

Rate Constants for the Decay and Reactions of the Lowest Electronically Excited Singlet State of Molecular Oxygen in Solution. An Expanded and Revised Compilation

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Rate Constants for the Decay and Reactions of the Lowest Electronically Excited Singlet State of Molecular Oxygen in Solution. An Expanded and Revised Compilation

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An expanded and revised compilation on the reactivity of singlet oxygen, the lowest electronically excited singlet state of molecular oxygen, $^1\text{O}_2^*(^1\Delta_g)$, in fluid solution is presented, which supersedes the publication of Wilkinson and Brummer, *J. Phys. Chem. Ref. Data* **10**, 809 (1981). Rate constants for the chemical reaction and physical deactivation of singlet oxygen available through 1993 have been critically compiled. Solvent deactivation rates (k_d) are tabulated for 145 solvents or solvent mixtures and second-order rate constants for interaction of singlet oxygen with 1915 compounds are reported. ©1995 American Institute of Physics and American Chemical Society.

Key words: Chemical kinetics; data compilation; decay; oxidation; photochemistry; photosensitization; quenching; rate constants; singlet oxygen; solution.

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1. Introduction

Reactions of singlet oxygen $^1\text{O}_2^*(^1\Delta_g)$, are of much current interest because of their importance in many photooxidations of chemical and biological systems including reactions used in photo-chemotherapy. There is strong evidence for the involvement of singlet oxygen, a powerful oxidant, in many photosensitized oxidations, photodynamic inactivation of viruses and cells, in phototherapy for cancer, in photocarcinogenesis, in the photodegradation of dyes and polymers and in the dye sensitization of the photodegradation of polymers. [See Refs. 1–7 and references therein].

The ground electronic state of molecular oxygen, which has zero angular momentum about the internuclear axis and contains two unpaired p electrons, has the group theoretical symbol $^3\Sigma_g^-$. The two electronically excited singlet states which arise from this same electron configuration but with spin pairing of the two electrons are the $^1\Delta_g$ and the $^1\Sigma_g^+$ states which lie at 94 and 157 kJ mol⁻¹, respectively, above the $^3\Sigma_g^-$ ground state. The electronic transitions $^1\Delta_g \leftarrow ^3\Sigma_g^-$ and $^1\Sigma_g^+ \leftarrow ^3\Sigma_g^-$ although highly forbidden are readily observed in absorption and emission in the upper atmosphere with zero-zero transitions at 1,269 and 762 nm and estimated radiative lifetimes of 64 min and 10 s, respectively.^{8,9} The measured lifetimes in the gas phase and in solution are very much shorter than this. In condensed media, the lifetime of $^1\text{O}_2^*(^1\Sigma_g^+)$ is short, 130 ns in carbon tetrachloride, and until recently very little was known about its properties,¹⁰ and thus the term singlet oxygen is used throughout this review to refer to the $^1\Delta_g$ state.

In 1981 we published a critical comprehensive compilation which reported first order decay constants for 50 solvents and second order rate constants for deactivation and chemical reaction of singlet oxygen with 690 different compounds. This article updates and replaces our 1981 article.⁵ It uses identical equation numbers and symbols wherever possible as did our recent compilation,⁶ "Quantum Yields for the Photosensitized Formation of the Lowest Electronically Excited Singlet State of Molecular Oxygen in Solution." It covers the literature up to the end of 1993 and includes solvent deactivation rates (k_d) for 145 solvents and solvent mixtures and rate constants for chemical reaction and physical

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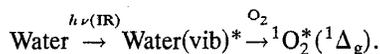
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deactivation of singlet oxygen with over 1,900 different compounds.

2. Sources of Singlet Oxygen in Solution

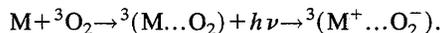
2.1. Direct Absorption by O₂ (³Σ_g⁻)

Generation of ¹O₂^{*}(¹Δ_g) by direct absorption has been accomplished by irradiation with Nd:YAG lasers of Freon solutions subjected to high pressures of O₂, by Matheson and Lee¹¹⁻¹³ and also by Evans¹⁴ using the simultaneous transition 2 O₂(³Σ_g⁻, ³Σ_g⁻) → 2 O₂^{*}(¹Δ_g, ¹Δ_g). In addition Singh *et al.*¹⁵ have shown that it is also possible to produce ¹O₂^{*}(¹Δ_g) by irradiation of aerated water at 600 nm via vibrationally excited water with a yield of ~3 × 10⁻⁵, i.e.,



2.2. Production Following Absorption into O₂ (³Σ_g⁻): Organic Molecule Charge-Transfer Bands

The perturbing effect of dissolved oxygen on the uv/vis absorption spectra of organic molecules is a well known phenomenon first studied in detail by Evans¹⁶ and subsequently discussed by Mulliken¹⁷ and others.¹⁸ The additional absorption bands observed include enhanced absorption of the lowest energy transition in the organic molecule, M, which corresponds to the S₀ → T₁ transition of the organic molecule in intimate contact with an oxygen molecule. More intense absorption is also often observed at shorter wavelengths which is attributed to CT transitions within ³(M...O₂) contact complexes, viz,



This effect is easily observed by comparing the absorption spectra of liquid aromatic hydrocarbons such as benzene,

toluene, or *o*-, *m*-, or *p*-xylenes saturated with oxygen and in the absence of dissolved oxygen. The oxygen induced red shift observed, which is reversible when the oxygen is removed, has been assigned to charge transfer absorption. This assignment is supported by the broad structureless appearance of the bands. Scurlock and Ogilby^{19,20} have demonstrated that irradiation of O₂(³Σ_g⁻):organic molecule charge-transfer bands produces singlet oxygen with relatively high yields. Picosecond laser flash photolysis studies have been carried out in attempts to understand the mechanism involved.^{21,22}

2.3. Photosensitized Production

The method most frequently used for producing singlet oxygen in the laboratory is photo-sensitization (see Scheme 1). Both continuous irradiation and pulsed excitation studies have made much use of this method of production which also frequently occurs in nature. In this mechanism (Scheme 1) the lowest excited singlet and triplet states of the sensitizers are represented as S₁, and T₁, respectively, and the ground electronic state by S₀. Any substrate which deactivates singlet oxygen by physical or chemical quenching is represented in Scheme 1 by M. However, when quenching is known to be mainly by chemical reaction we shall use A to represent a reactive substrate and if a second reactive substrate is employed A' will be used. When the molecule is known to be a physical quencher with negligible reaction. Q will be used in place of M. The singlet oxygen sensitizer, even when the sensitizer quenches singlet oxygen, will be represented by S. Thus M is a general symbol in Scheme 1 which may be replaced by A, A', Q, or S or any combination of these. In the tables we have used A throughout for all substrates irrespective of whether they were known to have little measured chemical reactivity.

Scheme 1

	Rate Constants	Quantum Yields and Fractional Probabilities
1 $S_0 + h\nu \rightarrow S_1$	rate = I_a	
2 $S_1 \rightarrow S_0 + h\nu_F$	$\left. \begin{array}{l} k_F \\ k_{ic} \\ k_{isc} \end{array} \right\} k_{SD} = (\tau_S^0)^{-1}$	$\phi_F = \frac{k_F}{k_{SD}}$
3 $S_1 \rightarrow S_0$		$\phi_T = \frac{k_{isc}}{k_{SD}}$
4 $S_1 \rightarrow T_1$		
5 $S_1 + O_2 \rightarrow T_1 + {}^1O_2^*$	$\left. \begin{array}{l} k_{S\Delta}^{O_2} \\ k_{isc}^{O_2} \\ k_{Sd}^{O_2} \\ k_{Sr}^{O_2} \end{array} \right\} k_{S^O_2}$	$f_{\Delta}^S = k_{S\Delta}^{O_2} / k_{SQ}^{O_2}$
6 $S_1 + O_2 \rightarrow T_1 + O_2$		$f_T^{O_2} = (k_{S\Delta}^{O_2} + k_{isc}^{O_2}) / k_{SQ}^{O_2}$
7 $S_1 O_2 \rightarrow S_0 + {}^3O_2$		$P_S^{O_2} = k_{SQ}^{O_2} [O_2] / (k_{SD} + k_{SQ}^{O_2} [O_2])$
8 $S_1 + O_2 \rightarrow \text{products}$		$1 - P_S^{O_2} = 1 / (1 + k_{SQ}^{O_2} \tau_S^0 [O_2])$
9 $T_1 \rightarrow S_0 + h\nu_P$	$\left. \begin{array}{l} k_{Tp} \\ k_{Td} \end{array} \right\} k_{TD} = (\tau_T^0)^{-1}$	
10 $T_1 \rightarrow S_0$		
11 $T_1 + O_2 \rightarrow S_0 + {}^1O_2^*$	$\left. \begin{array}{l} k_{T\Delta}^{O_2} \\ k_{Td}^{O_2} \\ k_{Tr}^{O_2} \end{array} \right\} k_{TQ}^{O_2}$	$f_{\Delta}^T = k_{T\Delta}^{O_2} / k_{TQ}^{O_2}$
12 $T_1 + O_2 \rightarrow S_0 + {}^3O_2$		
13 $T_1 + O_2 \rightarrow \text{products}$		$P_T^{O_2} = k_{TQ}^{O_2} [O_2] / (k_{TD} + k_{TQ}^{O_2} [O_2])$
14 ${}^1O_2^* \rightarrow {}^3O_2 + h\nu_P$	$\left. \begin{array}{l} k_{\Delta P} \\ k_{\Delta d} \end{array} \right\} k_{\Delta} = \tau_{\Delta}^{-1}$	$f_P^{\Delta} = k_{\Delta P} / (k_{\Delta P} + k_{\Delta d})$
15 ${}^1O_2^* \rightarrow {}^3O_2$		
16 ${}^1O_2^* + M \rightarrow \text{products}$	$\left. \begin{array}{l} k_r^M \\ k_q^M \end{array} \right\} k_M$	$f_r^M = k_r^M / (k_r^M + k_q^M)$
17 ${}^1O_2^* + M \rightarrow {}^1M + {}^3O_2$		

f_{Δ}^S = fraction of S_1 quenched by O_2 which gives ${}^1O_2^*$

$f_T^{O_2}$ = fraction of S_1 quenched by O_2 which gives T_1

f_{Δ}^T = fraction of T_1 quenched by O_2 which gives ${}^1O_2^*$

$P_S^{O_2}$ = proportion of S_1 quenched by O_2

$P_T^{O_2}$ = proportion of T_1 quenched by O_2

The quantum yield of singlet oxygen production, ϕ_{Δ} , via sensitization is given by the sum of contributions due to oxygen quenching of S_1 and T_1 , i.e.,

$$\phi_{\Delta} = \phi_{\Delta}(S) + \phi_{\Delta}(T) = P_S^{O_2} f_{\Delta}^S + \phi_T^{O_2} P_T^{O_2} f_{\Delta}^T$$

In the presence of oxygen quenching of S_1 and T_1

$$\phi_{\Delta} = P_S^{O_2} f_{\Delta}^S + \phi_T (1 - P_S^{O_2}) P_T^{O_2} f_{\Delta}^T + P_S^{O_2} f_T^{O_2} P_T^{O_2} f_{\Delta}^T,$$

which can be written as

$$\phi_{\Delta} = \phi_T P_T^{O_2} f_{\Delta}^T + P_S^{O_2} \{ f_{\Delta}^S + P_T^{O_2} f_{\Delta}^T (f_T^{O_2} - \phi_T) \}. \quad (1)$$

Methods for determining ϕ_{Δ} were reviewed by us⁶ and 1,600 quantum yield determinations were tabulated for 750 different chemical species.

2.4. Sensitized Production by Pulsed Radiolysis

When a high energy electron beam is passed through liquid benzene, for example, a high yield of excited states can be formed. Since the lifetimes of singlet and triplet states of

benzene are only a few nanoseconds in neat benzene, quenching by dissolved oxygen does not produce much singlet oxygen. However, in the presence of a triplet energy acceptor, e.g., 10^{-2} mol L⁻¹ naphthalene, energy transfer from triplet benzene occurs to give triplet naphthalene which is quenched by oxygen producing singlet oxygen. This enables the properties of singlet oxygen to be probed using the technique of pulsed radiolysis.²³

2.5. Microwave Generation of Singlet Oxygen

When a microwave discharge is passed through oxygen gas in a gaseous flow system, singlet molecular oxygen (${}^1\Delta_g$ and ${}^1\Sigma_g^+$), oxygen atoms, and ozone are produced. The latter two oxidizing species can be removed by reaction with mercury vapor and the ${}^1O_2^*$ (${}^1\Sigma_g^+$) is rapidly quenched, probably to give ${}^1O_2^*$ (${}^1\Delta_g$) when the emerging gases are bubbled through solutions containing oxidizable substrates. Often the flow is bubbled simultaneously through two cells, one containing the substrate only and the other containing substrate

and potential singlet oxygen quencher.²⁴ This makes it easier to allow for variations in the concentration of dissolved singlet oxygen produced in these bubbling experiments.

2.6. Chemical Production of Singlet Oxygen

Among the reactions used to form singlet oxygen are (a) reaction of hydrogen peroxide with hypochlorite or hypobromite,²⁵ (b) reaction of potassium superoxide with water, and (c) thermal decomposition of aryl peroxides or of the ozonide of triphenyl phosphite.²⁴ Experiments are usually carried out so that a fixed amount of singlet oxygen is produced in the presence of variable amounts of reactive substrate A and/or A' with or without added quencher, Q.

3. Methods for the Direct Study of the Kinetics of the Reactions of Singlet Oxygen

3.1. Luminescence Decay—Time Resolved Infrared Luminescence

Although the quantum yield of phosphorescence of singlet oxygen is very low in most solvents, the development of germanium photodiodes with high gain, coupled with wide-band amplifiers which can give overall time responses of less than a microsecond, means that the lifetime of singlet oxygen in most solvents can be measured accurately by monitoring infrared luminescence at ~ 1270 nm.^{26,27} If the logarithm of the phosphorescence intensity is plotted as a function of time then the slope gives the decay constant

$$k_D = k_A + \sum k_M[M], \quad (2)$$

where M represents any molecule including the sensitizer which quenches singlet oxygen, physically or chemically. If k_D is measured as a function of the concentration of a particular quencher M, keeping all other quencher concentrations constant, the bimolecular rate constant for quenching of singlet oxygen by M, k_M can be obtained.^{28,29} Measurement of k_D as a function of sensitizer concentration allows k_S to be evaluated. When a decay constant for singlet oxygen is not extrapolated to zero sensitizer concentration we shall use $k_d = (k_A + k_S[S])$ for the decay constant. It is often assumed that under many experimental conditions $k_d = k_A$, however this is not always the case.

3.2. Time Dependent Thermal Lensing due to Singlet Oxygen Decay

The absorption of even part of the energy in a laser pulse gives rise to local temperature changes in gases or liquids. This leads to changes in density and refractive index which causes the system to act as a diverging lens.³⁰ Time resolved thermal lensing (TL) due to release of energy by decaying excited states can be used to measure lifetimes of singlet oxygen in the range 0.1 to 100 μ s. The probe source is a continuous laser beam which is deflected by the thermal lens. The signal gives the relative magnitudes of heat contributions (U) for fast and slow non-radiative processes relative to

the acoustic transit time. The time dependence of the slow process gives rate information. The TL signal at time t is defined as

$$U(t) = \frac{V_0 - V(t)}{V_0}, \quad (3)$$

where $V(t)$ is the time dependent voltage generated by the detector. Following the sensitized production of $^1O_2^*$, the thermal buildup $\Delta U = U_{\text{total}} - U_{\text{fast}}$ decreases exponentially with the decay constant k_D given by Eq. (2).

3.3. Time Dependent Acceptor Disappearance

3.3.1. Following Pulsed Excitation of a Sensitizer

According to the mechanism given in Scheme 1, in this case with $M=A$, since we are discussing a reactive substrate, it follows that

$$-\frac{d[A]}{dt} = k_r^A[A][^1O_2^*].$$

Following pulsed excitation in aerated solutions most singlet and triplet states have decayed within 1 μ s and then

$$-\frac{d[^1O_2^*]}{dt} = (k_d + k_A[A])[^1O_2^*]$$

and thus

$$-d[A] = k_r^A[A][^1O_2^*]_{t=0} \left[\exp - \left(k_d t + \int_0^t k_A[A] dt \right) \right]. \quad (4)$$

Equation (4) has been treated slightly differently as follows:

(a) Merkel and Kearns^{31,32} assumed that $[A]$ on the right hand side of Eq. (4) can be treated as constant (i.e., as $[A]_{\text{av}}$ since typically $[A]$ only varies by $\sim 10\%$). Taking $k_D = k_d + k_A[A]_{\text{av}}$, integration of Eq. (4) gives,

$$[A]_t - [A]_{\infty} = \frac{k_r^A[^1O_2^*]_{t=0}[A]_{\text{av}}}{k_D} e^{-k_D t}. \quad (5)$$

Since the change in concentration of A is proportional to ΔA , the change in absorbance by the oxidizable acceptor at some convenient wavelength, $[A]_t - [A]_{\infty} = \Delta A/\epsilon l$, where ϵ is the extinction coefficient and l the analyzing path-length. It follows from Eq. (5) that

$$\ln \Delta A = -k_D t + \text{const}, \quad (6)$$

and a plot of $-\ln \Delta A$ vs t should have a slope equal to $k_D = k_d + k_A[A]_{\text{av}}$. Thus by varying $[A]_{\text{av}}$ values k_d and k_A can be determined.

(b) Adams and Wilkinson³³ and Young *et al.*³⁴ replaced $[A]$ by $[A]_{\text{av}}$ only in the exponential term in Eq. (4) and then integrated Eq. (4) to give

$$\ln \left[\frac{[A]}{[A]_0} \right] = \frac{(k_r^A[^1O_2^*]_{t=0})}{k_D} [e^{-k_D t} - 1] \quad (7)$$

or

$$\ln \left[\frac{[A]}{[A]_{\infty}} \right] = \frac{(k_r^A[^1O_2^*]_{t=0})}{k_D} e^{-k_D t}. \quad (8)$$

Experimental results were fitted to Eqs. (7) or (8) to evaluate k_D and thus values of k_d and k_A were obtained.

Comparison of the values obtained from the same data for k_D using Eqs. (5) or (7) and (8) give agreement to within $\pm 5\%$ and do not differ, within an experimental error of about $\pm 10\%$ when experiments are repeated many times, from computer treatments which do not make any assumptions about $[A]$ being relatively constant. If k_A is partly due to physical quenching and partly due to reaction, the value of k_A obtained will be the total rate constant for quenching due to both processes.

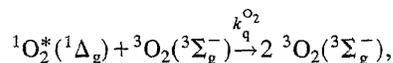
In the presence of several possible singlet oxygen quenchers, i.e., Scheme 1 with $M=A, S,$ and $Q,$ we have

$$k_D = k_A + k_S[S] + k_Q[Q] + k_A[A]. \quad (9)$$

Measurement of k_D as a function of $[Q]$ keeping $[S]$ and $[A]$ constant allows values of k_Q to be obtained. N.B. If k_Q is only partly due to physical quenching and partly due to reaction, the value of k_Q obtained is the total rate constant for quenching due to both processes.

3.3.2. Following Pulsed Excitation of Solutions Containing High Pressures of O_2

A variation on this method has been developed by Matheson *et al.*^{11,35} in which singlet oxygen is directly generated by absorption of the output at 1065 nm of a pulsed Nd-glass laser by oxygen dissolved under pressure (up to 130 atm) in 1,1,2-trichlorotrifluoroethane (Freon 113). The disappearance of the singlet oxygen acceptor 1,3-diphenylisobenzofuran (DPBF) was monitored. Because of the high concentration of oxygen present, quenching by ground state oxygen, i.e., due to the reaction,



contributes substantially to singlet oxygen decay, and

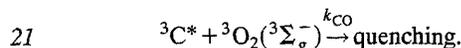
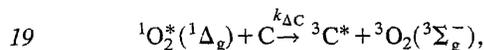
$$k_D = k_d + k_A[A] + k_q^{O_2}[O_2]. \quad (10)$$

Under these conditions $k_q^{O_2}[O_2] \gg k_d$, therefore only values of k_A and $k_q^{O_2}$ can be obtained by measuring k_D as a function of $[A]$ or $[O_2]$ respectively. Recent measurements suggest that k_A is pressure dependent.³⁶

3.4. Kinetic Analysis to give the Decay of Singlet Oxygen by Monitoring the Decay of Triplet β -carotene Produced by Energy Transfer from Singlet Oxygen

Farmilo and Wilkinson¹⁷ have developed a method for measuring singlet oxygen decay which monitors absorption by triplet β -carotene, ${}^3C^*$, formed by energy transfer from singlet oxygen in aerated solutions containing a sensitizer and a low concentration of β -carotene. Consider the mechanisms given in Scheme 1 in the presence of β -carotene, $C,$

i.e., a mechanism involving steps 1-17 with $M=Q$ together with steps 18-21 given below:



The differential rate equations which can be written for $d[T_1]/dt$, $d[{}^1O_2^*]/dt$, and $d[{}^3C^*]/dt$ can be solved without making the steady-state approximation and this gives the concentration of $[{}^3C^*]$ as

$$[{}^3C^*] = V[e^{-k_T t} - e^{-k_C t}] + W[e^{-k_D t} - e^{-k_C t}],$$

where $k_T = k_{TQ}^{O_2}[O_2] + k_{TC}[C]$; $k_C = k_{CO}[O_2] + k_{dC}$, and $k_D = k_d + k_{\Delta C}[C] + k_Q[Q]$. In aerated solutions the values of $k_{TQ}^{O_2}[O_2]$ and $k_{CO}[O_2]$ are such that after $\sim 1 \mu s$, $\exp(-k_T t)$ and $\exp(-k_C t)$ become negligibly small and thus

$$[{}^3C^*] = W e^{-k_D t}, \quad (11)$$

where $W = [T_1]_{t=0} k_{\Delta C}[C] k_{TQ}^{O_2}[O_2] / [(k_T - k_D)(k_C - k_D)]$. W is a constant provided $[O_2]$, $[C]$, and $[Q]$ are constant. It is usually possible to arrange for these to be present in excess so that $[O_2] \gg [{}^1O_2^*]$, $[C] \gg [{}^3C^*]$ and any consumption of Q or O_2 must also be negligibly small. It is important to bear these conditions in mind especially for work which involves, for example, focussed, high-energy laser pulses. However, when these conditions are met it follows from Eq. (11) that the decay of triplet β -carotene after $\sim 1 \mu s$ becomes first order with a decay constant k_D equal to that of its precursor, singlet oxygen as confirmed by Farmilo and Wilkinson.³⁷ Thus the decay of absorption at 520 nm due to ${}^3C^*$ under these conditions mirrors the singlet oxygen decay yielding values of k_D and hence values of k_d , $k_{\Delta C}$, and k_Q .

4. Methods for Obtaining Kinetic Information from Studies using Continuous Irradiation, i.e., Under Photostationary State Conditions

4.1. Luminescence Intensity Quenching

The phosphorescence intensity due to emission of singlet oxygen at 1270 nm, I_Δ , observed when a sensitizer is continuously irradiated depends on the steady-state concentration of singlet oxygen present in a solution. When a photostationary state of singlet oxygen is produced its rate of production $I_a \phi_\Delta$ equals the rate of decay $k_d [{}^1O_2^*]_{ss}$ and thus

$$[{}^1O_2^*]_{ss} = \phi_\Delta \frac{I_a}{k_d}.$$

In the presence of a singlet oxygen quencher M the steady-state singlet oxygen concentration $[^1O_2^*]_{ss}^M$ is reduced, i.e.,

$$[^1O_2^*]_{ss}^M = \frac{\phi_{\Delta} I_a}{k_d + (k_r^M + k_q^M)[M]}$$

Krasnovsky³⁸ and others have shown that a Stern-Volmer relationship

$$\frac{L_{\Delta}^0}{L_{\Delta}} = 1 + \frac{(k_r^M + k_q^M)[M]}{k_d} \quad (12)$$

holds for quenching of singlet oxygen phosphorescence by physical and chemical quenchers; from the slopes of plots of L_{Δ}^0/L_{Δ} vs $[M]$ values of the total quenching constant $(k_r^M + k_q^M)$ can be obtained provided the singlet oxygen decay constant in the absence of the quencher M is known.

Krasnovsky³⁸ pioneered the use of phosphorescence intensity measurements from singlet oxygen in solution. He and other workers have used this method to derive quenching rate constants using the Stern-Volmer equation. In addition, by assuming that $k_{\Delta r}$ is independent of solvent, Turro³⁹ has given estimates of lifetimes relative to a standard, in this case benzene, for which a value of $k_d = 4 \times 10^4 \text{ s}^{-1}$ was used.⁵ Measurements were made of the decrease in fluorescence intensity of a CCl_4 solution upon addition of other solvents and it was found that the Stern-Volmer relationship was observed, i.e.,

$$\frac{I_0}{I} = \kappa x + 1, \quad \text{where } \kappa = \frac{\tau_{\text{CCl}_4}}{\tau_{\text{solvent}}},$$

where x is the volume fraction. The question of the extent to which the radiative probability for phosphorescence from singlet oxygen varies with solvent is debatable.⁴⁰

4.2. Monitoring Sensitized Photo-oxidations by Consumption of Reactants or Appearance of Products Under Steady-State Conditions

Two major classes of photosensitized oxygenations have been designated as Type I and Type II. In the former, the excited sensitizer interacts directly with the substrate resulting, for example, in either H-atom transfer or electron transfer. The radicals so produced from the sensitizer react in the presence of oxygen to regenerate the sensitizer, while radicals produced from the substrate, for example, initiate free radical chain reactions, as observed in auto-oxidations. Type II reactions involve the direct interaction of the excited sensitizer and oxygen with energy transfer to give singlet oxygen, which reacts with various substrates.^{4,41}

4.2.1. Sensitized Photo-oxygenation of a Single Substrate A

Many photosensitized reactions have been carried out under conditions such that no quenching by A of the sensitizer singlet or triplet states occurs, in which case the mechanism is as given in Scheme 1, with $M=A$. For continuous irradiation,

$$-\frac{d[A]}{dt} = -\frac{d[O_2]}{dt} = \frac{d[P]}{dt} = k_r^A [^1O_2^*]_{ss}[A], \quad (13)$$

and the steady-state approximation can be applied to give

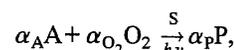
$$\phi_{ox} = \frac{r_{ox}}{I_a} = \frac{\phi_{\Delta} k_r^A [A]}{k_d + k_A [A]}, \quad (14)$$

where the rate of oxygenation (r_{ox}) may be followed by determining the rate of appearance of some product (Pa) and/or the rate of consumption of either the substrate A (Ac) and/or of oxygen (Oc). All three have been used, and this is indicated in the tables by an entry in the methods column. N.B. It follows from Eq. (14) that when $k_d \gg k_A [A]$ or $k_A [A] \gg k_d$ the rate of oxygenation will be first or zero order with respect to A, respectively. Equation (14) can be rearranged to give

$$r_{ox}^{-1} = (I_a \phi_{\Delta} f_r^A)^{-1} \left[1 + \frac{k_d}{k_A [A]} \right], \quad (15)$$

where $f_r^A = k_r^A/k_A$ is the fraction of reactive quenching of singlet oxygen by A.

Most reactive substrates, A, react with singlet oxygen with unit stoichiometry as implied in Eqs. (13) to (15) which apply when each time a molecule of $^1O_2^*$ reacts it leads to the consumption of one molecule of A and one of O_2 and produces one molecule of the product P. If there are stoichiometry factors α different from unity, the overall reaction is given by the equation



then

$$r_{ox} = -\frac{1}{\alpha_A} \frac{d[A]}{dt} = -\frac{1}{\alpha_{O_2}} \frac{d[O_2]}{dt} = \frac{1}{\alpha_P} \frac{d[P]}{dt},$$

and Eqs. (14) and (15) still apply. If, however, the rate of the reaction is monitored by observing the rate of consumption of a reactive substrate such as thiourea where $\alpha=2$ and this rate is not divided by $\alpha=2$, then αf_r^A appears in Eqs. (14) and (15). This needs to be borne in mind whenever unit stoichiometry does not apply.

According to Eq. (15) linear plots of r_{ox}^{-1} or ϕ_{ox}^{-1} vs $[A]^{-1}$ should give

$$\frac{\text{slope}}{\text{intercept}} = \frac{k_d}{k_A} = \beta_A,$$

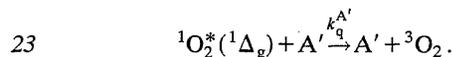
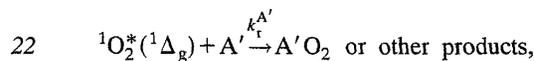
where $\beta_A = k_d/k_A$ represents the concentration at which the decay of singlet oxygen in the solvent alone (steps 14 and 15) equals the decay due to quenching by A (steps 16 and 17), i.e., it is the half-quenching concentration. [N.B. Eq. (15) only predicts a linear relationship if there is (i) constant light intensity, (ii) constant absorption by the sensitizer and with no absorption by A although this could be allowed for, and (iii) a constant oxygen concentration in the solution]. Tables 2 to 17 list hundreds of β values along with the values of k_d used to derive values of k_A from these β values.

4.2.2 Photo-Auto-Oxygenation of a Single Substrate A

When a substrate acts as its own sensitizer yielding singlet oxygen one can observe Type II photo-auto-oxygenations. Good examples are rubrene (Rub) and 9,10-dimethyl-anthracene (DMA) and for such cases this is indicated in the *Comments* column of the tables by S=A. Since the self-sensitizer is consumed in the photo-auto-oxygenation this usually leads to a change in I_a which must be allowed for. Alternatively, a totally absorbing solution can be used and then the rate of appearance of some product or the rate of consumption of oxygen can be measured and substituted directly into Eq. (15) to obtain values of β since under these conditions I_a is effectively constant.

4.2.3. Sensitized Photo-oxygenations of a Substrate A in the Presence of a Second Substrate A' which also Reacts with Singlet Oxygen

Consider in addition to steps 1 to 17 (Scheme 1) with M=A the further steps 22 and 23



In the presence of a second substrate [A'] it follows that

$$\frac{d[\text{A}']}{dt} = \frac{I_a \phi_{\Delta} k_t^{\text{A}'} [\text{A}']}{k_d + k_A [\text{A}] + k_{\text{A}'} [\text{A}']},$$

which when $k_{\text{A}'} [\text{A}'] (k_d + k_A [\text{A}])$ becomes

$$-\frac{d \ln[\text{A}']}{dt} = \frac{I_a \phi_{\Delta} k_t^{\text{A}'}}{k_d + k_A [\text{A}]} = \text{Slope.}$$

In the absence of A under identical conditions, the slope of the first order plot for the disappearance of A'

$$-\frac{d \ln[\text{A}']}{dt} = \frac{I_a \phi_{\Delta} k_t^{\text{A}'}}{k_d} = \text{Slope}_0,$$

thus

$$\frac{\text{Slope}_0}{\text{Slope}} = 1 + \frac{k_A}{k_d} [\text{A}] = 1 + \frac{[\text{A}]}{\beta_A}. \quad (16)$$

Young and co-workers^{42,43} and others^{44,45} have used this Stern-Volmer equation to obtain β values using low concentrations of the highly reactive fluorescent substrate 1,3-diphenylisobenzofuran (DPBF) as A'. This substrate is more reactive than most so that it decays in a first order manner during continuous irradiation in photosensitized oxidation experiments even in the presence of other substrates. The low concentrations of DPBF are often monitored by following the decrease in its fluorescence. Note that when $k_q^{\text{A}'} \gg k_t^{\text{A}'}$ (i.e., if A were a physical quencher of singlet oxygen) Eq. (16) applies even for much less reactive substrates than DPBF.

One can also use measurements of the relative rates of disappearance of two substrates in the same solution. Application of the steady-state approximation to steps 1 to 17 (Scheme 1) together with 22 and 23 gives

$$\frac{d[\text{AO}_2]/dt}{d[\text{A}'\text{O}_2]/dt} = \frac{-d[\text{A}]/dt}{-d[\text{A}']/dt} = \frac{k_t^{\text{A}'} [\text{A}]}{k_t^{\text{A}'} [\text{A}']}, \quad (17)$$

which upon integration gives

$$\frac{\ln ([\text{A}]_0/[\text{A}])}{\ln ([\text{A}']_0/[\text{A}'])} = \frac{k_t^{\text{A}'}}{k_t^{\text{A}'}}.$$

Equation (17) and its integrated forms have been used to determine values of $\beta_t = k_d/k_t^{\text{A}'}$. Equation (17) has also been used to compare rates of oxidation of two substrates A and A' separately irradiated under identical conditions in the same solvent and to compare the rates for the same substrate in different solvents.⁴²

Alternatively, $r_{\text{ox}}^{\text{A}'}(\text{A})$ and $r_{\text{ox}}^{\text{A}'}(\text{A})$, the rates of oxygenation of A in the presence and absence of A' respectively, can be evaluated and these will be related by the equation,

$$\left(\frac{r_{\text{ox}}^{\text{A}'}(\text{A})}{r_{\text{ox}}^{\text{A}'}(\text{A})} \right)_{t=0} = 1 + \frac{[\text{A}']_0/\beta_{\text{A}'}}{1 + [\text{A}]_0/\beta_{\text{A}'}} \quad (18)$$

provided A' does not absorb any exciting light, quench or react with S₁ or T₁. If initial rates are measured keeping [A]₀ constant and varying [A']₀ then Eq. (18) allows values of $\beta_{\text{A}'}$ to be obtained. If $\beta_{\text{A}'} \gg [\text{A}]_0$ the determination of $\beta_{\text{A}'}$ values is simplified.

4.2.4. Sensitized Photo-Oxygenations of a Substrate A' in the Presence of A=Q, a Physical Quencher of Singlet Oxygen

Consider Scheme 1 with M equal to both A' and Q, i.e., assuming for the moment that there is no chemical reaction with singlet oxygen by the quencher Q and that it does not absorb the exciting light. Application of the steady-state approximation then predicts

$$(r_{\text{ox}}^{\text{Q}})^{-1} = (I_a \phi_{\Delta} k_t^{\text{A}'})^{-1} \left[1 + [\text{A}']^{-1} \left(\beta_{\text{A}'} + \frac{k_{\text{Q}}[\text{Q}]}{k_{\text{A}'}} \right) \right], \quad (19)$$

i.e., a linear relationship between $(r_{\text{ox}}^{\text{Q}})^{-1}$ and $[\text{A}']^{-1}$ with

$$\frac{\text{slope}}{\text{intercept}} = \left(\beta_{\text{A}'} + \frac{k_{\text{Q}}[\text{Q}]}{k_{\text{A}'}} \right). \quad (20)$$

In the absence of quencher, slope/intercept = $\beta_{\text{A}'}$ [see also Eq. (15)]. Thus

$$\frac{(\text{slope}/\text{intercept})_{\text{Q}}}{(\text{slope}/\text{intercept})_0} = 1 + \frac{k_{\text{Q}}[\text{Q}]}{k_d} = 1 + \beta_{\text{Q}}^{-1}[\text{Q}]. \quad (21)$$

In the absence of quenching of excited singlet and triplet states of the sensitizer the intercepts of $(r_{\text{ox}}^{\text{Q}})^{-1}$ vs $[\text{A}']^{-1}$ plots are identical and it follows from Eqs. (19) and/or (21) that

$$\frac{(\text{slope})_{\text{Q}}}{(\text{slope})_0} = 1 + \beta_{\text{Q}}^{-1}[\text{Q}]. \quad (22)$$

In addition, from Eq. (19) the ratio of the rates of oxygenation in the absence and presence of Q is given by

$$\left(\frac{r_{\text{ox}}^{\text{O}}(A')}{r_{\text{ox}}^{\text{O}}(A')}\right)_{t=0} = 1 + \frac{k_{\text{Q}}[Q]}{k_{\text{d}} + k_{\text{A}'}[A']_0} = 1 + \frac{[Q]/\beta_{\text{O}}}{1 + [A']_0/\beta_{\text{A}'}} \quad (23)$$

of Eq. (18). Alternatively if one assumes that [A] does not change appreciably (i.e., for low fractional conversions) Eq. (19) can be integrated to give the concentration of A'O₂ produced after time *t*, which equals the change in concentration of A', Δ[A'], and

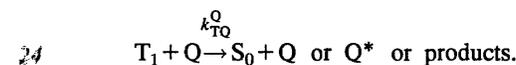
$$\frac{[A']_0}{[A'O_2]} = \frac{[A']_0}{\Delta[A']} = \frac{A^0}{\Delta A} = (I_a t \phi_{\Delta} f_{\text{r}}^{\text{A}'})^{-1} \left([A']_0 + \frac{k_{\text{d}}}{k_{\text{A}'}} + \frac{k_{\text{Q}}[Q]}{k_{\text{A}'}} \right), \quad (24)$$

where A⁰ and ΔA represent the initial absorbance and the change in the absorbance by the reactant A'. Plots of A⁰/ΔA vs [Q] have been shown to be linear and from Eq. (24) it follows that for such plots

$$k_{\text{Q}} = \frac{\text{slope}}{\text{intercept}} (k_{\text{d}} + k_{\text{A}'}[A']_0). \quad (25)$$

4.2.5. Sensitized Photo-Oxygenation of a Substrate A' in the Presence of A=Q, a Quencher of Both Singlet Oxygen and the Sensitizer Triplet

The mechanism is that given by Scheme 1 with M=A and Q, together with the reaction 24.



Application of the steady-state approximation gives

$$(r_{\text{ox}}^{\text{O}})^{-1} = (I_a \phi_{\Delta} f_{\text{r}}^{\text{A}'})^{-1} \left(\frac{k_{\text{TQ}}[Q]}{k_{\text{TQ}}[\text{O}_2]} + 1 \right) \times \left[1 + [A']^{-1} \left(\beta_{\text{A}'} + \frac{k_{\text{Q}}[Q]}{k_{\text{A}'}} \right) \right]. \quad (26)$$

Note that for a plot of (r_{ox}^O)⁻¹ vs [A']⁻¹ the slope/intercept is still given by Eq. (20) since the extra term in Eq. (26) affects both the intercept and slope equally. The presence or absence of this change in intercept for (r_{ox}^O)⁻¹ vs [A']⁻¹ plots can be used as a diagnostic test for the presence of steps such as 24 which reduce the yield of singlet oxygen produced. Another test is the occurrence of a dependence on the concentration of oxygen in solution since reaction 24 competes with oxygen quenching and thus the yield of singlet oxygen becomes dependent on the pressure of oxygen above the solution. (e.g., see Refs. 45, 46).

4.2.6. Separation of *k_r* and *k_q*

Apart from Eq. (17) application of all of the equations given so far only allows values of *k_A* = *k_r*^A + *k_q*^A or *k_O* = *k_r*^O + *k_q*^O to be obtained. Methods which have been used to separate *k_r* and *k_q* values usually involve the direct measurement

of the quantum yields of oxygenation, φ_{ox}, for example at high concentrations of A such that *k_A* [A] ≫ *k_d*, in which case it follows from Eq. (14) that

$$(\phi_{\text{ox}})_{[A] \rightarrow \infty} = \phi_{\Delta} f_{\text{r}}^{\text{A}'}. \quad (27)$$

Alternatively at low values of [A] when *k_d* ≫ *k_A*[A] Eq. (14) gives

$$\phi_{\text{ox}} = \frac{\phi_{\Delta} k_{\text{r}}^{\text{A}'} [A]}{k_{\text{d}}}, \quad (28)$$

and measurement of φ_{ox} together with a knowledge of φ_Δ, and *k_d* or β_A allows values of *k_r*^A or *f_r*^A to be determined.

The limiting yield of oxygenation of a very reactive acceptor e.g., α-terpinene or 2,5-dimethylfuran (2,5-DMF) for which *f_r*^A is close to unity (i.e., *k_r*^A ≫ *k_q*^A) may be used as a reference substrate to give values of φ_Δ and whence *k_r*^A for other additives.^{47,48}

Gollnick and Gricsbeck⁴⁹ have, for example, measured the rates of oxygen consumption of various substrates relative to that of 2,5-DMF at concentrations greater than 4 × 10⁻⁵ L⁻¹. In this method *k_r*^{DMF} ≫ *k_q*^{DMF}, *r_{ox}*^{DMF} = *I_a* φ_Δ, and

$$\frac{r_{\text{ox}}^{\text{DMF}}}{r_{\text{ox}}^{\text{A}}} = \frac{(k_{\text{r}}^{\text{A}} + k_{\text{q}}^{\text{A}})[A] + k_{\text{S}}[S] + k_{\Delta}}{k_{\text{r}}^{\text{A}}[A]},$$

or

$$\frac{r_{\text{ox}}^{\text{DMF}}}{r_{\text{ox}}^{\text{A}}} = \left(1 + \frac{k_{\text{q}}^{\text{A}}}{k_{\text{r}}^{\text{A}}} \right) + \left(\frac{k_{\Delta}}{k_{\text{r}}^{\text{A}}} + \frac{k_{\text{S}}[S]}{k_{\text{r}}^{\text{A}}} \right) \frac{1}{[A]}, \quad (29)$$

Plots of *r_{ox}*^{DMF}/*r_{ox}*^A versus [A]⁻¹ are linear and the value of *k_q*^A/*k_r*^A can be determined from the intercept. Variations in the slope of such plots with the sensitizer concentration allow values of *k_S*/*k_r*^A and *k_Δ*/*k_r*^A to be determined. If *k_Δ* is known then *k_r*^A, *k_S*, and *k_q*^A can be determined.⁴⁹

5. Kinetic Analysis for Oxygenation by Singlet Oxygen Generated by Chemical Reaction, by Microwave Discharge, or by Direct Laser Excitation

5.1. When Singlet Oxygen is Produced Chemically

Oxygenation reactions arising from singlet oxygen produced chemically have been studied in the presence and absence of singlet oxygen quenchers. In the absence of quencher the decrease in A is given by the relative probabilities of steps 14, 15, and 16, and 17 with M=A

$$-\frac{d[A]}{dt} = \frac{d[{}^1\text{O}_2^*]}{dt} \left[\frac{k_{\text{r}}^{\text{A}}[A]}{k_{\text{d}} + k_{\text{A}}[A]} \right], \quad (30)$$

which integrates to give

$$\beta_{\text{A}} \ln \left[\frac{[A]_0}{[A]_{\infty}} \right] + [A]_0 - [A]_{\infty} = f_{\text{r}}^{\text{A}} [{}^1\text{O}_2^*]_{\infty},$$

where [{}¹O₂^{*}]_∞ is the total amount of singlet oxygen generated chemically. For small fractional conversions

$$\ln \left(\frac{[A]_0}{[A]_\infty} \right) = \left(\frac{[A]_0 - [A]_\infty}{[A]_\infty} \right)$$

and substitution gives

$$\frac{1}{\Delta[A]} = (f_r^A [^1O_2^*]_\infty)^{-1} \left[\frac{\beta_A}{[A]_\infty} + 1 \right], \quad (31)$$

where $\Delta[A] = [A]_0 - [A]_\infty$. Thus a plot of $\Delta[A]^{-1}$ vs $[A]^{-1}$ for small conversions has slope/intercept = β_A . In the presence of a quencher of chemically produced singlet oxygen and a substrate A'

$$\left(\beta_{A'} + \frac{k_Q[Q]}{k_{A'}} \right) \left(\ln \left(\frac{[A']_0}{[A']_\infty} \right) + \Delta[A'] \right) = f_r^{A'} [^1O_2^*]_\infty, \quad (32)$$

so that if k_d and $k_{A'}$ are known, Eq. (32) allows k_Q to be evaluated from values of $[A']_0$ and $[A']_\infty$ in the presence of $[Q]$. With the decomposition of the ozonide $(C_6H_5O)_3P \cdots O_3$ in the presence of pyridine, Mendenhall⁵⁰ has shown that there is quantitative generation of $^1O_2^*$ so that $[^1O_2^*]_\infty$ can be replaced by the initial concentration of $(C_6H_5O)_3PO_3$, i.e., $[^1O_2^*]_\infty = [(C_6H_5O)_3PO_3]_0$ and $f_r^{A'}$ is often assumed to be unity when A' is rubrene.⁵⁰

5.2. When Singlet Oxygen is Produced by Microwave Discharge in the Gas Phase

Equations (31) to (32) also apply to the disappearance of a substrate as a result of reaction of singlet oxygen generated in microwave experiments (as well as for singlet oxygen produced via photosensitization). Taking Eq. (32) for relative measurements with the same initial concentration of substrate $[A'_0]$ in the presence and absence of a quencher gives

$$k_Q = \frac{k_{A'}([A']_\infty^Q - [A']_\infty^0) + k_d \ln \left(\frac{[A']_\infty^Q}{[A']_\infty^0} \right)}{[Q] \ln \left(\frac{[A']_0}{[A']_\infty^0} \right)}, \quad (33)$$

where $[A']_\infty^Q$ and $[A']_\infty^0$ represent the final values after exposure to microwave generated singlet oxygen in the presence and absence of quencher, respectively. Equation (33) has also been used following chemical and photochemical production of $^1O_2^*$ in the absence and presence of a quencher Q (or acceptor A).

