	$5.0 \times 10^9$				p.r.	P.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	640133
<b>12.197 Thionine cation</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Th}^+ \rightarrow \text{HCHO} + \text{H}^+ + ^{\bullet}\text{Th}$	$4.6 \times 10^9$	6.8			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH and 10 <sup>-4</sup> mol L <sup>-1</sup> thionine.	87A451
		$2.6 \times 10^9$	8			p.r.	D.k. at 600 nm in N <sub>2</sub> O-satd. soln. contg. MeOH; 86% <i>e</i> -transfer.	731078
<b>12.198 Thymine</b>								
	$^{\bullet}\text{CH}_2\text{OH} + 5\text{-MeU} \rightarrow$	$2.6 \times 10^8$	7			X-r.	Effect of [MeOH] on <i>G</i> (-T) in aerated soln.; rel. to <i>k</i> ( $\text{CH}_2\text{OH} + \text{O}_2$ ) = $4.2 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	680359
<b>12.199 Toluidine Blue cation</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{TB}^+ \rightarrow \text{HCHO} + [\text{TBH}]^{*+}$	$3.7 \times 10^9$	6.8			p.r.	P.b.k. at 830 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH.	89A262
<b>12.200 Cytochrome C</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Cyt C}(\text{Fe}^{3+}) \rightarrow \text{HCHO} + \text{H}^+ + \text{Cyt C}(\text{Fe}^{2+})$	$4.6 \times 10^8$	8.0			p.r.	Abs. changes at 550 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> MeOH; 40% Fe(III) redn.	89R257
		$3.0 \times 10^7$	8.5			p.r.	Abs. changes at 550 and 435 nm in N <sub>2</sub> O-satd. soln. contg. MeOH; 100% redn.	79A153
			7					
<b>12.201 Methemoglobin</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Fe}^{3+}\text{ Hb} \rightarrow \text{HCHO} + \text{H}^+ + \text{Fe}^{2+}\text{ Hb}$	$9.5 \times 10^6$	7			p.r.	Abs. changes at 550 and 435 nm in N <sub>2</sub> O-satd. soln. contg. MeOH; 100% redn.	79A153
<b>12.202 Metmyoglobin</b>								
	$^{\bullet}\text{CH}_2\text{OH} + \text{Fe}^{3+}\text{ Mb} \rightarrow \text{HCHO} + \text{H}^+ + \text{Fe}^{2+}\text{ Mb}$	$2.4 \times 10^7$	7			p.r.	Abs. changes at 550 and 435 nm in N <sub>2</sub> O-satd. soln. contg. MeOH; 95% redn. of hemoprotein.	79A153

TABLE 13. 1-Hydroxyethyl

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	$T$ (K)	Method	Comment	Ref.
<b>13.1 1-Hydroxyethyl</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{CH}_3\dot{\text{C}}\text{HOH} \rightarrow$	$1.2 \times 10^9$	6			p.r.	D.k. at 280 nm, in N <sub>2</sub> O-satd. soln. contg. EtOH; $pK_a = 11.6$ [660074]; $2k/\epsilon = 4.7 \times 10^6 \text{ cm s}^{-1}$ .	690419
		$7 \times 10^8$	~1			p.r.	D.k. at 296.7 nm in deaerated soln. contg. EtOH and 0.8 M H <sub>2</sub> SO <sub>4</sub> ; $\epsilon = 240 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	630045
		$5.5 \times 10^8$	~7			p.r.	D.k. at 289.4 nm in deaerated soln. contg. EtOH; $\epsilon = 260 \text{ L mol}^{-1} \text{ cm}^{-1}$ ; 80% combination and 20% disproportionation from product yields.	620140
<b>13.2 1-Hydroxyethyl(1-) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{CH}_3\dot{\text{C}}\text{HO}^- \rightarrow$	$2.5 \times 10^8$	13			p.r.	D.k. at 300 nm, in N <sub>2</sub> O-satd. soln. contg. EtOH; $2k/\epsilon = 5.7 \times 10^6 \text{ cm s}^{-1}$ .	690419
<b>13.3 Silver(I) ion, complex with Ag(0)</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Ag}_2^+ \rightarrow \text{CH}_3\text{CHO} + \text{H}^+ + \text{Ag}_2$	$1.0 \times 10^9$				p.r.	Calcd. from increase in condy. as function of time in soln. contg. EtOH and AgClO <sub>4</sub> .	78A410
<b>13.4 Bismuth(III) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Bi}^{3+} \rightarrow \text{BiCH}(\text{CH}_3)\text{OH}^{3+}$	$4 \times 10^6$	<0			p.r.	P.b.k. at ~400 nm in Ar-satd. soln. contg. 5 mol L <sup>-1</sup> HClO <sub>4</sub> and EtOH.	88A493
<b>13.5 Bromate ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{BrO}_3^- \rightarrow$	$3.0 \times 10^7$	11.8			p.r.	D.k. in soln. contg. EtOH.	72A018
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{BrO}_3^- \rightarrow$	$<5 \times 10^6$	6			p.r.	D.k. in soln. contg. EtOH.	72A018
<b>13.6 Cadmium(I) ions</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Cd}^+ \rightarrow \text{CdCHOHCH}_3^+$	$1.3 \times 10^9$				p.r.	D.k. at 300 nm (Cd <sup>+</sup> ) in soln. contg. EtOH and Cd <sup>2+</sup> , as well as condy. and p.b.k. at 240 nm (Cd <sup>2+</sup> ); assumed $k(\text{Cd}^+ + \text{H}_2\text{O}_2) = 1.5 \times 10^9$ , $k(\text{R} + \text{R}) = 1.15 \times 10^9$ and $2k(\text{Cd}^+ + \text{Cd}^+) = 3.0 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	751064
<b>13.7 Cadmium(II) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Cd}^{2+} \rightarrow$	$<2.5 \times 10^5$				p.r.	No reaction obs.	751153
<b>13.8 <i>N</i>-rac-5,7,7,12,14,14-H<sub>2</sub> amethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{N-rac-Co}(4,11\text{-dieneN}_4)^{2+} \rightarrow \text{HOCH}(\text{CH}_3)\text{Co}(4,11\text{-dieneN}_4)^{2+}$	$3.0 \times 10^7$	1-6			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH.	78A200
<b>13.9 Diaqua(nitrilotriacetato)cobaltate(II) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{CoNTA}^- \rightarrow \text{HOCH}(\text{CH}_3)\text{CoNTA}^-$	$9.7 \times 10^7$	4-7	298	p.r.		P.b.k. at 260 nm in N <sub>2</sub> O-satd. soln. contg. 1-50 × 10 <sup>-4</sup> mol L <sup>-1</sup> CoNTA and 0.2-1 mol L <sup>-1</sup> EtOH.	88A343
<b>13.10 Hexaamminecobalt(III) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow$	$8.5 \times 10^9$	12			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> EtOH; e-transfer.	72A018
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow$	$5.2 \times 10^7$	5-6			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> EtOH; e-transfer.	72A018
<b>13.11 Pentaammine(bromo)cobalt(III) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Co}(\text{NH}_3)_5\text{Br}^{2+} \rightarrow$	$1.5 \times 10^8$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. EtOH.	771100
<b>13.12 Pentaammine(chloro)cobalt(III) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Co}(\text{NH}_3)_5\text{Cl}^{2+} \rightarrow$	$3.0 \times 10^6$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. EtOH.	771100

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
13.13	Tris(ethylenediamine)cobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Co(en)}_3^{3+} \rightarrow$		3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. EtOH; no reaction.	771100
13.14	<i>trans</i> -Dibromobis(ethylenediamine)cobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Co(en)}_2\text{Br}_2^+ \rightarrow$	$5.7 \times 10^8$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. EtOH.	771100
13.15	<i>cis</i> -Bromobis(ethylenediamine)fluorocobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Co(en)}_2\text{BrF}^+ \rightarrow$	$2.8 \times 10^7$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. EtOH.	771100
13.16	<i>cis</i> -Aquachlorobis(ethylenediamine)cobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{cis-Co(en)}_2(\text{H}_2\text{O})\text{Cl}^{2+} \rightarrow$	$2.0 \times 10^7$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. EtOH.	771100
13.17	<i>trans</i> -Dichlorobis(ethylenediamine)cobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{trans-Co(en)}_2\text{Cl}_2^+ \rightarrow$	$1.5 \times 10^8$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. EtOH.	771100
13.18	<i>cis</i> -Dichlorobis(ethylenediamine)cobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{cis-Co(en)}_2\text{Cl}_2^+ \rightarrow$	$3.8 \times 10^7$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. EtOH.	771100
13.19	<i>cis</i> -Amminechlorobis(ethylenediamine)cobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{cis-Co(en)}_2(\text{NH}_3)\text{Cl}^{2+} \rightarrow$	$4.2 \times 10^6$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. EtOH.	771100
13.20	Bis(ethylenediamine)difluorocobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Co(en)}_2\text{F}_2^+ \rightarrow$		3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. EtOH; no reaction.	771100
13.21	Tris(1,10-phenanthroline)cobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Co(phen)}_3^{3+} \rightarrow$ addn. to ligand	$3.8 \times 10^9$	1-7			p.r.	P.b.k. at 475 nm in N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> EtOH.	80A227
13.22	Tris(5,6-dimethyl-1,10-phenanthroline)cobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Co(5,6-Me}_2\text{phen)}_3^{3+} \rightarrow$	$3.1 \times 10^9$	~7			p.r.	P.b.k., as well as d.k. at 380 nm in N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> EtOH.	80A227
13.23	$\mu$ -Amido- $\mu$ -superoxidooctakisamminedicobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{NH}_2[\text{Co}(\text{NH}_3)_4]_2(\text{O}_2)^{4+} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+ + \text{NH}_2[\text{Co}(\text{NH}_3)_4]_2(\text{O}_2)^{3+}$	$1.0 \times 10^8$	~5.0			p.r.	P.b.k. as well as d.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	81A009
13.24	$\mu$ -Amido- $\mu$ -superoxidotetrakis(ethylenediamine)dicobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{NH}_2[\text{Co(en)}_2]_2(\text{O}_2)^{4+} \rightarrow$	$2 \times 10^7$	~5.0			p.r.	P.b.k. as well as d.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	81A009
13.25	$\mu$ -Amido- $\mu$ -superoxidodicobaltate(III) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{O}_2[\text{Co}(\text{CN})_5]_2^{5-} \rightarrow$	$1.2 \times 10^8$	~5.0			p.r.	P.b.k. as well as d.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	81A009
13.26	Chromium(II) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Cr}^{2+} \rightarrow \text{CrCHOHCH}_3^{2+}$	$1.1 \times 10^8$	~3	293		p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> Cr <sup>2+</sup> and ethanol.	92A361
		$1.0 \times 10^8$	0-6.2			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.01-2 mol L <sup>-1</sup> EtOH, (1-20) $\times 10^{-4}$ mol L <sup>-1</sup> Cr <sup>2+</sup> and (9-100) $\times 10^{-4}$ AcO <sup>-</sup> /AcOH.	84A036
		$7.9 \times 10^7$	~1			p.r.	P.b.k. in Ar-satd. soln. contg. EtOH and HClO <sub>4</sub> .	741146
13.27	<i>cis</i> -Diaqua(nitrilotriacetato)chromate(II) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{cis-[CrNTA(H}_2\text{O)}_2]^- \rightarrow$	$1.0 \times 10^8$	5.0-6.4			p.r.	P.b.k. at 325 nm in He-satd. soln. contg. 0.055 mol L <sup>-1</sup> NTA, (0.42-1.0) $\times 10^{-3}$ mol L <sup>-1</sup> Cr <sup>2+</sup> , 0.009 mol L <sup>-1</sup> acetate, 1.8 mol L <sup>-1</sup> EtOH and 0.16 mol L <sup>-1</sup> acetaldehyde.	85A499

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
13.28	Ethylenediaminetetraacetatochromium(II) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{CrEDTA}^{2-} \rightarrow [\text{CH}_3\text{CH}(\text{OH})\text{CrEDTA}]^{2-} + \text{H}_2\text{O}$	$3.9 \times 10^7$	5			p.r.	P.b.k. in He-satd. soln. contg. EDTA, $\text{Cr}^{2+}$ , 0.009 mol L <sup>-1</sup> acetate, 1.8 mol L <sup>-1</sup> EtOH and 0.16 mol L <sup>-1</sup> acetaldehyde.	85A499
13.29	Copper(II) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Cu}^{2+} \rightarrow \text{Cu}^+ + \text{CH}_3\text{CHO} + \text{H}^+$	$9 \times 10^7$	6			p.r.	D.k. at ~300 nm (radical) in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	80A277
		$9.4 \times 10^7$	2.5	298		p.r.	P.b.k. at 320 nm ( $\text{Cu}^+\text{CH}_2\text{CHCONH}_2$ ) in soln. contg. EtOH and 0.01 mol L <sup>-1</sup> acrylamide.	78A322
		$7.4 \times 10^7$	5.6			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol L <sup>-1</sup> EtOH.	72A018
13.30	5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecopper(II) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Cu}(4,11\text{-dicucN}_4)^{2+} \rightarrow \text{Cu}(4,11\text{-dieneN}_4)^+ + \text{CH}_3\text{CHO} + \text{H}^+$	$\leq 2 \times 10^6$	3.5-			p.r.	P.b.k. in $\text{N}_2\text{O}$ satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	80A189
			10					
13.31	cis-Diaqua(nitrilotriacetato)copper(II) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{cis-}[\text{Cu}(\text{NTA})(\text{H}_2\text{O})_2]^+ \rightarrow \text{cis-}[\text{HOCH}(\text{CH}_3)\text{Cu}(\text{NTA})(\text{H}_2\text{O})]^+$	$6.0 \times 10^7$	5-8			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $\text{CuSO}_4$ , nitrilotriacetate ion and EtOH.	86D151
13.32	Iron(II) protoporphyrin							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Fe(II)PP} \rightarrow \text{addn.}$	$4 \times 10^8$	10.0			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $2 \times 10^{-5}$ mol L <sup>-1</sup> Fe(II)PP and 0.1 mol L <sup>-1</sup> ethanol.	85A006
13.33	Iron(III) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Fe}^{3+} \rightarrow \text{Fe}^{2+} + \text{H}^+ + \text{CH}_3\text{CHO}$	$3.8 \times 10^8$					Unpubl. data, C.N.Barnes and G.V.Buxton.	78A322
		$2.7 \times 10^8$	~1			γ-r.	C.k.; obs. $\text{C}(\text{NO}_2)_3^-$ and $\text{Fe}^{2+}$ yields; rel. to $k(\text{CH}_3\dot{\text{C}}\text{HOH} + \text{C}(\text{NO}_2)_4) = 5.6 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	77G411
13.34	Hemin							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Fe(III)PP(Cl)} \rightarrow \text{Fe(II)PP} + \text{H}^+ + \text{CH}_3\text{CHO}$	$5.6 \times 10^8$	9.2			p.r.	D.k. at 490 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol L <sup>-1</sup> EtOH and 0.2 mol L <sup>-1</sup> Na dodecylsulfate (micelles).	78A033
		$1.6 \times 10^9$	4.0					
		$7.7 \times 10^8$	7			p.r.	Redn. obs. at 560 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	77I128
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Fe(III)PP(Cl)} \rightarrow \text{Fe(II)PP} + \text{CH}_3\text{CHO}$	$9.0 \times 10^8$	13			p.r.	P.b.k. as well as d.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 30% EtOH.	74I040
13.35	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatoiron(III) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{FeTMpyP}^{5+} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+ + \text{FeTMpyP}^{4+}$	$2.7 \times 10^8$	8.5-			p.r.	P.b.k. at 562 nm as well as d.k. at 497 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol L <sup>-1</sup> EtOH.	91A380
			9.5					
13.36	Pentacyano(nitrosyl)ferrate(III) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Fe}(\text{CN})_5\text{NO}^{2-} \rightarrow \text{Fe}(\text{CN})_5\text{NO}^{3-} + \text{H}^+ + \text{CH}_3\text{CHO}$	$1.9 \times 10^9$	7			p.r.	P.b.k. at 435 nm in Ar-satd. soln. contg. 0.5 mol L <sup>-1</sup> ethanol and $5 \times 10^{-4}$ mol L <sup>-1</sup> substrate; follows hydrated electron reaction; also in $\text{N}_2\text{O}$ -satd. soln.	86A306
13.37	Ferricyanide ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Fe}(\text{CN})_6^{3-} \rightarrow$	$4 \times 10^9$				p.r.	D.k. at 420 nm in $\text{N}_2\text{O}$ -satd. soln. contg. EtOH.	79N061
		$5.3 \times 10^9$	7			p.r.	D.k. at 410 nm in soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	690522

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
13.38	Tris(1,10-phenanthroline)iron(III) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Fe}(\text{phen})_3^{3+} \rightarrow \text{CH}_3\text{CHO} + \text{Fe}(\text{phen})_3^{2+} + \text{H}^+$	$5 \times 10^9$	~1			p.r.	P.b.k. at 490 nm in soln. contg. 0.1-1 mol L <sup>-1</sup> EtOH and (0.4-1.0) × 10 <sup>-4</sup> mol L <sup>-1</sup> complex; outer-sphere electron transfer.	85A284
13.39	Ferrate(VI) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{FeO}_4^{2-} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+$	$8 \times 10^9$	12.4	~296		p.r.	P.b.k. at 380 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH.	91A475
		$8.0 \times 10^9$	10.4	298		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. EtOH.	89A354
13.40	Hexahydroxygallate(II) ion							
	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{Ga}(\text{OH})_6^{4-} \rightarrow$	$1.2 \times 10^9$	12.0	→0		p.r.	D.k. in soln. contg. EtOH; Ga(II) from $e_{\text{aq}}^- + \text{Ga}(\text{III})$ .	79A190
13.41	Mercury(I) cyanide							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{HgCN} \rightarrow$	$3.9 \times 10^9$				p.r.	Calcd. from increase in decay rate at 285 nm in soln. contg. EtOH and Hg(CN) <sub>2</sub> ; used $2k(\text{HgCN} + \text{HgCN}) = 3.4 \times 10^9$ .	751203
13.42	Mercury(II) iodide							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{HgI}_2 \rightarrow$	$7 \times 10^8$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. EtOH.	78A165
13.43	Iodate ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{IO}_3^- \rightarrow$	$<5 \times 10^6$	6			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. EtOH.	72A018
	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{IO}_3^- \rightarrow$	$7.5 \times 10^8$	11.8			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. EtOH.	72A018
13.44	Hexachloroiridate(IV) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{IrCl}_6^{2-} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+$	$4.5 \times 10^9$	4-6	295		p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	82A041
13.45	Permanganate ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{MnO}_4^- \rightarrow \text{CH}_3\text{CHO} + \text{H}^+$	$3.3 \times 10^9$	10.4	298		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. EtOH.	89A354
13.46	18-Molybdodiphosphate ion(6-)							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{P}_2\text{Mo}_{18}\text{O}_{62}^{6-} \rightarrow \text{CH}_3\text{CHO} + \text{HP}_2\text{Mo}_{18}\text{O}_{62}^{6-}$	$4.4 \times 10^9$	2	295		p.r.	P.b.k. in N <sub>2</sub> O-satd. (2.5 × 10 <sup>-2</sup> mol L <sup>-1</sup> ) soln. contg. 0.5 mol L <sup>-1</sup> EtOH and ~10 <sup>-4</sup> mol L <sup>-1</sup> heteropolymolybdophosphate.	82A107
13.47	Nitric oxide							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \cdot\text{NO} \rightarrow \text{addn.}$	$3.0 \times 10^9$	6.8	296		p.r.	P.b.k. at 270 nm in N <sub>2</sub> O-satd. soln. contg. NO and 1 mol L <sup>-1</sup> EtOH; includes contribution from β-radical.	94A457
13.48	Nitrite ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{NO}_2^- \rightarrow$	$<5 \times 10^6$	6			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. EtOH	72A018
13.49	Nitrate ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{NO}_3^- \rightarrow$	$<5 \times 10^6$	6			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. EtOH.	72A018
13.50	Nickel(I) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Ni}^+ \rightarrow \text{NiCHOHCH}_3^+$	$2.3 \times 10^9$				p.r.	D.k. at 300 nm (as well as p.b.k.) in soln. cont. NiSO <sub>4</sub> and EtOH.	741037
13.51	3,14-Dimethyl-4,7,10,13-tetraazahexadeca-3,13-diene-2,15-dione dioximatonickel(IV) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Ni}^{\text{IV}}\text{L}^{2+} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+ + [\text{Ni}^{\text{III}}\text{L}]^+$	$3.5 \times 10^9$	2.3- 2.5	294		p.r.	P.b.k. at 500 or 430 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	85A354

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
<b>13.52 Hydroxide ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{OH}^- \rightarrow \text{CH}_3\dot{\text{C}}\text{HO}^- + \text{H}_2\text{O}$	$7 \times 10^9$		11-12		e-r.	Esr line broadening in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH; $k_t = 4.1 \times 10^5$ L mol <sup>-1</sup> s <sup>-1</sup> ( $\text{p}K_a = 11.51$ ).	735065
<b>13.53 Hydrogen peroxide</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{H}_2\text{O}_2 \rightarrow \text{CH}_3\text{CHO} + \text{H}_2\text{O} + \cdot\text{OH}$	$2.0 \times 10^5$				chem.	Esr study in soln. contg. Ti(III), H <sub>2</sub> O <sub>2</sub> and EtOH.	88D348
		$2.8 \times 10^5$	6.8			$\gamma$ -r.	Obs. $G(\text{H}_2\text{O}_2)$ in N <sub>2</sub> O-satd. soln. contg. EtOH.	87G036
		$1.6 \times 10^5$	2	297		chem.	Esr study in soln. contg. Ti(III), H <sub>2</sub> O <sub>2</sub> and EtOH.	85Z383
		$1.5 \times 10^5$				$\gamma$ -r.	Calcd. from dose rate effect on $G(\text{H}_2\text{O}_2)$ in soln. contg. EtOH; used $2k(R + R) = 2.0 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	670094
<b>13.54 Oxygen</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{O}_2 \rightarrow \text{CH}_3\text{CH}(\text{OH})\text{OO}^\bullet$	$4.6 \times 10^9$	7			p.r.	C.k. in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH; rel. to $k(\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Fe}(\text{CN})_6^{3-}) = 5.3 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	690522
<b>13.55 Lead(I) ions</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Pb}^+ \rightarrow \text{PbCHOHCH}_3^+$	$1.7 \times 10^9$				p.r.	D.k. at 300 nm (Pb <sup>+</sup> ) in soln. contg. Pb <sup>2+</sup> and EtOH, knowing initial [R] and [Pb <sup>+</sup> ]; cor. for R + R.	761170
<b>13.56 Tris(1,10-phenanthroline)rhodium(III) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Rh}(\text{phen})_3^{3+} \rightarrow$ addn. to ligand	$2.5 \times 10^9$				p.r.	P.b.k. at 475 nm in N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> EtOH.	80A227
<b>13.57 Tris(2,2'-bipyridine)ruthenium(II) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Ru}(\text{bpy})_3^{2+} \rightarrow \text{CH}_3\text{CHO} + \text{Ru}(\text{bpy})_3^+$	$3.6 \times 10^9$	13	0.1		p.r.	P.b.k. at 510 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	91A218
		$7.0 \times 10^9$	11-13			p.r.	P.b.k.	78A068
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Ru}(\text{bpy})_3^{2+} \rightarrow$	$<10^6$	7			p.r.	No reduction.	78A068
<b>13.58 Tris(1,10-phenanthroline)ruthenium(II) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Ru}(\text{phen})_3^{2+} \rightarrow \text{CH}_3\text{CHO} + \text{Ru}(\text{phen})_3^+$	$5.9 \times 10^9$	12			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> EtOH; $k = \sim 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> at pH 1.	80A227
<b>13.59 Hexaammineruthenium(III) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Ru}(\text{NH}_3)_6^{3+} \rightarrow$	$5.5 \times 10^8$	5-6			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> EtOH; e-transfer.	72A018
<b>13.60 Pentaammine(chloro)ruthenium(III) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Ru}(\text{NH}_3)_5\text{Cl}^{2+} \rightarrow$	$8.0 \times 10^8$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soin. contg. 0.5-1 mol L <sup>-1</sup> ethanol.	771100
<b>13.61 Hydrogen sulfide</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{H}_2\text{S} \rightarrow \text{H}_2\dot{\text{S}}\text{CHOHCH}_3$		6			p.r.	Effect of [H <sub>2</sub> S] on p.b.k. at 380 nm (complex). $k(\text{adduct} \rightarrow \text{EtOH} + \cdot\text{SH}) = 4.6 \times 10^5$ s <sup>-1</sup> .	670262
<b>13.62 Hydrogen peroxomonosulfate ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{HSO}_5^- \rightarrow$	$2.1 \times 10^6$				chem.	Esr study in soln. contg. Ti(III) sulfate, H <sub>2</sub> O <sub>2</sub> , HSO <sub>5</sub> <sup>-</sup> and EtOH.	90D226

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	I	T (K)	Method	Comment	Ref.
13.63	Peroxodisulfate ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{S}_2\text{O}_8^{2-} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+$ + $\text{SO}_4^{2-} + \text{SO}_4^{2-}$	$6.9 \times 10^5$			~293	chem.	Esr study in soln. contg. 0.008 mol $\text{L}^{-1}$ Ti(III), 0.01 mol $\text{L}^{-1}$ $\text{H}_2\text{O}_2$ , (0-0.025) mol $\text{L}^{-1}$ $\text{S}_2\text{O}_8^{2-}$ and -0.01 mol $\text{L}^{-1}$ EtOH.	84D044
13.64	Ethylenediaminetetraacetatotitanate(IV) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{TiEDTA} \rightarrow \text{TiEDTA}^- + \text{CH}_3\text{CHO} + \text{H}^+$	$\geq 10^8$		acid		phot.	Calcd. assuming various rate constants in soln. contg. $\text{TiEDTA}^-$ and $\text{H}_2\text{O}_2$ .	82D287
13.65	Thallium(I) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Tl}^+ \rightarrow \text{Tl}^0 + \text{CH}_3\text{CHO}$	$4.7 \times 10^8$		0.01		p.r.	P.b.k. at 325, 420 and 450 nm in soln. contg. acetaldehyde, $\text{Tl}^+$ and $[\text{OH}^-] < 10^{-2} \text{ mol L}^{-1}$ ; $K = 0.43$ .	89C001
		$1.5 \times 10^9$		13		p.r.	P.b.k. at 420 nm in soln. contg. 0.1 mol $\text{L}^{-1}$ EtOH and $2 \times 10^{-4}$ mol $\text{L}^{-1}$ $\text{Tl}^+$ ; no reaction in neutral or acid soln.	80A123
13.66	Thallium(I) ion, complex with Tl(0) $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Tl}_2^+ + \text{H}^+ \rightarrow \text{EtOH} + \text{Tl}^+$	$3.0 \times 10^9$	6			p.r.	Calcd. from d.k. at 420 nm. and condy. changes in soln. contg. alcohol and $\text{Tl}^+$ assuming values for $2k(\text{Tl}_2^+ + \text{Tl}^+)$ , $k(\text{Tl}_2^+ + \text{H}_2\text{O}_2)$ and $2k(\text{R} + \text{R})$ .	80A123
13.67	Uranyl(VI) ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{UO}_2^{2+} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+$ + $\text{UO}_2^+$	$\leq 1 \times 10^8$				p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. EtOH.	89A327
13.68	12-Tungstoferrate ion(5-) $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{FeW}_{12}\text{O}_{40}^{5-} \rightarrow \text{CH}_3\text{CHO}$ + $\text{H}^+ + \text{FeW}_{12}\text{O}_{40}^{4-}$	$2.0 \times 10^9$	5-6			p.r.	P.b.k. at 650 nm in $\text{N}_2\text{O}$ -satd. soln. contg. EtOH.	82A271
13.69	12-Tungstate ion(6-), dihydrogen $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{H}_2\text{W}_{12}\text{O}_{40}^{6-} \rightarrow \text{CH}_3\text{CHO}$ + $\text{H}^+ + \text{H}_2\text{W}_{12}\text{O}_{40}^{5-}$	$2.3 \times 10^8$				p.r.	P.b.k. at 700 nm in soln. contg. 0.42 mol $\text{L}^{-1}$ EtOH	90A069
		$3.5 \times 10^8$	5-6			p.r.	P.b.k. at 650 nm in $\text{N}_2\text{O}$ -satd. soln. contg. EtOH.	82A271
13.70	12-Tungstophosphate ion(3-) $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{PW}_{12}\text{O}_{40}^{3-} \rightarrow \text{CH}_3\text{CHO}$ + $\text{H}^+ + \text{PW}_{12}\text{O}_{40}^{4-}$	$5.9 \times 10^9$	~1			p.r.	P.b.k. at 650 nm in $\text{N}_2\text{O}$ -satd. soln. contg. EtOH and $\text{HClO}_4$ .	82A271
13.71	12-Tungstosilicate ion(4-) $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{SiW}_{12}\text{O}_{40}^{4-} \rightarrow \text{CH}_3\text{CHO}$ + $\text{H}^+ + \text{SiW}_{12}\text{O}_{40}^{5-}$	$3.8 \times 10^9$	5-6			p.r.	P.b.k. at 650 nm in $\text{N}_2\text{O}$ -satd. soln. contg. EtOH.	82A271
13.72	Diphosphooctadecatungstate ion(6-) $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{P}_2\text{W}_{18}\text{O}_{62}^{6-} \rightarrow \text{CH}_3\text{CHO}$ + $\text{P}_2\text{W}_{18}\text{O}_{62}^{7-} + \text{H}^+$	$4.1 \times 10^9$	2		295	p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. ( $2.5 \times 10^{-2} \text{ mol L}^{-1}$ ) soln. contg. 0.5 mol $\text{L}^{-1}$ EtOH and $\sim 10^{-4} \text{ mol L}^{-1}$ heterotungstophosphate.	82A107
13.73	Acetophenone $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{C}_6\text{H}_5\text{COCH}_3 \rightarrow \text{CH}_3\text{CHO}$ + $\text{C}_6\text{H}_5\dot{\text{C}}\text{O}^-\text{CH}_3$	$1.1 \times 10^9$	13			p.r.	P.b.k. at 440 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol $\text{L}^{-1}$ EtOH; pH dependent, $k$ extrapolated to pH 14.	730122
13.74	Acrylamide $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{H}_2\text{C}=\text{CHCONH}_2 \rightarrow \text{addn.}$	$2.6 \times 10^7$	2-5			p.r.	C.k. in $\text{N}_2\text{O}$ -satd. soln. contg. EtOH and $\text{Cu}^{2+}$ ; rel. to $k(\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Cu}^{2+}) = 9.4 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ .	78A322

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
13.75	Acrylate ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{CH}_2=\text{CHCO}_2^- \rightarrow \text{addn.}$	$1.6 \times 10^6$	~9			chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and EtOH; calcd. using $2k(R + R) = 2.3 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	93D265
13.76	Adenine, conjugate acid $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{AH}^+ \rightarrow \text{addn.}$	$4.3 \times 10^7$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	94A368
13.77	Adenosine, conjugate acid $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{AH}^+ \rightarrow \text{addn.}$	$1.5 \times 10^7$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	94A368
13.78	Benzophenone $\text{CH}_3\dot{\text{C}}\text{HOH} + (\text{C}_6\text{H}_5)_2\text{CO} \rightarrow \text{CH}_3\text{CHO} + (\text{C}_6\text{H}_5)_2\dot{\text{C}}\text{O}^-$	$2.6 \times 10^8$ $1 \times 10^9$	13			p.r.	P.b.k. at 610 nm in N <sub>2</sub> O-satd. soln.	751125
			13			p.r.	P.b.k. at 610 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	741010
13.79	1,4-Benzoquinone $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Q} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+ + \text{Q}^-$	$4.2 \times 10^9$ $4.5 \times 10^9$				γ-r.	C.k. in soln. contg. 1 mol L <sup>-1</sup> H <sub>2</sub> SO <sub>4</sub> , $1.5 \times 10^{-4}$ mol L <sup>-1</sup> benzoquinone and EtOH with varied [O <sub>2</sub> ]; rel. to $k(\text{CH}_3\dot{\text{C}}\text{HOH} + \text{O}_2) = 4.6 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	86G034
						p.r.	P.b.k. at 430 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH.	710619
13.80	Biacetyl $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{CH}_3\text{COCOCH}_3 \rightarrow \text{CH}_3\text{CHO} + \text{H}^+ + [\text{CH}_3\text{COCOCH}_3]^-$	$5.6 \times 10^8$				p.r.	P.b.k. at 300 nm in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> EtOH.	680249
13.81	3-Carboxamido-2,2,5,5-tetramethylpyrrolidin-1-yloxy $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{NX-s} \rightarrow$	$4.3 \times 10^8$	acid			p.r.	Cond., changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH; <i>e</i> -transfer.	761152
13.82	3-Carboxamido-2,2,5,5-tetramethyl-3-pyrrolin-1-yloxy $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{NX-u} \rightarrow$	$6.2 \times 10^8$	acid			p.r.	Cond., changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH; <i>e</i> -transfer.	761152
13.83	4-Carboxy-1-methylpyridinium $\text{CH}_3\dot{\text{C}}\text{HOH} + 4\text{-py}^+(\text{CH}_3)\text{CO}_2^- \rightarrow$	$3.8 \times 10^9$	12.7			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	79A051
13.84	1-Chloro-2-nitrobenzene $\text{CH}_3\dot{\text{C}}\text{HOH} + 2\text{-ClC}_6\text{H}_4\text{NO}_2 \rightarrow 2\text{-ClC}_6\text{H}_4\text{NO}_2\text{-CHOHCH}_3$	$6.7 \times 10^8$				p.r.	P.b.k. at 305 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH.	92A414
13.85	Crotonic acid $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{CH}_3\text{CH=CHCO}_2\text{H} \rightarrow \text{addn.}$	$1.8 \times 10^6$	~2			chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and EtOH; calcd. using $2k(R + R) = 2.3 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	93D265
13.86	4-Cyanophenyl- <i>N</i> - <i>tert</i> -butylnitronite $\text{CH}_3\dot{\text{C}}\text{HOH} + 4\text{-CN-PBN} \rightarrow$	$2.0 \times 10^7$				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. EtOH and <i>p</i> -nitroacetophenone; rel. to $k(\text{CH}_3\dot{\text{C}}\text{HOH} + \text{PNAP}) = 8 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> .	82A184

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
13.87	Cysteamine, conjugate acid $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{H}_3\text{N}^+\text{CH}_2\text{CH}_2\text{SH} \rightarrow \text{EtOH} + \text{H}_3\text{N}^+\text{CH}_2\text{CH}_2\text{S}^-$	$1.7 \times 10^8$ $1.4 \times 10^8$	4.2			p.r.	P.b.k. at 415 nm in N <sub>2</sub> O-satd. soln. contg. EtOH, cysteamine and ABTS <sup>2-</sup> ; the latter reacts with RS <sup>-</sup> to give ABTS <sup>+</sup> which is observed.	82A196
13.88	2'-Deoxyadenosine, conjugate acid $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{dAH}^+ \rightarrow \text{addn.}$	$3.1 \times 10^7$	0.4			p.r.	P.b.k. at 410 nm (RSSR <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. EtOH; p <i>K</i> <sub>a</sub> = 8.27, 10.53.	680132
13.89	2'-Deoxyguanosine, conjugate acid $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{dGH}^+ \rightarrow \text{addn.}$	$1.4 \times 10^7$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	94A368
13.90	1,6-Diazabicyclo[4.4.4]tetradecane radical cation $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{DABCT}^+ \rightarrow$	$1.3 \times 10^9$	-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol EtOH and (0.2-12) $\times 10^{-4}$ mol L <sup>-1</sup> radical cation; 20% redn., 80% H abstr.; product analysis supported by condy. measurements.	86A272
13.91	1,1'-Dibenzyl-4,4'-bipyridinium $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{BV}^{2+} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+ + \text{BV}^{+}$	$2.3 \times 10^9$	8	293	p.r.		P.b.k. in soln. contg. 0.2 mol L <sup>-1</sup> EtOH.	83A295
13.92	3,5-Dibromo-4-nitrosobenzenesulfonate ion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{DBNBS} \rightarrow$	$6.3 \times 10^7$	8.0-8.5			p.r.	C.k. rel. to $k(\text{CH}_3\dot{\text{C}}\text{HOH} + \text{H}_2\text{TPPS}^{4-}) = 5.2 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ .	92A304
13.93	1,4-Dicyanobenzene $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{DCNB} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+ + [\text{DCNB}]^{2-}$	$3.7 \times 10^8$	~7			p.r.	P.b.k. at 345 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	91A229
13.94	(E)-4,5-Dihydroxy-1,2-dithiane $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{SSCH}_2(\text{CHOH})_2\text{CH}_2 \rightarrow$ $\text{CH}_3\text{CHO} + \text{S}^-\text{SCH}_2(\text{CHOH})_2\text{CH}_2$	$3.2 \times 10^8$ $6.0 \times 10^8$ $8.4 \times 10^8$	13.5 298 333	273	p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. (1-10) $\times 10^{-4}$ mol L <sup>-1</sup> DTT-ox and 0.1-0.5 mol L <sup>-1</sup> ethanol; mechanism suggested to be addn. followed by decomp. to radical anion.	89A167	
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{SSCH}_2(\text{CHOH})_2\text{CH}_2 \rightarrow$ $\text{CH}_3\text{CHO} + \text{H}^+ + \text{S}^-\text{SCH}_2(\text{CHOH})_2\text{CH}_2$	$6 \times 10^7$	10.8			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> EtOH.	86A363
13.95	3,3-Dimethylacrylic acid $\text{CH}_3\dot{\text{C}}\text{HOH} + (\text{CH}_3)_2\text{C}=\text{CHCO}_2\text{H} \rightarrow$ addn.	$2 \times 10^4$	~2			chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and EtOH; calcd. using $2k(R + R) = 2.3 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	93D265
13.96	1,1'-Dimethyl-4,4'-bipyridinium $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{MV}^{2+} \rightarrow \text{MV}^{+} + \text{CH}_3\text{CHO} + \text{H}^+$	$4 \times 10^9$	8	293	p.r.		P.b.k. in soln. contg. 0.2 mol L <sup>-1</sup> EtOH.	83A295 82A399
13.97	<i>N,N</i> -Dimethyl-4-nitrosoaniline $\text{CH}_3\dot{\text{C}}\text{HOH} + 4\text{-Me}_2\text{NC}_6\text{H}_4\text{NO} \rightarrow$	$2.4 \times 10^9$ $3.3 \times 10^9$	7			p.r.	D.k. at 440 nm in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> EtOH.	690156
						p.r.	D.k. at 440 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	680066

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$\gamma$	T (K)	Method	Comment	Ref.
13.98	1,4-Dinitrobenzene $\text{CH}_3\dot{\text{C}}\text{HOH} + 1,4\text{-C}_6\text{H}_4(\text{NO}_2)_2 \rightarrow \text{CH}_3\text{CH}(\text{OH})\text{ON}(\text{O})\text{C}_6\text{H}_4\text{-4-NO}_2$	$2.4 \times 10^9$	4.5		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH. 94% electron transfer detd. from conductance method; $k = 5.3 \times 10^4$ s <sup>-1</sup> for heterolysis of nitroxide to radical anion.	84A305
13.99	1,2-Dithiolane-3-pentanoate ion (Lipoate ion) $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{RSSR}^- \rightarrow \text{RSSR}^{\cdot-} + \text{CH}_3\text{CHO} + \text{H}^+$	$1.0 \times 10^8$	7			p.r.	P.b.k. at 410 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	700560
13.100	Dithiothreitol $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} \rightarrow \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{S}^\cdot + \text{EtOH}$	$9.7 \times 10^7$	7.4			p.r.	P.b.k. at 390 nm (DTT <sup>·-</sup> ) in N <sub>2</sub> O-satd. soln. contg. dithiothreitol and ethanol.	87A250
		$9.7 \times 10^7$	7.2		293	p.r.	P.b.k. at 400 nm (cyclized radical anion) in N <sub>2</sub> O-satd. soln. contg. DTT	87G007
13.101	Eosin dianion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Eos} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+ + (\text{Eos})^{\cdot-}$	$1.1 \times 10^9$	8.5-9.0			p.r.	P.b.k. at 405 nm in soln. contg. $10^{-2}$ mol L <sup>-1</sup> EtOH and $10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> .	670038
13.102	Fluorescein dianion $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Fl}^{2-} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+ + \text{Fl}^{\cdot-}$	$4.5 \times 10^8$	10.8			p.r.	D.k. at 500 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	731078
13.103	Fullerene-C <sub>60</sub> -γ-cyclodextrin complex $\text{CH}_3\dot{\text{C}}\text{HOH} + \gamma\text{-CD/C}_{60} \rightarrow \text{CH}_3\text{CHO} + \gamma\text{-CD/C}_{60}^{\cdot-} + \text{H}^+$	$1.4 \times 10^8$				p.r.	D.k. at 331 nm, as well as p.b.k. at 302 nm, in N <sub>2</sub> O-satd. soln. contg. 10% EtOH.	93A433
13.104	Glutathione $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{GSH} \rightarrow \text{GS}^\cdot + \text{EtOH}$	$1.1 \times 10^8$	8.4			p.r.	P.b.k. at 420 nm (GSSG <sup>·-</sup> ) in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH and glutathione; see also [84A012].	82A193
13.105	Guanine, conjugate acid $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{GH}^+ \rightarrow \text{addn.}$	$1.8 \times 10^7$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	94A368
13.106	Guanosine, conjugate acid $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{GH}^+ \rightarrow \text{addn.}$	$1.8 \times 10^7$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	94A368
13.107	Hematoporphyrin IX $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{HP} \rightarrow \text{CH}_3\text{CHO} + \text{HP}^{\cdot-}$	$7.0 \times 10^8$	13			p.r.	P.b.k. at 600-650 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	741040
13.108	Hexafluorobenzene $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{C}_6\text{F}_6 \rightarrow \text{CH}_3\text{CHO} + \text{C}_6\text{F}_6^{\cdot-}$	$2.5 \times 10^6$	14			p.r.	P.b.k. at 310 nm in N <sub>2</sub> O-satd. soln. contg. 50% EtOH and 1.0 mol L <sup>-1</sup> KOH.	93A041
13.109	1-(2-Hydroxyethyl)-2-methyl-5-nitroimidazole $\text{CH}_3\dot{\text{C}}\text{HOH} + (\text{ImH})\text{-NO}_2 \rightarrow$	$2 \times 10^8$				p.r.	D.k. at 320 nm in N <sub>2</sub> O-satd. soln. contg. EtOH..	741135
13.110	Hypoxanthine, conjugate acid $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{HxOH}_2^+ \rightarrow \text{addn.}$	$2.2 \times 10^7$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	94A368
13.111	Inosine $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Ino} \rightarrow \text{addn.}$	$\sim 5 \times 10^6$	6.5			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	94A368

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
13.112	Inosine, conjugate acid $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{InoH}^+ \rightarrow \text{addn.}$	$3.0 \times 10^7$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	94A368
13.113	Lipoamide $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{LS}_2 \rightarrow \text{LS}_2^{\cdot-} + \text{CH}_3\text{CHO} + \text{H}^+$	$1.6 \times 10^8$	10.8			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> EtOH.	86A363
		$1.1 \times 10^8$	5			p.r.	P.b.k. at 400 nm in soln. contg. 0.1 mol L <sup>-1</sup> EtOH. Lipoamide radical anion is formed from intermediate (addn. prod.?) which also decays to another product (half-life 1.3-3.2 × 10 <sup>-4</sup> s).	84A011
		$1.0 \times 10^8$	6					
		$1.0 \times 10^8$	7					
		$0.8 \times 10^8$	9					
13.114	Lumiflavine $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{LF} \rightarrow \text{CH}_3\text{CHO} + \text{LFH}^{\cdot}$	$2.6 \times 10^9$	7	297	p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-satd. soln. contg. ethanol.	83A073	
13.115	Lumiflavine semiquinone $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{LFH}^{\cdot} \rightarrow$	$1.2 \times 10^9$	7	297	p.r.	Abs. changes at 550 nm; decay to LFH <sup>·</sup> and LF <sub>0</sub> from calcd. concn.-time profile.	83A073	
13.116	2-Mercaptoethanol $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{HSCH}_2\text{CH}_2\text{OH} \rightarrow \text{EtOH} + \text{'SCH}_2\text{CH}_2\text{OH}$	$2.3 \times 10^8$	10			p.r.	P.b.k. (RSSR <sup>·</sup> ) in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	690553
13.117	4-Methoxyphenyl- <i>N</i> - <i>tert</i> -butylnitrone $\text{CH}_3\dot{\text{C}}\text{HOH} + 4\text{-CH}_3\text{O-PBN} \rightarrow$	$9 \times 10^6$				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. EtOH and <i>p</i> -nitroacetophenone; rel. to $k(\text{CH}_3\dot{\text{C}}\text{HOH} + \text{PNAP}) = 8 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	82A184
13.118	2-Methyl-1,4-naphthoquinone $\text{CH}_3\dot{\text{C}}\text{HOH} + 2\text{-CH}_3\text{NQ} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+ + [2\text{-CH}_3\text{NQ}]^{\cdot-}$	$3.8 \times 10^9$	7.0			p.r.	P.b.k. at 395 nm in soln. contg. 0.05 mol L <sup>-1</sup> EtOH; 90% <i>e</i> -transfer.	731047
	$\text{CH}_3\dot{\text{C}}\text{HO}^- + 2\text{-CH}_3\text{NQ} \rightarrow \text{CH}_3\text{CHO} + [2\text{-CH}_3\text{NQ}]^{\cdot-}$	$4.2 \times 10^9$	12.5			p.r.	P.b.k. at 395 nm in soln. contg. 0.05 mol L <sup>-1</sup> EtOH; 92% <i>e</i> -transfer.	731047
13.119	Methyl 4-nitrobenzenesulfonate $\text{CH}_3\dot{\text{C}}\text{HOH} + 4\text{-O}_2\text{NC}_6\text{H}_4\text{SO}_3\text{CH}_3 \rightarrow \text{CH}_3\text{CH(OH)ON(O)C}_6\text{H}_4\text{-4-SO}_3\text{CH}_3$	$1.3 \times 10^9$	4.5	293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH; 81% electron transfer detd. from conductance method; $k = 1.2 \times 10^4 \text{ s}^{-1}$ for heterolysis of nitroxide to radical anion.	84A305	
13.120	Methyl 4-nitrobenzoate $\text{CH}_3\dot{\text{C}}\text{HOH} + 4\text{-O}_2\text{NC}_6\text{H}_4\text{CO}_2\text{CH}_3 \rightarrow \text{CH}_3\text{CH(OH)ON(O)C}_6\text{H}_4\text{-4-CO}_2\text{CH}_3$	$8.5 \times 10^8$	4.5	293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH. 81% electron transfer detd. from conductance method; $k = 8.1 \times 10^3 \text{ s}^{-1}$ for heterolysis of nitroxide to radical anion.	84A305	
13.121	2-Methyl-2-nitrosopropane $\text{CH}_3\dot{\text{C}}\text{HOH} + (\text{CH}_3)_3\text{CNO} \rightarrow \text{addn.}$	$3.2 \times 10^8$	~7	-291	p.r.	P.b.k. (esr) in unbuffered N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> ethanol and (0.25-15) × 10 <sup>-3</sup> mol L <sup>-1</sup> MNP (assuming complete dimer dissociation).	91D097	
13.122	4-Methylphenyl- <i>N</i> - <i>tert</i> -butylnitrone $\text{CH}_3\dot{\text{C}}\text{HOH} + 4\text{-CH}_3\text{-PBN} \rightarrow$	$1 \times 10^6$				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. EtOH and <i>p</i> -nitroacetophenone; rel. to $k(\text{CH}_3\dot{\text{C}}\text{HOH} + \text{PNAP}) = 8 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	82A184
13.123	3-Methylpterin $\text{CH}_3\dot{\text{C}}\text{HOH} + 3\text{-MPT} \rightarrow$	$3.2 \times 10^7$	6.3			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. EtOH; 55% <i>e</i> -transfer.	761060

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
13.124	9-Methylpurine							
	CH <sub>3</sub> CHO <sup>+</sup> + 9-MP → 9-MP <sup>+</sup>	5.1 × 10 <sup>8</sup>	13.6			p.r.	P.b.k.; N <sub>2</sub> O-satd. soln. contg. EtOH.	751060
	CH <sub>3</sub> CHOH + 9-MP → 9-MPH <sup>+</sup>	<2 × 10 <sup>7</sup>	8.2			p.r.	P.b.k.; N <sub>2</sub> O-satd. soln. contg. EtOH.	751060
13.125	Nifuroxime							
	CH <sub>3</sub> CHOH + NF → NF <sup>+</sup> + CH <sub>3</sub> CHO + H <sup>+</sup>	>1.5 × 10 <sup>9</sup>	7			p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> EtOH; > 75% e- transfer.	731099
13.126	4-Nitroacetophenone							
	CH <sub>3</sub> CHOH + PNAP → CH <sub>3</sub> CH(OH)ON(O)C <sub>6</sub> H <sub>4</sub> -4-COCH <sub>3</sub>	1.0 × 10 <sup>9</sup>	4.6		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH. 84% electron transfer detd. from conductance method; <i>k</i> = 1.5 × 10 <sup>4</sup> s <sup>-1</sup> for heterolysis of nitroxide to radical anion; Δ <i>H</i> <sup>‡</sup> = 8.9 kJ mol <sup>-1</sup> , Δ <i>S</i> <sup>‡</sup> = -42 J K <sup>-1</sup> mol <sup>-1</sup> studied at 273-333 K.	84A305 88A099
		8 × 10 <sup>8</sup>	11			p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	730122
13.127	4-Nitroanisole							
	CH <sub>3</sub> CHOH + 4-CH <sub>3</sub> OC <sub>6</sub> H <sub>4</sub> NO <sub>2</sub> → 4-CH <sub>3</sub> OC <sub>6</sub> H <sub>4</sub> N(O)OCHOHCH <sub>3</sub>	1.1 × 10 <sup>8</sup>	4.5		293	p.r.	Cond. changes in N <sub>2</sub> O satd. soln. contg. 1 mol L <sup>-1</sup> EtOH. 35% electron transfer detd. from conductance method; <i>k</i> = 8 × 10 <sup>2</sup> s <sup>-1</sup> for heterolysis of nitroxide to radical anion.	84A305
13.128	<i>p</i> -Nitrobenzaldehyde							
	CH <sub>3</sub> CHOH + 4-O <sub>2</sub> NC <sub>6</sub> H <sub>4</sub> CHO → CH <sub>3</sub> CH(OH)ON(O)C <sub>6</sub> H <sub>4</sub> -4-CHO	1.8 × 10 <sup>9</sup>	4.5		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH.	84A305
13.129	4-Nitrobenzaldoxime							
	CH <sub>3</sub> CHOH + HON-CHC <sub>6</sub> H <sub>4</sub> -4-NO <sub>2</sub> → HN=COHC <sub>6</sub> H <sub>4</sub> N(O)OCH(OH)CH <sub>3</sub>	6.5 × 10 <sup>8</sup>	4.5		293	p.r.	Cond. changes in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH. 60% electron transfer detd. from conductance method; <i>k</i> = 4.0 × 10 <sup>3</sup> s <sup>-1</sup> for heterolysis of nitroxide to radical anion.	84A305
13.130	4-Nitrobenzamide							
	CH <sub>3</sub> CHOH + 4-O <sub>2</sub> NC <sub>6</sub> H <sub>4</sub> CONH <sub>2</sub> → CH <sub>3</sub> CH(OH)ON(O)C <sub>6</sub> H <sub>4</sub> -4-CONH <sub>2</sub>	4.3 × 10 <sup>8</sup>	4.6		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH. 75% electron transfer detd. from conductance method; <i>k</i> = 6.3 × 10 <sup>3</sup> s <sup>-1</sup> for heterolysis of nitroxide to radical anion; Δ <i>H</i> <sup>‡</sup> = 6.5 kJ mol <sup>-1</sup> , Δ <i>S</i> <sup>‡</sup> = -54.5 J K <sup>-1</sup> mol <sup>-1</sup> studied at 273-333 K.	84A305 88A099
13.131	Nitrobenzene							
	CH <sub>3</sub> CHOH + C <sub>6</sub> H <sub>5</sub> NO <sub>2</sub> →	2.4 × 10 <sup>8</sup>	5.6			p.r.	N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	72A018
		3.3 × 10 <sup>8</sup>	7			p.r.	P.b.k. at 285 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	660432
	CH <sub>3</sub> CHOH + C <sub>6</sub> H <sub>5</sub> NO <sub>2</sub> → CH <sub>3</sub> CHO + [C <sub>6</sub> H <sub>5</sub> NO <sub>2</sub> ] <sup>+</sup>	3 × 10 <sup>9</sup>	13			p.r.	P.b.k. at 285 nm in N <sub>2</sub> O-satd. soln. contg. EtOH.	741010
		3.1 × 10 <sup>9</sup>	13			p.r.	P.b.k. at 285 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	660432
13.132	4-Nitrobenzenesulfonamide							
	CH <sub>3</sub> CHOH + 4-O <sub>2</sub> NC <sub>6</sub> H <sub>4</sub> SO <sub>2</sub> NH <sub>2</sub> → CH <sub>3</sub> CH(OH)ON(O)C <sub>6</sub> H <sub>4</sub> -4-SO <sub>2</sub> NH <sub>2</sub>	7.9 × 10 <sup>8</sup>	4.5		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH. 80% electron transfer detd. from conductance method; <i>k</i> = 8.1 × 10 <sup>3</sup> s <sup>-1</sup> for heterolysis of nitroxide to radical anion.	84A305

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
13.133	4-Nitrobenzenesulfonate ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + 4-\text{O}_2\text{NC}_6\text{H}_4\text{SO}_3^- \rightarrow \text{CH}_3\text{CH}(\text{OH})\text{ON}(\text{O})\text{C}_6\text{H}_4-4-\text{SO}_3^-$	$6.0 \times 10^8$	4-6		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH. 64% electron transfer detd. from optical method; $k = 4.7 \times 10^3$ s <sup>-1</sup> for heterolysis of nitroxide to radical anion. $\Delta H^\ddagger = 5.4$ kJ mol <sup>-1</sup> , $\Delta S^\ddagger = -60.5$ J K <sup>-1</sup> mol <sup>-1</sup> studied at 273-333 K.	84A305 88A099
13.134	4-Nitrobenzoate ion							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + 4-\text{NO}_2\text{C}_6\text{H}_4\text{CO}_2^- \rightarrow \text{O}_2\text{C}-p\text{-C}_6\text{H}_4\text{N}(\text{O})\text{OCHOHCH}_3$	$5.9 \times 10^8$	4-5		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH. 61% electron transfer; $k = 3.6 \times 10^3$ s <sup>-1</sup> for heterolysis of nitroxide to radical anion.	84A305
13.135	4-Nitrobenzonitrile							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + 4-\text{O}_2\text{NC}_6\text{H}_4\text{CN} \rightarrow \text{CH}_3\text{CH}(\text{OH})\text{ON}(\text{O})\text{C}_6\text{H}_4-4-\text{CN}$	$1.2 \times 10^9$	4-6		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH. 77% electron transfer detd. from conductance method; $k = 1.0 \times 10^4$ s <sup>-1</sup> for heterolysis of nitroxide to radical anion. $\Delta H^\ddagger = 7.3$ kJ mol <sup>-1</sup> , $\Delta S^\ddagger = -45$ J K <sup>-1</sup> mol <sup>-1</sup> studied at 273-333 K.	84A305 88A099
13.136	4-Nitrophenol							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + 4-\text{O}_2\text{NC}_6\text{H}_4\text{OH} \rightarrow \text{CH}_3\text{CH}(\text{OH})\text{ON}(\text{O})\text{C}_6\text{H}_4-4-\text{OH}$	$7.0 \times 10^7$	4-5		293	p.r.	Cond.y. changes in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH. 40% electron transfer detd. from conductance method; $k = 4 \times 10^2$ s <sup>-1</sup> for heterolysis of nitroxide to radical anion.	84A305
13.137	4-Nitrophenyl- <i>N</i> - <i>tert</i> -butylnitrone							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + 4-\text{NO}_2\text{-PBN} \rightarrow$	$3.5 \times 10^7$				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. EtOH and <i>p</i> -nitroacetophenone; rel. to $k(\text{CH}_3\dot{\text{C}}\text{HOH} + \text{PNAP}) = 8 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> .	82A184
13.138	Nitrosobenzene							
	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{C}_6\text{H}_5\text{NO} \rightarrow \text{CH}_3\text{CHO} + \text{C}_6\text{H}_5\text{NO}^-$	$6.4 \times 10^9$	13.0			p.r.	P.b.k. at 450 nm in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> EtOH.	660433
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{C}_6\text{H}_5\text{NO} \rightarrow \text{CH}_3\text{CHO} + \text{C}_6\text{H}_5\text{NOH}$	$3.9 \times 10^9$	7.0			p.r.	P.b.k. at 450 nm in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> EtOH.	660433
13.139	4-Nitrotoluene							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + 4-\text{CH}_3\text{C}_6\text{H}_4\text{NO}_2 \rightarrow \text{CH}_3\text{CH}(\text{OH})\text{ON}(\text{O})\text{C}_6\text{H}_4-4-\text{CH}_3$	$1.5 \times 10^8$	4-5		293	p.r.	Cond.y. changes in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH. 28% electron transfer detd. from conductance method; $k = 7 \times 10^2$ s <sup>-1</sup> for heterolysis of nitroxide to radical anion.	84A305
13.140	<i>p</i> -Nitro- $\alpha,\alpha,\alpha$ -trifluorotoluene							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + 4-\text{CF}_3\text{C}_6\text{H}_4\text{NO}_2 \rightarrow \text{CH}_3\text{CH}(\text{OH})\text{ON}(\text{O})\text{C}_6\text{H}_4-4-\text{CF}_3$	$4.3 \times 10^8$	4-6		293	p.r.	Cond.y. changes in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH. 70% electron transfer detd. from conductance method; $k = 6.8 \times 10^3$ s <sup>-1</sup> for heterolysis of nitroxide to radical anion; $\Delta H^\ddagger = 9.1$ kJ mol <sup>-1</sup> , $\Delta S^\ddagger = -47$ J K <sup>-1</sup> mol <sup>-1</sup> studied at 273-333 K.	84A305 88A099
13.141	1,10-Phenanthroline							
	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{phen} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+ + \text{phenH}^+$	$8 \times 10^8$		~13		p.r.	P.b.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> EtOH.	80A115
13.142	Phenyl- <i>N</i> - <i>tert</i> -butylnitrone							
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{PBN} \rightarrow$	$1.6 \times 10^7$				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. EtOH and <i>p</i> -nitroacetophenone; rel. to $k(\text{CH}_3\dot{\text{C}}\text{HOH} + \text{PNAP}) = 8 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> .	82A184

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	T(K)	Method	Comment	Ref.
13.143	Pterin $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{PnH} \rightarrow$	$3.7 \times 10^7$	7.0			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. EtOH; -40% $e$ -transfer.	761060
13.144	Pterin, conjugate base $\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{Pn}^- \rightarrow$	$1.2 \times 10^9$	13.0			p.r..	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. EtOH; 100% $e$ -transfer	761060
13.145	Pyrene $\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{Py} \rightarrow \text{CH}_3\text{CHO} + \text{Py}'^-$	$1.7 \times 10^8$	13			p.r.	P.b.k. at 495 nm in micellar soln. contg. 0.2 mol $\text{L}^{-1}$ EtOH and $10^{-3}$ mol $\text{L}^{-1}$ pyrene solubilized by $5 \times 10^{-3}$ mol $\text{L}^{-1}$ hexadecyl trimethylammonium bromide; after photolysis $k(\text{R} + \text{Py}) = 8 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	761062
13.146	Quinoxaline $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Ox} \rightarrow \text{CH}_3\text{CHO} + \text{'OxH}$	$6.5 \times 10^7$	6.5			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. EtOH; 70% $e$ -transfer.	741127
13.147	Tetrachloro-1,4-benzoquinone $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Cl}_4\text{Q} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+ + \text{Cl}_4\text{Q}'^-$	$3 \times 10^9$				p.r.	P.b.k. in CTAB or NaLS micelles: soln. contains 0.1 mol $\text{L}^{-1}$ EtOH; cor. for $e_{aq}^-$ reaction.	761104
13.148	1,2,4,5-Tetracyanobenzene $\text{CH}_3\dot{\text{C}}\text{HOH} + 1,2,4,5-\text{C}_6\text{H}_2(\text{CN})_4 \rightarrow e$ -transfer	$3.5 \times 10^9$				p.r.	P.b.k. in CTAB or NaLS micelles; soln. contains 0.1 mol $\text{L}^{-1}$ EtOH; cor. for $e_{aq}^-$ reaction.	761104
13.149	Tetrafluoro-1,4-benzoquinone $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{F}_4\text{Q} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+ + \text{F}_4\text{Q}'^-$	$3.5 \times 10^9$	4.8			p.r.	P.b.k. at 435 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol $\text{L}^{-1}$ EtOH.	94A417
13.150	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphine $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{H}_2\text{TPPS}^{4-} \rightarrow$	$5.2 \times 10^7$	8.0-8.5			p.r.	P.b.k.	92A304
13.151	2,2,6,6-Tetramethylpiperidine-N-oxyl $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{TMPO} \rightarrow$	$4.9 \times 10^8$	acid			p.r.	Condy. changes in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ EtOH; $e$ -transfer.	761067
13.152	2,2,6,6-Tetramethyl-4-piperidone N-oxyl $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{TAN} \rightarrow$	$4.0 \times 10^8$ $6.4 \times 10^8$	acid			p.r.	Condy. changes in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ EtOH; $e$ -transfer.	761067
			5.6			p.r.	C.k. in $\text{N}_2\text{O}$ -satd. soln. contg. EtOH; rel. to $k(\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Fe}(\text{CN})_6^{3-}) = 5.3 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	710618
13.153	Tetranitromethane $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{C}(\text{NO}_2)_4 \rightarrow \text{CH}_3\text{CHO} + \text{'NO}_2 + \text{H}^+ + \text{C}(\text{NO}_2)_3^-$	$-3.5 \times 10^9$ $5.6 \times 10^9$		-1		p.r.	P.b.k. in micellar solns. contg. 0.1 mol $\text{L}^{-1}$ EtOH and either 0.1 mol $\text{L}^{-1}$ Na dodecyl sulfate or 0.02 mol $\text{L}^{-1}$ dodecyltrimethylammonium chloride.	761104
						p.r.	P.b.k. at 366 nm in soln. contg. 0.5 mol $\text{L}^{-1}$ EtOH.	650183
13.154	Thionine cation $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Th}^+ \rightarrow \text{'Th} + \text{CH}_3\text{CHO} + \text{H}^+$	$4.9 \times 10^9$	6.8			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ EtOH and $10^{-4}$ mol $\text{L}^{-1}$ thionine.	87A451

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
13.155	Thymine							
	CH <sub>3</sub> CHOH + 5-MeU →	7.7 × 10 <sup>7</sup>	7			X-r.	C.k.; obs. effect of [EtOH] on <i>G</i> (-T) in aerated soln.; rel. to <i>k</i> (CH <sub>3</sub> CHOH + O <sub>2</sub> ) = 4.6 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	680359
13.156	Toluidine Blue cation							
	CH <sub>3</sub> CHOH + TB <sup>+</sup> → [TBH] <sup>+</sup> + CH <sub>3</sub> CHO	4.0 × 10 <sup>9</sup>	6.8			p.r.	P.b.k. at 830 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	89A262
13.157	Albumin (serum)							
	CH <sub>3</sub> CHOH + C <sub>99</sub> → e.t.	1.3 × 10 <sup>8</sup>	7.3			p.r.	P.b.k. at 420 nm in soln. contg. 0.1 mol L <sup>-1</sup> EtOH and 10 <sup>-3</sup> mol L <sup>-1</sup> phosphate buffer; -SS- radical formn.	83A083
13.158	Cytochrome C <sub>3</sub>							
	CH <sub>3</sub> CHOH + cyt C <sub>3</sub> →	6 × 10 <sup>8</sup>	~3		293	p.r.	Abs. changes following e <sub>aq</sub> <sup>-</sup> reaction in soln. contg. EtOH.	82A399
13.159	Cytochrome C							
	CH <sub>3</sub> CHOH + Cyt C (Fe <sup>3+</sup> ) → Cyt C (Fe <sup>2+</sup> )	1.4 × 10 <sup>8</sup>	7			p.r.	Abs. changes at 550 and 435 nm in N <sub>2</sub> O-satd. soln. contg. EtOH; 100% redn.	79A153
		1.8 × 10 <sup>8</sup>	-7			p.r.	Abs. changes at 550 and 450 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH; see also [741007].	79A312
		2.4 × 10 <sup>8</sup>	2.0			p.r.	Abs. changes in range 400-750 nm.	771128
		1.8 × 10 <sup>8</sup>	6.8					
13.160	Cytochrome C, acetylated							
	CH <sub>3</sub> CHOH + Ac-cyt C →	2.5 × 10 <sup>8</sup>	~7	0.005		p.r.	Abs. changes at 550 and 450 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	79A312
13.161	Cytochrome C, carboxymethylated							
	CH <sub>3</sub> CHOH + Cxm-cyt C →	3.5 × 10 <sup>8</sup>	-7			p.r.	Abs. changes at 550 nm and 450 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	79A312
13.162	Cytochrome C, succinylated							
	CH <sub>3</sub> CHOH + Succ-cyt C →	1.8 × 10 <sup>9</sup>	-7			p.r.	Abs. changes at 550 and 450 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> EtOH.	79A312
13.163	Flavodoxin							
	CH <sub>3</sub> CHOH + C <sub>99</sub> → CH <sub>3</sub> CHO + H <sup>+</sup> + FldH	1.7 × 10 <sup>8</sup>	8		293	p.r.	P.b.k.	83A295
13.164	Methemoglobin							
	CH <sub>3</sub> CHOH + Fe <sup>3+</sup> Hb → CH <sub>3</sub> CHO + H <sup>+</sup> + Fe <sup>2+</sup> Hb	4.0 × 10 <sup>7</sup>	7			p.r.	Abs. changes at 550 and 435 nm in N <sub>2</sub> O-satd. soln. contg. EtOH; 100% redn.	79A153
13.165	Metmyoglobin							
	CH <sub>3</sub> CHOH + Fe <sup>3+</sup> Mb →	5.5 × 10 <sup>7</sup>	7			p.r.	Abs. changes at 550 and 435 nm in N <sub>2</sub> O-satd. soln. contg. EtOH; 95% redn. of hemoprotein.	79A153

TABLE 14. 2-Hydroxyethyl

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
14.1	3,10,17,24-Tetrasulfophthalocyaninecobalt(II) ion $\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{Co(tspc)}^{4-} \rightarrow \text{HOCH}_2\text{CH}_2\text{Co(tspc)}^{4-}$	$\geq 5 \times 10^9$	6.1			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene and Co(tspc) <sup>4-</sup> ; <i>k</i> calcd. assuming complex is monomer.	89A150
14.2	Chromium(II) ion $\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{Cr}^{2+} \rightarrow \text{CrCH}_2\text{CH}_2\text{OH}^{2+}$	$9.9 \times 10^7$	-3	293		p.r.	N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> Cr <sup>2+</sup> and ethylene; $\Delta V^\ddagger = 4.0 \text{ cm}^3 \text{ mol}^{-1}$ studied at 0.1-150 MPa.	92A361
		$1.8 \times 10^8$	0.5			p.r.	P.b.k. in soln. contg. $(1\text{-}20) \times 10^{-4}$ mol L <sup>-1</sup> Cr <sup>2+</sup> , satd. with ethylene/N <sub>2</sub> O.	91A477
14.3	Copper(I) ion $\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{Cu}^+ \rightarrow \text{CuCH}_2\text{CH}_2\text{OH}^+$	$1.9 \times 10^{10}$	4.5			p.r.	Estd. from p.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene and Cu <sup>2+</sup> . Final products are Cu <sup>2+</sup> + C <sub>2</sub> H <sub>4</sub> + OH <sup>-</sup> .	78A322
14.4	Ethylene-copper(I) complex $\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{Cu}(\text{C}_2\text{H}_4)^+ \rightarrow \text{H}_2\text{C}=\text{CH}_2 + \text{Cu}^{2+} + \text{OH}^-$	$7.8 \times 10^7$	4.5			p.r.	Estd. from effect of [C <sub>2</sub> H <sub>4</sub> ] on rate of formn. and decay of CuC <sub>2</sub> H <sub>4</sub> <sup>+</sup> at 227 nm; radical from ·OH + ethylene.	78A322
14.5	Copper(II) ion $\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{Cu}^{2+} \rightarrow \text{CuCH}_2\text{CH}_2\text{OH}^{2+}$	$3 \times 10^7$	6			p.r.	P.b.k. in soln. contg. $(1\text{-}5) \times 10^{-4}$ mol L <sup>-1</sup> CuSO <sub>4</sub> , satd. with ethylene-N <sub>2</sub> O(1:1).	80A277
		$1.9 \times 10^7$	4.5			p.r.	P.b.k. at 270 nm (CuC <sub>2</sub> H <sub>4</sub> ) in N <sub>2</sub> O-satd. soln. 0.001 mol L <sup>-1</sup> ethylene; ·C <sub>2</sub> H <sub>5</sub> is present at pH 4.5 (~ 10%) and pH 2 (~ 50%). Final product is Cu <sup>+</sup> .	78A322
14.6	Iron(II) protoporphyrin $\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{Fe(II)PP} \rightarrow \text{HOCH}_2\text{CH}_2\text{Fe(III)PP}$	$6 \times 10^8$	10-13			p.r.	P.b.k. in with N <sub>2</sub> O/ethylene (1:9) satd. soln. contg. $(1\text{-}3) \times 10^{-3}$ mol L <sup>-1</sup> Fe(II)PP.	86A511
14.7	Tris(1,10-phenanthroline)iron(III) ion $\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{Fe(phen)}_3^{3+} \rightarrow \text{redn.}$	$1.5 \times 10^8$	-1			p.r.	P.b.k. at 490 nm in soln. contg. ethylene; faster reaction assigned to ·CH <sub>2</sub> CH <sub>3</sub> + complex; probably inner-sphere mechanism.	85A284
14.8	Ferricyanide ion $\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{Fe(CN)}_6^{3-} \rightarrow$	$\sim 10^7$	7			p.r.	D.k. in soln. contg. 0.01 mol L <sup>-1</sup> ethylene and 0.01 mol L <sup>-1</sup> N <sub>2</sub> O.	690522
14.9	Hexachloroiridate(IV) ion $\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{IrCl}_6^{2-} \rightarrow \text{IrCl}_6^{3-} +$ other prod.	$\sim 2 \times 10^9$	4.6	295		p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. ethylene.	82A041
14.10	Oxygen $\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{O}_2 \rightarrow \text{HOCH}_2\text{CH}_2\text{OO}^\cdot$	$6.6 \times 10^9$	1			p.r.	P.b.k. at 240 nm; radical from OH addn. in soln. contg. ethylene-O <sub>2</sub> (99:1); includes O <sub>2</sub> reaction with ·C <sub>2</sub> H <sub>5</sub> from H addn.	670269
14.11	3-Carboxamido-2,2,5,5-tetramethyl-3-pyrrolin-1-yloxy $\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{NX-u} \rightarrow \text{addn.}$	$4.8 \times 10^8$	acid			p.r.	Condy. changes in N <sub>2</sub> O-satd. soln. contg. 0.01-0.1 mol L <sup>-1</sup> ethylene.	761152
14.12	3-Carboxamido-2,2,5,5-tetramethylpyrrolidin-1-yloxy $\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{NX-s} \rightarrow \text{addn.}$	$4.7 \times 10^8$	acid			p.r.	Condy. changes in N <sub>2</sub> O-satd. soln. contg. 0.01-0.1 mol L <sup>-1</sup> ethylene.	761152

TABLE 14. 2-Hydroxyethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
14.13	Ethanol							
	$\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{EtOH} \rightarrow \text{CH}_3\dot{\text{C}}\text{HOH} + \text{EtOH}$	$1.6 \times 10^1$				γ-r.	Calcd. from obs. yields and assumed mechanism in oxid. of EtOH by H <sub>2</sub> O <sub>2</sub> .	700338
14.14	Ethylene							
	$\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{H}_2\text{C}=\text{CH}_2 \rightarrow$ $\cdot\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$	$3 \times 10^4$				γ-r.	Calcd. from dose rate effect on yields of $\alpha,\omega$ -diols in N <sub>2</sub> O-satd. soln. contg. ethylene assuming termination rate constant of chain reaction is $5 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> .	80A054
		$1.6 \times 10^6$	4.5			p.r.	C.k. in N <sub>2</sub> O-satd. soln.; rel. to $k(\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{Cu}^{2+}) = 1.9 \times 10^7$ and $2.2 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> at pH 4.5 and 2, resp. Radical from ·OH + ethylene; contains ~10% (pH 4.5) and ~50% (pH 2) ·C <sub>2</sub> H <sub>5</sub> .	78A322
		$4.1 \times 10^6$	2					
14.15	2-Mercaptoethanol							
	$\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{HSCH}_2\text{CH}_2\text{OH} \rightarrow$ EtOH + ·SCH <sub>2</sub> CH <sub>2</sub> OH	$4.7 \times 10^7$	10			p.r.	P.b.k. (RSSR <sup>-</sup> ) in Ar-satd. soln.; radical from $e_{\text{aq}}^- + \text{HO}(\text{CH}_2)_2\text{SH}$ .	690553

TABLE 15. 1-Hydroxypropyl

Nu.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
15.1	Tris(1,10-phenanthroline)iron(III) ion							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{Fe}(\text{phen})_3^{3+} \rightarrow \text{C}_2\text{H}_5\text{CHO} + \text{Fe}(\text{phen})_3^{2+} + \text{H}^+$	$3.2 \times 10^9$	-1			p.r.	P.b.k. at 490 nm in soln. contg. 0.1-1 mol L <sup>-1</sup> 1-PrOH and (0.4-1.0) $\times 10^{-4}$ mol L <sup>-1</sup> complex; a slower reaction ( $\sim 7 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> ) was also obs., probably from $\text{CH}_3\dot{\text{C}}\text{HCH}_2\text{OH}$ .	85A284
15.2	Ferricyanide ion							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{Fe}(\text{CN})_6^{4-} \rightarrow \text{Fe}(\text{CN})_6^{3-}$	$3.7 \times 10^9$	7			p.r.	D.k. at 410 nm in soln. contg. 0.1 mol L <sup>-1</sup> 1-PrOH.	690522
15.3	Oxygen							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{O}_2 \rightarrow \text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{OO}^\cdot$	$4.7 \times 10^9$	7			p.r.	C.k. in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. 0.1 mol L <sup>-1</sup> 1-PrOH; rel. to $k(\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{Fe}(\text{CN})_6^{3-}) = 3.7 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	690522
15.4	Hydrogen sulfide							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{H}_2\text{S} \rightleftharpoons \text{H}_2\dot{\text{S}}\text{CHOHCH}_2\text{CH}_3$		6			p.r.	Effect of [H <sub>2</sub> S] on p.b.k. at 380 nm; $K = 5.7 \times 10^{-4}$ L mol <sup>-1</sup> ; $k(\text{adduct} \rightarrow 1\text{-PrOH} + \cdot\text{SH}) = 3.8 \times 10^5$ s <sup>-1</sup> .	670262
15.5	Biacetyl							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{CH}_3\text{COCOCH}_3 \rightarrow \text{C}_2\text{H}_5\text{CHO} + \text{H}^+ + [\text{CH}_3\text{COCOCH}_3]$	$6.8 \times 10^8$				p.r.	P.b.k. at 300 nm in N <sub>2</sub> O-satd. soln. contg. 1-PrOH.	680249
15.6	4-Cyanophenyl- <i>N</i> - <i>tert</i> -butylnitronne							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + 4\text{-CN-PBN} \rightarrow$	$1.7 \times 10^7$				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 1-PrOH and <i>p</i> -nitroacetophenone; rel. to $k(\text{CH}_3\text{CHOHCH}_2\text{CH}_3 + \text{PNAP}) = 2.4 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	82A184
15.7	Glutathione							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{GSH} \rightarrow \text{GS}^\cdot + 1\text{-PrOH}$	$1.4 \times 10^8$				p.r.	P.b.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. 1-PrOH and glutathione.	88A144
15.8	4-Methoxyphenyl- <i>N</i> - <i>tert</i> -butylnitronne							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + 4\text{-CH}_3\text{O-PBN} \rightarrow$	$1 \times 10^6$				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 1-PrOH and <i>p</i> -nitroacetophenone; rel. to $k(\text{CH}_3\text{CHOHCH}_2\text{CH}_3 + \text{PNAP}) = 2.4 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	82A184
15.9	2-Methyl-2-nitrosopropane							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + (\text{CH}_3)_3\text{CNO} \rightarrow \text{addn.}$	$1.3 \times 10^8$	-7	-291	p.r.	P.b.k. (esr) in unbuffered N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> 1-PrOH and (0.25-15) $\times 10^{-3}$ mol L <sup>-1</sup> MNP (assuming complete dimer dissociation).	91D097	
15.10	4-Methylphenyl- <i>N</i> - <i>tert</i> -butylnitronne							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + 4\text{-CH}_3\text{-PBN} \rightarrow$	$3.5 \times 10^6$				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 1-PrOH and <i>p</i> -nitroacetophenone; rel. to $k(\text{CH}_3\text{CHOHCH}_2\text{CH}_3 + \text{PNAP}) = 2.4 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	82A184
15.11	Nifuroxime							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{NF} \rightarrow \text{NF}^\cdot + \text{CH}_3\text{CH}_2\text{CHO} + \text{H}^+$	$3.2 \times 10^9$	7			p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. 1-PrOH; 52% <i>e</i> -transfer.	731062
		$3.2 \times 10^9$	7			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. 1-PrOH; 95% <i>e</i> -transfer.	731099
15.12	4-Nitroacetophenone							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{PNAP} \rightarrow$	$2.4 \times 10^9$	7			p.r.	P.b.k. at 360 and 550 nm in N <sub>2</sub> O-satd. soln. contg. 1-PrOH; 45% <i>e</i> -transfer.	731062

TABLE 15. 1-Hydroxypropyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
<b>15.13</b>	<b>Nitrobenzene</b>							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$ $\text{C}_2\text{H}_5\text{CHO} + \text{H}^+ + [\text{C}_6\text{H}_5\text{NO}_2]^\bullet$	$1.0 \times 10^9$	7			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. 1-PrOH; 60% <i>e</i> -transfer.	731062
		$3.5 \times 10^8$	7			p.r.	P.b.k. at 285 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 1-PrOH; 68% <i>e</i> -transfer.	660432
<b>15.14</b>	<b>4-Nitrophenyl-<i>N</i>-<i>tert</i>-butylnitrone</b>							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + 4\text{-NO}_2\text{-PBN} \rightarrow$	$6.5 \times 10^6$				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 1-PrOH and <i>p</i> -nitroacetophenone; rel. to $k'(\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{PNAP}) = 2.4 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	82A184
<b>15.15</b>	<b>Nitrosobenzene</b>							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{C}_6\text{H}_5\text{NO} \rightarrow$ $\text{C}_2\text{H}_5\text{CHO} + \text{C}_6\text{H}_5\text{NOH}$	$4.0 \times 10^9$	7.0			p.r.	P.b.k. at 450 nm in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> 1-PrOH; includes $\beta$ -alcohol radical reaction.	660433
<b>15.16</b>	<b>Phenyl-<i>N</i>-<i>tert</i>-butylnitrone</b>							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{PBN} \rightarrow$	$1.3 \times 10^7$				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 1-PrOH and <i>p</i> -nitroacetophenone; rel. to $k'(\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{PNAP}) = 2.4 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	82A184
<b>15.17</b>	<b>Tetranitromethane</b>							
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{C}(\text{NO}_2)_4 \rightarrow$ $\text{C}_2\text{H}_5\text{CHO} + \text{NO}_2 + \text{H}^+ + \text{C}(\text{NO}_2)_3^-$	$4.7 \times 10^9$				p.r.	P.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 1-PrOH.	640133

TABLE 16. 1-Hydroxy-1-methylethyl

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	T (K)	Method	Comment	Ref.
<b>16.1 1-Hydroxy-1-methylethyl</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + (\text{CH}_3)_2\dot{\text{C}}\text{OH} \rightarrow$	$3.8 \times 10^8$				p.r.	D.k. at 250 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	86A409
		$4.9 \times 10^8$	<10	0.1		f.p./rq	D.k. (esr) in soln. contg. $1.3 \text{ mol L}^{-1}$ 2-PrOH and $0.6 \text{ mol L}^{-1}$ acetone; studied at pH 1 to 13; equation describing pH dependence presented.	84A257
		$6.5 \times 10^8$	9	0.0015 298		f.p./rq	D.k. (esr) in soln. contg. $0.6 \text{ mol L}^{-1}$ acetone, $1.3 \text{ mol L}^{-1}$ 2-PrOH; $E_a = 18.1 \text{ kJ mol}^{-1}$ , log $A = 12.3$ , studied at 283-349 K.	83A159
		$6.5 \times 10^8$				p.r.	D.k. at 310 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.02 mol $\text{L}^{-1}$ 2-PrOH; $\epsilon \approx 353 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	771011
		$7 \times 10^8$	6			p.r.	D.k. at 280 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH; $2k/\epsilon = 2.1 \times 10^6 \text{ cm s}^{-1}$ ; $pK_a = 12.2$ [660074].	690419
<b>16.2 Acetone ketyl radical</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + (\text{CH}_3)_2\dot{\text{C}}\text{O}^- \rightarrow$	$1.2 \times 10^8$	>13	0.1		f.p./rq	D.k. (esr) in soln. contg. $0.6 \text{ mol L}^{-1}$ acetone, $1.3 \text{ mol L}^{-1}$ 2-PrOH; studied at pH 1 to 13.	84A257
		$2 \times 10^8$		13.3		p.r.	D.k. at 300 nm, in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH; $2k/\epsilon = 2.7 \times 10^5 \text{ cm s}^{-1}$ .	690419
<b>16.3 Disilver monocation</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ag}_2^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Ag}_2$	$2.5 \times 10^9$				p.r.	Calcd. from increase in condy. as function of time in soln. contg. $0.1 \text{ mol L}^{-1}$ 2-PrOH and $5 \times 10^{-4} \text{ mol L}^{-1}$ $\text{AgClO}_4$ .	78A410
<b>16.4 Silver(I) ion</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ag}^+ \rightarrow$					p.r.	No reaction to give $\text{Ag}^0$ in soln. contg. $0.1 \text{ mol L}^{-1}$ 2-PrOH.	78A410
<b>16.5 5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatoargentate(II) ion</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{AgTPPS}^{4-} \rightarrow \text{AgTPPS}^{5-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$6 \times 10^8$	8.9			p.r.	D.k. at 540 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $0.2 \text{ mol L}^{-1}$ 2-PrOH and $1.5 \times 10^{-4} \text{ mol L}^{-1}$ $\text{Ag}^{II}\text{TPPS}$ .	81A247
<b>16.6 Bismuth(III) ion</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Bi}^{3+} \rightarrow \text{BiC}(\text{CH}_3)_2\text{OH}^{3+}$	$4 \times 10^5$	<0			p.r.	P.b.k. at $\sim 400$ nm in Ar-satd. soln. contg. $5 \text{ mol L}^{-1}$ $\text{HClO}_4$ and 2-PrOH.	88A493
<b>16.7 Hexachlorobismuthate(III) ion</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{BiCl}_6^{3-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{BiCl}_6^{4-}$	$1.7 \times 10^5$	<0			p.r.	P.b.k. at $460$ nm in Ar-satd. soln. contg. $0.5 \text{ mol L}^{-1}$ HCl, $0.1 \text{ mol L}^{-1}$ Bi(III), $5 \text{ mol L}^{-1}$ 2-PrOH and $2 \text{ mol L}^{-1}$ $\text{HClO}_4$ .	86A035
<b>16.8 5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatobismuth(III) ion</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{BiTMpyP}^{5+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{BiTMpyP}]^{4+}$	$2.1 \times 10^9$	7			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $1 \text{ mol L}^{-1}$ 2-PrOH.	86A138
<b>16.9 Cadmium(I) ions</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cd}^+ \rightarrow \text{CdC}(\text{CH}_3)_2\text{OH}^+$	$2.4 \times 10^9$				p.r.	D.k. at 300 nm ( $\text{Cd}^+$ ) in soln. contg. 2-PrOH and $\text{Cd}^{2+}$ , as well as condy. and p.b.k. at $240$ nm ( $\text{Cd}_2^{2+}$ ); assumed $k(\text{Cd}^+ + \text{H}_2\text{O}_2) = 1.5 \times 10^9$ , $k(\text{R} + \text{R}) = 7 \times 10^8$ and $2k(\text{Cd}^+ + \text{Cd}^+) = 3.0 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	751064
<b>16.10 Cadmium(II) ion</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cd}^{2+} \rightarrow$	< $10^6$				p.r.	Estd. from lack of increase in $\text{Cd}^+$ in soln. contg. $0.1 \text{ mol L}^{-1}$ $\text{Cd}^{2+}$ upon addn. of $0.1 \text{ mol L}^{-1}$ 2-PrOH.	751027
		< $2.5 \times 10^5$				p.r.	No reaction obs.	751153

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
16.11	Cobalt(II) ion $(\text{CH}_3)_2\dot{\text{CO}} + \text{Co}^{2+} \rightarrow$	<10 <sup>6</sup>				p.r.	Estd. from lack of increase in $\text{Co}^+$ in soln. contg. 0.1 mol L <sup>-1</sup> $\text{Co}^{2+}$ upon addn. of 0.1 mol L <sup>-1</sup> 2-PrOH.	751027
16.12	Nitrilotriacetatocobaltate(II) ion $(\text{CH}_3)_2\dot{\text{CO}} + \text{CoNTA}^- \rightarrow \text{HO}(\text{CH}_3)_2\text{CoNTA}(\text{H}_2\text{O})^-$	$2.3 \times 10^7$	4.7		298	p.r.	P.b.k. at 260 nm in $\text{N}_2\text{O}$ -satd. soln. contg. (1-50) $\times 10^{-4}$ mol L <sup>-1</sup> CoNTA and 0.2-1 mol L <sup>-1</sup> 2-PrOH.	88A343
16.13	2,3,9,10-Tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraenecobalt(II) ion $(\text{CH}_3)_2\dot{\text{CO}} + \text{Co}(\text{Me}_4\text{tetraeneN}_4)^{2+} \rightarrow \begin{matrix} 5.5 \times 10^9 \\ \text{CH}_3\text{COCH}_3 + \text{H}^+ \\ \text{Co}(\text{Me}_4\text{tetraeneN}_4)^+ \end{matrix}$	1.25, 6.5				p.r.	P.b.k. in soln. contg. 2 mol L <sup>-1</sup> 2-PrOH.	761001
16.14	<i>N</i> -rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion $(\text{CH}_3)_2\dot{\text{CO}} + \begin{matrix} <10^7 \\ \text{N-rac-Co}(4,11\text{-dieneN}_4)^{2+} \end{matrix} \rightarrow \begin{matrix} <10^7 \\ 6.5 \end{matrix}$					p.r.	No reaction obs.	78A200
							No reaction obs. in soln. contg. 2 mol L <sup>-1</sup> 2-PrOH.	761001
16.15	<i>N</i> -rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene(dihydroxy)cobalt(II) $(\text{CH}_3)_2\dot{\text{CO}}^- + \begin{matrix} 3.5 \times 10^8 \\ \text{N-rac-Co}(4,11\text{-dieneN}_4)(\text{OH})_2 \\ \text{CH}_3\text{COCH}_3 \\ \text{N-rac-Co}(4,11\text{-dieneN}_4)(\text{OH})_2^- \end{matrix} \rightarrow$	>11		298	p.r.	Abs. changes in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	91A513	
16.16	5,7,7,12,12,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,14-dienecobalt(II) ion $(\text{CH}_3)_2\dot{\text{CO}} + \text{Co}(4,14\text{-dieneN}_4)^{2+} \rightarrow \begin{matrix} <<10^7 \\ 6.5 \end{matrix}$					p.r.	No reaction obs. in soln. contg. in 2 mol L <sup>-1</sup> 2-PrOH.	761001
16.17	2,2'-Bipyridinecobalt(II) ion $(\text{CH}_3)_2\dot{\text{CO}} + \begin{matrix} 2.0 \times 10^6 \\ \text{Co}(\text{bpy})_2^{2+} \end{matrix} \rightarrow$			296	p.r.	P.b.k. at 430 nm in Ar-satd. soln. contg. 2-PrOH; total <i>k</i> for radical consumption.	85A034	
16.18	4,4'-Dimethyl-2,2'-bipyridinecobalt(II) ion $(\text{CH}_3)_2\dot{\text{CO}} + \begin{matrix} 1.0 \times 10^6 \\ \text{Co}(4,4'\text{-Me}_2\text{bpy})_2^{2+} \end{matrix} \rightarrow$					p.r.	P.b.k. at 430 nm in Ar-satd. soln. contg. 2-PrOH; total <i>k</i> for radical consumption.	85A034
16.19	Bis(2,2'-bipyridine)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{CO}} + \begin{matrix} 2.0 \times 10^6 \\ \text{Co}(\text{bpy})_2[\text{C}(\text{OH})(\text{CH}_3)_2]^{2+} \end{matrix} \rightarrow$					p.r.	P.b.k. at 430 nm in Ar-satd. soln. contg. 2-PrOH; total <i>k</i> for radical consumption.	85A034
16.20	Bis(4,4'-dimethyl-2,2'-bipyridine)cobalt(II) ion $(\text{CH}_3)_2\dot{\text{CO}} + \begin{matrix} 1.0 \times 10^6 \\ \text{Co}(4,4'\text{-Me}_2\text{bpy})_2[\text{C}(\text{OH})(\text{CH}_3)_2]^{2+} \end{matrix} \rightarrow$					p.r.	P.b.k. at 430 nm in Ar-satd. soln. contg. 2-PrOH; total <i>k</i> for radical consumption.	85A034
16.21	Tris(2,2'-bipyridine)cobalt(II) ion $(\text{CH}_3)_2\dot{\text{CO}} + \begin{matrix} 4.0 \times 10^7 \\ \text{Co}(\text{bpy})_3^{2+} \end{matrix} \rightarrow \text{Co}(\text{bpy})_3^+ + \text{CH}_3\text{COCH}_3 + \text{H}^+$					p.r.	P.b.k. at 430 nm in Ar-satd. soln. contg. 2-PrOH; total <i>k</i> for radical consumption; 40% addn.	85A034
16.22	Tris(4,4'-dimethyl-2,2'-bipyridine)cobalt(II) ion $(\text{CH}_3)_2\dot{\text{CO}} + \begin{matrix} 5 \times 10^6 \\ \text{Co}(4,4'\text{-Me}_2\text{bpy})_3^{2+} \end{matrix} \rightarrow$					p.r.	P.b.k. at 430 nm in Ar-satd. soln. contg. 2-PrOH; total <i>k</i> for radical consumption.	85A034
16.23	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatocobaltate(II) ion $(\text{CH}_3)_2\dot{\text{CO}} + \begin{matrix} 1.2 \times 10^9 \\ \text{HO}(\text{CH}_3)_2\text{CCoTPPS}^{4-} \end{matrix} \rightarrow$	8		294	p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 1.5 mol L <sup>-1</sup> 2-PrOH.	83A088	

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
16.24	Hydroxytetrakis(4-sulfonatophenyl)porphinatocobaltate(II) ion							
	$(\text{CH}_3)_2\dot{\text{CO}}^- + (\text{HO})\text{CoTPPS}^{5-} \rightarrow \text{CH}_3\text{COCH}_3 + (\text{HO})\text{CoTPPS}^{6-}$	$6.9 \times 10^8$	13		294	p.r.	D.k. in soln. contg. 1.5 mol L <sup>-1</sup> 2-PrOH; follows fast $e_{aq}^-$ reaction.	83A088
16.25	3,10,17,24-Tetrasulfophthalocyaninecobalt(II) ion dimer							
	$(\text{CH}_3)_2\dot{\text{COH}} + [\text{Co(tspc)}]_2^{8-} \rightarrow \text{electron transfer}$	$1.5 \times 10^9$	9			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; mechanism suggested to involve ligand-radical formation, followed by metal redn. and dimer splitting to give $(\text{Co}^{\text{I}}\text{tspc})^{5-}$ .	80A146
16.26	Hexaamminecobalt(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Co}(\text{NH}_3)_6^{2+} + \text{H}^+$	$4.1 \times 10^5$	0-3	0.1	298	chem.	D.k. at 311 nm in N <sub>2</sub> O-satd. soln. contg. $1.5 \times 10^{-4}$ mol L <sup>-1</sup> $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+}$ , 0.4 mol L <sup>-1</sup> 2-PrOH, $1.4 \times 10^{-3}$ mol L <sup>-1</sup> $\text{Cl}^{2+}$ and (4.5-64) $\times 10^{-3}$ mol L <sup>-1</sup> $\text{H}^+$ ; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+} = 0.127$ s <sup>-1</sup> .	82A480
		$1.3 \times 10^7$	5-6			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> 2-PrOH.	72A018
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Co}(\text{NH}_3)_6^{2+}$	$5.0 \times 10^9$	12			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> 2-PrOH.	72A018
16.27	Hexa(ammine-d <sub>3</sub> )cobalt(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{ND}_3)_6^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Co}(\text{ND}_3)_6^{2+} + \text{H}^+$	$3.0 \times 10^5$	0-3	0.1	298	chem.	D.k. at 311 nm in N <sub>2</sub> O-satd. soln. contg. $9.0 \times 10^{-5}$ mol L <sup>-1</sup> $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+}$ , 0.4 mol L <sup>-1</sup> 2-PrOH, $[\text{Co}(\text{ND}_3)_6^{3+}] / [\text{Cr}^{2+}] = 0.214 - 0.531$ and $\text{HClO}_4$ ; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+} = 0.127$ s <sup>-1</sup> ; in D <sub>2</sub> O $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{ND}_3)_6^{3+}) = 2.4 \times 10^5$ L mol <sup>-1</sup> s <sup>-1</sup> .	82A480
16.28	Pentaammine(bromo)cobalt(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_5\text{Br}^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+$	$3.0 \times 10^8$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	771100
16.29	Pentaammine(chloro)cobalt(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_5\text{Cl}^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+$	$4.0 \times 10^7$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	771100
16.30	Pentaammine(fluoro)cobalt(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_5\text{F}^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.2 \times 10^6$	~1	1.0	298	chem.	C.k., radical from homolysis of $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+}$ ; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{en})_3^{3+}) = 1.7 \times 10^5$ L mol <sup>-1</sup> s <sup>-1</sup> .	83A048
16.31	Pentaammine(2-nitrobenzoato)cobalt(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{-2-NO}_2^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{-2-NO}_2]^{1+}$	$2.0 \times 10^9$	7		298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) $\times 10^{-5}$ mol L <sup>-1</sup> complex.	86A340
		$1.7 \times 10^9$	7.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	771027
16.32	Pentaammine(3-nitrobenzoato)cobalt(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{-3-NO}_2^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{-3-NO}_2]^{1+}$	$2.5 \times 10^9$	7		298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) $\times 10^{-5}$ mol L <sup>-1</sup> complex.	86A340
		$1.5 \times 10^9$	7.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	771027

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
<b>16.33 Pentaammine(4-nitrobenzoato)cobalt(III) ion</b>								
	(CH <sub>3</sub> ) <sub>2</sub> COH + Co(NH <sub>3</sub> ) <sub>5</sub> O <sub>2</sub> CC <sub>6</sub> H <sub>4</sub> -4-NO <sub>2</sub> <sup>2+</sup> → CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup> + [Co(NH <sub>3</sub> ) <sub>5</sub> O <sub>2</sub> CC <sub>6</sub> H <sub>4</sub> -4-NO <sub>2</sub> ] <sup>+</sup>	~4 × 10 <sup>9</sup>	7	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) × 10 <sup>-3</sup> mol L <sup>-1</sup> complex.	86A340	
		2.6 × 10 <sup>9</sup>	7.0		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	771027	
		2.6 × 10 <sup>9</sup>	4.5		p.r.	Cond. changes in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH.	741002	
<b>16.34 Pentaammine(2,4-dinitrobenzoato)cobalt(III) ion</b>								
	(CH <sub>3</sub> ) <sub>2</sub> COH + Co(NH <sub>3</sub> ) <sub>5</sub> O <sub>2</sub> CC <sub>6</sub> H <sub>3</sub> -2,4-(NO <sub>2</sub> ) <sub>2</sub> <sup>2+</sup> →	4.3 × 10 <sup>9</sup>	7.0		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	771027	
<b>16.35 Pentaammine(3,5-dinitrobenzoato)cobalt(III) ion</b>								
	(CH <sub>3</sub> ) <sub>2</sub> COH + Co(NH <sub>3</sub> ) <sub>5</sub> O <sub>2</sub> CC <sub>6</sub> H <sub>3</sub> -3,5-(NO <sub>2</sub> ) <sub>2</sub> <sup>2+</sup> →	2.9 × 10 <sup>9</sup>	7.0		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	771027	
<b>16.36 Hexaamminebis(μ-hydroxy)[μ-(4-nitrobenzoato)]dicobalt(III) ion</b>								
	(CH <sub>3</sub> ) <sub>2</sub> COH + HO[Co(NH <sub>3</sub> ) <sub>3</sub> ] <sub>2</sub> O <sub>2</sub> CC <sub>6</sub> H <sub>4</sub> -4-NO <sub>2</sub> <sup>3+</sup> → CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup> + HO[Co(NH <sub>3</sub> ) <sub>3</sub> ] <sub>2</sub> O <sub>2</sub> CC <sub>6</sub> H <sub>4</sub> -4-NO <sub>2</sub> <sup>2+</sup>	1.4 × 10 <sup>9</sup>		295	p.r.	P.b.k. at 370 nm in soln. contg. 1% 2-PrOH; $\Delta H^\ddagger = 13 \pm 8$ kJ mol <sup>-1</sup> studied at 273-306 K; $k = 1.3 \times 10^9$ and $4.3 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> and $\Delta H^\ddagger = 13$ and 39 kJ mol <sup>-1</sup> in 10% and 90% 2-PrOH, resp.; $k = 1.25 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> in 99% D <sub>2</sub> O-1% 2-PrOH.	80A066	
		2 × 10 <sup>9</sup>	0.7-6.0		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	78A108	
<b>16.37 Pentaammine(2-nitrophenylacetato)cobalt(III) ion</b>								
	(CH <sub>3</sub> ) <sub>2</sub> COH + Co(NH <sub>3</sub> ) <sub>5</sub> O <sub>2</sub> CCH <sub>2</sub> C <sub>6</sub> H <sub>4</sub> -2-NO <sub>2</sub> <sup>2+</sup> → CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup> + [Co(NH <sub>3</sub> ) <sub>5</sub> O <sub>2</sub> CCH <sub>2</sub> C <sub>6</sub> H <sub>4</sub> -2-NO <sub>2</sub> ] <sup>+</sup>	1.3 × 10 <sup>9</sup>	0.1	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex.	86A340	
		2.6 × 10 <sup>9</sup>	7					
<b>16.38 Pentaammine(3-nitrophenylacetato)cobalt(III) ion</b>								
	(CH <sub>3</sub> ) <sub>2</sub> COH + Co(NH <sub>3</sub> ) <sub>5</sub> O <sub>2</sub> CCH <sub>2</sub> C <sub>6</sub> H <sub>4</sub> -3-NO <sub>2</sub> <sup>2+</sup> → CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup> + [Co(NH <sub>3</sub> ) <sub>5</sub> O <sub>2</sub> CCH <sub>2</sub> C <sub>6</sub> H <sub>4</sub> -3-NO <sub>2</sub> ] <sup>+</sup>	2.3 × 10 <sup>9</sup>	0.1	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex.	86A340	
		1.9 × 10 <sup>9</sup>	7					
<b>16.39 Pentaammine(4-nitrophenylacetato)cobalt(III) ion</b>								
	(CH <sub>3</sub> ) <sub>2</sub> COH + Co(NH <sub>3</sub> ) <sub>5</sub> O <sub>2</sub> CCH <sub>2</sub> C <sub>6</sub> H <sub>4</sub> -4-NO <sub>2</sub> <sup>2+</sup> → CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup> + [Co(NH <sub>3</sub> ) <sub>5</sub> O <sub>2</sub> CCH <sub>2</sub> C <sub>6</sub> H <sub>4</sub> -4-NO <sub>2</sub> ] <sup>+</sup>	1.7 × 10 <sup>9</sup>	0.1,	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex.	86A340	
		7						
<b>16.40 Pentaammine(2,4-dinitrophenylacetato)cobalt(III) ion</b>								
	(CH <sub>3</sub> ) <sub>2</sub> COH + Co(NH <sub>3</sub> ) <sub>5</sub> O <sub>2</sub> CCH <sub>2</sub> C <sub>6</sub> H <sub>3</sub> -2,4-(NO <sub>2</sub> ) <sub>2</sub> <sup>2+</sup> → CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup> + [Co(NH <sub>3</sub> ) <sub>5</sub> O <sub>2</sub> CCH <sub>2</sub> C <sub>6</sub> H <sub>3</sub> -2,4-(NO <sub>2</sub> ) <sub>2</sub> ] <sup>+</sup>	2.5 × 10 <sup>9</sup>	0.1	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex.	86A340	
<b>16.41 Pentaammine(4-nitrophenylbutanoato)cobalt(III) ion</b>								
	(CH <sub>3</sub> ) <sub>2</sub> COH + Co(NH <sub>3</sub> ) <sub>5</sub> O <sub>2</sub> C(CH <sub>2</sub> ) <sub>3</sub> C <sub>6</sub> H <sub>4</sub> -4-NO <sub>2</sub> <sup>2+</sup> → CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup> + [Co(NH <sub>3</sub> ) <sub>5</sub> O <sub>2</sub> C(CH <sub>2</sub> ) <sub>3</sub> C <sub>6</sub> H <sub>4</sub> -4-NO <sub>2</sub> ] <sup>2+</sup>	2.2 × 10 <sup>9</sup>	7	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex.	86A340	
<b>16.42 Pentaammine(4-nitrophenylglycinato)cobalt(III) ion</b>								
	(CH <sub>3</sub> ) <sub>2</sub> COH + Co(NH <sub>3</sub> ) <sub>5</sub> (4-NO <sub>2</sub> C <sub>6</sub> H <sub>4</sub> Gly) <sup>2+</sup> → CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup> + Co(NH <sub>3</sub> ) <sub>5</sub> (4-NO <sub>2</sub> C <sub>6</sub> H <sub>4</sub> Gly) <sup>+</sup>	3.5 × 10 <sup>9</sup>	7	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex.	86A340	

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
16.43	Pentaammine(2-nitrocinnamato)cobalt(III) ion $\begin{aligned} (\text{CH}_3)_2\dot{\text{C}}\text{OH} + & \quad 1.5 \times 10^9 \\ \text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}=\text{CHC}_6\text{H}_4\text{-2-NO}_2^{2+} & \quad 2.0 \times 10^9 \\ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + & \\ [\text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}=\text{CHC}_6\text{H}_4\text{-2-NO}_2]^{3+} & \end{aligned}$	0-1	7	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex.	86A340	
16.44	Pentaammine(4-nitrophenylglycylglycinato)cobalt(III) ion $\begin{aligned} (\text{CH}_3)_2\dot{\text{C}}\text{OH} + & \quad 2.6 \times 10^9 \\ \text{Co}(\text{NH}_3)_5(4\text{-NO}_2\text{C}_6\text{H}_4\text{GlyGly})^{2+} \rightarrow & \quad 2.8 \times 10^9 \\ \text{CH}_3\text{COCH}_3 + \text{H}^+ + & \\ [\text{Co}(\text{NH}_3)_5(4\text{-NO}_2\text{C}_6\text{H}_4\text{GlyGly})]^{3+} & \end{aligned}$	0-1	7	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex.	86A340	
16.45	Pentaammine(3-nitrocinnamato)cobalt(III) ion $\begin{aligned} (\text{CH}_3)_2\dot{\text{C}}\text{OH} + & \quad 3.0 \times 10^9 \\ \text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}=\text{CHC}_6\text{H}_4\text{-3-NO}_2^{2+} & \quad 2.0 \times 10^9 \\ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + & \\ [\text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}=\text{CHC}_6\text{H}_4\text{-3-NO}_2]^{3+} & \end{aligned}$	0-1	7	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex.	86A340	
16.46	Pentaammine(4-nitrocinnamato)cobalt(III) ion $\begin{aligned} (\text{CH}_3)_2\dot{\text{C}}\text{OH} + & \quad 2.6 \times 10^9 \\ \text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}=\text{CHC}_6\text{H}_4\text{-4-NO}_2^{2+} & \quad 3.9 \times 10^9 \\ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + & \\ [\text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}=\text{CHC}_6\text{H}_4\text{-4-NO}_2]^{3+} & \end{aligned}$	0-1	7	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex.	86A340	
16.47	Pentaammine(4-nitrophenylsulfonato)cobalt(III) ion $\begin{aligned} (\text{CH}_3)_2\dot{\text{C}}\text{OH} + & \quad 1.8 \times 10^9 \\ 4\text{-O}_2\text{NC}_6\text{H}_4\text{SO}_3\text{Co}(\text{NH}_3)_5^{2+} \rightarrow & \\ \text{CH}_3\text{COCH}_3 + \text{H}^+ + & \\ 4\text{-O}_2\text{NC}_6\text{H}_4\text{OSO}_2\text{Co}(\text{NH}_3)_5^{3+} & \end{aligned}$	7	7	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex.	86A340	
16.48	Pentaammine(4-nitrophenylcyano)cobalt(III) ion $\begin{aligned} (\text{CH}_3)_2\dot{\text{C}}\text{OH} + & \quad 2.8 \times 10^9 \\ 4\text{-O}_2\text{NC}_6\text{H}_4\text{CNCo}(\text{NH}_3)_5^{3+} \rightarrow & \\ \text{CH}_3\text{COCH}_3 + \text{H}^+ + & \\ 4\text{-O}_2\text{NC}_6\text{H}_4\text{CNCo}(\text{NH}_3)_5^{2+} & \end{aligned}$	7	7	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex.	86A340	
16.49	Pentaammine(4-nitrophenylaminosulfonyl)cobalt(III) ion $\begin{aligned} (\text{CH}_3)_2\dot{\text{C}}\text{OH} + & \quad 2.7 \times 10^9 \\ p\text{-O}_2\text{NC}_6\text{H}_4\text{NHSO}_2\text{Co}(\text{NH}_3)_5^{2+} \rightarrow & \\ \text{CH}_3\text{COCH}_3 + \text{H}^+ + & \\ 4\text{-O}_2\text{NC}_6\text{H}_4\text{NHSO}_2\text{Co}(\text{NH}_3)_5^{3+} & \end{aligned}$	7	7	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex.	86A340	
16.50	Pentaammine(4-nitrophenoxy)cobalt(III) ion $\begin{aligned} (\text{CH}_3)_2\dot{\text{C}}\text{OH} + & \quad 2.9 \times 10^9 \\ 4\text{-O}_2\text{NC}_6\text{H}_4\text{OCO}(\text{NH}_3)_5^{2+} \rightarrow & \\ \text{CH}_3\text{COCH}_3 + \text{H}^+ + & \\ 4\text{-O}_2\text{NC}_6\text{H}_4\text{OCO}(\text{NH}_3)_5^{3+} & \end{aligned}$	7	7	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex.	86A340	
16.51	Pentaammine(imidazole)cobalt(III) ion $\begin{aligned} (\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{NH}_3)_5(\text{Im})^{3+} \rightarrow & \quad 1.4 \times 10^6 \\ \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(\text{NH}_3)_5(\text{Im})^{2+} & \end{aligned}$	1	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.1 mol L <sup>-1</sup> H <sup>+</sup> , Cr <sup>2+</sup> , Co(III) complex and 1 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	89A532	
16.52	Pentaammine(4,5-dichloroimidazole)cobalt(III) ion $\begin{aligned} (\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{NH}_3)_5(4,5\text{-Cl}_2\text{Im})^{3+} \rightarrow & \quad 1.9 \times 10^7 \\ \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(\text{NH}_3)_5(4,5\text{-Cl}_2\text{Im})^{2+} & \end{aligned}$	1	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.1 mol L <sup>-1</sup> H <sup>+</sup> , Cr <sup>2+</sup> , Co(III) complex and 1 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	89A532	

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
16.53	Pentaammine(1-methylimidazole)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{NH}_3)_5(1-\text{MeIm})^{3+} \rightarrow$ $\text{CH}_3\text{COCH}_3 + \text{H}^+ +$ $\text{Co}(\text{NH}_3)_5(1-\text{MeIm})^{2+}$	$2.2 \times 10^6$	1	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.1 mol L <sup>-1</sup> H <sup>+</sup> , Cr <sup>2+</sup> , Co(III) complex and 1 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	89A532
16.54	Pentaammine(2-methylimidazole)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OII} + \text{Co}(\text{NH}_3)_5(2-\text{MeIm})^{3+} \rightarrow$ $\text{CH}_3\text{COCH}_3 + \text{H}^+ +$ $\text{Co}(\text{NH}_3)_5(2-\text{MeIm})^{2+}$	$3.0 \times 10^6$	1	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.1 mol L <sup>-1</sup> H <sup>+</sup> , Cr <sup>2+</sup> , Co(III) complex and 1 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	89A532
16.55	Pentaammine(4-methylimidazole)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{NH}_3)_5(4-\text{MeIm})^{3+} \rightarrow$ $\text{CH}_3\text{COCH}_3 + \text{H}^+ +$ $\text{Co}(\text{NH}_3)_5(4-\text{MeIm})^{2+}$	$1.8 \times 10^6$	1	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.1 mol L <sup>-1</sup> H <sup>+</sup> , Cr <sup>2+</sup> , Co(III) complex and 1 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	89A532
16.56	Pentaammine(pyridine)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{NH}_3)_5(\text{py})^{3+} \rightarrow$ $\text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(\text{NH}_3)_5(\text{py})^{2+}$	$1.2 \times 10^7$	1	1.0	298	chem.	D.k. at 300-330 nm in soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , (2.0-12.3) × 10 <sup>-4</sup> mol L <sup>-1</sup> Cr <sup>2+</sup> , (14.7-1.41) × 10 <sup>-4</sup> mol L <sup>-1</sup> $\text{Co}(\text{NH}_3)_5(\text{py})^{3+}$ , 1.0 mol L <sup>-1</sup> 2-PrOH, 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> and LiClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	86A289
		$\sim 10^9$		1-7		γ-r.	Estd. from <i>G</i> (Co <sup>2+</sup> ) in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	79A213
16.57	Pentaammine(4-methylpyridine)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{NH}_3)_5(4-\text{CH}_3\text{py})^{3+} \rightarrow$ $\text{CH}_3\text{COCH}_3 + \text{H}^+ +$ $\text{Co}(\text{NH}_3)_5(4-\text{CH}_3\text{py})^{2+}$	$9.3 \times 10^6$	1	1.0	298	chem.	D.k. at 300-330 nm in soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , (2.87-4.73) × 10 <sup>-4</sup> mol L <sup>-1</sup> Cr <sup>2+</sup> , (2.4-7.0) × 10 <sup>-4</sup> mol L <sup>-1</sup> Co(NH <sub>3</sub> ) <sub>5</sub> (4- CH <sub>3</sub> py) <sup>3+</sup> , 1.0 mol L <sup>-1</sup> 2-PrOH, 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> and LiClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	86A289
16.58	Pentaammine(4- <i>tert</i> -butylpyridine)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} +$ $\text{Co}(\text{NH}_3)_5(4-\text{C}(\text{CH}_3)_3\text{py})^{3+} \rightarrow$ $\text{CH}_3\text{COCH}_3 + \text{H}^+ +$ $\text{Co}(\text{NH}_3)_5(4-\text{C}(\text{CH}_3)_3\text{py})^{2+}$	$8.7 \times 10^6$	1	1.0	298	chem.	D.k. at 300-330 nm in soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , (2.29-6.48) × 10 <sup>-4</sup> mol L <sup>-1</sup> Cr <sup>2+</sup> , (2.3-6.6) × 10 <sup>-4</sup> mol L <sup>-1</sup> Co(NH <sub>3</sub> ) <sub>5</sub> (4- C(CH <sub>3</sub> ) <sub>3</sub> py) <sup>3+</sup> , 1.0 mol L <sup>-1</sup> 2-PrOH, 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> and LiClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	86A289

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
16.59	Pentaammine[4-(dimethylamino)pyridine]cobalt(III) ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_5(\text{4-NMe}_2\text{py})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(\text{NH}_3)_5(\text{4-NMe}_2\text{py})^{2+}$	$3.4 \times 10^6$	1	1.0	298	chem.	D.k. at 300-330 nm in soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , (1.23-4.39) × 10 <sup>-4</sup> mol L <sup>-1</sup> Cr <sup>2+</sup> , (2.5-6.3) × 10 <sup>-4</sup> mol L <sup>-1</sup> Co(NH <sub>3</sub> ) <sub>5</sub> (4-NMe <sub>2</sub> py) <sup>3+</sup> , 1.0 mol L <sup>-1</sup> 2-PrOH, 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> and LiClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	86A289
16.60	Pentaammine(3-chloropyridine)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_5(\text{3-Clpy})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(\text{NH}_3)_5(\text{3-Clpy})^{2+}$	$3.1 \times 10^7$	1	1.0	298	chem.	D.k. at 300-330 nm in soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , (2.57-6.0) × 10 <sup>-4</sup> mol L <sup>-1</sup> Cr <sup>2+</sup> , (1.46-8.50) × 10 <sup>-4</sup> mol L <sup>-1</sup> Co(NH <sub>3</sub> ) <sub>5</sub> (3-Clpy) <sup>3+</sup> , 1.0 mol L <sup>-1</sup> 2-PrOH, 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> and LiClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	86A289
16.61	Pentaammine(3-cyanopyridine)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_5(\text{3-CNpy})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(\text{NH}_3)_5(\text{3-CNpy})^{2+}$	$1.4 \times 10^8$	1	1.0	298	chem.	D.k. at 300-330 nm in soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , (3.49-6.21) × 10 <sup>-4</sup> mol L <sup>-1</sup> Cr <sup>2+</sup> , (1.75-9.96) × 10 <sup>-4</sup> mol L <sup>-1</sup> Co(NH <sub>3</sub> ) <sub>5</sub> (3-CNpy) <sup>3+</sup> , 1.0 mol L <sup>-1</sup> 2-PrOH, 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> and LiClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	86A289
16.62	Pentaammine(carboxymethyl 4-pyridinecarboxylato)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_5(\text{4-pyCO}_2\text{CH}_2\text{CO}_2)^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{Co}(\text{NH}_3)_5(\text{4-pyCO}_2\text{CH}_2\text{CO}_2)]^{2+}$	$3.0 \times 10^9$ $2.9 \times 10^9$	1 4.5- 5.5	295	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.		83B029
16.63	Pentaammine[4-(aminocarbonyl)-1-(carboxymethyl)pyridinio]cobalt(III) ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_5(\text{O}_2\text{CCH}_2\text{py-4-CONH}_2)^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{Co}(\text{NH}_3)_5(\text{O}_2\text{CCH}_2\text{py-4-CONH}_2)]^{2+}$	$4.2 \times 10^9$ $1.6 \times 10^{10}$	1 4.5- 5.5	295	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.		83B029
16.64	Pentaammine[4-(aminocarbonyl)-1-(1-carboxyethyl)pyridinio]cobalt(III) ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_5(\text{O}_2\text{CCH}(\text{CH}_3)\text{py-4-CONH}_2)^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{Co}(\text{NH}_3)_5(\text{O}_2\text{CCH}(\text{CH}_3)\text{py-4-CONH}_2)]^{2+}$	$4.5 \times 10^9$ $\leq 2.8 \times 10^8$	1 4.5- 5.5	295	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.		83B029
16.65	Pentaammine[4-(aminocarbonyl)-1-(3-carboxypropyl)pyridinio]cobalt(III) ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_5(\text{O}_2\text{C}(\text{CH}_2)_3\text{py-4-CONH}_2)^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{Co}(\text{NH}_3)_5(\text{O}_2\text{C}(\text{CH}_2)_3\text{py-4-CONH}_2)]^{2+}$	$4.0 \times 10^9$ $2.8 \times 10^9$	1 4.5- 5.5	295	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.		83B029
16.66	Pentaammine(pyrazinecarboxylato-O)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_4\text{H}_3\text{N}_2^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_4\text{H}_3\text{N}_2(\text{H})]^{2+}$	$4.0 \times 10^8$	0-5		p.r.	P.b.k. in N <sub>2</sub> O or Ar-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH; pyrazinyl radical formed.		78A222
16.67	Tetraammine(pyrazinecarboxylato-N,O)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_4\text{O}_2\text{CC}_4\text{H}_3\text{N}_2^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{Co}(\text{NH}_3)_4\text{O}_2\text{CC}_4\text{H}_3\text{N}_2(\text{H})]^{2+}$	$9 \times 10^8$ $4.5 \times 10^8$	5.1 0.7		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and (1-4) × 10 <sup>-4</sup> mol L <sup>-1</sup> complex.		82A146

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
16.68	Bis(ethylenediamine)pyrazinecarboxylatocobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{en})_2\text{O}_2\text{Cp}^{2+} \rightarrow$	$3 \times 10^9$	5.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (0.5-5) × 10 <sup>-4</sup> mol L <sup>-1</sup> complex.	82A146
16.69	$\mu$ -4-Pyrimidinecarboxylatobis[hydroxotris(ammine)cobalt(III)] ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 4\text{-pmCO}_2[\text{Co}(\text{NH}_3)_3]_2(\text{OH})_2^{3+} \rightarrow$	$3.6 \times 10^8$	0.7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and (1-5) × 10 <sup>-4</sup> mol L <sup>-1</sup> complex; no reaction obs. at pH 5.	82A146
16.70	$\mu$ -5-Pyrimidinecarboxylatobis[hydroxotris(ammine)cobalt(III)] ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 5\text{-pmCO}_2[\text{Co}(\text{NH}_3)_3]_2(\text{OH})_2^{3+} \rightarrow$	$1.3 \times 10^8$	0.7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and (1-5) × 10 <sup>-4</sup> mol L <sup>-1</sup> complex.	82A146
16.71	Tris(ethylenediamine)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{en})_3^{3+} \rightarrow$ $\text{CH}_3\text{COCH}_3 + \text{Co}(\text{en})_3^{2+} + \text{H}^+$	$1.7 \times 10^5$	0.3	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> O-satd. soln. contg. (3.0-9.0) × 10 <sup>-4</sup> mol L <sup>-1</sup> CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.4 mol L <sup>-1</sup> 2-PrOH, (1.95-3.3) × 10 <sup>-2</sup> mol L <sup>-1</sup> Co(en) <sub>3</sub> <sup>3+</sup> , (1.90-5.77) × 10 <sup>-3</sup> mol L <sup>-1</sup> Cr <sup>2+</sup> and 3.94 × 10 <sup>-2</sup> -0.32 mol L <sup>-1</sup> H <sup>+</sup> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	82A480
			3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; no reaction detected.	771100
16.72	<i>trans</i> -Dibromobis(ethylenediamine)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{en})_2\text{Br}_2^{+} \rightarrow$	$6.8 \times 10^8$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	771100
16.73	<i>cis</i> -Bromobis(ethylenediamine)fluorocobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{en})_2\text{BrF}^{+} \rightarrow$	$1.1 \times 10^8$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	771100
16.74	<i>trans</i> -Dichlorobis(ethylenediamine)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{trans-}\text{Co}(\text{en})_2\text{Cl}_2^{+} \rightarrow$	$3.8 \times 10^8$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	771100
16.75	<i>cis</i> -Dichlorobis(ethylenediamine)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{cis-}\text{Co}(\text{en})_2\text{Cl}_2^{+} \rightarrow$	$1.0 \times 10^8$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	771100
16.76	Bis(ethylenediamine)difluorocobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{en})_2\text{F}_2^{+} \rightarrow$		3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; no reaction detected.	771100
16.77	<i>cis</i> -Aquachlorobis(ethylenediamine)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{cis-}\text{Co}(\text{en})_2(\text{H}_2\text{O})\text{Cl}^{2+} \rightarrow$	$8.2 \times 10^7$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	771100
16.78	<i>cis</i> -Amminechlorobis(ethylenediamine)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{cis-}\text{Co}(\text{en})_2(\text{NH}_3)\text{Cl}^{2+} \rightarrow$	$2.2 \times 10^7$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	771100
16.79	Bis(1,4-diaminobutane)ethylenediaminecobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{en})(\text{tn})_2^{3+} \rightarrow$ $\text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(\text{en})(\text{tn})_2^{2+}$	$1.3 \times 10^6$	acid	1.0	298	chem.	D.k. at 407 nm in N <sub>2</sub> O-satd. soln. contg. (1-5) × 10 <sup>-4</sup> mol L <sup>-1</sup> CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.3-0.4 mol L <sup>-1</sup> 2-PrOH, 0.03-0.35 mol L <sup>-1</sup> H <sup>+</sup> and NaClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	89A531
16.80	Bis(ethylenediamine)(1,3-diaminopropane)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{en})_2(\text{tn})^{3+} \rightarrow$ $\text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(\text{en})_2(\text{tn})^{2+}$	$5.0 \times 10^5$	acid	1.0	298	chem.	D.k. in N <sub>2</sub> O-satd. soln. contg. (1-5) × 10 <sup>-4</sup> mol L <sup>-1</sup> CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.3-0.4 mol L <sup>-1</sup> 2-PrOH, 0.03-0.35 mol L <sup>-1</sup> H <sup>+</sup> and NaClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	89A531

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>16.81 Bis(ethylenediamine)(1,4-diaminobutane)cobalt(III) ion</b>								
16.81	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{en})_2(\text{tmd})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(\text{en})_2(\text{tmd})^{2+}$	$1.0 \times 10^6$	acid	1.0	298	chem.	D.k. in N <sub>2</sub> -satd. soln. contg. (1-5) × 10 <sup>-4</sup> mol L <sup>-1</sup> CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.3-0.4 mol L <sup>-1</sup> 2-PrOH, 0.03-0.35 mol L <sup>-1</sup> H <sup>+</sup> and NaClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	89A531
<b>16.82 Tris(1,3-diaminopropane)cobalt(III) ion</b>								
16.82	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{tn})_3^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(\text{tn})_3^{2+}$	$1.8 \times 10^6$	0-3	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. 3.0 × 10 <sup>-4</sup> mol L <sup>-1</sup> CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.347 mol L <sup>-1</sup> 2-PrOH, 4.4 × 10 <sup>-3</sup> mol L <sup>-1</sup> Cr <sup>2+</sup> , (5.0-22) × 10 <sup>-3</sup> mol L <sup>-1</sup> Co(tn) <sub>3</sub> <sup>3+</sup> and (1.68-19) × 10 <sup>-2</sup> mol L <sup>-1</sup> H <sup>+</sup> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	82A480
<b>16.83 Tris(1,4-diaminobutane)cobalt(III) ion</b>								
16.83	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{tmd})_3^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(\text{tmd})_3^{2+}$	$4.3 \times 10^6$	acid	0.2	298	chem.	D.k. in N <sub>2</sub> -satd. soln. contg. (1-5) × 10 <sup>-4</sup> mol L <sup>-1</sup> CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.3-0.4 mol L <sup>-1</sup> 2-PrOH, 0.03-0.35 mol L <sup>-1</sup> H <sup>+</sup> and NaClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	89A531
<b>16.84 Tris-trans-(1,2-cyclohexanediamine)cobalt(III) ion</b>								
16.84	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{chxn})_3^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(\text{chxn})_3^{2+}$	$<1 \times 10^4$	0-3	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.4 mol L <sup>-1</sup> 2-PrOH, [Co(chxn) <sub>3</sub> <sup>3+</sup> ]/[Cr <sup>2+</sup> ] < 13 and HCl; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	82A480
<b>16.85 1,3,6,8,10,13,16,19-Octaazabicyclo[6.6.6]eicosane cobalt(III) ion</b>								
16.85	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{sep})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(\text{sep})^{2+}$	$4.6 \times 10^6$	acid	1.0	298	chem.	D.k. in N <sub>2</sub> -satd. soln. contg. (1-5) × 10 <sup>-4</sup> mol L <sup>-1</sup> CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.3-0.4 mol L <sup>-1</sup> 2-PrOH, 0.03-0.35 mol L <sup>-1</sup> H <sup>+</sup> and NaClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	89A531
<b>16.86 Dihydroxy(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion</b>								
16.86	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{Me}_4\text{tetraeneN}_4)(\text{OH})_2^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(\text{Me}_4\text{tetraeneN}_4)(\text{OH})_2$	$3.3 \times 10^8$	9.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	761203
<b>16.87 (Aqua)hydroxy(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion</b>								
16.87	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{Me}_4\text{tetraeneN}_4)(\text{H}_2\text{O})\text{OH}^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(\text{Me}_4\text{tetraeneN}_4)(\text{H}_2\text{O})\text{OH}^+$	$5.5 \times 10^8$	5.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	761203
<b>16.88 2,3,9,10-Tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene cobalt(III) ion</b>								
16.88	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{Me}_4\text{tetraeneN}_4)^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(\text{Me}_4\text{tetraeneN}_4)^{2+}$	$1.9 \times 10^9$	1.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	761203
<b>16.89 Dichloro(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(III) ion</b>								
16.89	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(4,11\text{-dieneN}_4)\text{Cl}_2^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co}(4,11\text{-dieneN}_4)\text{Cl}_2$	$7.0 \times 10^8$		1.0		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	761203

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
16.90	5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienedihydroxycobalt(III) ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(4,11\text{-dieneN}_4)(\text{OH})_2^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+$ $\text{N-rac-}\text{Co}(4,11\text{-dieneN}_4)(\text{OH})_2$	$1.1 \times 10^8$	10.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	761203
16.91	Aqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)hydroxycobalt(III) ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(4,11\text{-dieneN}_4)(\text{H}_2\text{O})\text{OH}^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+$ $\text{Co}(4,11\text{-dieneN}_4)(\text{H}_2\text{O})\text{OH}^+$	$1.1 \times 10^8$	6.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	761203
16.92	Diaqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(4,11\text{-dieneN}_4)(\text{H}_2\text{O})_2^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+$ $\text{Co}(4,11\text{-dieneN}_4)(\text{H}_2\text{O})_2^{2+}$	$2.0 \times 10^8$	2.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	761203
16.93	3-((4-Nitrophenyl)carbonyl)-2,4-dimethyl-1,5,8,12-tetraazacyclotetradeca-1,3-dienecobalt(III) ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{NCYC} \rightarrow \text{redn.}$	$2.0 \times 10^9$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and (2-10) $\times 10^{-5}$ mol L <sup>-1</sup> complex.	86A340
16.94	$\mu$ - <i>p</i> -Nitrobenzoatobis[hydroxo(1,4,7-triazacyclononane)cobalt(III)] ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{NO}_2\text{C}_6\text{H}_4\text{CO}_2[\text{Co}_2(\mu\text{-OH})_2(\text{tacn})_2]^{3+} \rightarrow$	$1 \times 10^9$ $7 \times 10^8$	1 5			p.r.	P.b.k. in Ar-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and (1-5) $\times 10^{-4}$ mol L <sup>-1</sup> complex.	82A146
16.95	$\mu$ -(Pyrazinecarboxylato)bis[hydroxo(1,4,7-triazacyclononane)cobalt(III)] ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{C}_4\text{H}_3\text{N}_2\text{CO}_2[\text{Co}_2(\mu\text{-OH})_2(\text{tacn})_2]^{3+} \rightarrow$	$2.2 \times 10^9$ $3.5 \times 10^8$	1 5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and (1-5) $\times 10^{-4}$ mol L <sup>-1</sup> complex.	82A146
16.96	Aquabis(dimethylglyoximato)methylcobalt(III) $(\text{CH}_3)_2\dot{\text{COH}} + \text{CH}_3\text{Co}(\text{dmgH})_2(\text{H}_2\text{O}) \rightarrow$ $\text{tert-BuOH} + \text{Co}(\text{dmgH})_2(\text{H}_2\text{O})_2$	$7 \times 10^5$	acid	1.0	298	chem.	C.k. in soln. contg. CrCH <sub>2</sub> C <sub>6</sub> H <sub>5</sub> <sup>2+</sup> , H <sub>2</sub> O <sub>2</sub> and 2-PrOH; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Co(en)}_3^{3+}) = 1.7 \times 10^3$ L mol <sup>-1</sup> s <sup>-1</sup> .	86M354
16.97	Aquabis(dimethylglyoximato)methylcobalt(III), protonated $(\text{CH}_3)_2\dot{\text{COH}} + \text{CH}_3\text{Co}(\text{dmg}_2\text{H}_3)(\text{H}_2\text{O})^+ \rightarrow$ $\text{tert-BuOH} + \text{Co}(\text{dmg}_2\text{H}_3)(\text{H}_2\text{O})_2^+$	$1 \times 10^6$	acid	1.0	298	chem.	C.k. in soln. contg. CrCH <sub>2</sub> C <sub>6</sub> H <sub>5</sub> <sup>2+</sup> , H <sub>2</sub> O <sub>2</sub> and 2-PrOH; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Co(en)}_3^{3+}) = 1.7 \times 10^5$ L mol <sup>-1</sup> s <sup>-1</sup> .	86M354
16.98	Aquabis(dimethylglyoximato)ethylcobalt(III) $(\text{CH}_3)_2\dot{\text{COH}} + \text{CH}_3\text{CH}_2\text{Co}(\text{dmgH})_2(\text{H}_2\text{O}) \rightarrow$ $\text{C}_2\text{H}_5\text{C}(\text{CH}_3)_2\text{OH} + \text{Co}(\text{dmgH})_2(\text{H}_2\text{O})_2$	$6 \times 10^5$	acid	1.0	298	chem.	C.k. in soln. contg. CrCH <sub>2</sub> C <sub>6</sub> H <sub>5</sub> <sup>2+</sup> , H <sub>2</sub> O <sub>2</sub> and 2-PrOH; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Co(en)}_3^{3+}) = 1.7 \times 10^3$ L mol <sup>-1</sup> s <sup>-1</sup> .	86M354
16.99	Aquabis(dimethylglyoximato)ethylcobalt(III), protonated $(\text{CH}_3)_2\dot{\text{COH}} + \text{CH}_3\text{CH}_2\text{Co}(\text{dmg}_2\text{H}_3)(\text{H}_2\text{O})^+ \rightarrow$ $\text{C}_2\text{H}_5\text{C}(\text{CH}_3)_2\text{OH} + \text{Co}(\text{dmg}_2\text{H}_3)(\text{H}_2\text{O})_2^+$	$8 \times 10^5$	acid	1.0	298	chem.	C.k. in soln. contg. CrCH <sub>2</sub> C <sub>6</sub> H <sub>5</sub> <sup>2+</sup> , H <sub>2</sub> O <sub>2</sub> and 2-PrOH; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Co(en)}_3^{3+}) = 1.7 \times 10^5$ L mol <sup>-1</sup> s <sup>-1</sup> .	86M354
16.100	Aquabis(dimethylglyoximato)(1-methylethyl)cobalt(III) $(\text{CH}_3)_2\dot{\text{COH}} + (\text{CH}_3)_2\text{CHCo}(\text{dmgH})_2(\text{H}_2\text{O}) \rightarrow$ $(\text{CH}_3)_2\text{CHC}(\text{CH}_3)_2\text{OH} + \text{Co}(\text{dmgH})_2(\text{H}_2\text{O})_2$	$4 \times 10^5$	acid	1.0	298	chem.	C.k. in soln. contg. CrCH <sub>2</sub> C <sub>6</sub> H <sub>5</sub> <sup>2+</sup> , H <sub>2</sub> O <sub>2</sub> and 2-PrOH; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Co(en)}_3^{3+}) = 1.7 \times 10^5$ L mol <sup>-1</sup> s <sup>-1</sup> .	86M354
16.101	Aquabis(dimethylglyoximato)(1-methylethyl)cobalt(III), protonated $(\text{CH}_3)_2\dot{\text{COH}} + (\text{CH}_3)_2\text{CHCo}(\text{dmg}_2\text{H}_3)(\text{H}_2\text{O})^+ \rightarrow$ $(\text{CH}_3)_2\text{CHC}(\text{CH}_3)_2\text{OH} + \text{Co}(\text{dmg}_2\text{H}_3)(\text{H}_2\text{O})_2^+$	$5 \times 10^5$	acid	1.0	298	chem.	C.k. in soln. contg. CrCH <sub>2</sub> C <sub>6</sub> H <sub>5</sub> <sup>2+</sup> , H <sub>2</sub> O <sub>2</sub> and 2-PrOH; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Co(en)}_3^{3+}) = 1.7 \times 10^5$ L mol <sup>-1</sup> s <sup>-1</sup> .	86M354

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.	
<b>16.102</b> <b>Aqua(benzyl)bis(dimethylglyoximate)cobalt(III)</b>									
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{C}_6\text{H}_5\text{CH}_2\text{Co}(\text{dmgH})_2(\text{H}_2\text{O}) \rightarrow \text{C}_6\text{H}_5\text{CH}_2\text{C(OH)(CH}_3)_2 + \text{Co}(\text{dmgH})_2(\text{H}_2\text{O})_2$	$5 \times 10^6$	acid	1.0	298	chem.	C.k. in soln. contg. $\text{CrCH}_2\text{C}_6\text{H}_5^{2+}$ , $\text{H}_2\text{O}_2$ and 2-PrOH; rel. to $k((\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{Co(en)}_3^{3+}) = 1.7 \times 10^5 \text{ L mol}^{-1} \text{ s}^{-1}$ .	86M354	
<b>16.103</b> <b>Aqua(benzyl)bis(dimethylglyoximate)cobalt(III), protonated</b>									
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{C}_6\text{H}_5\text{CH}_2\text{Co}(\text{dmgH}_2\text{H}_3)(\text{H}_2\text{O})^+ \rightarrow \text{C}_6\text{H}_5\text{CH}_2\text{C(OH)(CH}_3)_2 + \text{Co}(\text{dmgH}_2\text{H}_3)(\text{H}_2\text{O})_2^+$	$1.0 \times 10^7$	acid	1.0	298	chem.	C.k. in soln. contg. $\text{CrCH}_2\text{C}_6\text{H}_5^{2+}$ , $\text{H}_2\text{O}_2$ and 2-PrOH; rel. to $k((\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{Co(en)}_3^{3+}) = 1.7 \times 10^5 \text{ L mol}^{-1} \text{ s}^{-1}$ .	86M354	
<b>16.104</b> <b>Benzylbis(dimethylglyoximate)(pyridine)cobalt(III)</b>									
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{C}_6\text{H}_5\text{CH}_2\text{Co}(\text{dmgH})_2(\text{py}) \rightarrow \text{CH}_3\text{COCH}_3 + \text{C}_6\text{H}_5\text{CH}_2\text{Co}(\text{dmgH})_2(\text{py})^-$	$8 \times 10^8$		12		p.r.	P.b.k. at 700 nm in deoxygenated soln. contg. 10% 2-PrOH.	94A288	
<b>16.105</b> <b>Aquabromobis(dimethylglyoximate)cobalt(III)</b>									
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{BrCo}(\text{dmgH})_2(\text{H}_2\text{O}) \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Br}^- + \text{Co}(\text{dmgH})_2(\text{H}_2\text{O})_2$	$1.5 \times 10^8$		7.5		f.p./rq	P.b.k. at 462 nm in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and 1 mol L <sup>-1</sup> acetone.	86A074	
<b>16.106</b> <b>Aquachlorobis(dimethylglyoximate)cobalt(III)</b>									
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{ClCo}(\text{dmgH})_2(\text{H}_2\text{O}) \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Cl}^- + \text{Co}(\text{dmgH})_2(\text{H}_2\text{O})_2$	$8.9 \times 10^7$		7.5		296	f.p./rq	P.b.k. at 462 nm in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and 1 mol L <sup>-1</sup> acetone.	86A074
<b>16.107</b> <b>Dihydroxytetrakis(4-sulfonatophenyl)porphinatocobaltate(III) ion</b>									
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{CoTPPS}(\text{OH})_2^{5-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{CoTPPS}(\text{OH})_2^{6-}$	$1.1 \times 10^9$		13		p.r.	P.b.k. ( $\text{Co}^{II}$ ) and d.k. ( $\text{Co}^{III}$ ) in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	81A317	
<b>16.108</b> <b>(Aqua)hydroxytetrakis(4-sulfonatophenyl)porphinatocobaltate(III) ion</b>									
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{CoTPPS}(\text{H}_2\text{O})(\text{OH})^{4-} \rightarrow \text{CoTPPS}(\text{H}_2\text{O})(\text{OH})^{5-} + \text{CH}_3\text{COCH}_3$	$8 \times 10^8$		8		p.r.	P.b.k. ( $\text{Co}^{II}$ ) and d.k. ( $\text{Co}^{III}$ ) in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	81A317	
<b>16.109</b> <b>Dihydroxytetrakis(1-methylpyridinium-4-yl)porphinecobalt(III) ion</b>									
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{CoTMpyP}(\text{OH})_2^{3+} \rightarrow \text{CoTMpyP}(\text{H}_2\text{O})(\text{OH})^{2+} + \text{CH}_3\text{COCH}_3$	$7.0 \times 10^9$		13		p.r.	P.b.k. ( $\text{Co}^{II}$ ) and d.k. ( $\text{Co}^{III}$ ) in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	81A317	
<b>16.110</b> <b>(Aqua)hydroxytetrakis(1-methylpyridinium-4-yl)porphinecobalt(III) ion</b>									
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{CoTMpyP}(\text{H}_2\text{O})(\text{OH})^{4+} \rightarrow \text{CoTMpyP}(\text{H}_2\text{O})(\text{OH})^{3+} + \text{CH}_3\text{COCH}_3$	$1.8 \times 10^9$		8		p.r.	P.b.k. ( $\text{Co}^{II}$ ) and d.k. ( $\text{Co}^{III}$ ) in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	81A317	
<b>16.111</b> <b>Dihydroxytetrakis[4-(<i>N,N,N</i>-trimethylammonio)phenyl]porphinecobalt(III) ion</b>									
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{CoTAPP}(\text{OH})_2^{3+} \rightarrow \text{CoTAPP}(\text{H}_2\text{O})(\text{OH})^{2+} + \text{CH}_3\text{COCH}_3$	$3.4 \times 10^9$		13		p.r.	P.b.k. ( $\text{Co}^{II}$ ) and d.k. ( $\text{Co}^{III}$ ) in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	81A317	
<b>16.112</b> <b>Tris(2,2'-bipyridine)cobalt(III) ion</b>									
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{Co(bpy)}_3^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co(bpy)}_3^{2+}$	$2.5 \times 10^9$		0.5, 7.8		p.r.	P.b.k. at 330 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	79A034	
<b>16.113</b> <b>Tris(1,10-phenanthroline)cobalt(III) ion</b>									
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{Co(phen)}_3^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co(phen)}_3^{2+}$	$4.6 \times 10^9$		7.0		p.r.	P.b.k. at 360 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH.	79A034	
<b>16.114</b> <b>Tris(5,6-dimethyl-1,10-phenanthroline)cobalt(III) ion</b>									
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{Co(5,6-Me}_2\text{phen)}_3^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Co(5,6-Me}_2\text{phen)}_3^{2+}$	$3.2 \times 10^9$		~7		p.r.	P.b.k., as well as d.k. at 380 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.25 mol L <sup>-1</sup> 2-PrOH; same product from $e_{aq}^-$ reaction.	80A227	

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
16.115	Decakis(cyano)-μ-superoxidodicobaltate(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{O}_2[\text{Co}(\text{CN})_5]_2^{5-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{O}_2[\text{Co}(\text{CN})_5]_2^{6-}$	$2.6 \times 10^8$		-5.0		p.r.	D.k.; redn. may involve metal in part.	81A009
16.116	μ-Amido-μ-superoxidotetrakis(ethylenediamine)dicobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NH}_2[\text{Co}(\text{en})_2]_2(\text{O}_2)^{4+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{NH}_2[\text{Co}(\text{en})_2]_2(\text{O}_2)^{3+}$	$1.3 \times 10^9$		-5.0		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	81A009
16.117	μ-Amido-μ-superoxidoctakisamminedicobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NH}_2[\text{Co}(\text{NH}_3)_4]_2(\text{O}_2)^{4+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{NH}_2[\text{Co}(\text{NH}_3)_4]_2(\text{O}_2)^{3+}$	$1.5 \times 10^9$		-5.0		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	81A009
16.118	μ-Pyrazinecarboxylatobis[hydroxytris(ammime)cobalt(III)] ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + [\text{pzCO}_2\text{Co}(\text{NH}_3)_3]_2(\text{OH})_2^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{pzCO}_2\text{Co}(\text{NH}_3)_3]_2(\text{OH})_2^{2+}$	$4.2 \times 10^8$	0-5			p.r.	P.b.k. in N <sub>2</sub> O or Ar-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	78A222
16.119	Pentaammineosmium(III)(isonicotinylprolylprolylprolinato)pentaamminecobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + [(\text{NH}_3)_5\text{Os}^{\text{III}}\text{iso}(\text{Pro})_3\text{Co}^{\text{III}}(\text{NH}_3)_5]^{5+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [(\text{NH}_3)_5\text{Os}^{\text{II}}\text{iso}(\text{Pro})_3\text{Co}^{\text{III}}(\text{NH}_3)_5]^{4+}$	$6 \times 10^8$			298	p.r.	P.b.k. at 525 nm in soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	85A396
16.120	Chromium(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}^{2+} \rightarrow \text{CrC}(\text{CH}_3)_2\text{OH}^{2+}$	$6.4 \times 10^7$	-3		293	p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> Cr <sup>2+</sup> and 2-PrOH; $\Delta V_{\ddagger} = 5.7 \text{ cm}^3 \text{ mol}^{-1}$ studied at 0.1-150 MPa.	92A361
		$6.4 \times 10^7$	4.1			p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. 0.9 mol L <sup>-1</sup> 2-PrOH and 0.001 mol L <sup>-1</sup> Cr <sup>2+</sup> ; <i>k</i> dependent on acetate concn. $\Delta V_{\ddagger} = 5.7 \text{ cm}^3 \text{ mol}^{-1}$ studied at 0.1-150 MPa [93A323].	92A484
		$5 \times 10^7$	0-6.2			p.r.	P.b.k. at 310 nm in N <sub>2</sub> O-satd. soln. contg. 0.01-2 mol L <sup>-1</sup> 2-PrOH, (1-15) $\times 10^{-4}$ mol L <sup>-1</sup> Cr <sup>2+</sup> and (9-100) $\times 10^{-4}$ AcO <sup>-</sup> /AcOH.	84A036
		$5.1 \times 10^7$	~1			p.r.	P.b.k. in Ar-satd. soln. contg. 2-PrOH and HClO <sub>4</sub> .	741146
16.121	Acetatochromium(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr(OAc)}^+ \rightarrow (\text{CH}_3)_2\text{C}(\text{OH})\text{Cr(OAc)}^+$	$2.0 \times 10^7$	5.2			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.9 mol L <sup>-1</sup> 2-PrOH, 0.001 mol L <sup>-1</sup> Cr <sup>2+</sup> and 0.27 mol L <sup>-1</sup> acetate ion; $\Delta V_{\ddagger} = -7.4 \text{ cm}^3 \text{ mol}^{-1}$ studied at 0.1-150 MPa [93A323].	92A484
16.122	trans-Diaqua(1,4,8,12-tetraazacyclopentadecane)chromium(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr([15]aneN}_4)_2^{2+} \rightarrow (\text{CH}_3)_2\text{C}(\text{OH})\text{Cr([15]aneN}_4)_2^{2+}$	$4.9 \times 10^7$	4.4-5.3			p.r.	P.b.k. at 320 nm in N <sub>2</sub> O-satd. soln. contg. (0.2-11.0) $\times 10^{-3}$ mol L <sup>-1</sup> [15]aneN <sub>4</sub> , (0.16-1.0) $\times 10^{-3}$ mol L <sup>-1</sup> Cr <sup>2+</sup> , (0.009) mol L <sup>-1</sup> acetate and 1.0 mol L <sup>-1</sup> 2-PrOH.	85A499
16.123	cis-Diaqua(nitrilotriacetato)chromate(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{cis-[CrNTA(H}_2\text{O)}_2]^- \rightarrow \text{cis-}[(\text{CH}_3)_2\text{C}(\text{OH})\text{CrNTA(H}_2\text{O)}]^- + \text{H}_2\text{O}$	$8.4 \times 10^7$	5.0-6.4			p.r.	P.b.k. at 325 nm in He-satd. soln. contg. 0.055 mol L <sup>-1</sup> NTA, (0.42-1.0) $\times 10^{-3}$ mol L <sup>-1</sup> Cr <sup>2+</sup> , 0.009 mol L <sup>-1</sup> acetate, 2.1 mol L <sup>-1</sup> 2-PrOH and 0.12 mol L <sup>-1</sup> acetone.	85A499
16.124	Ethylenediaminetetraacetatochromium(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CrEDTA}^{2-} \rightarrow (\text{CH}_3)_2\text{C}(\text{OH})\text{CrEDTA}^{2-}$	$2.6 \times 10^7$	5			p.r.	P.b.k. in He-satd. soln. contg. EDTA, Cr <sup>2+</sup> , 0.009 mol L <sup>-1</sup> acetate, 2.1 mol L <sup>-1</sup> 2-PrOH and 0.12 mol L <sup>-1</sup> acetone.	85A499