5.3. When Singlet Oxygen is Produced by Direct CW Laser Excitation of Oxygen

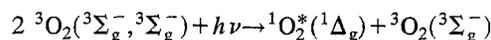
Evans and Tucker¹⁴ and Matheson and co-workers^{11-13,35,51} have used laser excitation of highly concentrated oxygen solutions in high pressure cells, with gaseous oxygen up to 130 atm, to give directly the $^1O_2^*(^1\Delta_g)$ state by absorption at 1065 nm from a CW Nd YAG laser and $^1O_2^*(^1\Delta_g)$ directly from the "double simultaneous transition" using He-Ne laser excitation at 632.8 nm. Evans and Tucker¹⁴ find the quantum yields of photo-oxygenation of 9,10-dimethylanthracene and tetraphenylcyclopentadiene are twice as high for absorption of a photon in the "double simultaneous transition" as for the direct excitation of a single

$^1\Delta_g$ state. Modification of Eq. (15) to account for the direct excitation by replacing ϕ_Δ by $n=1$ or 2 for excitation at 1065 nm or 633 nm, respectively, gives

$$\frac{1}{\phi_{ox}} = \frac{1}{n} \left[\frac{k_A}{k_r^A} + \frac{k_d}{k_r^A[A]} \right] \quad (34)$$

and plots of ϕ_{ox}^{-1} vs $[A]^{-1}$ can be used to give f_r^A and β_A values.

Matheson *et al.*^{11-13,35,51,52} have obtained experimental pseudo first order rate constants for the disappearance of various substrates while directly producing $^1O_2^*(^1\Delta_g)$ with a CW Nd YAG laser. Since the absorption involves the process



Eq. (14) has been modified by them to give

$$-\frac{d[A]}{dt} = \frac{\sigma E [O_2]^2 k_r^A [A]}{k_d + k_A[A] + k_{O_2}[O_2]}, \quad (35)$$

where E is the laser intensity and σ the absorption cross section for double photon absorption. At high oxygen concentration where $k_{O_2}[O_2] \gg (k_d + k_A[A])$ the observed first order rate constant k_1 is given by

$$k_1 = \frac{\sigma E [O_2] k_r^A}{k_{O_2}}. \quad (36)$$

Thus from a knowledge of σ , E , and $[O_2]$ values of k_r^A relative to k_{O_2} can be obtained. In the presence of a singlet oxygen quencher at relatively high concentrations and a substrate A'

$$k_1 = \frac{\sigma E [O_2]^2 k_r^{A'}}{k_{O_2}[O_2] + k_Q[Q]} \quad (37)$$

and a plot of $([O_2]/k_1)$ vs $([Q]/[O_2])$ will have a slope/intercept = k_Q/k_{O_2} .

Values obtained using this method have often been substantially lower than those given by other workers. According to Matheson^{51,52} this was due, partially at least, to an artifact with the over depletion of the acceptor concentration in the laser beam cross section so that the observed chemical reaction rate may be affected by diffusion of unreactive acceptor into the depleted region. Thus values for k_r^A determined in this way published prior to 1977 may be low by up to an order of magnitude and have been omitted from this compilation.

6. First Order Rate Constants for the Decay of Singlet Oxygen in Various Solvents—Comments on Table 1

Table 1 contains decay rates of singlet oxygen in 145 solvents and solvent mixtures. Many of the data have been reported as lifetimes (τ), the reciprocal of the decay rate, which have been tabulated. The decay rate (k_d) column contains reported values as well as values calculated from lifetimes. The values in both columns are rounded to two significant figures. When the data were reported with one significant

figure, or when the quoted error exceeded 20%, only one significant figure is given. The *Method*, *Comment*, and *Reference* columns (see Secs. 7.2.4–7.2.6) provide details of the measurements. Only data obtained by time-resolved methods have been included except for solvents where no such measurements have been reported but where estimates have been made from steady-state measurements.

The data for each solvent are listed in reverse chronological order, so that the most recent entries appear first. It is apparent from Table 1 that k_d values tend to decrease with year of publication especially for solvents with values $<10^2 \text{ s}^{-1}$. For such solvents the presence of impurities including water and high concentrations of sensitizers can give inaccurate values. It is likely that the lower the k_d values the higher the accuracy. Usually there is good agreement between different authors for k_d values $>10^3 \text{ s}^{-1}$.

The lifetime of singlet oxygen shows an enormous solvent dependence, including a large isotope effect, and variations over almost five orders of magnitude from a few microseconds in water to hundreds of milliseconds in carbon tetrachloride. The reason for this is that the nonradiative deactivation is essentially a bimolecular energy transfer reaction between $\text{O}_2^*(^1\Delta_g)$ and the solvent molecules which thereby become vibrationally excited. The first interpretation by Merkel and Kearns³² that the electronic vibrational energy transfer was a dipole resonance transfer has been replaced by an exchange transfer mechanism following important contributions by Schuster *et al.*,^{27,53} Rodgers,⁵⁴ and Schmidt *et al.*^{55–58} The bimolecular rate constant for solvent deactivation k_{sol} can be obtained from

$$k_D = k_0 + k_{\text{sol}}[\text{sol}],$$

where k_0 is an intrinsic molecular rate constant probably equal to $k_{\Delta P}$, the rate constant for radiative decay, and $[\text{sol}]$ represents the concentration of the solvent in mol L^{-1} calculated from the density and the molecular weight of the solvent; k_{sol} can be shown to depend on the availability of high energy X–Y, especially C–H and O–H, vibrations in the molecule. Thus several workers have shown that

$$k_{\text{sol}} = \sum_{XY} N_{XY} k_{XY},$$

where N_{XY} is the number of times a particular X–Y bond occurs in the molecule. In this way values for k_{XY} have been calculated, which can be used to calculate k_{sol} values for solvents for which values of k_d have not been experimentally determined. Since $k_{\Delta P}$ varies from 0.1 to 3 s^{-1} , k_0 is often negligible compared with $k_{\text{sol}}[\text{sol}]$, but for solvents containing no high energy vibrations values of $k_{\Delta P}$ have been used by Schmidt to obtain k_{XY} values from k_D , for example in CCl_4 and CS_2 which show the lowest values for k_D .

We made several attempts to calculate k_{XY} values from the k_d values in Table 1 which includes solvents with C–H, C–D, C=O, O–H, O–D, C≡N, C–F, C–Cl, C–Br, C–I, C=S, and S=O bonds. We used the formula

$$k_d/[\text{sol}] = \sum_{XY} N_{XY} k_{XY}$$

as the basis for a least squares fitting of the measured values of k_d to obtain a set of values for k_{XY} . The procedure resulted in negative values for some parameters and statistical uncertainties for many that were larger than the value of the parameter. Restricting the data set, for example by eliminating solvents containing halogens, deuterium and sulfur and measured values which deviated significantly from the average, did not eliminate this problem. Separation of C–H bonds into classes (CH_3 , CH_2 , CH, cycloalkyl, aromatic) and perhaps other X–Y bonds as well, and the selection of standard k_d values appear to be crucial to establishing a set of k_{XY} values.

7. Second-order Rate Constants for Reactive and Physical Quenching of Singlet Oxygen by Various Substrates—Comments on Tables 2–17

7.1. Scope of the Compilation

Second-order rate constants for quenching of singlet oxygen are given in 16 tables containing 4683 separate entries for 1915 substrates. The data have been extracted from the literature published through 1993. The papers have been selected from the bibliographic database of the Radiation Chemistry Data Center and from citations in those papers. Data reported by the same author(s) which have been clearly superseded have been omitted. For some well-studied systems many independent measurements have been made; all reported values have been included allowing the user to make comparisons based on method, similarity of values, etc. Data from dissertations and conference papers have been included only if no other measurements for the substrate in that solvent have been reported. The authors would welcome having our attention drawn to any data which have been missed.

7.2. Arrangement of Tables

Each table includes related groups of compounds, e.g., olefins, aromatic hydrocarbons, phenols, etc. In some cases choices were made based on functionality, for example tyrosine and its peptides are in Table 4 with phenols instead of Table 10 (amino acids and peptides). Benzopyranols (such as tocopherol) are in Table 4 (phenols) instead of Table 5 (furans and pyrans). Cysteine and methionine and their derivatives are in Table 11 (sulfur compounds), not Table 10 (amino acids).

Within each table the various substrates are arranged alphabetically by name, given an entry number which includes the table number (2.1, 2.2, etc.) and within each entry the arrangement is by solvent. Inverted names have been used as headings whenever possible so that substituted anthracenes, porphines, phenols, etc. are grouped. Systematic names have been used in most cases, otherwise, common names have been given. An index of chemical names and synonyms and a molecular formula index follow the tables (Secs. 13 and 14) and refer to the entry numbers in Tables 2–17.

7.2.1. Solvent

Data in each entry are grouped by solvent and listed in reverse chronological order of the year of publication. The *Solvent* column gives the solvent or mixture of solvents with the proportions (volume:volume). Micellar systems are labelled (mic), and the surfactant present is given in the *Comment*. When water or D₂O is the solvent the pH or pD is given, if reported. If the reaction was studied over a range of pH values and the *k* derived for a particular ionic form of the substrate no pH is given in the *Solvent* column and the pH range is given in the *Comment* column.

7.2.2. Rate Constants (*k*) and Beta (*k_d/k*) Values

The rate constants in the second column are for total quenching by chemical reaction and/or physical quenching, $k = k_r + k_q$, except where separate reactive quenching (k_r) and physical quenching (k_q) rate constants have been measured. It may be known from other studies that a particular substrate interacts with singlet oxygen totally by chemical reaction ($f_r^A = 1$) or totally by physical quenching; an example of the latter is azide ion. We have, however, only provided the labels k_r and k_q when a method was used which made the distinction. Values of β which have been reported are listed in the third column. When the ratio is k_d/k_r the label β_r is used.

Values of *k* and β have been rounded to two significant figures unless they were given to only one significant figure by the authors. The authors' error limits have been omitted; when the reported error is greater than 20% the values have been given to one significant figure. Upper or lower limits have been given to only one significant figure.

7.2.3. Temperature

Temperatures in Kelvin are listed whenever they have been reported. When the information has not been reported it is assumed that the temperature is ambient. If the study has been carried out over a range of temperatures the range is given in the *Comment* column.

7.2.4. Method

The *Method* column describes the method by symbols (see Sec. 9) representing the excitation technique, the measurement technique, and the equation numbers given in the previous sections which have been used for analyzing the data. For example, PL/Ld-2 represents the pulsed-laser luminescence-decay technique and refers to Eq. (2). If two measurement techniques or equations were used the symbols are combined. For example, CP/Oc,Ac-17 indicates that excitation was by continuous photolysis, oxygen consumption (Oc) and substrate consumption (Ac) were measured, and the rate constant was derived using Eq. (17).

7.2.5. Comment

Some details of the determination are given in the *Comment* column. Abbreviations and symbols are listed in Sec. 9 for chemical species which have been used as photosensitizer

(S) or reference substrate (A'). The source of the $^1O_2^*$ is given when it was generated in a chemical reaction. Values for k_d which have been used by the author to calculate *k* from β (k_d/k) are given. The reader is referred to Table 1 to compare these values with the various measured values of k_d for a particular solvent. In some cases values of $\beta_{A'}$ for the reference substrate have been used to calculate β (or to calculate *k* also using a value of k_d) and those values are given in the *Comment*. Data are available for some substrates only as ratios with a reference substrate (e.g., $k_r^A/k_r^{A'}$). When a value for the rate constant for the reference substrate has been used by the author(s) to calculate *k*, the reference value which was used is given in the *Comment* column. When rate constants have not been calculated by the authors the ratios are given in the *Comment* column and no value appears in the *k* column; the ratios have been rounded to two significant figures. Since ratios of rate constants refer equally to both substrates, the reference substrates (A') have been included in the Chemical Name Index (Sec. 14) with the entry number(s) in which ratios of rate constants with another substrate are present or can be derived. For example, Acetone azine appears in Table 15 (entry 15.3) but rate constants for another substrate relative to k_r for acetone azine are found in entry 2.40. There is no entry in the tables for 9-Acetyl-2,3,4,9-tetrahydrocarbazole but relative data are found in entries 6.2, 6.3, 6.10, 6.14, 6.18, and 6.19.

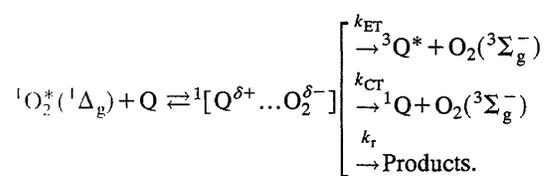
Other data are included when they have been reported: activation energy (E_a), activation volume (ΔV^\ddagger), enthalpy of activation (ΔH^\ddagger), entropy of activation (ΔS^\ddagger), along with the temperature or pressure ranges of the study. For some entries where product appearance (Pa) was measured the products have been given.

7.2.6. References

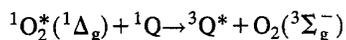
The rate constants have been compiled from more than 700 references which are identified in the *Reference* column by codes from the Radiation Chemistry Data Center Bibliographic Database. The first two characters of the reference code represents the year of publication. The complete references to Tables 1–17 are listed in Sec. 12 which follows the tables.

8. Mechanism of Quenching

Two recent reviews^{1,2} discuss bimolecular processes of singlet molecular oxygen in detail. Most results can be explained in terms of exciplex formation followed by competing reactions involving energy transfer (ET), charge transfer (CT) or chemical reaction as shown.

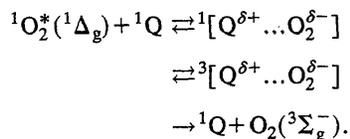


It is well established that quenching of singlet oxygen arises from chemical reaction and/or physical quenching or a combination of both. Physical quenching due to the spin-allowed electronic energy transfer process



has been demonstrated to occur by direct observation of the triplet state of the quencher, e.g., in the case of various carotenes.³⁷ This type of quenching is diffusion controlled when the triplet energy of the quencher lies below 94 kJ mol⁻¹ and has been proposed as the mechanism of quenching to account for the high efficiency of quenching of singlet oxygen by certain dyes and several coordination complexes.^{59,60} Quenching of singlet oxygen by electronic energy transfer is the reverse of reaction II which is likely to be a limiting factor for finding sensitizers absorbing in the red for use in photodynamic therapy.⁶¹ Physical quenching of singlet oxygen as discussed in Sec. 6, also arises as a result of electronic to vibrational energy transfer, where the pseudo-first order decay constant in a particular solvent depends on the availability of high energy vibrations for example O-H and C-H vibrations in the solvent molecule. This kind of process is obviously possible for all substrates but is often much less efficient than physical quenching resulting from charge transfer interactions.

Physical quenching resulting from favorable charge transfer interactions was first demonstrated with various amines.^{62,63} This type of quenching may be represented as follows:



If the charge transfer complexes shown above are able to dissociate to give separated ions this constitutes chemical quenching, although the production of O₂⁻ (superoxide) has only been demonstrated for highly polar solvents such as water and with compounds with exceptionally low ionization potentials such as *N,N,N',N'*-tetramethyl-*p*-phenylenediamine.⁶⁴ The temperature dependence of the rate constants observed⁶⁵ for singlet oxygen quenching by strychnine and DABCO in toluene has established complex formation during the quenching process. The efficiency of quenching by amines increases when the ionization potential of the amine decreases, which is also the case for quenching by phenols and sulfides which give similar Hammett plots.^{66,67} Quenching by amines, phenols and, sulfides shows varying amounts of chemical reaction.

Chemical reactions of singlet oxygen have been discussed in detail in a number of reviews.⁶⁸⁻⁷² Alkenes react to form hydroperoxides, 1,2-dioxetanes, and endoperoxides, which are often produced in the case of other substrates, for example in the case of aromatic hydrocarbons, furans, etc. Recent research^{73,74} has revealed that intermediates exist along the reaction coordinate and there has been much speculation concerning the nature of these intermediates. Since it is known that tryptophan is one of the main targets when O₂^{*}(¹Δ_g) reacts with protein^{75,76} there has been considerable

interest in studying rate constants for reaction of singlet oxygen with tryptophan in a variety of solvents. As with many other amino acids⁷⁷ reactive quenching only accounts for part of the total quenching of singlet oxygen observed. It has been shown⁷⁸ that singlet oxygen causes single-strand breaks in DNA and that guanine is the nucleoside base from which oxidative products are derived. As with all substrates it is important to establish that particular products arise as a result of reactions of singlet oxygen. It is hoped that this compilation will help with establishing the importance of singlet oxygen reactions in the photodegradation of dyes, pigments, polymers, etc, as well as in harmful and/or beneficial photo-oxidations in biological systems.

9. List of Abbreviations and Symbols

Excitation Methods

CL	continuous laser photolysis
CP	continuous photolysis
CR	chemical reaction
FP	flash photolysis
MD	microwave discharge
MP	modulated photolysis
PL	pulsed laser photolysis
PR	pulsed radiolysis

Measurement Methods

Ac	substrate consumption under steady-state conditions
A'c	reference substrate consumption under steady-state conditions
Ad	time resolved substrate disappearance
A'd	time resolved reference substrate disappearance
βCd	triplet beta-carotene decay as a probe for singlet oxygen decay
Ld	luminescence decay
LI	luminescence intensity under steady-state conditions
Oc	oxygen consumption under steady-state conditions
Pa	product appearance under steady-state conditions
P'a	product appearance (from reference substrate) under steady-state conditions
Pb	time-resolved product buildup
P'b	time-resolved product buildup (from reference substrate)
Tb	time-resolved thermal buildup

Other Symbols

A	primary substrate
A'	reference substrate
A''	second reference substrate
β	beta value including both β _q and β _r
β _q	beta value for physical quenching of ¹ O ₂ [*]
β _r	beta value for chemical reaction
E _a	activation energy
ΔH [‡]	enthalpy of activation

ΔS^\ddagger	entropy of activation	CQ	Camphoroquinone
ΔV^\ddagger	activation volume	CTAB	Hexadecyltrimethylammonium bromide
f_r^A	fraction of $^1O_2^*$ quenched by A which reacts	CTAC	Hexadecyltrimethylammonium chloride
k	rate constant including both k_q and k_r	CuTCPC	Copper(II) tetracarboxyphthalocyanine
k_A	rate constant for primary substrate, including both k_q and k_r	DABCO	1,4-Diazabicyclo[2.2.2]octane
$k_{A'}$	rate constant for reference substrate, including both k_q and k_r	DAP	Dodecylammonium propionate
k_d	first-order decay rate of singlet oxygen in solvent	DBrA	9,10-Dibromoanthracene
k_Δ	first-order decay rate of singlet oxygen for [S]→0	DCA	9,10-Dicyanoanthracene
k_Q	rate constant for reference substrate which is a physical quencher	DCIA	9,10-Dichloroanthracene
k_q	rate constant for physical quenching of $^1O_2^*$	DDAB	Didodecyltrimethylammonium bromide
k_r	rate constant for chemical reaction of $^1O_2^*$	DDM	Diazodiphenylmethane [1,1'-(Diazomethylene) bisbenzene]
k_S	rate constant for reaction of $^1O_2^*$ with sensitizer	DLPC	Dilauroyl phosphatidylcholine
mic	micelles	DMA	9,10-Dimethylantracene
P	product of primary substrate	DMAA	<i>N,N</i> -Dimethylacetamide
P'	product of reference substrate	DMAO ₂	9,10-Dimethylantracene endoperoxide
ϕ_Δ	quantum yield of singlet oxygen formation	DMBA	9,10-Dimethyl-1,2-benzanthracene
ϕ_{isc}	quantum yield of intersystem crossing	DMDPA	1,4-Dimethoxy-9,10-diphenylantracene
ϕ_{ox}	quantum yield of oxidation of substrate	2,5-DMF	2,5-Dimethylfuran
Q	reference substrate which is a physical quencher	DMF	<i>N,N</i> -Dimethylformamide
r_{ox}	rate of oxygenation	DMHD	2,5-Dimethyl-2,4-hexadiene
S	sensitizer	DMNO ₂	1,4-Dimethylnaphthalene 1,4-endoperoxide
ves	vesicles	DNT	1,8-Dinaphthalene thiophene (Diacenaphtho[1,2- <i>b</i> :1',2'- <i>d</i>]thiophene)

Sensitizers, Reference Substrates, and Medium Components

Ac	Acridine	DODAC	Diocadecyltrimethylammonium chloride
2-ACN	2-Acetonaphthone	DPA	9,10-Diphenylantracene
ADC	Anthra[1,9- <i>bc</i> :4,10- <i>b'</i> <i>c'</i>]dichromene	DPB	1,4-Diphenyl-1,3-butadiene
ADPA	9,10-Anthracenedipropionate ion	DPBF	1,3-Diphenylisobenzofuran
AES	Anthracene-9,10-bis(ethanesulfate ion)	DPF	2,5-Diphenylfuran
AlCl(tspc)	Chloroaluminum(III) sulfophthalocyanine	DPPC	Dipalmitoyl phosphatidylcholine
An	Anthracene	DTAC	Dodecyltrimethylammonium chloride
AnS	Anthracenesulfonate	Eos	Eosin (Tetrabromofluorescein)
AOT	Di(2-ethylhexyl) sulfosuccinate	Ery	Erythrosin (Tetraiodofluorescein)
azine	2-Pivaloyl-4-phenyl-6-dichthylamino-8-methyl-quinoxal-3-one	ES	Ergosterol
Azo dye 10	<i>N</i> -[3-(Aminosulfonyl)phenyl]-3-[(3-cyano-5-hydroxy-1-phenylpyrazol-4-yl)azo]-4-methoxybenzenesulfonamide	EtOH	Ethanol
BA	1,2-Benzanthracene	FFA	Furfuryl alcohol
BChl	Bacteriochlorophyll	FI	Fluorene
BDX	Benzo[1,2,3- <i>kl</i> :4,5,6- <i>k'l'</i>]dixanthene	FI ²⁻	Fluorescein
BHMF	2,5-Bis(hydroxymethyl)furan	FIN ₂	9-Diazofluorene
BHT	2,6-Di- <i>tert</i> -butyl-4-methylphenol	FMN	Flavin mononucleotide (Riboflavin-5'-phosphate)
Biph	Biphenyl	GaCl(tspc)	Chlorogallium(III) sulfophthalocyanine
BP	Benzophenone	GV	Gilvocarin V
BR	Bilirubin	HA	Hypocrellin A
Brij 35	Polyoxyethylene(23) dodecyl ether	HCD	Heterocoerdianthrone
BuOH	Butanol	3-HF	3-Hydroxyflavone
BXP	Benoxapofen	His	Histidine
Car	all- <i>trans</i> -Carotene	HP	Hematoporphyrin
CHD	Cyclohexadiene	HPD	Hematoporphyrin derivative
Chl	Chlorophyll	HYP	Hypericin
Chr	Chrysene	Im	Imidazole
Cor	Coronene	InH	Indole
		MB	Methylene Blue
		2M2B	2-Methyl-2-butene
		MC 540	Merocyanine 540
		MCH	Methylcyclohexane
		MDH	Mesodiphenylhelianthrene
		MeOH	Methanol

Met	Methionine	RF	Riboflavin
MNPO ₂	4-Methyl-1-naphthalenepropionate endoperoxide	RF(OAc) ₄	Riboflavin tetraacetate
8-MOP	8-Methoxypsoralen	Rub	Rubrene (5,6,11,12-Tetraphenylnaphthacene)
MP	Mesoporphyrin	Rubi	Rubicene (Benz[<i>a</i>]indeno[1,2,3- <i>hi</i>]aceanthrylene)
2M2P	2-Methyl-2-pentene	SDS	Sodium dodecylsulfate
MPDME	Mesoporphyrin dimethyl ester	SiNC	Bis(tri- <i>n</i> -hexylsiloxy)-(2,3-naphthalocyaninato) silicon
NAZ	Nitrazepam	TAN	2,2,6,6-Tetramethylpiperidone-1-oxyl
NDPO ₂	1,4-Naphthalenedipropionate endoperoxide	TEMP	2,2,6,6-Tetramethylpiperidine
NMTA	<i>N</i> -Methylthioacridone	TEMPO	2,2,6,6-Tetramethylpiperidin-1-oxyl
Np	Naphthalene	TEMPOH	2,2,6,6-Tetramethylpiperidin-1-ol
NT2	Octaethylpurpurin ethyl ester	TEMP-4-OH	2,2,6,6-Tetramethylpiperidin-4-ol
<i>i</i> -octane	2,2,4-Trimethylpentane	Tetr	Tetracene (Naphthacene)
OMAPB	2-Methylacetophenone biradical	Th	Thionine
PBA	1-Pyrenebutyrate ion	THF	Tetrahydrofuran
PBN	Phenyl- <i>N</i> - <i>tert</i> -butylnitron	TMDT	2,6,10-Trimethyl-2,6,10-dodecatriene
PEO	Polyethylene oxide	TME	2,3-Dimethyl-2-butene (Tetramethylethylene)
Per	Perylene	T(m-HOP)P	Tetra(3-hydroxyphenyl)porphyrin
Ph	Pheophytin	TMS	α,β,β -Trimethylstyrene
Phen	Phenanthrene	TPBC	<i>trans</i> -Tetraphenylbacteriochlorin
PHO	Phenalen-1-one	TPP	Tetraphenylporphyrin
Poly-RB	Polymer supported Rose Bengal	H ₂ TPPS ⁴⁻	Tetra(4-sulfonatophenyl)porphyrin
PP	Protoporphyrin	Triton X-100	Polyoxyethylene(10)4-(1,1,3,3-tetramethyl-butyl)phenyl ether
PPDME	Protoporphyrin dimethyl ester	TTMPP	Tetra(3,4,5-trimethoxyphenyl)porphyrin
PrOH	Propanol	TTT	Terthiophene
PrPor	2,7,12,17-Tetrapropylporphycene	UP	Uroporphyrin I
Pso	Psoralen	VD ₃	Vitamin D ₃
Pt(DHBA)(DPA)	Platinum(II) (3,4-dihydroxybenzoate) (2,2'-dipyridylamine)	Zn(pc)	Zinc(II) phthalocyanine
Pt(phen)(BCAT)	Platinum(II) (1,10-phenanthroline) (<i>tert</i> -butylcatechol)	Zn(pc)(py) ₂	Zinc(II) phthalocyaninebis(pyridine)
Pt(phen)(CAT)	Platinum(II) (1,10-phenanthroline) (catechol)	Zn(tspc)	Zinc(II) sulfophthalocyanine
Pt(phen)(DMT)	Platinum(II) (1,10-phenanthroline) (3,4-dimercaptotoluene)	ZnTPP	Zinc(II) tetraphenylporphyrin
PTSA	Pyrenetetrasulfonate ion		
Pur	Purpurin		
py	Pyridine		
Py	Pyrene		
Pz	Phenazine		
RB	Rose Bengal (Tetrachlorotetraiodofluorescein)		
RBCE	Rose Bengal complexed with dicyclohexyl-18-crown-6		
Ret	<i>all-trans</i> -Retinal		

10. ACKNOWLEDGMENTS

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TABLE I. Decay constants for singlet oxygen in various solvents.

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.1 Acetone						
		2.0×10^4	5.1×10^{-5}	PL/Ld-2	S = MB, TPP or PHO.	92E256
		1.9×10^4	5.4×10^{-5}	PL/Ld-2	S = HVD and PPDME.	92E274
		2.6×10^4	3.8×10^{-5}	PL/Ld-2	S = RB.	89E324
		2.3×10^4	4.3×10^{-5}	PL/Ld-2	S = TPP.	89E324
		2.4×10^4	4.1×10^{-5}	PL/Ld-2	S = MB.	89E700
		2.2×10^4	4.6×10^{-5}	PL/Ld-2	S = RB.	89E700
		2.1×10^4	4.8×10^{-5}	PL/Ld-2	S = HP.	89E700
		2.0×10^4		PL/Ld-2	S = Ac.	87E466
		1.8×10^4	5.5×10^{-5}	PL/Ld-2	S = An.	87E668
		2.1×10^4	4.7×10^{-5}	PL/Ld-2	S = An.	87E959
		2.5×10^4	4.0×10^{-5}	PL/Tb-3	S = An.	85E591
		2.1×10^4	4.7×10^{-5}	PL/Tb-3	S = ZnTPP.	85E591
		2.0×10^4	5.0×10^{-5}	PL/Ld-2	S = 2-ACN.	84E066
		4.0×10^4	2.5×10^{-5}	PL/Tb-3	S = Ery.	83A050
		3.3×10^4	3.0×10^{-5}	PL/Tb-3	S = TPP.	83A050
		2.0×10^4	5.0×10^{-5}	PL/Ld-2	S = HPDME.	83A223
		2.1×10^4	4.7×10^{-5}	PL/Ld-2	S = MPDME; no change in k at $T = 192$ to 295 K.	83E235 82E106
		2.0×10^4	5.1×10^{-5}	PL/Ld-2	S = Sulfo- and carboxyanthracenes.	83E844
		2.2×10^4	4.6×10^{-5}	PL/Ld-2	S = MPDME.	83F196
		2.8×10^4	3.6×10^{-5}	PL/Ad-8	S = An; A = DPBF.	82A349
		2.6×10^4	3.9×10^{-5}	PL/Ld-2	S = MB.	82E104
		2.5×10^4	4.0×10^{-5}	PL/Ld-2	S = RB.	82E104
		2.0×10^4	5.1×10^{-5}	PL/Ld-2	S = TPP.	82E104
		1.5×10^4	6.5×10^{-5}	PL/Ld-2	S = HP.	82E105
		2.6×10^4	3.9×10^{-5}	CP/LI-12	S = Benz[de]anthracen-7-one, phenalene or fluorenone; rel. to $k_d = 4.0 \times 10^4 s^{-1}$ in benzene.	82E329
		1.8×10^4	5.5×10^{-5}	PL/Ad-5	S = 2-ACN; A = DPBF; cor. for k_S .	81A287
		2.0×10^4	5.1×10^{-5}	PL/Ld-2	S = PdMPDME.	81E398 83E818 79E846
		2.0×10^4	5.0×10^{-5}	PL/Ld-2	S = TPP.	81E631
		2.4×10^4	4.2×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	76F903
		4×10^4	3×10^{-5}	PL/Ad-5	S = MB, A = DPBF.	727260
1.2 Acetone-d_6						
		1.0×10^3	9.9×10^{-4}	PL/Ld-2	S = MB, TPP or PHO.	92E256
		1.6×10^3	6.4×10^{-4}	PL/Ld-2	S = RB; varied [S] and extrapolated to [S] = 0.	89E324
		8.2×10^3	1.2×10^{-4}	PL/Tb-3	S = An.	85E591
		1.7×10^3	5.8×10^{-4}	PL/Ld-2	S = HPDME.	83A223
		1.2×10^3	8.6×10^{-4}	PL/Ld-2	S = MB, RB or TPP.	83E398
		2.6×10^3	3.9×10^{-4}	PL/Ld-2	S = PdMPDME.	83E818
		1.2×10^3	8.4×10^{-4}	PL/Ld-2	S = HP.	82E105
		1.4×10^3	6.9×10^{-4}	PL/Ld-2	S = MPDME.	82E106 83E235
		1.3×10^3	7.7×10^{-4}	CP/LI-12	S = Benz[de]anthracen-7-one, phenalene or fluorenone; rel. to $k_d = 4.0 \times 10^4 s^{-1}$ in benzene.	82E329
		1×10^3	8×10^{-4}	PL/Ad-5	S = 2-ACN; A = Rub; cor. for k_S .	81A287

TABLE 1. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.3 Acetonitrile						
		1.4×10^4	7.1×10^{-5}	PL/Ld-2	S = DCA.	93A244
		1.3×10^4	7.7×10^{-5}	PL/Ld-2	S = Ac.	93A244
		1.4×10^4		PL/Ld-2	S = Chr; rate decreased linearly with magnetic field strength, by 4-7% at 21kG.	93E183
		1.6×10^4	6.0×10^{-5}	PL/Ld-2	S = Ru(bpy) ₃ ²⁺ .	92A095
		1.3×10^4	7.7×10^{-5}	PL/Ld-2	S = MB, TPP or PHO.	92E256
		1.3×10^4	8.0×10^{-5}	PL/Ld-2	S = 1-MeNp.	91E297
		1.3×10^4		PL/Ld-2	S = Ac.	89A099
		1.3×10^4	7.5×10^{-5}	PL/Ld-2	S = OMAPB; extrapolated to zero laser dose.	89A241
		1.2×10^4	8.3×10^{-5}	PL/Ld-2	S = RB or H ₂ TPPS ⁴⁻ .	89A322 93U041
		3.0×10^4	3.3×10^{-5}	PL/Tb-3	S = (C ₆ H ₅) ₂ CO.	89E232
		1.8×10^4	5.5×10^{-5}	PL/Ld-2	S = RB.	89E324
		1.7×10^4	6.0×10^{-5}	PL/Tb-3	S = Ac.	88Z155
		1.5×10^4	6.7×10^{-5}	PL/Ld-2	S = Np, Biph, or Fl.	87E234
		1.2×10^4		PL/Ld-2	S = Ac.	87E466
		1.8×10^4	5.5×10^{-5}	PL/Ld-2	S = An.	87E668
		1.2×10^4	8.7×10^{-5}	PL/Ld-2	S = RB; from high intensity photolysis; M = ¹ O ₂ *	87F333
		1.9×10^4	5.4×10^{-5}	PL/Ld-2	¹ O ₂ * from 9,10-diphenylanthracene endoperoxide.	86F337
		2.1×10^4	4.8×10^{-5}	PL/Tb-3	S = An.	85E591
		1.8×10^4	5.6×10^{-5}	PL/Ld-2	S = 2-ACN.	84E066
		2.8×10^4	3.6×10^{-5}	PL/Tb-3	S = Ery.	83A050
		1.7×10^4	5.8×10^{-5}	PL/Ld-2	S = HPDME.	83A223
		1.6×10^4	6.4×10^{-5}	PL/Ld-2	S = MPDME.	83F196
		2.9×10^4	3.5×10^{-5}	PL/Ad-8	S = An; A = DPBF.	82A349
		1.6×10^4	6.1×10^{-5}	PL/Ld-2	S = RB.	82E104
		1.5×10^4	6.8×10^{-5}	PL/Ld-2	S = MB.	82E104
		1.8×10^4	5.4×10^{-5}	PL/Ld-2	S = MPDME.	82E106 83E235
		1.7×10^4	5.8×10^{-5}	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; rel. to $k_d = 4.0 \times 10^4 s^{-1}$ in benzene.	82E329
		1.1×10^4	9.2×10^{-5}	PL/Ad-5	S = 2-ACN; A = DPBF; cor. for k_S .	81A287
		1.8×10^4	5.7×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	76F903
		3×10^4	3×10^{-5}	PL/Ad-5	S = MB, A = DPBF.	727260
1.4 Acetonitrile/Water (50:50)						
		6.7×10^4	1.5×10^{-5}	PL/Ld-2	S = 9-Anthracenemethanol.	93F069
		4.5×10^4	2.2×10^{-5}	PL/Ld-2	S = RB.	93R059
1.5 Acetonitrile-d₃						
		9.0×10^2	1.1×10^{-3}	PL/Ld-2	S = Chr.	93E183
		8.2×10^2	1.2×10^{-3}	PL/Ld-2	S = RB or H ₂ TPPS ⁴⁻	89A322 93U041
		6.7×10^2	1.5×10^{-3}	PL/Ld-2	S = Pz.	89E597
		1.7×10^3	6.0×10^{-4}	PL/Ld-2	S = RB; from high intensity photolysis; M = ¹ O ₂ *	87F333
		9.3×10^3	1.1×10^{-4}	PL/Tb-3	S = An.	85E591
		1.6×10^3	6.2×10^{-4}	PL/Ld-2	S = HPDME.	83A223

TABLE I. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.5 Acetonitrile-d_3 — Continued						
		2.3×10^3	4.4×10^{-4}	PL/Ld-2	S = MB, RB or TPP.	83E398
		1.7×10^3	6.0×10^{-4}	PL/Ld-2	S = MPDME.	82E106 83E235
		1.1×10^3	9.5×10^{-4}	CP/LI-12	S = Benz[de]anthracen-7-one, phenalene or fluorenone; rel. to $k_d = 4.0 \times 10^4 s^{-1}$ in benzene.	82E329
		8×10^2	1×10^{-3}	PL/Ad-5	S = 2-ACN; A = Rub; cor. for k_s .	81A287
1.6 Acetophenone						
		3.8×10^4		PL/Ad-5	S = MB; A = DPBF.	83A371 83A006
1.7 Benzene						
		3.2×10^4	3.1×10^{-5}	PL/Ld-2	S = TPP; $\Delta V^\ddagger = -8.3 \text{ cm}^3 \text{ mol}^{-1}$; studied from 0.1 MPa to 250 MPa.	93A017
		3.3×10^4	3.0×10^{-5}	PL/Ld-2	S = Ac.	93A244
		3.3×10^4	3.0×10^{-5}	PL/Ld-2	S = Chr.	93E183
		3.3×10^4	3.0×10^{-5}	PL/Ld-2	S = MB, TPP or PHO.	92E256
		3.3×10^4	3.0×10^{-5}	PL/Ld-2	S = TPP.	92E555
		3.4×10^4		PL/Ld-2	S = TPP.	92F251
		3.2×10^4	3.1×10^{-5}	PL/Ld-2	S = 1-MeNp.	91E297
		3.3×10^4	3.0×10^{-5}	PL/Ld-2	S = Np, Pz and BP.	90A328
		3.2×10^4	3.1×10^{-5}	PL/Ld-2	S = Por.	90E374
		3.2×10^4	3.1×10^{-5}	PL/Ld-2	S = An.	90E400
		7.4×10^4	1.4×10^{-5}	PL/Ld-2	S = CHD.	89A235
		3.3×10^4	3.0×10^{-5}	PL/Ld-2	S = TPP.	89A322 93U041
		3.9×10^4	2.6×10^{-5}	PL/Ld-2	S = Ac.	89E324
		3.2×10^4	3.1×10^{-5}	PL/Ld-2	S = TPP.	89E388
		3.1×10^4	3.2×10^{-5}	PL/Ld-2	S = TPP.	89E700
		-3.4×10^4	-2.9×10^{-5}	PL/Ld-2	S = $(C_6H_5)_2CO$.	88E452
		3.2×10^4	3.1×10^{-5}	PL/Ld-2	S = TPP.	88F503
		3.3×10^4	3.0×10^{-5}	PL/Tb-3	S = $(C_6H_5)_2CO$.	88Z155
		3.0×10^4	3.3×10^{-5}	PL/Ld-2	S = TPP.	87E055
		3.1×10^4	3.2×10^{-5}	PL/Ld-2	S = Np, Rp, or Fl.	87E234
		3.3×10^4		PL/Ld-2	S = Ac.	87E466
		3.3×10^4	3.0×10^{-5}	PL/Ld-2	S = An.	87E668
		3.6×10^4	2.8×10^{-5}	PL/Ld-2	S = An.	87E959
		2.9×10^4	3.5×10^{-5}	PL/Ld-2	S = SiNC; reversible energy transfer with sensitizer proposed.	87R032
		4.1×10^4		PL/Ad-8	S = PP; A = DPBF.	85A124
		3.4×10^4	2.9×10^{-5}	PL/Tb-3	S = ZnTPP.	85E591
		3.3×10^4	3.0×10^{-5}	PL/Tb-3	S = An.	85E591
		3.2×10^4	3.1×10^{-5}	PL/Ld-2	S = 2-ACN.	84E066
		4.0×10^4		PL/Ad-5	S = 2-ACN; A = DPBF.	84F005
		4.3×10^4	2.3×10^{-5}	PL/Tb-3	S = TPP.	83A050
		3.2×10^4	3.1×10^{-5}	PL/Ld-2	S = HPDME.	83A223
		3.1×10^4	3.2×10^{-5}	PL/Ld-2	S = MB, RB or TPP.	83E398
		3.4×10^4	2.9×10^{-5}	PL/Ld-2	S = MPDME.	83F196
		3.7×10^4	2.7×10^{-5}	PL/Ld-2	S = MPDME.	82E106 83E235

TABLE 1. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.7 Benzene — Continued						
		3.5×10^4	2.8×10^{-5}	PL/Ad-5	S = 2-ACN; A = DPBF; cor. for k_S .	81A287
		3.3×10^4	3.0×10^{-5}	PL/Ld-2	S = PdMPDME.	81E398 83E818 79E846
		4.0×10^4		PL/Ld-2	S = An.	80A143
		3.7×10^4	2.7×10^{-5}	PR/Ad-5	S = Np, A = DPBF.	78E263
		4.1×10^4		PL/ β Cd-11	S = An, Q = Car.	78F276
		3.7×10^4	2.7×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	76F903
		4.1×10^4		PL/ β Cd-11	S = An, Q = Car.	737438
		3.9×10^4		PL/Ad-8	S = An, A = DPBF.	737438
		4×10^4	2×10^{-5}	PL/Ad-5	S = MB, A = DPBF.	727260
1.8 Benzene (mic)						
		5.0×10^4	2.0×10^{-5}	PL/Tb-3	S = Ery; reverse micelles contg. 0.04 mol L ⁻¹ DAP and 0.1 mol L ⁻¹ water.	83A050
1.9 Benzene/Methanol (80:20)						
		4×10^4	2.6×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	737014
1.10 Benzene-d_6						
		1.7×10^3	5.9×10^{-4}	PL/Ld-2	S = Chr.	93E183
		1.3×10^3	7.8×10^{-4}	PL/Ld-2	S = C ₆₀ or C ₇₀ .	93E301
		1.5×10^3	6.8×10^{-4}	PL/Ld-2	S = MB, TPP or PHO.	92E256
		1.5×10^3	6.5×10^{-4}	PL/Ld-2	S = Np, Pz and BP.	90A328
		1.5×10^3	6.8×10^{-4}	PL/Ld-2	S = An.	90E400
		1.5×10^3		PL/Ld-2	S = TPP.	89A331
		1.6×10^3	6.2×10^{-4}	PR/Ld-2	S = 2-ACN.	89E113
		1.3×10^3	7.9×10^{-4}	PL/Ld-2	S = TPP.	89E388
		1.3×10^3	7.7×10^{-4}	PL/Ld-2	S = Pz.	89E597
		1.6×10^3	6.3×10^{-4}	PL/Ld-2	S = Pur.	89R044
		2.6×10^3	3.8×10^{-4}	PL/Tb-3	S = An.	85E591
		1.6×10^3	6.3×10^{-4}	PL/Ld-2	S = HPDME.	83A223
		1.4×10^3	7.0×10^{-4}	PL/Ld-2	S = MB, RB or TPP.	83E398
		3.2×10^3	3.1×10^{-4}	PL/Ld-2	S = PdMPDME.	83E818
		1.6×10^3	6.2×10^{-4}	PL/Ld-2	S = Cercosporin.	83R123
		1.8×10^3	5.5×10^{-4}	PL/Ld-2	S = MPDME.	82E106 83E235
		1.5×10^3	6.8×10^{-4}	CP/I.1-12	S = Benz[<i>de</i>]anthracen-7-one, phenalenone or fluorenone; rel. to $k_d = 4.0 \times 10^4 s^{-1}$ in benzene.	82E329
		1×10^3	1×10^{-3}	PL/Ad-5	S = 2-ACN; A = DPBF; cor. for k_S .	81A287
		2×10^3	7×10^{-4}	PL/Ad-5	S = 3,6-Bis(dibutylamino)phenothiazinium bromide; A = Rub.	81A287
		2.8×10^4	3.6×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	76F902
1.11 Benzene-d_6/Benzene (95:5)						
		4.0×10^3	2.5×10^{-4}	PL/Ld-2	S = TPP.	89A322 93U041
1.12 Benzonitrile						
		2.5×10^4		PL/Ld-2	S = Ac.	87E466
		3.1×10^4		PL/Ad-5	S = A = Rub; .	83F075

TABLE I. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.13	Bromobenzene	2.4×10^4	4.2×10^{-5}	PL/Ld-2	S = TPP.	89E388
		2.0×10^4		PL/Ld-2	S = Rub.	87E466
		2.0×10^4	5.0×10^{-5}	PL/Ld-2	S = MB, RB or TPP.	83E398
1.14	Bromobenzene/Methanol (80:20)	4.3×10^4	2.3×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	737014
1.15	Bromobenzene- d_5	7.4×10^2	1.4×10^{-3}	PL/Ld-2	S = TPP.	89E388
		1.2×10^3	8.1×10^{-4}	PL/Ld-2	S = MB, RB or TPP.	83E398
1.16	Bromoform	5.9×10^3	1.7×10^{-4}	PL/Ld-2	S = PdMPDME.	81E398 83E818
		2×10^4	5×10^{-5}	PL/Ld-2	S = PdMPDME.	79E846
1.17	Bromopentafluorobenzene	46	0.022	MP/Ld-2	S = TPP.	89E388
1.18	1-Bromopropane	1×10^5	1×10^{-5}	PL/ β Cd-11	S = An, Q = Car.	76F902
		1×10^5	8×10^{-6}	PL/Ad-8	S = MB, A = DPBF.	76F902
1.19	1-Butanol	5.7×10^4	1.8×10^{-5}	PL/Ld-2	S = An.	87E668
		5.7×10^4	1.8×10^{-5}	PL/Ld-2	S = HPDME.	83A223
		5.2×10^4	1.9×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	737014
1.20	2-Butanol	6.2×10^4	1.6×10^{-5}	PL/Ld-2	S = RB.	89E324
		5.1×10^4	2.0×10^{-5}	PL/Ld-2	S = HPDME.	83A223
1.21	2-Butoxyethanol	-3.8×10^5		MD/Ac-33	A = Rub, Q = DABCO. Assumed $k_Q = 3.4 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$ and $k_A = 7.0 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$; $T = 273\text{K}$.	727319
1.22	Butylbenzene	4.0×10^4	2.5×10^{-5}	PL/Ld-2	S = O_2 ; solvent CT state.	90E220
1.23	Carbon disulfide	22	0.045	MP/Ld-2	S = MB, TPP or PHO; $k_d = 13 \text{ s}^{-1}$ for $[\text{O}_2] \leq 10^{-5} \text{ mol L}^{-1}$.	92E256
		34	0.029	MP/Ld-2	S = TPP.	89A400
		29	0.034	MP/Ld-2	S = TPP.	87E658
		6.6×10^2	1.5×10^{-3}	FP/Ld-2	S = Per.	82A322
		5×10^3	2×10^{-4}	PL/Ad-5	S = MB, A = DPBF, k_d cor. for 1% MeOH content.	727260
1.24	Carbon disulfide/Methanol (98:2)	4.0×10^3	2.5×10^{-4}	FP/Ad-5	S = MB, A = DPBF.	737334
1.25	Carbon tetrachloride	17	0.059	MP/Ld-2	S = MB, TPP or PHO; $k_d = 7.8 \text{ s}^{-1}$ for $[\text{O}_2] \leq 10^{-5} \text{ mol L}^{-1}$.	92E256
		1.3×10^3	7.7×10^{-4}	PL/Ld-2	S = TPP.	89A322 93U041