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
16.125	Chromium(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}^{3+} \rightarrow \text{Cr}^{2+} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$5.6 \times 10^2$	0.7	0.62		chem.	D.k. at 407 nm in soln. contg. $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+}$ , 1.13 mol L <sup>-1</sup> 2-PrOH, 6.96 $\times 10^{-2}$ mol L <sup>-1</sup> Cr <sup>3+</sup> , 0.2 mol L <sup>-1</sup> HClO <sub>4</sub> and (1.8-30) $\times 10^{-4}$ mol L <sup>-1</sup> Cr <sup>2+</sup> ; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and <i>k</i> for homolysis of $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+} = 0.127 \text{ s}^{-1}$ .	84A076
16.126	Hexaamminechromium(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}(\text{NH}_3)_6^{3+} \rightarrow$	$<7 \times 10^4$	0-3	0.1	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+}$ and $4.5 \times 10^{-3}$ -0.32 mol L <sup>-1</sup> $\text{H}^+$ ; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and <i>k</i> for homolysis of $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+} = 0.127 \text{ s}^{-1}$ .	82A480
16.127	Pentaaquachlorochromium(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}(\text{H}_2\text{O})_5\text{Cl}^{2+} \rightarrow$	$<3 \times 10^4$	0-3	0.1	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+}$ and $4.5 \times 10^{-3}$ -0.32 mol L <sup>-1</sup> $\text{H}^+$ ; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and <i>k</i> for homolysis of $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+} = 0.127 \text{ s}^{-1}$ .	82A480
16.128	Hexakis(urca)chromium(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}(\text{urea})_6^{3+} \rightarrow$	$<7 \times 10^4$	0-3	0.1	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+}$ and $4.5 \times 10^{-3}$ -0.32 mol L <sup>-1</sup> $\text{H}^+$ ; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and <i>k</i> for homolysis of $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+} = 0.127 \text{ s}^{-1}$ .	82A480
16.129	Tetraaquabis(pyridine)chromium(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{cis-}\text{Cr}(\text{H}_2\text{O})_4(\text{py})_2^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Cr}(\text{H}_2\text{O})_5(\text{py})_2^{2+}$	$<10^5$	1	1.0	298	chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L <sup>-1</sup> $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+}$ , Cr <sup>2+</sup> , Cr(py) <sup>3+</sup> , 1 mol L <sup>-1</sup> 2-PrOH, and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L}$ $\text{mol}^{-1} \text{ s}^{-1}$ and <i>k</i> for homolysis of $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+} = 0.127 \text{ s}^{-1}$ .	86A209
16.130	Pentaqua(pyridine)chromium(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}(\text{H}_2\text{O})_5(\text{py})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Cr}(\text{H}_2\text{O})_5(\text{py})^{2+}$	$<5 \times 10^4$	1	1.0	298	chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L <sup>-1</sup> $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+}$ , Cr <sup>2+</sup> , Cr(py) <sup>3+</sup> , 1 mol L <sup>-1</sup> 2-PrOH, and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; too slow to measure; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and <i>k</i> for homolysis of $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+} = 0.127 \text{ s}^{-1}$ .	86A209
16.131	Pentaqua(4- <i>tert</i> -butylpyridine)chromium(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}(\text{H}_2\text{O})_5(4\text{-}i\text{tert}\text{-Bupy})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Cr}(\text{H}_2\text{O})_5(4\text{-}i\text{tert}\text{-Bupy})^{2+}$	$<5 \times 10^4$	1	1.0	298	chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L <sup>-1</sup> $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+}$ , Cr <sup>2+</sup> , Cr(4- <i>tert</i> -Bupy) <sup>3+</sup> , 1 mol L <sup>-1</sup> 2-PrOH, and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; too slow to measure; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and <i>k</i> for homolysis of $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+} = 0.127 \text{ s}^{-1}$ .	86A209
16.132	Pentaqua(3-chloropyridine)chromium(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}(\text{H}_2\text{O})_5(3\text{-Clpy})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Cr}(\text{H}_2\text{O})_5(3\text{-Clpy})^{2+}$	$4.7 \times 10^6$	1	1.0	298	chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L <sup>-1</sup> $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+}$ , $1\text{-}7 \times 10^{-5}$ mol L <sup>-1</sup> Cr <sup>2+</sup> , $2\text{-}3 \times 10^{-4}$ mol L <sup>-1</sup> Cr(3-Clpy) <sup>3+</sup> , 1 mol L <sup>-1</sup> 2-PrOH, and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L}$ $\text{mol}^{-1} \text{ s}^{-1}$ and <i>k</i> for homolysis of $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+} = 0.127 \text{ s}^{-1}$ .	86A209

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
16.133	Pentaqua(4-chloropyridine)chromium(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}(\text{H}_2\text{O})_5(\text{4-Clpy})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Cr}(\text{H}_2\text{O})_5(\text{4-Clpy})^{2+}$	$5.1 \times 10^5$	1	1.0	298	chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L <sup>-1</sup> CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , $1-4 \times 10^{-5}$ mol L <sup>-1</sup> Cr <sup>2+</sup> , $3.5 \times 10^{-4}$ mol L <sup>-1</sup> Cr(4-Clpy) <sup>3+</sup> , 1 mol L <sup>-1</sup> 2-PrOH, and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = $5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	86A209
16.134	Pentaqua(3-cyanopyridine)chromium(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}(\text{H}_2\text{O})_5(\text{3-CNpy})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Cr}(\text{H}_2\text{O})_5(\text{3-CNpy})^{2+}$	$1.8 \times 10^8$	1	1.0	298	chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L <sup>-1</sup> CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , $1-8 \times 10^{-5}$ mol L <sup>-1</sup> Cr <sup>2+</sup> , $2-3 \times 10^{-4}$ mol L <sup>-1</sup> Cr(3-CNpy) <sup>3+</sup> , 1 mol L <sup>-1</sup> 2-PrOH, and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = $5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	86A209
16.135	Pentaqua(4-cyanopyridine)chromium(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}(\text{H}_2\text{O})_5(\text{4-CNpy})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Cr}(\text{H}_2\text{O})_5(\text{4-CNpy})^{2+}$	$5.3 \times 10^8$	1	1.0	298	chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L <sup>-1</sup> CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , $7-37 \times 10^{-4}$ mol L <sup>-1</sup> Cr <sup>2+</sup> , $2-3 \times 10^{-4}$ mol L <sup>-1</sup> Cr(4-CNpy) <sup>3+</sup> , 1 mol L <sup>-1</sup> 2-PrOH, and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = $5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	86A209
16.136	Tris(4,4'-dimethyl-2,2'-bipyridine)chromium(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}(4,4'\text{-Me}_2\text{bpy})_3^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Cr}(4,4'\text{-Me}_2\text{bpy})_3^{2+} + \text{H}^+$	$2 \times 10^9$		$\sim 0$		p.r.	P.b.k. at 480 nm in soln. contg. 1 mol L <sup>-1</sup> HCl and 2-PrOH.	81A060
16.137	Tris(1,10-phenanthroline)chromium(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}(\text{phen})_3^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Cr}(\text{phen})_3^{2+} + \text{H}^+$	$4.1 \times 10^9$		$\sim 0$		p.r.	P.b.k. at 480 nm in soln. contg. 1 mol L <sup>-1</sup> HCl and 2-PrOH.	81A060
16.138	Tris(5-bromo-1,10-phenanthroline)chromium(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}(5\text{-Brphen})_3^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Cr}(5\text{-Brphen})_3^{2+} + \text{H}^+$	$3.8 \times 10^9$		$\sim 0$		p.r.	P.b.k. at 420 nm in soln. contg. 1 mol L <sup>-1</sup> HCl and 2-PrOH.	81A060
16.139	Tris(5-chloro-1,10-phenanthroline)chromium(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}(5\text{-Clphen})_3^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Cr}(5\text{-Clphen})_3^{2+} + \text{H}^+$	$2.8 \times 10^9$		$\sim 0$		p.r.	P.b.k. at 400 nm in soln. contg. 1 mol L <sup>-1</sup> HCl and 2-PrOH.	81A060
16.140	Tris(5-methyl-1,10-phenanthroline)chromium(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}(5\text{-Mephen})_3^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Cr}(5\text{-Mephen})_3^{2+} + \text{H}^+$	$3.1 \times 10^9$		$\sim 0$		p.r.	P.b.k. at 400 nm in soln. contg. 1 mol L <sup>-1</sup> HCl and 2-PrOH.	81A060
16.141	Tris(5,6-dimethyl-1,10-phenanthroline)chromium(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}(5,6\text{-Me}_2\text{phen})_3^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Cr}(5,6\text{-Me}_2\text{phen})_3^{2+} + \text{H}^+$	$3.6 \times 10^9$		$\sim 0$		p.r.	P.b.k. at 420 nm in soln. contg. 1 mol L <sup>-1</sup> HCl and 2-PrOH.	81A060
16.142	Pentaqua(imidazole)chromium(III) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}(\text{H}_2\text{O})_5(\text{Im})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Cr}(\text{H}_2\text{O})_5(\text{Im})^{2+}$	$6.6 \times 10^5$	0.3	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -saturated soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.5 mol L <sup>-1</sup> H <sup>+</sup> and 1 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = $5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	91A514

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
<b>16.143 Pentaqua(4,5-dichloroimidazole)chromium(III) ion</b>								
16.143	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}(\text{H}_2\text{O})_5(4,5\text{-Cl}_2\text{Im})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Cr}(\text{H}_2\text{O})_5(4,5\text{-Cl}_2\text{Im})^{2+}$	$1.6 \times 10^6$	0.3	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.5 mol L <sup>-1</sup> H <sup>+</sup> and 1 mol L <sup>-1</sup> 2-PrOH; $k$ calcd. using $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and $k$ for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	91A514
<b>16.144 Pentaqua(1-methylimidazole)chromium(III) ion</b>								
16.144	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}(\text{H}_2\text{O})_5(1\text{-MeIm})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Cr}(\text{H}_2\text{O})_5(1\text{-MeIm})^{2+}$	$1.1 \times 10^5$	0.3	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.5 mol L <sup>-1</sup> H <sup>+</sup> and 1 mol L <sup>-1</sup> 2-PrOH; $k$ calcd. using $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and $k$ for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	91A514
<b>16.145 Pentaqua(2-methylimidazole)chromium(III) ion</b>								
16.145	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}(\text{H}_2\text{O})_5(2\text{-MeIm})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Cr}(\text{H}_2\text{O})_5(2\text{-MeIm})^{2+}$	$2.1 \times 10^5$	0.3	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.5 mol L <sup>-1</sup> H <sup>+</sup> and 1 mol L <sup>-1</sup> 2-PrOH; $k$ calcd. using $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and $k$ for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	91A514
<b>16.146 Pentaqua(4-methylimidazole)chromium(III) ion</b>								
16.146	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}(\text{H}_2\text{O})_5(4\text{-MeIm})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Cr}(\text{H}_2\text{O})_5(4\text{-MeIm})^{2+}$	$3.8 \times 10^5$	0.3	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.5 mol L <sup>-1</sup> H <sup>+</sup> and 1 mol L <sup>-1</sup> 2-PrOH; $k$ calcd. using $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and $k$ for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	91A514
<b>16.147 Pentaqua(4-methyl-5-(aminocarbonyl)imidazole)chromium(III) ion</b>								
16.147	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}(\text{H}_2\text{O})_5(4\text{-Me-5-CONH}_2\text{Im})^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Cr}(\text{H}_2\text{O})_5(4\text{-Me-5-CONH}_2\text{Im})^{2+}$	$7.2 \times 10^5$	0.3	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.5 mol L <sup>-1</sup> H <sup>+</sup> and 1 mol L <sup>-1</sup> 2-PrOH; $k$ calcd. using $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and $k$ for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	91A514
<b>16.148 5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatochromate(III) ion</b>								
16.148	$(\text{CH}_3)_2\dot{\text{COH}} + \text{CrTPPS}^{3-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{CrTPPS}]^{4-}$	$8.0 \times 10^8$	5.1			p.r.	P.b.k. at 680 nm in N <sub>2</sub> O-satd. soln. contg. 5% 2-PrOH.	92A175
<b>16.149 Chromium(III) mesoporphyrin</b>								
16.149	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{Cr}^{\text{III}}\text{MP} \rightarrow \text{CH}_3\text{COCH}_3 + [\text{Cr}^{\text{III}}\text{MP}]^{2-}$	$5.9 \times 10^8$	12.1			p.r.	P.b.k. at 680 nm in N <sub>2</sub> O-satd. soln. contg. 5% 2-PrOH.	92A175
16.149	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{Cr}^{\text{III}}\text{MP} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{Cr}^{\text{III}}\text{MP}]^{2-}$	$\leq 4 \times 10^7$	6.6			p.r.	P.b.k. at 680 nm in N <sub>2</sub> O-satd. soln. contg. 5% 2-PrOH.	92A175
<b>16.150 Chromate(VI) ion</b>								
16.150	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{CrO}_4^{2-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{CrO}_4^{3-}$	$9 \times 10^8$			298	p.r.	P.b.k. at 250-430 nm in Ar-satd. soln. contg. 0.5 mol L <sup>-1</sup> NaOH and 0.1 mol L <sup>-1</sup> 2-PrOH.	95A002
<b>16.151 Copper(I) ion</b>								
16.151	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cu}^+ \rightarrow$	$\sim 5 \times 10^9$	4.5			p.r.	Estd. from growth and decay of absorption in soln. contg. 2-PrOH and Cu <sup>2+</sup> .	78A322
<b>16.152 Copper(II) ion</b>								
16.152	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cu}^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+$	$5.0 \times 10^7$	6			p.r.	D.k. at ~300 nm (radical) in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	80A277
16.152		$5.2 \times 10^7$	2.5			p.r.	P.b.k. at 320 nm (Cu <sup>1</sup> CH <sub>2</sub> CHCONH <sub>2</sub> ) in soln. contg. 2-PrOH and 0.01 mol L <sup>-1</sup> acrylamide.	78A322
16.152		$5.0 \times 10^7$	$\leq 3$			p.r.	D.k. at 240-300 nm in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	78A322

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
16.152	Copper(II) ion — Continued							
		$4.5 \times 10^7$	5-6			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> 2-PrOH.	72A018
16.153	<i>cis</i> -Diaqua(nitrilotriacetato)copper(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{cis}-[\text{Cu}(\text{NTA})(\text{H}_2\text{O})_2]^- \rightarrow \text{cis}-[\text{HO}(\text{CH}_3)_2\text{Cu}(\text{NTA})(\text{H}_2\text{O})]^- + \text{H}_2\text{O}$	$2.2 \times 10^7$	5-8			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. CuSO <sub>4</sub> , nitrilotriacetate ion and 2-PrOH.	86B151
16.154	5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecopper(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cu}(4,11\text{-dieneN}_4)^{2+} \rightarrow \text{Cu}(4,11\text{-dieneN}_4)^+ + \text{CH}_3\text{COCH}_3 + \text{H}^+$ $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Cu}(4,11\text{-dieneN}_4)^{2+} \rightarrow 9.0 \times 10^8 \text{ Cu}(4,11\text{-dieneN}_4)^+ + \text{CH}_3\text{COCH}_3$	$\leq 2 \times 10^6$ 10	3.5- 12.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH. P.b.k. at 410 nm; no redn. obs. in neutral soln.	80A189 761039
16.155	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatocuprate(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CuTPPS}^{4-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{CuTPPS}]^{5-}$	$3.4 \times 10^8$	2.9	294	p.r.		P.b.k. at 650 nm in deaerated soln. contg. 2-PrOH.	92A390
16.156	Europium(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Eu}^{2+} + \text{H}^+ \rightarrow 2\text{-PrOH} + \text{Eu}^{3+}$	$1.5 \times 10^5$	1.4	298	chem.		D.k. at 407 nm in soln. contg. 3 mol L <sup>-1</sup> 2-PrOH, 8.0 × 10 <sup>-4</sup> mol L <sup>-1</sup> CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> and 0.037 mol L <sup>-1</sup> HCl or HClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> . <i>k</i> = 3.1 × 10 <sup>4</sup> L mol <sup>-1</sup> s <sup>-1</sup> in D <sub>2</sub> O.	84A076
16.157	Europium(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Eu}^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Eu}^{2+} + \text{H}^+$	$3.7 \times 10^4$	0.4	298	chem.		D.k. at 407 nm in soln. contg. 1.14 mol L <sup>-1</sup> 2-PrOH, 8.0 × 10 <sup>-4</sup> mol L <sup>-1</sup> CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> and 0.4 mol L <sup>-1</sup> HClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> . <i>k</i> = 8.8 × 10 <sup>3</sup> L mol <sup>-1</sup> s <sup>-1</sup> in D <sub>2</sub> O. Unexplained discrepancy in these data.	84A076
		$-8 \times 10^8$	1.2		p.r.		P.b.k. at 250 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH, 10 <sup>-2</sup> mol L <sup>-1</sup> Eu <sub>2</sub> O <sub>3</sub> and HClO <sub>4</sub> . Unexplained discrepancy in these data.	86A409
16.158	Iron(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Fe}^{2+} \rightarrow$	$2.9 \times 10^6$	~2		p.r.		Estd. from change in abs. at 250 nm; product suggested to be Fe(H <sub>2</sub> O) <sub>5</sub> C(OH)(CH <sub>3</sub> ) <sub>2</sub> <sup>2+</sup> .	751166
16.159	Iron(II) protoporphyrin (Heme) $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Fe(II)PP} \rightarrow \text{addn.}$	$6 \times 10^8$	10		p.r.		P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2 × 10 <sup>-5</sup> mol L <sup>-1</sup> Fe(II)PP and 0.1 mol L <sup>-1</sup> 2-PrOH.	85A006
16.160	Iron(II) deuteroporphyrin IX (Deuteroheme) $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Fe(II)DP} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Fe(I)DP}$ $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Fe(II)DP} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Fe(I)DP}$	$6.3 \times 10^8$	alk.		p.r.		D.k. at 583 nm in soln. contg. 5.9 mol L <sup>-1</sup> 2-PrOH and 0.67 mol L <sup>-1</sup> acetone.	84A345
		$6.3 \times 10^8$	7		p.r.		Abs. changes in soln. contg. 0.7 mol L <sup>-1</sup> acetone and 50% 2-PrOH; deuterohemin was chemically reduced by dithionite.	81A123
16.161	Iron(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Fe}^{3+} \rightarrow \text{Fe}^{2+} + \text{H}^+ + \text{CH}_3\text{COCH}_3$	$5.8 \times 10^8$					Unpubl. data, C.N.Barnes and G.V.Buxton.	78A322
		$1.8 \times 10^8$	-1		γ-r.		C.k.; obs. C(NO <sub>2</sub> ) <sub>3</sub> <sup>-</sup> and Fe <sup>2+</sup> yields; rel. to <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + TNM) = 5 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	77G411

TABLE 16. 1-Hydroxy-1-methylethyl. — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>J</i>	T (K)	Method	Comment	Ref.
16.161	Iron(III) ion — Continued							
		$4.5 \times 10^8$	-1	1		p.r.	D.k. at 270 nm in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH, $2 \times 10^{-4}$ mol L <sup>-1</sup> Fe(ClO <sub>4</sub> ) <sub>3</sub> and 0.5 mol L <sup>-1</sup> HClO <sub>4</sub> .	74A074
16.162	Pentacyano(nitrosyl)ferrate(III) ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Fe}(\text{CN})_5(\text{NO})^{2-} \rightarrow \text{Fe}(\text{CN})_5\text{NO}^{3-} + \text{H}^+ + \text{CH}_3\text{COCH}_3$	$2.8 \times 10^9$	7			p.r.	P.b.k. at 435 nm in N <sub>2</sub> O- or Ar-satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH and $5 \times 10^{-4}$ mol L <sup>-1</sup> substrate, slower reaction following hydrated electron reaction.	86A306
		$2.9 \times 10^9$	7.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH.	77A120
16.163	Ferricyanide ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Fe}(\text{CN})_6^{4-}$	$5.6 \times 10^9$	7.0			p.r.	D.k. at 420 nm.	73A104
		$4.7 \times 10^9$	7			p.r.	D.k. at 410 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	69A522
16.164	Tris(1,10-phenanthroline)iron(III) ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Fe}(\text{phen})_3^{3+} \rightarrow \text{Fe}(\text{phen})_3^{2+} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$4.1 \times 10^9$	-1			p.r.	P.b.k. at 490 nm in soln. contg. 0.1-1 mol L <sup>-1</sup> 2-PrOH and $(0.4-1.0) \times 10^{-4}$ mol L <sup>-1</sup> complex.	85A284
16.165	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatoiron(III) ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{FeTMpyP}^{5+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{FeTMpyP}^{4+}$	$1.7 \times 10^9$	8.5-			p.r.	D.k. at 497 nm, as well as p.b.k. at 562 nm, in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> 2-PrOH.	91A380
		$1.0 \times 10^9$	9.5					
			11.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	84A426
16.166	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatoferate(III) ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{FeTPPS}^{3-} \rightarrow \text{FeTPPS}^{4-} + \text{H}^+ + \text{CH}_3\text{COCH}_3$	$9.0 \times 10^8$	11.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	84A426
16.167	5,10,15,20-Tetrakis[4-( <i>N,N,N</i> -trimethylammonio)phenyl]porphinatoiron(III) ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{FeTAPP}^{5+} \rightarrow \text{FeTAPP}^{4+} + \text{H}^+ + \text{CH}_3\text{COCH}_3$	$1.2 \times 10^9$	11.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	84A426
16.168	Iron(III) deuteroporphyrin IX (Deuterohemin)							
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Fe}(\text{III})\text{DP} \rightarrow \text{Fe}(\text{II})\text{DP} + \text{H}^+ + \text{CH}_3\text{COCH}_3$	$9 \times 10^8$	-13			p.r.	D.k. in soln. contg. 50% 2-PrOH.	81A123
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Fe}(\text{III})\text{DP} \rightarrow \text{Fe}(\text{II})\text{DP} + \text{H}^+ + \text{CH}_3\text{COCH}_3$	$3.7 \times 10^8$	7.2			p.r.	D.k. in Ar-satd. soln. contg. 50% 2-PrOH and $3.4 \times 10^{-2}$ mol L <sup>-1</sup> acetone.	80A011
16.169	Iron(III) deuteroporphyrin, dimethyl ester							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{DPDMEFe}^{\text{III}} \rightarrow \text{DPDMEFe}^{\text{II}} + \text{H}^+ + \text{CH}_3\text{COCH}_3$	$1.3 \times 10^9$	-3			p.r.	Abs. changes in soln. contg. $1.2 \times 10^{-3}$ mol L <sup>-1</sup> HClO <sub>4</sub> and 50% 2-PrOH.	82A222
16.170	Hemin c							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Hem-Fe}^{\text{III}} \rightarrow \text{Hem-Fe}^{\text{II}} + \text{H}^+ + \text{CH}_3\text{COCH}_3$	$2.8 \times 10^9$	7.0			p.r.	P.b.k. at 413 nm in N <sub>2</sub> O-satd. soln. contg. 0.04 mol L <sup>-1</sup> 2-PrOH.	75A241
16.171	Ferrate(VI) ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{FeO}_4^{2-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{FeO}_4^{3-}$	$3.0 \times 10^9$	10.4	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	89A354	
16.172	Hexahydroxygallate(II) ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ga(OH)}_6^{4-} \rightarrow$	$1.7 \times 10^9$	12.0	→0		p.r.	D.k. in soln. contg. 2-PrOH; Ga(II) from $e_{\text{aq}}$ + Ga(III).	79A190

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
16.173	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatogallium(III) ion							
	(CH <sub>3</sub> ) <sub>2</sub> COH + GaTMpyP <sup>5+</sup> → CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup> + [GaTMpyP] <sup>4+</sup>	1.7 × 10 <sup>9</sup>	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	86A138
16.174	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatogermanium(IV) ion							
	(CH <sub>3</sub> ) <sub>2</sub> COH + GeTMpyP <sup>6+</sup> → CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup> + [GeTMpyP] <sup>5+</sup>	2.1 × 10 <sup>9</sup>	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	86A138
16.175	Hydrogen ion							
	(CH <sub>3</sub> ) <sub>2</sub> COH + H <sup>+</sup> → (CH <sub>3</sub> ) <sub>2</sub> COH <sub>2</sub> <sup>+</sup>	6.4 × 10 <sup>7</sup>				chem.	Esr line broadening in soln. contg. Ti(III), H <sub>2</sub> O <sub>2</sub> and 2-PrOH.	689058
		7.2 × 10 <sup>7</sup>		301		phot.	Esr line broadening in soln. contg. 10% acetone and 5% 2-PrOH.	66D162
16.176	Mercury(I) cyanide							
	(CH <sub>3</sub> ) <sub>2</sub> COH + HgCN →	2.4 × 10 <sup>9</sup>				p.r.	Calcd. from increase in decay rate at 285 nm in soln. contg. 2-PrOH and Hg(CN) <sub>2</sub> ; used 2k(HgCN + HgCN) = 3.4 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	751203
16.177	Mercury(II) bromide							
	(CH <sub>3</sub> ) <sub>2</sub> COH + HgBr <sub>2</sub> → HgBr + Br <sup>-</sup> + H <sup>+</sup> + CH <sub>3</sub> COCH <sub>3</sub>	2.4 × 10 <sup>9</sup>				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	761042
16.178	Mercury(II) thiocyanate							
	(CH <sub>3</sub> ) <sub>2</sub> COH + Hg(SCN) <sub>2</sub> → HgSCN + SCN <sup>-</sup> + H <sup>+</sup> + CH <sub>3</sub> COCH <sub>3</sub>	2.2 × 10 <sup>9</sup>				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	761042
16.179	Mercury(II) chloride							
	(CH <sub>3</sub> ) <sub>2</sub> COH + HgCl <sub>2</sub> → HgCl + Cl <sup>-</sup> + H <sup>+</sup> + CH <sub>3</sub> COCH <sub>3</sub>	2.0 × 10 <sup>9</sup>				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH; see also [761042].	730043
16.180	Mercury(II) iodide							
	(CH <sub>3</sub> ) <sub>2</sub> COH + HgI <sub>2</sub> → HgI + I <sup>-</sup> + H <sup>+</sup> + CH <sub>3</sub> COCH <sub>3</sub>	1.0 × 10 <sup>9</sup>				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	78A165
		2.0 × 10 <sup>9</sup>				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	761042
16.181	Iodate ion							
	(CH <sub>3</sub> ) <sub>2</sub> CO <sup>-</sup> + IO <sub>3</sub> <sup>-</sup> → CH <sub>3</sub> COClI <sub>3</sub> + IO <sub>3</sub> <sup>2-</sup>	1.0 × 10 <sup>9</sup>	-14			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> IO <sub>3</sub> <sup>-</sup> and 0.1 mol L <sup>-1</sup> 2-PrOH and 1.0 mol L <sup>-1</sup> OH <sup>-</sup> .	85A037
16.182	Indium(II) ion							
	(CH <sub>3</sub> ) <sub>2</sub> COH + In <sup>2+</sup> → CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup> + In <sup>+</sup>	9 × 10 <sup>8</sup>	2.7-4.3	0.09	295	p.r.	D.k. in He-satd. soln. contg. In(III) and 0.05 mol L <sup>-1</sup> 2-PrOH; value obtained by computer fit.	84A008
16.183	Indium(III) ion							
	(CH <sub>3</sub> ) <sub>2</sub> COH + In <sup>3+</sup> →	<3 × 10 <sup>6</sup>	3			p.r.	No In(II) formed in soln. contg. 2-PrOH, 1 mol L <sup>-1</sup> HClO <sub>4</sub> , 0.01 mol L <sup>-1</sup> acetone and 0.001 mol L <sup>-1</sup> In(III).	84A008
16.184	Bis(2,2'-bipyridine)([2,2'-bipyridin]-3-yl-C,N')iridium(III) ion							
	(CH <sub>3</sub> ) <sub>2</sub> COH + Ir(bpy) <sub>2</sub> (C <sup>3</sup> ,N'-bpy) <sup>2+</sup> → Ir(bpy) <sub>2</sub> (C <sup>3</sup> ,N'-bpy) <sup>+</sup> + CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup>	2.0 × 10 <sup>8</sup>	>3			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1.0 mol L <sup>-1</sup> 2-PrOH.	85A160
16.185	Bis(2,2'-bipyridine)([2,2'-bipyridin]-3-yl-C,N')iridium(III) ion, conjugate monoacid							
	(CH <sub>3</sub> ) <sub>2</sub> COH + Ir(bpy) <sub>2</sub> (C <sup>3</sup> ,N'-Hbpy) <sup>3+</sup> → Ir(bpy) <sub>2</sub> (C <sup>3</sup> ,N'-Hbpy) <sup>2+</sup> + CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup>	1.4 × 10 <sup>9</sup>	1-2			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1.0 mol L <sup>-1</sup> 2-PrOH.	85A160

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
16.186 Hexachloroiridate(IV) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{IrCl}_6^{2-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{IrCl}_6^{3-}$	$4.7 \times 10^9$	4-6		295	p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	82A041
16.187 5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{MnTMyP}^{4+} \rightarrow [\text{MnTMyP}]^{3+} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1.8 \times 10^9$	6.8			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
16.188 5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatomanganate(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{MnTPPS}^{4-} \rightarrow [\text{MnTPPS}]^{5-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1.8 \times 10^8$	6.8			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
16.189 5,10,15,20-Tetrakis(4-pyridyl)porphinatomanganese(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{MnTpyP}^+ \rightarrow \text{MnTpyP} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1.6 \times 10^9$	4.0, 6.8			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
16.190 5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatomanganate(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{MnTMyP}^{5+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{MnTMyP}^{4+}$	$2.5 \times 10^9$ $1.4 \times 10^9$	6.7- 9.3 3.1, 6.8			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313
16.191 Aqua(hydroxy)tetrakis(1-methylpyridinium-4-yl)porphinatomanganate(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + (\text{H}_2\text{O})(\text{OH})\text{MnTMyP}^{4+} \rightarrow (\text{H}_2\text{O})\text{MnTMyP}^{4+} + \text{CH}_3\text{COCH}_3 + \text{H}_2\text{O}$	$1.6 \times 10^9$	8.9			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
16.192 Bis(hydroxy)tetrakis(1-methylpyridinium-4-yl)porphinatomanganate(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + (\text{OH})_2\text{MnTMyP}^{3+} \rightarrow (\text{OH})\text{MnTMyP}^{3+} + \text{CH}_3\text{COCH}_3 + \text{OH}^-$	$2.3 \times 10^9$ $2.2 \times 10^9$ $8.0 \times 10^8$	11.9 12.4 11.0			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
16.193 5,10,15,20-Tetrakis[4-( <i>N,N,N</i> -trimethylammonio)phenyl]porphinatomanganate(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{MnTAPP}^{5+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{MnTAPP}^{4+}$	$2.7 \times 10^9$	6.7			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313
16.194 $\alpha,\alpha,\alpha,\beta$ -Tetrakis[2-( <i>N</i> -methylisonicotinamido)phenyl]porphinatomanganate(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{MnPFP}^{5+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{MnPFP}^{4+}$	$1.5 \times 10^9$	7.0			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313
16.195 5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatomanganate(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{MnTPPS}^{3-} \rightarrow \text{MnTPPS}^{4-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1.5 \times 10^9$	3.1, 6.8			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
16.196 Aqua(hydroxy)tetrakis(4-sulfonatophenyl)porphinatomanganate(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + (\text{H}_2\text{O})(\text{OH})\text{MnTPPS}^{4-} \rightarrow (\text{H}_2\text{O})\text{MnTPPS}^{4-} + \text{CH}_3\text{COCH}_3 + \text{H}_2\text{O}$	$1.7 \times 10^9$	8.9			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
16.197 Bis(hydroxy)tetrakis(4-sulfonatophenyl)porphinatomanganate(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + (\text{OH})_2\text{MnTPPS}^{5-} \rightarrow (\text{OH})\text{MnTPPS}^{5-} + \text{CH}_3\text{COCH}_3 + \text{OH}^-$	$1.7 \times 10^9$ $7.0 \times 10^8$	11.9, 12.6 11.0			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
16.198 Permanganate ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{MnO}_4^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{MnO}_4^{2-}$	$7.2 \times 10^9$ $4.2 \times 10^9$	10.4 7.0		298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	89A354
						D.k. at 545 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	731104

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
16.199	18-Molybdodiphosphate ion(6-)	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{P}_2\text{Mo}_{18}\text{O}_{62}^{6-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{HP}_2\text{Mo}_{18}\text{O}_{62}^{6-}$	$3.9 \times 10^9$	2	295	p.r.	P.b.k. in N <sub>2</sub> O-satd. ( $2.5 \times 10^{-2}$ mol L <sup>-1</sup> ) soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH and $\sim 10^{-4}$ mol L <sup>-1</sup> heteropolymolybdophosphate.	82A107
16.200	Azide ion	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{N}_3^- \rightarrow$				p.r.	D.k. of $(\text{CH}_3)_2\dot{\text{C}}\text{OH}$ unaffected by addn. of 0.1 mol L <sup>-1</sup> NaN <sub>3</sub> .	82A005
16.201	Nitrous oxide	$(\text{CH}_3)_2\dot{\text{C}}\text{OH}^- + \text{N}_2\text{O} \rightarrow$	$3.8 \times 10^4$	13.5		γ-r.	Estd. from $G$ (acetone) based on an assumed mechanism and values for competing reactions.	720167
16.202	Nitrate ion	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NO}_3^- \rightarrow$	$\sim 3 \times 10^4$			γ-r.	Calcd. from $G$ for destruction of NO <sub>3</sub> <sup>-</sup> in soln. contg. 0.1-0.2 mol L <sup>-1</sup> acetone, 0.2-0.4 mol L <sup>-1</sup> 2-PrOH, $2.5 \times 10^{-4}$ mol L <sup>-1</sup> Ag <sup>+</sup> and $10^{-3}$ mol L <sup>-1</sup> SDS assuming $G(R) = 5.8$ and $2k(R+R) = 1.4 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	80N062
16.203	Nickel(I) ion	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ni}^+ \rightarrow \text{NiCOH}(\text{CH}_3)_2$	$1.4 \times 10^9$			p.r.	D.k. at 300 nm (as well as p.b.k.) in soln. contg. NiSO <sub>4</sub> and 2-PrOH. Value obtained by computer fit.	741037
16.204	Nickel(II) ion	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ni}^{2+} \rightarrow$	$< 10^6$			p.r.	Estd. from lack of increase in Ni <sup>+</sup> in 0.1 mol L <sup>-1</sup> Ni <sup>2+</sup> on addn. of 0.1 mol L <sup>-1</sup> 2-PrOH.	751027
16.205	<i>N</i> -Methyl-5,10,15,20-tetrakis(4-sulfonatophenyl)porphinatonickelate(II) ion	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ni}(N\text{-Me})\text{TPPS}^{3-} \rightarrow [\text{Ni}(N\text{-Me})\text{TPPS}]^{4-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1.6 \times 10^9$			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	92G183
16.206	Tris(dimethylglyoximato)nickelate(IV) ion	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + [\text{Ni}^{\text{IV}}(\text{dmg})_3]^{2-} \rightarrow \text{CH}_3\text{COCH}_3 + [\text{Ni}^{\text{III}}(\text{dmg})_3]^{3-}$	$1.7 \times 10^9$	12.5	294	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 10% 2-PrOH.	85A354
16.207	3,14-Dimethyl-4,7,10,13-tetraazahexadeca-3,13-diene-2,15-dione dioximatonickel(IV) ion	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ni}^{\text{IV}}\text{L}^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{Ni}^{\text{III}}\text{L}]^+$	$2.7 \times 10^9$	2.5-	294	p.r.	P.b.k. at 500 or 430 nm in N <sub>2</sub> O-satd. soln. contg. 10% 2-PrOH.	85A354
16.208	Dioxoneptunium(VI) ion	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NpO}_2^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{NpO}_2^+$	$1.8 \times 10^{10}$	1		p.r.	C.k. in soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH, $3.2 \times 10^{-3}$ mol L <sup>-1</sup> 2,2'-bipyridine and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; rel. to $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{bpyH}^+) = 7.4 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> .	94A345
			$1.8 \times 10^{10}$	1		p.r.	C.k. in soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH, $1.9 \times 10^{-3}$ mol L <sup>-1</sup> 1,10-phenanthroline and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; rel. to $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{phenH}^+) = 3 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	94A345
16.209	Hydrogen peroxide	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{H}_2\text{O}_2 \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}_2\text{O} + \cdot\text{OH}$	$7 \times 10^5$			chem.	Esr study in soln. contg. Ti(III), H <sub>2</sub> O <sub>2</sub> and 2-PrOH.	88D348
			$2.3 \times 10^5$	6.8		γ-r.	Estd. from obs. $G(\text{H}_2\text{O}_2)$ in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	87G036
			$5 \times 10^5$	1.7		phot.	Esr study of effect of [H <sub>2</sub> O <sub>2</sub> ] on [R] in soln. contg. 2-PrOH and acetone; used $2k(R+R) = 1.4 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	715227

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
<b>16.210 Hydroxide ion</b>								
(16.210)	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{OH}^- \rightarrow (\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{H}_2\text{O}$	$7.5 \times 10^9$	10.4-11.0			p.r.	Cond. changes in soln. contg. 1 mol L <sup>-1</sup> acetone, $k_t = 1.4 \times 10^6$ L mol <sup>-1</sup> s <sup>-1</sup> ; $k_f$ calcd. from $\text{p}K_a = 12.00$ .	80A323
		$9 \times 10^9$	11-12			e.r.	Esr line broadening in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH; $k_t = 1.8 \times 10^6$ L mol <sup>-1</sup> s <sup>-1</sup> ( $\text{p}K_a = 12.03$ ).	735065
<b>16.211 Oxygen</b>								
(16.211)	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{O}_2 \rightarrow (\text{CH}_3)_2\dot{\text{C}}(\text{OH})\text{OO}^\bullet$	$4.5 \times 10^9$	-0.3			p.r.	D.k. at 290-300 nm in air-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and 0.5 mol L <sup>-1</sup> HClO <sub>4</sub> .	741074
		$3.5 \times 10^9$	5-6			p.r.	C.k. in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and <i>p</i> -nitroacetophenone; rel. to $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PNAP}) = 3.8 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	710618
		$4.2 \times 10^9$	7			p.r.	C.k. in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and ferricyanide; rel. to $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Fe}(\text{CN})_6^{3-}) = 4.7 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	690522
<b>16.212 Lead(I) ions</b>								
(16.212)	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Pb}^+$ → $\text{PbC}(\text{CH}_3)_2\text{OH}^+$	$1.1 \times 10^9$				p.r.	D.k. at 300 nm ( $\text{Pb}^+$ ) in soln. contg. 5 × 10 <sup>-4</sup> mol L <sup>-1</sup> Pb <sup>2+</sup> and 0.05 mol L <sup>-1</sup> 2-PrOH knowing initial [R] and [Pb <sup>+</sup> ]; cor. for R + R: Pb <sup>+</sup> is formed initially by $e_{\text{aq}}^- + \text{Pb}^{2+}$ .	761170
<b>16.213 Lead(II) ions</b>								
(16.213)	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Pb}^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Pb}^+ + \text{H}^+$	$3.0 \times 10^4$				p.r.	P.b.k. at 300 nm in 1 mol L <sup>-1</sup> 2-PrOH and 1 mol L <sup>-1</sup> Pb <sup>2+</sup> during 100 μs after pulse.	761170
<b>16.214 5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatolead(II) ion</b>								
(16.214)	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PbTMpyP}^{4+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{PbTMpyP}]^{3+}$	$2.0 \times 10^9$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	86A138
<b>16.215 Hexahydroxyplumbate(IV) ion</b>								
(16.215)	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Pb}(\text{OH})_6^{2-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Pb}(\text{OH})_4^- + 2 \text{OH}^-$	$1.3 \times 10^9$	alk.			p.r.	P.b.k. in soln. contg. 0.1 mol L <sup>-1</sup> acetone.	90A095
<b>16.216 Palladium(II) ion</b>								
(16.216)	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Pd}^{2+} \rightarrow \text{PdCOH}(\text{CH}_3)_2^+ \rightarrow \text{Pd}^+ + \text{H}^+ + \text{CH}_3\text{COCH}_3$	$1.4 \times 10^7$	0			p.r.	P.b.k. at 290 nm in soln. contg. 0.1-1 mol L <sup>-1</sup> 2-PrOH and (5-30) × 10 <sup>-5</sup> mol L <sup>-1</sup> Pd <sup>2+</sup> and 1 mol L <sup>-1</sup> HClO <sub>4</sub> .	94A518
		$1.7 \times 10^7$	0			p.r.	P.b.k. at 290 nm in soln. contg. 2-PrOH and (5-30) × 10 <sup>-5</sup> mol L <sup>-1</sup> Pd <sup>2+</sup> and 1 mol L <sup>-1</sup> HClO <sub>4</sub> .	94A210
<b>16.217 Tetraamminepalladium(II) ion</b>								
(16.217)	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Pd}(\text{NH}_3)_4^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Pd}(\text{I})$	$\sim 7 \times 10^7$				p.r.	P.b.k. in Ar-satd. soln. contg. 0.3 mol L <sup>-1</sup> 2-PrOH, 2 × 10 <sup>-4</sup> mol L <sup>-1</sup> Pd(NH <sub>3</sub> ) <sub>2</sub> Cl <sub>2</sub> and poly(ethyleneimine).	92A179
<b>16.218 Dichlorobis(ethylenediamine)platinum(IV) ion</b>								
(16.218)	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Pt}(\text{en})_2\text{Cl}_2^{2+} \rightarrow \text{redn.}$	$8.1 \times 10^8$	7			p.r.	P.b.k. at 260-340 nm in soln. contg. 2 mol L <sup>-1</sup> 2-PrOH.	751188
<b>16.219 Dioxoplatinum(VI) ion</b>								
(16.219)	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PuO}_2^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{PuO}_2^{+}$	$1.6 \times 10^{10}$	1			p.r.	C.k. in soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH, 1.9 × 10 <sup>-3</sup> mol L <sup>-1</sup> 1,10-phenanthroline and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; rel. to $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{phenH}^+) = 3 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	94A345

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>l</i>	T(K)	Method	Comment	Ref.
16.219	Dioxoplatinum(VI) ion — Continued	$1.5 \times 10^{10}$	1			p.r.	C.k. in soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH, 3.2 × 10 <sup>-3</sup> mol L <sup>-1</sup> 2,2'-bipyridine and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; rel. to $k((CH_3)_2COH + bpyH^+) = 7.4 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> .	94A345
16.220	Bis(2,2'-bipyridine)rhodium(II) ion	$(CH_3)_2COH + Rh(bpy)_2^{2+} \rightarrow Rh(bpy)_2^{+} + CH_3COCH_3 + H^+$ $2 \times 10^9$				p.r.	P.b.k. at 360 nm; estd. from increase in obs. rate constant with increasing dose per pulse in soln. contg. Rh <sup>III</sup> (bpy) <sub>2</sub> .	83A046
16.221	Bis(2,2'-bipyridine)dihydroxyrhodium(III) ion	$(CH_3)_2COH + Rh(bpy)_2(OH)_2^{2+} \rightarrow CH_3COCH_3 + H^+ + Rh(bpy)_2^{2+}$ $2.4 \times 10^8$	8.8		298	p.r.	P.b.k. at 360 nm.	83A046
		$(CH_3)_2CO^- + Rh(bpy)_2(OH)_2^{2+} \rightarrow Rh(bpy)_2^{2+} + CH_3COCH_3 + H^+$ $\sim 10^{10}$		12		p.r.	P.b.k. at 360 nm.	83A046
16.222	Tris(2,2'-bipyridine)rhodium(III) ion	$(CH_3)_2COH + Rh(bpy)_3^{3+} \rightarrow CH_3COCH_3 + H^+ + Rh(bpy)_3^{2+}$ $2.3 \times 10^9$			298	p.r.	P.b.k. at 360 nm; $E_a = 15.5$ kJ mol <sup>-1</sup> ; studied at 278–348 K.	83A046
		$1.8 \times 10^9$	1-10			p.r.	P.b.k. at 270 nm and 485 nm as well as d.k. at 320 and 350 nm in Ar-satd. or N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	81A134
		$2.9 \times 10^9$	7	0		p.r.	P.b.k.	741167
16.223	Tris(1,10-phenanthroline)rhodium(III) ion	$(CH_3)_2COH + Rh(phen)_3^{3+} \rightarrow CH_3COCH_3 + H^+ + Rh(phen)_3^{2+}$ $3.2 \times 10^9$		-7		p.r.	P.b.k. at 365 nm in N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> 2-PrOH.	80A227
16.224	Dihydroxy-5,10,15,20-tetrakis(4-sulfonatophenyl)porphimerohodate(III) ion	$(CH_3)_2CO^- + RhTPPS(OH)_2^{5-} \rightarrow RhTPPS(OH)_2^{5-} + CH_3COCH_3$ $5.7 \times 10^8$		13		p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	85A114
16.225	Hexaammineruthenium(II) ion	$(CH_3)_2COH + Ru(NH_3)_6^{2+} + H^+ \rightarrow 2\text{-PrOH} + Ru(NH_3)_5^{3+}$ $6.3 \times 10^6$	acid	0.1	298	chem.	D.k. at 311 nm in soln. contg. CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 1 mol L <sup>-1</sup> 2-PrOH and 0.003–0.1 mol L <sup>-1</sup> H <sup>+</sup> ; acid-dependent $k = 1.35 \times 10^8$ L <sup>2</sup> mol <sup>-2</sup> s <sup>-1</sup> ; $k$ calcd. using $k((CH_3)_2COH + Cr^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and $k$ for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	87A498
16.226	Pentaammine(pyridine)ruthenium(II) ion	$(CH_3)_2COH + Ru(NH_3)_5(py)^{2+} + H^+ \rightarrow 2\text{-PrOH} + Ru(NH_3)_5(py)^{3+}$ $1.9 \times 10^6$	acid	0.1	298	chem.	D.k. at 311 nm in soln. contg. CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 1 mol L <sup>-1</sup> 2-PrOH and 0.003–0.1 mol L <sup>-1</sup> H <sup>+</sup> ; acid-dependent $k = 2.05 \times 10^7$ L <sup>2</sup> mol <sup>-2</sup> s <sup>-1</sup> ; $k$ calcd. using $k((CH_3)_2COH + Cr^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and $k$ for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	87A498
16.227	Pentaammine(3-chloropyridine)ruthenium(II) ion	$(CH_3)_2COH + Ru(NH_3)_5(3\text{-Clpy})^{2+} + H^+ \rightarrow 2\text{-PrOH} + Ru(NH_3)_5(3\text{-Clpy})^{3+}$ $1.1 \times 10^6$	acid	0.1	298	chem.	D.k. in soln. contg. CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 1 mol L <sup>-1</sup> 2-PrOH and 0.001–0.1 mol L <sup>-1</sup> H <sup>+</sup> ; acid-dependent $k = 1.95 \times 10^7$ L <sup>2</sup> mol <sup>-2</sup> s <sup>-1</sup> ; $k$ calcd. using $k((CH_3)_2COH + Cr^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and $k$ for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	87A498

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
16.228	Pentaammine(4-methylpyridine)ruthenium(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ru}(\text{NH}_3)_5(\text{4-Mepy})^{2+} + \text{H}^+ \rightarrow 2\text{-PrOH} + \text{Ru}(\text{NH}_3)_5(\text{4-Mepy})^{3+}$	$2.4 \times 10^6$	acid	0.1	298	chem.	D.k. at 311 nm in soln. contg. CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 1 mol L <sup>-1</sup> 2-PrOH and 0.01 mol L <sup>-1</sup> H <sup>+</sup> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> COH + Cr <sup>2+</sup> ) = $5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	87A498
16.229	Pentaammine(4- <i>tert</i> -butylpyridine)ruthenium(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ru}(\text{NH}_3)_5(\text{4-(CH}_3)_3\text{Cpy})^{2+} + \text{H}^+ \rightarrow 2\text{-PrOH} + \text{Ru}(\text{NH}_3)_5(\text{4-(CH}_3)_3\text{Cpy})^{3+}$	$2.7 \times 10^6$	acid	0.1	298	chem.	D.k. at 311 nm in soln. contg. CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 1 mol L <sup>-1</sup> 2-PrOH and 0.01 mol L <sup>-1</sup> H <sup>+</sup> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> COH + Cr <sup>2+</sup> ) = $5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	87A498
16.230	Pentaammine(4-dimethylaminopyridine)ruthenium(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ru}(\text{NH}_3)_5(\text{4-Me}_2\text{Npy})^{2+} + \text{H}^+ \rightarrow 2\text{-PrOH} + \text{Ru}(\text{NH}_3)_5(\text{4-Me}_2\text{Npy})^{3+}$	$5.6 \times 10^6$	acid	0.1	298	chem.	D.k. at 311 nm in soln. contg. CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 1 mol L <sup>-1</sup> 2-PrOH and 0.0002 mol L <sup>-1</sup> H <sup>+</sup> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> COH + Cr <sup>2+</sup> ) = $5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	87A498
16.231	Tris(2,2'-bipyridine)ruthenium(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Ru}(\text{bpy})_3^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Ru}(\text{bpy})_3^+$	$7.5 \times 10^9$		12.7		p.r.	P.b.k. at 510 nm in soln. contg. 2-PrOH and acetone; no reaction obs. at pH 7.	93A299
		$3.1 \times 10^9$		13	0.1	p.r.	P.b.k. at 510 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	91A218
		$4.9 \times 10^9$		11-13		p.r.	P.b.k.	78A068
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ru}(\text{bpy})_3^{2+} \rightarrow <10^6$			7		p.r.	No reduction obs.	78A068
16.232	Tris(2,2'-bipyrazine)ruthenium(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ru}(\text{bpz})_3^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Ru}(\text{bpz})_3^+ + \text{H}^+$	$3.5 \times 10^9$		7-11		p.r.	Ar-purged or N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	86A422
16.233	Tris(1,10-phenanthroline)ruthenium(II) ion $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Ru}(\text{phen})_3^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Ru}(\text{phen})_3^+$	$3.7 \times 10^9$		13		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> 2-PrOH.	80A227
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ru}(\text{phen})_3^{2+} \rightarrow 8 \times 10^8$			1		p.r.	P.b.k. in Ar-satd. soln.	80A227
16.234	Hexaammineruthenium(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ru}(\text{NH}_3)_6^{3+} \rightarrow 9.2 \times 10^8$			5-6		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> 2-PrOH; <i>e</i> -transfer.	72A018
16.235	Pentaammine(chloro)ruthenium(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ru}(\text{NH}_3)_5\text{Cl}^{2+} \rightarrow 1.3 \times 10^9$			3.5-4		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.5-1 mol L <sup>-1</sup> 2-propanol.	771100
16.236	Pentaammine(nitroso)ruthenium(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ru}(\text{NH}_3)_5\text{NO}^{3+} \rightarrow \text{Ru}(\text{NH}_3)_5\text{NO}^{2+} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$5.5 \times 10^8$		5.0		p.r.	P.b.k. at 280 nm in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH.	751049
16.237	Hydrogen sulfide $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{H}_2\text{S} \rightarrow \text{H}_2\dot{\text{S}}\text{COH}(\text{CH}_3)_2$			6		p.r.	Effect of [H <sub>2</sub> S] on p.b.k. at 380 nm; <i>k</i> (adduct → 2-PrOH + ·SH) = $8.6 \times 10^5$ s <sup>-1</sup> .	670262
16.238	Sulfur dioxide $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{SO}_2 \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{SO}_2^-$	$2.1 \times 10^9$	acid			p.r.	C.k.; obs. formn. of 2-SO <sub>3</sub> AQ <sup>•-</sup> at 400 nm; rel. to <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> COH + 2-SO <sub>3</sub> AQ <sup>•-</sup> ) = 3.1 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	87A083

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
<b>16.239 Peroxodisulfate ion</b>								
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{S}_2\text{O}_8^{2-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{SO}_4^{2-} + \text{SO}_4^{2-}$	$9 \times 10^5$			273	$\gamma$ -r.	Derived from product anal. in soln. contg. peroxodisulfate and 2-PrOH by computer simulation.	88G043
		$7.1 \times 10^5$			~293	chem.	Esr study in soln. contg. 0.008 mol L <sup>-1</sup> Ti(III), 0.01 mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> , (0-0.025) mol L <sup>-1</sup> S <sub>2</sub> O <sub>8</sub> <sup>2-</sup> and ~0.01 mol L <sup>-1</sup> 2-PrOH.	84D044
<b>16.240 Hydrogen peroxomonosulfate ion</b>								
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{HSO}_5^- \rightarrow$	$3.0 \times 10^6$				chem.	Esr study in soln. contg. Ti(III) sulfate, H <sub>2</sub> O <sub>2</sub> , HSO <sub>5</sub> <sup>-</sup> and 2-PrOH.	90D226
<b>16.241 5,10,15,20-Tetrakis(4-pyridyl)porphinatoantimony(V) ion</b>								
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{SbTpyP}^{3+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{SbTpyP}]^{2+}$	$1.8 \times 10^9$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	86A138
<b>16.242 Technetate(VII) ion</b>								
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{TcO}_4^- \rightarrow \text{TcO}_4^{2-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$7 \times 10^8$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH, or He-satd. soln. contg. acetone and 2-PrOH	89A016
<b>16.243 Titanium(III) ions</b>								
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Ti}^{3+} + \text{H}_2\text{O} \rightarrow 2\text{-PrOH} + \text{TiO}^{2+} + \text{H}^+$	$2.1 \times 10^6$ $3.1 \times 10^5$	2.8 1.1	0.1	298	chem.	D.k. at 311 nm in soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> and [H <sup>+</sup> ] = 0.0015-0.085 mol L <sup>-1</sup> ; used $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and $k$ for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> ; $k = 3.6 \times 10^5$ + $1.8 \times 10^3/[H^+] + 25/[H^+]^2/1 + 7.3 \times 10^{-3}/[H^+]$ .	87A379
<b>16.244 Oxititanium(IV) ion</b>								
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{TiO}^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{TiOH}^{2+}$	$1.1 \times 10^6$	1.1- 1.5	1.0	298	chem.	C.k. in soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 1 mol L <sup>-1</sup> 2-PrOH and 0.03-0.08 mol L <sup>-1</sup> H <sup>+</sup> ; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Co}(\text{NH}_3)_6^{3+}) = 4.1 \times 10^5$ L mol <sup>-1</sup> s <sup>-1</sup> .	87A379
<b>16.245 Thallium(I) ion</b>								
	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{Tl}^+ \rightarrow \text{Tl}^0 + \text{CH}_3\text{COCH}_3$	$7.1 \times 10^9$	11-12	0.006		p.r.	P.b.k. at 325, 420 and 450 nm in soln. contg. acetone and Tl <sup>+</sup> and [OH <sup>-</sup> ] < 10 <sup>-2</sup> mol L <sup>-1</sup> .	89C001
		$3.0 \times 10^9$	13			p.r.	P.b.k. at 420 nm in soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and $1 \times 10^{-4}$ mol L <sup>-1</sup> Tl <sup>+</sup> ; no reaction obs. in neutral or acid soln. See also [79G191].	80A123
<b>16.246 Dithallium monocation</b>								
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Tl}_2^+ + \text{H}^+ \rightarrow 2\text{-PrOH} + \text{Tl}^+ + \text{Tl}^+$	$3.0 \times 10^9$	6			p.r.	Calcd. from d.k. at 420 nm. and condy. changes in soln. contg. alcohol and Tl <sup>+</sup> assuming values for $2k(\text{Tl}_2^+ + \text{Tl}^+)$ , $k(\text{Tl}_2^+ + \text{H}_2\text{O}_2)$ and $2k(\text{R} + \text{R})$ .	80A123
<b>16.247 Uranium(III) ion</b>								
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{U}^{3+} \rightarrow$	$\leq 1 \times 10^7$	0.3			p.r.	D.k. at 350 nm in He-satd. soln. contg. 0.5 mol L <sup>-1</sup> HClO <sub>4</sub> and 0.1-1 mol L <sup>-1</sup> 2-PrOH.	85A122
<b>16.248 Uranyl(VI) ion</b>								
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{UO}_2^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{UO}_2^{2+}$	$1.1 \times 10^8$				p.r.	D.k. at 310 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and (5-15) × 10 <sup>-5</sup> mol L <sup>-1</sup> uranyl sulfate.	89A327
		$4.1 \times 10^7$	1		295	p.r.	D.k. at 340 nm in soln. contg. (2.7-5.2) × 10 <sup>-3</sup> mol L <sup>-1</sup> uranyl sulfate and 1 mol L <sup>-1</sup> 2-PrOH.	86G099

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
16.249	Uranium(VI)							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{U(VI)} \rightarrow$	$2.4 \times 10^9$				p.r.	Abs. changes in soln. contg. 0.1 mol L <sup>-1</sup> H <sub>2</sub> SO <sub>4</sub> .	94Z077
16.250	Vanadium(II) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{V}^{2+} + \text{H}^+ \rightarrow 2\text{-PrOH} + \text{V}^{3+}$	$2.1 \times 10^5$	~1		298	chem.	D.k. at 311 nm in soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , Cr <sup>2+</sup> and 1.0 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> CO <sup>·</sup> + Ce <sup>2+</sup> ) = $5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> ; <i>k</i> = $3.6 \times 10^4$ L mol <sup>-1</sup> s <sup>-1</sup> in D <sub>2</sub> O.	83A237
16.251	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinato(oxo)vanadium(IV) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{VOTMpyP}^{4+} \rightarrow \text{VOTMpyP}^{3+} + \text{H}^+ + \text{CH}_3\text{COCH}_3$	$1.6 \times 10^9$	7			p.r.	Abs. changes in N <sub>2</sub> -saturated buffered soln. contg. $10^{-4}$ mol L <sup>-1</sup> metalloporphyrin and 2% 2-PrOH.	87A097
16.252	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinato(oxo)vanadium(IV) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{VOTPPS}^{4+} \rightarrow \text{VOTPPS}^{3+} + \text{CH}_3\text{COCH}_3$	$4.2 \times 10^8$	7			p.r.	Abs. changes in N <sub>2</sub> -saturated buffered soln. contg. $10^{-4}$ mol L <sup>-1</sup> metalloporphyrin and 2% 2-PrOH.	87A097
16.253	12-Tungstoferrate ion(5-)							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{FeW}_{12}\text{O}_{40}^{5-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{FeW}_{12}\text{O}_{40}^{6-}$	$4.5 \times 10^9$	5-6			p.r.	P.b.k. at 650 nm in N <sub>2</sub> O-saturated soln. contg. 2-PrOH.	82A271
16.254	12-Tungstate ion(6-), dihydrogen							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{H}_2\text{W}_{12}\text{O}_{40}^{6-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{H}_2\text{W}_{12}\text{O}_{40}^{7-}$	$1.3 \times 10^9$	5-6			p.r.	P.b.k. at 650 nm in N <sub>2</sub> O-saturated soln. contg. 2-PrOH.	82A271
16.255	12-Tungstophosphate ion(3-)							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{PW}_{12}\text{O}_{40}^{3-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{PW}_{12}\text{O}_{40}^{4-}$	$2.6 \times 10^9$	~1			p.r.	P.b.k. at 740 nm in Ar-saturated soln. contg. 0.1 mol L <sup>-1</sup> H <sub>2</sub> SO <sub>4</sub> , 0.13 mol L <sup>-1</sup> 2-PrOH and (1-100) $\times 10^{-4}$ mol L <sup>-1</sup> Na <sub>2</sub> HPW <sub>12</sub> O <sub>40</sub> .	94A454
		$7.6 \times 10^9$	~1			p.r.	P.b.k. at 650 nm in N <sub>2</sub> O-saturated soln. contg. 2-PrOH and HClO <sub>4</sub> .	82A271
16.256	Diphosphooctadecatungstate ion(6-)							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{P}_2\text{W}_{18}\text{O}_{62}^{6-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{P}_2\text{W}_{18}\text{O}_{62}^{7-}$	$5.7 \times 10^9$	2		295	p.r.	P.b.k. in N <sub>2</sub> O-saturated (2.5 $\times 10^{-2}$ mol L <sup>-1</sup> ) soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH and $\sim 10^{-4}$ mol L <sup>-1</sup> heteropolytungstophosphate.	82A107
16.257	12-Tungstosilicate ion(4-)							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{SiW}_{12}\text{O}_{40}^{4-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{SiW}_{12}\text{O}_{40}^{5-}$	$5.3 \times 10^9$	5-6			p.r.	P.b.k. at 650 nm in N <sub>2</sub> O-saturated soln. contg. 2-PrOH.	82A271
16.258	Zinc(I) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Zn}^+ + \text{H}^+ \rightarrow \text{Zn}^{2+} + 2\text{-PrOH}$	$1.3 \times 10^9$	~3,7		295	p.r.	Calcd. from d.k. at 310 nm (Zn <sup>+</sup> ) in soln. contg. 2-PrOH and ZnSO <sub>4</sub> using <i>k</i> (Zn <sup>+</sup> + Zn <sup>+</sup> ) = $4.5 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> .	771011
16.259	Zinc(II) ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Zn}^{2+} \rightarrow$	<10 <sup>6</sup>				p.r.	Estd. from lack of increase in Zn <sup>+</sup> in 2-PrOH.	751027
16.260	5,10,15,20-Tetraphenylporphinatozinc(II)							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{ZnTPP} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{ZnTPP}]^{*-}$	$\sim 1 \times 10^8$	7			p.r.	D.k. at ~475 nm as well as p.b.k. at ~700 nm (radical anion) in micellar soln. contg. 2% Triton X-100.	82N150

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
16.261	Tetraphenylporphinatozinc(II), triplet state $(\text{CH}_3)_2\dot{\text{CO}} + {}^3(\text{ZnTPP})^* \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{ZnTPP}]^{3-}$	$2.0 \times 10^9$	7			p.r.	Abs. changes in N <sub>2</sub> O-satd. micellar soln. contg. 2% Triton X-100, 1.3 mol L <sup>-1</sup> 2-PrOH and 10 <sup>-3</sup> mol L <sup>-1</sup> phosphate buffer; 15% triplet produced by photolysis at 532 nm.	82N150
16.262	5,10,15,20-Tetrakis-4-( <i>N,N,N</i> -trimethylammonio)phenylporphinezinc(II) ion $(\text{CH}_3)_2\dot{\text{CO}}^- + \text{ZnTAPP}^{4+} \rightarrow \text{CH}_3\text{COCH}_3 + [\text{ZnTAPP}]^{3+}$	$3.5 \times 10^9$	13			p.r.	P.b.k. (radical anion), as well as d.k., in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	81A317
	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{ZnTAPP}^{4+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{ZnTAPP}]^{3+}$	$2.4 \times 10^8$	8			p.r.	P.b.k. (radical anion), as well as d.k., in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	81A317
16.263	5,10,15,20-Tetrakis[1-(3-sulfonatopropyl)pyridinium-4-yl]porphinatozinc(II) $(\text{CH}_3)_2\dot{\text{CO}} + \text{ZnTZP} \rightarrow \text{CH}_3\text{COCH}_3 + [\text{ZnTZP}]^{3-} + \text{H}^+$	$8.6 \times 10^8$	7			p.r.	P.b.k. in soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH; slow grow-in follows fast $e_{\text{aq}}^-$ reaction.	83C026
	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{ZnTZP} \rightarrow \text{CH}_3\text{COCH}_3 + [\text{ZnTZP}]^{3-}$	$1.7 \times 10^9$	12			p.r.	P.b.k. in soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH; slow grow-in follows fast $e_{\text{aq}}^-$ reaction.	83C026
16.264	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatozinc(II) ion $(\text{CH}_3)_2\dot{\text{CO}} + \text{ZnTMpyP}^{4+} \rightarrow \text{CH}_3\text{COCH}_3 + [\text{ZnTMpyP}]^{3+} + \text{H}^+$	$2.3 \times 10^9$	7			p.r.	P.b.k. at 470 nm in N <sub>2</sub> O-satd. soln. contg. 5 × 10 <sup>-5</sup> mol L <sup>-1</sup> porphyrin, 10 <sup>-3</sup> mol L <sup>-1</sup> phosphate buffer, and 0.3 mol L <sup>-1</sup> 2-PrOH.	84A046
		$2.3 \times 10^9$	8			p.r.	P.b.k. (radical anion), as well as d.k., in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	81A317
	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{ZnTMpyP}^{4+} \rightarrow \text{CH}_3\text{COCH}_3 + [\text{ZnTMpyP}]^{3+}$	$6.7 \times 10^9$	13			p.r.	P.b.k. (radical anion), as well as d.k., in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	81A317
16.265	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatozinc(II) ion, triplet state $(\text{CH}_3)_2\dot{\text{CO}} + {}^3(\text{ZnTMpyP})^* \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{ZnTMpyP}]^{3+}$	$\geq 10^{10}$	7			p.r.	D.k. (triplet) and p.b.k. (radical anion) at 470 nm in N <sub>2</sub> O-satd. soln. contg. 5 × 10 <sup>-5</sup> mol L <sup>-1</sup> porphyrin, 10 <sup>-3</sup> mol L <sup>-1</sup> phosphate buffer, and 0.3 mol L <sup>-1</sup> 2-PrOH. Triplet excited by laser pulse at 590 nm.	84A046
16.266	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatozincate(II) ion $(\text{CH}_3)_2\dot{\text{CO}}^- + \text{ZnTPPS}^{4-} \rightarrow \text{CH}_3\text{COCH}_3 + [\text{ZnTPPS}]^{5-}$	$1.0 \times 10^9$	13			p.r.	P.b.k. (radical anion), as well as d.k., in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	81A317
	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{ZnTPPS}^{4-} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{ZnTPPS}]^{3-}$	$1 \times 10^8$	7, 11-12			p.r.	P.b.k. at 450 and 690 nm in N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> 2-PrOH and 10 <sup>-3</sup> mol L <sup>-1</sup> phosphate.	82A279
		$\sim 8 \times 10^7$	8			p.r.	P.b.k. (radical anion), as well as d.k., in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	81A317
16.267	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatozincate(II) ion, triplet state $(\text{CH}_3)_2\dot{\text{CO}} + {}^3(\text{ZnTPPS})^* \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{ZnTPPS}]^{5-}$	$\sim 3 \times 10^9$	7, 11-12			p.r.	P.b.k. at 450 and 690 nm in N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> 2-PrOH and 10 <sup>-3</sup> mol L <sup>-1</sup> phosphate buffer; ~85% of radicals react with triplet (30% of the ZnTPPS is converted to triplet by photolysis).	82A279
16.268	Tetrakis- <i>N</i> -methyl-2,3-pyridinoporphyrazinezinc(II) ion $(\text{CH}_3)_2\dot{\text{CO}} + \text{ZnTMPz}^{4+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{ZnTMPz}]^{3+}$	$5.5 \times 10^9$	7			p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-satd. phosphate buffered soln. contg. 10% 2-PrOH.	86B153
16.269	Zinc(II) hematoporphyrin $(\text{CH}_3)_2\dot{\text{CO}}^- + \text{ZnHP} \rightarrow \text{CH}_3\text{COCH}_3 + [\text{ZnHP}]^{3-}$	$1.0 \times 10^9$	13.0			p.r.	P.b.k. at 600-650 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	741040

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
16.270	Acetophenone							
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{C}_6\text{H}_5\text{COCH}_3 \rightarrow \text{CH}_3\text{COCH}_3 + \text{C}_6\text{H}_5\dot{\text{C}}\text{O}^-\text{CH}_3$	$9 \times 10^8$	13			p.r.	P.b.k. at 440 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH; pH dependent, $k$ extrapolated to pH 14.	730122
		$7.8 \times 10^8$	12			p.r.	P.b.k. at 440 nm in deaerated soln. contg. acetophenone and excess acetone.	670729
16.271	3-Acetylpyridine, conjugate acid							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 3\text{-pyH}^+\text{COCH}_3 \rightarrow$ electron transfer	$8.6 \times 10^9$	0.6			p.r.	P.b.k.; no $e$ -transfer in neutral soln.; $pK_a = 4.9$ .	741089
16.272	Acridine							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ac} \rightarrow$	$-3 \times 10^8$	7.9			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH; 50% addn., 50% redn.	79A305
		$3.0 \times 10^8$	7.6			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH; ~10% $e$ -transfer.	741127
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Ac} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Ac}^-$	$3 \times 10^9$	13			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	79A305
16.273	Acridinium							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{AcH}^+ \rightarrow \text{CH}_3\text{COCH}_3 +$ $\text{H}^+ + \text{AcH}^-$	$3.3 \times 10^9$	4			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	79A305
		$3.7 \times 10^9$	2.0			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH; ~90% $e$ -transfer.	741127
16.274	<i>N</i> <sup>1</sup> -(Acridinyl)- <i>N</i> <sup>4</sup> -methylsulfonyl-2-dimethylaminocyclohexa-2,5-diene-1',4'-diimine							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{mAQDI} \rightarrow \text{CH}_3\text{COCH}_3 +$ $+\text{I}^+ + \text{mAQDI}^-$	$4 \times 10^9$				p.r.	Abs. changes in $\text{N}_2$ -satd. soln. contg. 2-PrOH.	88A125
16.275	<i>N</i> <sup>1</sup> -(Acridinyl)- <i>N</i> <sup>4</sup> -methylsulfonyl-2-methoxycyclohexa-2,5-diene-1',4'-diimine							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{mAQDI} \rightarrow \text{CH}_3\text{COCH}_3 +$ $+\text{H}^+ + \text{mAQDI}^-$	$-3 \times 10^9$				p.r.	Abs. changes in $\text{N}_2$ -satd. soln. contg. 2-PrOH.	88A125
16.276	Acrylamide							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{H}_2\text{C}=\text{CHCONH}_2 \rightarrow$ addn.	$4.1 \times 10^7$	2.5			p.r.	C.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH and $\text{Cu}^{2+}$ ; rel. to $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cu}^{2+}) = 5.2 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> .	78A322
16.277	Acrylate ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CH}_2=\text{CHCO}_2^- \rightarrow$ addn.	$3.2 \times 10^6$	~9			chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> $\text{H}_2\text{O}_2$ and 2-PrOH; calcd. using $2k(\text{R} + \text{R}) = 1.4 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	93D265
16.278	Adenine, conjugate acid							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{AH}_2^+ \rightarrow$ addn.	$1.2 \times 10^8$	0.4			p.r.	P.b.k. at 300 or 320 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	94A368
16.279	Adenosine							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{AH} \rightarrow$ electron transfer	$4.7 \times 10^7$	2.2			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 1-2 mol L <sup>-1</sup> 2-PrOH; $pK_a = 3.6$ , 12.4.	751060
		$<10^6$	7.0					
16.280	Adenosine anion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{A}^- + \text{H}_2\text{O} \rightarrow [\text{AH}]^{--} +$ $\text{OH}^- + \text{CH}_3\text{COCH}_3$	$10^7$	13	293	p.r.	P.b.k. at 355 nm in deaerated soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	92A037	
		$<10^6$	13.6		p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 1-2 mol L <sup>-1</sup> 2-PrOH.	751060	

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
16.281	1-Amino-9,10-anthraquinone							
	$(\text{CH}_3)_2\dot{\text{COH}} + 1\text{-AQ}(\text{NH}_2) \rightarrow$ $\text{CH}_3\text{COCH}_3 + \text{H}^+ + 1\text{-AQ}^\cdot(\text{NH}_2)^-$	$3.0 \times 10^9$ $3.2 \times 10^9$ $2.8 \times 10^9$	2.0 8.0 12			p.r.	P.b.k. at >600 nm in N <sub>2</sub> O-satd. soln. contg. 5 mol L <sup>-1</sup> 2-PrOH and 1 mol L <sup>-1</sup> acetone; pK <sub>a</sub> of semiquinone = 5.8, >14.	94A267
16.282	4-Aminocarbonylpiperidinoacetate ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-NH}_2\text{COPy}^+\text{CH}_2\text{CO}_2^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+$ $[4\text{-NH}_2\text{COPyCH}_2\text{CO}_2]^{2-}$	$3.5 \times 10^9$ $4.1 \times 10^9$	1 4.5- 5.5	295	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	83B029	
16.283	1-Amino-4-hydroxy-9,10-anthraquinone							
	$(\text{CH}_3)_2\dot{\text{COH}} + 1,4\text{-AQ}(\text{NH}_2)(\text{OH}) \rightarrow$ $[\text{1,4-AQ}(\text{NH}_2)(\text{OH})]^{2-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1.6 \times 10^9$	8.8			p.r.	P.b.k. at >640 nm in N <sub>2</sub> O-satd. soln. soln. contg. 5 mol L <sup>-1</sup> 2-PrOH and 1 mol L <sup>-1</sup> acetone.	92A416
16.284	2-Amino-5-nitrothiazole							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{NX} \rightarrow \text{NX}^\cdot + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.0 \times 10^9$	~7			p.r.	P.b.k.	761075
16.285	2-[3-Aminopropyl]aminoethaneperthiol, conjugate acid							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{HSS}(\text{CH}_2)_2\text{NH}(\text{CH}_2)_3\text{NH}_3^+ \rightarrow 2\text{-PrOH}$ $+ \text{'SS}(\text{CH}_2)_2\text{NH}(\text{CH}_2)_3\text{NH}_3^+$	$2.5 \times 10^9$ $\sim 2.4 \times 10^8$	4.5 ~7	293	p.r.	P.b.k. at 374 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH, 0.001 mol L <sup>-1</sup> phosphate buffer and (0.25-1.75) × 10 <sup>-3</sup> mol L <sup>-1</sup> 2-(3-aminopropylamino)ethaneperthiol; pK <sub>a</sub> = 6.2; basic form unreactive.	94A328 94A061	
		$2.3 \times 10^9$	4.5	293	p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH, 0.001 mol L <sup>-1</sup> phosphate buffer, methyl viologen and 2-(3-aminopropylamino)ethaneperthiol; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{MV}^{2+}) = 2.6 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ ; $k_r = 3.8 \times 10^3 \text{ L mol}^{-1} \text{ s}^{-1}$ .	94A328	
16.286	2-[3-Aminopropyl]aminoethanethiol, conjugate acid							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{HSCH}_2\text{CH}_2\text{NH}(\text{CH}_2)_3\text{NH}_3^+ \rightarrow 2\text{-PrOH}$ $+ \text{'S}(\text{CH}_2)_2\text{NH}(\text{CH}_2)_3\text{NH}_2$	$2.5 \times 10^8$	4.5, ~7	293	p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH, 0.001 mol L <sup>-1</sup> phosphate buffer, methyl viologen and 2-(3-aminopropylamino)ethanethiol; pK <sub>a</sub> = 7.6; basic form unreactive; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{MV}^{2+}) = 2.6 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ ; $k_r = 1.4 \times 10^4 \text{ L mol}^{-1} \text{ s}^{-1}$ .	94A328 94A061	
		$2 \times 10^8$	7		p.r.	P.b.k.; monitored formation of thiyl radicals by their reaction with ABTS <sup>2+</sup> ; pK <sub>a</sub> = 7.3.	84A411	
16.287	4-Aminopyrimidine							
	$(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-AmPm} \rightarrow$		0.8- 13.0			p.r.	No e-transfer obs.	771034
16.288	9,10-Anthraquinone							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{AQ} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+$ $+ [\text{AQ}]^\cdot$	$2.7 \times 10^9$ $1.8 \times 10^9$ $1.6 \times 10^9$	2.0 8.0 12		p.r.	P.b.k. at >600 nm in N <sub>2</sub> O-satd. soln. contg. 5 mol L <sup>-1</sup> 2-PrOH and 1 mol L <sup>-1</sup> acetone; pK <sub>a</sub> of semiquinone = 4.4.	94A267	
		$1.6 \times 10^9$	7.0		p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	731104	
16.289	9,10-Anthraquinone-2,6-disulfonate ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + 2,6\text{-diSO}_3\text{AQ}^{2-} \rightarrow$ $\text{CH}_3\text{COCH}_3 + \text{H}^+ + [2,6\text{-diSO}_3\text{AQ}]^{3-}$	$4.6 \times 10^9$	7.0		p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	731104	
16.290	9,10-Anthraquinone-2-sulfonate ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + 2\text{-SO}_3\text{AQ}^- \rightarrow$ $[\text{2-SO}_3\text{AQ}]^{2-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$3.1 \times 10^9$	acid		p.r.	P.b.k. at 400 nm in soln. contg. 2-PrOH.	87A083	

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T(\text{K})$	Method	Comment	Ref.
<b>16.290 9,10-Anthraquinone-2-sulfonate ion — Continued</b>								
		$3 \times 10^9$		7.2		p.r.	P.b.k. in soln. contg. 0.2 mol $\text{L}^{-1}$ 2-PrOH, (0.005-0.01) mol $\text{L}^{-1}$ acetone and 6 mg $\text{L}^{-1}$ catalase.	82A156
		$5.6 \times 10^9$				p.r.	P.b.k. in $\text{N}_2\text{O}$ -sadt. soln. contg. 0.1 mol $\text{L}^{-1}$ 2-PrOH.	761070
		$3.0 \times 10^9$		7.0		p.r.	P.b.k. at 400 nm in $\text{N}_2\text{O}$ -sadt. soln. contg. 2-PrOH.	731104
<b>16.291 Ascorbate ion</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{AH}^- \rightarrow \text{A}^{\cdot-} + 2\text{-PrOH}$	$7.4 \times 10^5$		>5.5	289	f.p.	D.k. (esr) in soln. contg. 2,4-dihydroxy-2,4-dimethylpentan-3-one and ascorbic acid; studied at pH 1.0-7.3.	90A514
		$1.2 \times 10^6$		6.1		p.r.	P.b.k. in soln. contg. 1 mol $\text{L}^{-1}$ acetone. and 2 mol $\text{L}^{-1}$ 2-PrOH.	733006
<b>16.292 Ascorbic acid</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{AH}_2 \rightarrow \text{A}^{\cdot-} + 2\text{-PrOH}$	$3.8 \times 10^4$		<2.2	289	f.p.	D.k. (esr) in soln. contg. 2,4-dihydroxy-2,4-dimethylpentan-3-one and ascorbic acid; studied at pH 1.0-7.3.	90A514
<b>16.293 Ascorbate radical anion</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{A}^{\cdot-} \rightarrow$	$4.5 \times 10^8$			289	f.p.	D.k. (esr) in soln. contg. 2,4-dihydroxy-2,4-dimethylpentan-3-one and ascorbic acid; studied at pH 1.0-7.3.	90A514
<b>16.294 Azobenzene</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{C}_6\text{H}_5\text{N}=\text{NC}_6\text{H}_5 \rightarrow$ $\text{CH}_3\text{COCH}_3 + [\text{C}_6\text{H}_5\text{N}=\text{NC}_6\text{H}_5]^{\cdot-}$	$2 \times 10^9$		14		p.r.	P.b.k. at 380 nm in soln. contg. 2-PrOH; anti-isomer.	771169
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{C}_6\text{H}_5\text{N}=\text{NC}_6\text{H}_5 \rightarrow$ $\text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{C}_6\text{H}_5\text{N}=\text{NC}_6\text{H}_5]^{\cdot-}$	$4 \times 10^8$		-7		p.r.	P.b.k. at 380 nm in soln. contg. 2-PrOH; anti-isomer.	771169
<b>16.295 1,1'-Azobis(<i>N,N</i>-dimethylformamide)</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} +$ $(\text{CH}_3)_2\text{NCON}=\text{NCON}(\text{CH}_3)_2 \rightarrow$ $[(\text{CH}_3)_2\text{NCONCON}(\text{CH}_3)_2]^{\cdot-} + \text{H}^+ +$ $\text{CH}_3\text{COCH}_3$	$\sim 2.5 \times 10^9$			293	p.r.	P.b.k. at 400 nm.	751194
<b>16.296 Benzophenone</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + (\text{C}_6\text{H}_5)_2\text{CO} \rightarrow$ $\text{CH}_3\text{COCH}_3 + (\text{C}_6\text{H}_5)_2\dot{\text{C}}\text{O}^-$	$7.0 \times 10^8$		13		p.r.	P.b.k. at 610 nm in $\text{N}_2\text{O}$ -sadt. soln. contg. 2-PrOH.	751125
		$1.6 \times 10^9$		13.1		p.r.	P.b.k. at 605 nm in $\text{N}_2\text{O}$ -sadt. soln. contg. 2 mol $\text{L}^{-1}$ 2-PrOH.	720359
		$1.2 \times 10^9$		12		p.r.	P.b.k.	680308
<b>16.297 1,4-Benzoquinone</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Q} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ +$ $\text{Q}^{\cdot-}$	$3.1 \times 10^9$				$\gamma$ -r.	C.k. in soln. contg. 1 mol $\text{L}^{-1}$ $\text{H}_2\text{SO}_4$ , $1.5 \times 10^{-4}$ mol $\text{L}^{-1}$ benzoquinone and 2-PrOH with varied $[\text{O}_2]$ ; rel. to $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{O}_2) = 4.2 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	86G034
		$5 \times 10^9$		6.9		p.r.	P.b.k. at 430 nm in $\text{N}_2\text{O}$ -sadt. soln. contg. 0.2 mol $\text{L}^{-1}$ 2-PrOH.	730049
		$5.0 \times 10^9$		7		p.r.	P.b.k. in soln. contg. 1 mol $\text{L}^{-1}$ acetone and 1 mol $\text{L}^{-1}$ 2-PrOH.	730125
		$5.4 \times 10^9$		7.0		p.r.	P.b.k. at 400 nm in $\text{N}_2\text{O}$ -sadt. soln. contg. 2-PrOH.	731104
		$5.0 \times 10^9$				p.r.	P.b.k. at 430 nm in $\text{N}_2\text{O}$ -sadt. soln. contg. 1 mol $\text{L}^{-1}$ 2-PrOH.	710619

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
16.298	2,1,3-Benzothiadiazole-4,7-dicarbonitrile $(\text{CH}_3)_2\dot{\text{COH}} + \text{BTDN} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{BTDN}]^{--}$	$3.1 \times 10^9$				p.r.	P.b.k. at 500 nm.	86A098
16.299	3-Benzoyl-1-methylpyridinium $(\text{CH}_3)_2\dot{\text{COH}} + 3-\text{C}_6\text{H}_5\text{COPy}^+\text{CH}_3 \rightarrow \text{CH}_3\text{COCH}_3 + 3-\text{pyCH}_3^+\text{C(O}^-\text{)}\text{C}_6\text{H}_5 + \text{H}^+$	$2.3 \times 10^9$	5.0, 1.0			p.r.	P.b.k. at 530 nm in N <sub>2</sub> O-satd. soln. contg. 2 mol L <sup>-1</sup> 2-PrOH.	720359
16.300	2-Benzoylpyridine $(\text{CH}_3)_2\dot{\text{COH}} + 2-\text{C}_6\text{H}_5\text{COPy} \rightarrow \text{CH}_3\text{COCH}_3 + 2-\text{pyC(O}^-\text{)}\text{C}_6\text{H}_5 + \text{H}^+$ $(\text{CH}_3)_2\dot{\text{CO}}^- + 2-\text{C}_6\text{H}_5\text{COPy} \rightarrow \text{CH}_3\text{COCH}_3 + 2-\text{pyC(O}^-\text{)}\text{C}_6\text{H}_5$	$1.5 \times 10^8$ $2.3 \times 10^9$	5.9 13.2			p.r.	P.b.k. at 500 nm, as well as at 330 nm, in N <sub>2</sub> O-satd. soln. contg. 2 mol L <sup>-1</sup> 2-PrOH. P.b.k. at 550 nm, as well as at 330 nm, in N <sub>2</sub> O-satd. soln. contg. 2 mol L <sup>-1</sup> 2-PrOH.	720359 720359
16.301	2-Benzoylpyridine, conjugate acid $(\text{CH}_3)_2\dot{\text{COH}} + 2-\text{C}_6\text{H}_5\text{COPyH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + 2-\text{pyC(OH)}\text{C}_6\text{H}_5 + \text{H}^+$	$3.0 \times 10^9$	1.0			p.r.	P.b.k. at 500 nm, as well as at 330 nm, in N <sub>2</sub> O-satd. soln. contg. 2 mol L <sup>-1</sup> 2-PrOH.	720359
16.302	3-Benzoylpyridine $(\text{CH}_3)_2\dot{\text{CO}}^- + 3-\text{C}_6\text{H}_5\text{COPy} \rightarrow \text{CH}_3\text{COCH}_3 + 3-\text{pyC(O}^-\text{)}\text{C}_6\text{H}_5$ $(\text{CH}_3)_2\dot{\text{COH}} + 3-\text{C}_6\text{H}_5\text{COPy} \rightarrow \text{CH}_3\text{COCH}_3 + 3-\text{pyC(O}^-\text{)}\text{C}_6\text{H}_5 + \text{H}^+$	$2.0 \times 10^9$ $1.0 \times 10^8$	13.0 5.1			p.r.	P.b.k. at 605 nm, as well as at 341 nm, in N <sub>2</sub> O-satd. soln. contg. 2 mol L <sup>-1</sup> 2-PrOH. P.b.k. at 530 nm, as well as at 330 nm in N <sub>2</sub> O-satd. soln. contg. 2 mol L <sup>-1</sup> 2-PrOH.	720359 720359
16.303	3-Benzoylpyridine, conjugate acid $(\text{CH}_3)_2\dot{\text{COH}} + 3-\text{C}_6\text{H}_5\text{COPyH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + 3-\text{pyC(OH)}\text{C}_6\text{H}_5 + \text{H}^+$	$2.3 \times 10^9$ $1.7 \times 10^9$	0.5 0.9			p.r.	P.b.k. at 500 nm, as well as at 330 nm, in N <sub>2</sub> O-satd. soln. contg. 2 mol L <sup>-1</sup> 2-PrOH.	720359
16.304	4-Benzoylpyridine $(\text{CH}_3)_2\dot{\text{COH}} + 4-\text{C}_6\text{H}_5\text{COPy} \rightarrow \text{CH}_3\text{COCH}_3 + 4-\text{pyC(O}^-\text{)}\text{C}_6\text{H}_5 + \text{H}^+$ $(\text{CH}_3)_2\dot{\text{CO}}^- + 4-\text{C}_6\text{H}_5\text{COPy} \rightarrow \text{CH}_3\text{COCH}_3 + 4-\text{pyC(O}^-\text{)}\text{C}_6\text{H}_5$	$2.4 \times 10^8$ $2.5 \times 10^9$	7.7 13.2			p.r.	P.b.k. at 500 nm in N <sub>2</sub> O-satd. soln. contg. 2 mol L <sup>-1</sup> 2-PrOH. P.b.k. at 575 nm in N <sub>2</sub> O-satd. soln. contg. 2 mol L <sup>-1</sup> 2-PrOH.	720359 720359
16.305	4-Benzoylpyridine, conjugate acid $(\text{CH}_3)_2\dot{\text{COH}} + 4-\text{C}_6\text{H}_5\text{COPyH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + 4-\text{pyC(OH)}\text{C}_6\text{H}_5 + \text{H}^+$	$2.5 \times 10^9$	0.7			p.r.	P.b.k. at 510 nm in N <sub>2</sub> O-satd. soln. contg. 2 mol L <sup>-1</sup> 2-PrOH.	720359
16.306	Biacetyl $(\text{CH}_3)_2\dot{\text{COH}} + \text{CH}_3\text{COCOCH}_3 \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{CH}_3\text{COCOCH}_3]^{--}$	$6.0 \times 10^8$ $8.6 \times 10^8$	5-6			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. $10^{-2}$ mol L <sup>-1</sup> 2-PrOH.	72A018
							P.b.k. at 300 nm in N <sub>2</sub> O-satd. soln. contg. $10^{-2}$ mol L <sup>-1</sup> 2-PrOH.	680249
16.307	Bianthrone $(\text{CH}_3)_2\dot{\text{COH}} + \text{BA} \rightarrow \text{CH}_3\text{COCH}_3 + [\text{BA}]^{--} + \text{H}^+$	$\sim 3 \times 10^8$	12	294	p.r.	P.b.k. in N <sub>2</sub> O-satd. 2-PrOH soln. contg. 20% water, 10% dioxane and 0.2% acetone; two-step reaction cannot be determined accurately.	81A313	
16.308	2,2'-Bipyridine $(\text{CH}_3)_2\dot{\text{CO}}^- + \text{bpy} + \text{H}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{bpyH}^*$ $(\text{CH}_3)_2\dot{\text{COH}} + \text{bpy} \rightarrow <10^6$	$1.3 \times 10^8$ $<10^6$	13.0 7			p.r.	P.b.k. at 365 nm in soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and 0.1 mol L <sup>-1</sup> acetone. P.b.k.; no reaction obs.	79A148 79A148
16.309	2,2'-Bipyridine, conjugate acid $(\text{CH}_3)_2\dot{\text{COH}} + \text{bpyH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + [\text{bpyH}_2]^+$	$3.5 \times 10^8$	1.4, 3.7			p.r.	P.b.k. at 375 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH.	79A148

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T$ (K)	Method	Comment	Ref.
16.310	4,4'-Bipyridine, conjugate diacid $(\text{CH}_3)_2\dot{\text{COH}} + 4,4'\text{-bpyH}_2^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{4,4'-bpyH}_2]^{+}$	$3.2 \times 10^9$	1			p.r.	P.b.k. at 375 and 580 nm in soln. contg. 0.1-0.2 mol L <sup>-1</sup> 2-PrOH, 0.1 mol L <sup>-1</sup> $\text{HClO}_4$ and $(2\text{-}6) \times 10^{-4}$ mol L <sup>-1</sup> 4,4'-bpyH <sub>2</sub> <sup>2+</sup> .	84A325
16.311	(E)-1,2-Bis(4-pyridyl)ethene, conjugate diacid $(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-pyH}^+ \text{CH}=\text{CH}-4\text{-pyH}^+ \rightarrow [\text{4-pyHCH}=\text{CH}-4\text{-pyH}]^{+} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$-2 \times 10^8$	3			p.r.	P.b.k. at 500 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH.	91B043
16.312	1,1'-Bis(3-sulfonatopropyl)-4,4'-bipyridinium $(\text{CH}_3)_2\dot{\text{COH}} + \text{SPV} \rightarrow \text{SPV}^{+} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$3.5 \times 10^9$	2.0			p.r.	P.b.k. at 578 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH.	87N002
16.313	1-Bromo-1-chloro-2,2,2-trifluoroethane $(\text{CH}_3)_2\dot{\text{COH}} + \text{CF}_3\text{CHClBr} \rightarrow \text{CH}_3\text{COCH}_3 + \text{CF}_3\dot{\text{CHCl}} + \text{Br}^- + \text{H}^+$	$7.6 \times 10^7$				p.r.	C.k. in soln. contg. 10% 2-PrOH and 10% acetone; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{PNAP}) = 3.8 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	83A195
		$5 \times 10^7$	~3			p.r.	C.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 50% 2-PrOH and $1.2 \times 10^{-3}$ mol L <sup>-1</sup> $\text{HClO}_4$ ; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{PNAP}) = 1.8 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	82A222
	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{CF}_3\text{CHClBr} \rightarrow \text{CH}_3\text{COCH}_3 + \text{CF}_3\dot{\text{CHCl}} + \text{Br}^-$	$5.8 \times 10^8$	~13			p.r.	C.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 50% 2-PrOH, 0.68 mol L <sup>-1</sup> acetone and 0.05 mol L <sup>-1</sup> NaOH; rel. to $k((\text{CH}_3)_2\dot{\text{CO}}^- + \text{PNAP}) = 2.1 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	82A222
16.314	6-Bromo-6-deoxynascorbate ion $(\text{CH}_3)_2\dot{\text{COH}} + 6\text{-Br-AH}^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Br}^- + 6\text{-CH}_2\text{-AH}^-$	$2.2 \times 10^7$	6			p.r.	C.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 10% 2-PrOH, varied [PNAP] and $1 \times 10^{-3}$ mol L <sup>-1</sup> 6-bromo-6-deoxynascorbate ion; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{PNAP}) = 3.0 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	94A329
16.315	2-Bromo-5-nitrothiazole $(\text{CH}_3)_2\dot{\text{COH}} + \text{NTh} \rightarrow [\text{NTh}]^{+} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$3.0 \times 10^9$				p.r.	P.b.k.	761075
16.316	N-Bromosuccinimide $(\text{CH}_3)_2\dot{\text{COH}} + \text{SBr} \rightarrow$	$2.2 \times 10^9$				p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH, N-bromosuccinimide and bromide ion; buildup of $\text{Br}_2^{+}$ as monitor.	91A162
16.317	Bromotrifluoromethane $(\text{CH}_3)_2\dot{\text{CO}}^- + \text{CF}_3\text{Br} \rightarrow \text{CF}_3 + \text{Br}^- + \text{CH}_3\text{COCH}_3$	$-3 \times 10^8$	13			p.r.	C.k. in deoxygenated soln., satd. with $\text{CF}_3\text{Br}$ ( $4 \times 10^{-3}$ mol L <sup>-1</sup> ) and contg. $5 \times 10^{-4}$ mol L <sup>-1</sup> PNAP and 2-PrOH; rel. to $k((\text{CH}_3)_2\dot{\text{CO}}^- + \text{PNAP}) = 2.2 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	87A480
16.318	5-Bromouracil $(\text{CH}_3)_2\dot{\text{COH}} + 5\text{-BrU} \rightarrow$	$2 \times 10^7$				p.r.	C.k.; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{PNAP}) = 3.8 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	731140
16.319	Carbon tetrachloride $(\text{CH}_3)_2\dot{\text{COH}} + \text{CCl}_4 \rightarrow \text{CCl}_3 + \text{Cl}^- + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$7 \times 10^8$				p.r.	C.k. in soln. contg. 2-PrOII and acetone; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{PNAP}) = 3.8 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	731140
		$1.0 \times 10^8$				p.r.	Cond.; buildup of HCl in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	710778

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
16.320	3-Carboxamido-2,2,5,5-tetramethylpyrrolidin-1-yloxy $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NX-s} \rightarrow$ electron transfer	$3.3 \times 10^8$		acid		p.r.	Cond.y.; N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	761152
16.321	3-Carboxamido-2,2,5,5-tetramethyl-3-pyrrolin-1-yloxy $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NX-u} \rightarrow$ electron transfer	$3.6 \times 10^8$		acid		p.r.	Cond.y.; N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	761152
16.322	1-Carboxymethylimidazolium $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 1\text{-HO}_2\text{CCH}_2\text{ImH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [1\text{-HO}_2\text{CCH}_2\text{ImH}]^+$	$7.3 \times 10^4$	1	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.1 mol L <sup>-1</sup> H <sup>+</sup> and 1 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = $5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	89A532
16.323	Carboxymethyl 4-pyridinecarboxylate, anion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 4\text{-pyCO}_2\text{CH}_2\text{CO}_2^- \rightarrow \text{CH}_3\text{COCH}_3 + [4\text{-pyHCO}_2\text{CH}_2\text{CO}_2]^-$	$2.6 \times 10^9$ $1.3 \times 10^9$	1 4.5- 5.5		295	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	83B029
16.324	3-Carboxy-1-methylpyridinium $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 3\text{-py}^+(\text{CH}_3)\text{CO}_2^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + 3\text{-py}^+(\text{CH}_3)\text{CO}_2^-$	$1.0 \times 10^8$	9.2			p.r.	P.b.k. (pyridinyl radical) at 400 nm in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH.	741106
16.325	4-Carboxy-1-methylpyridinium $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 4\text{-py}^+(\text{CH}_3)\text{CO}_2^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + 4\text{-py}^+(\text{CH}_3)\text{CO}_2^-$	$1.5 \times 10^9$	8.6			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH.	741106
16.326	Chloral hydrate $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CCl}_3\text{CH}(\text{OH})_2 \rightarrow$	$1 \times 10^6$				p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + PNAP) = $3.8 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	731140
16.327	3-Chlorobenzonitrile $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + 3\text{-ClC}_6\text{H}_4\text{CN} \rightarrow \text{CH}_3\text{COCH}_3 + [3\text{-ClC}_6\text{H}_4\text{CN}]^-$	$2 \times 10^8$	13			p.r.	P.b.k. at 310 nm (radical anion); <i>k</i> < $10^7$ L mol <sup>-1</sup> s <sup>-1</sup> at pH 7.	81A001
16.328	Chloroform $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CHCl}_3 \rightarrow$	$<1 \times 10^7$				p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + PNAP) = $3.8 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	731140
16.329	1-Chloro-2-nitrobenzene $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 2\text{-ClC}_6\text{H}_4\text{NO}_2 \rightarrow 2\text{-ClC}_6\text{H}_4\text{NO}_2\text{-COH}(\text{CH}_3)_3$	$1.2 \times 10^9$				p.r.	P.b.k. at 310 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	92A414
16.330	3-Chloropyridinium $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 3\text{-ClC}_5\text{H}_4\text{NH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + 3\text{-ClC}_5\text{H}_4\text{NH}^+$	$7.4 \times 10^7$	1.0	298		chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L <sup>-1</sup> CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = $5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	86A209
16.331	4-Chloropyridinium $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 4\text{-ClC}_5\text{H}_4\text{NH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + 4\text{-ClC}_5\text{H}_4\text{NH}^+$	$2.6 \times 10^6$	1.0	298		chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L <sup>-1</sup> CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> ·COH + Cr <sup>2+</sup> ) = $5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	86A209

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
16.332	Crotonic acid $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CH}_3\text{CH}=\text{CHCO}_2\text{H} \rightarrow$ addn.	$2.0 \times 10^6$	~2			chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and 2-PrOH; calcd. using $2k(R + R) = 1.4 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	93D265
16.333	Crystal Violet cation $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CV}^+ \rightarrow$	$2.3 \times 10^9$	7			p.r.	D.k. at 525 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; 84% <i>e</i> -transfer.	731078
16.334	Cysteamine $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{H}_3\text{N}^+\text{CH}_2\text{CH}_2\text{S}^- \rightarrow$ 2-PrOH + H <sub>2</sub> NCH <sub>2</sub> CH <sub>2</sub> S <sup>·</sup>	$3.8 \times 10^8$	4.2			p.r.	P.b.k. at 415 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> acetone, 1 mol L <sup>-1</sup> 2-PrOH, cysteamine and ABTS <sup>2-</sup> ; the latter reacts with RS <sup>·</sup> to form ABTS <sup>·+</sup> which is observed	82A196
		$2.0 \times 10^8$	7			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; esr gating technique.	723003
		$4.2 \times 10^8$				p.r.	P.b.k. at 410 nm (RSSR <sup>·</sup> ) in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	680132
16.335	Cysteine $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CysSH} \rightarrow$	$1.9 \times 10^8$				p.r.	P.b.k. at 415 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH, cysteine and ABTS <sup>2-</sup> ; the latter reacts with RS <sup>·</sup> to give ABTS <sup>·+</sup> which is observed.	82Z335
16.336	5-Deazalumiflavin, protonated $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 5\text{-DeLFH}^+ \rightarrow$ $\text{CH}_3\text{COCH}_3 + \text{H}^+ + 5\text{-DeLFH}^-$	$3.0 \times 10^9$	0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	89A097
16.337	5-Deazalumiflavin $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 5\text{-DeLF} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + 5\text{-DeLF}^-$	$3.4 \times 10^9$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	89A097
16.338	5-Deazalumiflavin anion $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + 5\text{-DeLF}(\text{H})^- \rightarrow$ $\text{CH}_3\text{COCH}_3 + 5\text{-DeLF}(\text{H})^{2-}$	$1.6 \times 10^9$	13			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	89A097
16.339	2'-Deoxyadenosine, conjugate acid $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{dAH}^+ \rightarrow$ addn.	$1.3 \times 10^8$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	94A368
16.340	2'-Deoxyguanosine, conjugate acid $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{dGH}^+ \rightarrow$ addn.	$7.1 \times 10^7$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOII.	94A368
16.341	Deuteroporphyrin, dimethyl ester $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{DPDME} \rightarrow \text{CH}_3\text{COCH}_3 + \text{DPDME}^-$	$8 \times 10^8$	alk.			p.r.	Abs. changes in soln. contg. 0.67 mol L <sup>-1</sup> acetone and 50% 2-PrOH.	84A345
		$6 \times 10^8$	~13			p.r.	P.b.k. at 640 nm in N <sub>2</sub> -satd. soln. contg. 50% 2-PrOH, 0.7 mol L <sup>-1</sup> acetone and 0.1 mol L <sup>-1</sup> NaOH.	81A123
16.342	1,4-Diamino-9,10-anthraquinone $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 1,4\text{-AQ}(\text{NH}_2)_2 + \text{H}^+ \rightarrow$ [1,4-AQ(NH <sub>2</sub> ) <sub>2</sub> ] <sup>·-</sup> + CH <sub>3</sub> COCH <sub>3</sub>	$9.0 \times 10^8$	5.5			p.r.	P.b.k. at >640 nm in N <sub>2</sub> -satd. soln. soln. contg. 5 mol L <sup>-1</sup> 2-PrOH and 1 mol L <sup>-1</sup> acetone.	92A416

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T(\text{K})$	Method	Comment	Ref.
16.343	1,6-Diazabicyclo[4.4.4]tetradecane radical cation $(\text{CH}_3)_2\dot{\text{COH}} + \text{DABCT}^+ \rightarrow$	$1.1 \times 10^9$	~4			p.r.	D.k. in $\text{N}_2\text{O}$ -saturated soln. contg. 0.1 mol 2-PrOH and $0.2-12 \times 10^{-4}$ mol $\text{L}^{-1}$ radical cation; 40% redn., 60% H abstr.; product analysis supported by condy. measurements.	86A272
16.344	9-Diazofluorene $(\text{CH}_3)_2\dot{\text{COH}} + \text{FIN}_2^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{FIN}_2^-$	$4.6 \times 10^8$	~7			p.r.	P.b.k. at 510 nm in $\text{N}_2$ -saturated soln. contg. $2.5 \times 10^{-3}$ mol $\text{L}^{-1}$ 9-diazofluorene, 34% 2-PrOH and 16% acetone.	84A266 83A152
16.345	9-Diazofluorene $(\text{CH}_3)_2\dot{\text{COH}}^- + \text{FIN}_2^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{FIN}_2^-$	$6.1 \times 10^9$	11.5-13			p.r.	P.b.k. at 510 nm in $\text{N}_2$ -saturated soln. contg. $2.5 \times 10^{-3}$ mol $\text{L}^{-1}$ 9-diazofluorene, 34% 2-PrOH and 16% acetone.	84A266 83A152
16.345	1,1'-Dibenzyl-4,4'-bipyridinium $(\text{CH}_3)_2\dot{\text{COH}} + \text{BV}^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{BV}^{2+}$	$3.0 \times 10^9$	7			p.r.	P.b.k. at 400 or 600 nm in $\text{N}_2\text{O}$ -saturated soln. contg. 0.2 mol $\text{L}^{-1}$ 2-PrOH.	761070
16.346	3,5-Dibromo-4-nitrosobenzenesulfonate ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{DBNBS} \rightarrow$	$4.8 \times 10^7$	8.0-8.5			p.r.	C.k.; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{H}_2\text{TPPS}^{4-}) = 5.0 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ .	92A304
16.347	4,5-Dichloroimidazolium $(\text{CH}_3)_2\dot{\text{COH}} + 4,5\text{-Cl}_2\text{ImH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{4,5-Cl}_2\text{ImH}]^-$	$3.3 \times 10^6$	1	1.0	298	chem.	D.k. at 311 nm in $\text{N}_2$ -saturated soln. contg. $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+}$ , 0.1 mol $\text{L}^{-1}$ $\text{H}^+$ and 1 mol $\text{L}^{-1}$ 2-PrOH; $k$ calcd. using $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and $k$ for homolysis of $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+} = 0.127 \text{ s}^{-1}$ .	89A532
16.348	2,6-Dichloroindophenolate ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{DCIP}^- \rightarrow$	$4.4 \times 10^9$	7			p.r.	D.k. at 600 nm in $\text{N}_2\text{O}$ -saturated soln. contg. 2-PrOH; 88% e-transfer.	731078
16.349	Dichloromethane $(\text{CH}_3)_2\dot{\text{COH}} + \text{CH}_2\text{Cl}_2 \rightarrow \text{CH}_2\text{Cl} + \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Cl}^-$	$\sim 10^6$	7.2			p.r.	Estd. from rate of subsequent reaction of $\text{CH}_2\text{Cl}_2$ with deuteriohemochrome.	80A011
						γ-r.	No redn. in soln. contg. $1.5 \times 10^{-3}$ mol $\text{L}^{-1}$ Na dodecyl sulfate, 0.2 mol $\text{L}^{-1}$ 2-PrOH and 0.1 mol $\text{L}^{-1}$ acetone.	79G191
16.350	1,4-Dicyanobenzene $(\text{CH}_3)_2\dot{\text{COH}} + \text{DCNB} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{DCNB}]^-$	$3.9 \times 10^8$	~7			p.r.	P.b.k. at 345 nm in $\text{N}_2\text{O}$ -saturated soln. contg. 0.2 mol $\text{L}^{-1}$ 2-PrOH.	91A229
16.351	<i>N,N'</i> -Diethylthiourea $(\text{CH}_3)_2\dot{\text{COH}} + \text{C}_2\text{H}_5\text{NHCSNHC}_2\text{H}_5 \rightarrow$	$3.5 \times 10^8$	<0			p.r.	P.b.k. at 425 nm in soln. contg. 3.6 mol $\text{L}^{-1}$ $\text{H}_2\text{SO}_4$ and 1 mol $\text{L}^{-1}$ 2-PrOH. Mechanism suggested to be protonation at S and H abstr. from NH.	94A284
16.352	1,4-Dihydroxy-9,10-anthraquinone $(\text{CH}_3)_2\dot{\text{COH}} + 1,4\text{-AQ(OH)}_2 \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [1,4\text{-AQ(OH)}_2]^-$	$3.3 \times 10^9$	1.2, 5.45			p.r.	P.b.k. in soln. contg. 5 mol $\text{L}^{-1}$ 2-PrOH and 1 mol $\text{L}^{-1}$ acetone.	90A156
16.353	1,4-Dihydroxy-9,10-anthraquinone, monoanion $(\text{CH}_3)_2\dot{\text{COH}} + 1,4\text{-AQ(OH)}(\text{O}^-) \rightarrow \text{CH}_3\text{COCH}_3 + [1,4\text{-AQ(OH)}_2]^-$	$1.5 \times 10^9$	10.45			p.r.	P.b.k. in soln. contg. 5 mol $\text{L}^{-1}$ 2-PrOH and 1 mol $\text{L}^{-1}$ acetone.	90A156
16.354	1,4-Dihydroxy-9,10-anthraquinone dianion $(\text{CH}_3)_2\dot{\text{COH}}^- + 1,4\text{-AQ(O}^-)_2 \rightarrow \text{CH}_3\text{COCH}_3 + [1,4\text{-AQ(OH)}_2]^-$	$1.8 \times 10^9$	~14			p.r.	P.b.k. in soln. contg. 5 mol $\text{L}^{-1}$ 2-PrOH and 1 mol $\text{L}^{-1}$ acetone.	90A156

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
16.355	( <i>E</i> )-4,5-Dihydroxy-1,2-dithiane							
	$(CH_3)_2\dot{CO}^- + [SSCH_2(CHOH)_2CH_2] \rightarrow$	$1.9 \times 10^8$	13.1		273	p.r.	P.b.k. at 390 nm in soln. contg. $(1-10) \times 10^{-4}$ mol L <sup>-1</sup> DTT-ox, 0.2 mol L <sup>-1</sup> acetone and 0.1-0.5 mol L <sup>-1</sup> 2-PrOH; mechanism suggested to be addn. followed by decomp. to radical anion.	89A167
	$CH_3COCH_3 + [S^-SCH_2(CHOH)_2CH_2]$	$4.0 \times 10^8$			298			
		$7.0 \times 10^8$			333			
	$(CH_3)_2\dot{COH} + [SSCH_2(CHOH)_2CH_2] \rightarrow CH_3COCH_3 + H^+ + [S^-SCH_2(CHOH)_2CH_2]$	$2 \times 10^7$	10.8			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH.	86A363
16.356	1,3-Dihydroxy-2-nitrobenzene							
	$(CH_3)_2\dot{COH} + 2-NO_2C_6H_3-1,3-(OH)_2 \rightarrow CH_3COCH_3 + H^+ + [1,3-(HO)_2C_6H_3-2-NO_2]^{*-}$	$6.8 \times 10^8$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	761020
16.357	3,3-Dimethylacrylic acid							
	$(CH_3)_2\dot{COH} + (CH_3)_2C=CHCO_2H \rightarrow$	$1 \times 10^4$	~2			chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and 2-PrOH; calcd. using $2k(R + R) = 1.4 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	93D265
	addn.							
16.358	2,3-Dimethyl-1,4-benzoquinone							
	$(CH_3)_2\dot{COH} + 2,3-(CH_3)_2Q \rightarrow CH_3COCH_3 + H^+ + 2,3-(CH_3)_2Q^{*-}$	$3.5 \times 10^9$	7			p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and 1 mol L <sup>-1</sup> acetone.	730125
16.359	2,5-Dimethyl-1,4-benzoquinone							
	$(CH_3)_2\dot{COH} + 2,5-(CH_3)_2Q \rightarrow CH_3COCH_3 + H^+ + 2,5-(CH_3)_2Q^{*-}$	$3.9 \times 10^9$	7			p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and 1 mol L <sup>-1</sup> acetone.	730125
16.360	2,6-Dimethyl-1,4-benzoquinone							
	$(CH_3)_2\dot{COH} + 2,6-(CH_3)_2Q \rightarrow (CH_3)_2\dot{COH} + H^+ + 2,6-(CH_3)_2Q^{*-}$	$4.2 \times 10^9$				p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and 1 mol L <sup>-1</sup> acetone.	730125
16.361	1,1'-Dimethyl-4,4'-bipyridinium							
	$(CH_3)_2\dot{COH} + MV^{2+} \rightarrow CH_3COCH_3 + MV^{3+} + H^+$	$2.6 \times 10^9$	4.5		293	p.r.	P.b.k. at 600 nm in N <sub>2</sub> O-satd. soln. contg. 5% 2-PrOH, 0.001 mol L <sup>-1</sup> phosphate buffer and methyl viologen.	94A328
		$2.1 \times 10^9$	4.5		293	p.r.	P.b.k. at 600 nm in N <sub>2</sub> O-satd. soln. contg. 50% 2-PrOH, 0.001 mol L <sup>-1</sup> phosphate buffer and methyl viologen.	94A328
		$3.4 \times 10^9$	7			p.r.	P.b.k. at 605 nm in deaerated soln. contg. 2-PrOH.	88N031
		$2.9 \times 10^9$	1, nat.			p.r.	P.b.k. at 605 nm in soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH (plus 0.1 mol L <sup>-1</sup> acetone at nat. pH).	84A009
		$2.9 \times 10^9$	1			p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	84A053
		$3.5 \times 10^9$	7			p.r.	P.b.k. at 605 nm in deaerated soln. contg. $10^{-4}$ mol L <sup>-1</sup> MV <sup>2+</sup> , 1% acetone and 1% 2-propanol, and $1.2 \times 10^{-2}$ mol L <sup>-1</sup> poly(vinyl alcohol); slower process following $e_{aq}^-$ reaction.	81N004
	$(CH_3)_2\dot{CO}^- + MV^{2+} \rightarrow CH_3COCH_3 + MV^{3+}$	$6.7 \times 10^9$	13			p.r.	P.b.k. at 605 nm in soln. contg. 0.1 mol L <sup>-1</sup> each of 2-PrOH and acetone	84A009
16.362	Dimethyl fumarate							
	$(CH_3)_2\dot{COH} + trans-CH_3O_2CCH=CHCO_2CH_3 \rightarrow$	$4.0 \times 10^9$	7.0			p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH; 12% <i>e</i> -transfer.	730097

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
16.363	2,3-Dimethyl-1,4-naphthoquinone $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 2,3-(\text{CH}_3)_2\text{NQ} \rightarrow (\text{CH}_3\text{CO})_2\text{C} + \text{H}^+ + 2,3-(\text{CH}_3)_2\text{NQ}^-$	$3.9 \times 10^9$	7			p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and 1 mol L <sup>-1</sup> acetone.	730125
16.364	<i>N,N</i> -Dimethyl-4-nitrosoaniline $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 4-\text{Me}_2\text{C}_6\text{H}_4\text{NO} \rightarrow (\text{CH}_3\text{CO})_2\text{C} + \text{H}^+ + 4-\text{Me}_2\text{C}_6\text{H}_3(\text{NO})_2$	$3.2 \times 10^9$	7			p.r.	D.k. at 440 nm in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH.	690156
16.365	1,2-Dimethyl-3-phenylisoindole-4,7-dione $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 1,2-\text{DMPI} \rightarrow (\text{CH}_3\text{CO})_2\text{C} + \text{H}^+ + [\text{1},2-\text{DMPI}]^{+-}$	$2.3 \times 10^9$	7			p.r.	P.b.k. at 500 nm in deaerated soln. contg. 3 mol L <sup>-1</sup> 2-PrOH.	84R027
16.366	2,5-Dimethyl-3-phenylisoindole-4,7-dione $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 2,5-\text{DMPI} \rightarrow (\text{CH}_3\text{CO})_2\text{C} + \text{H}^+ + [\text{2},5-\text{DMPI}]^{+-}$	$\sim 2.4 \times 10^9$				p.r.	P.b.k. at 500 nm in deaerated soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	82A329
16.367	5,6-Dimethyl-3-phenyl-1,2-trimethyleneisoindole-4,7-dione $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{DMPTI} \rightarrow [\text{DMPTI}]^{+-} + (\text{CH}_3\text{CO})_2\text{C} + \text{H}^+$	$2.3 \times 10^9$	7			p.r.	P.b.k. at 500 nm in deaerated soln. contg. 3 mol L <sup>-1</sup> 2-PrOH.	84R027
16.368	1,4-Dimethylpyridinium $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + (\text{CH}_3)_2\text{py}^+ \rightarrow (\text{CH}_3)_2\text{C} + \text{H}^+ + (\text{CH}_3)_2\text{pyH}^-$	$\leq 1 \times 10^4$	acid	1.0	298	chem.	D.k. in N <sub>2</sub> -satd. soln. contg. CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.0104-0.0979 mol L <sup>-1</sup> H <sup>+</sup> and (8.92-18.0) × 10 <sup>-3</sup> mol L <sup>-1</sup> 1,4-dimethylpyridinium iodide; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> COH + Cr <sup>2+</sup> ) = 5.1 × 10 <sup>7</sup> L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	83A421
16.369	5,5-Dimethyl-1-pyrroline-1-oxy $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{DMPO} \rightarrow (\text{CH}_3)_2\text{C} + \text{H}^+ + \text{DMPO-COH}(\text{CH}_3)_2$	$1.5 \times 10^8$	11.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	84A426
16.370	4,4'-Dimethyl-1,1'-tetramethylene-2,2'-bipyridinium $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{BP}^{2+} \rightarrow (\text{CH}_3)_2\text{C} + \text{H}^+ + [\text{BP}]^{+-}$	$2.6 \times 10^9$	7.0			p.r.	P.b.k. at ~380 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH and 2.5 × 10 <sup>-4</sup> mol L <sup>-1</sup> viologen.	84A292
16.371	4,4'-Dimethyl-1,1'-trimethylene-2,2'-bipyridinium $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{BP}^{2+} \rightarrow (\text{CH}_3)_2\text{C} + \text{H}^+ + [\text{BP}]^{+-}$	$3.2 \times 10^9$	7.0			p.r.	P.b.k. at 380 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH and 2.5 × 10 <sup>-4</sup> mol L <sup>-1</sup> viologen.	84A292
16.372	1,5-Dimethyl-2,3-trimethyleneisoindole-4,7-dione $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 1,5-\text{DMTI} \rightarrow (\text{CH}_3\text{CO})_2\text{C} + \text{H}^+ + [\text{1},5-\text{DMTI}]^{+-}$	$\sim 2.4 \times 10^9$				p.r.	P.b.k. at 500 nm in deaerated soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	82A329
16.373	3,5-Dinitroanisole $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 3,5-(\text{NO}_2)_2\text{C}_6\text{H}_3\text{OCH}_3 \rightarrow (\text{CH}_3\text{CO})_2\text{C} + \text{H}^+ + [3,5-(\text{NO}_2)_2\text{C}_6\text{H}_3\text{OCH}_3]^{+-}$	$2.5 \times 10^9$	7			p.r.	P.b.k. at 310 nm in soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH; reaction observed as a slower process following fast <i>e</i> <sub>aq</sub> <sup>-</sup> reaction.	79A176
16.374	1,2-Dinitrobenzene $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 1,2-\text{C}_6\text{H}_4(\text{NO}_2)_2 \rightarrow (\text{CH}_3\text{CO})_2\text{C} + \text{H}^+ + [1,2-\text{C}_6\text{H}_4(\text{NO}_2)_2]^{+-}$	$2.9 \times 10^9$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; <i>k</i> at pH 0.8 within 20-30%.	761111
16.375	1,3-Dinitrobenzene $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 1,3-\text{C}_6\text{H}_4(\text{NO}_2)_2 \rightarrow (\text{CH}_3\text{CO})_2\text{C} + \text{H}^+ + [1,3-\text{C}_6\text{H}_4(\text{NO}_2)_2]^{+-}$	$3.6 \times 10^9$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; <i>k</i> at pH 0.8 within 20-30%.	761111

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
16.376	1,4-Dinitrobenzene							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 1,4\text{-C}_6\text{H}_4(\text{NO}_2)_2 \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{1,4-C}_6\text{H}_4(\text{NO}_2)_2]^{2-}$	$3.2 \times 10^9$	4.5		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	84A305
		$3.2 \times 10^9$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; <i>k</i> at pH 0.8 within 20-30%.	761111
16.377	2,4-Dinitrobenzoate ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 2,4\text{-}(\text{NO}_2)_2\text{C}_6\text{H}_3\text{CO}_2^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{2,4-(NO}_2)_2\text{C}_6\text{H}_3\text{CO}_2]^{2-}$	$2.9 \times 10^9$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; <i>k</i> at pH 0.8 within 20-30%.	761111
16.378	2,5-Dinitrobenzoate ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 2,5\text{-}(\text{NO}_2)_2\text{C}_6\text{H}_3\text{CO}_2^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{2,5-(NO}_2)_2\text{C}_6\text{H}_3\text{CO}_2]^{2-}$	$3.3 \times 10^9$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; <i>k</i> at pH 0.8 within 20-30%.	761111
16.379	3,4-Dinitrobenzoate ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 3,4\text{-}(\text{NO}_2)_2\text{C}_6\text{H}_3\text{CO}_2^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{3,4-(NO}_2)_2\text{C}_6\text{H}_3\text{CO}_2]^{2-}$	$3.2 \times 10^9$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; <i>k</i> at pH 0.8 within 20-30%.	761111
16.380	3,5-Dinitrobenzoate ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 3,5\text{-}(\text{NO}_2)_2\text{C}_6\text{H}_3\text{CO}_2^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{3,5-(NO}_2)_2\text{C}_6\text{H}_3\text{CO}_2]^{2-}$	$3.1 \times 10^9$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; <i>k</i> at pH 0.8 within 20-30%.	761111
16.381	Diphenyliodonium							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + (\text{C}_6\text{H}_5)_2\text{I}^+ \rightarrow (\text{C}_6\text{H}_5)_2\text{I}^\cdot + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$6 \times 10^7$				p.r.	P.b.k. at 390 nm in N <sub>2</sub> O satd. soln. contg. $(4\text{-}15) \times 10^{-3}$ mol L <sup>-1</sup> Ph <sub>2</sub> IPF <sub>6</sub> and 1.12 mol L <sup>-1</sup> 2-PrOH.	87A437
16.382	1,2-Dithiolane-3-pentanoate ion (Lipoate ion)							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{RSSR} \rightarrow \text{RSSR}^\cdot + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1.8 \times 10^8$	7			p.r.	P.b.k. at 410 nm in soln. contg. 1 mol L <sup>-1</sup> acetone and 2-PrOH.	700560
16.383	Dithiothreitol							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} \rightarrow 2\text{-PrOH} + \text{S}^\cdot\text{SCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} + \text{H}^+$	$2.0 \times 10^8$	7.4			p.r.	P.b.k. at 390 nm (DTT <sup>·-</sup> ) in N <sub>2</sub> O-satd. soln. contg. dithiothreitol and 2-PrOH.	87A250
		$2.0 \times 10^8$	7.3	293		p.r.	P.b.k. at 400 nm (cyclized radical anion) in N <sub>2</sub> O-satd. soln. contg. DTT.	87G007
		$5.4 \times 10^8$	4			p.r.	P.b.k. at 415 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH, dithiothreitol and ABTS <sup>2-</sup> ; the latter reacts with RS <sup>·-</sup> to give ABTS <sup>·-</sup> which is observed.	82Z335
		$2.1 \times 10^8$	7			p.r.	P.b.k. at 390 nm in soln. contg. 1 mol L <sup>-1</sup> acetone and 2 mol L <sup>-1</sup> 2-PrOH.	731020
16.384	Duroquinone							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{DQ} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{DQ}]^\cdot$	$4.0 \times 10^9$	7			p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and 1 mol L <sup>-1</sup> acetone.	730125
16.385	1-Ethoxycarbonyl-2,5-dimethyl-3-phenylisoindole-4,7-dione							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{EDMPI} \rightarrow [\text{EDMPI}]^\cdot + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.3 \times 10^9$	7			p.r.	P.b.k. at 500 nm in deaerated soln. contg. 3 mol L <sup>-1</sup> 2-PrOH.	84R027
16.386	1-Ethoxycarbonyl-6-methoxy-5-methyl-2,3-trimethyleneisoindole-4,7-dione							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + [\text{EMMTI}]^\cdot \rightarrow \text{EMMTI} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.3 \times 10^9$	7			p.r.	P.b.k. at 500 nm in deaerated soln. contg. 3 mol L <sup>-1</sup> 2-PrOH.	84R027

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
16.387	1-Ethoxycarbonyl-5-methyl-2,3-trimethyleneisoindole-4,7-dione							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + [\text{EMTI}]^{\cdot-} \rightarrow \text{EMTI} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.3 \times 10^9$	7			p.r.	P.b.k. at 500 nm in deaerated soln. contg. 3 mol L <sup>-1</sup> 2-PrOH.	84R027
16.388	1,1'-Ethylene-2,2'-bipyridinium							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{BP}^{2+} \rightarrow \text{BP}^{\cdot+} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$4.0 \times 10^9$	7.0			p.r.	P.b.k. at ~380 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH and $2.5 \times 10^{-4}$ mol L <sup>-1</sup> viologen.	84A292
16.389	1,1'-Ethylene-4,4'-dimethyl-2,2'-bipyridinium							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{MDQ}^{2+} \rightarrow \text{MDQ}^{\cdot+} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.8 \times 10^9$	7.0			p.r.	P.b.k. at ~380 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH and $2.5 \times 10^{-4}$ mol L <sup>-1</sup> viologen.	84A292
16.390	<i>N</i> -Ethylmaleimide							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NEM} \rightarrow \text{addn.}$	$5.0 \times 10^9$	6-7			p.r.	P.b.k. in soln. contg. 2-PrOH; 47% <i>e</i> -transfer, 50% addn. based on abs. spectra.	720144
16.391	Flavine mononucleotide							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{FMN} \rightarrow$	$1 \times 10^9$				p.r.	P.b.k.	73A150
16.392	Folic acid							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{FH} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+$ + 'FH <sup>-</sup>	$4.0 \times 10^8$	6.0			p.r.	P.b.k.; structure and abs. spectra of reduced species dependent on pH.	761060
16.393	Folic acid, protonated							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{FH}_2^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+$ + 'FH <sup>-</sup>	$1.1 \times 10^9$	-0.5			p.r.	P.b.k.; structure and abs. spectra of reduced species dependent on pH.	761060
16.394	Fullerene-C <sub>60</sub> -γ-cyclodextrin complex							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \gamma\text{-CD/C}_{60} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+$ + γ-CD/C <sub>60</sub> <sup>2-</sup> + H <sup>+</sup>	$2.7 \times 10^8$				p.r.	D.k. at 331 nm, as well as p.b.k. at 302 nm, in N <sub>2</sub> O-satd. soln. contg. 10% 2-PrOH.	93A433
16.395	Fumaric acid							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} +$ <i>trans</i> -HO <sub>2</sub> CCH=CHCO <sub>2</sub> H →	$9.0 \times 10^8$	0.5			p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH; 14% <i>e</i> -transfer; no <i>e</i> -transfer at pH 9.	730097
16.396	Glutathione							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{GSH} \rightarrow \text{GS}^{\cdot+} + 2\text{-PrOH}$	$1.8 \times 10^8$	4			p.r.	P.b.k. at 415 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH, glutathione and ABTS <sup>2-</sup> ; the latter reacts with RS <sup>·</sup> to give ABTS <sup>·+</sup> which is observed.	82Z335 83A16/
16.397	Glutathione, oxidized							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{GSSG} \rightarrow$	$\ll 10^7$	7			p.r.	No 420 nm abs. (RSSR <sup>·</sup> ) obs. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	720388
16.398	Guanine, conjugate acid							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{GH}^+ \rightarrow \text{addn.}$	$7.4 \times 10^7$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	94A368
16.399	Guanosine, conjugate acid							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{GH}^+ \rightarrow \text{addn.}$	$4.3 \times 10^7$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	94A368
16.400	Hematoporphyrin IX							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{HP} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+$ + HP <sup>2-</sup>	$2.4 \times 10^8$	7.0			p.r.	P.b.k. at 600-650 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	741040
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{HP} \rightarrow \text{CH}_3\text{COCH}_3 +$ HP <sup>2-</sup>	$1.1 \times 10^9$	13.0			p.r.	P.b.k. at 600-650 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	741040

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T(\text{K})$	Method	Comment	Ref.
16.401	Hexafluorobenzene							
	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{C}_6\text{F}_6 \rightarrow \text{CH}_3\text{COCH}_3 + \text{C}_6\text{F}_6^{2-}$	$1.6 \times 10^6$	14			p.r.	D.k. at 350 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 40% 2-PrOH and 1.0 mol $\text{L}^{-1}$ KOH.	93A041
16.402	1-Hydroxy-9,10-anthraquinone							
	$(\text{CH}_3)_2\dot{\text{CO}} + 1\text{-AQ(OH)} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + 1\text{-AQ}^\bullet(\text{OH})^-$	$3.2 \times 10^9$	2.0			p.r.	P.b.k. at >600 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 5 mol $\text{L}^{-1}$ 2-PrOH and 1 mol $\text{L}^{-1}$ acetone; $pK_a$ of semiquinone = 4.6, >14.	94A267
		$2.8 \times 10^9$	8.0					
		$1.5 \times 10^9$	12					
16.403	1-(2-Hydroxyethyl)-2-methyl-5-nitroimidazole							
	$(\text{CH}_3)_2\dot{\text{CO}} + (\text{ImH})\text{-NO}_2 \rightarrow$	$7 \times 10^8$				p.r.	D.k. at 320 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	741135
16.404	1-(2-Hydroxy-3-methoxypropyl)-2-nitroimidazole							
	$(\text{CH}_3)_2\dot{\text{CO}} + (\text{ImH})\text{-NO}_2 \rightarrow$	$2.8 \times 10^9$				p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ 2-PrOH.	761070
	$(\text{ImH})\text{-NO}_2^{2-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$							
16.405	2-Hydroxy-1,4-naphthoquinone							
	$(\text{CH}_3)_2\dot{\text{CO}} + 2\text{-}(\text{OH})\text{NQ} \rightarrow$	$3.4 \times 10^9$	7.0			p.r.	P.b.k. at 400 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	731104
	$\text{CH}_3\text{COCH}_3 + \text{H}^+ + 2\text{-}(\text{OH})\text{NQ}^{2-}$							
16.406	3-Hydroxy-2-nitrobenzoate ion							
	$(\text{CH}_3)_2\dot{\text{CO}} + 3\text{-HO-2-NO}_2\text{C}_6\text{H}_3\text{CO}_2^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{3-HO-2-NO}_2\text{C}_6\text{H}_3\text{CO}_2]^{2-}$	$3.3 \times 10^8$	7			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ 2-PrOH.	761020
16.407	Hypoxanthine							
	$(\text{CH}_3)_2\dot{\text{CO}} + \text{HxOH} \rightarrow \text{addn.}$	$-4 \times 10^6$	6.5			p.r.	P.b.k. at 300 or 320 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	94A368
16.408	Hypoxanthine, conjugate acid							
	$(\text{CH}_3)_2\dot{\text{CO}} + \text{HxOH}_2^+ \rightarrow \text{addn.}$	$7.8 \times 10^7$	0.4			p.r.	P.b.k. at 300 or 320 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	94A368
16.409	Imidazolium							
	$(\text{CH}_3)_2\dot{\text{CO}} + \text{ImH}_2^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{Im}]^+$	$1.7 \times 10^5$	1	1.0	298	chem.	D.k. at 311 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $\text{Cr}(\text{CH}_3)_2\text{OH}^{2+}$ , 0.1 mol $\text{L}^{-1}$ $\text{H}^+$ and 1 mol $\text{L}^{-1}$ 2-PrOH; $k$ calcd. using $k((\text{CH}_3)_2\dot{\text{CO}} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and $k$ for homolysis of $\text{Cr}(\text{CH}_3)_2\text{OH}^{2+} = 0.127 \text{ s}^{-1}$ .	89A532
16.410	Indigodisulfonate ion							
	$(\text{CH}_3)_2\dot{\text{CO}} + \text{IDS}^{2-} \rightarrow$	$4.0 \times 10^9$	7.9			p.r.	D.k. at 610 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH; 88% $e$ -transfer.	731078
16.411	Indigotetrasulfonate ion							
	$(\text{CH}_3)_2\dot{\text{CO}} + \text{ITS}^{4-} \rightarrow$	$4.2 \times 10^9$	7			p.r.	D.k. at 610 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH; 89% $e$ -transfer.	731078
16.412	Indophenolate ion							
	$(\text{CH}_3)_2\dot{\text{CO}} + \text{O=C}_6\text{H}_4=\text{NC}_6\text{H}_4\text{O}^- \rightarrow$	$4.0 \times 10^9$	9			p.r.	D.k. at 610 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH; 86% $e$ -transfer.	731078
16.413	Inosine							
	$(\text{CH}_3)_2\dot{\text{CO}} + \text{Ino} \rightarrow \text{addn.}$	$6.4 \times 10^6$	6.5			p.r.	P.b.k. at 300 or 320 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	94A368
16.414	Inosine, conjugate base							
	$(\text{CH}_3)_2\dot{\text{CO}} + \text{Ino}^- \rightarrow \text{addn.}$	$-10^6$	11.2			p.r.	P.b.k. at 300 or 320 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	94A368

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
16.415	Inosine, conjugate acid $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{InoH}^+ \rightarrow \text{addn.}$	$3.2 \times 10^7$	0.4			p.r.	P.b.k. at 300 or 320 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	94A368
16.416	Iodoacetamide $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{ICH}_2\text{CONH}_2 \rightarrow$	$4 \times 10^8$				p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PNAP}) = 3.8 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	731140
16.417	Iodoacetate ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{ICH}_2\text{CO}_2^- \rightarrow$	$7 \times 10^7$				p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PNAP}) = 3.8 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	731140
16.418	Iodocyclopentane $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + c\text{-C}_5\text{H}_9\text{I} \rightarrow \text{CH}_3\text{COCH}_3$ $+ \text{I}^- + \text{H}^+ + c\text{-C}_5\text{H}_9$	$2.3 \times 10^5$	1	0.1		chem.	D.k. at 407 nm in soln. contg. [CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> ], 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> and 3 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	84M334
		$7.8 \times 10^4$	1	0.1		chem.	D.k. at 407 nm in soln. contg. [CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> ], 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> and 10 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.323 s <sup>-1</sup> .	84M334
16.419	Iodoethane $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_2\text{H}_5\text{I} \rightarrow \text{CH}_3\text{COCH}_3 +$ $\text{I}^- + \text{H}^+ + \cdot\text{CH}_2\text{CH}_3$	$1.7 \times 10^4$	1	0.1		chem.	D.k. at 407 nm in soln. contg. [CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> ], 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> and 10 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.323 s <sup>-1</sup> .	84M334
16.420	Iodomethane $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CH}_3\text{I} \rightarrow \text{CH}_3\text{COCH}_3 + \text{I}^-$ $+ \text{H}^+ + \cdot\text{CH}_3$	$6.0 \times 10^2$	1	0.1		chem.	D.k. at 407 nm in soln. contg. [CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> ], 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> and 10 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.323 s <sup>-1</sup> .	84M334
		$<10^5$	7			p.r.	C.k. in soln. contg. 50% 2-PrOH and 0.68 mol L <sup>-1</sup> acetone; no reaction obs.; rel. to $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PNAP}) = 2.2 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	81A123
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{CH}_3\text{I} \rightarrow \text{CH}_3\text{COCH}_3 + \text{I}^-$ $+ \cdot\text{CH}_3$	$1.1 \times 10^8$		$\sim 13$		p.r.	C.k. in soln. contg. 50% 2-PrOII and 0.68 mol L <sup>-1</sup> acetone; rel. to $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PNAP}) = 2.2 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	81A123
16.421	2-Iodopropane $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + (\text{CH}_3)_2\text{CHI} \rightarrow$ $\text{CH}_3\text{COCH}_3 + \text{I}^- + \text{H}^+ + (\text{CH}_3)_2\dot{\text{C}}\text{H}$	$2.5 \times 10^5$	1	0.1		chem.	D.k. at 407 nm in soln. contg. [CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> ], 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> and 3 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	84M334

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>16.421 2-Iodopropane — Continued</b>							
	$1.1 \times 10^5$	1	0.1		chem.	D.k. at 407 nm in soln. contg. [CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> ], 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> and 10 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using <i>k</i> ((CH <sub>3</sub> ) <sub>2</sub> CO <sup>·+</sup> + Cr <sup>2+</sup> ) = $5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.323 s <sup>-1</sup> .	84M334
<b>16.422 Lipoamide</b>							
(CH <sub>3</sub> ) <sub>2</sub> COH + LS <sub>2</sub> → LS <sub>2</sub> <sup>·-</sup> + CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup>	$1.4 \times 10^8$	10.8			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH.	86A363
	$1.4 \times 10^8$	6			p.r.	P.b.k. at 400 nm in soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH. Lipoamide radical anion is formed from intermediate (addn. prod.?) which also decays to other prod. (half-life $4.1 \times 10^{-4}$ s).	84A011
<b>16.423 Lumazine</b>							
(CH <sub>3</sub> ) <sub>2</sub> COH + LH <sub>2</sub> → CH <sub>3</sub> COCH <sub>3</sub> + LH <sub>3</sub> <sup>·-</sup>	$1.3 \times 10^9$	0.8, 5.1			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1-2 mol L <sup>-1</sup> 2-PrOH; 100% <i>e</i> -transfer.	751056
(CH <sub>3</sub> ) <sub>2</sub> COH + LH <sup>·-</sup> → CH <sub>3</sub> COCH <sub>3</sub> + (LH <sub>2</sub> ) <sup>·-</sup>	$1.7 \times 10^8$	9.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1-2 mol L <sup>-1</sup> 2-PrOH; 70% <i>e</i> -transfer.	751036
<b>16.424 Lumazine dianion</b>							
(CH <sub>3</sub> ) <sub>2</sub> CO <sup>·-</sup> + L <sup>2-</sup> → CH <sub>3</sub> COCH <sub>3</sub> + LH <sup>2-</sup>	$1.0 \times 10^9$	14.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1-2 mol L <sup>-1</sup> 2-PrOH; 85% <i>e</i> -transfer.	751056
<b>16.425 Lumiflavin</b>							
(CH <sub>3</sub> ) <sub>2</sub> COH + LF → CH <sub>3</sub> COCH <sub>3</sub> + LFH <sup>·-</sup>	$2.0 \times 10^9$	7	297		p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-satd. soln. contg. 2-propanol.	83A073
<b>16.426 Lumiflavin semiquinone</b>							
(CH <sub>3</sub> ) <sub>2</sub> COH + LFH <sup>·-</sup> →	$8.8 \times 10^8$	7	297		p.r.	Abs. changes at 550 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; decay to LFH <sup>·-</sup> and LF <sub>0</sub> from calcd. concn.-time profile.	83A073
<b>16.427 Maleic acid</b>							
(CH <sub>3</sub> ) <sub>2</sub> COH + cis-HO <sub>2</sub> CCH=CHCO <sub>2</sub> H →	$2.2 \times 10^8$	0.5			p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH; 18% <i>e</i> -transfer; no <i>e</i> -transfer at pH 10.0 (dianion).	730097
<b>16.428 2-Mercaptobenzimidazole, conjugate acid</b>							
(CH <sub>3</sub> ) <sub>2</sub> COH + MBZH <sup>+</sup> → 2-PrOH + [MBZ] <sup>·+</sup>	$1.3 \times 10^9$	<0			p.r.	P.b.k. at 610 nm in N <sub>2</sub> O-satd. soln. contg. 3.6 mol L <sup>-1</sup> H <sub>2</sub> SO <sub>4</sub> , 5 × 10 <sup>-4</sup> mol L <sup>-1</sup> 2-mercaptobenzimidazole and 2-PrOH.	95A083
<b>16.429 2-Mercaptoethanol</b>							
(CH <sub>3</sub> ) <sub>2</sub> COH + HSCH <sub>2</sub> CH <sub>2</sub> OH → 2-PrOH + ·SCH <sub>2</sub> CH <sub>2</sub> OH	$5.1 \times 10^8$	10			p.r.	P.b.k. (RSSR <sup>·-</sup> ) in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	690553
<b>16.430 2-Mercaptopropionylglycine</b>							
(CH <sub>3</sub> ) <sub>2</sub> COH + HSCH(CH <sub>3</sub> )CONHCH <sub>2</sub> CO <sub>2</sub> H →	$3.7 \times 10^8$				p.r.	P.b.k. at 415 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH, mercaptopropionylglycine and ABTS <sup>2-</sup> ; the latter reacts with RS <sup>·-</sup> to give ABTS <sup>·-</sup> which is observed.	82Z335
<b>16.431 5,10-Methenyltetrahydrofolate</b>							
(CH <sub>3</sub> ) <sub>2</sub> COH + CH <sup>·</sup> H <sub>4</sub> (folate) →	$1.3 \times 10^8$	1.5			p.r.	P.b.k. at 360 nm in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	91A041
<b>16.432 4-Methoxybenzenediazonium cation</b>							
(CH <sub>3</sub> ) <sub>2</sub> COH + 4-CH <sub>3</sub> OC <sub>6</sub> H <sub>4</sub> N <sub>2</sub> <sup>+</sup> → CH <sub>3</sub> COCH <sub>3</sub> + 4-CH <sub>3</sub> OC <sub>6</sub> H <sub>4</sub> + N <sub>2</sub> + H <sup>+</sup>	$3.2 \times 10^9$	4			p.r.	D.k. at 330 nm in soln. contg. 0.001 mol L <sup>-1</sup> 2-PrOH.	81A297

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
16.433	9-(2-Methoxy-4-methylsulfonylaminoanilino)acridinium $(\text{CH}_3)_2\dot{\text{COH}} + \text{mAMSA}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{mAMSA}^+$	$1.2 \times 10^9$		7		p.r.	P.b.k. at 540 and 575 nm in N <sub>2</sub> O-satd. soln. contg. $2 \times 10^{-4}$ mol L <sup>-1</sup> mAMSA <sup>+</sup> and 0.2 mol L <sup>-1</sup> 2-PrOH.	84C001
16.434	4-Methoxyphenyl- <i>N</i> - <i>tert</i> -butylnitrone $(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-CH}_3\text{O-PBN} \rightarrow$	$1.5 \times 10^6$				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. <i>p</i> -nitroacetophenone and 2-PrOH; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{PNAP}) = 3.8 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	82A184
16.435	4-Methyl-5-(aminocarbonyl)imidazolium $(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-Me-5-CONH}_2\text{ImH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{4-Me-5-CONH}_2\text{ImH}]^+$	$2.1 \times 10^6$	1	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. Cr(C(CH <sub>3</sub> ) <sub>2</sub> OH) <sup>2+</sup> , 0.1 mol L <sup>-1</sup> H <sup>+</sup> and 1 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of Cr(C(CH <sub>3</sub> ) <sub>2</sub> OH) <sup>2+</sup> = 0.127 s <sup>-1</sup> .	89A532
16.436	Methyl-1,4-benzoquinone $(\text{CH}_3)_2\dot{\text{COH}} + \text{MeQ} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{MeQ}^-$	$3.5 \times 10^9$		7		p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and 1 mol L <sup>-1</sup> acetone.	730125
16.437	1-Methyl-2,2'-bipyridinium $(\text{CH}_3)_2\dot{\text{COH}} + 1\text{-Me-2,2'-bpy}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + 1\text{-Me-2,2'-bpy}^-$	$3.7 \times 10^8$		7		p.r.	P.b.k. at 605 nm in deaerated soln. contg. 2-PrOH.	88N031
16.438	4-Methyl-5-cyanoimidazolium $(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-Me-5-CNImH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{4-Me-5-CNImH}]^+$	$4.8 \times 10^6$	1	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. Cr(C(CH <sub>3</sub> ) <sub>2</sub> OH) <sup>2+</sup> , 0.1 mol L <sup>-1</sup> H <sup>+</sup> and 1 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of Cr(C(CH <sub>3</sub> ) <sub>2</sub> OH) <sup>2+</sup> = 0.127 s <sup>-1</sup> .	89A532
16.439	Methylene Blue cation $(\text{CH}_3)_2\dot{\text{COH}} + \text{MB}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{MB}^+ + \text{H}^+$	$4.4 \times 10^9$		7		p.r.	D.k. at 580 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; 91% <i>e</i> -transfer.	731078
		$4 \times 10^9$				p.r.	P.b.k.	73A150
16.440	1-Methylguanosine, conjugate acid $(\text{CH}_3)_2\dot{\text{COH}} + 1\text{-MeGH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + 1\text{-MeG}^+ + \text{H}^+$	$8.0 \times 10^7$		0.5		p.r.	P.b.k. in N <sub>2</sub> O-satd. contg. 1-2 mol L <sup>-1</sup> 2-PrOH; pK <sub>a</sub> = -2.4.	751060
16.441	1-Methylimidazolium $(\text{CH}_3)_2\dot{\text{COH}} + 1\text{-CH}_3\text{ImH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{1-CH}_3\text{ImH}]^+$	$1.1 \times 10^6$	1	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. Cr(C(CH <sub>3</sub> ) <sub>2</sub> OH) <sup>2+</sup> , 0.1 mol L <sup>-1</sup> H <sup>+</sup> and 1 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of Cr(C(CH <sub>3</sub> ) <sub>2</sub> OH) <sup>2+</sup> = 0.127 s <sup>-1</sup> .	89A532
16.442	2-Methylimidazolium $(\text{CH}_3)_2\dot{\text{COH}} + 2\text{-CH}_3\text{ImH}_2^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{2-MeImH}]^+$	$1.3 \times 10^4$	1	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. Cr(C(CH <sub>3</sub> ) <sub>2</sub> OH) <sup>2+</sup> , 0.1 mol L <sup>-1</sup> H <sup>+</sup> and 1 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of Cr(C(CH <sub>3</sub> ) <sub>2</sub> OH) <sup>2+</sup> = 0.127 s <sup>-1</sup> .	89A532
16.443	4-Methylimidazolium $(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-MeImH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{4-MeImH}]^+$	$4.5 \times 10^5$	1	1.0	298	chem.	D.k. at 311 nm in N <sub>2</sub> -satd. soln. contg. Cr(C(CH <sub>3</sub> ) <sub>2</sub> OH) <sup>2+</sup> , 0.1 mol L <sup>-1</sup> H <sup>+</sup> and 1 mol L <sup>-1</sup> 2-PrOH; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of Cr(C(CH <sub>3</sub> ) <sub>2</sub> OH) <sup>2+</sup> = 0.127 s <sup>-1</sup> .	89A532

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
16.444	S-Methylmethionine							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Me}_2\text{S}^+\text{CH}_2\text{CH}_2\text{CH}(\text{NH}_3^+)\text{CO}_2^- \rightarrow$	$<2 \times 10^6$				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH; no reaction obs.; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{PNAP}) = 3.0 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	91A184
16.445	2-Methyl-1,4-naphthoquinone							
	$(\text{CH}_3)_2\dot{\text{COH}} + 2\text{-CH}_3\text{NQ} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{2-CH}_3\text{NQ}]^\cdot$	$4.2 \times 10^9$	7			p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> acetone and 1 mol L <sup>-1</sup> 2-PrOH.	730125
		$4.1 \times 10^9$	7.0			p.r.	P.b.k. in soln. contg. 0.05 mol L <sup>-1</sup> 2-PrOH; 91% <i>e</i> -transfer.	731047
		$4.8 \times 10^9$	7.0			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	731104
		$6.2 \times 10^9$	6.9			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; 80% <i>e</i> -transfer.	723057
	$(\text{CH}_3)_2\dot{\text{CO}}^- + 2\text{-CH}_3\text{NQ} \rightarrow \text{CH}_3\dot{\text{C}}\text{OCH}_3 + [\text{2-CH}_3\text{NQ}]^\cdot$	$4.2 \times 10^9$	12.4			p.r.	P.b.k. in soln. contg. 0.05 mol L <sup>-1</sup> 2-PrOH; 91% <i>e</i> -transfer.	731047
16.446	1-Methylnicotinamide							
	$(\text{CH}_3)_2\dot{\text{COH}} + 3\text{-py}^+(\text{CH}_3)\text{CONH}_2 \rightarrow \text{CH}_3\text{COCH}_3 + 3\text{-py}^+(\text{CH}_3)\text{CONH}_2 + \text{H}^+$	$3.6 \times 10^8$	9.5			p.r.	P.b.k. (pyridinyl radical) in N <sub>2</sub> O-satd. soln. contg. 1-2 mol L <sup>-1</sup> 2-PrOH.	741089
16.447	3-Methyl-2-nitroanisole							
	$(\text{CH}_3)_2\dot{\text{COH}} + 3\text{-CH}_3\text{C}_6\text{H}_3(2\text{-NO}_2)\text{OCH}_3 \rightarrow [\text{3-CH}_3\text{C}_6\text{H}_3(2\text{-NO}_2)\text{OCH}_3]^\cdot + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.3 \times 10^8$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	761020
16.448	Methyl 4-nitrobenzenesulfonate							
	$(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-O}_2\text{NC}_6\text{H}_4\text{SO}_3\text{CH}_3 \rightarrow [\text{4-NO}_2\text{C}_6\text{H}_4\text{SO}_3\text{CH}_3]^\cdot + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.4 \times 10^9$	4.5	293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	84A305	
16.449	Methyl 4-nitrobenzoate							
	$(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-O}_2\text{NC}_6\text{H}_4\text{CO}_2\text{CH}_3 \rightarrow [\text{4-NO}_2\text{C}_6\text{H}_4\text{CO}_2\text{CH}_3]^\cdot + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.3 \times 10^9$	4.5	293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	84A305	
16.450	3-Methyl-2-nitrobenzoate ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + 3\text{-CH}_3\text{-2-NO}_2\text{C}_6\text{H}_3\text{CO}_2^- \rightarrow [\text{3-CH}_3\text{-2-NO}_2\text{C}_6\text{H}_3\text{CO}_2^-]^\cdot + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1.9 \times 10^8$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	761020
16.451	2-Methyl-5-nitroimidazole							
	$(\text{CH}_3)_2\dot{\text{COH}} + (\text{ImH})\text{-NO}_2 \rightarrow (\text{ImH})\text{-NO}_2^\cdot + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.5 \times 10^9$				p.r.	P.b.k.	761075
16.452	3-Methyl-2-nitrophenol							
	$(\text{CH}_3)_2\dot{\text{COH}} + 3\text{-CH}_3\text{-2-NO}_2\text{C}_6\text{H}_3\text{OH} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + 3\text{-CH}_3\text{(2-NO}_2\text{)C}_6\text{H}_3\text{OH}^\cdot$	$2.9 \times 10^8$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	761020
16.453	2-Methyl-2-nitrosopropane							
	$(\text{CH}_3)_2\dot{\text{COH}} + (\text{CH}_3)_3\text{CNO} \rightarrow \text{addn.}$	$6.9 \times 10^8$	-7	-291	p.r.	P.b.k. (esr) in unbuffered N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> 2-PrOH and (0.25-15) $\times 10^{-3}$ mol L <sup>-1</sup> MNP (assuming complete dimer dissociation).	91D097	