TABLE I. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.25 Carbon tetrachloride — Continued						
		36	0.028	FP/Ld-2	S = PdMP; very dilute soln.	88E018
		36	0.028	PL/Ld-2	S = TPP.	88F503
		36	0.028	PL/Ld-2	S = Ph a.	88R193
		11	0.087	MP/Ld-2	S = TPP.	87E658
		1.0×10^3	1.0×10^{-3}	PL/Ld-2	S = An.	87E668
		36	0.028	PL/Ld-2	S = TPP.	86F316
		1.1×10^3	9.0×10^{-4}	PL/Ld-2	S = TPP.	82E104
		32	0.031	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; rel. to $k_d = 4.0 \times 10^4 s^{-1}$ in benzene.	82E329
		38	0.026	PL/Ld-2	S = PdMPDME.	81E398 79E846
		38	0.026	PL/Ld-2	S = TPP.	81E631
		38	0.026	PL/Ld-2	S = PdMPDME or MPDME; decay at 1272 or 1588 nm.	80E558
		36	0.028	PL/Ld-2	S = Ret.	79F463
1.26 Carbon tetrachloride/Methanol (98:2)						
		3.3×10^3		PL/Ad-5	S = MB; A = DPBF.	83A006
		3.2×10^3	3.1×10^{-4}	FP/Ad-5	S = MB, A = DPBF.	78E238
1.27 Chlorobenzene						
		2.3×10^4	4.3×10^{-5}	PL/Ld-2	S = TPP.	89E388
		2.3×10^4		PL/Ld-2	S = Ac.	87E466
		2.2×10^4	4.5×10^{-5}	PL/Ld-2	S = An.	87E668
		2.2×10^4		PL/Ad-5	S = MB; A = DPBF.	83A371 83A006
		2.0×10^4	5.1×10^{-5}	PL/Ld-2	S = MB, RB or TPP.	83E398
		2.4×10^4	4.2×10^{-5}	PL/Ld-2	S = PdMPDME.	81E398 83E818
1.28 Chlorobenzene-d_5						
		8.3×10^2	1.2×10^{-3}	PL/Ld-2	S = MB, RB or TPP.	83E398
1.29 Chloroform						
		4.4×10^3	2.3×10^{-4}	PL/Ld-2	S = MB, TPP or PHO.	92E256
		6.0×10^3	1.7×10^{-4}	PL/Ld-2	S = HVD and PPDME.	92E274
		4.0×10^3	2.5×10^{-4}	PL/Ld-2	S = TPP.	90E731 92R076
		3.8×10^3	2.6×10^{-4}	PL/Ld-2	S = TPP.	89E700
		5.0×10^3	2.0×10^{-4}	PL/Tb-3	S = Pz.	88Z155
		4.0×10^3	2.5×10^{-4}	PL/Ld-2	S = An.	87E668
		1.6×10^4	6.2×10^{-5}	PL/Tb-3	S = TPP.	83A050
		4.0×10^3	2.5×10^{-4}	PL/Ld-2	S = MB, RB or TPP.	83E398
		6.3×10^3	1.6×10^{-4}	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; rel. to $k_d = 4.0 \times 10^4 s^{-1}$ in benzene.	82E329
		2.4×10^3	4.1×10^{-4}	PL/Ad-5	S = 2-ACN; A = DPBF; cor. for k_S .	81A287
		4.0×10^3	2.5×10^{-4}	PL/Ld-2	S = PdMPDME.	81E398 83E818 79E846
		4.2×10^3	2.4×10^{-4}	PL/Ld-2	S = PdMPDME or MPDME; decay at 1588 nm.	80E558

TABLE 1. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.29 Chloroform — Continued						
		9.0×10^3		PL/Ad-5	S = MB, A = DPBF.	78F061
		4×10^3	2×10^{-4}	PL/Ad-8	S = MB, A = DPBF.	76F903
		2×10^4	6×10^{-5}	PL/Ad-5	S = MB, A = DPBF. k_d decreases by 50% on lowering the temperature from 298 to 223K.	757088
1.30 Chloroform/Ethanol (50:50)						
		3.0×10^4	3.3×10^{-5}	PL/Ld-2	S = Zn(pc)(py) ₂ .	92E654
1.31 Chloroform-<i>d</i>						
		1.4×10^2	7.0×10^{-3}	MP/Ld-2	S = MB, TPP or PHO; $k_d = 1.1 \times 10^2 s^{-1}$ for $[O_2] \leq 10^{-5} mol L^{-1}$.	92E256
		1.1×10^2	9.4×10^{-3}	MP/Ld-2	S = TPP.	87E658
		1.6×10^3	6.4×10^{-4}	PL/Ld-2	S = MB, RB or TPP.	83E398
		2.8×10^2	3.6×10^{-3}	CP/LI-12	S = Benz[<i>de</i>]anthracen-7-one, phenalenone or fluorenone; rel. to $k_d = 4.0 \times 10^4 s^{-1}$ in benzene.	82E329
		2.8×10^2	3.6×10^{-3}	PI/Ld-2	S = Benz[<i>de</i>]anthracen-7-one, phenalenone or fluorenone.	82E329
		1×10^3	9×10^{-4}	PL/Ad-5	S = 2-ACN; A = Rub; cor. for k_S .	81A287
		1.2×10^3	8.4×10^{-4}	PL/Ld-2	S = PdMPDME.	81E398 83E818 79E846
		3×10^3	3×10^{-4}	PL/Ad-5	S = MB, A = DPBF.	757088
1.32 Chloropentafluorobenzene						
		41	0.024	MP/Ld-2	S = TPP.	89E388
1.33 Chlorotrifluoromethane						
		1.0×10^3	1.0×10^{-3}	PL/Ad-5	S = MB, A = DPBF, k_d cor. for 1-2% MeOH content.	757088
1.34 Cyclohexane						
		4.3×10^4	2.3×10^{-5}	PL/Ld-2	S = MB, TPP or PHO.	92E256
		4.3×10^4	2.3×10^{-5}	PL/Ld-2	S = 1-MeNp.	91E297
		4.2×10^4	2.4×10^{-5}	PL/Ld-2	S = 2-ACN.	90N078
		4.3×10^4	2.4×10^{-5}	PL/Ld-2	S = Np, Bp, or Fl.	87E234
		5.2×10^4		PL/Ld-2	S = Ac.	87E466
		5.0×10^4		PL/Ad-5	S = 2-ACN; A = DPBF.	84F005
		5.0×10^4	2.0×10^{-5}	PL/Tb-3	S = TPP.	83A050
		4.3×10^4	2.3×10^{-5}	PL/Ld-2	S = HPDME.	83A223
		5.0×10^4	2.0×10^{-5}	PL/Ad-8	S = An; A = DPBF.	82A349
		5.9×10^4	1.7×10^{-5}	CP/LI-12	S = Benz[<i>de</i>]anthracen-7-one, phenalenone or fluorenone; rel. to $k_d = 4.0 \times 10^4 s^{-1}$ in benzene.	82E329
		4.3×10^4	2.3×10^{-5}	PL/Ld-2	S = PdMPDME.	81E398
		5.9×10^4	1.7×10^{-5}	PL/Ad-5	S = MB, A = DPBF, k_d cor. for 2% MeOH content.	727260
1.35 Cyclohexane (mic)						
		5.9×10^4	1.7×10^{-5}	PL/Tb-3	S = Ery; reverse micelles contg. 0.04 mol L ⁻¹ DAP and 0.1 mol L ⁻¹ water.	83A050
1.36 Cyclohexane-<i>d</i>₁₂						
		2.2×10^3	4.5×10^{-4}	PL/Ld-2	S = Chr; from high intensity photolysis; M = ¹ O ₂ *.	87F333

TABLE 1. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.36	Cyclohexane- d_{12} — Continued					
		3.1×10^3	3.2×10^{-4}	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; rel. to $k_d = 4.0 \times 10^4 s^{-1}$ in benzene.	82E329
1.37	Cyclohexanol					
		6.6×10^4	1.5×10^{-5}	PL/Ld-2	S = HPDME; $T = 308K$.	83A223
		6.3×10^4	1.6×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	76F903
1.38	Decane					
		3.6×10^4	2.8×10^{-5}	PL/Ld-2	S = TPP.	83A223
1.39	Decyl alcohol					
		5.6×10^4	1.8×10^{-5}	PL/Ld-2	S = HPDME.	83A223
1.40	Deuterium oxide					
		1.8×10^4	5.5×10^{-5}	PL/Ld-2	S = Ru(bpy) $_3^{2+}$; pH = 6.8.	92A095
		1.5×10^4	6.8×10^{-5}	PL/Ld-2	S = MB, TPP or PHO.	92E256
		1.8×10^4	5.5×10^{-5}	PL/Ld-2	S = H $_2$ TPPS $^{4-}$, CAPeS, SnTPPSCl $_2^{4-}$ or ZnPCS $^{3-}$; Soln. contg. 2×10^{-3} mol L $^{-1}$ phosphate buffer and 1% NaCl wt/wt.	90A022
		1.7×10^4	6.0×10^{-5}	PL/Ld-2	S = 4-Thiouridine.	90E312
		1.4×10^4	7.0×10^{-5}	PL/Ld-2	S = RB or H $_2$ TPPS $^{4-}$; pD = 3.	89A322 93U041
		1.6×10^4	6.4×10^{-5}	PL/Ld-2	S = RB, TPP or H $_2$ TPPS $^{4-}$; 1.0 mol L $^{-1}$ NaOD.	89A322 93U041
		1.5×10^4	6.8×10^{-5}	PL/Ld-2	S = MB.	89E388
		1.6×10^4	6.1×10^{-5}	PL/Ld-2	S = Chlorin e $_6$; pD = 8.1.	89E505
		1.5×10^4	6.5×10^{-5}	PL/Ld-2	S = HP.	89E700
		1.4×10^4	7.0×10^{-5}	PL/Ld-2	S = MB.	89E700
		1.9×10^4	5.2×10^{-5}	PL/Ld-2	S = AlCl(tspc); pH = 7.	89R092
		1.7×10^4	6.0×10^{-5}	PL/Ld-2	S = Ru(bpy) $_3^{2+}$; pH = 7; O $_2$ saturated.	88A105
		1.7×10^4	5.8×10^{-5}	PL/Ld-2	S = 2-AnS; pH = 7.	88A398
		1.5×10^4	6.7×10^{-5}	PL/Ld-2	S = H $_2$ TPPS $^{4-}$.	88F503
		1.5×10^4	6.8×10^{-5}	PL/Ld-2	S = UP.	87E234
		1.7×10^4	6.0×10^{-5}	PL/Ld-2	S = H $_2$ TPPS $^{4-}$.	87E941
		1.5×10^4	6.7×10^{-5}	PL/Ld-2	S = RF; pD = 7.	87F290
		1.7×10^4	5.9×10^{-5}	PL/Ld-2	S = H $_2$ TPPS $^{4-}$; pH = 7.	86A198
		1.6×10^4	6.3×10^{-5}	PL/Ld-2	$^1O_2^*$ from NDPO $_2$.	86A264
		1.6×10^4	6.3×10^{-5}	PL/Ld-2	S = C $_6$ H $_5$ CO $_2^-$.	86A264
		1.5×10^4	6.7×10^{-5}	PL/Ld-2	S = H $_2$ TPPS $^{4-}$.	86F316
		1.5×10^4	6.8×10^{-5}	PL/Ld-2	S = H $_2$ TMpyP $^{4+}$.	84E296
		1.8×10^4	5.5×10^{-5}	PL/Ld-2	S = H $_2$ TPPS $^{4-}$.	83A223
		2.3×10^4	4.4×10^{-5}	PL/Ld-2	S = H $_2$ TPPS $^{4-}$.	83E756
		2.3×10^4	4.4×10^{-5}	PL/Ld-2	S = PdTPPS $^{4-}$.	83E818
		1.5×10^4	6.7×10^{-5}	PL/Ld-2	S = Sulfo- and carboxyanthracenes.	83E844
		1.9×10^4	5.4×10^{-5}	PL/Ad-5	S = PBA; A = Crocetin; pD = 8.4.	82A204
		1.7×10^4	5.8×10^{-5}	PL/Ld-2	S = MB.	82E104
		1.5×10^4	6.8×10^{-5}	PL/Ld-2	S = RB or Th.	82E106 83E235
		-2.2×10^4	-4.5×10^{-5}	PL/Ld-2	S = HP.	81E704
		1.9×10^4		PL/Ad-5	S = MB; A = ADPA.	80A205

TABLE I. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	$\tau(1/k_d)$ (s)	Method	Comment	Ref.
1.41 Deuterium oxide (mic)						
		1.6×10^4	6.1×10^{-5}	PL/Ld-2	S = Chlorin e ₆ ; pD = 8.1; Soln. cont. 10^{-3} mol L ⁻¹ Triton X-100.	89E505
		2.1×10^4	4.9×10^{-5}	PL/Ad-5	S = HYP; A = DPBF; BRIJ 35 micelles.	88N343
		2.8×10^4	3.6×10^{-5}	PL/Ld-2	S = Ppb a; Triton X-100 micelles.	88R193
		2.3×10^4	4.3×10^{-5}	PL/Ld-2	S = UP; 0.5 mol L ⁻¹ SDS.	87E234
		1.8×10^3	5.7×10^{-5}	PL/Ld-2	S = H ₂ TPPS ⁺ ; 10^{-2} mol L ⁻¹ SDS.	83N084
		1.8×10^3	5.6×10^{-5}	PL/Ld-2	S = H ₂ TPPS ⁺ ; 10^{-2} mol L ⁻¹ CTAB.	83N084
		1.9×10^3	5.2×10^{-5}	PL/Ld-2	S = H ₂ TPPS ⁺ ; 0.1 mol L ⁻¹ Brij.	83N084
		2.9×10^3	3.5×10^{-5}	PL/Ld-2	S = H ₂ TPPS ⁺ ; 10^{-2} mol L ⁻¹ DDAB.	83N084
		1.6×10^3	6.2×10^{-5}	PL/Ld-2	S = H ₂ TPPS ⁺ ; 10^{-3} mol L ⁻¹ HSA.	83N084
		3.1×10^3	3.2×10^{-5}	PL/Ld-2	S = H ₂ TPPS ⁺ ; 20 mg/mL Triton X-100.	83N084
		2.2×10^4	4.6×10^{-5}	PL/Ad-5	S = 2-ACN; A = DPBF; vesicles (4.0×10^{-2} mol L ⁻¹ DDAB).	82N027
		2.3×10^4		PL/Ad-5	S = MB or MB-tetrol; A = DPBF; vesicles (4.0×10^{-2} mol L ⁻¹ DDAB).	82N027
		3.8×10^4	2.6×10^{-5}	PL/Ad-5	S = 2-ACN; A = DPBF; 0.1 mol L ⁻¹ Brij 35.	79N041
		4.7×10^4	2.2×10^{-5}	PL/Ad-5	S = 2-ACN; A = DPBF; 0.1 mol L ⁻¹ Igepal CO-660.	79N041
		4.3×10^4	2.4×10^{-5}	PL/Ad-5	S = MB; A = DPBF; 0.1 mol L ⁻¹ Igepal CO-660.	79N041
		2.1×10^4	4.8×10^{-5}	PL/Ad-5	S = 2-ACN; A = DPBF; 0.1 mol L ⁻¹ sodium laurate.	79N041
		1.9×10^4	5.4×10^{-5}	PL/Ad-5	S = MB; A = DPBF; 0.1 mol L ⁻¹ SDS.	79N041
		1.9×10^4	5.4×10^{-5}	PL/Ad-5	S = 2-ACN; A = DPBF; 0.1 mol L ⁻¹ SDS.	79N041
		1.9×10^4	5.4×10^{-5}	PL/Ad-5	S = MB; A = DPBF; 0.1 mol L ⁻¹ CTAB.	79N041
		1.7×10^4	5.7×10^{-5}	PL/Ad-5	S = 2-ACN; A = DPBF; 0.1 mol L ⁻¹ CTAB.	79N041
		4.2×10^4	2.4×10^{-5}	PL/Ad-5	S = 2-ACN; A = DPBF; 0.1 mol L ⁻¹ Igepal CO-630.	79N041
		2.8×10^4	3.6×10^{-5}	PL/Ad-8	S = MB, A = DPBF; 0.1 mol L ⁻¹ CTAB.	78E143
		3.0×10^4	3.3×10^{-5}	PL/Ad-8	S = MB; A = DPBF; pD = 7.1; 0.1 mol L ⁻¹ SDS.	78E143
		3.3×10^4		PL/Ad-5	S = 2-ACN, A = DPBF; 0.1 mol L ⁻¹ SDS.	78E144
1.42 Deuterium oxide/Ethanol (95:5)						
		$\sim 2 \times 10^4$	$\sim 6 \times 10^{-5}$	PL/Ld-2	S = Ppb a.	88R193
1.43 Deuterium oxide/Ethanol (70:30)						
		4.0×10^4	2.5×10^{-5}	PL/Ld-2	S = HP.	86F316
1.44 Deuterium oxide/Ethanol (67:33)						
		3.8×10^4	2.6×10^{-5}	PL/Ld-2	S = H ₂ TPPS ⁺ .	88F503
1.45 Deuterium oxide/Methanol (50:50)						
		9.1×10^4	1.1×10^{-5}	PL/Ad-5	S = MB, A = DPBF.	727027
1.46 1,2-Dibromotetrafluoroethane						
		32	0.031	MP/Ld-2	S = MB, TPP or PHO; $k_d = 9.0 s^{-1}$ for $[O_2] \leq 10^{-5}$ mol L ⁻¹ .	92E256
		20	0.050	MP/Ld-2	S = TPP.	89E388
1.47 1,1-Dichloroethane						
		1.4×10^4	7.0×10^{-5}	PL/Ld-2	S = PdMPDME; Paper says ethylene dichloride.	81E398
		1.5×10^4		PL/Ad-5	S = MB, A = DPBF.	78F061

TABLE 1. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.48	1,2-Dichloroethane	1.6×10^4	6.3×10^{-5}	PL/Ld-2	S = HPDME.	83A223
		1.6×10^4	6.3×10^{-5}	PL/Ld-2	S = PdMPDME; Paper says dichloroethane.	81E398 79E846
1.49	2,2-Dichloroethanol	2×10^4	5×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	76F903
1.50	Dichloromethane	1.1×10^4	9.5×10^{-5}	PL/Ld-2	S = C ₆₀ or C ₇₀ .	93E301
		1.0×10^4	9.9×10^{-5}	PL/Ld-2	S = MB, TPP or PHO.	92E256
		1.3×10^4	8.0×10^{-5}	PL/Ld-2	S = HVD and PPDME.	92E274
		1.0×10^4	1.0×10^{-4}	PL/Tb-3	S = Pz.	88Z155
		1.2×10^4	8.2×10^{-5}	PL/Ld-2	S = An.	87E668
		1.9×10^4	5.4×10^{-5}	PL/Tb-3	S = TPP.	83A050
		1.2×10^4	8.3×10^{-5}	PL/Ld-2	S = HPDME.	83A223
		1.8×10^4	5.5×10^{-5}	PL/Ld-2	S = MPDME.	83F196
		1.0×10^4	1.0×10^{-4}	PL/Ld-2	S = TPP.	82E104
		1.7×10^4	5.9×10^{-5}	CP/LI-12	S = Benz[de]anthracen-7-one, phenalene or fluorenone; rel. to $k_d = 4.0 \times 10^4 s^{-1}$ in benzene.	82E329
		1.1×10^4	9.1×10^{-5}	PL/Ld-2	S = PdMPDME.	81E398 79E970
		1.6×10^4		PL/Ad-5	S = MB, A = DPBF.	78F061
7.1×10^3	1.4×10^{-4}	PL/Ad-8	S = MB, A = DPBF.	76F903		
1.51	Dichloromethane (mic)	1.9×10^4	5.2×10^{-5}	PL/Tb-3	S = Ery; reverse micelles contg. 0.04 mol L ⁻¹ DAP and 0.1 mol L ⁻¹ water.	83A050
1.52	Dichloromethane-d ₂	8.3×10^3	1.2×10^{-4}	CP/LI-12	S = Benz[de]anthracen-7-one, phenalene or fluorenone; rel. to $k_d = 4.0 \times 10^4 s^{-1}$ in benzene.	82E329
1.53	Diethyl ether	3.1×10^4	3.2×10^{-5}	PL/Ld-2	S = Ph a.	88R193
		2.7×10^4	3.7×10^{-5}	PL/Ld-2	S = An.	87E668
		3.3×10^4	3.0×10^{-5}	PL/Ld-2	S = HPDME.	83A223
		2.9×10^4	3.4×10^{-5}	PL/Ld-2	S = PdMPDME.	81E398 79E846
1.54	1,3-Difluorobenzene	1.6×10^4	6.2×10^{-5}	PL/Ld-2	S = MB, RB or TPP.	83E398
1.55	N,N-Dimethylacetamide	6.8×10^4	1.5×10^{-5}	PL/Ld-2	S = HVD and PPDME.	92E274
1.56	N,N-Dimethylacetamide-d ₆	9.5×10^3	1.0×10^{-4}	PL/Ld-2	S = HVD and PPDME.	92E274
1.57	Dimethyl adipate	3.1×10^4	3.2×10^{-5}	PL/Ld-2	S = Pz.	89E597
1.58	1,1-Dimethylethyl methyl ether	3.4×10^4	2.9×10^{-5}	PL/Ld-2	S = TPP.	92A386
		2.9×10^4	3.5×10^{-5}	PL/Ld-2	S = HPDME.	83A223

TABLE 1. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.59 <i>N,N</i>-Dimethylformamide						
		7.1×10^4	1.4×10^{-5}	PL/Ld-2	S = Chr.	93E183
		5.3×10^4	1.9×10^{-5}	PL/Ld-2	S = HVD and PPDME.	92E274
		4.0×10^4	2.5×10^{-5}	PL/Ld-2	S = An.	87E668
1.60 Dimethyl sulfoxide						
		-5.2×10^4		CP/Ac-16	S = RB, A = DPBF, A' = 2M2P. Measured $\beta_{A'}$ = 0.055 mol L ⁻¹ , assumed $k_{A'}$ in MeOH and DMSO are the same, used $\beta_{A'} = 0.15$ and $k_d = 1.4 \times 10^5 s^{-1}$ in MeOH.	766072
		-3.3×10^4	-3.0×10^{-5}		Method not reported, may be direct method given in ref. [719325].	74F643
1.61 1,4-Dioxane						
		4.8×10^4	2.1×10^{-5}	PL/Tb-3	S = TPP.	83A050
		3.7×10^4	2.7×10^{-5}	PL/Ld-2	S = HPDME.	83A223
		4.0×10^4	2.5×10^{-5}	PL/Ld-2	S = TPP.	82E104
		3×10^4	3×10^{-5}	PL/Ld-2	S = PdMPDME.	79E846
1.62 Dodecane						
		4.0×10^4	2.5×10^{-5}	PL/Ld-2	S = TPP.	83A223
1.63 Epibromohydrin						
		2×10^4	5×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	76F903
1.64 Ethanol						
		7.9×10^4	1.3×10^{-5}	PL/Ld-2	S = BPhe a.	93R131
		7.1×10^4	1.4×10^{-5}	PL/Ld-2	S = HP.	89E700
		6.3×10^4	1.6×10^{-5}	PL/Ld-2	S = RB.	89E700
		7.7×10^4	1.3×10^{-5}	PL/Ld-2	S = MB.	89E700
		7.1×10^4	1.4×10^{-5}	PL/Ld-2	S = Zn(pc)(py) ₂ .	88A284
		6.7×10^4	1.5×10^{-5}	PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	88F503
		7.4×10^4	1.4×10^{-5}	PL/Tb-3	S = HP.	87E054
		7.2×10^4	1.4×10^{-5}	PL/Ld-2	S = An.	87E668
		8.3×10^4		PL/Ad,Pb-5	S = An; A = MDH.	87F541
		8.3×10^4	1.2×10^{-5}	PL/Tb-3	S = An.	85E591
		7.7×10^4	1.3×10^{-5}	PL/Ld-2	S = 2-ACN.	84E066
		9.1×10^4	1.1×10^{-5}	PL/1b-3	S = Ery.	83A050
		6.5×10^4	1.5×10^{-5}	PL/Ld-2	S = HPDME.	83A223
		1.0×10^5	9.6×10^{-6}	PL/Ld-2	S = PdMPDME.	81E398 83E818 79E846
		-9.1×10^4	-1.1×10^{-5}	PL/Ld-2	S = HP.	81E704
		1.0×10^5	1.0×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	76F902
		5.3×10^4	1.9×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	76F903
		8×10^4	1×10^{-5}	PL/Ad-5	S = MB, A = DPBF.	727260
1.65 Ethanol/Water (95:5)						
		2×10^5	5×10^{-6}	PL/ β Cd-11	S = An, Q = Car.	76F902
1.66 Ethanol-d						
		3.2×10^4	3.1×10^{-5}	PL/Ld-2	S = Zn(pc)(py) ₂ .	88A284
		3.3×10^4	3.0×10^{-5}	PL/Ld-2	S = HP.	87E054
		3.4×10^4	2.9×10^{-5}	PL/Tb-3	S = HP.	87E054

TABLE 1. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.67	Ethanol- d_6	5×10^3	2×10^{-4}	PL/Tb-3	S = HP.	87E054
		4.3×10^3	2.3×10^{-4}	PL/Ld-2	S = PdMPDME.	81E398 83E818
1.68	Ethyl acetate	2.2×10^4	4.5×10^{-5}	PL/Ld-2	S = HVD and PPDME.	92E274
		2×10^4	5×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	76F903
1.69	Ethylbenzene	3.8×10^4	2.6×10^{-5}	PL/Ld-2	S = O ₂ :solvent CT state.	90E220
		3.8×10^4	2.6×10^{-5}	PL/Ld-2	S = An; 5% decrease in lifetime as T increased 298 to 353K.	89E597
		4.0×10^4		PL/Ad-5	S = MB; A = DPBF.	83A371 83A006
1.70	Ethylene glycol	1.3×10^5	7.5×10^{-6}	PL/Ld-2	S = HPDME.	83A223
1.71	Ethylene glycol/Methanol (50:50)	1.2×10^5		PL/Ad-8	S = MB or RB, A = DPBF, $k_D = 1.6 \times 10^5 s^{-1}$ when $[DPBF] = 1.9 \times 10^{-5} mol L^{-1}$ and $\beta = 6.3 \times 10^{-5} mol L^{-1}$.	737014
1.72	Fluorobenzene	2.3×10^4	4.3×10^{-5}	PL/Ld-2	S = TPP.	89E388
		2.2×10^4		PL/Ld-2	S = Ac.	87E466
		2.0×10^4	4.9×10^{-5}	PL/Ld-2	S = MB, RB or TPP.	83E398
1.73	Fluorobenzene- d_5	9.1×10^2	1.1×10^{-3}	PL/Ld-2	S = MB, RB or TPP.	83E398
1.74	2-Fluoroethanol	6×10^4	2×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	76F903
1.75	Formamide	1.5×10^5	6.7×10^{-6}	PL/Ld-2	S = An.	87E668
1.76	Furan	8.3×10^4	1.2×10^{-5}	PL/Ld-2	S = PdMPDME.	80E549
1.77	Heptane	3.4×10^4		PL/Ld-2	S = 3-HF.	89E365
		3.4×10^4	2.9×10^{-5}	PL/Ld-2	S = An.	87E668
		3.4×10^4	3.0×10^{-5}	PL/Ld-2	S = TPP.	83A223
		3.6×10^4	2.8×10^{-5}	PL/Ld-2	S = PdMPDME.	81E398
1.78	Heptane/Water (mic)	3.4×10^4		PL/Ld-2	S = RB; reverse micelles contg. AOT.	83N171
1.79	1-Heptanol	5.5×10^4	1.8×10^{-5}	PL/Ld-2	S = HPDME.	83A223
1.80	Hexadecane	4.1×10^4	2.4×10^{-5}	PL/Ld-2 [†]	S = TPP.	83A223
1.81	Hexafluorobenzene	2×10^2	5×10^{-3}	PL/Ld-2	S = C ₆₀ or C ₇₀ .	93E301

TABLE I. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	$\tau(1/k_d)$ (s)	Method	Comment	Ref.
1.81	Hexafluorobenzene — Continued					
		48	0.021	MP/Ld-2	S = MB, TPP or PHO; $k_d = 33 s^{-1}$ for $[O_2] \leq 10^{-5} mol L^{-1}$.	92E256
		40	0.025	MP/Ld-2	S = TPP.	87E658
		2.9×10^2	3.4×10^{-3}	PL/Ld-2	S = Chr; from high intensity photolysis; M = $^1O_2^*$.	87F333
		2.6×10^2	3.9×10^{-3}	PL/Ld-2	S = MB, RB or TPP.	83E398
		1.1×10^2	9.4×10^{-3}	CP/LI-12	S = Benz[de]anthracen-7-one, phenalene or fluorenone; rel. to $k_d = 4.0 \times 10^4 s^{-1}$ in benzene.	82E329
		2×10^3	6×10^{-4}	PL/Ad-5	S = MB, A = DPBF, k_d cor. for 1-2% MeOH content.	757088
1.82	1,1,1,3,3,3-Hexafluoro-2-propanol					
		1.9×10^4	5.2×10^{-5}	PL/Ld-2	S = RB.	89E324
1.83	Hexane					
		3.2×10^4	3.1×10^{-5}	PL/Ld-2	S = An.	87E668
		3.2×10^4	3.1×10^{-5}	PL/Ld-2	S = TPP.	83A223
		3.3×10^4	3.0×10^{-5}	PL/Ld-2	S = PdMPDME.	81E398
1.84	1-Hexanol					
		5.6×10^4	1.8×10^{-5}	PL/Ld-2	S = HPDME.	83A223
1.85	Iodobenzene					
		2.5×10^4	3.9×10^{-5}	PL/Ld-2	S = TPP.	89E388
		4.2×10^4		PL/Ld-2	S = Rub.	87E466
		2.9×10^4	3.5×10^{-5}	PL/Ld-2	S = MB, RB or TPP.	83E398
1.86	Iodobenzene-d_5					
		3.6×10^3	2.8×10^{-4}	PL/Ld-2	S = MB, RB or TPP.	83E398
1.87	Iodoethane					
		2.9×10^4	3.4×10^{-5}	PL/Ld-2	S = PdMPDME.	81E398 79E846
1.88	Iodomethane					
		2.7×10^4	3.7×10^{-5}	PL/Ld-2	S = PdMPDME.	81E398 79E846
1.89	Iodopentafluorobenzene					
		66	0.015	MP/Ld-2	S = TPP.	89E388
1.90	3-Iodotoluene					
		3.4×10^4	2.9×10^{-5}	PL/Ld-2	S = PdMPDME.	81E398 83E818
1.91	Mesitylene					
		6.4×10^4	1.6×10^{-5}	PL/Ld-2	S = TPP; $\Delta V_{\ddagger} = -20.7 cm^3 mol^{-1}$; studied from 0.1 MPa to 250 MPa.	93A017
		6.7×10^4	1.5×10^{-5}	PL/Ld-2	S = An.	90E400
1.92	Methanol					
		1.1×10^5	9.5×10^{-6}	PL/Ld-2	S = MB, TPP or PHO.	92E256
		8.9×10^4	1.1×10^{-5}	PL/Ld-2	S = T(m-HOP)P.	90R164
		9.8×10^4	1.0×10^{-5}	PL/Ld-2	S = RB or H_2TPPS^{4-} .	89A322 93U041
		1.1×10^5	9.0×10^{-6}	PL/Ld-2	S = MB and RF.	88A165

TABLE 1. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.92 Methanol — Continued						
		1.0×10^5	9.7×10^{-6}	PL/Ld-2	S = $C_6H_5CO_2^-$.	86A264
		1.0×10^5	1.0×10^{-5}	PL/Ld-2	$^1O_2^*$ from NDPO ₂ .	86A264
		1.0×10^5		PL/Ad-5	S = 2-ACN; A = DPBF.	84F005
		1.1×10^5	9.0×10^{-6}	PL/Tb-3	S = Ery.	83A050
		9.6×10^4	1.0×10^{-5}	PL/Ld-2	S = HPDME.	83A223
		1.0×10^5	1.0×10^{-5}	PL/Ad-8	S = An; A = DPBF.	82A349
		$\sim 1 \times 10^5$	$\sim 7 \times 10^{-6}$	PL/Ld-2	S = HP.	81E704
		8.3×10^4	1.2×10^{-5}	PL/Tb-3	S = $CH_3COCOCH_3$; A = 2,5-DMF.	80E606
		1.1×10^5		PL/Ad-5	S = MB, A = DPBF.	78F061
		1×10^5	9×10^{-6}	PL/Ad-8	S = MB, A = DPBF.	76F902
		9.7×10^4	1.0×10^{-5}	PL/Ad-8	S = RB, A = DPBF.	737014
		8.8×10^4	1.1×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	737014
		1×10^5	7×10^{-6}	PL/Ad-5	S = MB, A = DPBF.	719325
1.93 Methanol/Water (50:50)						
		3×10^5		PL/Ad-8	S = MB or RB, A = DPBF, $k_D = 3.7 \times 10^5 s^{-1}$ when $[DPBF] = 1.7 \times 10^{-5} mol L^{-1}$ and $\beta = 5.5 \times 10^{-5} mol L^{-1}$.	737014
		2.9×10^5	3.5×10^{-6}	PL/Ad-5	S = MB, A = DPBF.	727027
1.94 Methanol-d						
		4.1×10^3	2.5×10^{-4}	PL/Ld-2	S = RB or H_2TPPS^{4-} .	89A322 93U041
		3.4×10^4	2.9×10^{-5}	PL/Ld-2	S = MB and RF.	88A165
		3.6×10^4	2.8×10^{-5}	PL/Ld-2	S = $SnPPCl_2$.	88R194
		3.1×10^4	3.2×10^{-5}	PL/Tb-3	S = HP.	88Z155
		2.5×10^4	4.0×10^{-5}	PL/Tb-3	S = Ery.	83A050
		4.1×10^4	2.5×10^{-5}	PL/Ld-2	S = MPDME.	83F196
		2.7×10^4	3.7×10^{-5}	PL/Ld-2	S = MB.	82E104
1.95 Methanol-d₄						
		3.7×10^3	2.7×10^{-4}	PL/Ld-2	S = RB.	93A326
		4.2×10^3	2.4×10^{-4}	PL/Ld-2	S = RB.	92F063
		3.8×10^3		PL/Ld-2	S = H_2TPPS^{4-} .	89A331
		4.4×10^3	2.3×10^{-4}	PL/Ld-2	S = MB and RF.	88A165
		4.4×10^3	2.3×10^{-4}	PL/Ld-2	S = HPDME.	83A223
1.96 2-Methoxyethanol						
		9.3×10^4	1.0×10^{-5}	PL/Ad-5	A = DPBF; S = MB.	87E690
1.97 Methyl benzoate						
		3×10^4	4×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	76F903
1.98 3-Methyl-1-butanol						
		5.4×10^4	1.8×10^{-5}	PL/Ld-2	S = An.	87E668
1.99 3-Methylpentane						
		3.1×10^4	3.2×10^{-5}	PL/Ld-2	S = HPDME.	83A223
1.100 2-Methyl-1-propanol						
		4.7×10^4	2.1×10^{-5}	PL/Ld-2	S = An.	87E668
		4.7×10^4	2.1×10^{-5}	PL/Ld-2	S = HPDME.	83A223

TABLE I. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.101	2-Methyl-2-propanol	3.2×10^4	3.1×10^{-5}	PL/Ld-2	S = HPDME.	83A223
		3.0×10^4	3.4×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	737014
1.102	Methyl propionate	2.7×10^4	3.7×10^{-5}	PL/Ld-2	S = Chr.	93E183
		2.6×10^4	3.8×10^{-5}	PL/Ld-2	S = An; 5% decrease in lifetime as T increased 298 to 353K.	89E597
1.103	Nonane	4.2×10^4	2.4×10^{-5}	PL/Ld-2	S = TPP.	83A223
1.104	1-Nonanol	5.4×10^4	1.9×10^{-5}	PL/Ld-2	S = HPDME.	83A223
1.105	1-Octanol	5.4×10^4	1.9×10^{-5}	PL/Ld-2	S = HPDME.	83A223
1.106	Oxygen	2.3×10^4		PL/Ld-2	k_d in $^{18}O_2 = 50 s^{-1}$. $T = 77K$.	84E289
1.107	Pentachloroethane	2.1×10^3	4.8×10^{-4}	PL/Ld-2	S = PdMPDME.	81E398
		2.2×10^3	4.5×10^{-4}	PL/Ld-2	S = PdMPDME or MPDME; decay at 1588 nm.	80E558
1.108	Pentafluorobenzene	3.2×10^3	3.2×10^{-4}	PL/Ld-2	S = MB, RB or TPP.	83E398
1.109	Pentane	2.9×10^4	3.5×10^{-5}	PL/Ld-2	S = MB, TPP or PHO.	92E256
		2.9×10^4	3.5×10^{-5}	PL/Ld-2	S = TPP.	83A223
		4.5×10^4	2.2×10^{-5}	PL/Ld-2	S = PdMPDME.	81E398
1.110	1-Pentanol	5.6×10^4	1.8×10^{-5}	PL/Ld-2	S = HPDME.	83A223
1.111	Perfluorodecalin	17	0.059	MP/Ld-2	S = MB, TPP or PHO; $k_d = 3.2 s^{-1}$ for $[O_2] \leq 10^{-5} mol L^{-1}$.	92E256
1.112	Perfluoroethyl ether	9.1×10^2	1.1×10^{-3}	CP/LI-12	S = Benz[de]anthracen-7-one, phenalene or fluorenone; rel. to $k_d = 4.0 \times 10^4 s^{-1}$ in benzene.	82E329
1.113	Perfluorohexane	15	0.068	MP/Ld-2	S = MB, TPP or PHO; $k_d = 4.7 s^{-1}$ for $[O_2] \leq 10^{-5} mol L^{-1}$.	92E256
		20		PL/Ld-2	S = Phen; from delayed fluorescence of phenanthrene attributed to singlet(oxygen)-triplet(Phen) annihilation; $T = 200K$.	88E775
		10	0.096	MP/Ld-2	S = TPP.	87E658
1.114	Perfluorohexyl iodide	40	0.025	MP/Ld-2	S = MB, TPP or PHO; $k_d = 19 s^{-1}$ for $[O_2] \leq 10^{-5} mol L^{-1}$.	92E256
		27	0.036	MP/Ld-2	S = TPP.	89E388

TABLE I. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.115	1-Phenylethanol					
		4.6×10^4		PL/Ad-5	S = MB; A = DPBF.	83A371 83A006
1.116	1-Propanol					
		5.7×10^4	1.8×10^{-5}	PL/Ld-2	S = An.	87E668
		6.1×10^4	1.6×10^{-5}	PL/Ld-2	S = HPDME.	83A223
1.117	2-Propanol					
		4.5×10^4	2.2×10^{-5}	PL/Ld-2	S = RB.	89E324
		4.9×10^4		PL/Ld-2	S = Ac.	87E466
		4.0×10^4	2.5×10^{-5}	PL/Ld-2	S = An.	87E668
		4.5×10^4	2.2×10^{-5}	PL/Ld-2	S = HPDME.	83A223
1.118	Propylene carbonate					
		3.3×10^4	3.0×10^{-5}	PL/Ad-5	A = DPBF; S = MB.	87E690
1.119	Pyridine					
		1.8×10^5	5.7×10^{-6}	PL/Ld-2	S = RB or H_2TPPS^{4-} .	89A322 93U041
		6.5×10^4	1.5×10^{-5}	PL/Ld-2	S = Chlorin e_6 .	89E505
		7.7×10^4	1.3×10^{-5}	PL/Ld-2	S = An.	87E959
		7.1×10^4	1.4×10^{-5}	PL/Tb-3	S = TPP.	83A050
		5.9×10^4	1.7×10^{-5}	PL/Tb-3	S = Ery.	83A050
		6.3×10^4	1.6×10^{-5}	PL/Ld-2	S = PdMPDME.	81E398 79E846
		6×10^4	2×10^{-5}	PL/Ad-8	S = RB, A = DPBF.	76F903
1.120	1,1,2,2-Tetrachloro-1,2-difluoroethane					
		24	0.042	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; rel. to $k_d = 4.0 \times 10^4 s^{-1}$ in benzene.	82E329
1.121	1,1,2,2-Tetrachloroethane					
		8.3×10^3		PL/Ad-5	S = MB, A = DPBF.	78F061
1.122	Tetrachloroethylene					
		8.3×10^2	1.2×10^{-3}	PL/Ld-2	S = PdMPDME.	81E398
		7.7×10^2	1.3×10^{-3}	PL/Ld-2	S = PdMPDME or MPDME; decay at 1588 nm.	80E558
1.123	Tetradecane					
		4.0×10^4	2.5×10^{-5}	PL/Ld-2	S = TPP.	83A223
1.124	1,2,4,5-Tetrafluorobenzene					
		6.5×10^3	1.6×10^{-4}	PL/Ld-2	S = MB, RB or TPP.	83E398
1.125	Tetrahydrofuran					
		4.8×10^4		PL/Ld-2	S = RB.	87E466
		4.3×10^4	2.3×10^{-5}	PL/Ld-2	S = An.	87E668
		5.4×10^4	1.9×10^{-5}	PL/Tb-3	S = An.	85E591
		5.0×10^4	2.0×10^{-5}	PL/Ld-2	S = TPP.	82E104
		3.3×10^4	3.0×10^{-5}	PL/Ld-2	S = PdMPDME.	81E398
		4.3×10^4	2.3×10^{-5}	PL/Ad-8	S = RB, A = DPBF.	76F903
1.126	Toluene					
		3.4×10^4	2.9×10^{-5}	PL/Ld-2	S = TPP; $\Delta V^\ddagger = -10.0 \text{ cm}^3 \text{ mol}^{-1}$; studied from 0.1 MPa to 250 MPa.	93A017

TABLE I. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.126 Toluene — Continued						
		3.5×10^4	2.9×10^{-5}	PL/Ld-2	S = Ac.	93A017
		3.4×10^4	2.9×10^{-5}	PL/Ld-2	S = O ₂ :solvent CT state.	90E220
		3.6×10^4	2.8×10^{-5}	PL/Ld-2	S = An.	90E400
		3.4×10^4	2.9×10^{-5}	PL/Ld-2	S = 2-ACN; $\Delta H^\ddagger = -1.7$ kJ mol ⁻¹ ; studied at 203-333 K.	88A427
		3.5×10^4		PL/Ld-2	S = Ac.	87E466
		3.4×10^4	2.9×10^{-5}	PL/Ld-2	S = An.	87E668
		4.0×10^4	2.5×10^{-5}	PL/Ld-2	S = 2-ACN.	84E066
		4.0×10^4	2.5×10^{-5}	PL/ β Cd-11	S = An.	82A349
		3.8×10^4	2.6×10^{-5}	PL/Ad-8	S = An; A = DPBF.	82A349
		3.2×10^4		PL/Ad-5	S = A = Rub; .	82E072
		3.7×10^4	2.7×10^{-5}	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; rel. to $k_d = 4.0 \times 10^4$ s ⁻¹ in benzene.	82E329
		3.4×10^4	2.9×10^{-5}	PL/Ld-2	S = PdMPDME.	81E398 83E818 79E846
		4.3×10^4	2.3×10^{-5}	CP/Ac-14	S = TPP; A = TME; Used $k_A = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80C002
		4.0×10^4		PR/Ad-5	S = Np; A = DPBF; $E_a = -2$ kJ mol ⁻¹ ; studied at 222 to 333K.	79A106 78E263
		5×10^4	2×10^{-5}	CP/Ac-16	S = A = DMA; compared with $\beta = 1.2 \times 10^{-3}$ mol L ⁻¹ in benzene where $\tau = 24$ μ s.	79F148
1.127 Toluene-<i>d</i>₆						
		3.5×10^3	2.8×10^{-4}	PL/Ld-2	S = Pz.	89E597
		3.2×10^3	3.1×10^{-4}	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; rel. to $k_d = 4.0 \times 10^4$ s ⁻¹ in benzene.	82E329
		3.1×10^3	3.2×10^{-4}	PL/Ld-2	S = PdMPDME.	81E398 83E818 79E846
1.128 2,2,2-Trichloroethanol						
		2×10^4	5×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	76F903
1.129 Trichloroethylene						
		4.0×10^3	2.5×10^{-4}	PL/Ld-2	S = MB, TPP or PHO.	92E256
		4.5×10^3	2.2×10^{-4}	PL/Ld-2	S = PdMPDME.	81E398
		4.8×10^3	2.1×10^{-4}	PL/Ld-2	S = PdMPDME or MPDME; decay at 1588 nm.	80E558
1.130 Trichlorofluoromethane						
		9.1	0.11	MP/Ld-2	S = TPP.	89E388
		42	0.024	MP/Ld-2	S = TPP.	87E658
1.131 1,1,2-Trichlorotrifluoroethane						
		14	0.072	MP/Ld-2	S = MB, TPP or PHO; $k_d = 7.5$ s ⁻¹ for $[O_2] \leq 10^{-5}$ mol L ⁻¹ .	92E256
		10	0.099	MP/Ld-2	S = TPP.	87E658
		51	0.020	FP/Ld-2	S = Per.	82A322
		24	0.042	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; rel. to $k_d = 4.0 \times 10^4$ s ⁻¹ in benzene.	82E329