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T(\text{K})$	Method	Comment	Ref.
16.454	4-Methylphenyl- <i>N</i> - <i>tert</i> -butylnitron	$(\text{CH}_3)_2\dot{\text{COH}} + 4-\text{CH}_3\text{-PBN} \rightarrow$ $1 \times 10^6$				p.r.	C.k. in $\text{N}_2\text{O}$ -saturated soln. contg. $p$ -nitroacetophenone and 2-PrOH; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{PNAP}) = 3.8 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	82A184
16.455	5-Methyl-1-phenyl-2,3-trimethyleneisoindole-4,7-dione	$(\text{CH}_3)_2\dot{\text{COH}} + 5\text{-MPTI} \rightarrow [5\text{-MPTI}]^{+-} +$ $\text{CH}_3\text{COCH}_3 + \text{H}^+$ $\sim 2.4 \times 10^9$				p.r.	P.b.k. at 500 nm in deaerated soln. contg. 1 mol $\text{L}^{-1}$ 2-PrOH.	82A329
16.456	3-Methylpterin, conjugate acid	$(\text{CH}_3)_2\dot{\text{COH}} + 3\text{-MPTH}^+ \rightarrow$ $1.9 \times 10^9$	0.8			p.r.	P.b.k. in $\text{N}_2\text{O}$ -saturated soln. contg. 2-PrOH; 100% <i>e</i> -transfer.	761060
16.457	3-Methylpterin	$(\text{CH}_3)_2\dot{\text{COH}} + 3\text{-MPT} \rightarrow$ $2.9 \times 10^8$	7.0			p.r.	P.b.k. in $\text{N}_2\text{O}$ -saturated soln. contg. 2-PrOH; 100% <i>e</i> -transfer.	761060
16.458	9-Methylpurine, conjugate acid	$(\text{CH}_3)_2\dot{\text{COH}} + 9\text{-MPH}^+ \rightarrow \text{CH}_3\text{COCH}_3 +$ $+ 9\text{-MPH}_3^{2+}$ $1.9 \times 10^9$	-0			p.r.	P.b.k. in $\text{N}_2\text{O}$ -saturated soln. contg. 2-PrOH; $\text{pK}_a = 2.4$ .	751060
16.459	9-Methylpurine	$(\text{CH}_3)_2\dot{\text{COH}} + 9\text{-MP} \rightarrow \text{CH}_3\text{COCH}_3 +$ $9\text{-MPH}^+$ $1.7 \times 10^8$	8.6			p.r.	P.b.k. in $\text{N}_2\text{O}$ -saturated soln. contg. 2-PrOH.	751060
		$(\text{CH}_3)_2\dot{\text{COH}} + 9\text{-MP} \rightarrow \text{CH}_3\text{COCH}_3 +$ $9\text{-MP}^{2+}$ $8.7 \times 10^8$	13.6			p.r.	P.b.k. in $\text{N}_2\text{O}$ -saturated soln. contg. 2-PrOH.	751060
16.460	<i>N</i> -Methyl-2-pyridinealdoxime	$(\text{CH}_3)_2\dot{\text{COH}} + 2\text{-HON=CHC}_5\text{H}_4\text{N}^+\text{CH}_3$ $\rightarrow$ $6 \times 10^8$	3,7,11			p.r.	P.b.k.; <i>e</i> -transfer.	761182
16.461	1-Methylpyridinium	$(\text{CH}_3)_2\dot{\text{COH}} + 1\text{-Mepy}^+ \rightarrow$ $3.7 \times 10^5$	acid	1.0	298	chem.	D.k. in $\text{N}_2$ -saturated soln. contg. $\text{CrCH}(\text{CH}_3)_2\text{OH}^{2+}$ , $0.015\text{--}0.103 \text{ mol L}^{-1} \text{ H}^+$ and $(6.77\text{--}17.2) \times 10^{-3} \text{ mol L}^{-1}$ 1-methylpyridinium iodide; $k$ calcd. using $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and $k$ for homolysis of $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+} = 0.127 \text{ s}^{-1}$ .	83A421
16.462	4-Methylpyridinium	$(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-CH}_3\text{pyH}^+ \rightarrow$ $7.3 \times 10^4$	acid	1.0	298	chem.	D.k. in $\text{N}_2$ -saturated soln. contg. $\text{CrCH}(\text{CH}_3)_2\text{OH}^{2+}$ , $0.00741\text{--}0.103 \text{ mol L}^{-1} \text{ H}^+$ and $(24.2\text{--}104) \times 10^{-3} \text{ mol L}^{-1}$ 4-methylpyridinium perchlorate; $k$ calcd. using $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and $k$ for homolysis of $\text{CrC}(\text{CH}_3)_2\text{OH}^{2+} = 0.127 \text{ s}^{-1}$ .	83A421
16.463	5-Methyl-1,2-trimethyleneisoindole-4,7-dione	$(\text{CH}_3)_2\dot{\text{COH}} + 5\text{-MTI} \rightarrow [5\text{-MTI}]^{+-} +$ $\text{CH}_3\text{COCH}_3 + \text{H}^+$ $2.3 \times 10^9$	7			p.r.	P.b.k. at 500 nm in deaerated soln. contg. 3 mol $\text{L}^{-1}$ 2-PrOH.	84R027
16.464	1,4-Naphthoquinone	$(\text{CH}_3)_2\dot{\text{COH}} + \text{NQ} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+$ $+ \text{NQ}^{2-}$ $3.6 \times 10^9$	7			p.r.	P.b.k. in soln. contg. 1 mol $\text{L}^{-1}$ 2-PrOH and 1 mol $\text{L}^{-1}$ acetone.	730125
16.465	Neutral Red cation	$(\text{CH}_3)_2\dot{\text{COH}} + \text{NRH}^+ \rightarrow \text{CH}_3\text{COCH}_3 +$ $[\text{NRH}_2]^{2-}$ $2 \times 10^9$ $6.9 \times 10^9$	5 8			p.r.	P.b.k. at 400 and 700 nm in soln. contg. 2-PrOH; $\text{pK}_a = 6.8$ .	93A100

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
16.466	Nicotinamide $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 3\text{-pyCONH}_2 \rightarrow$	$<1 \times 10^6$	9.2			p.r.	P.b.k. at ~400 nm in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH.	741106
16.467	Nicotinamide, conjugate acid $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 3\text{-pyH}^+\text{CONH}_2 \rightarrow 3\text{-py(H)}\text{CONH}_2 + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$7.9 \times 10^8$	acid	1.0	298	chem.	D.k. in N <sub>2</sub> O-satd. soln. contg. Cr(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.041–0.080 mol L <sup>-1</sup> H <sup>+</sup> and (1.95–4.88) × 10 <sup>-3</sup> mol L <sup>-1</sup> 3-pyH <sup>+</sup> CONH <sub>2</sub> . <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and <i>k</i> for homolysis of Cr(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	83A421
		$2.1 \times 10^8$	0.9			p.r.	P.b.k.; no <i>e</i> -transfer in neutral soln.	741089
		$4.0 \times 10^8$	1.9			p.r.	P.b.k. at ~400 nm in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH.	741106
16.468	Nicotinamide adenine dinucleotide $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NAD}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{NAD}^+$	$1.0 \times 10^9$	6.0			p.r.	P.b.k.	731104
		$1.0 \times 10^9$				p.r.	Estd. from buildup and decay of NAD <sup>+</sup> at 400 nm in soln. contg. 1 mol L <sup>-1</sup> acetone, 1 mol L <sup>-1</sup> 2-PrOH, 2 × 10 <sup>-4</sup> mol L <sup>-1</sup> O <sub>2</sub> , 2 × 10 <sup>-5</sup> mol L <sup>-1</sup> benzoquinone and 0.02 mol L <sup>-1</sup> NAD <sup>+</sup> .	703013
16.469	Nifuroxime $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NF}^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{NF}^-$	$3.5 \times 10^9$				p.r.	P.b.k.	761075
		$3.3 \times 10^9$	7			p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH; 100% <i>e</i> -transfer.	731099
16.470	4-Nitroacetophenone $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PNAP} \rightarrow [\text{PNAP}]^{+-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$3.0 \times 10^9$	5			p.r.	P.b.k. at 360 nm in N <sub>2</sub> O-satd. soln. contg. 10% 2-PrOH and 4 × 10 <sup>-4</sup> mol L <sup>-1</sup> PNAP; <i>k</i> decreases at higher % 2-PrOH.	89A469
		$1.5 \times 10^9$	4.5	293		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH. $\Delta H^\ddagger = 14.8 \text{ kJ mol}^{-1}$ , $\Delta S^\ddagger = -15 \text{ J K}^{-1} \text{ mol}^{-1}$ studied at 273–343 K.	84A305 88A099
		$1.8 \times 10^9$	acid			p.r.	P.b.k. in soln. contg. 50% 2-PrOH.	82A222
		$3.8 \times 10^9$	11			p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	730122
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{PNAP} \rightarrow [\text{PNAP}]^{+-} + \text{CH}_3\text{COCH}_3$	$2.1 \times 10^9$	alk.			p.r.	P.b.k. in soln. contg. 0.05 mol L <sup>-1</sup> NaOH and 50% 2-PrOH.	82A222
16.471	2-Nitroaniline $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 2\text{-O}_2\text{NC}_6\text{H}_4\text{NH}_2 \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{2-NO}_2\text{C}_6\text{H}_4\text{NH}_2]^{+-}$	$9.2 \times 10^8$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	761020
16.472	3-Nitroaniline $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 3\text{-O}_2\text{NC}_6\text{H}_4\text{NH}_2 \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{3-NO}_2\text{C}_6\text{H}_4\text{NH}_2]^{+-}$	$1.5 \times 10^9$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	761020
16.473	4-Nitroaniline $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 4\text{-O}_2\text{NC}_6\text{H}_4\text{NH}_2 \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{4-NO}_2\text{C}_6\text{H}_4\text{NH}_2]^{+-}$	$5 \times 10^8$	4.5	293	p.r.	Cond.; N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	84A305	
		$1.9 \times 10^9$	10.7			p.r.	P.b.k. at 380 nm in N <sub>2</sub> O-satd. soln. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	771118

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
16.473	4-Nitroaniline — Continued							
		$7.2 \times 10^8$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	761020
16.474	4-Nitroanisole							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 4\text{-CH}_3\text{OC}_6\text{H}_4\text{NO}_2 \rightarrow [\text{4-CH}_3\text{OC}_6\text{H}_4\text{NO}_2]^- + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1.2 \times 10^9$	4-5		293	p.r.	Cond.; N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	84A305
16.475	<i>p</i> -Nitrobenzaldehyde							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 4\text{-O}_2\text{NC}_6\text{H}_4\text{CHO} \rightarrow [\text{4-NO}_2\text{C}_6\text{H}_4\text{CHO}]^- + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.8 \times 10^9$	4-5		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	84A305
16.476	4-Nitrobenzaldoxime							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{HON-CHC}_6\text{H}_4\text{-4-NO}_2 \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{HON-CHC}_6\text{H}_4\text{-4-NO}_2]^-$	$2.0 \times 10^9$	4-5		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	84A305
16.477	4-Nitrobenzamide							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 4\text{-O}_2\text{NC}_6\text{H}_4\text{CONH}_2 \rightarrow [\text{4-NO}_2\text{C}_6\text{H}_4\text{CONH}_2]^- + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.2 \times 10^9$	4-6		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH. $\Delta H^\ddagger = 14.5 \text{ kJ mol}^{-1}$ , $\Delta S^\ddagger = -18 \text{ J K}^{-1} \text{ mol}^{-1}$ studied at 273-343 K.	88A099 84A305
16.478	Nitrobenzene							
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow \text{CH}_3\text{COCH}_3 + [\text{C}_6\text{H}_5\text{NO}_2]^-$	$3.0 \times 10^9$	13			p.r.	P.b.k. at 285 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	660432
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{C}_6\text{H}_5\text{NO}_2]^-$	$1.6 \times 10^9$	7			p.r.	P.b.k. at 285 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	660432
16.479	4-Nitrobenzenesulfonamide							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 4\text{-O}_2\text{NC}_6\text{H}_4\text{SO}_2\text{NH}_2 \rightarrow [\text{4-NO}_2\text{C}_6\text{H}_4\text{SO}_2\text{NH}_2]^- + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.3 \times 10^9$	4-5		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	84A305
16.480	4-Nitrobenzenesulfonate ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 4\text{-O}_2\text{NC}_6\text{H}_4\text{SO}_3^- \rightarrow [\text{4-O}_2\text{NC}_6\text{H}_4\text{SO}_3]^{2-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1.7 \times 10^9$	4-6		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH. $\Delta H^\ddagger = 13.8 \text{ kJ mol}^{-1}$ , $\Delta S^\ddagger = -22 \text{ J K}^{-1} \text{ mol}^{-1}$ studied at 273-343 K.	88A099 84A305
16.481	2-Nitrobenzoate ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 2\text{-NO}_2\text{C}_6\text{H}_4\text{CO}_2^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{2-NO}_2\text{C}_6\text{H}_4\text{CO}_2]^-$	$5.4 \times 10^8$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; at pH 0.8 <i>k</i> was the same $\pm$ 20-30%.	761111
16.482	3-Nitrobenzoate ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 3\text{-NO}_2\text{C}_6\text{H}_4\text{CO}_2^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{3-NO}_2\text{C}_6\text{H}_4\text{CO}_2]^{2-}$	$9.0 \times 10^8$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; at pH 0.8 <i>k</i> was the same $\pm$ 20-30%.	761111
16.483	4-Nitrobenzoate ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 4\text{-NO}_2\text{C}_6\text{H}_4\text{CO}_2^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{4-NO}_2\text{C}_6\text{H}_4\text{CO}_2]^-$	$3.1 \times 10^9$	4-5		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	84A305
		$2.1 \times 10^9$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; at pH 0.8 <i>k</i> was the same $\pm$ 20-30%.	761111
16.484	4-Nitrobenzonitrile							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 4\text{-O}_2\text{NC}_6\text{H}_4\text{CN} \rightarrow [\text{4-NO}_2\text{C}_6\text{H}_4\text{CN}]^- + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.7 \times 10^9$	4-6		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH; $\Delta H^\ddagger = 16.1 \text{ kJ mol}^{-1}$ , $\Delta S^\ddagger = -10 \text{ J K}^{-1} \text{ mol}^{-1}$ studied at 273-343 K.	88A099 84A305

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
16.485	5-Nitro-2-furoate ion $(\text{CH}_3)_2\dot{\text{COH}} + \text{NF}^{\cdot-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1.5 \times 10^9$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	730114
16.486	2-Nitroimidazole $(\text{CH}_3)_2\dot{\text{COH}} + (\text{ImH})-\text{NO}_2 \rightarrow (\text{ImH})-\text{NO}_2^{\cdot-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$3.5 \times 10^9$				p.r.	P.b.k.	761075
16.487	4-Nitroimidazole $(\text{CH}_3)_2\dot{\text{COH}} + (\text{ImH})-\text{NO}_2 \rightarrow (\text{ImH})-\text{NO}_2^{\cdot-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$3.5 \times 10^9$				p.r.	P.b.k.	761075
16.488	2-Nitrosophthalate ion $(\text{CH}_3)_2\dot{\text{COH}} + 2\text{-NO}_2\text{C}_6\text{H}_3\text{-1,3-(CO}_2^{\cdot-})_2 \rightarrow [2\text{-NO}_2\text{C}_6\text{H}_3\text{-1,3-(CO}_2^{\cdot-})_2]^{\cdot-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1.5 \times 10^8$	7			p.r.	P.b.k. at 310 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	761020
	$(\text{CH}_3)_2\dot{\text{CO}}^- + 2\text{-NO}_2\text{C}_6\text{H}_3\text{-1,3-(CO}_2^{\cdot-})_2 \rightarrow [2\text{-NO}_2\text{C}_6\text{H}_3\text{-1,3-(CO}_2^{\cdot-})_2]^{\cdot-} + \text{CH}_3\text{COCH}_3$	$1.5 \times 10^8$	14			p.r.	P.b.k. at 310 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	761020
16.489	<i>aci</i> -Nitromethane anion $(\text{CH}_3)_2\dot{\text{COH}} + \text{CH}_2\text{NO}_2^{\cdot-} \rightarrow \text{adduct formation}$	$1.2 \times 10^7$	9.15	-285	p.r.	D.k. (esr) in N <sub>2</sub> O-satd. soln. contg. (0.5-5) × $10^{-3}$ mol L <sup>-1</sup> nitromethane and 0.25 mol L <sup>-1</sup> 2-PrOH; $k = 1.2 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> for electron transfer.	88D069	
		$5.0 \times 10^7$	11.3	-285	p.r.	P.b.k. (esr) in N <sub>2</sub> O-satd. soln. contg. (0.5-5) × $10^{-3}$ mol L <sup>-1</sup> nitromethane and 0.25 mol L <sup>-1</sup> 2-PrOH.	88D069	
	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{CH}_2\text{NO}_2^{\cdot-} \rightarrow \text{adduct formation}$	$3.4 \times 10^7$	13.0	-285	p.r.	P.b.k. (esr) in N <sub>2</sub> O-satd. soln. contg. (0.5-5) × $10^{-3}$ mol L <sup>-1</sup> nitromethane and 0.25 mol L <sup>-1</sup> 2-PrOH; d.k. gave $k = 4.0 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> .	88D069	
16.490	4-Nitroperoxybenzoic acid $(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-O}_2\text{NC}_6\text{H}_4\text{CO}_3\text{H} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{4-O}_2\text{NC}_6\text{H}_4\text{CO}_3\text{H}]^{\cdot-}$	$3.3 \times 10^9$	5.0			p.r.	P.b.k. at 330 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	741078
16.491	<i>p</i> -Nitrophenethyl bromide $(\text{CH}_3)_2\dot{\text{COH}} + p\text{-O}_2\text{NC}_6\text{H}_4\text{CH}_2\text{CH}_2\text{Br} \rightarrow [p\text{-NO}_2\text{C}_6\text{H}_4\text{CH}_2\text{CH}_2\text{Br}]^{\cdot-}$	$-1.5 \times 10^9$	7			p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	81A068
16.492	2-Nitrophenol $(\text{CH}_3)_2\dot{\text{COH}} + 2\text{-O}_2\text{NC}_6\text{H}_4\text{OH} \rightarrow [2\text{-O}_2\text{NC}_6\text{H}_4\text{OH}]^{\cdot-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.6 \times 10^9$	1			p.r.	P.b.k. in soln. contg. 2-PrOH.	690270
16.493	4-Nitrophenol $(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-O}_2\text{NC}_6\text{H}_4\text{OH} \rightarrow [4\text{-HO}_2\text{C}_6\text{H}_4\text{NO}_2]^{2-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1.1 \times 10^9$	4.5	293	p.r.	Cond. changes in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	84A305	
16.494	2-Nitrophenoxide ion $(\text{CH}_3)_2\dot{\text{CO}}^- + 2\text{-NO}_2\text{C}_6\text{H}_4\text{O}^- \rightarrow [2\text{-O}_2\text{C}_6\text{H}_4\text{NO}_2]^{2-} + \text{CH}_3\text{COCH}_3$	$1.4 \times 10^9$	13			p.r.	P.b.k. in soln. contg. 2-PrOH.	690270
16.495	2-Nitropyrrole $(\text{CH}_3)_2\dot{\text{COH}} + 2\text{-NP} \rightarrow [2\text{-NP}]^{\cdot-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.0 \times 10^9$				p.r.	P.b.k.	761075
16.496	3-Nitropyrrole $(\text{CH}_3)_2\dot{\text{COH}} + 3\text{-NP} \rightarrow [3\text{-NP}]^{\cdot-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.0 \times 10^9$				p.r.	P.b.k.	761075

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T(\text{K})$	Method	Comment	Ref.
16.497	Nitrosobenzene							
	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{C}_6\text{H}_5\text{NO} \rightarrow \text{CH}_3\text{COCH}_3 + \text{C}_6\text{H}_5\text{NO}^-$	$7.0 \times 10^9$	13.0			p.r.	P.b.k. at 450 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.05 mol $\text{L}^{-1}$ 2-PrOH.	660433
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{C}_6\text{H}_5\text{NO} \rightarrow \text{CH}_3\text{COCH}_3 + \text{C}_6\text{H}_5\text{NOH}$	$5.0 \times 10^9$	7.0			p.r.	P.b.k. at 450 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.05 mol $\text{L}^{-1}$ 2-PrOH.	660433
16.498	2-Nitrothiophene							
	$(\text{CH}_3)_2\dot{\text{COH}} + 2\text{-NT} \rightarrow 2\text{-NT}^{**} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$3.0 \times 10^9$				p.r.	P.b.k.	761075
16.499	3-Nitrothiophene							
	$(\text{CH}_3)_2\dot{\text{COH}} + 3\text{-NT} \rightarrow 3\text{-NT}^{**} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.0 \times 10^9$				p.r.	P.b.k.	761075
16.500	2-Nitrotoluene							
	$(\text{CH}_3)_2\dot{\text{COH}} + 2\text{-CH}_3\text{C}_6\text{H}_4\text{NO}_2 \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{2-CH}_3\text{C}_6\text{H}_4\text{NO}_2]^-$	$4.8 \times 10^8$	7			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ 2-PrOH.	761020
16.501	4-Nitrotoluene							
	$(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-CH}_3\text{C}_6\text{H}_4\text{NO}_2 \rightarrow [\text{4-CH}_3\text{C}_6\text{H}_4\text{NO}_2]^- + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1.4 \times 10^9$	4-5		293	p.r.	Cond.; $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol $\text{L}^{-1}$ 2-PrOH.	84A305
16.502	<i>p</i> -Nitro- $\alpha,\alpha,\alpha$ -trifluorotoluene							
	$(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-CF}_3\text{C}_6\text{H}_4\text{NO}_2 \rightarrow [\text{4-CF}_3\text{C}_6\text{H}_4\text{NO}_2]^- + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1.9 \times 10^9$	4.5-6		293	p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol $\text{L}^{-1}$ 2-PrOH; $\Delta H^\ddagger = 15.4 \text{ kJ mol}^{-1}$ , $\Delta S^\ddagger = -15 \text{ J K}^{-1} \text{ mol}^{-1}$ studied at 273-343 K.	88A099 84A305
16.503	5-Nitouracil							
	$(\text{CH}_3)_2\dot{\text{COH}} + 5\text{-NO}_2\text{U} \rightarrow [\text{5-NO}_2\text{U}]^{**} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$7 \times 10^8$				p.r.	P.b.k.	73A150
16.504	Norpseudopelletierine <i>N</i> -oxy							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{NPPN} \rightarrow$	$8.1 \times 10^8$				p.r.	D.k. at 242 nm in soln. contg. 2-PrOH.	710061
16.505	Orotate ion							
	$(\text{CH}_3)_2\dot{\text{COH}} + 6\text{-UCO}_2^- \rightarrow [\text{6-UCO}_2]^{**} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1 \times 10^8$				p.r.	P.b.k.	73A150
16.506	Penicillamine							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{PenSH} \rightarrow \text{PenS}^- + 2\text{-PrOH}$	$1.2 \times 10^8$				p.r.	C.k. with $\text{CCl}_3$ formation in $\text{N}_2\text{O}$ -satd. soln. contg. 50% 2-PrOH, varied $[\text{CCl}_4]$ and 0.01 mol $\text{L}^{-1}$ penicillamine; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{CCl}_4) = 1.2 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	89A469
		$3.0 \times 10^8$				p.r.	P.b.k. at 415 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH, penicillamine and ABTS <sup>2-</sup> ; the latter reacts with RS <sup>*</sup> to give ABTS <sup>**</sup> which is observed.	82Z335
16.507	1,10-Phenanthroline, conjugate acid							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{phenH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + [\text{phenH}_2]^{**}$	$3.2 \times 10^9$	1			p.r.	P.b.k. at 520 nm in soln. contg. 1 mol $\text{L}^{-1}$ 2-PrOH; $pK_a = 4.9$ .	80A115
		$1.9 \times 10^9$	3.0			p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol $\text{L}^{-1}$ 2-PrOH.	79A148
16.508	1,10-Phenanthroline							
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{phen} \rightarrow \text{CH}_3\text{COCH}_3 + \text{phenH}^*$	$1 \times 10^8$	5.5			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	80A115
		$<1 \times 10^7$	8					
		$1.2 \times 10^7$	7				P.b.k. in soln. contg. 2-PrOH and acetone.	79A148
	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{phen} \rightarrow \text{CH}_3\text{COCH}_3 + \text{phenH}^*$	$3.0 \times 10^9$	-13			p.r.	P.b.k. at 490 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol $\text{L}^{-1}$ 2-PrOH.	80A115

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
16.508	1,10-Phenanthroline — Continued							
		$5.7 \times 10^8$	13			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	79A305
		$6.0 \times 10^8$	13			p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	79A148
16.509	Phenazine							
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Pz} \rightarrow \text{CH}_3\text{COCH}_3 + \cdot\text{PzH}$	$3 \times 10^9$	13			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	79A305
16.510	Phenosafranine cation							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PSF}^+ \rightarrow$	$3.2 \times 10^9$	7			p.r.	D.k. at 520 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; 82% <i>e</i> -transfer.	731078
16.511	Phenyl- <i>N</i> - <i>tert</i> -butylnitronate							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PBN} \rightarrow$	$1.0 \times 10^7$				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. <i>p</i> -nitroacetophenone and 2-PrOH; rel. to $k((\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PNAP}) = 3.8 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	82A184
16.512	Phenythiourea							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_6\text{H}_5\text{NHCSNH}_2 \rightarrow \text{C}_6\text{H}_5\text{NH}\dot{\text{C}}(\text{SH})\text{NH}_2 + \text{CH}_3\text{COCH}_3$	$5 \times 10^8$	<0			p.r.	P.b.k. at 410 nm in N <sub>2</sub> O-purged soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and 3.5 mol L <sup>-1</sup> H <sub>2</sub> SO <sub>4</sub> ; yield of reduced species was lower at lower acid concn.	94A002
16.513	<i>p</i> -Phthalate ion							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + 1,4\text{-C}_6\text{H}_4(\text{CO}_2^-)_2 \rightarrow \text{CH}_3\text{COCH}_3 + [\text{1,4-C}_6\text{H}_4(\text{CO}_2^-)_2]^-$	$1.7 \times 10^7$	$\sim 13$			p.r.	P.b.k. at 360 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	89A242
16.514	Primaquine							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PQ} \rightarrow$	$1.3 \times 10^9$ $\leq 10^7$	1.8 ~7			p.r.	P.b.k. at 480-500 nm in soln. contg. 2-PrOH.	88A471
16.515	1,3-Propanediylbis(1'-methyl-4,4'-bipyridinium)							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PTQ}^{4+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{PTQ}^{3+}$	$3.5 \times 10^9$	7			p.r.	P.b.k. at 605 nm in N <sub>2</sub> O-satd. soln. contg. 1% 2-PrOH and $(0.4) \times 10^{-4}$ mol L <sup>-1</sup> viologen.	85A301
16.516	Pterin							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PnH} \rightarrow$	$4.5 \times 10^8$	7.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; ~100% <i>e</i> -transfer.	761060
16.517	Pterin, conjugate acid							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PnH}_2^+ \rightarrow$	$2.0 \times 10^9$	0.8			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; ~100% <i>e</i> -transfer.	761060
16.518	Pterin, conjugate base							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Pn}^- \rightarrow$	$\ll 10^7$	9.4			p.r.	No electron transfer obs. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	761060
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Pn}^- \rightarrow$	$1.5 \times 10^9$	13.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; ~100% <i>e</i> -transfer.	761060
16.519	Purine							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_5\text{H}_4\text{N}_4 \rightarrow$	$< 10^7$	6.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1-2 mol L <sup>-1</sup> 2-PrOH.	751060
16.520	Purine, conjugate monoacid							
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + (\text{C}_5\text{H}_4\text{N}_4)\text{H}^+ \rightarrow$	$2.7 \times 10^9$	$\sim 0$			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1-2 mol L <sup>-1</sup> 2-PrOH; $pK_a = 2.4, 9.0$ .	751060

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T(\text{K})$	Method	Comment	Ref.
16.521	Purine, conjugate base $(\text{CH}_3)_2\dot{\text{CO}}^- + \text{C}_5\text{H}_5\text{N}_4^- \rightarrow$	$<10^7$	13.3			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 1-2 mol $\text{L}^{-1}$ 2-PrOH.	751060
16.522	Pyrazine $(\text{CH}_3)_2\dot{\text{COH}} + \text{pz} \rightarrow$	$\ll 10^7$	5.0, 11.0			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	741127
	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{pz} \rightarrow$	$1.7 \times 10^9$	13.6			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	741127
16.523	Pyrazine, conjugate monoacid $(\text{CH}_3)_2\dot{\text{COH}} + \text{pzH}^+ \rightarrow$	$2.8 \times 10^9$	~0			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH; $k = 5 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ in 70% $\text{HClO}_4$ soln.	741127
16.524	Pyrazinecarboxylic acid $(\text{CH}_3)_2\dot{\text{COH}} + \text{pzCO}_2\text{H} \rightarrow 2 \text{H}^+ + \text{CH}_3\text{COCH}_3 + [\text{pzCO}_2]^{2-}$	$8.5 \times 10^8$	1-5.5			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol $\text{L}^{-1}$ 2-PrOH and $10^{-4}$ - $10^{-2}$ mol $\text{L}^{-1}$ $\text{pzCO}_2\text{H}/\text{pzCO}_2^-$ .	82A146
16.525	Pyrene $(\text{CH}_3)_2\dot{\text{CO}}^- + \text{Py} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Py}^{+-}$	$2.3 \times 10^9$	13			p.r.	P.b.k. at 495 nm in soln. contg. $2 \times 10^{-4}$ mol $\text{L}^{-1}$ pyrene, 0.2 mol $\text{L}^{-1}$ 2-PrOH, 0.1 mol $\text{L}^{-1}$ acetone and $5 \times 10^{-3}$	761062
16.526	Pyridazine $(\text{CH}_3)_2\dot{\text{CO}}^- + \text{pdz} + \text{H}_2\text{O} \rightarrow \text{CH}_3\text{COCH}_3 + [\text{pdzH}]^+ + \text{OH}^-$	$2.1 \times 10^9$	13.6			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	741127
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{pdz} \rightarrow$	$\ll 10^7$	5.0, 11.0			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	741127
16.527	Pyridazine, conjugate monoacid $(\text{CH}_3)_2\dot{\text{COH}} + \text{pdzH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + [\text{pdzH}_2]^{1+}$	$2.6 \times 10^9$	~0			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	741127
16.528	4-Pyridinealdoxime, conjugate acid $(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-HON}=\text{CHC}_5\text{H}_4\text{NH}^+ \rightarrow$	$1.7 \times 10^9$	acid			p.r.	P.b.k. (pyridinyl radical) in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	761182
16.529	4-Pyridinealdoxime $(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-HON}=\text{CHC}_5\text{H}_4\text{N} \rightarrow$	$\ll 10^7$	7			p.r.	P.b.k. (pyridinyl radical) in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH; $e$ -transfer in strong acid or base.	761182
	$(\text{CH}_3)_2\dot{\text{CO}}^- + 4\text{-HON}=\text{CHC}_5\text{H}_4\text{N} \rightarrow$	$1.7 \times 10^8$	13.3			p.r.	P.b.k. (pyridinyl radical) in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	761182
16.530	Pyridine-4-carboxamide, conjugate acid $(\text{CH}_3)_2\dot{\text{COH}} + 4\text{-pyH}^+\text{CONH}_2 \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + 4\text{-py(H)}\text{CONH}_2$	$1.2 \times 10^9$	acid	1.0	298	chem.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $\text{Cr}(\text{CH}_3)_2\text{OH}^{2+}$ , $0.077$ - $0.232$ mol $\text{L}^{-1}$ $\text{H}^+$ and $(1.56$ - $5.47) \times 10^{-3}$ mol $\text{L}^{-1}$ 4-pyH $^+\text{CONH}_2$ ; $k$ calcd. using $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Cr}^{2+}) = 5.1 \times 10^7 \text{ L mol}^{-1} \text{s}^{-1}$ and $k$ for homolysis of $\text{Cr}(\text{CH}_3)_2\text{OH}^{2+} = 0.127 \text{ s}^{-1}$ .	83A421
		$3.1 \times 10^9$	0.7			p.r.	P.b.k. (pyridinyl radical) in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH.	741089
16.531	2-Pyridinecarboxylate ion $(\text{CH}_3)_2\dot{\text{CO}}^- + 2\text{-pyCO}_2^- \rightarrow 2\text{-pyCO}_2^- + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$4 \times 10^7$	13.8			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ 2-PrOH.	91A257
16.532	3-Pyridinecarboxylate ion $(\text{CH}_3)_2\dot{\text{CO}}^- + 3\text{-pyCO}_2^- \rightarrow 3\text{-pyCO}_2^- + \text{CH}_3\text{COCH}_3$	$9 \times 10^7$	13.8			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ 2-PrOH.	91A257

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T(K)	Method	Comment	Ref.
16.532	3-Pyridinecarboxylate ion — Continued							
		$\geq 1 \times 10^8$	13.1			p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH.	741106
	(CH <sub>3</sub> ) <sub>2</sub> COH + 3-pyCO <sub>2</sub> <sup>-</sup> →	$< 1 \times 10^6$	8.2			p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH.	741106
16.533	4-Pyridinecarboxylate ion							
	(CH <sub>3</sub> ) <sub>2</sub> CO <sup>-</sup> + 4-pyCO <sub>2</sub> <sup>-</sup> → 4-pyCO <sub>2</sub> <sup>-</sup> +	$7 \times 10^7$	13.8			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	91A257
	CH <sub>3</sub> COCH <sub>3</sub>							
		$2 \times 10^8$	13.3			p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH.	741106
	(CH <sub>3</sub> ) <sub>2</sub> COH + 4-pyCO <sub>2</sub> <sup>-</sup> →	$< 1 \times 10^6$	9.0			p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH.	741106
16.534	2-Pyridinecarboxylic acid							
	(CH <sub>3</sub> ) <sub>2</sub> COH + 2-pyH <sup>+</sup> CO <sub>2</sub> <sup>-</sup> →	$1.5 \times 10^9$	0			p.r.	P.b.k. at 305 and 350 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH; pK <sub>a</sub> = 0.79, 5.39.	92A458
	[2-pyH <sup>+</sup> CO <sub>2</sub> <sup>-</sup> ] <sup>·-</sup> + CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup>	$1.5 \times 10^8$	3.8					
		$1.9 \times 10^9$	1			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	91A257
16.535	3-Pyridinecarboxylic acid							
	(CH <sub>3</sub> ) <sub>2</sub> COH + 3-pyH <sup>+</sup> CO <sub>2</sub> <sup>-</sup> →	$2 \times 10^8$	1			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH; pK <sub>a</sub> = 1.0, 4.83.	91A257
	[3-pyH <sup>+</sup> CO <sub>2</sub> <sup>-</sup> ] <sup>·-</sup> + CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup>	$1.8 \times 10^8$	3.4					
							P.b.k. at ~400 nm (pyridinyl radical) in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH.	741106
16.536	3-Pyridinecarboxylic acid, conjugate acid							
	(CH <sub>3</sub> ) <sub>2</sub> COH + 3-pyH <sup>+</sup> CO <sub>2</sub> H →	$3.5 \times 10^8$	0.0			p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH.	741106
16.537	4-Pyridinecarboxylic acid							
	(CH <sub>3</sub> ) <sub>2</sub> COH + 4-pyH <sup>+</sup> CO <sub>2</sub> <sup>-</sup> →	$3 \times 10^9$	1			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	91A257
	[4-pyH <sup>+</sup> CO <sub>2</sub> <sup>-</sup> ] <sup>·-</sup> + CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup>	$8.5 \times 10^8$	3.2			p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH.	741106
16.538	4-Pyridinecarboxylic acid, conjugate acid							
	(CH <sub>3</sub> ) <sub>2</sub> COH + 4-pyH <sup>+</sup> CO <sub>2</sub> H →	$2.0 \times 10^9$	0.4			p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> 2-PrOH.	741106
16.539	3,5-Pyridinedicarboxylate dianion							
	(CH <sub>3</sub> ) <sub>2</sub> CO <sup>-</sup> + 3,5-py(CO <sub>2</sub> ) <sub>2</sub> →	$1.6 \times 10^8$	13.8			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	91A257
	[3,5-py(CO <sub>2</sub> ) <sub>2</sub> ] <sup>·-</sup> + CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup>							
16.540	2,6-Pyridinedicarboxylate dianion							
	(CH <sub>3</sub> ) <sub>2</sub> CO <sup>-</sup> + 2,6-py(CO <sub>2</sub> ) <sub>2</sub> →	$1 \times 10^8$	13.8			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	91A257
	[2,6-py(CO <sub>2</sub> ) <sub>2</sub> ] <sup>·-</sup> + CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup>							
16.541	2,6-Pyridinedicarboxylic acid							
	(CH <sub>3</sub> ) <sub>2</sub> COH + 2,6-pyH <sup>+</sup> (CO <sub>2</sub> H)(CO <sub>2</sub> <sup>-</sup> ) →	$5 \times 10^8$	1			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	91A257
	[2,6-pyH <sup>+</sup> (CO <sub>2</sub> ) <sub>2</sub> ] <sup>·-</sup> + CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup>							
16.542	3,5-Pyridinedicarboxylic acid							
	(CH <sub>3</sub> ) <sub>2</sub> COH + 3,5-py(CO <sub>2</sub> H) <sub>2</sub> →	$2.2 \times 10^9$	1			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	91A257
	[3,5-pyH <sup>+</sup> (CO <sub>2</sub> ) <sub>2</sub> ] <sup>·-</sup> + CH <sub>3</sub> COCH <sub>3</sub> + H <sup>+</sup>							

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
<b>16.543 Pyridinium</b>								
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{pyH}^+ \rightarrow$	$9.6 \times 10^5$	acid	1.0	298	chem.	D.k. in N <sub>2</sub> -satd. soln. contg. CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.012-0.259 mol L <sup>-1</sup> H <sup>+</sup> and $(5.0-54) \times 10^{-3}$ mol L <sup>-1</sup> pyridinium perchlorate; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{Cr}^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	83A421
<b>16.544 Pyridinium, 4-(aminocarbonyl)-1-(3-carboxypropyl)-</b>								
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + 4\text{-NH}_2\text{COPy}^+(\text{CH}_2)_3\text{CO}_2^- \rightarrow$	$3.7 \times 10^9$	1		295	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	83B029
	$\text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{4-NH}_2\text{COPy}(\text{CH}_2)_3\text{CO}_2]^-$			5.5				
<b>16.545 3-Pyridinol, conjugate acid</b>								
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + 3\text{-HOpyH}^+ \rightarrow \text{addn.}$	$3.8 \times 10^8$	2.6			p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and 0.2 mol L <sup>-1</sup> acetone.	90A329
		$1.4 \times 10^8$	acid	1.0	298	chem.	D.k. in N <sub>2</sub> -satd. soln. contg. CrCH(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> , 0.046-0.203 mol L <sup>-1</sup> H <sup>+</sup> and $(2.65-9.36) \times 10^{-3}$ mol L <sup>-1</sup> 3-hydroxypyridinium perchlorate; <i>k</i> calcd. using $k((\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{Cr}^{2+}) = 5.1 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and <i>k</i> for homolysis of CrC(CH <sub>3</sub> ) <sub>2</sub> OH <sup>2+</sup> = 0.127 s <sup>-1</sup> .	83A421
<b>16.546 3-Pyridinol</b>								
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + 3\text{-pyOH} \rightarrow \text{addn.}$	$1.1 \times 10^7$	6.8			p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH and 0.2 mol L <sup>-1</sup> acetone.	90A329
<b>16.547 Pyridoxal 5-phosphate</b>								
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{PPH} \rightarrow \text{CH}_3\text{COCH}_3 + \cdot\text{PPH}_2$	$1.3 \times 10^8$	5.6			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	751024
<b>16.548 Pyridoxal 5-phosphate, conjugate acid</b>								
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{PPH}_2^+ + \text{H}^+ \rightarrow$	$5.8 \times 10^8$	1.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	751024
	$\text{CH}_3\text{COCH}_3 + \cdot\text{PPH}_3^+$							
<b>16.549 Pyridoxal 5-phosphate, conjugate base</b>								
	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{PP}^- + \text{H}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \cdot\text{PPH}_2^-$	$2.9 \times 10^8$	10.0, 13.3			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	751024
<b>16.550 Pyridoxine</b>								
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{PH} \rightarrow$	$\ll 10^7$	1.7, 13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	751024
<b>16.551 <math>\alpha</math>-(4-Pyridyl 1-oxide)-N-tert-butylnitrone</b>								
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + 4\text{-POBN} \rightarrow$	$1 \times 10^8$				p.r.	P.b.k. at 270 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	86A472 83A388
	$4\text{-POBN-COH}(\text{CH}_3)_2$							
		$3.8 \times 10^8$	11.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	84A426
<b>16.552 Pyrimidine</b>								
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{Pm} \rightarrow$	$\ll 10^7$	5.0, 11.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	741127
	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{Pm} \rightarrow$	$\ll 10^7$	13.6			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	741127
<b>16.553 Pyrimidine, conjugate monoacid</b>								
	$(\text{CH}_3)_2\dot{\text{CO}}\text{H} + \text{PmH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \cdot\text{PmH}_2^+$	$2.2 \times 10^9$	-0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	741127

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
16.554	Quinoxaline $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Qx} \rightarrow \text{CH}_3\text{COCH}_3 + \cdot\text{QxH}$	$1.6 \times 10^8$	6.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	741127
16.555	Quinoxaline, conjugate monoacid $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{QxH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \cdot\text{QxH}_2^+$	$3.7 \times 10^9$	-0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2 mol L <sup>-1</sup> HClO <sub>4</sub> and 2 mol L <sup>-1</sup> 2-PrOH; $k = 7.0 \times 10^8$ in 70% HClO <sub>4</sub> .	741127
16.556	Riboflavin $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{RF} \rightarrow$	$2.3 \times 10^9$	7.0			p.r.	P.b.k. at 560 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; <i>e</i> -transfer.	731104
16.557	Safranine cation $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{ST}^+ \rightarrow$	$2.8 \times 10^9$	7			p.r.	D.k. at 520 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH; 86% <i>e</i> -transfer.	731078
16.558	Tetracycline $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{TC} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{TC}^-$	$4.7 \times 10^7$	6.8			p.r.	P.b.k. at 630 nm in N <sub>2</sub> O-satd. soln. contg. 2-PrOH.	94A209
16.559	Tetrafluoro-1,4-benzoquinone $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{F}_4\text{Q} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{F}_4\text{O}^-$	$3.7 \times 10^9$	5.7			p.r.	P.b.k. at 435 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> 2-PrOH.	94A417
16.560	5,10,15,20-Tetrakis(4-carboxyphenyl)porphine $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{H}_2\text{TCPP}^{4+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{H}_2\text{TCPP}]^{5-}$	$9 \times 10^8$	7-11			p.r.	P.b.k. at 460 and 700 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH.	79A143
16.561	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphine $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{H}_2\text{TMpyP}^{4+} \rightarrow [\text{H}_2\text{TMpyP}]^{4+} + \text{CH}_3\text{COCH}_3$	$5 \times 10^9$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and $10^{-4}$ mol L <sup>-1</sup> porphyrin.	82A152
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{HTMpyP}^{3+} \rightarrow [\text{H}_2\text{TMpyP}]^{3+} + \text{CH}_3\text{COCH}_3$	$6.3 \times 10^9$	13			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and $10^{-4}$ mol L <sup>-1</sup> porphyrin.	82A152
16.562	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphine $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{H}_2\text{TPPS}^{4+} \rightarrow [\text{H}_2\text{TPPS}]^{4+} + \text{CH}_3\text{COCH}_3$	$5.0 \times 10^7$	8.0-8.5			p.r.	Abs. changes in soln. contg. 2-PrOH.	92A304
	$\sim 2 \times 10^9$	7				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and $10^{-4}$ mol L <sup>-1</sup> porphyrin.	82A152
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{HTPPS}^{5-} \rightarrow [\text{H}_2\text{TPPS}]^{5-} + \text{CH}_3\text{COCH}_3$	$\sim 1 \times 10^9$	13			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and $10^{-4}$ mol L <sup>-1</sup> porphyrin.	82A152
16.563	1,1'-Tetramethylene-2,2'-bipyridinium $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{BP}^{2+} \rightarrow \text{BP}^{+} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$3.0 \times 10^9$	7.0			p.r.	P.b.k. at $\sim 380$ nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH and $2.5 \times 10^{-4}$ mol L <sup>-1</sup> viologen.	84A292
16.564	4,5,4',5'-Tetramethyl-1,1'-ethylene-2,2'-bipyridinium $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{BP}^{2+} \rightarrow \text{BP}^{+} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$5.5 \times 10^8$	7.0			p.r.	P.b.k. at $\sim 380$ nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH and $2.5 \times 10^{-4}$ mol L <sup>-1</sup> viologen.	84A292
16.565	1,2,3,5-Tetramethylisoindole-4,7-dione $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{TMI} \rightarrow [\text{TMI}]^{+-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.3 \times 10^9$	7			p.r.	P.b.k. at 500 nm in deaerated soln. contg. 3 mol L <sup>-1</sup> 2-PrOH.	84R027
16.566	1,2,5,6-Tetramethyl-3-phenylisoindole-4,7-dione $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{TMPI} \rightarrow [\text{TMPI}]^{+-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.3 \times 10^9$	7			p.r.	P.b.k. at 500 nm in deaerated soln. contg. 3 mol L <sup>-1</sup> 2-PrOH.	84R027

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	I	T(K)	Method	Comment	Ref.
16.567	2,2,6,6-Tetramethylpiperidine- <i>N</i> -oxyl $(\text{CH}_3)_2\dot{\text{COH}} + \text{TMPN} \rightarrow$ electron transfer	$3.6 \times 10^8$	acid			p.r.	Cond.y.; $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	761067
16.568	2,2,6,6-Tetramethyl-4-piperidone <i>N</i> -oxyl $(\text{CH}_3)_2\dot{\text{COH}} + \text{TAN} \rightarrow$ addn.	$4.3 \times 10^8$	acid			p.r.	Cond.y.; $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	761067
		$4.7 \times 10^8$	5-6			p.r.	C.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{PNAP}) = 3.8 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	710618
		$3.9 \times 10^8$	5-6			p.r.	C.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + \text{Fe}(\text{CN})_6^{3-}) = 4.7 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	710618
16.569	4,5,4',5'-Tetramethyl-1,1'-tetramethylene-2,2'-bipyridinium $(\text{CH}_3)_2\dot{\text{COH}} + \text{BP}^{2+} \rightarrow \text{BP}^{+} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$1.7 \times 10^8$	7.0			p.r.	P.b.k. at ~380 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH and $2.5 \times 10^{-4}$ mol L <sup>-1</sup> viologen.	84A292
16.570	4,5,4',5'-Tetramethyl-1,1'-trimethylene-2,2'-bipyridinium $(\text{CH}_3)_2\dot{\text{COH}} + \text{BP}^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{BP}^{+}$	$9.0 \times 10^8$	7.0			p.r.	P.b.k. at ~380 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH and $2.5 \times 10^{-4}$ mol L <sup>-1</sup> viologen.	84A292
16.571	Tetranitromethane $(\text{CH}_3)_2\dot{\text{COH}} + \text{C}(\text{NO}_2)_4 \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{C}(\text{NO}_2)_3^- + \text{NO}_2$	$5 \times 10^9$	1.0			f.p.	P.b.k. at 365 nm in soln. contg. $8.5 \times 10^{-3}$ mol L <sup>-1</sup> $\text{TiO}_2$ and $(6-300) \times 10^{-6}$ mol L <sup>-1</sup> TNM, along with $\text{Cl}^-$ and 2-PrOH.	82N025
		$5.0 \times 10^9$				p.r.	P.b.k. at 350 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	640133
16.572	Thiamine, conjugate acid $(\text{CH}_3)_2\dot{\text{COH}} + \text{ThmH}^{2+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Thm} + \text{H}^+$	$2.2 \times 10^8$	0.5			p.r.	P.b.k. in soln. contg. 2-PrOH.	771034
16.573	Thiamine cation $(\text{CH}_3)_2\dot{\text{COH}} + \text{Thm}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{Thm} + \text{H}^+$	$1.9 \times 10^8$	6.6			p.r.	P.b.k. in soln. contg. 2-PrOH.	771034
16.574	Thiazole $(\text{CH}_3)_2\dot{\text{CO}}^- + \text{Tz} \rightarrow$		13.3			p.r.	No electron transfer obs.	771034
16.575	Thiazole, conjugate acid $(\text{CH}_3)_2\dot{\text{COH}} + \text{TzH}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{TzH}$	$6.2 \times 10^8$	0.8			p.r.	P.b.k. in soln. contg. 2-PrOH.	771034
16.576	Thionine cation $(\text{CH}_3)_2\dot{\text{COH}} + \text{Th}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{Th}$	$4.6 \times 10^9$	6.8			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH and $10^{-4}$ mol L <sup>-1</sup> thionine.	87A451
		$4.2 \times 10^9$	8			p.r.	D.k. at 600 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH; 88% <i>e</i> -transfer.	731078
16.577	Thiosemicarbazide $(\text{CH}_3)_2\dot{\text{COH}} + \text{NH}_2\text{NHCSNH}_2 \rightarrow$	$2.0 \times 10^8$	<0			p.r.	P.b.k. at 400 nm in soln. contg. 3.6 mol L <sup>-1</sup> $\text{H}_2\text{SO}_4$ and 1 mol L <sup>-1</sup> 2-PrOH. Mechanism suggested to be protonation at S and H abstr. from NH.	94A284
16.578	Toluidine Blue cation $(\text{CH}_3)_2\dot{\text{COH}} + \text{TB}^+ \rightarrow \text{CH}_3\text{COCH}_3 + [\text{TBH}]^{+}$	$3.7 \times 10^9$	6.8			p.r.	P.b.k. at 830 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	89A262

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T$ (K)	Method	Comment	Ref.
16.579	Trichloroacetate ion $(\text{CH}_3)_2\dot{\text{CO}} + \text{Cl}_3\text{CCO}_2^- \rightarrow$	$5 \times 10^6$				p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to $k((\text{CH}_3)_2\dot{\text{CO}} + \text{PNAP}) = 3.8 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	731140
	$(\text{CH}_3)_2\dot{\text{CO}}^- + \text{Cl}_3\text{CCO}_2^- \rightarrow$	$3 \times 10^6$	13			p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to $k((\text{CH}_3)_2\dot{\text{CO}} + \text{PNAP}) = 3.8 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	731140
16.580	Trifluoroacetate ion $(\text{CH}_3)_2\dot{\text{CO}} + \text{CF}_3\text{CO}_2^- \rightarrow$	$<1 \times 10^5$				p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to $k((\text{CH}_3)_2\dot{\text{CO}} + \text{PNAP}) = 3.8 \times 10^9 \text{ L mol}^{-1} \text{s}^{-1}$ .	731140
16.581	2-[3-( <i>N,N,N</i> -Trimethylammonio)-2-hydroxypropyl]-3,4-dimethyl-9-oxothioxanthene $(\text{CH}_3)_2\dot{\text{CO}}^- + \text{TX}^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{TX}^+$	$4.0 \times 10^8$	12			p.r.	D.k. in $\text{N}_2$ -satd. soln. contg. 10% 2-PrOH.	88A109
16.582	2,3,5-Trimethyl-1,4-benzoquinone $(\text{CH}_3)_2\dot{\text{CO}} + 2,3,5-(\text{CH}_3)_3\text{Q} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [2,3,5-(\text{CH}_3)_3\text{Q}]^{2-}$	$3.6 \times 10^9$	7			p.r.	P.b.k. in soln. contg. 1 mol $\text{L}^{-1}$ 2-PrOH and 1 mol $\text{L}^{-1}$ acetone.	730125
16.583	1,1'-Trimethylene-2,2'-bipyridinium $(\text{CH}_3)_2\dot{\text{CO}} + \text{TQ}^{2+} \rightarrow \text{TQ}^{+} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$3.9 \times 10^9$	7.0			p.r.	P.b.k. at ~380 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.2 mol $\text{L}^{-1}$ 2-PrOH and $2.5 \times 10^{-4}$ mol $\text{L}^{-1}$ viologen.	84A292
16.584	1,2,5-Trimethyl-3-phenylisoindole-4,7-dione $(\text{CH}_3)_2\dot{\text{CO}} + \text{TMPI} \rightarrow [\text{TMPI}]^{2-} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$\sim 2.4 \times 10^9$				p.r.	P.b.k. at 500 nm in deaerated soln. contg. 1 mol $\text{L}^{-1}$ 2-PrOH.	82A329
16.585	2,4,6-Trinitrobenzoate ion $(\text{CH}_3)_2\dot{\text{CO}} + 2,4,6-(\text{NO}_2)_3\text{C}_6\text{H}_2\text{CO}_2^- \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [2,4,6-(\text{NO}_2)_3\text{C}_6\text{H}_2\text{CO}_2]^{2-}$	$3.9 \times 10^9$	7			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 2-PrOH; $k$ at pH 0.8 within 20-30%.	761111
16.586	Trypan Blue tetraanion $(\text{CH}_3)_2\dot{\text{CO}} + \text{TB}^{4-} \rightarrow$	$3 \times 10^9$				p.r.	P.b.k.	73A150
16.587	Ubiquinone 30 $(\text{CH}_3)_2\dot{\text{CO}} + \text{UQ} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + \text{UQ}^{2-}$	$1.9 \times 10^9$	7			p.r.	P.b.k. in soln. contg. 7 mol $\text{L}^{-1}$ 2-PrOH and 1 mol $\text{L}^{-1}$ acetone.	730125
16.588	Vitamin K <sub>1</sub> $(\text{CH}_3)_2\dot{\text{CO}} + 2-\text{Me}(3\text{-phytyl})\text{NQ} \rightarrow \text{CH}_3\text{COCH}_3 + \text{Me}(\text{phytyl})\text{NQ}^{2-} + \text{H}^+$	$1.7 \times 10^9$	7			p.r.	P.b.k. in soln. contg. 5 mol $\text{L}^{-1}$ 2-PrOH and 2 mol $\text{L}^{-1}$ acetone.	730125
16.589	1,1'-[ <i>o</i> -Xylylene(1-methyl-4,4'-bipyridinium)] $(\text{CH}_3)_2\dot{\text{CO}} + \text{DV}^{4+} \rightarrow [\text{DV}]^{3+} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$3.5 \times 10^9$	7			p.r.	P.b.k. at 605 nm in $\text{N}_2$ -satd. soln. contg. 1% 2-PrOH and $(0-4) \times 10^{-4}$ mol $\text{L}^{-1}$ viologen.	85A301
16.590	1,1'-[ <i>m</i> -Xylylene(1-methyl-4,4'-bipyridinium)] $(\text{CH}_3)_2\dot{\text{CO}} + \text{DV}^{4+} \rightarrow [\text{DV}]^{3+} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$3.3 \times 10^9$	7			p.r.	P.b.k. at 605 nm in $\text{N}_2$ -satd. soln. contg. 1% 2-PrOH and $(0-4) \times 10^{-4}$ mol $\text{L}^{-1}$ viologen.	85A301
16.591	1,1'-[ <i>p</i> -Xylylene(1-methyl-4,4'-bipyridinium)] $(\text{CH}_3)_2\dot{\text{CO}} + \text{DV}^{4+} \rightarrow [\text{DV}]^{3+} + \text{CH}_3\text{COCH}_3 + \text{H}^+$	$2.9 \times 10^9$	7			p.r.	P.b.k. at 605 nm in $\text{N}_2$ -satd. soln. contg. 1% 2-PrOH and $(0-4) \times 10^{-4}$ mol $\text{L}^{-1}$ viologen.	85A301
16.592	1,1'- <i>o</i> -Xylylenebis(4,4'-bipyridinium) $(\text{CH}_3)_2\dot{\text{CO}} + \text{DV}^{4+} \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}^+ + [\text{DV}]^{3+}$	$3.6 \times 10^9$	7			p.r.	P.b.k. at 605 nm in $\text{N}_2$ -satd. soln. contg. 1% 2-PrOH and $(0-4) \times 10^{-4}$ mol $\text{L}^{-1}$ viologen.	85A301

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>16.593 Cytochrome C</b>								
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Cyt C}(\text{Fe}^{3+}) \rightarrow (\text{CH}_3)_2\text{COCH}_3 + \text{H}^+ + \text{Cyt C}(\text{Fe}^{2+})$	$3.9 \times 10^8$	8.0-			p.r.	Abs. changes at 550 nm in soln. contg. 0.1 mol L <sup>-1</sup> 2-PrOH.	89R257
		$2.6 \times 10^8$	8.5			p.r.	P.b.k. at 550 nm in soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH, (0.005-0.01) mol L <sup>-1</sup> acetone and 6 mg L <sup>-1</sup> catalase; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + (\text{CH}_3)_2\dot{\text{COH}}) = 2 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	82A156
		$3.8 \times 10^8$	7.2			p.r.	P.b.k. at 550 nm; radical from 2-PrOH.	751012
		$1.6 \times 10^8$	9.3					
<b>16.594 Deoxyribonucleic acid</b>								
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{DNA} \rightarrow$	$7.4 \times 10^3$	9.2			γ-r.	Calcd. from inactivation efficiency in N <sub>2</sub> O-satd. soln. contg. $10^{-4}$ mol L <sup>-1</sup> MgCl <sub>2</sub> , $10^{-3}$ mol L <sup>-1</sup> Na tetraborate, and 2-PrOH.	88R099
								83R032
<b>16.595 Methemoglobin</b>								
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Fe}^{3+} \text{ Hb} \rightarrow (\text{CH}_3)_2\text{COCH}_3 + \text{H}^+ + \text{Fe}^{2+} \text{ Hb}$	$2.4 \times 10^8$	7.2			p.r.	P.b.k. at 555 nm in soln. contg. 0.2 mol L <sup>-1</sup> 2-PrOH, (0.005-0.01) mol L <sup>-1</sup> acetone and 6 mg L <sup>-1</sup> catalase; rel. to $k((\text{CH}_3)_2\dot{\text{COH}} + (\text{CH}_3)_2\dot{\text{COH}}) = 2 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	82A156
<b>16.596 Metmyoglobin</b>								
	$(\text{CH}_3)_2\dot{\text{COH}} + \text{Fe}^{3+} \text{ Mb} \rightarrow (\text{CH}_3)_2\text{COCH}_3 + \text{H}^+ + \text{Fe}^{2+} \text{ Mb}$	$\sim 1 \times 10^8$	7.5			p.r.	P.b.k.	79A371

TABLE 17. 2-Hydroxy-2,2-dimethylethyl

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T$ (K)	Method	Comment	Ref.
17.1	2-Hydroxy-2,2-dimethylethyl							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + ^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} \rightarrow (\text{CH}_3)_2\text{C}(\text{OH})\text{CH}_2\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH}$	$6 \times 10^8$	6		294	p.r.	D.k. at 227 nm in $\text{N}_2\text{O}$ -sattd. soln. contg. 1 $\text{mol L}^{-1}$ <i>tert</i> -BuOH; $\epsilon = 960 \text{ L mol}^{-1} \text{cm}^{-1}$	92A447
		$7 \times 10^8$	6			p.r.	D.k. in $\text{N}_2\text{O}$ -sattd. soln. contg. <i>tert</i> -BuOH; $\epsilon = 900, 200$ and $30 \text{ L mol}^{-1} \text{cm}^{-1}$ at 225, 250 and 280 nm, resp.; $2k/\epsilon = 1.3 \times 10^7$ and $1.1 \times 10^7 \text{ cm s}^{-1}$ at pH 6 and 13.5, resp.	690419
		$6 \times 10^8$	13.5					
17.2	Disilver monocation							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Ag}_2^+ \rightarrow \text{Ag}^+ + \text{Ag}^+ + \text{OH}^- + \text{CH}_2=\text{C}(\text{CH}_3)_2$	$2.0 \times 10^9$				p.r.	Calcd. from best fit for increase in condy. as function of time in soln. contg. $0.1 \text{ mol L}^{-1}$ <i>tert</i> -BuOH and $5 \times 10^{-4} \text{ mol L}^{-1}$ $\text{AgClO}_4$ .	78A410
17.3	Silver(I) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Ag}^+ \rightarrow$					p.r.	No reaction to give $\text{Ag}^0$ in soln. contg. $0.1 \text{ mol L}^{-1}$ <i>tert</i> -BuOH.	78A410
17.4	Bismuth(III) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Bi}^{3+} \rightarrow \text{BiCH}_2\text{C}(\text{CH}_3)_2\text{OH}^{3+}$	$4 \times 10^6$	<0			p.r.	P.b.k. at ~400 nm in Ar-sattd. soln. contg. $5 \text{ mol L}^{-1}$ $\text{HClO}_4$ and <i>tert</i> -BuOH.	88A493
17.5	Bromine							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Br}_2 \rightarrow \text{BrCH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Br}^{\cdot}$	$2.5 \times 10^9$	~4		296	p.r.	P.b.k. at 360 nm in $\text{N}_2\text{O}$ -sattd. soln. contg. $0.001 \text{ mol L}^{-1}$ $\text{Br}^-$ , $(5-30) \times 10^{-5} \text{ mol L}^{-1}$ $\text{Br}_2$ and $1 \text{ mol L}^{-1}$ <i>tert</i> -BuOH.	93A156
17.6	Cadmium(I) ions							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cd}^{2+} \rightarrow \text{Cd}^{2+} + \text{CH}_2=\text{C}(\text{CH}_3)_2 + \text{OH}^-$	$\sim 1 \times 10^9$				p.r.	Calcd. from opt. and condy. studies in soln. contg. <i>tert</i> -BuOH and $\text{Cd}^{2+}$ .	751064
17.7	Cadmium dimer dication							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cd}_2^{2+} \rightarrow \text{OH}^- + \text{Cd}^{2+} + \text{CH}_2=\text{C}(\text{CH}_3)_2 + \text{Cd}^{2+}$	$\sim 1 \times 10^9$				p.r.	Calcd. from opt. and condy. studies in soln. contg. <i>tert</i> -BuOH and $\text{Cd}^{2+}$ .	751064
17.8	Cadmium(II) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cd}^{2+} \rightarrow$	$<10^6$				p.r.	Estd. from lack of increase in $\text{Cd}^{2+}$ in soln. contg. $0.1 \text{ mol L}^{-1}$ $\text{Cd}^{2+}$ upon addn. of $0.1 \text{ mol L}^{-1}$ <i>tert</i> -BuOH.	751027
		$<2.5 \times 10^5$				p.r.	No reaction obs.	751153
17.9	<i>N</i> -rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(I) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + N\text{-rac-Co}(4,11\text{-dieneN}_4)^+ \rightarrow$	$2 \times 10^8$	7		298	p.r.	D.k. in soln. contg. $\text{H}_2\text{PO}_4^{2-}$ and $0.5 \text{ mol L}^{-1}$ <i>tert</i> -BuOH.	91A513
17.10	<i>N</i> -rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(I) ion, protonated							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + N\text{-rac-Co}(4,11\text{-dieneN}_4)(\text{H})^{2+} \rightarrow$	$2 \times 10^8$	7		298	p.r.	D.k. in soln. contg. $\text{H}_2\text{PO}_4^{2-}$ and $0.5 \text{ mol L}^{-1}$ <i>tert</i> -BuOH.	91A513
17.11	Cobalt(II) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Co}^{2+} \rightarrow$	$<10^6$				p.r.	Estd. from lack of increase in $\text{Co}^{2+}$ in soln. contg. $0.1 \text{ mol L}^{-1}$ $\text{Co}^{2+}$ upon addn. of $0.1 \text{ mol L}^{-1}$ <i>tert</i> -BuOH.	751027
17.12	<i>N</i> -meso-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + N\text{-meso-Co}(4,11\text{-dieneN}_4)^{2+} \rightarrow$	$2 \times 10^7$	7		298	p.r.	D.k. in $\text{N}_2$ -sattd. soln. contg. $0-0.25 \text{ mol L}^{-1}$ <i>tert</i> -BuOH and $(0.05-1.8) \times 10^{-3} \text{ mol L}^{-1}$ <i>N</i> -meso-Co(4,11-dieneN <sub>4</sub> ) <sup>2+</sup> .	91A513
	$N\text{-meso-HOC(CH}_3)_2\text{CH}_2\text{Co}(4,11\text{-dieneN}_4)^{2+}$							

TABLE 17. 2-Hydroxy-2,2-dimethylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	<i>rH</i>	<i>I</i>	T (K)	Method	Comment	Ref.
17.13	<i>N</i> -rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion							
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{N-rac-Co}(4,11\text{-dieneN}_4)^{2+} \rightarrow$	$1.4 \times 10^6$	7		298	p.r.	D.k. in N <sub>2</sub> -satd. soln. contg. 0-0.25 mol L <sup>-1</sup> <i>tert</i> -BuOH and (0.05-1.8) × 10 <sup>-3</sup> mol L <sup>-1</sup> <i>N</i> -rac-Co(4,11-dieneN <sub>4</sub> ) <sup>2+</sup> .	91A513
	$\text{HO}(\text{CH}_3)_2\text{CH}_2\text{Co}(4,11\text{-dieneN}_4)^{2+}$	$<1 \times 10^7$				p.r.	No reaction obs.	78A200
17.14	Nitrilotriacetatocobaltate(II) ion							
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{CoNTA}^- \rightarrow$	$1.1 \times 10^7$	7			p.r.	P.b.k. at 330 nm in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> <i>tert</i> -BuOH.	79A255
	$\text{HO}(\text{CH}_3)_2\text{CH}_2\text{CoNTA}^-$							
17.15	3,10,17,24-Tetrasulfophthalocyaninecobaltate(II) ion							
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Co(tspc)}^{4-} \rightarrow$	$4.5 \times 10^9$	3-12			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. <i>tert</i> -BuOH; monomer and dimer reactions not differentiated.	83A238
	$\text{HO}(\text{CH}_3)_2\text{CH}_2\text{Co(tspc)}^{4-}$	$1 \times 10^8$				p.r.	P.b.k. at 675 nm in N <sub>2</sub> O-satd. soln. contg. <i>tert</i> -BuOH. Reaction of aggregated Co(tspc) <sup>4-</sup> . Rate constant for monomer is higher (monomerized by high alcohol concn.).	82A433
		$2.2 \times 10^8$	9			p.r.	P.b.k. at 440 nm in N <sub>2</sub> O-satd. soln. contg. 0.1-0.2 mol L <sup>-1</sup> <i>tert</i> -BuOH; mechanism suggested to involve addn. to the dimer [Co(tspc)] <sub>2</sub> <sup>8-</sup> followed by splitting to the monomeric product.	80A146
17.16	Cobal(II)amin							
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{B12r} \rightarrow \text{B12a}$	$2.4 \times 10^8$	5			p.r.	P.b.k. at 350-60 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	751169
17.17	Chromium(II) ion							
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cr}^{2+} \rightarrow$	$1.0 \times 10^8$	-3		293	p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> Cr <sup>2+</sup> and <i>tert</i> -BuOH; $\Delta V_{\frac{1}{2}} = 3.4 \text{ cm}^3 \text{ mol}^{-1}$ studied at 0.1-150 MPa.	92A361
	$\text{CrCH}_2\text{C}(\text{CH}_3)_2\text{OH}^{2+}$	$1.0 \times 10^8$	-1			p.r.	P.b.k. in Ar-satd. soln. contg. <i>tert</i> -BuOH and HClO <sub>4</sub> .	741146
17.18	Chromium(III) mesoporphyrin							
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cr}^{\text{III}}\text{MP} \rightarrow \text{addn.}$	$-1 \times 10^{10}$				p.r.	P.b.k. in deoxygenated soln. contg. <i>tert</i> -BuOH.	92G079
17.19	Copper(I) ion							
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cu}^+ \rightarrow$	$4.5 \times 10^9$	2.7-			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. (5-20) × 10 <sup>-4</sup> mol L <sup>-1</sup> CuSO <sub>4</sub> , (5-30) × 10 <sup>-5</sup> mol L <sup>-1</sup> Cu <sup>+</sup> , (5-30) × 10 <sup>-5</sup> mol L <sup>-1</sup> Cr <sup>III</sup> , and 0.1-1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	88A410
	$\text{CuCH}_2\text{C}(\text{CH}_3)_2\text{OH}^+$		4.5					
		$2.6 \times 10^{10}$	4.5			p.r.	Estd. from p.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. <i>tert</i> -BuOH and Cu <sup>2+</sup> ; final products are Cu <sup>2+</sup> and isobutene.	78A322
17.20	Ethylene-copper(I) complex							
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{CuC}_2\text{H}_4^+ \rightarrow$	$5.3 \times 10^7$	4.5				Estd. from effect of [C <sub>2</sub> H <sub>4</sub> ] on rate of formn. and decay of Cu(ethylene) <sup>+</sup> at 227 nm in soln. contg. <i>tert</i> -BuOH.	78A322
	$\text{H}_2\text{C}=\text{CH}_2 + \text{CH}_2=\text{C}(\text{CH}_3)_2 + \text{Cu}^{2+} + \text{OH}^-$							
17.21	Bis(1,10-phenanthroline)copper(I) ion							
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cu}(\text{phen})_2^+ \rightarrow$	$>10^{10}$	7			p.r.	P.b.k. in He-satd. soln. contg. 0.01-1 mol L <sup>-1</sup> <i>tert</i> -BuOH and (1-5) × 10 <sup>-4</sup> mol L <sup>-1</sup> Cu(phen) <sub>2</sub> <sup>+</sup> .	88A392
	$\text{HO}(\text{CH}_3)_2\text{CH}_2\text{Cu}(\text{phen})_2^+$							

TABLE 17. 2-Hydroxy-2,2-dimethylethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
17.22	Copper(II) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cu}^{2+} \rightarrow$ $\text{CuCH}_2\text{C}(\text{CH}_3)_2\text{OH}^{2+}$	$5 \times 10^6$	6			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. (1-5) × 10 <sup>-4</sup> mol L <sup>-1</sup> CuSO <sub>4</sub> and 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	80A277
		$2.7 \times 10^6$	4.5			p.r.	P.b.k. at 320 nm (Cu <sup>1</sup> CH <sub>2</sub> CHCONH <sub>2</sub> ) in N <sub>2</sub> O-satd. soln. contg. <i>tert</i> -BuOH and acrylamide. Product is Cu <sup>+</sup> .	78A322
		$3.2 \times 10^6$	3					
17.23	Copper(II) triglycine							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{O}^{\bullet-} + \text{Cu}(\text{Gly}_3)^{\bullet-} \rightarrow$ $(\text{Gly}_3)\text{CuCH}_2\text{C}(\text{CH}_3)_2\text{OH}^{\bullet-}$	$2.6 \times 10^7$	-7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	79A445
17.24	Copper(II) tetraglycine							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cu}(\text{Gly}_4)^{\bullet-} \rightarrow$ $(\text{Gly}_4)\text{CuCH}_2\text{C}(\text{CH}_3)_2\text{OH}^{2+}$	$2 \times 10^7$	8.1			p.r.	P.b.k. at 320 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	80A304
17.25	Pentacyanonitrosylferrate(II) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Fe}(\text{CN})_5\text{NO}^{2-} \rightarrow$ $[\text{Fe}(\text{CN})_5\text{N}(\text{O})\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH}]^{3-}$	$2.5 \times 10^9$	6.0			p.r.	D.k. at 380 nm, as well as p.b.k. in soin. contg. 0.3 mol L <sup>-1</sup> <i>tert</i> -BuOH and 5 × 10 <sup>-4</sup> mol L <sup>-1</sup> Fe(CN) <sub>5</sub> NO <sup>2-</sup> .	79A134
			7.5					
17.26	Ethylenediaminetetraacetatoferate(II) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{FeEDTA}^{2-} \rightarrow$ $\text{CH}_2=\text{C}(\text{CH}_3)_2 + \text{OH}^{\bullet-} + \text{FeEDTA}^{-}$	$\sim 2 \times 10^6$	7	296	chem.		Esr study in soln. contg. Fe(II), EDTA, H <sub>2</sub> O <sub>2</sub> and <i>tert</i> -BuOH.	92D262
17.27	Tris(1,10-phenanthroline)iron(III) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Fe}(\text{phen})_3^{3+} \rightarrow$ $\text{Fe}(\text{phen})_3^{2+} + \text{other prod.}$	$1.5 \times 10^7$	-1			p.r.	P.b.k. at 490 nm in soln. contg. <i>tert</i> -BuOH; faster reactions assigned to H and OH + complex.	85A284
		$\sim 10^7$	acid			p.r.	P.b.k. in soln. contg. <i>tert</i> -BuOH, H <sub>2</sub> SO <sub>4</sub> and HClO <sub>4</sub> ; slower process follows fast H reaction.	79A174
17.28	Mercury(I) cyanide							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{HgCN} \rightarrow$	$1.6 \times 10^9$				p.r.	Calcd. from increase in decay rate at 285 nm in soln. contg. <i>tert</i> -BuOH and Hg(CN) <sub>2</sub> ; used $2k(\text{HgCN} + \text{HgCN}) = 3.4 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	751203
17.29	Hexachloroiridate(IV) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{IrCl}_6^{2-} \rightarrow \text{IrCl}_5^{2-} +$ $\text{ClCH}_2\text{C}(\text{CH}_3)_2\text{OH}$	$1.2 \times 10^9$	4-6	295	p.r.		D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. <i>tert</i> -BuOH.	82A041
17.30	5,10,15,20-Tetrakis(4-sulfonophenyl)porphinatomanganate(II) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{MnTPPS}^{4-} \rightarrow$ $\text{HO}(\text{CH}_3)_2\text{CH}_2\text{MnTPPS}^{4-}$	$\sim 9.5 \times 10^8$	8.8	295	p.r.		P.b.k. in soln. contg. <i>tert</i> -BuOH.	92A391
		$\sim 9.5 \times 10^8$	9.4, 12.6			p.r.	D.k. as well as p.b.k.	84A120
17.31	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatomanganate(II) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{MnTMyP}^{4+} \rightarrow$ $\text{HO}(\text{CH}_3)_2\text{CH}_2\text{MnTMyP}^{4+}$	$\sim 1.8 \times 10^9$	9.0			p.r.	D.k. as well as p.b.k.	84A120
17.32	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatomanganate(III) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{MnTMyP}^{5+} \rightarrow$ $\text{MnTMyP}^{4+} + \text{other prod.}$	$4 \times 10^4$	6.7 9.3			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313
17.33	5,10,15,20-Tetrakis[4-( <i>N,N,N</i> -trimethylammonio)phenyl]porphinatomanganate(III) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{MnTAPP}^{5+} \rightarrow$ $\text{MnTAPP}^{4+} + \text{other prod.}$	$5.0 \times 10^4$	6.7			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313

TABLE I7. 2-Hydroxy-2,2-dimethylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
17.34	$\alpha,\alpha,\alpha,\beta$ -Tetrakis[2-( <i>N</i> -methylisonicotinamido)phenyl]porphinatomanganese(III) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{MnPFP}^{5+} \rightarrow$ $\text{MnPFP}^{4+} + \text{other prod.}$	$1.6 \times 10^5$	7.0			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313
17.35	Nickel(I) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Ni}^+ \rightarrow \text{Ni}^{2+} +$ $\text{CH}_2=\text{C}(\text{CH}_3)_2 + \text{OH}^-$	$3 \times 10^9$				p.r.	D.k. at 300 nm ( $\text{Ni}^+$ ) in soln. contg. $\text{NiSO}_4$ and <i>tert</i> -BuOH; assumed $G(\text{Ni}^+) = G(\text{R}) = 2.7$ .	741037
17.36	Nickel(II) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Ni}^{2+} \rightarrow$	$<10^6$				p.r.	Estd. from lack of increase in $\text{Ni}^+$ in soln. contg. 0.1 mol L <sup>-1</sup> $\text{Ni}^{2+}$ on addn. of 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	751027
17.37	Oxygen							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{O}_2 \rightarrow$ $(\text{CH}_3)_2\text{C}(\text{OH})\text{CH}_2\text{OO}^{\bullet}$	$1.4 \times 10^9$	6		295	p.r.	P.b.k. at 320 nm in $\text{O}_2$ -satd. soln. contg. <i>tert</i> -BuOH.	92A447
		$1.8 \times 10^9$				p.r.	P.b.k. at 260 nm in soln. contg. <i>tert</i> -BuOH and various $[\text{O}_2]$ .	90F447
17.38	<i>trans</i> -Dihydroxybis(ethylenediamine)platinum(IV) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} +$ $\text{trans-Pt(en)}_2(\text{OH})_2^{2+} \rightarrow$	$<2 \times 10^7$	3.9-			p.r.	No reaction obs. in soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH and (1 or 2.5) $\times 10^{-4}$ mol L <sup>-1</sup> $\text{Pt}(\text{en})(\text{OII})_2^{2+}$ .	80A286
17.39	Hexachloroplatinate(IV) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{PtCl}_6^{2-} \rightarrow$ $\text{PtCl}_2(\text{OH})_2^- + \text{Cl}^- + \text{H}^+$ $\text{ClCH}_2\text{C}(\text{CH}_3)_2\text{OH}$	$6.1 \times 10^7$	4.3			p.r.	P.b.k. at 370-460 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.11 or 0.51 mol L <sup>-1</sup> <i>tert</i> -BuOH, and 2 $\times 10^{-3}$ or $6.2 \times 10^{-3}$ mol L <sup>-1</sup> $\text{PtCl}_6^{2-}$ ; condy. increase gave $k = 6.0 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> .	89A203
17.40	Pentaamminenitrosylruthenium(II) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Ru}(\text{NH}_3)_5\text{NO}^{2+} \rightarrow$ $\text{Ru}(\text{NH}_3)_5\text{N(O)}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH}^{2+}$	$3.7 \times 10^9$	6.0-			p.r.	D.k. at 280 nm, as well as p.b.k. in soln. contg. 0.3 mol L <sup>-1</sup> <i>tert</i> -BuOH and $5 \times 10^{-4}$ mol L <sup>-1</sup> $\text{Ru}(\text{NH}_3)_5\text{NO}^{3+}$ .	79A134
17.41	Tris(2,2'-bipyridine)ruthenium(II) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Ru}(\text{bpy})_3^{2+} \rightarrow$	$<10^6$	7			p.r.	P.b.k.; no reduction obs.	78A068
17.42	Tris(2,2'-bipyridine)ruthenium(III) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Ru}(\text{bpy})_3^{3+} \rightarrow$ $\text{Ru}(\text{bpy})_3^{2+}$	$1.9 \times 10^8$	4.6			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. <i>tert</i> -BuOH.	78A070
		$1.3 \times 10^8$	acid			p.r.		720462
17.43	Decaamminebis(2,2'-bipyridine)bis[ $\mu$ -(cyano)]triruthenium(III),(II),(III) ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + [3,2,3] \rightarrow$	$<1 \times 10^6$	2			p.r.	No reaction obs. in 0.5 mol L <sup>-1</sup> <i>tert</i> -BuOH; redn. to $[3,2,3]^-$ obs. in $\gamma$ -radiolysis.	89A024
17.44	Hydrogen sulfide							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{H}_2\text{S} \rightarrow$ $\text{H}_2\text{SCH}_2\text{C}(\text{CH}_3)_2\text{OH}$	$2.0 \times 10^5$	7			p.r.	P.b.k. at 380 nm in soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH and (0.5-2) $\times 10^{-3}$ mol L <sup>-1</sup> $\text{H}_2\text{S}$ ; $K = 8.5 \times 10^2$ L mol <sup>-1</sup> ; Products are $\text{HS}^{\bullet}$ + <i>tert</i> -BuOH.	87A082
			6			p.r.	Effect of $[\text{H}_2\text{S}]$ on p.b.k. at 380 nm; $k(\text{complex} \rightarrow \text{tert-BuOH} + \text{HS}^{\bullet}) = 1.3 \times 10^5$ s <sup>-1</sup> .	670262
17.45	Peroxodisulfate ion							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{S}_2\text{O}_8^{2-} \rightarrow$	$<10^4$			-293	chem.	Esr; soln. contg. 0.008 mol L <sup>-1</sup> Ti(III), 0.01 mol L <sup>-1</sup> $\text{H}_2\text{O}_2$ , (0-0.025) mol L <sup>-1</sup> $\text{S}_2\text{O}_8^{2-}$ and $-0.01$ mol L <sup>-1</sup> <i>tert</i> -BuOH.	84D044

TABLE 17. 2-Hydroxy-2,2-dimethylethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
17.46	Uranium(III) ion $^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{U}^{3+} \rightarrow$	$\leq 5 \times 10^6$	0.3			p.r.	D.k. at 355 nm in He-satd. soln. contg. 0.5 mol L <sup>-1</sup> HClO <sub>4</sub> and 0.9 mol L <sup>-1</sup> <i>tert</i> -BuOH; no reaction obs.	85A122
17.47	Zinc(I) ion $^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Zn}^{2+} + \text{H}^+ \rightarrow \text{Zn}^{2+} +$ <i>tert</i> -BuOH	$1.0 \times 10^9$	7	295		p.r.	Calcd. from d.k. at 310 nm ( $\text{Zn}^{2+}$ ) in <i>tert</i> -BuOH-ZnSO <sub>4</sub> soln. assuming $k(\text{H} + \text{H}) = 1.3 \times 10^{10}$ , $k(\text{Zn}^{2+} + \text{Zn}^{2+}) = 4 \times 10^8$ , $k(\text{R} + \text{R}) = 6.5 \times 10^8$ and $k(\text{Zn}^{2+} + \text{H}) = 2.8 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	771011
17.48	Zinc(II) ion $^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{O}^{2-} + \text{Zn}^{2+} \rightarrow$	$< 10^6$				p.r.	Estd. from lack of increase in $\text{Zn}^{2+}$ in soln. contg. 0.1 mol L <sup>-1</sup> $\text{Zn}^{2+}$ upon addn. of 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	751027
17.49	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatozincate(II) ion $^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{ZnTPPS}^{4-} \rightarrow$	$< 10^7$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. <i>tert</i> -BuOH.	82A279
17.50	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatozincate(II) ion, triplet state $^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + [^3(\text{ZnTPPS}^{4-})] \rightarrow$	$1.8 \times 10^9$	7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. <i>tert</i> -BuOH; triplet produced by photolysis.	82A279
17.51	Acrylamide $^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{H}_2\text{C}=\text{CHCONH}_2 \rightarrow$	$4.5 \times 10^7$ addn. $6.8 \times 10^7$	4.5 3			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. <i>tert</i> -BuOH and Cu <sup>2+</sup> ; rel. to $k(^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cu}^{2+}) = 2.7 \times 10^6$ and $3.2 \times 10^6$ L mol <sup>-1</sup> s <sup>-1</sup> at pH 4.5 and 3, resp.	78A322
17.52	4-Aminophenoxy $^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + 4-\text{H}_2\text{NC}_6\text{H}_4\text{O}^\bullet \rightarrow$	$3.9 \times 10^8$ addn.	9.2			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH, 0.01 mol L <sup>-1</sup> NaN <sub>3</sub> and 4-aminophenol.	93A306
17.53	2,2'-Bipyridine H-adduct, conjugate monoacid $^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + [\text{bpyH}_2]^+ \rightarrow$	$1.1 \times 10^9$	1			p.r.	D.k. at 365 nm in Ar-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-ProOH, 0.25 mol L <sup>-1</sup> <i>tert</i> -BuOH and HClO <sub>4</sub> and $5 \times 10^{-4}$ mol L <sup>-1</sup> bpyH <sup>+</sup> ; radical-radical reaction.	85A184
17.54	4,4'-Bipyridine H-adduct, conjugate monoacid $^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + [4,4'\text{-bpyH}_2]^+ \rightarrow$	$\sim 1.3 \times 10^9$	1			p.r.	D.k. at 375 nm in Ar-satd. soln. contg. 0.2 mol L <sup>-1</sup> <i>tert</i> -BuOH and $4 \times 10^{-4}$ mol L <sup>-1</sup> 4,4'-bpyH <sub>2</sub> <sup>2+</sup> .	84A325
17.55	N-Bromosuccinimide $^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{SBr} \rightarrow$	$1.5 \times 10^8$		296		p.r.	P.b.k. at 270 nm in N <sub>2</sub> O-satd. soln. contg. (5-40) $\times 10^{-4}$ mol L <sup>-1</sup> SBr, 10 <sup>-4</sup> mol L <sup>-1</sup> Ag <sup>+</sup> and 0.01 mol L <sup>-1</sup> <i>tert</i> -BuOH.	93A156
		$2 \times 10^8$		296		p.r.	C.k. in soln. contg. [O <sub>2</sub> ]/[SBr] = 0 to 0.25 and 1 mol L <sup>-1</sup> <i>tert</i> -BuOH; rel. to $k(^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{O}_2) = 3 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	93A156
17.56	4-( <i>tert</i> -Butyl)phenoxy $^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + 4-(\text{CH}_3)_3\text{CC}_6\text{H}_4\text{O}^\bullet \rightarrow$	$6.0 \times 10^8$ addn.	9.2			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH, 0.01 mol L <sup>-1</sup> NaN <sub>3</sub> and 4- <i>tert</i> -butylphenol.	93A306
17.57	3-Carboxamido-2,2,5,5-tetramethylpyrrolidin-1-yloxy $^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{NX-s} \rightarrow$	$1.8 \times 10^8$	acid			p.r.	Cond. change in N <sub>2</sub> O-satd. soln. contg. 0.01-0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH; addn. reaction.	761152

TABLE 17. 2-Hydroxy-2,2-dimethylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
17.58	3-Carboxamido-2,2,5,5-tetramethyl-3-pyrrolin-1-yloxy ·CH <sub>2</sub> C(CH <sub>3</sub> ) <sub>2</sub> OH + NX-u →	2.0 × 10 <sup>8</sup>		acid		p.r.	Cond. change in N <sub>2</sub> O-satd. soln. contg. 0.01-0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH; addn. reaction.	761152
17.59	4-Carboxy-2,6-dimethoxyphenoxy, anion ·CH <sub>2</sub> C(CH <sub>3</sub> ) <sub>2</sub> OH + 4-O <sub>2</sub> C-2,6-(CH <sub>3</sub> O) <sub>2</sub> C <sub>6</sub> H <sub>2</sub> O <sup>·</sup> → addn.	2.5 × 10 <sup>8</sup>		9.2		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH, 0.01 mol L <sup>-1</sup> NaN <sub>3</sub> and 4-carboxy-2,6-dimethylphenol.	93A306
17.60	2-Carboxy-2,5,7,8-tetramethyl-6-chromanoxo ·CH <sub>2</sub> C(CH <sub>3</sub> ) <sub>2</sub> OH + HTxO <sup>·</sup> → addn.	1.5 × 10 <sup>8</sup>		9.2		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH, 0.01 mol L <sup>-1</sup> NaN <sub>3</sub> and Trolox C anion.	93A306
17.61	Chlorpromazine, conjugate acid ·CH <sub>2</sub> C(CH <sub>3</sub> ) <sub>2</sub> OH + CZH <sup>+</sup> →	<10 <sup>6</sup>		7		p.r.	No bleaching of solute on ms time-scale in N <sub>2</sub> O-satd. soln. contg. <i>tert</i> -BuOH.	83A272
17.62	4-Cyanophenoxy ·CH <sub>2</sub> C(CH <sub>3</sub> ) <sub>2</sub> OH + 4-CNC <sub>6</sub> H <sub>4</sub> O <sup>·</sup> → addn.	1.0 × 10 <sup>9</sup>		9.2		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH, 0.01 mol L <sup>-1</sup> NaN <sub>3</sub> and 4-cyanophenol.	93A306
17.63	Cysteamine ·CH <sub>2</sub> C(CH <sub>3</sub> ) <sub>2</sub> OH + H <sub>3</sub> N <sup>+</sup> CH <sub>2</sub> CH <sub>2</sub> S <sup>·-</sup> →	1.8 × 10 <sup>7</sup>				p.r.	P.b.k. at 410 nm (RSSR <sup>·</sup> ) in N <sub>2</sub> O-satd. soln. contg. <i>tert</i> -BuOH.	680132
17.64	Cysteine ·CH <sub>2</sub> C(CH <sub>3</sub> ) <sub>2</sub> OH + CysSH → CysS <sup>·</sup> +	3 × 10 <sup>7</sup>				p.r.	P.b.k. at 410 nm in deaerated soln. contg. cysteine and <i>tert</i> -BuOH.	89A096
17.65	1,6-Diazabicyclo[4.4.4]tetradecane radical cation ·CH <sub>2</sub> C(CH <sub>3</sub> ) <sub>2</sub> OH + DABCT <sup>·+</sup> →	6.8 × 10 <sup>8</sup>		~4		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol <i>tert</i> -BuOH and (0.2-10) × 10 <sup>-4</sup> mol L <sup>-1</sup> radical cation.	86A272
				-2 × 10 <sup>9</sup>		p.r.	D.k. in N <sub>2</sub> -satd. soln. contg. 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	80A022
17.66	1,5-Diazabicyclo[3.3.3]undecane radical cation ·CH <sub>2</sub> C(CH <sub>3</sub> ) <sub>2</sub> OH + [3.3.3] <sup>·+</sup> →	-2 × 10 <sup>9</sup>				p.r.	D.k. in N <sub>2</sub> -satd. soln. contg. 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	80A022
17.67	(E)-4,5-Dihydroxy-1,2-dithiane ·CH <sub>2</sub> C(CH <sub>3</sub> ) <sub>2</sub> OH + [SSCH <sub>2</sub> (CHOH) <sub>2</sub> CH <sub>2</sub> ] →	<10 <sup>6</sup>		10.8		p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> <i>tert</i> -BuOH.	86A363
17.68	1,1'-Dimethyl-4,4'-bipyridinium ·CH <sub>2</sub> C(CH <sub>3</sub> ) <sub>2</sub> OH + MV <sup>2+</sup> → MVH <sup>·2+</sup> +	1 × 10 <sup>7</sup>		1		p.r.	Computer simulation based on abs. at 390 and 595 nm in air-free soln. contg. (1-4) × 10 <sup>-4</sup> mol L <sup>-1</sup> MV <sup>2+</sup> and (4-16) × 10 <sup>-2</sup> mol L <sup>-1</sup> <i>tert</i> -BuOH.	82A216
17.69	1,6-Dimethyl-1,6-diazacyclo[4.4]decane radical cation ·CH <sub>2</sub> C(CH <sub>3</sub> ) <sub>2</sub> OH + [4.4] <sup>·+</sup> →	-2 × 10 <sup>9</sup>				p.r.	D.k. in N <sub>2</sub> -satd. soln. contg. 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	80A022
17.70	1,3-Dimethylumichrome ·CH <sub>2</sub> C(CH <sub>3</sub> ) <sub>2</sub> OH + Fl →	2.5 × 10 <sup>9</sup>		5-10		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. <i>tert</i> -BuOH.	82B104

TABLE 17. 2-Hydroxy-2,2-dimethylethyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T$ (K)	Method	Comment	Ref.
17.71	Dithiothreitol							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} \rightarrow \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{S}^{\bullet} + \text{tert-BuOH}$	$4.7 \times 10^7$	7.4			p.r.	P.b.k. at 390-400 nm in $\text{N}_2\text{O}$ -satd. soln. contg. dithiothreitol and <i>tert</i> -BuOH; also see [87G007].	87A250
		$6.8 \times 10^7$	7			p.r.	P.b.k. at 390 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 1 $\text{mol L}^{-1}$ <i>tert</i> -BuOH.	731020
17.72	<i>N</i> -Ethymaleimide							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{NEM} \rightarrow \text{addn.}$					p.r.	No $e$ -transfer obs.; very low addn. rate.	720144
17.73	Glutathione							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{GSH} \rightarrow \text{GS}^{\bullet} + \text{tert-BuOH}$	$5.0 \times 10^7$			293	p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. <i>tert</i> -BuOH.	88A144
17.74	Hydroquinone							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{QH}_2 \rightarrow$	$\leq 2 \times 10^6$	11.5			p.r.	Semiquinone not formed in soln. contg. <i>tert</i> -BuOH.	79A051
17.75	Iodoacetic acid							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{ICH}_2\text{CO}_2\text{H} \rightarrow \text{ICH}_2\text{C}(\text{CH}_3)_2\text{OH} + ^{\bullet}\text{CH}_2\text{CO}_2\text{H}$	$-1 \times 10^7$	1		293	chem.	Estd. from esr meas. in $\text{Ti}^{III}\text{-H}_2\text{O}_2$ soln. contg. <i>tert</i> -BuOH; used $2k(^{\bullet}\text{CH}_2\text{CO}_2\text{H} + ^{\bullet}\text{CH}_2\text{CO}_2\text{H}) = 1.8 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	745286
17.76	Iodoacetonitrile							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{ICH}_2\text{CN} \rightarrow \text{ICH}_2\text{C}(\text{CH}_3)_2\text{OH} + ^{\bullet}\text{CH}_2\text{CN}$	$-2 \times 10^7$	1		293	chem.	Estd. from esr meas. in $\text{Ti}^{III}\text{-H}_2\text{O}_2$ soln. contg. <i>tert</i> -BuOH; used $2k(^{\bullet}\text{CH}_2\text{CN} + ^{\bullet}\text{CH}_2\text{CN}) = 2 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	745286
17.77	2-Iodoethanol							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{ICH}_2\text{CH}_2\text{OH} \rightarrow \text{ICH}_2\text{C}(\text{CH}_3)_2\text{OH} + ^{\bullet}\text{CH}_2\text{CH}_2\text{OH}$	$-2 \times 10^5$	1		293	chem.	Estd. from esr meas. in $\text{Ti}^{III}\text{-H}_2\text{O}_2$ soln. contg. <i>tert</i> -BuOH; used $2k(^{\bullet}\text{CH}_2\text{CH}_2\text{OH} + ^{\bullet}\text{CH}_2\text{CH}_2\text{OH}) = 1.9 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ .	745286
17.78	3-Iodopropionic acid							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{ICH}_2\text{CH}_2\text{CO}_2\text{H} \rightarrow \text{ICH}_2\text{C}(\text{CH}_3)_2\text{OH} + ^{\bullet}\text{CH}_2\text{CH}_2\text{CO}_2\text{H}$	$\sim 2 \times 10^5$	1		293	chem.	Estd. from esr meas. in $\text{Ti}^{III}\text{-H}_2\text{O}_2$ soln. contg. <i>tert</i> -BuOH; used $2k(^{\bullet}\text{CH}_2\text{CH}_2\text{CO}_2\text{H} + ^{\bullet}\text{CH}_2\text{CH}_2\text{CO}_2\text{H}) = 2.4 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	745286
17.79	Lipoamide							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{LS}_2 \rightarrow$	$\sim 10^7$	10.8			p.r.	P.b.k. at 400 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.2 $\text{mol L}^{-1}$ <i>tert</i> -BuOH.	86A363
17.80	Lumiflavine							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{LF} \rightarrow$	$4 \times 10^9$	7			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. <i>tert</i> -BuOH and lumiflavine; gave spectrum with $\lambda_{\text{max}} = 560 \text{ nm}$ .	86A457
17.81	2-Mercaptoethanol							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{HSCH}_2\text{CH}_2\text{OH} \rightarrow \text{tert-BuOH} + ^{\bullet}\text{SCH}_2\text{CH}_2\text{OH}$	$8.2 \times 10^7$	10			p.r.	P.b.k. at 420 nm ( $\text{RSSR}^-$ ) in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 $\text{mol L}^{-1}$ <i>tert</i> -BuOH.	690553
17.82	2-Methoxy-4-methylphenoxy							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + 4-\text{CH}_3-2-\text{CH}_3\text{OC}_6\text{H}_3\text{O}^{\bullet} \rightarrow \text{addn.}$	$3.3 \times 10^8$	9.2			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 1 $\text{mol L}^{-1}$ <i>tert</i> -BuOH, 0.01 $\text{mol L}^{-1}$ $\text{NaN}_3$ and 2-methoxy-4-methylphenol.	93A306
17.83	4-Methoxyphenoxy							
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + 4-\text{CH}_3\text{OC}_6\text{H}_4\text{O}^{\bullet} \rightarrow \text{addn.}$	$5.0 \times 10^8$	9.2			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 1 $\text{mol L}^{-1}$ <i>tert</i> -BuOH, 0.01 $\text{mol L}^{-1}$ $\text{NaN}_3$ and 4-methoxyphenol.	93A306

TABLE 17. 2-Hydroxy-2,2-dimethylethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.	
17.84	2-Methyl-2-nitrosopropane								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + (\text{CH}_3)_3\text{CNO} \rightarrow$ addn.	$<1 \times 10^6$		~7		~291	p.r.	P.b.k. (esr) in unbuffered N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> <i>tert</i> -BuOH and (0.25-15) $\times 10^{-3}$ mol L <sup>-1</sup> MNP (assuming complete dimer dissociation).	91D097
17.85	4-Methylphenoxy								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + 4\text{-CH}_3\text{C}_6\text{H}_4\text{O}^* \rightarrow$ addn.	$5.6 \times 10^8$		9.2			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH, 0.01 mol L <sup>-1</sup> NaN <sub>3</sub> and 4-methylphenol.	93A306
17.86	Norpseudopelletierine <i>N</i> -oxyl								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{NPPN} \rightarrow$	$5.1 \times 10^8$					p.r.	D.k. at 240 nm in N <sub>2</sub> O-satd. soln. contg. <i>tert</i> -BuOH.	710061
17.87	Promethazine, conjugate acid								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{PZH}^+ \rightarrow$	$<10^6$		7			p.r.	No bleaching of solute on ms time-scale in N <sub>2</sub> O-satd. soln. contg. <i>tert</i> -BuOH.	83A272
17.88	2,2,6,6-Tetramethylpiperidine- <i>N</i> -oxyl								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{TMPN} \rightarrow$ addn.	$1.5 \times 10^8$		2.6			p.r.	Cond. change in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	761067
17.89	2,2,6,6-Tetramethyl-4-piperidone <i>N</i> -oxyl								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{TAN} \rightarrow$ addn.	$2.8 \times 10^8$		2.4			p.r.	Cond. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	761067
17.90	Thionine cation								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Th}^+ \rightarrow$			6.8			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH and 10 <sup>-4</sup> mol L <sup>-1</sup> thionine; no reaction obs.	87A451
17.91	Toluidine Blue cation								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{TB}^+ \rightarrow$			6.8			p.r.	N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH; no reaction obs.	89A262
17.92	2,4,6-Tribromophenoxy								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + 2,4,6\text{-Br}_3\text{C}_6\text{H}_2\text{O}^* \rightarrow$ addn.	$5.6 \times 10^8$		9.2			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH, 0.01 mol L <sup>-1</sup> NaN <sub>3</sub> and 2,4,6-tribromophenol.	93A306
17.93	2,4,6-Trichlorophenoxy								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + 2,4,6\text{-Cl}_3\text{C}_6\text{H}_2\text{O}^* \rightarrow$ addn.	$5.2 \times 10^8$		9.2			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH, 0.01 mol L <sup>-1</sup> NaN <sub>3</sub> and 2,4,6-trichlorophenol.	93A306
17.94	2,4,6-Triiodophenoxy								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + 2,4,6\text{-I}_3\text{C}_6\text{H}_2\text{O}^* \rightarrow$ addn.	$1.5 \times 10^9$		9.2			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH, 0.01 mol L <sup>-1</sup> NaN <sub>3</sub> and 2,4,6-triiodophenol.	93A306
17.95	2,4,6-Trimethylphenoxy								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + 2,4,6\text{-Me}_3\text{C}_6\text{H}_2\text{O}^* \rightarrow$ addn.	$4.3 \times 10^8$		9.2			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH, 0.01 mol L <sup>-1</sup> NaN <sub>3</sub> and 2,4,6-trimethylphenol.	93A306
17.96	Cytochrome C								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cyt C}(\text{Fe}^{3+}) \rightarrow$						p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> <i>tert</i> -BuOH; no reaction obs.	78A288
17.97	Laccase								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cu-OXD} \rightarrow$ addn.	$\sim 10^{10}$		6.0			p.r.	P.b.k. (complex formn.)	82A422

TABLE 18. Methoxymethyl

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
18.1	5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradecanecobalt(II) ion							
	$\text{CH}_3\text{OCH}_2 + \text{Co}(\text{Me}_6[14]\text{aneN}_4)^{2+} \rightarrow \text{CH}_3\text{OCH}_2\text{Co}(\text{Me}_6[14]\text{aneN}_4)^{2+}$		7		296	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and CH <sub>3</sub> OCH <sub>2</sub> Co(cyclam) <sup>2+</sup> .	89A530
18.2	Cobal(II)amin							
	$\text{CH}_3\text{OCH}_2 + \text{B12r} \rightarrow \text{addn.}$	$5.1 \times 10^8$	7		296	f.p.	D.k. at 470 nm, as well as p.b.k. at 520 nm, in soln. contg. CH <sub>3</sub> OCH <sub>2</sub> Co(cyclam) <sup>2+</sup> and cobal(II)amin.	89A530
18.3	Chromium(II) ion							
	$\text{CH}_3\text{OCH}_2 + \text{Cr}^{2+} \rightarrow \text{CrCH}_2\text{OCH}_3^{2+}$	$2.3 \times 10^8$	<2		297	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and CH <sub>3</sub> OCH <sub>2</sub> Co(cyclam) <sup>2+</sup> .	89A338
18.4	1,4,8,12-Tetraazacyclopentadecanechromium(II) ion							
	$\text{CH}_3\text{OCH}_2 + \text{Cr}([15]\text{aneN}_4)^{2+} \rightarrow \text{CH}_3\text{OCH}_2\text{Cr}([15]\text{aneN}_4)^{2+}$	$1.6 \times 10^8$			298	f.p.	D.k. at 600 nm in soln. contg. MV <sup>+</sup> as indicator and CH <sub>3</sub> OCH <sub>2</sub> Co(dmgH) <sub>2</sub> .	91A427
18.5	Ferricyanide ion							
	$\text{CH}_3\text{OCH}_2 + \text{Fe}(\text{CN})_6^{3-} \rightarrow$	$4.3 \times 10^9$	4-6			p.r.	D.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. dimethyl ether.	82A041
18.6	Hexachloroiridate(IV) ion							
	$\text{CH}_3\text{OCH}_2 + \text{IrCl}_6^{2-} \rightarrow \text{IrCl}_6^{3-}$	$6.5 \times 10^9$	4-6			p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. dimethyl ether.	82A041
18.7	$\alpha$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion							
	$\text{CH}_3\text{OCH}_2 + \alpha\text{-Ni}(\text{cyclam})^{2+} + \text{H}_2\text{O} \rightarrow \alpha\text{-CH}_3\text{OCH}_2\text{Ni}(\text{cyclam})(\text{H}_2\text{O})^{2+}$	$2.4 \times 10^8$	0	6.0	298	f.p.	D.k. at 650 nm in deaerated soln. contg. ABTS <sup>•-</sup> as indicator and alkylcobalt(III) complex and 6.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
18.8	$\beta$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion							
	$\text{CH}_3\text{OCH}_2 + \beta\text{-Ni}(\text{cyclam})^{2+} + \text{H}_2\text{O} \rightarrow \beta\text{-CH}_3\text{OCH}_2\text{Ni}(\text{cyclam})(\text{H}_2\text{O})^{2+}$	$1.5 \times 10^7$	0	1.0	298	f.p.	D.k. at 650 nm in deaerated soln. contg. ABTS <sup>•-</sup> as indicator, alkylcobalt(III) complex and 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
18.9	Oxygen							
	$\text{CH}_3\text{OCH}_2 + \text{O}_2 \rightarrow \text{CH}_3\text{OCH}_2\text{OO}^\bullet$	$4.9 \times 10^9$	0		298	f.p.	C.k. in soln. contg. 1.0 mol L <sup>-1</sup> HClO <sub>4</sub> ; alkyl radical from RCo(dmgH) <sub>2</sub> OH <sub>2</sub> or RCo(cyclam)H <sub>2</sub> O <sup>2+</sup> ; rel. to $k(\text{CH}_3\text{OCH}_2 + \beta\text{-Ni}(\text{cyclam})^{2+}) = 1.5 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> .	91A176
18.10	2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion							
	$\text{CH}_3\text{OCH}_2 + \text{ABTS}^{•-} \rightarrow \text{addn.}$	$1.8 \times 10^9$ $1.2 \times 10^9$	0 6.0	1.0 6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> (from ABTS <sup>2-</sup> + Br <sub>2</sub> ), alkylcobalt(III) complex and 1.0 or 6.0 mol L <sup>-1</sup> HClO <sub>4</sub> .	91A515
18.11	1,1'-Dimethyl-4,4'-bipyridinium radical cation							
	$\text{CH}_3\text{OCH}_2 + \text{MV}^{•+} \rightarrow$	$1.1 \times 10^9$			298	f.p.	D.k. at 600 nm in soln. contg. (1-8) $\times 10^{-5}$ mol L <sup>-1</sup> MV <sup>•+</sup> and CH <sub>3</sub> OCH <sub>2</sub> Co(dmgH) <sub>2</sub> .	91A427
		$1.1 \times 10^9$	<2		297	f.p.	D.k. at 600 nm (MV <sup>•+</sup> , $\epsilon = 1.37 \times 10^4$ L mol <sup>-1</sup> cm <sup>-1</sup> , 0.01-0.1 mol L <sup>-1</sup> ); MV <sup>•+</sup> from Zn/Hg redn. of MV <sup>2+</sup> ; (2-4) $\times 10^{-6}$ mol L <sup>-1</sup> radical from photolysis of CH <sub>3</sub> OCH <sub>2</sub> Co(cyclam) <sup>2+</sup> .	89A338
18.12	4-Nitroacetophenone							
	$\text{CH}_3\text{OCH}_2 + \text{PNAP} \rightarrow \text{CH}_3\text{OCH}_2\text{ON}(\text{O})\text{C}_6\text{H}_4\text{-4-COCH}_3$	$5.0 \times 10^7$	5-7		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> dimethyl ether; $\Delta H^\ddagger = 14.1$ kJ mol <sup>-1</sup> , $\Delta S^\ddagger = -49$ J K <sup>-1</sup> mol <sup>-1</sup> , studied at 273-333 K.	88A099

TABLE 18. Methoxymethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
<b>18.13 Tetranitromethane</b>								
	$\text{CH}_3\text{OCH}_2 + \text{C}(\text{NO}_2)_4 \rightarrow \text{CH}_3\text{OCH}_2\text{ON}^+(\text{O}^-)\text{C}(\text{NO}_2)_3$	$6 \times 10^9$				p.r.	P.b.k. at 300 nm in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> methyl ether; adduct in equilibrium with CH <sub>3</sub> OCH <sub>2</sub> ON(Ö)C(NO <sub>2</sub> ) <sub>3</sub> ; adduct decomposes to nitroform anion, <i>k</i> = 1.1 × 10 <sup>4</sup> s <sup>-1</sup> .	80A071

TABLE 19. 1-Ethoxyethyl

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
19.1	Diaqua(nitrilotriacetato)cobalt(II) ion $\text{CH}_3\dot{\text{C}}\text{HOOC}_2\text{H}_5 + \text{CoNTA}^- \rightarrow \text{C}_2\text{H}_5\text{OCH}(\text{CH}_3)\text{CoNTA}^-$	$4.9 \times 10^7$	4.7		298	p.r.	P.b.k. at 260 nm in N <sub>2</sub> O-satd. soln. contg. (1-50) × 10 <sup>-4</sup> mol L <sup>-1</sup> CoNTA <sup>-</sup> and 0.2-1 mol L <sup>-1</sup> Et <sub>2</sub> O.	88A343
19.2	Hexaamminecobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOOC}_2\text{H}_5 + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow$	$\leq 5 \times 10^6$	5.5-6			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. ethyl ether.	771100
19.3	Pentaammine(bromo)cobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOOC}_2\text{H}_5 + \text{Co}(\text{NH}_3)_5\text{Br}^{2+} \rightarrow$	$1.6 \times 10^8$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. ethyl ether.	771100
19.4	Pentaammine(chloro)cobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOOC}_2\text{H}_5 + \text{Co}(\text{NH}_3)_5\text{Cl}^{2+} \rightarrow$	$1.4 \times 10^7$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. ethyl ether.	771100
19.5	Pentaammine(fluoro)cobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOOC}_2\text{H}_5 + \text{Co}(\text{NH}_3)_5\text{F}^{2+} \rightarrow$	$1.1 \times 10^6$	-1	1.0	298	chem.	C.k., radical from homolysis of CrCH(CH <sub>3</sub> )OC <sub>2</sub> H <sub>5</sub> <sup>2+</sup> ; rel. to $k'(\text{CH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{NH}_3)_5\text{Cl}^{2+}) = 1.4 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ .	83A048
19.6	trans-Dibromobis(ethylenediamine)cobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOOC}_2\text{H}_5 + \text{Co}(\text{en})_2\text{Br}_2^+ \rightarrow$	$6.5 \times 10^8$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. Et <sub>2</sub> O.	771100
19.7	cis-Bromobis(ethylenediamine)fluorocobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOOC}_2\text{H}_5 + \text{Co}(\text{en})_2\text{BrF}^+ \rightarrow$	$4.9 \times 10^7$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. Et <sub>2</sub> O.	771100
19.8	Bis(ethylenediamine)dichlorocobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOOC}_2\text{H}_5 + \text{Co}(\text{en})_2\text{Cl}_2^+ \rightarrow$	$1.5 \times 10^8$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. Et <sub>2</sub> O.	771100
19.9	cis-Aquachlorobis(ethylenediamine)cobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOOC}_2\text{H}_5 + \text{cis-Co}(\text{en})_2(\text{H}_2\text{O})\text{Cl}^{2+} \rightarrow$	$3.5 \times 10^7$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. Et <sub>2</sub> O.	771100
19.10	cis-Amminechlorobis(ethylenediamine)cobalt(III) ion $\text{CH}_3\dot{\text{C}}\text{HOOC}_2\text{H}_5 + \text{cis-Co}(\text{en})_2(\text{NH}_3)\text{Cl}^{2+} \rightarrow$	$4.6 \times 10^6$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. Et <sub>2</sub> O.	771100
19.11	Aquabis(dimethylglyoximato)methylcobalt(III) $\text{CH}_3\dot{\text{C}}\text{HOOC}_2\text{H}_5 + \text{CH}_3\text{Co}(\text{dmgH})_2(\text{H}_2\text{O}) \rightarrow \text{CH}_3\text{CH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{dmgH})_2(\text{H}_2\text{O})_2$	$1.4 \times 10^6$	acid	1.0	298	chem.	C.k.; radical from homolysis of CrCH(CH <sub>3</sub> )OC <sub>2</sub> H <sub>5</sub> <sup>2+</sup> ; rel. to $k'(\text{CH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{NH}_3)_5\text{F}^{2+}) = 1.1 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ .	86M354
19.12	Aquabis(dimethylglyoximato)methylcobalt(III), protonated $\text{CH}_3\dot{\text{C}}\text{HOOC}_2\text{H}_5 + \text{CH}_3\text{Co}(\text{dmgH}_2\text{H}_2\text{O})^+ \rightarrow \text{CH}_3\text{CH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{dmgH}_2\text{H}_2\text{O})_2^+$	$1.8 \times 10^6$	acid	1.0	298	chem.	C.k.; radical from homolysis of CrCH(CH <sub>3</sub> )OC <sub>2</sub> H <sub>5</sub> <sup>2+</sup> ; [H <sup>+</sup> ] = 0.15-1.0 mol L <sup>-1</sup> ; rel. to $k'(\text{CH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{NH}_3)_5\text{F}^{2+}) = 1.1 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ .	86M354
19.13	Aquabis(dimethylglyoximato)ethylcobalt(III) $\text{CH}_3\dot{\text{C}}\text{HOOC}_2\text{H}_5 + \text{CH}_3\text{CH}_2\text{Co}(\text{dmgH})_2(\text{H}_2\text{O}) \rightarrow \text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{dmgH})_2(\text{H}_2\text{O})_2$	$8 \times 10^5$	acid	1.0	298	chem.	C.k.; radical from homolysis of CrCH(CH <sub>3</sub> )OC <sub>2</sub> H <sub>5</sub> <sup>2+</sup> ; rel. to $k'(\text{CH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{NH}_3)_5\text{F}^{2+}) = 1.1 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ .	86M354
19.14	Aquabis(dimethylglyoximato)ethylcobalt(III), protonated $\text{CH}_3\dot{\text{C}}\text{HOOC}_2\text{H}_5 + \text{CH}_3\text{CH}_2\text{Co}(\text{dmgH}_2\text{H}_2\text{O})^+ \rightarrow \text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{dmgH}_2\text{H}_2\text{O})_2^+$	$1 \times 10^6$	acid	1.0	298	chem.	C.k.; radical from homolysis of CrCH(CH <sub>3</sub> )OC <sub>2</sub> H <sub>5</sub> <sup>2+</sup> ; [H <sup>+</sup> ] = 0.15-1.0 mol L <sup>-1</sup> ; rel. to $k'(\text{CH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{NH}_3)_5\text{F}^{2+}) = 1.1 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ .	86M354

TABLE 19. 1-Ethoxyethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
19.15	Aquabis(dimethylglyoximato)(1-methylethyl)cobalt(III)							
	$\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + (\text{CH}_3)_2\text{CHCo}(\text{dmgH})_2(\text{H}_2\text{O}) \rightarrow (\text{CH}_3)_2\text{CHCH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{dmgH})_2(\text{H}_2\text{O})_2$	$7 \times 10^5$	acid	1.0	298	chem.	C.k.; radical from homolysis of $\text{CrCH}(\text{CH}_3)\text{OC}_2\text{H}_5^{2+}$ ; rel. to $k'(\text{CH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{NH}_3)_5\text{F}^{2+}) = 1.1 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ .	86M354
19.16	Aquabis(dimethylglyoximato)(1-methylethyl)cobalt(III), protonated							
	$\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + (\text{CH}_3)_2\text{CHCo}(\text{dmgH}_2\text{H}_3)(\text{H}_2\text{O})^+ \rightarrow (\text{CH}_3)_2\text{CHCH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{dmgH}_2\text{H}_3)(\text{H}_2\text{O})_2^+$	$6 \times 10^5$	acid	1.0	298	chem.	C.k.; radical from homolysis of $\text{CrCH}(\text{CH}_3)\text{OC}_2\text{H}_5^{2+}$ ; $[\text{H}^+] = 0.15\text{-}1.0 \text{ mol L}^{-1}$ ; rel. to $k'(\text{CH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{NH}_3)_5\text{F}^{2+}) = 1.1 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ .	86M354
19.17	Aqua(benzyl)bis(dimethylglyoximato)cobalt(III)							
	$\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{C}_6\text{H}_5\text{CH}_2\text{Co}(\text{dmgH})_2(\text{H}_2\text{O}) \rightarrow \text{C}_6\text{H}_5\text{CH}_2\text{CH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{dmgH})_2(\text{H}_2\text{O})_2$	$1.0 \times 10^7$	acid	1.0	298	chem.	C.k.; radical from homolysis of $\text{CrCH}(\text{CH}_3)\text{OC}_2\text{H}_5^{2+}$ ; rel. to $k'(\text{CH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{NH}_3)_5\text{F}^{2+}) = 1.1 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ .	86M354
19.18	Aquabenzylbis(dimethylglyoximato)cobalt(III), protonated							
	$\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{C}_6\text{H}_5\text{CH}_2\text{Co}(\text{dmgH}_2\text{H}_3)(\text{H}_2\text{O})^+ \rightarrow \text{C}_6\text{H}_5\text{CH}_2\text{CH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{dmgH}_2\text{H}_3)(\text{H}_2\text{O})_2^+$	$1.4 \times 10^7$	acid	1.0	298	chem.	C.k.; radical from homolysis of $\text{CrCH}(\text{CH}_3)\text{OC}_2\text{H}_5^{2+}$ ; $[\text{H}^+] = 0.15\text{-}1.0 \text{ mol L}^{-1}$ ; rel. to $k'(\text{CH}(\text{CH}_3)\text{OC}_2\text{H}_5 + \text{Co}(\text{NH}_3)_5\text{F}^{2+}) = 1.1 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ .	86M354
19.19	Chromium(II) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{Fe}^{2+} \rightarrow \text{CrCH}(\text{CH}_3)\text{OC}_2\text{H}_5^{2+}$	$3.4 \times 10^7$	~3		293	p.r.	$\text{N}_2\text{O}$ -satd. soln. contg. $0.001 \text{ mol L}^{-1} \text{ Cr}^{2+}$ and ethyl ether; $\Delta V^\ddagger = 4.3 \text{ cm}^3 \text{ mol}^{-1}$ , studied at 0.1-150 MPa.	92A361
		$3.4 \times 10^7$	~1			p.r.	P.b.k. in Ar-satd. soln. contg. $\text{Et}_2\text{O}-\text{HClO}_4$ .	741146
19.20	Ferricyanide ion							
	$\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{Fe}(\text{CN})_6^{4-} + \text{other prod.}$	$4.0 \times 10^9$	4-6		295	p.r.	D.k. at 420 nm in $\text{N}_2\text{O}$ -satd. soln. contg. diethyl ether.	82A041
19.21	Hexachloroiridate(IV) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{IrCl}_6^{2-} \rightarrow \text{IrCl}_6^{3-} + \text{other prod.}$	$5.7 \times 10^9$	4-6		295	p.r.	D.k. at 490 nm in $\text{N}_2\text{O}$ -satd. soln. contg. diethyl ether.	82A041
19.22	Hydrogen peroxide							
	$\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{H}_2\text{O}_2 \rightarrow$	$5.5 \times 10^4$				chem.	Calcd. from esr in Ti(III)- $\text{H}_2\text{O}_2$ soln. contg. $\text{Et}_2\text{O}$ ; assumed $2k(\text{R} + \text{R}) \approx 3 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	745144
19.23	Hexaammineruthenium(III) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{Ru}(\text{NH}_3)_6^{3+} \rightarrow$	$1.0 \times 10^8$	3.5-4			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.5-1 mol $\text{L}^{-1}$ ethyl ether.	771100
19.24	Pentaammine(bromo)ruthenium(III) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{Ru}(\text{NH}_3)_5\text{Br}^{2+} \rightarrow$	$5.8 \times 10^8$	3.5-4			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.5-1 mol $\text{L}^{-1}$ ethyl ether.	771100
19.25	Pentaammine(chloro)ruthenium(III) ion							
	$\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{Ru}(\text{NH}_3)_5\text{Cl}^{2+} \rightarrow$	$2.6 \times 10^8$	3.5-4			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.5-1 mol $\text{L}^{-1}$ ethyl ether.	771100
19.26	Hydrogen peroxomonosulfate ion							
	$\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{HSO}_5^- \rightarrow$	$2.0 \times 10^6$				chem.	Esr study in soln. contg. Ti(III) sulfate, $\text{H}_2\text{O}_2$ , $\text{HSO}_5^-$ and diethyl ether.	90D226

TABLE 19. 1-Ethoxyethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	$T$ (K)	Method	Comment	Ref.
19.27	Peroxodisulfate ion $\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{S}_2\text{O}_8^{2-} \rightarrow \text{SO}_4^{\cdot-} + \text{SO}_4^{2-} + \text{other prod.}$	$7.5 \times 10^5$			-293	chem.	Esr study in soln. contg. 0.008 mol L <sup>-1</sup> Ti(III), 0.01 mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> , (0-0.025) mol L <sup>-1</sup> S <sub>2</sub> O <sub>8</sub> <sup>2-</sup> and ~0.01 mol L <sup>-1</sup> ethyl ether.	84D044
19.28	Vanadium(II) ion $\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{V}^{2+} + \text{H}^+ \rightarrow (\text{C}_2\text{H}_5)_2\text{O} + \text{V}^{3+}$	$5.9 \times 10^4$		~1	298	chem.	D.k. at 396 nm in soln. contg. CrCH(CH <sub>3</sub> )OC <sub>2</sub> H <sub>5</sub> , diethyl ether, Cr <sup>2+</sup> , HClO <sub>4</sub> and V <sup>2+</sup> ; $k$ calcd. using $k(\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{Cr}^{2+}) = 3.4 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> and $k$ for homolysis of CrCH(CH <sub>3</sub> )OC <sub>2</sub> H <sub>5</sub> .	83A237
19.29	Carbon tetrachloride $\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{CCl}_4 \rightarrow$	$2.5 \times 10^7$				p.r.	Cond y changes; buildup of HCl in N <sub>2</sub> O-satd. soln. contg. Et <sub>2</sub> O.	710778
19.30	Crotonic acid $\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{CH}_3\text{CH}=\text{CHCO}_2\text{H} \rightarrow$ addn.	$2.0 \times 10^6$		~2		chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and Et <sub>2</sub> O; calcd. using $2k(R + R)$ .	93D265
19.31	Nitrobenzene $\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$	$2.5 \times 10^8$				p.r.	D.k.; radical from ethyl ether.	771100
19.32	Tetranitromethane $\text{CH}_3\dot{\text{C}}\text{HOCH}_2\text{H}_5 + \text{C}(\text{NO}_2)_4 \rightarrow \text{C}(\text{NO}_2)_3\text{O}^- + \text{other prod.}$	$\sim 4 \times 10^9$				p.r.	P.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. ethyl ether.	80A071

TABLE 20. 1,2-Dihydroxyethyl

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
20.1	1,2-Dihydroxyethyl							
	'CHOHCH <sub>2</sub> OH + 'CHOHCH <sub>2</sub> OH →	9.6 × 10 <sup>8</sup>				p.r.	D.k. at 245 nm in N <sub>2</sub> O-satd. soln. contg. ethylene glycol; ε = 880 L mol <sup>-1</sup> cm <sup>-1</sup> .	79B120
		3.4 × 10 <sup>8</sup>	6.0			p.r.	D.k. at 250 nm in N <sub>2</sub> O-satd. soln. contg. ethylene glycol; 2 <i>k</i> /ε = 1.1 × 10 <sup>6</sup> (ε = 610 L mol <sup>-1</sup> cm <sup>-1</sup> ).	730004
	HOCH <sub>2</sub> CHO <sup>-</sup> → 'CH <sub>2</sub> CHO + OH <sup>-</sup>	3.1 × 10 <sup>6</sup> s <sup>-1</sup>	≥12			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol; rel. to <i>k</i> (HOCH <sub>2</sub> CHO <sup>-</sup> + <i>N</i> -methylisonicotinate ion) = 3.8 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	79A051
20.2	Cadmium(II) ion							
	'CHOHCH <sub>2</sub> OH + Cd <sup>2+</sup> →	<2.5 × 10 <sup>3</sup>				p.r.	No reaction obs.	751153
20.3	<i>N</i> -rac-5,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion							
	'CHOHCH <sub>2</sub> OH + <i>N</i> -rac-Co(4,11-dieneN <sub>4</sub> ) <sup>2+</sup> →	~1 × 10 <sup>7</sup>	3-7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> ethylene glycol.	78A200
	HOCH <sub>2</sub> CHOHCo(4,11-dieneN <sub>4</sub> ) <sup>2+</sup> + other prod.							
20.4	Cobal(II)amin							
	'CHOHCH <sub>2</sub> OH + B12r → addn.	1.8 × 10 <sup>8</sup>	5.9			p.r.	Abs. changes at 370, 390, 430 and 520 nm in soln. contg. 0.5 mol L <sup>-1</sup> ethylene glycol; addn. prod. decomposes to Co(I) or H-Co(III) species.	82A176
		2.4 × 10 <sup>8</sup>				p.r.	P.b.k. at 525 nm as well as d.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> ethylene glycol.	751169
20.5	Hexaamminebis(μ-hydroxy)[μ-(4-nitrobenzoato)]dicobalt(III) ion							
	'CHOHCH <sub>2</sub> OH + HO[Co(NH <sub>3</sub> ) <sub>3</sub> ] <sub>2</sub> O <sub>2</sub> CC <sub>6</sub> H <sub>4</sub> -4-NO <sub>2</sub> <sup>3+</sup> →	8 × 10 <sup>7</sup>			295	p.r.	P.b.k. at 370 nm in soln. of 50% H <sub>2</sub> O-50% ethylene glycol; Δ <i>H</i> <sub>‡</sub> = 21 kJ mol <sup>-1</sup> , studied at 203-295 K.	80A066
	HO[Co(NH <sub>3</sub> ) <sub>3</sub> ] <sub>2</sub> O <sub>2</sub> CC <sub>6</sub> H <sub>4</sub> -4-NO <sub>2</sub> <sup>2+</sup>							
20.6	Chromium(II) ion							
	'CHOHCH <sub>2</sub> OH + Cr <sup>2+</sup> → CrCHOHCH <sub>2</sub> OH <sup>2+</sup>	1.0 × 10 <sup>8</sup>	~3		293	p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> Cr <sup>2+</sup> and ethylene glycol; Δ <i>V</i> <sub>‡</sub> = 4.8 cm <sup>3</sup> mol <sup>-1</sup> , studied at 0.1-150 MPa.	92A361
		1.5 × 10 <sup>8</sup>	3.0			p.r.	P.b.k. in Ar-satd. soln. contg. ethylene glycol-HClO <sub>4</sub> .	741146
20.7	Pentacyano(nitrosyl)ferrate(III) ion							
	'CHOHCH <sub>2</sub> OH + Fe(CN) <sub>5</sub> (NO) <sup>2-</sup> → Fe(CN) <sub>5</sub> NO <sup>3-</sup> + H <sup>+</sup> + HOCH <sub>2</sub> CHO	2.4 × 10 <sup>8</sup>	7			p.r.	P.b.k. at 435 nm in N <sub>2</sub> O- or Ar-satd. soln. contg. 0.2 mol L <sup>-1</sup> ethylene glycol and 5 × 10 <sup>-4</sup> mol L <sup>-1</sup> substrate.	86A306
20.8	Ferricyanide ion							
	'CHOHCH <sub>2</sub> OH + Fe(CN) <sub>6</sub> <sup>3-</sup> →	3.6 × 10 <sup>9</sup>	7			p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L <sup>-1</sup> ethylene glycol.	690522
20.9	Hydrogen ion							
	'CHOHCH <sub>2</sub> OH + H <sup>+</sup> → 'CH <sub>2</sub> CHO + H <sub>2</sub> O + H <sup>+</sup>	1.1 × 10 <sup>7</sup>				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 1,2-ethanediol at varied [H <sup>+</sup> ]; acid catalyzed dehydration.	86A220
20.10	Hydroxide ion							
	'CHOHCH <sub>2</sub> OH + OH <sup>-</sup> → HOCH <sub>2</sub> CHO <sup>-</sup> + H <sub>2</sub> O	~10 <sup>10</sup>	10			p.r.	Absorption spectrum immediately after pulse in N <sub>2</sub> O-satd. soln. contg. ethylene glycol decays in <10 μs to formylmethyl spectrum.	730004

TABLE 20. 1,2-Dihydroxyethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>20.11 Oxygen</b>								
20.11	'CHOHCH <sub>2</sub> OH + O <sub>2</sub> → 'OOCHOHCH <sub>2</sub> OH	$3.2 \times 10^9$	7			p.r.	C.k. in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. 0.3 mol L <sup>-1</sup> ethylene glycol with ferricyanide. rel. to $k(\text{'CHOHCH}_2\text{OH} + \text{Fe}(\text{CN})_6^{3-}) = 3.6 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	690522
<b>20.12 1,1'-Dimethyl-4,4'-bipyridinium</b>								
20.12	'CHOHCH <sub>2</sub> OH + MV <sup>2+</sup> → MV <sup>+</sup> + other prod.	$1.8 \times 10^8$	6			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 1,2-ethanediol.	86A220
<b>20.13 Dithiothreitol</b>								
20.13	'CHOHCH <sub>2</sub> OH + HSCH <sub>2</sub> (CHOH) <sub>2</sub> CH <sub>2</sub> SH → HSCH <sub>2</sub> (CHOH) <sub>2</sub> CH <sub>2</sub> S' + HOCH <sub>2</sub> CH <sub>2</sub> OH	$2.6 \times 10^7$	7.4			p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. dithiothreitol and 0.1 mol L <sup>-1</sup> ethylene glycol.	87A250
<b>20.14 2-Methyl-2-nitrosopropane</b>								
20.14	'CHOHCH <sub>2</sub> OH + (CH <sub>3</sub> ) <sub>3</sub> CNO → addn.	$3.4 \times 10^7$	~7		~291	p.r.	P.b.k. in unbuffered N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> ethylene glycol and (0.25-15) × 10 <sup>-3</sup> mol L <sup>-1</sup> MNP (assuming complete dimer dissociation).	91D097
<b>20.15 Tetranitromethane</b>								
20.15	'CHOHCH <sub>2</sub> OH + C(NO <sub>2</sub> ) <sub>4</sub> →	$1.7 \times 10^9$				p.r.	P.b.k. in soln. contg. 0.2 mol L <sup>-1</sup> ethylene glycol.	730126

TABLE 21. Formylmethyl

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
21.1	Formylmethyl							
	$\cdot\text{CH}_2\text{CHO} + \cdot\text{CH}_2\text{CHO} \rightarrow$	$7.5 \times 10^7$	7.4			p.r.	D.k. at 260 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> ethylene glycol or 0.1 mol L <sup>-1</sup> acetaldehyde.	91A488
		$4.5 \times 10^8$	9.8			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 10 <sup>-3</sup> mol L <sup>-1</sup> acetylene; $2k/e = 3.4 \times 10^6$ cm s <sup>-1</sup> .	78A007
		$4.5 \times 10^8$	10			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> ethylene glycol; $\epsilon = 260$ L mol <sup>-1</sup> cm <sup>-1</sup> at 300 nm.	730004
21.2	Diaqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(II) ion							
	$\cdot\text{CH}_2\text{CHO} + \text{Co}(4,11\text{-dieneN}_4)(\text{H}_2\text{O})_2^{2+} \rightarrow \text{CHOCH}_2\text{Co}(4,11\text{-dieneN}_4)(\text{H}_2\text{O})^{2+}$	$8 \times 10^7$	1-3, 7-10			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> ethylene glycol.	78A200
21.3	Dihydroxytetrakis(4-sulfonatophenyl)porphinatocobaltate(II) ion							
	$\cdot\text{CH}_2\text{CHO} + \text{CoTPPS(OH)}_2^6 \rightarrow$	$2.0 \times 10^9$	12			p.r.	D.k. as well as p.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol; addn. or oxidation.	81A317
21.4	Chromium(II) ion							
	$\cdot\text{CH}_2\text{CHO} + \text{Cr}^{2+} + \text{H}_2\text{O} \rightarrow \text{CrCH}_2\text{CH(OH)}_2^{2+}$	$3.5 \times 10^8$	~1			p.r.	P.b.k. in Ar-satd. soln. contg. ethylene glycol-HClO <sub>4</sub> .	741146
21.5	Tris(1,10-phenanthroline)iron(III) ion							
	$\cdot\text{CH}_2\text{CHO} + \text{Fe}(\text{phen})_3^{3+} \rightarrow$	$<1 \times 10^6$	~1			p.r.	No reaction obs. in soln. contg. ethylene glycol.	85A284
21.6	Ferrocyanide ion							
	$\cdot\text{CH}_2\text{CHO} + \text{Fe}(\text{CN})_6^{4-} + \text{H}^+ \rightarrow \text{CH}_3\text{CHO} + \text{Fe}(\text{CN})_6^{3-}$	$8.7 \times 10^6$	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.9 mol L <sup>-1</sup> ethylene glycol	90C007
21.7	Hexachloroiridate(IV) ion							
	$\cdot\text{CH}_2\text{CHO} + \text{IrCl}_6^{2-} \rightarrow$	$1.7 \times 10^9$	7			p.r.	D.k. at 490 nm in soln. contg. 2-chloroethanol.	82A041
21.8	Bis(hydroxy)tetrakis(4-pyridyl)porphinatomanganate(III) ion							
	$\cdot\text{CH}_2\text{CHO} + (\text{OH})_2\text{MnTpyP}^- \rightarrow$	$-4 \times 10^8$	11.9			p.r.	D.k. as well as p.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	84A120
21.9	Bis(hydroxy)tetrakis(4-sulfonatophenyl)porphinatomanganate(III) ion							
	$\cdot\text{CH}_2\text{CHO} + (\text{OH})_2\text{MnTPPS}^{5-} \rightarrow$	$6.2 \times 10^8$	12.4			p.r.	D.k. as well as p.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	84A120
21.10	Bis(hydroxy)tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(III) ion							
	$\cdot\text{CH}_2\text{CHO} + (\text{OH})_2\text{MnTMPyP}^{3+} \rightarrow$	$2.2 \times 10^8$	12.4			p.r.	D.k. as well as p.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	84A120
21.11	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatozincate(II) ion							
	$\cdot\text{CH}_2\text{CHO} + \text{ZnTPPS}^{4-} + \text{H}^+ \rightarrow \text{CH}_3\text{CHO} + [\text{ZnTPPS}]^{3-}$	$-1.5 \times 10^8$	12			p.r.	D.k. as well as p.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	81A317
21.12	4-Aminophenoxy ion							
	$\cdot\text{CH}_2\text{CHO} + 4\text{-NH}_2\text{C}_6\text{H}_4\text{O}^- + \text{H}^+ \rightarrow \text{CH}_3\text{CHO} + 4\text{-H}_2\text{NC}_6\text{H}_4\text{O}^-$	$2.1 \times 10^9$	~11.5	296	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. N <sub>2</sub> O and ethylene glycol.	79A051	
21.13	Ascorbate ion							
	$\cdot\text{CH}_2\text{CHO} + \text{AH}^- \rightarrow \text{CH}_3\text{CHO} + \text{A}^-$	$7 \times 10^8$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln.	88A266
		$8.8 \times 10^7$	7	296	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ClCH <sub>2</sub> CH <sub>2</sub> OH.	79A051	

TABLE 21. Formylmethyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
21.14	<b>2-<i>tert</i>-Butylhydroquinone dianion</b> $\cdot\text{CH}_2\text{CHO} + (\text{CH}_3)_3\text{CQ}^{2-} + \text{H}_2\text{O} \rightarrow \cdot\text{CH}_2\text{CHO} + (\text{CH}_3)_3\text{CQ}^{+} + \text{OH}^-$	$1.7 \times 10^9$	13.5		295	p.r.	P.b.k. at 430 nm in N <sub>2</sub> O-satd. soln. contg. 0.9 mol L <sup>-1</sup> ethylene glycol, ~0.5 mol L <sup>-1</sup> KOH and <i>tert</i> -butylhydroquinone.	95A022
21.15	<b>Catechin, conjugate base</b> $\cdot\text{CH}_2\text{CHO} + \text{H}^+ + \text{ArO}^- \rightarrow \cdot\text{CH}_2\text{CHO} + \text{ArO}^\cdot$	$1.8 \times 10^9$	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.16	<b>Catechol monoanion</b> $\cdot\text{CH}_2\text{CHO} + 2\text{-HOCH}_2\text{O}^- \rightarrow \cdot\text{CH}_2\text{CHO} + 2\text{-OC}_2\text{H}_4\text{O}^\cdot$	$7.4 \times 10^8$	-11.5		296	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	79A051
21.17	<b>1,4-Dihydroxy-9,10-anthraquinone-2-sulfonate ion</b> $\cdot\text{CH}_2\text{CHO} + \text{Q2SH}_2 \rightarrow \text{Q2SH}^\cdot + \text{CH}_2\text{ClIO}$	$1.2 \times 10^{10}$	1			p.r.	P.b.k. at >650 nm in N <sub>2</sub> -satd. soln. contg. ethylene glycol.	92A203
21.18	<b>1,4-Dihydroxy-9,10-anthraquinone-6-sulfonate ion</b> $\cdot\text{CH}_2\text{CHO} + \text{Q6SH}_2 \rightarrow \text{Q6SH}^\cdot + \text{CH}_2\text{CHO}$	$2.0 \times 10^{10}$	1			p.r.	P.b.k. at >650 nm in N <sub>2</sub> -satd. soln. contg. ethylene glycol.	92A203
21.19	<b>3,4-Dihydroxycinnamate trianion</b> $\cdot\text{CH}_2\text{CHO} + \text{H}^+ + 3,4\text{-(O)}_2\text{C}_6\text{H}_3\text{CH=CHCO}_2^- \rightarrow \cdot\text{CH}_2\text{CHO} + 3,4\text{-(O)(O)}_2\text{C}_6\text{H}_3\text{CH=CHCO}_2^-$	$2.6 \times 10^9$	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.20	<b>6,7-Dihydroxycoumarin, conjugate base</b> $\cdot\text{CH}_2\text{CHO} + \text{H}^+ + \text{ArO}^- \rightarrow \cdot\text{CH}_2\text{CHO} + \text{ArO}^\cdot$	$2 \times 10^9$	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.21	<b>5,8-Dihydroxy-1,4-naphthoquinone, conjugate dibase</b> $\cdot\text{CH}_2\text{CHO} + 5,8\text{-NQ(O)}_2 \rightarrow \cdot\text{CH}_2\text{CHO} + \cdot\text{NQ(OH)}_2^-$	$3.6 \times 10^9$	-13			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> ethylene glycol and (2-12) $\times 10^{-5}$ mol L <sup>-1</sup> naphthazarin.	88A374
21.22	<b>5,8-Dihydroxy-1,4-naphthoquinone</b> $\cdot\text{CH}_2\text{CHO} + 5,8\text{-NQ(OH)}_2 \rightarrow \cdot\text{CH}_2\text{CHO} + \cdot\text{NQH(OH)}_2^-$	$9.0 \times 10^9$	-1			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> ethylene glycol and (2-12) $\times 10^{-5}$ mol L <sup>-1</sup> naphthazarin.	88A374
21.23	<b>2,5-Dihydroxyphenylacetate ion, conjugate dibase</b> $\cdot\text{CH}_2\text{CHO} + \text{H}^+ + 2,5\text{-(O)}_2\text{C}_6\text{H}_3\text{CH}_2\text{CO}_2^- \rightarrow \cdot\text{CH}_2\text{CHO} + 2,5\text{-(O)(O)}_2\text{C}_6\text{H}_3\text{CH}_2\text{CO}_2^-$	$1.7 \times 10^9$	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.24	<b>DL-3,4-Dihydroxyphenylalanine</b> $\cdot\text{CH}_2\text{CHO} + (\text{HO})_2\text{C}_6\text{H}_3\text{CH}_2\text{CH}(\text{NH}_2)\text{CO}_2\text{H} \rightarrow$	$1.4 \times 10^9$	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.25	<b>4-(Dimethylamino)phenoxide ion</b> $\cdot\text{CH}_2\text{CHO} + \text{H}^+ + (\text{CH}_3)_2\text{NC}_6\text{H}_4\text{O}^- \rightarrow \cdot\text{CH}_2\text{CHO} + 4\text{-(CH}_3)_2\text{NC}_6\text{H}_4\text{O}^\cdot$	$2.2 \times 10^9$	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.26	<b>Dithiothreitol, anion</b> $\cdot\text{CH}_2\text{CHO} + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{S}^- \rightarrow \cdot\text{CH}_2\text{CHO} + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{S}^\cdot + \text{CH}_2\text{CHO}$	$1.2 \times 10^8$ $3.5 \times 10^8$	10 11.1			p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. dithiothreitol and 0.1 mol L <sup>-1</sup> ethylene glycol.	87A250
21.27	<b>Ellagic acid, conjugate base</b> $\cdot\text{CH}_2\text{CHO} + \text{H}^+ + \text{ArO}^- \rightarrow \cdot\text{CH}_2\text{CHO} + \text{ArO}^\cdot$	$2.4 \times 10^9$	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253

TABLE 21. Formylmethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
21.28	4-Ethylphenoxyde ion							
	'CH <sub>2</sub> CHO + 4-EtC <sub>6</sub> H <sub>4</sub> O <sup>-</sup> + H <sup>+</sup> → CH <sub>3</sub> CHO + 4-EtC <sub>6</sub> H <sub>4</sub> O'	7.0 × 10 <sup>7</sup>	~11.5		296	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	79A051
21.29	Hydroquinone							
	'CH <sub>2</sub> CHO + QH <sub>2</sub> →	≤2 × 10 <sup>6</sup>	7.2		296	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 2-chloroethanol.	79A051
21.30	Hydroquinone monoanion							
	'CH <sub>2</sub> CHO + 4-HOC <sub>6</sub> H <sub>4</sub> O <sup>-</sup> → CH <sub>3</sub> CHO + Q <sup>-</sup>	2.2 × 10 <sup>9</sup>	~11.5		296	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol or 2-methoxy- or 2-ethoxyethanol.	79A051
21.31	<i>p</i> -Hydroxycinnamate ion, conjugate base							
	'CH <sub>2</sub> CHO + H <sup>+</sup> + 4-(O <sup>-</sup> )C <sub>6</sub> H <sub>4</sub> CH=ClCO <sub>2</sub> <sup>-</sup> → 4-(OC <sub>6</sub> H <sub>4</sub> CH=CHO <sub>2</sub> <sup>-</sup>	7.7 × 10 <sup>7</sup>	11.5			p.r.	P.b.k. at 595 nm in soln. contg. 1 mol L <sup>-1</sup> ethylene glycol.	84A206
21.32	7-Hydroxycoumarin, conjugate base							
	'CH <sub>2</sub> CHO + H <sup>+</sup> + ArO <sup>-</sup> → CH <sub>3</sub> CHO + ArO'	1.3 × 10 <sup>6</sup>	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.33	5-Hydroxydopamine							
	'CH <sub>2</sub> CHO + (HO) <sub>3</sub> C <sub>6</sub> H <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> NH <sub>2</sub> →	1.8 × 10 <sup>9</sup>	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.34	6-Hydroxydopamine							
	'CH <sub>2</sub> CHO + (HO) <sub>3</sub> C <sub>6</sub> H <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> NH <sub>2</sub> →	1.8 × 10 <sup>9</sup>	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.35	5-Hydroxyindole, conjugate base							
	'CH <sub>2</sub> CHO + H <sup>+</sup> + [5-InH-O <sup>-</sup> ] → CH <sub>3</sub> CHO + 5-InH-O'	1.3 × 10 <sup>9</sup>	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.36	3-Hydroxyphenoxide ion							
	'CH <sub>2</sub> CHO + 3-HOC <sub>6</sub> H <sub>4</sub> O <sup>-</sup> → CH <sub>3</sub> CHO + 3-OC <sub>6</sub> H <sub>4</sub> O'	1.3 × 10 <sup>9</sup>	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
		1.6 × 10 <sup>9</sup>	~11.5		296	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	79A051
21.37	6-Hydroxy-2,5,7,8-tetramethylchroman-2-carboxylate dianion							
	'CH <sub>2</sub> CHO + H <sup>+</sup> + TxO <sup>2-</sup> → CH <sub>3</sub> CHO + TxO <sup>-</sup>	1.8 × 10 <sup>9</sup>	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.38	5-Hydroxytryptophan							
	'CH <sub>2</sub> CHO + 5-OHTrpH →	1.3 × 10 <sup>9</sup>	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.39	Isobarbiturate ion							
	'CH <sub>2</sub> CHO + H <sup>+</sup> + IBO <sup>-</sup> → CH <sub>3</sub> CHO + IBO'	1.6 × 10 <sup>9</sup>	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.40	4-Methoxyphenoxide ion							
	'CH <sub>2</sub> CHO + 4-CH <sub>3</sub> OC <sub>6</sub> H <sub>4</sub> O <sup>-</sup> + H <sup>+</sup> → CH <sub>3</sub> CHO + 4-CH <sub>3</sub> OC <sub>6</sub> H <sub>4</sub> O'	9.8 × 10 <sup>8</sup>	~11.5		296	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	79A051
		8.3 × 10 <sup>8</sup>	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.41	4-Methylphenoxide ion							
	'CH <sub>2</sub> CHO + 4-CH <sub>3</sub> C <sub>6</sub> H <sub>4</sub> O <sup>-</sup> + H <sup>+</sup> → CH <sub>3</sub> CHO + 4-CH <sub>3</sub> C <sub>6</sub> H <sub>4</sub> O'	9.0 × 10 <sup>7</sup>	~11.5		296	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	79A051

TABLE 21. Formylmethyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
21.42	Metiazinic acid, conjugate base $\cdot^{\text{CH}_2\text{CHO}} + \text{MZ}^- + \text{H}^+ \rightarrow \text{CH}_3\text{CHO} + [\text{MZ}]$	$2 \times 10^8$	10			p.r.	P.b.k. at 529 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> ethylene glycol; 51% <i>e</i> -transfer.	81A162
21.43	Noradrenaline $\cdot^{\text{CH}_2\text{CHO}} + (\text{HO})_2\text{C}_6\text{H}_3\text{CH}(\text{CH}_2\text{NH}_2)\text{OH} \rightarrow$	$1.5 \times 10^9$	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.44	Phenoxide ion $\cdot^{\text{CH}_2\text{CHO}} + \text{C}_6\text{H}_5\text{O}^- + \text{H}^+ \rightarrow \text{CH}_3\text{CHO} + \text{C}_6\text{H}_5\text{O}^\cdot$	$4.3 \times 10^6$	-11.5	296	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	79A051	
21.45	<i>o</i> -Phenylenediamine $\cdot^{\text{CH}_2\text{CHO}} + 1,2\text{-C}_6\text{H}_4(\text{NH}_2)_2 \rightarrow \text{CH}_3\text{CHO} + 2\text{-H}_2\text{NC}_6\text{H}_4\text{NH}$	$7.7 \times 10^7$ $7.3 \times 10^7$	13.5 -11.5		296	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol. P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253 79A051
21.46	<i>p</i> -Phenylenediamine $\cdot^{\text{CH}_2\text{CHO}} + 1,4\text{-C}_6\text{H}_4(\text{NH}_2)_2 \rightarrow \text{CH}_3\text{CHO} + 4\text{-H}_2\text{NC}_6\text{H}_4\text{NH}$	$4.6 \times 10^8$ $4.0 \times 10^8$	13.5 -11.5		296	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol. P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253 79A051
21.47	Quercetin, conjugate base $\cdot^{\text{CH}_2\text{CHO}} + \text{QO}^- + \text{H}^+ \rightarrow \text{CH}_3\text{CHO} + \text{QO}^\cdot$	$3.1 \times 10^9$	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.48	Rutin, conjugate base $\text{CH}_2\text{CHO} + \text{ArO}^- \rightarrow \text{C}_{27}\text{H}_{29}\text{O}_{16} + \text{CH}_3\text{CHO} + \text{H}^+$	$1.5 \times 10^9$	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.49	1,2,5,8-Tetrahydroxy-9,10-anthraquinone, conjugate base $\cdot^{\text{CH}_2\text{CHO}} + \text{ArO}^- \rightarrow \text{ArO}^\cdot + \text{CH}_3\text{CHO} + \text{H}^+$	$2.4 \times 10^9$	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253
21.50	<i>N,N,N',N'</i> -Tetramethyl- <i>p</i> -phenylenediamine $\cdot^{\text{CH}_2\text{CHO}} + \text{TMPD} + \text{H}^+ \rightarrow \text{CH}_3\text{CHO} + \text{TMPD}^\cdot$	$2.1 \times 10^9$ $2.0 \times 10^9$	13.5 -11.5		296	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol. P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253 79A051
21.51	3,4,5-Trihydroxybenzoate ion, conjugate dibase $\cdot^{\text{CH}_2\text{CHO}} + 3,4,5\text{-(OH)(O)}_2\text{C}_6\text{H}_2\text{CO}_2^- \rightarrow \text{CH}_3\text{CHO} + 3,4,5\text{-(O)(O)}_2\text{C}_6\text{H}_2\text{CO}_2^-$	$1.4 \times 10^9$	13.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. ethylene glycol.	82A253

TABLE 22. Carboxymethyl

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
22.1	Carboxymethyl $\cdot\text{CH}_2\text{CO}_2\text{H} + \cdot\text{CH}_2\text{CO}_2\text{H} \rightarrow$	$9 \times 10^8$	3			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. acetic acid; $\epsilon = 650 \text{ L mol}^{-1} \text{ cm}^{-1}$ at 320 nm; $pK_a = 4.5$ .	690446
22.2	Carboxymethyl, anion $\cdot\text{CH}_2\text{CO}_2^- + \cdot\text{CH}_2\text{CO}_2^- \rightarrow$	$5.5 \times 10^8$	6.5			p.r.	D.k. at 366 nm in N <sub>2</sub> O-satd. soln. contg. Na acetate; $\epsilon = 780 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	761082
		$5 \times 10^8$	10			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. acetate ion; $\epsilon = 800 \text{ L mol}^{-1} \text{ cm}^{-1}$ at 350 nm.	690446
22.3	Diaqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(II) ion $\cdot\text{CH}_2\text{CO}_2^- + \text{Co}(4,11\text{-dieneN}_4)(\text{H}_2\text{O})_2^{2+} \rightarrow$	$<1 \times 10^7$				p.r.	No reaction obs.	78A200
22.4	Diaqua(nitrilotriacetato)cobaltate(II) ion $\cdot\text{CH}_2\text{CO}_2^- + \text{CoNTA}^- \rightarrow \text{O}_2\text{CCH}_2\text{CoNTA}^{2-}$	$1.5 \times 10^7$	4.7	298		p.r.	P.b.k. at 260 nm in N <sub>2</sub> O-satd. soln. contg. $1-50 \times 10^{-4} \text{ mol L}^{-1}$ CoNTA and 0.2-1 mol L <sup>-1</sup> AcOH.	88A343
22.5	Hexaamminecobalt(III) ion $\cdot\text{CH}_2\text{CO}_2^- + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow$	$<3.2 \times 10^6$	7.3			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> acetate.	72A018
	$\cdot\text{CH}_2\text{CO}_2\text{H} + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow$	$<1.0 \times 10^7$	2.5			p.r.	D.k. in Ar-satd. soln. contg. 0.01 mol L <sup>-1</sup> acetic acid.	72A018
22.6	Chromium(II) ion $\cdot\text{CH}_2\text{CO}_2\text{H} + \text{Cr}^{2+} \rightarrow \text{CrCH}_2\text{CO}_2\text{H}^{2+}$	$2.5 \times 10^8$	~1			p.r.	P.b.k. in Ar-satd. soln. contg. acetic acid and HClO <sub>4</sub> .	741146
22.7	Dichromate(VI) ion $\cdot\text{CH}_2\text{CO}_2\text{H} + \text{Cr}_2\text{O}_7^{2-} \rightarrow \text{Cr(V)} + \text{other prod.}$	$1.8 \times 10^8$	0.5, ~3.0			p.r.	D.k. at 350 nm, as well as 310 nm, in N <sub>2</sub> O-satd. soln. contg. $(1-6) \times 10^{-4} \text{ mol L}^{-1}$ dichromate and 0.1 mol L <sup>-1</sup> acetic acid.	91A230
22.8	Copper(II) ion $\cdot\text{CH}_2\text{CO}_2^- + \text{Cu}^{2+} \rightarrow \text{CuCH}_2\text{CO}_2^+$	$6.4 \times 10^8$	6.0			p.r.	D.k. in N <sub>2</sub> O-satd. $10^{-2} \text{ mol L}^{-1}$ acetate soln. Final product is Cu <sup>+</sup> .	771025
22.9	Copper(II) triglycine $\cdot\text{CH}_2\text{CO}_2^- + \text{Cu}(\text{Gly}_3)^- \rightarrow (\text{Gly}_3)\text{CuCH}_2\text{CO}_2^{2-}$	$1.6 \times 10^7$	~7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> acetate ion.	79A445
22.10	Copper(II) tetraglycine $\cdot\text{CH}_2\text{CO}_2^- + \text{Cu}(\text{Gly}_4)^{2-} \rightarrow (\text{Gly}_4)\text{CuCH}_2\text{CO}_2^{3-}$	$9 \times 10^6$	8.1			p.r.	P.b.k. at 320 nm in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> acetate ion.	80A304
22.11	Tris(1,10-phenanthroline)iron(III) ion $\cdot\text{CH}_2\text{CO}_2\text{H} + \text{Fe}(\text{phen})_3^{3+} \rightarrow \text{redn.}$	$1.2 \times 10^6$	~1			p.r.	Estd. from <i>k</i> <sub>obs</sub> in soln. contg. 1.5-4.0 mol L <sup>-1</sup> AcOH (reacts with >90% of ·OH and <15% of H <sup>+</sup> ) and $(2-6) \times 10^{-4} \text{ mol L}^{-1}$ complex, and <i>G</i> value; probably inner-sphere mechanism.	85A284
22.12	Ferricyanide ion $\cdot\text{CH}_2\text{CO}_2\text{H} + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{electron transfer}$	$2 \times 10^6$	3.3	293		p.r.	D.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. acetic acid.	82A041
22.13	Hexachloroiridate(IV) ion $\cdot\text{CH}_2\text{CO}_2\text{H} + \text{IrCl}_6^{2-} \rightarrow \text{IrCl}_5^{2-} + \text{ClCH}_2\text{CO}_2\text{H}$	$1.4 \times 10^9$	3.3	293		p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. acetate.	82A041

TABLE 22. Carboxymethyl — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T$ (K)	Method	Comment	Ref.
<b>22.13 Hexachloroiridate(IV) ion — Continued</b>								
	${}^{\bullet}\text{CH}_2\text{CO}_2^- + \text{IrCl}_6^{2-} \rightarrow \text{IrCl}_5^{2-} + {}^{\bullet}\text{CICH}_2\text{CO}_2^-$	$4.2 \times 10^8$	7			p.r.	D.k. at 490 nm in $\text{N}_2\text{O}$ -satd. soln. contg. acetate.	82A041
<b>22.14 Oxygen</b>								
	${}^{\bullet}\text{CH}_2\text{CO}_2^- + \text{O}_2 \rightarrow {}^{\bullet}\text{OOCH}_2\text{CO}_2^-$	$1.7 \times 10^9$	8			p.r.	P.b.k. at 275 nm in $\text{N}_2\text{O}/\text{O}_2$ (4:1 v/v) satd. soln. contg. $0.01 \text{ mol L}^{-1}$ acetate ion.	85A106
		$2.1 \times 10^9$	8.2			p.r.	D.k. at 366 nm in $\text{N}_2\text{O}/\text{O}_2$ satd. soln. contg. $0.01 \text{ mol L}^{-1}$ acetate; cor. for $k(K + R) = 5.5 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	761082
		$3 \times 10^9$	8			p.r.	D.k. at 370 nm in $\text{N}_2\text{O}/\text{O}_2$ satd. soln. contg. $0.1 \text{ mol L}^{-1}$ acetate.	761207
<b>22.15 Ozone</b>								
	${}^{\bullet}\text{CH}_2\text{CO}_2^- + \text{O}_3 \rightarrow \cdot\ddot{\text{O}}_3\text{CH}_2\text{CO}_2^-$	$1.5 \times 10^9$	9-10			p.r.	D.k. at 350 nm ( ${}^{\bullet}\text{CH}_2\text{CO}_2^-$ ), as well as p.b.k. at 430 nm ( $\cdot\ddot{\text{O}}_3^-$ ), in $\text{N}_2\text{O}$ -satd. soln. contg. $(1-2) \times 10^{-4} \text{ mol L}^{-1}$ ozone and $(1-10) \times 10^{-2} \text{ mol L}^{-1}$ acetate ion; computer simulation; product decomposes to $\cdot\ddot{\text{O}}_2^-$ , $\text{CO}_2$ and $\text{CH}_2\text{O}$ .	87A13
<b>22.16 Hexaammineruthenium(III) ion</b>								
	${}^{\bullet}\text{CH}_2\text{CO}_2\text{H} + \text{Ru}(\text{NH}_3)_6^{3+} \rightarrow$	$\leq 5 \times 10^6$	3.9			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.5-1 \text{ mol L}^{-1}$ acetic acid.	771100
		$< 3.0 \times 10^7$	2.5			p.r.	D.k. in Ar-satd. soln. contg. $0.01 \text{ mol L}^{-1}$ acetic acid.	72A018
	${}^{\bullet}\text{CH}_2\text{CO}_2^- + \text{Ru}(\text{NH}_3)_6^{3+} \rightarrow$	$< 1 \times 10^7$	7.3			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.01 \text{ mol L}^{-1}$ acetate.	72A018
<b>22.17 Pentaammine(bromo)ruthenium(III) ion</b>								
	${}^{\bullet}\text{CH}_2\text{CO}_2\text{H} + \text{Ru}(\text{NH}_3)_5\text{Br}^{2+} \rightarrow$	$4.6 \times 10^8$	3.9			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.5-1 \text{ mol L}^{-1}$ acetic acid.	771100
<b>22.18 Pentaammine(chloro)ruthenium(III) ion</b>								
	${}^{\bullet}\text{CH}_2\text{CO}_2\text{H} + \text{Ru}(\text{NH}_3)_5\text{Cl}^{2+} \rightarrow$	$4.0 \times 10^7$	3.9			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.5-1 \text{ mol L}^{-1}$ acetic acid.	771100
<b>22.19 Titanium(III) ions</b>								
	${}^{\bullet}\text{CH}_2\text{CO}_2\text{H} + \text{Ti}^{3+} \rightarrow \text{TiCH}_2\text{CO}_2\text{H}^{3+}$	$4 \times 10^6$	0.5			p.r.	P.b.k. in soln. contg. $2 \text{ mol L}^{-1}$ AcOH and $0.3 \text{ mol L}^{-1}$ sulfuric acid. Complex formn. deduced from transient spectra. Product is $\text{Ti}(\text{IV})$ .	79A341
<b>22.20 Uranium(III) ion</b>								
	${}^{\bullet}\text{CH}_2\text{CO}_2\text{H} + \text{U}^{3+} \rightarrow \text{UCH}_2\text{CO}_2\text{H}^3$	$1.2 \times 10^8$	0.3			p.r.	D.k. at 355 nm in He-satd. soln. contg. $0.5 \text{ mol L}^{-1}$ $\text{HClO}_4$ and $0.1-1 \text{ mol L}^{-1}$ AcOH.	85A122
<b>22.21 2-Methyl-2-nitrosopropane</b>								
	${}^{\bullet}\text{CH}_2\text{CO}_2^- + (\text{CH}_3)_3\text{CNO} \rightarrow (\text{CH}_3)_3\text{CN}(\ddot{\text{O}})\text{CH}_2\text{CO}_2^-$	$7.0 \times 10^6$	9.2	-291		p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.1 \text{ mol L}^{-1}$ Na acetate, $0.01 \text{ mol L}^{-1}$ borate buffer and $(0.25-15) \times 10^{-3} \text{ mol L}^{-1}$ MNP (assuming complete MNP dimer dissociation).	91D097
<b>22.22 <i>aci</i>-Nitromethane anion</b>								
	${}^{\bullet}\text{CH}_2\text{CO}_2^- + \text{CH}_2\text{NO}_2^- \rightarrow {}^{\bullet}\text{O}_2\text{CCH}_2\text{CH}_2\text{NO}_2^-$	$7.9 \times 10^7$	11.3	-285		p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.5-5 \times 10^{-3} \text{ mol L}^{-1}$ nitromethane and $0.5 \text{ mol L}^{-1}$ acetate ion; d.k. gave $k = 8.8 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ .	88D069

TABLE 23. Carboxy(hydroxy)methyl

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
23.1	(Carboxy)hydroxymethyl							
	'CHOHCO <sub>2</sub> H + 'CHOHCO <sub>2</sub> H →	6.5 × 10 <sup>8</sup>	1			p.r.	D.k in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> glycolic acid ( $\epsilon = 6000 \text{ L mol}^{-1} \text{ cm}^{-1}$ ); p <i>K<sub>a</sub></i> = 4.6.	690447
	'CHOHCO <sub>2</sub> <sup>-</sup> + 'CHOHCO <sub>2</sub> <sup>-</sup> →	4.3 × 10 <sup>8</sup>	7.2			p.r.	D.k in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> glycolic acid ( $\epsilon = 6000 \text{ L mol}^{-1} \text{ cm}^{-1}$ ); p <i>K<sub>a</sub></i> = 8.8.	690447
	'CHO <sup>-</sup> CO <sub>2</sub> <sup>-</sup> + 'CHO <sup>-</sup> CO <sub>2</sub> <sup>-</sup> →	7.5 × 10 <sup>6</sup>	12			p.r.	D.k in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> glycolic acid ( $\epsilon = 6000 \text{ L mol}^{-1} \text{ cm}^{-1}$ ).	690447
23.2	Tetrahydroxyborate ion							
	'CHOHCO <sub>2</sub> <sup>-</sup> + B(OH) <sub>4</sub> <sup>-</sup> →	1.4 × 10 <sup>7</sup>	9.16,	→0		p.r.	Calcd. from effect of borate on d.k. at 270 nm in N <sub>2</sub> O-satd. soln. contg. glycolate.	751053
	'CHO <sup>-</sup> CO <sub>2</sub> <sup>-</sup> + H <sub>3</sub> BO <sub>3</sub> + H <sub>2</sub> O		9.75					
23.3	Chromium(II) ion							
	'CHOHCO <sub>2</sub> H + Cr <sup>2+</sup> →	1.4 × 10 <sup>8</sup>	↔ 1			p.r.	P.b.k. in Ar-satd. soln. contg. glycolic acid and HClO <sub>4</sub> .	741146
23.4	Ferricyanide ion							
	'CHOHCO <sub>2</sub> H + Fe(CN) <sub>6</sub> <sup>3-</sup> →	1.0 × 10 <sup>8</sup>	3.4		295	p.r.	D.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. glycolic acid.	82A041
	Fe(CN) <sub>6</sub> <sup>4-</sup> + other prod.							
	'CHOHCO <sub>2</sub> <sup>-</sup> + Fe(CN) <sub>6</sub> <sup>3-</sup> →	5 × 10 <sup>8</sup>	7			p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L <sup>-1</sup> glycolate ion.	690522
	+ other prod.							
	'OCHCO <sub>2</sub> <sup>-</sup> + Fe(CN) <sub>6</sub> <sup>3-</sup> →	7.5 × 10 <sup>8</sup>	11.5		295	p.r.	D.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. glycolate.	82A041
	+ other prod.							
23.5	Hexachloroiridate(IV) ion							
	'CHOHCO <sub>2</sub> H + IrCl <sub>6</sub> <sup>2-</sup> →	2.3 × 10 <sup>9</sup>	3.3		295	p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. glycolate.	82A041
	IrCl <sub>6</sub> <sup>3-</sup> + other prod.							
	'CHOHCO <sub>2</sub> <sup>-</sup> + IrCl <sub>6</sub> <sup>2-</sup> →	2.0 × 10 <sup>9</sup>	6.9		295	p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. glycolate.	82A041
	IrCl <sub>6</sub> <sup>3-</sup> + other prod.							
	'OCHCO <sub>2</sub> <sup>-</sup> + IrCl <sub>6</sub> <sup>2-</sup> →	1.8 × 10 <sup>9</sup>	10.7		295	p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. glycolate.	82A041
	+ other prod.							
23.6	Ammonia							
	'CHOHCO <sub>2</sub> <sup>-</sup> + NH <sub>3</sub> →	7.5 × 10 <sup>8</sup>	9.26,	→0		p.r.	Calcd. from effect of [NH <sub>3</sub> ] in buffer soln. on d.k. at 270 nm in N <sub>2</sub> O-satd. soln. contg. glycolate.	751053
	NH <sub>4</sub> <sup>+</sup>		9.75					
23.7	Hydroxide ion							
	'CHOHCO <sub>2</sub> <sup>-</sup> + OH <sup>-</sup> →	3.9 × 10 <sup>9</sup>	9.5-	→0		p.r.	Calcd. from effect of [OH <sup>-</sup> ] in buffer soln. on d.k. at 270 nm in N <sub>2</sub> O-satd. soln. contg. glycolate; $k = 3.1 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ in unbuffered soln.	751053
	H <sub>2</sub> O		10.5					
23.8	Oxygen							
	'CHOHCO <sub>2</sub> <sup>-</sup> + O <sub>2</sub> →	1.8 × 10 <sup>9</sup>	7			p.r.	C.k. in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. 0.3 mol L <sup>-1</sup> glycolate and ferricyanide. rel. to $k('CHOHCO_2^- + Fe(CN)_6^{3-}) = 5 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	690522
23.9	Pyrophosphate ion							
	'CHOHCO <sub>2</sub> <sup>-</sup> + P <sub>2</sub> O <sub>7</sub> <sup>4-</sup> →	5.8 × 10 <sup>6</sup>	9.26,	→0		p.r.	Calcd. from effect of [P <sub>2</sub> O <sub>7</sub> <sup>4-</sup> ] on d.k. at 270 nm in N <sub>2</sub> O-satd. glycolate soln.	751053
	+ HP <sub>2</sub> O <sub>7</sub> <sup>3-</sup>		9.75					
23.10	9,10-Anthraquinone-2-sulfonate ion							
	'CHOHCO <sub>2</sub> <sup>-</sup> + 2-SO <sub>3</sub> AQ <sup>-</sup> →	7.1 × 10 <sup>8</sup>	7.0			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. glycolate.	731104
	[2-SO <sub>3</sub> AQ] <sup>2-</sup> + other prod.							