TABLE 1. Decay constants for singlet oxygen in various solvents. — Continued

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.132	1,1,2-Trichlorotrifluoroethane/Ethanol (99:1)	7.1×10^2	1.4×10^{-3}	PL/Ld-2	S = HP.	81E704
1.133	1,1,2-Trichlorotrifluoroethane/Ethanol (90:10)	6.7×10^3	1.5×10^{-4}	PL/Ld-2	S = HP.	81E704
1.134	1,3,5-Trifluorobenzene	1.0×10^4	9.9×10^{-5}	PL/Ld-2	S = MB, RB or TPP.	83E398
1.135	2,2,2-Trifluoroethanol	4.1×10^4	2.4×10^{-5}	PL/Ld-2	S = RB.	89E324
		3.1×10^4		PL/Ld-2	S = RB; not extrapolated to [S] = 0.	87E466
		2×10^4	4×10^{-5}	PL/Ad-8	S = MB, A = DPBF.	76F903
1.136	α,α,α -Trifluorotoluene	1.6×10^4		PL/Ld-2	S = Ac.	87E466
1.137	2,4,4-Trimethyl-1-pentanol	4.1×10^4	2.4×10^{-5}	PL/Ld-2	S = HPDME.	83A223
1.138	2,2,4-Trimethylpentane	2.7×10^4	3.8×10^{-5}	PL/Ld-2	S = HPDME.	83A223
		2.7×10^4		PL/Ld-2	S = RB; reverse micelles contg. AOT.	83N171
1.139	<i>n</i> -Undecane	4.0×10^4	2.5×10^{-5}	PL/Ld-2	S = TPP.	83A223
1.140	Water	2.4×10^5	4.2×10^{-6}	PL/Ld-2	S = MB or PHO.	92E256
		3.2×10^5	3.1×10^{-6}	PL/Ld-2	S = H ₂ TPPS ⁴⁻ ; Nonmonotonic change in lifetime over 283-368 K; $\tau_A = 4.8 \mu s$ at 368 K.	91A478
		2.4×10^5	4.1×10^{-6}	PL/Ld-2	S = RB or H ₂ TPPS ⁴⁻ ; 1.0 mol L ⁻¹ NaOH.	89A322 93U041
		2.4×10^5	4.2×10^{-6}	PL/Ld-2	S = MB.	89E388
		3.2×10^5	3.1×10^{-6}	PL/Ld-2	S = H ₂ TPPS ⁴⁻ ; pH = 8; oxygen pressure 1-15 atm.	89E585
		2.5×10^5	4.0×10^{-6}	PL/Ld-2	S = H ₂ TPPS ⁴⁻ ; pH = 7.	86A198
		2.4×10^5	4.1×10^{-6}	PL/Ld-2	S = C ₆ H ₅ CO ₂ ⁻ .	86A264
		3.1×10^5	3.2×10^{-6}	PL/Ld-2	S = H ₂ TMpyP ⁴⁺ .	84E296
		2.4×10^5	4.2×10^{-6}	PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	83A223
		2.9×10^5	3.5×10^{-6}	PL/Ld-2	S = PdTPPS ⁴⁻ .	83E818
		3.2×10^5	3.1×10^{-6}	PL/Ld-2	S = Sulfo- and carboxyanthracenes.	83E844
1.141	Water (mic)	2.2×10^5	4.6×10^{-6}	PL/Ld-2	S = H ₂ TPPS ⁴⁻ ; 1% Triton X-100.	91A478
		3.4×10^5	2.9×10^{-6}	PL/Ac-5	S = MB; A = DPBF; BRIJ 35 micelles.	88N343
		5.0×10^4		PL/Ld-2	S = RB; 0-1 mol L ⁻¹ SDS.	83N171
		4.0×10^4		PL/Ld-2	S = RB; 0-0.5 mol L ⁻¹ CTAB.	83N171
		2.5×10^5	4.0×10^{-6}	PL/Ad-5	S = 2-ACN; A = DPBF; 0.1 mol L ⁻¹ CTAB; extrapolated from D ₂ O/H ₂ O mixtures to 100% water.	79N041
		2.9×10^5	3.5×10^{-6}	PL/Ad-5	S = 2-ACN; A = DPBF; 0.1 mol L ⁻¹ Igepal CO-630; extrapolated from D ₂ O/H ₂ O mixtures to 100% water.	79N041
		3.3×10^5		PL/Ad-5	S = 2-ACN, A = DPBF; 0.1 mol L ⁻¹ SDS.	78E144

TABLE 1. Decay constants for singlet oxygen in various solvents. --- Continued

No.	Solvent	k_d (s^{-1})	τ ($1/k_d$) (s)	Method	Comment	Ref.
1.142	Water/Methanol (80:20)	2.0×10^5	4.9×10^{-6}	PL/Ld-2	$^1O_2^*$ from NDPO ₂ .	86A264
1.143	<i>m</i> -Xylene	4.0×10^4	2.5×10^{-5}	PL/Ld-2	S = TPP; $\Delta V^\ddagger = -13.0 \text{ cm}^3 \text{ mol}^{-1}$; studied from 0.1 MPa to 250 MPa.	93A017
1.144	<i>o</i> -Xylene	4.4×10^4	2.3×10^{-5}	PL/Ld-2	S = TPP; $\Delta V^\ddagger = -14.2 \text{ cm}^3 \text{ mol}^{-1}$; studied from 0.1 MPa to 250 MPa.	93A017
		5.3×10^4	1.9×10^{-5}	PL/Ld-2	S = An.	90E400
1.145	<i>p</i> -Xylene	5.0×10^4	2.0×10^{-5}	PL/Ld-2	S = TPP; $\Delta V^\ddagger = -19.2 \text{ cm}^3 \text{ mol}^{-1}$; studied from 0.1 MPa to 250 MPa.	93A017

TABLE 2. Rate constants for interaction of singlet oxygen with olefins.

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_q/k_t) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.1	Acrolein (Propenal)						
	MeOH	1.6×10^3	89	263	CP/Oc-15	S = MB; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	737479
2.2	Adamantane, 2-(hydroxymethylene)-, acetate						
	CD ₃ COCD ₃	3.4×10^4			PL/Ld-2	S = MB.	83A026
	CD ₃ OD	2.1×10^4			PL/Ld-2	S = MB.	83A026
2.3	Benzvalene						
	C ₆ H ₆		1.1 (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; meas. $1 + k_q/k_t = 1$.	84F065
	CCl ₄		0.059 (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; meas. $1 + k_q/k_t = 1$.	84F065
	CH ₂ Cl ₂		4.9×10^{-3} (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; meas. $1 + k_q/k_t = 1$.	84F065
	CH ₃ CN		4.0×10^{-3} (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; meas. $1 + k_q/k_t = 1$.	84F065
	CH ₃ COCH ₃		7.2×10^{-3} (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; meas. $1 + k_q/k_t = 1$.	84F065
	CHCl ₃		0.020 (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; meas. $1 + k_q/k_t = 1$.	84F065
	MeOH		0.019 (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; meas. $1 + k_q/k_t = 1$.	84F065
2.4	Bicyclo[2.2.1]hepta-2,5-diene (Norbornadiene)						
	CHCl ₃	1.7×10^4			CR/A'c-33	A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	81E003
2.5	Bicyclo[2.2.1]hepta-2,5-diene, 7,7-dimethyl-2-(trimethylsiloxy)- [Norbornadiene, 7,7-dimethyl-2-(trimethylsiloxy)-]						
	CDCl ₃				CP/Ac,A'c-17	S = TPP; A' = 7,7-Dimethyl-2-(trimethylsiloxy)norborn-2-ene; meas. $k_t/k_t^{A'} = 4.2$.	78F290
2.6	Bicyclo[2.2.1]hepta-2,5-diene, 2-methyl- (Norbornadiene, 2-methyl-)						
	CH ₃ CN			273	CP/Ac,A'c-17	S = MB; A' = 5-Methylene-2-norbornene; meas. $k_t/k_t^{A'} = 34$.	78F149
2.7	Bicyclo[2.2.1]hepta-2,5-diene, 2-(trimethylsiloxy)-						
	CDCl ₃				CP/Ac,A'c-17	S = TPP; A' = 7,7-Dimethyl-2-(trimethylsiloxy)norborn-2-ene; meas. $k_t/k_t^{A'} = 0.17$.	78F290
2.8	Bicyclo[2.2.1]heptane, 2,3-bis(methylene)- (Norbornane, 2,3-dimethylene-)						
	CD ₃ COCD ₃	3.6×10^5		195	CP/A'c-16	S = RB; A' = DPRF; k_d not given.	87A368
2.9	Bicyclo[2.2.1]heptane, 7,7-dimethyl-2-methylene-						
	CH ₃ CN			273	CP/Ac,A'c-17	S = MB; A' = 2,7,7-Trimethylnorborn-2-ene; meas. $k_t/k_t^{A'} = 3.4$.	78F149
	CH ₃ CN				CP/Ac,A'c-17	S = MB; A' = 2-Methylenenorbornane; meas. $k_t/k_t^{A'} = 0.26$.	74F647
2.10	Bicyclo[2.2.1]heptane, 2,3-dioxymethyl-7-tricyclo[3.3.1.1^{3,7}]decylidene- (exo,exo)						
	C ₆ H ₅ Cl/ 2-PrOH (90:10)	1.8×10^6		273	CR/LI-12	used $k_d = 4.1 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from hydrotrioxide, e.g. (CH ₃) ₂ C(OH)OOH.	90M125
2.11	Bicyclo[2.2.1]heptane, 2-methylene- (Norbornane, 2-methylene-)						
	CH ₃ CN			273	CP/Ac,A'c-17	S = MB; A' = 5-Methylene-2-norbornene; meas. $k_t/k_t^{A'} = 4.3$.	78F149
	CH ₃ CN			273	CP/Ac,A'c-17	S = MB; A' = 2,7,7-Trimethylnorborn-2-ene; meas. $k_t/k_t^{A'} = 13$.	78F149
	CH ₃ CN			?	?	S = MB; A' = <i>c</i> -C ₆ H ₅ CH ₃ ; meas. $k_A/k_{A'} = 0.065$.	73F664
2.12	Bicyclo[2.2.1]heptane, 2,3-(2¹-oxatrimethylene)-7-tricyclo[3.3.1.1^{3,7}]decylidene- (exo,exo)						
	C ₆ H ₅ Cl/ 2-PrOH (90:10)	1.2×10^6		273	CR/LI-12	used $k_d = 4.1 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from hydrotrioxide, e.g. (CH ₃) ₂ C(OH)OOH.	90M125

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.13	Bicyclo[2.2.1]heptane-2- <i>d</i> , 3-methylene-, <i>endo</i> - CH ₃ CN				CP/Ac,A'c-17	S = MB; A' = 2-Methylenenorbornane; meas. $k_f/k_r^{A'} = 1.0$.	74F647
2.14	Bicyclo[2.2.1]heptane-2- <i>d</i> , 3-methylene-, <i>exo</i> - CH ₃ CN				CP/Ac,A'c-17	S = MB; A' = 2-Methylenenorbornane; meas. $k_f/k_r^{A'} = 1.1$.	74F647
2.15	Bicyclo[2.2.1]heptane-2,3-dicarboxylic acid, 7-tricyclo[3.3.1.1 ^{3,7}]decylidene-, anhydride (<i>endo,endo</i>) CHCl ₃	2.8×10^4		295	CL/LI-12	S = An; used $k_d = 4.9 \times 10^3$ s ⁻¹ .	90F473
2.16	Bicyclo[2.2.1]heptane-2,3-dicarboxylic acid, 7-tricyclo[3.3.1.1 ^{3,7}]decylidene-, anhydride (<i>exo,exo</i>) CHCl ₃	1.0×10^4		295	CL/LI-12	S = An; used $k_d = 4.9 \times 10^3$ s ⁻¹ .	90F473
2.17	Bicyclo[2.2.1]heptane-2,3-dicarboxylic acid, 7-tricyclo[3.3.1.1 ^{3,7}]decylidene-, dimethyl ester (<i>endo,endo</i>) CHCl ₃	3.1×10^4		295	CL/LI-12	S = An; used $k_d = 4.9 \times 10^3$ s ⁻¹ .	90F473
2.18	Bicyclo[2.2.1]heptane-2,3-dicarboxylic acid, 7-tricyclo[3.3.1.1 ^{3,7}]decylidene-, dimethyl ester (<i>exo,exo</i>) CHCl ₃	1.5×10^4		295	CL/LI-12	S = An; used $k_d = 4.9 \times 10^3$ s ⁻¹ .	90F473
2.19	Bicyclo[2.2.1]hept-2-ene, 5,6-bis(methylene)- [Norborn-2-ene, 5,6-bis(methylene)-] CH ₂ Cl ₂			253	CP/Ac-17	S = TPP; A' = 2,3-Dimethylenebicyclo[2.2.1]heptane; meas. $k_f/k_r^{A'} = 0.12$.	82F450
2.20	Bicyclo[2.2.1]hept-2-ene, 2-methoxy- (Norborn-2-ene, 2-methoxy-) c-C ₆ H ₁₂ C ₆ H ₅ CH ₃ CH ₃ CN CH ₃ COCH ₃ MeOH	$<1.0 \times 10^4$ 1.1×10^4 6.2×10^5 2.5×10^5 6.2×10^5			PL/A'd-8 PL/A'd-8 PL/A'd-8 PL/A'd-8 PL/A'd-8	S = An; A' = DPBF. S = An; A' = DPBF. S = An; A' = DPBF; $\Delta H^\ddagger = -1.3$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -141$ J K ⁻¹ mol ⁻¹ ; studied at 250-273 K. S = An; A' = DPBF. S = An; A' = DPBF; $\Delta H^\ddagger = -0.8$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -130$ J K ⁻¹ mol ⁻¹ ; studied at 250-273 K.	82A349 82A349 82A349 82A349 82A349
2.21	Bicyclo[2.2.1]hept-2-ene, 2-methyl- (Norborn-2-ene, 2-methyl-) CH ₃ CN CH ₃ CN CH ₃ CN			273	CP/Ac,A'c-17 CP/Ac,A'c-17 ?	S = MB; A' = 5-Methylene-2-norbornene; meas. $k_f/k_r^{A'} = 14$. S = MB; A' = 2-Methylenenorbornane; meas. $k_f/k_r^{A'} = 3.1$. S = MB; A' = c-C ₆ H ₅ CH ₃ ; meas. $k_A/k_{A'} = 0.14$.	78F149 74F647 73F664
2.22	Bicyclo[2.2.1]hept-2-ene, 5-methylene- CH ₃ CN			273	CP/Ac,A'c-17	S = MB; A' = c-C ₃ H ₇ CH ₃ ; meas. $k_f/k_r^{A'} = 2.0 \times 10^{-3}$.	78F149
2.23	Bicyclo[2.2.1]hept-2-ene, 2,7,7-trimethyl- CH ₃ CN CH ₃ CN			273	CP/Ac,A'c-17 CP/Ac,A'c-17	S = MB; A' = 2-Methylnorborn-2-ene; meas. $k_f/k_r^{A'} = 0.025$. S = MB; A' = 2-Methylenenorbornane; meas. $k_f/k_r^{A'} = 0.077$.	78F149 74F647
2.24	Bicyclo[2.2.1]hept-2-ene, 2-(trimethylsiloxy)- CDCl ₃				CP/Ac,A'c-17	S = TPP; A' = 7,7-Dimethyl-2-(trimethylsiloxy)norborn-2-ene; meas. $k_f/k_r^{A'} = 8.4$.	78F290
2.25	Bicyclo[3.1.1]hept-2-ene, 2-ethenyl-6,6-dimethyl- (Nopadiene) MeOH		-2.0	293	CP/Oc-15	S = RB; $E_a = 16$ kJ mol ⁻¹ .	68F288

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.26	Bicyclo[4.1.0]hept-2-ene, 3,7,7-trimethyl- (Δ^2 -Carene)						
	MeOH		0.17		?	Method not reported.	68F289
2.27	Bicyclo[4.1.0]hept-2-ene, 4,7,7-trimethyl- (Δ^4 -Carene)						
	MeOH		0.21		?	Method not reported.	68F289
2.28	Bicyclo[4.1.0]hept-3-ene, 3,7,7-trimethyl- (Δ^3 -Carene)						
	MeOH		0.40		?	Method not reported.	68F289
2.29	Bicyclo[2.2.0]hexa-2,5-diene, hexamethyl-						
	CHCl ₃	1.1×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78A005
2.30	Bicyclo[3.1.0]hex-2-ene, 4-methyl-1-(1-methylethyl)-, (1R)- (α -Thujene)						
	CD ₃ OD	1.8×10^6 (k_r) < 10^4 (k_d)		295	CP/Oc-15,28	S = RB; used $k_d = 4.0 \times 10^3$ s ⁻¹ ; used ϕ_{Δ} (RB) = 0.76.	91F332
2.31	Bicyclo[3.2.2]nonane, 6,7-bis(methylene)-						
	CD ₃ COCD ₃	1.7×10^6		195	CP/A'c-16	S = RB; A' = DPBF; k_d not given.	87A368
2.32	Bicyclo[4.2.0]octa-2,4-diene, 7,8-dibromo- (Cyclooctatetraene dibromide)						
	MeOH		-0.30	293	CP/Oc-15	S = RB; $E_a = 11$ kJ mol ⁻¹ .	68F288
2.33	Bicyclo[2.2.2]octane, 2,3-bis(methylene)-						
	CD ₃ COCD ₃	1.7×10^6		195	CP/A'c-16	S = RB; A' = DPBF; k_d not given.	87A368
2.34	Bicyclo[7.2.0]undec-4-ene, 4,11,11-trimethyl-8-methylene-, [1R-(1R*,4E,9S*)]- (β -Caryophyllene)						
	MeOH/ C ₆ H ₆ (50:50)			293	CP/Ac,A'c-17	S = BP, triphenylene, quinoline, Np, Py, RB, MB; A' = γ -Caryophyllene; meas. $k_r/k_t^{A'} = 5.1$.	70F735
2.35	1,3-Butadiene, 1,4-di(4,4'-dimethoxyphenyl)-						
	CCl ₄	1.1×10^6 (k_r)			CP/Pa,P'a-17	S = TPP; A' = DPB; used $k_t^{A'} = 2.1 \times 10^5$ L mol ⁻¹ s ⁻¹ ; P = 1,4-Di(4,4'-dimethoxyphenyl)-1,3-butadiene endoperoxide.	90F292
2.36	1,3-Butadiene, 1,4-di(1,1-dimethylethoxy)-, (E,E)-						
	CH ₂ Cl ₂	8.5×10^7			CP/A'c-16	S = MPDME; A' = DPBF; used $k_d = 1.0 \times 10^4$ s ⁻¹ .	85A261 86A159
	CH ₃ CN	2.0×10^8			CP/A'c-16	S = MPDME; A' = DPBF; k_d not given.	86A159
	CH ₃ COCH ₃	9.1×10^7			CP/A'c-16	S = MPDME; A' = DPBF; used $k_d = 2.2 \times 10^4$ s ⁻¹ .	85A261 86A159
	CH ₃ COCH ₃	9.6×10^7 (k_r)	2.3×10^{-3} (β_r)		CP/Ac,A'c-17	S = MPDME; A' = (Z,Z)-1,4-Di(<i>tert</i> -butoxy)-1,3-butadiene; used $k_d = 2.2 \times 10^4$ s ⁻¹ ; β_r meas. rel. to β_r (TME) = 1.2×10^{-3} mol L ⁻¹ .	86A159
	THF	1.1×10^8			CP/A'c-16	S = MPDME; A' = DPBF; k_d not given.	86A159
2.37	1,3-Butadiene, 1,4-di(1,1-dimethylethoxy)-, (E,Z)-						
	CH ₂ Cl ₂	5.3×10^7			CP/A'c-16	S = MPDME; A' = DPBF; used $k_d = 1.0 \times 10^4$ s ⁻¹ .	85A261 86A159
	CH ₃ CN	1.1×10^8			CP/A'c-16	S = MPDME; A' = DPBF; k_d not given.	86A159
	CH ₃ COCH ₃	5.7×10^7			CP/A'c-16	S = MPDME; A' = DPBF; used $k_d = 2.2 \times 10^4$ s ⁻¹ .	85A261 86A159
	THF	5.5×10^7			CP/A'c-16	S = MPDME; A' = DPBF; k_d not given.	86A159
2.38	1,3-Butadiene, 1,4-di(1,1-dimethylethoxy)-, (Z,Z)-						
	CH ₂ Cl ₂	2.0×10^7			CP/A'c-16	S = MPDME; A' = DPBF; used $k_d = 1.0 \times 10^4$ s ⁻¹ .	85A261 86A159
	CH ₃ CN	3.8×10^7			CP/A'c-16	S = MPDME; A' = DPBF; k_d not given.	86A159

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.38 1,3-Butadiene, 1,4-di(1,1-dimethylethoxy)-, (Z,Z)- — Continued							
	CH ₃ COCH ₃	1.5×10^7			CP/A'c-16	S = MPDME; A' = DPBF; used $k_d = 2.2 \times 10^4$ s ⁻¹ .	85A261 86A159
	CH ₃ COCH ₃	1.4×10^7 (k_t)	1.6×10^{-3} (β_t)		CP/Ac,A'c-17	S = MPDME; A' = TME; used $k_d = 2.2 \times 10^4$ s ⁻¹ , $\beta_t A' = 1.2 \times 10^{-3}$ mol L ⁻¹ .	85A261 86A159
	THF	1.9×10^7			CP/A'c-16	S = MPDME; A' = DPBF; k_d not given.	86A159
2.39 1,3-Butadiene, 2,3-dimethyl-							
	CHCl ₃	7.8×10^4			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.40 1,3-Butadiene, 1,4-diphenyl- (DPB)							
	CCl ₄	2.1×10^5	6.9×10^{-3}		CP/Pa-15	S = TPP; used $k_d = 1.4 \times 10^3$ s ⁻¹ ; P = 1,4-Diphenyl-1,3-butadiene endoperoxide.	90F292
	CCl ₄			273	CP/Pa-17	S = TPP; A' = Acetone azine; meas. $k_t/k_r A' = 3.5$.	79F278
	C ₆ F ₆			273	CP/Pa-17	S = TPP; A' = Acetone azine; meas. $k_t/k_r A' = 3.6$.	79F278
	CDCl ₃			253	CP/Pa-17	S = MB; A' = Acetone azine; meas. $k_t/k_r A' = 3.3$.	79F278
	CDCl ₃			253	CP/Pa-17	S = TPP; A' = Acetone azine; meas. $k_t/k_r A' = 4.5$.	79F278
	CDCl ₃			253	CP/Pa-17	S = Poly-RB; A' = Acetone azine; meas. $k_t/k_r A' = 3.6$.	79F278
	CH ₃ CN	6.0×10^5	0.056		CP/Pa-15	S = RB; used $k_d = 3.3 \times 10^4$ s ⁻¹ ; P = 1,4-Diphenyl-1,3-butadiene endoperoxide.	90F292
2.41 1,3-Butadiene, 2-ethyl-							
	CHCl ₃	7.2×10^4			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.42 1,3-Butadiene, 2-methyl- (Isoprene)							
	C ₆ H ₅ Cl/ 2-PrOH (90:10)	3×10^4		273	CR/LI-12	used $k_d = 4.1 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from hydrotrioxide, e.g. (CH ₃) ₂ C(OH)OOH.	90M125
	CHCl ₃	3.7×10^4			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.43 1,3-Butadiene, 2-(phenylmethyl)-							
	C ₆ H ₆		7.3	277	CP/Oc-14	S = TPP.	81F582
	CCl ₄		0.82	277	CP/Oc-14	S = TPP.	81F582
	CH ₃ COCH ₂ CH ₃		5.7	277	CP/Oc-14	S = RB.	81F582
	CHCl ₃		3.4	277	CP/Oc-14	S = TPP.	81F582
	EtOH		11	277	CP/Oc-14	S = RB.	81F582
2.44 (E)-2-Butenal (Crotonaldehyde)							
	MeOH	2.2×10^3	65	263	CP/Oc-15	S = MB; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	737479
2.45 1-Butene, 2,3-dimethyl-							
	MeOH			288	CP/Ac,A'c-17	S = MB; A' = <i>c</i> -C ₆ H ₁₀ ; meas. $k_t/k_r A' = 1.7$.	65F028
2.46 2-Butene							
	MeOH		13	293	CP/Oc-15	S = RB; $E_a = 42$ kJ mol ⁻¹ .	68F288
2.47 2-Butene, (E)							
	CCl ₄ / MeOH (96:4)	2×10^3			PL/A'd-8	S = MB; A' = DPBF.	777162
	CS ₂	7.2×10^3		298	PL/Ld-2	S = TPP; $\Delta H^\ddagger = 1$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -176$ J K ⁻¹ mol ⁻¹ ; studied at 183-310 K.	85A167
2.48 2-Butene, (Z)							
	CCl ₂ F			193	CP/Ac-17	S = MPDME; A' = (E)-2-Butene; meas. $k_t/k_r A' = 18$.	90F111

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_q/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.48	2-Butene, (Z) — Continued						
	CCl ₄ /MeOH (96:4)	6×10^3			PL/A'd-8	S = MB; A' = DPBF.	777162
	CS ₂	4.8×10^4		298	PL/Ld-2	S = TPP; $\Delta H^\ddagger = 7$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -134$ J K ⁻¹ mol ⁻¹ ; studied at 183-310 K.	85A167
2.49	2-Butene, 2-cyclopropyl-, (E)						
	CH ₃ COCH ₃				CP/Ac,A'c-17	S = Eos; A' = (Dicyclopropylmethylidene)cyclobutane; meas. $k_r/k_r^{A'} = 0.53$.	78F430
2.50	2-Butene, 2-cyclopropyl-3-methyl-						
	CH ₃ CN			283	CP/Ac,A'c-17	S = MB; A' = TME; meas. $k_r/k_r^{A'} = 1.0$; C.k. with 1,2-dimethylcyclohexene.	79F646
	CH ₃ COCH ₃				CP/Ac,A'c-17	S = Eos; A' = (Dicyclopropylmethylidene)cyclobutane; meas. $k_r/k_r^{A'} = 0.76$.	78F430
2.51	2-Butene, 2,3-dimethyl-, (TME)						
	1-BuOH		4.4×10^{-3}	296	CP/A'c-16	S = MB; A' = DPBF.	717398
	tert-BuOH		2.9×10^{-3}	296	CP/A'c-16	S = MB; A' = DPBF.	717398
	C ₅ H ₅ N	-9×10^6		286	?	S = Poly-RB; value from graph; method not reported.	81F534
	C ₅ H ₅ N		1.3×10^{-3}	285	CP/Pa-20	S = Th, MB, DMA; A' = DMA.	737202
	C ₅ H ₅ N			~283	CP/A'c-17	S = A' = DPBF; meas. $k_r/k_r^{A'} = 0.026$.	66F041
	c-C ₆ H ₁₂ (mic)	1×10^7			PL/Tb-3	S = Ery; reverse micelles contg. 0.04 mol L ⁻¹ DAP and 0.1 mol L ⁻¹ water.	83A050
	C ₆ H ₅ CH ₃	3.6×10^7			PL/Ld-2	S = 2-ACN; $\Delta H^\ddagger = -3$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -126$ J K ⁻¹ mol ⁻¹ ; $E_a = -1$ kJ mol ⁻¹ ; studied at 183-363 K; pre-excimer-equilibrium limit activation parameters.	88A427
	C ₆ H ₅ CH ₃		1.1×10^{-3}		CP/Ac-14	S = TPP.	80C002
	C ₆ H ₅ CH ₃	4.2×10^7			PR/A'd-5	S = Np; A' = DPBF.	78E263
	C ₆ H ₅ Cl/2-PrOH (90:10)	2.6×10^7		273	CR/LI-12	used $k_q = 4.1 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from hydrotrioxide, e.g. (CH ₃) ₂ C(OH)OOH.	90M125
	C ₆ H ₆		1.3×10^{-3} (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; meas. $1 + k_q/k_r = 1$.	84F065
	C ₆ H ₆	1.8×10^7	2.2×10^{-3}		CP/Oc-19	S = Chl (os); Q = Chl (os); used $k_q = 4.0 \times 10^4$ s ⁻¹ ; Chl (os) is a commercial mixture contg. a small % of chlorophyll.	81F321
	C ₆ H ₆	-8×10^6		286	?	S = Poly-RB; value from graph; method not reported.	81F534
	C ₆ H ₆		1.2×10^{-3}	298	CP/A'c-23	S = A' = Tetr; used $\beta_{A'} = 1.7 \times 10^{-3}$ mol L ⁻¹ .	706079
	C ₆ H ₆		7.1×10^{-4}	298	CP/A'c-23	S = A' = Rub; used $\beta_{A'} = 3.0 \times 10^{-4}$ mol L ⁻¹ .	706079
	C ₆ H ₆		1.2×10^{-3}	298	CP/A'c-23	S = A' = DMBA; used $\beta_{A'} = 7.1 \times 10^{-4}$ mol L ⁻¹ .	706079
	C ₆ H ₆		7.7×10^{-4}	298	CP/A'c-23	S = A' = DMA; used $\beta_{A'} = 3.0 \times 10^{-4}$ mol L ⁻¹ .	706079
	CCl ₄		1.0×10^{-4} (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; meas. $1 + k_q/k_r = 1$.	84F065
	CCl ₄	-5×10^5		286	?	S = Poly-RB; value from graph; method not reported.	81F534
	CH ₂ Cl ₂	5.2×10^7			PL/Ld-2	S = MoO ₅ .	93F368
	CH ₂ Cl ₂		4.0×10^{-4} (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; meas. $1 + k_q/k_r = 1$.	84F065
	CH ₂ Cl ₂	4×10^7			PL/Tb-3	S = TPP.	83A050
	CH ₂ Cl ₂	-2×10^6		286	?	S = Poly-RB; value from graph; method not reported.	81F534
	CH ₃ CN	3.7×10^7		300	PL/P'b-5	S = MB; A' = FIN ₂ ; P' = 9-Fluorenone oxide.	85A206

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.51 2-Butene, 2,3-dimethyl- (TME) — Continued							
	CH ₃ CN	3.5×10^7		300	PL/P'b-5	S = MB; A' = DDM; P' = Benzophenone oxide.	84A339
	CH ₃ CN		7.6×10^{-4} (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; meas. $1 + k_d/k_r = 1$.	84F065
	CH ₃ CN	-7×10^6		286	?	S = Poly-RB; value from graph; method not reported.	81F534
	CH ₃ COCH ₃		1.2×10^{-3} (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; meas. $1 + k_d/k_r = 1$.	84F065
	CH ₃ COCH ₃	3×10^7			PL/Ld-2	S = MPDME.	83E235
	CH ₃ COCH ₃		6.3×10^{-4} 7.7×10^{-4}	294 206	CP/A'c-16	S = MPDME; A' = DPBF.	83E235
	CH ₃ COCH ₃	-10^7		286	?	S = Poly-RB; value from graph; method not reported.	81F534
	CH ₃ COCH ₃	5.4×10^7	7.2×10^{-4}	288	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	77F876
	CHCl ₃		3.6×10^{-4} (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; meas. $1 + k_d/k_r = 1$.	84F065
	CHCl ₃	5.6×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81E003
	CHCl ₃	5.4×10^7			CR/A'c-33	A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	81E003
	CHCl ₃	-5×10^6		286	?	S = Poly-RB; value from graph; method not reported.	81F534
	CHCl ₃	5.8×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78A005
	CS ₂	2.2×10^7		298	PL/Ld-2	S = TPP; $\Delta H^\ddagger = 2$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -96$ J K ⁻¹ mol ⁻¹ ; studied at 183-310 K.	85A167
	CS ₂	-8×10^5		286	?	S = Poly-RB; value from graph; method not reported.	81F534
	EtOH		0.56		CP/Ac-15	S = MB; Reported values are suspect since r_{ox} depends on [O ₂] and β value was determined from nonlinear data plots.	767041
	EtOH	1.6×10^7			CP/Oc-23	S = RB; A' = Hexamethylenedithiocarbamate; used $k_d = 1.0 \times 10^4$ s ⁻¹ , $k_{A'} = 1.5 \times 10^8$ L mol ⁻¹ s ⁻¹ ; meas. $k/(k_d + k_{A'}[A']) = 270$ at $[A'] = 2.8 \times 10^{-4}$ mol L ⁻¹ .	727116
	H ₂ O pH = 7.0	1.1×10^8 (k_r)		292	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r A' = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	87A180
	MeOH		4.0×10^{-3} (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; meas. $1 + k_d/k_r = 1$.	84F065
	MeOH	3×10^7			PL/Tb-3	S = Ery.	83A050
	MeOH	1.3×10^7		286	?	S = Poly-RB; value from graph; method not reported.	81F534
	MeOH		4.6×10^{-3}	296	CP/A'c-16	S = MB; A' = DPBF.	717398
	MeOH	4×10^7			PL/A'd-5	S = MB; A' = DPBF.	719325
	MeOH		6.2×10^{-3}	293	CP/Oc-15	S = RB; $E_a = 2.1$ kJ mol ⁻¹ .	68F288
	MeOH		3.0×10^{-3}	?	?	Method not reported.	68F289
	MeOH/ <i>tert</i> -BuOH (50:50)		2.3×10^{-3}		CP/A'c-16	S = RB; A' = DPBF.	717398
2.52 2-Butene, 2,3-dimethyl-<i>d</i>₆, (E)-							
	CD ₃ COCD ₃			263	CP/Pa-17	S = RB; A' = TME; meas. $k_r/k_r A' = 0.71$.	79F155
2.53 2-Butene, 2,3-dimethyl-<i>d</i>₆, (Z)-							
	CD ₃ COCD ₃			263	CP/Pa-17	S = RB; A' = TME; meas. $k_r/k_r A' = 0.91$.	79F155

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k_t) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
1.54	2-Butene, 2,3-dimethyl-, (<i>d</i>₁₂)-						
	C ₆ H ₅ CH ₃	3.2 × 10 ⁷			PL/Ld-2	S = 2-ACN; $\Delta H^\ddagger = -3$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -126$ J K ⁻¹ mol ⁻¹ ; $E_a = -0.2$ kJ mol ⁻¹ ; studied at 183-363 K; pre-excimer-equilibrium limit activation parameters.	88A427
1.55	2-Butene, 2-methoxy-						
	<i>c</i> -C ₆ H ₁₂	2.5 × 10 ⁶			PL/A'd-8	S = An; A' = DPBF; $\Delta H^\ddagger = 4$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -103$ J K ⁻¹ mol ⁻¹ ; studied at 290-340 K.	82A349
	C ₆ H ₅ CH ₃	1.2 × 10 ⁷			PL/A'd-8	S = An; A' = DPBF; $\Delta H^\ddagger = -1$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -115$ J K ⁻¹ mol ⁻¹ ; studied at 250-340 K.	82A349
	CH ₃ CN	2.4 × 10 ⁷			PL/A'd-8	S = An; A' = DPBF; $\Delta H^\ddagger = -3$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -114$ J K ⁻¹ mol ⁻¹ ; studied at 250-340 K.	82A349
	CH ₃ COCH ₃	1.1 × 10 ⁷			PL/A'd-8	S = An; A' = DPBF; $\Delta H^\ddagger = -2.5$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -119$ J K ⁻¹ mol ⁻¹ ; studied at 240-320 K.	82A349
	MeOH	1.3 × 10 ⁷			PL/A'd-8	S = An; A' = DPBF; $\Delta H^\ddagger = -2$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -116$ J K ⁻¹ mol ⁻¹ ; studied at 250-310 K.	82A349
1.56	2-Butene, 2-methyl- (2M2B)						
	C ₆ H ₆		0.035 (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; meas. 1 + $k_d/k_t = 1$.	84F065
	CCl ₄		1.5 × 10 ⁻³ (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; meas. 1 + $k_d/k_t = 1$.	84F065
	CD ₃ COCD ₃	1.3 × 10 ⁶		298	PL/Ld-2	S = TPP; $\Delta H^\ddagger = 5$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -113$ J K ⁻¹ mol ⁻¹ ; studied at 183-310 K.	85A167
	CD ₃ OD	9.4 × 10 ⁵			CP/LI-12	S = RB; used $k_d = 4.0 \times 10^3$ s ⁻¹ .	92A386
	CH ₂ Cl ₂		5.8 × 10 ⁻³ (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; meas. 1 + $k_d/k_t = 1$.	84F065
	(CH ₃) ₃ CCH ₂ OCH ₃	1.1 × 10 ⁶			CP/LI-12	S = TPP; used $k_d = 3.5 \times 10^4$ s ⁻¹ .	92A386
	CH ₃ CN		0.011 (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; meas. 1 + $k_d/k_t = 1$.	84F065
	CH ₃ COCH ₃		0.020 (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; meas. 1 + $k_d/k_t = 1$.	84F065
	CHCl ₃		7.2 × 10 ⁻³ (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; meas. 1 + $k_d/k_t = 1$.	84F065
	CHCl ₃	1.5 × 10 ⁶			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81E003
	CHCl ₃	2.3 × 10 ⁶			CR/A'c-33	A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	81E003
	CHCl ₃	2.3 × 10 ⁶			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78A005
	CS ₂	7.2 × 10 ⁵		298	PL/Ld-2	S = TPP; $\Delta H^\ddagger = 3$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -125$ J K ⁻¹ mol ⁻¹ ; studied at 183-310 K.	85A167
	EtOH		1.6		CP/Ac-15	S = MB; Reported values are suspect since r_{ox} depends on [O ₂] and β value was determined from nonlinear data plots.	767041
	MeOH		0.096 (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; meas. 1 + $k_d/k_t = 1$.	84F065
	MeOH	1.1 × 10 ⁶		286	?	S = Poly-RB; method not reported.	81F534
	MeOH	1.1 × 10 ⁶	0.10		?	used $k_d = 1.1 \times 10^5$ s ⁻¹ ; Unpublished data.	79F074
	MeOH		0.060	293	CP/Oc-15	S = FICl ₄ ²⁻ ; $E_a = 6.7$ kJ mol ⁻¹ .	68F288
	MeOH		0.030	293	CP/Oc-15	S = DNT; $E_a = 5.9$ kJ mol ⁻¹ .	68F288
	MeOH		0.60	293	CP/Oc-15	S = RB; $E_a = 6.7$ kJ mol ⁻¹ .	68F288
	MeOH		0.055	293	CP/Oc-15	S = FIBr ₄ Cl ₄ ²⁻ ; $E_a = 6.3$ kJ mol ⁻¹ .	68F288
	MeOH		0.10	293	CP/Oc-15	S = MB; $E_a = 9.2$ kJ mol ⁻¹ .	68F288
	MeOH		0.055		?	Method not reported.	68F289
	MeOH/ <i>tert</i> -BuOH (50:50)				CP/Ac,A'c-17	S = RB; A' = TME; meas. $k_t/k_t^{A'} = 0.045$.	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)				CR/Ac,A'c-17	A' = TME; meas. $k_t/k_t^{A'} = 0.043$; ¹ O ₂ * from H ₂ O ₂ /Ca(OCl) ₂ .	68F292

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.56 2-Butene, 2-methyl- (2M2B) — Continued							
	MeOH/ <i>tert</i> -BuOH (50:50)				CR/Ac,A'c-17	A' = TME; meas. $k_t/k_t^{A'} = 0.067$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)			303	CP/Pa,P'a-17	S = RB; A' = TME; meas. $k_t/k_t^{A'} = 0.024$.	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)			298	CR/Pa,P'a-17	A' = TME; meas. $k_t/k_t^{A'} = 0.029$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	68F292
2.57 (E)-2-Butenoic acid (Crotonic acid)							
	C ₆ D ₆	3.3 × 10 ³			PL/Ld-2	S = TPP.	89A331
2.58 2-Butenoic acid, 2-methyl-, (E)							
	C ₆ D ₆	6.8 × 10 ³			PL/Ld-2	S = TPP.	89A331
2.59 3-Butenoic acid							
	C ₆ D ₆	4.0 × 10 ³			PL/Ld-2	S = TPP.	89A331
2.60 2-Buten-1-ol, 3-methyl-							
	MeOH/ H ₂ O (95:5)		0.14		CP/Oc-15	S = RB; Soln. contg. 1% sodium acetate.	79F137
2.61 1-Buten-3-one, 1-(2,6,6-trimethyl-1-cyclohexen-1-yl)- (β-Ionone)							
	C ₆ H ₆	1.6 × 10 ⁶			PL/A'd-5	S = A; A' = DPBF.	85E293
2.62 β-<i>apo</i>-8'-Carotenal							
	C ₆ H ₆	1.4 × 10 ¹⁰			PL/βCd-11	S = An.	78F276
	CH ₂ Cl ₂	3.1 × 10 ⁹		298	CP/P'a-19	S = Chl a; A' = Soybean oil; used $k_{A'} = 1.0 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 3.0 \times 10^4$; obs. peroxide formation.	91U180
2.63 α-Carotene							
	C ₆ H ₅ CH ₃	8.2 × 10 ⁹			PL/Ld-2	S = Pz.	91E465
	CHCl ₃ / EtOH (50:50)	6 × 10 ⁹		310	CR/LI-12	¹ O ₂ * from NDPO ₂ ; reported $k = 1.9 \times 10^{10}$ L mol ⁻¹ s ⁻¹ using $k_d = 1 \times 10^5$ s ⁻¹ , recalcd. using $k_d = 3.0 \times 10^4$ s ⁻¹ [92E654].	89R188 90E622
2.64 9-<i>cis</i>-β-Carotene							
	C ₆ H ₅ CH ₃	9 × 10 ⁹			PL/Ld-2	S = Pz.	91E465
	C ₆ H ₆	1.1 × 10 ¹⁰			PL/Ld-2	S = Pz.	91E465
2.65 15,15'-(<i>Z</i>)-β-Carotene							
	C ₆ H ₅ CH ₃	1.2 × 10 ¹⁰			PL/Ld-2	S = Pz.	91F465
	C ₆ H ₆	1.1 × 10 ¹⁰			PL/Ld-2	S = Pz.	91E465
2.66 β-Carotene							
	1-BuOH		5.5 × 10 ⁻⁶		CP/A'c-16	S = RB; A' = DPF.	717398
	<i>tert</i> -BuOH		3.8 × 10 ⁻⁶		CP/A'c-16	S = RB; A' = DPF.	717398
	C ₅ H ₅ N	6.5 × 10 ⁹			CP/A'c-23	S = A' = Rub; used $k_d = 6.0 \times 10^4$ s ⁻¹ , $k_{A'} = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	743112
	C ₆ D ₆	2.1 × 10 ¹⁰			PL/Ld-2	S = Pur.	89R044
	<i>n</i> -C ₆ H ₁₄	1.4 × 10 ¹⁰			PL/Ld-2	S = Pz.	91E465
	<i>n</i> -C ₆ H ₁₄	3.7 × 10 ⁷ (k_t)			CP/Ac-?	S = A' = An; used $k_d = 6 \times 10^4$ s ⁻¹ ; calcd. using $k_A = 3 \times 10^{10}$ L mol ⁻¹ s ⁻¹ .	80F169
	C ₆ H ₅ Br	3.4 × 10 ⁹		273	MD/A'c-33	A' = Rub; used $k_d = 1.3 \times 10^4$ s ⁻¹ , $k_{A'} = 4.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k/[(k_d/[A']) + k_{A'}] = 33.7$ at $[A'] = 1.5 \times 10^{-4}$ mol L ⁻¹ .	737333
	C ₆ H ₅ CH ₃	1.4 × 10 ¹⁰			PL/Ld-2	S = Pz.	91E465

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
1.66 β-Carotene — Continued							
	C ₆ H ₅ CH ₃	1.1 × 10 ¹⁰			PL/Ld-2	S = 2-ACN; $\Delta H^\ddagger = 2$ (5) kJ mol ⁻¹ ; $\Delta S^\ddagger = -60$ (-50) J K ⁻¹ mol ⁻¹ ; $E_a = 4$ (7) kJ mol ⁻¹ ; studied at 183-363 K; pre-excimer-equilibrium limit (and diffusion limit).	88A427
	C ₆ H ₅ CH ₃	1 × 10 ¹⁰			CP/A'c-20	S = A' = MDH; used $k_d = 4.0 \times 10^4$ s ⁻¹ .	83F406
	C ₆ H ₅ CH ₃	3.0 × 10 ¹⁰			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
	C ₆ H ₆	1.3 × 10 ¹⁰			PL/Ld-2	S = Pz.	91E465
	C ₆ H ₆	1.3 × 10 ¹⁰ 2.0 × 10 ⁶ (k_r) 1.2 × 10 ¹⁰ (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
	C ₆ H ₆	1.5 × 10 ¹⁰		303	CP/P'a-19	S = A' = Rub; k_d not given.	87A107
	C ₆ H ₆	1.2 × 10 ¹⁰			PL/ β Cd-11	S = An.	78F276
	C ₆ H ₆	1.3 × 10 ¹⁰		298	PL/A'd-8	S = An; A' = DPBF.	737438
	C ₆ H ₆	1.1 × 10 ¹⁰		298	PL/ β Cd-11	S = An.	737438
	C ₆ H ₆	2 × 10 ¹⁰			PL/A'd-5	S = MB; A' = DPBF; Solvent contained 2% MeOH.	727260
	C ₆ H ₆ / EtOH (67:33)	1.6 × 10 ¹⁰			CP/A'c-19	S = RB; A' = Chl a; used $k_d = 1 \times 10^5$ s ⁻¹ .	78F404
	C ₆ H ₆ / EtOH (89:11)	1.3 × 10 ¹⁰		295	CP/P'a-19	S = RB; A' = TEMP-4-OH; used $k_d = 3 \times 10^4$ s ⁻¹ ; P' = TEMPOL.	757445
	C ₆ H ₆ / MeOH (60:40)	2.3 × 10 ¹⁰	4.3 × 10 ⁻⁶		CP/A'c-22	S = MB; A' = Rub; used $k_d = 1.0 \times 10^5$ s ⁻¹ .	747042
	C ₆ H ₆ / MeOH (80:20)	9.7 × 10 ⁹	3.9 × 10 ⁻⁶		CP/A'c-16	S = RB; A' = DPF; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	717398
	C ₆ H ₆ / MeOH (80:20)			298	CP/P'a-20	S = MB; A' = 2M2P; meas. $k_A/k_{A'} = 1.5 \times 10^4$.	70F734
	CCl ₄	9.9 × 10 ⁹			PL/Ld-2	S = Pz.	91E465
	CCl ₄	1.0 × 10 ¹⁰		296	CR/LI-12	used $k_d = 1.7 \times 10^3$ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	90F069
	CCl ₄	5.9 × 10 ⁹			CP/LI-12	S = PHO; used $k_d = 35$ s ⁻¹ .	88E479
	CCl ₄	3.8 × 10 ⁶ (k_r)			CP/Ac-14,27	S = TPP; A' = Tetr; k_r derived using $k_A = 7 \times 10^9$ L mol ⁻¹ s ⁻¹ .	83A336
	CCl ₄	7.0 × 10 ⁹			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	83A336 78E892
	CCl ₄	6.5 × 10 ⁹		295	PL/Ld-2	S = PdMPDME or MPDME; decay at 1588 nm; decay at 1272 nm gave 7×10^9 L mol ⁻¹ s ⁻¹ .	80E558
	CCl ₄	8.0 × 10 ⁹			MP/LI-12	S = Ret; used $k_d = 36$ s ⁻¹ .	79F463 78F700
	CCl ₄	7 × 10 ⁹			MP/LI-12	S = PP, Pht a, or BChl a; used $k_d = 35$ s ⁻¹ .	77E617 78E881 79A010
	CCl ₄ / CHCl ₃ (90:10)	6.2 × 10 ⁹			CP/A'c-23	S = A' = Rub; used $k_d = 1.4 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k/(k_A[A'] + k_d) = 3.5 \times 10^6$ L mol ⁻¹ at $[A'] = 5 \times 10^{-6}$ mol L ⁻¹ .	74F645
	CD ₃ OD	1.4 × 10 ⁹			CP/LI-12	S = RB; used $k_d = 4.4 \times 10^3$ s ⁻¹ .	88E479
	CD ₃ OD	1.5 × 10 ⁹			CP/LI-12	S = PHO; used $k_d = 4.4 \times 10^3$ s ⁻¹ .	88E479
	CH ₂ Cl ₂	4.6 × 10 ⁹		298	CP/P'a-19	S = Chl a; A' = Soybean oil; used $k_{A'} = 1.0 \times 10^5$ L mol ⁻¹ s ⁻¹ ; obs. peroxide formation.	91U180
	CH ₂ Cl ₂	1.3 × 10 ¹⁰			PL/Tb-3	S = TPP.	83A050
	CH ₂ Cl ₂	1.3 × 10 ¹⁰		298	CP/A'c-23	S = A' = Rub; used $k_d = 8.0 \times 10^3$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.66 β-Carotene — Continued							
	CH ₂ Cl ₂	8.5×10^9			CP/A'c-23	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	732066
	CHCl ₃	5×10^9			CR/LI-12	used $k_d = 3.0 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	92R054
	CHCl ₃	1.1×10^{10}			PL/Ld-2	S = Pz.	91E465
	CHCl ₃	6.5×10^9			PL/Ld-2	S = MPDDE or PdMPDDE.	81E472
	CHCl ₃ /EtOH (50:50)	1.2×10^{10}			PL/Ld-2	S = Pz; Soln. cont. 1% H ₂ O.	91E465
	CHCl ₃ /EtOH (50:50)	4×10^9		310	CR/LI-12	¹ O ₂ * from NDPO ₂ ; reported $k' = 1.4 \times 10^{10}$ L mol ⁻¹ s ⁻¹ using $k_d = 1 \times 10^5$ s ⁻¹ , recalcd. using $k_d = 3.0 \times 10^4$ s ⁻¹ [92E654].	89R188 90E622
	CS ₂		1.5×10^{-7}		CP/P'a-20	S = TPP; A' = 2M2P.	727028
	C1CF ₂ CCl ₂ F	1.1×10^{10}		303	CR/P'a-32	A' = Rub; ¹ O ₂ * from DMNO ₂ ; $k_{A'}$ and k_d not given.	87A107
	C1CF ₂ CCl ₂ F/ CH ₂ Cl ₂ (96:4)	9.5×10^9			PL/Tb-3	S = TPP.	83A050
	EtOH/H ₂ O (95:5)	2×10^9			CR/LI-12	¹ O ₂ * from pyrogallol autooxidation by O ₂ /KOH; k_d not given.	78F605
	MeOH	9.3×10^8		297	CR/P'a-31	A' = TEMP; formn. of TEMPO monitored by esr; soln. cont. MeONa and CoCl ₂ ; ¹ O ₂ * from autooxidation of adrenaline; k_d not given.	92D227
	MeOH		6.1×10^{-6}		CP/A'c-16	S = RB.	717398
	MeOH/H ₂ O (95:5)	6.3×10^9		310	CR/LI-12	used $k_d = 1.8 \times 10^5$ s ⁻¹ ; soln. cont. 0.05 mol L ⁻¹ MeONa and 5×10^{-4} mol L ⁻¹ CoCl ₂ ; ¹ O ₂ * from autooxidation of oxytetracycline.	92M228
2.67 β, β-Carotene, 3',6'-diacetyloxy-6',7'-didehydro-5,6-epoxy-5,5',6,6',7,8-hexahydro-3,3',5'-trihydroxy-8-oxo-, (3S,3'S,5R,5'R,6S,6'S)- (Fucoxanthin)							
	CCl ₄	2.6×10^5 (k_t)			CP/Ac-14,27	S = TPP; A' = Tetr; k_t derived using $k_A = 7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	83A336
	CCl ₄	7.0×10^8			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	83A336
2.68 ψ-Carotene, 3,4-didehydro-1,2,7',8'-tetrahydro-1-methoxy- (all-E)- (Spheroidene)							
	C ₆ D ₆	1.6×10^{10}			PL/Ld-2	S = Pur.	89R044
2.69 ψ-Carotene, 3,4-didehydro-1,2,7',8'-tetrahydro-1-methoxy-2-oxo- (all-E)- (Spheroidenone)							
	C ₆ D ₆	1.9×10^{10}			PL/Ld-2	S = Pur.	89R044
2.70 ψ-Carotene, 7,8-dihydro- (all-E)- (Neurosporene)							
	C ₆ D ₆	1.7×10^{10}			PL/Ld-2	S = Pur.	89R044
2.71 ψ-Carotene, 3,3',4,4'-tetrahydro-1,1',2,2'-tetrahydro-1,1'-dimethoxy- (all-E)- (Spirilloxanthin)							
	C ₆ D ₆	1.3×10^{10}			PL/Ld-2	S = Pur.	89R044
2.72 ψ-Carotene, 7,8,11,12-tetrahydro- (ζ-Carotene)							
	C ₆ D ₆	3.5×10^9			PL/Ld-2	S = MPDME.	89R044
2.73 ψ, ψ-Carotene, 7,7',8,8',11,12-hexahydro-, 15-cis- (15-cis-Phytofluene)							
	CHCl ₃	$<1 \times 10^7$			CR/LI-12	used $k_d = 3.0 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	92R054
	C ₆ H ₆ /MeOH (60:40)	$\leq 1.0 \times 10^8$	$\geq 1.0 \times 10^{-3}$		CP/A'c-22	S = MB; A' = Rub; used $k_d = 1.0 \times 10^5$ s ⁻¹ .	747042
2.74 15(Z)-ψ-Carotene, 7,7',8,8',11,11',12,12'-octahydro- (15-cis-Phytoene)							
	CHCl ₃	$<1 \times 10^7$			CR/LI-12	used $k_d = 3.0 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	92R054
	C ₆ H ₆ /MeOH (60:40)	$\leq 1.9 \times 10^7$	$\geq 5.3 \times 10^{-3}$		CP/A'c-22	S = MB; A' = Rub; used $k_d = 1.0 \times 10^5$ s ⁻¹ .	747042

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
1.76 (E)-β,ϵ-Carotene, 3,3'-dihydroxy- (3R,3'R,6'R)- (Lutein)							
	C ₆ H ₆ / MeOH (60:40)	2.1×10^{10}	4.8×10^{-6}		CP/A'c-22	S = MB; A' = Rub; used $k_d = 1.0 \times 10^5$ s ⁻¹ .	747042
	CH ₂ Cl ₂	5.7×10^9	1.8×10^{-6}	293	CP/Oc-19	S = Chl a; A' = Soybean oil; used $k_d = 1.0 \times 10^4$ s ⁻¹ .	90R128
	CHCl ₃	1.6×10^{10}			PL/Ld-2	S = Pz; Contains ~5% zeaxanthin.	91E465
	CHCl ₃ / EtOH (50:50)	2×10^9		310	CR/LI-12	¹ O ₂ * from NDPO ₂ ; reported $k = 8 \times 10^9$ L mol ⁻¹ s ⁻¹ using $k_d = 1 \times 10^5$ s ⁻¹ , recalcd. using $k_d = 3.0 \times 10^4$ s ⁻¹ [92E654].	89R188 90E622
1.76 γ-Carotene							
	CHCl ₃ / EtOH (50:50)	7×10^9		310	CR/LI-12	¹ O ₂ * from NDPO ₂ ; reported $k = 2.5 \times 10^{10}$ L mol ⁻¹ s ⁻¹ using $k_d = 1 \times 10^5$ s ⁻¹ , recalcd. using $k_d = 3.0 \times 10^4$ s ⁻¹ [92E654].	89R188 90E622
	CHCl ₃	8.3×10^8			PL/Ld-2	S = Pz.	91E465
1.77 Carotene analog, C-30							
	C ₆ H ₆ / MeOH (80:20)				CP/Pa-20	S = MB; A' = 2M2P; meas. $k/k_{A'} = (57 \pm 86)$.	707188
1.78 Carotene analog, C-35							
	C ₆ H ₆ / MeOH (80:20)				CP/P'a-20	S = MB; A' = 2M2P; meas. $k/k_{A'} = 1900 \pm 2850$.	707188
1.79 β,β-Carotene-3,3'-diol, (3R,3'R)- (Zeaxanthin)							
	C ₆ H ₆	1.2×10^{10}			PL/Ld-2	S = Pz.	91E465
	C ₆ H ₆	2.8×10^9			PL/ β Cd-2	S = An.	80A143
	CCl ₄	7.0×10^9			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	83A336
	CCl ₄	3.4×10^6 (k_T)			CP/A'c-27	S = TPP, A' = Tetr, k_T derived using $k_A = 7 \times 10^9$ L mol ⁻¹ s ⁻¹ .	83A336
	CH ₂ Cl ₂	6.8×10^9	1.5×10^{-6}	293	CP/Oc-19	S = Chl a; A' = Soybean oil; used $k_d = 1.0 \times 10^4$ s ⁻¹ .	90R128
	CHCl ₃ / EtOH (50:50)	3×10^9		310	CR/LI-12	¹ O ₂ * from NDPO ₂ ; reported $k = 1.0 \times 10^{10}$ L mol ⁻¹ s ⁻¹ using $k_d = 1 \times 10^5$ s ⁻¹ , recalcd. using $k_d = 3.0 \times 10^4$ s ⁻¹ [92E654].	89R188 90E622
1.80 β,β-Carotene-3,3'-diol, 5,6:5',6'-diepoxy-5,5',6,6'-tetrahydro- (all-E) (Violaxanthin)							
	C ₆ H ₆	1.6×10^{10}			PL/Ld-2	S = Pz.	91E465
1.81 β,β-Carotene-4,4'-diol, all-E- (Isozeaxanthin)							
	C ₆ H ₆ / MeOH (60:40)	2.9×10^{10}	3.4×10^{-6}		CP/A'c-22	S = MB; A' = Rub; used $k_d = 1.0 \times 10^5$ s ⁻¹ .	747042
	CH ₂ Cl ₂	7.4×10^9	1.3×10^{-6}	293	CP/Oc-19	S = Chl a; A' = Soybean oil; used $k_d = 1.0 \times 10^4$ s ⁻¹ .	90R128
2.82 β-Carotene-4,4'-dione, 3,3'-dihydroxy- (Astaxanthin)							
	C ₆ H ₆	1.4×10^{10}			PL/Ld-2	S = Pz.	91E465
	CH ₂ Cl ₂	9.8×10^9	1.0×10^{-6}	293	CP/Oc-19	S = Chl a; A' = Soybean oil; used $k_d = 1.0 \times 10^4$ s ⁻¹ .	90R128
	CHCl ₃ / EtOH (50:50)	7×10^9		310	CR/LI-12	¹ O ₂ * from NDPO ₂ ; reported $k = 2.4 \times 10^{10}$ L mol ⁻¹ s ⁻¹ using $k_d = 1 \times 10^5$ s ⁻¹ , recalcd. using $k_d = 3.0 \times 10^4$ s ⁻¹ [92E654].	89R188 90E622
2.83 β,β-Carotene-4,4'-dione (Canthaxanthin)							
	C ₆ H ₅ CH ₃	1.3×10^{10}			PL/Ld-2	S = Pz.	91E465
	C ₆ H ₆	1.8×10^{10}			PL/ β Cd-2	S = An.	80A143
	C ₆ H ₆	1.4×10^{10}			PL/ β Cd-11	S = An.	78F276

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.83 β,β-Carotene-4,4'-dione (Canthaxanthin) — Continued							
	CCl ₄	1.0×10^{10}			CP/LI-12	S = PHO; used $k_d = 35$ s ⁻¹ .	88E479
	CD ₃ OD	1.2×10^{10}			CP/LI-12	S = PHO; used $k_d = 4.4 \times 10^3$ s ⁻¹ .	88E479
	CH ₂ Cl ₂	1.1×10^{10}			CP/P'a-19	S = Chl a; A' = Soybean oil; used $k_{A'} = 1.0 \times 10^5$ L mol ⁻¹ s ⁻¹ ; obs. peroxide formation.	91U180
	CHCl ₃ / EtOH (50:50)	6×10^9		310	CR/LI-12	¹ O ₂ * from NDPO ₂ ; reported $k = 2.1 \times 10^{10}$ L mol ⁻¹ s ⁻¹ using $k_d = 1 \times 10^5$ s ⁻¹ , recalcd. using $k_d = 3.0 \times 10^4$ s ⁻¹ [92E654].	89R188
2.84 κ,κ-Carotene-6,6'-dione, 2,2'-dihydroxy- (2S,2'S,5R,5'R) (C₄₀-Epiisocapsorubin)							
	CHCl ₃	8×10^9			CR/LI-12	used $k_d = 3.0 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	92R054
2.85 β-apo-8-Carotenoic acid, ethyl ester							
	C ₆ H ₆	1.2×10^{10}			PL/ β Cd-11	S = An.	78F276
2.86 β-apo-8'-Carotenol							
	C ₆ H ₆ / MeOH (80:20)				CP/P'a-20	S = MB; A' = 2M2P; meas. $k_A/k_{A'} = -1.9 \times 10^3$.	707188
	C ₆ H ₆ / MeOH (80:20)	1.2×10^{10}		298	CP/P'a-20	S = MB; A' = 2M2P; used $k_d = 1.0 \times 10^5$ s ⁻¹ , $\beta_{A'} = 0.04$ mol L ⁻¹ .	70F734
2.87 β,β-Caroten-3-ol (Cryptoxanthin)							
	CHCl ₃ / EtOH (50:50)	2×10^9		310	CR/LI-12	¹ O ₂ * from NDPO ₂ ; reported $k = 6 \times 10^9$ L mol ⁻¹ s ⁻¹ using $k_d = 1 \times 10^5$ s ⁻¹ , recalcd. using $k_d = 3.0 \times 10^4$ s ⁻¹ [92E654].	89R188 90E622
2.88 β,β-Caroten-4-one (Echinonone)							
	C ₆ H ₆	1.1×10^{10}			PL/ β Cd-2	S = An.	80A143
2.89 3,5-Cholestadiene							
	CHCl ₃	7.4×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.90 4-Cholesten-3-one, 4-methyl-							
			$>2 \times 10^2$		CP/Ac-18	S = Poly-RB or RB or MB; A' = Linalool; used $\beta_{A'} = 0.18$ mol L ⁻¹ ; Solvent is CH ₂ Cl ₂ or MeOH or C ₆ H ₆ .	80F111
2.91 (E)-Cinnamic acid							
	CD ₃ OD	3.4×10^3		293	PL/Ld-2	S = HP.	90F411
2.92 Coumarin, 3,4,5,6,7,8-hexahydro-							
	CD ₃ COCD ₃	1.0×10^6 (k_r) 5.5×10^5 (k_q)		296	CP/Ac,P'a-17	S = MB; A' = 2M2P; used $k_r A' = 8.1 \times 10^5$ L mol ⁻¹ s ⁻¹ ; $\Delta H^\ddagger = 4.6$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -130$ J K ⁻¹ mol ⁻¹ .	86F219
	CD ₃ COCD ₃	1.1×10^6		296	PL/Ld-2	S = MB.	86F219
2.93 Crocetin							
	D ₂ O pD = 8.4	6×10^8		293	PL/Ad,A'd-5	S = PBA; A' = DPBF; used $k_{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	82A204
	D ₂ O pD = 8.4	2.5×10^9		293	PL/Ad-5	S = PBA.	82A204
	DMF	$<5 \times 10^6$ (k_r) -7×10^9 (k_q)		308	CR/Ac-?	used $k_d = 1.4 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	87A318
	DMSO	$<5 \times 10^6$ (k_r) -2×10^9 (k_q)		308	CR/Ac-?	used $k_d = 4.2 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	87A318
	H ₂ O pH = 7.8	2.5×10^8 (k_r) 5.5×10^9 (k_q)		308	CR/Ac-?	used $k_d = 4.2 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	87A318

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
1.94	Cyclobutane, (1-cyclopropylethylidene)-						
	CH ₃ COCH ₃				CP/Ac,A'c-17	S = Eos; A' = (Dicyclopropylmethylidene)cyclobutane; meas. $k_f/k_r^{A'} = 0.70$.	78F430
1.95	Cyclobutane, (cyclopropylmethylene)-						
	CH ₃ COCH ₃				CP/Ac,A'c-17	S = Eos; A' = (Dicyclopropylmethylidene)cyclobutane; meas. $k_f/k_r^{A'} = 0.59$.	78F430
1.96	Cyclobutane, (dicyclopropylmethylidene)-						
	C ₂ H ₅ I				CP/Ac,A'c-17	S = TPP; A' = TMS; meas. $k_f/k_r^{A'} = 0.21$.	78F430
	C ₆ H ₆				CP/Ac,A'c-17	S = TPP; A' = TMS; meas. $k_f/k_r^{A'} = 0.25$.	78F430
	CH ₂ Cl ₂				CP/Ac,A'c-17	S = MB; A' = TMS; meas. $k_f/k_r^{A'} = 0.21$.	78F430
	CH ₃ COCH ₃				CP/Ac,A'c-17	S = Eos; A' = TMS; meas. $k_f/k_r^{A'} = 0.26$.	78F430
	CS ₂				CP/Ac,A'c-17	S = TPP; A' = TMS; meas. $k_f/k_r^{A'} = 0.22$.	78F430
	MeOH				CP/Ac,A'c-17	S = Eos; A' = TMS; meas. $k_f/k_r^{A'} = 0.21$.	78F430
1.97	Cyclobutene, 1-<i>tert</i>-butyl-						
	CH ₃ CN			273	CP/Ac,A'c-17	S = MB; A' = 1- <i>tert</i> -Butylcyclohexene; meas. $k_f/k_r^{A'} = 5.8$.	81F018
1.98	Cyclobutene, 1-methyl-						
	CH ₃ CN			273	CP/Ac,A'c-17	S = MB; A' = 1- <i>tert</i> -Butylcyclohexene; meas. $k_f/k_r^{A'} = 9.3$.	81F018
1.99	1,3-Cycloheptadiene						
	CHCl ₃	1.1×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.100	Cycloheptane, ethylidene-						
	CHCl ₃	4.8×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.101	Cycloheptane, methylene-						
	CH ₃ CN			273	CP/Ac,A'c-17	S = MB; A' = Methylene-cyclohexane; meas. $k_f/k_r^{A'} = 62$.	81F018
2.102	Cycloheptene, 1-methyl-						
	CH ₃ CN			273	CP/Ac,A'c-17	S = MB; A' = 1- <i>tert</i> -Butylcyclohexene; meas. $k_f/k_r^{A'} = 17$.	81F018
	CHCl ₃	2.4×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.103	1,3-Cyclohexadiene						
	C ₆ H ₆		0.015 (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; meas. $1 + k_d/k_r = 1$.	84F065
	CCl ₄		4.4×10^{-4} (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; meas. $1 + k_d/k_r = 1$.	84F065
	CCl ₄	1.8×10^6			CP/Ac-14	S = TPP; used $k_d = 1.4 \times 10^3$ s ⁻¹ .	80C002
	CH ₂ Cl ₂		3.2×10^{-3} (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; meas. $1 + k_d/k_r = 1$.	84F065
	CH ₃ CN		9.4×10^{-3} (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; meas. $1 + k_d/k_r = 1$.	84F065
	CH ₃ COCH ₃		0.013 (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; meas. $1 + k_d/k_r = 1$.	84F065
	CHCl ₃		4.3×10^{-3} (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; meas. $1 + k_d/k_r = 1$.	84F065
	CHCl ₃	7.1×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
	MeOH		0.037 (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; meas. $1 + k_d/k_r = 1$.	84F065
	MeOH		0.025	293	CP/Oc-15	S = FIBr ₄ Cl ₄ ²⁻ ; $E_a = 5.4$ kJ mol ⁻¹ .	68F288

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.103 1,3-Cyclohexadiene — Continued							
	MeOH		0.011	293	CP/Oc-15	S = DNT; $E_a = 5.9$ kJ mol ⁻¹ .	68F288
	MeOH		0.040	293	CP/Oc-15	S = FICl ₄ ²⁻ ; $E_a = 5.9$ kJ mol ⁻¹ .	68F288
	MeOH		0.073	293	CP/Oc-15	S = MB; $E_a = 5.0$ kJ mol ⁻¹ .	68F288
	MeOH		0.045	293	CP/Oc-15	S = RB; $E_a = 5.0$ kJ mol ⁻¹ .	68F288
	MeOH/ <i>tert</i> -BuOH (50:50)				CR/Ac,A' ^c -17	A' = TME; meas. $k_r/k_r^{A'} = 0.33$; ¹ O ₂ * from H ₂ O ₂ /Ca(OCl) ₂ .	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)				CP/Ac,A' ^c -17	S = RB; A' = TME; meas. $k_r/k_r^{A'} = 0.077$.	68F292
	2-PrOH	7.3×10^5		273	CR/LI-12	used $k_d = 4.1 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from hydrotrioxide, e.g. (CH ₃) ₂ C(OH)OOH.	90M125
2.104 1,3-Cyclohexadiene, 5,6-bis(1-methylethylidene)- (Tetramethyl-<i>o</i>-xylylene)							
	CH ₃ CN	3.2×10^8			PL/Ld-2	S = Pz.	92A325
2.105 1,3-Cyclohexadiene, 1-methyl-4-(1-methylethyl)- (α-Terpinene)							
	CHCl ₃	1×10^8			CP/A' ^c -33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
	MeOH	4.0×10^{-3}		293	CP/Oc-15	S = MB; $E_a = 1.7$ kJ mol ⁻¹ ; studied at 173-293 K.	68F288
	MeOH	1.3×10^{-3}		293	CP/Oc-15	S = Acridine Orange; $E_a = 1.7$ kJ mol ⁻¹ .	68F288
	MeOH	3.3×10^{-3}		293	CP/Oc-15	S = FIBr ₄ Cl ₄ ²⁻ ; $E_a = 1.3$ kJ mol ⁻¹ .	68F288
	MeOH	1.4×10^{-3}		293	CP/Oc-15	S = DNT; $E_a = 1.3$ kJ mol ⁻¹ .	68F288
	MeOH	6.0×10^{-3}		293	CP/Oc-15	S = FICl ₄ ²⁻ ; $E_a = 0.84$ kJ mol ⁻¹ .	68F288
	MeOH	3.1×10^{-3}		293	CP/Oc-15	S = RB; $E_a = 1.7$ kJ mol ⁻¹ .	68F288
	MeOH	0.010		288	CP/Oc-15	S = RB.	587004
2.106 1,3-Cyclohexadiene, 2-methyl-5-(1-methylethyl)-							
	CHCl ₃	3.2×10^7			CP/A' ^c -33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
	MeOH		0.010	293	CP/Oc-15	S = RB; $E_a = 4.2$ kJ mol ⁻¹ .	68F288
2.107 1,4-Cyclohexadiene, 1-methyl-							
	CHCl ₃	2.0×10^5			CP/A' ^c -33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.108 2,4-Cyclohexadien-1-one, 6,6-dimethyl-							
	MeOH		~1.9	293	CP/Oc-15	S = RB; $E_a = 15$ kJ mol ⁻¹ .	68F288
2.109 Cyclohexane, cyclohexylidene-							
	MeOH		0.030	293	CP/Oc-15	S = RB; $E_a = 5.4$ kJ mol ⁻¹ .	68F288
	MeOH		0.056	?		Method not reported.	627005
2.110 Cyclohexane, ethylidene-							
	CHCl ₃	8.6×10^5			CP/A' ^c -33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445 78A005
2.111 Cyclohexane, (hydroxymethylene)-, acetate							
	CD ₃ COCD ₃	7.5×10^4			PL/Ld-2	S = MB.	83A026
	CD ₃ OD	4.8×10^4			PL/Ld-2	S = MB.	83A026
2.112 Cyclohexane, methylene-							
	CD ₃ COCD ₃	6.1×10^3		298	PL/Ld-2	S = TPP; $\Delta H^\ddagger = -0.8$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -176$ J K ⁻¹ mol ⁻¹ ; studied at 183-310 K.	85A167
	CH ₃ CN	$<1 \times 10^3$ (k_c)			?	S = MB; A' = <i>c</i> -C ₆ H ₅ CH ₃ .	73F664

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
1.112	Cyclohexane, methylene- — Continued						
	CS ₂	5.2×10^3		298	PL/Ld-2	S = TPP; $\Delta H^\ddagger = -0.4$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -176$ J K ⁻¹ mol ⁻¹ ; studied at 183-310 K.	85A167
1.113	Cyclohexanol, 2-(cyclohexylidene)-						
	MeOH		0.44		?	Method not reported.	627005
1.114	Cyclohexanone, 2-cyclohexylidene-						
			0.34		CP/Ac-18	S = Poly-RB or RB; A' = Linalool; used $\beta_{A'} = 0.18$ mol L ⁻¹ ; Solvent is CH ₂ Cl ₂ or MeOH.	80F111
	MeOH		0.35	293	CP/Oc-15	S = RB; $E_a = 11.7$ kJ mol ⁻¹ .	68F288
	MeOH		0.37		?	Method not reported.	627005
1.115	Cyclohexanone, 5-methyl-2-(1-methylethenyl)- (Pulegone)						
			0.12		CP/Ac-18	S = Poly-RB or RB or MB; A' = Linalool; used $\beta_{A'} = 0.18$ mol L ⁻¹ ; Solvent is CH ₂ Cl ₂ or MeOH or C ₆ H ₆ .	80F111
	CHCl ₃	6.1×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
1.116	Cyclohexene						
	C ₃ H ₅ N	-10^4 (k_r)		286	?	S = Poly-RB; method not reported; value from graph.	81F534
	C ₆ H ₆	-8×10^3 (k_r)		286	?	S = Poly-RB; method not reported; value from graph.	81F534
	C ₆ H ₆ / MeOH (75:25)	2.0×10^4	3.1	298	CP/Pa-15	S = RB; used $k_d = 6.3 \times 10^4$ s ⁻¹ .	79A457 78F586
	CCl ₄	-5×10^2 (k_r)		286	?	S = Poly-RB; method not reported; value from graph.	81F534
	CH ₂ Cl ₂	-7×10^3 (k_r)		286	?	S = Poly-RB; method not reported; value from graph.	81F534
	CH ₃ CN	-10^4 (k_r)		286	?	S = Poly-RB; method not reported; value from graph.	81F534
	CH ₃ COCH ₃	-2×10^4 (k_r)		286	?	S = Poly-RB; method not reported; value from graph.	81F534
	CHCl ₃	-9×10^3 (k_r)		286	?	S = Poly-RB; method not reported; value from graph.	81F534
	CS ₂	-10^3 (k_r)		286	?	S = Poly-RB; method not reported; value from graph.	81F534
	MeOH	2.7×10^4 (k_r)		286	?	S = Poly-RB; method not reported; value from graph.	81F534
	MeOH			288	CP/Ac,A'c-17	S = MB; A' = CH ₃ CH ₂ CH ₂ CH=CHCH ₃ ; meas. $k_r/k_r^{A'} = 0.12$.	65F028
	MeOH		26		?	Method not reported.	68F289
	MeOH/ <i>tert</i> -BuOH (50:50)			303	CP/Pa,P'a-17	S = RB; A' = (CH ₃) ₂ CHCH=CHCH ₃ ; meas. $k_r/k_r^{A'} = 0.19$.	68F292
1.117	Cyclohexene, 1,2-dimethyl-						
	CHCl ₃	3.0×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78A005
	MeOH	3.9×10^6		286	?	S = Poly-RB; method not reported.	81F534
	MeOH	1×10^7			PL/A'd-5	S = MB; A' = DPBF.	727260
	MeOH			288	CP/Ac,A'c-17	S = MB; A' = TME; meas. $k_r/k_r^{A'} = 0.53$.	65F028
	MeOH		0.030		?	Method not reported.	68F289

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.118	Cyclohexene, 1,3-dimethyl- CHCl ₃	5.1 × 10 ⁵			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.119	Cyclohexene, 1,4-dimethyl- CHCl ₃	4.0 × 10 ⁵			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.120	Cyclohexene, 2,3-dimethyl- MeOH			288	CP/Ac,A'c-17	S = MB; A' = <i>c</i> -C ₆ H ₉ CH ₃ ; meas. $k_t/k_r^{A'} = 1.1$.	65F028
2.121	Cyclohexene, 4-(1-hydroxy-1-methylethyl)-1-methyl- (Terpinolene) MeOH		-0.050	293	CP/Oc-15	S = RB; $E_a = 1.7$ kJ mol ⁻¹ .	68F288
2.122	Cyclohexene, 1-methyl						
	C ₆ H ₆		0.15	298	CP/A'c-23	S = A' = Rub; used $\beta_{A'} = 3.0 \times 10^{-4}$ mol L ⁻¹ .	706079
	C ₆ H ₆		0.14	298	CP/A'c-23	S = A' = Tetr; used $\beta_{A'} = 1.7 \times 10^{-3}$ mol L ⁻¹ .	706079
	C ₆ H ₆		0.13	298	CP/A'c-23	S = A' = DMA; used $\beta_{A'} = 3.0 \times 10^{-4}$ mol L ⁻¹ .	706079
	C ₆ H ₆		0.12	298	CP/A'c-23	S = A' = DMBA; used $\beta_{A'} = 7.1 \times 10^{-4}$ mol L ⁻¹ .	706079
	CH ₃ CN			273	CP/Ac,A'c-17	S = MB; A' = 1- <i>tert</i> -Butylcyclohexene; meas. $k_t/k_r^{A'} = 2.3$.	81F018
	CH ₃ COCH ₃	2.1 × 10 ⁵ (k_t)		281	?	S = ?; A' = 1,4-Dioxene; used $k_{A'} = 2.2 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 0.96$.	70F733
	CHCl ₃	3.3 × 10 ⁵			CR/A'c-33	A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	81E003
	CHCl ₃	3.4 × 10 ⁵			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81E003
	CHCl ₃	3.6 × 10 ⁵			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445 78A005
	MeOH	2.0 × 10 ⁵		286	?	S = Poly-RB; method not reported.	81F534
	MeOH			288	CP/Ac,A'c-17	S = MB; A' = <i>c</i> -C ₅ H ₇ CH ₃ ; meas. $k_t/k_r^{A'} = 0.12$.	65F028
	MeOH			288	CP/Ac,A'c-17	S = Ery; A' = <i>c</i> -C ₅ H ₇ CH ₃ ; meas. $k_t/k_r^{A'} = 0.11$.	65F028
	MeOH			288	CP/Ac,A'c-17	S = HP; A' = <i>c</i> -C ₅ H ₇ CH ₃ ; meas. $k_t/k_r^{A'} = 0.11$.	65F028
	MeOH			288	CP/Ac,A'c-17	S = RB; A' = <i>c</i> -C ₅ H ₇ CH ₃ ; meas. $k_t/k_r^{A'} = 0.087$.	65F028
	MeOH			288	CP/Ac,A'c-17	S = Eos; A' = <i>c</i> -C ₅ H ₇ CH ₃ ; meas. $k_t/k_r^{A'} = 0.093$.	65F028
	MeOH		1.2	?	?	Method not reported.	68F289
	MeOH/ <i>tert</i> -BuOH (50:50)				CR/Ac,A'c-17	A' = 2M2B; meas. $k_t/k_r^{A'} = 0.050$; ¹ O ₂ * from H ₂ O ₂ /Ca(OCl) ₂ .	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)			276	CR/Pa,P'a-17	A' = 2M2P; meas. $k_t/k_r^{A'} = 0.26$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)			303	CP/Pa,P'a-17	S = RB; A' = 2M2P; meas. $k_t/k_r^{A'} = 0.22$.	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)				CP/Ac,A'c-17	S = RB; A' = 2M2B; meas. $k_t/k_r^{A'} = 0.043$.	68F292
2.123	Cyclohexene, 4-methyl- MeOH			288	CP/Ac,A'c-17	S = MB; A' = <i>c</i> -C ₆ H ₁₀ ; meas. $k_t/k_r^{A'} = 0.67$.	65F028
2.124	Cyclohexene, 1-methyl-4-(1-methylethenyl)-, (R)- (Limonene)						
	CH ₃ COCH ₃	1.7 × 10 ⁵			PL/Ld-2	S = RB.	92F225
	MeOH		1.7	293	CP/Oc-15	S = MB; $E_a = 8.4$ kJ mol ⁻¹ .	68F288
	MeOH		1.7	?	?	Method not reported.	627005
2.125	Cyclohexene, 1-methyl-4-(1-methylethyl)- (Carvomenthene) MeOH		-1.0	293	CP/Oc-15	S = MB; $E_a = 13$ kJ mol ⁻¹ .	68F288

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
1.126	Cyclohexen-1-ol, 6,6-dimethyl-, acetate CD ₃ COCD ₃	8×10^3 (k_r)		296	CP/Pa-17	S = MB; A' = Adamantylidenemethyl acetate; used $k_r^{A'} = 2.7 \times 10^4$ L mol ⁻¹ s ⁻¹ .	86F219
1.127	2-Cyclohexen-1-one, 2-ethyl-3-methyl-		$>2 \times 10^2$		CP/Ac-18	S = Poly-RB or RB; A' = Linalool; used $\beta_{A'} = 0.18$ mol L ⁻¹ ; Solvent is CH ₂ Cl ₂ or MeOH.	80F111
1.128	2-Cyclohexen-1-one, 2-hydroxy-3-methyl- MeOH	-4×10^7 (k_r)		273	CP/Pa,P'a-17	S = RB; A' = TME; $k_r^{A'}$ not given.	85F150
1.129	1,3-Cyclooctadiene CHCl ₃	6.5×10^4			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
1.130	1,4-Cyclooctadiene, 6-hydroperoxy- CHCl ₃	2.9×10^4	0.58		CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	89F349
1.131	1,4-Cyclooctadiene, 6-methoxy- MeOH	7.2×10^5	0.14		CP/A'c-33	S = A' = Rub; used $k_d = 1.0 \times 10^5$ s ⁻¹ , $k_{A'} = 3.1 \times 10^7$ L mol ⁻¹ s ⁻¹ .	89F349
1.132	1,4-Cyclooctadiene, 6-(trimethylsiloxy)- CHCl ₃	6.2×10^4	0.28		CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	89F349
1.133	1,5-Cyclooctadiene CHCl ₃	3.3×10^4	0.53		CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	89F349
	MeOH	4.6×10^5		293	CP/Ac-14	S = MB; used $k_d = 2.0 \times 10^5$ s ⁻¹ .	89F358
	MeOH	3.1×10^5		293	CP/Ac-14	S = HP; used $k_d = 2.0 \times 10^5$ s ⁻¹ .	89F358
	MeOH	2.7×10^5		293	CP/Ac-14	S = RB; used $k_d = 2.0 \times 10^5$ s ⁻¹ .	89F358
	MeOH	4.9×10^5		293	CP/Ac-14	S = HA; used $k_d = 2.0 \times 10^5$ s ⁻¹ .	89F358
1.134	2,5-Cyclooctadien-1-ol CHCl ₃	8.6×10^4	0.20		CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	89F349
	MeOH	1.9×10^5	0.54		CP/A'c-33	S = A' = Rub; used $k_d = 1.0 \times 10^5$ s ⁻¹ , $k_{A'} = 3.1 \times 10^7$ L mol ⁻¹ s ⁻¹ .	89F349
2.135	Cyclooctane, ethylidene- CHCl ₃	4.9×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.136	1,3,5,7-Cyclooctatetraene C ₈ H ₅ Cl/ 2-PrOH (90:10)	1.3×10^5		273	CR/LI-12	used $k_d = 4.1 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from hydrotrioxide, e.g. (CH ₃) ₂ C(OH)OOOH.	90M125
2.137	Cyclooctene CHCl ₃	4.8×10^4			CR/A'c-33	A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	81E003
	EtOH				CP/Ac,A'c-17	S = MB; A' = 1,5-Cyclooctadiene; meas. $k_r/k_r^{A'} = 0.14$.	71F581
2.138	Cyclooctene, 1-methyl- CH ₃ CN			273	CP/Ac,A'c-17	S = MB; A' = 1- <i>tert</i> -Butylcyclohexene; meas. $k_r/k_r^{A'} = 4.7$.	81F018

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k_t) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.138	Cyclooctene, 1-methyl- CHCl ₃	5.3 × 10 ⁵	—		CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.139	Cyclooctyne CHCl ₃	2 × 10 ⁵			CR/A'c-33	A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	81E003
2.140	Cyclopentadiene C ₆ H ₅ CH ₃	3.9 × 10 ⁷			PR/A'd-5	S = Np; A' = DPBF; $\Delta H^\ddagger = 0$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -108$ J K ⁻¹ mol ⁻¹ ; studied at 223-353 K.	79A106
	CH ₂ Cl ₂			253	CP/Ac-17	S = TPP; A' = 2,3-Dimethylenebicyclo[2.2.1]heptane; meas. $k_t/k_t^{A'} = >10$.	82F450
	CHCl ₃	1 × 10 ⁸			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
	MeOH		4.4 × 10 ⁻³	293	CP/Oc-15	S = RB; $E_a = 1.3$ kJ mol ⁻¹ .	68F288
	MeOH		4.1 × 10 ⁻³	293	CP/Oc-15	S = MB; $E_a = 0.84$ kJ mol ⁻¹ .	68F288
	MeOH/ <i>tert</i> -BuOH (50:50)				CR/Ac,A'c-17	A' = TME; meas. $k_t/k_t^{A'} = 0.7$; ¹ O ₂ * from H ₂ O ₂ /Ca(OCl) ₂ .	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)				CR/Ac,A'c-17	A' = TME; meas. $k_t/k_t^{A'} = 2.0$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)				CP/Ac,A'c-17	S = RB; A' = TME; meas. $k_t/k_t^{A'} = 1.2$.	68F292
2.141	1,3-Cyclopentadiene, 1,4-bis(4-chlorophenyl)- CH ₂ Cl ₂	6.5 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
2.142	1,3-Cyclopentadiene, 1,4-bis(4-fluorophenyl)- CH ₂ Cl ₂	7.6 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
2.143	1,3-Cyclopentadiene, 1,4-bis(4-methoxyphenyl)- CH ₂ Cl ₂	1.3 × 10 ⁸			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
2.144	1,3-Cyclopentadiene, 1,4-bis(4-methylphenyl)- CH ₂ Cl ₂	1.0 × 10 ⁸			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
2.145	1,3-Cyclopentadiene, 1-(4-chlorophenyl)-4-(4-methoxyphenyl)- CH ₂ Cl ₂	8.8 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
2.146	1,3-Cyclopentadiene, 1-(4-chlorophenyl)-4-phenyl- CH ₂ Cl ₂	6.8 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
2.147	1,3-Cyclopentadiene, 1,4-diphenyl- CH ₂ Cl ₂	8.7 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
2.148	1,3-Cyclopentadiene, 1-(4-methoxyphenyl)-4-phenyl- CH ₂ Cl ₂	1.1 × 10 ⁸			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
2.149	1,3-Cyclopentadiene, 5-(1-methylethylidene)-(6,6-Dimethylfulvene) MeOH		6.0 × 10 ⁻³	293	CP/Oc-15	S = RB; $E_a = 1.3$ kJ mol ⁻¹ .	68F288

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.150	1,3-Cyclopentadiene, 5-(1-methylethylidene)-, endoperoxide MeOH		-2.5	293	CP/Oc-15	S = RB; $E_a = 14$ kJ mol ⁻¹ .	68F288
2.151	Cyclopentane, (dicyclopropylmethylidene)- CH ₃ COCH ₃				CP/Ac,A'c-17	S = Eos; A' = (Dicyclopropylmethylidene)cyclobutane; meas. $k_t/k_r^{A'} = 0.90$.	78F430
2.152	Cyclopentane, ethylidene- CHCl ₃	8.7×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445 78A005
2.153	Cyclopentane, methylene- CH ₃ CN			273	CP/Ac,A'c-17	S = MB; A' = Methylene-cyclohexane; meas. $k_t/k_r^{A'} = 1.5 \times 10^2$.	81F018
	CH ₃ CN			273	CP/Ac,A'c-17	S = MB; A' = 5-Methylene-2-norbornene; meas. $k_t/k_r^{A'} = 16$.	78F149
	CH ₃ CN			?		S = MB; A' = <i>c</i> -C ₆ H ₉ CH ₃ ; meas. $k_A/k_{A'} = 0.23$.	73F664
2.154	Cyclopentanone, 2-cyclopentylidene-		0.06		CP/Ac-18	S = Poly-RB or RB; A' = Linalool; used $\beta_{A'} = 0.18$ mol L ⁻¹ ; Solvent is CH ₂ Cl ₂ or MeOH.	80F111
2.155	Cyclopentanone, 2-(1-methylethenyl)-		0.25		CP/Ac-18	S = Poly-RB or RB; A' = Linalool; used $\beta_{A'} = 0.18$ mol L ⁻¹ ; Solvent is CH ₂ Cl ₂ or MeOH.	80F111
2.156	Cyclopentene CS ₂	5.8×10^4		298	PL/Ld-2	S = TPP; $\Delta H^\ddagger = 5$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -134$ J K ⁻¹ mol ⁻¹ ; studied at 183-310 K.	85A167
	MeOH	2.2×10^5		286	?	S = Poly-RB; method not reported.	81F534
	MeOH			288	CP/Ac,A'c-17	S = MB; A' = 1,6-Dimethylcyclohexene; meas. $k_t/k_r^{A'} = 0.33$.	65F028
2.157	Cyclopentene, 1- <i>tert</i> -butyl- CH ₃ CN			273	CP/Ac,A'c-17	S = MB; A' = 1- <i>tert</i> -Butylcyclohexene; meas. $k_t/k_r^{A'} = 14$.	81F018
2.158	Cyclopentene, 1,2-dimethyl- MeOH	9.5×10^6		286	?	S = Poly-RB; method not reported.	81F534
2.159	Cyclopentene, 1,5-dimethyl- CHCl ₃	1.5×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.160	Cyclopentene, 1-methoxy- <i>c</i> -C ₆ H ₁₂	2.4×10^6			PL/A'd-8	S = An; A' = DPBF; $\Delta H^\ddagger = -3$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -134$ J K ⁻¹ mol ⁻¹ ; studied at 290-340 K.	82A349
	C ₆ H ₅ CH ₃	1.2×10^7			PL/A'd-8	S = An; A' = DPBF; $\Delta H^\ddagger = -4$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -125$ J K ⁻¹ mol ⁻¹ ; studied at 250-340 K.	82A349
	CH ₃ CN	2.5×10^7			PL/A'd-8	S = An; A' = DPBF; $\Delta H^\ddagger = -2$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -112$ J K ⁻¹ mol ⁻¹ ; studied at 250-340 K.	82A349
	CH ₃ COCH ₃	1.6×10^7			PL/A'd-8	S = An; A' = DPBF; $\Delta H^\ddagger = -3$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -119$ J K ⁻¹ mol ⁻¹ ; studied at 240-320 K.	82A349
	MeOH	1.3×10^7			PL/A'd-8	S = An; A' = DPBF; $\Delta H^\ddagger = -1$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -114$ J K ⁻¹ mol ⁻¹ ; studied at 250-310 K.	82A349
2.161	Cyclopentene, 1-methyl- C ₆ H ₆		0.018	298	CP/A'c-23	S = A' = DMA; used $\beta_{A'} = 3.0 \times 10^{-4}$ mol L ⁻¹ .	706079