TABLE 23. Carboxy(hydroxy)methyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
23.11	<b>1,4-Benzozquinone</b> $^{\bullet}\text{CHOHCO}_2^- + \text{Q} \rightarrow \text{Q}^{\bullet-} + \text{other prod.}$	$2.2 \times 10^9$	7.0			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. glycolate; 72% <i>e</i> -transfer.	731052 731104
23.12	<b>2-Hydroxy-1,4-naphthoquinone</b> $^{\bullet}\text{CHOHCO}_2^- + 2\text{-}(\text{OH})\text{NQ} \rightarrow 2\text{-}(\text{OH})\text{NQ}^{\bullet-} + \text{other prod.}$	$9.1 \times 10^8$	7.0			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. glycolate.	731104
23.13	<b>2-Methyl-1,4-naphthoquinone</b> $^{\bullet}\text{CHOHCO}_2\text{H} + 2\text{-CH}_3\text{NQ} \rightarrow$ $^{\bullet}\text{CHOHCO}_2^- + 2\text{-CH}_3\text{NQ} \rightarrow$ $^{\bullet}\text{CHO}^{\bullet}\text{CO}_2^- + 2\text{-CH}_3\text{NQ} \rightarrow$	$9.2 \times 10^8$ $1.5 \times 10^9$ $1.6 \times 10^9$	3.2 6.5 10.6			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. glycolic acid; 13% <i>e</i> -transfer. P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. glycolate ion; 69% <i>e</i> -transfer. P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. glycolate ion; 77% <i>e</i> -transfer.	731047 731047 731104
23.14	<b>1,4-Naphthoquinone-2-sulfonate ion</b> $\text{CHOHCO}_2^- + 2\text{-SO}_3\text{NQ}^{\bullet-} \rightarrow$ $[\text{2-SO}_3\text{NQ}]^{2-} + \text{other prod.}$	$1.7 \times 10^9$	7.0			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. glycolate ion.	731104
23.15	<b>Riboflavin</b> $^{\bullet}\text{CHOHCO}_2^- + \text{RF} \rightarrow \text{electron transfer}$	$9.3 \times 10^8$	7.0			p.r.	P.b.k. at 560 nm in N <sub>2</sub> O-satd. soln. contg. glycolate ion.	731104

TABLE 24. Carboxy(hydroxy)ethyl

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
24.1	<b>Hexaamminecobalt(III) ion</b> $\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow$ electron transfer	$7.0 \times 10^6$	6.0			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol L <sup>-1</sup> lactate.	72A018
	$\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CO}_2^- + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow$ electron transfer	$2.4 \times 10^{10}$	12.0			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol L <sup>-1</sup> lactate.	72A018
24.2	<b>Chromium(II) ion</b> $\text{CH}_3\dot{\text{C}}\text{OHCO}_2\text{H} + \text{Cr}^{2+} \rightarrow$ $\text{CrCOH}(\text{CH}_3)\text{CO}_2\text{H}^{2+}$	$9.2 \times 10^7$	~1			p.r.	P.b.k. in Ar-satd. soln. contg. lactic acid and $\text{HClO}_4^-$ .	741146
24.3	<b>Hemin c</b> $\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{Hem-Fe}^{\text{III}} \rightarrow \text{Hem-Fe}^{\text{II}}$ + other prod.	$5.6 \times 10^8$	7.0			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.025 mol L <sup>-1</sup> lactate.	75A241
24.4	<b>Ferricyanide ion</b> $\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{Fe}(\text{CN})_6^{3-} \rightarrow$	$1.5 \times 10^9$	7			p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L <sup>-1</sup> lactate ion.	690522
24.5	<b>Oxygen</b> $\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{O}_2 \rightarrow$ $\text{CH}_3\dot{\text{C}}(\text{OO}^\cdot)(\text{OH})\text{CO}_2^-$	$3.5 \times 10^8$	7.3			p.r.	D.k. at 270 nm in $\text{N}_2\text{O}/\text{O}_2$ -satd. soln. contg. lactate ion.	731052
		$2.6 \times 10^9$	7			p.r.	C.k. in soln. contg. 0.3 mol L <sup>-1</sup> lactate; rel. to $k(\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{Fe}(\text{CN})_6^{3-}) = 1.5 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	690522
24.6	<b>Hexaamineruthenium(III) ion</b> $\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{Ru}(\text{NH}_3)_6^{3+} \rightarrow$ electron transfer	$2.5 \times 10^9$	6.0			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. 0.01 mol L <sup>-1</sup> lactate ion.	72A018
24.7	<b>9,10-Anthraquinone-2,6-disulfonate ion</b> $\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + 2,6\text{-diSO}_3\text{AQ}^{2-} \rightarrow$ $[2,6\text{-diSO}_3\text{AQ}]^{3-} + \text{CH}_3\text{COCO}_2^- + \text{H}^+$	$3.0 \times 10^9$	7.0			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $5 \times 10^{-3}$ mol L <sup>-1</sup> lactate; 58% <i>e</i> -transfer.	751051
24.8	<b>1,4-Benzquinone</b> $\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{Q} \rightarrow \text{Q}^\cdot +$ $\text{CH}_3\text{COCO}_2^- + \text{H}^+$	$6.5 \times 10^9$ $-7.0 \times 10^9$	7.3 10.8			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. lactate; 97% <i>e</i> -transfer.	731052
24.9	<b>Biacetyl</b> $\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{CH}_3\text{COCOCH}_3 \rightarrow$	$2.8 \times 10^7$	6.0			p.r.	D.k. in $\text{N}_2\text{O}$ satd. soln. contg. 0.01 mol L <sup>-1</sup> lactate.	72A018
24.10	<b>2-Methyl-1,4-naphthoquinone</b> $\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + 2\text{-CH}_3\text{NQ} \rightarrow$	$1.4 \times 10^9$	6.5			p.r.	P.b.k. at 395 nm in $\text{N}_2\text{O}$ -satd. soln. contg. lactate ion; 55% <i>e</i> -transfer.	731047
	$\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CO}_2^- + 2\text{-CH}_3\text{NQ} \rightarrow$	$1.9 \times 10^9$	10.6			p.r.	P.b.k. at 395 nm in $\text{N}_2\text{O}$ -satd. soln. contg. lactate ion; 72% <i>e</i> -transfer (15% at pH 3.2).	731047
24.11	<b>Nifuroxime</b> $\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{NF} \rightarrow \text{NF}^\cdot +$ $\text{CH}_3\text{COCO}_2^- + \text{H}^+$	$1.5 \times 10^9$	7			p.r.	P.b.k. at 390 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.2 mol L <sup>-1</sup> lactate ion; 100% <i>e</i> -transfer.	731099
24.12	<b>Nitrobenzene</b> $\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$	$6.5 \times 10^7$	6.0			p.r.	Abs. changes in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> lactate ion.	72A018
24.13	<b>Cytochrome C</b> $\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{Cyt C} (\text{Fe}^{3+}) \rightarrow \text{Cyt C} (\text{Fe}^{2+}) + \text{CH}_3\text{COCO}_2^- + \text{H}^+$	$2.3 \times 10^8$ $2.5 \times 10^8$ $2.4 \times 10^8$	7 11			p.r.	P.b.k. at 550 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.2 mol L <sup>-1</sup> lactate.	751012
						p.r.	P.b.k. at 550 nm in soln. contg. lactate.	741007

TABLE 25. Amino(carboxy)methyl

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
25.1	<b>Hexaamminacobalt(III) ion</b> $\text{H}_3\text{N}^+\text{CHCO}_2^- + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow$	$<1.2 \times 10^7$	5.7			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> glycine.	72A018
25.2	<b>Ferricyanide ion</b> $\text{H}_2\text{NCHCO}_2^- + \text{Fe}(\text{CN})_6^{3-} \rightarrow$	$1 \times 10^9$				p.r.	D.k. at 420 nm in soln. contg. glycine.	761082
25.3	<b>Oxygen</b> $\text{H}_2\text{NCHCO}_2^- + \text{O}_2 \rightarrow \text{HN}=\text{CH}_2(\text{CO}_2^-)\text{OO}^\cdot$	$\sim 1 \times 10^9$	7.9			p.r.	D.k. at 307 nm in $\text{N}_2\text{O}/\text{O}_2$ satd. soln. contg. 0.2 mol L <sup>-1</sup> glycine; also c.k. with ferricyanide.	761082
25.4	<b>Hexaamineruthenium(III) ion</b> $\text{H}_3\text{N}^+\text{CHCO}_2^- + \text{Ru}(\text{NH}_3)_6^{3+} \rightarrow$ electron transfer	$4.0 \times 10^8$	5.7			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol L <sup>-1</sup> glycine.	72A018
25.5	<b>9,10-Anthraquinone-2,6-disulfonate ion</b> $\text{H}_2\text{NCHCO}_2^- + 2,6\text{-diSO}_3\text{AQ}^{2-} \rightarrow [2,6\text{-diSO}_3\text{AQ}]^{3-} + \text{HN}=\text{CHCO}_2^- + \text{H}^+$	$2.6 \times 10^9$	8.0			p.r.	P.b.k. at 400 nm in $\text{N}_2\text{O}$ -satd. soln. contg. glycine.	731104
25.6	<b>9,10-Anthraquinone-2-sulfonate ion</b> $\text{H}_2\text{NCHCO}_2^- + 2\text{-SO}_3\text{AQ}^{2-} \rightarrow [2\text{-SO}_3\text{AQ}]^{2-} + \text{HN}=\text{CHCO}_2^- + \text{H}^+$	$2.2 \times 10^9$	8.0			p.r.	P.b.k. at 400 nm in $\text{N}_2\text{O}$ -satd. soln. contg. glycine.	731104
25.7	<b>1,4-Benzquinone</b> $\text{H}_2\text{NCHCO}_2^- + Q \rightarrow Q^\cdot + \text{HN}=\text{CHCO}_2^- + \text{H}^+$	$3.9 \times 10^9$	8.0			p.r.	P.b.k. at 400 nm in $\text{N}_2\text{O}$ -satd. soln. contg. glycine.	731104
25.8	<b>Crystal Violet cation</b> $\text{H}_2\text{NCHCO}_2^- + \text{CV}^+ \rightarrow$	$1.2 \times 10^9$	7			p.r.	D.k. at 525 nm in $\text{N}_2\text{O}$ -satd. soln. contg. glycine; 56% e-transfer.	731078
25.9	<b>2,6-Dichloroindophenolate ion</b> $\text{H}_2\text{NCHCO}_2^- + \text{DCIP}^- \rightarrow$	$3.6 \times 10^9$	7			p.r.	D.k. at 600 nm in $\text{N}_2\text{O}$ -satd. soln. contg. glycine; 87% e-transfer.	731078
25.10	<b>2-Hydroxy-1,4-naphthoquinone</b> $\text{H}_2\text{NCHCO}_2^- + 2\text{-(OH)NQ} \rightarrow 2\text{-(OH)NQ}^\cdot + \text{HN}=\text{CHCO}_2^- + \text{H}^+$	$3.1 \times 10^9$	8.0			p.r.	P.b.k. at 400 nm in $\text{N}_2\text{O}$ -satd. soln. contg. glycine.	731104
25.11	<b>Indigodisulfonate ion</b> $\text{H}_2\text{NCHCO}_2^- + \text{IDS}^{2-} \rightarrow$	$2.8 \times 10^9$	9			p.r.	D.k. at 610 nm in $\text{N}_2\text{O}$ -satd. soln. contg. glycine; 71% e-transfer.	731078
25.12	<b>Indigotetrasulfonate ion</b> $\text{H}_2\text{NCHCO}_2^- + \text{ITS}^{4-} \rightarrow$	$2.6 \times 10^9$	7.0			p.r.	D.k. at 610 nm in $\text{N}_2\text{O}$ -satd. soln. contg. glycine; 78% e-transfer.	731078
25.13	<b>Lumiflavine</b> $\text{H}_2\text{NCHCO}_2^- + \text{LF} \rightarrow$	$1.8 \times 10^9$ $3.6 \times 10^8$	7 11.2			p.r.	P.b.k. at >500 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.05-0.1 mol L <sup>-1</sup> glycine.	85A224
25.14	<b>Methylene Blue cation</b> $\text{H}_2\text{NCHCO}_2^- + \text{MB}^+ \rightarrow$	$3.7 \times 10^9$	7			p.r.	D.k. at 580 nm in $\text{N}_2\text{O}$ -satd. soln. contg. glycine; 86% e-transfer.	731078
25.15	<b>2-Methyl-1,4-naphthoquinone</b> $\text{H}_2\text{NCHCO}_2^- + 2\text{-CH}_3\text{NQ} \rightarrow$	$5.5 \times 10^9$ $4.0 \times 10^9$	5.4 8.0			p.r.	P.b.k. at 395 nm in $\text{N}_2\text{O}$ -satd. soln. contg. glycine; 71% e-transfer.	731047
							P.b.k. at 395 nm in soln. contg. glycine; 79% e-transfer; also see [731104].	731047

TABLE 25. Amino(carboxy)methyl — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
25.15	2-Methyl-1,4-naphthoquinone — Continued	$3.8 \times 10^9$	6.2			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. glycine; 78% <i>e</i> -transfer.	723057
25.16	1,4-Naphthoquinone-2-sulfonate ion	$3.3 \times 10^9$	8.0			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. glycine.	731104
25.17	Nicotinamide adenine dinucleotide	$1.5 \times 10^9$	6.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. glycine.	731104
25.18	Phenosafranine cation	$1.9 \times 10^9$	7			p.r.	D.k. at 520 nm in N <sub>2</sub> O-satd. soln. contg. glycine; 66% <i>e</i> -transfer.	731078
25.19	Riboflavin	$2.7 \times 10^9$	8.0			p.r.	P.b.k. at 560 nm in N <sub>2</sub> O-satd. soln. contg. glycine.	731104
25.20	Safranine cation	$1.6 \times 10^9$	7			p.r.	D.k. at 520 nm in N <sub>2</sub> O-satd. soln. contg. glycine; 60% <i>e</i> -transfer.	731078
25.21	Thionine cation	$3.2 \times 10^9$	8			p.r.	D.k. at 600 nm in N <sub>2</sub> O-satd. soln. contg. glycine; 85% <i>e</i> -transfer.	731078

TABLE 26. Carbon dioxide radical anion

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>26.1 Carbon dioxide radical anion</b>								
	${}^{\bullet}\text{CO}_2^- + {}^{\bullet}\text{CO}_2^- \rightarrow$	$6.5 \times 10^8$	7	0.1		p.r.	D.k. at 235 nm, $\epsilon = 3000 \text{ L mol}^{-1} \text{ cm}^{-1}$ , in soln. contg. 0.1 mol L <sup>-1</sup> formate.	86A327
		$5 \times 10^8$	7	0.16	293	p.r.	D.k. at 280 nm in N <sub>2</sub> O-satd. soln. contg. 2 × 10 <sup>-3</sup> mol L <sup>-1</sup> phosphate-0.16 mol L <sup>-1</sup> formate buffer; $\epsilon = 1200 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	86A394
		$5 \times 10^8$	7.0	0.16		p.r.	D.k. at 285 nm using $\epsilon = 1000 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	84A153
		$3.8 \times 10^8$	2.7	→ 0		p.r.	D.k. at 250 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; $\epsilon = 2050 \text{ L mol}^{-1} \text{ cm}^{-1}$ (1100 at pH 0); $k = 8.5 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ at pH 0.	730085
		$4.5 \times 10^8$	2.8-7			p.r.	D.k. in CO-satd. soln. at 260 nm ( $\epsilon = 2200 \text{ L mol}^{-1} \text{ cm}^{-1}$ ) as well as condy. changes; same result in N <sub>2</sub> O-satd. soln. contg. formate.	700303
		$7.5 \times 10^8$	3.1-9	0.5		p.r.	D.k. at 255 nm in N <sub>2</sub> O-satd. soln. contg. formate, as well as in CO <sub>2</sub> -satd. soln. contg. formate; $\epsilon_{\max} = 3000 \text{ L mol}^{-1} \text{ cm}^{-1}$ at 235 nm; $k = 8.5 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ at pH 13.	690446
		$5 \times 10^8$	5	→ 0		p.r.	D.k. at 250 nm in CO <sub>2</sub> -satd. soln. contg. 0.01 mol L <sup>-1</sup> formate; $\epsilon = 2250 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	650384
<b>26.2 Hydrated electron</b>								
	${}^{\bullet}\text{CO}_2^- + e_{\text{aq}}^- + \text{H}_2\text{O} \rightarrow \text{HCO}_2^- + \text{H}^+ + \text{OH}^-$	$9 \times 10^9$	9.15		298	p.r.	D.k. at 670 nm in H <sub>2</sub> -satd. soln. contg. 2.3 × 10 <sup>-4</sup> mol L <sup>-1</sup> formate and 3 × 10 <sup>-4</sup> mol L <sup>-1</sup> borate buffer.	92A377
<b>26.3 Silver(I) ion</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Ag}^+ \rightarrow \text{CO}_2 + \text{Ag}^0$	$4 \times 10^9$	5.5			p.r.	P.b.k. at 310 nm in N <sub>2</sub> O-satd. soln. contg. formate.	93A166
<b>26.4 Bismuth(III) ion</b>								
	${}^{\bullet}\text{CO}_2\text{H} + \text{Bi}^{3+} \rightarrow \text{BiCOOH}^{3+}$	$7 \times 10^4$	<0			p.r.	P.b.k. at ~400 nm in Ar-satd. soln. contg. 5 mol L <sup>-1</sup> HClO <sub>4</sub> and formate.	88A493
<b>26.5 Bicarbonate ion</b>								
	${}^{\bullet}\text{CO}_2^- + \text{HCO}_3^- \rightarrow \text{HCO}_2^- + \text{CO}_3^{2-}$	$2 \times 10^3$				γ-r.	Computer fitting using initial yields of oxalate and formate, as well as transient absorbance, in O <sub>2</sub> -free soln. contg. 0.5-1 mol L <sup>-1</sup> ammonium bicarbonate.	91G058
<b>26.6 Carbonate radical ion</b>								
	${}^{\bullet}\text{CO}_2^- + \text{CO}_3^{2-} \rightarrow \text{CO}_2 + \text{CO}_3^{2-}$	$5 \times 10^7$				p.r.	D.k. at 250 nm in O <sub>2</sub> -free soln. contg. 0.5-1 mol L <sup>-1</sup> bicarbonate; at low dose mixed kinetics are observed; computer fitting with yields of formate and oxalate in γ-radiolysis.	91G058
<b>26.7 Cadmium(I) ion</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Cd}^+ \rightarrow \text{CO}_2 + \text{Cd}^0$	$2 \times 10^9$				p.r.	D.k. in deaerated soln. contg. 5 × 10 <sup>-4</sup> mol L <sup>-1</sup> Cd(ClO <sub>4</sub> ) <sub>2</sub> and 10 <sup>-3</sup> mol L <sup>-1</sup> formate.	92N098
<b>26.8 Cadmium(II) ion</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Cd}^{2+} \rightarrow \text{CO}_2 + \text{Cd}^+$	$\sim 10^5$				p.r.	Estd. from increase in Cd <sup>+</sup> in CO <sub>2</sub> -satd. soln. contg. 0.1 mol L <sup>-1</sup> Cd <sup>2+</sup> and 0.1 mol L <sup>-1</sup> HCO <sub>3</sub> <sup>-</sup> .	751027
		$5.1 \times 10^6$				p.r.	P.b.k. in soln. contg. formate.	751153
<b>26.9 <i>N</i>-rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(I) ion, protonated</b>								
	${}^{\bullet}\text{CO}_2^- + \text{N-rac-Co}(4,11\text{-dieneN}_4)(\text{H})^{2+} \rightarrow$	$6 \times 10^9$	0.1	298	p.r.	Abs. changes in soln. contg. 0.1 mol L <sup>-1</sup> formate.	91A513	

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.	
26.10	Cobalt(II) ion								
	$\cdot\text{CO}_2^- + \text{Co}^{2+} \rightarrow \text{CO}_2 + \text{Co}^+$	$<10^5$				p.r.	Estd. from lack of increase in $\text{Co}^+$ in soln. contg. 0.1 mol L <sup>-1</sup> $\text{Co}^{2+}$ upon addn. of 0.1 mol L <sup>-1</sup> formate, as well as $\gamma$ -r. expts. [730039]; $10^2 < k < 10^5$ L mol <sup>-1</sup> s <sup>-1</sup> .	751027	
26.11	2,3,9,10-Tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraenecobalt(II) ion								
	$\cdot\text{CO}_2^- + \text{Co}(\text{Me}_4\text{tetraeneN}_4)^{2+} \rightarrow \text{CO}_2 + \text{Co}(\text{Me}_4\text{tetraeneN}_4)^+$	$4.7 \times 10^9$	6.5	0.1		p.r.	P.b.k. in soln. contg. 0.1 mol L <sup>-1</sup> formate.	761001	
26.12	<i>N</i> -meso-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion								
	$\cdot\text{CO}_2^- + N\text{-meso-}\text{Co}(4,11\text{-dieneN}_4)^{2+} \rightarrow \text{CO}_2 + N\text{-meso-}\text{Co}(4,11\text{-dieneN}_4)(\text{CO}_2)^+$	$3 \times 10^9$	0.1	298	p.r.	Abs. changes in $\text{CO}_2$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; 80% addn., 20% Co(I) is produced.	91A513		
26.13	<i>N</i> -rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion								
	$\cdot\text{CO}_2^- + N\text{-rac-}\text{Co}(4,11\text{-dieneN}_4)^{2+} \rightarrow \text{CO}_2 + \text{sec-N-rac-}\text{Co}(4,11\text{-dieneN}_4)(\text{CO}_2)^+$	$8.5 \times 10^8$	0.1	298	p.r.	Abs. changes in $\text{CO}_2$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; at 339 K 20-30% Co(I) is produced.	91A513		
		$<1 \times 10^7$	6.5	0.1	p.r.	P.b.k.; no reaction obs. in soln. contg. 0.1 mol L <sup>-1</sup> formate.	761001		
26.14	5,7,7,12,12,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,14-dienecobalt(II) ion								
	$\cdot\text{CO}_2^- + \text{Co}(4,14\text{-dieneN}_4)^{2+} \rightarrow \text{CO}_2 + \text{Co}(4,14\text{-dieneN}_4)^+$	$<1 \times 10^7$	6.5	0.1	p.r.	No reaction obs. in soln. contg. 0.1 mol L <sup>-1</sup> formate.	761001		
26.15	2,2'-Bipyridinecobalt(II) ion								
	$\cdot\text{CO}_2^- + \text{Co}(\text{bpy})^{2+} \rightarrow \text{Co}(\text{bpy})\text{CO}_2^+$	$6.0 \times 10^6$		0.2		p.r.	P.b.k.; total <i>k</i> for radical consumption.	85A034	
26.16	Bis(2,2'-bipyridine)cobalt(II) ion								
	$\cdot\text{CO}_2^- + \text{Co}(\text{bpy})_2^{2+} \rightarrow \text{Co}(\text{bpy})_2\text{CO}_2^+$	$1.6 \times 10^7$		0.2		p.r.	P.b.k.; total <i>k</i> for radical consumption; 70% addn., 30% electron transfer.	85A034	
26.17	Tris(2,2'-bipyridine)cobalt(II) ion								
	$\cdot\text{CO}_2^- + \text{Co}(\text{bpy})_3^{2+} \rightarrow \text{Co}(\text{bpy})_3^+ + \text{H}^+ + \text{CO}_2$	$3.5 \times 10^7$		0.2		p.r.	P.b.k.; total <i>k</i> for radical consumption; also 10% addn.	85A034	
26.18	4,4'-Dimethyl-2,2'-bipyridinecobalt(II) ion								
	$\cdot\text{CO}_2^- + \text{Co}(4,4'\text{-Me}_2\text{bpy})^{2+} \rightarrow \text{Co}(4,4'\text{-Me}_2\text{bpy})\text{CO}_2^+$	$1.1 \times 10^7$		0.5		p.r.	P.b.k.; total <i>k</i> for radical consumption.	85A034	
26.19	Bis(4,4'-dimethyl-2,2'-bipyridine)cobalt(II) ion								
	$\cdot\text{CO}_2^- + \text{Co}(4,4'\text{-Me}_2\text{bpy})_2^{2+} \rightarrow \text{Co}(4,4'\text{-Me}_2\text{bpy})_2\text{CO}_2^+$	$1.1 \times 10^7$		0.5		p.r.	P.b.k.; total <i>k</i> for radical consumption.	85A034	
26.20	Tris(4,4'-dimethyl-2,2'-bipyridine)cobalt(II) ion								
	$\cdot\text{CO}_2^- + \text{Co}(4,4'\text{-Me}_2\text{bpy})_3^{2+} \rightarrow \text{Co}(4,4'\text{-Me}_2\text{bpy})_3^+ + \text{CO}_2$	$1.7 \times 10^7$		0.5		p.r.	P.b.k.; total <i>k</i> for radical consumption; also 40% addn.	85A034	
26.21	3,10,17,24-Tetrasulfophthalocyaninecobalt(II) ion								
	$\cdot\text{CO}_2^- + \text{Co}(\text{tspc})^{4-} \rightarrow \text{CO}_2 + \text{Co}(\text{tspc})^5-$	$1.5 \times 10^8$	3-11	0.1		p.r.	P.b.k. at 460 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $(1\text{-}5) \times 10^{-5}$ mol L <sup>-1</sup> $\text{Co}(\text{pts})^{4-}$ and 0.1 mol L <sup>-1</sup> formate (substrate present as dimer).	83A238	
		$2.7 \times 10^8$				p.r.	P.b.k. at 450 nm in $\text{N}_2\text{O}$ -satd. soln. contg. formate (substrate present as dimer).	82A433	
26.22	Tetrakis(4-sulfonatophenyl)porphinatocobaltate(II) ion								
	$\cdot\text{CO}_2^- + \text{CoTPPS}^{4-} \rightarrow \text{CO}_2 + \text{CoTPPS}^{5-}$	$1.7 \times 10^8$		8		294	p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. formate.	83A088
		$2.6 \times 10^8$		13					

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
26.23	Nitrilotriacetatocobaltate(II) ion $\text{CO}_2^- + \text{CoNTA}^- \rightarrow [\text{CO}_2\text{CoNTA}]^{2-}$	$7.3 \times 10^7$	4.7			p.r.	P.b.k. at 260 nm in N <sub>2</sub> O-satd. soln. contg. (1.50) × 10 <sup>-4</sup> mol L <sup>-1</sup> CoNTA and 0.2-1 mol L <sup>-1</sup> formate.	88A343
		$7.3 \times 10^7$	7	0.2		p.r.	P.b.k. at 270 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> formate.	79A255
26.24	Cobal(II)amin $\text{CO}_2^- + \text{B12r} \rightarrow \text{CO}_2 + \text{B12s}$	$8.2 \times 10^8$	9.2	0.1		p.r.	D.k. at 311 and 478 nm as well as p.b.k. at 386 and 280 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	741105
26.25	Hexaamminecobalt(III) ion $\text{CO}_2^- + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow \text{CO}_2 + \text{Co}(\text{NH}_3)_6^{2+}$	$1.1 \times 10^8$	6.9			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; rel. to $k'(\text{CO}_2^- + \text{PANBCo}^{\text{III}}) = 1.9 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	731075
		$4.0 \times 10^7$	4.8			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> formate.	72A018
26.26	Pentaammine(aqua)cobalt(III) ion $\text{CO}_2^- + \text{Co}(\text{NH}_3)_5(\text{H}_2\text{O})^{3+} \rightarrow \text{CO}_2 + \text{Co}(\text{NH}_3)_5(\text{H}_2\text{O})^{2+}$	$1.7 \times 10^8$	5.2			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; rel. to $k'(\text{CO}_2^- + \text{PANBCo}^{\text{III}}) = 1.9 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	731075
26.27	Pentaammine(hydroxy)cobalt(III) ion $\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{OH}^{2+} \rightarrow$	$<3 \times 10^7$	7.8			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; rel. to $k'(\text{CO}_2^- + \text{PANBCo}^{\text{III}}) = 1.9 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	731075
26.28	Pentaammine(chloro)cobalt(III) ion $\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{Cl}^{2+} \rightarrow \text{CO}_2 + \text{Co}(\text{NH}_3)_5\text{Cl}^+$	$1.5 \times 10^8$	6.9			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; rel. to $k'(\text{CO}_2^- + \text{PANBCo}^{\text{III}}) = 1.9 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	731075
26.29	Pentaammine(nitrito- <i>N</i> )cobalt(III) ion $\text{CO}_2^- + \text{Co}(\text{NH}_3)_5(\text{NO}_2)^{2+} \rightarrow$	$<2 \times 10^7$	6.9			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; rel. to $k'(\text{CO}_2^- + \text{PANBCo}^{\text{III}}) = 1.9 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	731075
26.30	Pentaammine(nitrito- <i>O</i> )cobalt(III) ion $\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{NO}_3^{2+} \rightarrow \text{CO}_2 + \text{Co}(\text{NH}_3)_5\text{NO}_3^+$	$2.1 \times 10^8$	6.9			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; rel. to $k'(\text{CO}_2^- + \text{PANBCo}^{\text{III}}) = 1.9 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	731075
26.31	(Acetato)pentaamminecobalt(III) ion $\text{CO}_2^- + \text{Co}(\text{NH}_3)_5(\text{OAc})^{2+} \rightarrow \text{CO}_2 + \text{Co}(\text{NH}_3)_5(\text{OAc})^+$	$1.1 \times 10^8$	6.9			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; rel. to $k'(\text{CO}_2^- + \text{PANBCo}^{\text{III}}) = 1.9 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	731075
26.32	Pentaammine(phenylacetato)cobalt(III) ion $\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}_2\text{C}_6\text{H}_5^{2+} \rightarrow \text{CO}_2 + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}_2\text{C}_6\text{H}_5^+$	$7.0 \times 10^7$	6.9			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; rel. to $k'(\text{CO}_2^- + \text{PANBCo}^{\text{III}}) = 1.9 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	731075
26.33	Pentaammine(benzoato)cobalt(III) ion $\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_5^{2+} \rightarrow \text{CO}_2 + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_5^+$	$4.5 \times 10^7$	6.9			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; rel. to $k'(\text{CO}_2^- + \text{PANBCo}^{\text{III}}) = 1.9 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	731075

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
26.34	Pentaammine(4-cyanobenzoato)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{-4-CN}^{2+} \rightarrow \text{CO}_2 + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{-4-CN}^+$	$4.6 \times 10^7$	6.9			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; rel. to $k(\cdot\text{CO}_2^- + \text{PANBCo}^{\text{III}}) = 1.9 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	731075
26.35	Pentaammine(2-nitrobenzoato)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{-2-NO}_2^{2+} \rightarrow \text{CO}_2 + [\text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{-2-NO}_2]^+$	$2.0 \times 10^9$	7	0.1		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (2-10) $\times 10^{-5}$ mol L <sup>-1</sup> complex.	771027
26.36	Pentaammine(3-nitrobenzoato)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{-3-NO}_2^{2+} \rightarrow \text{CO}_2 + [\text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{-3-NO}_2]^+$	$1.5 \times 10^9$	7	0.1		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (2-10) $\times 10^{-5}$ mol L <sup>-1</sup> complex.	771027
26.37	Pentaammine(4-nitrobenzoato)cobalt(III) ion (PANBCo <sup>III</sup> ) $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{-4-NO}_2^{2+} \rightarrow \text{CO}_2 + [\text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{-4-NO}_2]^+$	$1.9 \times 10^9$	7	0.1		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (2-10) $\times 10^{-5}$ mol L <sup>-1</sup> complex.	771027
26.38	Pentaammine(2,4-dinitrobenzoato)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_3\text{-2,4-(NO}_2)_2^{2+} \rightarrow \text{CO}_2 + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_3\text{-2,4-(NO}_2)_2^+$	$7.5 \times 10^9$	7.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate and (1-3) $\times 10^{-4}$ mol L <sup>-1</sup> complex.	771027
26.39	Pentaammine(3,5-dinitrobenzoato)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_3\text{-3,5-(NO}_2)_2^{2+} \rightarrow \text{CO}_2 + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_3\text{-3,5-(NO}_2)_2^+$	$8.1 \times 10^9$	7.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate and (1-3) $\times 10^{-4}$ mol L <sup>-1</sup> complex.	771027
26.40	Pentaammine(2-nitrophenylacetato)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}_2\text{C}_6\text{H}_4\text{-2-NO}_2^{2+} \rightarrow \text{CO}_2 + [\text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}_2\text{C}_6\text{H}_4\text{-2-NO}_2]^+$	$1.3 \times 10^9$	7	0.1	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (2-10) $\times 10^{-5}$ mol L <sup>-1</sup> complex.	86A340
26.41	Pentaammine(3-nitrophenylacetato)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}_2\text{C}_6\text{H}_4\text{-3-NO}_2^{2+} \rightarrow \text{CO}_2 + [\text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}_2\text{C}_6\text{H}_4\text{-3-NO}_2]^+$	$1.5 \times 10^9$	7	0.1	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (2-10) $\times 10^{-5}$ mol L <sup>-1</sup> complex.	86A340
26.42	Pentaammine(4-nitrophenylacetato)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}_2\text{C}_6\text{H}_4\text{-4-NO}_2^{2+} \rightarrow \text{CO}_2 + [\text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}_2\text{C}_6\text{H}_4\text{-4-NO}_2]^+$	$1.4 \times 10^9$	7	0.1	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (2-10) $\times 10^{-5}$ mol L <sup>-1</sup> complex.	86A340
		$1.2 \times 10^9$	6.9			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; rel. to $k(\cdot\text{CO}_2^- + \text{PANBCo}^{\text{III}}) = 1.9 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	731075
26.43	Pentaammine(2,4-dinitrophenylacetato)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}_2\text{C}_6\text{H}_3\text{-2,4-(NO}_2)_2^{2+} \rightarrow \text{CO}_2 + [\text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}_2\text{C}_6\text{H}_3\text{-2,4-(NO}_2)_2]^+$	$3.9 \times 10^9$	7	0.1	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (2-10) $\times 10^{-5}$ mol L <sup>-1</sup> complex.	86A340
26.44	Pentaammine(2-nitrocinnamato)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH=CHC}_6\text{H}_4\text{-2-NO}_2^{2+} \rightarrow \text{CO}_2 + [\text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH=CHC}_6\text{H}_4\text{-2-NO}_2]^+$	$1.9 \times 10^9$	7	0.1	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (2-10) $\times 10^{-5}$ mol L <sup>-1</sup> complex.	86A340

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T(K)	Method	Comment	Ref.
26.45	Pentaammine(3-nitrocinnamato)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}=\text{CHC}_6\text{H}_4\text{-3-NO}_2^{2+} \rightarrow \text{CO}_2 + [\text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}=\text{CHC}_6\text{H}_4\text{-3-NO}_2]^{+}$	$1.2 \times 10^9$	7	0.1	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex.	86A340
26.46	Pentaammine(4-nitrocinnamato)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}=\text{CHC}_6\text{H}_4\text{-4-NO}_2^{2+} \rightarrow \text{CO}_2 + [\text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}=\text{CHC}_6\text{H}_4\text{-4-NO}_2]^{+}$	$1.4 \times 10^9$	7	0.1	298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex.	86A340
26.47	Pentaammine(pyridine)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5(\text{py})^{3+} \rightarrow \text{CO}_2 + \text{Co}(\text{NH}_3)_5(\text{py})^{2+}$	$3.3 \times 10^8$	6.9			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; rel. to $k(\cdot\text{CO}_2^- + \text{PANBCo}^{\text{III}}) = 1.9 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	731075
26.48	Pentaammine(pyridinecarboxylato-O)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{Cpy}^{2+} \rightarrow \text{CO}_2 + \text{Co}(\text{NH}_3)_5\text{O}_2\text{Cpy}^+$	$5 \times 10^7$	6.9			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; rel. to $k(\cdot\text{CO}_2^- + \text{PANBCo}^{\text{III}}) = 1.9 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	731075
26.49	Pentaammine(1-methyl-4,4'-bipyridinium)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5(\text{mbpy})^{4+} \rightarrow \text{CO}_2 + [\text{Co}(\text{NH}_3)_5(\text{mbpy})]^{3+}$	$2.4 \times 10^9$	7.2	0.1	298	p.r.	P.b.k. at 600 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	89A115
26.50	Tris(2,2'-bipyridine)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{bpy})_3^{3+} \rightarrow \text{CO}_2 + \text{Co}(\text{bpy})_3^{2+}$	$7.8 \times 10^9$	6.9	0.1		p.r.	P.b.k. at 330 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	79A034
		$7.6 \times 10^9$	6.9			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; rel. to $k(\cdot\text{CO}_2^- + \text{PANBCo}^{\text{III}}) = 1.9 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	731075
26.51	Bis(ethylenediamine)pyrazinecarboxylatocobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{en})_2\text{O}_2\text{Cpz}^{2+} \rightarrow \text{CO}_2 + \text{Co}(\text{en})_2\text{O}_2\text{Cpz}^{2+}$	$3 \times 10^9$	5.5	0.1	295	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (0.5-5) × 10 <sup>-4</sup> mol L <sup>-1</sup> complex.	82A146
26.52	2,3,9,10-Tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraenecobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{Me}_4\text{tetraeneN}_4)^{3+} \rightarrow \text{CO}_2 + \text{Co}(\text{Me}_4\text{tetraeneN}_4)^{2+}$	$6.4 \times 10^9$	2.5			p.r.	P.b.k.	761203
26.53	N-rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(III) ion $\cdot\text{CO}_2^- + N\text{-rac-Co}(4,11\text{-dieneN}_4)^{3+} \rightarrow \text{CO}_2 + N\text{-rac-Co}(4,11\text{-dieneN}_4)^{2+}$	$8.1 \times 10^8$	2.5			p.r.	P.b.k.	761203
26.54	Dichloro(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(4,11\text{-dieneN}_4)\text{Cl}_2^+ \rightarrow \text{CO}_2 + \text{Co}(4,11\text{-dieneN}_4)\text{Cl}_2$	$1.1 \times 10^9$	2.5			p.r.	P.b.k.	761203
26.55	Chlorobis(dimethylglyoximato)(pyridine)cobaltate(III) $\cdot\text{CO}_2^- + \text{Co}(\text{dmgH})_2(\text{py})\text{Cl} + \text{H}_2\text{O} \rightarrow \text{CO}_2 + \text{C}_5\text{H}_5\text{N} + \text{Cl}^- + \text{Co}(\text{dmgH})_2(\text{H}_2\text{O})$	$1.3 \times 10^9$	6.6			p.r.	P.b.k. at 460 nm in deoxygenated soln. contg. formate.	94A288
26.56	Aqua(benzyl)bis(dimethylglyoximato)cobalt(III) $\cdot\text{CO}_2^- + \text{C}_6\text{H}_5\text{CH}_2\text{Co}(\text{dmgH})_2(\text{H}_2\text{O}) \rightarrow \text{CO}_2 + \text{C}_6\text{H}_5\text{CH}_2\text{Co}(\text{dmgH})_2(\text{H}_2\text{O})$	$3.9 \times 10^7$				p.r.	D.k. at 400-450 nm in deoxygenated soln. contg. formate.	94A288
26.57	Hydroxocob(III)alamin $\cdot\text{CO}_2^- + \text{B12a} \rightarrow \text{CO}_2 + \text{B12r}$	$1.5 \times 10^9$	9.2			p.r.	D.k. at 350 nm as well as p.b.k. at 310 nm in CO <sub>2</sub> -satd. soln. contg. <i>tert</i> -BuOH.	741105

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	I	T(K)	Method	Comment	Ref.
26.58	Cyanocob(III)alamin							
	$\cdot\text{CO}_2^- + \text{B12} \rightarrow$	$<10^7$				p.r.	No abs. change in N <sub>2</sub> O or CO <sub>2</sub> -satd. soln. contg. 0.1 mol L <sup>-1</sup> formate, or CO <sub>2</sub> -satd. soln. contg. 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	741105
26.59	Decakis(cyano)- $\mu$ -superoxidodicobaltate(III) ion							
	$\cdot\text{CO}_2^- + \text{O}_2[\text{Co}(\text{CN})_5]_2^{5-} \rightarrow \text{CO}_2 + \text{O}_2[\text{Co}(\text{CN})_5]_2^{6-}$	$1.7 \times 10^7$	~5.0	0.1		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	81A009
26.60	$\mu$ -Amido- $\mu$ -superoxidoctakisamminedicobalt(III) ion							
	$\cdot\text{CO}_2^- + \text{NH}_2[\text{Co}(\text{NH}_3)_4]_2(\text{O}_2)^{4+} \rightarrow \text{CO}_2 + \text{NH}_2[\text{Co}(\text{NH}_3)_4]_2(\text{O}_2)^{3+}$	$5.4 \times 10^9$	~5.0	0.1		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	81A009
26.61	Hexaamminebis( $\mu$ -hydroxy)- $\mu$ -(trifluoroacetato)dicobalt(III) ion							
	$\cdot\text{CO}_2^- + \text{CF}_3\text{CO}_2[\text{Co}(\text{NH}_3)_3]_2(\text{OH})_2^{3+} \rightarrow \text{CO}_2 + \text{CF}_3\text{CO}_2[\text{Co}(\text{NH}_3)_3]_2(\text{OH})_2^{2+}$	$3.5 \times 10^8$				p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	83A140
26.62	Hexaammine- $\mu$ -(difluoroacetato)bis( $\mu$ -hydroxy)dicobalt(III) ion							
	$\cdot\text{CO}_2^- + \text{CHF}_2\text{CO}_2[\text{Co}(\text{NH}_3)_3]_2(\text{OH})_2^{3+} \rightarrow \text{CO}_2 + \text{CHF}_2\text{CO}_2[\text{Co}(\text{NH}_3)_3]_2(\text{OH})_2^{2+}$	$2.4 \times 10^8$				p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	83A140
26.63	Hexaammine- $\mu$ -(fluoroacetato)bis( $\mu$ -hydroxy)dicobalt(III) ion							
	$\cdot\text{CO}_2^- + \text{CH}_2\text{FCO}_2[\text{Co}(\text{NH}_3)_3]_2(\text{OH})_2^{3+} \rightarrow \text{CO}_2 + \text{CH}_2\text{FCO}_2[\text{Co}(\text{NH}_3)_3]_2(\text{OH})_2^{2+}$	$1.1 \times 10^8$				p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	83A140
26.64	$\mu$ -Acetatohexaamminebis( $\mu$ -hydroxy)dicobalt(III) ion							
	$\cdot\text{CO}_2^- + \text{CH}_3\text{CO}_2[\text{Co}(\text{NH}_3)_3]_2(\text{OH})_2^{3+} \rightarrow \text{CO}_2 + \text{CH}_3\text{CO}_2[\text{Co}(\text{NH}_3)_3]_2(\text{OH})_2^{2+}$	$5.8 \times 10^7$				p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	83A140
26.65	$\mu$ -Amido- $\mu$ -superoxidotetrakis(ethylenediamine)dicobalt(III) ion							
	$\cdot\text{CO}_2^- + \text{NH}_2[\text{Co}(\text{en})_2]_2(\text{O}_2)^{4+} \rightarrow \text{CO}_2 + \text{NH}_2[\text{Co}(\text{en})_2]_2(\text{O}_2)^{3+}$	$5.7 \times 10^9$	~5.0	0.1		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	81A009
26.66	Pentaammineosmium(III)(isonicotinylprolylprolylprolinato)pentaamminecobalt(III) ion							
	$\cdot\text{CO}_2^- + [(\text{NH}_3)_5\text{Os}^{\text{III}}\text{iso}(\text{Pro})_3\text{Co}^{\text{III}}(\text{NH}_3)_5]^{5+} \rightarrow \text{CO}_2 + [(\text{NH}_3)_5\text{Os}^{\text{IV}}\text{iso}(\text{Pro})_3\text{Co}^{\text{III}}(\text{NH}_3)_5]^{4+}$	$4 \times 10^9$	0.1	298	p.r.	P.b.k. at 525 nm in soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	85A396	
26.67	Chromium(II)							
	$\cdot\text{CO}_2^- + \text{Cr}(\text{II}) \rightarrow \text{Cr}^{\text{III}}\text{CO}_2^-$	$1.1 \times 10^9$	1.4			p.r.	D.k. in soln. contg. 1 mol L <sup>-1</sup> formic acid; product spectrum similar to products containing C-Cr bonds [741146].	731057
26.68	Chromium(III)							
	$\cdot\text{CO}_2^- + \text{Cr}(\text{III}) \rightarrow$		1.4			p.r.	No reaction obs. in soln. contg. 1 mol L <sup>-1</sup> formic acid.	731057
26.69	Copper(I) ion							
	$\cdot\text{CO}_2^- + \text{Cu}^+ \rightarrow \text{CuCO}_2$	$>1 \times 10^{10}$	7.3			p.r.	P.b.k. at 480 nm in N <sub>2</sub> O-satd. soln. contg. formate.	91A367
26.70	Copper(II) ion							
	$\cdot\text{CO}_2^- + \text{Cu}^{2+} \rightarrow \text{CO}_2 + \text{Cu}^+$	$2 \times 10^9$	7.3			p.r.	D.k. at 240 nm in N <sub>2</sub> O-satd. soln. contg. 0.005 mol L <sup>-1</sup> formate.	91A367
		$1.5 \times 10^8$	6.8	0.1		p.r.	D.k. at 260 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	78A176

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
26.71	<b>1,4,8,11-Tetraazacyclotetradecane copper(II) ion</b>							
	$^{\bullet}\text{CO}_2^- + \text{Cu}(\text{cyclam})^{2+} \rightarrow \text{CO}_2 + \text{Cu}(\text{cyclam})^+$	$3 \times 10^9$		0.1		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (2-30) $\times 10^{-5}$ mol L <sup>-1</sup> Cu(cyclam)(ClO <sub>4</sub> ) <sub>2</sub> .	82A320
26.72	<b>5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradecane copper(II) ion</b>							
	$^{\bullet}\text{CO}_2^- + \text{Cu}(\text{Me}_6[14]\text{aneN}_4)^{2+} \rightarrow \text{CO}_2 + \text{Cu}(\text{Me}_6[14]\text{aneN}_4)^+$	$2.5 \times 10^9$		0.1		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (2-30) $\times 10^{-5}$ mol L <sup>-1</sup> Cu(Me <sub>6</sub> [14]aneN <sub>4</sub> )(ClO <sub>4</sub> ) <sub>2</sub> .	82A320
26.73	<b>5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene copper(II) ion</b>							
	$^{\bullet}\text{CO}_2^- + \text{Cu}(4,11\text{-dieneN}_4)^{2+} \rightarrow \text{CO}_2 + \text{Cu}(4,11\text{-dieneN}_4)^+$	$2.3 \times 10^9$	7.0			p.r.	P.b.k. at 410 nm.	761039
26.74	<b>2,2,4,11,11,13-Hexamethyl-1,5,10,14-tetraazacyclooctadeca-4,13-diene copper(II) ion</b>							
	$^{\bullet}\text{CO}_2^- + \text{Cu}(4,13\text{-dieneN}_4)^{2+} \rightarrow \text{CO}_2 + \text{Cu}(4,13\text{-dieneN}_4)^+$	$4.2 \times 10^9$	7.0			p.r.	P.b.k. at ~380 nm in O <sub>2</sub> -free soln.	84A292
		$5.0 \times 10^7$		0.1		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (2-30) $\times 10^{-5}$ mol L <sup>-1</sup> Cu(4,13-dieneN <sub>4</sub> )(ClO <sub>4</sub> ) <sub>2</sub> .	82A320
26.75	<b>3,10,17,24-Tetrasulfophthalocyanine copper(II) ion</b>							
	$^{\bullet}\text{CO}_2^- + \text{Cu}(\text{tspc})^{4-} \rightarrow \text{CO}_2 + \text{Cu}(\text{tspc})^{5-}$	$1.9 \times 10^8$				p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-satd. soln. contg. formate. substrate present as dimer.	82A433
26.76	<b>Glycylglycylglycinato copper(II) complex</b>							
	$^{\bullet}\text{CO}_2^- + \text{Cu}(\text{Gly}_3)^- \rightarrow \text{CO}_2 + \text{Cu}(\text{Gly}_3)^{2-}$	$2.8 \times 10^8$	9.1			p.r.	D.k. at 550 nm (Cu <sup>II</sup> ) in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> formate, Cu(II) and gly <sub>3</sub> in 1:5, 1:3 and 1:2 ratio.	761016
26.77	<b>Copper(II) tetraglycine</b>							
	$^{\bullet}\text{CO}_2^- + \text{Cu}(\text{Gly}_4)^{2-} \rightarrow \text{CO}_2 + \text{Cu}(\text{Gly}_4)^{3-}$	$6.5 \times 10^8$	7.3-10	1.0	295	p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> formate ion.	80A304
26.78	<b>Histidine copper(II) complex</b>							
	$^{\bullet}\text{CO}_2^- + \text{Cu}(\text{His})_2 \rightarrow \text{CO}_2 + \text{Cu}(\text{His})_2^-$	$4.1 \times 10^8$	11.0			p.r.	D.k. at 600 nm (Cu <sup>II</sup> ) in N <sub>2</sub> O-satd. soln. contg. formate.	771138
26.79	<b>Glycylhistidine copper(II) complex</b>							
	$^{\bullet}\text{CO}_2^- + \text{Cu}(\text{GlyHis}) \rightarrow \text{CO}_2 + \text{Cu}(\text{GlyHis})^-$	$4.5 \times 10^8$	6.6			p.r.	D.k. at 565 nm (Cu <sup>II</sup> ) in N <sub>2</sub> O-satd. soln. contg. formate.	771138
	$1.6 \times 10^7$	11.0						
26.80	<b><math>\beta</math>-Alanylhistidine copper(II) complex</b>							
	$^{\bullet}\text{CO}_2^- + \text{Cu}(\beta\text{-AlaHis}) \rightarrow \text{CO}_2 + \text{Cu}(\beta\text{-AlaHis})^-$	$3.5 \times 10^8$	7.5-11			p.r.	D.k. at 600 nm (Cu <sup>II</sup> ) in N <sub>2</sub> O-satd. soln. contg. formate.	771138
26.81	<b>Bis(D-penicillamine) copper(II)</b>							
	$^{\bullet}\text{CO}_2^- + \text{Cu}^{\text{II}}(\text{D-Pen})_2 \rightarrow \text{CO}_2 + \text{Cu}^{\text{I}}(\text{D-Pen})_2$	$1.2 \times 10^8$	10, 12	0.05	296	p.r.	D.k. at 335 nm in N <sub>2</sub> O-satd. soln. contg. (2.5-10) $\times 10^{-5}$ mol L <sup>-1</sup> bis(penicillamine)copper(II).	91A119
26.82	<b>Glutathione copper(II), oxidized</b>							
	$^{\bullet}\text{CO}_2^- + \text{Cu}^{\text{II}}(\text{GSSG})_n \rightarrow \text{CO}_2 + \text{Cu}^{\text{I}}(\text{GSSG})_n$	$1.0 \times 10^8$	11			p.r.	D.k. at 595 nm (Cu <sup>II</sup> ) in N <sub>2</sub> O-satd. soln. contg. formate ion; 10% of the $^{\bullet}\text{CO}_2^-$ reacted with the disulfide $\rightarrow \text{GSSG}^-$ (p.b.k. at 410 nm).	761016
26.83	<b>Bleomycin-copper(II) complex</b>							
	$^{\bullet}\text{CO}_2^- + \text{BLM-Cu(II)} \rightarrow \text{CO}_2 + \text{BLM-Cu(I)}$	$6.7 \times 10^8$	7			p.r.	P.b.k. at 365 nm in N <sub>2</sub> O-satd. soln. contg. 0.02 mol L <sup>-1</sup> formate and $2 \times 10^{-4}$ mol L <sup>-1</sup> bleomycin-copper complex; intermediate suggested to be BLM-CuCO <sub>2</sub> <sup>+</sup> .	87A184

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	T (K)	Method	Comment	Ref.
26.84	Europium(III) ion							
	${}^{\bullet}\text{CO}_2^- + \text{Eu(III)} \rightarrow \text{CO}_2 + \text{Eu(II)}$	$>7 \times 10^6$	1.4			p.r.	Estd. from p.b.k. at 250 nm ( $\text{Eu}^{II}$ ).	731057
26.85	Nitrilotriacetatoferate(II) ion							
	${}^{\bullet}\text{CO}_2^- + \text{FeNTA}^- \rightarrow \text{CO}_2\text{FeNTA}^{2-}$	$2 \times 10^7$			293	p.r.	Abs. changes in $\text{N}_2\text{O}$ -satd. soln. contg. formate; $\Delta V_{\frac{1}{2}} = -1.3 \text{ cm}^3 \text{ mol}^{-1}$ , P range not given.	94A367
		$1.7 \times 10^7$	7	0.1		p.r.	P.b.k. at 405 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $0.1 \text{ mol L}^{-1}$ formate ion; $k = 1.5 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ by c.k. rel. to $k(\text{CO}_2^- + \text{Co}(\text{NH}_3)_6^{3+}) = 4 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ ; $k_r = 140 \text{ s}^{-1}$ .	88A184
26.86	<i>N</i> -(2-Hydroxyethyl)ethylenediaminetriacetatoferate(II) ion							
	${}^{\bullet}\text{CO}_2^- + \text{FeHEDTA}^- \rightarrow \text{CO}_2\text{FeHEDTA}^{2-}$	$1.0 \times 10^7$	7	0.1		p.r.	P.b.k. at 420 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $0.1 \text{ mol L}^{-1}$ formate ion; $k = 6.2 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ by c.k. rel. to $k(\text{CO}_2^- + \text{Co}(\text{NH}_3)_6^{3+}) = 4 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ ; $k_r = 25 \text{ s}^{-1}$ .	88A184
26.87	Iron(II) protoporphyrin							
	${}^{\bullet}\text{CO}_2^- + \text{Fe(II)PP} \rightarrow \text{CO}_2 + \text{Fe(I)PP}$	$8 \times 10^7$	10.0	0.1		p.r.	Pseudo-first-order reaction obs. in $\text{N}_2\text{O}$ -satd. soln. contg. $(2-10) \times 10^{-5} \text{ mol L}^{-1}$ $\text{Fe(II)PP}$ and $0.1 \text{ mol L}^{-1}$ formate ion.	85A006
26.88	Ferricyanide ion							
	${}^{\bullet}\text{CO}_2^- + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{CO}_2 + \text{Fe}(\text{CN})_6^{4-}$	$7.0 \times 10^8$	6.0, 11.0	0.1		p.r.	D.k. at 420 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $0.1 \text{ mol L}^{-1}$ formate.	83A091
		$1.1 \times 10^9$	7	0.3		p.r.	D.k. at 410 nm in soln. contg. $0.3 \text{ mol L}^{-1}$ formate ion; ionic strength effects reported.	690522
26.89	Pentacyano(nitrosyl)ferrate(III) ion							
	${}^{\bullet}\text{CO}_2^- + \text{Fe}(\text{CN})_5(\text{NO})^{2-} \rightarrow \text{CO}_2 + \text{Fe}(\text{CN})_5\text{NO}^{3-}$	$4.0 \times 10^8$	7.0	0.1		p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.1 \text{ mol L}^{-1}$ formate.	771120
		$3.7 \times 10^8$	7	0.02		p.r.	P.b.k. at 450 nm in $\text{N}_2\text{O}$ -satd. $0.02 \text{ mol L}^{-1}$ formate soln.	690052
26.90	Nitrilotriacetatoferate(III)							
	${}^{\bullet}\text{CO}_2^- + \text{FeNTA}^- \rightarrow \text{CO}_2 + \text{FeNTA}^{2-}$	$5.5 \times 10^7$	7	0.1		p.r.	C.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.1 \text{ mol L}^{-1}$ formate ion; rel. to $k({}^{\bullet}\text{CO}_2^- + [\text{CO}_2\text{FeNTA}^{2-}]) = 1.9 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ .	88A184
26.91	Carboxylato(nitrilotriacetato)ferrate(III) ion							
	${}^{\bullet}\text{CO}_2^- + \text{CO}_2\text{FeNTA}^{2-} + \text{H}^+ + \text{H}^+ \rightarrow \text{CO} + \text{CO}_2 + \text{FeNTA}^- + \text{H}_2\text{O}$	$1.9 \times 10^7$	7	0.1		p.r.	Calcd. from d.k. at 410 nm in soln. contg. $0.1 \text{ mol L}^{-1}$ formate, $0.006 \text{ mol L}^{-1}$ NTA and $\text{Fe}^{2+}$ and c.k. rel. to $k({}^{\bullet}\text{CO}_2^- + [\text{CO}_2\text{FeNTA}^{2-}]) = 4 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ .	88A184
26.92	Ethylenediaminetetraacetatoferate(III) ion							
	${}^{\bullet}\text{CO}_2^- + \text{FeEDTA}^- \rightarrow \text{CO}_2 + \text{FeEDTA}^{2-}$	$5 \times 10^7$	3.8-10		295	p.r.	D.k. at 300 and 325 nm in $\text{O}_2$ -satd. soln. contg. formate ion.	771088
26.93	<i>N</i> -(2-Hydroxyethyl)ethylenediaminetriacetatoferate(III)							
	${}^{\bullet}\text{CO}_2^- + \text{FeHEDTA}^- \rightarrow \text{CO}_2 + \text{FeHEDTA}^{2-}$	$8.3 \times 10^7$	7	0.1		p.r.	C.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.1 \text{ mol L}^{-1}$ formate ion, rel. to $k({}^{\bullet}\text{CO}_2^- + [\text{CO}_2\text{FeHEDTA}^{2-}]) = 4.5 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ .	88A184
26.94	Carboxylato(2-hydroxyethyl)ethylenediaminetriacetatoferate(III) ion							
	${}^{\bullet}\text{CO}_2^- + \text{CO}_2\text{FeHEDTA}^{2-} + \text{H}^+ + \text{H}^+ \rightarrow \text{CO} + \text{CO}_2 + \text{FeHEDTA}^- + \text{H}_2\text{O}$	$4.5 \times 10^6$	7	0.1		p.r.	Calcd. from d.k. at 420 nm in soln. contg. $0.1 \text{ mol L}^{-1}$ formate, $0.006 \text{ mol L}^{-1}$ HEDTA and $\text{Fe}^{2+}$ and c.k. rel. to $k({}^{\bullet}\text{CO}_2^- + [\text{CO}_2\text{FeHEDTA}^{2-}]) = 4 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ .	88A184

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
26.95	Diethylenetriaminepentaacetatoferate(III) ion $\cdot\text{CO}_2^- + \text{FeDTPA}^{2-} \rightarrow \text{CO}_2 + \text{FeDTPA}^{3-}$	$1 \times 10^8$	9-12	0.1		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate, 0.001 mol L <sup>-1</sup> DTPA and $2 \times 10^{-4}$ mol L <sup>-1</sup> Fe <sup>3+</sup> ; $K(\text{FeDTPA}^{2-} + \text{OH}^-) = 4 \times 10^3$ L mol <sup>-1</sup> .	89A135
26.96	Diethylenetriaminepentaacetato(hydroxy)ferrate(III) ion $\cdot\text{CO}_2^- + \text{FeDTPA(OH)}^{3-} \rightarrow \text{CO}_2 + \text{FeDTPA}^{3-} + \text{OH}^-$	$1 \times 10^7$	9-12	0.1		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate, 0.001 mol L <sup>-1</sup> DTPA and $2 \times 10^{-4}$ mol L <sup>-1</sup> Fe <sup>3+</sup> .	89A135
26.97	Ethylenediaminebis[2-(2-hydroxyphenyl)acetato]iron(III) ion $\cdot\text{CO}_2^- + \text{FeEHPG}^+ \rightarrow \text{CO}_2 + \text{FeEHPG}$	$7.3 \times 10^6$	7.0			p.r.	D.k. at 475 nm in N <sub>2</sub> O-satd. soln. contg. formate ion.	87A281
26.98	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatoiron(III) ion $\cdot\text{CO}_2^- + \text{FeTMpyP}^{5+} \rightarrow \text{CO}_2 + \text{FeTMpyP}^{4+}$	$1.6 \times 10^{10}$	8.5-9.5	0.01		p.r.	Abs. changes at 497 and 562 nm in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> formate.	91A380
		$1.3 \times 10^{10}$	8	0.05		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> formate ion.	86A118
		$4.0 \times 10^9$	11.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate ion.	84A426
		$7.5 \times 10^9$	5.6-8.3	0.1		p.r.	D.k. at 420 as well as p.b.k. at 445 and 560 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> HCO <sub>3</sub> <sup>-</sup> .	82A119
		$7.1 \times 10^9$	7.8	0.05	298	p.r.	P.b.k. at 580 nm as well as d.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> formate.	81A207
26.99	Dicyanotetrakis(1-methylpyridinium-4-yl)porphineiron(III) ion $\cdot\text{CO}_2^- + \text{FeTMpyP}(\text{CN})_2^{3+} \rightarrow \text{CO}_2 + \text{FeTMpyP}(\text{CN})_2^{2+}$	$5 \times 10^9$	10.1	0.1		p.r.	D.k. at 435 as well as p.b.k. at 470 nm in soln. contg. $2.0 \times 10^{-3}$ mol L <sup>-1</sup> KCN and $(1-5) \times 10^{-5}$ mol L <sup>-1</sup> Fe <sup>III</sup> complex.	82A119
26.100	Tetraakis(1-methylpyridinium-4-yl)porphineiron(III)-diimidazole complex $\cdot\text{CO}_2^- + \text{FeTMpyP(Im)}_2^{5+} \rightarrow \text{CO}_2 + \text{FeTMpyP(Im)}_2^{4+}$	$6 \times 10^8$	9.1	0.5		p.r.	P.b.k. at 450 nm in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> formate and 0.02 mol L <sup>-1</sup> imidazole.	82A119
26.101	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphineiron(III)-dihistidine complex $\cdot\text{CO}_2^- + \text{FeTMpyP(His)}_2^{5+} \rightarrow \text{CO}_2 + \text{FeTMpyP(His)}_2^{4+}$	$2 \times 10^8$	8.0	0.5		p.r.	P.b.k.	82A119
26.102	5,10,15,20-Tetrakis[4-( <i>N,N,N</i> -trimethylammonio)phenyl]porphinatoiron(III) ion $\cdot\text{CO}_2^- + \text{FeTAPP}^{5+} \rightarrow \text{CO}_2 + \text{FeTAPP}^{4+}$	$3.7 \times 10^9$	11.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate ion.	84A426
26.103	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatoferate(III) ion $\cdot\text{CO}_2^- + \text{FeTPPS}^{3-} \rightarrow \text{CO}_2 + \text{FeTPPS}^{4-}$	$1.8 \times 10^9$	5	0.05		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> formate ion.	86A118
		$1.5 \times 10^9$	11.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate ion.	84A426
26.104	Tetrakis(4-sulfonatophenyl)porphinatoferate(III) ion, $\mu$ -oxo-dimer $\cdot\text{CO}_2^- + (\text{TPPS})_{\text{Fe}} \text{O} \text{ Fe}(\text{TPPS})^{8-} \rightarrow \text{CO}_2 + (\text{TPPS})_{\text{Fe}}^{\text{III}} \text{O-Fe}^{\text{II}}(\text{TPPS})^{9-}$	$-2 \times 10^9$	9			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> formate ion.	86A118
26.105	3,10,17,24-Tetrasulfophthalocyanineiron(III) ion $\cdot\text{CO}_2^- + \text{Fe(tspc)}^{3-} \rightarrow \text{CO}_2 + \text{Fe(tspc)}^{4-}$	$3.4 \times 10^8$				p.r.	P.b.k. at 500-520 nm in N <sub>2</sub> O-satd. soln. contg. formate, substrate present as dimer.	82A433
26.106	$\alpha,\alpha,\alpha,\beta$ -Tetrakis( <i>N</i> -methylisonicotinamidophenoxy)porphinatoiron(III) ion $\cdot\text{CO}_2^- + \text{FePFP}^{5+} \rightarrow \text{CO}_2 + \text{FePFP}^{4+}$	$5.9 \times 10^9$	6-8	0.1		p.r.	D.k. at 420 nm (Fe <sup>III</sup> ) as well as p.b.k. at 440 nm (Fe <sup>II</sup> ) in soln. contg. $(5-50) \times 10^{-6}$ mol L <sup>-1</sup> Fe <sup>III</sup> and 0.1 mol L <sup>-1</sup> formate.	86A154

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>26.107 Dicyano-<math>\alpha,\alpha,\alpha,\beta</math>-tetrakis(<i>N</i>-methylisonicotinamidophenyl)porphinatoiron(III) ion</b>								
	${}^{\bullet}\text{CO}_2^- + \text{FePFP}(\text{CN})_2^{3+} \rightarrow \text{CO}_2 + \text{FePFP}(\text{CN})_2^{2+}$	$3.9 \times 10^9$		10.2		p.r.	D.k. at 420 nm ( $\text{Fe}^{\text{III}}$ ) as well as p.b.k. at 440 nm ( $\text{Fe}^{\text{II}}$ ) in soln. contg. $(10\text{-}50) \times 10^{-6}$ mol L <sup>-1</sup> $\text{Fe}^{\text{III}}$ , $10^{-3}$ mol L <sup>-1</sup> carbonate, $5 \times 10^{-4}$ mol L <sup>-1</sup> KCN and 0.1 mol L <sup>-1</sup> formate.	86A154
<b>26.108 Bis(1-methylimidazole)-<math>\alpha,\alpha,\alpha,\beta</math>-tetrakis(<i>N</i>-methylisonicotinamidophenyl)porphinatoiron(III) ion</b>								
	${}^{\bullet}\text{CO}_2^- + \text{FePFP}(1\text{-MeIm})_2^{5+} \rightarrow \text{CO}_2 + \text{FePFP}(1\text{-MeIm})_2^{4+}$	$3.1 \times 10^9$		6-8	0.1	p.r.	P.b.k. at 434 nm ( $\text{Fe}^{\text{II}}$ ) in $\text{N}_2\text{O}$ -satd. soln. contg. $(5\text{-}50) \times 10^{-6}$ mol L <sup>-1</sup> $\text{Fe}^{\text{III}}$ , 0.1 mol L <sup>-1</sup> formate and $3.4 \times 10^{-2}$ mol L <sup>-1</sup> ligand ( $\text{p}K_a$ 1-MeIm = 7.0).	86A154
<b>26.109 Hemin c</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Hem-Fe}^{\text{III}} \rightarrow \text{CO}_2 + \text{Hem-Fe}^{\text{II}}$	$1.3 \times 10^9$		7.0		p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.02 mol L <sup>-1</sup> formate.	75A241
<b>26.110 Bleomycin-iron(III) complex</b>								
	${}^{\bullet}\text{CO}_2^- + \text{BLM-Fe(III)} \rightarrow \text{CO}_2 + \text{BLM-Fe(II)}$	$1.9 \times 10^8$		7		p.r.	D.k. at 365 nm, as well as 403 and 435 nm, in $\text{N}_2\text{O}$ -satd. soln. contg. 0.02 mol L <sup>-1</sup> formate.	87A501
<b>26.111 Ferrate(VI) ion</b>								
	${}^{\bullet}\text{CO}_2^- + \text{FeO}_4^{2-} \rightarrow \text{CO}_2 + \text{FeO}_4^{3-}$	$3.5 \times 10^8$		9.5-10.5	297	p.r.	D.k. at 510 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.02 mol L <sup>-1</sup> formate, $4 \times 10^{-5}$ mol L <sup>-1</sup> diethylenetriaminepentaacetate ion; same results at pH 12.3.	87A381
<b>26.112 Mercury(II) cyanide</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Hg}(\text{CN})_2 \rightarrow \text{CO}_2 + \text{Hg(I)}$	$3.4 \times 10^9$				p.r.	P.b.k. at 285 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol L <sup>-1</sup> formate.	751203
<b>26.113 Mercury(II) iodide</b>								
	${}^{\bullet}\text{CO}_2^- + \text{HgI}_2 \rightarrow \text{CO}_2 + \text{Hg(I)}$	$3.0 \times 10^9$				p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. formate ion.	78A165
<b>26.114 Iodine</b>								
	${}^{\bullet}\text{CO}_2^- + \text{I}_2 \rightarrow \text{CO}_2 + \text{I}_2^{.-}$	$7 \times 10^9$				p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol L <sup>-1</sup> formate, $1.5 \times 10^{-4}$ mol L <sup>-1</sup> $\text{I}_2$ and $10^{-4}$ mol L <sup>-1</sup> $\text{I}^-$ .	86A070
<b>26.115 Hypoiodous acid</b>								
	${}^{\bullet}\text{CO}_2^- + \text{HOI} \rightarrow \text{CO}_2 + \text{HOI}^-$	$5.7 \times 10^8$		9		p.r.	P.b.k. ( $\text{HOI}^- \rightarrow \text{OH}^- + \text{I}^- \rightarrow \text{I}_2^-$ ) in soln. contg. formate ion, $\text{I}^-$ , and 0.01 mol L <sup>-1</sup> borax buffer.	86A901
<b>26.116 Iodate ion</b>								
	${}^{\bullet}\text{CO}_2^- + \text{IO}_3^- \rightarrow \text{CO}_2 + \text{IO}_3^{2-}$	$8.1 \times 10^7$		8.8		p.r.	P.b.k. at 490 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 1.0 mol L <sup>-1</sup> formate.	94A107
	${}^{\bullet}\text{CO}_2^- + \text{IO}_3^- \rightarrow \text{CO}_2 + \text{HOIO}_2^-$	$1.3 \times 10^8$		0.1		p.r.	P.b.k. at 480 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2 or $4 \times 10^{-3}$ mol L <sup>-1</sup> $\text{IO}_3^-$ and 0.1 mol L <sup>-1</sup> formate ion.	85A037
<b>26.117 Indium(III) ion</b>								
	${}^{\bullet}\text{CO}_2^- + \text{In}^{3+} \rightarrow$	$<1 \times 10^4$		2		p.r.	No reaction obs.	83A206
<b>26.118 Hexachloroiridate(IV) ion</b>								
	${}^{\bullet}\text{CO}_2^- + \text{IrCl}_6^{2-} \rightarrow \text{CO}_2 + \text{IrCl}_6^{3-}$	$1.7 \times 10^9$		6-7		p.r.	D.k. at 490 nm in $\text{N}_2\text{O}$ -satd. soln. contg. formate.	82A041
<b>26.119 Manganese(II) ion</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Mn}^{2+} \rightarrow \text{CO}_2 + \text{Mn}^+$	$<2 \times 10^5$				p.r.	No effect of $\text{Mn}^{2+}$ on d.k. of ${}^{\bullet}\text{CO}_2^-$ at 280 or 256 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol L <sup>-1</sup> formate.	761109

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
<b>26.120 5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(III) ion</b>								
	$\cdot\text{CO}_2^- + \text{MnTMpyP}^{5+} \rightarrow \text{CO}_2 + \text{MnTMpyP}^{4+}$	$5.5 \times 10^9$	6.7			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm in soln. contg. 0.01 mol L <sup>-1</sup> formate ion; $pK_a = 8.0, 10.6$ .	86A313
		$5.0 \times 10^9$	9.3					
		$3.5 \times 10^9$	11.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate ion.	84A426
<b>26.121 5,10,15,20-Tetrakis[4-(<i>N,N,N</i>-trimethylammonio)phenyl]porphinatomanganese(III) ion</b>								
	$\cdot\text{CO}_2^- + \text{MnTAPP}^{5+} \rightarrow \text{CO}_2 + \text{MnTAPP}^{4+}$	$4.2 \times 10^9$	7-9			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm in soln. contg. 0.01 mol L <sup>-1</sup> formate ion; $pK_a = 8.2, 10.8$ .	86A313
		$3.6 \times 10^9$	11					
<b>26.122 5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatomanganate(III) ion</b>								
	$\cdot\text{CO}_2^- + \text{MnTPPS}^{3-} \rightarrow \text{CO}_2 + \text{MnTPPS}^{4-}$	$4.2 \times 10^9$	11.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate ion.	84A426
<b>26.123 <math>\alpha,\alpha,\alpha,\beta</math>-Tetrakis[2-(<i>N</i>-methylisonicotinamido)phenyl]porphinatomanganese(III) ion</b>								
	$\cdot\text{CO}_2^- + \text{MnPFP}^{5+} \rightarrow \text{CO}_2 + \text{MnPFP}^{4+}$	$6.0 \times 10^9$	7.0	0.01		p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm in soln. contg. 0.01 mol L <sup>-1</sup> formate ion.	86A313
<b>26.124 Nitrous oxide</b>								
	$\cdot\text{CO}_2^- + \text{N}_2\text{O} + \text{H}_2\text{O} \rightarrow \text{CO}_2 + \text{N}_2 + \cdot\text{OH} + \text{OH}^-$	$1.6 \times 10^3$	4.4	0.1	292	$\gamma$ -r.	Calcd. from $G(\text{CO}_2)$ vs. dose rate; N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion; chain reaction; used $2k(\cdot\text{CO}_2^- + \cdot\text{CO}_2^-) = 1.3 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	85G029
<b>26.125 Nitric oxide</b>								
	$\cdot\text{CO}_2^- + \cdot\text{NO} \rightarrow \text{NOCO}_2^-$	$2.9 \times 10^9$	6.7		296	p.r.	D.k. 250 nm in soln. contg. $1.3 \times 10^{-5}$ mol L <sup>-1</sup> N <sub>2</sub> O, NO and 0.01 mol L <sup>-1</sup> formate.	94A457
<b>26.126 Nickel(I) ion</b>								
	$\cdot\text{CO}_2^- + \text{Ni}^+ \rightarrow \text{NiCO}_2^-$	$6.6 \times 10^9$	5.0			p.r.	D.k. at 300 nm (as well as p.b.k.) in soln. contg. NiSO <sub>4</sub> and formate ion.	741037
<b>26.127 Nickel(II) ion</b>								
	$\cdot\text{CO}_2^- + \text{Ni}^{2+} \rightarrow \text{CO}_2 + \text{Ni}^{2+}$	<10 <sup>5</sup>				p.r.	Estd. from lack of increase in Ni <sup>+</sup> in soln. contg. 0.1 mol L <sup>-1</sup> Ni <sup>2+</sup> on addn. of 0.1 mol L <sup>-1</sup> formate ion, as well as $\gamma$ -r. experiments [730039]. $10^2 < k < 10^5$ L mol <sup>-1</sup> s <sup>-1</sup> .	751027
<b>26.128 1,4,8,11-Tetraazacyclotetradecanenickel(II) ion</b>								
	$\cdot\text{CO}_2^- + \text{Ni}(\text{cyclam})^{2+} \rightarrow \text{CO}_2 + \text{Ni}(\text{cyclam})^{2+}$	$6.7 \times 10^9$	4.3		295	f.p.	P.b.k. at 380 nm in Ar-satd. soln. contg. 0.01 mol L <sup>-1</sup> oxalate and $(1-8) \times 10^{-4}$ mol L <sup>-1</sup> Ni(cyclam) <sup>2+</sup> ; $\Delta H^\ddagger = 25$ kJ mol <sup>-1</sup> and $\Delta S^\ddagger = 25$ J K <sup>-1</sup> mol <sup>-1</sup> , studied at 275-323 K.	95A154
		$5.2 \times 10^9$	6.0	0.1		p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and $(1-10) \times 10^{-4}$ mol L <sup>-1</sup> Ni(cyclam) <sup>2+</sup> .	85A032
<b>26.129 Tetracyanonickelate(II) ion</b>								
	$\cdot\text{CO}_2^- + \text{Ni}(\text{CN})_4^{2-} \rightarrow \text{CO}_2 + \text{Ni}(\text{CN})_4^{3-}$	$1.2 \times 10^9$		0.1		p.r.	P.b.k. at 240 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion and 5, 10 and $48 \times 10^{-5}$ mol L <sup>-1</sup> Ni(CN) <sub>4</sub> <sup>2-</sup> .	741072
<b>26.130 1,4,7,10-Tetraazacyclotridecanenickel(II) ion</b>								
	$\cdot\text{CO}_2^- + \text{Ni}([13]\text{aneN}_4)_4^{2+} \rightarrow \text{CO}_2 + \text{Ni}([13]\text{aneN}_4)_4^{+}$	$1.7 \times 10^9$	5.5	0.1		p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion and $1-10 \times 10^{-4}$ mol L <sup>-1</sup> Ni([13]aneN <sub>4</sub> ) <sup>2+</sup> .	85A145
<b>26.131 1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(II) ion</b>								
	$\cdot\text{CO}_2^- + \text{Ni}(\text{Me}_4[14]\text{aneN}_4)_4^{2+} \rightarrow \text{CO}_2 + \text{Ni}(\text{Me}_4[14]\text{aneN}_4)_4^{+}$	$1.5 \times 10^9$	6.0	0.1		p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and $(1-10) \times 10^{-4}$ mol L <sup>-1</sup> Ni(Me <sub>4</sub> [14]aneN <sub>4</sub> ) <sup>2+</sup> .	85A032

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
26.132	5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradecanenickel(II) ion	${}^{\bullet}\text{CO}_2^- + \text{Ni}(\text{Me}_6[14]\text{aneN}_4)^{2+} \rightarrow \text{CO}_2 + \text{Ni}(\text{Me}_6[14]\text{aneN}_4)^+$	$5.7 \times 10^9$	7.0	0.1	p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; Ni(I) is also formed by reaction of $e_{\text{aq}}^-$ .	761039
26.133	5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienenickel(II) ion	${}^{\bullet}\text{CO}_2^- + \text{Ni}(4,11\text{-dieneN}_4)^{2+} \rightarrow \text{CO}_2 + \text{Ni}(4,11\text{-dieneN}_4)^+$	$6.7 \times 10^9$	7.0	0.1	p.r.	P.b.k. in Ar-satd. 0.1 mol L <sup>-1</sup> formate.	761039
26.134	1,4,5,7,7,8,11,12,14,14-Decamethyl-1,4,8,11-tetraazacyclotetradecanenickel(II) ion	${}^{\bullet}\text{CO}_2^- + \text{Ni}(\text{Me}_{10}\text{cyclam})^{2+} \rightarrow \text{CO}_2 + \text{Ni}(\text{Me}_{10}\text{cyclam})^+$	$4 \times 10^6$	6.0	0.1	p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and $(1\text{-}10) \times 10^{-4}$ mol L <sup>-1</sup> complex.	85A032
26.135	3,14-Dimethyl-4,7,10,13-tetraazahexadeca-3,13-diene-2,15-dione dioximatonickel(IV) ion	${}^{\bullet}\text{CO}_2^- + \text{Ni}^{\text{IV}}\text{L}^{2+} \rightarrow \text{CO}_2 + [\text{Ni}^{\text{III}}\text{L}]^+$	$1.2 \times 10^{10}$	2.2-4.1		p.r.	P.b.k.	85A354
26.136	Hydrogen peroxide							
	${}^{\bullet}\text{CO}_2^- + \text{H}_2\text{O}_2 \rightarrow \text{CO}_2 + {}^{\bullet}\text{OH} + \text{OH}^-$	$6 \times 10^5$			298	p.r.	D.k. at 270 nm in CO <sub>2</sub> -satd. soln. contg. 0.025 mol L <sup>-1</sup> MeOH in absence and presence of 0.01 mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> ; $E_a = 21$ kJ mol <sup>-1</sup> , studied at 298-337 K.	92A377
		$7.3 \times 10^5$	6.8			γ-r.	Obs. $G(\text{H}_2\text{O}_2)$ in N <sub>2</sub> O-satd. soln. contg. formate ion; used $2k({}^{\bullet}\text{CO}_2^- + {}^{\bullet}\text{CO}_2^-) = 1.5 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	87G036
		$\leq 7 \times 10^5$	7			phot.	Calcd. from assumed chain mechanism in CO-H <sub>2</sub> O <sub>2</sub> soln.; recalcd. in [745144]; used $2k({}^{\bullet}\text{CO}_2^- + {}^{\bullet}\text{CO}_2^-) = 1.5 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	637005
26.137	Oxygen							
	${}^{\bullet}\text{CO}_2^- + \text{O}_2 \rightarrow \text{CO}_2 + \text{O}_2^-$	$2.0 \times 10^9$	8.0	0.1		p.r.	P.b.k. at 260 nm in O <sub>2</sub> -satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	761072
		$4.2 \times 10^9$	6.8	0.18		p.r.	D.k. at 270 nm and 300 nm in soln. contg. 0.18 mol L <sup>-1</sup> formate ion.	761132
		$2.4 \times 10^9$	7	0.3		p.r.	C.k. in soln. contg. 0.3 mol L <sup>-1</sup> formate; rel. to $k({}^{\bullet}\text{CO}_2^- + \text{Fe}(\text{CN})_6)^{3-} = 1.1 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	690522
26.138	Lead(II) ions							
	${}^{\bullet}\text{CO}_2^- + \text{Pb}^{2+} \rightarrow \text{CO}_2 + \text{Pb}^+$	$1 \times 10^{10}$				p.r.	P.b.k. at 320 nm in N <sub>2</sub> O-satd. soln. contg. $(0.7\text{-}2) \times 10^{-4}$ mol L <sup>-1</sup> Pb(ClO <sub>4</sub> ) <sub>2</sub> and $2 \times 10^{-3}$ mol L <sup>-1</sup> formate ion.	92A206
		$2.6 \times 10^8$	3.9	0.05		p.r.	P.b.k. at 330 nm in soln. contg. 0.05 mol L <sup>-1</sup> formate ion.	82A425
26.139	Palladium(II) ion							
	${}^{\bullet}\text{CO}_2\text{H} + \text{Pd}^{2+} \rightarrow \text{PdCO}_2\text{H}^+ \rightarrow \text{Pd}^+ + \text{H}^+ + \text{CO}_2$	$4.0 \times 10^7$	0			p.r.	P.b.k. at 290 nm in soln. contg. 0.1-1 mol L <sup>-1</sup> formic acid, $(5\text{-}30) \times 10^{-5}$ mol L <sup>-1</sup> Pd <sup>2+</sup> and 1 mol L <sup>-1</sup> HClO <sub>4</sub> .	94A518
		$3.0 \times 10^7$	0			p.r.	P.b.k. at 290 nm in soln. contg. formic acid, $(5\text{-}30) \times 10^{-5}$ mol L <sup>-1</sup> Pd <sup>2+</sup> and 1 mol L <sup>-1</sup> HClO <sub>4</sub> .	94A210
26.140	Tris(2,2'-bipyridine)rhodium(III) ion							
	${}^{\bullet}\text{CO}_2^- + \text{Rh}(\text{bpy})_3^{3+} \rightarrow \text{CO}_2 + \text{Rh}(\text{bpy})_3^{2+}$	$6.2 \times 10^9$	7	0.1		p.r.	P.b.k. at 270 nm as well as d.k. at 320 and 350 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	81A134

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
26.141	Tris(2,2'-bipyridine)ruthenium(II) ion							
	$\cdot\text{CO}_2^- + \text{Ru}(\text{bpy})_3^{2+} \rightarrow \text{CO}_2 + \text{Ru}(\text{bpy})_3^+$	$6.0 \times 10^7$	3-10	0.15		p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	91A081
26.142	Bis(2,2'-bipyridine)(2,2'-bipyrimidine)ruthenium(II) ion							
	$\cdot\text{CO}_2^- + \text{Ru}(\text{bpy})_2(\text{bpm})^{2+} \rightarrow \text{CO}_2 + \text{Ru}(\text{bpy})_2(\text{bpm})^+$	$2.5 \times 10^9$	3-10	0.15		p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	91A081
26.143	(2,2'-Bipyrazine)bis(2,2'-bipyridine)ruthenium(II) ion							
	$\cdot\text{CO}_2^- + \text{Ru}(\text{bpy})_2(\text{bpz})^{2+} \rightarrow \text{CO}_2 + \text{Ru}(\text{bpy})_2(\text{bpz})^+$	$4.8 \times 10^9$	3-10	0.15		p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	91A081
26.144	Tris(2,2'-bipyrimidine)ruthenium(II) ion							
	$\cdot\text{CO}_2^- + \text{Ru}(\text{bpm})_3^{2+} \rightarrow \text{CO}_2 + \text{Ru}(\text{bpm})_3^+$	$6.7 \times 10^9$	3.0, 7.0, 13.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion and $(2.5-10) \times 10^{-5}$ mol L <sup>-1</sup> Ru(bpm) <sub>3</sub> <sup>2+</sup> .	89A280
26.145	(2,2'-Bipyridine)bis(2,2'-bipyrimidine)ruthenium(II) ion							
	$\cdot\text{CO}_2^- + \text{Ru}(\text{bpm})_2(\text{bpy})^{2+} \rightarrow \text{CO}_2 + \text{Ru}(\text{bpm})_2(\text{bpy})^+$	$4.7 \times 10^9$	3-10	0.15		p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	91A081
26.146	(2,2'-Bipyrazine)bis(2,2'-bipyrimidine)ruthenium(II) ion							
	$\cdot\text{CO}_2^- + \text{Ru}(\text{bpm})_2(\text{bpz})^{2+} \rightarrow \text{CO}_2 + \text{Ru}(\text{bpm})_2(\text{bpz})^+$	$6.8 \times 10^9$	3-10	0.15		p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	91A081
26.147	(2,2'-Bipyrazine)(2,2'-bipyridine)(2,2'-bipyrimidine)ruthenium(II) ion							
	$\cdot\text{CO}_2^- + \text{Ru}(\text{bpy})(\text{bpm})(\text{bpz})^{2+} \rightarrow \text{CO}_2 + \text{Ru}(\text{bpy})(\text{bpm})(\text{bpz})^+$	$6.0 \times 10^9$	3-10	0.15		p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	91A081
26.148	Tris(2,2'-bipyrazine)ruthenium(II) ion							
	$\cdot\text{CO}_2^- + \text{Ru}(\text{bpz})_3^{2+} \rightarrow \text{CO}_2 + \text{Ru}(\text{bpz})_3^+$	$1.3 \times 10^{10}$	3-11	0.1		p.r.	P.b.k. at ~360 and 490 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	86A422
26.149	Bis(2,2'-bipyrazine)(2,2'-bipyrimidine)ruthenium(II) ion							
	$\cdot\text{CO}_2^- + \text{Ru}(\text{bpz})_2(\text{bpm})^{2+} \rightarrow \text{CO}_2 + \text{Ru}(\text{bpz})_2(\text{bpm})^+$	$8.4 \times 10^9$	3-10	0.15		p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	91A081
26.150	Bis(2,2'-bipyrazine)(2,2'-bipyridine)ruthenium(II) ion							
	$\cdot\text{CO}_2^- + \text{Ru}(\text{bpz})_2(\text{bpy})^{2+} \rightarrow \text{CO}_2 + \text{Ru}(\text{bpz})_2(\text{bpy})^+$	$6.4 \times 10^9$	3-10	0.15		p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	91A081
26.151	Bis(2,2'-bipyridine)(dipyrro[3,2- <i>a</i> :2',3'- <i>c</i> ]phenazine)ruthenium(II) ion							
	$\cdot\text{CO}_2^- + \text{Ru}(\text{bpy})_2(\text{dppz})^{2+} \rightarrow \text{CO}_2 + \text{Ru}(\text{bpy})_2(\text{dppz})^+$	$3.3 \times 10^9$	2-13			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion and $(2.5-10) \times 10^{-5}$ mol L <sup>-1</sup> Ru(bpy) <sub>2</sub> (dppz) <sup>2+</sup> ; product may be singly or doubly protonated ( <i>pK<sub>a</sub></i> = 4, 10).	89A312
26.152	Hexaammineruthenium(III) ion							
	$\cdot\text{CO}_2^- + \text{Ru}(\text{NH}_3)_6^{3+} \rightarrow \text{CO}_2 + \text{Ru}(\text{NH}_3)_6^{2+}$	$2.0 \times 10^9$	4.8			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> formate.	72A018
26.153	Pentaammine(nitroso)ruthenium(III) ion							
	$\cdot\text{CO}_2^- + \text{Ru}(\text{NH}_3)_5\text{NO}^{3+} \rightarrow \text{CO}_2 + \text{Ru}(\text{NH}_3)_5\text{NO}^{2+}$	$3.1 \times 10^9$	6.6	0.5		p.r.	P.b.k. at 280 nm in N <sub>2</sub> O-satd. soln. contg. 0.5 mol L <sup>-1</sup> formate ion.	751049
26.154	Pentaammine(isonicotinamide)ruthenium(III) ion							
	$\cdot\text{CO}_2^- + \text{Ru}(\text{NH}_3)_5\text{isn}^{3+} \rightarrow \text{CO}_2 + \text{Ru}(\text{NH}_3)_5\text{isn}^{2+}$	$1.0 \times 10^{10}$	4.9	0.1	296	p.r.	P.b.k. at 480 nm in N <sub>2</sub> O-satd. soln. contg. formate.	80A317
26.155	Pentaammine(1-methyl-4,4'-bipyridinium)ruthenium(III) ion							
	$\cdot\text{CO}_2^- + \text{Ru}(\text{NH}_3)_5(\text{mbpy})^{4+} \rightarrow \text{CO}_2 + \text{Ru}(\text{NH}_3)_5(\text{mbpy})^{3+}$	$1.1 \times 10^{10}$	6.2	0.1		p.r.	P.b.k. at 600 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	89A115

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	$T$ (K)	Method	Comment	Ref.
<b>26.156 Decaamminebis(2,2'-bipyridine)bis[μ-(cyano)]triruthenium(III),(II),(III) ion</b>								
	$^{\bullet}\text{CO}_2^- + [3,2,3] \rightarrow \text{CO}_2 + [2,2,3] +$ [3,2,2]	$1.4 \times 10^{10}$	7			p.r.	P.b.k., or d.k., in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion and (5-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> [3,2,3].	89A024
<b>26.157 Nonaamminebis(2,2'-bipyridine)bis[μ-(cyano)](pyridine)triruthenium(III),(II),(III) ion</b>								
	$^{\bullet}\text{CO}_2^- + [3',2,3] \rightarrow \text{CO}_2 + [2',2,3] +$ [3',2,2]	$1.5 \times 10^{10}$	7			p.r.	P.b.k., or d.k., in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion and (5-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> [3',2,3].	89A024
<b>26.158 Octaamminebis(2,2'-bipyridine)bis[μ-(cyano)]bis(pyridine)triruthenium(III),(II),(III) ion</b>								
	$^{\bullet}\text{CO}_2^- + [3',2,3'] \rightarrow \text{CO}_2 + [2',2,3'] +$ [3',2,2']	$1.3 \times 10^{10}$	7			p.r.	P.b.k., or d.k., in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion and (5-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> [3',2,3'].	89A024
<b>26.159 Sulfur dioxide</b>								
	$^{\bullet}\text{CO}_2^- + \text{SO}_2 \rightarrow \text{CO}_2 + \text{SO}_2^{\bullet-}$	$7.6 \times 10^8$	3.1			p.r.	Abs. changes in soln. contg. 1 mol L <sup>-1</sup> formate; used $2k(^{\bullet}\text{CO}_2^- + ^{\bullet}\text{CO}_2^-) = 7.6 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> .	751118
<b>26.160 Tetrathionate ion</b>								
	$^{\bullet}\text{CO}_2^- + \text{S}_4\text{O}_6^{2-} \rightarrow \text{CO}_2 + \text{S}_4\text{O}_6^{3-}$	$5.8 \times 10^7$		0.1		p.r.	P.b.k. at 370 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate, as well as d.k. at 280 nm.	731027
<b>26.161 Peroxodisulfate ion</b>								
	$^{\bullet}\text{CO}_2^- + \text{S}_2\text{O}_8^{2-} \rightarrow \text{CO}_2 + \text{SO}_4^{2-} +$ $\text{SO}_4^{\bullet-}$	$\sim 1 \times 10^5$				p.r.	D.k. at 290 nm in soln. contg. 0.012 mol L <sup>-1</sup> N <sub>2</sub> O, 5 × 10 <sup>-3</sup> mol L <sup>-1</sup> CO and 0.01-0.05 mol L <sup>-1</sup> S <sub>2</sub> O <sub>8</sub> <sup>2-</sup> .	89A510
<b>26.162 Scandium(III)</b>								
	$^{\bullet}\text{CO}_2^- + \text{Sc(III)} \rightarrow$		1.4			p.r.	No reaction obs. in soln. contg. 1 mol L <sup>-1</sup> formic acid and 0.01 mol L <sup>-1</sup> Sc(III).	731057
<b>26.163 Titanium(III) ions</b>								
	$^{\bullet}\text{CO}_2^- + \text{Ti}^{3+} + \text{H}^+ \rightarrow \text{Ti}^{3+}\text{CO}_2\text{H}$	$4 \times 10^6$	0.5			p.r.	P.b.k. in soln. contg. 0.3 mol L <sup>-1</sup> sulfuric and 2 mol L <sup>-1</sup> formic acid; competition with radical combination; complex formn. deduced from transient spectra.	79A341
		$\sim 5 \times 10^6$	1.4			p.r.	D.k. in soln. contg. 1 mol L <sup>-1</sup> formic acid.	731057
<b>26.164 Thallium(I) ion</b>								
	$^{\bullet}\text{CO}_2^- + \text{Tl}^+ \rightarrow \text{CO}_2 + \text{Tl}^0$	$3.0 \times 10^6$	3.7	0.05		p.r.	P.b.k. at 420 nm in soln. contg. 0.01-0.04 mol L <sup>-1</sup> Tl <sup>+</sup> , formate ion and CO <sub>2</sub> ; reaction goes to equilibrium.	89C001
		$2.3 \times 10^6$	13			p.r.	P.b.k. at 420 nm in soln. contg. 1 mol L <sup>-1</sup> formate and 1.5 × 10 <sup>-2</sup> mol L <sup>-1</sup> Tl <sup>+</sup> ; reaction also obs. for neutral and acid soln.	80A123
<b>26.165 Uranium(VI)</b>								
	$^{\bullet}\text{CO}_2^- + \text{U(VI)} \rightarrow$	$7.3 \times 10^8$				p.r.	Abs. changes in soln. contg. 0.4 mol L <sup>-1</sup> H <sub>2</sub> SO <sub>4</sub> + 5.3 mol L <sup>-1</sup> HCO <sub>2</sub> H.	94Z077
<b>26.166 12-Tungstate ion(6-), dihydrogen</b>								
	$^{\bullet}\text{CO}_2^- + \text{H}_2\text{W}_{12}\text{O}_{40}^{6-} \rightarrow \text{CO}_2 +$ $\text{H}_2\text{W}_{12}\text{O}_{40}^{7-}$	$1.2 \times 10^8$	~1			p.r.	P.b.k. at 650 nm in N <sub>2</sub> O-satd. soln. contg. ~0.5 mol L <sup>-1</sup> formate, HClO <sub>4</sub> at pH 1 and ~0.01 mol L <sup>-1</sup> phosphate buffer at pH 5-6.	83A368
<b>26.167 12-Tungstoferrate ion(5-)</b>								
	$^{\bullet}\text{CO}_2^- + \text{FeW}_{12}\text{O}_{40}^{5-} \rightarrow \text{CO}_2 +$ $\text{FeW}_{12}\text{O}_{40}^{6-}$	$4.1 \times 10^8$	~1			p.r.	P.b.k. at 650 nm in N <sub>2</sub> O-satd. soln. contg. ~0.5 mol L <sup>-1</sup> formate, HClO <sub>4</sub> at pH 1 and ~0.01 mol L <sup>-1</sup> phosphate buffer at pH 5-6.	83A368
		$1.7 \times 10^8$	~5					

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>26.168 12-Tungstophosphate ion(3-)</b>								
	${}^{\bullet}\text{CO}_2^- + \text{PW}_{12}\text{O}_{40}^{3-} \rightarrow \text{CO}_2 + \text{PW}_{12}\text{O}_{40}^{4-}$	$3.0 \times 10^9$	~1			p.r.	P.b.k. at 650 nm in N <sub>2</sub> O-satd. soln. contg. ~0.5 mol L <sup>-1</sup> formate and HClO <sub>4</sub> ; heteropoly compound unstable at pH > 1.2.	83A368
<b>26.169 12-Tungstosilicate ion(4-)</b>								
	${}^{\bullet}\text{CO}_2^- + \text{SiW}_{12}\text{O}_{40}^{4-} \rightarrow \text{CO}_2 + \text{SiW}_{12}\text{O}_{40}^{5-}$	$6.4 \times 10^8$	~1			p.r.	P.b.k. at 650 nm in N <sub>2</sub> O-satd. soln. contg. ~0.5 mol L <sup>-1</sup> formate, HClO <sub>4</sub> at pH 1 and ~0.01 mol L <sup>-1</sup> phosphate buffer at pH 5-6.	83A368
<b>26.170 Ytterbium(III)</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Yb(III)} \rightarrow$		1.4			p.r.	No reaction obs. in soln. contg. 1 mol L <sup>-1</sup> formic acid and 0.01 mol L <sup>-1</sup> Yb(III).	731057
<b>26.171 Zinc(I) ion</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Zn}^+ \rightarrow \text{HCO}_2^- + \text{Zn}^{2+}$	$\sim 4 \times 10^9$			295	p.r.	Estd. from first-order decay at 310 nm (Zn <sup>+</sup> ) in soln. contg. formate and ZnSO <sub>4</sub> .	771011
<b>26.172 Zinc(II) ion</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Zn}^{2+} \rightarrow$	$<2 \times 10^4$			295	p.r.	No reaction obs. in soln. contg. 0.5 mol L <sup>-1</sup> ZnSO <sub>4</sub> .	771011
		$<10^2$				p.r.	Estd. from lack of increase in Zn <sup>+</sup> in soln. contg. 0.1 mol L <sup>-1</sup> Zn <sup>2+</sup> upon addn. of 0.1 mol L <sup>-1</sup> formate ion, as well as $\gamma$ -r. experiments [730039].	751027
<b>26.173 Acetophenone</b>								
	${}^{\bullet}\text{CO}_2^- + \text{C}_6\text{H}_5\text{COCH}_3 \rightarrow \text{CO}_2 + \text{C}_6\text{H}_5\text{CO}^-\text{CH}_3$	$1 \times 10^7$	12			p.r.	P.b.k. at 440 nm.	680308
<b>26.174 Acridine</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Ac} + \text{H}^+ \rightarrow \text{CO}_2 + {}^{\bullet}\text{AcH}$	$\sim 3 \times 10^8$	7			p.r.	P.b.k.; at pH 13 adduct is formed.	79A305
<b>26.175 Acrylamide</b>								
	${}^{\bullet}\text{CO}_2^- + \text{H}_2\text{C}=\text{CHCONH}_2 \rightarrow$ addn.	$\sim 4 \times 10^7$	~5			p.r.	Abs. changes; electron transfer not obs.	700052
<b>26.176 Adenosine 5'-monophosphate</b>								
	${}^{\bullet}\text{CO}_2^- + \text{AMP} \rightarrow$	$<10^6$	8.3			p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-satd. 0.1 mol L <sup>-1</sup> formate.	680441
<b>26.177 Adriamycin, conjugate acid</b>								
	${}^{\bullet}\text{CO}_2^- + {}^+\text{HAdH}_2 \rightarrow \text{CO}_2 + {}^+\text{HAdH}_2^-$	$3.4 \times 10^9$	1.1, 6.5			p.r.	P.b.k. at 380, 475, and 720 nm in N <sub>2</sub> O-satd. soln. contg. formate and $(1-9) \times 10^{-5}$ mol L <sup>-1</sup> adriamycin.	85A360
<b>26.178 Adriamycin, negative ion</b>								
	${}^{\bullet}\text{CO}_2^- + \text{AdH}^- \rightarrow \text{CO}_2 + \text{AdH}_2^{--} + \text{OH}^-$	$1.8 \times 10^8$	11.5			p.r.	P.b.k. at 380, 475, and 720 nm in N <sub>2</sub> O-satd. soln. contg. formate and $(1-9) \times 10^{-5}$ mol L <sup>-1</sup> adriamycin.	85A360
<b>26.179 Alloxan</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Al} + \text{H}^+ \rightarrow \text{CO}_2 + {}^{\bullet}\text{AlH}$	$3.7 \times 10^7$	4.8	0.1		p.r.	P.b.k. at 310 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; cor. for decay of ${}^{\bullet}\text{CO}_2^-$ .	80A197
<b>26.180 3-Amino-1,2,4-benzotriazine-1,4-dioxide</b>								
	${}^{\bullet}\text{CO}_2^- + \text{C}_7\text{H}_6\text{N}_4\text{O}_2 \rightarrow$ redn.	$2.8 \times 10^9$	7.4	0.2		p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> formate.	88R247
<b>26.181 1-Amino-4-hydroxy-9,10-anthraquinone, conjugate base</b>								
	${}^{\bullet}\text{CO}_2^- + 1,4\text{-AQ}(\text{NH}_2)(\text{O}^-) + \text{H}^+ \rightarrow$	$1.1 \times 10^9$	11			p.r.	P.b.k. at 650 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	92A416
	$\text{CO}_2 + [\text{1,4-AQ}(\text{NH}_2)(\text{OH})]^{--}$	$1.3 \times 10^9$	14					

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
26.182	9,10-Anthraquinone-1,5-disulfonate ion $\cdot\text{CO}_2^- + 1,5\text{-diSO}_3\text{AQ}^{2-} \rightarrow \text{CO}_2 + [\text{1,5-diSO}_3\text{AQ}]^{3-}$	$1.0 \times 10^9$	8.4			p.r.	P.b.k. at 500 or 385 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> anthraquinonedisulfonate.	91A047
26.183	9,10-Anthraquinone-2,6-disulfonate ion $\cdot\text{CO}_2^- + 2,6\text{-diSO}_3\text{AQ}^{2-} \rightarrow \text{CO}_2 + [\text{2,6-diSO}_3\text{AQ}]^{3-}$	$8.1 \times 10^8$	7.0			p.r.	P.b.k. at 515 or 390 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (2-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> anthraquinonedisulfonate.	91A047
		$2.4 \times 10^9$	7.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate.	73110
26.184	9,10-Anthraquinone-1-sulfonate ion $\cdot\text{CO}_2^- + 1\text{-SO}_3\text{AQ}^- \rightarrow \text{CO}_2 + [\text{1-SO}_3\text{AQ}]^{2-}$	$2.1 \times 10^9$				f.p./rq	P.b.k. at 500 nm in air-free soln. contg. 2 mol L <sup>-1</sup> formate and $2 \times 10^{-4}$ mol L <sup>-1</sup> anthraquinone-1-sulfonate; radical from reductive quenching of triplet by formate.	93A410
		$1.0 \times 10^9$	3			p.r.	P.b.k.	720391
		$3.3 \times 10^9$	7					
26.185	9,10-Anthraquinone-2-sulfonate ion $\cdot\text{CO}_2^- + 2\text{-SO}_3\text{AQ}^- \rightarrow \text{CO}_2 + [\text{2-SO}_3\text{AQ}]^{2-}$	$2.1 \times 10^9$	-8			f.p./rq	P.b.k. at 500 nm in N <sub>2</sub> -satd. soln. contg. 0.8 mol L <sup>-1</sup> formate ion and $2 \times 10^{-4}$ mol L <sup>-1</sup> anthraquinone-2-sulfonate; radical from reductive quenching of triplet by formate.	91A174
		$1.6 \times 10^9$	7			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. formate.	731104
		$2.8 \times 10^9$	3			p.r.	P.b.k. in soln. contg. formate.	720391
		$3.1 \times 10^9$	7					
26.186	Azobis( <i>N,N</i> -dimethylformamide) $\cdot\text{CO}_2^- + (\text{CH}_3)_2\text{NCON=NCON(CH}_3)_2 \rightarrow \text{CO}_2 + [\text{(CH}_3)_2\text{NCONNCON(CH}_3)_2]^{2-}$	$-2.5 \times 10^9$				p.r.	P.b.k. at 400 nm.	751194
26.187	1,4-Benzenedithiol, conjugate base $\cdot\text{CO}_2^- + 4\text{-HSC}_6\text{H}_4\text{S}^- \rightarrow \text{HCO}_2^- + 4\text{-SC}_6\text{H}_4\text{S}^{\cdot-}$	$1.5 \times 10^9$	-7	0.1		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; <i>k</i> < 10 <sup>8</sup> L mol <sup>-1</sup> s <sup>-1</sup> for benzenedithiol dianion.	93A206
26.188	1,4-Benzenedithiol $\cdot\text{CO}_2^- + 4\text{-HSC}_6\text{H}_4\text{SH} \rightarrow \text{HCO}_2^- + 4\text{-HSC}_6\text{H}_4\text{S}^{\cdot-}$	$3.1 \times 10^9$	acid	0.1		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; p <i>K<sub>a</sub></i> = 6.0, 7.7.	93A206
26.189	1,4-Benzoquinone $\cdot\text{CO}_2^- + \text{Q} \rightarrow \text{CO}_2 + \text{Q}^{\cdot-}$	$7 \times 10^9$	6.9	0.1		p.r.	P.b.k. at 430 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	730049
		$6.6 \times 10^9$	7.0			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. formate.	731104
		$6.6 \times 10^9$	-7	0.2		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> formate.	710619
26.190	Bilirubin dianion $\cdot\text{CO}_2^- + \text{BR}^{2-} \rightarrow \text{CO}_2 + \text{BR}^{\cdot-3-}$		11			p.r.	P.b.k. at 520 nm in N <sub>2</sub> O-satd. micellar soln. contg. 0.05 mol L <sup>-1</sup> formate and $2.5 \times 10^{-4}$ mol L <sup>-1</sup> CTAB gave <i>k</i> = $5.3 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> ; <i>k</i> decreases with increasing [CTAB]. No reaction obs. in homogeneous solution	94N154

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH <sub>r</sub>	<i>I</i>	T (K)	Method	Comment	Ref.
26.191	<b>2,2'-Bipyridine, conjugate acid</b> ${}^{\bullet}\text{CO}_2^- + \text{bpyH}^+ \rightarrow \text{CO}_2 + \text{bpyH}^{\bullet}$	$5.0 \times 10^8$	4.4	0.2		p.r.	P.b.k. at 375 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> formate.	79A148
26.192	<b>2,2'-Bipyridine</b> ${}^{\bullet}\text{CO}_2^- + \text{bpy} \rightarrow$	$<10^6$	7			p.r.	P.b.k.	79A148
26.193	<b>1,1'-Bis(carboxyethyl)-4,4'-bipyridinium</b> ${}^{\bullet}\text{CO}_2^- + \text{CEV}^{2+} \rightarrow \text{CO}_2 + \text{CEV}^{\bullet+}$	$2.0 \times 10^9$	7.0	0.2		p.r.	P.b.k. at 680 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> formate.	761169
26.194	<b>1,1'-Bis(4-cyanophenyl)-4,4'-bipyridinium</b> ${}^{\bullet}\text{CO}_2^- + \text{CV}^{2+} \rightarrow \text{CO}_2 + \text{CV}^{\bullet+}$	$1.4 \times 10^{10}$	6.8	0.1		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	78A321
26.195	<b>1,1'-Bis(2-hydroxyethyl)-4,4'-bipyridinium</b> ${}^{\bullet}\text{CO}_2^- + \text{BP}^{2+} \rightarrow \text{CO}_2 + \text{BP}^{\bullet+}$	$1.9 \times 10^{10}$	6.8	0.1		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	78A321
26.196	<b>Bis(2-hydroxyethyl)trisulfide</b> ${}^{\bullet}\text{CO}_2^- + (\text{HOCH}_2\text{CH}_2)_2\text{S}_3 \rightarrow \text{CO}_2 + \text{HOCH}_2\text{CH}_2\text{SS}^{\bullet} + \text{HOCH}_2\text{CH}_2\text{S}^-$	$5 \times 10^8$	5.7			p.r.	P.b.k. at 370 nm in N <sub>2</sub> O-satd. soln. contg. formate.	82A307
26.197	<b>3,3'-Bis(penicillamine)trisulfide</b> ${}^{\bullet}\text{CO}_2^- + \text{PenSSSPen} \rightarrow \text{CO}_2 + \text{PenS}^- + \text{PenSS}^{\bullet}$	$2.3 \times 10^8$	5.6	0.1		p.r.	P.b.k. at 374 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	92A019
26.198	<b>5-Bromouracil</b> ${}^{\bullet}\text{CO}_2^- + 5\text{-BrU} \rightarrow \text{CO}_2 + 5\text{-BrU}^{\bullet-}$	$>1.0 \times 10^8$				p.r.	P.b.k. at 440 nm (BrUCO <sub>2</sub> <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. formate.	690826
26.199	<b>1,4-Butanediylbis(1'-methyl-4,4'-bipyridinium)</b> ${}^{\bullet}\text{CO}_2^- + \text{BTQ}^{4+} \rightarrow \text{CO}_2 + \text{BTQ}^{3+}$	$1.5 \times 10^{10}$	7.3	0.1	298	p.r.	P.b.k. at 600 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion and $(5\text{-}10) \times 10^{-5}$ mol L <sup>-1</sup> viologen.	86A266
26.200	<b>2-<i>tert</i>-Butyl-1,4-benzoquinone</b> ${}^{\bullet}\text{CO}_2^- + (\text{CH}_3)_3\text{CQ} \rightarrow \text{CO}_2 + (\text{CH}_3)_3\text{CQ}^{\bullet-}$	$2.2 \times 10^9$	6.8		295	p.r.	P.b.k. at 430 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and $(1\text{-}8) \times 10^{-5}$ mol L <sup>-1</sup> quinone.	95A022
26.201	<b>Camphor</b> ${}^{\bullet}\text{CO}_2^- + \text{C}_{10}\text{H}_{16}\text{O} \rightarrow$	$\leq 10^6$	13			p.r.	D.k. of ${}^{\bullet}\text{CO}_2^-$ at 260 nm in N <sub>2</sub> O-satd. soln. contg. formate was unaffected by $10^{-3}$ mol L <sup>-1</sup> camphor.	79A191
26.202	<b>Carbon tetrachloride</b> ${}^{\bullet}\text{CO}_2^- + \text{CCl}_4 \rightarrow$					p.r.	Cond. study. No reaction obs.	710778
26.203	<b>4-Carboxybenzophenone, conjugate base</b> ${}^{\bullet}\text{CO}_2^- + \text{C}_6\text{H}_5\text{COC}_6\text{H}_4\text{-4-CO}_2^- \rightarrow \text{CO}_2 + \text{C}_6\text{H}_5\text{CO}^{\bullet-}\text{C}_6\text{H}_4\text{-4-CO}_2^-$	$3.6 \times 10^7$	11.2			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	91A174
		$3.2 \times 10^7$	11.2			f.p./rq	P.b.k. at 680 nm in N <sub>2</sub> O-satd. soln. contg. 0.8 mol L <sup>-1</sup> formate ion and $4 \times 10^{-3}$ mol L <sup>-1</sup> benzophenone-4-carboxylate; radical from reductive quenching of triplet by formate.	91A174
26.204	<b>2-Carboxy-1-methylpyridinium</b> ${}^{\bullet}\text{CO}_2^- + 2\text{-py}^+(\text{CH}_3)\text{CO}_2^- \rightarrow \text{CO}_2 + 2\text{-py}^+(\text{CH}_3)\text{CO}_2^-$	$7 \times 10^8$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	82A146

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
26.205	1-Chloro-4-nitrobenzene $\cdot\text{CO}_2^- + 4\text{-ClC}_6\text{H}_4\text{NO}_2 \rightarrow \text{CO}_2 + [\text{4-ClC}_6\text{H}_4\text{NO}_2]^-$	$3 \times 10^8$				p.r.	P.b.k.	77R167
26.206	Crystal Violet cation $\cdot\text{CO}_2^- + \text{CV}^+ \rightarrow \text{CO}_2 + \text{C}_{25}\text{H}_{30}\text{N}_3^+$	$1.6 \times 10^9$	7			p.r.	D.k. at 520 nm as well as p.b.k. at ~400 nm.	73I078
26.207	Cystamine $\cdot\text{CO}_2^- + [\text{H}_2\text{NCH}_2\text{CH}_2\text{S}]_2 \rightarrow \text{CO}_2 + [\text{H}_2\text{NCH}_2\text{CH}_2\text{S}]_2^-$	$\leq 2.5 \times 10^7$	9.6	0.1		p.r.	P.b.k. at 410 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion, up to $3 \times 10^{-3}$ mol L <sup>-1</sup> cystamine and $4 \times 10^{-4}$ mol L <sup>-1</sup> cysteamine.	84A233
26.208	Daunomycin $\cdot\text{CO}_2^- + \text{D} \rightarrow \text{CO}_2 + \text{D}^-$	$2.0 \times 10^9$	7	0.1		p.r.	P.b.k. at $\geq 600$ nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	85A001
26.209	5-Deazalumiflavin, protonated $\cdot\text{CO}_2^- + 5\text{-DeLFH}^+ \rightarrow \text{CO}_2 + 5\text{-DeLFH}^*$	$2.5 \times 10^9$	0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> formic acid; $\text{pK}_a = 1.7, 11.3$ .	89A097
26.210	5-Deazalumiflavin $\cdot\text{CO}_2^- + 5\text{-DeLF} \rightarrow \text{CO}_2 + 5\text{-DeLF}^-$	$5.0 \times 10^8$	7	0.1		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	89A097
26.211	5-Deazalumiflavin anion $\cdot\text{CO}_2^- + 5\text{-DeLF(-H)}^- \rightarrow \text{CO}_2 + 5\text{-DeLF(-H)}^{2-}$	$2.5 \times 10^8$	13			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	89A097
26.212	3,6-Diamino-10-methylacridinium $\cdot\text{CO}_2^- + \text{ACFI}^+ \rightarrow \text{CO}_2 + [\text{ACFI}]^*$	$3.7 \times 10^8$				p.r.	D.k. (dye) in Ar-satd. 0.1 mol L <sup>-1</sup> formate.	700241
26.213	1,1'-Dibenzyl-4,4'-bipyridinium $\cdot\text{CO}_2^- + \text{BV}^{2+} \rightarrow \text{CO}_2 + \text{BV}^{+}$	$1.7 \times 10^{10}$	6.8	0.1		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	78A321
		$6.7 \times 10^9$	7.0	0.2		p.r.	P.b.k. at 680 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> formate.	76I169
26.214	3,5-Dibromo-4-nitrosobenzenesulfonate ion $\cdot\text{CO}_2^- + \text{DBNBS} \rightarrow$	$1.5 \times 10^9$	-8.3			p.r.	D.k. at 370 nm in N <sub>2</sub> O-satd. soln. contg. formate.	92A304
		$2.5 \times 10^9$				p.r.		90A024
26.215	2,6-Dichloroindophenolate ion $\cdot\text{CO}_2^- + \text{DCIP}^- \rightarrow \text{CO}_2 + \text{DCIP}^{2-}$	$3.5 \times 10^9$	7			p.r.	D.k. at 600 nm in N <sub>2</sub> O-satd. soln. contg. formate, as well as p.b.k. at ~400 nm; 100% <i>e</i> -transfer.	73I078
26.216	<i>N,N'</i> -Diethylthiourea $\cdot\text{CO}_2\text{H} + \text{C}_2\text{H}_5\text{NHCSNHC}_2\text{H}_5 \rightarrow$	$5.5 \times 10^8$	<0			p.r.	P.b.k. at 425 nm in soln. contg. 3.6 mol L <sup>-1</sup> H <sub>2</sub> SO <sub>4</sub> and 1 mol L <sup>-1</sup> formate. Mechanism suggested to be protonation at S and H abstr. from NH.	94A284
26.217	Dihydrolipoamide $\cdot\text{CO}_2^- + \text{L}(\text{SH})_2 \rightarrow \text{HCO}_2^- + \text{L}\dot{\text{S}}_2\text{H}$	$6.4 \times 10^8$	4			p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> formate ion and $(1\text{-}15) \times 10^{-4}$ mol L <sup>-1</sup> dihydrolipoamide; $k_r = 1.2 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> .	89C009

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	I	T (K)	Method	Comment	Ref.
26.218	1,5-Dihydroxy-9,10-anthraquinone dianion	$\cdot\text{CO}_2^- + 1,5\text{-AQ(O}^-\text{)}_2 + 2\text{ H}^+ \rightarrow \text{CO}_2 + [1,5\text{-AQ(OH)}_2]^{2-}$	$2.7 \times 10^8$	-14		p.r.	P.b.k. at 640 nm in N <sub>2</sub> O-satd. soln. contg. (5-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> quinone and 0.1 mol L <sup>-1</sup> formate ion. pK <sub>a</sub> = 10.6, 12.5.	91A124
26.219	1,5-Dihydroxy-9,10-anthraquinone monoanion	$\cdot\text{CO}_2^- + 1,5\text{-AQ(OH)(O}^-\text{)} + \text{H}^+ \rightarrow \text{CO}_2 + [1,5\text{-AQ(OH)}_2]^{2-}$	$1.0 \times 10^9$	11		p.r.	P.b.k. at 640 nm in N <sub>2</sub> O-satd. soln. contg. (5-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> quinone and 0.1 mol L <sup>-1</sup> formate ion; pK <sub>a</sub> = 10.6, 12.5.	91A124
26.220	1,8-Dihydroxy-9,10-anthraquinone dianion	$\cdot\text{CO}_2^- + 1,8\text{-AQ(O}^-\text{)}_2 + 2\text{ H}^+ \rightarrow \text{CO}_2 + [1,8\text{-AQ(OH)}_2]^{2-}$	$3.7 \times 10^8$	-14		p.r.	P.b.k. at 640 nm in N <sub>2</sub> O-satd. soln. contg. (5-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> quinone and 0.1 mol L <sup>-1</sup> formate ion; pK <sub>a</sub> = 9.7, 12.1.	91A124
26.221	1,8-Dihydroxy-9,10-anthraquinone monoanion	$\cdot\text{CO}_2^- + 1,8\text{-AQ(OH)(O}^-\text{)} + \text{H}^+ \rightarrow \text{CO}_2 + [1,8\text{-AQ(OH)}_2]^{2-}$	$1.7 \times 10^9$	11		p.r.	P.b.k. at 640 nm in N <sub>2</sub> O-satd. soln. contg. (5-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> quinone and 0.1 mol L <sup>-1</sup> formate ion; pK <sub>a</sub> = 9.7, 12.1.	91A124
26.222	2,6-Dihydroxy-9,10-anthraquinone dianion	$\cdot\text{CO}_2^- + 2,6\text{-AQ(O}^-\text{)}_2 + \text{H}^+ \rightarrow \text{CO}_2 + [2,6\text{-AQ(OH)}_2]^{2-}$	$1.0 \times 10^9$	11		p.r.	P.b.k. at >600 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (5-40) × 10 <sup>5</sup> mol L <sup>-1</sup> 2,6-dihydroxyanthraquinone.	94A089
26.223	1,4-Dihydroxy-9,10-anthraquinone-2-sulfonate ion	$\cdot\text{CO}_2^- + 1,4\text{-AQS(OH)}_2 \rightarrow \text{CO}_2 + [1,4\text{-AQS(OH)}_2]^{2-}$	$3.2 \times 10^9$	5.7		p.r.	P.b.k. at 475 nm in N <sub>2</sub> O-satd. soln. contg. (2-6) × 10 <sup>-5</sup> mol L <sup>-1</sup> quinone and 0.1 mol L <sup>-1</sup> formate and 2 × 10 <sup>-3</sup> mol L <sup>-1</sup> phosphate buffer (or 1 mol L <sup>-1</sup> formic acid and 0.05 mol L <sup>-1</sup> H <sub>2</sub> SO <sub>4</sub> ); pK <sub>a</sub> = 9.1, 11.85; $k$ for reaction of 6-sulfonate similar.	88A304
26.224	(E)-4,5-Dihydroxy-1,2-dithiane	$\cdot\text{CO}_2^- + \text{[SCH}_2(\text{CHOH})_2\text{CH}_2\text{]} \rightarrow \text{CO}_2 + \text{[S}^-\text{SCH}_2(\text{CHOH})_2\text{CH}_2\text{]}$	$5.2 \times 10^7$ $9.6 \times 10^7$ $1.5 \times 10^8$	6.6 298 333	273	p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. (1-10) × 10 <sup>-4</sup> mol L <sup>-1</sup> DTT-ox and 0.1-0.5 mol L <sup>-1</sup> formate ion; curved Arrhenius plot; mechanism suggested to be addn. followed by decomp. to radical anion.	89A167
			$1.1 \times 10^8$	9	0.1	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	82A171
26.225	5,8-Dihydroxy-1,4-naphthoquinone	$\cdot\text{CO}_2^- + 5,8\text{-NQ(OH)}_2 \rightarrow \text{CO}_2 + [5,8\text{-NQ(OH)}_2]^{2-}$	$5.1 \times 10^9$	5.8	0.1	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	83A039
26.226	5,8-Dihydroxy-1,4-naphthoquinone, conjugate base	$\cdot\text{CO}_2^- + 5,8\text{-NQ(OH)(O}^-\text{)} + \text{H}_2\text{O} \rightarrow \text{CO}_2 + \text{OH}^- + [5,8\text{-NQ(OH)}_2]^{2-}$	$2.2 \times 10^9$	9.2	0.1	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	83A039
		$\cdot\text{CO}_2^- + 5,8\text{-NQ(O}^-\text{)}_2 + 2\text{ H}_2\text{O} \rightarrow \text{CO}_2 + 2\text{ OH}^- + [5,8\text{-NQ(OH)}_2]^{2-}$	$1.4 \times 10^9$	13.0	0.2	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	83A039
26.227	1,1'-Dimethyl-4,4'-bipyridinium	$\cdot\text{CO}_2^- + \text{MV}^{2+} \rightarrow \text{CO}_2 + \text{MV}^{+}$	$2.9 \times 10^9$ $6.5 \times 10^9$ $6.4 \times 10^9$	1 0.1 11	1.8 0.1 1.0	p.r. f.p./rq	G.V. Buxton, private communication Calcd. from decay at 490 nm, recovery at 440 nm, and formation at 605 nm in soln. contg. 0.1 mol L <sup>-1</sup> oxalate ion and 5 × 10 <sup>-4</sup> mol L <sup>-1</sup> methyl viologen; $\cdot\text{CO}_2^-$ from reductive quenching of $[\text{Ru(bpz)}_3]^{2+}$ by $\text{C}_2\text{O}_4^{2-}$ .	90C004 89E105

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
26.227	1,1'-Dimethyl-4,4'-bipyridinium — Continued							
		$\sim 1 \times 10^{10}$		$\rightarrow 0$		p.r.	P.b.k. at 600 nm in N <sub>2</sub> O-satd. soln. contg. 0.1-1.5 mol L <sup>-1</sup> formate ion ( <i>k</i> = $4 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> at the latter concn.).	86A327
		$1.5 \times 10^{10}$		0.1		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	731074
26.228	1,1'-Dimethyl-4,4'-bipyridinium radical cation	${}^{\cdot}\text{CO}_2^- + \text{MV}^{++} \rightarrow$	$\sim 1 \times 10^9$		0.1	$\gamma$ -r.	Estd. from effect of dose on absorbance in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	86A327
26.229	Dimethyl fumarate	${}^{\cdot}\text{CO}_2^-$ <i>trans</i> -CH <sub>3</sub> O <sub>2</sub> CCH=CHCO <sub>2</sub> CH <sub>3</sub> $\rightarrow$ CO <sub>2</sub> + [CH <sub>3</sub> O <sub>2</sub> CCHCHCO <sub>2</sub> CH <sub>3</sub> ] <sup>+</sup>	$9 \times 10^8$	7.0		p.r.	P.b.k.; >80% <i>e</i> -transfer.	730097
26.230	1,3-Dimethylullumichrome	${}^{\cdot}\text{CO}_2^- + \text{Fl} \rightarrow \text{CO}_2 + \text{FIH}^{\cdot}$	$6.3 \times 10^8$	6, 10	0.1	p.r.	P.b.k. at ~450 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	82B104
26.231	<i>N,N</i> -Dimethyl-4-nitrosoaniline	${}^{\cdot}\text{CO}_2^- + 4\text{-Me}_2\text{NC}_6\text{H}_4\text{NO} \rightarrow \text{CO}_2 +$ [4-Me <sub>2</sub> NC <sub>6</sub> H <sub>4</sub> NO] <sup>+</sup>	$1.8 \times 10^9$	7	0.25	p.r.	D.k. at 440 nm in N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> formate.	690156
			$1.9 \times 10^9$			p.r.	D.k. at 440 nm in N <sub>2</sub> O-satd. soln. contg. formate ion.	680066
26.232	5,5-Dimethyl-1-pyrroline-1-oxyl	${}^{\cdot}\text{CO}_2^- + \text{DMPO} \rightarrow \text{DMPO-CO}_2^-$	$7.5 \times 10^8$	11.0		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate ion.	84A426
26.233	4,4'-Dimethyl-1,1'-trimethylene-2,2'-bipyridinium	${}^{\cdot}\text{CO}_2^- + \text{BP}^{2+} \rightarrow \text{CO}_2 + \text{BP}^{\cdot+}$	$5.8 \times 10^9$	7.0		p.r.	P.b.k. at ~380 nm in O <sub>2</sub> -free soln.	84A292
26.234	1,4-Dinitrobenzene	${}^{\cdot}\text{CO}_2^- + 1,4\text{-C}_6\text{H}_4(\text{NO}_2)_2 \rightarrow \text{CO}_2 +$ [1,4-C <sub>6</sub> H <sub>4</sub> (NO <sub>2</sub> ) <sub>2</sub> ] <sup>2-</sup>	$2.1 \times 10^9$	7	293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	84A305
26.235	2,4-Dinitrobenzoate ion	${}^{\cdot}\text{CO}_2^- + 2,4\text{-(NO}_2\text{)}_2\text{C}_6\text{H}_3\text{CO}_2^- \rightarrow \text{CO}_2$ + [2,4-(NO <sub>2</sub> ) <sub>2</sub> C <sub>6</sub> H <sub>3</sub> CO <sub>2</sub> ] <sup>2-</sup>	$1.8 \times 10^9$	7		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate.	761111
26.236	2,5-Dinitrobenzoate ion	${}^{\cdot}\text{CO}_2^- + 2,5\text{-(NO}_2\text{)}_2\text{C}_6\text{H}_3\text{CO}_2^- \rightarrow \text{CO}_2$ + [2,5-(NO <sub>2</sub> ) <sub>2</sub> C <sub>6</sub> H <sub>3</sub> CO <sub>2</sub> ] <sup>2-</sup>	$1.9 \times 10^9$	7		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate.	761111
26.237	3,4-Dinitrobenzoate ion	${}^{\cdot}\text{CO}_2^- + 3,4\text{-(NO}_2\text{)}_2\text{C}_6\text{H}_3\text{CO}_2^- \rightarrow \text{CO}_2$ + [3,4-(NO <sub>2</sub> ) <sub>2</sub> C <sub>6</sub> H <sub>3</sub> CO <sub>2</sub> ] <sup>2-</sup>	$1.8 \times 10^9$	7		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate.	761111
26.238	3,5-Dinitrobenzoate ion	${}^{\cdot}\text{CO}_2^- + 3,5\text{-(NO}_2\text{)}_2\text{C}_6\text{H}_3\text{CO}_2^- \rightarrow \text{CO}_2$ + [3,5-(NO <sub>2</sub> ) <sub>2</sub> C <sub>6</sub> H <sub>3</sub> CO <sub>2</sub> ] <sup>2-</sup>	$2.5 \times 10^9$	7		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate.	761111
26.239	1-(2,4-Dinitrophenyl)pyridinium	${}^{\cdot}\text{CO}_2^- + 2,4\text{-(NO}_2\text{)}_2\text{C}_6\text{H}_3\text{Py}^+ \rightarrow \text{CO}_2 +$ [2,4-(NO <sub>2</sub> ) <sub>2</sub> C <sub>6</sub> H <sub>3</sub> Py] <sup>·</sup>	$4 \times 10^8$			p.r.	P.b.k.	77R167
26.240	1,1'-Diphenyl-4,4'-bipyridinium	${}^{\cdot}\text{CO}_2^- + \text{BP}^{2+} \rightarrow \text{CO}_2 + \text{BP}^{\cdot+}$	$1.3 \times 10^{10}$	6.8	0.1	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	78A321

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	$T$ (K)	Method	Comment	Ref.
26.241	1,2-Dithiolane-3-pentanoate ion							
	$^{\bullet}\text{CO}_2^- + \text{RSSR} \rightarrow \text{CO}_2 + \text{RSSR}^{\bullet-}$	$5.6 \times 10^8$	6.1- 9.2			p.r.	P.b.k. at 410 nm; $k = 9 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> at pH 3.5.	751195
		$5.5 \times 10^8$	7	0.1		p.r.	P.b.k. at 410 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	700560
26.242	Dithiothreitol							
	$^{\bullet}\text{CO}_2^- + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} \rightarrow \text{HCO}_2^- + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{S}^{\bullet}$	$8.3 \times 10^8$	8.1		293	p.r.	P.b.k. at 400 nm (cyclized radical anion) in N <sub>2</sub> O-satd. soln. contg. DTT; $pK_a = 8.3, 9.5$ .	87G007
26.243	Eosin dianion							
	$^{\bullet}\text{CO}_2^- + \text{Eos} \rightarrow \text{CO}_2 + (\text{Eos})^{\bullet-}$	$2.5 \times 10^8$	8.5- 9.0			p.r.	P.b.k. at 405 nm in soln. contg. 0.01 mol L <sup>-1</sup> HCO <sub>2</sub> <sup>-</sup> and 0.001 mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> ; product is semiquinone.	670038
26.244	1-Ethoxy-2-methylpyridinium							
	$^{\bullet}\text{CO}_2^- + \text{C}_2\text{H}_5\text{Opy}^+\text{CH}_3 \rightarrow \text{CO}_2 + \text{C}_2\text{H}_5\text{OpyCH}_3$	$2.1 \times 10^8$				p.r.	D.k. at 280 nm in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> formate and $1.12 \times 10^{-3}$ mol L <sup>-1</sup> 1-ethoxy-2-methylinium tetrafluoroborate.	88A255
26.245	1,1'-Ethylene-2,2'-bipyridinium							
	$^{\bullet}\text{CO}_2^- + \text{BP}^{2+} \rightarrow \text{CO}_2 + \text{BP}^{\bullet+}$	$1.2 \times 10^{10}$	7.0	0.1		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion and $2 \times 10^{-3}$ mol L <sup>-1</sup> phosphate buffer.	84A292
		$1.2 \times 10^{10}$	6.8	0.1		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	78A321
		$4.0 \times 10^9$	7.0	0.2		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> formate ion.	761169
26.246	1,1'-Ethylene-4,4'-dimethyl-2,2'-bipyridinium							
	$^{\bullet}\text{CO}_2^- + \text{MDQ}^{2+} \rightarrow \text{CO}_2 + \text{MDQ}^{\bullet+}$	$1.1 \times 10^{10}$	7.0			p.r.	P.b.k. at ~380 nm in O <sub>2</sub> -free soln.	84A292
26.247	N-Ethylmaleimide							
	$^{\bullet}\text{CO}_2^- + \text{NEM} \rightarrow \text{CO}_2 + \text{NEM}^{\bullet-}$	$5.4 \times 10^9$	6-7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate; 100% <i>e</i> -transfer based on abs. spectra.	720144
26.248	1-(2-Ethylsulfonyl)ethyl-2-methyl-5-nitroimidazole (Tinidazole)							
	$^{\bullet}\text{CO}_2^- + (\text{ImH})\text{-NO}_2 \rightarrow \text{CO}_2 + (\text{ImH})\text{-NO}_2^{\bullet-}$	$1.6 \times 10^9$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and 0.001 mol L <sup>-1</sup> nitroimidazole.	90A467
26.249	1-(2-Ethylsulfonyl)ethyl-2-methyl-5-nitroimidazole, conjugate acid							
	$^{\bullet}\text{CO}_2^- + (\text{ImH}_2^+)\text{-NO}_2 \rightarrow \text{CO}_2 + (\text{ImH}_2^+)\text{-NO}_2^{\bullet-}$	$1.7 \times 10^9$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> formic acid and 0.001 mol L <sup>-1</sup> nitroimidazole; $pK_a = 1.85$ .	90A467
26.250	Flavine adenine dinucleotide							
	$^{\bullet}\text{CO}_2^- + \text{FAD} \rightarrow \text{CO}_2 + \text{FAD}^{\bullet-}$	$7 \times 10^8$	10	0.06		p.r.	P.b.k. at 370 nm in N <sub>2</sub> O-satd. soln. contg. formate ion.	84A045
		$1.2 \times 10^9$	7			p.r.	Unpublished data.	82G120
26.251	Flavine mononucleotide							
	$^{\bullet}\text{CO}_2^- + \text{FMN} \rightarrow \text{CO}_2 + \text{FMN}^{\bullet-}$	$3.0 \times 10^9$	6.0	0.1		p.r.	P.b.k. at 525 and 560 nm in N <sub>2</sub> O-satd. soln. cont. 0.1 mol L <sup>-1</sup> formate.	83A091
		$1.0 \times 10^{10}$	11.0					
26.252	Fluorescein dianion							
	$^{\bullet}\text{CO}_2^- + \text{Fl}^{2-} \rightarrow$	$2.6 \times 10^7$	10.4			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. $10^{-2}$ mol L <sup>-1</sup> formate; product is semiquinone.	680172
26.253	N-Formylkynurenone							
	$^{\bullet}\text{CO}_2^- + \text{FK} + \text{H}^+ \rightarrow \text{CO}_2 + \text{FKH}^{\bullet-}$	$>3 \times 10^7$	7.6	0.1		p.r.	P.b.k. (semiquinone) in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	757361

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T$ (K)	Method	Comment	Ref.
26.254	Furadantin ${}^{\bullet}\text{CO}_2^- + \text{NF} \rightarrow \text{CO}_2 + \text{NF}^-$	$1.0 \times 10^9$				p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.1 \text{ mol L}^{-1}$ formate and $0.001 \text{ mol L}^{-1}$ of the nitrofuran.	90A467
26.255	(E)-2-(2-Furyl)-3-(5-nitro-2-furyl)acrylamide ${}^{\bullet}\text{CO}_2^- + \text{NF} \rightarrow \text{CO}_2 + \text{NF}^-$	$2.0 \times 10^9$	7.4			p.r.	P.b.k. at 680 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $0.05 \text{ mol L}^{-1}$ formate ion and $0.002 \text{ mol L}^{-1}$ sodium phosphate.	84A208
26.256	(Z)-2-(2-Furyl)-3-(5-nitro-2-furyl)acrylamide ${}^{\bullet}\text{CO}_2^- + \text{NF} \rightarrow \text{CO}_2 + \text{NF}^-$	$3.0 \times 10^9$	7.4			p.r.	P.b.k. at 680 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $0.05 \text{ mol L}^{-1}$ formate ion and $0.002 \text{ mol L}^{-1}$ sodium phosphate.	84A208
26.257	Glutathione ${}^{\bullet}\text{CO}_2^- + \text{GSH} \rightarrow$	$3 \times 10^8$	7	293	p.r.	Abs. changes in $\text{N}_2\text{O}$ -satd. soln. contg. phosphate buffer.		88A251
26.258	Glutathione, oxidized ${}^{\bullet}\text{CO}_2^- + \text{GSSG} \rightarrow$	$\ll 10^7$				p.r.	No 420 nm abs. ( $\text{RSSR}^-$ ) obs. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.1 \text{ mol L}^{-1}$ formate.	720388
26.259	Glycine anhydride ${}^{\bullet}\text{CO}_2^- + \text{-CH}_2\text{CONHCH}_2\text{CONH-} \rightarrow$	$< 10^7$	6.2			p.r.	No e-transfer obs. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.2 \text{ mol L}^{-1}$ formate.	710554
26.260	Hematoporphyrin IX ${}^{\bullet}\text{CO}_2^- + \text{HP} \rightarrow \text{CO}_2 + \text{HP}^-$	$4 \times 10^7$	130			p.r.	P.b.k. at 600-650 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $0.1 \text{ mol L}^{-1}$ formate.	741040
26.261	Histidine ${}^{\bullet}\text{CO}_2^- + \text{His} \rightarrow$	$< 2 \times 10^5$	7	293	p.r.	Abs. changes in $\text{N}_2\text{O}$ -satd. soln. contg. phosphate buffer.		88A251
26.262	Hydrogen fumarate ion ${}^{\bullet}\text{CO}_2^- + \text{trans-HO}_2\text{CCH=CHCO}_2^- \rightarrow$	$2.0 \times 10^7$	4.0			p.r.	P.b.k., >30% e-transfer; no e-transfer at pH 10.0.	730097
26.263	Hydrogen maleate ion ${}^{\bullet}\text{CO}_2^- + \text{cis-HO}_2\text{CCH=CHCO}_2^- \rightarrow$	$1.1 \times 10^8$	5.2			p.r.	P.b.k.; $\geq 65\%$ e-transfer; no e-transfer obs. at pH 10.5 (dianion).	730097
26.264	2-Hydroxy-9,10-anthraquinone monoanion ${}^{\bullet}\text{CO}_2^- + 2\text{-AQ(O}^-) \rightarrow \text{CO}_2 + 2\text{-AQ}'(\text{O}^-)^-$	$1.0 \times 10^9$	11			p.r.	P.b.k. at >600 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $0.1 \text{ mol L}^{-1}$ formate and $(5-40) \times 10^5 \text{ mol L}^{-1}$ 2-hydroxyanthraquinone.	94A089
26.265	1-(2-Hydroxyethyl)-2-methyl-5-nitroimidazole (Metronidazole) ${}^{\bullet}\text{CO}_2^- + (\text{ImH})\text{-NO}_2 \rightarrow \text{CO}_2 + (\text{ImH})\text{-NO}_2^-$	$1.2 \times 10^9$				p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.1 \text{ mol L}^{-1}$ formate and $0.001 \text{ mol L}^{-1}$ nitroimidazole.	90A467
		$1.7 \times 10^9$	4			p.r.	P.b.k. in buffered $\text{N}_2\text{O}$ -satd. soln. contg. $0.1$ or $1 \text{ mol L}^{-1}$ formate contg. $0.1-1 \times 10^{-3} \text{ mol L}^{-1}$ nitroimidazole; $\text{pK}_a = 2.5$ .	87A208
		$1.1 \times 10^9$	6					
		$1.1 \times 10^9$	8					
		$0.87 \times 10^9$	11.6					
		$8 \times 10^8$				p.r.	D.k. at 320 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $0.1 \text{ mol L}^{-1}$ formate ion.	741135
		$8 \times 10^8$				p.r.	C.k. rel. to $k({}^{\bullet}\text{CO}_2^- + \text{TAN}) = 6 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$	741135

TABLE 26. Carbon dioxide radical anion — Continued

Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>26.266 1-(2-Hydroxyethyl)-2-methyl-5-nitroimidazole, conjugate acid</b>							
$\cdot\text{CO}_2^- + (\text{ImH}_2^+)-\text{NO}_2 \rightarrow \text{CO}_2 + (\text{ImH}_2^+)-\text{NO}_2\text{H}$	$1.5 \times 10^9$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> formic acid and 0.001 mol L <sup>-1</sup> nitroimidazole; p <i>K</i> <sub>a</sub> = 2.5.	90A467
<b>26.267 1-(2-Hydroxy-3-methoxypropyl)-2-nitroimidazole (Misonidazole)</b>							
$\cdot\text{CO}_2^- + (\text{ImH})-\text{NO}_2 \rightarrow \text{CO}_2 + (\text{ImH})-\text{NO}_2^-$	$1.6 \times 10^9$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and 0.001 mol L <sup>-1</sup> nitroimidazole.	90A467
<b>26.268 1-(2-Hydroxy-3-methoxypropyl)-2-nitroimidazole, conjugate acid</b>							
$\cdot\text{CO}_2^- + (\text{ImH}_2^+)-\text{NO}_2 \rightarrow \text{CO}_2 + (\text{ImH})-\text{NO}_2\text{H}$	$1.0 \times 10^9$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> formic acid and 0.001 mol L <sup>-1</sup> nitroimidazole; p <i>K</i> <sub>a</sub> = -0.75.	90A467
<b>26.269 2-Hydroxy-1,4-naphthoquinone</b>							
$\cdot\text{CO}_2^- + 2-(\text{OH})\text{NO} \rightarrow \text{CO}_2 + 2-(\text{OH})\text{NQ}^-$	$2.0 \times 10^9$	7.0			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. formate.	731104
<b>26.270 5-Hydroxy-1,4-naphthoquinone (Juglone)</b>							
$\cdot\text{CO}_2^- + 5\text{-OH-NQ} \rightarrow \text{CO}_2 + 5\text{-OH-NQ}^-$	$4.4 \times 10^9$	1.2			p.r.	P.b.k. at 385 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate, (2-5.4) × 10 <sup>-5</sup> mol L <sup>-1</sup> juglone (p <i>K</i> <sub>a</sub> = 8.85) and 4 × 10 <sup>-3</sup> mol L <sup>-1</sup> phosphate buffer.	87A234
$\cdot\text{CO}_2^- + 5\text{-OH-NQ}^- \rightarrow \text{CO}_2 + 1.3 \times 10^9$	6.4						
$\cdot\text{CO}_2^- + 5\text{-OH-NQ}^- \rightarrow \text{CO}_2 + 10.5$	10.5						
<b>26.271 6-Hydroxy-5-nitrothymine</b>							
$\cdot\text{CO}_2^- + \text{TNNO}_2(\text{OH}) \rightarrow \text{CO}_2 + \text{TNNO}_2(\text{OH})^-$	$1.7 \times 10^8$	2			p.r.	P.b.k. at 430 nm.	80A210
<b>26.272 6-Hydroxy-5-nitrothymine, conjugate base</b>							
$\cdot\text{CO}_2^- + \text{TNNO}_2(\text{O}^-) \rightarrow \text{CO}_2 + \text{TNNO}_2(\text{O}^-)^-$	$9 \times 10^7$	6.5			p.r.	D.k. at 340 nm.	80A210
<b>26.273 Indigodisulfonate ion</b>							
$\cdot\text{CO}_2^- + \text{IDS}^{2-} \rightarrow \text{CO}_2 + \text{IDS}^{3-}$	$2.1 \times 10^9$	7.0			p.r.	P.b.k. at 400 nm, as well as d.k. at 610 nm in N <sub>2</sub> O-satd. soln. contg. formate.	731078
<b>26.274 Indophenolate ion</b>							
$\cdot\text{CO}_2^- + \text{O}=\text{C}_6\text{H}_4=\text{NC}_6\text{H}_4\text{O}^- \rightarrow \text{CO}_2 + [\text{O}=\text{C}_6\text{H}_4=\text{NC}_6\text{H}_4\text{O}]^{2-}$	$2.8 \times 10^9$	9.0			p.r.	P.b.k. at ~400 nm, as well as d.k. at 610 nm in N <sub>2</sub> O-satd. soln. contg. formate.	731078
<b>26.275 Lipoamide</b>							
$\cdot\text{CO}_2^- + \text{LS}_2 \rightarrow \text{CO}_2 + \text{LS}_2^{+}$	$5.5 \times 10^8$	9	0.1		p.r.	P.b.k. at 400 nm in soln. contg. 0.1 mol L <sup>-1</sup> formate and 0.25-1 × 10 <sup>-3</sup> mol L <sup>-1</sup> lipoamide.	84A011
<b>26.276 Lumichrome</b>							
$\cdot\text{CO}_2^- + \text{Fl} \rightarrow \text{CO}_2 + \text{FlH}^+$	$2.5 \times 10^9$	6	0.1		p.r.	P.b.k. at ~450 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	82B104
$\cdot\text{CO}_2^- + \text{Fl} \rightarrow \text{CO}_2 + \text{FlH}^+$	$4.7 \times 10^8$	10					
$\cdot\text{CO}_2^- + \text{Fl} \rightarrow \text{CO}_2 + \text{FlH}^+$	$1.8 \times 10^9$	7			p.r.	Unpublished data.	82G120
<b>26.277 Lumiflavine</b>							
$\cdot\text{CO}_2^- + \text{LF} \rightarrow \text{CO}_2 + \text{LF}^{+}$	$3.0 \times 10^9$	9		296	p.r.	P.b.k.	85A389
$\cdot\text{CO}_2^- + \text{LF} \rightarrow \text{CO}_2 + \text{LF}^{+}$	$2.1 \times 10^9$	11.2					
$\cdot\text{CO}_2^- + \text{LF} \rightarrow \text{CO}_2 + \text{LF}^{+}$	$3.6 \times 10^9$	7		297	p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-satd. soln. contg. formate ion.	83A073
<b>26.278 Lumiflavine semiquinone</b>							
$\cdot\text{CO}_2^- + \text{LFH}^* \rightarrow$	$1.7 \times 10^9$	7		297	p.r.	Decay to LFH <sup>+</sup> and LF <sub>2</sub> <sup>+</sup> from calcd. concn.-time profile.	83A073

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
26.279	2-Mercaptobenzimidazole, conjugate acid $\cdot\text{CO}_2\text{H} + \text{MBZH}^+ \rightarrow \text{HCO}_2\text{H} + [\text{MBZ}]^{+\cdot}$	$7.7 \times 10^9$	<0			p.r.	P.b.k. at 610 nm in N <sub>2</sub> -saturated soln. contg. 3.6 mol L <sup>-1</sup> H <sub>2</sub> SO <sub>4</sub> , 5 × 10 <sup>-4</sup> mol L <sup>-1</sup> 2-mercaptobenzimidazole and formic acid.	95A083
26.280	5,10-Methenyltetrahydrofolate $\cdot\text{CO}_2^- + \text{CH}^+\text{H}_4(\text{folate}) \rightarrow \text{CO}_2 + \text{CH}^+\text{H}_4(\text{folate})^{\cdot-}$	$2.4 \times 10^9$	1.5			p.r.	P.b.k. at 360 nm in soln. contg. 1 mol L <sup>-1</sup> formate.	91A041
26.281	Methoxatine $\cdot\text{CO}_2^- + \text{MTX} \rightarrow \text{CO}_2 + [\text{MTX}]^{\cdot-}$	$2.8 \times 10^8$	7.2		298	p.r.	P.b.k. in N <sub>2</sub> O-saturated soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	90A247
		$3.3 \times 10^8$	7.3			p.r.	P.b.k. at 460 nm in N <sub>2</sub> O-saturated soln. contg. 0.1 mol L <sup>-1</sup> formate, 5 × 10 <sup>-3</sup> mol L <sup>-1</sup> phosphate and ~2 × 10 <sup>-4</sup> mol L <sup>-1</sup> methoxatine.	86A520
26.282	3-Methyl-7,8-bis,nor-5-deazalumiflavin $\cdot\text{CO}_2^- + \text{dFl}_{\text{ox}} \rightarrow \text{dFl-1-CO}_2^-$	$2.0 \times 10^9$	5.4- 9.2	0.1		p.r.	P.b.k. at 560 nm in N <sub>2</sub> O-saturated soln. contg. 0.1 mol L <sup>-1</sup> formate ion; initial product suggested to be adduct.	81A434
26.283	Methylene Blue cation $\cdot\text{CO}_2^- + \text{MB}^+ \rightarrow \text{CO}_2 + \cdot\text{MB}$	$8.5 \times 10^9$	6.8			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-saturated soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	90A329
		$\sim 7 \times 10^8$	-5.7			p.r.	D.k. at 580 nm in soln. contg. 0.1 mol L <sup>-1</sup> formate.	650396
		$\sim 1 \times 10^9$	-0.8					
		$\sim 2 \times 10^9$	1.8					
		$5.6 \times 10^9$	-9					
26.284	1-Methylumichrome $\cdot\text{CO}_2^- + \text{Fl} \rightarrow \text{CO}_2 + \text{FlH}^{\cdot-}$	$1.9 \times 10^9$ $3.4 \times 10^8$	6 10	0.1		p.r.	P.b.k. at ~450 nm in N <sub>2</sub> O-saturated soln. contg. 0.1 mol L <sup>-1</sup> formate.	82B104
26.285	3-Methylumichrome $\cdot\text{CO}_2^- + \text{Fl} \rightarrow \text{CO}_2 + \text{FlH}^{\cdot-}$	$3.2 \times 10^9$ $5.5 \times 10^8$	6 10	0.1		p.r.	P.b.k. at ~450 nm in N <sub>2</sub> O-saturated soln. contg. 0.1 mol L <sup>-1</sup> formate.	82B104
26.286	S-Methylmethionine $\cdot\text{CO}_2^- + \text{Me}_2\text{S}^+\text{CH}_2\text{CH}_2\text{CH}(\text{NH}_3^+)\text{CO}_2^- \rightarrow$	$<10^6$				p.r.	No reaction obs.; c.k. rel. to $k(\text{CO}_2^- + \text{TNM}) = 4 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	91A184
26.287	2-Methyl-1,4-naphthoquinone $\cdot\text{CO}_2^- + 2\text{-CH}_3\text{NQ} \rightarrow \text{CO}_2 + [\text{2-CH}_3\text{NQ}]^{\cdot-}$	$4.8 \times 10^9$ $5.4 \times 10^9$	7 6.9			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-saturated soln. contg. formate.	731047
						p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-saturated soln. contg. formate; 100% <i>e</i> -transfer.	723057
26.288	1-Methylnicotinamide $\cdot\text{CO}_2^- + 3\text{-py}^+(\text{CH}_3)\text{CONH}_2 \rightarrow \text{CO}_2 + 3\text{-py}^+(\text{CH}_3)\text{CONH}_2$	$4.6 \times 10^9$	8.5	0.1		p.r.	P.b.k. at 420 nm in N <sub>2</sub> O-saturated soln. contg. 0.1 mol L <sup>-1</sup> formate.	680441
26.289	Methyl 4-nitrobenzenesulfonate $\cdot\text{CO}_2^- + 4\text{-O}_2\text{NC}_6\text{H}_4\text{SO}_3\text{CH}_3 \rightarrow \text{CO}_2 + [4\text{-NO}_2\text{C}_6\text{H}_4\text{SO}_3\text{CH}_3]^{\cdot-}$	$1.5 \times 10^9$	7		293	p.r.	P.b.k. in N <sub>2</sub> O-saturated soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	84A305
26.290	Methyl 4-nitrobenzoate $\cdot\text{CO}_2^- + 4\text{-O}_2\text{NC}_6\text{H}_4\text{CO}_2\text{CH}_3 \rightarrow \text{CO}_2 + [4\text{-NO}_2\text{C}_6\text{H}_4\text{CO}_2\text{CH}_3]^{\cdot-}$	$1.2 \times 10^9$	7		293	p.r.	P.b.k. in N <sub>2</sub> O-saturated soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	84A305

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
26.291	<b>2-Methyl-5-nitroimidazole</b>							
	$\cdot\text{CO}_2^- + (\text{ImH})\text{-NO}_2 \rightarrow \text{CO}_2 + (\text{ImH})\text{-NO}_2^{\cdot-}$	$7.4 \times 10^8$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and 0.001 mol L <sup>-1</sup> nitroimidazole.	90A467
		$5.8 \times 10^8$	4			p.r.	P.b.k. in buffered N <sub>2</sub> O-satd. soln. contg. 0.1 or 1 mol L <sup>-1</sup> formic acid and (0.1-1) $\times 10^{-3}$ mol L <sup>-1</sup> nitroimidazole; p <i>K</i> <sub>a</sub> = 1.1, 9.7.	87A208
		$5.5 \times 10^8$	6					
		$6.9 \times 10^8$	8					
26.292	<b>2-Methyl-5-nitroimidazole, conjugate acid</b>							
	$\cdot\text{CO}_2^- + (\text{ImH}_2^+)\text{-NO}_2 \rightarrow \text{CO}_2 + (\text{ImH}_2^+)\text{-NO}_2^{\cdot-}\text{H}$	$1.9 \times 10^9$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> formic acid and 0.001 mol L <sup>-1</sup> nitroimidazole; p <i>K</i> <sub>a</sub> = 0.8, 9.7.	90A467
26.293	<b>2-Methyl-5-nitroimidazole, conjugate base</b>							
	$\cdot\text{CO}_2^- + (\text{Im}^-)\text{-NO}_2 \rightarrow \text{CO}_2 + (\text{Im}^-)\text{-NO}_2^{\cdot-}$	$1.1 \times 10^8$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and 0.001 mol L <sup>-1</sup> nitroimidazole.	90A467
		$1.4 \times 10^8$	11.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 or 1 mol L <sup>-1</sup> formate and (0.1-1) $\times 10^{-3}$ mol L <sup>-1</sup> nitroimidazole.	87A208
26.294	<b>2-Methyl-2-nitrosopropane</b>							
	$\cdot\text{CO}_2^- + (\text{CH}_3)_3\text{CNO} \rightarrow \text{addn.}$	$1.7 \times 10^9$	9.2	-291	p.r.	P.b.k. (esr) in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and 0.01 mol L <sup>-1</sup> borate buffer.	91D097	
26.295	<b><i>N</i>-Methyl-4-phenyl-2,3-dihydropyridinium</b>							
	$\cdot\text{CO}_2^- + \text{MPDP}^+ \rightarrow \text{CO}_2 + \text{MPDP}^{\cdot-}$	$5.8 \times 10^9$	7.0			p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and 0.1 mol L <sup>-1</sup> phosphate buffer.	89A012
26.296	<b><i>N</i>-Methyl-4-phenylpyridinium</b>							
	$\cdot\text{CO}_2^- + \text{MPP}^+ \rightarrow \text{CO}_2 + \text{MPP}^{\cdot-}$	$3.4 \times 10^8$	7.9			p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	87A355
26.297	<b>Mitomycin C</b>							
	$\cdot\text{CO}_2^- + \text{Aq} \rightarrow \text{CO}_2 + \text{Aq}^{\cdot-}$	$1.8 \times 10^9$	7.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and (4-50) $\times 10^{-5}$ mol L <sup>-1</sup> mitomycin C.	88A260
26.298	<b>1-(2-N-Morpholinoethyl)-4-nitroimidazole (Nimorazole)</b>							
	$\cdot\text{CO}_2^- + (\text{ImH})\text{-NO}_2 \rightarrow \text{CO}_2 + (\text{ImH})\text{-NO}_2^{\cdot-}$	$1.9 \times 10^9$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and 0.001 mol L <sup>-1</sup> nitroimidazole.	90A467
26.299	<b>1-(2-N-Morpholinoethyl)-4-nitroimidazole, conjugate acid</b>							
	$\cdot\text{CO}_2^- + (\text{ImH}_2^+)\text{-NO}_2 \rightarrow \text{CO}_2 + (\text{ImH}_2^+)\text{-NO}_2^{\cdot-}\text{H}$	$1.2 \times 10^9$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> formic acid and 0.001 mol L <sup>-1</sup> nitroimidazole; p <i>K</i> <sub>a</sub> = 0.85.	90A467
26.300	<b>1,4-Naphthoquinone</b>							
	$\cdot\text{CO}_2^- + \text{NQ} \rightarrow \text{CO}_2 + \text{NQ}^{\cdot-}$	$3.2 \times 10^9$	~8			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	91A174
		$4.0 \times 10^9$	~8			f.p./rq	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.02 mol L <sup>-1</sup> formate ion and 3 $\times 10^{-4}$ mol L <sup>-1</sup> naphthoquinone; radical from reductive quenching of triplet by formate.	91A174
26.301	<b>Nicotinamide adenine dinucleotide</b>							
	$\cdot\text{CO}_2^- + \text{NAD}^+ \rightarrow \text{CO}_2 + \text{NAD}^{\cdot-}$	$1.6 \times 10^9$	6.4	0.1		p.r.	P.b.k. at 400 nm in N <sub>2</sub> O satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	680411
26.302	<b>Nifuroxime</b>							
	$\cdot\text{CO}_2^- + \text{NF} \rightarrow \text{CO}_2 + \text{NF}^{\cdot-}$	$2.0 \times 10^9$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and 0.001 mol L <sup>-1</sup> of the nitrofuran.	90A467

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
26.302	Nifuroxime — Continued	$2.7 \times 10^9$				p.r.	P.b.k. at 390 nm in CO <sub>2</sub> -satd. soln. contg. <i>tert</i> -BuOH or 0.2 mol L <sup>-1</sup> formate; 100% <i>e</i> -transfer.	731099
26.303	Nifurtimox	$2.7 \times 10^9$	7			p.r.	P.b.k. at 405 nm oxygen-free soln. contg. formate.	91A487
26.304	Nitro Blue Tetrazolium	$6.4 \times 10^9$	10	0.1		p.r.	P.b.k. at 405 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	80A085
26.305	4-Nitroacetophenone	$1.8 \times 10^9$	7		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	84A305
		$7 \times 10^8$				p.r.	P.b.k.	77R167
		$1.0 \times 10^9$	10			p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-satd. soln. contg. formate ion.	730122
26.306	4-Nitroanisole	$1.2 \times 10^8$	7		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	84A305
26.307	4-Nitrobenzaldehyde	$2.6 \times 10^9$	7		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	84A305
26.308	4-Nitrobenzaldoxime	$1.4 \times 10^9$	7		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	84A305
26.309	4-Nitrobenzamide	$1.2 \times 10^9$	7		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	84A305
26.310	Nitrobenzene	$4.6 \times 10^8$	0			p.r.	P.b.k.	730085
		$7.5 \times 10^8$	2.5					
		$5.8 \times 10^8$	9.4					
		$5.6 \times 10^8$	-3			p.r.	P.b.k. at 295 nm in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> formate.	700303
		$1.0 \times 10^9$	6.7					
26.311	4-Nitrobenzenesulfonamide	$1.1 \times 10^9$	7		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	84A305
26.312	4-Nitrobenzenesulfonate ion	$1.3 \times 10^9$	7		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	84A305
26.313	2-Nitrobenzoate ion	$2.4 \times 10^8$	0.8, 7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate.	761111
26.314	3-Nitrobenzoate ion	$6.3 \times 10^8$	0.8, 7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate.	761111

TABLE 26. Carbon dioxide radical anion — Continued

Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	T (K)	Method	Comment	Ref.
26.315 4-Nitrobenzoate ion							
$\cdot\text{CO}_2^- + 4\text{-NO}_2\text{C}_6\text{H}_4\text{CO}_2^- \rightarrow \text{CO}_2 + [\cdot\text{NO}_2\text{C}_6\text{H}_4\text{CO}_2^-]^-$	$7.4 \times 10^8$	7		293	p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ formate ion.	84A305
	$8.0 \times 10^8$	0.8, 7			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. formate.	761111
26.316 4-Nitrobenzonitrile							
$\cdot\text{CO}_2^- + 4\text{-NO}_2\text{C}_6\text{H}_4\text{CN} \rightarrow \text{CO}_2 + [\cdot\text{NO}_2\text{C}_6\text{H}_4\text{CN}]^-$	$2.1 \times 10^9$	7		293	p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ formate ion.	84A305
26.317 5-Nitro-2-furaldehyde semicarbazone							
$\cdot\text{CO}_2^- + \text{NF} \rightarrow \text{CO}_2 + \text{NF}^-$	$2.0 \times 10^9$				p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ formate and 0.001 mol $\text{L}^{-1}$ of the nitrofuran.	90A467
26.318 5-Nitro-2-furoate ion							
$\cdot\text{CO}_2^- + \text{NF} \rightarrow \text{CO}_2 + \text{NF}^-$	$1.2 \times 10^9$				p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ formate and 0.001 mol $\text{L}^{-1}$ of the nitrofuran.	90A467
26.319 2-Nitroimidazole							
$\cdot\text{CO}_2^- + (\text{ImH})\text{-NO}_2 \rightarrow \text{CO}_2 + (\text{ImH})\text{-NO}_2^-$	$1.1 \times 10^9$				p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ formate and 0.001 mol $\text{L}^{-1}$ nitroimidazole.	90A467
26.320 2-Nitroimidazole, conjugate acid							
$\cdot\text{CO}_2^- + (\text{ImH}_2^+)-\text{NO}_2 \rightarrow \text{CO}_2 + (\text{ImH}_2^+)-\text{NO}_2\text{H}$	$1.3 \times 10^9$				p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol $\text{L}^{-1}$ formic acid and 0.001 mol $\text{L}^{-1}$ nitroimidazole; $\text{p}K_a = -0.75, 7.0$ .	90A467
26.321 2-Nitroimidazole, conjugate base							
$\cdot\text{CO}_2^- + (\text{Im}^-)\text{-NO}_2 \rightarrow \text{CO}_2 + (\text{Im}^-)\text{-NO}_2^-$	$4.0 \times 10^7$				p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ formate and 0.001 mol $\text{L}^{-1}$ nitroimidazole.	90A467
26.322 4-Nitroimidazole							
$\cdot\text{CO}_2^- + (\text{ImH})\text{-NO}_2 \rightarrow \text{CO}_2 + (\text{ImH})\text{-NO}_2^-$	$6.0 \times 10^8$				p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ formate and 0.001 mol $\text{L}^{-1}$ nitroimidazole.	90A467
	$6.3 \times 10^8$	4			p.r.	P.b.k. in buffered $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 or 1 mol $\text{L}^{-1}$ formic acid and 0.001 mol $\text{L}^{-1}$ nitroimidazole; $\text{p}K_a = -0.2, 9.4$ .	87A208
	$6.1 \times 10^8$	6					
	$2.2 \times 10^8$	8					
26.323 4-Nitroimidazole, conjugate acid							
$\cdot\text{CO}_2^- + (\text{ImH}_2^+)-\text{NO}_2 \rightarrow \text{CO}_2 + (\text{ImH}_2^+)-\text{NO}_2\text{H}$	$1.1 \times 10^9$				p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol $\text{L}^{-1}$ formic acid and 0.001 mol $\text{L}^{-1}$ nitroimidazole; $\text{p}K_a = -0.20, 9.4$ .	90A467
26.324 4-Nitroimidazole, conjugate base							
$\cdot\text{CO}_2^- + (\text{Im}^-)\text{-NO}_2 \rightarrow \text{CO}_2 + (\text{Im}^-)\text{-NO}_2^-$	$5.0 \times 10^8$				p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ formate and 0.001 mol $\text{L}^{-1}$ nitroimidazole.	90A467
	$1.4 \times 10^8$	11.5			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 or 1 mol $\text{L}^{-1}$ formate and 0.001 mol $\text{L}^{-1}$ nitroimidazole.	87A208
26.325 aci-Nitromethane anion							
$\cdot\text{CO}_2^- + \text{CH}_2\text{NO}_2^- \rightarrow \text{O}_2\text{CCH}_2\text{NO}_2^-$	$1.4 \times 10^7$	11.3		~285	p.r.	P.b.k. (esr) in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ nitromethane and 0.001 mol $\text{L}^{-1}$ formate ion.	88D069
26.326 5-( <i>p</i> -Nitrophenyl)-2,3-diphenyltetrazolium							
$\cdot\text{CO}_2^- + \text{p-NTB}^+ \rightarrow \text{CO}_2 + \text{p-NTB}^\bullet$	$1.9 \times 10^9$	10.0			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.2 mol $\text{L}^{-1}$ formate and 0.001 mol $\text{L}^{-1}$ p-NTB.	88G273
26.327 2-( <i>p</i> -Nitrophenyl)-3,5-diphenyltetrazolium							
$\cdot\text{CO}_2^- + \text{p-NTC}^+ \rightarrow \text{CO}_2 + \text{p-NTC}^\bullet$	$5.0 \times 10^9$	10.0			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.2 mol $\text{L}^{-1}$ formate.	88G273

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
26.328	Nitrosobenzene $\cdot\text{CO}_2^- + \text{C}_6\text{H}_5\text{NO} \rightarrow \text{CO}_2 + \text{C}_6\text{H}_5\text{NO}^-$	$4.0 \times 10^9$				p.r.	P.b.k. at 450 nm in soln. contg. formate ion.	660433
26.329	<i>p</i> -Nitro- $\alpha,\alpha,\alpha$ -trifluorotoluene $\cdot\text{CO}_2^- + 4\text{-CF}_3\text{C}_6\text{H}_4\text{NO}_2 \rightarrow \text{CO}_2 + 4\text{-CF}_3\text{C}_6\text{H}_4\text{NO}_2^-$	$\sim 1 \times 10^9$	7		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	84A305
26.330	Perylene $\cdot\text{CO}_2^- + \text{Per} \rightarrow \text{CO}_2 + \text{Per}^-$	$2.9 \times 10^{10}$				p.r.	P.b.k. at 580 nm in soln. contg. 0.066 mol L <sup>-1</sup> CO <sub>2</sub> and (0.5-4) $\times 10^{-5}$ mol L <sup>-1</sup> perylene.	92A233
26.331	1,10-Phenanthroline-5,6-dione $\cdot\text{CO}_2^- + 1,10\text{-PD} \rightarrow \text{CO}_2 + [1,10\text{-PD}]^-$	$1.8 \times 10^9$	7.2		298	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	90A247
26.332	1,7-Phenanthroline-5,6-dione $\cdot\text{CO}_2^- + 1,7\text{-PD} \rightarrow \text{CO}_2 + [1,7\text{-PD}]^-$	$1.8 \times 10^9$	7.2		298	p.r.	P.b.k. at 630 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	90A247
26.333	Phenyl- <i>N</i> - <i>tert</i> -butylnitrone $\cdot\text{CO}_2^- + \text{PBN} \rightarrow$	$1.5 \times 10^7$				p.r.	Abs. changes in soln. contg. formate.	82A184
26.334	Phenylthiourea $\cdot\text{CO}_2^- + \text{C}_6\text{H}_5\text{NHCSNH}_2 \rightarrow$	$1.1 \times 10^9$	<0			p.r.	P.b.k. at 410 nm in soln. contg. 3.5 mol L <sup>-1</sup> H <sub>2</sub> SO <sub>4</sub> . Yield of reduced species was lower at reduced acid concn.	94A002
26.335	Primaquine $\cdot\text{CO}_2^- + \text{PQ} \rightarrow \text{CO}_2 + \text{PQ}^-$	$<10^7$ $\sim 1.3 \times 10^9$	-7 -3.3			p.r.	P.b.k. at 480-500 nm in soln. contg. formate ion; pK = 3.5; k from graph.	88A471
26.336	Pterin $\cdot\text{CO}_2^- + \text{PnH} + \text{H}^+ \rightarrow \text{CO}_2 + \text{PnH}_2^+$	$4.5 \times 10^8$	7		296	p.r.	P.b.k. in air-free soln. contg. (2-10) $\times 10^{-4}$ mol L <sup>-1</sup> pterin, phosphate buffer and formate ion.	91A410
		$4.6 \times 10^8$ $\ll 10^7$	7.0 9.5- 13			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate ion; 100% <i>e</i> -transfer at pH 7; no <i>e</i> -transfer obs. at pH 9.5-13.	761060
26.337	Pterin-6-carboxylate $\cdot\text{CO}_2^- + \text{Pn6CB} + \text{H}^+ \rightarrow \text{CO}_2 + \text{Pn6CBH}^-$	$1.7 \times 10^8$	7		296	p.r.	P.b.k. in air-free soln. contg. (2-10) $\times 10^{-4}$ mol L <sup>-1</sup> pterin-6-carboxylate, phosphate buffer and formate ion.	91A410
26.338	Purine $\cdot\text{CO}_2^- + \text{C}_5\text{H}_4\text{N}_4 \rightarrow$	$<10^7$	6.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln.	751060
26.339	Pyrazine $\cdot\text{CO}_2^- + \text{pz} \rightarrow$	$\ll 10^7$	5.0, 11.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate ion.	741127
26.340	Pyridazine $\cdot\text{CO}_2^- + \text{pdz} \rightarrow$	$\ll 10^7$	5.0, 11.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. formate ion.	741127
26.341	2-Pyridinecarboxylic acid $\cdot\text{CO}_2^- + 2\text{-pyH}^+\text{CO}_2^- + \text{H}^+ \rightarrow \text{CO}_2 + 2\text{-pyH}^+(\text{H})\text{CO}_2^-$	$2.3 \times 10^8$ $2.7 \times 10^8$	3.8 4.2			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> formate; pK <sub>a</sub> = 0.79, 5.39.	92A458
						p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion; pK <sub>a</sub> = 5.32; no reaction obs. with unprotonated form.	88A250

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
26.342	3-Pyridinol							
	$\cdot\text{CO}_2^- + 3\text{-pyOH} \rightarrow \text{addn.}$	$7.8 \times 10^7$	6.8			p.r.	C.k. rel. to $k(\text{CO}_2^- + \text{MB}^+) = 8.5 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	90A329
26.343	3-Pyridinol, conjugate acid							
	$\cdot\text{CO}_2^- + 3\text{-HOpyH}^+ \rightarrow \text{addn.}$	$4.8 \times 10^8$	2.6			p.r.	P.b.k. at 405 and 425 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol L <sup>-1</sup> formic acid and 0.18 mol L <sup>-1</sup> formate.	90A329
26.344	$\alpha$ -(4-Pyridyl 1-oxide)- <i>N</i> - <i>tert</i> -butylnitronate							
	$\cdot\text{CO}_2^- + 4\text{-POBN} \rightarrow 4\text{-POBN-CO}_2^-$	$6.1 \times 10^8$	11.0			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. formate ion.	84A426
26.345	Pyrimidine							
	$\cdot\text{CO}_2^- + \text{Pm} \rightarrow$	$\ll 10^7$	5.0, 11.0			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. formate ion.	741127
26.346	Rhodamine B							
	$\cdot\text{CO}_2^- + \text{Rh B} \rightarrow \text{CO}_2 + \text{Rh B}_{\text{red}}$	$1.8 \times 10^8$				p.r.	D.k. at 510 nm as well as p.b.k. at 410 nm in soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	676053
26.347	Riboflavin							
	$\cdot\text{CO}_2^- + \text{RF} \rightarrow \text{CO}_2 + [\text{RF}]^{\cdot-}$	$1.7 \times 10^9$	7.0			p.r.	P.b.k. at 560 nm in $\text{N}_2\text{O}$ -satd. soln. contg. formate ion; <i>e</i> -transfer.	731104
		$3.0 \times 10^9$	-2			p.r.	D.k. at 420 nm, as well as p.b.k. at 560 nm (semiquinone) in $\text{N}_2\text{O}$ -satd. soln. contg. formate ion.	690283
		$3.6 \times 10^9$	3.5.9					
		$1.4 \times 10^9$	11.5- 13			p.r.	D.k. at 460 nm, as well as p.b.k. at 360 nm (semiquinone) in $\text{N}_2\text{O}$ -satd. soln. contg. formate ion.	690283
26.348	Rose Bengal dianion							
	$\cdot\text{CO}_2^- + \text{RB} \rightarrow \text{CO}_2 + \text{RB}^{\cdot-}$	$3.2 \times 10^8$	7			p.r.	P.b.k. $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	90A430
26.349	Tetracycline							
	$\cdot\text{CO}_2^- + \text{TC} \rightarrow \text{CO}_2 + \text{TC}^{\cdot-}$	$1.6 \times 10^8$	6.8			p.r.	P.b.k. at 630 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	94A209
26.350	Tetrafluoro-1,4-benzoquinone							
	$\cdot\text{CO}_2^- + \text{F}_4\text{Q} \rightarrow \text{CO}_2 + \text{F}_4\text{Q}^{\cdot-}$	$2.5 \times 10^9$	5.9			p.r.	P.b.k. at 435 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 1 mol L <sup>-1</sup> formate.	94A417
26.351	1,1'-Tetramethylene-2,2'-bipyridinium							
	$\cdot\text{CO}_2^- + \text{BP}^{2+} \rightarrow \text{CO}_2 + \text{BP}^{\cdot+}$	$9 \times 10^9$	7.0	0.1		p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and 0.002 mol L <sup>-1</sup> phosphate buffer.	84A292
		$7 \times 10^9$	6.8	0.1		p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	78A321
26.352	4,5,4',5'-Tetramethyl-1,1'-ethylene-2,2'-bipyridinium							
	$\cdot\text{CO}_2^- + \text{BP}^{2+} \rightarrow \text{CO}_2 + \text{BP}^{\cdot+}$	$9 \times 10^9$	7.0			p.r.	P.b.k. at ~380 nm in $\text{O}_2$ -free soln.	84A292
26.353	2,2,6,6-Tetramethyl-4-piperidone N-oxyl							
	$\cdot\text{CO}_2^- + \text{TAN} \rightarrow \text{addn.}$	$5.4 \times 10^8$	7-8			p.r.	C.k. in $\text{N}_2\text{O}$ -satd. soln. contg. formate, rel. to $k(\cdot\text{CO}_2^- + \text{Fe}(\text{CN})_6^{3-}) = 1.1 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	710618
		$7.0 \times 10^8$	7-8			p.r.	P.b.k. at 310 nm in $\text{N}_2\text{O}$ -satd. soln. contg. formate.	710618
26.354	4,5,4',5'-Tetramethyl-1,1'-tetramethylene-2,2'-bipyridinium							
	$\cdot\text{CO}_2^- + \text{BP}^{2+} \rightarrow \text{CO}_2 + \text{BP}^{\cdot+}$	$4.2 \times 10^9$	7.0			p.r.	P.b.k. at ~380 nm in $\text{O}_2$ -free soln.	84A292

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
26.355	4,5,4',5'-Tetramethyl-1,1'-trimethylene-2,2'-bipyridinium $\cdot\text{CO}_2^- + \text{BP}^{2+} \rightarrow \text{CO}_2 + \text{BP}'^+$	$6.3 \times 10^9$	7.0			p.r.	P.b.k. at ~380 nm in $O_2$ -free soln.	84A292
26.356	Tetranitromethane $\cdot\text{CO}_2^- + \text{C}(\text{NO}_2)_4 \rightarrow \text{CO}_2 + \text{C}(\text{NO}_2)_3^- + \cdot\text{NO}_2$	$4 \times 10^9$	3-7			p.r.	P.b.k.	700303
26.357	2-Thioriboflavin $\cdot\text{CO}_2^- + \text{Fl} \rightarrow \text{CO}_2 + \text{Fl}'^-$	$4.0 \times 10^9$ $1.3 \times 10^9$	7 10		297	p.r.	D.k. at 490 nm in $N_2O$ -satd. soln. contg. 0.02 mol L <sup>-1</sup> formate, 0.01 mol L <sup>-1</sup> phosphate buffer.	86B055
26.358	Thiosemicarbazide $\cdot\text{CO}_2\text{H} + \text{NH}_2\text{NHCSNH}_2 \rightarrow$	$5.0 \times 10^8$	<0			p.r.	P.b.k. at 400 nm in soln. contg. 3.6 mol L <sup>-1</sup> $H_2\text{SO}_4$ and 1 mol L <sup>-1</sup> formate. Mechanism suggested to be protonation at S and H abstr. from NH.	94A284
26.359	Thymine $\cdot\text{CO}_2^- + 5\text{-MeU} \rightarrow$	$\sim 5 \times 10^4$	7-8			$\gamma$ -r.	Estd. from dependence of <i>G</i> (-T) on thymine concn. in soln. contg. formate and $N_2O$ ; used $2k(\cdot\text{CO}_2^- + \cdot\text{CO}_2^-) = 1 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	701103
26.360	1,1'-Trimethylene-2,2'-bipyridinium $\cdot\text{CO}_2^- + \text{TQ}^{2+} \rightarrow \text{CO}_2 + \text{TQ}'^+$	$1.1 \times 10^{10}$	7.0	0.1		p.r.	P.b.k. in $N_2O$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and $2 \times 10^{-3}$ mol L <sup>-1</sup> phosphate buffer.	84A292
		$1.1 \times 10^{10}$	6.8	0.1		p.r.	P.b.k. in $N_2O$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	78A321
26.361	2,4,6-Trinitrobenzoate ion $\cdot\text{CO}_2^- + 2,4,6-(\text{NO}_2)_3\text{C}_6\text{H}_2\text{CO}_2^- \rightarrow \text{CO}_2 + [2,4,6-(\text{NO}_2)_3\text{C}_6\text{H}_2\text{CO}_2]^{2-}$	$3.4 \times 10^9$	0.8, 7			p.r.	P.b.k. in $N_2O$ -satd. soln. contg. formate.	761111
26.362	2,3,5-Triphenyltetrazolium $\cdot\text{CO}_2^- + \text{TT}'^+ \rightarrow \text{CO}_2 + \text{TT}'$	$1.1 \times 10^9$	10.0			p.r.	P.b.k. in $N_2O$ -satd. soln. contg. 0.2 mol L <sup>-1</sup> formate and $10^{-4}$ mol L <sup>-1</sup> TT.	88G273
26.363	Tryptophan $\cdot\text{CO}_2^- + \text{TrpH} \rightarrow$	$<10^5$	7		293	p.r.	Abs. changes in $N_2O$ -satd. soln. contg. phosphate buffer.	88A251
26.364	Tyrosine $\cdot\text{CO}_2^- + \text{TyrOH} \rightarrow$	$<10^5$	7		293	p.r.	Abs. changes in $N_2O$ -satd. soln. contg. phosphate buffer.	88A251
26.365	Aponeocarzinostatin $\cdot\text{CO}_2^- + \text{NCS} \rightarrow$	$2.3 \times 10^8$ $4.2 \times 10^7$	3.2 8.2			p.r.	P.b.k. at 425 nm; <i>k</i> for total reaction, relative to total protein concn.; 1 reducible disulfide group per mole of protein.	90A416
26.366	Ascorbate oxidase $\cdot\text{CO}_2^- + \text{AAO}(\text{Cu}^{II}) \rightarrow \text{CO}_2 + \text{AAO}(\text{Cu}^{I})$	$1.1 \times 10^9$	7.0	0.1	292	p.r.	D.k. at 610 nm in soln. contg. formate; concn. adjusted so only one Cu per monomer unit (contg. 4 Cu) was reduced.	93A158
26.367	Azurin $\cdot\text{CO}_2^- + \text{Cu}^{II}\text{-azurin} \rightarrow$	$1.5 \times 10^8$ $1.8 \times 10^8$	7.0		298	p.r.	D.k. at 625 nm ( $\text{Cu}^{II}$ ) and p.b.k. at 410 nm ( $\text{RSSR}'$ ) in $N_2O$ -satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; protein from <i>Alcaligenes faecalis</i> .	92A224

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T(K)	Method	Comment	Ref.
<b>26.367 Azurin — Continued</b>								
		$2.1 \times 10^8$	7.0		298	p.r.	D.k. at 625 nm (Cu(II)) and p.b.k. at 410 nm (RSSR <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; protein from Pseudomonas fluorescens B.	92A224
		$3.5 \times 10^8$						
		$5.0 \times 10^8$	7.0		298	p.r.	D.k. at 625 nm (Cu(II)) and p.b.k. at 410 nm (RSSR <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; protein from Pseudomonas aeruginosa.	89R267
		$2.6 \times 10^8$						
		$6.0 \times 10^8$	7.0		298	p.r.	D.k. at 625 nm (Cu(II)) and p.b.k. at 410 nm (RSSR <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; protein from Alcaligenes spp. (Iwasaki).	89R267
		$4.8 \times 10^8$						
<b>26.368 Carboxypeptidase A</b>								
	${}^{\bullet}\text{CO}_2^- + \text{CPD-A} \rightarrow \text{e.t}$	$7 \times 10^8$				p.r.	P.b.k. at 410 nm (electron adduct).	731060
<b>26.369 Ceruloplasmin</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Cp-Cu(II)} \rightarrow$	$4 \times 10^9$					Unpublished data., I. Pecht and M. Faraggi.	731064
<b>26.370 Cytochrome C</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Cyt C (Fe}^{3+}) \rightarrow \text{CO}_2 + \text{Cyt C (Fe}^{2+})$	$7.0 \times 10^8$	7	0.16	293	p.r.	D.k. at 320 to 550 nm in N <sub>2</sub> O-satd. soln. contg. $2 \times 10^{-3}$ mol L <sup>-1</sup> phosphate and 0.16 mol L <sup>-1</sup> formate; cytochrome C from yeast (Hansenula anomala).	86A394
		$2 \times 10^9$	7.0	0.003	294	p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-purged soln. contg. 0.002 mol L <sup>-1</sup> formate, 0.001 mol L <sup>-1</sup> phosphate and $10^{-5}$ mol L <sup>-1</sup> cyt C; $E_a = 14$ kJ mol <sup>-1</sup> , studied at 285-313 K.	82A281
		$2.1 \times 10^9$	7.0	0.1	295	p.r.	P.b.k. at 550 nm in soln. contg. $1.85 \times 10^{-5}$ mol L <sup>-1</sup> cyt C, 0.1 mol L <sup>-1</sup> formate and 0.001 mol L <sup>-1</sup> phosphate buffer.	82A366
		$1.0 \times 10^8$	~7	0.1		p.r.	P.b.k. at 550 nm in soln. contg. formate.	79A312
		$1.3 \times 10^9$	7.0	0.01		p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> formate.	78A288
		$7 \times 10^8$	7.4	0.1	293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	771096
		$5.0 \times 10^8$	8.5					
		$9.4 \times 10^8$	2.0			p.r.	P.b.k.	771128
		$7.4 \times 10^8$	6.7					
		$1.0 \times 10^9$	6.2	0.1	293	p.r.	Abs. change at 450 and 550 nm in soln. contg. 0.1 mol L <sup>-1</sup> formate; at pH 6.2 $E_a = 11$ kJ mol <sup>-1</sup> and $A = 1.0 \times 10^{11}$ ; studied at 278-313 K; ionic strength effects studied.	761127
		$6.3 \times 10^8$	8.7					
		$6.9 \times 10^8$	7	~0.03		p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-satd. soln. contg. formate.	751012
		$2.5 \times 10^8$	10.8					
		$2.8 \times 10^9$	2	0.1		p.r.	P.b.k. at 550 nm in soln. contg. 0.03-1 mol L <sup>-1</sup> formate; ionic strength effects studied.	710327
		$7.9 \times 10^8$	7					
<b>26.371 Cytochrome C, ruthenium(III)-modified</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Fe}^{3+} \text{ Cyt c (Ru}^{3+}) \rightarrow \text{CO}_2 + \text{Fe}^{2+} \text{ Cyt c (Ru}^{2+})$	$5.4 \times 10^9$	7.0			p.r.	P.b.k. at 550 nm in soln. cont. 0.1 mol L <sup>-1</sup> formate and 0.1 mol L <sup>-1</sup> phosphate buffer.	84A062
		$1.8 \times 10^9$	7.0			p.r.	P.b.k. at 550 nm in soln. cont. 0.1 mol L <sup>-1</sup> formate and 0.1 mol L <sup>-1</sup> phosphate buffer.	84A062
<b>26.372 Cytochrome C, acetylated</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Ac-cyt C} \rightarrow$	$1.5 \times 10^9$	~7	0.1		p.r.	P.b.k. at 550 nm in soln. contg. formate; ionic strength effects studied.	79A312

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
26.373	Cytochrome C, carboxymethylated							
	·CO <sub>2</sub> <sup>-</sup> + Cxm-cyt C →	1.3 × 10 <sup>8</sup>	-7	0.1		p.r.	P.b.k. at 550 nm in soln. contg. formate.	79A312
		1.4 × 10 <sup>8</sup>	7			p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> formate ion.	78A288
26.374	Cytochrome C, succinylated							
	·CO <sub>2</sub> <sup>-</sup> + Succ-cyt C →	4.0 × 10 <sup>9</sup>	-7	0.1		p.r.	P.b.k. at 550 nm in soln. contg. formate.	79A312
26.375	Cytochrome C <sub>3</sub>							
	·CO <sub>2</sub> <sup>-</sup> + cyt C <sub>3</sub> →	2.1 × 10 <sup>8</sup>	8.1			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.16 mol L <sup>-1</sup> formate; used 2 <i>k</i> (·CO <sub>2</sub> <sup>-</sup> + ·CO <sub>2</sub> <sup>-</sup> ) = 1.8 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> ; from <i>D. vulgaris</i> ; only 2 of the hemes react.	78A232
26.376	Cytochrome P-450							
	·CO <sub>2</sub> <sup>-</sup> + cyt P-450 →					p.r.	No redn. obs. in N <sub>2</sub> O-satd. soln. contg. formate.	79A036
26.377	Cytochrome c 551							
	·CO <sub>2</sub> <sup>-</sup> + cyt C 551 → redn.	1.1 × 10 <sup>9</sup>	7	0.31	-293	p.r.	P.b.k. at 551 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate and 0.1 mol L <sup>-1</sup> phosphate.	88A366
		3.7 × 10 <sup>9</sup>	5.6	0.1		p.r.	P.b.k. at 550 nm in soln. contg. 0.01-0.1 mol L <sup>-1</sup> formate.	84A430
		7.4 × 10 <sup>8</sup>	7.0	0.1				
		4.5 × 10 <sup>8</sup>	7.0	0.01				
26.378	Cytochrome c 551, ruthenium(III)-modified							
	·CO <sub>2</sub> <sup>-</sup> + Fe <sup>3+</sup> cyt C 551 (Ru <sup>3+</sup> ) → redn.	1.9 × 10 <sup>9</sup>	7	0.31	-293	p.r.	P.b.k. at 551 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate, 0.1 mol L <sup>-1</sup> phosphate; reduction of Fe <sup>III</sup> /Fe <sup>II</sup> :Ru <sup>III</sup> /Ru <sup>II</sup> ~9:1	88A366
26.379	Daunorubicin, apo-riboflavin binding protein complex							
	·CO <sub>2</sub> <sup>-</sup> + D-apo-RBP →	2.4 × 10 <sup>8</sup>	7			p.r.	P.b.k. in soln. contg. (5-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> complex with apo-RBP; semiquinone formn.	89A450
26.380	Daunorubicin-DNA complex							
	·CO <sub>2</sub> <sup>-</sup> + D-DNA → CO <sub>2</sub> + D <sup>·-</sup> -DNA	1.9 × 10 <sup>8</sup>	7			p.r.	P.b.k. in soln. contg. 0.1 mol L <sup>-1</sup> formate and (1-4) β 10 <sup>-4</sup> mol L <sup>-1</sup> complex, [daunorubicin]/[DNA] 1/10 or 1/20.	91A258
26.381	Deoxyribonucleic acid							
	·CO <sub>2</sub> <sup>-</sup> + DNA →	2.5 × 10 <sup>4</sup>	9.2			γ-r.	Estd. from <i>D</i> <sub>37</sub> values at various dose rates in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate, 0.01 mol L <sup>-1</sup> MgCl <sub>2</sub> , 0.01 mol L <sup>-1</sup> tetraborate and single stranded ΦX174 DNA.	83R032 88R099
26.382	Ferredoxin, oxidized							
	·CO <sub>2</sub> <sup>-</sup> + [Fe <sub>2</sub> S <sub>2</sub> (SCys) <sub>4</sub> ] <sup>2-</sup> → CO <sub>2</sub> + [Fe <sub>2</sub> S <sub>2</sub> (SCys) <sub>4</sub> ] <sup>3-</sup>	6.2 × 10 <sup>7</sup>	7.3		297	p.r.	D.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. 1.0 mol L <sup>-1</sup> formate.	81A279
		8.0 × 10 <sup>7</sup>	7.5			p.r.	D.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	731064
26.383	Ferredoxin-NADP reductase							
	·CO <sub>2</sub> <sup>-</sup> + FNR-FAD + H <sup>+</sup> → CO <sub>2</sub> + FNR-FADH <sup>·</sup>	≤3 × 10 <sup>7</sup>	7.1		298	p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	82R184
26.384	Flavocytochrome b <sub>2</sub> (Fe <sup>3+</sup> )							
	·CO <sub>2</sub> <sup>-</sup> + Fl b <sub>2</sub> (Fe <sup>3+</sup> ) → CO <sub>2</sub> + Fl b <sub>2</sub> (Fe <sup>2+</sup> )	2.1 × 10 <sup>8</sup>	7.0	0.16		p.r.	D.k. at 547 and 440 nm in N <sub>2</sub> O-satd. soln. contg. formate and phosphate buffer; used 2 <i>k</i> (·CO <sub>2</sub> <sup>-</sup> + ·CO <sub>2</sub> <sup>-</sup> ) = 1.1 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup>	84A153

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T$ (K)	Method	Comment	Ref.
26.385	Glucose oxidase $^{\bullet}\text{CO}_2^- + \text{GOX-F} \rightarrow \text{CO}_2 + \text{GOX-FH}^-$	$2.5 \times 10^8$	6.0			p.r.	P.b.k. at 560 nm in deaerated soln. contg. 3.5 $\times 10^{-5}$ mol L $^{-1}$ GOX and 0.1 mol L $^{-1}$ formate; nearly quantitative electron transfer.	84A473
26.386	$\alpha$ -Hemoglobin $^{\bullet}\text{CO}_2^- + \text{Fe(III)}\alpha\text{-Hb} \rightarrow \text{CO}_2 + \text{Fe(II)}\alpha\text{-Hb}$	$2.1 \times 10^9$	7.0			p.r.	P.b.k. at 450 and 570 nm as well as d.k. at 500 and 430 nm in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L $^{-1}$ formate.	88R111
26.387	$\alpha$ -Hemoglobin Cys-104 disulfide with 5-thio-2-nitrobenzoic acid $^{\bullet}\text{CO}_2^- + \text{Fe(III)}\alpha\text{-Hb-SSR} \rightarrow \text{CO}_2 + \text{Fe(III)}\alpha\text{-Hb-SSR}^-$	$2.2 \times 10^8$	7			p.r.	P.b.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. 0.1-0.2 mol L $^{-1}$ formate and $(1-10) \times 10^{-5}$ mol L $^{-1}$ Fe(III)- $\alpha$ -Hb-SSR.	88R111
26.388	High-potential iron-sulfur protein ( <i>Chromatium vinosum</i> D), reduced $^{\bullet}\text{CO}_2^- + \text{Hipip}_r \rightarrow$		7.0			p.r.	No reaction obs. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L $^{-1}$ formate contg. $5.0 \times 10^{-3}$ mol L $^{-1}$ phosphate.	80A432
26.389	Immunoglobulin G (bovine) $^{\bullet}\text{CO}_2^- + \text{IgG} \rightarrow$	$1.3 \times 10^9$ $1.2 \times 10^8$	3.2 8.2			p.r.	P.b.k. at 440 nm; $k$ for total reaction, relative to total protein concn.; 7 reducible disulfide groups per mole of protein.	90A416
26.390	Laccase $^{\bullet}\text{CO}_2^- + \text{Cu-OXD} \rightarrow \text{addn.}$	$\geq 7 \times 10^9$	6.0			p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L $^{-1}$ formate and 0.01 mol L $^{-1}$ phosphate; addn. followed by Cu $^{2+}$ redn.; complex kinetics.	82A422
26.391	Lysozyme $^{\bullet}\text{CO}_2^- + \text{C}_{99} \rightarrow \text{redn.}$	$1.5 \times 10^8$				p.r.	P.b.k. at 410 nm in soln. contg. $1.6 \times 10^{-5}$ mol L $^{-1}$ protein; used $k(^{\bullet}\text{CO}_2^- + ^{\bullet}\text{CO}_2^-) = 1.5 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	82A466
		$\sim 9 \times 10^8$	4.8			p.r.	P.b.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L $^{-1}$ formate and $2 \times 10^{-4}$ mol L $^{-1}$ lysozyme; value from graph.	751080
		$\sim 5 \times 10^8$	6					
		$\sim 3.5 \times 10^8$	10.8					
26.392	Melanin (from DOPA) $^{\bullet}\text{CO}_2^- + \text{DOPA}_{\text{mel}} \rightarrow \text{redn.}$	$10^6-10^7$	7.4			p.r.	D.k. in soln. contg. 0.1 mol L $^{-1}$ formate; $k$ based on monomer of mol. wt. 150; from autoxidation of DL-dihydroxyphenylalanine.	86A227
26.393	Methemerythrin $^{\bullet}\text{CO}_2^- + \text{Fe(III)}_2\text{HrSH} \rightarrow$	$5.1 \times 10^7$		298	p.r.	D.k. at 350 nm; electron transfer at unknown protein site is followed by electron transfer to the iron.	90R009	
		$6.8 \times 10^7$	8.2	0.03	p.r.	D.k. at 360 nm in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L $^{-1}$ formate; octamer from <i>T. pyrodes</i> .	79A204	
26.394	Methemerythrin disulfide $^{\bullet}\text{CO}_2^- + \text{Fe(III)}_2\text{HrSSR} \rightarrow \text{CO}_2 + \text{Fe(III)}_2\text{HrSSR}^-$	$5.7 \times 10^8$	7	298	p.r.	P.b.k. at 410 nm in N <sub>2</sub> O-satd. soln. contg. $(1-17) \times 10^{-5}$ mol L $^{-1}$ methemerythrin disulfide and 0.1 mol L $^{-1}$ formate ion.	90R009	
26.395	Methemoglobin $^{\bullet}\text{CO}_2^- + \text{Fe}^{3+}\text{Hb} \rightarrow$	$< 8 \times 10^6$	9			p.r.	Abs. changes at 550 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L $^{-1}$ formate ion.	81R003

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
<b>26.396 Metmyoglobin</b>								
	$\cdot\text{CO}_2^- + \text{Fe}^{3+}\text{Mb} \rightarrow \text{CO}_2 + \text{Fe}^{2+}\text{Mb}$	$2 \times 10^8$	7.0		298	p.r.	P.b.k. at 434 nm in N <sub>2</sub> O-satd. soln. contg. 0.012 mol L <sup>-1</sup> formate ion and (0.5-10) × 10 <sup>-6</sup> mol L <sup>-1</sup> horse heart metmyoglobin.	94R065
		$2.9 \times 10^9$	8.2	0.03		p.r.	D.k. at 300 nm in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> formate ion.	79A204
		$2.0 \times 10^9$	7			p.r.	Abs. changes in soln. contg. 0.01 mol L <sup>-1</sup> formate.	78A288
<b>26.397 Plastocyanin</b>								
	$\cdot\text{CO}_2^- + \text{Cu}^{\text{II}}\text{-plastocyanin} \rightarrow$	$3.0 \times 10^8$	7.0	0.1	293	p.r.	D.k. at 597 nm (Cu <sup>II</sup> redn.) in soln. contg. 1.2 × 10 <sup>-3</sup> mol L <sup>-1</sup> formate.	90A259 93R003
		$8 \times 10^8$	7	0.31	~293	p.r.	D.k. (Cu <sup>II</sup> ) in N <sub>2</sub> O-satd. soln. contg. 0.10 mol L <sup>-1</sup> formate and 0.1 mol L <sup>-1</sup> phosphate; A. variabilis or S. obliquus plastocyanin (PCu <sup>II</sup> ).	88A268
<b>26.398 Plastocyanin (Cu<sup>II</sup> Tyr83NO<sub>2</sub> deriv.)</b>								
	$\cdot\text{CO}_2^- + \text{Cu}^{2+}\text{P}(\text{Tyr83NO}_2) \rightarrow$	$5.7 \times 10^8$	7.0	0.1	293	p.r.	D.k. at 597 nm (Cu <sup>II</sup> redn.) in soln. contg. 1.2 × 10 <sup>-3</sup> mol L <sup>-1</sup> formate.	90A259 93R003
<b>26.399 Plastocyanin, ruthenium(III)-modified</b>								
	$\cdot\text{CO}_2^- + \text{Cu}^{\text{II}}\text{Ru}^{\text{III}}\text{-Plastocyanin} \rightarrow$	$7 \times 10^8$	7	0.31	~293	p.r.	D.k. (Cu <sup>II</sup> ) in N <sub>2</sub> O-satd. soln. contg. 0.10 mol L <sup>-1</sup> formate; 72% Cu <sup>II</sup> redn. (→ stable PCu <sup>II</sup> Ru <sup>III</sup> ) and 28% Ru <sup>III</sup> redn. (→ transient PCu <sup>II</sup> Ru <sup>II</sup> ); A. variabilis plastocyanin (PCu <sup>II</sup> ) treated with Ru(NH <sub>3</sub> ) <sub>5</sub> H <sub>2</sub> O <sup>2+</sup> , modified His-59.	88A268
		$7 \times 10^8$	7.0			p.r.	D.k. at 597 nm (Cu <sup>II</sup> ) in N <sub>2</sub> O-satd. soln. contg. 0.10 mol L <sup>-1</sup> phosphate and 0.10 mol L <sup>-1</sup> formate; Plastocyanin from A. variabilis modified by addn. of Ru(NH <sub>3</sub> ) <sub>6</sub> <sup>3+</sup> to His59; 65% redn. at Cu, 35% redn. at Ru.	87A033
<b>26.400 Riboflavin binding protein</b>								
	$\cdot\text{CO}_2^- + \text{RBP} \rightarrow$	$1.2 \times 10^9$	3.2	0.16		p.r.	P.b.k. at 425 nm; $k$ for total reaction, relative to total protein concn.; 9 reducible disulfide groups per mole of protein; obs. disulfide radical anion formation.	91R292
		$1.7 \times 10^8$	8.2					90A416
		$6.4 \times 10^7$	7			p.r.	P.b.k. in soln. contg. (2-10) × 10 <sup>-4</sup> mol L <sup>-1</sup> apo-RPB; disulfide radical anion formn.	89A450
		$7.0 \times 10^7$	5.2			p.r.	P.b.k. at 450 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; flavin reduction rate.	85A169
		$2.6 \times 10^7$	7.0					
		$2.2 \times 10^7$	9.0					
<b>26.401 Ribonuclease</b>								
	$\cdot\text{CO}_2^- + \text{RNase} \rightarrow$	$3 \times 10^8$	7.3			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate; rel. to $k(\cdot\text{CO}_2^- + \text{lipoate}) = 4.1 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	85A169
<b>26.402 Serum albumin (bovine)</b>								
	$\cdot\text{CO}_2^- + \text{BSA} \rightarrow \text{e.t.}$	$8 \times 10^8$	6.4			p.r.	P.b.k. at 420 nm (RSSR) <sup>-</sup> in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> formate.	83A083
		$7 \times 10^8$	7.6					
<b>26.403 Stellacyanin</b>								
	$\cdot\text{CO}_2^- + \text{Cu}^{\text{II}}\text{-stellacyanin} \rightarrow \text{CO}_2 + \text{St}[\text{Cu}(\text{I})]$	$8.3 \times 10^8$	7.0		291	p.r.	D.k. at 605 nm in N <sub>2</sub> O-satd. buffer-free soln. contg. 0.1 mol L <sup>-1</sup> formate.	89R079
<b>26.404 Stellacyanin, ruthenium(III) modified</b>								
	$\cdot\text{CO}_2^- + \text{Ru}(\text{III})\text{-St}[\text{Cu}(\text{II})] \rightarrow \text{CO}_2 + \text{Ru}(\text{II})\text{-St}[\text{Cu}(\text{II})]$	$1.2 \times 10^9$	7.0		298	p.r.	D.k. at 310 nm in N <sub>2</sub> O-satd. buffer-free soln. contg. 0.1 mol L <sup>-1</sup> formate ion.	90A402

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T$ (K)	Method	Comment	Ref.
<b>26.404 Stellacyanin, ruthenium(III) modified — Continued</b>								
		$1.0 \times 10^9$	7.0		291	p.r.	D.k. at 310 nm in $\text{N}_2\text{O}$ -satd. buffer-free soln. contg. 0.1 mol $\text{L}^{-1}$ formate.	89R079
	${}^{\bullet}\text{CO}_2^- + \text{Ru(III)-St[Cu(II)]} \rightarrow \text{CO}_2 + \text{Ru(III)-St[Cu(I)]}$	$1 \times 10^9$	7.0		298	p.r.	D.k. at 605 nm in $\text{N}_2\text{O}$ -satd. buffer-free soln. contg. 0.1 mol $\text{L}^{-1}$ formate ion; $\Delta H^\ddagger = 7 \text{ kJ mol}^{-1}$ and $\Delta S^\ddagger = -50 \text{ J K}^{-1} \text{ mol}^{-1}$ , studied at 276-313 K.	90A402
		$8.5 \times 10^8$	7.0		291	p.r.	D.k. at 605 nm in $\text{N}_2\text{O}$ -satd. buffer-free soln. contg. 0.1 mol $\text{L}^{-1}$ formate.	89R079
<b>26.405 Superoxide dismutase</b>								
	${}^{\bullet}\text{CO}_2^- + \text{CuZnSOD} \rightarrow$	$1.2 \times 10^{10}$	8.5-9.5			p.r.	C.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol $\text{L}^{-1}$ formate; rel. to $k(\text{CO}_2^- + \text{FeTMpyP}^{\text{5+}}) = 1.6 \times 10^{10} \text{ L mol}^{-1} \text{ s}^{-1}$ .	91A380
	${}^{\bullet}\text{CO}_2^- + \text{CuZnSOD} \rightarrow \text{redn. of Cu(II)}$	$7.9 \times 10^8$	6.8		298	p.r.	D.k. at 680 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1-0.01 mol $\text{L}^{-1}$ formate ion and 12.5-100 $\times 10^{-6} \text{ mol L}^{-1}$ SOD; bovine liver enzyme ( $\text{Cu}^{2+}$ ).	85A436
<b>26.406 Transferrin, dicupric complex</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Cu(II)-Tf} \rightarrow$	$5.2 \times 10^6$	9			p.r.	Calcd from fraction Cu(II) reduced (obs. at 435 nm) and model including competing reactions, in 0.1 mol $\text{L}^{-1}$ formate and $2.5 \times 10^{-2} \text{ mol L}^{-1} \text{ KHCO}_3$ .	82A086
<b>26.407 Transferrin, diferric complex</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Fe(III)-Tf} \rightarrow$	$3.8 \times 10^8$	7.0			p.r.	P.b.k. at 420 nm (protein reduction) in $\text{N}_2\text{O}$ -satd. soln. contg. formate ion; bleaching at 465 nm ( $\text{Fe}^{\text{III}}$ reduction) gave an estimated $k = 2.1 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ .	87A281
		$2.1 \times 10^6$	9			p.r.	Calcd. from fraction Fe(III) reduced (obs. at 470 nm) and model including competing reactions, in 0.1 mol formate and $2.5 \times 10^{-2} \text{ mol L}^{-1} \text{ KHCO}_3$ .	82A086
<b>26.408 Transferrin, dimanganese complex</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Mn(III)-Tf} \rightarrow$	$5.1 \times 10^6$	9			p.r.	Calcd. from fraction Mn(III) reduced (obs. at 420 nm) and model including competing reactions, in 0.1 mol formate and $2.5 \times 10^{-2} \text{ mol L}^{-1} \text{ KHCO}_3$ .	82A086
<b>26.409 Trypsin</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Tryp} \rightarrow$	$2.6 \times 10^9$	7		293	p.r.	C.k. rel. to $k({}^{\bullet}\text{CO}_2^- + \text{Q}) = 6.7 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	88A251
<b>26.410 Zinc(II) insulin complex</b>								
	${}^{\bullet}\text{CO}_2^- + \text{Zn(Insulin)}^{2+} \rightarrow$	$6 \times 10^8$	9.0	0.05		p.r.	P.b.k. at 420 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $10^{-2} \text{ mol L}^{-1}$ formate; based on monomer concn. ( $1.5-2.0 \times 10^{-5} \text{ mol L}^{-1}$ ); $k$ decreased to $2 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ on the fourth pulse.	80A204

TABLE 27. Miscellaneous Substituted Alkyl Radicals

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
27.1	Acetoxymethyl							
27.1.1	Oxygen							
	$\text{CH}_3\text{CO}_2\dot{\text{C}}\text{H}_2 + \text{O}_2 \rightarrow \text{AcOCH}_2\text{OO}^\cdot$	$1.4 \times 10^{10}$	6.4			p.r.	P.b.k. at 260 nm in $\text{N}_2\text{O}/\text{O}_2$ satd. soln. contg. methyl acetate and $(6.26) \times 10^{-5}$ mol L <sup>-1</sup> oxygen.	78A402
27.2	Acetylamino(carboxy)methyl, anion							
27.2.1	Hydroxide ion							
	$\text{CH}_3\text{CONH}\dot{\text{C}}\text{HCO}_2^- + \text{OH}^- \rightarrow \text{CH}_3\text{CON}^-\dot{\text{C}}\text{HCO}_2^- + \text{H}_2\text{O}$	$8 \times 10^8$	>13			e-r.	Estd. by esr from pH dependence of line width in $\text{N}_2\text{O}$ -satd. soln. contg. acetylglycine; $k_t = 1.6 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> ; ( $\text{p}K_a = 14.0$ ).	765198
27.3	(N-Acetylamino)methyl							
27.3.1	N-Ethylmaleimide							
	$\text{CH}_3\text{CONH}\dot{\text{C}}\text{H}_2 + \text{NEM} \rightarrow \text{addn.}$	$\sim 10^8$	6-7			p.r.	P.b.k. at 400 nm; 100% addn. based on abs. spectra; radical from N-methylacetamide.	720144
27.3.2	2-Methyl-1,4-naphthoquinone							
	$\text{CH}_3\text{CONH}\dot{\text{C}}\text{H}_2 + 2\text{-CH}_3\text{NQ} \rightarrow$	$2.0 \times 10^9$	6.0, 10.9			p.r.	P.b.k. at 395 nm in soln. contg. N-methylacetamide; 19% e-transfer.	731047
27.4	1-Acetylamo-3-(methylthio)propyl							
27.4.1	1,1'-Dimethyl-4,4'-bipyridinium							
	$\text{CH}_3\text{SCH}_2\text{CH}_2\dot{\text{C}}\text{HNHCOCOCH}_3 + \text{MV}^{2+} \rightarrow$ electron transfer	$\sim 1 \times 10^7$	4.7			p.r.	P.b.k. at 600 nm in $\text{N}_2\text{O}$ -satd. soln. contg. acetylmethionine.	83A200
27.5	Acetylglycylglycinamide, radical anion							
27.5.1	2-Methyl-1,4-naphthoquinone							
	$[\text{AcGlyGlyNH}_2]^- + 2\text{-CH}_3\text{NQ} \rightarrow$ $[\text{2-CH}_3\text{NQ}]^- + \text{other prod.}$	$2.7 \times 10^9$	7.0			p.r.	P.b.k. at 395 nm; 99% e-transfer.	731047
27.6	[(N-Acetyl-N-methyl)amino]carboxymethyl, anion							
27.6.1	2-Methyl-1,4-naphthoquinone							
	$\text{CH}_3\text{CON}(\text{CH}_3)\dot{\text{C}}\text{HCO}_2^- + 2\text{-CH}_3\text{NQ} \rightarrow$	$1.3 \times 10^9$ $1.0 \times 10^9$	7.0 12.5			p.r.	P.b.k. at 395 nm in $\text{N}_2\text{O}$ -satd. soln. contg. acetylsarcosine; 39% e-transfer at pH 7, 38% at pH 12.5.	731047
27.7	(N-Acetyl-N-methylamino)methyl							
27.7.1	Pentacyanonitrosylferrate(II) ion							
	$[\text{CH}_2\text{N}(\text{CH}_3)\text{C}(\text{O})\text{CH}_3 + \text{Fe}(\text{CN})_5\text{NO}^{3-}] \rightarrow$ $[\text{Fe}(\text{CN})_5\text{N}(\text{O})\text{CH}_2\text{N}(\text{CH}_3)\text{C}(\text{O})\text{CH}_3]^{3-}$	$3.5 \times 10^{10}$	6.0- 7.5			p.r.	D.k. at 380 nm as well as p.b.k. in soln. contg. 0.3 mol L <sup>-1</sup> N,N-dimethylacetamide and $5 \times 10^{-4}$ mol L <sup>-1</sup> $\text{Fe}(\text{CN})_5\text{NO}^{2-}$ .	79A134
27.7.2	Pentaamminenitrosylruthenium(II) ion							
	$[\text{CH}_2\text{N}(\text{CH}_3)\text{C}(\text{O})\text{CH}_3 + \text{Ru}(\text{NH}_3)_5\text{NO}^{2+}] \rightarrow$ $\text{Ru}(\text{NH}_3)_5\text{N}(\text{O})\text{CH}_2\text{N}(\text{CH}_3)\text{C}(\text{O})\text{CH}_3^{2+}$	$2.9 \times 10^9$	6.0- 7.5			p.r.	D.k. at 280 nm, as well as p.b.k. in soln. contg. 0.3 mol L <sup>-1</sup> N,N-dimethylacetamide and $5 \times 10^{-4}$ mol L <sup>-1</sup> $\text{Ru}(\text{NH}_3)_5\text{NO}^{3+}$ .	79A134
27.8	Acrylamide, radical anion							
27.8.1	Silver(I) ion							
	$[\text{CH}_2\text{CHCONH}_2]^- + \text{Ag}^+ \rightarrow \text{Ag}^0 + \text{H}^+$ + $\text{H}_2\text{C}=\text{CHCONH}_2$	$1.1 \times 10^8$	-6			p.r.	P.b.k. at 313 nm in soln. contg. acrylamide.	700052
27.8.2	Water							
	$[\text{CH}_2\text{CHCONH}_2]^- + \text{H}_2\text{O} \rightarrow$ $\text{CH}_3\text{CHCONH}_2 + \text{OH}^-$	$1.4 \times 10^5 \text{ s}^{-1}$	9.3- 13			p.r.	D.k. in soln. contg. acrylamide and 0.001 mol L <sup>-1</sup> borate buffer; general acid catalysis by buffer components, e.g. $\text{B}(\text{OH})_3$ , $\text{NH}_4^+$ , $(\text{CH}_3)_3\text{NH}^+$ , $\text{HCO}_3^-$ , $\text{HPO}_4^{2-}$ , etc.	751052

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
<b>27.8 Acrylamide, radical anion — Continued</b>								
<b>27.8.3 Boric acid</b>	$[\text{CH}_2\text{CHCONH}_2]^\cdot + \text{H}_3\text{BO}_3 + \text{H}_2\text{O} \rightarrow \text{CH}_3\text{CHCONH}_2 + \text{B(OH)}_4^-$	$1.6 \times 10^6$	9.8	→0		p.r.	D.k. in soln. contg. acrylamide.	751052
<b>27.8.4 Bicarbonate ion</b>								
	$[\text{CH}_2\text{CHCONH}_2]^\cdot + \text{HCO}_3^- \rightarrow \text{CH}_3\text{CHCONH}_2 + \text{CO}_3^{2-}$	$8.6 \times 10^5$		→0		p.r.	D.k. in soln. contg. acrylamide.	751052
<b>27.8.5 Ammonium ion</b>	$[\text{CH}_2\text{CHCONH}_2]^\cdot + \text{NH}_4^+ \rightarrow \text{CH}_3\text{CHCONH}_2 + \text{NH}_3$	$9.5 \times 10^6$		→0		p.r.	D.k. in soln. contg. acrylamide.	751052
<b>27.8.6 Dihydrogen phosphate ion</b>								
	$[\text{CH}_2\text{CHCONH}_2]^\cdot + \text{H}_2\text{PO}_4^- \rightarrow \text{CH}_3\text{CHCONH}_2 + \text{HPO}_4^{2-}$	$3.8 \times 10^6$		→0		p.r.	D.k. in soln. contg. acrylamide.	751052
<b>27.8.7 Hydrogen phosphate ion</b>	$[\text{CH}_2\text{CHCONH}_2]^\cdot + \text{HPO}_4^{2-} \rightarrow \text{CH}_3\text{CHCONH}_2 + \text{PO}_4^{3-}$	$8.6 \times 10^4$		→0		p.r.	D.k. in soln. contg. acrylamide.	751052
<b>27.8.8 Cyclohexylammonium ion</b>	$[\text{CH}_2\text{CHCONH}_2]^\cdot + c\text{-C}_6\text{H}_{11}\text{NH}_3^+ \rightarrow \text{CH}_3\text{CHCONH}_2 + c\text{-C}_6\text{H}_{11}\text{NH}_2$	$1.4 \times 10^7$				p.r.	D.k. in soln. contg. acrylamide.	751052
<b>27.8.9 Diethylammonium ion</b>	$[\text{CH}_2\text{CHCONH}_2]^\cdot + (\text{C}_2\text{H}_5)_2\text{NH}_2^+ \rightarrow \text{CH}_3\text{CHCONH}_2 + (\text{C}_2\text{H}_5)_2\text{NH}$	$7.2 \times 10^7$				p.r.	D.k. in soln. contg. acrylamide.	751052
<b>27.8.10 Ethylammonium ion</b>	$[\text{CH}_2\text{CHCONH}_2]^\cdot + \text{C}_2\text{H}_5\text{NH}_3^+ \rightarrow \text{CH}_3\text{CHCONH}_2 + \text{C}_2\text{H}_5\text{NH}_2$	$1.5 \times 10^7$				p.r.	D.k. in soln. contg. acrylamide.	751052
<b>27.8.11 Glycine</b>	$[\text{CH}_2\text{CHCONH}_2]^\cdot + \text{GlyH} \rightarrow \text{CH}_3\text{CHCONH}_2 + \text{Gly}^-$	$2.5 \times 10^7$				p.r.	D.k. in soln. contg. acrylamide.	751052
<b>27.8.12 Piperidine, conjugate acid</b>	$[\text{CH}_2\text{CHCONH}_2]^\cdot + c\text{-C}_5\text{H}_{10}\text{NH}_2^+ \rightarrow \text{CH}_3\text{CHCONH}_2 + c\text{-C}_5\text{H}_{10}\text{NH}$	$6.3 \times 10^7$				p.r.	D.k. in soln. contg. acrylamide.	751052
<b>27.8.13 Pyrrolidinium ion</b>	$[\text{CH}_2\text{CHCONH}_2]^\cdot + \text{-NH}_2^+(\text{CH}_2)_4^- \rightarrow \text{CH}_3\text{CHCONH}_2 + \text{-NH}(\text{CH}_2)_4^-$	$2.0 \times 10^8$				p.r.	D.k. in soln. contg. acrylamide.	751052
<b>27.8.14 Triethylammonium ion</b>	$[\text{CH}_2\text{CHCONH}_2]^\cdot + (\text{C}_2\text{H}_5)_3\text{NH}^+ \rightarrow \text{CH}_3\text{CHCONH}_2 + (\text{C}_2\text{H}_5)_3\text{N}$	$1.3 \times 10^8$	10.3- 11.8	→0		p.r.	D.k. in soln. contg. acrylamide.	751052
<b>27.8.15 Trimethylammonium ion</b>	$[\text{CH}_2\text{CHCONH}_2]^\cdot + (\text{CH}_3)_3\text{NH}^+ \rightarrow \text{CH}_3\text{CHCONH}_2 + (\text{CH}_3)_3\text{N}$	$2.1 \times 10^9$		→0		p.r.	D.k. in soln. contg. acrylamide.	751052
<b>27.9 Acrylamide, radical anion, protonated</b>								
<b>27.9.1 Acrylamide</b>	$[\text{CH}_2\text{CHC(OH)NH}_2]^\cdot + \text{H}_2\text{C=CHCONH}_2 \rightarrow \text{addn.}$	$2.5 \times 10^5$	-6			p.r.	D.k. at 275 nm.	700052
<b>27.10 Acrylic acid, radical anion</b>								
<b>27.10.1 Water</b>	$[\text{CH}_2\text{CHCO}_2\text{H}]^\cdot + \text{H}_2\text{O} \rightarrow \text{CH}_3\text{CHCO}_2^- + \text{H}_2\text{O}$	$4.0 \times 10^4 \text{ s}^{-1}$ $3.0 \times 10^4 \text{ s}^{-1}$	6.0 9.5			p.r.	D.k. in acrylate soln.; extrapolated to zero concn. of buffer.	761113
<b>27.10.2 Boric acid</b>	$[\text{CH}_2\text{CHCO}_2\text{H}]^\cdot + \text{H}_3\text{BO}_3 \rightarrow \text{CH}_3\text{CHCO}_2^- + \text{H}_3\text{BO}_3$	$2.8 \times 10^5$	>7			p.r.	D.k. in soln. contg. acrylate.	761113

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
27.10	Acrylic acid, radical anion — Continued							
27.10.3	Tetrahydroxyborate ion $[\text{CH}_2\text{CHCO}_2\text{H}]^{--} + \text{B(OH)}_4^- \rightarrow \text{CH}_3\text{CHCO}_2^- + \text{B(OH)}_4^-$	$2.3 \times 10^5$	>7	→0		p.r.	D.k. in soln. contg. acrylate.	761113
27.10.4	Ammonia $[\text{CH}_2\text{CHCO}_2\text{H}]^{--} + \text{NH}_3 \rightarrow \text{CH}_3\text{CHCO}_2^- + \text{NH}_3$	$2.8 \times 10^6$	>7	→0		p.r.	D.k. in soln. contg. acrylate.	761113
27.10.5	Ammonium ion $[\text{CH}_2\text{CHCO}_2\text{H}]^{--} + \text{NH}_4^+ \rightarrow \text{CH}_3\text{CHCO}_2^- + \text{NH}_4^+$	$1.8 \times 10^6$	>7	→0		p.r.	D.k. in soln. contg. acrylate.	761113
27.10.6	Hydroxide ion $[\text{CH}_2\text{CHCO}_2\text{H}]^{--} + \text{OH}^- \rightarrow$	$7.7 \times 10^8$	>7	→0		p.r.	D.k. in soln. contg. acrylate; for mechanism and evidence for protonation at the β position see [740033].	761113
27.10.7	Hydrogen phosphate ion $[\text{CH}_2\text{CHCO}_2\text{H}]^{--} + \text{HPO}_4^{2-} \rightarrow \text{CH}_3\text{CHCO}_2^- + \text{HPO}_4^{2-}$	$7 \times 10^3$	>7	→0		p.r.	D.k. in soln. contg. acrylate.	761113
27.10.8	Dihydrogen phosphate ion $[\text{CH}_2\text{CHCO}_2\text{H}]^{--} + \text{H}_2\text{PO}_4^- \rightarrow \text{CH}_3\text{CHCO}_2^- + \text{H}_2\text{PO}_4^-$	$5.7 \times 10^6$	>7	→0		p.r.	D.k. in soln. contg. acrylate.	761113
27.10.9	Hydrogen pyrophosphate ion $[\text{CH}_2\text{CHCO}_2\text{H}]^{--} + \text{HP}_2\text{O}_7^{3-} \rightarrow \text{CH}_3\text{CHCO}_2^- + \text{HP}_2\text{O}_7^{3-}$	$9.1 \times 10^4$	>7	→0		p.r.	D.k. in soln. contg. acrylate.	761113
27.11	Alanine anhydride, radical anion							
27.11.1	Acetophenone $[-\text{NHCOC(Me)}\text{NHCOCH(Me)}-\text{J}^{--} + \text{C}_6\text{H}_5\text{COCH}_3 \rightarrow \text{-CH(Me)}\text{CONHCH(Me)}\text{CONH-} + \text{C}_6\text{H}_5\dot{\text{C}}\text{O}^\bullet\text{CH}_3]$	$2.0 \times 10^9$ $1.5 \times 10^9$	5.2 12.2			p.r.	P.b.k. at 280 nm (320 at pH 12.2) in soln. contg. alanine anhydride and 1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	710554
27.11.2	Benzophenone $[-\text{NHCOC(Me)}\text{NHCOCH(Me)}-\text{J}^{--} + (\text{C}_6\text{H}_5)_2\text{CO} \rightarrow \text{-CH(Me)}\text{CONHCH(Me)}\text{CONH-} + (\text{C}_6\text{H}_5)_2\text{CO}^-]$	$1.6 \times 10^9$ $1.9 \times 10^9$	5.2 12.2			p.r.	P.b.k. at 330 nm (320 at pH 12.2) in soln. contg. alanine anhydride and 1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	710554
27.11.3	Cystamine $[-\text{NHCOC(Me)}\text{NHCOCH(Me)}-\text{J}^{--} + [\text{H}_2\text{NCH}_2\text{CH}_2\text{S}]_2 \rightarrow \text{electron transfer}$	$1.1 \times 10^8$	5.1, 11.4			p.r.	D.k. at 265 nm (R) in soln. contg. alanine anhydride and 1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	710554
27.11.4	Cysteine $[-\text{NHCOC(Me)}\text{NHCOCH(Me)}-\text{J}^{--} + \text{CysSH} \rightarrow \text{electron transfer}$	$1.4 \times 10^8$	7.4			p.r.	D.k. at 265 nm in soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH and alanine anhydride.	710554
27.11.5	2-Methyl-1,4-naphthoquinone $[-\text{NHCOC(Me)}\text{NHCOCH(Me)}-\text{J}^{--} + 2\text{-CH}_3\text{NQ} \rightarrow [\text{2-CH}_3\text{NQ}]^{--} + \text{other prod.}$	$4.8 \times 10^9$	6.0			p.r.	P.b.k. at 395 nm in soln. contg. alanine anhydride; 92% <i>e</i> -transfer.	731047
27.12	α-Aminoalkyl radical from glutathione							
27.12.1	α-Aminoalkyl radical from glutathione ${}^\bullet\text{GSH} + {}^\bullet\text{GSH} \rightarrow$	$\sim 1 \times 10^7$ $\sim 4 \times 10^6$ $\sim 2 \times 10^6$	7.5 9.0 10.5			p.r.	D.k. at 280 nm in N <sub>2</sub> O-satd. soln. contg. (5-10) × 10 <sup>-4</sup> mol L <sup>-1</sup> glutathione.	92A321
27.12.2	Glutathione ${}^\bullet\text{GSH} + \text{GSH} \rightarrow \text{GS}^\bullet + \text{GSH}$	$<1.4 \times 10^5$	7.5			p.r.	Estd. from formation rate of radical in soln. contg. 0.007 mol L <sup>-1</sup> glutathione.	92A321

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>27.12 α-Aminoalkyl radical from glutathione — Continued</b>								
<b>27.12.2 Glutathione — Continued</b>								
<b>27.12.3 4-Nitroacetophenone</b>								
'GSH + PNAP → [PNAP] <sup>·-</sup> + other prod.		7.2 × 10 <sup>6</sup>	8.0			p.r.	P.b.k. at 410 nm in deaerated soln. contg. 0.03 mol L <sup>-1</sup> glutathione.	89A096
		1.3 × 10 <sup>6</sup>	9.9					
<b>27.13 α-Aminoalkyl radical from S-methylglutathione</b>								
<b>27.13.1 4-Nitroacetophenone</b>								
'GSMe + PNAP → [PNAP] <sup>·-</sup> + other prod.		7 × 10 <sup>8</sup>	8.4			p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> glutathione.	92A321
		8 × 10 <sup>9</sup>	10.5			p.r.	P.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> glutathione.	88A242
<b>27.14 α-Aminoalkyl radical from ophthalmic acid (γ-glutamyl-2-aminobutanoylglycine)</b>								
<b>27.14.1 4-Nitroacetophenone</b>								
'GMe + PNAP → [PNAP] <sup>·-</sup> + other prod.		3.0 × 10 <sup>9</sup>	10.5			p.r.	P.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> S-methylglutathione.	88A242
<b>27.15 2-Amino-1-(aminomethyl)ethyl, conjugate diacid</b>								
<b>27.15.1 2-Amino-1-(aminomethyl)ethyl, conjugate diacid</b>								
'CH(CH <sub>2</sub> NH <sub>3</sub> <sup>+</sup> ) <sub>2</sub> + 'CH(CH <sub>2</sub> NH <sub>3</sub> <sup>+</sup> ) <sub>2</sub> →		5.5 × 10 <sup>8</sup>	2.3-3.5			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.05-0.1 mol L <sup>-1</sup> 1,3-propanediamine; ε = 2100 L mol <sup>-1</sup> cm <sup>-1</sup> at 355 nm.	93A473
<b>27.15.2 Copper(I) ion</b>								
'CH(CH <sub>2</sub> NH <sub>3</sub> <sup>+</sup> ) <sub>2</sub> + Cu <sup>+</sup> → CuCH(CH <sub>2</sub> NH <sub>3</sub> <sup>+</sup> ) <sub>2</sub> <sup>+</sup>		4.2 × 10 <sup>8</sup>	3.0-3.8			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.05-0.1 mol L <sup>-1</sup> 1,3-propanediamine, 0-0.001 mol L <sup>-1</sup> CuSO <sub>4</sub> and (0.05-0.13) × 10 <sup>-3</sup> mol L <sup>-1</sup> Cu <sup>+</sup> .	93A473
<b>27.16 1-Aminobutyl</b>								
<b>27.16.1 4-Nitroacetophenone</b>								
CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> NH <sub>2</sub> + PNAP → CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH=NH + H <sup>+</sup> + [PNAP] <sup>·-</sup>		4.1 × 10 <sup>9</sup>	10.8			p.r.	P.b.k. at 350 nm and 545 nm in soln. contg. butylamine.	83A200
<b>27.17 Amino(carbamoyl)methyl</b>								
<b>27.17.1 2-Methyl-1,4-naphthoquinone</b>								
NH <sub>2</sub> CHCONH <sub>2</sub> + 2-CH <sub>3</sub> NQ →		5.4 × 10 <sup>9</sup>	10.4			p.r.	P.b.k. at 395 nm in soln. contg. glycinamide; 41% e-transfer.	731047
		5 × 10 <sup>9</sup>	8.0			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. glycinamide; 38% e-transfer.	723057
<b>27.18 Ammonio(carbamoyl)methyl</b>								
<b>27.18.1 2-Methyl-1,4-naphthoquinone</b>								
H <sub>3</sub> N <sup>+</sup> CHCONH <sub>2</sub> + 2-CH <sub>3</sub> NQ →		3.6 × 10 <sup>9</sup>	3.2			p.r.	P.b.k. at 395 nm in soln. contg. glycinamide; 24% e-transfer.	731047
<b>27.19 2-Amino-1-carboxyethyl</b>								
<b>27.19.1 Copper(I) ion</b>								
'CH(CH <sub>2</sub> NH <sub>3</sub> <sup>+</sup> )CO <sub>2</sub> <sup>-</sup> + Cu <sup>+</sup> → CuCH(CH <sub>2</sub> NH <sub>3</sub> <sup>+</sup> )CO <sub>2</sub> <sup>+</sup>		3.4 × 10 <sup>9</sup>	2-7			p.r.	P.b.k. at 380 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> β-alanine, (3.5-11) × 10 <sup>-5</sup> mol L <sup>-1</sup> Cu <sup>+</sup> and (0-1) × 10 <sup>-3</sup> mol L <sup>-1</sup> Cu <sup>2+</sup> .	92A134
<b>27.20 2-Amino-2-carboxyethyl</b>								
<b>27.20.1 Cysteine</b>								
'CH <sub>2</sub> CH(NH <sub>3</sub> <sup>+</sup> )CO <sub>2</sub> <sup>-</sup> + CysSH → CysS <sup>·</sup> + Ala		5.0 × 10 <sup>6</sup>	~6			p.r.	P.b.k. at 410 nm in deaerated soln. contg. 0.02 mol L <sup>-1</sup> cysteine.	89A096
		3.6 × 10 <sup>6</sup>	~9					

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
27.21	2-Amino-2-carboxy-1-hydroxyethyl, anion							
27.21.1	First-order reaction							
	$\cdot\text{OCHCH}(\text{NH}_3^+)\text{CO}_2^- \rightarrow \text{NH}_4^+ + \text{O}=\text{CH}\dot{\text{C}}\text{HO}_2^-$	$2.4 \times 10^6 \text{ s}^{-1}$			290	p.r.	Cond. buildup in soln. contg. serine; p <i>K</i> of radical at the hydroxy site = 7.0.	85A462
27.21.2	Ferricyanide ion							
	$\cdot\text{OCHCH}(\text{NH}_3^+)\text{CO}_2^- + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{OOCHOHCH}(\text{NH}_2)\text{CO}_2^-$	$3.2 \times 10^9$	7			p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L <sup>-1</sup> serine.	690522
27.21.3	Oxygen							
	$\cdot\text{OCHCH}(\text{NH}_3^+)\text{CO}_2^- + \text{O}_2 \rightarrow \text{OOCHOHCH}(\text{NH}_2)\text{CO}_2^-$	$2.4 \times 10^9$	7			p.r.	C.k. in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. 0.3 mol L <sup>-1</sup> serine and ferricyanide, rel. to $k(\cdot\text{OCHCH}(\text{NH}_3^+)\text{CO}_2^- + \text{Fe}(\text{CN})_6^{3-}) = 3.2 \times 10^3 \text{ L mol}^{-1} \text{ s}^{-1}$ .	690522
27.22	2-Amino-2-carboxy-2-methylethyl							
27.22.1	Copper(I) ion							
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)(\text{NH}_3^+)\text{CO}_2^- + \text{Cu}^+ \rightarrow \text{CuCH}_2\text{C}(\text{CH}_3)(\text{NH}_3)\text{CO}_2^+$	$1.3 \times 10^9$	3			p.r.	P.b.k. at 355 nm in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> 2-methylalanine, (5-15) $\times 10^{-5}$ mol L <sup>-1</sup> Cu <sup>+</sup> and (3-100) $\times 10^{-3}$ mol L <sup>-1</sup> Cu <sup>2+</sup> .	92A215
27.22.2	Copper(II) ion							
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)(\text{NH}_3^+)\text{CO}_2^- + \text{Cu}^{2+} \rightarrow \text{CuCH}_2\text{C}(\text{CH}_3)(\text{NH}_3)\text{CO}_2^{2+}$	$1.3 \times 10^7$	3			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> 2-methylalanine and (3-100) $\times 10^{-3}$ mol L <sup>-1</sup> Cu <sup>2+</sup> .	92A215
27.22.3	Pentacyanonitrosylferrate(II) ion							
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)(\text{NH}_3^+)\text{CO}_2^- + \text{Fe}(\text{CN})_5\text{NO}^{3-} \rightarrow [\text{Fe}(\text{CN})_5\text{N}(\text{O})\text{CH}_2\text{C}(\text{CH}_3)(\text{NH}_3^+)\text{CO}_2^-]^{3-}$	$1.6 \times 10^9$	6.0-7.5			p.r.	D.k. at 380 nm as well as p.b.k. in soln. contg. 0.3 mol L <sup>-1</sup> 2-aminoisobutyrate ion and 5 $\times 10^{-4}$ mol L <sup>-1</sup> Fe(CN) <sub>5</sub> NO <sup>2-</sup> .	79A134
27.22.4	Pentaamminenitrosylruthenium(II) ion							
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)(\text{NH}_3^+)\text{CO}_2^- + \text{Ru}(\text{NH}_3)_5\text{NO}^{2+} \rightarrow \text{Ru}(\text{NH}_3)_5\text{N}(\text{O})\text{CH}_2\text{C}(\text{CH}_3)(\text{NH}_3)\text{CO}_2^{2+}$	$3.1 \times 10^9$	6.0-7.5			p.r.	D.k. at 280 nm, as well as p.b.k. in soln. contg. 0.3 mol L <sup>-1</sup> 2-aminoisobutyrate ion and 5 $\times 10^{-4}$ mol L <sup>-1</sup> Ru(NH <sub>3</sub> ) <sub>5</sub> NO <sup>3+</sup> .	79A134
27.23	1-Aminoethyl							
27.23.1	2-Methyl-1,4-naphthoquinone							
	$\text{CH}_3\dot{\text{C}}\text{HNH}_2 + 2\text{-CH}_3\text{NQ} \rightarrow$	$3.3 \times 10^9$	11.6			p.r.	P.b.k. at 395 nm in soln. contg. ethylamine; 34% <i>e</i> -transfer.	731047
27.24	2-Aminoethyl, conjugate acid							
27.24.1	Copper(I) ion							
	$\cdot\text{CH}_2\text{CH}_2\text{NH}_3^+ + \text{Cu}^+ \rightarrow \text{CuCH}_2\text{CH}_2\text{NH}_2^{2+}$	$1.1 \times 10^9$	2.2-3.8			p.r.	P.b.k. at 370 nm in N <sub>2</sub> O-satd. soln. contg. 0.05-0.1 mol L <sup>-1</sup> ethylamine, 0-0.001 mol L <sup>-1</sup> CuSO <sub>4</sub> and (0.05-0.13) $\times 10^{-3}$ mol L <sup>-1</sup> Cu <sup>+</sup> .	93A473
27.25	1-Amino-1-methylethyl							
27.25.1	2-Methyl-1,4-naphthoquinone							
	$(\text{CH}_3)_2\dot{\text{C}}\text{NH}_2 + 2\text{-CH}_3\text{NQ} \rightarrow$	$3.6 \times 10^9$	11.4			p.r.	P.b.k. at 395 nm in soln. contg. isopropylamine; 41% <i>e</i> -transfer; 14% <i>e</i> -transfer at pH 9.0.	731047
27.26	2-Amino-1-hydroxyethyl conjugate monoacid							
27.26.1	<i>N</i> -rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotradeca-4,11-dienecobalt(II) ion							
	$\text{H}_3\text{N}^+\text{CH}_2\dot{\text{C}}\text{HOH} + \text{N-rac-Co}(4,11\text{-dieneN}_4)^{2+} \rightarrow$	$4.0 \times 10^7$	7.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-aminoethanol; pH dependent.	78A200

## RATE CONSTANTS FOR ALIPHATIC CARBON-CENTERED RADICALS IN SOLUTION

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TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
<b>27.27 2-Amino-2-methylpropyl, conjugate acid</b>							
<b>27.27.1 Chromium(II) ion</b>							
$\text{CH}_2\text{C}(\text{CH}_3)_2\text{NH}_3^+ + \text{Cr}^{2+} \rightarrow$ $\text{CrCH}_2\text{C}(\text{CH}_3)_2\text{NH}_3^{3+}$	$2.2 \times 10^7$	1-3			p.r.	P.b.k. at 285 nm in N <sub>2</sub> O-satd. soln. contg. 0.09 mol L <sup>-1</sup> 2-methyl-2-propanamine and (1-10) × 10 <sup>-4</sup> mol L <sup>-1</sup> Cr <sup>2+</sup> .	92A073
	$1.6 \times 10^7$	~3		293	p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> Cr <sup>2+</sup> and 2-methyl-2-propanamine; $\Delta V_f^\ddagger = 3.6 \text{ cm}^3 \text{ mol}^{-1}$ , studied at 0.1-150 MPa.	92A361
<b>27.27.2 Copper(I) ion</b>							
$\text{CH}_2\text{C}(\text{CH}_3)_2\text{NH}_3^+ + \text{Cu}^+ \rightarrow$ $\text{CuCH}_2\text{C}(\text{CH}_3)_2\text{NH}_3^{2+}$	$1.2 \times 10^9$	3			p.r.	P.b.k. at 375 nm in N <sub>2</sub> O-satd. soln. contg. 0.02-0.2 mol L <sup>-1</sup> 2-methyl-2-propanamine, 0-0.0005 mol L <sup>-1</sup> CuSO <sub>4</sub> and (3.9-11) × 10 <sup>-5</sup> mol L <sup>-1</sup> Cu <sup>+</sup> .	92A073
<b>27.27.3 Pentacyanonitrosylferrate(II) ion</b>							
$\text{CH}_2\text{C}(\text{CH}_3)_2\text{NH}_3^+ + \text{Fe}(\text{CN})_5\text{NO}^{3-} \rightarrow$ $[\text{Fe}(\text{CN})_5\text{N}(\text{O})\text{CH}_2\text{C}(\text{CH}_3)_2\text{NH}_3]^{2-}$	$1.2 \times 10^{10}$	6.0-7.5			p.r.	D.k. at 380 nm as well as p.b.k. in soln. contg. 0.3 mol L <sup>-1</sup> 2-methyl-2-propanamine and $5 \times 10^{-4}$ mol L <sup>-1</sup> Fe(CN) <sub>5</sub> NO <sup>2-</sup> .	79A134
<b>27.27.4 Pentaamminenitrosylruthenium(II) ion</b>							
$\text{CH}_2\text{C}(\text{CH}_3)_2\text{NH}_3^+ + \text{Ru}(\text{NH}_3)_5\text{NO}^{2+} \rightarrow$ $\text{Ru}(\text{NH}_3)_5\text{N}(\text{O})\text{CH}_2\text{C}(\text{CH}_3)_2\text{NH}_3^{3+}$	$2.0 \times 10^9$	6.0-7.5			p.r.	D.k. at 280 nm, as well as p.b.k. in soln. contg. 0.3 mol L <sup>-1</sup> 2-methyl-2-propanamine and $5 \times 10^{-4}$ mol L <sup>-1</sup> Ru(NH <sub>3</sub> ) <sub>5</sub> NO <sup>3+</sup> .	79A134
<b>27.28 1-Amino-3-(methylthio)propyl</b>							
<b>27.28.1 Ferricyanide ion</b>							
$\text{CH}_3\text{SCH}_2\text{CH}_2\dot{\text{C}}\text{HNH}_2 + \text{Fe}(\text{CN})_6^{3-} \rightarrow$ electron transfer	$3.5 \times 10^9$	5.8			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. methionine.	83A200
<b>27.28.2 Oxygen</b>							
$\text{CH}_3\text{SCH}_2\text{CH}_2\dot{\text{C}}\text{HNH}_2 + \text{O}_2 \rightarrow \text{O}_2^{\cdot-} +$ $\text{CH}_3\text{SCH}_2\text{CH}_2\text{CH}=\text{NH} + \text{H}^+$	$1.8 \times 10^9$	5.5			p.r.	D.k. at 290 nm in N <sub>2</sub> O-satd. soln. contg. methionine.	83A200
<b>27.28.3 4-Carboxybenzophenone, conjugate base</b>							
$\text{CH}_3\text{SCH}_2\text{CH}_2\dot{\text{C}}\text{HNH}_2 +$ $\text{C}_6\text{H}_5\text{COC}_6\text{H}_4\text{-4-CO}_2^- \rightarrow$ $\text{C}_6\text{H}_5\dot{\text{C}}(\text{OH})\text{C}_6\text{H}_4\text{-4-CO}_2^- +$ $\text{CH}_3\text{SCH}_2\text{CH}_2\text{CH}=\text{NH} + 2 \text{H}^+$	$8.0 \times 10^8$	6			p.r.	P.b.k. at 570 nm in N <sub>2</sub> O-satd. soln. contg. 4-carboxybenzophenone and methionine; $pK_a$ of ketyl radical = 8.2 [81A314], $pK_a$ of aminoalkyl radical = 3.85.	92A427
<b>27.28.4 Cysteine</b>							
$\text{CH}_3\text{SCH}_2\text{CH}_2\dot{\text{C}}\text{HNH}_2 + \text{CysSH} \rightarrow$ $\text{CH}_3\text{SCH}_2\text{CH}_2\text{CH}=\text{NH} + \text{H}^+ + \text{Cys}^\cdot$	$2.7 \times 10^8$	8.2			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> methionine and $5 \times 10^{-4}$ mol L <sup>-1</sup> cysteine.	89A096
	$\sim 1 \times 10^9$	8.3			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> methionine.	83A200
<b>27.28.5 L-Cystinylbisglycine</b>							
$\text{CH}_3\text{SCH}_2\text{CH}_2\dot{\text{C}}\text{HNH}_2 + (\text{CysGly})_2 \rightarrow$ $\text{CH}_3\text{SCH}_2\text{CH}_2\text{CH}=\text{NH} + (\text{CysGly})_2^{\cdot-} +$ $\text{H}^+$	$> 7 \times 10^6$	8.1			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> methionine and (CysGly) <sub>2</sub> .	89A096
<b>27.28.6 1,1'-Dimethyl-4,4'-bipyridinium</b>							
$\text{CII}_3\text{SCl}_2\text{CH}_2\dot{\text{C}}\text{HNH}_2 + \text{MV}^{2+} \rightarrow$ $\text{MV}^{\cdot+} + \text{CH}_3\text{SCH}_2\text{CH}_2\text{CH}=\text{NH} + 2 \text{H}^+$	$3.6 \times 10^9$	7			p.r.	P.b.k. at 600 nm in N <sub>2</sub> O-satd. soln. contg. 5 × 10 <sup>-3</sup> mol L <sup>-1</sup> methionine.	81A124 83A200
<b>27.28.7 1,2-Dithiolane-3-pentanoate ion (Lipoate ion)</b>							
$\text{CH}_3\text{SCH}_2\text{CH}_2\dot{\text{C}}\text{HNH}_2 + \text{RSSR} \rightarrow$ electron transfer	$\sim 1 \times 10^8$	8.2			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. methionine.	83A200
<b>27.28.8 Nicotinamide adenine dinucleotide</b>							
$\text{CH}_3\text{SCH}_2\text{CH}_2\dot{\text{C}}\text{HNH}_2 + \text{NAD}^+ \rightarrow$ $\text{CH}_3\text{SCH}_2\text{CH}_2\text{CH}=\text{NH} + \text{H}^+ + \text{NAD}^\cdot$	$8.5 \times 10^8$	6.6			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. methionine.	83A200

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>27.28 1-Amino-3-(methylthio)propyl — Continued</b>								
<b>27.28.9 4-Nitroacetophenone</b>								
	$\text{CH}_3\text{SCH}_2\text{CH}_2\dot{\text{C}}\text{HNH}_2 + \text{PNAP} \rightarrow [\text{PNAP}]^\cdot + \text{CH}_3\text{SCH}_2\text{CH}_2\text{CH}=\text{NH} + \text{H}^+$	$3.9 \times 10^9$	4.3-11			p.r.	P.b.k. at 350 or 545 nm in N <sub>2</sub> O-satd. soln. contg. $5 \times 10^{-3}$ mol L <sup>-1</sup> methionine and $2 \times 10^{-5}$ mol L <sup>-1</sup> PNAP.	83A200
<b>27.28.10 2,2,6,6-Tetramethylpiperidine-<i>N</i>-oxyl</b>								
	$\text{CH}_3\text{SCH}_2\text{CH}_2\dot{\text{C}}\text{HNH}_2 + \text{TMPN} \rightarrow$	$5.4 \times 10^8$	7			p.r.	Cond. changes in N <sub>2</sub> O-satd. soln. contg. methionine.	83A200
<b>27.28.11 Tetranitromethane</b>								
	$\text{CH}_3\text{SCH}_2\text{CH}_2\dot{\text{C}}\text{HNH}_2 + \text{C}(\text{NO}_2)_4 \rightarrow$ electron transfer	$4.2 \times 10^9$	4.5			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. methionine.	83A200
<b>27.28.12 Cytochrome C</b>								
	$\text{CH}_3\text{SCH}_2\text{CH}_2\dot{\text{C}}\text{HNH}_2 + \text{Cyt C} (\text{Fe}^{3+}) \rightarrow$ electron transfer	$6.6 \times 10^8$	5.0			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. methionine.	83A200
<b>27.29 1-Amino-3-(methylthio)propyl, conjugate acid</b>								
<b>27.29.1 1,1'-Dimethyl-4,4'-bipyridinium</b>								
	$\text{CH}_3\text{SCH}_2\text{CH}_2\dot{\text{C}}\text{HNH}_3^+ + \text{MV}^{2+} \rightarrow \text{MV}^{+} + \text{CH}_3\text{SCH}_2\text{CH}_2\text{CH}=\text{NH} + 2 \text{H}^+$	$1.0 \times 10^7$	<3			p.r.	P.b.k. at 600 nm; calcd. from studies over a pH range in N <sub>2</sub> O satd. soln. contg. $5 \times 10^{-3}$ mol L <sup>-1</sup> methionine; $pK_a$ of radical = 3.85.	83A200
<b>27.29.2 2,2,6,6-Tetramethylpiperidine-<i>N</i>-oxyl</b>								
	$\text{CH}_3\text{SCH}_2\text{CH}_2\dot{\text{C}}\text{HNH}_3^+ + \text{TMPN} \rightarrow$	$2.3 \times 10^8$	<3			p.r.	Cond. changes in N <sub>2</sub> O-satd. soln. contg. methionine.	83A200
<b>27.30 2-Ammonio-1-phosphatoethyl</b>								
<b>27.30.1 Nifuroxime</b>								
	$\text{H}_3^+\text{NCH}_2\dot{\text{C}}\text{HOPO}_3^{2-} + \text{NF} \rightarrow$	$3.0 \times 10^9$	7			p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> <i>o</i> -phosphorylethanolamine; 1% <i>e</i> -transfer.	731099
<b>27.31 Carbamoyl</b>								
<b>27.31.1 Hexaamminecobalt(III) ion</b>								
	$[\text{CONH}_2 + \text{Co}(\text{NH}_3)_6]^{3+} \rightarrow$	$<3.6 \times 10^7$	6.2			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> formamide.	72A018
<b>27.31.2 Chromium(II) ion</b>								
	$[\text{CONH}_2 + \text{Cr}^{2+} \rightarrow \text{CrCONH}_2]^{2+}$	$6.5 \times 10^8$	~5			p.r.	P.b.k. in Ar- or N <sub>2</sub> O-satd. soln. contg. formamide.	741146
<b>27.31.3 Hexaammineruthenium(III) ion</b>								
	$[\text{CONH}_2 + \text{Ru}(\text{NH}_3)_6]^{3+} \rightarrow$	$<7.0 \times 10^7$	6.2			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> formamide; <i>e</i> -transfer.	72A018
<b>27.31.4 <i>aci</i>-Nitromethane anion</b>								
	$[\text{CONH}_2 + \text{CH}_2\text{NO}_2^- \rightarrow \text{adduct formation}]$	$2.4 \times 10^8$	9.15	-285	p.r.		D.k. (esr) in N <sub>2</sub> O-satd. soln. contg. (0.5-5) $\times 10^{-3}$ mol L <sup>-1</sup> nitromethane and 0.1 mol L <sup>-1</sup> formamide.	88D069
<b>27.32 1-Carbamoyl-1-hydroxyethyl</b>								
<b>27.32.1 Tetrahydroxyborate ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{OHCONH}_2 + \text{B}(\text{OH})_4^- \rightarrow$ $[\text{CO}^\cdot(\text{CH}_3)\text{CONH}_2 + \text{H}_3\text{BO}_3 + \text{H}_2\text{O}]$	$3.1 \times 10^8$	8.3	→0		p.r.	D.k. at 300 nm in N <sub>2</sub> O-satd. soln. contg. lactamide.	751053
<b>27.32.2 Ammonia</b>								
	$\text{CH}_3\dot{\text{C}}\text{OHCONH}_2 + \text{NH}_3 \rightarrow$ $[\text{CO}^\cdot(\text{CH}_3)\text{CONH}_2 + \text{NH}_4^+]$	$9.7 \times 10^8$	8.05	→0		p.r.	D.k. at 300 nm in N <sub>2</sub> O-satd. soln. contg. lactamide.	751053
<b>27.32.3 Hydroxide ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{OHCONH}_2 + \text{OH}^- \rightarrow$ $[\text{CO}^\cdot(\text{CH}_3)\text{CONH}_2 + \text{H}_2\text{O}]$	$1.1 \times 10^{10}$	8.0-10.2	→0		p.r.	D.k. at 300 nm in N <sub>2</sub> O-satd. soln. contg. lactamide.	751053

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>27.32 1-Carbamoyl-1-hydroxyethyl — Continued</b>								
27.32.4	Hydrogen phosphate ion							
	$\text{CH}_3\dot{\text{C}}\text{OHCONH}_2 + \text{HPO}_4^{2-} \rightarrow$ $\cdot\text{CO}^-(\text{CH}_3)\text{CONH}_2 + \text{H}_2\text{PO}_4^-$	$8.5 \times 10^8$	6.2	→0		p.r.	D.k. at 300 nm in N <sub>2</sub> O-satd. soln. contg. lactamide.	751053
27.32.5	Hydrogen pyrophosphate ion							
	$\text{CH}_3\dot{\text{C}}\text{OHCONH}_2 + \text{HP}_2\text{O}_7^{3-} \rightarrow$ $\cdot\text{CO}^-(\text{CH}_3)\text{CONH}_2 + \text{H}_2\text{P}_2\text{O}_7^{2-}$	$3.7 \times 10^8$	8.1, 9.3			p.r.	D.k. at 300 nm in N <sub>2</sub> O-satd. soln. contg. lactamide; <i>k</i> = $8.5 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> for P <sub>2</sub> O <sub>7</sub> <sup>4-</sup> .	751053
27.32.6	1,4-Benzoquinone							
	$\text{CH}_3\dot{\text{C}}\text{OHCONH}_2 + \text{Q} \rightarrow \text{Q}^\bullet + \text{other prod.}$	$2.0 \times 10^9$ $3.6 \times 10^9$	5.0 7.3			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. lactamide.	731052
27.33	(Carbamoyl)hydroxymethyl							
27.33.1	Tetrahydroxyborate ion							
	$\cdot\text{CHOHCONH}_2 + \text{B}(\text{OH})_4^- \rightarrow$ $\cdot\text{CHO}^-\text{CONH}_2 + \text{H}_3\text{BO}_3 + \text{H}_2\text{O}$	$9.1 \times 10^8$	8.25	→0		p.r.	D.k. at 290 nm in N <sub>2</sub> O-satd. soln. contg. glycolamide.	751053
27.33.2	Ammonia							
	$\cdot\text{CHOHCONH}_2 + \text{NH}_3 \rightarrow$ $\cdot\text{CHO}^-\text{CONH}_2 + \text{NH}_4^+$	$1.2 \times 10^9$	8.05, 8.25	→0		p.r.	D.k. at 290 nm in N <sub>2</sub> O-satd. soln. contg. glycolamide.	751053
27.33.3	Hydroxide ion							
	$\cdot\text{CHOHCONH}_2 + \text{OH}^- \rightarrow$ $\cdot\text{CHO}^-\text{CONH}_2 + \text{H}_2\text{O}$	$1.1 \times 10^{10}$	8.3- 9.9	→0		p.r.	D.k. at 290 nm in N <sub>2</sub> O-satd. soln. contg. glycolamide.	751053
27.33.4	Hydrogen phosphate ion							
	$\cdot\text{CHOHCONH}_2 + \text{HPO}_4^{2-} \rightarrow$ $\cdot\text{CHO}^-\text{CONH}_2 + \text{H}_2\text{PO}_4^-$	$1.8 \times 10^9$	8.3	→0		p.r.	D.k. at 290 nm in N <sub>2</sub> O-satd. soln. contg. glycolamide.	751053
27.33.5	Hydrogen pyrophosphate ion							
	$\cdot\text{CHOHCONH}_2 + \text{HP}_2\text{O}_7^{3-} \rightarrow$ $\cdot\text{CHO}^-\text{CONH}_2 + \text{H}_2\text{P}_2\text{O}_7^{2-}$	$1.1 \times 10^9$	6.1, 6.4	→0		p.r.	D.k. at 290 nm in N <sub>2</sub> O-satd. soln. contg. glycolamide.	751053
27.34	Carbamoyl(hydroxy)methyl, anion							
27.34.1	2-Methyl-1,4-naphthoquinone							
	$\cdot\text{CHO}^-\text{CONH}_2 + 2\text{-CH}_3\text{NQ} \rightarrow$	$2.3 \times 10^9$	7.1			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. glycolamide; 48% <i>e</i> -transfer.	731047
27.35	Carboxy(carboxymethylamino)methyl, dianion							
27.35.1	Ferricyanide ion							
	$\cdot\text{O}_2\text{CCH}_2\text{NH}\dot{\text{C}}\text{HCO}_2^- + \text{Fe}(\text{CN})_6^{3-} \rightarrow$	$5.0 \times 10^8$	7			p.r.	D.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. iminodiacetate ion.	81A023
27.35.2	Oxygen							
	$\cdot\text{O}_2\text{CCH}_2\text{NH}\dot{\text{C}}\text{HCO}_2^- + \text{O}_2 \rightarrow$ $\cdot\text{O}_2\text{CCH}_2\text{NHCH}(\text{OO}^\bullet)\text{CO}_2^-$	$8 \times 10^8$	7			p.r.	D.k. at 270 nm in N <sub>2</sub> O/O <sub>2</sub> -satd. soln. contg. iminodiacetate ion.	81A023
27.36	1-Carboxyethenyl, anion							
27.36.1	Acetylenecarboxylate ion							
	$\text{H}_2\text{C}=\dot{\text{C}}\text{CO}_2^- + \text{HC}\equiv\dot{\text{C}}\text{CO}_2^- \rightarrow$ $\text{H}_2\text{C}=\text{C}(\text{CO}_2^-)\text{CII}=\dot{\text{C}}\text{CO}_2^-$	$4.2 \times 10^6$	11			p.r.	D.k. (esr) in N <sub>2</sub> -satd. soln. contg. 0.002 mol L <sup>-1</sup> acetylenecarboxylate ion.	82D088
27.37	1-Carboxyethyl							
27.37.1	1-Carboxyethyl							
	$\text{CH}_3\dot{\text{C}}\text{HCO}_2\text{H} + \text{CH}_3\dot{\text{C}}\text{HCO}_2\text{H} \rightarrow$	$1.1 \times 10^9$	3			p.r.	D.k. at 300 nm in N <sub>2</sub> O-satd. soln. contg. propionic acid; $\epsilon$ = 700 L mol <sup>-1</sup> cm <sup>-1</sup> ; <i>pK<sub>a</sub></i> = 4.9.	690446
27.37.2	Chromium(II) ion							
	$\text{CH}_3\dot{\text{C}}\text{HCO}_2\text{H} + \text{Cr}^{2+} \rightarrow$ $\text{CrCH}(\text{CH}_3)\text{CO}_2\text{H}^{2+}$	$1.1 \times 10^8$	~1			p.r.	P.b.k. in Ar-satd. soln. contg. propionic acid and HClO <sub>4</sub> .	741146

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>27.37 1-Carboxyethyl — Continued</b>								
<b>27.37.3 Uranium(III) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HCO}_2\text{H} + \text{U}^{3+} \rightarrow$ $\text{UCH}(\text{CH}_3)\text{CO}_2\text{H}^{3+}$	$2.1 \times 10^7$	0.3			p.r.	D.k. sy 350 nm in He-satd. soln. contg. 0.5 mol L <sup>-1</sup> $\text{HClO}_4$ and 0.1-1 mol L <sup>-1</sup> propionic acid.	85A122
<b>27.37.4 Acrylic acid</b>								
	$\text{CH}_3\dot{\text{C}}\text{HCO}_2\text{H} + \text{H}_2\text{C}=\text{CHCO}_2\text{H} \rightarrow$ addn.	$3 \times 10^5$	-2			chem	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> $\text{H}_2\text{O}_2$ and propionic acid; used $2k(R + R) = 2.2 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	93D265
<b>27.37.5 Methacrylic acid</b>								
	$\text{CH}_3\dot{\text{C}}\text{HCO}_2\text{H} + \text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2\text{H} \rightarrow$ addn.	$5 \times 10^5$	-2			chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> $\text{H}_2\text{O}_2$ and propionic acid; used $2k(R + R) = 2.2 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	93D265
<b>27.38 1-Carboxyethyl, anion</b>								
<b>27.38.1 1-Carboxyethyl, anion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HCO}_2^- + \text{CH}_3\dot{\text{C}}\text{HCO}_2^- \rightarrow$	$6 \times 10^8$	10, 13.5			p.r.	D.k. at 335 nm in $\text{N}_2\text{O}$ -satd. soln. contg. propionate ion; $c = 950$ L mol <sup>-1</sup> cm <sup>-1</sup> ; $pK_a = 4.9$ .	690446
<b>27.38.2 Copper(II) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HCO}_2^- + \text{Cu}^{2+} \rightarrow$ $\text{CuCH}(\text{CH}_3)\text{CO}_2^+$	$5 \times 10^8$	6			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $(2-10) \times 10^{-5}$ mol L <sup>-1</sup> $\text{CuSO}_4$ and 0.01 mol L <sup>-1</sup> propionate ion.	80A277
<b>27.38.3 Nifuroxime</b>								
	$\text{CH}_3\dot{\text{C}}\text{HCO}_2^- + \text{NF}^- \rightarrow$	$4.0 \times 10^9$	7			p.r.	P.b.k. at 390 nm ( $\text{NF}^-$ ) in $\text{N}_2\text{O}$ -satd. soln. contg. 0.2 mol L <sup>-1</sup> propionate ion; 2% <i>e</i> -transfer based on abs. spectra.	731099
<b>27.39 2-Carboxyethyl</b>								
<b>27.39.1 Acrylic acid</b>								
	$\text{CH}_2\text{CH}_2\text{CO}_2\text{H} + \text{H}_2\text{C}=\text{CHCO}_2\text{H} \rightarrow$ addn.	$3.0 \times 10^6$	-2			chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> $\text{H}_2\text{O}_2$ and propionic acid; used $2k(R + R) = 2.1 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	93D265
<b>27.39.2 Methacrylic acid</b>								
	$\text{CH}_2\text{CH}_2\text{CO}_2\text{H} + \text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2\text{H} \rightarrow$ → addn.	$3.5 \times 10^6$	-2			chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> $\text{H}_2\text{O}_2$ and propionic acid; used $2k(R + R) = 2.1 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	93D265
<b>27.40 1-Carboxy-2-hydroxyethyl, anion</b>								
<b>27.40.1 Acrylate ion</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{HCO}_2^- + \text{CH}_3\dot{\text{C}}\text{HCO}_2^- \rightarrow$ $\text{HOCH}_2\text{CH}(\text{CO}_2^-)\text{CH}_2\dot{\text{C}}\text{HCO}_2^-$	$7 \times 10^4$	12	0.1- 0.5		p.r.	D.k. (esr) in $\text{N}_2$ -satd. soln. contg. acrylate ion.	82A328
<b>27.40.2 Nifuroxime</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{HCO}_2^- + \text{NF}^- \rightarrow$	$6 \times 10^9$	7			p.r.	P.b.k. at 390 nm in soln. contg. $4 \times 10^{-4}$ mol L <sup>-1</sup> acrylate ion; 65% <i>e</i> -transfer.	731099
<b>27.41 2-Carboxy-1-hydroxy-1-methylethyl, dianion</b>								
<b>27.41.1 Ferricyanide ion</b>								
	$\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CH}_2\text{CO}_2^- + \text{Fe}(\text{CN})_6^{3-} \rightarrow$	$7.3 \times 10^8$	7.0			p.r.	D.k. at 420 nm in soln. contg. acetoacetate ion (radical by reaction with $\text{e}_{\text{aq}}^-$ ).	731104
<b>27.41.2 Permanganate ion</b>								
	$\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CH}_2\text{CO}_2^- + \text{MnO}_4^- \rightarrow$	$4.8 \times 10^9$	9.2			p.r.	D.k. at 545 nm in Ar-satd. soln. contg. acetoacetate and <i>tert</i> -BuOH.	731104

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
<b>27.41 2-Carboxy-1-hydroxy-1-methylethyl, dianion — Continued</b>								
27.41.3	<b>9,10-Anthraquinone</b> $\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CH}_2\text{CO}_2^- + \text{AQ} \rightarrow [\text{AQ}]^{2-} + \text{CH}_3\text{COCH}_2\text{CO}_2^-$	$6.7 \times 10^8$	9.2			p.r.	P.b.k. at 400 nm in Ar-satd. soln. contg. acetoacetate and 1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	731104
27.41.4	<b>9,10-Anthraquinone-2,6-disulfonate ion</b> $\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CH}_2\text{CO}_2^- + 2,6\text{-diSO}_3\text{AQ}^{2-} \rightarrow [2,6\text{-diSO}_3\text{AQ}]^{3-} + \text{CH}_3\text{COCH}_2\text{CO}_2^-$	$7.2 \times 10^8$	9.2			p.r.	P.b.k. at 400 nm in Ar-satd. soln. contg. acetoacetate and <i>tert</i> -BuOH.	731104
27.41.5	<b>9,10-Anthraquinone-2-sulfonate ion</b> $\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CH}_2\text{CO}_2^- + 2\text{-SO}_3\text{AQ}^- \rightarrow [2\text{-SO}_3\text{AQ}]^{2-} + \text{CH}_3\text{COCH}_2\text{CO}_2^-$	$2.1 \times 10^9$	9.2			p.r.	P.b.k. at 400 nm in Ar-satd. soln. contg. acetoacetate and <i>tert</i> -BuOH.	731104
27.41.6	<b>2,5-Dimethyl-1,4-benzoquinone</b> $\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CH}_2\text{CO}_2^- + 2,5\text{-}(\text{CH}_3)_2\text{Q} \rightarrow [2,5\text{-}(\text{CH}_3)_2\text{Q}]^{2-} + \text{CH}_3\text{COCH}_2\text{CO}_2^-$	$3.3 \times 10^9$	9.2			p.r.	P.b.k. at 400 nm in Ar-satd. soln. contg. <i>tert</i> -BuOH + acetoacetate ion.	731104
27.41.7	<b>2-Hydroxy-1,4-naphthoquinone</b> $\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CH}_2\text{CO}_2^- + 2\text{-}(\text{OH})\text{NQ} \rightarrow [2\text{-}(\text{OH})\text{NQ}]^{2-} + \text{CH}_3\text{COCH}_2\text{CO}_2^-$	$1.5 \times 10^9$	9.2			p.r.	P.b.k. at 400 nm in Ar-satd. soln. contg. acetoacetate ion and <i>tert</i> -BuOH.	731104
27.41.8	<b>2-Methyl-1,4-naphthoquinone</b> $\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CH}_2\text{CO}_2^- + 2\text{-CH}_3\text{NQ} \rightarrow [2\text{-CH}_3\text{NQ}]^{2-} + \text{CH}_3\text{COCH}_2\text{CO}_2^-$	$3.7 \times 10^9$	9.2			p.r.	P.b.k. at 395 nm in soln. contg. acetoacetate and 1 mol L <sup>-1</sup> <i>tert</i> -BuOH; 95% <i>e</i> -transfer.	731047 731104
<b>27.42 2-Carboxy-2-hydroxy-2-methylethyl, anion</b>								
27.42.1	<b>Pentacyanonitrosylferrate(II) ion</b> $[\text{Fe}(\text{CN})_5\text{NO}]^{3-} + \text{CH}_2\text{C}(\text{CH}_3)(\text{OH})\text{CO}_2^- \rightarrow [\text{Fe}(\text{CN})_5\text{N}(\text{O})\text{CH}_2\text{COH}(\text{CH}_3)\text{CO}_2]^{4-}$	$6.3 \times 10^8$	6.0			p.r.	D.k. at 380 nm as well as p.b.k. in soln. contg. 0.3 mol L <sup>-1</sup> 2-hydroxyisobutyrate ion and $5 \times 10^{-4}$ mol L <sup>-1</sup> Fe(CN) <sub>5</sub> NO <sup>2-</sup> .	79A134
27.42.2	<b>Pentaamminenitrosylruthenium(II) ion</b> $[\text{Ru}(\text{NH}_3)_5\text{NO}]^{3+} + \text{CH}_2\text{C}(\text{CH}_3)(\text{OH})\text{CO}_2^- \rightarrow [\text{Ru}(\text{NH}_3)_5\text{N}(\text{O})\text{CH}_2\text{C}(\text{CH}_3)(\text{OH})\text{CO}_2]^{2+}$	$3.0 \times 10^9$	6.0			p.r.	D.k. at 280 nm, as well as p.b.k. in soln. contg. 0.3 mol L <sup>-1</sup> 2-hydroxyisobutyrate ion and $4 \times 10^{-4}$ mol L <sup>-1</sup> Ru(NH <sub>3</sub> ) <sub>5</sub> NO <sup>3+</sup> .	79A134
<b>27.43 1-Carboxy-2-hydroxypropyl, anion</b>								
27.43.1	<b>Nifuroxime</b> $\text{CH}_3\text{CHOH}\dot{\text{C}}\text{HCO}_2^- + \text{NF} \rightarrow$	$5.5 \times 10^9$	7			p.r.	P.b.k. at 390 nm in soln. contg. crotonate ion; 25% <i>e</i> -transfer.	731099
<b>27.44 Carboxy(methylamino)methyl, anion</b>								
27.44.1	<b>2-Methyl-1,4-naphthoquinone</b> $\text{CH}_3\text{NH}\dot{\text{C}}\text{HCO}_2^- + 2\text{-CH}_3\text{NQ} \rightarrow$	$1.1 \times 10^9$	6.0			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. sarcosine; 33% <i>e</i> -transfer.	731047
		$1.7 \times 10^9$	12.5			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. sarcosine; 64% <i>e</i> -transfer.	731047
<b>27.45 1-Carboxy-1-methylethyl<sup>1</sup></b>								
27.45.1	<b>1-Carboxy-1-methylethyl</b> $[\text{C}(\text{CH}_3)_2\text{CO}_2\text{H}]^{2-} + [\text{C}(\text{CH}_3)_2\text{CO}_2\text{H}] \rightarrow$	$-5 \times 10^8$	3			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. isobutyric acid; $\text{pK}_a = 5.8$ .	690446
27.45.2	<b>Chromium(II) ion</b> $[\text{C}(\text{CH}_3)_2\text{CO}_2\text{H}]^{2-} + \text{Cr}^{2+} \rightarrow \text{CrC}(\text{CH}_3)_2\text{CO}_2\text{H}^{2+}$	$1.2 \times 10^8$	1.0-2.0		295	p.r.	P.b.k. at 290 nm in N <sub>2</sub> O-satd. soln. contg. $(2\text{-}10) \times 10^{-4}$ mol L <sup>-1</sup> Cr <sup>2+</sup> and 0.1 mol L <sup>-1</sup> isobutyric acid; $[\text{CH}_2\text{CH}(\text{CH}_3)\text{CO}_2\text{H}]$ also contributes to this reaction.	82A315

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>27.45 1-Carboxy-1-methylethyl — Continued</b>								
<b>27.45.3 Tris(1,10-phenanthroline)iron(III) ion</b>								
	$\cdot\text{C}(\text{CH}_3)_2\text{CO}_2\text{H} + \text{Fe}(\text{phen})_3^{3+} \rightarrow \text{redn.}$	$6.3 \times 10^7$		~1		p.r.	P.b.k. at 490 nm in soln. contg. isobutyric acid; also includes reaction of $\cdot\text{CH}_2\text{CH}(\text{CH}_3)\text{CO}_2\text{H}$ .	85A284
<b>27.45.4 Acrylic acid</b>								
	$\cdot\text{C}(\text{CH}_3)_2\text{CO}_2\text{H} + \text{H}_2\text{C}=\text{CHCO}_2\text{H} \rightarrow$ addn.	$5 \times 10^5$		~2		chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and isobutyric acid; estimated from an assumed $2k(R + R)$ .	93D265
<b>27.45.5 Methacrylic acid</b>								
	$\cdot\text{C}(\text{CH}_3)_2\text{CO}_2\text{H} + \text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2\text{H} \rightarrow$ addn.	$7 \times 10^5$		~2		chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and isobutyric acid; estimated from an assumed $2k(R + R)$ .	93D265
<b>27.46 1-Carboxy-1-methylethyl, anion</b>								
<b>27.46.1 1-Carboxy-1-methylethyl, anion</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{CO}_2^- + (\text{CH}_3)_2\dot{\text{C}}\text{CO}_2^- \rightarrow$	$\sim 5 \times 10^8$		9		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. isobutyric acid; $pK_a = 5.8$ .	690446
<b>27.47 2-Carboxy-2-methylpropyl</b>								
<b>27.47.1 2-Carboxy-2-methylpropyl</b>								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2\text{H} +$ $\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2\text{H} \rightarrow$ $\text{HO}_2\text{CC}(\text{CH}_3)_2\text{CH}_2\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2\text{H}$	$7 \times 10^8$				p.r.	D.k. at 245 nm in N <sub>2</sub> O-satd. soln. contg. pivalic acid; studied at pH 2.2-8.3; $pK_a = 4.9$ .	94A494
		$6.5 \times 10^8$		3		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. pivalic acid; $pK_a = 4.8$ .	690446
<b>27.47.2 2-Carboxy-2-methylpropyl, anion</b>								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2\text{H} +$ $\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2^- \rightarrow$ $\text{HO}_2\text{CC}(\text{CH}_3)_2\text{CH}_2\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2^-$	$\sim 7 \times 10^8$				p.r.	D.k. at 245 nm in N <sub>2</sub> O-satd. soln. contg. pivalic acid; studied at pH 2.2-8.3; $pK_a = 4.9$ .	94A494
<b>27.47.3 Chromium(II) ion</b>								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2\text{H} + \text{Cr}^{2+} \rightarrow$ $\text{CrCH}_2\text{C}(\text{CH}_3)_2\text{CO}_2\text{H}^{2+}$	$1.1 \times 10^8$		~1		p.r.	P.b.k. in Ar-satd. soln. contg. pivalic acid and $\text{HClO}_4$ .	741146
<b>27.47.4 Copper(I) ion</b>								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2\text{H} + \text{Cu}^+ \rightarrow$ $\text{CuCH}_2\text{C}(\text{CH}_3)_2\text{CO}_2\text{H}^+$	$2.4 \times 10^9$		1.0- 3.5		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. $(5-30) \times 10^{-4}$ mol L <sup>-1</sup> CuSO <sub>4</sub> , $(5-30) \times 10^{-5}$ mol L <sup>-1</sup> Cu <sup>+</sup> and 0.05-0.1 mol L <sup>-1</sup> pivalic acid.	90A474
<b>27.47.5 Copper(II) ion</b>								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2\text{H} + \text{Cu}^{2+} \rightarrow$ $\text{CuCH}_2\text{C}(\text{CH}_3)_2\text{CO}_2\text{H}^{2+}$	$3.1 \times 10^7$		3-4		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. $(5-20) \times 10^{-4}$ mol L <sup>-1</sup> CuSO <sub>4</sub> and 0.05-0.1 mol L <sup>-1</sup> pivalic acid.	90A474
<b>27.47.6 Tris(1,10-phenanthroline)iron(III) ion</b>								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2\text{H} + \text{Fe}(\text{phen})_3^{3+} \rightarrow$ redn.	$7.2 \times 10^7$		~1		p.r.	P.b.k. at 490 nm in soln. contg. pivalic acid.	85A284
<b>27.48 2-Carboxy-2-methylpropyl, anion</b>								
<b>27.48.1 2-Carboxy-2-methylpropyl, anion</b>								
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2^- +$ $\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2^- \rightarrow$ $\text{O}_2\text{CC}(\text{CH}_3)_2\text{CH}_2\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2^-$	$3.7 \times 10^8$				p.r.	D.k. at 245 nm in N <sub>2</sub> O-satd. soln. contg. pivalic acid; studied at pH 2.2-8.3; $pK_a = 4.9$ .	94A494
		$4.7 \times 10^8$		9		p.r.	D.k. at 240 nm in N <sub>2</sub> O-satd. soln. contg. pivalate ion; $\epsilon = 1800 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	690446

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>27.48 2-Carboxy-2-methylpropyl, anion — Continued</b>								
<b>27.48.2 Pentacyanonitrosylferrate(II) ion</b>								
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2^- + \text{Fe}(\text{CN})_5\text{NO}^{3-} \rightarrow [\text{Fe}(\text{CN})_5\text{N}(\text{O})\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2]^{4-}$	$2.0 \times 10^9$	6.0-7.5	p.r.	D.k. at 380 nm as well as p.b.k. in soln. contg. 0.3 mol L <sup>-1</sup> pivalate ion and $5 \times 10^{-4}$ mol L <sup>-1</sup> $\text{Fe}(\text{CN})_5\text{NO}^{3-}$ .		79A134	
<b>27.48.3 Pentaamminenitrosylruthenium(II) ion</b>								
	$^{\bullet}\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2^- + \text{Ru}(\text{NH}_3)_5\text{NO}^{2+} \rightarrow [\text{Ru}(\text{NH}_3)_5\text{N}(\text{O})\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2]^{+}$	$2.9 \times 10^9$	6.0-7.5	p.r.	D.k. at 280 nm, as well as p.b.k. in soln. contg. 0.3 mol L <sup>-1</sup> pivalate ion and $5 \times 10^{-4}$ mol L <sup>-1</sup> $\text{Ru}(\text{NH}_3)_5\text{NO}^{2+}$ .		79A134	
<b>27.49 2-Carboxy-5-oxopyrrolidinyl, conjugate base</b>								
<b>27.49.1 Hydroxide ion</b>								
	$-(\text{CH}_2)_2\text{CONH}\dot{\text{C}}(\text{CO}_2^-) + \text{OH}^- \rightarrow -(\text{CH}_2)_2\text{CON}^-\dot{\text{C}}(\text{CO}_2^-) + \text{H}_2\text{O}$	$1 \times 10^9$		e-r.	Estd. by esr from pH dependence of line width in N <sub>2</sub> O-satd. soln. contg. 2-pyrrolidone-5-carboxylic acid; ( $\text{p}K_a = 12.7$ ).		775087	
<b>27.50 1-Carboxypropyl</b>								
<b>27.50.1 1-Carboxypropyl</b>								
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCO}_2\text{H} + \text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCO}_2\text{H} \rightarrow$	$\sim 5 \times 10^8$	3	p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. butyric acid; $\text{p}K_a = 4.8$ .		690446	
<b>27.51 1-Carboxypropyl, anion</b>								
<b>27.51.1 1-Carboxypropyl, anion</b>								
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCO}_2^- + \text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCO}_2^- \rightarrow$	$\sim 5 \times 10^8$	9	p.r.	D.k. at 335 nm in N <sub>2</sub> O-satd. soln. contg. butyrate ion; $\epsilon = 900 \text{ L mol}^{-1} \text{ cm}^{-1}$ .		690446	
<b>27.51.2 Nifuroxime</b>								
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCO}_2^- + \text{NF}^- \rightarrow$	$4.9 \times 10^9$	7	p.r.	P.b.k. at 390 nm (NF <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> butyrate ion; 2% <i>e</i> -transfer.		731099	
<b>27.52 2-Carboxypropyl</b>								
<b>27.52.1 Acrylic acid</b>								
	$^{\bullet}\text{CH}_2\text{CH}(\text{CH}_3)\text{CO}_2\text{H} + \text{H}_2\text{C}=\text{CHCO}_2\text{H} \rightarrow$ addn.	$2.5 \times 10^6$	-2	chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and isobutyric acid; used $2k(R + R) = 1.4 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .		93D265	
<b>27.52.2 Methacrylic acid</b>								
	$^{\bullet}\text{CH}_2\text{CH}(\text{CH}_3)\text{CO}_2\text{H} + \text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2\text{H} \rightarrow$ addn.	$2.5 \times 10^6$	-2	chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and isobutyric acid; used $2k(R + R) = 1.4 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .		93D265	
<b>27.53 1-Chloro-2,2-difluoro-2-methoxyethyl</b>								
<b>27.53.1 Oxygen</b>								
	$\text{CH}_3\text{OCF}_2\dot{\text{C}}\text{HCl} + \text{O}_2 \rightarrow \text{CH}_3\text{OCF}_2\text{CHClOO}^{\bullet}$	$1.3 \times 10^9$		p.r.	Eval. from leveling off of rate of reaction of peroxy radical with ABTS, chlorpromazine, promethazine, ascorbate and propyl gallate at high concn. of substrates in air-satd. soln. contg. 0.5-1 mol L <sup>-1</sup> <i>tert</i> -BuOH and methoxyflurane.		88A364	
<b>27.54 1-Chloro-2-oxoethyl</b>								
<b>27.54.1 1-Chloro-2-oxoethyl</b>								
	$^{\bullet}\text{CHClCHO} + ^{\bullet}\text{CHClCHO} \rightarrow$	$2.6 \times 10^8$		p.r.	D.k. at 265 nm in N <sub>2</sub> O-satd. soln. contg. $10^{-4}$ mol L <sup>-1</sup> <i>trans</i> -1,2-dichloroethylene; $\epsilon = 800 \text{ L mol}^{-1} \text{ s}^{-1}$ (from graph).		710709	

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>27.55 2-(Chloromethylene)-1,3-dioxolane radical cation</b>								
27.55.1	Hydroxide ion							
	$[-(\text{CH}_2)_2\text{OC}(\text{=CHCl})\text{O}]^{+\cdot} + \text{OH}^- \rightarrow$ $\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{other prod.}$	$1.2 \times 10^9$	$\leq 5$			p.r.	Cond. changes; radical from 2-(dichloromethyl)-1,3-dioxolane.	81D027
<b>27.56 Crotonamide, radical anion</b>								
27.56.1	Water							
	$[\text{CH}_3\text{CHCHCONH}_2]^{+\cdot} + \text{H}_2\text{O} \rightarrow$ $\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCONH}_2 + \text{OH}^-$	$2 \times 10^4 \text{ s}^{-1}$	10.2			p.r.	D.k. in soln. contg. <i>trans</i> -crotonamide and borate buffer.	751052
<b>27.57 Crotonic acid, radical anion</b>								
27.57.1	Water							
	$[\text{CH}_3\text{CHCHCO}_2\text{H}]^{+\cdot} + \text{H}_2\text{O} \rightarrow$ $\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCO}_2^- + \text{H}_2\text{O}$	$1.0 \times 10^4 \text{ s}^{-1}$	10.4			p.r.	D.k. in soln. contg. crotonate; extrapolated to zero concn. of buffer.	761113
27.57.2	Hydroxide ion							
	$[\text{CH}_3\text{CHCHCO}_2\text{H}]^{+\cdot} + \text{OH}^- \rightarrow$ $\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCO}_2^- + \text{OH}^-$	$\sim 1.2 \times 10^8$	$>7.5 \rightarrow 0$			p.r.	D.k. in soln. contg. <i>trans</i> -crotonate.	761113
<b>27.58 18-Crown-6 radical</b>								
27.58.1	18-Crown-6 radical							
	$\text{C}_{12}\text{H}_{23}\text{O}_6 + \text{C}_{12}\text{H}_{23}\text{O}_6 \rightarrow$	$2 \times 10^8$	6.7			p.r.	D.k. at 260 nm; radical by H-abstr. with $\cdot\text{OH}$ ; similar results at pH 1.2 with $\text{H}^\bullet$ , also studied at pH 13.6.	87A299
<b>27.59 1-Cyanoethyl</b>								
27.59.1	Chromium(II) ion							
	$\text{CH}_3\dot{\text{C}}\text{HCN} + \text{Cr}^{2+} \rightarrow \text{CrCH}(\text{CH}_3)\text{CN}^{2+}$	$2.3 \times 10^8$	1.0-2.0		295	p.r.	P.b.k. at 290 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $(2\text{-}10) \times 10^{-4} \text{ mol L}^{-1}$ $\text{Cr}^{2+}$ and 0.2 mol $\text{L}^{-1}$ propionitrile; $\cdot\text{CH}_2\text{CH}_2\text{CN}$ also contributes to this reaction.	82A315
<b>27.60 Cyanomethyl</b>								
27.60.1	Oxygen							
	$\cdot\text{CH}_2\text{CN} + \text{O}_2 \rightarrow \text{NCCCH}_2\text{OO}^\cdot$	$1.3 \times 10^9$				p.r.	P.b.k. in $\text{N}_2\text{O}/\text{O}_2$ (4:1) satd. soln. contg. 5% acetonitrile.	90A371
<b>27.61 1-Cyano-1-methylethyl</b>								
27.61.1	Chromium(II) ion							
	$\cdot\text{C}(\text{CH}_3)_2\text{CN} + \text{Cr}^{2+} \rightarrow \text{CrC}(\text{CH}_3)_2\text{CN}^{2+}$	$1.9 \times 10^8$	1.0-2.0		295	p.r.	P.b.k. at 290 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $(2\text{-}10) \times 10^{-4} \text{ mol L}^{-1}$ $\text{Cr}^{2+}$ and 0.1 mol $\text{L}^{-1}$ isobutyronitrile; $\cdot\text{CH}_2\text{CH}(\text{CH}_3)\text{CN}$ also contributes to this reaction.	82A315
<b>27.62 (Cyclohexyl)hydroxymethyl</b>								
27.62.1	Biacetyl							
	$c\text{-C}_6\text{H}_{11}\dot{\text{C}}\text{HOH} + \text{CH}_3\text{COCOCH}_3 \rightarrow$ $c\text{-C}_6\text{H}_{11}\dot{\text{C}}\text{HO} + \text{H}^\bullet +$ $[\text{CH}_3\text{COCOCH}_3]^{+\cdot}$	$2.6 \times 10^8$				p.r.	P.b.k. at 300 nm in $\text{N}_2\text{O}$ -satd. soln. contg. cyclohexanemethanol.	680249
<b>27.63 Diamide, radical anion</b>								
27.63.1	Hydrogen phosphate ion							
	$[(\text{CH}_3)_2\text{NCONNCON}(\text{CH}_3)_2]^{+\cdot} +$ $\text{H}_2\text{PO}_4^- \rightarrow$ $(\text{CH}_3)_2\text{NCONH}\dot{\text{N}}\text{CON}(\text{CH}_3)_2 +$ $\text{HPO}_4^{2-}$	$7 \times 10^7$	6-9			p.r.	D.k. at 300 nm in soln. contg. $10^{-4} \text{ mol L}^{-1}$ <i>tert</i> -BuOH and diamide.	751194