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.161 Cyclopentene, 1-methyl- — Continued							
	C ₆ H ₆		0.018	298	CP/A'c-23	S = A' = Rub; used $\beta_{A'} = 3.0 \times 10^{-4}$ mol L ⁻¹ .	706079
	C ₆ H ₆		0.016	298	CP/A'c-23	S = A' = DMBA; used $\beta_{A'} = 7.1 \times 10^{-4}$ mol L ⁻¹ .	706079
	C ₆ H ₆		0.018	298	CP/A'c-23	S = A' = Tetr; used $\beta_{A'} = 1.7 \times 10^{-3}$ mol L ⁻¹ .	706079
	CH ₃ CN			273	CP/Ac,A'c-17	S = MB; A' = 1- <i>tert</i> -Butylcyclohexene; meas. $k_t/k_r^{A'} = 17$.	81F018
	CH ₃ CN			?		S = MB; A' = <i>c</i> -C ₆ H ₉ CH ₃ ; meas. $k_A/k_{A'} = 7.7$.	73F664
	CHCl ₃	2.7×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445 78A005
	MeOH	9.2×10^5		286	?	S = Poly-RB; method not reported.	81F534
	MeOH			288	CP/Ac,A'c-17	S = MB; A' = 1,2-Dimethylcyclohexene; meas. $k_t/k_r^{A'} = 0.13$.	65F028
	MeOH/ <i>tert</i> -BuOH (50:50)				CR/Ac,A'c-17	A' = 2M2B; meas. $k_t/k_r^{A'} = 0.63$; ¹ O ₂ * from H ₂ O ₂ /Ca(OCl) ₂ .	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)				CP/Ac,A'c-17	S = RB; A' = 2M2B; meas. $k_t/k_r^{A'} = 1.0$.	68F292
2.162 2-Cyclopenten-1-one, 3-methyl-2-pentyl-							
			$>2 \times 10^2$		CP/Ac-18	S = Poly-RB or RB; A' = Linalool; used $\beta_{A'} = 0.18$ mol L ⁻¹ ; Solvent is CH ₂ Cl ₂ or MeOH.	80F111
2.163 2-Cyclopenten-1-one, 2-acetoxy-3-methyl-							
	CD ₃ COCD ₃	2.9×10^4			PL/Ld-2	S = Ac.	89F079
2.164 2-Cyclopenten-1-one, 3-acetoxy-2-methyl-							
	CD ₃ COCD ₃	3.6×10^4			PL/Ld-2	S = Ac.	89F079
2.165 2-Cyclopenten-1-one, 2,3-dimethyl-							
	CD ₃ COCD ₃	7.8×10^4			PL/Ld-2	S = Ac.	89F079
2.166 2-Cyclopenten-1-one, 2-ethyl-3-methyl-							
	CD ₃ COCD ₃	1.8×10^5			PL/Ld-2	S = Ac.	89F079
2.167 2-Cyclopenten-1-one, 3-methoxy-2-methyl-							
	CD ₃ COCD ₃	7.5×10^4			PL/Ld-2	S = Ac.	89F079
2.168 Cyclopropane, (dicyclopropylmethylidene)-							
	CH ₃ CN			293	CP/Ac-17	S = RB; A' = TME; meas. $k_t/k_r^{A'} = 2.1 \times 10^{-3}$; c.k. with 1-methylcyclohexene.	79F119
	CH ₃ COCH ₃				CP/Ac,A'c-17	S = Eos; A' = (Dicyclopropylmethylidene)cyclobutane; meas. $k_t/k_r^{A'} = 1.0$.	78F430
2.169 Cyclopropane, 1,1',1''-(1-ethenyl-2-ylidene)tris-							
	CH ₃ COCH ₃				CP/Ac,A'c-17	S = Eos; A' = (Dicyclopropylmethylidene)cyclobutane; meas. $k_t/k_r^{A'} = 0.40$.	78F430
2.170 Cyclopropane, (1-methylethylidene)-							
	CH ₃ CN			293	CP/Ac-17	S = RB; A' = TME; meas. $k_t/k_r^{A'} = 5.6 \times 10^{-3}$; c.k. with 1-methylcyclohexene.	79F119
2.171 1,6-Decadiene, 2,6,9-trimethyl-, (E)-							
	EtOH/ 2-PrOH (50:50)		0.080 (β_1)	292	CP/Oc-14,27	S = RB; A' = 2,5-DMF.	78F464

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
1.172	1,6-Decadiene, 2,6,9-trimethyl-, (Z)-		0.11 (β)	292	CP/Oc-14,27	S = RB; A' = 2,5-DMF.	78F464
	EtOH/ 2-PrOH (50:50)						
1.173	8,8'-Diapo- ψ -carotendioic acid, bis(6-O- β -D-glucopyranosyl- β -D-glucopyranosyl) ester (Crocin)			310	CR/LI-12	¹ O ₂ * from NDPO ₂ ; reported $k = 1.1 \times 10^9$ L mol ⁻¹ s ⁻¹ using $k_d = 1 \times 10^5$ s ⁻¹ , recalcd. using $k_d = 3.0 \times 10^4$ s ⁻¹ [92E654].	89R188 90E622
	CHCl ₃ / EtOH (50:50)						
	H ₂ O pH = 7.4			308	CR/Ac-?	used $k_d = 3.3 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	87A318
1.174	6,6'-Diapo- Ψ , Ψ -carotenedioic acid (<i>trans</i> -Norbixin)			308	CR/A'c-16	A' = DPBF; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	90A437
	DMF						
	DMF						
	DMSO						
	DMSO			308	CR/A'c-?	used $k_d = 5.2 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	90A437
1.175	6,6'-Diapo- Ψ , Ψ -carotenedioic acid, dimethyl ester (<i>trans</i> -Methylbixin)			308	CR/A'c-16	A' = DPBF; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	90A437
	DMF						
	DMF						
	DMSO						
	DMSO			308	CR/A'c-?	used $k_d = 5.2 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	90A437
1.176	6,6'-Diapo- Ψ , Ψ -carotenedioic acid, dimethyl ester, 9- <i>cis</i> - (Methylbixin)			308	CR/A'c-16	A' = DPBF; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	90A437
	DMF						
	DMF						
	DMSO						
	DMSO			308	CR/A'c-?	used $k_d = 5.2 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	90A437
1.177	6,6'-Diapo- Ψ , Ψ -carotenedioic acid, monomethyl ester, 9- <i>cis</i> - (Bixin)			310	CR/LI-12	¹ O ₂ * from NDPO ₂ ; reported $k = 1.4 \times 10^{10}$ L mol ⁻¹ s ⁻¹ using $k_d = 1 \times 10^5$ s ⁻¹ , recalcd. using $k_d = 3.0 \times 10^4$ s ⁻¹ [92E654].	89R188 90E622
	CHCl ₃						
	CHCl ₃ / EtOH (50:50)						
	DMF						
	DMF						
	DMSO						
	DMSO			308	CR/A'c-?	used $k_d = 5.2 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	90A437
	H ₂ O pH = 7.8			308	CR/Ac-?	used $k_d = 2.4 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	90A437

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k_t) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.177 6,6'-Diapo-Ψ,Ψ-carotenedioic acid, monomethyl ester, 9-cis- (Bixin) — Continued							
	H ₂ O (mic) pH = 7.8	7×10^9		308	CR/A'c-16	A' = DPBF; used $k_d = 2.4 \times 10^5$ s ⁻¹ ; 0.1 mol L ⁻¹ SDS; ¹ O ₂ * from MNPO ₂ .	90A437
	H ₂ O (mic) pH = 7.8	7×10^7 (k_t) 1×10^{10} (k_q)		308	CR/A'c-?	used $k_d = 2.4 \times 10^5$ s ⁻¹ ; 0.1 mol L ⁻¹ SDS; ¹ O ₂ * from MNPO ₂ .	90A437
2.178 8,8'-Diapocarotenedioic acid, mono(6-O-β-D-glucopyranosyl-β-D-glucopyranosyl) ester (emi-Crocin)							
	H ₂ O pH = 7.4	1.3×10^8 (k_t) 5.1×10^9 (k_q)		308	CR/Ac-?	used $k_d = 3.3 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	87A318
2.179 9-cis-6,6'-Diapo-Ψ,Ψ-carotenedioic acid (Norbixin)							
	DMF	1.7×10^{10}		308	CR/A'c-16	A' = DPBF; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	90A437
	DMF	2×10^6 (k_t) 1×10^{10} (k_q)		308	CR/A'c-?	used $k_d = 1.4 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	90A437
	DMSO	9×10^9		308	CR/A'c-16	A' = DPBF; used $k_d = 5.2 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	90A437
	DMSO	2×10^6 (k_t) 2×10^{10} (k_q)		308	CR/A'c-?	used $k_d = 5.2 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	90A437
	H ₂ O pH = 7.8	2×10^8 (k_t) 2×10^{10} (k_q)		308	CR/Ac-?	used $k_d = 2.4 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	90A437
	H ₂ O (mic) pH = 7.8	6×10^9		308	CR/Ac-16	A' = DPBF; used $k_d = 2.4 \times 10^5$ s ⁻¹ ; 0.1 mol L ⁻¹ SDS; ¹ O ₂ * from MNPO ₂ .	90A437
	H ₂ O (mic) pH = 7.8	8×10^7 (k_t) 9×10^9 (k_q)		308	CR/Ac-?	used $k_d = 2.4 \times 10^5$ s ⁻¹ ; 0.1 mol L ⁻¹ SDS; ¹ O ₂ * from MNPO ₂ .	90A437
2.180 4a,9a:9,10-Diethenoanthracene, 1,4,9,10-tetrahydro-5,8-dimethoxy-							
	CH ₂ Cl ₂	2.5×10^4			PR/A'd-8	S = An; A' = DPBF.	79A457
2.181 4a,9a:9,10-Diethenoanthracene, 1,4,9,10-tetrahydro-							
	CH ₂ Cl ₂	1.0×10^6			PR/A'd-8	S = An; A' = DPBF.	79A457
2.182 2,3-Dioxabicyclo[2.2.2]oct-5-ene (3,6-Endoperoxycyclohexene)							
	MeOH		1.5×10^2	293	CP/Oc-15	S = RB; $E_a = 26$ kJ mol ⁻¹ .	68F288
2.183 1,4-Dioxene							
	CH ₃ COCH ₃	2.2×10^5	0.18	288	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	77F876
	CH ₃ COCH ₃	3.6×10^5		281	?	S = ?; A' = Car; used $k_{A'} = 3 \times 10^{10}$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 1.2 \times 10^{-5}$.	70F733
2.184 1,4-Dioxene, 2-(4-cyanophenyl)-3-(4-dimethylaminophenyl)-							
	CD ₃ COCD ₃	2.3×10^7 (k_t)			CP/Ac,A'c-17	S = TPP or RB; A' = TME; used $k_t^{A'} = 5.5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80F007
2.185 1,4-Dioxene, 2,3-di(4-acetaminophenyl)-							
	CD ₃ COCD ₃ / CD ₃ SOCD ₃ (95:5)	1.5×10^7 (k_t)			CP/Ac,A'c-17	S = TPP or RB; A' = TME; used $k_t^{A'} = 5.5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80F007
2.186 1,4-Dioxene, 2,3-di(3-chlorophenyl)-							
	CH ₃ COCH ₃	3.6×10^6 (k_t)			CP/Ac,A'c-17	S = TPP or RB; A' = TME; used $k_t^{A'} = 5.5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80F007
2.187 1,4-Dioxene, 2,3-di(4-chlorophenyl)-							
	CH ₃ CN	1.9×10^7 (k_t)			CP/Ac,A'c-17	S = TPP or RB; A' = TME; used $k_t^{A'} = 1.1 \times 10^8$ L mol ⁻¹ s ⁻¹ .	80F007
	CH ₃ COCH ₃	7.5×10^6 (k_t)			CP/Ac,A'c-17	S = TPP or RB; A' = TME; used $k_t^{A'} = 5.5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80F007

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
1.188 1,4-Dioxene, 2,3-di(4-dimethylaminophenyl)- CD ₃ COCD ₃	3.7×10^8 (k_r)			CP/Ac,A'c-17	S = TPP or RB; A' = TME; used $k_r^{A'} = 5.5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80F007
1.189 1,4-Dioxene, 2,3-di(4-hydroxyphenyl)- CD ₃ COCD ₃	6.5×10^7 (k_r)			CP/Ac,A'c-17	S = TPP or RB; A' = TME; used $k_r^{A'} = 5.5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80F007
1.190 1,4-Dioxene, 2,3-di(3-methoxyphenyl)- CH ₃ COCH ₃	1.0×10^7 (k_r)			CP/Ac,A'c-17	S = TPP or RB; A' = TME; used $k_r^{A'} = 5.5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80F007
1.191 1,4-Dioxene, 2,3-di(4-methoxyphenyl)- CD ₃ CN	1.3×10^8 (k_r)			CP/Ac,A'c-17	S = TPP or RB; A' = TME; used $k_r^{A'} = 1.1 \times 10^8$ L mol ⁻¹ s ⁻¹ .	80F007
	CH ₃ COCH ₃	4.8×10^7 (k_r)		CP/Ac,A'c-17	S = TPP or RB; A' = TME; used $k_r^{A'} = 5.5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80F007
1.192 1,4-Dioxene, 2-(4-dimethylaminophenyl)-3-phenyl- CD ₃ COCD ₃	7.5×10^7 (k_r)			CP/Ac,A'c-17	S = TPP or RB; A' = TME; used $k_r^{A'} = 5.5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80F007
1.193 1,4-Dioxene, 2,3-di(4-methylphenyl)- CH ₃ COCH ₃	2.9×10^7 (k_r)			CP/Ac,A'c-17	S = TPP or RB; A' = TME; used $k_r^{A'} = 5.5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80F007
1.194 1,4-Dioxene, 2,3-diphenyl- CH ₃ CN	1.7×10^7		298	PL/Ld-2	S = DCA.	91A311
	CH ₃ COCH ₃	1.6×10^7 (k_r)		CP/Ac,A'c-17	S = TPP or RB; A' = TME; used $k_r^{A'} = 5.5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80F007
	CH ₃ COCH ₃	1.3×10^7 (k_r)	281	?	S = ?; A' = 1,4-Dioxene; used $k_{A'} = 2.2 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 58$.	70F733
1.195 1,4-Dioxene, 2-(4-methoxyphenyl)-3-phenyl- CH ₃ COCH ₃	2.7×10^7 (k_r)			CP/Ac,A'c-17	S = TPP or RB; A' = TME; used $k_r^{A'} = 5.5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80F007
1.196 1,4-Dioxene, 2,3,5,6-tetraphenyl- C ₆ H ₆	1.5×10^7 (k_r)			CP/Pa-17	S = A; A' = TME; used $k_r^{A'} = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ ; P = Benzil.	79A241
1.197 1,3-Dioxolane, 4,5-diethylidene-2,2-dimethyl-, (E,Z) CH ₂ Cl ₂	2.3×10^7			CP/A'c-16	S = MPDME; A' = DPBF; used $k_d = 1 \times 10^4$ s ⁻¹ .	87A035
1.198 1,3-Dioxolane, 4,5-diethylidene-2,2-dimethyl-, (Z,Z) CH ₂ Cl ₂	3.2×10^7			CP/A'c-16	S = MPDME; A' = DPBF; used $k_d = 1 \times 10^4$ s ⁻¹ .	87A035
1.199 1,3-Dioxole CH ₃ COCH ₃	1.2×10^7	3.3×10^{-3}	288	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	77F876
1.200 Docosahexaenoic acid CCl ₄	1.5×10^5			MR/LI-12	S = TPP; used $k_d = 42$ s ⁻¹ .	83E425 83F151
1.201 4,8-Dodecadiene, 4,8-dimethyl- MeOH	6.9×10^5 (k_r)		253	CP/Oc-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	78A344

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.202	4,8-Dodecadiene, 4,8-dimethyl-, (E,E)- MeOH	1.1×10^6 (k_r)		253	CP/Oc-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	78A344
2.203	4,8-Dodecadiene, hydroperoxy-4,8-dimethyl- MeOH	3.8×10^5 (k_r)		253	CP/Oc,Ac,Pa-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	78A344
2.204	(E,E)-8,10-Dodecadienol C ₆ H ₅ Cl/ 2-PrOH (90:10)	5.7×10^5		273	CR/LI-12	used $k_d = 4.1 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from hydrotrioxide, e.g. (CH ₃) ₂ C(OH)OOOH.	90M125
2.205	2,4,6,8,10-Dodecapentaene-1,12-dione, 1,12-bis(3-hydroxy-1,2,2-trimethylcyclopentyl)-4,7-dimethyl- [1R-[1 α [2E,4E,6E,8E,10E,12(1R*,3R*)],3 α]- (C ₃₀ -Capsorubin) CHCl ₃	$<1 \times 10^7$			CR/LI-12	used $k_d = 3.0 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	92R054
2.206	2,4,6,8,10-Dodecapentaene-1,12-dione, 1,12-bis(3-hydroxy-1,2,2-trimethylcyclopentyl)-4,7-dimethyl- [1R-[1 α [2E,4E,6E,8E,10E,12(1R*,3R*)],3 β]- (C ₃₀ -Epicapsorubin) CHCl ₃	$<1 \times 10^7$			CR/LI-12	used $k_d = 3.0 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	92R054
2.207	2,4,6,8,10-Dodecapentaene-1,12-dione, 1,12-bis(4-hydroxy-1,2,2-trimethylcyclopentyl)-4,7-dimethyl- [1R-[1 α [2E,4E,6E,8E,10E,12(1R*,4R*)],4 β]- (C ₃₀ -Isocapsorubin) CHCl ₃	$<1 \times 10^7$			CR/LI-12	used $k_d = 3.0 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	92R054
2.208	2,6,10-Dodecatriene, dihydroperoxy-2,6,10-trimethyl- MeOH	6×10^5 (k_r)		253	CP/Oc,Pa-17	S = RB; A' = TMDT; used $k_r^{A'} = 2.0 \times 10^6$ L mol ⁻¹ s ⁻¹ .	83A078
2.209	2,6,10-Dodecatriene, hydroperoxy-2,6,10-trimethyl- MeOH	1.2×10^6 (k_r)		253	CP/Oc,Pa-17	S = RB; A' = TMDT; used $k_r^{A'} = 2.0 \times 10^6$ L mol ⁻¹ s ⁻¹ .	83A078
2.210	2,6,10-Dodecatriene, 2,6,10-trimethyl- (TMDT) MeOH	2.0×10^6	0.055	253	CP/Oc,Pa-15	S = RB; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	83A078
2.211	4,6,8,10,12,14,16-Eicosahptaene-3,18-dione, 8,13-dimethyl-2,2,19,19-tetramethoxy- (all-E) (C ₂₂ -Polyene-tetronc-diacetal) CHCl ₃	-2×10^9			CR/LI-12	used $k_d = 3.0 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	92R054
2.212	5,8,11,14-Eicosatetraenoic acid (Arachidonic acid) CCl ₄	1×10^5			MP/LI-12	S = TPP; used $k_d = 42$ s ⁻¹ .	83E425 83F151
2.213	5,8,11,14-Eicosatetraenoic acid, methyl ester (Methyl arachidonate) C ₅ H ₅ N	2.4×10^5 (k_r)			CP/Ac,A'c-17	S = PP; A' = Cholesterol; used $k_d = 6 \times 10^4$ s ⁻¹ ; meas. $k_r/k_r^{A'} = 3.5$, $\beta_{A'} = 0.89$ mol L ⁻¹ .	743115
2.214	5,8,11,14-Eicosatetraenoic acid, phenyl ester (Phenyl arachidonate) CD ₃ OD	1.2×10^5			PL/Ld-2	S = MB and RF.	88A165
2.215	Ethanol, 2-cyclododecylidene- MeOH/ H ₂ O (95:5)		0.34		CP/Oc-15	S = RB; Soln. contg. 1% sodium acetate.	79F137
2.216	Ethanol, 2-cyclohexylidene- MeOH/ H ₂ O (95:5)		0.43		CP/Oc-15	S = RB; Soln. contg. 1% sodium acetate.	79F137
2.217	Ethanol, 2-cyclooctylidene- MeOH/ H ₂ O (95:5)		0.06		CP/Oc-15	S = RB; Soln. contg. 1% sodium acetate.	79F137
2.218	Ethanol, 2-cyclopentylidene- MeOH/ H ₂ O (95:5)		0.02		CP/Oc-15	S = RB; Soln. contg. 1% sodium acetate.	79F137

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
1.219	Ethanol, 1-(2-methylene-3,5-cyclohexadienylidene)- (2-Methylacetophenone enol) CH ₃ CN	$\sim 10^9$			PL/Ld	S = OMAPB; estd. from obs. lifetimes for different laser doses.	89A241
1.220	Ethanol, 1-tricyclo[3.3.1.1 ^{3,7}]decylidene-, acetate (1-Adamantylideneethyl acetate) CD ₃ COCD ₃	4.5×10^4		296	PL/Ld-2	S = MB.	86F219
1.221	Ethene, 1,1-diethoxy-						
	C ₆ H ₆	2.6×10^5	0.15	288	CP/A'c-16	S = RBCE; A' = DPBF; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	77F876
	CH ₃ COCH ₃	$< 1 \times 10^4$ (k_r)		279	CP/Ac,A'c-17	S = RB; A' = 1,4-Dioxene; No measurable reaction of A.	77F876
	CH ₃ COCH ₃	4.6×10^5	0.083	288	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	77F876
1.222	Ethene, 1,2-diethoxy-, (E)-						
	CH ₃ COCH ₃	2.6×10^7 (k_r)		279	CP/Ac,A'c-17	S = RB; A' = (Z)-1,2-Diethoxyethene; used $k_r^{A'} = 5.7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.46$.	77F876
	CH ₃ COCH ₃	4.7×10^7	8.1×10^{-4}	288	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	77F876
	CH ₃ COCH ₃	1.0×10^7 (k_r)		281	?	S = ?; A' = 1,4-Dioxene; used $k_{A'} = 2.2 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 46$.	70F733
1.223	Ethene, 1,2-diethoxy-, (Z)-						
	CH ₃ COCH ₃	4.4×10^7	8.6×10^{-4}	288	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	77F876
	CH ₃ COCH ₃	5.7×10^7 (k_r)		279	CP/Ac,A'c-17	S = RB; A' = TME; used $k_r^{A'} = 5.4 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 1.1$; Found $k_r \gg k_q$.	77F876
	CH ₃ COCH ₃	3.3×10^7 (k_r)		281	?	S = ?; A' = 1,4-Dioxene; used $k_{A'} = 2.2 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 1.5 \times 10^2$.	70F733
1.224	Ethene, ethoxy-						
	C ₆ H ₆	2.3×10^5	0.18	288	CP/A'c-16	S = RBCE; A' = DPBF; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	77F876
	CH ₃ COCH ₃	3.1×10^4 (k_r)		279	CP/Ac,A'c-17	S = RB; A' = 1,4-Dioxene; used $k_r^{A'} = 2.2 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.14$; Found $k_r \gg k_q$.	77F876
	CH ₃ COCH ₃	4.3×10^4	0.88	288	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	77F876
	CH ₃ COCH ₃	5.7×10^4 (k_r)		281	?	S = ?; A' = 1,4-Dioxene; used $k_{A'} = 2.2 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 0.26$.	70F733
1.225	Ethene, tetraethoxy-						
	C ₆ H ₆	7.4×10^7	5.7×10^{-4}	288	CP/A'c-16	S = RBCE; A' = DPBF; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	77F876
	CH ₃ CN	4.3×10^7	7.7×10^{-4}	288	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 3.3 \times 10^4$ s ⁻¹ .	77F876
	CH ₃ COCH ₃	4.6×10^7 (k_r)		279	CP/Ac,A'c-17	S = RB; A' = TME; used $k_r^{A'} = 5.4 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.85$; Found $k_r \gg k_q$.	77F876
	CH ₃ COCH ₃	4.5×10^7	8.5×10^{-4}	288	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	77F876
	CHCl ₃	7.6×10^7	2.2×10^{-4}	288	CP/A'c-16	S = MB; A' = DPBF; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; Solvent contained 1% EtOH.	77F876
1.226	Ethene, 1,1,2-triethoxy-						
	CH ₃ COCH ₃	1.2×10^8	3.1×10^{-4}	288	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	77F876
1.227	2-Furanone, 3-(1-methylethylidene)-		0.65		CP/Ac-18	S = Poly-RB or RB; A' = Linalool; used $\beta_{A'} = 0.18$ mol L ⁻¹ ; Solvent is CH ₂ Cl ₂ or MeOH.	80F111
1.228	1-Heptene						
	CCl ₄ /MeOH (96:4)	2×10^3			PL/A'd-8	S = MB; A' = DPBF.	777162
1.229	(Z)-2-Heptene						
	MeOH	1.3×10^5		286	?	S = Poly-RB; method not reported.	81F534

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.230	<i>(all-E)</i> -1,3,5,7,9,11,13,15,17,19,21,23,25-Hexacosatriecaene, 3,7,11,16,20,24-hexamethyl-1,26-bis(2,6,6-trimethyl-1-cyclohexyl)- (Decapreno- β -carotene)						
	C ₆ H ₅ CH ₃	2.1×10^{10}			PL/Ld-2	S = Pz.	91E465
	C ₆ H ₆	2.0×10^{10}			PL/Ld-2	S = Pz.	91E465
	C ₆ H ₆	2.2×10^9			PL/ β Cd-2	S = An.	80A143
2.231	2,4,6,8,10,12,14-Hexadecaheptaene-1,16-dione, 1,16-bis(3-hydroxy-1,2,2-trimethylcyclopentyl)-6,11-dimethyl- [1R-[1 α [2E,4E,6E,8E,10E,12E,14E,16(1R*,3S*)],3 β]- (C ₃₄ -Capsorubin)						
	CHCl ₃	$\sim 2 \times 10^9$			CR/LI-12	used $k_d = 3.0 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	92R054
2.232	2,4,6,8,10,12,14-Hexadecaheptaene-1,16-dione, 1,16-bis(4-hydroxy-1,2,2-trimethylcyclopentyl)-6,11-dimethyl- [1R-[1 α [2E,4E,6E,8E,10E,12E,14E,16(1R*,4S*)],4 β]- (C ₃₄ -Epiisocapsorubin)						
	CHCl ₃	$\sim 2 \times 10^9$			CR/LI-12	used $k_d = 3.0 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	92R054
2.233	4,6,8,10,12-Hexadecapentaene-3,14-dione, 6,11-dimethyl-2,2,15,15-tetramethoxy- (<i>all-E</i>) (C ₁₈ -Polyene-tetrone-diacetal)						
	CHCl ₃	$< 1 \times 10^7$			CR/LI-12	used $k_d = 3.0 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	92R054
2.234	4,6,8,10,12-Hexadecapentaene-2,3,14,15-tetraone, 6,11-dimethyl- (<i>all-E</i>) (C ₁₈ -Polyene-tetrone)						
	CHCl ₃	$\sim 1 \times 10^7$			CR/LI-12	used $k_d = 3.0 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	92R054
2.235	2,6,10,14-Hexadecatetraene, 2,6,10,14-tetramethyl-						
	MeOH	2.2×10^6	0.05	253	CP/Oc,Pa-15	S = RB; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	83A078
2.236	2-Hexadecene, 1-ethoxy-3,7,11,15-tetramethyl- (Ethyl phytol ether)						
	EtOH		3.0 (β_r)		CP/Pa,P'a-17	S = RB; A' = <i>c</i> -C ₆ H ₉ CH ₃ ; used $\beta_r A' = 1.5 \times 10^{-3}$ mol L ⁻¹ .	86F091
2.237	2-Hexadecene, 1-methoxy-3,7,11,15-tetramethyl- (Methyl phytol ether)						
	EtOH		3.7 (β_r)		CP/Pa,P'a-17	S = RB; A' = <i>c</i> -C ₆ H ₉ CH ₃ ; used $\beta_r A' = 1.5 \times 10^{-3}$ mol L ⁻¹ .	86F091
2.238	2-Hexadecen-1-ol, 3,7,11,15-tetramethyl- (Phytol)						
	EtOH		1.3 (β_r)		CP/Pa,P'a-17	S = RB; A' = <i>c</i> -C ₆ H ₉ CH ₃ ; used $\beta_r A' = 1.5 \times 10^{-3}$ mol L ⁻¹ .	86F091
2.239	2-Hexadecen-1-ol, 3,7,11,15-tetramethyl-, acetate (Phytol acetate)						
	EtOH		7.8 (β_r)		CP/Pa,P'a-17	S = RB; A' = <i>c</i> -C ₆ H ₉ CH ₃ ; used $\beta_r A' = 1.5 \times 10^{-3}$ mol L ⁻¹ .	86F091
2.240	1,5-Hexadiene						
	CCl ₄ / MeOH (96:4)	2×10^3			PL/A'd-8	S = MB; A' = DPBF.	777162
2.241	<i>(E,E)</i> -2,4-Hexadiene						
	CCl ₄ / MeOH (96:4)	2×10^4			PL/A'd-8	S = MB; A' = DPBF.	777162
	CHCl ₃	2.4×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_A = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.242	<i>(E,Z)</i> -2,4-Hexadiene						
	CHCl ₃	1.0×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_A = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.243	2,4-Hexadiene, 2,5-dimethyl- (DMHD)						
	C ₆ H ₆	1.8×10^5 (k_r) 1.8×10^6 (k_d)	0.24 (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; used $k_d = 4.2 \times 10^4$ s ⁻¹ ; meas. $k_d/k_r = 9.74$: for formation of products (2) 3,3-dimethyl-2-(2-methyl-1-propenyl)-1,2-dioxetane, (3) 2,5-dimethyl-3-hydroperoxy-1,4-hexadiene, (4) 1,2-dioxo-3,3,6,6-tetramethyl-4-cyclohexene, (5) <i>trans</i> -2,5-dimethyl-5-hydroperoxy-1,3-hexadiene, $k_r = 0.05, 0.59, 0.34$ and 0.81×10^5 L mol ⁻¹ s ⁻¹ , resp.	84F335

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
1.143 2,4-Hexadiene, 2,5-dimethyl- (DMHD) — Continued						
C ₆ H ₆	4 × 10 ⁶			PL/Ld-2	S = MPDME.	83F195 83F196
C ₆ H ₆	<2.5 × 10 ⁵ (k_r)		295	CP/Ac-17	S = RB; A' = 2M2P; used $k_r^{A'} = 7.2 \times 10^5$ L mol ⁻¹ s ⁻¹ ; for formation of 3-hydroperoxy-2,5-dimethyl-1,4-diene $k_r = 1.4 \times 10^5$ L mol ⁻¹ s ⁻¹ .	83F196
CCl ₄	1.0 × 10 ⁵ (k_r) 9.8 × 10 ⁵ (k_q)	0.014 (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; used $k_d = 1.4 \times 10^3$ s ⁻¹ ; meas. $k_q/k_r = 9.81$; for formation of products (2) 3,3-dimethyl-2-(2-methyl-1-propenyl)-1,2-dioxetane, (3) 2,5-dimethyl-3-hydroperoxy-1,4-hexadiene, (4) 1,2-dioxo-3,3,6,6-tetramethyl-4-cyclohexene, (5) <i>trans</i> -2,5-dimethyl-5-hydroperoxy-1,3-hexadiene, $k_r = 0.07, 0.25, 0.23$ and 0.42×10^5 L mol ⁻¹ s ⁻¹ , resp.	84F335
CH ₂ Cl ₂	8.6 × 10 ⁵ (k_r) 1.9 × 10 ⁶ (k_q)	0.011 (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; used $k_d = 9.5 \times 10^3$ s ⁻¹ ; meas. $k_q/k_r = 2.21$; for formation of products (2) 3,3-dimethyl-2-(2-methyl-1-propenyl)-1,2-dioxetane, (3) 2,5-dimethyl-3-hydroperoxy-1,4-hexadiene, (4) 1,2-dioxo-3,3,6,6-tetramethyl-4-cyclohexene, (5) <i>trans</i> -2,5-dimethyl-5-hydroperoxy-1,3-hexadiene, $k_r = 0.26, 5.5, 0.34$ and 2.5×10^5 L mol ⁻¹ s ⁻¹ , resp.	84F335
CH ₂ Cl ₂	5 × 10 ⁶			PL/Ld-2	S = MPDME.	83F195 83F196
CH ₂ Cl ₂	1 × 10 ⁶ (k_r)		295	CP/Ac-17	S = RB; A' = 2M2P; used $k_r^{A'} = 9.7 \times 10^5$ L mol ⁻¹ s ⁻¹ ; for formation of 3-hydroperoxy-2,5-dimethyl-1,4-diene $k_r = 1.3 \times 10^6$ L mol ⁻¹ s ⁻¹ .	83F196
CH ₂ Cl ₂				CP/Pa,P'a-17	S = ?; A' = <i>c</i> -C ₆ H ₉ CH ₃ ; meas. $k_r/k_r^{A'} = 5.0$.	73F662
CH ₃ CN	1.4 × 10 ⁶ (k_r) 1.3 × 10 ⁶ (k_q)	0.024 (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; used $k_d = 3.3 \times 10^4$ s ⁻¹ ; meas. $k_q/k_r = 0.91$; for formation of products (2) 3,3-dimethyl-2-(2-methyl-1-propenyl)-1,2-dioxetane, (3) 2,5-dimethyl-3-hydroperoxy-1,4-hexadiene, (4) 1,2-dioxo-3,3,6,6-tetramethyl-4-cyclohexene, (5) <i>trans</i> -2,5-dimethyl-5-hydroperoxy-1,3-hexadiene, $k_r = 0.41, 12.3, 0.55$ and 0.55×10^5 L mol ⁻¹ s ⁻¹ , resp.	84F335
CH ₃ CN	5.2 × 10 ⁶	0.029		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.5 \times 10^5$ s ⁻¹ .	83F195
CH ₃ CN	6.3 × 10 ⁶			PL/Ld-2	S = MPDME.	83F195 83F196
CH ₃ CN	1.6 × 10 ⁶ (k_r)		295	CP/Ac-17	S = RB; A' = 2M2P; used $k_r^{A'} = 1.2 \times 10^6$ L mol ⁻¹ s ⁻¹ ; for formation of 3-hydroperoxy-2,5-dimethyl-1,4-diene $k_r = 1.7 \times 10^6$ L mol ⁻¹ s ⁻¹ .	83F196
CH ₃ CN				CP/Pa,P'a-17	S = ?; A' = <i>c</i> -C ₆ H ₉ CH ₃ ; meas. $k_r/k_r^{A'} = 6.3$.	73F662
CH ₃ COCH ₃	7.4 × 10 ⁵ (k_r) 1.1 × 10 ⁶ (k_q)	0.051 (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; used $k_d = 3.8 \times 10^4$ s ⁻¹ ; meas. $k_q/k_r = 1.44$; for formation of products (2) 3,3-dimethyl-2-(2-methyl-1-propenyl)-1,2-dioxetane, (3) 2,5-dimethyl-3-hydroperoxy-1,4-hexadiene, (4) 1,2-dioxo-3,3,6,6-tetramethyl-4-cyclohexene, (5) <i>trans</i> -2,5-dimethyl-5-hydroperoxy-1,3-hexadiene, $k_r = 0.59, 6.2, 0.22$ and 0.37×10^5 L mol ⁻¹ s ⁻¹ , resp.	84F335
CH ₃ COCH ₃	3.9 × 10 ⁶		295	PL/Ld-2	S = MPDME.	83F195 83F196

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.243 2,4-Hexadiene, 2,5-dimethyl- (DMHD) — Continued							
	CH ₃ COCH ₃	7×10^5 (k_r)		295	CP/Ac-17	S = RB; A' = 2M2P; used $k_r^{A'} = 8.1 \times 10^5$ L mol ⁻¹ s ⁻¹ ; $\Delta H^\ddagger = -0.96$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -138$ J K ⁻¹ mol ⁻¹ ; studied at 195-295 K; for formation of 3-hydroperoxy-2,5-dimethyl-1,4-diene $k_r = 3.4, 2.5$ and 3.2×10^5 L mol ⁻¹ s ⁻¹ at 295, 241 and 195 K, resp. and $\Delta H^\ddagger = 1.7$ kJ mol ⁻¹ and $\Delta S^\ddagger = -146$ J K ⁻¹ mol ⁻¹ .	83F196
	CH ₃ COCH ₃				CP/Pa,P'a-17	S = ?; A' = <i>c</i> -C ₆ H ₉ CH ₃ ; meas. $k_r/k_r^{A'} = 3.2$.	73F662
	CH ₃ COCH ₃ /H ₂ O (75:25)				CP/Pa,P'a-17	S = ?; A' = <i>c</i> -C ₆ H ₉ CH ₃ ; meas. $k_r/k_r^{A'} = 13$.	73F662
	CHCl ₃	4.8×10^5 (k_r) 9.0×10^5 (k_q)	8.3×10^{-3} (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; used $k_d = 4.0 \times 10^3$ s ⁻¹ ; meas. $k_q/k_r = 1.86$; for formation of products (2) 3,3-dimethyl-2-(2-methyl-1-propenyl)-1,2-dioxetane, (3) 2,5-dimethyl-3-hydroperoxy-1,4-hexadiene, (4) 1,2-dioxo-3,3,6,6-tetramethyl-4-cyclohexene, (5) <i>trans</i> -2,5-dimethyl-5-hydroperoxy-1,3-hexadiene, $k_r = 0.14, 2.98, 0.29$ and 1.45×10^5 L mol ⁻¹ s ⁻¹ , resp.	84F335
	CHCl ₃	5.3×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
	MeOD	2.6×10^6			PL/Ld-2	S = MPDME.	83F196
	MeOH	2.4×10^6 (k_r) 1.1×10^6 (k_q)	0.059 (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; meas. $k_q/k_r = 0.45$; for formation of products (2) 3,3-dimethyl-2-(2-methyl-1-propenyl)-1,2-dioxetane, (3) 2,5-dimethyl-3-hydroperoxy-1,4-hexadiene, (4) 1,2-dioxo-3,3,6,6-tetramethyl-4-cyclohexene, (5) <i>trans</i> -2,5-dimethyl-5-hydroperoxy-1,3-hexadiene, (6) <i>trans</i> -2,5-dimethyl-1-hydroperoxy-5-methoxy-3-hexene, $k_r = 12.8, 5.1, 0.96, 0.48$ and 4.8×10^5 L mol ⁻¹ s ⁻¹ , resp.	84F335
	MeOH	2.6×10^6	0.042		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	83F195 83F196
	MeOH	3×10^6 (k_r)		295	CP/Ac-17	S = RB; A' = 2M2P; used $k_r^{A'} = 2.0 \times 10^5$ L mol ⁻¹ s ⁻¹ ; $\Delta H^\ddagger = 2.7$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -115$ J K ⁻¹ mol ⁻¹ ; studied at 195-295 K; for formation of 3-hydroperoxy-2,5-dimethyl-1,4-diene $k_r = 2.9, 1.0$ and 0.28×10^5 L mol ⁻¹ s ⁻¹ at 295, 241 and 195 K, resp. and $\Delta H^\ddagger = 9.2$ kJ mol ⁻¹ and $\Delta S^\ddagger = -113$ J K ⁻¹ mol ⁻¹ .	83F196
	MeOH	2×10^6			PL/A'd-5	S = MB; A' = DPBF.	727260
	MeOH				CP/Pa,P'a-17	S = ?; A' = <i>c</i> -C ₆ H ₉ CH ₃ ; meas. $k_r/k_r^{A'} = 28$.	73F662
	MeOH/H ₂ O (88:13)				CP/Pa,P'a-17	S = ?; A' = <i>c</i> -C ₆ H ₉ CH ₃ ; meas. $k_r/k_r^{A'} = 29$.	73F662
2.244 2-Hexene							
	MeOH			288	CP/Ac,A'c-17	S = MB; A' = <i>c</i> -C ₅ H ₈ ; meas. $k_r/k_r^{A'} = 0.56$.	65F028
2.245 (E)-3-Hexene							
	CS ₂	7.7×10^3		298	PL/Ld-2	S = TPP; $\Delta H^\ddagger = 2$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -163$ J K ⁻¹ mol ⁻¹ ; studied at 183-310 K.	85A167
2.246 (Z)-3-Hexene							
	CHCl ₃	3.5×10^4 3.1×10^4 (k_r) 4×10^3 (k_q)	0.14		CP/Oc-14,27	S = MB; used $k_d = 4.4 \times 10^3$ s ⁻¹ ; obs. rate of oxygen consumption as a ratio with TME; calcn. involves $k_q(\text{MB}) = 6.4 \times 10^6$ L mol ⁻¹ s ⁻¹ .	88A026
	CS ₂	3.9×10^4		298	PL/Ld-2	S = TPP; $\Delta H^\ddagger = 8$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -130$ J K ⁻¹ mol ⁻¹ ; studied at 183-310 K.	85A167

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
1.147	Indole, 1-methyl-3-(β -methoxyvinyl)- (<i>E</i>) CD ₂ Cl ₂			195	CP/Pa,P'a-17	S = TPP; A' = <i>E</i> -1-(Phenylsulfonyl)-3-(β -methoxyvinyl)indole; meas. $k_t/k_t^{A'}$ = 5.	93F367
1.148	Indole, 1-methyl-3-(β -methoxyvinyl)- (<i>Z</i>) CD ₂ Cl ₂			195	CP/Pa,P'a-17	S = TPP; A' = <i>E</i> -1-Methyl-3-(β -methoxyvinyl)indole; meas. $k_t/k_t^{A'}$ = 4.1.	93F367
1.149	Indole, 1-(phenylsulfonyl)-3-(β -methoxyvinyl)- (<i>Z</i>) CD ₂ Cl ₂			195	CP/Pa,P'a-17	S = TPP; A' = <i>E</i> -1-(Phenylsulfonyl)-3-(β -methoxyvinyl)indole; meas. $k_t/k_t^{A'}$ = 5.2.	93F367
1.250	Lycopene, (<i>all-E</i>)-						
	<i>n</i> -C ₆ H ₁₄	1.9 × 10 ¹⁰			PL/Ld-2	S = Pz.	91E465
	C ₆ H ₅ CH ₃	1.8 × 10 ¹⁰			PL/Ld-2	S = Pz.	91E465
	C ₆ H ₆	1.7 × 10 ¹⁰			PL/Ld-2	S = Pz.	91E465
	C ₆ H ₆ / MeOH (80:20)				CP/P'a-20	S = MB; A' = 2M2P; meas. k_A/k_A' = 1.5 × 10 ⁴ .	707188
	CCl ₄	1.4 × 10 ¹⁰			PL/Ld-2	S = Pz.	91E465
	CH ₂ Cl ₂	6.9 × 10 ⁹	1.4 × 10 ⁻⁶	293	CP/Oc-19	S = Chl a; A' = Soybean oil; used k_d = 1.0 × 10 ⁴ s ⁻¹ .	90R128
	CHCl ₃	9 × 10 ⁹			CR/LI-12	used k_d = 3.0 × 10 ⁴ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	92R054
	CHCl ₃	1.9 × 10 ¹⁰			PL/Ld-2	S = Pz.	91E465
	CHCl ₃ / EtOH (50:50)	1.8 × 10 ¹⁰			PL/Ld-2	S = Pz; Soln. cont. 1% H ₂ O.	91E465
	CHCl ₃ / EtOH (50:50)	9 × 10 ⁹		310	CR/LI-12	¹ O ₂ * from NDPO ₂ ; reported k = 3.1 × 10 ¹⁰ L mol ⁻¹ s ⁻¹ using k_d = 1 × 10 ⁵ s ⁻¹ , recalcd. using k_d = 3.0 × 10 ⁴ s ⁻¹ [92E654].	89R188 90E622
1.251	Lycopene, dihydroxy- C ₆ H ₆	5.1 × 10 ⁹			PL/ β Cd-11	S = An.	80A143
1.252	Methacrylic acid C ₆ D ₆	4.7 × 10 ³			PL/Ld-2	S = TPP.	89A331
1.253	2,5-Methano-1,3-dithiol[4,5- <i>d</i>][1,3]dithiin, dihydro-2,3a,5-trimethyl-7-methylene- CHCl ₃	1.2 × 10 ⁵		295	CL/LI-12	S = An; used k_d = 4.9 × 10 ³ s ⁻¹ .	90F473
1.254	4,7-Methanoindene, 4,5,6,7-tetrahydro- (Isodicyclopentadiene) CD ₃ COCD ₃	1.5 × 10 ⁸		195	CP/A'c-16	S = RB; A' = DPBF; k_d not given.	87A368
1.255	Methanol, cyclohexylidene-, acetate CD ₃ COCD ₃	7.5 × 10 ⁴		298	PL/Ld-2	S = MB.	85A167
	CD ₃ OD	4.8 × 10 ⁴		298	PL/Ld-2	S = MB.	85A167
1.256	Methanol, 1-tricyclo[3.3.1.1 ^{3,7}]decylidene-, acetate (Adamantylidenemethyl acetate) CD ₃ COCD ₃	3.4 × 10 ⁴		296	PL/Ld-2	S = MB.	86F219 85A167
	CD ₃ COCD ₃	2.7 × 10 ⁴ (k_t)		296	CP/Pa-17	S = MB; A' = 2M2P; used $k_t^{A'}$ = 8.1 × 10 ⁵ L mol ⁻¹ s ⁻¹ .	86F219
	CD ₃ OD	2.1 × 10 ⁴		298	PL/Ld-2	S = MB.	85A167
1.257	1,4-Methanonaphthalene, 5,8-dimethoxy-1,2,3,4-tetrahydro-9-isopropylidene- CH ₂ Cl ₂	4.3 × 10 ⁶			PL/A'd-8	S = An; A' = DPBF.	81A437
1.258	1,4-Methanonaphthalene, 5,6,7,8-tetrachloro-1,2,3,4-tetrahydro-9-isopropylidene- CH ₂ Cl ₂	9.6 × 10 ⁴			PL/A'd-8	S = An; A' = DPBF.	81A437