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
27.64	1,2-Dicarboxy-1,2-dihydroxyethyl							
27.64.1	2-Methyl-1,4-naphthoquinone							
	$\text{HO}_2\dot{\text{C}}\text{COHCHOHCO}_2\text{H} + 2\text{-CH}_3\text{NQ} \rightarrow$	$7.0 \times 10^8$	3.2			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. tartaric acid; 14% <i>e</i> -transfer.	731047
27.65	1,2-Dicarboxy-1,2-dihydroxyethyl, dianion							
27.65.1	Hemin c							
	$\text{O}_2\dot{\text{C}}\text{COHCHOHCO}_2^- + \text{Hem-Fe}^{\text{III}} \rightarrow$	$8.1 \times 10^7$	7.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.02 mol L <sup>-1</sup> tartrate.	75A241
	$\text{Hem-Fe}^{\text{II}}$							
27.65.2	2-Methyl-1,4-naphthoquinone							
	$\text{O}_2\dot{\text{C}}\text{COHCHOHCO}_2^- + 2\text{-CH}_3\text{NQ} \rightarrow$	$7.0 \times 10^8$	11.0			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. tartrate ion; 69% <i>e</i> -transfer.	731047
27.65.3	Cytochrome C							
	$\text{O}_2\dot{\text{C}}\text{COHCHOHCO}_2^- + \text{Cyt C (Fe}^{3+}\text{)} \rightarrow$	$1.7 \times 10^8$	7			p.r.	P.b.k. at 550 nm in soln. contg. tartrate.	751012
27.65.4	Cytochrome C, carboxymethylated							
	$\text{O}_2\dot{\text{C}}\text{COHCHOHCO}_2^- + \text{Cxm-cyt C} \rightarrow$	$2.8 \times 10^7$	7			p.r.	P.b.k. at 550 nm in soln. contg. 0.01 mol L <sup>-1</sup> tartrate ion.	78A288
27.65.5	Metmyoglobin							
	$\text{O}_2\dot{\text{C}}\text{COHCHOHCO}_2^- + \text{Fe}^{3+}\text{Mb} \rightarrow$	$3.5 \times 10^7$	7			p.r.	Abs. changes in soln. contg. 0.01 mol L <sup>-1</sup> tartrate.	78A288
27.66	1,2-Dicarboxyethyl							
27.66.1	1,2-Dicarboxyethyl							
	$\text{IIO}_2\dot{\text{C}}\text{ClIClI}_2\text{CO}_2\text{II} +$	$4 \times 10^8$				p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. succinic acid; pH study (2-14)	85A487
	$\text{HO}_2\dot{\text{C}}\text{CHCH}_2\text{CO}_2\text{H} \rightarrow$							
27.66.2	Hexachloroiridate(IV) ion							
	$\text{HO}_2\dot{\text{C}}\text{CHCH}_2\text{CO}_2\text{H} + \text{IrCl}_6^{2-} \rightarrow \text{IrCl}_6^{3-}$	$4.6 \times 10^8$	3.3			p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. succinate.	82A041
+ other prod.								
27.67	1,2-Dicarboxyethyl, dianion							
27.67.1	1,2-Dicarboxyethyl, dianion							
	$\text{O}_2\dot{\text{C}}\text{CH}_2\dot{\text{C}}\text{HCO}_2^- + \text{O}_2\dot{\text{C}}\text{CH}_2\dot{\text{C}}\text{HCO}_2^- \rightarrow$	$5 \times 10^6$				p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. succinic acid; pH study (2-14)	85A487
27.67.2	Hexachloroiridate(IV) ion							
	$\text{O}_2\dot{\text{C}}\text{CH}_2\dot{\text{C}}\text{HCO}_2^- + \text{IrCl}_6^{2-} \rightarrow \text{IrCl}_6^{3-}$	$1.1 \times 10^8$	7			p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. succinate.	82A041
+ other prod.								
27.68	1,2-Dicarboxy-2-hydroxyethenyl, dianion							
27.68.1	Hydroxide ion							
	$\text{O}_2\dot{\text{C}}(\text{OH})=\dot{\text{C}}\text{CO}_2^- + \text{OH}^- \rightarrow$	$1.9 \times 10^9$				p.r.	D.k. (esr) in N <sub>2</sub> O-satd. soln. contg. acetylenedicarboxylate ion as a function of [OH <sup>-</sup> ]; product protonates and isomerizes to $\text{O}_2\dot{\text{C}}(\text{O})\dot{\text{C}}\text{HO}_2^-$ .	82D088
	$\text{O}_2\dot{\text{C}}(\text{O}^-)=\dot{\text{C}}\text{CO}_2^- + \text{H}_2\text{O}$							
27.69	1,2-Dicarboxy-1-hydroxyethyl							
27.69.1	1,2-Dicarboxy-1-hydroxyethyl							
	$\text{HO}_2\dot{\text{C}}\text{COHCH}_2\text{CO}_2\text{H} +$	$2.5 \times 10^8$				p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. malic acid; pH study (2-14)	85A487
	$\text{HO}_2\dot{\text{C}}\text{COHCH}_2\text{CO}_2\text{H} \rightarrow$							
27.70	1,2-Dicarboxy-1-hydroxyethyl, monoanion							
27.70.1	1,2-Dicarboxy-1-hydroxyethyl, monoanion							
	$\text{HO}_2\dot{\text{C}}\text{CH}_2\dot{\text{C}}\text{OHCO}_2^- +$	$1.3 \times 10^8$				p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. malic acid; pH study (2-14)	85A487
	$\text{HO}_2\dot{\text{C}}\text{CH}_2\dot{\text{C}}\text{HO}_2^- \rightarrow$							

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
27.71	1,2-Dicarboxy-1-hydroxyethyl, dianion							
27.71.1	1,2-Dicarboxy-1-hydroxyethyl, dianion							
	$\text{O}_2\dot{\text{C}}\text{COHCH}_2\text{CO}_2^- + \text{O}_2\dot{\text{C}}\text{COHCH}_2\text{CO}_2^- \rightarrow$	$2.0 \times 10^6$				p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. malic acid; pH study (2-14)	85A48
27.71.2	2-Methyl-1,4-naphthoquinone							
	$\text{O}_2\dot{\text{C}}\text{COHCH}_2\text{CO}_2^- + 2\text{-CH}_3\text{NQ} \rightarrow$	$1.1 \times 10^9$	7.0			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. malate;; 47% <i>e</i> -transfer.	731047
		$3.1 \times 10^9$	6.2			p.r.	P.b.k. at 395 nm in soln. contg. oxaloacetate and 1 mol L <sup>-1</sup> <i>tert</i> -BuOH; 92% <i>e</i> -transfer.	731047
27.71.3	Nifuroxime							
	$\text{O}_2\dot{\text{C}}\text{COHCH}_2\text{CO}_2^- + \text{NF} \rightarrow$	$1.2 \times 10^8$	7			p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> malate ion; 30% <i>e</i> -transfer.	731099
27.71.4	Cytochrome C							
	$\text{O}_2\dot{\text{C}}\text{COHCH}_2\text{CO}_2^- + \text{Cyt C}(\text{Fe}^{3+}) \rightarrow$	$8.5 \times 10^7$	6.4			p.r.	P.b.k. at 550 nm in malate soln.: $E_a = 12 \text{ kJ mol}^{-1}$	741007
27.72	1,2-Dicarboxy-1-hydroxyethyl, trianion							
27.72.1	1,2-Dicarboxy-1-hydroxyethyl, trianion							
	$\text{O}_2\dot{\text{C}}\text{CH}_2\dot{\text{C}}(\text{O}^-)\text{CO}_2^- + \text{O}_2\dot{\text{C}}\text{CH}_2\dot{\text{C}}(\text{O}^-)\text{CO}_2^- \rightarrow$	$2.0 \times 10^5$				p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. malic acid; pH study (2-14)	85A487
27.73	1,2-Dicarboxy-2-hydroxyethyl, dianion							
27.73.1	Copper(II) ion							
	$\text{O}_2\dot{\text{C}}\text{CHOHCHCO}_2^- + \text{Cu}^{2+} \rightarrow$	$<2 \times 10^7$	1.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. (5-10) $\times 10^{-5}$ mol L <sup>-1</sup> CuSO <sub>4</sub> and (2.5-10) $\times 10^{-4}$ mol L <sup>-1</sup> fumarate; adduct yields Cu <sup>+</sup> .	80A277
	$\text{CuCH}(\text{CO}_2^-)\text{C}(\text{OH})\text{CO}_2^-$	$3.1 \times 10^7$	2.1					
		$6.4 \times 10^7$	2.6					
		$1.2 \times 10^8$	3.0					
		$1.8 \times 10^8$	3.5					
		$8.0 \times 10^8$	5.0					
		$8 \times 10^8$	6					
27.73.2	Nifuroxime							
	$\text{O}_2\dot{\text{C}}\text{CHOHCHCO}_2^- + \text{NF} \rightarrow$	$2.4 \times 10^9$	7			p.r.	P.b.k. at 390 nm in soln. contg. maleate ion; 3% <i>e</i> -transfer.	731099
27.74	Dicarboxy(hydroxy)methyl, dianion							
27.74.1	2-Methyl-1,4-naphthoquinone							
	$^*\text{C}(\text{OH})(\text{CO}_2^-)_2 + 2\text{-CH}_3\text{NQ} \rightarrow$	$2.5 \times 10^9$	9.2			p.r.	P.b.k. at 395 nm in soln. contg. ketomalonate and 1 mol L <sup>-1</sup> <i>tert</i> -BuOH; 94% <i>e</i> -transfer; p <i>K</i> <sub>a</sub> = 12.9.	731047
[2-CH <sub>3</sub> NQ] <sup>-</sup> + other prod.								
27.75	Dicarboxymethyl							
27.75.1	Hexaamminecobalt(III) ion							
	$^*\text{CH}(\text{CO}_2\text{H})_2 + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow$	$<8.0 \times 10^6$	2.5			p.r.	D.k. in Ar-satd. soln. contg. 0.01 mol L <sup>-1</sup> malonic acid.	72A018
27.75.2	Chromium(II) ion							
	$^*\text{CH}(\text{CO}_2\text{H})_2 + \text{Cr}^{2+} \rightarrow \text{CrCH}(\text{CO}_2\text{H})_2^{2+}$	$6.0 \times 10^7$	~1			p.r.	P.b.k. in Ar-satd. soln. contg. malonic acid and HClO <sub>4</sub> .	741146
27.75.3	Hexaammineruthenium(III) ion							
	$^*\text{CH}(\text{CO}_2\text{H})_2 + \text{Ru}(\text{NH}_3)_6^{3+} \rightarrow$	$<1.1 \times 10^8$	2.5			p.r.	D.k. in Ar-satd. soln. contg. 0.01 mol L <sup>-1</sup> malonic acid.	72A018
27.75.4	Titanium(III)							
	$^*\text{CH}(\text{CO}_2\text{H})_2 + \text{Ti}(\text{III}) \rightarrow \text{Ti}(\text{IV}) + \text{other prod.}$	$8 \times 10^6$	~0			e-r.	Estd. from effect of [Ti <sup>III</sup> ] on esr signal intensity; assuming $2k(R + R) \approx 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	730249

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>27.76 Dicarboxymethyl dianion</b>								
27.76.1	<b>5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatomanganate(II) ion</b>	$\cdot\text{CH}(\text{CO}_2^-)_2 + \text{MnTPPS}^{4-} \rightarrow$	$5.8 \times 10^8$	6.6	295	p.r.	P.b.k. in soln. contg. malonate; radical oxidizes Mn(II) to Mn(III).	92A391
27.76.2	<b>Ascorbate ion</b>	$\cdot\text{CH}(\text{CO}_2^-)_2 + \text{AH}^- \rightarrow \text{CH}_2(\text{CO}_2^-)_2 + \text{A}^{\cdot-}$	$1.3 \times 10^7$	7.5		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.8 mol L <sup>-1</sup> malonate.	733006
27.76.3	<b>Nifuroxime</b>	$\cdot\text{CH}(\text{CO}_2^-)_2 + \text{NF} \rightarrow$	$1.3 \times 10^9$	7		p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> malonate ion; 3% <i>e</i> -transfer.	731099
<b>27.77 Dichloro(cyano)methyl</b>								
27.77.1	<b>Oxygen</b>	$\cdot\text{CCl}_2\text{CN} + \text{O}_2 \rightarrow \text{CCl}_2(\text{CN})\text{OO}^{\cdot}$	$3.9 \times 10^8$			p.r.	Eval. from leveling off of rate of reaction of peroxy radical with ABTS, chlorpromazine, promethazine and ascorbate at high concn. of substrates in air-satd. soln. contg. 0.5-1 mol L <sup>-1</sup> <i>tert</i> -BuOH and trichloroacetonitrile.	88A364
<b>27.78 1,1-Dichloro-2-oxoethyl</b>								
27.78.1	<b>1,1-Dichloro-2-oxoethyl</b>	$\cdot\text{CCl}_2\text{CHO} + \cdot\text{CCl}_2\text{CHO} \rightarrow$	$3.1 \times 10^8$			p.r.	D.k. at 265 nm in N <sub>2</sub> O-satd. soln. contg. 10 <sup>-4</sup> mol L <sup>-1</sup> trichloroethylene; $\epsilon = 3200 \text{ L mol}^{-1} \text{ s}^{-1}$ (from graph).	710709
<b>27.79 Dicyclohexano-18-crown-6 radical</b>								
27.79.1	<b>Dicyclohexano-18-crown-6 radical</b>	$\text{C}_{20}\text{H}_{35}\text{O}_5 + \text{C}_{20}\text{H}_{35}\text{O}_5 \rightarrow$	$1.4 \times 10^9$ $2.5 \times 10^8$ $1.8 \times 10^8$	1.0 6.5 13.5		p.r.	D.k. at 260 nm in Ar-satd. soln. at pH 1 and in N <sub>2</sub> O-satd. soln. at pH 6.5 and 13.5; $\epsilon = 1300 \text{ L mol}^{-1} \text{ cm}^{-1}$ at pH $\geq 6.5$ and $\epsilon = 3500 \text{ L mol}^{-1} \text{ cm}^{-1}$ at pH 1.	88A440
<b>27.80 1,1-Diethoxyethene radical cation</b>								
27.80.1	<b>Hydroxide ion</b>	$[(\text{C}_2\text{H}_5\text{O})_2\text{C}=\text{CH}_2]^+ + \text{OH}^- \rightarrow$ $\cdot\text{CH}_2\text{CO}_2\text{C}_2\text{H}_5 + \text{EtOH}$	$2.5 \times 10^9$			p.r.	Cond. changes; radical from 2-chloro-1,1-diethoxyethane.	81D027
<b>27.81 1-[(Diethoxy)methoxy]ethyl</b>								
27.81.1	<b>Ferricyanide ion</b>	$(\text{C}_2\text{H}_5\text{O})_2\text{CHOCHCH}_3 + \text{Fe}(\text{CN})_6^{3-} \rightarrow$ $(\text{C}_2\text{H}_5\text{O})_2\text{CHOCH}^+\text{CH}_3 + \text{Fe}(\text{CN})_6^{4-}$	$1.6 \times 10^9$	7-8	293	p.r.	D.k. at 420 nm in soln. contg. 0.01 mol L <sup>-1</sup> triethyl orthoformate and (5-50) $\times 10^{-5}$ mol L <sup>-1</sup> Fe(CN) <sub>6</sub> <sup>3-</sup> .	86A155
27.81.2	<b>Hexachloroiridate(IV) ion</b>	$(\text{C}_2\text{H}_5\text{O})_2\text{CHOCHCH}_3 + \text{IrCl}_6^{2-} \rightarrow$ $(\text{C}_2\text{H}_5\text{O})_2\text{CHOCH}^+\text{CH}_3 + \text{IrCl}_6^{3-}$	$2.9 \times 10^9$	7-8	293	p.r.	D.k. at 490 nm in soln. contg. 0.01 mol L <sup>-1</sup> triethyl orthoformate and (5-50) $\times 10^{-5}$ mol L <sup>-1</sup> IrCl <sub>6</sub> <sup>2-</sup> ; $k = 2.8 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ from condy. meas.	86A155
<b>27.82 1-(Diethylamino)ethyl</b>								
27.82.1	<b>Benzophenone</b>	$\text{CH}_3\dot{\text{C}}\text{HNEt}_2 + (\text{C}_6\text{H}_5)_2\text{CO} \rightarrow$ $(\text{C}_6\text{H}_5)_2\dot{\text{C}}\text{O}^- + \text{H}^+ + \text{CH}_2=\text{CHNEt}_2$	$1.2 \times 10^8$			f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L <sup>-1</sup> NaOH, 0.072 mol L <sup>-1</sup> triethylamine and benzophenone; $k$ increases as water increases to 80%.	86A248

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
27.82	1-(Diethylamino)ethyl	$1.5 \times 10^9$	~12			f.p./rq	P.b.k. at 620 nm in soln. contg. 0.29 mol L <sup>-1</sup> triethylamine, benzophenone and 20% acetonitrile. Reaction followed quenching of <sup>3</sup> [BP]* by triethylamine.	84A285
27.82.2	4-Chlorobenzophenone	$4.3 \times 10^8$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L <sup>-1</sup> NaOH, 0.072 mol L <sup>-1</sup> triethylamine and 4-chlorobenzophenone.	86A248
27.82.3	4,4'-Dichlorobenzophenone	$1.4 \times 10^9$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L <sup>-1</sup> NaOH, 0.072 mol L <sup>-1</sup> triethylamine and 4,4'-dichlorobenzophenone.	86A248
27.82.4	4,4'-Dimethoxybenzophenone	$5.2 \times 10^6$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L <sup>-1</sup> NaOH, 0.072 mol L <sup>-1</sup> triethylamine and 4,4'-dimethoxybenzophenone.	86A248
27.82.5	4-Fluorobenzophenone	$2.1 \times 10^8$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L <sup>-1</sup> NaOH, 0.072 mol L <sup>-1</sup> triethylamine and 4-fluorobenzophenone.	86A248
27.82.6	4-Methoxybenzophenone	$2.9 \times 10^7$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L <sup>-1</sup> NaOH, 0.072 mol L <sup>-1</sup> triethylamine and 4-methoxybenzophenone.	86A248
27.82.7	4-Methylbenzophenone	$8.3 \times 10^7$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L <sup>-1</sup> NaOH, 0.072 mol L <sup>-1</sup> triethylamine and 4-methylbenzophenone.	86A248
27.82.8	2-Methyl-1,4-naphthoquinone	$4.6 \times 10^9$	11.6			p.r.	P.b.k. at 395 nm in soln. contg. triethylamine; 37% <i>e</i> -transfer; ~10% <i>e</i> -transfer at pH 6.	731047
27.82.9	4-(Trifluoromethyl)benzophenone	$1.6 \times 10^9$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L <sup>-1</sup> NaOH, 0.072 mol L <sup>-1</sup> triethylamine and 4-(trifluoromethyl)benzophenone.	86A248
27.83	2-(Diethylamino)ethyl, conjugate acid							
27.83.1	Copper(I) ion							
	$\text{CH}_3\text{CH}_2\text{NEt}_2\text{H}^+ + \text{Cu}^+ \rightarrow \text{CuCH}_2\text{CH}_2\text{NEt}_2\text{H}^{2+}$	$7.5 \times 10^8$	2.2-	3.5		p.r.	P.b.k. at 370 nm in N <sub>2</sub> O-satd. soln. contg. 0.05-0.1 mol L <sup>-1</sup> triethylamine, 0.0001 mol L <sup>-1</sup> CuSO <sub>4</sub> and (0.05-0.13) × 10 <sup>-3</sup> mol L <sup>-1</sup> Cu <sup>+</sup> .	93A473
27.84	1,2-Dihydroxybutyl							
27.84.1	Hydrogen ion							
	$\text{CH}_3\text{CH}_2\text{CHOH}\dot{\text{C}}\text{HOH} + \text{H}^+ \rightarrow \text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCHO} + \text{H}_2\text{O} + \text{H}^+$	$1.5 \times 10^8$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 1,2-butanediol at varied [H <sup>+</sup> ]; acid catalysis.	86A220

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
<b>27.84 1,2-Dihydroxybutyl — Continued</b>								
<b>27.84.2 1,4-Benzoquinone</b>	$\text{CH}_3\text{CH}_2\text{CHOH}\dot{\text{C}}\text{HOH} + \text{Q} \rightarrow \text{Q}^{\cdot-} + \text{other prod.}$	$2.5 \times 10^9$		6.7		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 1,2-butanediol.	86A220
<b>27.85 1,4-Dihydroxybutyl</b>								
<b>27.85.1 Cysteamine, conjugate acid</b>	${}^{\cdot}\text{CHOHCH}_2\text{CH}_2\text{CH}_2\text{OH} + \text{HSCH}_2\text{CH}_2\text{NH}_3^+ \rightarrow \text{HO}(\text{CH}_2)_4\text{OH} + \text{H}_3\text{N}^+\text{CH}_2\text{CH}_2\text{S}^{\cdot}$	$1.1 \times 10^8$				p.r.	P.b.k. at 410 nm (RSSR <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. 1,4-butanediol.	680132
<b>27.86 1,2-Dihydroxycyclohexyl</b>								
<b>27.86.1 Hydrogen ion</b>	$c\text{-}\dot{\text{C}}_6\text{H}_9\text{-}1,2\text{-(OH)}_2 + \text{H}^+ \rightarrow \text{H}_2\text{O} + c\text{-C}_6\text{H}_{10}\text{-(=O)} + \text{H}^+$	$1.3 \times 10^9$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 1,2-cyclohexanediol at varied [H <sup>+</sup> ]; acid catalysis.	86A220
<b>27.86.2 1,1'-Dimethyl-4,4'-bipyridinium</b>	$c\text{-}\dot{\text{C}}_6\text{H}_9\text{-}1,2\text{-(OH)}_2 + \text{MV}^{2+} \rightarrow \text{MV}^{\cdot+} + \text{other prod.}$	$1.3 \times 10^9$		6		p.r.	P.b.k. at 600 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 1,2-cyclohexanediol	86A220
<b>27.86.3 Dithiothreitol</b>	$c\text{-}\dot{\text{C}}_6\text{H}_9\text{-}1,2\text{-(OH)}_2 + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} \rightarrow \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{S}^{\cdot} + c\text{-C}_6\text{H}_{10}\text{-}1,2\text{-(OH)}_2$	$1.4 \times 10^8$		7.4		p.r.	P.b.k. at 390 nm (DTT <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. dithiothreitol and 1,2-cyclohexanediol.	87A250
<b>27.87 1,3-Dihydroxycyclohexyl</b>								
<b>27.87.1 Dithiothreitol</b>	$c\text{-}\dot{\text{C}}_6\text{H}_9\text{-}1,3\text{-(OH)}_2 + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} \rightarrow \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{S}^{\cdot} + c\text{-C}_6\text{H}_{10}\text{-}1,3\text{-(OH)}_2$	$3.4 \times 10^8$		7.4		p.r.	P.b.k. at 390 nm (DTT <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. dithiothreitol and 1,3-cyclohexanediol.	87A250
<b>27.88 1,4-Dihydroxycyclohexyl</b>								
<b>27.88.1 Dithiothreitol</b>	$c\text{-}\dot{\text{C}}_6\text{H}_9\text{-}1,4\text{-(OH)}_2 + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} \rightarrow \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{S}^{\cdot} + c\text{-C}_6\text{H}_{10}\text{-}1,4\text{-(OH)}_2$	$3.4 \times 10^8$		7.4		p.r.	P.b.k. at 390 nm (DTT <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. dithiothreitol and 1,4-cyclohexanediol.	87A250
<b>27.89 1,3-Dihydroxy-2,2-di(hydroxymethyl)propyl</b>								
<b>27.89.1 Hemin c</b>	${}^{\cdot}\text{CHOHC}(\text{CH}_2\text{OH})_3 + \text{Hem-Fe}^{\text{III}} \rightarrow \text{Hem-Fe}^{\text{II}} + \text{other prod.}$	$3.0 \times 10^8$		7.0		p.r.	P.b.k. at 413 nm in N <sub>2</sub> O-satd. soln. contg. 0.25 mol L <sup>-1</sup> pentaerythritol.	75A241
<b>27.89.2 Lead(I) ions</b>	${}^{\cdot}\text{ClIOHIC}(\text{CH}_2\text{OH})_3 + \text{Pb}^{\text{+}} \rightarrow \text{PbCHOHC}(\text{CH}_2\text{OH})_3^+$	$7.0 \times 10^8$				p.r.	D.k. at 300 nm (Pb <sup>+</sup> ) in soln. contg. Pb <sup>2+</sup> and pentaerythritol knowing initial [R] and [Pb <sup>+</sup> ]; cor. for R + R.	761170
<b>27.89.3 Cytochrome C</b>								
<b>27.89.3 Cytochrome C</b>	${}^{\cdot}\text{CHOHC}(\text{CH}_2\text{OH})_3 + \text{Cyt C}(\text{Fe}^{\text{3+}}) \rightarrow \text{Cyt C}(\text{Fe}^{\text{2+}}) + \text{other prod.}$	$<10^6$		5.6		p.r.	P.b.k. at 550 nm; radical from pentaerythritol.	751012
<b>27.90 1,2-Dihydroxy-1,2-dimethylpropyl</b>								
<b>27.90.1 Hydrogen ion</b>	$(\text{CH}_3)_2\text{C}(\text{OH})\dot{\text{C}}\text{OHCH}_3 + \text{H}^+ \rightarrow \text{CH}_3\dot{\text{C}}(\text{CH}_3)\text{COCH}_3 + \text{H}_2\text{O} + \text{H}^+$	$1.7 \times 10^9$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-methyl-2,3-butanediol at varied [H <sup>+</sup> ]; acid catalysis.	86A220

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
<b>27.90 1,2-Dihydroxy-1,2-dimethylpropyl</b> — Continued								
<b>27.90.2 1,4-Benzoquinone</b>								
	$(\text{CH}_3)_2\dot{\text{C}}(\text{OH})\dot{\text{C}}\text{HOCH}_3 + \text{Q}^{\bullet-} \rightarrow \text{Q}^{\bullet-} +$ other prod.	$1.9 \times 10^9$	6-7			p.r.	P.b.k. at 430 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-methyl-2,3-butanediol	86A220
<b>27.91 1,1-Dihydroxyethyl</b>								
<b>27.91.1 Tetranitromethane</b>								
	$\text{CH}_3\dot{\text{C}}(\text{OH})_2 + \text{C}(\text{NO}_2)_4 \rightarrow \text{CH}_3\text{CO}_2^- +$ $\text{C}(\text{NO}_2)_3 + \cdot\text{NO}_2 + \text{H}^+$	$2.8 \times 10^9$	6.5	-293	p.r.		P.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. 2 × $10^{-3}$ mol L <sup>-1</sup> acetaldehyde and (0.4-2.1) × $10^{-4}$ mol L <sup>-1</sup> TNM.	88A266
<b>27.92 1,2-Dihydroxy-1-(hydroxymethyl)ethyl</b>								
<b>27.92.1 Cadmium(II) ion</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{OHCH}_2\text{OH} + \text{Cd}^{2+} \rightarrow$	$<2.5 \times 10^5$				p.r.	No reaction obs.	751153
<b>27.92.2 Bis(1,10-phenanthroline)copper(II) ion</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{OHCH}_2\text{OH} + \text{Cu}(\text{phen})_2^{2+} \rightarrow$ $\text{Cu}(\text{phen})_2^+ +$ other prod.	$1.1 \times 10^8$	7			p.r.	P.b.k. in soln. contg. 0.1 mol L <sup>-1</sup> glycerol; reacting radicals also include $\cdot\text{CHOHCHOHCH}_2\text{OH}$ .	90A517
<b>27.92.3 Ferricyanide ion</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{OHCH}_2\text{OH} + \text{Fe}(\text{CN})_6^{3-} \rightarrow$	$3.3 \times 10^9$	7			p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L <sup>-1</sup> glycerol; radical mixture also contains $\cdot\text{CHOHCHOHCH}_2\text{OH}$ .	690522
<b>27.92.4 Hemin c</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{OHCH}_2\text{OH} + \text{Hem-Fe}^{\text{III}} \rightarrow$ $\text{Hem-Fe}^{\text{II}} +$ other prod.	$1.3 \times 10^9$	7.0			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> glycerol; radical mixture contains $\cdot\text{CHOHCHOHCH}_2\text{OH}$ .	75A241
<b>27.92.5 Hydrogen ion</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{OHCH}_2\text{OH} + \text{H}^+ \rightarrow$ $\text{HOCH}_2\dot{\text{C}}\text{HCHO} + \text{H}_2\text{O} + \text{H}^+$	$3.5 \times 10^6$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> glycerol at varied [H <sup>+</sup> ]; acid catalysis.	86A220
<b>27.92.6 Oxygen</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{OHCH}_2\text{OH} + \text{O}_2 \rightarrow$ addn.	$3.3 \times 10^9$	7			p.r.	C.k. in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. 0.4 mol L <sup>-1</sup> glycerol and ferricyanide. rel. to $k(\text{HOCH}_2\dot{\text{C}}\text{OHCH}_2\text{OH} + \text{Fe}(\text{CN})_6^{3-}) = 3.3 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	690522
<b>27.92.7 1,1'-Dimethyl-4,4'-bipyridinium</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{OHCH}_2\text{OH} + \text{MV}^{2+} \rightarrow \text{MV}^{\bullet+}$ + other prod.	$1.2 \times 10^8$	6			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> glycerol. Radical mixture also contains $\cdot\text{CHOHCHOHCH}_2\text{OH}$ .	86A220
<b>27.92.8 Nifuroxime</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{OHCH}_2\text{OH} + \text{NF} \rightarrow$	$1.3 \times 10^9$	7			p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. 0.2 mol L <sup>-1</sup> glycerol; 20% <i>e</i> -transfer.	731099
<b>27.92.9 Tetranitromethane</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{OHCH}_2\text{OH} + \text{C}(\text{NO}_2)_4 \rightarrow$	$2.4 \times 10^9$				p.r.	P.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> glycerol.	640133
<b>27.92.10 Cytochrome C</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{OHCH}_2\text{OH} + \text{Cyt C}(\text{Fe}^{3+}) \rightarrow$	$2.5 \times 10^6$	7			p.r.	P.b.k. at 550 nm; radicals from glycerol.	751012
<b>27.93 2,3-Dihydroxy-1-(hydroxymethyl)propenyl</b>								
<b>27.93.1 Hydrogen ion</b>								
	$\text{HOCH}_2\dot{\text{C}}(\text{OH})=\dot{\text{C}}\text{CH}_2\text{OH} + \text{H}^+ \rightarrow$ $\text{HOCH}_2\dot{\text{C}}\text{OCHCH}_2\text{OH}$	$\geq 5 \times 10^6$	1-2			chem.	Esr study in soln. contg. Ti(III), H <sub>2</sub> O <sub>2</sub> and 2-butyne-1,4-diol using $k(R + R) = I \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	89D228

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
<b>27.93 2,3-Dihydroxy-1-(hydroxymethyl)propenyl — Continued</b>								
<b>27.93.2 2-Butyne-1,4-diol</b>								
	$\text{HOCH}_2\text{C}(\text{OH})=\dot{\text{C}}\text{CH}_2\text{OH} + \text{HOCH}_2\text{C}\equiv\text{CCH}_2\text{OH} \rightarrow \text{HOCHC}\equiv\text{CCH}_2\dot{\text{O}}\text{H} + \text{HOCH}_2\text{C}(\text{OH})=\text{CHCH}_2\text{OH}$	$\geq 1.6 \times 10^7$	1.5			chem.	Esr study in soln. contg. Ti(III), H <sub>2</sub> O <sub>2</sub> and 2-butyne-1,4-diol using $k(R+R) = 1 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	89D228
<b>27.94 2,3-Dihydroxy-4-mercaptopbutyyl</b>								
<b>27.94.1 Dithiothreitol</b>								
	${}^{\cdot}\text{CH}_2(\text{CHOH})_2\text{CH}_2\text{SH} + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} \rightarrow \text{CH}_3(\text{CHOH})_2\text{CH}_2\text{SH} + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{S}^{\cdot}$	$5.5 \times 10^6$	7.1			p.r.	P.b.k. at 390 nm in deaerated soln. contg. 0.02 mol L <sup>-1</sup> dithiothreitol.	89A096
<b>27.95 Dihydroxymethyl</b>								
<b>27.95.1 Dihydroxymethyl</b>								
	${}^{\cdot}\text{CH}(\text{OH})_2 + {}^{\cdot}\text{CH}(\text{OH})_2 \rightarrow \text{HCO}_2\text{H} + \text{CH}_2(\text{OH})_2$	$1.4 \times 10^9$			293	f.p.	D.k. at 260 nm in soln. contg. H <sub>2</sub> O <sub>2</sub> and formaldehyde; $\epsilon = 550 \text{ L mol}^{-1} \text{ cm}^{-1}$ ; unclear whether <i>k</i> or <i>2k</i> .	91A163
		$3.6 \times 10^8$	6.3			p.r.	D.k. at 250 nm, as well as condy. change, in N <sub>2</sub> O-satd. soln. contg. formaldehyde, as well as in soln. contg. <i>tert</i> -BuOH and CO; $\epsilon \approx 850$ and 1500 L mol <sup>-1</sup> cm <sup>-1</sup> at pH 6 and 11.8, resp.; $\text{p}K_a = 9.5$ .	710424
		$2.3 \times 10^8$	12					
		$5.0 \times 10^8$	5			p.r.	D.k. at 230 nm in N <sub>2</sub> O-satd. soln. contg. formaldehyde; $\epsilon = 520 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	710924
<b>27.95.2 Chromium(II) ion</b>								
	${}^{\cdot}\text{CH}(\text{OH})_2 + \text{Cr}^{2+} \rightarrow \text{CrCH}(\text{OH})_2^{2+}$	$1.3 \times 10^8$	2.8-6			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.3 mol L <sup>-1</sup> formaldehyde, 10 <sup>-3</sup> mol L <sup>-1</sup> Cr <sup>2+</sup> and 0.3 mol L <sup>-1</sup> Na perchlorate. Product forms CrCHO <sup>2+</sup> , $k = 1 \times 10^2 \text{ s}^{-1}$ .	85A084
<b>27.95.3 Hydrogen peroxide</b>								
	${}^{\cdot}\text{CH}(\text{OH})_2 + \text{H}_2\text{O}_2 \rightarrow \text{CH}_2(\text{OH})_2 + \text{HO}_2^{\cdot}$	$7.4 \times 10^5$			293	f.p.	D.k. at 260 nm in Ar-satd. soln. contg. H <sub>2</sub> O <sub>2</sub> and formaldehyde.	91A163
		$3.5 \times 10^6$			293	phot.	Estd. from chain termination.	91A163
<b>27.95.4 Oxygen</b>								
	${}^{\cdot}\text{CH}(\text{OH})_2 + \text{O}_2 \rightarrow \text{CH}(\text{OH})_2\text{OO}^{\cdot}$	$3.5 \times 10^9$			293	f.p.	D.k. in air-satd. soln. contg. H <sub>2</sub> O <sub>2</sub> and formaldehyde.	91A163
		$4.5 \times 10^9$	3.5-6.5		294	p.r.	Increase in condy obs. in N <sub>2</sub> O/O <sub>2</sub> (80/20 v:v) satd. soln. contg. 5 × 10 <sup>-3</sup> mol L <sup>-1</sup> formaldehyde and (2-27) × 10 <sup>-5</sup> mol L <sup>-1</sup> oxygen; products are formate and H <sub>2</sub> O <sub>2</sub> .	80A282
		$7.7 \times 10^8$	5.7			p.r.	D.k. at 250 nm in N <sub>2</sub> O-satd. soln. contg. formaldehyde, as well as condy. increase.	710424
<b>27.95.5 Nitrobenzene</b>								
	${}^{\cdot}\text{CH}(\text{OH})_2 + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow \text{HCO}_2^- + 2 \text{H}^+ + [\text{C}_6\text{H}_5\text{NO}_2]^-$	$1.9 \times 10^9$	5.8			p.r.	P.b.k. at 290 nm in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> formaldehyde; also condy. study.	710424
<b>27.96 Dihydroxymethyl, conjugate base</b>								
<b>27.96.1 Nitrobenzene</b>								
	${}^{\cdot}\text{CH}(\text{OH})\text{O}^- + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow \text{HCO}_2^- + \text{H}^+ + [\text{C}_6\text{H}_5\text{NO}_2]^-$	$4.5 \times 10^9$	12			p.r.	P.b.k. at 290 nm in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> formaldehyde; also condy. study.	710424

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
27.97	1,4-Dihydroxy-1-methylbutyl							
27.97.1	1,4-Dihydroxy-1-methylbutyl							
	$\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\dot{\text{C}}(\text{OH})\text{CH}_3 + \text{CH}_3\text{CH}(\text{OH})\text{CH}_2\dot{\text{C}}(\text{OH})\text{CH}_3 \rightarrow$	$\sim 5 \times 10^8$	6.5			p.r.	D.k. at 280 nm in N <sub>2</sub> O-satd. soln. contg. 2,4-pentanediol; used <i>G</i> (radicals) = $6.0 \times 10^{-7}$ mol J <sup>-1</sup> ; mixture of radicals.	94P051
27.98	1,2-Dihydroxy-1-methylethyl							
27.98.1	1,1'-Dimethyl-4,4'-bipyridinium							
	$\text{CH}_3\dot{\text{C}}\text{OHCH}_2\text{OH} + \text{MV}^{2+} \rightarrow \text{MV}^{++} +$ other prod.	$\sim 5 \times 10^8$	6			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 1,2-propanediol.	86A220
27.99	1,2-Dihydroxy-1-methylpropyl							
27.99.1	Hydrogen ion							
	$\text{CH}_3\text{CHOH}\dot{\text{C}}\text{OHCH}_3 + \text{H}^+ \rightarrow$ $\text{CH}_3\text{CO}\dot{\text{C}}\text{HCH}_3 + \text{H}_2\text{O} + \text{H}^+$	$9.7 \times 10^8$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2,3-butanediol at varied [H <sup>+</sup> ]; acid catalysis.	86A220
27.99.2	1,1'-Dimethyl-4,4'-bipyridinium							
	$\text{CH}_3\text{CHOH}\dot{\text{C}}\text{OHCH}_3 + \text{MV}^{2+} \rightarrow \text{MV}^{++} +$ + other prod.	$1.1 \times 10^9$	6			p.r.	P.b.k. at 600 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2,3-butanediol	86A220
27.99.3	Tetranitromethane							
	$\text{CH}_3\text{CHOH}\dot{\text{C}}\text{OHCH}_3 + \text{C}(\text{NO}_2)_4 \rightarrow$	$3.3 \times 10^9$				p.r.	P.b.k. in soln. contg. 0.2 mol L <sup>-1</sup> 2,3-butanediol.	730126
27.100	1,2-Dihydroxy-1-methylpropyl, conjugate base							
27.100.1	First-order reaction							
	$\text{CH}_3\text{CHOH}\dot{\text{C}}\text{O}^- \text{CH}_3 \rightarrow \text{OH}^- +$ $\text{CH}_3\text{CO}\dot{\text{C}}\text{HCH}_3$	$\geq 8.1 \times 10^6 \text{ s}^{-1}$	$\geq 12$			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 2,3-butanediol; rel. to <i>k</i> (R + <i>N</i> -methylisonicotinate ion) = $3.8 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	79A051
27.101	1,2-Dihydroxy-2-methylpropyl							
27.101.1	Hydrogen ion							
	$(\text{CH}_3)_2\text{COH}\dot{\text{C}}\text{HOH} + \text{H}^+ \rightarrow$ $(\text{CH}_3)_2\text{CHO} + \text{H}_2\text{O} + \text{H}^+$	$7.0 \times 10^8$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-methylpropane-1,2-diol at varied [H <sup>+</sup> ]; acid catalysis.	86A220
27.101.2	1,4-Benzoquinone							
	$(\text{CH}_3)_2\text{COH}\dot{\text{C}}\text{HOH} + \text{Q} \rightarrow \text{Q}^\cdot +$ other prod.	$2.0 \times 10^9$	6-7			p.r.	P.b.k. at 430 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-methyl-1,2-propanediol.	86A220
27.102	1,2-Dihydroxypropyl							
27.102.1	Hydrogen ion							
	$\text{CHOHCHOHCH}_3 + \text{H}^+ \rightarrow$ $\text{CH}_3\dot{\text{C}}\text{HCHO} + \text{H}_2\text{O} + \text{H}^+$	$9 \times 10^7$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 1,2-propanediol at varied [H <sup>+</sup> ]; acid catalysis.	86A220
27.102.2	1,1'-Dimethyl-4,4'-bipyridinium							
	$\text{CHOHCHOHCH}_3 + \text{MV}^{2+} \rightarrow \text{MV}^{++} +$ other prod.	$\sim 1 \times 10^8$	6			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 1,2-propanediol.	86A220
27.102.3	Tetranitromethane							
	$\text{CHOHCHOHCH}_3 + \text{C}(\text{NO}_2)_4 \rightarrow$	$3.2 \times 10^9$				p.r.	P.b.k. in soln. contg. 0.2 mol L <sup>-1</sup> 1,2-propanediol.	730126
27.103	1,2-Dihydroxypropyl, conjugate base							
27.103.1	First-order reaction							
	$\text{CH}_3\text{CHOH}\dot{\text{C}}\text{HOH} \rightarrow \text{OH}^- +$ $\text{CH}_3\dot{\text{C}}\text{HCHO}$	$5.3 \times 10^6 \text{ s}^{-1}$	$\geq 12$			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. 1,2-propanediol; rel. to <i>k</i> (R + <i>N</i> -methylisonicotinate ion) = $3.8 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	79A051

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>27.104 1,3-Dihydroxypropyl</b>								
27.104.1 Cysteamine, conjugate acid	$\cdot\text{CHOHCH}_2\text{CH}_2\text{OH} + \text{HSCH}_2\text{CH}_2\text{NH}_3^+ \rightarrow$	$<1 \times 10^7$				p.r.	P.b.k. at 410 nm ( $\text{RSSR}^-$ ) in $\text{N}_2\text{O}$ -satd. soln. contg. allyl alcohol.	680132
<b>27.104.2 Nifuroxime</b>								
	$\cdot\text{CHOHCH}_2\text{CH}_2\text{OH} + \text{NF}^- \rightarrow$	$5.1 \times 10^9$	7			p.r.	P.b.k. at 395 nm ( $\text{NF}^-$ ) in $\text{N}_2\text{O}$ -satd. soln. contg. allyl alcohol; 3% <i>e</i> -transfer.	731062 731099
<b>27.104.3 4-Nitroacetophenone</b>								
	$\cdot\text{CHOHCH}_2\text{CH}_2\text{OH} + \text{PNAP}^- \rightarrow$	$2.7 \times 10^9$	7			p.r.	P.b.k. at 360 and 550 nm ( $\text{PNAP}^-$ ) in $\text{N}_2\text{O}$ -satd. soln. contg. allyl alcohol; 3% <i>e</i> -transfer.	731062
<b>27.104.4 Nitrobenzene</b>								
	$\cdot\text{CHOHCH}_2\text{CH}_2\text{OH} + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$	$\sim 1.5 \times 10^9$	7			p.r.	P.b.k. at 400 nm in $\text{N}_2\text{O}$ -satd. soln. contg. allyl alcohol; 5% <i>e</i> -transfer.	731062
<b>27.105 1-(Diisobutylphosphatormethyl)-1-methylethyl</b>								
27.105.1 Water	$(\text{CH}_3)_2\dot{\text{C}}\text{CH}_2\text{OPO}_3[\text{CH}_2\text{CH}(\text{CH}_3)_2]_2 + \text{H}_2\text{O} \rightarrow \text{H}^+ + (\text{CH}_3)_2\dot{\text{C}}\text{CH}_2\text{OH} + \text{HOPO}_3[\text{CH}_2\text{CH}(\text{CH}_3)_2]_2$	$1.4 \times 10^4 \text{ s}^{-1}$	4.5-5		292	p.r.	Cond. changes; $\text{N}_2\text{O}$ -satd. soln. contg. 0.001-0.01 mol L <sup>-1</sup> tris(2-methyl-1-propyl) phosphate	82A350
<b>27.106 1,1-Dimethoxyethene radical cation</b>								
27.106.1 Hydroxide ion	$[(\text{CH}_3\text{O})_2\text{C}=\text{CH}_2]^+ + \text{OH}^- \rightarrow \text{CH}_2\text{CO}_2\text{CH}_3 + \text{MeOH}$	$4.2 \times 10^9$				p.r.	Cond. changes; radical from 2-chloro-1,1-dimethoxyethane.	81D027
27.106.2 Hydrogen phosphate ion	$[(\text{CH}_3\text{O})_2\text{C}=\text{CH}_2]^+ + \text{HPO}_4^{2-} \rightarrow (\text{CH}_3\text{O})_2\text{C}(\text{OPO}_4^{2-})\text{CH}_2$	$9 \times 10^5$	3			phot.	Esr study; radical from 2-chloro-1,1-dimethoxyethane; rel. to $k[(\text{CH}_3\text{O})_2\text{C}=\text{CH}_2]^+ + \text{OH}^-$ .	81D027
<b>27.107 1,1-Dimethoxyethyl</b>								
27.107.1 Tetranitromethane	$\text{CH}_3\dot{\text{C}}(\text{OCH}_3)_2 + \text{C}(\text{NO}_2)_4 \rightarrow \text{CH}_3\text{C}(\text{OCH}_3)_2\text{OH} + \text{NO}_2 + \text{C}(\text{NO}_2)_3^-$	$3 \times 10^9$	6.5			p.r.	P.b.k. at 300 and 350 nm in $\text{N}_2\text{O}$ -satd. soln. contg. TNM and acetaldehyde dimethyl acetal.	90A004
<b>27.108 (Dimethoxy)methoxymethyl</b>								
27.108.1 Ferricyanide ion	$(\text{CH}_3\text{O})_2\text{CHO}\dot{\text{C}}\text{H}_2 + \text{Fe}(\text{CN})_6^{3-} \rightarrow (\text{CH}_3\text{O})_2\text{CHOCH}_2^+ + \text{Fe}(\text{CN})_6^{4-}$	$1.7 \times 10^9$	7-8		293	p.r.	D.k. at 420 nm in soln. contg. 0.01 mol L <sup>-1</sup> trimethyl orthoformate and $(5-50) \times 10^{-5}$ mol L <sup>-1</sup> $\text{Fe}(\text{CN})_6^{3-}$ ; $k = 1.8 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ from condy. meas.	86A155
27.108.2 Hexachloroiridate(IV) ion	$(\text{CH}_3\text{O})_2\text{CHO}\dot{\text{C}}\text{H}_2 + \text{IrCl}_6^{2-} \rightarrow (\text{CH}_3\text{O})_2\text{CHOCH}_2^+ + \text{IrCl}_6^{3-}$	$3.8 \times 10^9$	7-8		293	p.r.	D.k. at 490 nm in soln. contg. 0.01 mol L <sup>-1</sup> trimethyl orthoformate and $(5-50) \times 10^{-5}$ mol L <sup>-1</sup> $\text{IrCl}_6^{2-}$ ; same value from condy. expts.	86A155
27.108.3 Tetranitromethane	$(\text{CH}_3\text{O})_2\text{CHO}\dot{\text{C}}\text{H}_2 + \text{C}(\text{NO}_2)_4 \rightarrow (\text{CH}_3\text{O})_2\text{CHOCH}_2^+ + \text{NO}_2 + \text{C}(\text{NO}_2)_3^-$	$\sim 1 \times 10^9$	7.9		293	p.r.	P.b.k. at 350 nm in soln. contg. 0.01 mol L <sup>-1</sup> trimethyl orthoformate and $(5-50) \times 10^{-5}$ mol L <sup>-1</sup> tetranitromethane.	86A155
<b>27.109 Dimethoxymethyl</b>								
27.109.1 Hydrogen peroxide	$\cdot\text{CH}(\text{OCH}_3)_2 + \text{H}_2\text{O}_2 \rightarrow$	$1 \times 10^6$				chem.	Esr study in Ti(III)-H <sub>2</sub> O <sub>2</sub> soln. contg. dimethoxymethane; assumed $2k(\text{R} + \text{R}) = 2 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	745144

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
<b>27.109 Dimethoxymethyl — Continued</b>								
<b>27.109.2 Acrylic acid</b>								
	$^{\cdot}\text{CH}(\text{OCH}_3)_2 + \text{H}_2\text{C}=\text{CHCO}_2\text{H} \rightarrow \text{addn.}$	$1.5 \times 10^7$		~2		chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and dimethoxymethane; estimated from an assumed $2k(R + R)$ .	93D265
<b>27.109.3 Crotonic acid</b>								
	$^{\cdot}\text{CH}(\text{OCH}_3)_2 + \text{CH}_3\text{CH}=\text{CHCO}_2\text{H} \rightarrow \text{addn.}$	$8 \times 10^5$		~2		chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and dimethoxymethane; estimated from an assumed $2k(R + R)$ .	93D265
<b>27.109.4 Methacrylic acid</b>								
	$^{\cdot}\text{CH}(\text{OCH}_3)_2 + \text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2\text{H} \rightarrow \text{addn.}$	$2.2 \times 10^7$		~2		chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and dimethoxymethane; estimated from an assumed $2k(R + R)$ .	93D265
<b>27.110 1,1-Dimethoxypropene radical cation</b>								
<b>27.110.1 Hydroxide ion</b>								
	$[(\text{CH}_3\text{O})_2\text{C}=\text{CHCH}_3]^+ + \text{OH}^- \rightarrow \text{CH}_3\dot{\text{C}}\text{HO}_2\text{CH}_3 + \text{MeOH}$	$2.3 \times 10^8$				p.r.	Cond. changes; radical from 2-chloro-1,1-dimethoxypropane.	81D027
<b>27.111 <i>N,N</i>-Dimethylacrylamide, radical anion</b>								
<b>27.111.1 Water</b>								
	$[\text{CH}_2\text{CHCON}(\text{CH}_3)_2]^{ \cdot -} + \text{H}_2\text{O} \rightarrow \text{CH}_3\text{CHCON}(\text{CH}_3)_2 + \text{OH}^-$	$3.7 \times 10^5 \text{ s}^{-1}$		10		p.r.	D.k. in soln. contg. <i>N,N</i> -dimethylacrylamide and borate buffer.	751052
<b>27.112 <math>\beta,\beta</math>-Dimethylacrylamide, radical anion</b>								
<b>27.112.1 Water</b>								
	$[(\text{CH}_3)_2\text{CCHCONH}_2]^{ \cdot -} + \text{H}_2\text{O} \rightarrow (\text{CH}_3)_2\text{CHCHCONH}_2 + \text{OH}^-$	$2 \times 10^4 \text{ s}^{-1}$		10.2	→0	p.r.	D.k. in soln. contg. $\beta,\beta$ -dimethylacrylamide.	751052
<b>27.113 <math>\beta,\beta</math>-Dimethylacrylate, radical anion</b>								
<b>27.113.1 Water</b>								
	$[(\text{CH}_3)_2\text{CCHCO}_2\text{H}]^{ \cdot -} + \text{H}_2\text{O} \rightarrow (\text{CH}_3)_2\text{CHCHCO}_2^- + \text{H}_2\text{O}$	$9 \times 10^3 \text{ s}^{-1}$		11.0		p.r.	D.k. in soln. contg. $\beta,\beta$ -dimethylacrylate; extrapolated to zero concn. of buffer.	761113
<b>27.113.2 Hydroxide ion</b>								
	$[(\text{CH}_3)_2\text{CCHCO}_2\text{H}]^{ \cdot -} + \text{OH}^- \rightarrow (\text{CH}_3)_2\text{CHCHCO}_2^- + \text{OH}^-$	$3 \times 10^6$		>8.0	→0	p.r.	D.k. in soln. contg. $\beta,\beta$ -dimethylacrylate.	761113
<b>27.114 <i>N</i>-(Dimethylaminocarbonyl)-<i>N</i>-methylaminomethyl</b>								
<b>27.114.1 Tetranitromethane</b>								
	$^{\cdot}\text{CH}_2\text{N}(\text{CH}_3)\text{CON}(\text{CH}_3)_2 + \text{C}(\text{NO}_2)_4 \rightarrow \text{NO}_2 + \text{C}(\text{NO}_2)_3 + \text{other prod.}$	$-7 \times 10^9$				p.r.	P.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. tetramethylurea.	84G133
<b>27.115 2-(Dimethylamino)-1-(dimethylaminomethyl)ethyl, conjugate diacid</b>								
<b>27.115.1 2-(Dimethylamino)-1-(dimethylaminomethyl)ethyl, conjugate diacid</b>								
	$^{\cdot}\text{CH}(\text{CH}_2\text{NMe}_2\text{H}^+)_2 + \text{Cu}^+ \rightarrow \text{CuCH}(\text{CH}_2\text{NMe}_2\text{H}^+)_2^+$	$9.0 \times 10^8$		2.2-		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.05-0.1 mol L <sup>-1</sup> <i>N,N,N',N'</i> -tetramethyl-1,3-propanediamine; $\epsilon = 750 \text{ L mol}^{-1} \text{ cm}^{-1}$ at 370 nm.	93A473
<b>27.115.2 Copper(I) ion</b>								
	$^{\cdot}\text{CH}(\text{CH}_2\text{NMe}_2\text{H}^+)_2 + \text{Cu}^+ \rightarrow \text{CuCH}(\text{CH}_2\text{NMe}_2\text{H}^+)_2^+$	$4.2 \times 10^8$		2.2-		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.05-0.1 mol L <sup>-1</sup> <i>N,N,N',N'</i> -tetramethyl-1,3-propanediamine, 0.001 mol L <sup>-1</sup> CuSO <sub>4</sub> and $(0.05-0.13) \times 10^{-3}$ mol L <sup>-1</sup> Cu <sup>+</sup> .	93A473

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T(K)	Method	Comment	Ref.
<b>27.116 Dimethylaminomethyl</b>							
<b>27.116.1 Oxygen</b>							
$\cdot\text{CH}_2\text{N}(\text{CH}_3)_2 + \text{O}_2 \rightarrow (\text{CH}_3)_2\text{NCH}_2\text{OO}^{\cdot}$	$3.5 \times 10^9$	10.4			p.r.	D.k. at 260 nm in N <sub>2</sub> O-satd. soln. contg. 10 <sup>-3</sup> mol L <sup>-1</sup> trimethylamine and (7-14) × 10 <sup>-5</sup> mol L <sup>-1</sup> oxygen; products are O <sub>2</sub> <sup>·+</sup> + (CH <sub>3</sub> ) <sub>2</sub> N <sup>+</sup> =CH <sub>2</sub> , which may be formed directly by electron transfer, or by decay of a peroxy radical.	87A128
<b>27.116.2 4-Nitroacetophenone</b>							
$\cdot\text{CH}_2\text{N}(\text{CH}_3)_2 + \text{PNAP} \rightarrow [\text{PNAP}]^{\cdot-} + \text{other prod.}$	$4 \times 10^9$	4-11			p.r.	P.b.k. at 365 nm in N <sub>2</sub> O-satd. soln. contg. trimethylamine.	86A113
<b>27.117 1,4-Dimethyl-3,6-dioxo-2-piperazinyl</b>							
<b>27.117.1 1,4-Dimethyl-3,6-dioxo-2-piperazinyl</b>							
$\boxed{\text{N}(\text{Me})\text{CO}\dot{\text{C}}\text{HN}(\text{Me})\text{COCH}_2} + \boxed{\text{N}(\text{Me})\text{COCHN}(\text{Me})\text{COCH}_2} \rightarrow$	$2.3 \times 10^8$	5.6			p.r.	D.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. sarcosine anhydride; calcd. from $k_{\text{overall}} = 6.0 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> .	89A473
<b>27.117.2 4-Methyl-3,6-dioxo-1-piperazinylmethyl</b>							
$\boxed{\text{N}(\text{Me})\text{CO}\dot{\text{C}}\text{HN}(\text{Me})\text{COCH}_2} + \boxed{\text{N}(\text{CH}_3)\text{COCH}_2\text{N}(\text{CH}_2)\text{COCH}_2} \rightarrow$	$5.5 \times 10^8$	5.6			p.r.	D.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. sarcosine anhydride; calcd. from $k_{\text{overall}} = 6.0 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> .	89A473
<b>27.117.3 Ferricyanide ion</b>							
$\boxed{\text{N}(\text{Me})\text{CO}\dot{\text{C}}\text{HN}(\text{Me})\text{COCH}_2} + \text{Fe}(\text{CN})_6^{3-} \rightarrow$	$4.1 \times 10^8$ $4.0 \times 10^8$ $4.1 \times 10^8$	3.5 6.5 10.9			p.r.	D.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. sarcosine anhydride.	89A473
<b>27.117.4 Hexachloroiridate(IV) ion</b>							
$\boxed{\text{N}(\text{Me})\text{CO}\dot{\text{C}}\text{HN}(\text{Me})\text{COCH}_2} + \text{IrCl}_6^{2-} \rightarrow \text{IrCl}_6^{3-} + \text{H}^+ + \text{other prod.}$	$3.6 \times 10^9$	5.7			p.r.	Abs. changes at 250, 350 and 490 nm in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> sarcosine anhydride and (3.8-9.3) × 10 <sup>-5</sup> mol L <sup>-1</sup> IrCl <sub>6</sub> <sup>2-</sup> ; radical mixture includes 20% -N(CH <sub>2</sub> )COCH <sub>2</sub> N(Me)COCH <sub>2</sub> <sup>·-</sup> .	89A464
	$3.0 \times 10^9$	4			p.r.	Cond. changes in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> sarcosine anhydride.	89A464
<b>27.117.5 Oxygen</b>							
<b>27.117.5.1</b>							
$\boxed{\text{N}(\text{Me})\text{CO}\dot{\text{C}}\text{HN}(\text{Me})\text{COCH}_2} + \text{O}_2 \rightarrow \boxed{\text{N}(\text{Me})\text{CH}(\text{OO}^{\cdot})\text{CON}(\text{Me})\text{CH}_2\text{CO}}$	$2.0 \times 10^9$ $9 \times 10^8$	6.0, 11.7			p.r.	D.k. at 360 nm in N <sub>2</sub> O/O <sub>2</sub> (4:1) satd. soln. contg. sarcosine anhydride	89A245
<b>27.117.5.2</b>							
						D.k. at 360 nm in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. sarcosine anhydride.	710554
<b>27.118 2,5-Dimethyl-3,6-dioxo-2-piperazinyl</b>							
<b>27.118.1 2,5-Dimethyl-3,6-dioxo-2-piperazinyl</b>							
$\boxed{\text{NHCO}\dot{\text{C}}(\text{Me})\text{NHCOCH}(\text{Me})} + \boxed{\text{NHCO}\dot{\text{C}}(\text{Me})\text{NHCOCH}(\text{Me})} \rightarrow$	$2.2 \times 10^8$ $7.5 \times 10^7$	6.3 11.8			p.r.	D.k. at 410 nm in N <sub>2</sub> O-satd. soln. contg. alanine anhydride.	89A473
<b>27.118.2 Ferricyanide ion</b>							
$\boxed{\text{NHCO}\dot{\text{C}}(\text{Me})\text{NHCOCH}(\text{Me})} + \text{Fe}(\text{CN})_6^{3-} \rightarrow$	$7.9 \times 10^8$ $8.0 \times 10^8$ $7.8 \times 10^8$	2.8 6.7 9.7			p.r.	D.k. at 360 nm in N <sub>2</sub> O-satd. soln. contg. alanine anhydride.	89A473
<b>27.118.3 Hexachloroiridate(IV) ion</b>							
$\boxed{\text{NHCO}\dot{\text{C}}(\text{Me})\text{NHCOCH}(\text{Me})} + \text{IrCl}_6^{2-} \rightarrow \text{IrCl}_6^{3-} + \text{H}^+ + \boxed{\text{N}=\text{C}(\text{Me})\text{CONHCH}(\text{Me})\text{CO}}$	$3.0 \times 10^9$	5.7			p.r.	Abs. changes at 350 and 360 nm in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> alanine anhydride and (3.8-9.3) × 10 <sup>-5</sup> mol L <sup>-1</sup> IrCl <sub>6</sub> <sup>2-</sup> .	89A464
<b>27.118.4 Hydroxide ion</b>							
$\boxed{\text{NIICO}\dot{\text{C}}(\text{Me})\text{NIICOCH}(\text{Me})} + \text{OH}^- \rightarrow \boxed{\text{CONH}\dot{\text{C}}(\text{CH}_3)\text{CON}^-\text{CH}(\text{CH}_3)} + \text{H}_2\text{O}$	$-1.1 \times 10^{10}$	9.2, 10.5			p.r.	P.b.k. at 300 nm in N <sub>2</sub> O satd. soln. contg. 4 × 10 <sup>-3</sup> mol L <sup>-1</sup> alanine anhydride.	710554

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
<b>27.118 2,5-Dimethyl-3,6-dioxo-2-piperazinyl — Continued</b>								
<b>27.118.5 Oxygen</b>								
	$\boxed{\text{NHCO}\dot{\text{C}}(\text{Me})\text{NHCOCH}(\text{Me})} + \text{O}_2 \rightarrow$	$2.3 \times 10^9$	6.2			p.r.	D.k. at 360 nm in N <sub>2</sub> O/O <sub>2</sub> (4:1) satd. soln. alanine anhydride.	89A245
	$\boxed{\text{NHC}(\text{Me})(\text{OO}^\cdot)\text{CONHCH}(\text{Me})\text{CO}}$	$2.1 \times 10^9$	11.7					
		$1.0 \times 10^9$	5.4			p.r.	D.k. at 360 nm in N <sub>2</sub> O/O <sub>2</sub> satd. soln. alanine anhydride.	710554
		$1.1 \times 10^9$	12.0					
<b>27.118.6 2-Methyl-1,4-naphthoquinone</b>								
	$\boxed{\text{NHCO}\dot{\text{C}}(\text{Me})\text{NHCOCH}(\text{Me})} +$	$3.1 \times 10^9$	10.9			p.r.	P.b.k. at 395 nm in soln. contg. alanine anhydride, 75% <i>e</i> -transfer.	731047
	$2\text{-CH}_3\text{NQ} \rightarrow$							
<b>27.119 2,4-Dimethyl-1,3-dithiolan-2-yl</b>								
<b>27.119.1 2,4-Dimethyl-1,3-dithiolan-2-yl</b>								
	$\boxed{\text{S}\dot{\text{C}}(\text{CH}_3)\text{SCH}(\text{CH}_3)\text{CH}_2}$ +	$2.0 \times 10^9$	-4			p.r.	D.k. at 315 nm in N <sub>2</sub> O-satd. soln. contg. 2,4-dimethyl-1,3-dithiolane; $\epsilon = 2000 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	86B043
	$\boxed{\text{S}\dot{\text{C}}(\text{CH}_3)\text{SCH}(\text{CH}_3)\text{CH}_2^-}$ →							
<b>27.120 1-[Di(1-methylethoxy)methoxy]-1-methylethyl</b>								
<b>27.120.1 Ferricyanide ion</b>								
	$((\text{CH}_3)_2\text{CHO})_2\text{CHO}\dot{\text{C}}(\text{CH}_3)_2 +$	$2.7 \times 10^9$	7-8		293	p.r.	D.k. at 420 nm in soln. contg. 0.01 mol L <sup>-1</sup> triisopropoxymethane and (5-50) × 10 <sup>-5</sup> mol L <sup>-1</sup> Fe(CN) <sub>6</sub> <sup>3-</sup> .	86A155
	$\text{Fe}(\text{CN})_6^{4-} \rightarrow$							
	$((\text{CH}_3)_2\text{CHO})_2\text{CHOC}^+(\text{CH}_3)_2 +$							
	$\text{Fe}(\text{CN})_6^{4-}$							
<b>27.120.2 Hexachloroiridate(IV) ion</b>								
	$((\text{CH}_3)_2\text{CHO})_2\text{CHO}\dot{\text{C}}(\text{CH}_3)_2 + \text{IrCl}_6^{2-} \rightarrow$	$2.8 \times 10^9$	7-8		293	p.r.	D.k. at 490 nm in soln. contg. 0.01 mol L <sup>-1</sup> triisopropoxymethane and (5-50) × 10 <sup>-5</sup> mol L <sup>-1</sup> IrCl <sub>6</sub> <sup>2-</sup> .	86A155
	$\rightarrow ((\text{CH}_3)_2\text{CHO})_2\text{CHOC}^+(\text{CH}_3)_2 +$							
	$\text{IrCl}_6^{3-}$							
<b>27.121 1,1-Dimethylethoxymethyl</b>								
<b>27.121.1 Tetranitromethane</b>								
	$\cdot\text{CH}_2\text{OC}(\text{CH}_3)_3 + \text{C}(\text{NO}_2)_4 \rightarrow$	$\sim 3 \times 10^9$				p.r.	P.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. methyl <i>tert</i> -butyl ether.	80A071
	$\text{C}(\text{NO}_2)_3^- + \text{other prod.}$							
<b>27.122 Dimethyl fumarate, radical anion</b>								
<b>27.122.1 Oxygen</b>								
	$[\text{CH}_3\text{O}_2\text{CCHCHCO}_2\text{CH}_3]^{+-} + \text{O}_2 \rightarrow$	$2.2 \times 10^9$				p.r.	D.k. in soln. contg. dimethyl fumarate.	730097
		$5.3 \times 10^9$	11			p.r.	D.k. in soln. contg. dimethyl fumarate.	670729
<b>27.122.2 N-Ethylmaleimide</b>								
	$[\text{CH}_3\text{O}_2\text{CCHCHCO}_2\text{CH}_3]^{+-} + \text{NEM} \rightarrow$	$2.2 \times 10^9$				p.r.	D.k. in soln. contg. dimethyl fumarate and <i>N</i> -ethylmaleimide.	730097
	$\text{NEM}^- + \text{other prod.}$							
<b>27.123 2,5-Dioxacyclohexyl</b>								
<b>27.123.1 2,5-Dioxacyclohexyl</b>								
	$\boxed{\text{O}\dot{\text{C}}\text{CH}_2\text{O}(\text{CH}_2)_2} +$	$7.5 \times 10^8$			300	p.r.	D.k. at 255 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> dioxane; $\epsilon = 470 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	86A377
	$\boxed{\text{O}\dot{\text{C}}\text{CH}_2\text{O}(\text{CH}_2)_2^-}$ →							
<b>27.123.2 Hexaammincobalt(III) ion</b>								
	$\boxed{\text{O}\dot{\text{C}}\text{CH}_2\text{O}(\text{CH}_2)_2} + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow$	$\leq 2 \times 10^6$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. dioxane.	771100
<b>27.123.3 Pentaammine(bromo)cobalt(III) ion</b>								
	$\boxed{\text{O}\dot{\text{C}}\text{CH}_2\text{O}(\text{CH}_2)_2} + \text{Co}(\text{NH}_3)_5\text{Br}^{2+} \rightarrow$	$\leq 2 \times 10^6$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. dioxane.	771100
<b>27.123.4 Pentaammine(chloro)cobalt(III) ion</b>								
	$\boxed{\text{O}\dot{\text{C}}\text{CH}_2\text{O}(\text{CH}_2)_2} + \text{Co}(\text{NH}_3)_5\text{Cl}^{2+} \rightarrow$	$\leq 2 \times 10^6$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. dioxane.	771100
<b>27.123.5 trans-Dibromobis(ethylenediamine)cobalt(III) ion</b>								
	$\boxed{\text{O}\dot{\text{C}}\text{CH}_2\text{O}(\text{CH}_2)_2} + \text{Co}(\text{en})_2\text{Br}_2^+ \rightarrow$	$4.4 \times 10^8$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. dioxane.	771100
<b>27.123.6 Bis(ethylenediamine)dichlorocobalt(III) ion</b>								
	$\boxed{\text{O}\dot{\text{C}}\text{CH}_2\text{O}(\text{CH}_2)_2} + \text{Co}(\text{en})_2\text{Cl}_2^+ \rightarrow$	$3.5 \times 10^7$	3.5-4			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. dioxane.	771100

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T$ (K)	Method	Comment	Ref.
<b>27.123 2,5-Dioxacyclohexyl — Continued</b>								
27.123.7	<b>Chromium(II) ion</b> $\text{OCHCH}_2\text{O}(\text{CH}_2)_2 + \text{Cr}^{2+} \rightarrow \text{addn.}$	$1.0 \times 10^8$	~1			p.r.	P.b.k. in Ar-satd. soln. contg. dioxane and $\text{HClO}_4$ .	741146
<b>27.123.8 Copper(II) ion</b>								
	$\text{OCHCH}_2\text{O}(\text{CH}_2)_2 + \text{Cu}^{2+} \rightarrow$	$4.0 \times 10^6$	0.5-4.0			p.r.	Calcd. from first-order d.k. at 390 nm (decomp. of $\text{Cu}^{11}\text{CHCH}_2\text{OCH}_2\text{CH}_2\text{O}^-$ ) dependence on $[\text{Cu}^{\pm}]$ and $[\text{Cu}^{2+}]$	87A225
<b>27.123.9 Hexachloroiridate(IV) ion</b>								
	$\text{OCHCH}_2\text{O}(\text{CH}_2)_2 + \text{IrCl}_6^{2-} \rightarrow \text{IrCl}_6^{3-}$ + other prod.	$5.4 \times 10^9$	4-6			p.r.	D.k. at 490 nm in $\text{N}_2\text{O}$ -satd. soln. contg. dioxane.	82A041
<b>27.123.10 Permanganate ion</b>								
	$\text{OCHCH}_2\text{O}(\text{CH}_2)_2 + \text{MnO}_4^- \rightarrow$	$6.5 \times 10^9$	4-6			p.r.	D.k. at 545 nm in $\text{N}_2\text{O}$ -satd. soln. contg. dioxane.	82A041
<b>27.123.11 Hydrogen peroxide</b>								
	$\text{OCHCH}_2\text{O}(\text{CH}_2)_2 + \text{H}_2\text{O}_2 \rightarrow$	$3 \times 10^4$				chem.	Esr study in $\text{Ti}(\text{III})-\text{H}_2\text{O}_2$ soln. contg. dioxane and <i>tert</i> -BuOH; assumed $2k(R + R) = 2 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	745144
<b>27.123.12 Hexammineruthenium(III) ion</b>								
	$\text{OCHCH}_2\text{O}(\text{CH}_2)_2 + \text{Ru}(\text{NH}_3)_6^{3+} \rightarrow$	$5.0 \times 10^6$	3.5-4			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.5\text{-}1 \text{ mol L}^{-1}$ dioxane.	771100
<b>27.123.13 Pentaammine(bromo)ruthenium(III) ion</b>								
	$\text{OCHCH}_2\text{O}(\text{CH}_2)_2 + \text{Ru}(\text{NH}_3)_5\text{Br}^{2+} \rightarrow$	$2.7 \times 10^8$	3.5-4			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.5\text{-}1 \text{ mol L}^{-1}$ dioxane.	771100
<b>27.123.14 Pentaammine(chloro)ruthenium(III) ion</b>								
	$\text{OCHCH}_2\text{O}(\text{CH}_2)_2 + \text{Ru}(\text{NH}_3)_5\text{Cl}^{2+} \rightarrow$	$8.3 \times 10^7$	3.5-4			p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.5\text{-}1 \text{ mol L}^{-1}$ dioxane.	771100
<b>27.123.15 Nitrobenzene</b>								
	$\text{OCHCH}_2\text{O}(\text{CH}_2)_2 + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$	$2.5 \times 10^7$				p.r.	D.k.; radical from dioxane.	771100
<b>27.123.16 Thionine cation</b>								
	$\text{OCHCH}_2\text{O}(\text{CH}_2)_2 + \text{Th}^+ \rightarrow [\text{ThH}]^{++} +$ other prod.	$2.7 \times 10^9$	6.8			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. $0.1 \text{ mol L}^{-1}$ dioxane and $10^{-4} \text{ mol L}^{-1}$ thionine.	87A451
<b>27.123.17 Toluidine Blue cation</b>								
	$\text{OCHCH}_2\text{O}(\text{CH}_2)_2 + \text{TB}^+ \rightarrow [\text{TBH}]^+$ + other prod.	$2.6 \times 10^9$	6.8			p.r.	P.b.k. at 830 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $0.1 \text{ mol L}^{-1}$ dioxane.	89A262
<b>27.124 2,5-Dioxacyclopentyl</b>								
<b>27.124.1 Hydrogen peroxide</b>								
	$\text{OCHO}(\text{CH}_2)_2 + \text{H}_2\text{O}_2 \rightarrow$	$\geq 6 \times 10^4$				chem.	Esr study in $\text{Ti}(\text{III})-\text{H}_2\text{O}_2$ soln. contg. dioxolane; used $2k(R + R) = 3 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	745144
<b>27.125 1,3-Dioxolan-4-yl</b>								
<b>27.125.1 Dithiothreitol</b>								
	$\text{OCH}_2\text{OCH}_2\dot{\text{C}}\text{H} + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} \rightarrow \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{S}^- + \text{OCH}_2\text{O}(\text{CH}_2)_2$	$1.0 \times 10^8$	8.0	293	p.r.	P.b.k. at 400 nm (cyclized radical anion) in $\text{N}_2\text{O}$ -satd. soln. contg. DTT and dioxolane; radical mixture.	87G007	
<b>27.126 1,3-Dioxan-4-yl</b>								
<b>27.126.1 Dithiothreitol</b>								
	$\text{OCH}_2\text{OCH}_2\text{CH}_2\dot{\text{C}}\text{H} + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} \rightarrow \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{S}^- + \text{dioxane}$	$1.2 \times 10^8$	8.0	293	p.r.	P.b.k. at 400 nm (cyclized radical anion) in $\text{N}_2\text{O}$ -satd. soln. contg. DTT and 1,3-dioxane; radical mixture.	87G007	

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
27.127	3,6-Dioxo-2-piperazinyl							
27.127.1	3,6-Dioxo-2-piperazinyl							
	$\boxed{\text{CH}_2\text{CONH}\dot{\text{C}}\text{HCONH}}$ + $\boxed{\text{CH}_2\text{CONH}\dot{\text{C}}\text{HCONH}}$ →	$3.5 \times 10^8$ $1.4 \times 10^8$	6.2 11.7			p.r.	D.k. at 440 nm in N <sub>2</sub> O-satd. soln. contg. glycine anhydride.	89A473
27.127.2	Ferricyanide ion							
	$\boxed{\text{CH}_2\text{CONH}\dot{\text{C}}\text{HCONH}}$ + Fe(CN) <sub>6</sub> <sup>3-</sup> →	$1.0 \times 10^8$ $3.1 \times 10^8$	6.4 11.3			p.r.	D.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. glycine anhydride.	89A473
27.127.3	Hexachloroiridate(IV) ion							
	$\boxed{\text{CH}_2\text{CONH}\dot{\text{C}}\text{HCONH}}$ + IrCl <sub>6</sub> <sup>2-</sup> →	$3.1 \times 10^9$	5.7			p.r.	Abs. changes at 250 and 270 nm in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> glycine anhydride and $(3.8-9.3) \times 10^{-5}$ mol L <sup>-1</sup> IrCl <sub>6</sub> <sup>2-</sup> .	89A464
27.127.4	Hydroxide ion							
	$\boxed{\text{CH}_2\text{CONH}\dot{\text{C}}\text{HCONH}}$ + OH <sup>-</sup> → H <sub>2</sub> O	$\sim 8 \times 10^9$	~9.2- 10.5			p.r.	P.b.k at 300 nm in N <sub>2</sub> O-satd. soln. contg. 4 × $10^{-3}$ mol L <sup>-1</sup> glycine anhydride.	710554
	+ $\boxed{\text{CONHCHCON}\cdot\text{CH}_2}$							
27.127.5	Oxygen							
	$\boxed{\text{CH}_2\text{CONH}\dot{\text{C}}\text{HCONH}}$ + O <sub>2</sub> →	$2.0 \times 10^9$	6.5- 11.7		293	p.r.	D.k. at 360 nm in N <sub>2</sub> O/O <sub>2</sub> (4:1) satd. soln. contg. glycine anhydride.	89A245
	$\boxed{\text{NHCH(OO')}}\text{CONHCH}_2\text{CO}_2^-$							
		$1.2 \times 10^9$	5.0			p.r.	D.k. at 360 nm in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. glycine anhydride.	710554
		$2.8 \times 10^8$	12.0					
27.127.6	1,4-Benzoquinone							
	$\boxed{\text{CH}_2\text{CONH}\dot{\text{C}}\text{HCONH}}$ + Q →	$2.2 \times 10^9$	10.5			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. glycine anhydride; 87% e-transfer.	731052
	$\boxed{\text{CH}_2\text{CONHCH}_2\text{CONH}}$ + Q <sup>•+</sup>							
27.127.7	Cysteine							
	$\boxed{\text{CH}_2\text{CONH}\dot{\text{C}}\text{HCONH}}$ + CysSH →	<10 <sup>7</sup>	6,10, 12			p.r.	No change in d.k. at 265 nm on addn. of cysteine in N <sub>2</sub> O-satd. soln. contg. glycine anhydride.	710554
27.127.8	2-Methyl-1,4-naphthoquinone							
	$\boxed{\text{CH}_2\text{CONH}\dot{\text{C}}\text{HCONH}}$ + 2-CH <sub>3</sub> NQ →	$4.0 \times 10^9$	10.9			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. glycine anhydride; 88% e-transfer; no e-transfer at pH 6.7.	731047
	[2-CH <sub>3</sub> NQ] <sup>•-</sup> + other prod.							
		$5.0 \times 10^9$	10.9			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. glycine anhydride; 85% e-transfer; no e-transfer at pH 7.0.	723057
27.127.9	Cytochrome C							
	$\boxed{\text{CH}_2\text{CONH}\dot{\text{C}}\text{HCONH}}$ + Cyt C (Fe <sup>3+</sup> ) →	<10 <sup>7</sup>	6.8			p.r.	P.b.k. at 550 nm in N <sub>2</sub> O-satd. soln. contg. glycine anhydride.	78A288
27.128	1,3-Dithiolan-2-yl							
27.128.1	Tetranitromethane							
	$\boxed{\text{SCHS}(\text{CH}_2)_2}$ + C(NO <sub>2</sub> ) <sub>4</sub> → *NO <sub>2</sub> +	$4.3 \times 10^9$	~4			p.r.	D.k. as well as p.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. 1,3 dithiolane; mixt. of radicals.	86B043
C(NO <sub>2</sub> ) <sub>3</sub> <sup>-</sup> + other prod.								
27.129	1-Ethoxy-1-methoxyethene radical cation							
27.129.1	Hydroxide ion							
	$[(\text{C}_2\text{H}_5\text{O})(\text{CH}_3\text{O})\text{C}=\text{CH}_2]^{+\cdot} + \text{OH}^- \rightarrow$	$3.0 \times 10^9$				p.r.	Cond. changes; radical from 2-chloro-1-ethoxy-1-methoxyethane.	81D027
	*CH <sub>2</sub> CO <sub>2</sub> CH <sub>3</sub> + *CH <sub>2</sub> CO <sub>2</sub> C <sub>2</sub> H <sub>5</sub> + EtOH							
	+ MeOH							
27.130	Ethylenediaminetetraacetate radical							
27.130.1	1,1'-Dimethyl-4,4'-bipyridinium							
	[EDTA <sub>ox</sub> ] <sup>·</sup> + MV <sup>2+</sup> → MV <sup>•+</sup> + EDTA	$5.9 \times 10^5$ $1.5 \times 10^9$	4.7 8.7, 11			f.p./rq	P.b.k. at 395 and 605 nm in soln. contg. Ru(bpz) <sub>3</sub> <sup>2+</sup> , EDTA and MV <sup>2+</sup> . Reaction follows quenching of *[Ru(bpz) <sub>3</sub> <sup>2+</sup> ] by EDTA followed by deprotonation.	89E105

## RATE CONSTANTS FOR ALIPHATIC CARBON-CENTERED RADICALS IN SOLUTION

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TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T(\text{K})$	Method	Comment	Ref.
27.130 Ethylenediaminetetraacetate radical — Continued								
27.130.1 1,1'-Dimethyl-4,4'-bipyridinium — Continued								
		$8.5 \times 10^6$	4.7			p.r.	P.b.k. at 602 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.1 mol $\text{L}^{-1}$ EDTA and $(0.1-1) \times 10^{-3}$ mol $\text{L}^{-1}$ methyl viologen.	85A051
		$7.6 \times 10^8$	8.3					
		$2.8 \times 10^9$	12.5					
27.130.2 Flavine mononucleotide								
	$[\text{EDTA}_{\text{ox}}]^\cdot + \text{FMN} + \text{H}^+ \rightarrow \text{FMNH}^\cdot + \text{EDTA}$	$5 \times 10^8$	7.0			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. FMN and EDTA.	81A115
27.130.3 Lumiflavine								
	$[\text{EDTA}_{\text{ox}}]^\cdot + \text{LF} + \text{H}^+ \rightarrow \text{LFH}^\cdot + \text{EDTA}$	$1.5 \times 10^9$	7			p.r.	P.b.k. at 500 nm in $\text{N}_2\text{O}$ -satd. soln. contg. EDTA.	85A224
27.130.4 Cytochrome C								
	$[\text{EDTA}_{\text{ox}}]^\cdot + \text{Cyt C} (\text{Fe}^{3+}) \rightarrow$	$2 \times 10^8$	7.0			p.r.	P.b.k.; biphasic, $k = 2 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ ; indicates two reducing radicals from EDTA.	81A115
27.131 2-(Ethylidene)-1,3-dioxolane radical cation								
27.131.1 Hydroxide ion								
	$[(\text{CH}_2)_2\text{OC}(\text{=CHCH}_3)\text{O}]^\cdot + \text{OH}^- \rightarrow$ $\text{CH}_3\dot{\text{C}}\text{HO}_2\text{CH}_2\text{CH}_2\text{OH}$	$7.0 \times 10^8$				p.r.	Cond. changes; radical from 2-(1-chloroethyl)-1,3-dioxolane.	81D027
27.132 4-(Ethylthio)butyl								
27.132.1 1,4-Benzoquinone								
	$\text{C}_2\text{H}_5\dot{\text{S}}(\text{CH}_2)_3\text{CH}_2 + \text{Q} \rightarrow \text{addn.}$	$4.1 \times 10^8$	6			p.r.	P.b.k. in soln. contg. 1 mol $\text{L}^{-1}$ <i>tert</i> -BuOH and 0.1 mol $\text{L}^{-1}$ 1-ethylthiolanium.	91A184
27.133 1-(Ethylthio)ethyl								
27.133.1 Tetranitromethane								
	$\text{CH}_3\dot{\text{C}}\text{HS}_2\text{H}_5 + \text{C}(\text{NO}_2)_4 \rightarrow \text{addn.}$	$3.3 \times 10^9$	3.5	294	p.r.	P.b.k. at 350 nm in $\text{N}_2\text{O}$ -satd. soln. contg. diethyl sulfide.	84A087	
27.134 1-Ethyl-2-trimethylammonioethyl								
27.134.1 Ferricyanide ion								
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCH}_2\text{N}^+(\text{CH}_3)_3 + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{Fe}(\text{CN})_6^{4-} + \text{other prod.}$	$3.6 \times 10^9$				p.r.	D.k. at 404 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.001 mol $\text{L}^{-1}$ butyltrimethylammonium and $5 \times 10^{-5}$ mol $\text{L}^{-1}$ ferricyanide; $k$ for $\beta$ - and $\gamma$ -radicals, slower reaction with $\delta$ -radicals.	84A385
27.135 1-Formylethyl								
27.135.1 Hydroquinone monoanion								
	$\text{CH}_3\dot{\text{C}}\text{HCHO} + 4\text{-HOC}_6\text{H}_4\text{O}^- \rightarrow$	$1.2 \times 10^9$	-11.5			p.r.	P.b.k. at 430 nm (semiquinone) in $\text{N}_2\text{O}$ -satd. soln. contg. 1,2-propanediol; radical mixture also contains $\text{CH}_3\text{COCH}_2$ .	79A051
27.136 1-Formyl-4-hydroxybutyl								
27.136.1 Hydroquinone monoanion								
	$\text{HO}(\text{CH}_2)_3\dot{\text{C}}\text{HCHO} + 4\text{-HOC}_6\text{H}_4\text{O}^- \rightarrow$	$8.6 \times 10^8$	-11.5			p.r.	P.b.k. at 430 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 2-(hydroxymethyl)tetrahydrofuran.	79A051
27.137 1-Formyl-2-hydroxyethyl								
27.137.1 Hydroquinone monoanion								
	$\text{HOCH}_2\dot{\text{C}}\text{HCHO} + 4\text{-HOC}_6\text{H}_4\text{O}^- \rightarrow$	$1.7 \times 10^9$	-11.5			p.r.	P.b.k. at 430 nm in $\text{N}_2\text{O}$ -satd. soln. contg. $\text{HOCH}_2\text{CH}(\text{PO}_4^{2-})\text{CH}_2\text{OH}$ ; radical also obtained from glycerol, $k = 1.5 \times 10^9$ , and 2,3-epoxypropanol, $k = 1.3 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	79A051

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
27.138	1-Formyl-5-hydroxypentyl							
27.138.1	Hydroquinone monoanion							
	$\text{HO}(\text{CH}_2)_4\dot{\text{C}}\text{HCHO} + 4\text{-HOC}_6\text{H}_4\text{O}^- \rightarrow$	$5.2 \times 10^8$		$\sim 11.5$		p.r.	P.b.k. at 430 nm in N <sub>2</sub> O-satd. soln. contg. 2-(hydroxymethyl)tetrahydropyran.	79A051
27.139	( <i>N</i> -Formyl- <i>N</i> -methylamino)methyl							
27.139.1	Hexaamminecobalt(III) ion							
	${}^\bullet\text{CH}_2\text{N}(\text{CH}_3)\text{CHO} + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow$	$<1.0 \times 10^7$		6.0		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> dimethylformamide.	72A018
27.139.2	Chromium(II) ion							
	${}^\bullet\text{CH}_2\text{N}(\text{CH}_3)\text{CHO} + \text{Cr}^{2+} \rightarrow$ $\text{Cr}(\text{CH}_2\text{N}(\text{CH}_3)\text{CHO})^{2+}$	$1.1 \times 10^8$		$\sim 5$		p.r.	P.b.k. in Ar or N <sub>2</sub> O-satd. soln. contg. dimethylformamide.	741146
27.139.3	Hexaammineruthenium(III) ion							
	${}^\bullet\text{CH}_2\text{N}(\text{CH}_3)\text{CHO} + \text{Ru}(\text{NH}_3)_6^{3+} \rightarrow$	$<3.0 \times 10^7$		6.0		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> dimethylformamide; <i>e</i> transfer.	72A018
27.140	Glycine anhydride, radical anion							
27.140.1	Acetophenone							
	$[\text{NHCOCH}_2\text{NHCOCH}_2]^{*-} +$ $\text{C}_6\text{H}_5\text{COCH}_3 \rightarrow$ $[\text{CH}_2\text{CONHCH}_2\text{CONH}]^+$ $+ \text{C}_6\text{H}_5\dot{\text{C}}\text{O}^-\text{CH}_3$	$2.3 \times 10^9$ $2.0 \times 10^9$	5.2 12.3			p.r.	P.b.k. at 280 nm (320 at pH 12.3) in soln. contg. glycine anhydride and 1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	710554
27.140.2	Benzophenone							
	$[\text{NHCOCH}_2\text{NHCOCH}_2]^{*-} +$ $(\text{C}_6\text{H}_5)_2\text{CO} \rightarrow$ $[\text{CH}_2\text{CONHCH}_2\text{CONH}]^+$ $+ (\text{C}_6\text{H}_5)_2\text{CO}^-$	$2.2 \times 10^9$ $2.5 \times 10^9$	5.5 12.3			p.r.	P.b.k. at 330 nm (320 at pH 12.3) in soln. contg. glycine anhydride and 1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	710554
27.140.3	Cystamine							
	$[\text{NHCOCH}_2\text{NHCOCH}_2]^{*-} +$ $[\text{H}_2\text{NCH}_2\text{CH}_2\text{S}]_2 \rightarrow$ electron transfer	$1.2 \times 10^8$	5.7, 11.0			p.r.	D.k. at 265 nm (R) in soln. contg. glycine anhydride and 1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	710554
27.140.4	Cysteine							
	$[\text{NHCOCH}_2\text{NHCOCH}_2]^{*-} + \text{CysSH} \rightarrow$	$2.1 \times 10^8$	6.4			p.r.	D.k. at 265 nm in soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH and glycine anhydride.	710554
27.140.5	Glutathione							
	$[\text{NHCOCH}_2\text{NHCOCH}_2]^{*-} + \text{GSH} \rightarrow$ electron transfer	$1.8 \times 10^8$	6.4, 7.4			p.r.	D.k. at 265 nm in soln. contg. glycine anhydride and 1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	710554
27.140.6	Glutathione, oxidized							
	$[\text{NHCOCH}_2\text{NHCOCH}_2]^{*-} + \text{GSSG} \rightarrow$ $\text{GSSG}^- + \text{other prod.}$	$4.0 \times 10^7$	6.2			p.r.	D.k. at 265 nm in soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH and glycine anhydride.	710554
27.140.7	3-Mercaptopropionate ion							
	$[\text{NHCOCH}_2\text{NHCOCH}_2]^{*-} +$ $\text{HSCH}_2\text{CH}_2\text{CO}_2^- \rightarrow$ electron transfer	$3.0 \times 10^8$	5.3, 7.4			p.r.	D.k. at 265 nm in soln. contg. glycine anhydride and 1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	710554
27.140.8	2-Methyl-1,4-naphthoquinone							
	$[\text{NHCOCH}_2\text{NHCOCH}_2]^{*-} +$ $2\text{-CH}_3\text{NQ} \rightarrow [2\text{-CH}_3\text{NQ}]^{*-} + \text{other prod.}$	$4.9 \times 10^9$	6.9			p.r.	P.b.k. at 395 nm in soln. contg. glycine anhydride; 98% <i>e</i> -transfer.	731047
27.140.9	Cytochrome C							
	$[\text{NHCOCH}_2\text{NHCOCH}_2]^{*-} + \text{Cyt C} (\text{Fe}^{3+}) \rightarrow$	$8 \times 10^8$	6.8			p.r.	P.b.k. at 500 nm in soln. contg. glycine anhydride.	78A288
27.141	1-Hydroxy-2-butenyl							
27.141.1	Nifuroxime							
	$\text{CH}_3\text{CH}=\text{CH}\dot{\text{C}}\text{HOH} + \text{NF}^- \rightarrow$	$5.6 \times 10^9$	7			p.r.	P.b.k. at 390 nm (NF <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. crotyl alcohol; 24% <i>e</i> -transfer.	731099

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
<b>27.141 1-Hydroxy-2-butenyl — Continued</b>								
27.141.1	Nifuroxime — Continued							
		$2.4 \times 10^9$	7			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. crotyl alcohol; 10% <i>e</i> -transfer.	731062
27.141.2	4-Nitroacetophenone							
	$\text{CH}_3\text{CH}=\text{CH}\dot{\text{C}}\text{HOH} + \text{PNAP} \rightarrow$	$2.0 \times 10^9$	7			p.r.	P.b.k. at 360 and 550 nm (PNAP <sup>·</sup> ) in N <sub>2</sub> O-satd. soln. contg. crotyl alcohol; 9% <i>e</i> -transfer.	731062
27.141.3	Nitrobenzene							
	$\text{CH}_3\text{CH}=\text{CH}\dot{\text{C}}\text{HOH} + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$	$\sim 1 \times 10^9$	7			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. crotyl alcohol; 8% <i>e</i> -transfer.	731062
<b>27.142 1-Hydroxybutyl</b>								
27.142.1	Ethylenediaminetetraacetatocuprate(I) ion							
	$\text{CH}_3(\text{CH}_2)_2\dot{\text{C}}\text{HOH} + \text{CuEDTA}^{3-} \rightarrow$	$\sim 5 \times 10^9$	7.5			p.r.	P.b.k. at 440 nm in soln. contg. 0.01 mol L <sup>-1</sup> CuEDTA <sup>2-</sup> and 0.06 mol L <sup>-1</sup> 1-BuOH. Value obtained from computer fit.	80A153
27.142.2	Ethylenediaminetetraacetatocuprate(II) ion							
	$\text{CH}_3(\text{CH}_2)_2\dot{\text{C}}\text{HOH} + \text{CuEDTA}^{2-} \rightarrow$	$\sim 1 \times 10^6$	7.5			p.r.	P.b.k. at 440 nm in soln. contg. CuEDTA <sup>2-</sup> and 1-BuOH. Value obtained from computer fit.	80A153
27.142.3	Cysteamine, conjugate acid							
	$\text{CH}_3(\text{CH}_2)_2\dot{\text{C}}\text{HOH} + \text{HSCH}_2\text{CH}_2\text{NH}_3^+ \rightarrow 1\text{-BuOH} + \text{H}_3\text{N}^+\text{CH}_2\text{CH}_2\text{S}^\cdot$	$8.2 \times 10^7$				p.r.	P.b.k. at 410 nm (RSSR <sup>·</sup> ) in N <sub>2</sub> O-satd. soln. contg. 1-BuOH.	680132
27.142.4	2-Methyl-1,4-naphthoquinone							
	$\text{CH}_3(\text{CH}_2)_2\dot{\text{C}}\text{HOH} + 2\text{-CH}_3\text{NQ} \rightarrow$	$4.1 \times 10^9$	7.0			p.r.	P.b.k. in soln. contg. 0.05 mol L <sup>-1</sup> 1-BuOH; 32.3% (pH 7) and 40% (pH 12.7) <i>e</i> -transfer.	731047
		$4.2 \times 10^9$	12.7					
27.142.5	Nifuroxime							
	$\text{CH}_3(\text{CH}_2)_2\dot{\text{C}}\text{HOH} + \text{NF} \rightarrow$	$5.1 \times 10^9$	7			p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. 1-BuOH; 75% <i>e</i> -transfer.	731099
		$3.4 \times 10^9$	7			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. 1-BuOH; 32% <i>e</i> -transfer.	731062
27.142.6	4-Nitroacetophenone							
	$\text{CH}_3(\text{CH}_2)_2\dot{\text{C}}\text{HOH} + \text{PNAP} \rightarrow$	$2.2 \times 10^9$	7			p.r.	P.b.k. at 360 and 550 nm in N <sub>2</sub> O-satd. soln. contg. 1-BuOH; 24% <i>e</i> -transfer.	731062
27.142.7	Nitrobenzene							
	$\text{CH}_3(\text{CH}_2)_2\dot{\text{C}}\text{HOH} + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$	$1.1 \times 10^9$	7			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. 1-BuOH; 31% <i>e</i> -transfer.	731062
		$4.0 \times 10^8$	7			p.r.	P.b.k. at 285 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 1-BuOH; 35% <i>e</i> -transfer.	660432
27.142.8	Nitrosobenzene							
	$\text{CH}_3(\text{CH}_2)_2\dot{\text{C}}\text{HOH} + \text{C}_6\text{H}_5\text{NO} \rightarrow$	$4.0 \times 10^9$	7.0			p.r.	P.b.k. at 450 nm in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> 1-BuOH; includes $\beta$ - and $\gamma$ -alcohol radical reaction.	660433
	$\text{CH}_3\text{CH}_2\text{CH}_2\dot{\text{C}}\text{HO} + \text{C}_6\text{H}_5\text{NOH}$							
<b>27.143 1-Hydroxybutyl, conjugate base</b>								
27.143.1	1-Amino-4-anilino-9,10-anthraquinone-2-sulfonate ion							
	$\text{CH}_3\text{CH}_2\text{CH}_2\dot{\text{C}}\text{HO}^- + \text{ABSBR} \rightarrow$	$2.4 \times 10^9$	11.8			p.r.	P.b.k. in Ar-satd. soln. contg. 0.2 mol L <sup>-1</sup> 1-BuOH; $\epsilon(500) = 6800 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	89A043
27.143.2	Nitrobenzene							
	$\text{CH}_3\text{CH}_2\text{CH}_2\dot{\text{C}}\text{HO}^- + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$	$3.1 \times 10^9$	13			p.r.	P.b.k. at 285 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 1-BuOH.	660432
	$\text{CH}_3\text{CH}_2\text{CH}_2\dot{\text{C}}\text{HO} + [\text{C}_6\text{H}_5\text{NO}_2]^{2-}$							

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
<b>27.144 1-Hydroxycyclobutyl</b>								
27.144.1 Ferricyanide ion								
	$\boxed{\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_2} + \text{Fe}(\text{CN})_6^{3-} \rightarrow$ $\boxed{(\text{CH}_2)_3\text{CO}_2^-} + \text{Fe}(\text{CN})_6^{4-} + \text{H}^+$	$2.6 \times 10^9$ $5.3 \times 10^9$	7		275 337	p.r.	D.k. at 410 nm in soln. contg. $10^{-3}$ mol L <sup>-1</sup> cyclobutanone and 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH; $E_a = 8.8$ kJ mol <sup>-1</sup> .	761103
27.144.2 Nitrobenzene								
	$\boxed{\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_2} + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow \text{H}^+ +$ $[\text{C}_6\text{H}_5\text{NO}_2]^- + \boxed{(\text{CH}_2)_3\text{CO}_2^-}$	$1.5 \times 10^9$ $3.2 \times 10^9$			275 337	p.r.	P.b.k. at 280 nm in soln. contg. $10^{-3}$ mol L <sup>-1</sup> cyclobutanone and 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH; $E_a = 9.6$ kJ mol <sup>-1</sup> .	761103
<b>27.145 1-Hydroxycyclopentyl</b>								
27.145.1 Ferricyanide ion								
	$\boxed{\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_3} + \text{Fe}(\text{CN})_6^{3-} \rightarrow$ $\boxed{(\text{CH}_2)_4\text{CO}_2^-} + \text{Fe}(\text{CN})_6^{4-} + \text{H}^+$	$2.3 \times 10^9$ $5.4 \times 10^9$	7		275 337	p.r.	D.k. at 410 nm in soln. contg. $10^{-3}$ mol L <sup>-1</sup> cyclopentanone and 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH; $E_a = 10.9$ kJ mol <sup>-1</sup> .	761103
27.145.2 Nitrobenzene								
	$\boxed{\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_3} + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$ $[\text{C}_6\text{H}_5\text{NO}_2]^- + \boxed{(\text{CH}_2)_4\text{CO}_2^-}$	$1.4 \times 10^9$ $5.2 \times 10^9$			275 337	p.r.	P.b.k. at 280 nm in soln. contg. $10^{-3}$ mol L <sup>-1</sup> cyclopentanone and 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH; $E_a = 16.8$ kJ mol <sup>-1</sup> .	761103
<b>27.146 1-Hydroxycycloheptyl</b>								
27.146.1 Ferricyanide ion								
	$\boxed{\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_5} + \text{Fe}(\text{CN})_6^{3-} \rightarrow$ $\boxed{(\text{CH}_2)_6\text{CO}_2^-} + \text{Fe}(\text{CN})_6^{4-} + \text{H}^+$	$2.1 \times 10^9$ $5.4 \times 10^9$	7		275 337	p.r.	D.k. at 410 nm in soln. contg. $10^{-3}$ mol L <sup>-1</sup> cycloheptanone and 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH; $E_a = 11.7$ kJ mol <sup>-1</sup> .	761103
27.146.2 Nitrobenzene								
	$\boxed{\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_5} + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$ $[\text{C}_6\text{H}_5\text{NO}_2]^- + \boxed{(\text{CH}_2)_6\text{CO}_2^-}$	$1.4 \times 10^9$ $4.9 \times 10^9$			275 337	p.r.	P.b.k. at 280 nm in soln. contg. $10^{-3}$ mol L <sup>-1</sup> cycloheptanone and 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH; $E_a = 15.9$ kJ mol <sup>-1</sup> .	761103
<b>27.147 1-Hydroxycyclohexyl</b>								
27.147.1 Ferricyanide ion								
	$\boxed{\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_4} + \text{Fe}(\text{CN})_6^{3-} \rightarrow$ $c\text{-C}_6\text{H}_{10}(=\text{O}) + \text{Fe}(\text{CN})_6^{4-}$	$1.0 \times 10^9$ $1.8 \times 10^9$ $5.0 \times 10^9$		7		p.r.	D.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. cyclohexanol.	79N061
					275 337	p.r.	D.k. at 410 nm in soln. contg. $10^{-3}$ mol L <sup>-1</sup> cyclohexanone and 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH; $E_a = 12.1$ kJ mol <sup>-1</sup> .	761103
27.147.2 Nitrobenzene								
	$\boxed{\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_4} + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$ $[\text{C}_6\text{H}_5\text{NO}_2]^- + c\text{-C}_6\text{H}_{10}(=\text{O})$	$7 \times 10^8$ $2.0 \times 10^9$			275 337	p.r.	P.b.k. at 280 nm in soln. contg. $10^{-3}$ mol L <sup>-1</sup> cyclohexanone and 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH; $E_a = 13$ kJ mol <sup>-1</sup> .	761103
<b>27.148 2-Hydroxycyclohexyl</b>								
27.148.1 Copper(II) ion								
	$\boxed{\text{CHCHOH}(\text{CH}_2)_4} + \text{Cu}^{2+} \rightarrow$	$\leq 1 \times 10^7$		1-5.5		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. $(5-50) \times 10^{-4}$ mol L <sup>-1</sup> CuSO <sub>4</sub> , $(0-1) \times 10^{-4}$ mol L <sup>-1</sup> Cu <sup>+</sup> , 0.15 mol L <sup>-1</sup> cyclohexene, 0.5 mol L <sup>-1</sup> acetonitrile and chromium(III).	91A152
27.148.2 Copper(I) ion, complex with cyclohexene								
	$\boxed{\text{CHCHOH}(\text{CH}_2)_4} + \text{Cu}(\text{cyclohexene})^+ \rightarrow$ $c\text{-C}_6\text{H}_{10} + \text{CuCHCH(OH)(CH}_2)_4^+$	$2.6 \times 10^9$		1-5.5		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. $(5-20) \times 10^{-4}$ mol L <sup>-1</sup> CuSO <sub>4</sub> , $(5-40) \times 10^{-5}$ mol L <sup>-1</sup> Cu <sup>+</sup> , $(5-40) \times 10^{-5}$ mol L <sup>-1</sup> Cr(III), 0.02-0.15 mol L <sup>-1</sup> cyclohexene and 0.15-0.65 mol L <sup>-1</sup> acetonitrile.	91A152

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
<b>27.149 1-Hydroxycyclooctyl</b>								
<b>27.149.1 Ferricyanide ion</b>								
	$\boxed{\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_6} + \text{Fe}(\text{CN})_6^{3-} \rightarrow$ $\boxed{(\text{CH}_2)_7\text{CO}} + \text{Fe}(\text{CN})_6^{4-} + \text{H}^+$	$2.2 \times 10^9$ $5.4 \times 10^9$	7	275 337	p.r.	D.k. at 410 nm in soln. contg. $10^{-3}$ mol L <sup>-1</sup> cyclooctanone and 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH; $E_a = 11.7$ kJ mol <sup>-1</sup> .	761103	
<b>27.149.2 Nitrobenzene</b>								
	$\boxed{\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_6} + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$ $[\text{C}_6\text{H}_5\text{NO}_2]^\cdot + \boxed{(\text{CH}_2)_7\text{CO}}$	$1.6 \times 10^9$ $5.2 \times 10^9$		275 338	p.r.	P.b.k. at 280 nm in soln. contg. $10^{-3}$ mol L <sup>-1</sup> cyclooctanone and 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH. $E_a = 15.5$ kJ mol <sup>-1</sup> .	761103	
<b>27.150 1-Hydroxy-2-[<i>N,N</i>-di(2-hydroxyethyl)amino]ethyl</b>								
<b>27.150.1 First-order reaction</b>								
	$(\text{HOCH}_2\text{CH}_2)_2\text{NCH}_2\dot{\text{C}}\text{HOH} \rightarrow$ $(\text{HOCH}_2\text{CH}_2)_2\text{NCHOH}\dot{\text{C}}\text{H}_2$	$2.3 \times 10^5$ s <sup>-1</sup> 9.5	8.0	298	p.r.	P.b.k. at 230 and 410 nm as well as d.k. at 270 nm in soln. contg. triethanolamine; $E_a = 33$ kJ mol <sup>-1</sup> , studied at 283-328 K. $\log A = 11.079$ .	82G071	
<b>27.151 2-Hydroxy-1-[di(2-hydroxyethyl)amino]ethyl</b>								
<b>27.151.1 Tris(2,2'-bipyrazine)ruthenium(II) ion</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{HN}(\text{CH}_2\text{CH}_2\text{OH})_2 + \text{Ru}(\text{bpz})_3^{2+} \rightarrow \text{Ru}(\text{bpz})_3^\cdot + \text{other prod.}$	$1.2 \times 10^9$	12		f.p./rq	P.b.k. at 490 nm in soln. contg. Ru(bpz) <sub>3</sub> <sup>2+</sup> and triethanolamine; reaction follows quenching of * $[\text{Ru}(\text{bpz})_3^{2+}]$ by TEOA followed by deprotonation.	89E105	
<b>27.151.2 1,1'-Dimethyl-4,4'-bipyridinium</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{HN}(\text{CH}_2\text{CH}_2\text{OH})_2 + \text{MV}^{2+} \rightarrow \text{MV}^\cdot + \text{other prod.}$	$2.7 \times 10^9$	12		f.p./rq	P.b.k. at 605 nm in soln. contg. Ru(bpz) <sub>3</sub> <sup>2+</sup> , triethanolamine and MV <sup>2+</sup> ; reaction follows quenching of * $[\text{Ru}(\text{bpz})_3^{2+}]$ by TEOA followed by deprotonation.	89E105	
<b>27.152 2-Hydroxy-2-[<i>N,N</i>-di(2-hydroxyethyl)amino]ethyl</b>								
<b>27.152.1 2-Hydroxy-2-[<i>N,N</i>-di(2-hydroxyethyl)amino]ethyl</b>								
	$(\text{HOCH}_2\text{CH}_2)_2\text{NCHOH}\dot{\text{C}}\text{H}_2 + (\text{HOCH}_2\text{CH}_2)_2\text{NCHOH}\dot{\text{C}}\text{H}_2 \rightarrow$	$1.3 \times 10^8$	8		p.r.	D.k. at 230 nm or 410 nm in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> TEOA.	82G071	
<b>27.152.2 Triethanolamine</b>								
	$(\text{HOCH}_2\text{CH}_2)_2\text{NCHOH}\dot{\text{C}}\text{H}_2 + \text{TEOA} \rightarrow$ $\text{HOCH}_2\dot{\text{C}}\text{HN}(\text{CH}_2\text{CH}_2\text{OH})_2 + (\text{HOCH}_2\text{CH}_2)_2\text{NCHOH}\dot{\text{C}}\text{H}_3$	$5 \times 10^4$	-8		$\gamma$ -r.	Chain reaction; calcd. from intensity and pH dependence of products and $k = 2.5 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> for radical decay in N <sub>2</sub> O-satd. soln. contg. TEOA.	82G071	
<b>27.153 2-Hydroxyethenyl</b>								
<b>27.153.1 2-Hydroxyethenyl</b>								
	$\text{HOCH=CH}^\cdot + \text{HOCH=CH}^\cdot \rightarrow$ $\text{HOCH=CHCH=CHOH}$	$3.2 \times 10^9$	<7		p.r.	P.b.k. at 240 nm in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> acetylene; $\epsilon = 8.1 \times 10^3$ L mol <sup>-1</sup> cm <sup>-1</sup> ; $2k/\epsilon = 2.0 \times 10^5$ cm s <sup>-1</sup> ; product rearranges to succinaldehyde.	78A007	
<b>27.153.2 Hydroxide ion</b>								
	$\text{HOCH=CH}^\cdot + \text{OH}^- \rightarrow [\text{CH=CHO}^\cdot] +$ $\text{H}_2\text{O}$	$1.5 \times 10^{10}$	9.4-10		p.r.	D.k. at 260 nm in $10^{-3}$ mol L <sup>-1</sup> acetylene soln.; hydrolysis product is formylmethyl radical.	78A007	
<b>27.153.3 Oxygen</b>								
	$\text{HOCH=CH}^\cdot + \text{O}_2 \rightarrow \text{HOCH=CHOO}^\cdot$	$1.0 \times 10^9$			p.r.	Condy. buildup in soln. contg. N <sub>2</sub> O/O <sub>2</sub> and acetylene.	81A371	

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>27.153 2-Hydroxyethenyl — Continued</b>								
<b>27.153.4 Acetylene</b>								
	$\text{HOCH}=\text{CH}' + \text{HC}\equiv\text{CH} \rightarrow$ $\text{HOCH}=\text{CHCH}=\text{CH}$	$8.8 \times 10^6$	4.0, 6.0		298	p.r.	P.b.k. at 290 nm in N <sub>2</sub> O-satd. soln. contg. acetylene; product thought to be hydroxybutadienyl which reacts to give hydroxyhexatrienyl (p.b.k. at 260 nm, <i>k</i> = 5 × 10 <sup>6</sup> L mol <sup>-1</sup> s <sup>-1</sup> ); <i>E<sub>a</sub></i> = 25 kJ mol <sup>-1</sup> , studied at 278-333 K.	78A007
<b>27.154 1-(2-Hydroxyethylcarbonyl)ethyl</b>								
<b>27.154.1 1-(2-Hydroxyethylcarbonyl)ethyl</b>								
	$\text{CH}_3\dot{\text{C}}\text{HCO}_2\text{CH}_2\text{CH}_2\text{OH} +$ $\text{CH}_3\dot{\text{C}}\text{HCO}_2\text{CH}_2\text{CH}_2\text{OH} \rightarrow$	$5 \times 10^8$				p.r.	D.k. in He-satd. soln. contg. 0.5 mol L <sup>-1</sup> <i>tert</i> -BuOH and 2-hydroxyethyl acrylate.	93A106
<b>27.155 2-Hydroxy-1-(2-hydroxyethoxy)carbonylethyl</b>								
<b>27.155.1 2-Hydroxy-1-(2-hydroxyethoxy)carbonylethyl</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{HCO}_2\text{CH}_2\text{CH}_2\text{OH} +$ $\text{HOCH}_2\dot{\text{C}}\text{HCO}_2\text{CH}_2\text{CH}_2\text{OH} \rightarrow$	$6 \times 10^8$				p.r.	D.k. at 300 nm in N <sub>2</sub> O-satd. soln. contg. 2-hydroxyethyl acrylate; p <i>K<sub>a</sub></i> = 7.8.	93A106
<b>27.156 3-Hydroxy-1-(hydroxymethyl)-2-oxopropyl</b>								
<b>27.156.1 Hydroquinone monoanion</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{HCOCH}_2\text{OH} + 4\text{-HOOC}_6\text{H}_4\text{O}^- \rightarrow$	$1.3 \times 10^9$	-11.5			p.r.	P.b.k. at 430 nm in N <sub>2</sub> O-satd. soln. contg. <i>meso</i> -erythritol; 2-alkanoyl radical mixture formed by H-abstraction from erythritol and dehydration.	79A051
<b>27.157 1-Hydroxy-2-methoxyethyl</b>								
<b>27.157.1 Hydrogen ion</b>								
	$\text{CH}_3\text{OCH}_2\dot{\text{C}}\text{HOH} + \text{H}^+ \rightarrow \cdot\text{CH}_2\text{CHO} +$ $\text{MeOH} + \text{H}^+$	$4.9 \times 10^5$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-methoxyethanol at varied [H <sup>+</sup> ]; acid catalysis.	86A220
<b>27.158 2-Hydroxy-1-methylethyl</b>								
<b>27.158.1 3,10,17,24-Tetrasulfophthalocyaninecobaltate(II) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HCH}_2\text{OH} + \text{Co(tspc)}^{4-} \rightarrow$ $\text{HOCH}_2\text{CH}(\text{CH}_3)\text{Co(tspc)}^{4-}$	$1.5 \times 10^9$	6.1			p.r.	P.b.k.	89A150
<b>27.158.2 Chromium(II) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HCH}_2\text{OH} + \text{Cr}^{2+} \rightarrow$ $\text{CrCH}(\text{CH}_3)\text{CH}_2\text{OH}^{2+}$	$1.1 \times 10^8$	-3		293	p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> Cr <sup>2+</sup> and propylene; $\Delta V_{\ddagger}^{\ddagger} = 3.9 \text{ cm}^3 \text{ mol}^{-1}$ , studied at 0.1-150 MPa.	92A361
		$1.5 \times 10^8$	0-5			p.r.	P.b.k. in soln. satd. with propylene/N <sub>2</sub> O, contg. (1-20) × 10 <sup>-4</sup> mol L <sup>-1</sup> Cr <sup>2+</sup> .	91A477
<b>27.158.3 Iron(II) protoporphyrin</b>								
	$\text{CH}_3\dot{\text{C}}\text{HCH}_2\text{OH} + \text{Fe(II)PP} \rightarrow$ $\text{HOCH}_2\text{C}(\text{CH}_3)\text{Fe(III)PP}$	$5 \times 10^8$	10-13			p.r.	P.b.k. in soln. satd. with N <sub>2</sub> O/propylene (1:9) contg. (1-3) × 10 <sup>-5</sup> mol L <sup>-1</sup> Fe(II)PP.	86A511
<b>27.159 1-Hydroxymethyl-2-oxopropyl</b>								
<b>27.159.1 Thionine cation</b>								
	$\text{HOCH}_2\dot{\text{C}}\text{HCOCH}_3 + \text{Th}^+ \rightarrow$ $\text{H}_2\text{C}=\text{CHCOCH}_3 + [\text{ThH}]^{+}$	$7 \times 10^9$	6.8			p.r.	P.b.k. at 770 nm in N <sub>2</sub> O-satd. soln. contg. 4 × 10 <sup>-3</sup> mol L <sup>-1</sup> methyl vinyl ketone and 1 × 10 <sup>-5</sup> mol L <sup>-1</sup> thionine.	90A306
<b>27.160 1-Hydroxy-1-methyl-2-oxopropyl</b>								
<b>27.160.1 Hexaamminecobalt(III) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{HOCHCOCH}_3 + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow$	$<2.0 \times 10^5$	1.2			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> biacetyl.	72A018

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
<b>27.160 1-Hydroxy-1-methyl-2-oxopropyl — Continued</b>								
<b>27.160.2 Hexaammineruthenium(III) ion</b>								
	$\text{CH}_3\dot{\text{C}}\text{OHCOCOCH}_3 + \text{Ru}(\text{NH}_3)_6^{3+} \rightarrow$	$<3.8 \times 10^6$		1.2		p.r.	D.k. in Ar-satd. soln. contg. 0.001 mol L <sup>-1</sup> biacetyl.	72A018
<b>27.161 1-Hydroxy-1-methyl-2-oxopropyl, conjugate base</b>								
<b>27.161.1 Hexaamminecobalt(III) ion</b>								
	$[\text{CH}_3\text{COCOCH}_3]^- + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow$	$\leq 1.8 \times 10^5$		5.5		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> biacetyl.	72A018
<b>27.161.2 Hexaammineruthenium(III) ion</b>								
	$[\text{CH}_3\text{COCOCH}_3]^- + \text{Ru}(\text{NH}_3)_6^{3+} \rightarrow$	$2.0 \times 10^9$		5.5		p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> biacetyl.	72A018
<b>27.162 1-Hydroxy-1-methyl-2-propenyl</b>								
<b>27.162.1 Safranine cation</b>								
	$\text{CH}_3\dot{\text{C}}\text{OHCCH=CH}_2 + \text{ST}^+ \rightarrow$ $\text{H}_2\text{C=CHCOCH}_3 + [\text{ST}]^\cdot$	$1.6 \times 10^9$		6.8		p.r.	P.b.k. at 770 nm in N <sub>2</sub> -satd. soln. contg. $6 \times 10^{-3}$ mol L <sup>-1</sup> methyl vinyl ketone, $5 \times 10^{-5}$ mol L <sup>-1</sup> safranine and 0.8 mol L <sup>-1</sup> <i>tert</i> -BuOH.	90A306
<b>27.162.2 Thionine cation</b>								
	$\text{CH}_3\dot{\text{C}}\text{OHCCH=CH}_2 + \text{Th}^+ \rightarrow$ $\text{H}_2\text{C=CHCOCH}_3 + [\text{ThH}]^\cdot$	$3.2 \times 10^9$		6.8		p.r.	P.b.k. at 770 nm in N <sub>2</sub> -satd. soln. contg. $6 \times 10^{-3}$ mol L <sup>-1</sup> methyl vinyl ketone, $5 \times 10^{-5}$ mol L <sup>-1</sup> thionine and 0.8 mol L <sup>-1</sup> <i>tert</i> -BuOH.	90A306
<b>27.163 1-Hydroxy-1-methylpropyl</b>								
<b>27.163.1 Ferricyanide ion</b>								
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{OHCH}_3 + \text{Fe}(\text{CN})_6^{3-} \rightarrow$ $\text{Fe}(\text{CN})_6^{4-} + \text{other prod.}$	$4.8 \times 10^9$		7		p.r.	D.k. at 410 nm in soln. contg. 0.1 mol L <sup>-1</sup> 2-BuOH.	690522
<b>27.163.2 Oxygen</b>								
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{OHCH}_3 + \text{O}_2 \rightarrow$ $\text{CH}_3\text{CH}_2\text{C}(\text{CH}_3)(\text{OH})\text{OO}^\cdot$	$4.0 \times 10^9$		7		p.r.	C.k. in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. 0.3 mol L <sup>-1</sup> 2-BuOH and ferricyanide. rel. to $k(\text{CH}_3\text{CH}_2\dot{\text{C}}\text{OHCH}_3 + \text{Fe}(\text{CN})_6^{3-}) = 4.8 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	690522
<b>27.163.3 Biacetyl</b>								
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{OHCH}_3 + \text{CH}_3\text{COCOCH}_3 \rightarrow$ $\text{CH}_3\text{COCH}_2\text{CH}_3 + \text{H}^+ +$ $[\text{CH}_3\text{COCOCH}_3]^-$	$7.2 \times 10^8$				p.r.	P.b.k. at 300 nm in N <sub>2</sub> O-satd. soln. contg. 2-BuOH.	680249
<b>27.164 1-Hydroxy-2-methylpropyl</b>								
<b>27.164.1 Ferricyanide ion</b>								
	$(\text{CH}_3)_2\text{CH}\dot{\text{C}}\text{HOH} + \text{Fe}(\text{CN})_6^{3-} \rightarrow$ $\text{Fe}(\text{CN})_6^{4-} + \text{other prod.}$	$3.0 \times 10^9$		7		p.r.	D.k. at 410 nm in soln. contg. 0.1 mol L <sup>-1</sup> 2-methyl-1-propanol.	690522
<b>27.164.2 Oxygen</b>								
	$(\text{CH}_3)_2\text{CH}\dot{\text{C}}\text{HOH} + \text{O}_2 \rightarrow$ $(\text{CH}_3)_2\text{CHCH}(\text{OH})\text{OO}^\cdot$	$3.4 \times 10^9$		7		p.r.	C.k. in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. 0.3 mol L <sup>-1</sup> 2-methyl-1-propanol and ferricyanide. rel. to $k((\text{CH}_3)_2\text{CH}\dot{\text{C}}\text{HOH} + \text{Fe}(\text{CN})_6^{3-}) = 3.0 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	690522
<b>27.164.3 Hydrogen peroxide</b>								
	$(\text{CH}_3)_2\text{CH}\dot{\text{C}}\text{HOH} + \text{H}_2\text{O}_2 \rightarrow$	$2.2 \times 10^5$		6.8		$\gamma$ -r.	Obs. G(H <sub>2</sub> O <sub>2</sub> ) in N <sub>2</sub> O-satd. soln. contg. 2-methyl-1-propanol.	87G036
<b>27.164.4 Cysteamine, conjugate acid</b>								
	$(\text{CH}_3)_2\text{CH}\dot{\text{C}}\text{HOH} + \text{HSCH}_2\text{CH}_2\text{NH}_3^+ \rightarrow$ $\text{iso-BuOH} + \text{H}_3\text{N}^+\text{CH}_2\text{CH}_2\text{S}^\cdot$	$1.4 \times 10^8$				p.r.	P.b.k. at 410 nm (RSSR <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. 2-methyl-1-propanol.	680132

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
27.164	1-Hydroxy-2-methylpropyl — Continued							
27.164.5	Nitrobenzene							
	$(\text{CH}_3)_2\text{CH}\dot{\text{C}}\text{HOH} + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow (\text{CH}_3)_2\text{CHCHO} + \text{H}^+ + [\text{C}_6\text{H}_5\text{NO}_2]^-$	$3.9 \times 10^8$	7			p.r.	P.b.k. at 285 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-methyl-1-propanol; 39% <i>e</i> -transfer.	660432
27.164.6	Nitrosobenzene							
	$(\text{CH}_3)_2\text{CH}\dot{\text{C}}\text{HOH} + \text{C}_6\text{H}_5\text{NO} \rightarrow (\text{CH}_3)_2\text{CHCHO} + \text{C}_6\text{H}_5\text{NOH}$	$4.0 \times 10^9$	7.0			p.r.	P.b.k. at 450 nm in N <sub>2</sub> O-satd. soln. contg. 0.05 mol L <sup>-1</sup> 2-methyl-1-propanol; includes β-alcohol radical reaction.	660433
27.165	1-Hydroxy-2-methylpropyl, conjugate base							
27.165.1	Nitrobenzene							
	$(\text{CH}_3)_2\text{CH}\dot{\text{C}}\text{HO}^- + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow (\text{CH}_3)_2\text{CHCHO} + [\text{C}_6\text{H}_5\text{NO}_2]^-$	$2.9 \times 10^9$	13			p.r.	P.b.k. at 285 nm in N <sub>2</sub> O-satd. soln. contg. 2-methyl-1-propanol.	660432
27.166	2-Hydroxy-1-methylpropyl							
27.166.1	3,10,17,24-Tetrasulfophthalocyaninecobaltate(II) ion							
	$\cdot\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)\text{OH} + \text{Co}(\text{tspc})^{4-} \rightarrow \text{CH}_3\text{CHOHCH}(\text{CH}_3)\text{Co}(\text{tspc})^{4-}$	$8 \times 10^8$	6.1			p.r.	P.b.k.	89A150
27.166.2	Chromium(II) ion							
	$\cdot\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)\text{OH} + \text{Cr}^{2+} \rightarrow \text{CrCH}(\text{CH}_3)\text{CH}(\text{CH}_3)\text{OH}^{2+}$	$9.8 \times 10^7$	-3	293	p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 0.001 mol L <sup>-1</sup> Cr <sup>2+</sup> and 2-butene; $\Delta V^\ddagger = 3.9 \text{ cm}^3 \text{ mol}^{-1}$ , studied at 0.1-150 MPa.	92A361	
		$1.1 \times 10^8$	0.5		p.r.	P.b.k. in soln. satd. with 2-butene/N <sub>2</sub> O, contg. (1-20) $\times 10^{-4}$ mol L <sup>-1</sup> Cr <sup>2+</sup> .	91A477	
27.167	4-Hydroxy-2-oxobutyl							
27.167.1	Hydroquinone monoanion							
	$\text{HOCH}_2\text{CH}_2\text{CO}\dot{\text{C}}\text{H}_2 + 4\text{-HOC}_6\text{H}_4\text{O}^- \rightarrow$	$6.2 \times 10^8$	-11.5			p.r.	P.b.k. at 430 nm in N <sub>2</sub> O-satd. soln. contg. 2-hydroxytetrahydrofuran.	79A051
27.168	3-Hydroxy-2-oxopropyl							
27.168.1	2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) ion							
	$\text{HOCH}_2\text{CO}\dot{\text{C}}\text{H}_2 + \text{ABTS}^{2-} \rightarrow$	$2.1 \times 10^7$	4	293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> glycerol 1-phosphate and (2-120) $\times 10^{-5}$ mol L <sup>-1</sup> ABTS <sup>2-</sup> .	88A159	
27.169	1-Hydroxypentyl							
27.169.1	Ferricyanide ion							
	$\text{CH}_3(\text{CH}_2)_3\dot{\text{C}}\text{HOH} + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{Fe}(\text{CN})_6^{4-} + \text{other prod.}$	$9 \times 10^8$			p.r.	D.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. 1-pentanol.	79N061	
27.170	2-Hydroxypropyl							
27.170.1	Copper(II) tetraglycine							
	$\cdot\text{CH}_2\text{CHOHCH}_3 + \text{Cu}(\text{Gly})_4^{2-} \rightarrow (\text{Gly}_4)\text{CuCH}_2\text{CHOHCH}_3$	$2.7 \times 10^9$	8.2		p.r.	P.b.k. at 320 nm in soln. contg. 1 mol L <sup>-1</sup> 2-PrOH. Also present is (CH <sub>3</sub> ) <sub>2</sub> COH which reduces Cu(Gly) <sub>4</sub> <sup>2-</sup> .	80A304	
27.170.2	1,1'-Dimethyl-4,4'-bipyridinium radical cation							
	$\cdot\text{CH}_2\text{CHOHCH}_3 + \text{MV}^{++} \rightarrow$	$\sim 7 \times 10^8$	11.5		p.r.	D.k. (10%) at 600 nm, 0.5-1.5 ms after the pulse, in N <sub>2</sub> O-satd. soln. contg. 5 $\times 10^{-4}$ mol L <sup>-1</sup> MV <sup>2+</sup> and 0.1 mol L <sup>-1</sup> 1-PrOH.	86A327	
27.170.3	2-Propanol							
	$\cdot\text{CH}_2\text{CHOHCH}_3 + 2\text{-PrOH} \rightarrow 2\text{-PrOH} + (\text{CH}_3)_2\dot{\text{C}}\text{OH}$	$>5 \times 10^1$			γ-r.	Estd. from rel. rates and <i>G</i> (-H <sub>2</sub> O <sub>2</sub> ) in soln. contg. H <sub>2</sub> O <sub>2</sub> and 2-PrOH.	700104	

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
27.171 2-Hydroxy-1-sulfonatoethyl, conjugate base							
27.171.1 2-Hydroxy-1-sulfonatoethyl, conjugate base							
$\text{OCH}_2\dot{\text{C}}\text{HSO}_3^- + \text{OCH}_2\dot{\text{C}}\text{HSO}_3^- \rightarrow$	$9.6 \times 10^8$				p.r.	D.k. at 250 nm in N <sub>2</sub> O-satd. soln. contg. sodium vinyl sulfonate.	82A328
27.172 2-Hydroxy-1-sulfonatoethyl							
27.172.1 2-Hydroxy-1-sulfonatoethyl							
$\text{HOCH}_2\dot{\text{C}}\text{HSO}_3^- + \text{HOCH}_2\dot{\text{C}}\text{HSO}_3^- \rightarrow$	$4.3 \times 10^8$				p.r.	D.k. at 250 nm in N <sub>2</sub> O-satd. soln. contg. sodium vinyl sulfonate.	82A328
27.172.2 Vinyl sulfonate ion							
$\text{HOCH}_2\dot{\text{C}}\text{HSO}_3^- + \text{CH}_2=\text{CHSO}_3^- \rightarrow$	$7 \times 10^4$	12.3	0.1-		p.r.	D.k. (esr) in N <sub>2</sub> O-satd. soln. contg. sodium vinyl sulfonate.	82A328
$\text{HOCH}_2\dot{\text{C}}\text{HSO}_3^- + \text{CH}_2=\text{CHSO}_3^- \rightarrow$			0.5				
27.173 1-[Isobutyl (methylphosphato)methyl]-1-methylethyl							
27.173.1 Water							
$(\text{Me})_2\dot{\text{C}}\text{CH}_2\text{OPO}(\text{OCH}_3)\text{OCH}_2\text{CH}(\text{Me})_2 \rightarrow$	$3 \times 10^4 \text{ s}^{-1}$	4.5-5		292	p.r.	Cond. changes in N <sub>2</sub> O-satd. soln. contg. 0.001-0.01 mol L <sup>-1</sup> methyl bis(2-methyl-1-propyl) phosphate	82A350
$+ \text{H}_2\text{O} \rightarrow \text{H}^+ + (\text{CH}_3)_2\dot{\text{C}}\text{CH}_2\text{OH} +$							
$\text{HOPO}(\text{OCH}_3)\text{OCH}_2\text{CH}(\text{CH}_3)_2$							
27.174 1-Isopropoxy-1-methylethyl							
27.174.1 Ferricyanide ion							
$(\text{CH}_3)_2\dot{\text{C}}\text{OCH}(\text{CH}_3)_2 + \text{Fe}(\text{CN})_6^{3-} \rightarrow$	$3.6 \times 10^9$	4-6		295	p.r.	D.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. diisopropyl ether.	82A041
$\text{Fe}(\text{CN})_6^{4-} + \text{other prod.}$							
27.174.2 Hexachloroiridate(IV) ion							
$(\text{CH}_3)_2\dot{\text{C}}\text{OCH}(\text{CH}_3)_2 + \text{IrCl}_6^{2-} \rightarrow$	$3.6 \times 10^9$	4-6		295	p.r.	D.k. at 490 nm in N <sub>2</sub> O-satd. soln. contg. diisopropyl ether.	82A041
$\text{IrCl}_6^{3-} + \text{other prod.}$							
27.174.3 Hydrogen peroxomonosulfate ion							
$(\text{CH}_3)_2\dot{\text{C}}\text{OCH}(\text{CH}_3)_2 + \text{HSO}_5^- \rightarrow$	$6.0 \times 10^6$				chem.	Esr study; soln. contg. Ti(III) sulfate, H <sub>2</sub> O <sub>2</sub> , HSO <sub>5</sub> <sup>-</sup> and diisopropyl ether.	90D226
27.174.4 Tetranitromethane							
$(\text{CH}_3)_2\dot{\text{C}}\text{OCH}(\text{CH}_3)_2 + \text{C}(\text{NO}_2)_4 \rightarrow$	$4 \times 10^9$				p.r.	P.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. 2 × 10 <sup>-3</sup> mol L <sup>-1</sup> diisopropyl ether and tetranitromethane.	87G038
$\text{HOC}(\text{CH}_3)_2\text{OCH}(\text{CH}_3)_2 + \text{C}(\text{NO}_2)_3^- +$							
$\text{NO}_2 + \text{H}^+$							
27.175 Methacrylamide, radical anion							
27.175.1 Water							
$[\text{CH}_2\dot{\text{C}}(\text{CH}_3)\text{CONH}_2]^\cdot^- + \text{H}_2\text{O} \rightarrow$	$1.3 \times 10^6 \text{ s}^{-1}$	10-13			p.r.	D.k. in soln. contg. methacrylamide and borate buffer.	751052
$\text{CH}_3\dot{\text{C}}(\text{CH}_3)\text{CONH}_2 + \text{OH}^-$							
27.176 Methacrylic acid, radical anion							
27.176.1 Water							
$[\text{CH}_2\dot{\text{C}}(\text{CH}_3)\text{CO}_2\text{H}]^\cdot^- + \text{H}_2\text{O} \rightarrow$	$2.0 \times 10^5 \text{ s}^{-1}$	9.0			p.r.	D.k. in soln. contg. methacrylate; extrapolated to zero concn. of buffer.	761113
$(\text{CH}_3)_2\dot{\text{C}}\text{CO}_2^- + \text{H}_2\text{O}$							
27.176.2 Hydroxide ion							
$[\text{CH}_2\dot{\text{C}}(\text{CH}_3)\text{CO}_2\text{H}]^\cdot^- + \text{OH}^- \rightarrow$	$8 \times 10^8$	>5.3 → 0			p.r.	D.k. in soln. contg. methacrylate.	761113
$(\text{CH}_3)_2\dot{\text{C}}\text{CO}_2^- + \text{OH}^-$							
27.177 1-(Methoxycarbonyl)-1-hydroxyethyl, conjugate base							
27.177.1 2-Methyl-1,4-naphthoquinone							
$\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CO}_2\text{CH}_3 + 2\text{-CH}_3\text{NQ} \rightarrow$	$2.3 \times 10^9$	10.4			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. methyl lactate; 74% e-transfer (20% at pH 3.2).	731047

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
27.178	Methoxycarbonylmethyl							
27.178.1	Oxygen							
	$\cdot\text{CH}_2\text{CO}_2\text{CH}_3 + \text{O}_2 \rightarrow \cdot\text{OOCH}_2\text{CO}_2\text{CH}_3$	$1.8 \times 10^9$	4			p.r.	D.k. at 340 nm in soln. contg. 0.001 mol L <sup>-1</sup> methyl chloroacetate, 0.05 mol L <sup>-1</sup> formate ion and (0.6-2) × 10 <sup>-4</sup> mol L <sup>-1</sup> oxygen.	78A402
27.179	(1-Methoxyethoxy)methyl							
27.179.1	Tetranitromethane							
	$\text{CH}_3\text{CH}(\text{OCH}_3)\text{OCH}_2 + \text{C}(\text{NO}_2)_4 \rightarrow \text{CH}_3\text{CH}(\text{OCH}_3)\text{OCH}_2\text{ON}(\ddot{\text{O}})\text{C}(\text{NO}_2)_3$	$3 \times 10^9$	6.5			p.r.	P.b.k. at 300 and 350 nm in N <sub>2</sub> O-satd. soln. contg. TNM and acetaldehyde dimethyl acetal.	90A004
27.180	Methoxy(methoxycarbonyl)methyl							
27.180.1	Methoxy(methoxycarbonyl)methyl							
	$\text{CH}_3\text{O}\dot{\text{C}}\text{HCO}_2\text{CH}_3 + \text{CH}_3\text{O}\dot{\text{C}}\text{HCO}_2\text{CH}_3 \rightarrow 1.2 \times 10^9$					p.r.	D.k. at 260 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> methyl methoxyacetate; $\epsilon = 1900 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	88A503
27.181	(Methoxymethoxy)methyl							
27.181.1	Crotonic acid							
	$\text{CH}_3\text{OCH}_2\text{OCH}_2 + \text{CH}_3\text{CH}=\text{CHCO}_2\text{H} \rightarrow \text{addn.}$	$6 \times 10^5$	-2			chem.	Esr study in soln. contg. $1.67 \times 10^{-3}$ mol L <sup>-1</sup> Ti(III), $1.67 \times 10^{-3}$ mol L <sup>-1</sup> H <sub>2</sub> O <sub>2</sub> and dimethoxymethane; estimated from an assumed $2k(R + R)$ .	93D265
27.181.2	Tetranitromethane							
	$\text{CH}_3\text{OCH}_2\text{OCH}_2 + \text{C}(\text{NO}_2)_4 \rightarrow \text{CH}_3\text{OCH}_2\text{OCH}_2\text{ON}(\ddot{\text{O}})\text{C}(\text{NO}_2)_3$	$5 \times 10^9$	4-13			p.r.	P.b.k. at 300 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> dimethoxymethane; adduct decomposes to nitroform anion ( $\lambda$ 350 nm), $k = 8.2 \times 10^2 \text{ s}^{-1}$ .	80A071
27.182	Methyl acetate, radical anion							
27.182.1	First-order reaction							
	$\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{OCH}_3 \rightarrow \text{CH}_3\dot{\text{C}}\text{O} + \text{CH}_3\text{O}^-$	$5.5 \times 10^5 \text{ s}^{-1}$	7.8			p.r.	D.k. at 260 nm; partial reaction to $\text{CH}_3\text{CO}_2^- + \cdot\text{CH}_3$ .	78A402
27.182.2	Hydrogen ion							
	$\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{OCH}_3 + \text{H}^+ \rightarrow \text{CH}_3\dot{\text{C}}(\text{OH})\text{OCH}_3$	$1.4 \times 10^{10}$				p.r.	D.k. at 360 nm in soln. contg. methyl acetate and $(1.5) \times 10^{-5}$ mol L <sup>-1</sup> HClO <sub>4</sub> .	78A402
27.183	4-Methyl-3,6-dioxo-1-piperazinylmethyl							
27.183.1	4-Methyl-3,6-dioxo-1-piperazinylmethyl							
	$\boxed{\text{N}(\text{CH}_3)\text{COCH}_2\text{N}(\dot{\text{C}}\text{H}_2)\text{COCH}_2} + \boxed{\text{N}(\text{CH}_3)\text{COCH}_2\text{N}(\dot{\text{C}}\text{H}_2)\text{COCH}_2} \rightarrow 1.2 \times 10^8$	5.6				p.r.	D.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. sarcosine anhydride; calcd. from $k_{\text{overall}} = 6.0 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	89A473
27.183.2	Sarcosine anhydride							
	$\boxed{\text{N}(\text{CH}_3)\text{COCH}_2\text{N}(\dot{\text{C}}\text{H}_2)\text{COCH}_2} + \boxed{\text{N}(\text{CH}_3)\text{COCH}_2\text{N}(\text{CH}_3)\text{COCH}_2} \rightarrow 6.0 \times 10^2$	5.6				p.r.	D.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. sarcosine anhydride; calcd. from $k_{\text{overall}} = 6.0 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	89A473
27.184	2-Methyl-1,3-dithiolan-2-yl							
27.184.1	2-Methyl-1,3-dithiolan-2-yl							
	$\boxed{\text{SC}(\text{CH}_3)\text{S}(\text{CH}_2)_2} + \boxed{\text{SC}(\text{CH}_3)\text{S}(\text{CH}_2)_2} \rightarrow 2.0 \times 10^9$	-4				p.r.	D.k. at 310 nm in N <sub>2</sub> O-satd. soln. contg. 2-methyl-1,3-dithiolane; $\epsilon = 2350 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	86B043
27.185	2-Methylene-1,3-dioxane radical cation							
27.185.1	Hydroxide ion							
	$\boxed{[(\text{CH}_2)_3\text{OC}(\text{=CH}_2)\text{O}]^+} + \text{OH}^- \rightarrow \cdot\text{CH}_2\text{CO}_2(\text{CH}_2)_3\text{OH}$	$9.0 \times 10^8$				p.r.	Cond. changes; radical from 2-(chloromethyl)-1,3-dioxane.	81D027

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
<b>27.185 2-Methylene-1,3-dioxane radical cation — Continued</b>								
<b>27.185.2 Hydrogen phosphate ion</b>								
	$[(\text{CH}_2)_2\text{OC}(\text{---CH}_2)\text{O}]^+ + \text{HPO}_4^{2-} \rightarrow$ $[(\text{CH}_2)_2\text{OC(OPO}_3^{2-})\text{(CH}_2)\text{O}]$	$8 \times 10^6$	3			phot.	Esr study; radical from 2-(chloromethyl)-1,3-dioxane; rel. to $k(\text{R} + \text{OH}^-) = 9.0 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	81D027
<b>27.186 2-Methylene-1,3-dioxolane radical cation</b>								
<b>27.186.1 Hydroxide ion</b>								
	$[(\text{CH}_2)_2\text{OC}(\text{---CH}_2)\text{O}]^+ + \text{OH}^- \rightarrow$ $\cdot\text{CH}_2\text{CO}_2\text{CH}_2\text{CH}_2\text{OH}$	$6.4 \times 10^9$				p.r.	Cond. changes; radical from 2-(chloromethyl)-1,3-dioxolane.	81D027
<b>27.186.2 Hydrogen phosphate ion</b>								
	$[(\text{CH}_2)_2\text{OC}(\text{---CH}_2)\text{O}]^+ + \text{HPO}_4^{2-} \rightarrow$ $[(\text{CH}_2)_2\text{OC(OPO}_3^{2-})\text{(CH}_2)\text{O}]$	$-3 \times 10^8$	3			phot.	Esr study; radical from 2-(chloromethyl)-1,3-dioxolane; rel. to $k(\text{R} + \text{OH}^-) = 6.4 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	81D027
<b>27.187 Methyl methacrylate, radical anion</b>								
<b>27.187.1 Water</b>								
	$[\text{CH}_3\dot{\text{C}}(\text{CH}_3)\text{CO}_2\text{CH}_3]^\cdot^- + \text{H}_2\text{O} \rightarrow$ $\text{CH}_3\dot{\text{C}}(\text{CH}_3)\text{CO}_2\text{CH}_3 + \text{OH}^-$	$4.5 \times 10^5 \text{ s}^{-1}$	9.8- 12.8			p.r.	D.k. in soln. contg. methyl methacrylate and borate buffer.	751052
<b>27.188 1-Methyl-1-(methylthio)ethyl</b>								
<b>27.188.1 Tetranitromethane</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{SCH}_3 + \text{C}(\text{NO}_2)_4 \rightarrow$ addn.	$3.2 \times 10^9$	3.5	294	p.r.		P.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. methyl isopropyl sulfide.	84A087
<b>27.189 1-Methyl-2-oxopropyl</b>								
<b>27.189.1 Hydroquinone monoanion</b>								
	$\text{CH}_3\dot{\text{C}}\text{OCHCH}_3 + 4\text{-HOC}_6\text{H}_4\text{O}^- \rightarrow$	$5.6 \times 10^8$	$\sim 11.5$			p.r.	P.b.k. at 430 nm in N <sub>2</sub> O-satd. soln. contg. 2,3-butanediol.	79A051
<b>27.190 1-(Methylsulfonatomethyl)ethyl</b>								
<b>27.190.1 Water</b>								
	$\text{CH}_3\dot{\text{C}}\text{HCH}_2\text{OSO}_2\text{CH}_3 + \text{H}_2\text{O} \rightarrow \text{H}^+ +$ $\text{CH}_3\dot{\text{C}}\text{IICH}_2\text{OII} + \text{CH}_3\text{SO}_3\text{H}$	$2 \times 10^5 \text{ s}^{-1}$	4.5-5	292	p.r.		Cond. changes in N <sub>2</sub> O-satd. soln. contg. 0.001-0.01 mol L <sup>-1</sup> propyl methanesulfonate.	82A350
<b>27.191 1-(Methylsulfonatomethyl)-1-methylethyl</b>								
<b>27.191.1 Water</b>								
	$(\text{CH}_3)_2\dot{\text{C}}\text{HCH}_2\text{OSO}_2\text{CH}_3 + \text{H}_2\text{O} \rightarrow \text{H}^+ +$ $(\text{CH}_3)_2\dot{\text{C}}\text{CH}_2\text{OH} + \text{CH}_3\text{SO}_3\text{H}$	$\geq 10^6 \text{ s}^{-1}$	4.5-5	292	p.r.		Cond. changes in N <sub>2</sub> O-satd. soln. contg. 0.001-0.01 mol L <sup>-1</sup> 2-methylpropyl methanesulfonate.	82A350
<b>27.192 1-(Methylsulfonatomethyl)propyl</b>								
<b>27.192.1 Water</b>								
	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCH}_2\text{OSO}_2\text{CH}_3 + \text{H}_2\text{O} \rightarrow$ $\text{H}^+ + \text{CH}_3\text{CH}_2\text{CHCH}_2\text{OH} + \text{CH}_3\text{SO}_3\text{H}$	$\geq 10^6 \text{ s}^{-1}$	4.5-5	292	p.r.		Cond. changes in N <sub>2</sub> O-satd. soln. contg. 0.001-0.01 mol L <sup>-1</sup> butyl methanesulfonate.	82A350
<b>27.193 4-(Methylthio)butyl</b>								
<b>27.193.1 1,4-Benzoquinone</b>								
	$\text{CH}_3\text{S}(\text{CH}_2)_3\dot{\text{C}}\text{H}_2 + \text{Q} \rightarrow$ addn.	$2.6 \times 10^8$	6			p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH and 0.1 mol L <sup>-1</sup> 1-methylthiolanium.	91A184
<b>27.194 1-(Methylthio)butyl</b>								
<b>27.194.1 Tetranitromethane</b>								
	$\text{CH}_3\text{S}(\text{CH}_2)_3\dot{\text{C}}\text{H}_2 + \text{C}(\text{NO}_2)_4 \rightarrow$ addn.	$2.2 \times 10^9$	3.5	294	p.r.		P.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. methyl butyl sulfide.	84A087

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
27.195	1-(Methylthio)ethyl							
27.195.1	Tetranitromethane							
	$\text{CH}_3\dot{\text{C}}\text{HSCH}_3 + \text{C}(\text{NO}_2)_4 \rightarrow \text{addn.}$	$4.2 \times 10^9$	3.5		294	p.r.	P.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. methyl ethyl sulfide.	84A087
27.196	Methylthiomethyl							
27.196.1	Tetranitromethane							
	$\text{CH}_2\dot{\text{S}}\text{CH}_3 + \text{C}(\text{NO}_2)_4 \rightarrow \text{addn.}$	$2.8 \times 10^9$	3.5		294	p.r.	P.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. dimethyl sulfide.	84A087
27.197	5-(Methylthio)pentyl							
27.197.1	1,4-Benzoquinone							
	$\text{CH}_3\dot{\text{S}}(\text{CH}_2)_4\dot{\text{C}}\text{H}_2 + \text{Q} \rightarrow \text{addn.}$	$4.8 \times 10^8$	6			p.r.	P.b.k. in soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH and 0.1 mol L <sup>-1</sup> 1-methylthianium.	91A184
27.198	1-(Methylthio)propyl							
27.198.1	Tetranitromethane							
	$\text{C}_2\text{H}_5\dot{\text{C}}\text{HSCH}_3 + \text{C}(\text{NO}_2)_4 \rightarrow \text{addn.}$	$2.1 \times 10^9$	3.5		294	p.r.	P.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. methyl propyl sulfide.	84A087
27.199	2-Oxocyclohexyl							
27.199.1	Hydroquinone monoanion							
	$[(\text{CH}_2)_4\dot{\text{C}}\text{HCO}]^- + 4-\text{HO}\text{C}_6\text{H}_4\text{O}^- \rightarrow$	$5.5 \times 10^8$		-11.5		p.r.	P.b.k. at 430 nm in N <sub>2</sub> O-satd. soln. contg. 1,2-cyclohexanediol.	79A051
27.200	1-Oxoethyl							
27.200.1	Chromium(II) ion							
	$\text{CH}_3\dot{\text{C}}\text{O} + \text{Cr}^{2+} \rightarrow \text{CrCOCH}_3^{2+}$	$3.1 \times 10^8$				f.p.	P.b.k. at 320 nm in soln. contg. CH <sub>3</sub> COCo([14]aneN <sub>4</sub> ) <sup>2+</sup> and (2.1-10.6) × 10 <sup>-3</sup> mol L <sup>-1</sup> chromium(II) ion.	92A424
27.200.2	Tetranitromethane							
	$\text{CH}_3\dot{\text{C}}\text{O} + \text{C}(\text{NO}_2)_4 \rightarrow \text{C}(\text{NO}_2)_3^- + \text{NO}_2 + \text{other prod.}$	$4.5 \times 10^7$				f.p.	P.b.k. at 350 nm in soln. contg. CH <sub>3</sub> COCo([14]aneN <sub>4</sub> ) <sup>2+</sup> and (7-30) × 10 <sup>-5</sup> mol L <sup>-1</sup> tetranitromethane.	92A424
27.201	2-Oxoglutarate, radical anion							
27.201.1	2-Methyl-1,4-naphthoquinone							
	$[\text{O}_2\text{CCH}_2\text{CH}_2\text{COCO}_2]^{1-} + 2-\text{CH}_3\text{NQ} \rightarrow [\text{O}_2\text{CCH}_2\text{CH}_2\text{COCO}_2^- + [2-\text{CH}_3\text{NQ}]^{1-}}$	$3.8 \times 10^9$		10.2		p.r.	P.b.k. at 395 nm in soln. contg. α-ketoglutarate and 1 mol L <sup>-1</sup> <i>tert</i> -BuOH; 94% <i>e</i> -transfer.	731047
27.202	2-Oxopropyl							
27.202.1	2-Oxopropyl							
	$\text{CH}_3\text{CO}\dot{\text{C}}\text{H}_2 + \text{CH}_3\text{CO}\dot{\text{C}}\text{H}_2 \rightarrow$	$7 \times 10^8$	6.5			p.r.	D.k. at 300 nm in N <sub>2</sub> O-satd. soln. contg. acetone.	86A285
27.202.2	Oxygen							
	$\text{CH}_3\text{CO}\dot{\text{C}}\text{H}_2 + \text{O}_2 \rightarrow \text{CH}_3\text{COCH}_2\text{OO}^\cdot$	$3.1 \times 10^9$				p.r.	P.b.k. at 350 nm in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. 0.01 mol L <sup>-1</sup> acetone.	86A285
27.202.3	Cysteamine, conjugate acid							
	$\text{CH}_3\text{CO}\dot{\text{C}}\text{H}_2 + \text{HSCH}_2\text{CH}_2\text{NH}_3^+ \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}_3\text{N}^+\text{CH}_2\text{CH}_2\text{S}^\cdot$	$\sim 4 \times 10^8$				p.r.	P.b.k. at 410 nm (RSSR <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. acetone.	680132
27.202.4	Hydroquinone monoanion							
	$\text{CH}_3\text{CO}\dot{\text{C}}\text{H}_2 + 4-\text{HO}\text{C}_6\text{H}_4\text{O}^- \rightarrow \text{Q}^{1-} + \text{CH}_3\text{COCH}_3$	$1.2 \times 10^9$		-11.5		p.r.	P.b.k. at 430 nm (semiquinone) in N <sub>2</sub> O-satd. soln. contg. 1,2-propanediol; radical mixture also contains CH <sub>3</sub> CHCHO.	79A051

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
<b>27.202 2-Oxopropyl — Continued</b>								
<b>27.202.5 2-Methyl-2-nitrosopropane</b>	$\text{CH}_3\text{CO}\dot{\text{C}}\text{H}_2 + (\text{CH}_3)_3\text{CNO} \rightarrow \text{addn.}$	$3.7 \times 10^7$	-7		-291	p.r.	P.b.k. (esr) in unbuffered N <sub>2</sub> O-satd. soln. contg. 2 mol L <sup>-1</sup> acetone and (0.25-15) × 10 <sup>-3</sup> mol L <sup>-1</sup> MNP (assuming complete dimer dissociation).	91D097
<b>27.202.6 <i>N,N,N',N'-Tetramethyl-p-phenylenediamine</i></b>								
	$\text{CH}_3\text{CO}\dot{\text{C}}\text{H}_2 + \text{TMPD} + \text{H}^+ \rightarrow$ $\text{CH}_3\text{COCH}_3 + \text{TMPD}^{+ \cdot}$	$1.2 \times 10^9$	8.5			p.r.	P.b.k. at 565 nm in Ar-satd. soln. contg. 0.1 mol L <sup>-1</sup> acetone and (0.2-1.8) × 10 <sup>-4</sup> mol L <sup>-1</sup> TMPD.	86A285
<b>27.203 2-Propenyl, 1-hydroxy-1-(2-hydroxyethoxy)-, anion</b>								
<b>27.203.1 Dihydrogen phosphate ion</b>	$\text{CH}_2=\text{CH}\dot{\text{C}}(\text{O}^-)\text{OCH}_2\text{CH}_2\text{OH} + \text{H}_2\text{PO}_4^- \rightarrow \text{CH}_3\dot{\text{C}}\text{HO}_2\text{CH}_2\text{CH}_2\text{OH} + \text{HPO}_4^{2-}$	$4 \times 10^6$				p.r.	D.k. in He-satd. soln. contg. 0.5 mol L <sup>-1</sup> <i>tert</i> -BuOH and 2-hydroxyethyl acrylate.	93A106
<b>27.204 1-(Propylsulfatomethyl)ethyl</b>								
<b>27.204.1 Water</b>	$\text{CH}_3\dot{\text{C}}\text{HCH}_2\text{OSO}_3\text{CH}_2\text{CH}_2\text{CH}_3 + \text{H}_2\text{O} \rightarrow \text{H}^+ + \text{CH}_3\dot{\text{C}}\text{HCH}_2\text{OH} + \text{HOSO}_3\text{CH}_2\text{CH}_2\text{CH}_3$	$\geq 10^6 \text{ s}^{-1}$	4.5-5		292	p.r.	Cond. changes in N <sub>2</sub> O-satd. soln. contg. 0.001-0.01 mol L <sup>-1</sup> di-1-propyl sulfate.	82A350
<b>27.205 Radicals from acetylasparagine</b>								
<b>27.205.1 2-Methyl-1,4-naphthoquinone</b>	$\text{R}^\cdot + 2\text{-CH}_3\text{NQ} \rightarrow$	$1.5 \times 10^9$	12.5			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. acetylasparagine; 39% <i>e</i> -transfer; ~12% <i>e</i> -transfer at pH 3.2 and 6.0.	731047
<b>27.206 Radicals from acetylglycine</b>								
<b>27.206.1 Oxygen</b>	$\text{AcGlyNH}\dot{\text{C}}\text{HCO}_2^- + \text{O}_2 \rightarrow \text{addn.}$	$5.5 \times 10^8$	5.5			p.r.	D.k. at 330 nm in N <sub>2</sub> O/O <sub>2</sub> -satd. soln. contg. acetylglycine.	731052
<b>27.206.2 2-Methyl-1,4-naphthoquinone</b>								
	$\text{AcGlyNH}\dot{\text{C}}\text{HCO}_2^- + 2\text{-CH}_3\text{NQ} \rightarrow$	$3.8 \times 10^9$	12.3			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. acetylglycine; 55% <i>e</i> -transfer.	731047
<b>27.207 Radicals from acetylserineamide</b>								
<b>27.207.1 2-Methyl-1,4-naphthoquinone</b>	$\text{R}^\cdot + 2\text{-CH}_3\text{NQ} \rightarrow$	$1.5 \times 10^9$ $1.9 \times 10^9$	6, 9 11.0			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. acetylserineamide; 52%, 57%, and 68% <i>e</i> -transfer, resp., at pH 6, 9, and 11.	731047
<b>27.208 Radicals from acetyltrialanine</b>								
<b>27.208.1 2-Methyl-1,4-naphthoquinone</b>	$\text{R}^\cdot + 2\text{-CH}_3\text{NQ} \rightarrow$	$2.6 \times 10^9$	12.3			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. acetyltrialanine; 47% <i>e</i> -transfer.	731047
		$2.1 \times 10^9$	6.9			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. acetyltrialanine; 18% <i>e</i> -transfer.	731047
<b>27.209 Radicals from acetyltriglycine</b>								
<b>27.209.1 2-Methyl-1,4-naphthoquinone</b>	$\text{R}^\cdot + 2\text{-CH}_3\text{NQ} \rightarrow$	$3.7 \times 10^9$	12.5			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. acetyltriglycine; 50% <i>e</i> -transfer.	731047

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
<b>27.210 Radicals from acetyltrisarcosine</b>								
<b>27.210.1 2-Methyl-1,4-naphthoquinone</b>								
$R' + 2\text{-CH}_3\text{NQ} \rightarrow$	$1.3 \times 10^9$		12.5			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. acetyltrisarcosine; 39% <i>e</i> -transfer at pH 12.5 and 7.0.	731047
<b>27.211 Radicals from arabinose</b>								
<b>27.211.1 Dithiothreitol</b>								
$R' + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} \rightarrow$	$1.6 \times 10^7$		7.3			p.r.	P.b.k. at 390 nm (RSSR <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. $5 \times 10^{-4}$ mol L <sup>-1</sup> DTT and arabinose.	85A220
<b>27.212 Radicals from arachidonate</b>								
<b>27.212.1 Oxygen</b>								
$L' + \text{O}_2 \rightarrow \text{LOO}'$	$2 \times 10^8$		13			p.r.	D.k. at 280 nm in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. $\sim (4-8) \times 10^{-4}$ mol L <sup>-1</sup> arachidonate.	78A365
<b>27.213 Radicals from 2-deoxygalactose</b>								
<b>27.213.1 Dithiothreitol</b>								
$R' + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} \rightarrow$	$1.9 \times 10^7$		7.3			p.r.	P.b.k. at 390 nm (RSSR <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. $5 \times 10^{-4}$ mol L <sup>-1</sup> DTT and 2-deoxygalactose.	85A220
<b>27.214 Radicals from 2-deoxyglucose</b>								
<b>27.214.1 Dithiothreitol</b>								
$R' + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} \rightarrow$	$9.2 \times 10^7$		7.3			p.r.	P.b.k. at 390 nm (RSSR <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. $5 \times 10^{-4}$ mol L <sup>-1</sup> DTT and 2-deoxyglucose.	85A220
<b>27.215 Radicals from deoxyribose</b>								
<b>27.215.1 Ferricyanide ion</b>								
$dR' + \text{Fe}(\text{CN})_6^{3-} \rightarrow$	$1.4 \times 10^9$					p.r.	D.k. in soln. contg. 2-deoxy-D-ribose.	78A175
	$2.8 \times 10^9$		7			p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L <sup>-1</sup> deoxyribose.	710618
<b>27.215.2 Hydrogen ion</b>								
$dR' + \text{H}^+ \rightarrow$ dehydration	$1.5 \times 10^7$					p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-deoxyribose at varied [H <sup>+</sup> ]; acid catalysis.	86A220
<b>27.215.3 Oxygen</b>								
$dR' + \text{O}_2 \rightarrow d\text{ROO}'$	$2.0 \times 10^9$		5-6			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. deoxyribose; rel. to $k(dR' + \text{Fe}(\text{CN})_6^{3-}) = 2.8 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	710618
<b>27.215.4 1,4-Benzoquinone</b>								
$dR' + Q \rightarrow Q'' +$ deoxyribose	$1.6 \times 10^9$		6-7			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-deoxyribose.	86A220
	$2.7 \times 10^9$		5.6			p.r.	P.b.k. at 430 nm in N <sub>2</sub> O-satd. soln. contg. deoxyribose.	730049
<b>27.215.5 Dithiothreitol</b>								
$dR' + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} \rightarrow$	$1.8 \times 10^8$		7.4			p.r.	P.b.k. at 390 nm (DTT <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. $2 \times 10^{-4}$ mol L <sup>-1</sup> dithiothreitol and 0.01 mol L <sup>-1</sup> deoxyribose.	87A250
	$2.4 \times 10^7$		7.3			p.r.	P.b.k. at 390 nm (RSSR <sup>-</sup> ) in N <sub>2</sub> O-satd. soln. contg. $5 \times 10^{-4}$ mol L <sup>-1</sup> DTT and 0.2 mol L <sup>-1</sup> deoxyribose.	85A220
<b>27.215.6 Glutathione</b>								
$dR' + \text{GSH} \rightarrow$ deoxyribose + GS'	$3.5 \times 10^7$		8.4			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. deoxyribose.	84A012

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
<b>27.215 Radicals from deoxyribose — Continued</b>								
<b>27.215.7 2-Methyl-1,4-naphthoquinone</b>								
dR <sup>·</sup> + 2-CH <sub>3</sub> NQ →	$2.1 \times 10^9$	6.8				p.r.	P.b.k. in soln. contg. 0.05 mol L <sup>-1</sup> deoxyribose; 81% <i>e</i> -transfer.	731047
	$4 \times 10^9$	6.8				p.r.	P.b.k. at 400 nm in soln. contg. deoxyribose; 74% <i>e</i> -transfer.	723057
<b>27.215.8 Nifuroxime</b>								
dR <sup>·</sup> + NF →	$1.4 \times 10^9$	7				p.r.	P.b.k. at 390 nm in N <sub>2</sub> O-satd. soln. contg. 0.01 mol L <sup>-1</sup> deoxyribose; 70% <i>e</i> -transfer.	731099
<b>27.215.9 4-Nitroacetophenone</b>								
dR <sup>·</sup> + PNAP → [PNAP] <sup>·-</sup> + other prod.	$1.0 \times 10^9$					p.r.	P.b.k.; 47% <i>e</i> -transfer. Radicals from deoxyribose	751207
<b>27.215.10 2,2,6,6-Tetramethyl-4-piperidone <i>N</i>-oxyl</b>								
dR <sup>·</sup> + TAN →	$3.9 \times 10^8$	5-6				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. deoxyribose; rel. to $k(dR^{\cdot} + Fe(CN)_6^{3-}) = 2.8 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	710618
<b>27.216 Radicals from diglycine</b>								
<b>27.216.1 2-Methyl-1,4-naphthoquinone</b>								
NH <sub>3</sub> <sup>+</sup> CH <sub>2</sub> CONHCHCO <sub>2</sub> <sup>-</sup> + 2-CH <sub>3</sub> NQ →	$1.2 \times 10^9$	11.0				p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. diglycine; 19% <i>e</i> -transfer at pH 6.6 and 47% at pH 11.	731047
<b>27.217 Radicals from 3,3-dimethyl-2-hydroxy-1,4-butyrolactone + OH</b>								
<b>27.217.1 Dithiothreitol</b>								
R <sup>·</sup> + HSCH <sub>2</sub> (CHOH) <sub>2</sub> CH <sub>2</sub> SH →	$6.0 \times 10^7$	7.4				p.r.	P.b.k. at 390 nm (DTT <sup>·-</sup> ) in N <sub>2</sub> O-satd. soln. contg. dithiothreitol and 3,3-dimethyl-2-hydroxy-1,4-butyrolactone.	87/A250
<b>27.218 Radicals from erythritol, conjugate base</b>								
<b>27.218.1 First-order reaction</b>								
HOCH <sub>2</sub> CHOH <sup>·</sup> CO <sup>-</sup> CH <sub>2</sub> OH → OH <sup>-</sup> +	$2.6 \times 10^6$ s <sup>-1</sup>	≥12				p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. erythritol; rel. to $k(R + N\text{-methylisonicotinate ion}) = 3.8 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> .	79A051
<b>27.219 Radicals from erythritol</b>								
<b>27.219.1 Hydrogen ion</b>								
HOCH <sub>2</sub> ·C(OH)CH(OH)CH <sub>2</sub> OH + H <sup>+</sup> →	$2.9 \times 10^6$					p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> erythritol at varied [H <sup>+</sup> ]; acid catalysis.	86A220
<b>27.219.2 1,1'-Dimethyl-4,4'-bipyridinium</b>								
HOCH <sub>2</sub> ·C(OH)CH(OH)CH <sub>2</sub> OH + MV <sup>2+</sup> →	$7.2 \times 10^7$	6				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> erythritol. Radical mixture also contains HOCH <sub>2</sub> CHOHCHOHCHOH.	86A220
<b>27.220 Radicals from fructose</b>								
<b>27.220.1 Dithiothreitol</b>								
R <sup>·</sup> + HSCH <sub>2</sub> (CHOH) <sub>2</sub> CH <sub>2</sub> SH →	$1.2 \times 10^7$	7.3				p.r.	P.b.k. at 390 nm (RSSR <sup>·-</sup> ) in N <sub>2</sub> O-satd. soln. contg. $5 \times 10^{-4}$ mol L <sup>-1</sup> DTT and fructose.	85A220
<b>27.221 Radicals from galactose</b>								
<b>27.221.1 Dithiothreitol</b>								
R <sup>·</sup> + HSCH <sub>2</sub> (CHOH) <sub>2</sub> CH <sub>2</sub> SH →	$1.6 \times 10^7$	7.3				p.r.	P.b.k. at 390 nm (RSSR <sup>·-</sup> ) in N <sub>2</sub> O-satd. soln. contg. $5 \times 10^{-4}$ mol L <sup>-1</sup> DTT and galactose.	85A220
<b>27.222 Radicals from glucose</b>								
<b>27.222.1 First-order reaction</b>								
R <sup>·</sup> →	$9 \times 10^4$ s <sup>-1</sup>					p.r.	C.k. with radical reaction with glutathione.	84A012

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>27.222 Radicals from glucose — Continued</b>								
<b>27.222.2 Ferricyanide ion</b>								
	R <sup>·</sup> + Fe(CN) <sub>6</sub> <sup>3-</sup> →	1.9 × 10 <sup>9</sup>	7			p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L <sup>-1</sup> glucose.	690522
<b>27.222.3 Hydrogen ion</b>								
	R <sup>·</sup> + H <sup>+</sup> → dehydration	1.1 × 10 <sup>6</sup>		293		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> α-D-glucose and ~1 × 10 <sup>-4</sup> mol L <sup>-1</sup> methyl viologen at varied pH.	88A159
<b>27.222.4 Oxygen</b>								
	R <sup>·</sup> + O <sub>2</sub> → ROO <sup>·</sup>	1.6 × 10 <sup>9</sup>	7			p.r.	C.k. in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. 0.3 mol L <sup>-1</sup> glucose and ferricyanide; rel. to <i>k</i> (R <sup>·</sup> + ferricyanide) = 1.9 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	690522
<b>27.222.5 3-Carboxamido-2,2,5,5-tetramethylpyrrolidin-1-yloxy</b>								
	R <sup>·</sup> + NX-s →	5.1 × 10 <sup>7</sup>	acid			p.r.	Condy. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> glucose; <i>e</i> -transfer.	761152
<b>27.222.6 3-Carboxamido-2,2,5,5-tetramethyl-3-pyrrolin-1-yloxy</b>								
	R <sup>·</sup> + NX-u →	4.3 × 10 <sup>7</sup>	acid			p.r.	Condy. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> glucose; <i>e</i> -transfer.	761152
<b>27.222.7 1-Chloro-4-nitrobenzene</b>								
	R <sup>·</sup> + 4-ClC <sub>6</sub> H <sub>4</sub> NO <sub>2</sub> →	4.0 × 10 <sup>8</sup>				p.r.	Abs. changes in soln. contg. glucose.	77R167
<b>27.222.8 Cysteamine, conjugate acid</b>								
	R <sup>·</sup> + HSCH <sub>2</sub> CH <sub>2</sub> NH <sub>3</sub> <sup>+</sup> → H <sub>3</sub> N <sup>+</sup> CH <sub>2</sub> CH <sub>2</sub> S <sup>·</sup> + other prod.	3.2 × 10 <sup>7</sup>				p.r.	P.b.k. at 410 nm (RSSR <sup>·</sup> ) in N <sub>2</sub> O-satd. soln. contg. glucose.	680132
<b>27.222.9 1,1'-Dimethyl-4,4'-bipyridinium</b>								
	R <sup>·</sup> + MV <sup>2+</sup> → MV <sup>+</sup> + other prod.	1.2 × 10 <sup>8</sup>	5	293		p.r.	P.b.k. at 602 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> α-D-glucose and methyl viologen.	88A159
<b>27.222.10 3,5-Dinitrobenzonitrile</b>								
	R <sup>·</sup> + 3,5-(O <sub>2</sub> N) <sub>2</sub> C <sub>6</sub> H <sub>3</sub> CN → [3,5-(O <sub>2</sub> N) <sub>2</sub> C <sub>6</sub> H <sub>3</sub> CN] <sup>·+</sup> + other prod.	1.0 × 10 <sup>9</sup>				p.r.	Abs. changes in soln. contg. glucose.	77R167
<b>27.222.11 1-(2,4-Dinitrophenyl)pyridinium</b>								
	R <sup>·</sup> + 2,4-(NO <sub>2</sub> ) <sub>2</sub> C <sub>6</sub> H <sub>3</sub> Py <sup>+</sup> → [2,4-(NO <sub>2</sub> ) <sub>2</sub> C <sub>6</sub> H <sub>3</sub> Py] <sup>·+</sup> + other prod.	1.0 × 10 <sup>9</sup>				p.r.	Abs. changes in soln. contg. glucose.	77R167
<b>27.222.12 Dithiothreitol</b>								
	R <sup>·</sup> + HSCH <sub>2</sub> (CHOH) <sub>2</sub> CH <sub>2</sub> SH →	1.7 × 10 <sup>7</sup>	7.3			p.r.	P.b.k. at 390 nm (RSSR <sup>·</sup> ) in N <sub>2</sub> O-satd. soln. contg. 5 × 10 <sup>-4</sup> mol L <sup>-1</sup> DTT and glucose.	85A220
<b>27.222.13 Glutathione</b>								
	R <sup>·</sup> + GSH → GS <sup>·</sup> + glucose	7 × 10 <sup>6</sup>	8.4			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. glucose.	84A012
<b>27.222.14 Hydroquinone monoanion</b>								
	R <sup>·</sup> + 4-HOC <sub>6</sub> H <sub>4</sub> O <sup>·-</sup> →	7.1 × 10 <sup>8</sup>	-11.5			p.r.	P.b.k. at 430 nm in N <sub>2</sub> O-satd. soln. contg. glucose; 2-alkanonyl radicals by H <sup>-</sup> abstraction and dehydration.	79A051
<b>27.222.15 4-Nitroacetophenone</b>								
	R <sup>·</sup> + PNAP → [PNAP] <sup>·+</sup> + other prod.	9 × 10 <sup>8</sup>				p.r.	Abs. changes in soln. contg. glucose.	77R167
<b>27.222.16 4-Nitrobenzonitrile</b>								
	R <sup>·</sup> + 4-O <sub>2</sub> NC <sub>6</sub> H <sub>4</sub> CN →	1.0 × 10 <sup>9</sup>				p.r.	Abs. changes in soln. contg. glucose.	77R167
<b>27.222.17 2,2,6,6-Tetramethylpiperidine-N-oxyl</b>								
	R <sup>·</sup> + TMPN →	4.9 × 10 <sup>7</sup>	acid			p.r.	Condy. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> glucose; addn. reaction.	761067
<b>27.222.18 2,2,6,6-Tetramethyl-4-piperidone N-oxyl</b>								
	R <sup>·</sup> + TAN →	5.9 × 10 <sup>7</sup>	acid			p.r.	Condy. changes in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> glucose; addn. reaction.	761067

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	I	T (K)	Method	Comment	Ref.
<b>27.222 Radicals from glucose — Continued</b>								
<b>27.222.18 2,2,6,6-Tetramethyl-4-piperidone N-oxyl — Continued</b>								
		$<1 \times 10^8$	5-6			p.r.	C.k. with ferricyanide in N <sub>2</sub> O-satd. soln. contg. glucose.	710618
<b>27.222.19 Tetranitromethane</b>								
	$R^\cdot + C(NO_2)_4 \rightarrow$	$2.6 \times 10^9$				p.r.	P.b.k. at 366 nm in N <sub>2</sub> O-satd. soln. 0.25 mol L <sup>-1</sup> glucose.	650183
<b>27.222.20 Thionine cation</b>								
	$R^\cdot + Th^+ \rightarrow [ThH]^{++} + \text{other prod.}$	$1.6 \times 10^9$	6.8			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> glucose and $10^{-4}$ mol L <sup>-1</sup> thionine.	87A451
<b>27.222.21 Toluidine Blue cation</b>								
	$R^\cdot + TB^+ \rightarrow [TBH]^{++} + \text{other prod.}$	$2.2 \times 10^9$	6.8			p.r.	P.b.k. at 830 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> glucose.	89A262
<b>27.222.22 2,4,6-Trinitrobenzenesulfonate ion</b>								
	$R^\cdot + 2,4,6-(NO_2)_3C_6H_2SO_3^- \rightarrow$	$1.1 \times 10^9$				p.r.	Abs. changes in soln. contg. glucose.	77R167
<b>27.223 Radicals from glycylglycinamide</b>								
<b>27.223.1 2-Methyl-1,4-naphthoquinone</b>								
	$H_2N\dot{C}HCONHCH_2CONH_2 + 2-CH_3NQ \rightarrow$	$8.5 \times 10^8$	6.8			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. glycylglycinamide; 25% e-transfer at pH 6.8 (16% e-transfer at pH 5.5 and 45% at pH 11.0).	731047
<b>27.224 Radicals from glycylsarcosine</b>								
<b>27.224.1 2-Methyl-1,4-naphthoquinone</b>								
	$H_3N^+CH_2CON(CH_3)\dot{C}HCO_2^- + 2-CH_3NQ \rightarrow$	$1.0 \times 10^9$	10.9			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. glycylsarcosine; 46% e-transfer (20% at pH 6.8).	731047
<b>27.225 Radicals from linolenate</b>								
<b>27.225.1 Oxygen</b>								
	$L^\cdot + O_2 \rightarrow LOO^\cdot$	$3.2 \times 10^8$	10.9			p.r.	D.k. at 280 nm in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. linolenate.	87A277
		$3 \times 10^8$	10.5-13			p.r.	D.k. at 280 nm in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. $\sim (4-8) \times 10^{-4}$ mol L <sup>-1</sup> linolenate.	78A365
<b>27.226 Radicals from linoleate</b>								
<b>27.226.1 Oxygen</b>								
	$L^\cdot + O_2 \rightarrow LOO^\cdot$	$3 \times 10^8$	10.5-13			p.r.	D.k. at 280 nm in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. 0.01 mol L <sup>-1</sup> linoleate and 0.02 mol L <sup>-1</sup> phosphate.	78A365
<b>27.227 Radicals from myoinositol</b>								
<b>27.227.1 Hydrogen ion</b>								
	$C_6H_{11}O_6 + H^+ \rightarrow \text{dehydration}$	$5.7 \times 10^5$				p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> myoinositol (isomer with $\beta$ -OH axial) at varied [H <sup>+</sup> ]; acid catalysis; $k = 1.0 \times 10^5$ L mol <sup>-1</sup> s <sup>-1</sup> for $\beta$ -OH equatorial isomer.	86A220
<b>27.227.2 1,1'-Dimethyl-4,4'-bipyridinium</b>								
	$C_6H_{11}O_6 + MV^{2+} \rightarrow MV^{++} + \text{other prod.}$	$1 \times 10^8$	6			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> myoinositol (isomer with $\beta$ -OH axial); $k = 2 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> for $\beta$ -OH equatorial.	86A220

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
<b>27.228 Radicals from oleate</b>								
<b>27.228.1 Oxygen</b>								
	$\text{L}^\cdot + \text{O}_2 \rightarrow \text{LOO}^\cdot$	$1.0 \times 10^9$	13			p.r.	D.k. at 280 nm in $\text{N}_2\text{O}/\text{O}_2$ satd. soln. contg. $\sim (4-8) \times 10^{-4}$ mol L <sup>-1</sup> oleate.	78A365
<b>27.229 Radicals from ribose</b>								
<b>27.229.1 Dithiothreitol</b>								
	$\text{R}^\cdot + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} \rightarrow \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{S}^\cdot + \text{RH}$	$9.0 \times 10^7$	7.4			p.r.	P.b.k. at 390 nm ( $\text{DTT}^\cdot$ ) in $\text{N}_2\text{O}$ -satd. soln. contg. dithiothreitol and ribose.	87A250
		$1.2 \times 10^7$	7.3			p.r.	P.b.k. at 390 nm ( $\text{RSSR}^\cdot$ ) in $\text{N}_2\text{O}$ -satd. soln. contg. $5 \times 10^{-4}$ mol L <sup>-1</sup> DTT and 0.2 mol L <sup>-1</sup> ribose.	85A220
<b>27.229.2 N-Ethylmaleimide</b>								
	$\text{R}^\cdot + \text{NEM} \rightarrow$	$2.1 \times 10^9$	6.7			p.r.	Abs. changes in soln. contg. ribose; 30% <i>e</i> -transfer, 20% addn. based on abs. spectra.	720144
<b>27.229.3 Hydroquinone monoanion</b>								
	$\text{R}^\cdot + 4\text{-HO}\text{C}_6\text{H}_4\text{O}^- \rightarrow$	$9.6 \times 10^8$	$\sim 11.5$			p.r.	P.b.k. at 430 nm in $\text{N}_2\text{O}$ -satd. soln. contg. ribose; 2-alkanonyl radicals by H-abstraction and dehydration.	79A051
<b>27.229.4 2-Methyl-1,4-naphthoquinone</b>								
	$\text{R}^\cdot + 2\text{-CH}_3\text{NQ} \rightarrow$	$1.4 \times 10^9$	6.9			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 0.5 mol L <sup>-1</sup> ribose; 60% <i>e</i> -transfer.	731047
		$2.6 \times 10^9$	6.9			p.r.	P.b.k. in $\text{N}_2\text{O}$ -satd. soln. contg. ribose; 44% <i>e</i> -transfer.	723057
<b>27.229.5 Nifuroxime</b>								
	$\text{R}^\cdot + \text{NF} \rightarrow$	$1.5 \times 10^9$	7			p.r.	P.b.k. at 390 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.01 mol L <sup>-1</sup> ribose; 50% <i>e</i> -transfer.	731099
<b>27.230 Radicals from ribose 5-phosphate</b>								
<b>27.230.1 Dithiothreitol</b>								
	$\text{R}^\cdot + \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{SH} \rightarrow \text{HSCH}_2(\text{CHOH})_2\text{CH}_2\text{S}^\cdot + \text{RH}$	$\sim 5 \times 10^7$	7.4			p.r.	P.b.k. at 390 nm ( $\text{DTT}^\cdot$ ) in $\text{N}_2\text{O}$ -satd. soln. contg. dithiothreitol and D-ribose-5-phosphate.	87A250
		$5 \times 10^6$	7.3			p.r.	P.b.k. at 390 nm ( $\text{RSSR}^\cdot$ ) in $\text{N}_2\text{O}$ -satd. soln. contg. $5 \times 10^{-4}$ mol L <sup>-1</sup> DTT and ribose 5-phosphate.	85A220
<b>27.230.2 2-Methyl-1,4-naphthoquinone</b>								
	$\text{R}^\cdot + 2\text{-CH}_3\text{NQ} \rightarrow$	$4.0 \times 10^9$	6.8			p.r.	P.b.k. at 400 nm in $\text{N}_2\text{O}$ -satd. soln. contg. ribose-5-phosphate; 25% <i>e</i> -transfer.	723057
<b>27.230.3 Nifuroxime</b>								
	$\text{R}^\cdot + \text{NF} \rightarrow$	$1.7 \times 10^9$	7			p.r.	P.b.k. at 390 nm in $\text{N}_2\text{O}$ -satd. soln. contg. 0.001 mol L <sup>-1</sup> ribose phosphate; 10% <i>e</i> -transfer.	731099
<b>27.231 Radicals from sodium dodecylsulfate</b>								
<b>27.231.1 1,4-Benzoquinone</b>								
	$\text{R}^\cdot + \text{Q} \rightarrow \text{Q}^\cdot + \text{other prod.}$	$1.2 \times 10^9$				p.r.	P.b.k. at 430 nm in soln. contg. 0.1 mol L <sup>-1</sup> sodium dodecylsulfate; $k(\text{R} + \text{micelle}) = 9.9 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$ .	78A261
<b>27.232 Radicals from sorbitol</b>								
<b>27.232.1 Hydroquinone monoanion</b>								
	$\text{R}^\cdot + 4\text{-HO}\text{C}_6\text{H}_4\text{O}^- \rightarrow$	$9.8 \times 10^8$	$\sim 11.5$			p.r.	P.b.k. at 430 nm in $\text{N}_2\text{O}$ -satd. soln. contg. sorbitol; 2-alkanonyl radicals by H-abstraction and dehydration.	79A051

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
<b>27.233 Radicals from sucrose</b>								
<b>27.233.1 Tetranitromethane</b>								
	$\text{C}_{12}\text{H}_{21}\text{O}_{12} + \text{C}(\text{NO}_2)_4 \rightarrow$	$8.3 \times 10^8$				p.r.	P.b.k. in soln. contg. 0.1 or 0.01 mol L <sup>-1</sup> sucrose.	650183
		$7.0 \times 10^8$				p.r.	P.b.k. at 350 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> sucrose.	640133
<b>27.234 Radicals from triglycine</b>								
<b>27.234.1 9,10-Anthraquinone-2,6-disulfonate ion</b>								
	$\text{R}^\cdot + 2,6\text{-diSO}_3\text{AQ}^{2-} \rightarrow [2\text{-SO}_3\text{AQ}]^{2-} +$ other prod.	$1.8 \times 10^9$	10			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. triglycine.	731104
<b>27.234.2 9,10-Anthraquinone-2-sulfonate ion</b>								
	$\text{R}^\cdot + 2\text{-SO}_3\text{AQ}^- \rightarrow [2\text{-SO}_3\text{AQ}]^{2-} +$ other prod.	$1.4 \times 10^9$	10			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. triglycine.	731104
<b>27.234.3 1,4-Benzoquinone</b>								
	$\text{R}^\cdot + \text{Q} \rightarrow \text{GlyGlyGly} + \text{Q}^{+ -}$	$2.5 \times 10^9$	10			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. triglycine	731104
<b>27.234.4 2-Hydroxy-1,4-naphthoquinone</b>								
	$\text{R}^\cdot + 2\text{-}(\text{OH})\text{NQ} \rightarrow 2\text{-}(\text{OH})\text{NQ}^{+ -} +$ other prod.	$1.9 \times 10^9$	10			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. triglycine.	731104
<b>27.234.5 2-Methyl-1,4-naphthoquinone</b>								
	$\text{R}^\cdot + 2\text{-CH}_3\text{NQ} \rightarrow$	$1.8 \times 10^9$	12.0			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. triglycine; 77% <i>e</i> -transfer.	731047
		$1.8 \times 10^9$	7.0			p.r.	P.b.k. at 395 nm in N <sub>2</sub> O-satd. soln. contg. triglycine; 11% <i>e</i> -transfer.	731047
		$1.9 \times 10^9$	10			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. triglycine.	731104
<b>27.234.6 1,4-Naphthoquinone-2-sulfonate ion</b>								
	$\text{R}^\cdot + 2\text{-SO}_3\text{NQ}^- \rightarrow [2\text{-SO}_3\text{NQ}]^{2-} +$ other prod.	$2.0 \times 10^9$	10			p.r.	P.b.k. at 400 nm in N <sub>2</sub> O-satd. soln. contg. triglycine.	731104
<b>27.235 Radicals from xylitol</b>								
<b>27.235.1 Hydroquinone monoanion</b>								
	$\text{R}^\cdot + 4\text{-HOC}_6\text{H}_4\text{O}^- \rightarrow$	$1.2 \times 10^9$	~11.5			p.r.	P.b.k. at 430 nm in N <sub>2</sub> O-satd. soln. contg. xylitol; 2-alkanonyl radicals by H <sup>-</sup> abstraction and dehydration.	79A051
<b>27.236 Sarcosine anhydride, radical anion</b>								
<b>27.236.1 Acetophenone</b>								
	$[\text{N}(\text{CH}_3)\text{COCH}_2\text{N}(\text{CH}_3)\text{COCH}_2]^{+ -} + \text{C}_6\text{H}_5\text{COCH}_3 \rightarrow$	$2.0 \times 10^9$	5.2			p.r.	P.b.k. at 280 nm (320 at pH 12.4) in soln. contg. sarcosine anhydride and 1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	710554
		$2.1 \times 10^9$	12.4					
<b>27.236.2 Benzophenone</b>								
	$[\text{N}(\text{CH}_3)\text{COCH}_2\text{N}(\text{CH}_3)\text{COCH}_2]^{+ -} + (\text{C}_6\text{H}_5)_2\text{CO} \rightarrow$	$2.3 \times 10^9$	5.2			p.r.	P.b.k. at 330 nm (320 at pH 12.2) in soln. contg. sarcosine anhydride and 1 mol L <sup>-1</sup> <i>tert</i> -BuOH.	710554
		$2.4 \times 10^9$	12.2					
<b>27.236.3 Cysteine</b>								
	$[\text{N}(\text{CH}_3)\text{COCH}_2\text{N}(\text{CH}_3)\text{COCH}_2]^{+ -} + \text{CysSH} \rightarrow$ electron transfer	$1.5 \times 10^8$	7.0			p.r.	D.k. at 265 nm in soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH and sarcosine anhydride.	710554
<b>27.236.4 2-Methyl-1,4-naphthoquinone</b>								
	$[\text{N}(\text{CH}_3)\text{COCH}_2\text{N}(\text{CH}_3)\text{COCH}_2]^{+ -} + 2\text{-CH}_3\text{NQ} \rightarrow [2\text{-CH}_3\text{NQ}]^{+ -} +$ other prod.	$4.6 \times 10^9$	6.0			p.r.	P.b.k. at 395 nm in soln. contg. sarcosine anhydride; 91% <i>e</i> -transfer.	731047

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
27.237	Sorbic acid, radical anion							
27.237.1	Water							
	[CH <sub>3</sub> CHCHCHCHCO <sub>2</sub> H] <sup>•-</sup> + H <sub>2</sub> O →	5.0 × 10 <sup>4</sup> s <sup>-1</sup>	11.1			p.r.	D.k. in sorbate soln.; extrapolated to zero concn. of buffer.	761113
27.237.2	Hydroxide ion							
	[CH <sub>3</sub> CHCHCHCHCO <sub>2</sub> H] <sup>•-</sup> + OH <sup>-</sup> →	~2 × 10 <sup>7</sup>	>6.4	→0		p.r.	D.k. in soln. contg. sorbate.	761113
27.238	1-Sulfatoethyl							
27.238.1	Ferricyanide ion							
	CH <sub>3</sub> CHOSO <sub>3</sub> <sup>-</sup> + Fe(CN) <sub>6</sub> <sup>3-</sup> →	~2 × 10 <sup>8</sup>				p.r.	D.k. at 420 nm in N <sub>2</sub> O-satd. soln. contg. ethylsulfate ion; similar values are given also for radicals produced from reaction of ·OH with octyl and decyl sulfates.	79N061
27.239	1,1,2,2-Tetrachloro-2-hydroxyethyl							
27.239.1	First-order reaction							
	·CCl <sub>2</sub> CCl <sub>2</sub> OH → ·CCl <sub>2</sub> C(O)Cl + H <sup>+</sup> + Cl <sup>-</sup>	>7 × 10 <sup>5</sup> s <sup>-1</sup>			298	p.r.	Cond. changes in N <sub>2</sub> O-satd. soln. contg. tetrachloroethylene.	94A397
		>7 × 10 <sup>5</sup> s <sup>-1</sup>				p.r.	Abs. changes in N <sub>2</sub> O-satd. soln. contg. 10 <sup>-4</sup> mol L <sup>-1</sup> tetrachloroethylene.	710709
27.240	Tetrahydro-2,5-dimethyl-2-furanyl							
27.240.1	Dithiothreitol							
	[(OCH(CH <sub>3</sub> )CH <sub>2</sub> CH <sub>2</sub> CH(CH <sub>3</sub> )] <sup>1</sup> + HSCH <sub>2</sub> (CHOH) <sub>2</sub> CH <sub>2</sub> SH → HSCH <sub>2</sub> (CHOH) <sub>2</sub> CH <sub>2</sub> S <sup>•</sup> + [(OCH(CH <sub>3</sub> )CH <sub>2</sub> CH <sub>2</sub> CH(CH <sub>3</sub> )] <sup>1</sup>	6.1 × 10 <sup>8</sup>	8.1		293	p.r.	P.b.k. at 400 nm (cyclized radical anion) in N <sub>2</sub> O-satd. soln. contg. DTT and 2,5-dimethyltetrahydrofuran.	87G007
27.241	Tetrahydro-2-furanyl							
27.241.1	Hydrogen peroxide							
	[(OCH(CH <sub>2</sub> ) <sub>3</sub> ] <sup>1</sup> + H <sub>2</sub> O <sub>2</sub> →	3 × 10 <sup>4</sup>				chem.	Esr study in Ti(III)-H <sub>2</sub> O <sub>2</sub> soln. contg. tetrahydrofuran; used 2 <i>k</i> (R + R) = 3 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	745144
27.241.2	Hydrogen peroxomonosulfate ion							
	[(OCH(CH <sub>2</sub> ) <sub>3</sub> ] <sup>1</sup> + HSO <sub>5</sub> <sup>-</sup> →	~1.8 × 10 <sup>6</sup>				chem.	Esr study; soln. contg. Ti(III) sulfate, H <sub>2</sub> O <sub>2</sub> , HSO <sub>5</sub> <sup>-</sup> and tetrahydrofuran.	90D226
27.241.3	Carbon tetrachloride							
	[(OCH(CH <sub>2</sub> ) <sub>3</sub> ] <sup>1</sup> + CCl <sub>4</sub> → Cl <sup>-</sup> + other prod.	2.0 × 10 <sup>7</sup>				p.r.	Cond. changes; buildup of HCl in N <sub>2</sub> O-satd. soln. contg. tetrahydrofuran and CCl <sub>4</sub> .	710778
27.241.4	1,4-Dicyanobenzene							
	[(OCH(CH <sub>2</sub> ) <sub>3</sub> ] <sup>1</sup> + DCNB →	5 × 10 <sup>7</sup>	-7			p.r.	P.b.k. at 345 nm in N <sub>2</sub> O-satd. soln. contg. tetrahydrofuran.	91A229
27.241.5	Dithiothreitol							
	[(OCH(CH <sub>2</sub> ) <sub>3</sub> ] <sup>1</sup> + HSCH <sub>2</sub> (CHOH) <sub>2</sub> CH <sub>2</sub> SH → HSCH <sub>2</sub> (CHOH) <sub>2</sub> CH <sub>2</sub> S <sup>•</sup> + THF	1.2 × 10 <sup>8</sup>	7.2		293	p.r.	P.b.k. at 400 nm (cyclized radical anion) in N <sub>2</sub> O-satd. soln. contg. DTT and tetrahydrofuran.	87G007
27.241.6	4-Nitroacetophenone							
	[(OCH(CH <sub>2</sub> ) <sub>3</sub> ] <sup>1</sup> + PNAP →	1.0 × 10 <sup>9</sup>	5-7		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> tetrahydrofuran Δ <i>H</i> <sub>‡</sub> = 11.1 kJ mol <sup>-1</sup> , Δ <i>S</i> <sub>‡</sub> = -34 J K <sup>-1</sup> mol <sup>-1</sup> ; studied at 273-333 K.	88A099
27.241.7	4-Nitrobenzonitrile							
	[(OCH(CH <sub>2</sub> ) <sub>3</sub> ] <sup>1</sup> + 4-O <sub>2</sub> NC <sub>6</sub> H <sub>4</sub> CN →	1.3 × 10 <sup>9</sup>	5-7		293	p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 1 mol L <sup>-1</sup> tetrahydrofuran; Δ <i>H</i> <sub>‡</sub> = 9.1 kJ mol <sup>-1</sup> , Δ <i>S</i> <sub>‡</sub> = -39 J K <sup>-1</sup> mol <sup>-1</sup> ; studied at 273-333 K.	88A099

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>27.241 Tetrahydro-2-furanyl — Continued</b>								
27.241.8	Thionine cation	$\text{[O}\dot{\text{C}}(\text{CH}_2)_3\text{]} + \text{Th}^+ \rightarrow [\text{ThH}]^{+\cdot} + \text{other prod.}$	$4.6 \times 10^9$	6.8		p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> THF and 10 <sup>-4</sup> mol L <sup>-1</sup> thionine.	87A451
27.241.9	Toluidine Blue cation	$\text{[O}\dot{\text{C}}(\text{CH}_2)_3\text{]} + \text{TB}^+ \rightarrow [\text{TBH}]^{+\cdot} + \text{other prod.}$	$3.7 \times 10^9$	6.8		p.r.	P.b.k. at 830 nm in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> THF.	89A262
27.242	Tetrahydrofuryl(hydroxy)methyl							
27.242.1	Hydrogen ion	$\text{[O}\dot{\text{C}}\text{H}_2\text{CH}_2\text{CH}_2\text{CH}\dot{\text{C}}\text{HOH} + \text{H}^+ \rightarrow \text{HOCH}_2\text{CH}_2\text{CH}_2\text{CHCHO} + \text{H}_2\text{O} + \text{H}^+$	$2.8 \times 10^6$			p.r.	P.b.k. in N <sub>2</sub> O-satd. soln. contg. 0.1 mol L <sup>-1</sup> 2-hydroxymethylfuran at varied [H <sup>+</sup> ]; acid catalysis.	86A220
27.243	Tetrahydro-2-pyranyl							
27.243.1	Tetrahydro-2-pyranyl	$\text{[O}\dot{\text{C}}(\text{CH}_2)_4\text{]} + \text{[O}\dot{\text{C}}(\text{CH}_2)_4\text{]} \rightarrow$	$\sim 9 \times 10^8$		300	p.r.	D.k. at 250 nm in N <sub>2</sub> O-satd. soln. contg. tetrahydropyran; calcd. assuming parallel first and second order reactions.	86A377
27.244	1,1,2-Trichloro-2-oxoethyl							
27.244.1	1,1,2-Trichloro-2-oxoethyl	$\text{'CCl}_2\text{C(O)Cl} + \text{'CCl}_2\text{C(O)Cl} \rightarrow \text{ClC(O)CCl}_2\text{C(O)Cl}$	$3.5 \times 10^8$		298	p.r.	D.k. at 265 nm in N <sub>2</sub> O-satd. soln. contg. tetrachloroethylene; $\epsilon = 4100 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	94A397
			$1.6 \times 10^8$			p.r.	D.k. at 265 nm in N <sub>2</sub> O-satd. soln. contg. 10 <sup>-4</sup> mol L <sup>-1</sup> tetrachloroethylene; $\epsilon = 2500 \text{ L mol}^{-1} \text{ s}^{-1}$ (from graph).	710709
27.244.2	Oxygen	$\text{'CCl}_2\text{C(O)Cl} + \text{O}_2 \rightarrow \text{ClC(O)CCl}_2\text{OO}'$	$1.2 \times 10^9$			p.r.	P.b.k. at 260 nm in N <sub>2</sub> O/O <sub>2</sub> satd. soln. contg. 0.001 mol L <sup>-1</sup> tetrachloroethylene.	94A221
27.245	1-[Tri(ethoxy)methoxy]ethyl							
27.245.1	Hexachloroiridate(IV) ion	$(\text{C}_2\text{H}_5\text{O})_3\text{CO}\dot{\text{C}}\text{HCH}_3 + \text{IrCl}_6^{2-} \rightarrow (\text{CH}_3\text{O})_3\text{COCH}_2^+ + \text{IrCl}_6^{3-}$	$2.2 \times 10^9$	7-8	293	p.r.	D.k. at 490 nm in soln. contg. 0.01 mol L <sup>-1</sup> triethyl orthocarbonate and (5-50) × 10 <sup>-5</sup> mol L <sup>-1</sup> IrCl <sub>6</sub> <sup>2-</sup> ; $k = 3.4 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ from condy. meas.	86A155
27.245.2	Ferricyanide ion	$(\text{C}_2\text{H}_5\text{O})_3\text{CO}\dot{\text{C}}\text{HCH}_3 + \text{Fe(CN)}_6^{3-} \rightarrow (\text{CH}_3\text{O})_3\text{COCH}_2^+ + \text{Fe(CN)}_6^{4-}$	$1.8 \times 10^9$	7-8	293	p.r.	D.k. at 420 nm in soln. contg. 0.01 mol L <sup>-1</sup> triethyl orthocarbonate and (5-50) × 10 <sup>-5</sup> mol L <sup>-1</sup> Fe(CN) <sub>6</sub> <sup>3-</sup> .	86A155
27.246	Triethoxymethyl							
27.246.1	Ferricyanide ion	$(\text{C}_2\text{H}_5\text{O})_3\dot{\text{C}} + \text{Fe(CN)}_6^{3-} \rightarrow (\text{C}_2\text{H}_5\text{O})_3\text{C}^+ + \text{Fe(CN)}_6^{4-}$	$1.6 \times 10^9$	7-8	293	p.r.	D.k. at 420 nm in soln. contg. 0.01 mol L <sup>-1</sup> triethyl orthoformate and (5-50) × 10 <sup>-5</sup> mol L <sup>-1</sup> Fe(CN) <sub>6</sub> <sup>3-</sup> .	86A155
27.246.2	Hexachloroiridate(IV) ion	$(\text{C}_2\text{H}_5\text{O})_3\dot{\text{C}} + \text{IrCl}_6^{2-} \rightarrow (\text{C}_2\text{H}_5\text{O})_3\text{C}^+ + \text{IrCl}_6^{3-}$	$2.9 \times 10^9$	7-8	293	p.r.	D.k. at 490 nm in soln. contg. 0.01 mol L <sup>-1</sup> triethyl orthoformate and (5-50) × 10 <sup>-5</sup> mol L <sup>-1</sup> IrCl <sub>6</sub> <sup>2-</sup> .	86A155

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
27.247	2,2,2-Trifluoro-1-(difluoromethoxy)ethyl							
27.247.1	Oxygen							
	$\text{CHF}_2\text{O}\dot{\text{C}}\text{HCF}_3 + \text{O}_2 \rightarrow$ $\text{CHF}_2\text{OCH}(\text{OO}')\text{CF}_3$	$1.4 \times 10^9$				p.r.	Eval. from leveling off of rate of reaction of peroxy radical with ABTS, chlorpromazine, promethazine, ascorbate and propyl gallate at high concn. of substrates in air-satd. soln. contg. 0.5-1 mol L <sup>-1</sup> <i>tert</i> -BuOH and isoflurane.	88A364
27.248	1,2,2-Trifluoro-2-(difluoromethoxy)ethyl							
27.248.1	Oxygen							
	$\text{CHF}_2\text{OCF}_2\dot{\text{C}}\text{HF} + \text{O}_2 \rightarrow$ $\text{CHF}_2\text{OCF}_2\text{CHFOO}'$	$1.2 \times 10^9$				p.r.	Eval. from leveling off of rate of reaction of peroxy radical with ABTS, chlorpromazine, promethazine and propyl gallate at high concn. of substrates in air-satd. soln. contg. 0.5-1 mol L <sup>-1</sup> <i>tert</i> -BuOH and enflurane.	88A364
27.249	2,2,2-Trifluoro-1-hydroxyethyl							
27.249.1	<i>N</i> -rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion							
	$\text{^*CHOHC}_3 +$ $\text{N-rac-Co}(4,11\text{-dieneN}_4)^{2+} \rightarrow$ $\text{CF}_3\text{CHOHC}(4,11\text{-dieneN}_4)^{2+}$	$1 \times 10^7$	6			p.r.	P.b.k.	78A200
27.250	3,4,5-Trihydroxy-2-oxocyclohexyl							
27.250.1	Hydroquinone monoanion							
	$\boxed{(\text{CHOH})_3\text{CH}_2\dot{\text{C}}\text{HCO}} + 4\text{-HOCH}_2\text{H}_4\text{O}^- \rightarrow$	$6.4 \times 10^8$	-11.5			p.r.	P.b.k. at 430 nm in N <sub>2</sub> O-satd. soln. contg. <i>meso</i> -inositol.	79A051
27.251	1,2,3-Trihydroxypropyl, conjugate base							
27.251.1	First-order reaction							
	$\text{HOCH}_2\text{CHOH}\dot{\text{C}}\text{HO}^- \rightarrow \text{OH}^- +$ $\text{HOCH}_2\dot{\text{C}}\text{HCHO}$	$2.8 \times 10^6 \text{ s}^{-1}$	$\geq 12$			p.r.	C.k. in N <sub>2</sub> O-satd. soln. contg. glycerol; rel. to $k(R + N\text{-methylisonicotinate ion}) = 3.8 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ .	79A051
27.252	Tri(methoxy)methoxymethyl							
27.252.1	Ferricyanide ion							
	$(\text{CH}_3\text{O})_3\text{CO}\dot{\text{C}}\text{H}_2 + \text{Fe}(\text{CN})_6^{3-} \rightarrow$ $(\text{CH}_3\text{O})_3\text{COCH}_2^+ + \text{Fe}(\text{CN})_6^{4-}$	$3.8 \times 10^8$	7-8		293	p.r.	D.k. at 420 nm in soln. contg. 0.01 mol L <sup>-1</sup> trimethyl orthocarbonate and (5-50) $\times 10^{-5}$ mol L <sup>-1</sup> $\text{Fe}(\text{CN})_6^{3-}$ .	86A155
27.252.2	Hexachloroiridate(IV) ion							
	$(\text{CH}_3\text{O})_3\text{CO}\dot{\text{C}}\text{H}_2 + \text{IrCl}_6^{2-} \rightarrow$ $(\text{CH}_3\text{O})_3\text{COCH}_2^+ + \text{IrCl}_6^{3-}$	$3.0 \times 10^9$	7-8		293	p.r.	D.k. at 490 nm in soln. contg. 0.01 mol L <sup>-1</sup> trimethyl orthocarbonate and (5-50) $\times 10^{-5}$ mol L <sup>-1</sup> $\text{IrCl}_6^{2-}$ ; $k = 4.0 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ from condy. meas.	86A155
27.253	Trimethoxymethyl							
27.253.1	Ferricyanide ion							
	$(\text{CH}_3\text{O})_3\dot{\text{C}} + \text{Fe}(\text{CN})_6^{3-} \rightarrow (\text{CH}_3\text{O})_3\text{C}^+$ + $\text{Fe}(\text{CN})_6^{4-}$	$1.7 \times 10^9$	7-8		293	p.r.	D.k. at 420 nm in soln. contg. 0.01 mol L <sup>-1</sup> trimethyl orthoformate and (5-50) $\times 10^{-5}$ mol L <sup>-1</sup> $\text{Fe}(\text{CN})_6^{3-}$ .	86A155
27.253.2	Hexachloroiridate(IV) ion							
	$(\text{CH}_3\text{O})_3\dot{\text{C}} + \text{IrCl}_6^{2-} \rightarrow (\text{CH}_3\text{O})_3\text{C}^+ +$ $\text{IrCl}_6^{3-}$	$3.8 \times 10^9$	7-8		293	p.r.	D.k. at 490 nm in soln. contg. 0.01 mol L <sup>-1</sup> trimethyl orthoformate and (5-50) $\times 10^{-5}$ mol L <sup>-1</sup> $\text{IrCl}_6^{2-}$ .	86A155
27.253.3	Tetranitromethane							
	$(\text{CH}_3\text{O})_3\dot{\text{C}} + \text{C}(\text{NO}_2)_4 \rightarrow (\text{CH}_3\text{O})_3\text{C}^+ +$ $\text{NO}_2 + \text{C}(\text{NO}_2)_3^-$	$\sim 2 \times 10^9$	7.9		293	p.r.	P.b.k. at 350 nm in soln. contg. 0.01 mol L <sup>-1</sup> trimethyl orthoformate and (5-50) $\times 10^{-5}$ mol L <sup>-1</sup> tetranitromethane.	86A155

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
<b>27.254 Trimethylammoniomethyl</b>								
<b>27.254.1 2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate ion)</b>								
	$\cdot\text{CH}_2\text{N}^+(\text{CH}_3)_3 + \text{ABTS}^{2-} \rightarrow \text{ABTS}^{\cdot+} + 4 \times 10^8$ other prod.					p.r.	P.b.k.; radical from tetramethylammonium ion.	86A113
<b>27.255 Tri(1-methylethoxy)methyl</b>								
<b>27.255.1 Ferricyanide ion</b>								
	$((\text{CH}_3)_2\text{CHO})_3\dot{\text{C}} + \text{Fe}(\text{CN})_6^{3-} \rightarrow$ $((\text{CH}_3)_2\text{CHO})_3\text{C}^+ + \text{Fe}(\text{CN})_6^{4-}$	$2.7 \times 10^9$	7-8		293	p.r.	D.k. at 420 nm in soln. contg. 0.01 mol L <sup>-1</sup> triisopropoxymethane and (5-50) × 10 <sup>-5</sup> mol L <sup>-1</sup> $\text{Fe}(\text{CN})_6^{3-}$ .	86A155
<b>27.255.2 Hexachloroiridate(IV) ion</b>								
	$((\text{CH}_3)_2\text{CHO})_3\dot{\text{C}} + \text{IrCl}_6^{2-} \rightarrow$ $((\text{CH}_3)_2\text{CHO})_3\text{C}^+ + \text{IrCl}_6^{3-}$	$2.8 \times 10^9$	7-8		293	p.r.	D.k. at 490 nm in soln. contg. 0.01 mol L <sup>-1</sup> triisopropoxymethane and (5-50) × 10 <sup>-5</sup> mol L <sup>-1</sup> $\text{IrCl}_6^{2-}$ .	86A155

TABLE 28. Benzyl

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
28.1	Benzyl							
	$C_6H_5\dot{C}H_2 + C_6H_5\dot{C}H_2 \rightarrow$ $C_6H_5CH_2CH_2C_6H_5$	$1.5 \times 10^9$				f.p.	D.k. at 315 nm in soln. contg. (0.4-1.2) × $10^{-3}$ mol L <sup>-1</sup> pentaammine(phenylacetato)cobalt(III) ion; log <i>A</i> = 12.57, <i>E</i> <sub>a</sub> = 17.58 kJ mol <sup>-1</sup> , studied at 275.5-338 K.	93A123 93A346
		$3.2 \times 10^9$	~7			p.r.	D.k. in soln. contg. benzylammonium ion.	86A410
		$2.9 \times 10^9$	11			p.r.	D.k. at 258 and 316 nm in N <sub>2</sub> -satd. soln. contg. benzyl trimethylammonium and 0.5 mol L <sup>-1</sup> MeOH; ε = 14400 and 1750 L mol <sup>-1</sup> cm <sup>-1</sup> , resp.; radical mixt. contains *CH <sub>2</sub> OH.	81A034
		$1.2 \times 10^9$	>13			p.r.	D.k. in N <sub>2</sub> O-satd. soln. contg. toluene; ε = 14400 and 5500 L mol <sup>-1</sup> cm <sup>-1</sup> , at 258 and 317 nm, resp.	730089
28.2	Cobal(II)amin							
	$C_6H_5\dot{C}H_2 + B12r \rightarrow (C_6H_5CH_2)B12$	$3.5 \times 10^8$	1		297	therm.	Eval. from <i>K</i> and <i>k</i> <sub>r</sub> and <i>k</i> (C <sub>6</sub> H <sub>5</sub> CH <sub>2</sub> + Cr <sup>2+</sup> ) in soln. contg. benzylcobalamin and Cr <sup>2+</sup> .	85A500
28.3	Chromium(II) ion							
	$C_6H_5\dot{C}H_2 + Cr^{2+} \rightarrow CrCH_2C_6H_5^{2+}$	$8.5 \times 10^7$	acid	0.1	296	f.p.	P.b.k. at 364 nm in soln. contg. 5 × 10 <sup>-4</sup> mol L <sup>-1</sup> dibenzyl ketone, (0.8-4.0) × 10 <sup>-4</sup> mol L <sup>-1</sup> Cr <sup>2+</sup> , 2 mol L <sup>-1</sup> acetonitrile and 0.05 mol L <sup>-1</sup> HClO <sub>4</sub> . Alternatively, the radical was obtained from photolysis of benzylchromium.	84A300
28.4	1,4,8,12-Tetraazacyclopentadecanechromium(II) ion							
	$C_6H_5\dot{C}H_2 + Cr([15]aneN_4)^{2+} \rightarrow$ $C_6H_5CH_2Cr([15]aneN_4)^{2+}$	$1.9 \times 10^8$			298	f.p.	D.k. at 600 nm in soln. contg. MV <sup>++</sup> as indicator and C <sub>6</sub> H <sub>5</sub> CH <sub>2</sub> Co(dmgH) <sub>2</sub> .	91A427
28.5	Copper(II) ion							
	$C_6H_5\dot{C}H_2 + Cu^{2+} \rightarrow CuCH_2C_6H_5^{2+}$	$2.8 \times 10^6$			293	f.p.	D.k. in soln. contg. Co(NH <sub>3</sub> ) <sub>5</sub> (C <sub>6</sub> H <sub>5</sub> CH <sub>2</sub> CO <sub>2</sub> ) <sup>2+</sup> and Cu(ClO <sub>4</sub> ) <sub>2</sub> .	93A346
		$2.4 \times 10^7$			293	f.p.	D.k. in soln. contg. dibenzyl ketone, Cu(CLO <sub>4</sub> ) <sub>2</sub> and 10% acetonitrile; log <i>A</i> = 7.94, <i>E</i> <sub>a</sub> = 3.1 kJ mol <sup>-1</sup> , studied at 274-333 K.	92A148
		$2.1 \times 10^7$	2.8		300	f.p.	P.b.k. at 375 nm, (as well as d.k. at 317 nm) in soln. contg. [Co(NH <sub>3</sub> ) <sub>5</sub> OOCCH <sub>2</sub> C <sub>6</sub> H <sub>5</sub> ] <sup>2+</sup> and (1-4) × 10 <sup>-3</sup> mol L <sup>-1</sup> CuSO <sub>4</sub> ; <i>k</i> = 5.3 × 10 <sup>7</sup> in micellar soln. contg. 0.2 mol L <sup>-1</sup> SDS.	84A367
28.6	Benzylcopper(III) ion							
	$C_6H_5\dot{C}H_2 + CuCH_2C_6H_5^{2+} \rightarrow$ $C_6H_5CH_2CH_2C_6H_5 + Cu^{2+}$	$2.6 \times 10^9$				f.p.	D.k. in soln. contg. Co(NH <sub>3</sub> ) <sub>5</sub> (C <sub>6</sub> H <sub>5</sub> CH <sub>2</sub> CO <sub>2</sub> ) <sup>2-</sup> and Cu(ClO <sub>4</sub> ) <sub>2</sub> .	93A346
		$3.2 \times 10^9$			295	f.p.	D.k. in soln. contg. dibenzyl ketone, Cu(ClO <sub>4</sub> ) <sub>2</sub> and 10% acetonitrile.	92A148
28.7	1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(I) ion							
	$C_6H_5\dot{C}H_2 + Ni(Me_4[14]aneN_4)^{+} \rightarrow$ addn.	$\sim 10^8$				phot.	Estd. from product yields.	86M180
28.8	α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion							
	$C_6H_5\dot{C}H_2 + \alpha\text{-Ni(cyclam)}^{2+} + H_2O \rightarrow$ $\alpha\text{-C}_6H_5CH_2Ni(cyclam)(H_2O)^{2+}$	$4.7 \times 10^7$	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator and benzylcobalt(III) complex.	91A515
28.9	β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion							
	$C_6H_5\dot{C}H_2 + \beta\text{-Ni(cyclam)}^{2+} \rightarrow$ addn.	$<2 \times 10^5$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>−</sup> as indicator and benzylcobalt(III) complex.	91A515

TABLE 28. Benzyl — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
<b>28.10 Oxygen</b>								
	$C_6H_5\dot{C}H_2 + O_2 \rightarrow C_6H_5CH_2OO^\cdot$	$2.8 \times 10^9$	1		298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> as indicator and 0.1 mol L <sup>-1</sup> HClO <sub>4</sub> ; benzyl radical from RCo(dmgH) <sub>2</sub> or RCo(cyclam) <sup>2+</sup> .	91A176
		$2.0 \times 10^9$	7			p.r.	D.k. at 316 nm in N <sub>2</sub> /O <sub>2</sub> satd. soln. contg. 2% <i>tert</i> -BuOH and $\sim 10^{-3}$ mol L <sup>-1</sup> benzyl chloride.	89A165
<b>28.11 Vanadium(II) ion</b>								
	$C_6H_5\dot{C}H_2 + V^{2+} + H^+ \rightarrow C_6H_5CH_3 + V^{3+}$	$1.2 \times 10^5$	2		296	f.p.	D.k. at 600 nm in soln. 0.01-0.03 mol L <sup>-1</sup> H <sup>+</sup> , (1-5) $\times 10^{-4}$ mol L <sup>-1</sup> $C_6H_5CH_2Co(\text{dmgH})(H_2O)$ or $C_6H_5CH_2Co(\text{cyclam})^{2+}$ , (5-38) $\times 10^{-6}$ mol L <sup>-1</sup> MV <sup>•+</sup> as indicator and 0.01-0.06 mol L <sup>-1</sup> V <sup>2+</sup> .	91A428
<b>28.12 2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion</b>								
	$C_6H_5\dot{C}H_2 + ABTS^{•-} \rightarrow \text{addn.}$	$1.2 \times 10^9$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. ABTS <sup>•-</sup> (from ABTS + Br <sub>2</sub> ) and alkylcobalt(III) complex.	91A515
		$1.1 \times 10^9$		6.0				
<b>28.13 Cysteamine, conjugate acid</b>								
	$C_6H_5\dot{C}H_2 + HSCH_2CH_2NH_3^+ \rightarrow C_6H_5CH_3 + H_3N^+CH_2CH_2S^\cdot$	$2.0 \times 10^4$	7			$\gamma$ -r.	C.k. assuming $2k(C_6H_5\dot{C}H_2 + C_6H_5\dot{C}H_2) = 2 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> ; obs. bibenzyl and toluene formnn.	82G282
<b>28.14 Cysteine</b>								
	$C_6H_5\dot{C}H_2 + CysSH \rightarrow C_6H_5CH_3 + CysS^\cdot$	$2.1 \times 10^4$	7			$\gamma$ -r.	C.k. assuming $2k(C_6H_5\dot{C}H_2 + C_6H_5\dot{C}H_2) = 2 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> ; obs. bibenzyl and toluene formnn.	82G282
<b>28.15 1,1'-Dimethyl-4,4'-bipyridinium radical cation</b>								
	$C_6H_5\dot{C}H_2 + MV^{•+} \rightarrow$	$1.2 \times 10^9$			298	f.p.	D.k. at 600 nm in soln. contg. MV <sup>•+</sup> and $C_6H_5CH_2Co(\text{dmgH})$ .	91A427
		$1.5 \times 10^9$	2		296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L <sup>-1</sup> H <sup>+</sup> , (1-5) $\times 10^{-4}$ mol L <sup>-1</sup> $C_6H_5CH_2Co(\text{dmgH})(H_2O)$ or $C_6H_5CH_2Co(\text{cyclam})^{2+}$ , (5-38) $\times 10^{-6}$ mol L <sup>-1</sup> MV <sup>•+</sup> .	91A428
<b>28.16 1,2-Ethanedithiol</b>								
	$C_6H_5\dot{C}H_2 + HSCH_2CH_2SH \rightarrow C_6H_5CH_3 + C_6H_5CH_2S^\cdot$	$5.9 \times 10^4$	7			$\gamma$ -r.	C.k. assuming $2k(C_6H_5\dot{C}H_2 + C_6H_5\dot{C}H_2) = 2 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> ; obs. bibenzyl and toluene formnn.	82G282
<b>28.17 Methanol</b>								
	$C_6H_5\dot{C}H_2 + MeOH \rightarrow C_6H_5CH_3 + CH_2OH$	$2.5 \times 10^{-1}$	7			$\gamma$ -r.	C.k. assuming $2k(C_6H_5\dot{C}H_2 + C_6H_5\dot{C}H_2) = 2 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> ; obs. bibenzyl and toluene formnn.	82G282
<b>28.18 2,2,6,6-Tetramethylpiperidine-N-oxyl</b>								
	$C_6H_5\dot{C}H_2 + TMPN \rightarrow \text{addn.}$	$5.4 \times 10^7$	5.5		296.4	therm.	C.k. in 0.1 mol L <sup>-1</sup> acetate buffer; benzyl radical from $C_6H_5CH_2Cr^{2+}$ ; rel. to $k(CH_2C_6H_5 + B12r) = 3.5 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> .	85A500
<b>28.19 Thiophenol</b>								
	$C_6H_5\dot{C}H_2 + C_6H_5SH \rightarrow C_6H_5CH_3 + C_6H_5S^\cdot$	$4.0 \times 10^4$	7			$\gamma$ -r.	C.k. assuming $2k(C_6H_5\dot{C}H_2 + C_6H_5\dot{C}H_2) = 2 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> ; obs. bibenzyl and toluene formnn.	82G282

TABLE 29. Substituted Benzyl Radicals

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
29.1	2-Carboxy-2-hydroxy-1-(4-hydroxyphenyl)ethyl, anion							
29.1.1	Hydrogen ion							
	$4\text{-HOCH}_6\text{H}_4\dot{\text{C}}\text{HCHOHCO}_2^- + \text{H}^+ \rightarrow 4\text{-HOCH}_6\text{H}_4\dot{\text{C}}\text{HCHOHCO}_2\text{H}$	$3.8 \times 10^{10}$				p.r.	D.k. as a function of $[\text{H}^+]$ in $\text{N}_2\text{O}$ -satd. soln.; $k_f = 2.9 \times 10^5 \text{ s}^{-1}$ .	84A206
29.2	4-Chlorobenzyl							
29.2.1	4-Chlorobenzyl							
	$4\text{-ClC}_6\text{H}_4\dot{\text{C}}\text{H}_2 + 4\text{-ClC}_6\text{H}_4\dot{\text{C}}\text{H}_2 \rightarrow 4\text{-ClC}_6\text{H}_4\text{CH}_2\text{CH}_2\text{C}_6\text{H}_4\text{-4-Cl}$	$2.1 \times 10^9$				f.p.	D.k. at 315 nm in soln. contg. (0.4-1.2) $\times 10^{-3}$ mol L <sup>-1</sup> pentaammine(4-chlorophenylacetato)cobalt(III) ion; $\log A = 12.97$ , $E_a = 19.11 \text{ kJ mol}^{-1}$ , studied at 275.5-338 K.	93A123 93A346
29.2.2	Copper(II) ion							
	$4\text{-ClC}_6\text{H}_4\dot{\text{C}}\text{H}_2 + \text{Cu}^{2+} \rightarrow \text{CuCH}_2\text{C}_6\text{H}_4\text{-4-Cl}^{2+}$	$1.6 \times 10^6$			293	f.p.	D.k. in soln. contg. $\text{Co}(\text{NH}_3)_5(4\text{-ClC}_6\text{H}_4\text{CH}_2\text{CO}_2)^{2+}$ and $\text{Cu}(\text{ClO}_4)_2$ .	93A346
29.3	4-Cyanobenzyl							
29.3.1	4-Cyanobenzyl							
	$4\text{-CNC}_6\text{H}_4\dot{\text{C}}\text{H}_2 + 4\text{-CNC}_6\text{H}_4\dot{\text{C}}\text{H}_2 \rightarrow$	$1 \times 10^9$		13.7		p.r.	D.k. in $\text{N}_2\text{O}$ -satd. soln. contg. 4-cyanotoluene; $\epsilon_{275} = 30,000 \pm 1000$ and $\epsilon_{315} = 3,500 \pm 200 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	79A350
29.4	Diphenylmethyl							
29.4.1	Diphenylmethyl							
	$(\text{C}_6\text{H}_5)_2\dot{\text{C}}\text{H} + (\text{C}_6\text{H}_5)_2\dot{\text{C}}\text{H} \rightarrow$	$3.5 \times 10^9$		~7		p.r.	D.k. at 328 nm in soln. contg. diphenylmethylammonium ion.	86A410
29.4.2	Oxygen							
	$(\text{C}_6\text{H}_5)_2\dot{\text{C}}\text{H} + \text{O}_2 \rightarrow (\text{C}_6\text{H}_5)_2\text{CHOO}^\cdot$	$7.5 \times 10^8$		6.5		p.r.	D.k. at 328 nm in $\text{N}_2/\text{O}_2$ satd. soln. contg. $5 \times 10^{-3}$ mol L <sup>-1</sup> diphenylmethylammonium ion.	89A165
29.5	Flavone-8-methyl							
29.5.1	Oxygen							
	$\text{F-8-CH}_3 + \text{O}_2 \rightarrow \text{F-8-CH}_3\text{OO}^\cdot$	$1.0 \times 10^9$		6.8		p.r.	D.k. at 410 nm in $\text{N}_2/\text{O}_2$ (2.5-12 vol %) satd. soln. contg. 0.02 mol L <sup>-1</sup> $\text{K}_2\text{S}_2\text{O}_8$ , 0.02 mol L <sup>-1</sup> <i>tert</i> -BuOH and 0.001 mol L <sup>-1</sup> flavone-8-acetate ion	93A549
29.6	4-Methoxybenzyl							
29.6.1	4-Methoxybenzyl							
	$4\text{-CH}_3\text{OC}_6\text{H}_4\dot{\text{C}}\text{H}_2 + 4\text{-CH}_3\text{OC}_6\text{H}_4\dot{\text{C}}\text{H}_2 \rightarrow$	$3.0 \times 10^9$				f.p.	D.k. at 315 nm in soln. contg. (0.4-1.2) $\times 10^{-3}$ mol L <sup>-1</sup> pentaammine(4-methoxyphenylacetato)cobalt(III) ion; $\log A = 12.35$ , $E_a = 14.68 \text{ kJ mol}^{-1}$ , studied at 275.5-338 K.	93A123 93A346
29.6.2	Copper(II) ion							
	$4\text{-CH}_3\text{OC}_6\text{H}_4\dot{\text{C}}\text{H}_2 + \text{Cu}^{2+} \rightarrow \text{CuCH}_2\text{C}_6\text{H}_4\text{-4-OCH}_3^{2+}$	$8.0 \times 10^6$			293	f.p.	D.k. in soln. contg. $\text{Cu}(\text{ClO}_4)_2$ and $\text{Co}(\text{NH}_3)_5(4\text{-CH}_3\text{OC}_6\text{H}_4\text{CH}_2\text{CO}_2)^{2+}$ .	93A346
29.6.3	(4-Methoxyphenyl)methylcopper(III) ion							
	$4\text{-CH}_3\text{OC}_6\text{H}_4\dot{\text{C}}\text{H}_2 + \text{CuCH}_2\text{C}_6\text{H}_4\text{-4-OCH}_3^{2+} \rightarrow 4\text{-CH}_3\text{OC}_6\text{H}_4\text{CH}_2\text{CH}_2\text{C}_6\text{H}_4\text{-4-OCH}_3 + \text{Cu}^{2+}$	$5.8 \times 10^8$				f.p.	D.k. in soln. contg. $\text{Cu}(\text{ClO}_4)_2$ and $\text{Co}(\text{NH}_3)_5(4\text{-CH}_3\text{OC}_6\text{H}_4\text{CH}_2\text{CO}_2)^{2-}$ .	93A346

TABLE 29. Substituted Benzyl Radicals — Continued

No.	Reaction	$k$ ( $\text{L mol}^{-1} \text{s}^{-1}$ )	pH	$I$	$T$ (K)	Method	Comment	Ref.
<b>29.7 4-Methylbenzyl</b>								
29.7.1 4-Methylbenzyl	$4\text{-CH}_3\text{C}_6\text{H}_4\dot{\text{C}}\text{H}_2 + 4\text{-CH}_3\text{C}_6\text{H}_4\dot{\text{C}}\text{H}_2 \rightarrow 4\text{-CH}_3\text{C}_6\text{H}_4\text{CH}_2\text{CH}_2\text{C}_6\text{H}_4\text{-4-CH}_3$	$2.3 \times 10^9$				f.p.	D.k. at 315 nm in soln. contg. (0.4-1.2) × $10^{-3}$ mol L <sup>-1</sup> pentaammine(4-methylphenylacetato)cobalt(III) ion; log $A = 12.75$ , $E_a = 17.65$ kJ mol <sup>-1</sup> , studied at 275.5-338 K.	93A123 93A346
<b>29.7.2 Copper(II) ion</b>								
	$4\text{-CH}_3\text{C}_6\text{H}_4\dot{\text{C}}\text{H}_2 + \text{Cu}^{2+} \rightarrow \text{CuCH}_2\text{C}_6\text{H}_4\text{-4-CH}_3^{2+}$	$5.7 \times 10^6$		293		f.p.	D.k. in soln. contg. $\text{Co}(\text{NH}_3)_5(4\text{-CH}_3\text{C}_6\text{H}_4\text{CH}_2\text{CO}_2)^{2+}$ and $\text{Cu}(\text{ClO}_4)_2$ .	93A346
29.7.3 (4-Methylphenyl)methylcopper(III) ion	$4\text{-CH}_3\text{C}_6\text{H}_4\dot{\text{C}}\text{H}_2 + \text{CuCH}_2\text{C}_6\text{H}_4\text{-4-CH}_3^{2+} \rightarrow 4\text{-CH}_3\text{C}_6\text{H}_4\text{CH}_2\text{CH}_2\text{C}_6\text{H}_4\text{-4-CH}_3 + \text{Cu}^{2+}$	$5.1 \times 10^8$				f.p.	D.k. in soln. contg. $\text{Co}(\text{NH}_3)_5(4\text{-CH}_3\text{C}_6\text{H}_4\text{CH}_2\text{CO}_2)^{2-}$ and $\text{Cu}(\text{ClO}_4)_2$ .	93A346
<b>29.8 4-Nitrobenzyl</b>								
29.8.1 4-Nitrobenzyl	$4\text{-NO}_2\text{C}_6\text{H}_4\dot{\text{C}}\text{H}_2 + 4\text{-NO}_2\text{C}_6\text{H}_4\dot{\text{C}}\text{H}_2 \rightarrow 4\text{-NO}_2\text{C}_6\text{H}_4\text{CH}_2\text{CH}_2\text{C}_6\text{H}_4\text{-4-NO}_2$	$2.1 \times 10^9$				f.p.	D.k. at 315 nm in soln. contg. (0.4-1.2) × $10^{-3}$ mol L <sup>-1</sup> pentaammine(4-nitrophenylacetato)cobalt(III) ion; log $A = 12.18$ , $E_a = 14.62$ kJ mol <sup>-1</sup> , studied at 275.5-338 K.	93A123
29.8.2 Oxygen	$4\text{-NO}_2\text{C}_6\text{H}_4\dot{\text{C}}\text{H}_2 + \text{O}_2 \rightarrow 4\text{-NO}_2\text{C}_6\text{H}_4\text{CH}_2\text{OO}^\cdot$	$9 \times 10^8$	7			p.r.	D.k. at 360 nm in $\text{N}_2/\text{O}_2$ satd. soln. contg. $3 \times 10^{-4}$ mol L <sup>-1</sup> 4-nitrobenzyl bromide.	89A165
<b>29.9 1-Phenylethyl</b>								
29.9.1 1-Phenylethyl	$\text{C}_6\text{H}_5\dot{\text{C}}\text{HCH}_3 + \text{C}_6\text{H}_5\dot{\text{C}}\text{HCH}_3 \rightarrow$	$2.8 \times 10^9$	~7			p.r.	D.k. in soln. contg. $\alpha$ -methylbenzylammonium ion.	86A410

TABLE 30.  $\alpha$ -Hydroxybenzyl radicals

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T (K)	Method	Comment	Ref.
<b>30.1 Acetophenone radical anion</b>								
<b>30.1.1 Acetophenone radical anion</b>	$C_6H_5\dot{C}O^-CH_3 + C_6H_5\dot{C}O^-CH_3 \rightarrow$	$3.2 \times 10^8$	12.5		298	p.r.	D.k. at 440 nm; $\epsilon = 6 \times 10^3$ L mol <sup>-1</sup> cm <sup>-1</sup> ; $A = 9.7 \times 10^{10}$ L mol <sup>-1</sup> s <sup>-1</sup> , $E_a = 14.2$ kJ mol <sup>-1</sup> , studied at 293-343 K.	81A168
<b>30.1.2 Oxygen</b>	$C_6H_5\dot{C}O^-CH_3 + O_2 \rightarrow$	$1.8 \times 10^6$	12.5			p.r.	D.k. at 440 nm in soln. contg. acetophenone and $O_2$ ; $A = 1.3 \times 10^{10}$ L mol <sup>-1</sup> s <sup>-1</sup> , $E_a = 22$ kJ mol <sup>-1</sup> , studied at 293-343 K; peroxy radical formation, not electron transfer.	81A168
<b>30.1.3 Benzophenone</b>	$C_6H_5\dot{C}O^-CH_3 + (C_6H_5)_2CO \rightarrow$ $C_6H_5COCH_3 + (C_6H_5)_2CO^-$	$1.3 \times 10^9$	13			p.r.	Abs. changes in $N_2$ -saturated soln. contg. acetophenone and 0.5 mol L <sup>-1</sup> MeOH, $k = 2.0 \times 10^9$ L mol <sup>-1</sup> s <sup>-1</sup> in 2% CMC matrix.	80A116
		$7.8 \times 10^8$	12			p.r.	D.k., as well as p.b.k. in $N_2$ -saturated soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH, acetophenone and benzophenone; $\epsilon$ at 600 nm $((C_6H_5)_2\dot{C}O^-) = 4800$ L mol <sup>-1</sup> cm <sup>-1</sup> . $pK_a = 9.2$ ; $\epsilon$ at 445 nm $(C_6H_5\dot{C}O^-CH_3) = 2600$ L mol <sup>-1</sup> cm <sup>-1</sup> , $pK_a = 9.6$ .	730122
<b>30.1.4 1,1'-Dimethyl-4,4'-bipyridinium</b>	$C_6H_5\dot{C}OHCH_3 + MV^{2+} \rightarrow C_6H_5COCH_3 + MV^{+} + H^+$	$4.3 \times 10^9$				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L <sup>-1</sup> 4-methoxyphenol, acetophenone and methyl viologen.	84B033
<b>30.1.5 4-Nitroacetophenone</b>	$C_6H_5\dot{C}O^-CH_3 + PNAP \rightarrow C_6H_5COCH_3 + [PNAP]^-$	$5.2 \times 10^9$	11			p.r.	D.k., as well as p.b.k. at 550 nm in $N_2$ -saturated soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH, 0.002 mol L <sup>-1</sup> acetophenone and $(2-6) \times 10^{-4}$ mol L <sup>-1</sup> 4-nitroacetophenone; $\epsilon$ at 445 nm $(C_6H_5\dot{C}O^-CH_3) = 2600$ L mol <sup>-1</sup> cm <sup>-1</sup> , $pK_a = 9.6$ ; $\epsilon$ at 545 nm $[PNAP]^- = 2900$ L mol <sup>-1</sup> cm <sup>-1</sup> , $pK_a = 2.5-2.7$ .	730122
<b>30.1.6 Cytochrome C</b>	$C_6H_5\dot{C}OHCH_3 + Cyt C(Fe^{3+}) \rightarrow$ $C_6H_5COCH_3 + Cyt C(Fe^{2+}) + H^+$	$8.0 \times 10^8$	7.0		295	p.r.	P.b.k. at 550 nm in soln. contg. acetophenone.	78A288
<b>30.2 Benzamide radical anion</b>								
<b>30.2.1 3,4-Dihydroxyphenethylamine</b>	$C_6H_5\dot{C}O^-NH_2 +$ $3,4-(HO)_2C_6H_3CH_2CH_2NH_2 \rightarrow$	$5.9 \times 10^8$			298	p.r.	D.k. at 430 nm in $N_2$ -saturated soln. contg. $4 \times 10^{-3}$ mol L <sup>-1</sup> benzamide and 0.5 mol L <sup>-1</sup> <i>tert</i> -BuOH; $k_f = 2.2 \times 10^7$ L mol <sup>-1</sup> s <sup>-1</sup> .	94A395
<b>30.3 Benzoate radical dianion</b>								
<b>30.3.1 D-Amino acid oxidase</b>	$C_6H_5\dot{C}O_2^{2-} + DAAO \rightarrow$	$1.2 \times 10^9$	8.3			p.r.	D.k. at 409 nm in soln. contg. $5 \times 10^{-3}$ mol L <sup>-1</sup> phosphate buffer, 0.1 mol L <sup>-1</sup> <i>tert</i> -BuOH, $5 \times 10^{-6}$ mol L <sup>-1</sup> DDAO and $2.5 \times 10^{-2}$ mol L <sup>-1</sup> benzoate.	83A082
<b>30.3.2 Cytochrome C</b>	$C_6H_5\dot{C}O_2^{2-} + Cyt C(Fe^{3+}) \rightarrow C_6H_5CO_2^- + Cyt C(Fe^{2+})$	$1.8 \times 10^9$	7		295	p.r.	P.b.k. at 550 nm in soln. contg. benzoate.	78A288
<b>30.3.3 Cytochrome C, carboxymethylated</b>	$C_6H_5\dot{C}O_2^{2-} + Cxm-cyt C \rightarrow$	$1.4 \times 10^9$	7		295	p.r.	P.b.k. at 550 nm in soln. contg. benzoate.	78A288

TABLE 30.  $\alpha$ -Hydroxybenzyl radicals — Continued

No.	Reaction	$k$ ( $L\ mol^{-1}\ s^{-1}$ )	pH	$I$	$T$ (K)	Method	Comment	Ref.
<b>30.3 Benzoate radical dianion — Continued</b>								
<b>30.3.4 Hemin c</b>	$C_6H_5\dot{C}O_2^{2-} + \text{Hem-Fe}^{III} \rightarrow$	$2.1 \times 10^9$	7		295	p.r.	P.b.k. at 550 nm in soln. contg. benzoate.	78A288
<b>30.3.5 Metmyoglobin</b>								
	$C_6H_5\dot{C}O_2^{2-} + \text{Fe}^{3+}\text{Mb} \rightarrow$	$1.8 \times 10^9$	7		295	p.r.	P.b.k. at 550 nm in soln. contg. benzoate.	78A288
<b>30.4 Benzophenone radical anion</b>								
<b>30.4.1 Benzophenone radical anion</b>	$(C_6H_5)_2\dot{C}O^- + (C_6H_5)_2\dot{C}O^- \rightarrow$ $(C_6H_5)_2\text{CHOHCHOH}(C_6H_5)_2$	$3 \times 10^5$	12		273	f.p./rq	D.k. in soln. contg. benzophenone and 0.5% 1-PrOH.	82A414
		$\leq 3.7 \times 10^4$	13	0.25		f.p./rq	Chronoamperometric study in soln. contg. benzophenone and 50% EtOH, studied at pH 5.5-13.	767776
		$-2 \times 10^6$	12			p.r.	D.k. at 610 nm in $N_2O$ -saturated soln. contg. benzophenone and 50% MeOH, using $\epsilon = 6800\ L\ mol^{-1}\ cm^{-1}$ .	751125
		$\leq 9 \times 10^4$				f.p./rq	D.k. at 543 nm in soln. contg. benzophenone and 50% 2-PrOH, studied at pH 10-13; using $\epsilon = 5100\ L\ mol^{-1}\ cm^{-1}$ ; $pK_a = 9.2$ .	63F024
	$(C_6H_5)_2\dot{C}O^- + (C_6H_5)_2\dot{C}OH \rightarrow$ $(C_6H_5)_2\text{CHOHCHOH}(C_6H_5)_2$	$1.7 \times 10^9$	alk.			f.p./rq	D.k. at 630 nm in soln. contg. 40% 2-PrOH, 0.005 mol $L^{-1}$ ketone and 0.05 mol $L^{-1}$ NaOH; using $\epsilon = 5100\ L\ mol^{-1}\ cm^{-1}$ .	90A060
		$5.5 \times 10^9$		0.25		f.p./rq	Chronoamperometric study in soln. contg. benzophenone and 50% EtOH, studied at pH 5.5-13.	767776
		$1.1 \times 10^9$				f.p./rq	D.k. at 543 nm in soln. contg. benzophenone and 50% 2-PrOH, studied at pH 10-13; using $\epsilon = 5100\ L\ mol^{-1}\ cm^{-1}$ ; $pK_a = 9.2$ .	63F024
	$(C_6H_5)_2\dot{C}OH + (C_6H_5)_2\dot{C}OH \rightarrow$ $(C_6H_5)_2\text{CHOHCHOH}(C_6H_5)_2$	$1.2 \times 10^9$	5			p.r.	D.k. at 330 nm in soln. contg. 0.001 mol $L^{-1}$ benzophenone, 0.04 mol $L^{-1}$ phosphate buffer and 1.0 mol $L^{-1}$ <i>tert</i> -BuOH.	94A467
		$7.5 \times 10^8$				f.p./rq	D.k. in soln. contg. ~0.001 mol $L^{-1}$ benzophenone and 5% EthOH or 2-PrOH; $\epsilon = 3000\ L\ mol^{-1}\ cm^{-1}$ .	89A499
		$1.0 \times 10^9$		295		f.p.	D.k. at 540 nm in soln. contg. $10^{-4}$ mol $L^{-1}$ benzophenone.	88A294
		$8.0 \times 10^8$	2.0	273		f.p./rq	D.k. in soln. contg. benzophenone	82A414
		$4.3 \times 10^8$	~7			f.p./rq	D.k. at 550 nm in Ar-saturated soln. contg. 0.001 mol $L^{-1}$ benzophenone and 50% 2-PrOH.	79N121
		$1.2 \times 10^8$	5.5	0.25		f.p./rq	Chronoamperometric study in soln. contg. benzophenone and 50% EtOH, studied at pH 5.5-13.	767776
<b>30.4.2 First-order reaction</b>	$(C_6H_5)_2\dot{C}OH \rightarrow H^+ + (C_6H_5)_2\dot{C}O^-$	$8.3 \times 10^6\ s^{-1}$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol $L^{-1}$ NaOH, 0.072 mol $L^{-1}$ triethylamine and benzophenone.	86A248
<b>30.4.3 9,10-Anthraquinone-2-sulfonate ion</b>	$(C_6H_5)_2\dot{C}O^- + 2\text{-SO}_3\text{AQ}^- \rightarrow (C_6H_5)_2\dot{C}O + [2\text{-SO}_3\text{AQ}]^{2-}$	$4.0 \times 10^5$	alk.			f.p./rq	D.k. at 630 nm in soln. contg. 50% 2-PrOH, 0.005 mol $L^{-1}$ benzophenone, 0.08 mol $L^{-1}$ NaOH and anthraquinone-2-sulfonate.	88A209

TABLE 30.  $\alpha$ -Hydroxybenzyl radicals — Continued

No.	Reaction	$k$ ( $L\ mol^{-1}\ s^{-1}$ )	pH	$I$	$T\ (K)$	Method	Comment	Ref.
<b>30.4 Benzophenone radical anion — Continued</b>								
<b>30.4.4 Brilliant Green cation</b>								
	$(C_6H_5)_2\dot{CO}H + BG^+ \rightarrow (C_6H_5)_2CO + [BGH]^{+}$	$8.0 \times 10^8$	5			p.r.	P.b.k. at 340 nm in soln. contg. 0.001 mol L <sup>-1</sup> benzophenone, 0.04 mol L <sup>-1</sup> phosphate buffer, 1.0 mol L <sup>-1</sup> <i>tert</i> -BuOH and (4-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> dye.	94A467
<b>30.4.5 Crystal Violet cation</b>								
	$(C_6H_5)_2\dot{CO}H + CV^+ \rightarrow (C_6H_5)_2CO + [CVH]^{+}$	$4.0 \times 10^8$	5			p.r.	P.b.k. at 340 nm in soln. contg. 0.001 mol L <sup>-1</sup> benzophenone, 0.04 mol L <sup>-1</sup> phosphate buffer, 1.0 mol L <sup>-1</sup> <i>tert</i> -BuOH and (4-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> dye.	94A467
<b>30.4.6 1,4-Diazabicyclo[2.2.2]octane radical cation</b>								
	$(C_6H_5)_2\dot{CO}^- + DABCO^{+} \rightarrow (C_6H_5)_2CO + DABCO$	$8.7 \times 10^9$				f.p./rq	D.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L <sup>-1</sup> NaOH, 0.05 mol L <sup>-1</sup> DABCO and benzophenone; used ε(radical anion) = 6000 L mol <sup>-1</sup> cm <sup>-1</sup> .	86A248
<b>30.4.7 1,1'-Dimethyl-4,4'-bipyridinium</b>								
	$(C_6H_5)_2\dot{CO}^- + MV^{2+} \rightarrow (C_6H_5)_2CO + MV^{+} + H^+$	$3.2 \times 10^4$	alk.			f.p./rq	D.k., as well as p.b.k. at 605 nm in soln. contg. 50% 2-PrOH, 0.005 mol L <sup>-1</sup> benzophenone, 0.08 mol L <sup>-1</sup> NaOH and methyl viologen.	88A209
	$(C_6H_5)_2\dot{CO}H + MV^{2+} \rightarrow (C_6H_5)_2CO + MV^{+} + H^+$	$1.4 \times 10^9$				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L <sup>-1</sup> 4-methoxyphenol, benzophenone and methyl viologen.	84B033
<b>30.4.8 1,3-Dinitrobenzene</b>								
	$(C_6H_5)_2\dot{CO}H + 1,3-C_6H_4(NO_2)_2 \rightarrow (C_6H_5)_2CO + H^+ + [1,3-C_6H_4(NO_2)_2]^{+}$	$4.2 \times 10^6$		293	f.p./oq	D.k. at 542 nm in soln. contg. UO <sub>2</sub> <sup>2+</sup> , benzilic acid and 25% acetone.	80A320	
<b>30.4.9 1,4-Dinitrobenzene</b>								
	$(C_6H_5)_2\dot{CO}H + 1,4-C_6H_4(NO_2)_2 \rightarrow (C_6H_5)_2CO + H^+ + [1,4-C_6H_4(NO_2)_2]^{+}$	$3.8 \times 10^7$		293	f.p./oq	D.k. at 542 nm in soln. contg. UO <sub>2</sub> <sup>2+</sup> , benzilic acid and 25% acetone.	80A320	
<b>30.4.10 3,4-Dinitrobenzoate ion</b>								
	$(C_6H_5)_2\dot{CO}H + 3,4-(NO_2)_2C_6H_3CO_2^- \rightarrow (C_6H_5)_2CO + H^+ + [3,4-(NO_2)_2C_6H_3CO_2]^{2-}$	$3.7 \times 10^7$		293	f.p./oq	D.k. at 542 nm in soln. contg. UO <sub>2</sub> <sup>2+</sup> , benzilic acid and 25% acetone.	80A320	
<b>30.4.11 Malachite Green cation</b>								
	$(C_6H_5)_2\dot{CO}H + MG^+ \rightarrow (C_6H_5)_2CO + [MGH]^{+}$	$1.5 \times 10^9$	5			p.r.	P.b.k. at 340 nm in soln. contg. 0.001 mol L <sup>-1</sup> benzophenone, 0.04 mol L <sup>-1</sup> phosphate buffer, 1.0 mol L <sup>-1</sup> <i>tert</i> -BuOH and (4-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> dye.	94A467
<b>30.4.12 Methyl Green dication</b>								
	$(C_6H_5)_2\dot{CO}H + MEG^{2+} \rightarrow (C_6H_5)_2CO + [MEGH]^{2+}$	$1.0 \times 10^{10}$	5			p.r.	P.b.k. at 340 nm in soln. contg. 0.001 mol L <sup>-1</sup> benzophenone, 0.04 mol L <sup>-1</sup> phosphate buffer, 1.0 mol L <sup>-1</sup> <i>tert</i> -BuOH and (4-10) × 10 <sup>-5</sup> mol L <sup>-1</sup> dye.	94A467
<b>30.4.13 4-(4'-Methylphenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one</b>								
	$(C_6H_5)_2\dot{CO}H + MPMPP \rightarrow (C_6H_5)_2CO + \text{other products}$	$1.1 \times 10^9$				f.p./rq	D.k. in soln. contg. ~0.001 mol L <sup>-1</sup> benzophenone and 5% EtOH or 2-PrOH.	89A499
<b>30.4.14 Nitrobenzene</b>								
	$(C_6H_5)_2\dot{CO}H + C_6H_5NO_2 \rightarrow (C_6H_5)_2CO + H^+ + [C_6H_5NO_2]^{+}$	$3.5 \times 10^5$		293	f.p./oq	D.k. at 542 nm in soln. contg. UO <sub>2</sub> <sup>2+</sup> , benzilic acid and 25% acetone.	80A320	
<b>30.4.15 3-Nitrobenzoate ion</b>								
	$(C_6H_5)_2\dot{CO}H + 3-NO_2C_6H_4CO_2^- \rightarrow (C_6H_5)_2CO + H^+ + [3-NO_2C_6H_4CO_2]^{2-}$	$1.1 \times 10^6$		293	f.p./oq	D.k. at 542 nm in soln. contg. UO <sub>2</sub> <sup>2+</sup> , benzilic acid and 25% acetone.	80A320	

TABLE 30.  $\alpha$ -Hydroxybenzyl radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
<b>30.4 Benzophenone radical anion — Continued</b>								
30.4.16	2,2,4,4-Tetramethyl-4-piperidinol <i>N</i> -oxyl	$(C_6H_5)_2\dot{C}OH + TEMPOL \rightarrow (C_6H_5)_2CO + 8.0 \times 10^7$ TEMPOL-H			293	f.p./rq	D.k. at 540-560 nm in soln. contg. (5-500) $\times 10^{-6}$ mol L <sup>-1</sup> TEMPOL, ~0.001 mol L <sup>-1</sup> benzophenone and 4% ethanol.	90F503
30.4.17	2,2,4,4-Tetramethyl-4-piperidone <i>N</i> -oxyl	$(C_6H_5)_2\dot{C}OH + TAN \rightarrow (C_6H_5)_2CO + 1.2 \times 10^8$ TAN-H			293	f.p./rq	D.k. at 540-560 nm in soln. contg. (5-500) $\times 10^{-6}$ mol L <sup>-1</sup> TAN, ~0.001 mol L <sup>-1</sup> benzophenone and 4% ethanol.	90F503
<b>30.5 3-Benzoyl-1-methylpyridinium radical anion, protonated</b>								
30.5.1	3-Benzoyl-1-methylpyridinium radical anion, protonated	$3-pyCH_3^+\dot{C}(OH)C_6H_5 + 3-pyCH_3^+\dot{C}(OH)C_6H_5 \rightarrow$	$6.0 \times 10^8$	4.7		p.r.	D.k. at 530 nm in Ar-satd. soln. contg. 2.0 mol L <sup>-1</sup> 2-PrOH; $\epsilon = 3200$ L mol <sup>-1</sup> cm <sup>-1</sup> at 520 nm; $pK_a = 5.9$ .	720359
<b>30.6 4-Benzoyl-1-methylpyridinium radical anion, diprotonated</b>								
30.6.1	4-Benzoyl-1-methylpyridinium radical anion, diprotonated	$4-pyCH_3^+\dot{C}(OH)C_6H_5 + 4-pyCH_3^+\dot{C}(OH)C_6H_5 \rightarrow$	$1.8 \times 10^8$	7		p.r.	D.k. in N <sub>2</sub> -satd. soln. contg. 2-PrOH.	88N031
<b>30.7 2-Benzoylpypyridine, radical anion</b>								
30.7.1	2-Benzoylpypyridine, radical anion	$2-py\dot{C}(O^-)C_6H_5 + 2-py\dot{C}(O^-)C_6H_5 \rightarrow$	$6.0 \times 10^7$	13.3		p.r.	D.k. at 550 nm in Ar-satd. soln. contg. 2.0 mol L <sup>-1</sup> 2-PrOH; $\epsilon = 4800$ L mol <sup>-1</sup> cm <sup>-1</sup> at 560 nm.	720359
		$2-pyH^+\dot{C}(O^-)C_6H_5 + 2-pyH^+\dot{C}(O^-)C_6H_5 \rightarrow$	$6.0 \times 10^7$	5.9		p.r.	D.k. at 550 nm in Ar-satd. soln. contg. 2.0 mol L <sup>-1</sup> 2-PrOH; $\epsilon = 3000$ L mol <sup>-1</sup> cm <sup>-1</sup> at 495 nm; $pK_a = 12.3$ .	720359
		$2-pyH^+\dot{C}(OH)C_6H_5 + 2-pyH^+\dot{C}(OH)C_6H_5 \rightarrow$	$4.0 \times 10^8$	1.1		p.r.	D.k. at 550 nm in Ar-satd. soln. contg. 2.0 mol L <sup>-1</sup> 2-PrOH; $\epsilon = 2300$ L mol <sup>-1</sup> cm <sup>-1</sup> at 540 nm; $pK_a = 3.1$ ; d.k. at 350 nm ( $\epsilon = 37000$ ) gave $k = 3.6 \times 10^8$ L mol <sup>-1</sup> s <sup>-1</sup> .	720359
<b>30.8 3-Benzoylpypyridine radical anion, protonated</b>								
30.8.1	3-Benzoylpypyridine radical anion, protonated	$3-pyH^+\dot{C}(O^-)C_6H_5 + 3-pyH^+\dot{C}(O^-)C_6H_5 \rightarrow$	$2.8 \times 10^8$		295	f.p./rq	D.k. at 560 nm in deaerated soln. contg. 50% 2-PrOH and $7.1 \times 10^{-5}$ mol L <sup>-1</sup> 3-benzoylpypyridine; $\epsilon = 3400$ L mol <sup>-1</sup> cm <sup>-1</sup> .	93A159
			$3.8 \times 10^8$	5.1		p.r.	D.k. at 505 nm in Ar-satd. soln. contg. 2.0 mol L <sup>-1</sup> 2-PrOH; $\epsilon = 3400$ L mol <sup>-1</sup> cm <sup>-1</sup> at 503 nm; $pK_a = 9.2$ .	720359
		$3-pyH^+\dot{C}(OH)C_6H_5 + 3-pyH^+\dot{C}(OH)C_6H_5 \rightarrow$	$3.9 \times 10^8$	0.9		p.r.	D.k. at 505 nm in Ar-satd. soln. contg. 2.0 mol L <sup>-1</sup> 2-PrOH; $\epsilon = 3400$ L mol <sup>-1</sup> cm <sup>-1</sup> at 503 nm, $pK_a = 4.1$ .	720359
<b>30.9 4-Benzoylpypyridine, radical anion</b>								
30.9.1	4-Benzoylpypyridine, radical anion	$4-py\dot{C}(O^-)C_6H_5 + 4-py\dot{C}(O^-)C_6H_5 \rightarrow$	$8.5 \times 10^7$	13.2		p.r.	D.k. at 575 nm in Ar-satd. soln. contg. 2.0 mol L <sup>-1</sup> 2-PrOH; $\epsilon = 5900$ L mol <sup>-1</sup> cm <sup>-1</sup> .	720359
		$4-pyH^+\dot{C}(O^-)C_6H_5 + 4-pyH^+\dot{C}(O^-)C_6H_5 \rightarrow$	$4.8 \times 10^7$	5.2		p.r.	D.k. at 575 nm in Ar-satd. soln. contg. 2.0 mol L <sup>-1</sup> 2-PrOH; $\epsilon = 5600$ L mol <sup>-1</sup> cm <sup>-1</sup> ; $pK_a = 12.0$ .	720359
		$4-pyH^+\dot{C}(OH)C_6H_5 + 4-pyH^+\dot{C}(OH)C_6H_5 \rightarrow$	$5.5 \times 10^8$	0.8		p.r.	D.k. at 505 nm in Ar-satd. soln. contg. 2.0 mol L <sup>-1</sup> 2-PrOH; $\epsilon = 5800$ L mol <sup>-1</sup> cm <sup>-1</sup> at 510 nm, $pK_a = 4.2$ ; same $k$ from d.k. at 390 or 340 nm.	720359

TABLE 30.  $\alpha$ -Hydroxybenzyl radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	<i>T</i> (K)	Method	Comment	Ref.
<b>30.10 2'-Bromoacetophenone radical anion</b>								
<b>30.10.1 First-order reaction</b>								
	2-BrC <sub>6</sub> H <sub>4</sub> CO <sup>-</sup> CH <sub>3</sub> → 2'-C <sub>6</sub> H <sub>4</sub> COCH <sub>3</sub> + Br <sup>-</sup>	5 × 10 <sup>5</sup> s <sup>-1</sup>	12			p.r.	D.k. in N <sub>2</sub> -satd. soln. contg. <i>tert</i> -BuOH and 2'-bromoacetophenone.	81A098
	2-BrC <sub>6</sub> H <sub>4</sub> COHCH <sub>3</sub> → 2'-C <sub>6</sub> H <sub>4</sub> COCH <sub>3</sub> + Br <sup>-</sup> + H <sup>+</sup>	9 × 10 <sup>3</sup> s <sup>-1</sup>	7			p.r.	D.k. in N <sub>2</sub> -satd. soln. contg. <i>tert</i> -BuOH and 2'-bromoacetophenone.	81A098
<b>30.11 3'-Bromoacetophenone radical anion</b>								
<b>30.11.1 First-order reaction</b>								
	3-BrC <sub>6</sub> H <sub>4</sub> CO <sup>-</sup> CH <sub>3</sub> → 3'-C <sub>6</sub> H <sub>4</sub> COCH <sub>3</sub> + Br <sup>-</sup>	~10 <sup>2</sup> s <sup>-1</sup>	12			p.r.	D.k. in N <sub>2</sub> -satd. soln. contg. 2-PrOH and 3'-bromoacetophenone.	81A098
<b>30.12 4'-Bromoacetophenone radical anion</b>								
<b>30.12.1 First-order reaction</b>								
	4-BrC <sub>6</sub> H <sub>4</sub> CO <sup>-</sup> CH <sub>3</sub> → 4'-C <sub>6</sub> H <sub>4</sub> COCH <sub>3</sub> + Br <sup>-</sup>	5 × 10 <sup>3</sup> s <sup>-1</sup>	12			p.r.	D.k. in N <sub>2</sub> -satd. soln. contg. <i>tert</i> -BuOH and 4'-bromoacetophenone.	81A098
<b>30.12.2 4'-Nitroacetophenone</b>								
	4-BrC <sub>6</sub> H <sub>4</sub> CO <sup>-</sup> CH <sub>3</sub> + PNAP → 4-BrC <sub>6</sub> H <sub>4</sub> COCH <sub>3</sub> + [PNAP] <sup>-</sup>	4.8 × 10 <sup>9</sup>	12			p.r.	D.k., as well as p.b.k. at 550 nm in N <sub>2</sub> -satd. soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH, 0.002 mol L <sup>-1</sup> 4'-bromoacetophenone and (2-6) × 10 <sup>-4</sup> mol L <sup>-1</sup> 4'-nitroacetophenone; ε at 545 nm [PNAP] <sup>-</sup> = 2900 L mol <sup>-1</sup> cm <sup>-1</sup> , pK <sub>a</sub> = 2.5-2.7; ε at 445 nm (4-BrC <sub>6</sub> H <sub>4</sub> CO <sup>-</sup> CH <sub>3</sub> ) = 2800 L mol <sup>-1</sup> cm <sup>-1</sup> , pK <sub>a</sub> = 9.2.	730122
<b>30.13 4-Bromobenzaldehyde radical anion</b>								
<b>30.13.1 First-order reaction</b>								
	4-BrC <sub>6</sub> H <sub>4</sub> CHO <sup>-</sup> → 4'-C <sub>6</sub> H <sub>4</sub> CHO + Br <sup>-</sup>	4 × 10 <sup>2</sup> s <sup>-1</sup>	12			p.r.	D.k. in N <sub>2</sub> -satd. soln. contg. <i>tert</i> -BuOH or 2-PrOH and 4-bromobenzaldehyde.	81A098
<b>30.14 4-Bromobenzophenone radical anion</b>								
<b>30.14.1 First-order reaction</b>								
	4-BrC <sub>6</sub> H <sub>4</sub> CO <sup>-</sup> C <sub>6</sub> H <sub>5</sub> → 4'-C <sub>6</sub> H <sub>4</sub> COC <sub>6</sub> H <sub>5</sub> + Br <sup>-</sup>	<7 s <sup>-1</sup>	12			p.r.	D.k. in N <sub>2</sub> -satd. soln. contg. 2-PrOH and 4-bromobenzophenone.	81A098
<b>30.15 4-Carboxybenzophenone, radical dianion</b>								
<b>30.15.1 Hydrogen ion</b>								
	C <sub>6</sub> H <sub>5</sub> CO <sup>-</sup> C <sub>6</sub> H <sub>4</sub> -4-CO <sub>2</sub> <sup>-</sup> + H <sup>+</sup> → C <sub>6</sub> H <sub>5</sub> C(OH)C <sub>6</sub> H <sub>4</sub> -4-CO <sub>2</sub> <sup>-</sup>	6.8 × 10 <sup>10</sup>				p.r.	D.k. at 660 nm in N <sub>2</sub> -satd. soln. contg. 0.002 mol L <sup>-1</sup> 4-carboxybenzophenone at varied [H <sup>+</sup> ]; k <sub>r</sub> = 430 s <sup>-1</sup> .	94A001
		5 × 10 <sup>10</sup>	5.2-	7.0		f.p./rq	D.k. at 660 nm in soln. contg. 0.002 mol L <sup>-1</sup> 4-carboxybenzophenone and methionine at varied [H <sup>+</sup> ].	92A427
<b>30.15.2 Water</b>								
	C <sub>6</sub> H <sub>5</sub> CO <sup>-</sup> C <sub>6</sub> H <sub>4</sub> -4-CO <sub>2</sub> <sup>-</sup> + H <sub>2</sub> O → C <sub>6</sub> H <sub>5</sub> C(OH)C <sub>6</sub> H <sub>4</sub> -4-CO <sub>2</sub> <sup>-</sup> + OH <sup>-</sup>	1.4 × 10 <sup>4</sup> s <sup>-1</sup>	5.4			p.r.	D.k. at 570 nm in N <sub>2</sub> -satd. soln. contg. 0.002 mol L <sup>-1</sup> 4-carboxybenzophenone; k <sub>r</sub> = 8.7 × 10 <sup>9</sup> L mol <sup>-1</sup> s <sup>-1</sup> .	94A001
<b>30.15.3 4-Carboxybenzophenone, radical dianion</b>								
	C <sub>6</sub> H <sub>5</sub> CO <sup>-</sup> C <sub>6</sub> H <sub>4</sub> -4-CO <sub>2</sub> <sup>-</sup> + C <sub>6</sub> H <sub>5</sub> CO <sup>-</sup> C <sub>6</sub> H <sub>4</sub> -4-CO <sub>2</sub> <sup>-</sup> →	4.9 × 10 <sup>6</sup>	11			f.p./rq	D.k. at 660 nm in soln. contg. 0.002 mol L <sup>-1</sup> 4-carboxybenzophenone in the presence of $\alpha$ -methyl-4-carboxybenzhydrol; ε = 8100 L mol <sup>-1</sup> cm <sup>-1</sup> .	81A314
	C <sub>6</sub> H <sub>5</sub> CO <sup>-</sup> C <sub>6</sub> H <sub>4</sub> -4-CO <sub>2</sub> <sup>-</sup> + C <sub>6</sub> H <sub>5</sub> C(OH)C <sub>6</sub> H <sub>4</sub> -4-CO <sub>2</sub> <sup>-</sup> →	1.1 × 10 <sup>9</sup>	8.2			f.p./rq	D.k. at 660 nm in soln. contg. 0.002 mol L <sup>-1</sup> 4-carboxybenzophenone in the presence of $\alpha$ -methyl-4-carboxybenzhydrol.	81A314

TABLE 30.  $\alpha$ -Hydroxybenzyl radicals — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	$I$	T(K)	Method	Comment	Ref.
<b>30.15 4-Carboxybenzophenone, radical dianion — Continued</b>								
<b>30.15.3 4-Carboxybenzophenone, radical dianion — Continued</b>								
	$C_6H_5\dot{C}(OH)C_6H_4-4-CO_2^- + C_6H_5\dot{C}(OH)C_6H_4-4-CO_2^- \rightarrow$	$9.0 \times 10^8$	6.3			f.p./rq	D.k. at 525 nm in soln. contg. 0.002 mol L <sup>-1</sup> 4-carboxybenzophenone in the presence of $\alpha$ -methyl-4-carboxybenzhydrol; $\epsilon = 3600$ L mol <sup>-1</sup> cm <sup>-1</sup> ; 85% disproportionation, 15% pinacol formation.	81A314
<b>30.16 2'-Chloroacetophenone radical anion</b>								
<b>30.16.1 First-order reaction</b>								
	$2-ClC_6H_4\dot{C}O^-CH_3 \rightarrow 2-\cdot C_6H_4COCH_3 + Cl^-$	$1.5 \times 10^3$ s <sup>-1</sup>	12			p.r.	D.k. in N <sub>2</sub> -satt. soln. contg. <i>tert</i> -BuOH and 2'-chloroacetophenone.	81A098
<b>30.17 4'-Chloroacetophenone radical anion</b>								
<b>30.17.1 First-order reaction</b>								
	$4-ClC_6H_4\dot{C}O^-CH_3 \rightarrow 4-\cdot C_6H_4COCH_3 + Cl^-$	$\sim 10^2$ s <sup>-1</sup>	12			p.r.	D.k. in N <sub>2</sub> -satt. soln. contg. 2-PrOH and 4'-chloroacetophenone.	81A098
<b>30.17.2 1,1'-Dimethyl-4,4'-bipyridinium</b>								
	$4-ClC_6H_4\dot{C}OHCH_3 + MV^{2+} \rightarrow 4-ClC_6H_4COCH_3 + MV^{+} + H^+$	$3.6 \times 10^9$				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L <sup>-1</sup> 4-methoxyphenol, 4'-chloroacetophenone and methyl viologen.	84B033
<b>30.17.3 4'-Nitroacetophenone</b>								
	$4-ClC_6H_4\dot{C}O^-CH_3 + PNAP \rightarrow 4-ClC_6H_4COCH_3 + [PNAP]^{+-}$	$5.1 \times 10^9$	12			p.r.	D.k., as well as p.b.k. at 550 nm in N <sub>2</sub> -satt. soln. contg. 1 mol L <sup>-1</sup> <i>tert</i> -BuOH, 0.002 mol L <sup>-1</sup> 4'-chloroacetophenone and (2-6) $\times 10^{-4}$ mol L <sup>-1</sup> 4'-nitroacetophenone; $\epsilon$ at 545 nm [PNAP] <sup>+-</sup> = 2900 L mol <sup>-1</sup> cm <sup>-1</sup> , pK <sub>a</sub> = 2.5-2.7; $\epsilon$ at 445 nm (4-ClC <sub>6</sub> H <sub>4</sub> CO <sup>-</sup> CH <sub>3</sub> ) = 3100 L mol <sup>-1</sup> cm <sup>-1</sup> , pK <sub>a</sub> = 9.35.	730122
<b>30.18 4-Chlorobenzoate radical anion</b>								
<b>30.18.1 First-order reaction</b>								
	$4-ClC_6H_4\dot{C}O_2^- \rightarrow 4-\cdot O_2CC_6H_4 + Cl^-$	$4 \times 10^7$ s <sup>-1</sup>	12			p.r.	D.k. at 420 nm in N <sub>2</sub> -satt. soln. contg. <i>tert</i> -BuOH and 4-chlorobenzoate ion.	81A098
<b>30.19 4-Chlorobenzophenone radical anion, protonated</b>								
<b>30.19.1 First-order reaction</b>								
	$4-ClC_6H_4\dot{C}OH_2C_6H_5 \rightarrow H^+ + 4-ClC_6H_4\dot{C}O^-C_6H_5$	$9.8 \times 10^6$ s <sup>-1</sup>				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L <sup>-1</sup> NaOH, 0.072 mol L <sup>-1</sup> triethylamine and 4-chlorobenzophenone.	86A248
<b>30.19.2 1,1'-Dimethyl-4,4'-bipyridinium</b>								
	$4-ClC_6H_4\dot{C}OH_2C_6H_5 + MV^{2+} \rightarrow 4-ClC_6H_4CO_2C_6H_5 + MV^{+} + H^+$	$7.3 \times 10^8$				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L <sup>-1</sup> 4-methoxyphenol, 4-chlorobenzophenone and methyl viologen.	84B033
<b>30.20 3'-(Chloromethyl)acetophenone radical anion</b>								
<b>30.20.1 First-order reaction</b>								
	$3-(ClCH_2)C_6H_4\dot{C}O^-CH_3 \rightarrow 3-CH_3CO_2C_6H_4CH_2 + Cl^-$	$1.5 \times 10^4$ s <sup>-1</sup>	12			p.r.	D.k. at 300-320 and 460 nm, as well as p.b.k. at 340-400 nm, in N <sub>2</sub> -satt. soln. contg. <i>tert</i> -BuOH or 2-PrOH and <i>m</i> -(chloromethyl)acetophenone.	81A098

TABLE 30.  $\alpha$ -Hydroxybenzyl radicals — Continued

No.	Reaction	$k$ ( $L\ mol^{-1}\ s^{-1}$ )	pH	$I$	$T$ (K)	Method	Comment	Ref.
<b>30.21 4'-Cyanoacetophenone radical anion, protonated</b>								
<b>30.21.1 1,1'-Dimethyl-4,4'-bipyridinium</b>								
	$4-\text{CNC}_6\text{H}_4\dot{\text{C}}\text{OHCH}_3 + \text{MV}^{2+} \rightarrow$ $4-\text{CNC}_6\text{H}_4\text{COCH}_3 + \text{MV}^{+} + \text{H}^+$	$1.3 \times 10^9$				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol $L^{-1}$ 4-methoxyphenol, 4-cyanoacetophenone and methyl viologen.	84B033
<b>30.22 4,4'-Dichlorobenzophenone radical anion, protonated</b>								
<b>30.22.1 First-order reaction</b>								
	$(4-\text{ClC}_6\text{H}_4)_2\dot{\text{C}}\text{OH} \rightarrow \text{H}^+ +$ $(4-\text{ClC}_6\text{H}_4)_2\dot{\text{C}}\text{O}^-$	$\geq 1.5 \times 10^7\ s^{-1}$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol $L^{-1}$ NaOH, 0.036 mol $L^{-1}$ triethylamine and 4,4'-dichlorobenzophenone.	86A248
<b>30.22.2 1,1'-Dimethyl-4,4'-bipyridinium</b>								
	$(4-\text{ClC}_6\text{H}_4)_2\dot{\text{C}}\text{OH} + \text{MV}^{2+} \rightarrow$ $(4-\text{ClC}_6\text{H}_4)_2\dot{\text{C}}\text{O} + \text{MV}^{+} + \text{H}^+$	$4.3 \times 10^8$				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol $L^{-1}$ 4-methoxyphenol, 4,4'-dichlorobenzophenone and methyl viologen.	84B033
<b>30.23 4,4'-Dimethoxybenzophenone radical anion, protonated</b>								
<b>30.23.1 First-order reaction</b>								
	$(4-\text{CH}_3\text{OC}_6\text{H}_4)_2\dot{\text{C}}\text{OH} \rightarrow \text{H}^+ +$ $(4-\text{CH}_3\text{OC}_6\text{H}_4)_2\dot{\text{C}}\text{O}^-$	$7.4 \times 10^6\ s^{-1}$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol $L^{-1}$ NaOH, 0.14 mol $L^{-1}$ triethylamine and 4,4'-dimethoxybenzophenone.	86A248
<b>30.23.2 1,1'-Dimethyl-4,4'-bipyridinium</b>								
	$(4-\text{CH}_3\text{OC}_6\text{H}_4)_2\dot{\text{C}}\text{OH} + \text{MV}^{2+} \rightarrow$ $(4-\text{CH}_3\text{OC}_6\text{H}_4)_2\dot{\text{C}}\text{O} + \text{MV}^{+} + \text{H}^+$	$5.1 \times 10^9$				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol $L^{-1}$ 4-methoxyphenol, 4,4'-dimethoxybenzophenone and methyl viologen.	84B033
<b>30.24 4'-Fluoroacetophenone radical anion, protonated</b>								
<b>30.24.1 1,1'-Dimethyl-4,4'-bipyridinium</b>								
	$4-\text{FC}_6\text{H}_4\dot{\text{C}}\text{OHCH}_3 + \text{MV}^{2+} \rightarrow$ $4-\text{FC}_6\text{H}_4\text{COCH}_3 + \text{MV}^{+} + \text{H}^+$	$4.0 \times 10^9$				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol $L^{-1}$ 4-methoxyphenol, 4-fluoroacetophenone and methyl viologen.	84B033
<b>30.24.2 4'-Nitroacetophenone</b>								
	$4-\text{FC}_6\text{H}_4\dot{\text{C}}\text{O}^- \text{CH}_3 + \text{PNAP} \rightarrow$ $4-\text{FC}_6\text{H}_4\text{COCH}_3 + [\text{PNAP}]^-$	$4.9 \times 10^9$	11			p.r.	D.k., as well as p.b.k. at 550 nm in $N_2$ -sadt. soln. contg. 1 mol $L^{-1}$ <i>tert</i> -BuOH, 0.002 mol $L^{-1}$ 4-fluoroacetophenone and (2-6) $\times 10^{-4}$ mol $L^{-1}$ 4-nitroacetophenone; $\epsilon$ at 545 nm $[\text{PNAP}]^- = 2900\ L\ mol^{-1}\ cm^{-1}$ , $pK_a = 2.5-2.7$ ; $\epsilon$ at 445 nm (4- $\text{FC}_6\text{H}_4\dot{\text{C}}\text{O}^- \text{CH}_3) = 2000\ L\ mol^{-1}\ cm^{-1}$ , $pK_a = 9.7$ .	730122
<b>30.25 4-Fluorobenzoate radical anion</b>								
<b>30.25.1 First-order reaction</b>								
	$4-\text{FC}_6\text{H}_4\dot{\text{C}}\text{O}_2^{2-} \rightarrow 4-\text{O}_2\text{CC}_6\text{H}_4\cdot + \text{F}^-$	$6 \times 10^5\ s^{-1}$	12			p.r.	D.k. in $N_2$ -sadt. soln. contg. <i>tert</i> -BuOH and 4-fluorobenzoate ion.	81A098

TABLE 30.  $\alpha$ -Hydroxybenzyl radicals — Continued

No.	Reaction	$k$ ( $L\ mol^{-1}\ s^{-1}$ )	pH	$I$	T (K)	Method	Comment	Ref.
<b>30.26 4-Fluorobenzophenone radical anion, protonated</b>								
<b>30.26.1 First-order reaction</b>								
	$4\text{-FC}_6\text{H}_4\dot{\text{C}}\text{OHC}_6\text{H}_5 \rightarrow \text{H}^+ + 4\text{-FC}_6\text{H}_4\text{CO}^-\text{C}_6\text{H}_5$	$8.5 \times 10^6\ s^{-1}$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol $L^{-1}$ NaOH, 0.072 mol $L^{-1}$ triethylamine and 4-fluorobenzophenone.	86A248
<b>30.26.2 1,1'-Dimethyl-4,4'-bipyridinium</b>								
	$4\text{-FC}_6\text{H}_4\dot{\text{C}}\text{OHC}_6\text{H}_5 + \text{MV}^{2+} \rightarrow 4\text{-FC}_6\text{H}_4\text{COC}_6\text{H}_5 + \text{MV}^{+} + \text{H}^+$	$1.2 \times 10^9$				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol $L^{-1}$ 4-methoxyphenol, 4-fluorobenzophenone and methyl viologen.	84B033
<b>30.27 Hydroxy(phenyl)methyl</b>								
<b>30.27.1 4-Chlorobenzenediazonium cation</b>								
	$\text{C}_6\text{H}_5\dot{\text{C}}\text{HOH} + 4\text{-ClC}_6\text{H}_4\text{N}_2^+ \rightarrow \text{C}_6\text{H}_5\text{CHO} + 4\text{-ClC}_6\text{H}_4 + \text{N}_2 + \text{H}^+$	$4.1 \times 10^5$				$\gamma\text{-r.}$	Calcd. from concn. and dose rate effects on yields in soln. contg. 0.01-0.04 mol $L^{-1}$ benzyl alcohol and diazonium ions; assumed $2k(R + R) = 1 \times 10^9\ L\ mol^{-1}\ s^{-1}$ .	80G099
<b>30.27.2 4-Cyanobenzenediazonium ion</b>								
	$\text{C}_6\text{H}_5\dot{\text{C}}\text{HOH} + 4\text{-CNC}_6\text{H}_4\text{N}_2^+ \rightarrow \text{C}_6\text{H}_5\text{CHO} + 4\text{-CNC}_6\text{H}_4 + \text{N}_2 + \text{H}^+$	$9.1 \times 10^5$				$\gamma\text{-r.}$	Calcd. from concn. and dose rate effects on yields in soln. contg. 0.01-0.04 mol $L^{-1}$ benzyl alcohol and diazonium ions; assumed $2k(R + R) = 1 \times 10^9\ L\ mol^{-1}\ s^{-1}$ .	80G099
<b>30.27.3 4-Methoxybenzenediazonium cation</b>								
	$\text{C}_6\text{H}_5\dot{\text{C}}\text{HOH} + 4\text{-CH}_3\text{OC}_6\text{H}_4\text{N}_2^+ \rightarrow \text{C}_6\text{H}_5\text{CHO} + 4\text{-CH}_3\text{OC}_6\text{H}_4 + \text{N}_2 + \text{H}^+$	$1.5 \times 10^5$				$\gamma\text{-r.}$	Calcd. from concn. and dose rate effects on yields in soln. contg. 0.01-0.04 mol $L^{-1}$ benzyl alcohol and diazonium ions; assumed $2k(R + R) = 1 \times 10^9\ L\ mol^{-1}\ s^{-1}$ .	80G099
<b>30.27.4 4-Methylbenzenediazonium cation</b>								
	$\text{C}_6\text{H}_5\dot{\text{C}}\text{HOH} + 4\text{-CH}_3\text{C}_6\text{H}_4\text{N}_2^+ \rightarrow \text{C}_6\text{H}_5\text{CHO} + 4\text{-CH}_3\text{C}_6\text{H}_4 + \text{N}_2 + \text{H}^+$	$2.9 \times 10^5$				$\gamma\text{-r.}$	Calcd. from concn. and dose rate effects on yields in soln. contg. 0.01-0.04 mol $L^{-1}$ benzyl alcohol and diazonium ions; assumed $2k(R + R) = 1 \times 10^9\ L\ mol^{-1}\ s^{-1}$ .	80G099
<b>30.27.5 4-Nitrobenzenediazonium ion</b>								
	$\text{C}_6\text{H}_5\dot{\text{C}}\text{HOH} + 4\text{-NO}_2\text{C}_6\text{H}_4\text{N}_2^+ \rightarrow \text{C}_6\text{H}_5\text{CHO} + 4\text{-NO}_2\text{C}_6\text{H}_4 + \text{N}_2 + \text{H}^+$	$1.5 \times 10^6$				$\gamma\text{-r.}$	Calcd. from concn. and dose rate effects on yields in soln. contg. 0.01-0.04 mol $L^{-1}$ benzyl alcohol and diazonium ions; assumed $2k(R + R) = 1 \times 10^9\ L\ mol^{-1}\ s^{-1}$ .	80G099
<b>30.28 4-(2-Hydroxy-3-sulfopropoxy)benzophenone radical anion, protonated</b>								
<b>30.28.1 4-(2-Hydroxy-3-sulfopropoxy)benzophenone radical anion, protonated</b>								
	$\text{C}_6\text{H}_5\dot{\text{C}}\text{OHC}_6\text{H}_4\text{OCH}_2\text{CHOHCH}_2\text{SO}_3^- + \text{C}_6\text{H}_5\dot{\text{C}}\text{OHC}_6\text{H}_4\text{OCH}_2\text{CHOHCH}_2\text{SO}_3^- \rightarrow$	$1.9 \times 10^8$	7			p.r.	D.k. at 540 nm in soln. contg. $5 \times 10^{-4}$ mol $L^{-1}$ benzophenone and 5% 2-PrOH; $\epsilon = 3660\ L\ mol^{-1}\ cm^{-1}$ ; radical mixt. contains $(\text{CH}_3)_2\dot{\text{C}}\text{OH}$ .	88F197
<b>30.29 4-[2-Hydroxy-3-trimethylammonio]propoxy]benzophenone radical anion, protonated</b>								
<b>30.29.1 4-[2-Hydroxy-3-trimethylammonio]propoxy]benzophenone radical anion, protonated</b>								
	$\text{C}_6\text{H}_5\dot{\text{C}}\text{OHC}_6\text{H}_4\text{OCH}_2\text{CHOHCH}_2\text{N}^+(\text{CH}_3)_3 + \text{C}_6\text{H}_5\dot{\text{C}}\text{OHC}_6\text{H}_4\text{OCH}_2\text{CHOHCH}_2\text{N}^+(\text{CH}_3)_3 \rightarrow$	$1.4 \times 10^8$	7			p.r.	D.k. at 540 nm in soln. contg. $5 \times 10^{-4}$ mol $L^{-1}$ benzophenone and 5% 2-PrOH; $\epsilon = 4050\ L\ mol^{-1}\ cm^{-1}$ ; radical mixt. contains $(\text{CH}_3)_2\dot{\text{C}}\text{OH}$ .	88F197
<b>30.30 4'-Iodoacetophenone radical anion</b>								
<b>30.30.1 First-order reaction</b>								
	$4\text{-IC}_6\text{H}_4\dot{\text{C}}\text{O}^-\text{CH}_3 \rightarrow 4\text{-C}_6\text{H}_4\text{COCH}_3 + \text{I}^-$	$1.4 \times 10^5\ s^{-1}$	12			p.r.	D.k. in $N_2$ -saturated soln. contg. <i>tert</i> -BuOH and 4'-iodoacetophenone.	81A098

TABLE 30.  $\alpha$ -Hydroxybenzyl radicals — Continued

No.	Reaction	<i>k</i> (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T(K)	Method	Comment	Ref.
30.30	4'-Iodoacetophenone radical anion — Continued							
30.30.1	First-order reaction — Continued							
	$4\text{-IC}_6\text{H}_4\dot{\text{C}}\text{OHCH}_3 \rightarrow 4\text{-C}_6\text{H}_4\text{COCH}_3 + \text{I}^-$	$4 \times 10^3 \text{ s}^{-1}$	4			p.r.	D.k. in N <sub>2</sub> -satd. soln. contg. <i>tert</i> -BuOH and 4'-iodoacetophenone.	81A098
30.30.2	Hydrogen ion							
	$4\text{-IC}_6\text{H}_4\dot{\text{C}}\text{O}^-\text{CH}_3 + \text{H}^+ \rightarrow 4\text{-IC}_6\text{H}_4\text{COHCH}_3$	$2 \times 10^{10}$	4			p.r.	D.k. at 310-330 nm in N <sub>2</sub> -satd. soln. contg. <i>tert</i> -BuOH and 4'-iodoacetophenone.	81A098
30.31	4-Methoxyacetophenone radical anion, protonated							
30.31.1	1,1'-Dimethyl-4,4'-bipyridinium							
	$4\text{-CH}_3\text{OC}_6\text{H}_4\dot{\text{C}}\text{OHCH}_3 + \text{MV}^{2+} \rightarrow$ p-MAP + MV <sup>+</sup> + H <sup>+</sup>	$5.4 \times 10^9$				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L <sup>-1</sup> 4-methoxyphenol, 4-methoxyacetophenone and methyl viologen.	84B033
30.32	4-Methoxybenzophenone radical anion, protonated							
30.32.1	First-order reaction							
	$4\text{-CH}_3\text{OC}_6\text{H}_4\dot{\text{C}}\text{OH}_2\text{C}_6\text{H}_5 \rightarrow \text{H}^+ +$ $4\text{-CH}_3\text{OC}_6\text{H}_4\text{CO}^-\text{C}_6\text{H}_5$	$7.4 \times 10^6 \text{ s}^{-1}$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L <sup>-1</sup> NaOH, 0.14 mol L <sup>-1</sup> triethylamine and 4-methoxybenzophenone.	86A248
30.32.2	1,4-Diazabicyclo[2.2.2]octane radical cation							
	$4\text{-CH}_3\text{OC}_6\text{H}_4\dot{\text{C}}\text{O}^-\text{C}_6\text{H}_5 + \text{DABCO}^{2+} \rightarrow$ $4\text{-CH}_3\text{OC}_6\text{H}_4\text{COC}_6\text{H}_5 + \text{DABCO}$	$8.1 \times 10^9$				f.p./rq	D.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L <sup>-1</sup> NaOH, 0.05 mol L <sup>-1</sup> DABCO and 4-methoxybenzophenone; used ε(radical anion) = 6000 L mol <sup>-1</sup> cm <sup>-1</sup> .	86A248
30.32.3	1,1'-Dimethyl-4,4'-bipyridinium							
	$4\text{-CH}_3\text{OC}_6\text{H}_4\dot{\text{C}}\text{OH}_2\text{C}_6\text{H}_5 + \text{MV}^{2+} \rightarrow$ $4\text{-CH}_3\text{OC}_6\text{H}_4\text{COC}_6\text{H}_5 + \text{MV}^+ + \text{H}^+$	$3.3 \times 10^9$				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L <sup>-1</sup> 4-methoxyphenol, 4-methoxybenzophenone and methyl viologen.	84B033
30.33	4'-Methylacetophenone radical anion, protonated							
30.33.1	1,1'-Dimethyl-4,4'-bipyridinium							
	$4\text{-CH}_3\text{C}_6\text{H}_4\dot{\text{C}}\text{OHCH}_3 + \text{MV}^{2+} \rightarrow$ $4\text{-CH}_3\text{C}_6\text{H}_4\text{COCH}_3 + \text{MV}^+ + \text{H}^+$	$4.6 \times 10^9$				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L <sup>-1</sup> 4-methoxyphenol, 4-methylacetophenone and methyl viologen.	84B033
30.34	4-Methylbenzophenone radical anion, protonated							
30.34.1	First-order reaction							
	$4\text{-CH}_3\text{C}_6\text{H}_4\dot{\text{C}}\text{OH}_2\text{C}_6\text{H}_5 \rightarrow \text{H}^+ +$ $4\text{-CH}_3\text{C}_6\text{H}_4\text{CO}^-\text{C}_6\text{H}_5$	$7.3 \times 10^6 \text{ s}^{-1}$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L <sup>-1</sup> NaOH, 0.072 mol L <sup>-1</sup> triethylamine and 4-methylbenzophenone.	86A248
30.34.2	1,1'-Dimethyl-4,4'-bipyridinium							
	$4\text{-CH}_3\text{C}_6\text{H}_4\dot{\text{C}}\text{OH}_2\text{C}_6\text{H}_5 + \text{MV}^{2+} \rightarrow$ $4\text{-CH}_3\text{C}_6\text{H}_4\text{COC}_6\text{H}_5 + \text{MV}^+ + \text{H}^+$	$2.8 \times 10^9$				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L <sup>-1</sup> 4-methoxyphenol, 4-methylbenzophenone and methyl viologen.	84B033

TABLE 30.  $\alpha$ -Hydroxybenzyl radicals — Continued

No.	Reaction	$k$ ( $L \text{ mol}^{-1} \text{ s}^{-1}$ )	pH	$I$	$T(\text{K})$	Method	Comment	Ref.
<b>30.35 4-Sulfomethylbenzophenone radical anion, protonated</b>								
<b>30.35.1 4-Sulfomethylbenzophenone radical anion</b>								
	$\text{C}_6\text{H}_5\dot{\text{C}}\text{OHC}_6\text{H}_4\text{CH}_2\text{SO}_3^- + \text{C}_6\text{H}_5\dot{\text{C}}\text{O}^-\text{C}_6\text{H}_4\text{CH}_2\text{SO}_3^- \rightarrow$	$6.3 \times 10^6$	alk.			f.p./rq	D.k. at 618 nm in soln. contg. 2% EtOH, 0.005 mol L <sup>-1</sup> ketone and 0.05 mol L <sup>-1</sup> NaOH; $\epsilon = 1100 \text{ L mol}^{-1} \text{ cm}^{-1}$ ; $pK_a = 11.8$ ; $k = 2.0 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ in 50% EtOH.	90A060
		$8.3 \times 10^6$	alk.			f.p./rq	D.k. at 630 nm in soln. contg. 2% MeOH, 0.005 mol L <sup>-1</sup> ketone and 0.05 mol L <sup>-1</sup> NaOH; $\epsilon = 1100 \text{ L mol}^{-1} \text{ cm}^{-1}$ ; $pK_a = 11.8$ ; $k = 6.2 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ in 50% MeOH.	90A060
		$8.1 \times 10^6$	alk.			f.p./rq	D.k. at 630 nm in soln. contg. 1% 2-PrOH, 0.005 mol L <sup>-1</sup> ketone and 0.05 mol L <sup>-1</sup> NaOH; $\epsilon = 1100 \text{ L mol}^{-1} \text{ cm}^{-1}$ ; $pK_a = 11.8$ ; $k = 1.5 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$ in 60% 2-PrOH; $k$ decreases with increasing 2-PrOH concn.	90A060
	$\text{C}_6\text{H}_5\dot{\text{C}}\text{OHC}_6\text{H}_4\text{CH}_2\text{SO}_3^- + \text{C}_6\text{H}_5\dot{\text{C}}\text{OHC}_6\text{H}_4\text{CH}_2\text{SO}_3^- \rightarrow$	$1.4 \times 10^8$	7			p.r.	D.k. at 540 nm in soln. contg. 5 $\times 10^{-4}$ mol L <sup>-1</sup> benzophenone and 5% 2-PrOH; $\epsilon = 3215 \text{ L mol}^{-1} \text{ cm}^{-1}$ ; radical mixt. contains $(\text{CH}_3)_2\dot{\text{C}}\text{OH}$ .	88F197 88N031
<b>30.36 3,3',4,4'-Tetracarboxybenzophenone tetraanion, radical anion</b>								
<b>30.36.1 3,3',4,4'-Tetracarboxybenzophenone tetraanion, radical anion</b>								
	$(3,4\text{-CO}_2^-\text{C}_6\text{H}_3)_2\dot{\text{C}}\text{O}^- + (3,4\text{-CO}_2^-\text{C}_6\text{H}_3)_2\dot{\text{C}}\text{O}^- \rightarrow$	$1.1 \times 10^2$	12		293	f.p./rq	D.k. at 710 nm in soln. contg. $10^{-4}$ mol L <sup>-1</sup> 3,3',4,4'-tetracarboxybenzophenone and 10% ethanol or glycerol; $\epsilon = 6300 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	83A339
	$(3,4\text{-CO}_2^-\text{C}_6\text{H}_3)_2\dot{\text{C}}\text{OH} + (3,4\text{-CO}_2^-\text{C}_6\text{H}_3)_2\dot{\text{C}}\text{OH} \rightarrow$	$5 \times 10^5$	7		293	f.p./rq	D.k. at 600 nm in soln. contg. $10^{-4}$ mol L <sup>-1</sup> 3,3',4,4'-tetracarboxybenzophenone and 10% ethanol or glycerol; $pK_a = 8.5$ ; $\epsilon = 2400 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	83A339
<b>30.36.2 Ferricyanide ion</b>								
	$(3,4\text{-CO}_2^-\text{C}_6\text{H}_3)_2\dot{\text{C}}\text{OH} + \text{Fe}(\text{CN})_6^{3-} \rightarrow (3,4\text{-CO}_2^-\text{C}_6\text{H}_3)_2\text{CO} + \text{Fe}(\text{CN})_6^{4-} + \text{H}^+$	$8.0 \times 10^6$	7		293	f.p./rq	D.k. at 600 nm in soln. contg. $10^{-4}$ mol L <sup>-1</sup> 3,3',4,4'-tetracarboxybenzophenone, $3 \times 10^{-5}$ mol L <sup>-1</sup> ferricyanide and 10% ethanol; same value at pH 12.	83A339
<b>30.36.3 Oxygen</b>								
	$(3,4\text{-CO}_2^-\text{C}_6\text{H}_3)_2\dot{\text{C}}\text{OH} + \text{O}_2 \rightarrow (3,4\text{-CO}_2^-\text{C}_6\text{H}_3)_2\text{CO} + \text{O}_2^- + \text{H}^+$	$4 \times 10^7$	7		293	f.p./rq	D.k. at 600 nm in soln. contg. $10^{-4}$ mol L <sup>-1</sup> 3,3',4,4'-tetracarboxybenzophenone, $3 \times 10^{-5}$ mol L <sup>-1</sup> ferricyanide and 10% ethanol; same value at pH 12.	83A339
<b>30.36.4 2,2,6,6-Tetramethyl-4-piperidone N-oxyl</b>								
	$(3,4\text{-CO}_2^-\text{C}_6\text{H}_3)_2\dot{\text{C}}\text{OH} + \text{TAN} \rightarrow (3,4\text{-CO}_2^-\text{C}_6\text{H}_3)_2\text{CO} + \text{TAN-H}$	$1.3 \times 10^7$	7		293	f.p./rq	D.k. at 600 nm in soln. contg. $10^{-4}$ mol L <sup>-1</sup> 3,3',4,4'-tetracarboxybenzophenone, $3 \times 10^{-5}$ mol L <sup>-1</sup> ferricyanide and 10% ethanol; same value at pH 12.	83A339
<b>30.37 4-(Trifluoromethyl)benzophenone radical anion, protonated</b>								
<b>30.37.1 First-order reaction</b>								
	$4\text{-CF}_3\text{C}_6\text{H}_4\dot{\text{C}}\text{OHC}_6\text{H}_5 \rightarrow \text{H}^+ + 4\text{-CF}_3\text{C}_6\text{H}_4\dot{\text{C}}\text{O}^-\text{C}_6\text{H}_5$	$\geq 1.5 \times 10^7 \text{ s}^{-1}$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L <sup>-1</sup> NaOH, 0.036 mol L <sup>-1</sup> triethylamine and 4-(trifluoromethyl)benzophenone.	86A248
<b>30.37.2 1,4-Diazabicyclo[2.2.2]octane radical cation</b>								
	$4\text{-CF}_3\text{C}_6\text{H}_4\dot{\text{C}}\text{O}^-\text{C}_6\text{H}_5 + \text{DABCO}^+ \rightarrow 4\text{-CF}_3\text{C}_6\text{H}_4\text{COC}_6\text{H}_5 + \text{DABCO}$	$1.0 \times 10^{10}$				f.p./rq	D.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L <sup>-1</sup> NaOH, 0.05 mol L <sup>-1</sup> DABCO and 4-(trifluoromethyl)benzophenone; used $\epsilon(\text{radical anion}) = 6000 \text{ L mol}^{-1} \text{ cm}^{-1}$ .	86A248

TABLE 30.  $\alpha$ -Hydroxybenzyl radicals — Continued

No.	Reaction	$k$ (L mol <sup>-1</sup> s <sup>-1</sup> )	pH	<i>I</i>	T (K)	Method	Comment	Ref.
<b>30.37 4-(Trifluoromethyl)benzophenone radical anion, protonated — Continued</b>								
<b>30.37.3 1,1'-Dimethyl-4,4'-bipyridinium</b>								
$4\text{-CF}_3\text{C}_6\text{H}_4\dot{\text{C}}\text{OHC}_6\text{H}_5 + \text{MV}^{2+} \rightarrow 4\text{-CF}_3\text{C}_6\text{H}_4\text{COC}_6\text{H}_5 + \text{MV}^{+} + \text{H}^+$								
		$2.5 \times 10^8$				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L <sup>-1</sup> 4-methoxyphenol, 4-trifluoromethylbenzophenone and methyl viologen.	84B033
<b>30.38 2-[3-(<i>N,N,N</i>-Trimethylammonio)-2-hydroxypropyl]-3,4-dimethyl-9-oxothioxanthene radical anion, protonated</b>								
<b>30.38.1 2-[3-(<i>N,N,N</i>-Trimethylammonio)-2-hydroxypropyl]-3,4-dimethyl-9-oxothioxanthene radical anion, protonated</b>								
$\text{TXH}^{+} + \text{TXH}^{+} \rightarrow$								
		$3.8 \times 10^8$	7			p.r.	D.k. at 360 nm in soln. contg. 2-[3-(trimethylammonio)-2-hydroxypropyl]-3,4-dimethyl-9-oxothioxanthene; $\text{pK}_a = 9.8$ .	88A109
$\text{TX}^{+} + \text{TX}^{+} \rightarrow$								
		$5.5 \times 10^8$	12			p.r.	D.k. at 360 nm in soln. contg. 2-[3-(trimethylammonio)-2-hydroxypropyl]-3,4-dimethyl-9-oxothioxanthene.	88A109
<b>30.39 4-Trimethylammoniomethylbenzophenone radical anion, protonated</b>								
<b>30.39.1 4-Trimethylammoniomethylbenzophenone radical anion, protonated</b>								
$\text{C}_6\text{H}_5\dot{\text{C}}\text{OHC}_6\text{H}_4\text{CH}_2\text{N}(\text{CH}_3)_3^{+} + \text{C}_6\text{H}_5\dot{\text{C}}\text{OHC}_6\text{H}_4\text{CH}_2\text{N}(\text{CH}_3)_3^{+} \rightarrow$								
		$2.4 \times 10^8$	7			p.r.	D.k. at 540 nm in soln. contg. $5 \times 10^{-4}$ mol L <sup>-1</sup> benzophenone and 5% 2-PrOH; $\epsilon = 4500$ L mol <sup>-1</sup> cm <sup>-1</sup> ; radical mixt. contains $(\text{CH}_3)_2\dot{\text{C}}\text{OH}$ .	88F197 88N031

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## 10. Molecular Formula Index

$\text{Ag}^+$	Silver(I) ion 12.4, 16.4, 17.3, 26.3, 27.8.1	$\text{CH}_{15}\text{CoN}_6^{2+}$ Pentaammine(cyano)cobalt(III) ion 2.12
$\text{Ag}_2^+$	Silver(I) ion, complex with Ag(0) 12.3, 13.3, 16.3, 17.2	$\text{CH}_{15}\text{CoN}_6\text{S}^{2+}$ Pentaammine(thiocyanato- <i>N</i> )cobalt(III) ion 2.10
$\text{BH}_3\text{O}_3$	Boric acid 27.10.2, 27.8.3	$\text{CHgN}$ Pentaammine(thiocyanato- <i>S</i> )cobalt(III) ion 2.11
$\text{BH}_4\text{O}_4^-$	Tetrahydroxyborate ion 23.2, 27.10.3, 27.32.1, 27.33.1	$\text{CN}_4\text{O}_8$ Mercury(I) cyanide 12.59, 13.41, 16.176, 17.28
$\text{Bi}^{3+}$	Bismuth(III) ion 12.5, 13.4, 16.6, 17.4, 26.4	Tetranitromethane 12.196, 13.153, 15.17, 16.571, 18.13, 19.32, 20.15, 26.356, 27.102.3, 27.107.1, 27.108.3, 27.114.1, 27.121.1, 27.128.1, 27.133.1, 27.174.4, 27.179.1, 27.181.2, 27.188.1, 27.194.1, 27.195.1, 27.196.1, 27.198.1, 27.200.2, 27.222.1, 27.233.1, 27.253.3, 27.28.11, 27.91.1, 27.92.9, 27.99.3
$\text{BiCl}_6^{3-}$	Hexachlorobismuthate(III) ion 16.7	
$\text{BrCoH}_{15}\text{N}_5^{2+}$	Pentaammine(bromo)cobalt(III) ion 12.16, 13.11, 16.28, 19.3, 2.6, 27.123.3	$\text{CO}$ Carbon monoxide 1.2
$\text{BrH}_{15}\text{N}_5\text{Ru}^{2+}$	Pentaammine(bromo)ruthenium(III) ion 19.24, 2.31, 22.17, 27.123.1	$\text{CO}_2^-$ Carbon dioxide radical anion 26.
$\text{BrO}_3^-$	Bromate ion 13.5	$\text{CO}_3^-$ Carbonate radical ion 26.6
$\text{Br}_2$	Bromine 17.5	$\text{C}_2\text{Cl}_2\text{F}_3$ 1,2-Dichloro-1,2,2-trifluoroethyl 11.21
$\text{Br}_2\text{Hg}$	Mercury(II) bromide 16.177	$\text{C}_2\text{Cl}_2\text{N}$ Dichloro(cyano)methyl 27.77
$\text{CBrF}_3$	Bromotrifluoromethane 16.317	$\text{C}_2\text{Cl}_3$ Trichlorovinyl 11.27
$\text{CBr}_3$	Tribromomethyl 11.26	$\text{C}_2\text{Cl}_3\text{O}$ 1,1,2-Trichloro-2-oxoethyl 27.244
$\text{CCl}_2\text{F}$	Dichlorofluoromethyl 11.19	$\text{C}_2\text{Cl}_3\text{O}_2^-$ Trichloroacetate ion 16.579
$\text{CCl}_3$	Trichloromethyl 10.	$\text{C}_2\text{Cl}_5$ Pentachloroethyl 11.23
$\text{CCl}_4$	Carbon tetrachloride 12.110, 16.319, 19.29, 26.202, 27.241.3	$\text{C}_2\text{F}_3\text{O}_2^-$ Trifluoroacetate ion 16.580
$\text{CHBr}_2$	Dibromomethyl 11.16	$\text{C}_2\text{HBrClF}_3$ 1-Bromo-1-chloro-2,2,2-trifluoroethane 16.313
$\text{CHCl}_3$	Chloroform 16.328	$\text{C}_2\text{HClF}_3$ 1-Chloro-2,2,2-trifluoroethyl 11.13
$\text{CHO}_2$	Carboxyl 2.1, 26.	$\text{C}_2\text{HCl}_2$ Dichlorovinyl 11.22
$\text{CHO}_2^-$	Formate ion 11.13.9, 9.9	$\text{C}_2\text{HCl}_2\text{O}$ 1,1-Dichloro-2-oxoethyl 27.78
$\text{CHO}_3^-$	Bicarbonate ion 26.5, 27.8.4	$\text{C}_2\text{HCl}_4\text{O}$ 1,1,2,2-Tetrachloro-2-hydroxyethyl 27.239
$\text{CH}_2\text{Br}$	Bromomethyl 7.	$\text{C}_2\text{HO}_3^{2-}$ Carboxy(hydroxy)methyl, dianion 23.
$\text{CH}_2\text{Cl}_2$	Dichloromethane 16.349	$\text{C}_2\text{H}_2$ Acetylene 27.153.4
$\text{CH}_2\text{NO}$	Carbamoyl 27.31	$\text{C}_2\text{H}_2\text{BrF}_2$ 2-Bromo-1,2-difluoroethyl 11.1
$\text{CH}_2\text{NO}_2^-$	<i>aci</i> -Nitromethane anion 1.86, 12.177, 16.489, 22.22, 26.325, 27.31.4, 9.12	$\text{C}_2\text{H}_2\text{BrI}_3$ 1,2,2-Tribromoethyl 11.24
$\text{CH}_2\text{O}^-$	Hydroxymethyl, conjugate base 12.	$\text{C}_2\text{H}_2\text{Cl}$ 2-Chlorovinyl 11.14
$\text{CH}_2\text{O}_2^-$	Dihydroxymethyl, conjugate base 27.96	$\text{C}_2\text{H}_2\text{ClO}$ 1-Chloro-2-oxoethyl 27.54
$\text{CH}_3$	Methyl 1.	$\text{C}_2\text{H}_2\text{F}_3\text{O}$ 2,2,2-Trifluoro-1-hydroxyethyl 27.249
$\text{CH}_3\text{I}$	Iodomethane 16.420	$\text{C}_2\text{H}_2\text{IN}$ Iodoacetonitrile 17.76
$\text{CH}_3\text{O}$	Hydroxymethyl 12.	$\text{C}_2\text{H}_2\text{IO}_2^-$ Iodoacetate ion 16.417
$\text{CH}_3\text{O}_2$	Dihydroxymethyl 27.95	$\text{C}_2\text{H}_2\text{N}$ Cyanomethyl 27.60
$\text{CH}_4\text{O}$	Methanol 1.77, 11.13.10, 11.14.2, 11.16.2, 11.22.2, 11.27.2, 28.17, 9.11	$\text{C}_2\text{H}_2\text{O}_2^-$ Carboxymethyl, anion 22.
$\text{CH}_4\text{O}_2$	Dihydroxymethane 12.126	$\text{C}_2\text{H}_2\text{O}_3^-$ Carboxy(hydroxy)methyl, anion 23.
$\text{CH}_4\text{S}$	Methanethiol 1.76	$\text{C}_2\text{H}_3$ Vinyl 6.19
$\text{CH}_5\text{N}_3\text{S}$	Thiosemicarbazide 16.577, 26.358	$\text{C}_2\text{H}_3\text{Br}_2$ 1,2-Dibromoethyl 11.15
		$\text{C}_2\text{H}_3\text{ClO}_2$ Chloroacetic acid 1.54

$C_2H_3Cl_2$	1,1-Dichloroethyl 11.17 1,2-Dichloroethyl 11.18	$C_2H_6O_2$	Ethylene glycol 12.134
$C_2H_3Cl_3O_2$	Chloral hydrate 16.326	$C_2H_6S$	Ethanethiol 1.63, 2.37
$C_2H_3CrO_2^+$	Acetatochromium(II) ion 16.121	$C_2H_6S_2$	1,2-Ethanedithiol 28.16
$C_2H_3IO_2$	Iodoacetic acid 12.150, 17.75	$C_2H_7N^+$	2-Aminoethyl, conjugate acid 27.24
$C_2H_3N$	Acetonitrile 1.45	$C_2H_7NO^+$	2-Amino-1-hydroxyethyl conjugate monoacid 27.26
$C_2H_3NO_2^-$	Amino(carboxy)methyl, anion 25. Carbamoyl(hydroxy)methyl, anion 27.34	$C_2H_7NS$	Cysteamine 16.334, 17.63
$C_2H_3O$	Formylmethyl 21. 2-Hydroxyethenyl 27.153 1-Oxoethyl 27.200	$C_2H_8N^+$	Ethylammonium ion 27.8.10
$C_2H_3O_2$	Carboxymethyl 22.	$C_2H_8NS$	Cysteamine, conjugate acid 12.117, 13.87, 27.104.1, 27.142.3, 27.164.4, 27.202.3, 27.222.8, 27.85.1, 28.13
$C_2H_3O_3$	Carboxy(hydroxy)methyl 23.	$C_2H_{18}CoN_5O_2^{2+}$	(Acetato)pentaamminecobalt(III) ion 1.9, 26.31
$C_2H_3O_3S^-$	Vinyl sulfonate ion 27.172.2	$C_2H_{20}Co_2F_3N_6O_2^{3+}$	Hexaamminebis( $\mu$ -hydroxy)- $\mu$ - (trifluoroacetato)dicobalt(III) ion 26.61
$C_2H_3O_4S^{2-}$	2-Hydroxy-1-sulfonatoethyl, conjugate base 27.171	$C_2H_{21}Co_2F_2N_6O_2^{3+}$	Hexaammine- $\mu$ -(difluoroacetato)bis( $\mu$ - hydroxy)dicobalt(III) ion 26.62
$C_2H_4$	Ethylene 1.66, 11.19.1, 14.14, 9.8	$C_2H_{22}Co_2FN_6O_2^{3+}$	Hexaammine- $\mu$ -(fluoroacetato)bis( $\mu$ - hydroxy)dicobalt(III) ion 26.63
$C_2H_4Br$	2-Bromoethyl 11.2	$C_2H_{23}Co_2N_6O_2^{3+}$	$\mu$ -Acetatohexaamminebis( $\mu$ - hydroxy)dicobalt(III) ion 26.64
$C_2H_4Cl$	1-Chloroethyl 11.7 2-Chloroethyl 11.8	$C_2HgN_2$	Mercury(II) cyanide 26.112
$C_2H_4Cu^+$	Ethylene-copper(I) complex 14.4, 17.20	$C_2HgN_2S_2$	Mercury(II) thiocyanate 16.178
$C_2H_4INO$	Iodoacetamide 16.416	$C_3HBrN_2O_2S$	2-Bromo-5-nitrothiazole 16.315
$C_2H_4NO_2$	(Carbamoyl)hydroxymethyl 27.33	$C_3HO_2^-$	Propiolate ion 27.36.1
$C_2H_4NO_2^-$	Glycine, negative ion 1.70 <i>aci</i> -Nitroethane, negative ion 1.85	$C_3HO_4^{2-}$	Dicarboxymethyl dianion 27.76
$C_2H_4O^-$	1-Hydroxyethyl anion 13.	$C_3H_2F_5O$	2,2,2-Trifluoro-1-(difluoromethoxy)ethyl 27.247 1,2,2-Trifluoro-2-(difluoromethoxy)ethyl 27.248
$C_2H_4O_2$	Acetic acid 1.43	$C_3H_2N_3O_2^-$	2-Nitroimidazole, conjugate base 26.321 4-Nitroimidazole, conjugate base 26.324
$C_2H_4O_2^-$	1,2-Dihydroxyethyl, conjugate base 20.	$C_3H_2O_2^-$	1-Carboxyethenyl anion 27.36
$C_2H_4O_3$	Glycolic acid 1.71	$C_3H_3Cl_2N_2^+$	4,5-Dichloroimidazolium 16.347
$C_2H_4O_4S^-$	2-Hydroxy-1-sulfonatoethyl 27.172 1-Sulfatoethyl 27.238	$C_3H_3NO_2^-$	Cyanoacetic acid 1.56
$C_2H_5$	Ethyl 2.	$C_3H_3NS$	Thiazole 16.574
$C_2H_5I$	Iodoethane 16.419	$C_3H_3N_3O_2^-$	2-Nitroimidazole 16.486, 26.319 4-Nitroimidazole 16.487, 26.322
$C_2H_5IO$	2-Iodoethanol 17.77	$C_3H_3N_3O_2^-S$	2-Amino-5-nitrothiazole 16.284
$C_2H_5NO_2$	Glycine 1.69, 27.8.11	$C_3H_3O_2^-$	Acrylate ion 1.46, 12.100, 13.75, 16.277, 27.40.1
$C_2H_5N_2O$	Amino(carbamoyl)methyl 27.17	$C_3H_3O_3^-$	1-Carboxy-1-hydroxyethyl, dianion 24.
$C_2H_5O$	1-Hydroxyethyl 13. Methoxymethyl 18.	$C_3H_3O_4^-$	Dicarboxymethyl 27.75
$C_2H_5O_2$	1,1-Dihydroxyethyl 27.91 1,2-Dihydroxyethyl 20.		
$C_2H_5S$	Methylthiomethyl 27.196		
$C_2H_6N$	1-Aminoethyl 27.23		
$C_2H_6NO_4P^-$	2-Ammonio-1-phosphatoethyl 27.30		
$C_2H_6N_2O^+$	Ammonio(carbamoyl)methyl 27.18		
$C_2H_6O$	Ethanol 1.64, 11.13.8, 11.16.1, 14.13, 9.7		
$C_2H_6OS$	2-Mercaptoethanol 12.154, 13.116, 14.15, 16.429, 17.81		

$C_3H_4ClF_2O$	1-Chloro-2,2-difluoro-2-methoxyethyl 27.53	$C_3H_6O_2$	Propionic acid 1.91
$C_3H_4N$	1-Cyanoethyl 27.59	$C_3H_6O_2^-$	1,2-Dihydroxypropyl, conjugate base 27.103
$C_3H_4NS^+$	Thiazole, conjugate acid 16.575	$C_3H_6O_3$	Electron adduct of methyl acetate 27.182
$C_3H_4N_3O_2^+$	2-Nitroimidazole, conjugate acid 26.320	$C_3H_6O_3^-$	Lactic acid 1.73
	4-Nitroimidazole, conjugate acid 26.323		1,2,3-Trihydroxypropyl, conjugate base 27.251
$C_3H_4O_2$	Acrylic acid 1.47, 12.101, 27.109.2, 27.37.4, 27.39.1, 27.45.4, 27.52.1	$C_3H_7$	1-Methylethyl 4., 3.
$C_3H_4O_2^-$	Electron adduct of acrylic acid 27.10	$C_3H_7I$	2-Iodopropane 16.421, 2.38
	1-Carboxyethyl anion 27.38	$C_3H_7NO_2S$	Cysteine 1.57, 12.118, 16.335, 17.64, 27.11.4, 27.127.7, 27.140.4, 27.20.1, 27.236.3, 27.28.4, 28.14
$C_3H_4O_3^-$	1-Carboxy-2-hydroxyethyl, anion 27.40	$C_3H_7O$	1-Hydroxy-1-methylethyl 16. 2-Hydroxy-1-methylethyl 27.158
$C_3H_5$	2-Propenyl 6.17		2-Hydroxypropyl 27.170
$C_3H_5IO_2$	3-Iodopropionic acid 12.151, 17.78	$C_3H_7O_2$	1,2-Dihydroxy-1-methylethyl 27.98 1,2-Dihydroxypropyl 27.102 1,3-Dihydroxypropyl 27.104
$C_3H_5N$	Propionitrile 1.92		Dimethoxymethyl 27.109 1-Hydroxy-2-methoxyethyl 27.157
$C_3H_5NO$	3-Hydroxypropionitrile 1.72 Acrylamide 12.99, 13.74, 16.276, 17.51, 26.175, 27.9.1		(Methoxymethoxy)methyl 27.181
$C_3H_5NO^-$	Electron adduct of acrylamide 27.8	$C_3H_7O_3$	1,2-Dihydroxy-1-(hydroxymethyl)ethyl 27.92
$C_3H_5NO_2^-$	Carboxy(methylamino)methyl, anion 27.44	$C_3H_7S$	1-(Methylthio)ethyl 27.195
$C_3H_5NO_3^-$	2-Amino-2-carboxy-1-hydroxyethyl, anion 27.21	$C_3H_8N$	Dimethylaminomethyl 27.116 1-Amino-1-methylethyl 27.25
$C_3H_5N_2^+$	Imidazolium 16.409	$C_3H_8O$	1-Propanol 9.13 2-Propanol 1.90, 6.19.2, 9.14, 10.9, 11.13.11, 11.14.3, 11.16.3, 11.22.3, 11.27.3, 27.170.3
$C_3H_5O$	1-Formylethyl 27.135	$C_3H_{10}N^+$	Trimethylammonium ion 27.8.15
	2-Oxopropyl 27.202	$C_3H_{11}N_2^{2+}$	2-Amino-1-(aminomethyl)ethyl, conjugate diacid 27.15.1, 27.15.2
$C_3H_5O_2$	Acetoxymethyl 27.1 1-Carboxyethyl 27.37	$C_3H_{12}Cl_2CrN_2O_5^{3+}$	Pentaqua(4,5-dichloroimidazole)- chromium(III) ion 16.143
	2-Carboxyethyl 27.39	$C_3H_{14}CrN_2O_5^{3+}$	Pentaqua(imidazole)chromium(III) ion 16.142
	2,5-Dioxacyclopentyl 27.124	$C_3H_{17}Cl_2CoN_7^{3+}$	Pentaammine(4,5-dichloroimidazole)- cobalt(III) ion 16.52
	1,3-Dioxolan-4-yl 27.125	$C_3H_{19}CoN_7^{3+}$	Pentaammine(imidazole)cobalt(III) ion 16.51
	1-Formyl-2-hydroxyethyl 27.137	$C_3O_5^{3-}$	Dicarboxy(hydroxy)methyl, trianion 27.74
	3-Hydroxy-2-oxopropyl 27.168	$C_4HO_5^{2-}$	1,2-Dicarboxy-2-hydroxyvinyl, dianion 27.68
	Methoxycarbonylmethyl 27.178	$C_4H_2N_2O_4$	Alloxan 26.179
$C_3H_5O_2S^-$	3-Mercaptopropionate ion 27.140.7	$C_4H_2O_4^{2-}$	Fumarate ion 12.137, 9.10
$C_3H_5O_3$	1-Carboxy-1-hydroxyethyl 24.2	$C_4H_2O_5^{3-}$	1,2-Dicarboxy-1-hydroxyethyl, trianion 27.72
$C_3H_5S_2$	1,3-Dithiolan-2-yl 27.128		
$C_3H_6$	Propylene 1.93, 9.15		
$C_3H_6Br$	1-(Bromomethyl)ethyl 11.3		
$C_3H_6Cl$	1-(Chloromethyl)ethyl 11.10		
$C_3H_6NO$	( <i>N</i> -Formyl- <i>N</i> -methylamino)methyl 27.139 ( <i>N</i> -Acetylamino)methyl 27.3		
	Electron adduct of acrylamide, protonated 27.9		
$C_3H_6NO_2$	2-Amino-1-carboxyethyl 27.19		
	2-Amino-2-carboxyethyl 27.20		
	1-Carbamoyl-1-hydroxyethyl 27.32		
$C_3H_6NO_2^-$	<i>aci</i> -1-Nitropropane, negative ion 1.87 <i>aci</i> -2-Nitropropane, negative ion 1.88		
$C_3H_6O$	Acetone 1.44		
$C_3H_6O^-$	1-Hydroxy-1-methylethyl, conjugate base 16.		