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.259	1,4-Methanonaphthalene, 5,6,7,8-tetrafluoro-1,2,3,4-tetrahydro-9-isopropylidene- CH ₂ Cl ₂	5.2 × 10 ⁴			PL/A'd-8	S = An; A' = DPBF.	81A437
2.260	1,4-Methanonaphthalene, 1,2,3,4-tetrahydro-9-isopropylidene- CH ₂ Cl ₂	1.4 × 10 ⁵			PL/A'd-8	S = An; A' = DPBF.	81A437
2.261	Naphthalene, 1,2,3,4,5,6,7,8-octahydro- ($\Delta^{9,10}$ -Octalin) CHCl ₃	5.0 × 10 ⁶			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78A005
2.262	2,4,6,8-Nonatetraenoic acid, 9-(4-methoxy-2,3,6-trimethylphenyl)-3,7-dimethyl-, ethyl ester, (<i>all-E</i>)- CCl ₄	2 × 10 ⁷			CL/LI-12	S = TPP; used $k_d = 1 \times 10^3$ s ⁻¹ .	85F667
2.263	1-Nonene MeOH			288	CP/Ac,A'c-17	S = MB; A' = <i>c</i> -C ₆ H ₁₀ ; meas. $k_t/k_r^{A'} = 0.1$.	65F028
2.264	9,12-Octadecadienoic acid (Linolic acid) C ₆ D ₆ CCl ₄ CD ₃ OD CH ₃ CN	7.3 × 10 ⁴ 4.2 × 10 ⁴ 7.9 × 10 ⁴ 2.8 × 10 ⁵			PL/Ld-2 MP/LI-12 PL/Ld-2 298 CP/Ac-14	S = TPP. S = TPP; used $k_d = 42$ s ⁻¹ . S = H ₂ TPPS ⁴⁻ . S = RF(OAc) ₄ ; used $k_d = 3.3 \times 10^4$ s ⁻¹ .	89A331 83E425 83F151 89A331 89F484
2.265	9,12-Octadecadienoic acid, methyl ester (Methyl linoleate) C ₅ H ₅ N CHCl ₃ EtOH	1.3 × 10 ⁵ (k_t) 3.8 × 10 ⁴ (k_t) 9.5 × 10 ³ (k_q)	0.12 (β_t) 0.36	293	CP/Ac,A'c-17 CP/Oc-14,27 CP/Pa-15	S = PP; A' = Cholesterol; used $k_d = 6 \times 10^4$ s ⁻¹ ; meas. $k_t/k_r^{A'} = 2.0$, $\beta_{A'} = 0.89$ mol L ⁻¹ . S = MB; used $k_d = 4.4 \times 10^3$ s ⁻¹ ; meas. $k_q/k_t = 0.26$; obs. $\phi_{ox}^{TME}/\phi_{ox}^A$; cor. for k_q (MB). S = MB; P = Methyl linoleate monohydroperoxide.	743115 94R058 777378
2.266	9,12-Octadecadienoic acid, phenyl ester (Phenyl linoleate) MeOD MeOD	5.5 × 10 ⁴ 5.4 × 10 ⁴			PL/Ld-2 298 PL/Ld-2	S = MB and RF. S = Ery, MB, RF and HP.	88A165 87R138
2.267	9,12,15-Octadecatrienoic acid (Linolenic acid) C ₆ D ₆ CCl ₄ CH ₃ CN	1.0 × 10 ⁵ 8 × 10 ⁴ 6.4 × 10 ⁵			PL/Ld-2 MP/LI-12 298 CP/Ac-14	S = TPP. S = TPP; used $k_d = 42$ s ⁻¹ . S = RF(OAc) ₄ ; used $k_d = 3.3 \times 10^4$ s ⁻¹ .	89A331 83E425 83F151 89F484
2.268	9,12,15-Octadecatrienoic acid, ethyl ester (<i>all-Z</i>)- (Ethyl linolenate) CHCl ₃	5.3 × 10 ⁴ (k_t) 1.1 × 10 ⁴ (k_q)	0.082 (β_t)	293	CP/Oc-14,27	S = MB; used $k_d = 4.4 \times 10^3$ s ⁻¹ ; meas. $k_q/k_t = 0.51$; obs. $\phi_{ox}^{TME}/\phi_{ox}^A$; cor. for k_q (MB).	94R058
2.269	9,12,15-Octadecatrienoic acid, methyl ester (Methyl linolenate) C ₅ H ₅ N C ₅ H ₅ N EtOH	1.6 × 10 ⁵ 1.9 × 10 ⁵ (k_t)	0.27	293	CP/A'c-23 CP/Ac,A'c-17 CP/Pa-15	S = A' = Rub; used $k_d = 6.0 \times 10^4$ s ⁻¹ , $k_{A'} = 4.0 \times 10^7$ L mol ⁻¹ s ⁻¹ . S = PP; A' = Cholesterol; used $k_d = 6 \times 10^4$ s ⁻¹ ; meas. $k_t/k_r^{A'} = 2.9$, $\beta_{A'} = 0.89$ mol L ⁻¹ . S = MB.	743115 743115 777378
2.270	9,12,15-Octadecatrienoic acid, phenyl ester (Phenyl linolenate) CD ₃ OD	8.3 × 10 ⁴			PL/Ld-2	S = MB and RF.	88A165
2.271	9-Octadecenoic acid (Oleic acid) C ₆ D ₆	5.3 × 10 ⁴			PL/Ld-2	S = TPP.	89A331

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.271 9-Octadecenoic acid (Oleic acid) — Continued							
	CCl ₄	1.7×10^4			MP/LI-12	S = TPP; used $k_d = 42 \text{ s}^{-1}$.	83E425 83F151
	CH ₃ CN	1.6×10^5		298	CP/Ac-14	S = RF(OAc) ₄ ; used $k_d = 3.3 \times 10^4 \text{ s}^{-1}$.	89F484
2.272 9-Octadecenoic acid, methyl ester (Methyl oleate)							
	C ₅ H ₅ N	7.4×10^4 (k_r)			CP/Ac,A'c-17	S = PP; A' = Cholesterol; used $k_d = 6 \times 10^4 \text{ s}^{-1}$; meas. $k_r/k_r^{A'} = 1.1$, $\beta_{A'} = 0.89 \text{ mol L}^{-1}$.	743115
	CHCl ₃	2.4×10^4 (k_r) 1.2×10^4 (k_q)	0.18 (β_r)	293	CP/Oc-14,27	S = MB; used $k_d = 4.4 \times 10^3 \text{ s}^{-1}$; meas. $k_q/k_r = 0.20$; obs. $\phi_{\text{ox}}^{\text{TME}}/\phi_{\text{ox}}^{\text{A}}$; cor. for $k_q(\text{MB})$.	94R058
	EtOH		0.63	293	CP/Pa-15	S = MB; P = Methyl oleate monohydroperoxide.	777378
2.273 9-Octadecenoic acid, phenyl ester (Phenyl oleate)							
	MeOD	2.4×10^4			PL/Ld-2	S = MB and RF.	88A165
	MeOD	2.4×10^4		298	PL/Ld-2	S = Ery, MB, RF and HIP.	87R138
2.274 2,5-Octadiene, 7-hydroperoxy-2,7-dimethyl-							
	MeOH	4.2×10^5 (k_r)	0.27 (β_r)	253	CP/Oc,Ac,Pa-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5 \text{ s}^{-1}$; $k(\text{P}_1) = 1.9 \times 10^5$, $k(\text{P}_2) = 2.3 \times 10^5 \text{ L mol}^{-1} \text{ s}^{-1}$; P ₁ = 2,7-dimethyl-2,7-dihydroperoxy-3,5-octadiene, P ₂ = 2,7-dimethyl-2,6-dihydroperoxy-3,7-octadiene.	78A357
2.275 2,6-Octadiene, 2,6-dimethyl-, (E)							
	MeOH	1.9×10^6 (k_r)		253	CP/Oc-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5 \text{ s}^{-1}$.	78A344
2.276 2,6-Octadiene, 2,6-dimethyl-, (Z)							
	MeOH	1.1×10^6 (k_r)		253	CP/Oc-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5 \text{ s}^{-1}$.	78A344
2.277 2,6-Octadiene, 2,7-dimethyl-							
	MeOH	1.7×10^6 (k_r)	0.065 (β_r)	253	CP/Oc,Pa,Ac-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5 \text{ s}^{-1}$; $k(\text{P}_1) = 9.0 \times 10^5$, $k(\text{P}_2) = 8.1 \times 10^5 \text{ L mol}^{-1} \text{ s}^{-1}$; P ₁ = 2,7-dimethyl-7-hydroperoxy-2,6-octadiene, P ₂ = 2,7-dimethyl-6-hydroperoxy-2,7-octadiene.	78A357
2.278 2,6-Octadiene, hydroperoxy-2,6-dimethyl-							
	MeOH	7.4×10^5 (k_r)		253	CP/Oc,Pa,Ac-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5 \text{ s}^{-1}$; Mixture of all monohydroperoxides obtained from oxygenation of <i>trans</i> -2,6-dimethyl-2,6-octadiene.	78A344
2.279 2,7-Octadiene, 6-hydroperoxy-2,7-dimethyl-							
	MeOH	6.0×10^5 (k_r)	0.19 (β_r)		CP/Oc,Pa,Ac-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5 \text{ s}^{-1}$; P ₁ = 2,7-dimethyl-2,6-dihydroperoxy-3,7-octadiene, P ₂ = 2,7-dimethyl-3,6-dihydroperoxy-1,7-octadiene, $k(\text{P}_1) = 1.9 \times 10^5$, $k(\text{P}_2) = 4.1 \times 10^5 \text{ L mol}^{-1} \text{ s}^{-1}$.	78A357
2.280 1,6-Octadien-3-ol, 3,7-dimethyl- (Linalool)							
	CH ₂ Cl ₂				CR/Ac,A'c-17	A' = 2,6-[(CH ₃) ₃ C] ₂ C ₆ H ₃ OH; meas. $k_r/k_r^{A'} = 24$; ¹ O ₂ * from (PhO) ₃ PO ₃ .	72F520
	MeOH				CP/Ac,A'c-17	S = RB; A' = 2,6-[(CH ₃) ₃ C] ₂ C ₆ H ₃ OH; meas. $k_r/k_r^{A'} = 14$.	72F520
2.281 2,6-Octadien-1-ol, 3,7-dimethyl-, (E) (Geraniol)							
	MeOH	5.9×10^5 (k_r)	0.19 (β_r)	253	CP/Oc-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5 \text{ s}^{-1}$.	80A430

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.282	2,7-Octadien-1-ol, 3,7-dimethyl-, (E)- MeOH/ H ₂ O (95:5)		0.15		CP/Oc-15	S = RB; Soln. contg. 1% sodium acetate.	79F137
2.283	2,7-Octadien-1-ol, 3,7-dimethyl-, (Z)- MeOH/ H ₂ O (95:5)		0.21		CP/Oc-15	S = RB; Soln. contg. 1% sodium acetate.	79F137
2.284	2,7-Octadien-1-ol, 6-hydroperoxy-3,7-dimethyl- (Monohydroperoxygeraniol) MeOH	2.8×10^4 (k_r)		253	CP/Oc-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5$ s ⁻¹ ; mixture with 7-hydroperoxy-3,7-dimethyl-2,5-octadien-1-ol.	80A430
2.285	2,4,6-Octatriene, 2,6-dimethyl- (Alloocimine) MeOH		0.070	293	CP/Oc-15	S = RB; $E_a = 8.4$ kJ mol ⁻¹ .	68F288
2.286	3-Octene, 5-hydroperoxy-4-methyl- MeOH	2.5×10^4 (k_r)		253	CP/Oc-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	80A430
2.287	(E)-4-Octene CH ₃ CN	2.5×10^4 1×10^4 (k_r) 2×10^4 (k_q)			CP/Oc-14,27	S = MB; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; meas. $k_q/k_r = 1.5$; obs. rate of oxygen consumption as a ratio with TME; cor for $k_S[S] = 0.28$.	88A026
	CHCl ₃	2.2×10^4 4×10^3 (k_r) 2×10^4 (k_q)			CP/Oc-14,27	S = MB; used $k_d = 4.4 \times 10^3$ s ⁻¹ ; meas. $k_q/k_r = 4.5$; obs. rate of oxygen consumption as a ratio with TME; cor for $k_S[S] = 0.2$.	88A026
2.288	(Z)-4-Octene CHCl ₃	2.7×10^4 2.2×10^4 (k_r) 5×10^3 (k_q)	0.20 (β_r)		CP/Oc-14,27	S = MB; used $k_d = 4.4 \times 10^3$ s ⁻¹ ; meas. $k_q/k_r = 0.22$; obs. rate of oxygen consumption as a ratio with TME; calcn. involves $k_q(\text{MB}) = 6.4 \times 10^6$ L mol ⁻¹ s ⁻¹ .	88A026 89A254
2.289	4-Octene, 4-methyl- MeOH		0.27 (β_r)	253	CP/Oc-14,27	S = RB; A' = α -Terpinene; 46% <i>trans</i> , 54% <i>cis</i> .	76F909
	MeOH		0.29 (β_r)	253	CP/Oc-14,27	S = RB; A' = α -Terpinene; 25% <i>trans</i> , 75% <i>cis</i> .	76F909
2.290	4-Octene, 4-methyl-, (E)- MeOH	5.6×10^5 (k_r)	0.20 (β_r)	253	CP/Oc-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	79F074
2.291	4-Octene, 4-methyl-, (Z)- CHCl ₃	1.6×10^5 1.6×10^5 (k_r) $<8 \times 10^3$ (k_q)	0.027		CP/Oc-14/27	S = MB; used $k_d = 4.4 \times 10^3$ s ⁻¹ ; meas. $k_q/k_r = <0.05$; obs. rate of oxygen consumption as a ratio with TME; calcn. involves $k_q(\text{MB}) = 6.4 \times 10^6$ L mol ⁻¹ s ⁻¹ .	85F148 89A254
	MeOH	3.3×10^5 (k_r)	0.34 (β_r)	253	CP/Oc-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	79F074
2.292	2-Octen-1-ol, 3,7-dimethyl-, (E)- MeOH/ H ₂ O (95:5)		0.14		CP/Oc-15	S = RB; Soln. contg. 1% sodium acetate.	79F137
2.293	2-Octen-1-ol, 3,7-dimethyl-, (Z)- MeOH/ H ₂ O (95:5)		0.23		CP/Oc-15	S = RB; Soln. contg. 1% sodium acetate.	79F137
2.294	6-Octen-1-ol, 3,7-dimethyl- (β -Citronellol) 1-BuOH		0.12	293	CP/Pa-15	S = Eos.	627005
	1-BuOH		0.11	293	CP/Pa-15	S = RB.	627005
	CD ₃ OD	7.8×10^5		295	CL/LI-12	S = RB; used $k_d = 4.0 \times 10^3$ s ⁻¹ .	91F332

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k_t) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.294	6-Octen-1-ol, 3,7-dimethyl- (β-Citronellol) — Continued						
	CD ₃ OD	7.3×10^5 (k_t) 1×10^4 (k_q)		295	CP/Oc-15,28	S = RB; used $k_d = 4.0 \times 10^3$ s ⁻¹ ; used $\phi_{\Delta}(\text{RB}) = 0.76$.	91F332
	MeOH		0.16	293	CP/Pa-15	S = Ery.	627005
	MeOH		0.15	293	CP/Pa-15	S = Eos.	627005
	MeOH		0.16	293	CP/Pa-15	S = RB.	627005
	MeOH/H ₂ O (70:30)		0.060	293	CP/Pa-15	S = RB or Eos.	627005
2.295	7-Oxabicyclo[2.2.1]heptane, 2,3-bis(methylene)-						
	CH ₂ Cl ₂			253	CP/Ac-17	S = TPP; A' = 2,3-Dimethylenebicyclo[2.2.1]heptane; meas. $k_t/k_t^{A'}$ = 0.07.	82F450
2.296	7-Oxabicyclo[2.2.1]heptane, 2,3,5,6-tetrakis(methylene)-						
	CH ₂ Cl ₂			253	CP/Ac-17	S = TPP; A' = 2,3-Dimethylenebicyclo[2.2.1]heptane; meas. $k_t/k_t^{A'}$ = 0.02.	82F450
2.297	7-Oxabicyclo[2.2.1]hept-2-ene, 5,6-bis(methylene)-						
	CH ₂ Cl ₂			253	CP/Ac-17	S = TPP; A' = 2,3-Dimethylenebicyclo[2.2.1]heptane; meas. $k_t/k_t^{A'}$ = $<1 \times 10^{-3}$.	82F450
2.298	P-422 (8 conjugated bonds)						
	C ₆ H ₆ / MeOH (60:40)	1.2×10^{10}	8.3×10^{-6}		CP/A'c-22	S = MB; A' = Rub; used $k_d = 1.0 \times 10^5$ s ⁻¹ .	747042
2.299	P-438 (9 conjugated bonds)						
	C ₆ H ₆ / MeOH (60:40)	3.1×10^{10}	3.2×10^{-6}		CP/A'c-22	S = MB; A' = Rub; used $k_d = 1.0 \times 10^5$ s ⁻¹ .	747042
2.300	1,3-Pentadiene, 4-methyl-						
	CHCl ₃	1.6×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.301	1,3-Pentadiene, 1-phenyl-, (<i>E,E</i>)-						
	C ₆ H ₆		1.5	277	CP/Oc-14	S = TPP.	81F582
	CCl ₄		0.24	277	CP/Oc-14	S = TPP.	81F582
	CH ₃ COCH ₂ CH ₃		1.2	277	CP/Oc-14	S = RB.	81F582
	CHCl ₃		0.33	277	CP/Oc-14	S = TPP.	81F582
	EtOH		2.9	277	CP/Oc-14	S = RB.	81F582
2.302	1-Pentene						
	CCl ₄ / MeOH (96:4)	1×10^3			PL/A'd-8	S = MB; A' = DPBF.	777162
2.303	1-Pentene, 2,3,4-trimethyl-						
	CH ₃ CN			283	CP/Ac-17	S = MB; A' = TME; meas. $k_t/k_t^{A'} = 0.88$; C.k. with 1,2-dimethylcyclohexene.	79F646
2.304	(<i>E</i>)-2-Pentene						
	CCl ₄ / MeOH (96:4)	2×10^3			PL/A'd-8	S = MB; A' = DPBF.	777162
	CHCl ₃	2.1×10^4 7×10^3 (k_t) 1×10^4 (k_q)			CP/Oc-14,27	S = MB; used $k_d = 4.4 \times 10^3$ s ⁻¹ ; meas. $k_q/k_t = 2.3$; obs. r_{ox} as a ratio with TME; cor. for $k_S[S] = 0.2$.	88A026

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.305 (Z)-2-Pentene							
	CCl ₄	4.1 × 10 ⁴ 3.8 × 10 ⁴ (k_r) 3 × 10 ³ (k_q)			CP/Oc-14,27	S = TPP; used $k_d = 1.1 \times 10^3$ s ⁻¹ ; meas. $k_q/k_r = 0.08$; obs. r_{ox} as a ratio with TME; cor. for $k_S[S] = 1.4$.	88A026
	CCl ₄ / MeOH (96:4)	4 × 10 ³			PL/A'd-8	S = MB; A' = DPBF.	777162
	CHCl ₃	3.8 × 10 ⁴ 4 × 10 ³ (k_q)			CP/Oc-14,27	S = MB; used $k_d = 4.4 \times 10^3$ s ⁻¹ ; obs. r_{ox} as a ratio with TME; cor. for $k_S[S] = 0.2$.	88A026
2.306 2-Pentene, 2,4-dimethyl-							
	CHCl ₃	4.3 × 10 ⁵			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78A005
	MeOH		1.3		?	Method not reported.	68F289
2.307 2-Pentene, 2-methyl- (2M2P)							
	<i>tert</i> -BuOH		0.081	298	CP/A'c-16	S = RB; A' = DPBF.	717398
	<i>tert</i> -BuOH		0.051	303	CP/Ac-14	S = RB.	68F292
	C ₂ H ₅ I		0.1	298	CP/Pa-15	S = ZnTPP.	717356
	C ₅ H ₅ N		0.043		CP/Oc-15	S = RB.	757166
	C ₃ H ₅ N		0.050	298	CP/Pa-15	S = RB.	717356
	<i>c</i> -C ₆ H ₁₁ OH		0.070	298	CP/Pa-15	S = RB.	717356
	1,3-C ₆ H ₄ (OCH ₃) ₂		0.2	298	CP/Pa-15	S = ZnTPP.	717356
	C ₆ H ₅ Br		0.05	298	CP/Pa-15	S = ZnTPP.	717356
	C ₆ H ₅ OCH ₃		0.13	298	CP/Pa-15	S = ZnTPP.	717356
	C ₆ H ₆		0.049		CP/Oc-14	S = TPP, Chl a, Chl b, Phe b, ZnTPP, MgTPP, PPDME.	88R136
	C ₆ H ₆	8.7 × 10 ⁵	0.046		CP/Oc-14	S = RB; used $k_d = 4.0 \times 10^4$ s ⁻¹ .	84F191
	C ₆ H ₆	7.2 × 10 ⁵		295	PL/Ld-2	S = MPDME; $k_r \gg k_q$.	83F196
	C ₆ H ₆	9.2 × 10 ⁵	0.044		CP/Oc-19	S = Chl (os); Q = Chl (os); used $k_d = 4.0 \times 10^4$ s ⁻¹ ; Chl (os) is a commercial mixture contg. a small % of chlorophyll.	81F321
	C ₆ H ₆		0.53		CP/Oc-15	S = azine.	757166
	C ₆ H ₆		0.10	298	CP/Pa-15	S = ZnTPP.	717356
	C ₆ H ₆		0.2		CP/Pa-15	S = ZnTPP.	71F580
	C ₆ H ₆ / MeOH (80:20)		0.050		CP/Pa-15	S = MB.	717356
	CH ₂ Cl ₂	9.7 × 10 ⁵		295	PL/Ld-2	S = MPDME; $k_r \gg k_q$.	83F196
	CH ₃ CN	1.2 × 10 ⁶	0.014		CP/Oc-14	S = RB; used $k_d = 1.7 \times 10^4$ s ⁻¹ .	84F191
	CH ₃ CN	1.2 × 10 ⁶		295	PL/Ld-2	S = MPDME; $k_r \gg k_q$.	83F196
	CH ₃ CN		0.018		CP/Oc-15	S = RB.	757166
	CH ₃ CN		0.014		CP/Pa-15	S = RB.	71F580
	CH ₃ CO ₂ CH ₃		0.04	298	CP/Pa-15	S = RB.	717356
	CH ₃ COCH ₃	8.1 × 10 ⁵		295	PL/Ld-2	S = MPDME; $k_r \gg k_q$.	83F196
	CH ₃ COCH ₃	4.0 × 10 ⁵ (k_r) 2.8 × 10 ⁵ (k_r)		241 195	CP/Pa-17	S = RB; $\Delta H^\ddagger = 3$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -122$ J K ⁻¹ mol ⁻¹ ; P = 50:50 mixture of 2-methyl-3-penten-2-ol and 2-methyl-1-penten-3-ol; rel. to value at 295K from luminescence decay; $k_q \ll k_r$.	83F196
	CH ₃ COCH ₃		0.080	298	CP/Pa-15	S = RB.	717356
	CHCl ₃	7.6 × 10 ⁵			PL/Ld-2	S = TPP.	92F103
	CHCl ₃	5.1 × 10 ⁵	8.5 × 10 ⁻³		CP/Oc-15	S = MB; used $k_d = 4.4 \times 10^3$ s ⁻¹ ; cor. for k_S .	85F148
	CHCl ₃	1.9 × 10 ⁶			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78A005

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.307 2-Pentene, 2-methyl- (2M2P) — Continued						
CS ₂		0.080	273	CP/Pa-15	S = ZnTPP.	717356
DMSO		0.055		CP/A'c-16	S = RB; A' = DPBF.	766072
DMSO		0.070	298	CP/Pa-15	S = RB.	717356
MeOH	6.9 × 10 ⁵	0.16		CP/Oc-14	S = RB; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	84F191
MeOH	4.0 × 10 ⁵ (k_r) 2.0 × 10 ⁵ (k_p)		241 195	CP/Pa-17	S = RB; $\Delta H^\ddagger = 3.9 \pm 3.5$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -121 \pm 15$ J K ⁻¹ mol ⁻¹ ; rel. to $k_A = 6.7 \times 10^5$ L mol ⁻¹ s ⁻¹ at 298 K; $k_q \ll k_r$.	83F196
MeOH	6.2 × 10 ⁵	0.18		CP/Oc-14	S = RB; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	81F321
MeOH		0.13	298	CP/Pa-15	S = Chl b.	717356
MeOH		0.2	298	CP/Pa-15	S = Chl a.	717356
MeOH		0.16	298	CP/Pa-15	S = RB.	717356
MeOH		0.15	298	CP/A'c-16	S = RB; A' = DPBF.	717398
MeOH		0.2		CP/Pa-15	S = ZnTPP.	71F580
MeOH		0.13	293	CP/Oc-15	S = RB; $E_a = 8.4$ kJ mol ⁻¹ .	68F288
MeOH		0.18	?		Method not reported.	68F289
MeOH/ <i>tert</i> -BuOH (50:50)		0.12		CP/A'c-16	S = RB; A' = DPBF.	717398
MeOH/ <i>tert</i> -BuOH (50:50)			303	CP/Pa,P'a-17	S = RB; A' = 2M2B; meas. $k_r/k_r^{A'} = 0.76$.	68F292
MeOH/ <i>tert</i> -BuOH (50:50)			298	CR/Pa,P'a-17	A' = 2M2B; meas. $k_r/k_r^{A'} = 0.78$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	68F292
MeOH/ <i>tert</i> -BuOH (50:50)		0.2	298	CR/Ac-14	¹ O ₂ * from H ₂ O ₂ /NaOCl.	68F292
MeOH/ <i>tert</i> -BuOH (50:50)		0.13	298	CP/Ac-14	S = RB.	68F292
2.308 2-Pentene, 3-methyl-						
C ₆ H ₅ Cl	1.0 × 10 ⁶	0.016	298	CP/Ac-15	S = TPP; used $k_d = 1.6 \times 10^4$ s ⁻¹ ; <i>cis,trans</i> mixt.	747341
2.309 2-Pentene, 3-methyl-, (E)-						
CHCl ₃	2 × 10 ⁶			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78A005
EtOH/ 2-PrOH (50:50)		0.060 (β_p)	292	CP/Oc-14,27	S = RB; A' = 2,5-DMF.	78F464
MeOH	9.3 × 10 ⁵ (k_r)	0.12 (β_p)	253	CP/Oc-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	79F074
MeOH/ <i>tert</i> -BuOH (50:50)				CP/Ac,A'c-17	S = RB; A' = 2M2B; meas. $k_r/k_r^{A'} = 0.83$.	68F292
MeOH/ <i>tert</i> -BuOH (50:50)				CR/Ac,A'c-17	A' = <i>c</i> -C ₆ H ₉ CH ₃ ; meas. $k_r/k_r^{A'} = 7$; ¹ O ₂ * from H ₂ O ₂ /Ca(OCl) ₂ .	68F292
MeOH/ <i>tert</i> -BuOH (50:50)				CR/Ac,A'c-17	A' = 2M2B; meas. $k_r/k_r^{A'} = 0.71$; ¹ O ₂ * from H ₂ O ₂ /Ca(OCl) ₂ .	68F292
MeOH/ <i>tert</i> -BuOH (50:50)				CP/Ac,A'c-17	S = RB; A' = <i>c</i> -C ₆ H ₉ CH ₃ ; meas. $k_r/k_r^{A'} = 22$.	68F292
2.310 2-Pentene, 3-methyl-, (Z)-						
CHCl ₃	2.9 × 10 ⁵	0.015		CP/Oc-15	S = MB; used $k_d = 4.4 \times 10^3$ s ⁻¹ ; cor. for quenching by MB.	85F148
CHCl ₃	2.0 × 10 ⁶			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78A005
EtOH/ 2-PrOH (50:50)		0.050 (β_p)	292	CP/Oc-14,27	S = RB; A' = 2,5-DMF.	78F464

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.310	2-Pentene, 3-methyl-, (Z)- — Continued						
	MeOH	5.8×10^5 (k_r)	0.19 (β_r)	253	CP/Oc-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	79F074
	MeOH/ <i>tert</i> -BuOH (50:50)				CR/Ac,A'c-17	A' = 2M2B; meas. $k_r/k_r^{A'} = 0.40$; ¹ O ₂ * from H ₂ O ₂ /Ca(OCl) ₂ .	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)				CR/Ac,A'c-17	A' = TME; meas. $k_r/k_r^{A'} = 0.040$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)				CP/Ac,A'c-17	S = RB; A' = 2M2B; meas. $k_r/k_r^{A'} = 0.55$.	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)				CP/Ac,A'c-17	S = RB; A' = TME; meas. $k_r/k_r^{A'} = 0.028$.	68F292
2.311	2-Pentene, 4-methyl-, (E)-						
	MeOH/ <i>tert</i> -BuOH (50:50)			276	CR/Pa,P'a-17	A' = 2M2P; meas. $k_r/k_r^{A'} = 2.0 \times 10^{-3}$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)			303	CP/Pa,P'a-17	S = RB; A' = 2M2P; meas. $k_r/k_r^{A'} = 2.5 \times 10^{-3}$.	68F292
2.312	2-Pentene, 4-methyl-, (Z)-						
	MeOH/ <i>tert</i> -BuOH (50:50)		8.0		CP/A'c-16	S = RB; A' = DPBF.	717398
	MeOH/ <i>tert</i> -BuOH (50:50)			276	CR/Pa,P'a-17	A' = 2M2P; meas. $k_r/k_r^{A'} = 0.011$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)			303	CP/Pa,P'a-17	S = RB; A' = 2M2P; meas. $k_r/k_r^{A'} = 0.014$.	68F292
2.313	2-Pentene, 2,3,4-trimethyl-						
	CHCl ₃	3.9×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78A005
2.314	2-Pentene, 2,4,4-trimethyl-						
	MeOH		4.2		?	Method not reported.	68F289
2.315	4-Pentenoic acid						
	C ₆ D ₆	4.9×10^3			PL/Ld-2	S = TPP.	89A331
2.316	2-Penten-1-ol, 3,4-dimethyl-, (E)-						
	MeOH/ H ₂ O (95:5)		0.14		CP/Oc-15	S = RB; Soln. contg. 1% sodium acetate.	79F137
2.317	2-Penten-1-ol, 3,4-dimethyl-, (Z)-						
	MeOH/ H ₂ O (95:5)		0.23		CP/Oc-15	S = RB; Soln. contg. 1% sodium acetate.	79F137
2.318	2-Penten-1-ol, 3-ethyl-						
	MeOH/ H ₂ O (95:5)		0.25		CP/Oc-15	S = RB; Soln. contg. 1% sodium acetate.	79F137
2.319	2-Penten-1-ol, 3-methyl-, (E)-						
	MeOH/ H ₂ O (95:5)		0.13		CP/Oc-15	S = RB; Soln. contg. 1% sodium acetate.	79F137
2.320	2-Penten-1-ol, 3-methyl-, (Z)-						
	MeOH/ H ₂ O (95:5)		0.19		CP/Oc-15	S = RB; Soln. contg. 1% sodium acetate.	79F137
2.321	2-Penten-1-ol, 3,4,4-trimethyl-, (E)-						
	MeOH/ H ₂ O (95:5)		0.09		CP/Oc-15	S = RB; Soln. contg. 1% sodium acetate.	79F137
2.322	2-Penten-1-ol, 3,4,4-trimethyl-, (Z)-						
	MeOH/ H ₂ O (95:5)		0.95		CP/Oc-15	S = RB; Soln. contg. 1% sodium acetate.	79F137
2.323	2-Penten-4-ol, 2-methyl-						
	MeOH		8.4 (β_r)	253	CP/Oc-14,27	S = RB; A' = α -Terpinene.	76F909

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.324	3-Penten-2-one, 3,4-dimethyl-		28		CP/Ac-18	S = Poly-RB or RB; A' = Linalool; used $\beta_{A'} = 0.18$ mol L ⁻¹ ; Solvent is CH ₂ Cl ₂ or MeOH.	80F111
2.325	1-Phenanthrenecarboxylic acid, 1,2,3,4,4a,4b,5,6,10,10a-decahydro-1,4a-dimethyl-7-(1-methylethyl)-, [1R-(1 α ,4 α , β ,4 β ,10 α ,10 α)]- (Abietic acid)						
	CHCl ₃	3.8×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.326	α -Pinene						
	CH ₃ CN				?	S = MB; A' = <i>c</i> -C ₆ H ₉ CH ₃ ; meas. $k_A/k_{A'} = 0.25$.	73F664
	CH ₃ COCH ₃	4.3×10^4			PL/Ld-2	S = RB.	92F225
	MeOH		7.0	293	CP/Oc-15	S = MB; $E_a = 20$ kJ mol ⁻¹ .	68F288
	MeOH		5.0	293	CP/Oc-15	S = RB; $E_a = 19$ kJ mol ⁻¹ .	68F288
	MeOH		2.8	293	CP/Oc-15	S = DNT; $E_a = 21$ kJ mol ⁻¹ .	68F288
	MeOH		0.50	293	CP/Oc-15	S = FICl ₄ ²⁻ ; $E_a = 17$ kJ mol ⁻¹ .	68F288
	MeOH		3.8	293	CP/Oc-15	S = FIBr ₄ Cl ₄ ²⁻ ; $E_a = 17$ kJ mol ⁻¹ .	68F288
	MeOH		8.2		?	Method not reported.	68F289
2.327	β -Pinene						
	CH ₃ CN				CP/Ac,A'c-17	S = MB; A' = <i>c</i> -C ₆ H ₉ CH ₃ ; meas. $k_A/k_{A'} = 0.19$.	73F664
	MeOH		-1.0	293	CP/Oc-15	S = RB; $E_a = 21$ kJ mol ⁻¹ .	68F288
2.328	(<i>E</i>)-Piperylene ((<i>E</i>)-1,3-Pentadiene)						
	CHCl ₃	2.4×10^4			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.329	(<i>Z</i>)-Piperylene ((<i>Z</i>)-1,3-Pentadiene)						
	CHCl ₃	9×10^3			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
2.330	Polybutadiene						
	CH ₂ Cl ₂	3.4×10^5			PL/Ld-2	S = An.	86E809 86E884
	CHCl ₃	2.3×10^4 1.7×10^4 (k_T) 6×10^3 (k_q)	0.26		CP/Oc-14,27	S = MB; used $k_d = 4.4 \times 10^3$ s ⁻¹ ; meas. $k_q/k_T = 0.35$; obs. rate of oxygen consumption as a ratio with TME or 2,5-DMF; calcn. involves $k_q(\text{MB}) = 6.4 \times 10^6$ L mol ⁻¹ s ⁻¹ .	89A254
2.331	Polyisoprene						
	CH ₂ Cl ₂	5.5×10^5			PL/Ld-2	S = An.	86E809
	CHCl ₃	1.2×10^5 1.2×10^5 (k_T) $<6 \times 10^3$ (k_q)	0.035		CP/Oc-14,27	S = MB; used $k_d = 4.4 \times 10^3$ s ⁻¹ ; obs. rate of oxygen consumption as a ratio with TME or 2,5-DMF; calcn. involves $k_q(\text{MB}) = 6.4 \times 10^6$ L mol ⁻¹ s ⁻¹ .	89A254 85F148
2.332	Propene, 1,1-bis(cyclobutyl)-2-methyl-						
	CH ₃ CN			283	CP/Ac-17	S = MB; A' = TME; meas. $k_A/k_{A'} = 0.40$; C.k. with 1,2-dimethylcyclohexene.	79F646
2.333	Propene, 1,1-bis(cyclopropyl)-						
	CH ₃ COCH ₃				CP/Ac,A'c-17	S = Eos; A' = (Dicyclopropylmethylidene)cyclobutane; meas. $k_A/k_{A'} = 0.50$.	78F430
2.334	Propene, 1,1-bis(cyclopropyl)-2-methyl-						
	CH ₃ CN			283	CP/Ac-17	S = MB; A' = TME; meas. $k_A/k_{A'} = 0.33$; C.k. with 1,2-dimethylcyclohexene.	79F646

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.334	Propene, 1,1-bis(cyclopropyl)-2-methyl- — Continued						
	CH ₃ COCH ₃				CP/Ac,A'c-17	S = Eos; A' = (Dicyclopropylmethylidene)cyclobutane; meas. $k_t/k_r^{A'} = 0.65$; meas. $k_H/k_D = 1$ for 2-(methyl- <i>d</i> ₃) isomer.	78F430
2.335	Propene, 1-cyclopropyl-2-methyl-						
	CH ₃ COCH ₃				CP/Ac,A'c-17	S = Eos; A' = (Dicyclopropylmethylidene)cyclobutane; meas. $k_t/k_r^{A'} = 0.66$.	78F430
2.336	Propene, 1-ethoxy-2-methyl-						
	<i>c</i> -C ₆ H ₁₂	1.6×10^7			PL/A'd-8	S = An; A' = DPBF; $\Delta H^\ddagger = -2$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -120$ J K ⁻¹ mol ⁻¹ ; studied at 290-340 K.	82A349
	C ₆ H ₅ CH ₃	3.1×10^7			PL/A'd-8	S = An; A' = DPBF; $\Delta H^\ddagger = 0.8$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -98$ J K ⁻¹ mol ⁻¹ ; studied at 250-340 K.	82A349
	CH ₃ CN	3.9×10^7			PL/A'd-8	S = An; A' = DPBF; $\Delta H^\ddagger = -1$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -101$ J K ⁻¹ mol ⁻¹ ; studied at 250-340 K.	82A349
	CH ₃ COCH ₃	4.2×10^7			PL/A'd-8	S = An; A' = DPBF; $\Delta H^\ddagger = -2.5$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -108$ J K ⁻¹ mol ⁻¹ ; studied at 240-320 K.	82A349
	MeOH	2.3×10^7			PL/A'd-8	S = An; A' = DPBF; $\Delta H^\ddagger = 0.8$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -96$ J K ⁻¹ mol ⁻¹ ; studied at 250-310 K.	82A349
2.337	Propene, 2-methyl-						
	CS ₂	4.0×10^3		298	PL/Ld-2	S = TPP; $\Delta H^\ddagger = 0$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -180$ J K ⁻¹ mol ⁻¹ ; studied at 183-310 K.	85A167
	MeOH		1.6	293	CP/Oc-15	S = RB; $E_a = 24$ kJ mol ⁻¹ .	68F288
2.338	Propene, 2-methyl-1-(phenylsulfinyl)-						
	C ₆ H ₆		$>1 \times 10^2$ (β_r)		CP/Ac-17	S = TPP; A' = Linalool; used $\beta_r^{A'} = 0.18$ mol L ⁻¹ .	89F400
2.339	11-(Z)-Retinal						
	CCl ₄	10^6			MP/LI-12	S = PP; used $k_d = 36$ s ⁻¹ .	79F463
2.340	13-(Z)-Retinal						
	CCl ₄	3.6×10^5			MP/LI-12	S = PP; used $k_d = 36$ s ⁻¹ .	79F463 78F700
2.341	(all-E)-Retinal						
	CCl ₄	3.7×10^6			MP/LI-12	S = PP; used $k_d = 36$ s ⁻¹ .	79F463 78F700 83A336
	CCl ₄	7.5×10^5 (k_r) 3.7×10^6 (k_q)			CP/Ac-27	S = PP; A' = Tetr; meas. $k_q/k_r = 0.2 \pm 0.05$; used $\phi_\Delta(S)$ and $k_A = 3.7 \times 10^6$ L mol ⁻¹ s ⁻¹ .	79F463 78F700 83A336
	CH ₃ CN	6.5×10^7			PL/A'd-8	S = MB; A' = DPBF.	83F256
	HCONHCH ₃	1.7×10^8			PL/A'd-8	S = MB; A' = DPBF.	83F256
2.342	(all-E)-Retinoic acid						
	CHCl ₃ /EtOH (50:50)			310	CR/LI-12	¹ O ₂ * from NDPO ₂ ; no quenching.	89R188
2.343	(all-E)-Retinol						
	<i>c</i> -C ₆ H ₁₂	$\leq 2 \times 10^6$			PL/A'd-8	S = Rub; A' = DPBF.	83F256
	<i>n</i> -C ₆ H ₁₄	$\leq 1.5 \times 10^7$			PL/A'd-8	S = Rub; A' = DPBF.	83F256
	C ₆ H ₆	4×10^6		296	PL/A'd-5	S = A; A' = DPBF.	85E190
	C ₆ H ₆	$\leq 1.2 \times 10^7$			PL/A'd-8	S = Rub; A' = DPBF.	83F256