$C_4H_3BrN_2O_2$	5-Bromouracil 16.318, 26.198	$C_4H_6O_2$	Biacetyl 12.108, 13.80, 15.5, 16.306, 24.9, 27.163.3, 27.62.1
$C_4H_3NO_2S$	2-Nitrothiophene 16.498 3-Nitrothiophene 16.499		Crotonic acid 1.55, 12.115, 13.85, 16.332, 19.30, 27.109.3, 27.181.1
$C_4H_3N_2O_3^-$	Isobarbiturate ion 21.39		Methacrylic acid 1.75, 12.156, 27.109.4, 27.37.5, 27.39.2, 27.45.5, 27.52.2
$C_4H_3N_3O_4$	5-Nitouracil 16.503		2-Butyne-1,4-diol 27.93.2
$C_4H_3O_4^-$	Fumarate ion, hydrogen 26.262 Hydrogen maleate ion 26.263	$C_4H_6O_2^+$	2-Methylene-1,3-dioxolane radical cation 27.186
$C_4H_3O_4^{2-}$	1,2-Dicarboxyethyl, dianion 27.67	$C_4H_6O_2^-$	1-Carboxy-1-methylethyl anion 27.46
$C_4H_3O_5^{2-}$	1,2-Dicarboxy-1-hydroxyethyl, dianion 27.71		1-Carboxypropyl anion 27.51
	1,2-Dicarboxy-2-hydroxyethyl, dianion 27.73		Electron adduct of crotonate 27.57
$C_4H_3O_6^{2-}$	1,2-Dicarboxy-1,2-dihydroxyethyl, dianion 27.65		Electron adduct of methacrylic acid 27.176
$C_4H_4BrNO_2$	N-Bromosuccinimide 16.316, 17.55	$C_4H_6O_3^-$	1-Hydroxy-1-methyl-2-oxopropyl, conjugate base 27.161
$C_4H_4NO_4^{2-}$	Carboxy(carboxymethylamino)methyl, dian- ion 27.35		2-Carboxy-2-hydroxy-2-methylethyl, anion 27.42
$C_4H_4N_2$	Pyrazine 16.522, 26.339 Pyridazine 16.526, 26.340 Pyrimidine 16.552, 26.345		1-Carboxy-2-hydroxypropyl, anion 27.43
$C_4H_4N_2O_2$	2-Nitopyrrole 16.495 3-Nitopyrrole 16.496		1-(Methoxycarbonyl)-1-hydroxyethyl, conju- gate base 27.177
$C_4H_4N_3O_2^-$	2-Methyl-4-nitroimidazole, conjugate base 26.293	$C_4H_7N$	2-Methylpropionitrile 1.84
$C_4H_4O_4$	Fumaric acid 12.138, 16.395 Maleic acid 12.153, 16.427		Electron adduct of methacrylamide 27.175
$C_4H_4O_5^-$	1,2-Dicarboxy-1-hydroxyethyl, monoanion 27.70		Electron adduct of crotonamide 27.56
$C_4H_5ClO_2^+$	2-(Chloromethylene)-1,3-dioxolane radical cation 27.55	$C_4H_7N_2^+$	1-Methylimidazolium 16.441 2-Methylimidazolium 16.442 4-Methylimidazolium 16.443
$C_4H_5NO_3^-$	Acetylamino(carboxy)methyl anion 27.2	$C_4H_7N_2O_2^-$	Electron adduct of glycine anhydride 27.140
$C_4H_5N_2^+$	Pyrazine, conjugate monoacid 16.523 Pyridazine, conjugate monoacid 16.527 Pyrimidine, conjugate monoacid 16.553	$C_4H_7N_2O_3$	Radicals from diglycine 27.216
$C_4H_5N_2O_2$	3,6-Dioxo-2-piperazinyl 27.127	$C_4H_7O$	1-Hydroxy-2-butenyl 27.141 1-Hydroxycyclobutyl 27.144 1-Hydroxy-1-methyl-2-propenyl 27.162 1-Methyl-2-oxopropyl 27.189 Tetrahydro-2-furanyl 27.241
$C_4H_5N_3$	4-Aminopyrimidine 16.207	$C_4H_7O_2$	1-Carboxy-1-methylethyl 27.45 1-Carboxypropyl 27.50 2-Carboxypropyl 27.52 1,4-Dioxanyl 27.123 1,3-Dioxan-4-yl 27.126 1-Hydroxymethyl-2-oxopropyl 27.159
$C_4H_5N_3O_2$	2-Methyl-4-nitroimidazole 16.451, 26.291		1-Hydroxy-1-methyl-2-oxopropyl 27.160 4-Hydroxy-2-oxobutyl 27.167
$C_4H_5O_3^{2-}$	2-Carboxy-1-hydroxy-1-methylethyl, dian- ion 27.41	$C_4H_7O_3$	3-Hydroxy-1-(hydroxymethyl)-2-oxopropyl 27.156
$C_4H_5O_4$	1,2-Dicarboxyethyl 27.66		Methoxy(methoxycarbonyl)methyl 27.180
$C_4H_5O_5$	1,2-Dicarboxy-1-hydroxyethyl 27.69		2,3-Dihydroxy-1-(hydroxymethyl)propenyl 27.93
$C_4H_5O_6$	1,2-Dicarboxy-1,2-dihydroxyethyl 27.64	$C_4H_7S_2$	2-Methyl-1,3-dithiolan-2-yl 27.184
$C_4H_6$	Butadiene 1.50, 9.5	$C_4H_8$	1-Butene 1.51, 9.6 2-Methylpropene 1.81
$C_4H_6N$	1-Cyano-1-methylethyl 27.61	$C_4H_8Br$	1-(Bromomethyl)propyl 11.4 2-Bromo-1-methylpropyl 11.5
$C_4H_6N_2O_2$	Glycine anhydride 26.259		
$C_4H_6N_2S$	2-Mercapto-1-methylimidazole 1.74		
$C_4H_6N_3O_2^+$	2-Methyl-4-nitroimidazole, conjugate acid 26.292		

$C_4H_8Cl$	1-(Chloromethyl)-1-methylethyl 11.11 1-(Chloromethyl)propyl 11.12 1-(1-Chloroethyl)ethyl 11.9	$C_4H_{10}O$	Diethyl ether 10.8 2-Methyl-2-propanol 11.27.4
$C_4H_8NO$	( <i>N</i> -Acetyl- <i>N</i> -methylamino)methyl 27.7	$C_4H_{10}O_2S_2$	Dithiothreitol 12.133, 13.100, 16.383, 17.71, 20.13, 26.242, 27.125.1, 27.126.1, 27.211.1, 27.213.1, 27.214.1, 27.215.5, 27.217.1, 27.220.1, 27.221.1, 27.222.1, 27.229.1, 27.230.1, 27.240.1, 27.241.5, 27.86.3, 27.87.1, 27.88.1, 27.94.1
$C_4H_8NO_2$	2-Amino-2-carboxy-2-methylethyl 27.22	$C_4H_{10}O_3S_3$	Bis(2-hydroxyethyl)trisulfide 26.196
$C_4H_8N_3O_2$	Radicals from glycylglycinamide 27.223	$C_4H_{11}N^+$	Trimethylammoniomethyl 27.254 2-Amino-2-methylpropyl, conjugate acid 27.27
$C_4H_8O$	Tetrahydrofuran 10.10	$C_4H_{11}NS^+$	1-Amino-3-(methylthio)propyl, conjugate acid 27.29
$C_4H_8O^-$	1-Hydroxybutyl, conjugate base 27.143 1-Hydroxy-2-methylpropyl, conjugate base 27.165	$C_4H_{12}N^+$	Diethylammonium ion 27.8.9
$C_4H_8O_2$	Ethyl acetate 1.65 Methyl propionate 1.82 2-Methylpropionic acid 1.83	$C_4H_{12}N_2S_2$	Cystamine 26.207, 27.11.3, 27.140.3
$C_4H_8O_2^+$	1,1-Dimethoxyethene radical cation 27.106	$C_4H_{16}BrCoFN_4^+$	<i>cis</i> -Bromobis(ethylenediamine)- fluorocobalt(III) ion 12.22, 13.15, 16.73, 19.7
$C_4H_8O_2^-$	1,2-Dihydroxy-1-methylpropyl, conjugate base 27.100	$C_4H_{16}Br_2CoN_4^+$	<i>trans</i> -Dibromobis(ethylenediamine)- cobalt(III) ion 12.23, 13.14, 16.72, 19.6, 27.123.5
$C_4H_8O_2S_2$	( <i>E</i> )-4,5-Dihydroxy-1,2-dithiane 12.125, 13.94, 16.355, 17.67, 26.224	$C_4H_{16}Cl_2CoN_4^+$	<i>cis</i> -Dichlorobis(ethylenediamine)-cobalt(III) ion 12.25, 13.18, 16.75, 2.15 <i>trans</i> -Dichlorobis(ethylenediamine)- cobalt(III) ion 12.24, 13.17, 16.74, 2.14 Bis(ethylenediamine)dichlorocobalt(III) ion 19.8, 27.123.6
$C_4H_8O_4^-$	1,2,3-Trihydroxy-1-(hydroxymethyl)propyl, conjugate base 27.218	$C_4H_{16}Cl_2N_4Pt^{2+}$	Dichlorobis(ethylenediamine)platinum(IV) ion 12.74, 16.218
$C_4H_9$	1-Butyl 6.1 <i>tert</i> -Butyl 6.2 1-Methylpropyl 6.11 2-Methylpropyl 6.12	$C_4H_{16}CoF_2N_4^+$	Bis(ethylenediamine)disfluorocobalt(III) ion 12.26, 13.20, 16.76
$C_4H_9NO$	2-Methyl-2-nitrosopropane 1.80, 12.164, 13.121, 15.9, 16.453, 17.84, 2.39, 20.14, 22.21, 26.294, 27.202.5, 3.12, 4.13	$C_4H_{16}CrN_2O_5^{3+}$	Pentaqua(1-methylimidazole)chromium(III) ion 16.144 Pentaqua(2-methylimidazole)chromium(III) ion 16.145 Pentaqua(4-methylimidazole)chromium(III) ion 16.146
$C_4H_9O$	1-Hydroxybutyl 27.142 2-Hydroxy-2,2-dimethylethyl 17. 1-Hydroxy-1-methylpropyl 27.163 1-Hydroxy-2-methylpropyl 27.164 2-Hydroxy-1-methylpropyl 27.166	$C_4H_{18}ClCoN_4O^{2+}$	<i>cis</i> -Aquachlorobis(ethylenediamine)- cobalt(III) ion 12.20, 13.16, 16.77, 19.9, 2.13
$C_4H_9O_2$	1,2-Dihydroxybutyl 27.84 1,4-Dihydroxybutyl 27.85 1,2-Dihydroxy-1-methylpropyl 27.99 1,2-Dihydroxy-2-methylpropyl 27.101 1,1-Dimethoxyethyl 27.107 (1-Methoxyethoxy)methyl 27.179	$C_4H_{18}N_4O_2Pt^{2+}$	<i>trans</i> -Dihydroxybis(ethylenediamine)- platinum(IV) ion 17.38
$C_4H_9O_2S$	2,3-Dihydroxy-4-mercaptopbutyl 27.94		
$C_4H_9O_2S_2^-$	Dithiothreitol, monoanion 21.26		
$C_4H_9O_3$	(Dimethoxy)methoxymethyl 27.108 Trimethoxymethyl 27.253		
$C_4H_9O_3S$	1-(Methylsulfonatomethyl)ethyl 27.190		
$C_4H_9O_4$	Radicals from erythritol 27.219		
$C_4H_9S$	1-(Ethylthio)ethyl 27.133 1-Methyl-1-(methylthio)ethyl 27.188 1-(Methylthio)propyl 27.198		
$C_4H_{10}N$	1-Aminobutyl 27.16		
$C_4H_{10}N^+$	Pyrrolidinium ion 27.8.13		
$C_4H_{10}NS$	1-Amino-3-(methylthio)propyl 27.28		

$C_4H_{19}ClCoN_5^{2+}$	<i>cis</i> -Amminechlorobis(ethylenediamine)-cobalt(III) ion 12.21, 13.19, 16.78, 19.10	$C_5H_7O_3^-$	2-Propenyl, 1-hydroxy-1-(2-hydroxyethoxy)-anion 27.203
$C_4H_{21}CoN_7^{2+}$	Pentaammine(1-methylimidazole)cobalt(III) ion 16.53	$C_5H_8N_3O^+$	4-Methyl-5-(aminocarbonyl)imidazolium 16.435
$C_4H_{21}CoN_7^{3+}$	Pentaammine(2-methylimidazole)cobalt(III) ion 16.54	$C_5H_8O_2$	3,3-Dimethylacrylic acid 12.127, 13.95, 16.357
	Pentaammine(4-methylimidazole)cobalt(III) ion 16.55	$C_5H_8O_2^+$	2-(Ethylidene)-1,3-dioxolane radical cation 27.131 2-Methylene-1,3-dioxane radical cation 27.185
$C_4N_4Ni^{2-}$	Tetracyanonickelate(II) ion 26.129	$C_5H_8O_2^-$	Electron adduct of $\beta,\beta$ -dimethylacrylate 27.113
$C_5FeN_6O^{2-}$	Pentacyano(nitrosyl)ferrate(III) ion 12.44, 13.36, 16.162, 20.7, 26.89		Electron adduct of methyl methacrylate 27.187
$C_5FeN_6O^{3-}$	Pentacyanonitrosylferrate(II) ion 17.25, 27.22.3, 27.27.3, 27.42.1, 27.48.2, 27.7.1		2-Carboxy-2,2-dimethylethyl, anion 27.47.2, 27.48
$C_5H_2NO_5^-$	5-Nitro-2-furoate ion 16.485, 26.318	$C_5H_8O_8P$	Radicals from ribose 5-phosphate 27.230
$C_5H_3N_2O_4^-$	Orotate ion 16.505	$C_5H_9$	Cyclopentyl 5.
$C_5H_3N_4^-$	Purine anion 16.521	$C_5H_9I$	Iodocyclopentane 16.418
$C_5H_4N_2O_2$	Pyrazinecarboxylic acid 16.524	$C_5H_9NO^-$	Electron adduct of <i>N,N</i> -dimethylacrylamide 27.111
$C_5H_4N_2O_4$	Nifuroxime 12.169, 13.125, 15.11, 16.469, 24.11, 26.302, 27.104.2, 27.141.1, 27.142.5, 27.215.8, 27.229.5, 27.230.3, 27.30.1, 27.38.3, 27.40.2, 27.43.1, 27.51.2, 27.71.3, 27.73.2, 27.76.3, 27.92.8	$C_5H_9NO_3S$	Electron adduct of $\beta,\beta$ -dimethylacrylamide 27.112
$C_5H_4N_4$	Purine 16.519, 26.338	$C_5H_9N_2O_3$	Radicals from acetylserineamide 27.207
$C_5H_4N_4O$	Hypoxanthine 16.407		Radicals from glycylsarcosine 27.224
$C_5H_4O_5^{3-}$	2-Oxoglutamate, radical anion 27.201	$C_5H_9O$	1-Hydroxycyclopentyl 27.145
$C_5H_5ClN^+$	3-Chloropyridinium 16.330		Tetrahydro-2-pyranyl 27.243
	4-Chloropyridinium 16.331	$C_5H_9O_2$	2-Carboxy-2-methylpropyl 27.47
$C_5H_5NO$	3-Pyridinol 16.546, 26.342		1-Formyl-4-hydroxybutyl 27.136
$C_5H_5NO_3^-$	2-Carboxy-5-oxopyrrolidinyl, conjugate base 27.49		Tetrahydrofuranyl(hydroxy)methyl 27.242
$C_5H_5N_4^+$	Purine, conjugate monoacid 16.520	$C_5H_9O_3$	1-(2-Hydroxyethylcarbonyl)ethyl 27.154
$C_5H_5N_4O^+$	Hypoxanthine, conjugate acid 12.145, 13.110, 16.408	$C_5H_9O_4$	2-Hydroxy-1-(2-hydroxyethoxy)carbonylethyl 27.155
$C_5H_6N^+$	Pyridinium 16.543		Radicals from deoxyribose 27.215
$C_5H_6NO^+$	3-Pyridinol, conjugate acid 16.545, 26.343		Radicals from xylitol 27.235
$C_5H_6N_2O_2$	Thymine 12.198, 13.155, 26.359	$C_5H_9O_5$	Radicals from arabinose 27.211
$C_5H_6N_3^+$	4-Methyl-5-cyanoimidazolium 16.438		Radicals from ribose 27.229
$C_5H_6N_3O_5^-$	6-Hydroxy-5-nitrothymine, conjugate base 26.272	$C_5H_9S_2$	2,4-Dimethyl-1,3-dithiolan-2-yl 27.119
$C_5H_6N_5^+$	Adenine, conjugate acid 12.102, 13.76, 16.278	$C_5H_{10}O$	3-Pentanone 1.89
$C_5H_7$	Cyclopentenyl 6.5	$C_5H_{10}O_2^+$	1,1-Dimethoxypropene radical cation 27.110
$C_5H_7NO_3^-$	[( <i>N</i> -Acetyl- <i>N</i> -methyl)amino]carboxymethyl, anion 27.6		1-Ethoxy-1-methoxyethene radical cation 27.129
$C_5H_7N_2O_2^+$	1-Carboxymethylimidazolium 16.322	$C_5H_{11}$	Pentyl 6.14
$C_5H_7N_3O_5^-$	6-Hydroxy-5-nitrothymine 26.271		Radicals from pentane 6.15
			2,2-Dimethylpropyl 6.6
		$C_5H_{11}NO_2S$	Penicillamine 12.182, 16.506
		$C_5H_{11}N_2O$	<i>N</i> -(Dimethylaminocarbonyl)- <i>N</i> -methylaminomethyl 27.114

$C_5H_{11}O$	1,1-Dimethylethoxymethyl 27.121 1-Hydroxypentyl 27.169	$C_5H_{23}Co_2N_8O_4^{3+}$ $\mu$ -Pyrazinecarboxylatobis-[hydroxytris-(ammine)cobalt(III)] ion 16.118
$C_5H_{11}O_2$	1,2-Dihydroxy-1,2-dimethylpropyl 27.90. 1,4-Dihydroxy-1-methylbutyl 27.97	$\mu$ -4-Pyrimidinecarboxylatobis-[hydroxytris-(ammine)cobalt(III)] ion 16.69*
$C_5H_{11}O_3S$	1-Methyl-1-(methylsulfonyloxymethyl)ethyl 27.191 1-(Methylsulfonatomethyl)propyl 27.192	$\mu$ -5-Pyrimidinecarboxylatobis-[hydroxytris-(ammine)cobalt(III)] ion 16.70
$C_5H_{11}O_4$	Tri(methoxy)methoxymethyl 27.252 1,3-Dihydroxy-2,2-di(hydroxymethyl)propyl 27.89	$C_6Cl_4O_2$ Tetrachloro-1,4-benzoquinone 13.147
$C_5H_{11}S$	4-(Methylthio)butyl 27.193 1-(Methylthio)butyl 27.194	$C_6F_4O_2$ Tetrafluoro-1,4-benzoquinone 12.192, 13.149, 16.559, 26.350
$C_5H_{12}N^+$	Piperidine, conjugate acid 27.8.12	$C_6F_6$ Hexafluorobenzene 12.143, 13.108, 16.401
$C_5H_{12}N_2S$	$N,N'$ -Diethylthiourea 16.351, 26.216	$C_6FeN_6^{3-}$ Ferricyanide ion 1.26, 2.25, 4.4, 6.2.2, 8.5, 11.20.2, 12.45, 13.37, 14.8, 15.2, 16.163, 18.5, 19.20, 20.8, 22.12, 23.4, 24.4, 25.2, 26.88, 27.108.1, 27.117.3, 27.118.2, 27.120.1, 27.127.2, 27.134.1, 27.144.1, 27.145.1, 27.146.1, 27.147.1, 27.149.1, 27.163.1, 27.164.1, 27.169.1, 27.174.1, 27.21.2, 27.215.1, 27.222.2, 27.238.1, 27.245.2, 27.246.1, 27.252.1, 27.253.1, 27.255.1, 27.28.1, 27.35.1, 27.41.1, 27.81.1, 27.92.3, 30.36.2
$C_5H_{13}CuN_2O_4$	Bis(glycinato)methylcopper(III) ion 1.21	$C_6FeN_6^{4-}$ Ferrocyanide ion 21.6
$C_5H_{14}ClCrNO_5^{3+}$	Pentaqua(3-chloropyridine)chromium(III) ion 16.132 Pentaqua(4-chloropyridine)chromium(III) ion 16.133	$C_6H_2Br_2NO_4S^-$ 3,5-Dibromo-4-nitrosobenesulfonate ion 1.60, 12.122, 13.92, 16.346, 26.214
$C_5H_{14}N_2S$	2-[(3-Aminopropyl)amino]ethanethiol 16.286	$C_6H_2Br_3O$ 2,4,6-Tribromophenoxy 17.92
$C_5H_{15}CoN_6O_2^{2+}$	Tetraammine(pyrazinecarboxylato- <i>N,O</i> )cobalt(III) ion 16.67	$C_6H_2Cl_3O$ 2,4,6-Trichlorophenoxy 17.93
$C_5H_{15}CrNO_5^{3+}$	Pentaqua(pyridine)chromium(III) ion 16.130	$C_6H_2I_3O$ 2,4,6-Triiodophenoxy 17.94
$C_5H_{15}N_2S^+$	2-[(3-Aminopropyl)amino]ethanethiol, conjugate acid 16.286	$C_6H_2N_3O_9S^-$ 2,4,6-Trinitrobenzenesulfonate ion 27.222.2
$C_5H_{15}N_2S_2^+$	2-[(3-Aminopropyl)amino]ethaneperthiol, conjugate acid 16.285	$C_6H_2N_4O_2^{2-}$ Lumazine dianion 16.424
$C_5H_{17}CrN_3O_6^{3+}$	Pentaqua(4-methyl-5-(aminocarbonyl)imidazole)chromium(III) ion 16.147	$C_6H_3N_4O_2^-$ Lumazine anion 16.423
$C_5H_{18}CoN_7O_2^{2+}$	Pentaammine(pyrazinecarboxylato- <i>O</i> )cobalt(III) ion 16.66	$C_6H_4ClNO_2$ 1-Chloro-2-nitrobenzene 13.84, 16.329 1-Chloro-4-nitrobenzene 26.205, 27.222.7
$C_5H_{19}ClCoN_6^{3+}$	Pentaammine(3-chloropyridine)cobalt(III) ion 16.60	$C_6H_4ClN_2^+$ 4-Chlorobenzenediazonium cation 12.114, 30.27.1
$C_5H_{19}ClN_6Ru^{2+}$	Pentaammine(3-chloropyridine)ruthenium(II) ion 16.227	$C_6H_4NO_2^-$ 2-Pyridinecarboxylate ion 16.531 3-Pyridinecarboxylate ion 16.532 4-Pyridinecarboxylate ion 16.533
$C_5H_{20}CoN_6^{3+}$	Pentaammine(pyridine)cobalt(III) ion 16.56, 26.47	$C_6H_4NO_3^-$ 2-Nitrophenoxyde ion 16.191
$C_5H_{20}N_6Ru^{2+}$	Pentaammine(pyridine)ruthenium(II) ion 16.226	$C_6H_4NO_5S^-$ 4-Nitrobenzenesulfonate ion 13.133, 16.480, 26.312
		$C_6H_4N_2O_4$ 1,2-Dinitrobenzene 16.374 1,3-Dinitrobenzene 16.375, 30.4.8 1,4-Dinitrobenzene 12.132, 13.98, 16.376, 26.234, 30.4.9
		$C_6H_4N_3O_2^+$ 4-Nitrobenzenediazonium ion 12.174, 30.27.5
		$C_6H_4N_4$ Pteridine 12.187
		$C_6H_4N_4O_2$ Lumazine 16.423

$C_6H_4N_5O^-$	Pterin, conjugate base 16.518	$C_6H_6N_2O_4S$	4-Nitrobenzenesulfonamide 12.175, 13.132, 16.479, 26.311
$C_6H_4O_2$	1,4-Benzoquinone 16.297, 23.11, 24.8, 25.7, 26.189, 27.101.2, 27.127.6, 27.132.1, 27.193.1, 27.197.1, 27.215.4, 27.231.1, 27.234.3, 27.32.6, 27.84.2, 27.90.2	$C_6H_6N_4$	9-Methylpurine 13.124, 16.459
$C_6H_5NO$	Nitrosobenzene 16.497, 26.328, 27.142.8, 27.164.6	$C_6H_6N_4O_4$	5-Nitro-2-furaldehyde semicarbazone 26.317
$C_6H_5NO_2$	Nitrobenzene 16.478, 19.31, 24.12, 26.310, 27.104.4, 27.123.1, 27.141.3, 27.142.7, 27.143.2, 27.144.2, 27.145.2, 27.146.2, 27.147.2, 27.149.2, 27.164.5, 27.165.1, 27.95.5, 27.96.1, 30.4.14	$C_6H_6N_5O^+$	Guanine, conjugate acid 12.140, 13.105, 16.398
	2-Pyridinecarboxylic acid 16.534, 26.341		Pterin, conjugate acid 12.189, 16.517
	3-Pyridinecarboxylic acid 16.535	$C_6H_6O_2$	1,4-Benzenediol 17.74, 21.29
	4-Pyridinecarboxylic acid 16.537	$C_6H_6O_6^-$	Ascorbate radical anion 16.293
$C_6H_5NO_3$	4-Nitrophenol 13.136	$C_6H_6S$	Thiophenol 28.19
	2-Nitrophenol 16.492	$C_6H_6S_2$	1,4-Benzenedithiol 26.188
	4-Nitrophenol 16.493	$C_6H_7N$	Aniline 9.4
$C_6H_5NO_4$	1,3-Dihydroxy-2-nitrobenzene 16.356	$C_6H_7NO_2$	N-Ethylmaleimide 12.135, 16.390, 17.72, 26.247, 27.122.2, 27.229.2, 27.3.1
$C_6H_5N_5O$	Pterin 12.188, 13.143, 16.516, 26.336	$C_6H_7N_2O^+$	Nicotinamide, conjugate acid 16.467
$C_6H_5O^-$	Phenoxyde ion 21.44		4-Pyridinealdoxime, conjugate acid 16.528
$C_6H_5O_2^-$	1,2-Benzenediol monoanion 21.16	$C_6H_7N_4^+$	Pyridine-4-carboxamide, conjugate acid 16.530
	1,4-Benzenediol monoanion 21.30,	$C_6H_7O_6^-$	9-Methylpurine, conjugate acid 16.458
	27.135.1, 27.136.1, 27.137.1, 27.138.1, 27.156.1, 27.167.1, 27.189.1, 27.199.1, 27.202.4, 27.222.1, 27.229.3, 27.232.1, 27.235.1, 27.250.1		Ascorbate ion 11.13.6, 12.104, 16.291, 21.13, 27.76.2
	3-Hydroxyphenoxyde ion 21.36	$C_6H_8N^+$	1-Methylpyridinium 16.461
$C_6H_5S_2^-$	1,4-Benzenedithiol, conjugate base 26.187		4-Methylpyridinium 16.462
$C_6H_6BrO_5^-$	6-Bromo-6-deoxyascorbate ion 16.314	$C_6H_8N_2$	<i>o</i> -Phenylenediamine 21.45
$C_6H_6CoNO_6^-$	Nitrilotriacetatocobaltate(II) ion 1.10, 12.10, 13.9, 16.12, 17.14, 19.1, 22.4, 26.23	$C_6H_8N_2O_2$	<i>p</i> -Phenylenediamine 21.46
$C_6H_6FeNO_6$	Nitrilotriacetatoferrate(III) 26.90	$C_6H_8O_2^-$	1,3-Dimethyluracil 12.131
$C_6H_6FeNO_6^-$	Nitrilotriacetatoferrate(II) ion 1.22, 26.85	$C_6H_8O_4$	Radicals from acetylglutamate 27.206
$C_6H_6MnNO_6^-$	Nitrilotriacetatomanganate(II) ion 1.30	$C_6H_8O_4^-$	Electron adduct of sorbate 27.237
$C_6H_6NO$	4-Aminophenoxy 17.52	$C_6H_8O_4$	Dimethyl fumarate 16.362, 26.229
$C_6H_6NO^-$	4-Aminophenoxyde ion 21.12	$C_6H_8O_4^-$	Electron adduct of dimethyl fumarate 27.122
$C_6H_6NO_2^+$	3-Pyridinecarboxylic acid, conjugate acid 16.536	$C_6H_8O_6$	Ascorbic acid 16.292
	4-Pyridinecarboxylic acid, conjugate acid 16.538	$C_6H_9$	Trimethylcyclopropenyl 6.18
$C_6H_6N_2O$	Nicotinamide 16.466	$C_6H_9^+$	Cyclohexenyl 6.3
	4-Pyridinealdoxime 16.529	$C_6H_9N_2O_2$	Trimethylcyclopropenium cation 6.18.1
$C_6H_6N_2O_2$	2-Nitroaniline 16.471		1,4-Dimethyl-3,6-dioxo-2-piperazinyl 27.117
	3-Nitroaniline 16.472		2,5-Dimethyl-3,6-dioxo-2-piperazinyl 27.118
	4-Nitroaniline 16.473		4-Methyl-3,6-dioxo-1-piperazinylmethyl 27.117.2, 27.183
		$C_6H_9N_3O_2$	Histidine 26.261
		$C_6H_9N_3O_3$	1-(2-Hydroxyethyl)-2-methyl-5- nitroimidazole 12.144, 13.109, 16.403, 26.265
		$C_6H_9O$	2-Oxocyclohexyl 27.199
		$C_6H_9O_3$	Radicals from 3,3-dimethyl-2-hydroxy-1,4- butyrolactone 27.217
		$C_6H_9O_4$	3,4,5-Trihydroxy-2-oxocyclohexyl 27.250

$C_6H_{10}Cl$	2-Chlorocyclohexyl	11.6	$C_6H_{14}CrN_2O_5^{3+}$	Pentaqua(3-cyanopyridine)chromium(III) ion
$C_6H_{10}CrNO_8^-$	<i>cis</i> -Dqua(nitrilotriacetato)chromate(II) ion	12.36, 13.27, 16.123		16.134
$C_6H_{10}Cu^+$	Copper(I) ion, complex with cyclohexene	27.148.2	$C_6H_{14}N$	Pentaqua(4-cyanopyridine)chromium(III) ion
$C_6H_{10}CuNO_8^-$	<i>cis</i> -Dqua(nitrilotriacetato)copper(II) ion	1.20, 12.40, 13.31, 16.153	$C_6H_{14}N^+$	16.135
$C_6H_{10}N_2$	1-Propylimidazole	12.186	$C_6H_{14}NO_2S^{2+}$	1-(Diethylamino)ethyl
$C_6H_{10}N_2O_2$	Sarcosine anhydride	27.183.2		27.82, 27.82
$C_6H_{10}N_2O_2^-$	Electron adduct of alanine anhydride	27.11	$C_6H_{14}NO_3$	Cyclohexylammonium ion
	Electron adduct of sarcosine anhydride	27.236		27.8.8
$C_6H_{10}N_2O_4$	Radicals from acetylasparagine	27.205	$C_6H_{15}N^+$	S-Methylmethionine
$C_6H_{10}N_3O_3^+$	1-(2-Hydroxyethyl)-2-methyl-5-nitroimidazole, conjugate acid	26.266		16.444, 26.286
$C_6H_{10}N_3O_4$	Radicals from triglycine	27.234	$C_6H_{15}NO_3$	2-[Bis(2-hydroxyethyl)amino]-1-hydroxyethyl
$C_6H_{11}$	Cyclohexyl	6.4		27.150
	5-Hexenyl	6.8	$C_6H_{16}N^+$	2-Hydroxy-1-[di(2-hydroxyethyl)amino]ethyl
$C_6H_{11}CuN_3O_4^-$	Copper(II) triglycine	17.23, 22.9, 26.76		27.151
$C_6H_{11}NO$	5,5-Dimethyl-1-pyrrolinc-1-oxyl	16.369, 26.232	$C_6H_{19}CoN_6O_2^{2+}$	2-Hydroxy-2-[ <i>N,N</i> -di(2-hydroxyethyl)amino]ethyl
$C_6H_{11}O$	1-Hydroxycyclohexyl	27.147		27.152
	2-Hydroxycyclohexyl	27.149	$C_6H_{19}CoN_6O_3^{2+}$	Triethanolamine
	Tetrahydro-2,5-dimethyl-2-furanyl	27.240		27.152.2
$C_6H_{11}O_2$	1,2-Dihydroxycyclohexyl	27.86	$C_6H_{19}CoN_6O_3^+$	Triethylammonium ion
	1,3-Dihydroxycyclohexyl	27.87	$C_6H_{19}CoN_6O_2^{2+}$	27.8.14
	1,4-Dihydroxycyclohexyl	27.88		Pentaammine(pyridinecarboxylato- <i>O</i> )-cobalt(III) ion
	1-Formyl-5-hydroxypentyl	27.138		26.48
$C_6H_{11}O_5$	Radicals from 2-deoxygalactose	27.213	$C_6H_{19}CoN_6O_5S^{2+}$	Pentaamminc(4-nitrophenoxy)cobalt(III) ion
	Radicals from 2-deoxyglucose	27.214		16.50
	Radicals from sorbitol	27.232	$C_6H_{19}CoN_7^{3+}$	Pentaamminc(4-nitrophenylsulfonyl)cobalt(III) ion
$C_6H_{11}O_6$	Radicals from fructose	27.220		16.47
	Radicals from galactose	27.221	$C_6H_{19}CoN_7O_2^{3+}$	Pentaammine(3-cyanopyridine)cobalt(III) ion
	Radicals from glucose	27.222		16.61
	Radicals from myoinositol	27.227	$C_6H_{20}CoN_7O_4S^{2+}$	Pentaammine(4-nitrophenylcyano)cobalt(III) ion
$C_6H_{12}NOS$	1-Acetylamino-3-(methylthio)propyl	27.4		16.48
$C_6H_{12}N_2^+$	1,4-Diazabicyclo[2.2.2]octane radical cation	30.32.2, 30.37.2, 30.4.6	$C_6H_{21}N_7ORu^{3+}$	Pentaamminc(4-nitrophenylaminosulfonyl)cobalt(III) ion
$C_6H_{12}N_2O_3^-$	Electron adduct of acetylglycylglycinamide	27.5		16.49
$C_6H_{12}N_4O_2$	Diamide	16.295, 26.186	$C_6H_{22}CoN_6^{3+}$	Pentaammine(isonicotinamide)ruthenium(III) ion
$C_6H_{12}N_4O_2^-$	Electron adduct of Diamide	27.63		26.154
$C_6H_{12}O_2^+$	1,1-Diethoxyethene radical cation	27.80	$C_6H_{22}N_6Ru^{2+}$	Pentaammine(4-methylpyridine)cobalt(III) ion
$C_6H_{13}$	Hexyl	6.9		16.57
$C_6H_{13}O$	1-Isopropoxy-1-methylethyl	27.174	$C_6H_{24}CoN_6^{3+}$	Pentaammine(4-methylpyridine)ruthenium(II) ion
$C_6H_{13}O_4S$	1-(Propylsulfatomethyl)ethyl	27.204		16.228
$C_6H_{13}S$	4-(Ethylthio)butyl	27.132	$C_6H_{24}CrN_{12}O_6^{3+}$	Tris(ethylenediamine)cobalt(III) ion
	5-(Methylthio)pentyl	27.197		12.19, 13.13, 16.71
			$C_6H_{24}CrN_{12}O_6^{3+}$	Hexakis(urca)chromium(III) ion
				16.128
			$C_7H_2N_3O_8^-$	2,4,6-Trinitrobenzoate ion
				16.585, 26.361

$C_7H_3NO_4^{2-}$	3,5-Pyridinedicarboxylate dianion 16.539	$C_7H_7NO_2$	2-Carboxy-1-methylpyridinium 26.204
	2,6-Pyridinedicarboxylate dianion 16.540		3-Carboxy-1-methylpyridinium 16.324
$C_7H_3N_2O_6^-$	2,4-Dinitrobenzoate ion 16.377, 26.235		4-Carboxy-1-methylpyridinium 12.113, 13.83, 16.325
	2,5-Dinitrobenzoate ion 16.378, 26.236	$C_7H_7NO_3$	4-Nitroanisole 13.127
	3,4-Dinitrobenzoate ion 16.379, 26.237, 30.4.10	$C_7H_7NO_2$	2-Nitrotoluene 16.500
	3,5-Dinitrobenzoate ion 16.380, 26.238		4-Nitrotoluene 13.139, 16.501
$C_7H_3N_3O_4$	3,5-Dinitrobenzonitrile 27.222.1	$C_7H_7NO_3$	3-Methyl-2-nitrophenol 16.452
$C_7H_3O_5^{3-}$	3,4,5-Trihydroxybenzoate ion, conjugate dibase 21.51	$C_7H_7NO_5S$	4-Nitroanisole 16.474, 26.306
$C_7H_4ClN$	3-Chlorobenzonitrile 16.327	$C_7H_7N_2^+$	Methyl 4-nitrobenzenesulfonate 12.162, 13.119, 16.448, 26.289
$C_7H_4ClO_2^{2-}$	4-Chlorobenzoate radical anion 30.18	$C_7H_7N_2O^+$	4-Methylbenzenediazonium cation 12.159, 30.27.4
$C_7H_4FO_2^{2-}$	4-Fluorobenzoate radical anion 30.25	$C_7H_7N_2S^+$	4-Methoxybenzenediazonium cation 12.157, 16.432, 30.27.3
$C_7H_4F_3NO_2$	<i>p</i> -Nitro- $\alpha,\alpha,\alpha$ -trifluorotoluene 12.181, 13.140, 16.502, 26.329	$C_7H_7N_5O$	2-Mercaptobenzimidazole, conjugate acid 16.428, 26.279
$C_7H_4NO$	4-Cyanophenoxyl 17.62	$C_7H_7O$	3-Methylpterin 13.123, 16.457
$C_7H_4NO_4^-$	2-Nitrobenzoate ion 16.481, 26.313	$C_7H_7O^-$	4-Methylphenoxyl 17.85
	3-Nitrobenzoate ion 16.482, 26.314, 30.4.15		Benzaldehyde radical anion, protonated 30.27
	4-Nitrobenzoate ion 13.134, 16.483, 26.315	$C_7H_7OS^-$	4-Methylphenoxyde ion 21.41
$C_7H_4NO_5^-$	3-Hydroxy-2-nitrobenzoate ion 16.406	$C_7H_7O_2$	4-Methoxybenzenethiolate ion 1.79
$C_7H_4N_2O_2$	4-Nitrobenzonitrile 12.176, 13.135, 16.484, 26.316, 27.222.1, 27.241.7	$C_7H_7O_2^-$	4-Methoxyphenoxyl 17.83
$C_7H_4N_3^+$	4-Cyanobenzenediazonium ion 30.27.2	$C_7H_7O_2$	4-Methoxyphenoxide ion 21.40
$C_7H_4N_5O_3^-$	Pterin-6-carboxylate 26.337	$C_7H_8NO^+$	3-Acetylpyridine, conjugate acid 16.271
$C_7H_5BrO^-$	4-Bromobenzaldehyde radical anion 30.13	$C_7H_8N_2S$	Phenylthiourea 16.512, 26.334
$C_7H_5NO_3$	<i>p</i> -Nitrobenzaldehyde 12.171, 13.128, 16.475, 26.307	$C_7H_8N_5O^+$	3-Methylpterin, conjugate acid 12.167, 16.456
$C_7H_5NO_4$	2,6-Pyridinedicarboxylic acid 16.541	$C_7H_8OS$	4-Methoxybenzenethiol 1.78
	3,5-Pyridinedicarboxylic acid 16.542	$C_7H_9CoNO_6^-$	Methyl(nitrilotriacetato)cobaltate(III) ion 1.15
$C_7H_5NO_5$	4-Nitroperoxybenzoic acid 12.178, 16.490	$C_7H_9FeNO_6^-$	(Methyl)nitrilotriacetatoferate(III) ion 1.24
$C_7H_5O_2^{2-}$	Benzoate radical dianion 30.3	$C_7H_9MnNO_6^-$	(Methyl)nitrilotriacetatomanganate(III) ion 1.32
$C_7H_6Cl$	4-Chlorobenzyl 29.2	$C_7H_9N_2O^+$	1-Methylnicotinamide 16.446, 26.288
$C_7H_6FeNO_8^{2-}$	Carboxylato(nitrilotriacetato)ferrate(III) ion 26.91		2-Pyridinealdoxime, <i>N</i> -methyl- 16.460
$C_7H_6NO_2$	4-Nitrobenzyl 29.8	$C_7H_{10}N^+$	1,4-Dimethylpyridinium 16.368
$C_7H_6N_2O_3$	4-Nitrobenzaldoxime 13.129, 16.476, 26.308	$C_7H_{11}N_3O_4$	1-(2-Hydroxy-3-methoxypropyl)-2- nitroimidazole 16.404, 26.267
	4-Nitrobenzamide 12.172, 13.130, 16.477, 26.309	$C_7H_{12}N_3O_4^+$	1-(2-Hydroxy-3-methoxypropyl)-2- nitroimidazole, conjugate acid 26.268
$C_7H_6N_2O_5$	3,5-Dinitroanisole 16.373	$C_7H_{13}O$	(Cyclohexyl)hydroxymethyl 27.62
$C_7H_6N_4O_2$	3-Amino-1,2,4-benzotriazine-1,4-dioxide 26.180		1-Hydroxycycloheptyl 27.146
$C_7H_6O_2$	Methyl-1,4-benzoquinone 16.436	$C_7H_{15}$	Heptyl 6.7
$C_7H_7$	Benzyl 28.	$C_7H_{15}O_3$	1-[(Diethoxy)methoxy]ethyl 27.81
$C_7H_7Cu^{2+}$	Benzylcopper(III) ion 28.6		Triethoxymethyl 27.246
$C_7H_7NO^-$	Benzamide radical anion 30.2		

$C_7H_{17}N^+$	1-Ethyl-2-trimethylammonioethyl	27.134	$C_8H_7ClO^-$	2'-Chloroacetophenone radical anion	30.16
$C_7H_{18}CoN_7O_6^{2+}$	Pentaammine(2,4-dinitrobenzoato)cobalt(III) ion	16.34, 26.38	$C_8H_7FO^-$	4'-Fluoroacetophenone radical anion	30.24
	Pentaammine(3,5-dinitrobenzoato)cobalt(III) ion	16.35, 26.39	$C_8H_7IO^-$	4'-Iodoacetophenone radical anion	30.30
$C_7H_{19}CoN_6O_4^{2+}$	Pentaammine(2-nitrobenzoato)cobalt(III) ion	16.31, 26.35	$C_8H_7NO_3$	4-Nitroacetophenone	12.170, 13.126, 15.12, 16.470, 18.12, 26.305, 27.104.3, 27.116.2, 27.12.3, 27.13.1, 27.14.1, 27.141.2, 27.142.6, 27.16.1, 27.215.9, 27.222.1, 27.241.6, 27.28.9, 30.1.5, 30.12.2, 30.17.3, 30.24.2
	Pentaammine(3-nitrobenzoato)cobalt(III) ion	16.32, 26.36	$C_8H_7NO_4$	Methyl 4-nitrobenzoate	12.163, 13.120, 16.449, 26.290
	Pentaammine(4-nitrobenzoato)cobalt(III) ion	16.33, 26.37	$C_8H_7N_2^+$	Quinoxaline, conjugate monoacid	16.555
$C_7H_{19}N_2^{2+}$	2-(Dimethylamino)-1-(dimethylaminomethyl)ethyl, conjugate diacid	27.115	$C_8H_8BrNO_2$	<i>p</i> -Nitrophenethyl bromide	16.491
$C_7H_{20}CoN_5O_2^{2+}$	Pentaammine(benzoato)cobalt(III) ion	26.33	$C_8H_8BrO$	2'-Bromoacetophenone radical anion, protonated	30.10
$C_7H_{24}CoN_7^{3+}$	Pentaammine[4-(dimethylamino)-pyridine]cobalt(III) ion	16.59	$C_8H_8ClO$	4'-Chloroacetophenone radical anion, protonated	30.17
$C_7H_{24}Co_2N_7O_6^{3+}$	Hexaamminebis( $\mu$ -hydroxy)[ $\mu$ -(4-nitrobenzoato)]dicobalt(III) ion	16.36, 20.5	$C_8H_8FO$	4'-Fluoroacetophenone radical anion, protonated	30.24
$C_7H_{25}N_7Ru^{2+}$	Pentaammine(4-dimethylaminopyridine)ruthenium(II) ion	16.230	$C_8H_8IO$	4'-Iodoacetophenone radical anion, protonated	30.30
$C_7H_{26}CoN_6^{3+}$	Bis(ethylenediamine)(1,3-diaminopropane)cobalt(III) ion	16.80	$C_8H_8N_2O_3$	4-Aminocarbonylpyridinioacetate ion	16.282
$C_8H_2N_4S$	2,1,3-Benzothiadiazole-4,7-dicarbonitrile	16.298	$C_8H_8O$	Acetophenone	13.73, 16.270, 26.173, 27.11.1, 27.140.1, 27.236.1
$C_8H_3NO_6^{2-}$	2-Nitroisophthalate ion	16.488	$C_8H_8O^-$	Acetophenone radical anion	30.1
$C_8H_4N_2$	1,4-Dicyanobenzene	12.124, 13.93, 16.350, 27.241.4	$C_8H_8O_2$	2,3-Dimethyl-1,4-benzoquinone	16.358
$C_8H_4O_4^{2-}$	<i>p</i> -Phthalate ion	16.513	$C_8H_9$	2,5-Dimethyl-1,4-benzoquinone	16.359, 27.41.6
$C_8H_5O_4^{3-}$	2,5-Dihydroxyphenylacetate ion, conjugate dibase	21.23	$C_8H_9Cu^{2+}$	2,6-Dimethyl-1,4-benzoquinone	16.360
$C_8H_6N$	4-Cyanobenzyl	29.3	$C_8H_9CuO^{2+}$	(4-Methylphenyl)methylcopper(III) ion	29.7.3
$C_8H_6NO^-$	5-Hydroxyindole, conjugate base	21.35	$C_8H_9NO_3$	(4-Methoxyphenyl)methylcopper(III) ion	29.6.3
$C_8H_6NO_2^-$	Carboxymethyl 4-pyridinecarboxylate, anion	16.323	$C_8H_9NO_6P^-$	3-Methyl-2-nitroanisole	16.447
$C_8H_6NO_4^-$	3-Methyl-2-nitrobenzoate ion	16.450	$C_8H_9O$	Pyridoxal 5-phosphate, conjugate base	16.549
$C_8H_6N_2$	Quinoxaline	13.146, 16.554		4-Methoxybenzyl	29.6
$C_8H_6N_4O_5$	Furadantin	26.254		Acetophenone radical anion, protonated	30.1
$C_8H_7BrO^-$	2'-Bromoacetophenone radical anion	30.10	$C_8H_9O^-$	4-Ethylphenoxide ion	21.28
	3'-Bromoacetophenone radical anion	30.11	$C_8H_9O_2$	2-Methoxy-4-methylphenoxy	17.82
	4'-Bromoacetophenone radical anion	30.12	$C_8H_{10}CuN_4O_5^{2-}$	Copper(II) tetraglycine	12.41, 17.24, 22.10, 26.77, 27.170.1
			$C_8H_{10}NO^-$	4-(Dimethylamino)phenoxide ion	21.25
			$C_8H_{10}NO_6P$	Pyridoxal 5-phosphate	16.547

$C_8H_{10}N_2O$	$N,N$ -Dimethyl-4-nitrosoaniline 13.97, 16.364, 26.231	$C_8H_{21}CoN_6O_3^{2+}$ Pentaammine(carboxymethyl 4-pyridinecarboxylato)cobalt(III) ion 16.62
$C_8H_{10}N_3^+$	4-( $N,N$ -Dimethylamino)benzenediazonium cation 12.128	$C_8H_{21}CoN_6O_4^{2+}$ Pentaammine(2-nitrophenylacetato)-cobalt(III) ion 16.37, 26.40
$C_8H_{11}NO_2$	3,4-Dihydroxyphenethylamine 30.2.1	Pentaammine(3-nitrophenylacetato)-cobalt(III) ion 16.38, 26.41
$C_8H_{11}NO_3$	5-Hydroxydopamine 21.33 6-Hydroxydopamine 21.34 Noradrenaline 21.43 Pyridoxine 16.550	Pentaammine(4-nitrophenylacetato)-cobalt(III) ion 16.39, 26.42
$C_8H_{11}NO_6P^+$	Pyridoxal 5-phosphate, conjugate acid 16.548	$C_8H_{22}CoN_5O_2^{2+}$ Pentaammine(phenylacetato)cobalt(III) ion 26.32
$C_8H_{12}CuN_4O_3$	Glycylhistidinecopper(II) complex 26.79	$C_8H_{22}CoN_7O_4^{2+}$ Pentaammine(4-nitrophenylglycinato)-cobalt(III) ion 16.42
$C_8H_{12}NO^+$	1-Ethoxy-2-methylpyridinium 26.244	$C_8H_{23}CoN_7O_3^{3+}$ Pentaammine[4-(aminocarbonyl)-1-(carboxymethyl)pyridinio]cobalt(III) ion 16.63
$C_8H_{12}NO_2$	Norpseudopelletierine $N$ -oxyl 16.504, 17.86	$C_8H_{28}CoN_6^{3+}$ Bis(ethylenediamine)(1,4-diaminobutane)cobalt(III) ion 16.81
$C_8H_{12}N_3O_5$	Radicals from acetyltriglycine 27.209	$C_8H_{34}Co_2N_9O_2^{4+}$ $\mu$ -Amido- $\mu$ -superoxidotetrakis(ethylenediamine)dicobalt(III) ion 12.32, 13.24, 16.116, 26.65
$C_8H_{13}N_3O_4S$	1-(2-Ethylsulfonyl)ethyl-2-methyl-5-nitroimidazole 26.248	$C_9H_5O_3^-$ 7-Hydroxycoumarin, conjugate base 21.32
$C_8H_{13}O_2S_2^-$	1,2-Dithiolane-3-pentanoate ion 13.99, 16.382, 26.241, 27.28.7	$C_9H_5O_4^-$ 6,7-Dihydroxycoumarin, conjugate base 21.20
$C_8H_{14}Br_2CoN_4O_4^-$	Dibromobis(dimethylglyoximato)cobaltate(III) ion 2.17	$C_9H_5O_4^{3-}$ 3,4-Dihydroxycinnamate ion, conjugate dibase 21.19
$C_8H_{14}Cl_2CoN_4O_4^-$	Dichlorobis(dimethylglyoximato)cobaltate(III) ion 2.18	$C_9H_6O_3^{2-}$ <i>p</i> -Hydroxycinnamate ion, conjugate base 21.31
$C_8H_{14}N_3O_4S^+$	1-(2-Ethylsulfonyl)ethyl-2-methyl-5-nitroimidazole, conjugate acid 26.249	$C_9H_8NO$ 4'-Cyanoacetophenone radical anion, protonated 30.21
$C_8H_{15}NOS_2$	Lipoamide 12.152, 13.113, 16.422, 17.79, 26.275	$C_9H_8O_4^-$ 2-Carboxy-2-hydroxy-1-(4-hydroxyphenyl)ethyl, anion 29.1
$C_8H_{15}O$	1-Hydroxycyclooctyl 27.149	$C_9H_8O_5^-$ 4-Carboxy-2,6-dimethoxyphenoxy, anion 17.59
$C_8H_{16}BrCoN_4O_5$	Aquabromobis(dimethylglyoximato)cobalt(III) 16.105	$C_9H_9ClO^-$ 3'-(Chloromethyl)acetophenone radical anion 30.20
$C_8H_{16}ClCoN_4O_5$	Aquachlorobis(dimethylglyoximato)cobalt(III) 16.106, 2.16	$C_9H_{10}O_2$ 2,3,5-Trimethyl-1,4-benzoquinone 16.582
$C_8H_{17}$	1-Methylheptyl Octyl 6.10 6.13	$C_9H_{11}NO_3$ Tyrosine 26.364
$C_8H_{17}NO_2S$	Dihydrolipoamide 26.217	$C_9H_{11}NO_4$ DL-DOPA 21.24
$C_8H_{19}CoN_6O_2^{2+}$	Pentaammine(4-cyanobenzoato)cobalt(III) ion 26.34	$C_9H_{11}O$ 2,4,6-Trimethylphenoxy 17.95 4'-Methylacetophenone radical anion, protonated 30.33
$C_8H_{20}CoN_7O_6^{2+}$	Pentaammine(2,4-dinitrophenyl-acetato)cobalt(III) ion 16.40, 26.43	$C_9H_{11}O_2$ 4'-Methoxyacetophenone radical anion, protonated 30.31
		$C_9H_{14}CuN_4O_3$ $\beta$ -Alanylhistidinecopper(II) complex 26.80

$C_9H_{14}N_4O_3$	1-(2-N-Morpholinoethyl)-4-nitroimidazole 26.298	$C_9H_{28}CoN_6^{3+}$ Pentaammine(4- <i>tert</i> -butylpyridine)cobalt(III) ion 16.58
$C_9H_{15}N_2O_2$	3-Carboxamido-2,2,5,5-tetramethyl-3- pyrrolin-1-yloxy 1.53, 12.112, 13.82, 14.11, 16.321, 17.58, 27.222.6, 5.13	$C_9H_{28}N_6Ru^{2+}$ Pentaammine(4- <i>tert</i> - butylpyridine)ruthenium(II) ion 16.229
$C_9H_{15}N_3O_2S$	Ergothioneine 1.62	$C_9H_{30}CoN_6^{3+}$ Tris(1,3-diaminopropane)cobalt(III) ion 16.82
$C_9H_{15}N_4O_3^+$	1-(2-N-Morpholinoethyl)-4-nitroimidazole, conjugate acid 26.299	$C_{10}Co_2N_{10}O_2^{5-}$ Decakis(cyano)- $\mu$ -superoxidodicobaltate(III) ion 12.31, 13.25, 16.115, 26.59
$C_9H_{16}NO_2$	2,2,6,6-Tetramethyl-4-piperidone <i>N</i> -oxyl 12.195, 13.152, 16.568, 17.89, 26.353, 27.215.1, 27.222.1, 30.36.4, 30.4.17, 5.16	$C_{10}H_2N_4$ 1,2,4,5-Tetracyanobenzene 13.148
$C_9H_{17}N_2O_2$	3-Carboxamido-2,2,5,5- tetramethylpyrrolidin-1-yloxy 1.52, 12.111, 13.81, 14.12, 16.320, 17.57, 27.222.5, 5.12	$C_{10}H_4O_4^{2-}$ 5,8-Dihydroxy-1,4-naphthoquinone, conju- gate dibase 21.21, 26.226
$C_9H_{18}NO$	2,2,6,6-Tetramethylpiperidine- <i>N</i> -oxyl 12.194, 13.151, 16.567, 17.88, 27.222.1, 27.28.10, 27.29.2, 28.18, 5.15	$C_{10}H_5O_4^-$ 5,8-Dihydroxy-1,4-naphthoquinone, conju- gate base 26.226
$C_9H_{18}NO_2$	4-Hydroxy-2,2,6,6-tetramethylpiperidine <i>N</i> - oxyl 30.4.16	$C_{10}H_5O_5S^-$ 1,4-Naphthoquinone-2-sulfonate ion 23.14, 25.16, 27.234.6
$C_9H_{18}N_2^+$	1,5-Diazabicyclo[3.3.3]undecane radical cation 17.66	$C_{10}H_6O_2$ 1,4-Naphthoquinone 16.464, 26.300
$C_9H_{19}CoN_4O_5$	Aquabis(dimethylglyoximato)methylcobalt(III) 16.96, 19.11	$C_{10}H_6O_3$ 2-Hydroxy-1,4-naphthoquinone 16.405, 23.12, 25.10, 26.269, 27.234.4, 27.41.7
$C_9H_{19}CoN_6O_2^{2+}$	Bis(ethylenediamine)pyrazinecarboxylato- cobalt(III) ion 16.68, 26.51	$C_{10}H_6O_4$ 5,8-Dihydroxy-1,4-naphthoquinone 21.22, 26.225
$C_9H_{19}O_4$	1-[Tri(ethoxy)methoxy]ethyl 27.245	$C_{10}H_8CoN_2^{2+}$ 2,2'-Bipyridinecobalt(II) ion 16.17, 26.15
$C_9H_{20}CoN_4O_5^+$	Aquabis(dimethylglyoximato)methylcobalt(III), protonated 16.97, 19.12	$C_{10}H_8N_2$ 2,2'-Bipyridine 12.109, 16.308, 26.192
$C_9H_{20}O_4P$	1-[Isobutyl(methylphosphato)methyl]-1- methylethyl 27.173	$C_{10}H_9N_2^+$ 2,2'-Bipyridine, conjugate acid 16.309, 26.191
$C_9H_{21}CoN_6O_4^{2+}$	Pentaammine(2-nitrocinnamato)cobalt(III) ion 16.43, 26.44	$C_{10}H_{10}N_2^+$ 2,2'-Bipyridinyl, conjugate acid 17.53 4,4'-Bipyridinyl, conjugate acid 17.54
	Pentaammine(3-nitrocinnamato)cobalt(III) ion 16.45, 26.45	$C_{10}H_{10}N_2^{2+}$ 4,4'-Bipyridine, conjugate diacid 16.310
	Pentaammine(4-nitrocinnamato)cobalt(III) ion 16.46, 26.46	$C_{10}H_{11}N_4O_5^-$ Inosine, conjugate base 16.414
$C_9H_{21}O_3$	Tri(1-methylethoxyl)methyl 27.255	$C_{10}H_{12}CrN_2O_8^{2-}$ Ethylenediaminetetraacetatochromate(II) ion 13.28, 16.124
$C_9H_{22}N_4Ni^{2+}$	1,4,7,10-Tetraazacyclotridecanenickel(II) ion 26.130	$C_{10}H_{12}CuN_2O_8^{2-}$ Ethylenediaminetetraacetocuprate(II) ion 27.142.2
$C_9H_{23}CrNO_5^{3+}$	Pentaqua(4- <i>tert</i> - butylpyridine)chromium(III) ion 16.131	$C_{10}H_{12}CuN_2O_8^{3-}$ Ethylenediaminetetraacetocuprate(I) ion 27.142.1
$C_9H_{25}CoN_7O_3^{3+}$	Pentaammine[4-(aminocarbonyl)-1-(1- carboxyethyl)pyridinio]cobalt(III) ion 16.64	$C_{10}H_{12}FeN_2O_8^-$ Ethylenediaminetetraacetoferrate(III) ion 26.92
		$C_{10}H_{12}FeN_2O_8^{2-}$ Ethylenediaminetetraacetoferrate(II) ion 17.26
		$C_{10}H_{12}N_2O_3$ Pyridinium, 4-(aminocarbonyl)-1-(3- carboxypropyl)- 16.544

$C_{10}H_{12}N_2O_8Ti$	Ethylenediaminetetraacetatotitanate(IV) ion 13.64	$C_{10}H_{17}N_3O_6S$	Glutathione 1.67, 12.139, 13.104, 15.7, 16.396, 17.73, 26.257, 27.12.2, 27.140.5, 27.215.6, 27.222.1
$C_{10}H_{12}N_4O_5$	Inosine 13.111, 16.413	$C_{10}H_{18}CrN_2O_4^{3+}$	Tetraaquabis(pyridine)chromium(III) ion 16.129
$C_{10}H_{12}N_5O_4^-$	Adenosine anion 16.280	$C_{10}H_{18}N_4O_6S_2$	L-Cystinylbisglycine 27.28.5
$C_{10}H_{12}O_2$	Duroquinone 16.384 2- <i>tert</i> -Butyl-1,4-benzoquinone 26.200	$C_{10}H_{20}CuN_2O_4S_2$	Bis(D-penicillamine)copper(II) 26.81
$C_{10}H_{12}O_2^{2-}$	2- <i>tert</i> -Butyl-1,4-benzenediol dianion 21.14	$C_{10}H_{20}N_2O_4S_3$	3,3'-Bis(penicillamine)trisulfide 26.197
$C_{10}H_{12}O_5$	Propyl 3,4,5-trihydroxybenzoate 11.13.12	$C_{10}H_{21}CoN_4O_5$	Aquabis(dimethylglyoximato)ethylcobalt(III) 16.98, 19.13
$C_{10}H_{13}N_3O_5S$	Nifurtimox 26.303	$C_{10}H_{21}O_3$	1-[Di(1-methylethoxy)methoxy]-1-methylethyl 27.120
$C_{10}H_{13}N_4O_5^+$	Inosine, conjugate acid 12.149, 13.112, 16.415	$C_{10}H_{22}CoN_4O_5^+$	Aquabis(dimethylglyoximato)ethylcobalt(III), protonated 16.99, 19.14
$C_{10}H_{13}N_5O_4$	Adenosine 16.279	$C_{10}H_{22}N_2^+$	1,6-Dimethyl-1,6-diazacyclo[4.4]decane radical cation 17.69
$C_{10}H_{13}O$	4-( <i>tert</i> -Butyl)phenoxyl 17.56	$C_{10}H_{24}CuN_4^{2+}$	1,4,8,11-Tetraazacyclotetradecanecopper(II) ion 26.71
$C_{10}H_{14}N_2O_2$	$\alpha$ -(4-Pyridyl 1-oxide)- <i>N</i> - <i>tert</i> -butylnitronate 16.551, 26.344	$C_{10}H_{24}N_4Ni^{2+}$	$\alpha$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion 1.34, 2.28, 3.6, 4.7, 5.6, 6.1.3, 6.10.1, 6.11.2, 6.12.2, 6.13.1, 6.6.2, 7.6, 8.8, 18.7, 28.8
$C_{10}H_{14}N_5O_3^+$	2'-Deoxyadenosine, conjugate acid 12.119, 13.88, 16.339	$C_{10}H_{24}N_4Ni^{2+}$	$\beta$ -1,4,8,11-Tetraazacyclotetradecanenickel(II) ion 1.35, 2.29, 3.7, 4.8, 5.7, 6.1.4, 6.12.3, 6.13.2, 6.14.2, 6.7.1, 6.9.2, 7.7, 8.9, 18.8, 28.9
$C_{10}H_{14}N_5O_4^+$	Adenosine, conjugate acid 12.103, 13.77 2'-Deoxyguanosine, conjugate acid 12.120, 13.89, 16.340	$C_{10}H_{25}CoN_8O_5^{2+}$	1,4,8,11-Tetraazacyclotetradecanenickel(II) ion 26.128
$C_{10}H_{14}N_5O_5^+$	Guanosine, conjugate acid 12.141, 13.106, 16.399	$C_{10}H_{26}CoN_4O^{2+}$	Pentaammine(4-nitrophenylglycyl-glycinato)cobalt(III) ion 16.44
$C_{10}H_{14}N_5O_7P$	Adenosine 5'-monophosphate 26.176	$C_{10}H_{26}CoN_4O^{2+}$	Aqua(1,4,8,11-tetraazacyclotetradecane)-cobalt(II) ion 1.3
$C_{10}H_{15}FeN_2O_7$	<i>N</i> -(2-Hydroxyethyl)ethylenediamine-triacetatoferrate(III) 26.93	$C_{10}H_{27}CoN_6O_4^{2+}$	Pentaammine(4-nitrophenylbutanoato)-cobalt(III) ion 16.41
$C_{10}H_{15}FeN_2O_7^-$	<i>N</i> -(2-Hydroxyethyl)ethylenediamine-triacetatoferrate(II) ion 26.86	$C_{10}H_{27}CoN_7O_3^{3+}$	Pentaammine[4-(aminocarbonyl)-1-(3-carboxypropyl)pyridinio]cobalt(III) ion 16.65
$C_{10}H_{15}N_2O_8$	Ethylenediaminetetraacetate radical 27.130		
$C_{10}H_{15}N_3O_6S^-$	$\alpha$ -Aminoalkyl radical from glutathione 27.12		
$C_{10}H_{16}N_2$	<i>N,N,N',N'</i> -Tetramethyl- <i>p</i> -phenylenediamine 21.50, 27.202.6		
$C_{10}H_{16}N_3O_6S^-$	Glutathione, negative ion 1.68		
$C_{10}H_{16}O$	Camphor 26.201		
$C_{10}H_{17}BrCoN_5O_4$	Acetonitrile(bromo)bis(dimethylglyoximato)-cobalt(III) 2.19		
$C_{10}H_{17}CoN_2O_8^-$	Aqua- <i>N</i> -(hydroxyethyl)ethylenediamine-triacetatocobaltate(II) ion 12.11		

$C_{10}H_{28}CoN_4O_2^{2+}$	$C_{11}H_{26}CoN_7^{4+}$
Diaqua(1,4,8,11-tetraazacyclotetradecane)cobalt(II) ion 2.2	Pentaammine(1-methyl-4,4'-bipyridinium)cobalt(III) ion 26.49
$C_{10}H_{32}CoN_6^{3+}$	$C_{11}H_{26}CrN_4^{2+}$
Bis(1,4-diaminobutane)-ethylenediaminecobalt(III) ion 16.79	1,4,8,12-Tetraazacyclopentadecane-chromium(II) ion 1.17, 12.35, 16.122, 18.4, 2.21, 28.4, 3.5, 4.2, 5.3, 6.1.2, 6.11.1, 6.12.1, 6.6.1, 6.8.1, 7.4, 8.3
$C_{11}H_8N_2O_5$	$C_{11}H_{26}N_7Ru^{4+}$
(E)-2-(2-Furyl)-3-(5-nitro-2-furyl)acrylamide 26.255	Pentaammine(1-methyl-4,4'-bipyridinium)ruthenium(III) ion 26.155
(Z)-2-(2-Furyl)-3-(5-nitro-2-furyl)acrylamide 26.256	$C_{11}H_{29}N_4NiO^{2+}$
$C_{11}H_8N_3O_4^+$	$\alpha$ -Aquamethyl(1,4,8,11-tetraazacyclotetradecane)nickel(III) ion 1.36
1-(2,4-Dinitrophenyl)pyridinium 26.239, 27.222.1	$C_{12}H_6Cl_2NO_2^-$
$C_{11}H_8O_2$	2,6-Dichloroindophenolate ion 12.123, 16.348, 25.9, 26.215
2-Methyl-1,4-naphthoquinone 12.161, 13.118, 16.445, 23.13, 24.10, 25.15, 26.287, 27.11.5, 27.118.6, 27.127.8, 27.140.8, 27.142.4, 27.17.1, 27.177.1, 27.18.1, 27.201.1, 27.205.1, 27.206.2, 27.207.1, 27.208.1, 27.209.1, 27.210.1, 27.215.7, 27.216.1, 27.223.1, 27.224.1, 27.229.4, 27.23.1, 27.230.2, 27.234.5, 27.236.4, 27.25.1, 27.3.2, 27.34.1, 27.41.8, 27.44.1, 27.5.1, 27.6.1, 27.64.1, 27.65.2, 27.71.2, 27.74.1, 27.82.8	
$C_{11}H_{11}N_2^+$	1-Methyl-2,2'-bipyridinium 16.437
$C_{11}H_{12}N_2O_2$	Tryptophan 26.363
$C_{11}H_{12}N_2O_3$	5-Hydroxytryptophan 21.38
$C_{11}H_{12}N_2O_4$	N-Formylkynurenone 26.253
$C_{11}H_{14}N_2O_3$	4-Nitrophenyl- <i>N-tert</i> -butylnitrone 12.179, 13.137, 15.14
$C_{11}H_{15}FeN_2O_9^{2-}$	Carboxylato(2-hydroxyethylethylene-diaminetriacetato)ferrate(III) ion 26.94
$C_{11}H_{15}NO$	Phenyl- <i>N-tert</i> -butylnitrone 12.185, 13.142, 15.16, 16.511, 26.333
$C_{11}H_{16}N_5O_5^+$	1-Methylguanosine, conjugate acid 16.440
$C_{11}H_{18}N_3O_5$	Radicals from acetyltrialanine 27.208
	Radicals from acetyltrisarcosine 27.210
$C_{11}H_{18}N_3O_6$	$\alpha$ -Aminoalkyl radical from ophthalmic acid 27.14
$C_{11}H_{18}N_3O_6S$	$\alpha$ -Aminoalkyl radical from S-methylglutathione 27.13
$C_{11}H_{23}CoN_4O_5$	Aquabis(dimethylglyoximato)(1-methylethyl)cobalt(III) 16.100, 19.15
$C_{11}H_{24}CoN_4O_5^+$	Aquabis(dimethylglyoximato)(1-methylethyl)cobalt(III), protonated 16.101, 19.16
	$C_{12}H_{26}CoN_7^{4+}$
	Pentaammine(1-methyl-4,4'-bipyridinium)cobalt(III) ion 26.49
	$C_{12}H_{26}CrN_4^{2+}$
	1,4,8,12-Tetraazacyclopentadecane-chromium(II) ion 1.17, 12.35, 16.122, 18.4, 2.21, 28.4, 3.5, 4.2, 5.3, 6.1.2, 6.11.1, 6.12.1, 6.6.1, 6.8.1, 7.4, 8.3
	$C_{12}H_{26}N_7Ru^{4+}$
	Pentaammine(1-methyl-4,4'-bipyridinium)ruthenium(III) ion 26.155
	$C_{11}H_{29}N_4NiO^{2+}$
	$\alpha$ -Aquamethyl(1,4,8,11-tetraazacyclotetradecane)nickel(III) ion 1.36
	$C_{12}H_6Cl_2NO_2^-$
	2,6-Dichloroindophenolate ion 12.123, 16.348, 25.9, 26.215
	$C_{12}H_6N_2O_2^-$
	1,10-Phenanthroline-5,6-dione 26.331
	1,7-Phenanthroline-5,6-dione 26.332
	$C_{12}H_8NO_2^-$
	Indophenolate ion 12.148, 16.412, 26.274
	$C_{12}H_8N_2$
	1,10-Phenanthroline 12.183, 13.141, 16.508
	Phenazine 16.509
	$C_{12}H_9NO$
	2-Benzoylpyridine 16.300
	3-Benzoylpyridine 16.302
	4-Benzoylpyridine 16.304
	$C_{12}H_9NO^-$
	2-Benzoylpyridine, radical anion 30.7
	4-Benzoylpyridine, radical anion 30.9
	$C_{12}H_9N_2^+$
	1,10-Phenanthroline, conjugate monoacid 16.507
	$C_{12}H_{10}I^+$
	Diphenyliodonium 16.381
	$C_{12}H_{10}NO$
	2-Benzoylpyridine radical anion, protonated 30.7
	3-Benzoylpyridine radical anion, protonated 30.8
	4-Benzoylpyridine radical anion, protonated 30.9
	$C_{12}H_{10}NO^+$
	2-Benzoylpyridine, conjugate acid 16.301
	3-Benzoylpyridine, conjugate acid 16.303
	4-Benzoylpyridine, conjugate acid 16.305
	$C_{12}H_{10}N_2$
	Azobenzene 12.105, 16.294
	$C_{12}H_{10}N_3S^+$
	Thionine cation 12.197, 13.154, 16.576, 17.90, 25.21, 27.123.1, 27.159.1, 27.162.2, 27.222.2, 27.241.8
	$C_{12}H_{10}N_4O_2$
	Lumichrome 26.276
	$C_{12}H_{10}O_2$
	2,3-Dimethyl-1,4-naphthoquinone 16.363
	$C_{12}H_{11}NO^+$
	2-Benzoylpyridinium ketyl radical 30.7
	3-Benzoylpyridinium ketyl radical 30.8
	4-Benzoylpyridinium ketyl radical 30.9
	$C_{12}H_{11}NO_2$
	5-Methyl-1,2-trimethyleneisoindole-4,7-dione 16.463

$C_{12}H_{12}CoN_2^{2+}$	4,4'-Dimethyl-2,2'-bipyridinecobalt(II) ion 16.18, 26.18	$C_{12}H_{36}CoN_6^{3+}$	Tris(1,4-diaminobutane)cobalt(III) ion 16.83
$C_{12}H_{12}N^+$	<i>N</i> -Methyl-4-phenylpyridinium 26.296	$C_{13}H_8Cl_2O$	4,4'-Dichlorobenzophenone 27.82.3
$C_{12}H_{12}N_2^{2+}$	( <i>E</i> )-1,2-Bis(4-pyridyl)ethene, conjugate dia- cid 16.311 1,1'-Ethylene-2,2'-bipyridinium 16.388, 26.245	$C_{13}H_8N_2$	9-Diazofluorene 16.344
$C_{12}H_{13}NO_2$	1,2,3,5-Tetramethylisoindole-4,7-dione 16.565	$C_{13}H_9BrO^-$	4-Bromobenzophenone radical anion 30.14
$C_{12}H_{14}N^+$	<i>N</i> -Methyl-4-phenyl-2,3-dihydropyridinium 26.295	$C_{13}H_9ClO$	4-Chlorobenzophenone 27.82.2
$C_{12}H_{14}N_2$	4-Cyanophenyl- <i>N</i> - <i>tert</i> -butylnitron 12.116, 13.86, 15.6	$C_{13}H_9Cl_2O$	4,4'-Dichlorobenzophenone radical anion, protonated 30.22
$C_{12}H_{14}N_2^+$	1,1'-Dimethyl-4,4'-bipyridinium radical cation 1.61, 18.11, 2.36, 26.228, 27.170.2, 28.15, 3.11, 4.12, 5.14, 6.1.8, 6.11.5, 6.12.7, 6.6.6, 7.11, 8.13	$C_{13}H_9FO$	4-Fluorobenzophenone 27.82.5
$C_{12}H_{14}N_2^{2+}$	1,1'-Dimethyl-4,4'-bipyridinium 12.129, 13.96, 16.361, 17.68, 20.12, 26.227, 27.102.2, 27.130.1, 27.151.2, 27.219.2, 27.222.9, 27.227.2, 27.28.6, 27.29.1, 27.4.1, 27.86.2, 27.92.7, 27.98.1, 27.99.2, 30.1.4, 30.17.2, 30.19.2, 30.21.1, 30.22.2, 30.23.2, 30.24.1, 30.26.2, 30.31.1, 30.32.3, 30.33.1, 30.34.2, 30.37.3, 30.4.7	$C_{13}H_9N$	Acridine 16.272, 26.174
$C_{12}H_{16}CuN_6O_4$	Histidinecopper(II) complex 26.78	$C_{13}H_{10}ClO$	4-Chlorobenzophenone radical anion, pro- tonated 30.19
$C_{12}H_{17}NO$	4-Methylphenyl- <i>N</i> - <i>tert</i> -butylnitron 12.166, 13.122, 15.10, 16.454	$C_{13}H_{10}FO$	4-Fluorobenzophenone radical anion, pro- tonated 30.26
$C_{12}H_{17}NO_2$	4-Methoxyphenyl- <i>N</i> - <i>tert</i> -butylnitron 12.158, 13.117, 15.8, 16.434	$C_{13}H_{10}N^+$	Acridinium 12.98, 16.273
$C_{12}H_{17}N_4OS^+$	Thiamine cation 16.573	$C_{13}H_{10}O$	Benzophenone 12.106, 13.78, 16.296, 27.11.2, 27.140.2, 27.236.2, 27.82, 27.82.1, 30.1.3
$C_{12}H_{18}N_4OS^{2+}$	Thiamine, conjugate acid 16.572	$C_{13}H_{10}O^-$	Benzophenone radical anion 30.4
$C_{12}H_{18}N_6NiO_6^{2-}$	Tris(dimethylglyoximato)nickelate(IV) ion 16.206	$C_{13}H_{11}$	Diphenylmethyl 29.4
$C_{12}H_{21}O_{12}$	Radicals from sucrose 27.233	$C_{13}H_{11}N_3O_2$	3-Methyl-7,8-bis,nor-5-deazalumiflavin 26.282
$C_{12}H_{23}O_6$	18-Crown-6 radical 27.58	$C_{13}H_{11}O$	Benzophenone radical anion, protonated 30.4
$C_{12}H_{24}N_2^+$	1,6-Diazabicyclo[4.4.4]tetradecane radical cation 1.59, 12.121, 13.90, 16.343, 17.65	$C_{13}H_{12}NO^+$	3-Benzoyl-1-methylpyridinium 16.299
$C_{12}H_{24}NaO_4S$	Radicals from sodium dodecylsulfate 27.231	$C_{13}H_{12}N_4O_2$	Lumiflavine 13.114, 16.425, 17.80, 25.13, 26.277, 27.130.3 1-Methylumichrome 26.284 3-Methylumichrome 26.285
$C_{12}H_{26}O_4P$	1-(Diisobutylphosphatomethyl)-1- methylethyl 27.105	$C_{13}H_{13}NO^+$	3-Benzoyl-1-methylpyridinium ketyl radical 30.5 4-Benzoyl-1-methylpyridinium ketyl radical 30.6
$C_{12}H_{30}CoN_8^{3+}$	1,3,6,8,10,13,16,19-Octaaazabicyclo- [6.6.6]eicosanecobalt(III) ion 16.85	$C_{13}H_{13}NO_2$	1,5-Dimethyl-2,3-trimethyleneisoindole-4,7- dione 16.372
		$C_{13}H_{13}N_4O_2$	Lumiflavine semiquinone 13.115, 16.426, 26.278
		$C_{13}H_{14}N_2^{2+}$	1,1'-Trimethylene-2,2'-bipyridinium 16.583, 26.360
		$C_{13}H_{19}ClCoN_5O_4$	Chlorobis(dimethylglyoximato)(pyridine)cobaltate 26.55
		$C_{13}H_{19}CoN_5O_4$	Bis(dimethylglyoximato)(pyridine)cobalt(II) 1.11
		$C_{14}H_5O_8^-$	Ellagic acid, conjugate base 21.27
		$C_{14}H_6N_2O_8$	Methoxatine 26.281

$C_{14}H_6O_4^{2-}$	1,4-Dihydroxy-9,10-anthraquinone dianion 16.354	$C_{14}H_{11}O_4S^{2-}$ 4-Sulfomethylbenzophenone radical anion 30.35
	1,5-Dihydroxy-9,10-anthraquinone dianion 26.218	$C_{14}H_{12}N_3O_2^-$ 5-Deazalumiflavin anion 16.338, 26.211
	1,8-Dihydroxy-9,10-anthraquinone dianion 26.220	$C_{14}H_{12}O$ 4-Methylbenzophenone 27.82.7
	2,6-Dihydroxy-9,10-anthraquinone dianion 26.222	$C_{14}H_{12}O_2$ 4-Methoxybenzophenone 27.82.6
$C_{14}H_6O_8S_2^{2-}$	9,10-Anthraquinone-1,5-disulfonate ion 26.182	$C_{14}H_{12}O_2^-$ 4-Methoxybenzophenone radical anion 30.32
	9,10-Anthraquinone-2,6-disulfonate ion 16.289, 24.7, 25.5, 26.183, 27.234.1, 27.41.4	$C_{14}H_{12}O_4S^-$ 4-Sulfomethylbenzophenone radical anion, protonated 30.35
$C_{14}H_7O_3^-$	2-Hydroxy-9,10-anthraquinone monoanion 26.264	$C_{14}H_{13}N_3O_2$ 5-Deazalumiflavin 16.337, 26.210
$C_{14}H_7O_4^-$	1,4-Dihydroxy-9,10-anthraquinone, monoanion 16.353	$C_{14}H_{13}O$ 4-Methylbenzophenone radical anion, protonated 30.34
	1,5-Dihydroxy-9,10-anthraquinone monoanion 26.219	$C_{14}H_{13}O_2$ 4-Methoxybenzophenone radical anion, protonated 30.32
	1,8-Dihydroxy-9,10-anthraquinone monoanion 26.221	$C_{14}H_{14}N_3^+$ 3,6-Diamino-10-methylacridinium 26.212
$C_{14}H_7O_5S^-$	9,10-Anthraquinone-1-sulfonate ion 26.184	$C_{14}H_{14}N_3O_2^+$ 5-Deazalumiflavin, protonated 16.336, 26.209
	9,10-Anthraquinone-2-sulfonate ion 16.290, 23.10, 25.6, 26.185, 27.234.2, 27.41.5, 30.4.3	$C_{14}H_{14}N_4O_2$ 1,3-Dimethylillumichrome 17.70, 26.230
$C_{14}H_7O_6^-$	1,2,5,8-Tetrahydroxyanthraquinone, conjugate base 21.49	$C_{14}H_{16}N_2^{2+}$ 1,1'-Ethylene-4,4'-dimethyl-2,2'-bipyridinium 16.389, 26.246
$C_{14}H_7O_7S^-$	1,4-Dihydroxy-9,10-anthraquinone-2-sulfonate ion 21.17, 26.223	1,1'-Tetramethylene-2,2'-bipyridinium 16.563, 26.351
	1,4-Dihydroxy-9,10-anthraquinone-6-sulfonate ion 21.18	$C_{14}H_{16}O_4^{2-}$ 6-Hydroxy-2,5,7,8-tetramethylchroman-2-carboxylate dianion 21.37
$C_{14}H_8NO_3^-$	1-Amino-4-hydroxyanthraquinone, conjugate base 26.181	$C_{14}H_{17}O_4$ 2-Carboxy-2,5,7,8-tetramethyl-6-chromanoxo 17.60
$C_{14}H_8O_2$	9,10-Anthraquinone 16.288, 27.41.3	$C_{14}H_{18}FeN_3O_{10}^{2-}$ Diethylenetriaminepentaacetatoferrate(III) ion 12.46, 26.95
$C_{14}H_8O_3$	1-Hydroxyanthraquinone 16.402	$C_{14}H_{18}N_2O_2^{2+}$ 1,1'-Bis(2-hydroxyethyl)-4,4'-bipyridinium 26.195
$C_{14}H_8O_4$	1,4-Dihydroxyanthraquinone 16.352	$C_{14}H_{19}FeN_3O_{11}^{3-}$ Diethylenetriaminepentaacetato(hydroxy)ferrate(III) ion 26.96
$C_{14}H_9F_3O$	4-(Trifluoromethyl)benzophenone 27.82.9	$C_{14}H_{24}CoN_4^{2+}$ 2,3,9,10-Tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraenecobalt(II) ion 1.5, 16.13, 26.11
$C_{14}H_9F_3O^-$	4-(Trifluoromethyl)benzophenone radical anion 30.37	$C_{14}H_{24}N_6NiO_2^{2+}$ 3,14-Dimethyl-4,7,10,13-tetraazahexadeca-3,13-diene-2,15-dione dioximatonicel(IV) ion 12.69, 13.51, 16.207, 26.135
$C_{14}H_9NO_2$	1-Aminoanthraquinone 16.281	$C_{14}H_{26}CoN_4O_2^+$ Dihydroxy(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion 16.86
$C_{14}H_9NO_3$	1-Amino-4-hydroxyanthraquinone 16.283	
$C_{14}H_9O_3^-$	4-Carboxybenzophenone, conjugate base 26.203, 27.28.3	
$C_{14}H_9O_3^{2-}$	4-Carboxybenzophenone, radical dianion 30.15	
$C_{14}H_{10}F_3O$	4-(Trifluoromethyl)benzophenone radical anion, protonated 30.37	
$C_{14}H_{10}N_2O_2$	1,4-Diaminoanthraquinone 16.342	
$C_{14}H_{10}O_3^-$	4-Carboxybenzophenone radical anion, protonated 30.15	

$C_{14}H_{27}CoN_4O_2^{2+}$	$C_{16}H_{16}O_6S^-$	4-(2-Hydroxy-3-sulfopropoxy)benzophenone radical anion, protonated	30.28
(Aqua)hydroxy(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion	16.87		
$C_{14}H_{28}CoN_4O_2^{3+}$	$C_{16}H_{18}N_2O_4^{2+}$	1,1'-Bis(carboxyethyl)-4,4'-bipyridinium	26.193
2,3,9,10-Tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraenecobalt(III) ion	16.88, 26.52		
$C_{14}H_{32}N_4Ni^+$	$C_{16}H_{18}N_3S^+$	Methylene Blue cation	12.160, 16.439, 25.14, 26.283
1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(I) ion	28.7, 4.6, 5.5, 6.17.1, 6.4.2, 6.8.2		
$C_{14}H_{32}N_4Ni^{2+}$	$C_{16}H_{20}N_2^{2+}$	4,4'-Dimethyl-1,1'-tetramethylene-2,2'-bipyridinium	16.370
1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(II) ion	26.131	4,5,4',5'-Tetramethyl-1,1'-ethylene-2,2'-bipyridinium	16.564, 26.352
$C_{15}H_9O_7^-$	$C_{16}H_{20}N_2O_6S_2$	1,1'-Bis(3-sulfonatopropyl)-4,4'-bipyridinium	16.312
Quercetin, conjugate base	21.47		
$C_{15}H_{11}O_2$	$C_{16}H_{29}Co_2N_8O_4^{3+}$	$\mu$ -(Pyrazinecarboxylato)bis[hydroxo(1,4,7-triazacyclononane)cobalt(III)] ion	16.95
Flavone-8-methyl	29.5		
$C_{15}H_{12}NO_2^-$	$C_{16}H_{32}Cl_2CoN_4^+$	Dichloro(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(III) ion	16.89, 26.54
Metiazinic acid, conjugate base	21.42		
$C_{15}H_{13}O_6^-$	$C_{16}H_{32}CoN_4^+$	$N$ -rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(I) ion	17.9
Catechin, conjugate base	21.15		
$C_{15}H_{14}O_3$	$C_{16}H_{32}CoN_4^{2+}$	$N$ -rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion	1.6, 12.9, 13.8, 16.14, 17.13, 20.3, 26.13, 27.249.1, 27.26.1
$C_{15}H_{15}NO_4$		$N$ -meso-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion	1.7, 17.12, 26.12, 3.2, 7.1
1-Ethoxycarbonyl-5-methyl-2,3-trimethyleneisoindole-4,7-dione	16.387	5,7,7,12,12,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,14-dienecobalt(II) ion	16.16, 26.14
$C_{15}H_{15}O_3$			
4,4'-Dimethoxybenzophenone radical anion, protonated	30.23	$C_{16}H_{32}CoN_4^{3+}$	$N$ -rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion
$C_{15}H_{16}N_3S^+$			1.6, 12.9, 13.8, 16.14, 17.13, 20.3, 26.13, 27.249.1, 27.26.1
Toluidine Blue cation	12.199, 13.156, 16.578, 17.91, 27.123.1, 27.222.2, 27.241.9		
$C_{15}H_{17}N_4^+$		$N$ -meso-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion	1.7, 17.12, 26.12, 3.2, 7.1
Neutral Red cation	16.465	5,7,7,12,12,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,14-dienecobalt(II) ion	16.16, 26.14
$C_{15}H_{18}N_2^{2+}$			
4,4'-Dimethyl-1,1'-trimethylene-2,2'-bipyridinium	16.371, 26.233	$C_{16}H_{32}CoN_4^{3+}$	$N$ -rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(III) ion
$C_{15}H_{18}N_4O_5$			26.53
Mitomycin C	26.297	$C_{16}H_{32}CuN_4^{2+}$	5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecopper(II) ion
$C_{15}H_{21}N_3O$			12.39, 13.30, 16.154, 26.73
Primaquine	16.514, 26.335	$C_{16}H_{32}N_4Ni^{2+}$	5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienenickel(II) ion
$C_{15}H_{23}CoN_4O_5$			26.133
Aqua(benzyl)bis(dimethylglyoximato)cobalt(III)		$C_{16}H_{33}CoN_4^{2+}$	Hydrido- $N$ -rac-5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(III) ion
16.102, 19.17, 26.56			17.10, 26.9
$C_{15}H_{24}CoN_4O_5^+$			
Aqua(benzyl)bis(dimethylglyoximato)cobalt(III), protonated	16.103, 19.18		
$C_{16}H_6N_2O_{14}S_4^{4-}$			
Indigotetrasulfonate ion	12.147, 16.411, 25.12		
$C_{16}H_8N_2O_8S_2^{2-}$			
Indigodisulfonate ion	12.146, 16.410, 25.11, 26.273		
$C_{16}H_{10}$			
Pyrene	12.191, 13.145, 16.525		
$C_{16}H_{13}NO_2$			
1,2-Dimethyl-3-phenylisoindole-4,7-dione	16.365		
2,5-Dimethyl-3-phenylisoindole-4,7-dione	16.366		

$C_{16}H_{34}CoN_4O_2$	5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene(dihydroxy)cobalt(II) ion	16.15	$C_{17}H_{35}CoN_4^{2+}$	<i>N</i> -rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene(methyl)cobalt(III) ion	1.8
$C_{16}H_{34}CoN_4O_2^+$	5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienedihydroxycobalt(III) ion	16.90	$C_{18}H_{15}NO_2$	5-Methyl-1-phenyl-2,3-trimethyleneisoindole-4,7-dione	16.455
$C_{16}H_{35}CoN_4O_2^{2+}$	Aqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)hydroxycobalt(III) ion	16.91	$C_{18}H_{15}N_4^+$	Phenosafanine cation	12.184, 16.510, 25.18
$C_{16}H_{36}CoN_4^{2+}$	5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradecanecobalt(II) ion	1.4, 18.1, 2.3	$C_{18}H_{16}N_4O_6S_4^-$	2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion	1.48, 18.10, 2.35, 28.12, 3.10, 4.11, 5.11, 6.1.7, 6.10.3, 6.11.4, 6.12.6, 6.13.4, 6.14.4, 6.6.5, 6.7.3, 6.9.4, 7.10, 8.12
$C_{16}H_{36}CoN_4O_2^{2+}$	Diaqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(II) ion	21.2, 22.3	$C_{18}H_{16}N_4O_6S_4^{2-}$	2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate ion)	11.13.7, 27.168.1, 27.254.1
$C_{16}H_{36}CoN_4O_2^{3+}$	Diaqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(III) ion	16.92	$C_{18}H_{17}NO_2$	1,2,5,6-Tetramethyl-3-phenylisoindole-4,7-dione	16.566
$C_{16}H_{36}CuN_4^{2+}$	5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradecanecopper(II) ion	26.72	$C_{18}H_{18}FeN_2O_6^+$	Ethylenediaminebis[2-(2-hydroxyphenyl)acetato]iron(III) ion	26.97
$C_{16}H_{36}N_4N_4^{2+}$	5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradecanenickel(II) ion	26.132	$C_{18}H_{24}N_2^{2+}$	4,5,4',5'-Tetramethyl-1,1'-tetramethylene-2,2'-bipyridinium	16.569, 26.354
$C_{16}N_{17}NO_5$	1-Ethoxycarbonyl-6-methoxy-5-methyl-2,3-trimethyleneisoindole-4,7-dione	16.386	$C_{18}H_{28}O_2^-$	Radicals from linolenate	27.225
$C_{17}H_6O_9^{5-}$	3,3',4,4'-Tetracarboxybenzophenone tetraanion, radical anion	30.36	$C_{18}H_{30}O_2^-$	Radicals from linoleate	27.226
$C_{17}H_{15}NO_2$	1,2,5-Trimethyl-3-phenylisoindole-4,7-dione	16.584	$C_{18}H_{32}O_2^-$	Radicals from oleate	27.228
$C_{17}H_{15}N_3O$	4-(4'-Methylphenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one	30.4.13	$C_{18}H_{42}CoN_6^{3+}$	Tris-trans-(1,2-cyclohexanediamine)cobalt(III) ion	16.84
$C_{17}H_{20}ClN_2S^+$	Chlorpromazine, conjugate acid	17.61	$C_{19}H_{14}N_5O_2^+$	5-( <i>p</i> -Nitrophenyl)-2,3-diphenyltetrazolium	26.326
$C_{17}H_{20}N_4O_5S$	2-Thioriboflavine	26.357		2-( <i>p</i> -Nitrophenyl)-3,5-diphenyltetrazolium	26.327
$C_{17}H_{20}N_4O_6$	Riboflavine	16.556, 23.15, 25.19, 26.347	$C_{19}H_{15}N_4^+$	2,3,5-Triphenyltetrazolium	26.362
$C_{17}H_{21}NO^+$	4-Trimethylammoniomethylbenzophenone radical anion, protonated	30.39	$C_{19}H_{17}NO_2$	5,6-Dimethyl-3-phenyl-1,2-trimethyleneisoindole-4,7-dione	16.367
$C_{17}H_{21}N_2S^+$	Promethazine, conjugate acid	17.87	$C_{19}H_{17}NO_4$	1-Ethoxycarbonyl-2,5-dimethyl-3-phenylisoindole-4,7-dione	16.385
$C_{17}H_{21}N_4O_9P$	Flavine mononucleotide	16.391, 26.251, 27.130.2	$C_{19}H_{19}N_7O_6$	Folic acid	16.392
$C_{17}H_{22}N_2^{2+}$	4,5,4',5'-Tetramethyl-1,1'-trimethylene-2,2'-bipyridinium	16.570, 26.355	$C_{19}H_{20}N_7O_6^+$	Folic acid, protonated	16.393
			$C_{19}H_{24}CoN_5O_2^{3+}$	3-((4-Nitrophenyl)carbonyl)-2,4-dimethyl-1,5,8,12-tetraazacyclotetradeca-1,3-dienecobalt(III) ion	16.93
			$C_{19}H_{25}NO_3^+$	4-[2-Hydroxy-3-trimethylammonio)propoxy]benzophenone radical anion, protonated	30.29

$C_{19}H_{30}Co_2N_7O_4^{3+}$	$C_{21}H_{26}NO_2S^+$
$\mu$ - <i>p</i> -Nitrobenzoatobis[hydroxo(1,4,7-triazacyclonane)cobalt(III)] ion	2-[3-( <i>N,N,N</i> -Trimethylammonio)-2-hydroxypropyl]-3,4-dimethyl-9-oxothioxanthene 16.581
$C_{20}H_2Cl_4I_4O_5^{2-}$	$C_{21}H_{26}N_7O_{13}P_2^+$
Rose Bengal dianion	Nicotinamide adenine dinucleotide 12.168, 16.468, 25.17, 26.301, 27.28.8
$C_{20}H_6Br_4O_5^{2-}$	$C_{21}H_{27}NO_2S^+$
Eosin dianion	2-[3-( <i>N,N,N</i> -Trimethylammonio)-2-hydroxypropyl]-3,4-dimethyl-9-oxothioxanthene radical anion, protonated 30.38
$C_{20}H_{10}O_5^{2-}$	$C_{212}H_{306}FeN_4O_{154}S_4^{5-}$
Fluorescein dianion	Dihydroxytetrakis(4-sulfonatophenyl)porphinatoferrate(III)- $\beta$ -cyclodextrin complex 12.49
$C_{20}H_{12}$	$C_{21}H_{56}CoN_{14}O_5Os^{5+}$
Perylene	Pentaammineosmium(III)(isonicotinylprolylprolylprolinato)pentaaammmincobalt(III) ion 16.119, 26.66
$C_{20}H_{13}N_2O_5S^-$	$C_{22}H_{18}N_2^{2+}$
1-Amino-4-anilino-9,10-anthraquinone-2-sulfonate ion	1,1'-Diphenyl-4,4'-bipyridinium 26.240
$C_{20}H_{16}CoN_4^{2+}$	$C_{22}H_{20}N_4O_2S$
Bis(2,2'-bipyridine)cobalt(II) ion	$N^1$ -(Acridinyl)- $N^4$ -methylsulfonyl-2-dimethylaminocyclohexa-2,5-diene-1',4'-diimine 16.274
$C_{20}H_{19}N_4^+$	$C_{22}H_{24}N_2O_8$
Safranine cation	Tetracycline 16.558, 26.349
$C_{20}H_{20}N_4Rh^{2+}$	$C_{22}H_{46}N_{16}Ru_3^{6+}$
Bis(2,2'-bipyridine)rhodium(II) ion	Decaamminebis(2,2'-bipyridine)bis[ $\mu$ (cyano)]triruthenium(III),(II),(III) ion 17.43, 26.156
$C_{20}H_{22}N_4O_2Rh^+$	$C_{23}H_{25}N_2^+$
Bis(2,2'-bipyridine)dihydroxyrhodium(III) ion	Malachite Green cation 30.4.11
$C_{20}H_{22}N_7O_6^+$	$C_{24}H_{16}CuN_4^+$
5,10-Methenyltetrahydrofolate	Bis(1,10-phenanthroline)copper(I) ion 17.21
26.280	$C_{24}H_{16}CuN_4^{2+}$
$C_{20}H_{26}CoN_5O_4$	Bis(1,10-phenanthroline)copper(II) ion 27.92.2
Benzylbis(dimethylglyoximate)(pyridine)-cobaltate(III)	$C_{24}H_{16}N_4^{2+}$
12.27, 16.104	1,1'-Bis(4-cyanophenyl)-4,4'-bipyridinium 26.194
$C_{20}H_{30}O_2^-$	Radicals from arachidonate 27.212
$C_{20}H_{32}N_6O_{12}S_2$	$C_{21}H_{17}N_3O_3S$
Glutathione, oxidized	$N^1$ -(Acridinyl)- $N^4$ -methylsulfonyl-2-methoxycyclohexa-2,5-diene-1',4'-diimine 16.275
27.140.6	$C_{21}H_{20}N_3O_3S^+$
$C_{20}H_{32}N_6O_{12}S_2Cu$	9-(2-Methoxy-4-methylsulfonyl-aminoanilino)acridinium 16.433
Glutathione copper(II), oxidized	$C_{21}H_{26}NO_2S$
26.82	2-[3-( <i>N,N,N</i> -Trimethylammonio)-2-hydroxypropyl]-3,4-dimethyl-9-oxothioxanthene radical anion 30.38
$C_{20}H_{35}O_5$	
Dicyclohexano-18-crown-6 radical	
$C_{20}H_{40}CuN_4^{2+}$	
2,2,4,11,11,13-Hexamethyl-1,5,10,14-tetraazacyclooctadeca-4,13-dienecopper(II) ion	
26.74	
$C_{20}H_{40}N_4Ni^{2+}$	
1,4,5,7,7,8,11,12,14,14-Decamethyl-1,4,8,11-tetraazacyclotetradecane-nickel(II) ion	
26.134	
$C_{21}H_{17}N_3O_3S$	
$N^1$ -(Acridinyl)- $N^4$ -methylsulfonyl-2-methoxycyclohexa-2,5-diene-1',4'-diimine	
16.275	
$C_{21}H_{20}N_3O_3S^+$	
9-(2-Methoxy-4-methylsulfonyl-aminoanilino)acridinium	
16.433	
$C_{21}H_{26}NO_2S$	
2-[3-( <i>N,N,N</i> -Trimethylammonio)-2-hydroxypropyl]-3,4-dimethyl-9-oxothioxanthene radical anion	
30.38	

$C_{24}H_{18}N_{12}Ru^{2+}$	(2,2'-Bipyrazine)bis(2,2'-bipyridine)ruthenium(II) ion	26.143	$C_{30}H_{24}CoN_6^{2+}$	Tris(2,2'-bipyridine)cobalt(II) ion	16.21, 26.17
	(2,2'-Bipyridine)bis(2,2'-bipyrimidine)ruthenium(II) ion	26.145	$C_{30}H_{24}CoN_6^{3+}$	Tris(2,2'-bipyridine)cobalt(III) ion	12.28, 16.112, 26.50
	(2,2'-Bipyrazine)bis(2,2'-bipyrimidine)ruthenium(II) ion	26.146	$C_{30}H_{24}CrN_6^{3+}$	Tris(2,2'-bipyridine)chromium(III) ion	2.22
	(2,2'-Bipyrazine)(2,2'-bipyridine)(2,2'-bipyrimidine)ruthenium(II) ion	26.147	$C_{30}H_{24}FeN_6^{3+}$	Tris(2,2'-bipyridine)iron(III) ion	2.23
	Bis(2,2'-bipyrazine)(2,2'-bipyrimidine)ruthenium(II) ion	26.149	$C_{30}H_{24}IrN_6^{3+}$	Bis(2,2'-bipyridine)([2,2'-bipyridin]-3-yl- <i>C,N'</i> )iridium(III) ion, conjugate monoacid	16.185
	Bis(2,2'-bipyrazine)(2,2'-bipyridine)ruthenium(II) ion	26.150	$C_{30}H_{24}N_6Rh^{3+}$	Tris(2,2'-bipyridine)rhodium(III) ion	12.75, 16.222, 26.140
	Tris(2,2'-bipyrazine)ruthenium(II) ion	16.232, 26.148, 27.151.1	$C_{30}H_{24}N_6Ru^{2+}$	Tris(2,2'-bipyridine)ruthenium(II) ion	12.78, 13.57, 16.231, 17.41, 26.141
	Tris(2,2'-bipyrimidine)ruthenium(II) ion	26.144	$C_{30}H_{24}N_6Ru^{3+}$	Tris(2,2'-bipyridine)ruthenium(III) ion	17.42
$C_{24}H_{22}N_2^{2+}$	1,1'-Dibenzyl-4,4'-bipyridinium	13.91, 16.345, 26.213	$C_{30}H_{28}ClFeN_4O_4$	Iron(III) deuteroporphyrin IX	1.27, 10.4, 11.13.3, 11.26.1, 16.168, 9.2
$C_{24}H_{24}CoN_2^{2+}$	Bis(4,4'-dimethyl-2,2'-bipyridine)cobalt(II) ion	16.20, 26.19	$C_{30}H_{28}FeN_4O_4$	Iron(II) deuteroporphyrin IX	1.23, 10.3, 11.13.1, 16.160, 8.4, 9.1
$C_{25}H_{28}N_4^{4+}$	1,3-Propanediylbis(1'-methyl-4,4'-bipyridinium)	16.515	$C_{30}H_{30}N_4^{4+}$	1,1'-[ <i>o</i> -Xylylene(4,4'-bipyridinium)]	16.589
$C_{25}H_{30}N_3^+$	Crystal Violet cation	16.333, 25.8, 26.206, 30.4.5		1,1'-[ <i>m</i> -Xylylene(4,4'-bipyridinium)]	16.590
$C_{26}H_{30}N_4^{4+}$	1,4-Butanediylbis(1'-methyl-4,4'-bipyridinium)	26.199		1,1'-[ <i>p</i> -Xylylene(4,4'-bipyridinium)]	16.591
$C_{27}H_{28}NO_{11}^-$	Adriamycin, negative ion	26.178	$C_{31}H_{46}O_2$	Vitamin K <sub>1</sub>	16.588
$C_{27}H_{29}NO_{10}$	Daunomycin	26.208	$C_{32}H_{12}CoN_8O_{12}S_4^{4-}$	3,10,17,24-Tetrasulfophthalocyanine-cobaltate(II) ion	1.12, 14.1, 17.15, 26.21, 27.158.1, 27.166.1
$C_{27}H_{29}O_{16}^-$	Rutin, conjugate base	21.48	$C_{32}H_{12}CuN_8O_{12}S_4^{4-}$	3,10,17,24-Tetrasulfophthalocyanine-copper(II) ion	26.75
$C_{27}H_{30}NO_{11}^+$	Adriamycin, conjugate acid	26.177	$C_{32}H_{12}FeN_8O_{12}S_4^{3-}$	3,10,17,24-Tetrasulfophthalocyanineiron(III) ion	26.105
$C_{27}H_{33}N_2^+$	Brilliant Green cation	30.4.4	$C_{32}H_{24}N_{12}Zn^{4+}$	Tetrakis- <i>N</i> -methyl-2,3-pyridinoporphyrazinezinc(II) ion	16.268
$C_{27}H_{33}N_9O_{15}P_2$	Flavine adenine dinucleotide	26.250	$C_{32}H_{32}FeN_4O_4$	Iron(II) deuteroporphyrin, dimethyl ester	11.13.2
$C_{27}H_{35}N_3^{2+}$	Methyl Green dication	30.4.12	$C_{32}H_{32}FeN_4O_4^+$	Iron(III) deuteroporphyrin, dimethyl ester	11.13.4, 16.169
$C_{27}H_{48}N_{16}Ru_3^{6+}$	Nonaaammnebis(2,2'-bipyridine)bis[ $\mu$ -(cyano)][(pyridine)triruthenium(III),(II),(III) ion	26.157		J. Phys. Chem. Ref. Data, Vol. 25, No. 3, 1996	
$C_{28}H_{16}O_2$	Bianthrone	16.307			
$C_{28}H_{31}ClN_2O_3$	Rhodamine B	26.346			
$C_{29}H_{48}N_2^{2+}$	1-Methyl-1'-octadecyl-4,4'-bipyridinium	12.165			
$C_{30}H_{22}N_8Ru^{2+}$	Bis(2,2'-bipyridine)(2,2'-bipyrimidine)ruthenium(II) ion	26.142			
$C_{30}H_{23}IrN_6^{2+}$	Bis(2,2'-bipyridine)([2,2'-bipyridin]-3-yl- <i>C,N'</i> )iridium(III) ion	16.184			

$C_{32}H_{34}N_4O_4$	Deuteroporphyrin, dimethyl ester	1.58, 16.341	$C_{38}H_{30}N_8Ru^{2+}$	Bis(2,2'-bipyridine)(dipyrido[3,2- <i>a</i> :2',3'- <i>c</i> ]phenazine)ruthenium(II) ion	26.151
$C_{32}H_{50}N_{16}Ru_3^{6+}$	Octaamminebis(2,2'-bipyridine)bis[ $\mu$ -(cyano)]bis(pyridine)triruthenium(III),(II),(III) ion	26.158	$C_{39}H_{30}CrN_6^{3+}$	Tris(5-methyl-1,10-phenanthroline)-chromium(III) ion	16.140
$C_{33}H_{34}N_4O_6^{2-}$	Bilirubin dianion	26.190	$C_{39}H_{58}O_4$	Ubiquinone 30	16.587
$C_{34}H_{24}N_6O_{14}S_4^{4-}$	Trypan Blue tetraanion	16.586	$C_{40}H_{24}MnN_8^+$	5,10,15,20-Tetrakis(4-pyridyl)-porphinatomanganese(III) ion	16.189
$C_{34}H_{32}ClFeN_4O_4$	Iron(III) protoporphyrin	13.34	$C_{40}H_{24}N_8Sb^{3+}$	5,10,15,20-Tetrakis(4-pyridyl)-porphinatoantimony(V) ion	16.241
$C_{34}H_{32}FeN_4O_4$	Iron(II) protoporphyrin	12.42, 13.32, 14.6, 16.159, 26.87, 27.158.3	$C_{40}H_{30}MnN_8O_2^-$	Bis(hydroxy)tetrakis(4-pyridyl)-porphinatomanganate(III) ion	21.8
$C_{34}H_{36}CrN_4O_4$	Chromium(III) mesoporphyrin	16.149, 17.18	$C_{40}H_{30}N_{10}O_6^{2+}$	Nitro Blue Tetrazolium	26.304
$C_{34}H_{36}N_4O_6Zn$	Zinc(II) hematoporphyrin	16.269	$C_{40}H_{46}ClFeN_6O_8S_2$	Hemin c	16.170, 24.3, 26.109, 27.65.1, 27.89.1, 27.92.4, 30.3.4
$C_{34}H_{38}N_4O_6$	Hematoporphyrin IX	12.142, 13.107, 16.400, 26.260	$C_{42}H_{36}CoN_6^{3+}$	Tris(5,6-dimethyl-1,10-phenanthroline)-cobalt(III) ion	12.30, 13.22, 16.114
$C_{36}H_{21}Br_3CrN_6^{3+}$	Tris(5-bromo-1,10-phenanthroline)-chromium(III) ion	16.138	$C_{42}H_{36}CrN_6^{3+}$	Tris(5,6-dimethyl-1,10-phenanthroline)-chromium(III) ion	16.141
$C_{36}H_{21}Cl_3CrN_6^{3+}$	Tris(5-chloro-1,10-phenanthroline)-chromium(III) ion	16.139	$C_{44}H_{24}AgN_4O_{12}S_4^{4-}$	5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatoargentate(II) ion	16.5
$C_{36}H_{24}CoN_6^{3+}$	Tris(1,10-phenanthroline)cobalt(III) ion	12.29, 13.21, 16.113	$C_{44}H_{24}CoN_4O_2S_4^{4-}$	5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatocobaltate(II) ion	1.13, 12.12, 16.23, 4.1
$C_{36}H_{24}CrN_6^{3+}$	Tris(1,10-phenanthroline)chromium(III) ion	16.137	$C_{44}H_{24}CrN_4O_{12}S_4^{3-}$	5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatochromate(III) ion	16.148
$C_{36}H_{24}FeN_6^{3+}$	Tris(1,10-phenanthroline)iron(III) ion	1.25, 11.2.2, 12.47, 13.38, 14.7, 15.1, 16.164, 17.27, 2.24, 21.5, 22.11, 27.45.3, 27.47.6, 7.5	$C_{44}H_{24}CuN_4O_{12}S_4^{4-}$	5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatocuprate(II) ion	16.155
$C_{36}H_{24}N_6Rh^{3+}$	Tris(1,10-phenanthroline)rhodium(III) ion	12.76, 13.56, 16.223	$C_{44}H_{24}FeN_4O_{12}S_4^{3-}$	5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatoferrate(III) ion	12.48, 16.166, 26.103
$C_{36}H_{24}N_6Ru^{2+}$	Tris(1,10-phenanthroline)ruthenium(II) ion	12.79, 13.58, 16.233	$C_{44}H_{24}MnN_4O_{12}S_4^{3-}$	5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatomanganate(III) ion	16.195, 26.122, 9.3
$C_{36}H_{32}N_4^{4+}$	1,1'- <i>o</i> -Xylylenebis(4,4'-bipyridinium)	16.592	$C_{44}H_{24}MnN_4O_{12}S_4^{4-}$	5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatomanganate(II) ion	1.31, 16.188, 17.30, 27.76.1
$C_{36}H_{36}CoN_6^{2+}$	Tris(4,4'-dimethyl-2,2'-bipyridine)cobalt(II) ion	16.222, 26.20			
$C_{36}H_{36}CrN_6^{3+}$	Tris(4,4'-dimethyl-2,2'-bipyridine)chromium(III) ion	16.136			

$C_{44}H_{24}N_4O_{12}S_4Zn^{4-}$	$C_{44}H_{36}FeN_8^{5+}$
5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatozincate(II) ion 16.266, 17.49, 21.11	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatoiron(III) ion 12.50, 13.35, 16.165, 26.98
5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatozincate(II) ion, triplet state 16.267, 17.50	$C_{44}H_{36}GaN_8^{5+}$
$C_{44}H_{24}N_4O_{13}S_4V^{4-}$	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatogallium(III) ion 16.173
5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinato(oxo)vanadium(IV) ion 16.252	$C_{44}H_{36}GeN_8^{6+}$
5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatocobaltate(II) ion 16.24	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatogermanium(IV) ion 16.174
$C_{44}H_{25}CoN_4O_{13}S_4^{5-}$	$C_{44}H_{36}MnN_8^{4+}$
Hydroxytetrakis(4-sulfonatophenyl)-porphinatocobaltate(II) ion 16.24	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(II) ion 16.187, 17.31
$C_{44}H_{25}N_4O_{12}S_4^{5-}$	$C_{44}H_{36}MnN_8^{5+}$
5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphyrin, conjugate base 16.562	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(III) ion 12.63, 16.190, 17.32, 26.120
$C_{44}H_{26}CoN_4O_{14}S_4^{5-}$	$C_{44}H_{36}N_8OV^{4+}$
Dihydroxytetrakis(4-sulfonatophenyl)-porphinatocobaltate(III) ion 16.107	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinato(oxo)vanadium(IV) ion 16.251
$C_{44}H_{26}CoN_4O_{14}S_4^{6-}$	$C_{44}H_{36}N_8Pb^{4+}$
Dihydroxytetrakis(4-sulfonatophenyl)-porphinatocobaltate(II) ion 21.3	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatolead(II) ion 16.214
$C_{44}H_{26}MnN_4O_{14}S_2^{5-}$	$C_{44}H_{36}N_8Sn^{6+}$
Bis(hydroxy)tetrakis(4-sulfonatophenyl)-porphinatomanganate(III) ion 16.197, 21.9	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatotin(IV) ion 12.85
$C_{44}H_{26}N_4O_{12}S_4^{4-}$	$C_{44}H_{36}N_8Zn^{4+}$
5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphine 1.94, 12.193, 13.150, 16.562	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatozinc(II) ion 16.264
$C_{44}H_{26}N_4O_{14}RhS_4^{5-}$	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatozinc(II) ion, triplet state 16.265
Dihydroxy-5,10,15,20-tetrakis(4-sulfonatophenyl)porphinerhodate(III) ion 12.77, 16.224	$C_{44}H_{37}N_8^{3+}$
$C_{44}H_{27}CoN_4O_{14}S_2^{4-}$	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphyrin, conjugate base 16.561
(Aqua)hydroxytetrakis(4-sulfonatophenyl)-porphinatocobaltate(III) ion 16.108	$C_{44}H_{38}CoN_8O_2^{3+}$
$C_{44}H_{27}MnN_4O_{14}S_4^{4-}$	Dihydroxytetrakis(1-methylpyridinium-4-yl)porphinecobalt(III) ion 16.109
Aqua(hydroxy)tetrakis(4-sulfonatophenyl)-porphinatomanganate(III) ion 16.196	$C_{44}H_{38}MnN_8O_2^{3+}$
$C_{44}H_{28}N_4Zn$	Bis(hydroxy)tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(III) ion 16.192, 21.10
5,10,15,20-Tetraphenylporphinatozinc(II) 16.260	$C_{44}H_{38}N_8^{4+}$
Tetraphenylporphinatozinc(II), triplet state 16.261	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphine 16.561
$C_{44}H_{30}MnN_8O_2^{4+}$	$C_{44}H_{39}CoN_8O_2^{4+}$
Aqua(hydroxy)tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(III) ion 16.191	(Aqua)hydroxytetrakis(1-methylpyridinium-4-yl)porphinecobalt(III) ion 16.110
$C_{44}H_{30}N_4O_{12}S_4^{2-}$	$C_{45}H_{28}N_4NiO_{12}S_4^{3-}$
5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphine, dihydrogen 12.193	<i>N</i> -Methyl-5,10,15,20-tetrakis(4-sulfonatophenyl)porphinatonickelate(II) ion 16.205
$C_{44}H_{36}BiN_8^{5+}$	
5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatobismuth(III) ion 16.8	

$C_{46}H_{36}FeN_{10}^{5+}$	Dicyanotetrakis(1-methylpyridinium-4-yl)porphineiron(III) ion	12.51, 26.99
$C_{48}H_{26}N_4O_8^{4-}$	5,10,15,20-Tetrakis(4-carboxyphenyl)-porphine	16.560
$C_{50}H_{44}FeN_{12}^{5+}$	Tetraakis(1-methylpyridinium-4-yl)porphineiron(III)-diimidazole complex	26.100
$C_{52}H_{48}N_8O_{12}S_4Zn$	5,10,15,20-Tetrakis[1-(3-sulfonatopropyl)pyridinium-4-yl]porphinatozinc(II)	16.263
$C_{56}H_{54}FeN_{14}O_4^{5+}$	5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphineiron(III)-dihistidine complex	26.101
$C_{56}H_{60}FeN_8^{5+}$	5,10,15,20-Tetrakis[4-( <i>N,N,N</i> -trimethylammonio)phenyl]porphinatoiron(III) ion	16.167, 26.102
$C_{56}H_{60}MnN_8^{5+}$	5,10,15,20-Tetrakis[4-( <i>N,N,N</i> -trimethylammonio)phenyl]porphinatomanganese(III) ion	12.64, 16.193, 17.33, 26.121
$C_{56}H_{60}N_8Zn^{4+}$	5,10,15,20-Tetrakis-4-( <i>N,N,N</i> -trimethylammonio)phenylporphinezinc(II) ion	16.262
$C_{56}H_{62}CoN_8O_2^{3+}$	Dihydroxytetrakis[4-( <i>N,N,N</i> -trimethylammonio)phenyl]porphinecobalt(III) ion	16.111
$C_{60}C_{48}H_{80}O_{40}$	Fullerene-C <sub>60</sub> - $\gamma$ -cyclodextrin complex	12.136, 13.103, 16.394
$C_{62}H_{89}CoN_{13}O_{15}P$	Hydroxocob(III)alamin	26.57
$C_{62}H_{90}CoN_{13}O_{14}P$	Cobal(II)amin	1.14, 17.16, 18.2, 2.4, 20.4, 26.24, 28.2, 3.3, 7.2, 8.1
$C_{63}H_{90}CoN_{14}O_{14}P$	Cyanocob(III)alamin	26.58
$C_{64}H_{24}Co_2N_{16}O_{24}S_8^{8-}$	Tetrasulfophthalocyaninecobaltate(II) ion dimer	3.10, 17.24-
$C_{72}H_{56}FeN_{12}O_4^{5+}$	$\alpha,\alpha,\alpha,\beta$ -Tetrakis( <i>N</i> -methylisonicotinamido-phenyl)porphinatoiron(III) ion	12.52, 26.106
	$\alpha,\alpha,\alpha,\beta$ -Tetrakis[2-( <i>N</i> -methylisonicotinamido)-phenyl]porphinatomanganese(III) ion	12.65, 16.194, 17.34, 26.123
	Dicyano- $\alpha,\alpha,\alpha,\beta$ -tetrakis( <i>N</i> -methylisonicotinamidophenyl)porphinatoiron(III) ion	12.53, 26.107
	Bis(1-methylimidazole)- $\alpha,\alpha,\alpha,\beta$ -tetrakis( <i>N</i> -methylisonicotinamidophenyl)porphinatoiron(III) ion	12.54, 26.108
	Tetrakis(4-sulfonatophenyl)-porphinatoferrate(III) ion, $\mu$ -oxo-dimer	26.104
	5,10,15,20-Tetrakis(4-sulfonatophenyl)porphine dimer	12.193
$Cd^+$	Cadmium(I) ions	12.6, 13.6, 16.9, 17.6, 26.7
$Cd^{2+}$	Cadmium(II) ion	12.7, 13.7, 16.10, 17.8, 20.2, 26.8, 27.92.1
$Cd_2^{2+}$	Cadmium dimer dication	17.7
$ClCoH_{15}N_5^{2+}$	Pentaammine(chloro)cobalt(III) ion	12.17, 13.12, 16.29, 19.4, 2.7, 26.28, 27.123.4
$ClCrH_{10}O_5^{2+}$	Pentaquachlorochromium(III) ion	16.127
$ClH_{15}N_5Ru^{2+}$	Pentaammine(chloro)ruthenium(III) ion	12.81, 13.60, 16.235, 19.25, 22.18, 27.123.1
$Cl_2Hg$	Mercury(II) chloride	16.179
$Cl_6Ir^{2-}$	Hexachloroiridate(IV) ion	1.29, 2.26, 4.5, 6.2.3, 8.6, 10.5, 11.20.3, 11.8.1, 12.62, 13.44, 14.9, 16.186, 17.29, 18.6, 19.21, 21.7, 22.13, 23.5, 26.118, 27.108.2, 27.117.4, 27.118.3, 27.120.2, 27.123.9, 27.127.3, 27.174.2, 27.245.1, 27.246.2, 27.252.2, 27.253.2, 27.255.2, 27.66.2, 27.67.2, 27.81.2
$Cl_6Pt^{2-}$	Hexachloroplatinate(IV) ion	17.39
$Co^{2+}$	Cobalt(II) ion	12.8, 16.11, 17.11, 26.10
$CoD_{18}N_6^{3+}$	Hexa(ammine- <i>d</i> <sub>3</sub> )cobalt(III) ion	16.27
$CoFH_{15}N_5^{2+}$	Pentaammine(fluoro)cobalt(III) ion	12.18, 16.30, 19.5, 2.8
$CoH_{15}N_6O_2^{2+}$	Pentaammine(nitrito- <i>N</i> )cobalt(III) ion	26.29

$\text{CoH}_{15}\text{N}_6\text{O}_3^{2+}$	$\text{H}^+$	Hydrogen ion 12.58, 16.175, 19.28, 20.9, 27.101.1, 27.102.1, 27.157.1, 27.182.2, 27.215.2, 27.219.1, 27.222.3, 27.227.1, 27.242.1, 27.84.1, 27.86.1, 27.90.1, 27.92.5, 27.93.1, 27.99.1, 29.1.1, 30.15.1, 30.30.2
$\text{CoH}_{15}\text{N}_8^{2+}$	Pentaammine(nitrito- <i>O</i> )cobalt(III) ion 26.30	
$\text{CoH}_{16}\text{N}_5\text{O}^{2+}$	Pentaammine(azido)cobalt(III) ion 2.9	
$\text{CoH}_{17}\text{N}_5\text{O}^{3+}$	Pentaammine(hydroxy)cobalt(III) ion 26.27	
$\text{CoH}_{18}\text{N}_6^{3+}$	Pentaammine(aqua)cobalt(III) ion 12.15, 2.5, 26.26	
$\text{CoH}_{20}\text{N}_9\text{O}_2^{4+}$	Hexaamminecobalt(III) ion 12.14, 13.10, 16.26, 19.2, 22.5, 24.1, 25.1, 25.4, 26.25, 27.123.2, 27.139.1, 27.160.1, 27.161.1, 27.31.1, 27.75.1	
$\text{Cr}^{2+}$	$\mu$ -Amido- $\mu$ -superoxidoctakis- amminedicobalt(III) ion 12.33, 13.23, 16.117, 26.60	
$\text{Cr}^{3+}$	Chromium(II) ion 1.16, 12.34, 13.26, 14.2, 16.120, 17.17, 18.3, 19.19, 2.20, 20.6, 21.4, 22.6, 23.3, 24.2, 27.123.7, 27.139.2, 27.158.2, 27.166.2, 27.200.1, 27.27.1, 27.31.2, 27.37.2, 27.45.2, 27.47.3, 27.59.1, 27.61.1, 27.75.2, 27.95.2, 28.3, 3.4, 5.2, 7.3, 8.2	
$\text{CrH}_{18}\text{N}_6^{3+}$	Chromium(III) ion 16.125	
$\text{CrO}_4^{2-}$	Hexaamminechromium(III) ion 16.126	
$\text{Cr}_2\text{O}_7^{2-}$	Chromate(VI) ion 16.150	
$\text{Cu}^+$	Dichromate(VI) ion 22.7	
$\text{Cu}^{2+}$	Copper(I) ion 1.18, 12.37, 14.3, 16.151, 17.19, 26.69, 27.115.2, 27.15.2, 27.19.1, 27.22.1, 27.24.1, 27.27.2, 27.47.4, 27.83.1	
$\text{Eu}^{2+}$	Copper(II) ion 1.19, 10.2, 11.20.1, 12.38, 13.29, 14.5, 16.152, 17.22, 22.8, 26.70, 27.123.8, 27.148.1, 27.22.2, 27.38.2, 27.47.5, 27.73.1, 28.5, 29.2.2, 29.6.2, 29.7.2, 4.3	
$\text{Fe}^{2+}$	Europium(II) ion 16.156	
$\text{Fe}^{3+}$	Europium(III) ion 16.157	
$\text{FeO}_4^{2-}$	Iron(II) ion 16.158	
$\text{FeO}_{40}\text{W}_{12}^{5-}$	Iron(III) ion 12.43, 13.33, 16.161	
$\text{Ga}^{2+}$	Ferrate(VI) ion 13.39, 16.171, 26.111	
$\text{GaHO}^+$	12-Tungstoferrate ion(5-) 12.92, 13.68, 16.253, 26.167	
$\text{GaH}_6\text{O}_6^{4-}$	Gallium(II) ions 12.55	
	Hydroxygallium(II) ion 12.56	
	Hexahydroxygallate(II) ion 12.57, 13.40, 16.172	
	$\text{HgI}_2$	Hydrogen phosphate ion 27.10.7, 27.106.2, 27.185.2, 27.186.2, 27.32.4, 27.33.4, 27.8.7
	$\text{IO}_3^-$	Hypiodous acid 26.115
	$\text{I}_2$	Hydroxide ion 13.52, 16.210, 20.10, 23.7, 27.10.6, 27.106.1, 27.110.1, 27.113.2, 27.118.4, 27.127.4, 27.129.1, 27.131.1, 27.153.2, 27.176.2, 27.185.1, 27.186.1, 27.2.1, 27.237.2, 27.32.3, 27.33.3, 27.49.1, 27.55.1, 27.57.2, 27.68.1, 27.80.1
	$\text{In}^{2+}$	Hydrogen peroxomonosulfate ion 1.39, 12.83, 13.62, 16.240, 19.26, 2.32, 27.174.3, 27.241.2
	$\text{In}^{3+}$	Hydrogen pyrophosphate ion 27.10.9, 27.32.5, 27.33.5
	$\text{Mn}^{2+}$	Hydrogen peroxide 1.37, 12.70, 13.53, 16.209, 19.22, 26.136, 27.109.1, 27.123.1, 27.124.1, 27.164.3, 27.241.1, 27.95.3, 5.8, 6.15.1
	$\text{H}_2\text{O}_2$	Dihydrogen phosphate ion 27.10.8, 27.203.1, 27.63.1, 27.8.6
	$\text{H}_2\text{O}_{40}\text{W}_{12}^{6-}$	12-Tungstate ion(6-), dihydrogen 12.91, 13.69, 16.254, 26.166
	$\text{H}_2\text{S}$	Hydrogen sulfide 12.82, 13.61, 15.4, 16.237, 17.44
	$\text{H}_4\text{N}^+$	Ammonium ion 27.10.5, 27.8.5
	$\text{H}_6\text{O}_6\text{Pb}^{2-}$	Hexahydroxyplumbate(IV) ion 16.215
	$\text{H}_{12}\text{N}_4\text{Pd}^{2+}$	Tetraamminepalladium(II) ion 16.217
	$\text{H}_{15}\text{N}_6\text{ORu}^{2+}$	Pentaamminenitrosylruthenium(II) ion 17.40, 27.22.4, 27.27.4, 27.42.2, 27.48.3, 27.7.2
	$\text{H}_{15}\text{N}_6\text{ORu}^{3+}$	Pentaammine(nitroso)ruthenium(III) ion 16.236, 26.153
	$\text{H}_{18}\text{N}_6\text{Ru}^{2+}$	Hexaammineruthenium(II) ion 16.225
	$\text{H}_{18}\text{N}_6\text{Ru}^{3+}$	Hexaammineruthenium(III) ion 12.80, 13.59, 16.234, 19.23, 22.16, 24.6, 25.4, 26.152, 27.123.1, 27.139.3, 27.160.2, 27.161.2, 27.31.3, 27.75.3
	$\text{HgI}_2$	Mercury(II) iodide 13.42, 16.180, 26.113
	$\text{IO}_3^-$	Iodate ion 13.43, 16.181, 26.116
	$\text{I}_2$	Iodine 1.28, 26.114
	$\text{In}^{2+}$	Indium(II) ion 12.60, 16.182
	$\text{In}^{3+}$	Indium(III) ion 12.61, 16.183, 26.117
	$\text{Mn}^{2+}$	Manganese(II) ion 26.119

$\text{MnO}_4^-$	Permanganate ion 1.33, 8.7, 10.6, 11.20.4, 13.45, 16.198, 2.27, 27.123.1, 27.41.2	$\text{Pd}^{2+}$	Palladium(II) ion 12.73, 16.216, 26.139
$\text{Mo}_{18}\text{O}_{62}\text{P}_2^{6-}$	18-Molybdodiphosphate ion(6-) 12.66, 13.46, 16.199	$\text{Ti}^{3+}$	Titanium(III) ions 16.243, 22.19, 26.163
$\text{NH}_3$	Ammonia 23.6, 27.10.4, 27.32.2, 27.33.2	$\text{Tl}^+$	Thallium(I) ion 12.87, 13.65, 16.245, 26.164
$\text{NO}$	Nitric oxide 13.47, 26.125	$\text{Tl}_2^+$	Thallium(I) ion, complex with $\text{Tl}(0)$ 12.88, 13.66, 16.246
$\text{NO}_2^-$	Nitrite ion 13.48	$\text{U}^{3+}$	Uranium(III) ion 1.41, 12.89, 16.247, 17.46, 22.20, 27.37.3
$\text{NO}_3^-$	Nitrate ion 13.49, 16.202	$\text{V}^{2+}$	Vanadium(II) ion 1.42, 16.250, 19.28, 2.34, 28.11, 3.9, 4.10, 5.10, 6.1.6, 6.12.5, 6.6.4, 7.9, 8.11
$\text{N}_2\text{O}$	Nitrous oxide 16.201, 26.124	$\text{Zn}^+$	Zinc(I) ion 12.96, 16.258, 17.47, 26.171
$\text{N}_3^-$	Azide ion 16.200	$\text{Zn}^{2+}$	Zinc(II) ion 12.97, 16.259, 17.48, 26.172
$\text{Ni}^{2+}$	Nickel(II) ion 12.68, 16.204, 17.36, 26.127		
$\text{NpO}_2^{2+}$	Dioxoneptunium(VI) ion 16.208		
$\text{OTi}^{2+}$	Oxotitanium(IV) ion 16.244		
$\text{O}_2$	Oxygen 1.38, 2.30, 3.8, 4.9, 5.9, 6.1.5, 6.10.2, 6.11.3, 6.12.4, 6.13.3, 6.14.3, 6.19.1, 6.6.3, 6.7.2, 6.9.3, 7.8, 8.10, 10.7, 11.13.5, 11.14.1, 11.17.1, 11.18.1, 11.2.3, 11.21.1, 11.22.1, 11.23.1, 11.27.1, 11.7.1, 12.71, 13.54, 14.10, 15.3, 16.211, 17.37, 18.9, 20.11, 22.14, 23.8, 24.5, 25.3, 26.137, 27.1.1, 27.116.1, 27.117.5, 27.118.5, 27.122.1, 27.127.5, 27.153.3, 27.163.2, 27.164.2, 27.178.1, 27.202.2, 27.206.1, 27.21.3, 27.212.1, 27.215.3, 27.222.4, 27.225.1, 27.226.1, 27.228.1, 27.244.2, 27.247.1, 27.248.1, 27.28.2, 27.35.2, 27.53.1, 27.60.1, 27.77.1, 27.92.6, 27.95.4, 28.10, 29.4.2, 29.5.1, 29.8.2, 30.1.2, 30.36.3		
$\text{O}_2\text{Pu}^{2+}$	Dioxoplutonium(VI) ion 16.219		
$\text{O}_2\text{S}$	Sulfur dioxide 16.238, 26.159		
$\text{O}_2\text{U}^{2+}$	Uranyl(VI) ion 12.90, 13.67, 16.248		
$\text{O}_3$	Ozone 22.15		
$\text{O}_4\text{S}^{2-}$	Sulfate ion 2.33		
$\text{O}_4\text{Tc}^-$	Technetate(VII) ion 16.242		
$\text{O}_6\text{S}_4^{2-}$	Tetrathionate ion 26.160		
$\text{O}_7\text{P}_2^{4-}$	Pyrophosphate ion 23.9		
$\text{O}_8\text{S}_2^{2-}$	Peroxodisulfate ion 1.40, 12.84, 13.63, 16.239, 17.45, 19.27, 26.161		
$\text{O}_{40}\text{PW}_{12}^{3-}$	12-Tungstophosphate ion(3-) 12.93, 13.70, 16.255, 26.168		
$\text{O}_{40}\text{SiW}_{12}^{4-}$	12-Tungstosilicate ion(4-) 12.95, 13.71, 16.257, 26.169		
$\text{O}_{62}\text{P}_2\text{W}_{18}^{6-}$	Diphospho octadecatungstate ion(6-) 12.94, 13.72, 16.256		
$\text{Pb}^+$	Lead(I) ions 12.72, 13.55, 16.212, 27.89.2		
$\text{Pb}^{2+}$	Lead(II) ions 16.213, 26.138		

## 11. Chemical Name Index

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 AF-2 (trans) 26.255  
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 Acetatochromium(II) ion 16.121  
 $\mu$ -Acetatohexaamminebis( $\mu$ -hydroxy)dicobalt(III) ion 26.64  
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