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
1.343	(all-E)-Retinol — Continued						
	C ₆ H ₆ / MeOH (80:20)				CP/Pa-20	S = MB; A' = 2M2P; meas. $k_A/k_{A'} = \leq 9$.	707188
	CH ₃ CN	2.6×10^7			PL/A'd-8	S = MB; A' = DPBF.	83F256
	CH ₃ COCH ₃	1×10^7			PL/A'd-8	S = MB; A' = DPBF.	83F256
	HCONHCH ₃	8.5×10^7			PL/A'd-8	S = MB; A' = DPBF.	83F256
	MeOH	6.0×10^6		296	PL/A'd-5	S = A; A' = DPBF.	85E190
	2-PrOH	1.7×10^7			PL/A'd-8	S = MB; A' = DPBF.	83F256
1.344	Retinyl acetate						
	CCl ₄	7×10^5			MP/LI-12	S = PP; used $k_d = 36 \text{ s}^{-1}$.	79F463 78F700
1.345	Spirocyclopropane[4,7]methanoindene, 4,5,6,7-tetrahydro-						
	CD ₃ COCD ₃	1.3×10^8		195	CP/A'c-16	S = RB; A' = DPBF; k_d not given.	87A368
1.346	Squalene						
	EtOH	4.2×10^6		298	CP/Ac-14	S = TTT; used $k_d = 8.3 \times 10^4 \text{ s}^{-1}$; $E_a = 11.2 \text{ kJ mol}^{-1}$; studied at 271-326 K.	93F327
	MeOH	3.6×10^6	0.031	253	CP/Oc-15	S = RB; used $k_d = 1.1 \times 10^5 \text{ s}^{-1}$.	83A078
1.347	4,6,8,10,12,14,16,18,20-Tetracosanonaene-3,22-dione, 6,10,15,19-tetramethyl-2,2,23,23-tetramethoxy- (all-E) (C₂₈-Polyene-tetrone-diacetal)						
	CHCl ₃	9×10^9			CR/LI-12	used $k_d = 3.0 \times 10^4 \text{ s}^{-1}$; ¹ O ₂ * from NDPO ₂ .	92R054
1.348	4,6,8,10,12,14,16,18,20-Tetracosanonaene-2,3,22,23-tetraone, 6,10,15,19-tetramethyl- (all-E) (C₂₈-Polyene-tetrone)						
	CHCl ₃	1.6×10^{10}			CR/LI-12	used $k_d = 3.0 \times 10^4 \text{ s}^{-1}$; ¹ O ₂ * from NDPO ₂ .	92R054
1.349	(Z)-9-Tricosene						
	CHCl ₃	2.4×10^4 1×10^4 (k_T) 1×10^4 (k_q)	0.37	293	CP/Oc-14,27	S = MB; used $k_d = 4.4 \times 10^3 \text{ s}^{-1}$; meas. $k_q/k_T = 1.0$; obs. rate of oxygen consumption as a ratio with TME; calcn. involves $k_q(\text{MB}) = 6.4 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$.	88A026 83A394
1.350	Tricyclo[3.3.1.1^{3,7}]decane, 2-(3-chlorophenoxymethylene)- [2-(3-Chlorophenoxymethylidene)adamantane]						
	C ₆ H ₆			283	CP/Pa-17	S = TPP; A' = 2-(Phenoxymethylidene)adamantane; meas. $k_T/k_T^{A'} = 0.1$.	84F474
	CH ₂ Cl ₂			283	CP/Pa-17	S = MB; A' = 2-(Phenoxymethylidene)adamantane; meas. $k_T/k_T^{A'} = 0.4$.	84F474
1.351	Tricyclo[3.3.1.1^{3,7}]decane, 2-(4-chlorophenoxymethylene)- [2-(4-Chlorophenoxymethylidene)adamantane]						
	C ₆ H ₆			283	CP/Pa-17	S = TPP; A' = 2-(Phenoxymethylidene)adamantane; meas. $k_T/k_T^{A'} = 0.2$.	84F474
	CH ₂ Cl ₂			283	CP/Pa-17	S = MB; A' = 2-(Phenoxymethylidene)adamantane; meas. $k_T/k_T^{A'} = 0.6$.	84F474
1.352	Tricyclo[3.3.1.1^{3,7}]decane, 2-(4-methoxyphenoxymethylene)- [2-(4-Methoxyphenoxymethylidene)adamantane]						
	C ₆ H ₆			283	CP/Pa-17	S = TPP; A' = 2-(Phenoxymethylidene)adamantane; meas. $k_T/k_T^{A'} = 5$.	84F474
	CH ₂ Cl ₂			283	CP/Pa-17	S = MB; A' = 2-(Phenoxymethylidene)adamantane; meas. $k_T/k_T^{A'} = 2$.	84F474

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
2.352 Tricyclo[3.3.1.1^{3,7}]decane, 2-(4-methoxyphenoxymethylene)- [2-(4-Methoxyphenoxymethylidene)adamantane] — Continued							
	CH ₃ CN			283	CP/Pa-17	S = MB; A' = 2-(Phenoxymethylidene)adamantane; meas. $k_t/k_r^{A'}$ = 2.	84F474
	CH ₃ CO ₂ C ₂ H ₅			283	CP/Pa-17	S = TPP; A' = 2-(Phenoxymethylidene)adamantane; meas. $k_t/k_r^{A'}$ = 6.	84F474
	CH ₃ COCH ₃			283	CP/Pa-17	S = MB; A' = 2-(Phenoxymethylidene)adamantane; meas. $k_t/k_r^{A'}$ = 2.	84F474
	EtOH			283	CP/Pa-17	S = MB; A' = 2-(Phenoxymethylidene)adamantane; meas. $k_t/k_r^{A'}$ = 2.	84F474
	MeOH			283	CP/Pa-17	S = MB; A' = 2-(Phenoxymethylidene)adamantane; meas. $k_t/k_r^{A'}$ = 2.	84F474
	1-PrOH			283	CP/Pa-17	S = MB; A' = 2-(Phenoxymethylidene)adamantane; meas. $k_t/k_r^{A'}$ = 2.	84F474
	THF			283	CP/Pa-17	S = TPP; A' = 2-(Phenoxymethylidene)adamantane; meas. $k_t/k_r^{A'}$ = 6.	84F474
2.353 Tricyclo[3.3.1.1^{3,7}]decane, (1-methylethylene)- (2-Isopropylideneadamantane)							
	C ₆ H ₆				CP/Pa-17	S = TPP; A' = 1,1-Di- <i>tert</i> -butyl-2-methoxyethene; meas. $k_t/k_r^{A'}$ = 7.	82F102
	CH ₂ Cl ₂				CP/Pa-17	S = MB; A' = 1,1-Di- <i>tert</i> -butyl-2-methoxyethene; meas. $k_t/k_r^{A'}$ = 3.6.	82F102
	CH ₃ CN				CP/Pa-17	S = MB; A' = 1,1-Di- <i>tert</i> -butyl-2-methoxyethene; meas. $k_t/k_r^{A'}$ = 3.	82F102
	CH ₃ COCH ₃				CP/Pa-17	S = MB; A' = 1,1-Di- <i>tert</i> -butyl-2-methoxyethene; meas. $k_t/k_r^{A'}$ = 7.	82F102
	EtOH				CP/Pa-17	S = MB; A' = 1,1-Di- <i>tert</i> -butyl-2-methoxyethene; meas. $k_t/k_r^{A'}$ = 2.5.	82F102
	MeOH				CP/Pa-17	S = MB; A' = 1,1-Di- <i>tert</i> -butyl-2-methoxyethene; meas. $k_t/k_r^{A'}$ = 1.9.	82F102
	2-PrOH				CP/Pa-17	S = MB; A' = 1,1-Di- <i>tert</i> -butyl-2-methoxyethene; meas. $k_t/k_r^{A'}$ = 2.5.	82F102
2.354 Tricyclo[3.3.1.1^{3,7}]decane, 2-(4-methylphenoxymethylene)- [2-(4-Methylphenoxymethylidene)adamantane]							
	C ₆ H ₆			283	CP/Pa-17	S = TPP; A' = 2-(Phenoxymethylidene)adamantane; meas. $k_t/k_r^{A'}$ = 2.	84F474
	CH ₂ Cl ₂			283	CP/Pa-17	S = MB; A' = 2-(Phenoxymethylidene)adamantane; meas. $k_t/k_r^{A'}$ = 1.5.	84F474
2.355 Tricyclo[3.3.1.1^{3,7}]decane, (2-methylpropylidene)- [2-Isobutylideneadamantane]							
	C ₆ H ₆				CP/Pa-17	S = TPP; A' = 1,1-Di- <i>tert</i> -butyl-2-methoxyethene; meas. $k_t/k_r^{A'}$ = 2.	82F102
	CH ₂ Cl ₂				CP/Pa-17	S = MB; A' = 1,1-Di- <i>tert</i> -butyl-2-methoxyethene; meas. $k_t/k_r^{A'}$ = 1.	82F102
	CH ₃ CN				CP/Pa-17	S = MB; A' = 1,1-Di- <i>tert</i> -butyl-2-methoxyethene; meas. $k_t/k_r^{A'}$ = 0.7.	82F102
	CH ₃ COCH ₃				CP/Pa-17	S = MB; A' = 1,1-Di- <i>tert</i> -butyl-2-methoxyethene; meas. $k_t/k_r^{A'}$ = 1.2.	82F102

TABLE 2. Rate constants for interaction of singlet oxygen with olefins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
1.355 Tricyclo[3.3.1.1 ^{3,7}]decane, (2-methylpropylidene)- [2-Isobutylideneadamantane] — Continued							
	EtOH				CP/Pa-17	S = MB; A' = 1,1-Di- <i>tert</i> -butyl-2-methoxyethene; meas. $k_r/k_r^{A'}$ = 0.53.	82F102
	MeOH				CP/Pa-17	S = MB; A' = 1,1-Di- <i>tert</i> -butyl-2-methoxyethene; meas. $k_r/k_r^{A'}$ = 0.45.	82F102
	2-PrOH				CP/Pa-17	S = MB; A' = 1,1-Di- <i>tert</i> -butyl-2-methoxyethene; meas. $k_r/k_r^{A'}$ = 0.5.	82F102
1.356 Tricyclo[3.3.1.1 ^{3,7}]decane, tricyclo[3.3.1.1 ^{3,7}]decylidene- (Adamantylideneadamantane)							
	C ₆ H ₅ Cl/ 2-PrOH (90:10)	2.2 × 10 ⁵		273	CR/LI-12	used k_d = 4.1 × 10 ⁴ s ⁻¹ ; ¹ O ₂ * from hydrotrioxide, e.g. (CH ₃) ₂ C(OH)OOOH.	90M125
	CHCl ₃	4.7 × 10 ⁵		295	CL/LI-12	S = An; used k_d = 4.9 × 10 ³ s ⁻¹ .	90F473
	CHCl ₃	9.0 × 10 ⁵			CR/A'c-33	A' = Rub; used k_d = 1.7 × 10 ⁴ s ⁻¹ , $k_{A'}$ = 5.3 × 10 ⁷ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	81E003
	CHCl ₃	1.0 × 10 ⁶	0.016	288	CP/A'c-16	S = MB; A' = DPBF; used k_d = 1.7 × 10 ⁴ s ⁻¹ ; Solvent contained 1% EtOH.	77F876
1.357 8,9,11-Trioxatetracyclo[4.2.2.1.0 ^{5,6}]undec-5-ene, 2,3-bis(methylene)-							
	CH ₂ Cl ₂			253	CP/Ac-17	S = TPP; A' = 2,3-Dimethylenebicyclo[2.2.1]heptane; meas. $k_r/k_r^{A'}$ = <1 × 10 ⁻³ .	82F450
1.358 (<i>all-E</i>)-1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33-Tritriacontaeptaheptaene, 3,7,11,15,20,24,28,32-octamethyl-1,34-bis(2,6,6-trimethyl-1-cyclohexen-1-yl)- (Dodecapreno- β -carotene)							
	C ₆ H ₅ CH ₃	2.9 × 10 ¹⁰			PL/Ld-2	S = Pz.	91E465
	C ₆ H ₆	2.3 × 10 ¹⁰			PL/Ld-2	S = Pz.	91E465
1.359 1,6-Undecadiene, 2,6-dimethyl-, (<i>E</i>)-							
	EtOH/ 2-PrOH (50:50)		0.10 (β_r)	292	CP/Oc-14,27	S = RB; A' = 2,5-DMF.	78F464
1.360 1,6-Undecadiene, 2,6-dimethyl-, (<i>Z</i>)-							
	EtOH/ 2-PrOH (50:50)		0.13 (β_r)	292	CP/Oc-14,27	S = RB; A' = 2,5-DMF.	78F464
1.361 Vitamin D ₃							
	C ₆ H ₆	4.0 × 10 ⁵			PL/Ld-2	S = A.	90E030

TABLE 3. Rate constants for interaction of singlet oxygen with aromatic substrates.

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
3.1 2'-Acetonaphthone (2-ACN)							
	CDCl ₃	2×10^6			PL/A'd-5	S = A; A' = Rub.	81A287
3.2 Acetophenone							
	CCl ₄ / MeOH (98:2)	2.7×10^3		293	PL/A'd-8	S = MB; A' = DPBF.	83A371
3.3 Anthracene							
	<i>n</i> -C ₆ H ₁₄	3×10^5			CP/A'c-?	S = A; Q = Car; used $k_d = 6 \times 10^4$ s ⁻¹ , $k_Q = 3 \times 10^{10}$ L mol ⁻¹ s ⁻¹ .	80F169
	C ₆ H ₅ Br		0.12		CP/Ac-15	S = A.	59F003
	C ₆ H ₆	1.6×10^5	0.27	298	CP/A'c-20	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $\beta_{A'} = 1.0 \times 10^{-3}$ mol L ⁻¹ .	747312
	C ₆ H ₆		0.047		CP/Ac-15	S = DNT.	727028
	C ₆ H ₆		0.57		CP/Ac-15	S = A.	59F003
	C ₆ H ₆		0.42		CP/Pa-15	S = A; studied at 263-317 K.	55F004
	CCl ₄	3.5×10^5			CP/Ac-15	S = A; used $k_d = 1.4 \times 10^3$ s ⁻¹ .	80F718
	CCl ₄		4.0×10^{-3}		CP/Oc-15	S = A.	537004
	CHCl ₃	5.4×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78A005
	CHCl ₃		0.036		CP/Pa-15	S = A; studied at 263-317 K.	55F004
	CHCl ₃		0.014		CP/Oc-15	S = A.	537004
	CS ₂		2.6×10^{-3}		CP/Ac-15	S = DNT.	727028
	CS ₂		3.6×10^{-3}		CP/Oc-15	S = A.	537004
	CS ₂ / C ₆ H ₆ (99:1)		0.015		CP/Oc-15	S = A; solvent in mole %.	537004
	CS ₂ / C ₆ H ₆ (96:4)		0.027		CP/Ac-15	S = DNT; solvent in mole %.	727028
	CS ₂ / C ₆ H ₆ (95:5)		0.038		CP/Oc-15	S = A; solvent in mole %.	537004
	CS ₂ / C ₆ H ₆ (93:7)		0.052		CP/Ac-15	S = DNT; solvent in mole %.	727028
	CS ₂ / C ₆ H ₆ (90:10)		0.062		CP/Oc-15	S = A; solvent in mole %.	537004
	CS ₂ / C ₆ H ₆ (75:25)		0.094		CP/Ac-15	S = TPP; solvent in mole %.	727028
	CS ₂ / C ₆ H ₆ (50:50)		0.077		CP/Ac-15	S = TPP; solvent in mole %.	727028
3.4 Anthracene, 1-chloro-							
	CCl ₄		4.1×10^{-3}		CP/Oc-15	S = A.	537004
	CHCl ₃		0.045		CP/Oc-15	S = A.	537004
	CS ₂		4.9×10^{-3}		CP/Oc-15	S = A.	537004
3.5 Anthracene, 9-chloro-							
	CCl ₄		3.2×10^{-3}		CP/Oc-15	S = A.	537004
	CHCl ₃		0.024		CP/Oc-15	S = A.	537004
	CS ₂		3.0×10^{-3}		CP/Oc-15	S = A.	537004
3.6 Anthracene, 1-chloro-9,10-diphenyl-							
	CHCl ₃	2×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78A005
3.7 Anthracene, 9,10-dichloro- (DCIA)							
	CCl ₄		0.010		CP/Oc-15	S = A.	537004
	CHCl ₃		0.060		CP/Oc-15	S = A.	537004
	CS ₂		0.017		CP/Oc-15	S = A.	537004
3.8 Anthracene, 9,10-dimethoxy-							
	C ₆ H ₆	1.4×10^7 (k_T)		298	CP/Ac,A'c-17	S = A' = Rub; used $k_T^{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_T/k_T^{A'} = 0.33$.	747312

TABLE 3. Rate constants for interaction of singlet oxygen with aromatic substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
3.9 Anthracene, 1,4-dimethoxy-9,10-diphenyl- (DMDPA)							
	(C ₂ H ₅) ₂ O		2 × 10 ⁻⁴		CP/Ac-15	S = A.	84F197
	C ₆ H ₅ CH ₃	1.3 × 10 ⁸			PL/Ld-2	S = A.	93F207
	CH ₃ CO ₂ C ₂ H ₅		9.3 × 10 ⁻⁵		CP/Ac-15	S = A.	84F197
	CHCl ₃	3.2 × 10 ⁸			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78A005
3.10 Anthracene, 9,10-dimethyl- (DMA)							
	C ₅ H ₅ N		1.0 × 10 ⁻³	285	CP/Pa-20	S = MB; A' = TME.	737202
	C ₅ H ₅ N		1.4 × 10 ⁻³	285	CP/Pa-20	S = A; A' = TME.	737202
	C ₅ H ₅ N		1.4 × 10 ⁻³	285	CP/Pa-20	S = ThCl; A' = TME.	737202
	C ₅ H ₅ N				CP/Ac-17	S = MB; A' = TME; meas. $k_r/k_r^{A'} = 1.0$.	66F041
	<i>c</i> -C ₆ H ₁₂	1.2 × 10 ⁷	5 × 10 ⁻³	297	CP/Ac-15	S = A; used $k_d = 5.9 \times 10^4$ s ⁻¹ .	747207
	C ₆ H ₅ Br				CP/Ac-17	S = MB; A' = TME; meas. $k_r/k_r^{A'} = 1.0$.	66F041
	C ₆ H ₅ CH ₃		2 × 10 ⁻³		CP/Ac-15	S = A.	84F197
	C ₆ H ₅ CH ₃		1.5 × 10 ⁻³	298	CP/Ac-16	S = A; A' = Leucomalachite Green.	79F148
	C ₆ H ₆	2.5 × 10 ⁷		293	CP/Ac-15	S = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	85N293
	C ₆ H ₆		1.2 × 10 ⁻³	298	CP/Ac-?	S = A.	767422
	C ₆ H ₆	2.1 × 10 ⁷	2 × 10 ⁻³	298	CP/Ac-15	S = A; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	747312
	C ₆ H ₆		3.0 × 10 ⁻⁴	298	CP/Ac-15	S = A, Rub, Tetr.	706079
	C ₆ H ₆		3.0 × 10 ⁻⁴	298	CP/Ac-?	S = Per and An.	69F388
	C ₆ H ₆ / MeOH (60:40)	4.8 × 10 ⁷			CP/A'c-33	S = A' = Rub; k_d and $k_{A'}$ not given; 6×10^{-3} mol L ⁻¹ KOH.	88F650
	CCl ₄	7.0 × 10 ⁶ (k_r)		297	CP/Ac,A'c-17	S = A' = Rub; used $k_r^{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.5$.	747207
	CH ₃ CN	1.7 × 10 ⁸	2 × 10 ⁻⁴		CP/Ac-15	S = MB; used $k_d = 3.3 \times 10^4$ s ⁻¹ .	777113
	CHCl ₃	2.9 × 10 ⁷			PL/Ld-2	S = MB.	93A050
	CHCl ₃	3.2 × 10 ⁷	5.2 × 10 ⁻⁴		CP/Pa-14	S = 1,5-Diamino-4,8-dihydroxyanthraquinone; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; P = 9,10-Dimethylanthracene endoperoxide.	80E446
	CHCl ₃	9.3 × 10 ⁷	2 × 10 ⁻⁴		CP/Ac-15	S = MB; used $k_d = 1.7 \times 10^4$ s ⁻¹ .	777113
	CHCl ₃	2.7 × 10 ⁷ (k_r)		297	CP/Ac,A'c-17	S = A' = Rub; used $k_r^{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.64$.	747207
	CS ₂	1.6 × 10 ⁷		295	MP/Ld-2	S = TPP.	89A400
	CS ₂		2 × 10 ⁻⁶	295	CP/Ac-14	S = A.	89A400
	CS ₂	1.3 × 10 ⁷ (k_r)		297	CP/Ac,A'c-17	S = A' = Rub; used $k_r^{A'} = 2.5 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.5$.	747207
	CICF ₂ CCl ₂ F		1 × 10 ⁻⁶	295	CP/Ac-14	S = A; [DMA] = (4-11) × 10 ⁻⁵ mol L ⁻¹ .	89A400
	CICF ₂ CCl ₂ F		2 × 10 ⁻⁵	295	CP/Ac-14	S = A; [DMA] = (3-9) × 10 ⁻⁶ mol L ⁻¹ .	89A400
	D ₂ O (mic)	7.4 × 10 ⁸	6.8 × 10 ⁻⁵	298	CP/Ac-15	S = MB; used $k_d = 5.0 \times 10^4$ s ⁻¹ ; A solubilized in DTAC micelles.	78F061
	D ₂ O (ves)	3.1 × 10 ⁸			CP/Ac-14	S = RB; used $k_d = 1.8 \times 10^4$ s ⁻¹ ; used ϕ_{isc} (RB) = 0.76; 0.05% egg yolk lecithin.	86N104
	EtOH	4.6 × 10 ⁷		293	CP/Ac-15	S = MB; used $k_d = 8.3 \times 10^4$ s ⁻¹ .	85N293
	EtOH	3.9 × 10 ⁷	2.1 × 10 ⁻³	298	CP/Ac-15	S = MB; used $k_d = 8.3 \times 10^4$ s ⁻¹ .	78F061
	EtOH	4.4 × 10 ⁷	1.9 × 10 ⁻³	298	CP/Ac-15	S = Eos; used $k_d = 8.3 \times 10^4$ s ⁻¹ .	78F061
	EtOH	1.2 × 10 ⁷	7.2 × 10 ⁻³	297	CP/Ac-15	S = A; used $k_d = 8.3 \times 10^4$ s ⁻¹ .	747207
	EtOH/H ₂ O (50:50)	2.0 × 10 ⁸		293	CP/Ac-15	S = MB; used $k_d = 2 \times 10^5$ s ⁻¹ .	85N293
	H ₂ O (mic)	5 × 10 ⁷		293	CP/Ac-15	S = MB; used $k_d = 2.5 \times 10^5$ s ⁻¹ ; 0.015 mol L ⁻¹ CTAB.	85N293

TABLE 3. Rate constants for interaction of singlet oxygen with aromatic substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
3.10 Anthracene, 9,10-dimethyl- (DMA) — Continued							
	H ₂ O (mic)	5.4×10^7		293	CP/Ac-15	S = MB; used $k_d = 2.4 \times 10^5$ s ⁻¹ ; 0.1 mol L ⁻¹ SDS.	85N293
	H ₂ O (mic)	7.5×10^8	6.6×10^{-4}	298	CP/Ac-15	S = MB; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; A solubilized in DTAC micelles.	78F061
	H ₂ O (mic)	9.1×10^8	5.5×10^{-4}	298	CP/Ac-15	S = Eos; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; S and A solubilized in DTAC micelles.	78F061
	H ₂ O (ves)	3.2×10^8			CP/Ac-14	S = RB; used $k_d = 2.5 \times 10^5$ s ⁻¹ ; used $\phi_{isc}(RB) = 0.76$; 0.05% egg yolk lecithin.	86N104
	MeOH	6.9×10^7		293	CP/Ac-15	S = MB; used $k_d = 1 \times 10^5$ s ⁻¹ .	85N293
	MeOH	4.8×10^7	3×10^{-3}		CP/Ac-15	S = MB; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	777113
	MeOH	2.4×10^7	8.0×10^{-3}	297	CP/Ac-15	S = A; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	747207
	MeOH/ H ₂ O (80:20)	2.0×10^8		293	CP/Ac-15	S = MB; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	85N293
3.11 Anthracene, 9,10-diphenyl- (DPA)							
	C ₅ H ₅ N				CP/Ac-17	S = A; A' = TME; meas. $k_f/k_r^{A'} = 0.18$.	66F041
	C ₆ H ₅ CH ₃	7.8×10^5			PL/Ld-2	S = A.	93F207
	C ₆ H ₅ CH ₃		0.031	293	CP/Ac-16	S = A' = Rub.	83F335
	C ₆ H ₆	1.2×10^6	0.04	298	CP/A'c-20	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $\beta_{A'} = 1.0 \times 10^{-3}$ mol L ⁻¹ .	747312
	C ₆ H ₆		0.040	298	CP/Ac-15	S = A.	727196
	C ₆ H ₆		0.060		CP/Ac-20	S = ZnTPP; A' = (C ₂ H ₅) ₂ S.	71F580
	C ₆ H ₆		0.045		CP/Ac-15	S = A.	59F003
	C ₆ H ₆		0.057		CP/Ac-15	S = A.	55F004
	CCl ₄	6×10^5			CP/Ac-14	S = TPP; used $k_d = 1.4 \times 10^3$ s ⁻¹ .	80C002
	CCl ₄		6.0×10^{-4}		CP/Oc-15	S = A.	537004
	CH ₂ Cl ₂	4.2×10^6 (k_r) 8×10^6 (k_q)	1×10^{-3}		CR/Ac-31	used $k_d = 1.2 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from triphenyl phosphite ozonide; $f_r^{A'} = 0.3$.	85M406
	CHCl ₃	3.0×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78A005
	CHCl ₃		4.0×10^{-3}		CP/Oc-15	S = A.	537004
	CS ₂		5×10^{-5}	295	CP/Ac-14	S = A.	89A400
	CS ₂	8.5×10^5		295	MP/Ld-2	S = TPP.	89A400
	CS ₂		3.2×10^{-3}		CP/Oc-15	S = A.	537004
	CICF ₂ CCl ₂ F		1×10^{-4}	295	CP/Ac-14	S = A.	89A400
3.12 Anthracene, 9-methoxy-							
	C ₆ H ₆	2.5×10^6 (k_r)		298	CP/Ac,A'c-17	S = A' = Tetr; used $k_r^{A'} = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_f/k_r^{A'} = 0.21$.	747312
3.13 Anthracene, 9-methyl-							
	C ₆ H ₆	2.3×10^6		293	CP/Ac-15	S = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	85N293
	C ₆ H ₆	3.2×10^6	0.01	298	CP/A'c-20	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $\beta_{A'} = 1.0 \times 10^{-3}$ mol L ⁻¹ .	747312
	CCl ₄		3.3×10^{-3}		CP/Oc-15	S = A.	537004
	CHCl ₃	8.1×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78A005
	CHCl ₃		1.2×10^{-3}		CP/Oc-15	S = A.	537004
	EtOH	2×10^6		293	CP/Ac-15	S = MB; used $k_d = 8.3 \times 10^4$ s ⁻¹ .	85N293
	EtOH/ H ₂ O (50:50)	1.7×10^7		293	CP/Ac-15	S = MB; used $k_d = 2 \times 10^5$ s ⁻¹ .	85N293
	H ₂ O	3.8×10^7		293	CP/Ac-15	S = MB; 0.068 mol L ⁻¹ PEO; k_d not given.	85N293

TABLE 3. Rate constants for interaction of singlet oxygen with aromatic substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
3.13 Anthracene, 9-methyl- — Continued							
	H ₂ O	9.6×10^7		293	CP/Ac-15	S = MB; used $k_d = 3 \times 10^5$ s ⁻¹ .	85N293
	H ₂ O (mic)	1.7×10^7		293	CP/Ac-15	S = MB; used $k_d = 2.4 \times 10^5$ s ⁻¹ ; 0.1 mol L ⁻¹ SDS.	85N293
	H ₂ O (mic)	1.4×10^7		293	CP/Ac-15	S = MB; used $k_d = 2.5 \times 10^5$ s ⁻¹ ; 0.015 mol L ⁻¹ CTAB.	85N293
	MeOH	2×10^6		293	CP/Ac-15	S = MB; used $k_d = 1 \times 10^5$ s ⁻¹ .	85N293
3.14 Anthracene, 9-phenyl-							
	C ₆ H ₆	4.2×10^5	0.10	298	CP/A'c-20	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $\beta_{A'} = 1.0 \times 10^{-3}$ mol L ⁻¹ .	747312
	CCl ₄		7.4×10^{-4}		CP/Oc-15	S = A.	537004
	CHCl ₃		7.2×10^{-3}		CP/Oc-15	S = A.	537004
	CS ₂		8.4×10^{-4}		CP/Oc-15	S = A.	537004
3.15 9,10-Anthracenediethanesulfonate ion (AES)							
	D ₂ O/ H ₂ O (80:20) pH = 7.4		1.1×10^{-3}	310	CR/Pa-31	¹ O ₂ * from NDPO ₂ .	89M097
	H ₂ O pH = 7.4		7.7×10^{-3}	310	CR/Pa-31	¹ O ₂ * from NDPO ₂ .	89M097
	H ₂ O pH = 7.4		8×10^{-3}	310	CR/Pa-31	¹ O ₂ * from NaOCl/H ₂ O ₂ .	89M097
	H ₂ O	4.7×10^7 (k_T)			CR/Ac,Pa-31	¹ O ₂ * from H ₂ O ₂ /OCl ⁻ ; counter ion Na ⁺ ; meas. $k_d/k_T = 0.35$; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	85A176
	H ₂ O/ D ₂ O (62:38) pH = 7.4		3×10^{-3}	310	CR/Pa-31	¹ O ₂ * from NaOCl/H ₂ O ₂ .	89M097
3.16 9,10-Anthracenedipropionate ion (ADPA)							
	D ₂ O	8.2×10^7			PL/Ad-5	S = MB.	80A205
	H ₂ O pH = 6.8	1×10^8		295	CP/Ac-14	S = Ru(bpy) ₃ ²⁺ ; used $k_d = 2.5 \times 10^4$ s ⁻¹ .	92A095
3.17 1,5-Anthracenedisulfonate ion							
	H ₂ O	7.0×10^6	0.070	303	CP/Ac-15	S = A; used $k_d = 5.0 \times 10^5$ s ⁻¹ .	78A275
	H ₂ O	$\leq 10^7$		301	CP/P'a-23	S = A; A' = KI; Q = NaN ₃ ; P' = I ₃ ⁻ . No measurable effect.	777074
3.18 1-Anthracenesulfonate ion							
	H ₂ O	5.4×10^7	9.2×10^{-3}	303	CP/Ac-15	S = A; used $k_d = 5.0 \times 10^5$ s ⁻¹ .	78A275
	H ₂ O	5.0×10^8		301	CP/P'a-23	S = A; A' = KI; Q = NaN ₃ ; used $k_d = 5.0 \times 10^5$ s ⁻¹ , $k_Q = 2.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; P' = I ₃ ⁻ .	777074
3.19 2-Anthracenesulfonate ion							
	H ₂ O	4.5×10^7	0.011	303	CP/Ac-15	S = A; used $k_d = 5.0 \times 10^5$ s ⁻¹ .	78A275
	H ₂ O	3.0×10^8		301	CP/P'a-23	S = A; A' = KI; Q = NaN ₃ ; used $k_d = 5.0 \times 10^5$ s ⁻¹ , $k_Q = 2.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; P' = I ₃ ⁻ .	777074
3.20 Anthra[1,9-bc:4,10-b'c']dichromene							
	C ₆ H ₅ CH ₃	5×10^8	1×10^{-4}		CP/Ac-15	S = A; used $k_d = 5 \times 10^4$ s ⁻¹ .	84F197 82F068
	CS ₂	3.4×10^8		295	MP/Ld-2	S = TPP.	89A400
3.21 9-Anthroate ion							
	H ₂ O	2.0×10^7			PL/P'a-16	S = Ery; A' = TMPD; used $k_d = 3.3 \times 10^5$ s ⁻¹ ; P' = [TMPD] ⁺ .	82A080

TABLE 3. Rate constants for interaction of singlet oxygen with aromatic substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
3.22	Benzamide, 4-(bromomethyl)- <i>N</i> -(diphenylmethyl)- CH ₂ Cl ₂	<10 ⁵			PL/Ld-2	S = MPDME.	91E134
3.23	Benz[<i>a</i>]anthracene C ₆ H ₆	4.8 × 10 ⁴ (k_r)		298	CP/Ac, A'c-17	S = A' = An; used $k_r^{A'} = 1.6 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.30$.	747312
3.24	Benz[<i>a</i>]anthracene, 9,10-dimethyl- C ₆ H ₆		1.6 × 10 ⁻³	298	CP/Ac-?	S = A.	767422
	C ₆ H ₆	1.4 × 10 ⁷ (k_r)		298	CP/Ac, A'c-17	S = A' = Rub; used $k_r^{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.33$.	747312
	C ₆ H ₆		7.1 × 10 ⁻⁴	298	CP/Ac-15	S = A or Tetr.	706079
	C ₆ H ₆		8.3 × 10 ⁻⁴	298	CP/Ac-15	S = Rub.	706079
	C ₆ H ₆		7.4 × 10 ⁻⁴	298	CP/Ac-?	S = Per and An.	69F388
	H ₂ O (mic)	2.5 × 10 ⁹	4.0 × 10 ⁻⁴		CP/Ac-15	S = MB; used $k_d = 1 \times 10^6$ s ⁻¹ ; A solubilized in CTAB micelles.	78N003
3.25	Benzanthrone EtOH	9.6 × 10 ⁸			CP/Ac-14	S = A; used $k_d = 6.7 \times 10^4$ s ⁻¹ .	92D048
3.26	Benzene C ₆ D ₆	2.7 × 10 ³			PL/Ld-2	S = TPP.	83E398
	CCl ₄	3.9 × 10 ³		298	CP/LI-12	S = Benz[<i>de</i>]anthracen-7-one, phenalenone or fluorenone; used $k_d = 32$ s ⁻¹ .	82E329
	CCl ₄	2 × 10 ³			PL/A'd-8	S = MB; A' = DPBF.	76F903
	CCl ₄ /MeOH (96:4)	5 × 10 ²			PL/A'd-8	S = MB; A' = DPBF.	777162
3.27	Benzene- <i>d</i> ₆ CCl ₄	1.3 × 10 ²		298	CP/LI-12	S = Benz[<i>de</i>]anthracen-7-one, phenalenone or fluorenone; used $k_d = 32$ s ⁻¹ .	82E329
3.28	Benzene, 1,5-bis(1,1-dimethylethyl)-2,4-dimethoxy- MeOH				CP/Pa, P'a-17	S = RB; A' = TME; meas. $k_r/k_r^{A'} = 2.3 \times 10^{-3}$.	70F454
	MeOH				CR/Pa, P'a-17	A' = TME; meas. $k_r/k_r^{A'} = 3.0 \times 10^{-3}$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	70F454
3.29	Benzene, 1,3-bis(1,1-dimethylethyl)-2-methoxy-5-methyl- MeOH	5.9 × 10 ⁵	0.20		CP/A'c-16	S = MB; A' = DPF; used $k_d = 1.2 \times 10^5$ s ⁻¹ .	78A171
3.30	Benzene, bromo- CCl ₄	2 × 10 ³			PL/A'd-8	S = MB; A' = DPBF.	76F903
3.31	Benzene, chloro- CCl ₄ /MeOH (98:2)	2.1 × 10 ³		293	PL/A'd-8	S = MB; A' = DPBF.	83A371
3.32	Benzene, 2-chloro-1,4-dimethoxy- CH ₃ CN	4.7 × 10 ⁵			PL/Ld-2	S = RB.	91A341
	dioxane	<1 × 10 ⁴			PL/Ld-2	S = ZnTPP.	91A341
3.33	Benzene, 5-chloro-1,3-dimethoxy- CH ₃ CN	5.6 × 10 ⁵			PL/Ld-2	S = RB.	91A341
	dioxane	6.1 × 10 ⁵			PL/Ld-2	S = ZnTPP.	91A341
3.34	Benzene, 1-chloro-2-methoxy- MeOH	<10 ⁴			CP/Ac-23	S = A' = Rub; used $k_d = 1.4 \times 10^5$ s ⁻¹ , $k_A = 5 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	90F518

TABLE 3. Rate constants for interaction of singlet oxygen with aromatic substrates. — Continued

Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
3.35 Benzene, 1,3-dichloro- C ₆ H ₆ / MeOH (60:40)	<10 ⁴			CP/A'c-33	S = A' = Rub; k_d and $k_{A'}$ not given; 6×10^{-3} mol L ⁻¹ KOH.	88F650
3.36 Benzene, 1,4-dichloro- C ₆ H ₆ / MeOH (60:40)	<10 ⁴			CP/A'c-33	S = A' = Rub; k_d and $k_{A'}$ not given; 6×10^{-3} mol L ⁻¹ KOH.	88F650
3.37 Benzene, 2,6-dichloro-1-methoxy- C ₆ H ₆ / MeOH (60:40)	<10 ⁴			CP/A'c-33	S = A' = Rub; k_d and $k_{A'}$ not given; 6×10^{-3} mol L ⁻¹ KOH.	88F650
3.38 Benzene, 1,2-dimethoxy- MeOH	$\leq 5 \times 10^6$ (k_r)		293	CP/Ac,A'c-17	S = RB and MB; A' = 1,2,4,5-C ₆ H ₂ (CH ₃ O) ₄ ; No measurable effect.	72A020
3.39 Benzene, 1,3-dimethoxy- MeOH	$\leq 5 \times 10^6$ (k_r)		293	CP/Ac,A'c-17	S = MB and RB; A' = 1,2,4,5-C ₆ H ₂ (CH ₃ O) ₄ ; No measurable effect.	72A020
3.40 Benzene, 1,4-dimethoxy- MeOH	$\leq 5 \times 10^6$ (k_r)		293	CP/Ac,A'c-17	S = MB and RB; A' = 1,2,4,5-C ₆ H ₂ (CH ₃ O) ₄ ; No measurable effect.	72A020
3.41 Benzene, ethyl- CCl ₄	1.3×10^5		296	CR/LI-12	used $k_d = 1.7 \times 10^3$ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	90F069
CCl ₄ / MeOH (98:2)	3.6×10^3		293	PL/A'd-8	S = MB; A' = DPBF.	83A371
CCl ₄ / MeOH (96:4)	5×10^2			PL/A'd-8	S = MB; A' = DPBF.	777162
3.42 Benzene, hexamethoxy- MeOH			293	CP/Ac,A'c-17	S = MB and RB; A' = 1,2,4,5-C ₆ H ₂ (CH ₃ O) ₄ ; meas. $k_r/k_r^{A'} = 0.031$.	72A020
3.43 Benzene, methoxy- C ₆ H ₆ / MeOH (60:40)	<10 ⁴			CP/A'c-33	S = A' = Rub; k_d and $k_{A'}$ not given; 6×10^{-3} mol L ⁻¹ KOH.	88F650
CCl ₄	2.0×10^5		296	CR/LI-12	used $k_d = 1.7 \times 10^3$ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	90F069
MeOH	$\leq 5 \times 10^6$ (k_r)		293	CP/Ac,A'c-17	S = RB and MB; A' = 1,2,4,5-C ₆ H ₂ (CH ₃ O) ₄ ; No measurable effect.	72A020
3.44 Benzene, 1-methoxy-2-nitro- MeOH/ C ₆ H ₆ (60:40)	<10 ³			CP/Ac-23	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 5 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	90F518
3.45 Benzene, (3-methyl-2-butenyl)- MeOH		0.15	293	CP/Oc-15	S = RB; $E_a = 9.6$ kJ mol ⁻¹ .	68F288
MeOH		0.13		?	Method not given.	627005
3.46 Benzene, 1,1'-(2-methyl-1-propenylidene)bis- CH ₃ CN	5.0×10^6			PL/Ld-2	S = (C ₆ H ₅) ₂ CO.	91E697
3.47 Benzene, nitro- CH ₂ Cl ₂	5.0×10^3			PL/Ld-2	S = MPDME.	91E134
3.48 Benzene, pentamethoxy- MeOH			293	CP/Ac,A'c-17	S = MB and RB; A' = 1,2,4,5-C ₆ H ₂ (CH ₃ O) ₄ ; meas. $k_r/k_r^{A'} = 0.19$.	72A020

TABLE 3. Rate constants for interaction of singlet oxygen with aromatic substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
3.49	Benzene, 1,2,3,4-tetramethoxy- MeOH	$\leq 5 \times 10^6$ (k_r)		293	CP/Ac,A'c-17	S = MB and RB; A' = 1,2,4,5-C ₆ H ₂ (CH ₃ O) ₄ ; No measurable effect.	72A020
3.50	Benzene, 1,2,3,5-tetramethoxy- MeOH			293	CP/Ac,A'c-17	S = MB and RB; A' = 1,2,4,5-C ₆ H ₂ (CH ₃ O) ₄ ; meas. $k_r/k_r^{A'}$ = 0.15.	72A020
3.51	Benzene, 1,2,4,5-tetramethoxy- MeOH			293	CP/Ac,A'c-17	S = MB and RB; A' = 1,2,4-C ₆ H ₃ (OCH ₃) ₃ ; meas. $k_r/k_r^{A'}$ = 12.	72A020
3.52	Benzene, 1,2,3-trimethoxy- MeOH	$\leq 5 \times 10^6$ (k_r)		293	CP/Ac,A'c-17	S = MB and RB; A' = 1,2,4,5-C ₆ H ₂ (CH ₃ O) ₄ ; No measurable effect.	72A020
3.53	Benzene, 1,2,4-trimethoxy- MeOH	1.8×10^7	6.4×10^{-3}		CP/A'c-16	S = MB; A' = DPF; used $k_d = 1.2 \times 10^5$ s ⁻¹ .	78A171
3.54	Benzene, 1,3,5-trimethoxy- MeOH	$\leq 5 \times 10^6$ (k_r)		293	CP/Ac,A'c-17	S = MB and RB; A' = 1,2,4,5-C ₆ H ₂ (CH ₃ O) ₄ ; No measurable effect.	72A020
3.55	Benzenemethanol, α -methyl- CCl ₄ /MeOH (98:2)	4.1×10^3		293	PL/A'd-8	S = MB; A' = DPBF.	83A371
3.56	Benzo[1,2,3- <i>kl</i> :4,5,6- <i>k'l'</i>]dixanthene (BDX) C ₆ H ₅ CH ₃	1.0×10^8	5.1×10^{-4}		CP/Ac-15	S = A; used $k_d = 5 \times 10^4$ s ⁻¹ .	84F197 82F068
	CS ₂	7.2×10^7		295	MP/Ld-2	S = TPP.	89A400
3.57	Benzoic acid, methyl ester CCl ₄	3×10^3			PL/A'd-8	S = MB; A' = DPBF.	76F903
3.58	Benzophenone (BP) C ₆ H ₆	$< 3 \times 10^4$ (k_r)			CP/A'c-17	S = A' = Rub; $k_A[A']/(k_A[A'] + k[BP]) > 0.95$ when [BP] = 0.1 mol L ⁻¹ and [A'] = 5×10^{-4} mol L ⁻¹ .	81F364
	CICF ₂ CCl ₂ F	4×10^3		298	FP/Ld-2	S = Per.	82A322
3.59	Biphenyl, 2-methoxy- EtOH	2.3×10^6			PL/Ld-2	S = RB; 7.5×10^{-3} mol L ⁻¹ KOH.	93E536
3.60	Cyclopentadienone, tetraphenyl- Dibutyl terephthalate				CP/Ac-17	S = N-[2-[(2-Bromo-4,6-dinitrophenyl)azo]-5-[(2-cyanoethyl)(2-hydroxyethyl)amino]-4-methoxyphenyl]acetamide; A' = BRH ₂ ; meas. $k_r/k_r^{A'}$ = 1.0.	81F609
	C ₆ H ₅ CHOHCH ₃				CP/Ac-17	S = N-[2-[(2-Bromo-4,6-dinitrophenyl)azo]-5-[(2-cyanoethyl)(2-hydroxyethyl)amino]-4-methoxyphenyl]acetamide; A' = BRH ₂ ; meas. $k_r/k_r^{A'}$ = 0.6.	81F609
	C ₆ H ₆	1×10^8 (k_r) 2.2×10^8 (k_q)	1.0×10^{-4}	298	CP/Ac-15,27	S = Cor; used $k_d = 3.7 \times 10^4$ s ⁻¹ ; meas. k_q/k_r = 1.6.	82A179
	C ₆ H ₆			298	CP/Ac-17	S = A' = DPBF; meas. $k_r/k_r^{A'}$ = 3.8.	82A179
	CH ₂ Cl ₂	5×10^7 (k_r) 6×10^7 (k_q)	1×10^{-4}		CR/Ac-31	used $k_d = 1.2 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from triphenyl phosphite ozonide; $f_r^{A'}$ = 0.46.	85M406
	CH ₃ CN	6×10^7 (k_r) 4×10^8 (k_q)		298	CP/Ac-15,27	S = Cor; used $k_d = 1.8 \times 10^4$ s ⁻¹ ; meas. k_q/k_r = 6.2.	82A179

TABLE 3. Rate constants for interaction of singlet oxygen with aromatic substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
3.60 Cyclopentadienone, tetraphenyl- — Continued							
	CHCl ₃				CP/Ac-17	S = N-[2-[(2-Bromo-4,6-dinitrophenyl)azo]-5-[(2-cyanoethyl)(2-hydroxyethyl)amino]-4-methoxyphenyl]acetamide; A' = BRH ₂ ; meas. $k_r^A = \ll 0.06 \times k_r^A$ in dibutyl terephthalate.	81F609
	(C ₆ H ₅) ₂ / (C ₆ H ₅) ₂ O (25:75)				CP/Ac-17	S = N-[2-[(2-Bromo-4,6-dinitrophenyl)azo]-5-[(2-cyanoethyl)(2-hydroxyethyl)amino]-4-methoxyphenyl]acetamide; A' = BRH ₂ ; meas. $k_r/k_r^A = 0.6$.	81F609
	MeOH		2.5×10^{-4}		CP/Ac,A'c-18	S = MB; A' = DPBF; used $\beta_{A'} = 7.3 \times 10^{-5}$ mol L ⁻¹ .	90F251
	dioxane		1.6×10^{-4}		CP/Ac-14	S = O-Methyl Rose Bengal methyl ester; used $\phi_d(S) = 0.70$; 10^{-3} mol L ⁻¹ HCl.	90F251
3.61 Dibenz[<i>a,h</i>]anthracene							
	<i>c</i> -C ₆ H ₁₂	9.5×10^3 (k_p)		298	CP/Ac,A'c-17	S = A' = An; used $k_r^A = 1.6 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^A = 0.59$.	747312
3.62 Dibenz[<i>fg,uv</i>]naphtho[2,3-<i>c</i>]pentaphene-9,19-dione, 1,2,3,4,11,12,13,14-octahydro-							
	C ₆ H ₆	4.3×10^8	9.7×10^{-5}	298	CP/Ac-14	S = A; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	93F128
3.63 Dibenz[<i>a,j</i>]perylene							
	C ₆ H ₆	$> 2 \times 10^8$			CP/Ac-14	S = A; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	79F473
3.64 Dibenz[<i>a,o</i>]perylene, 7,16-diphenyl- (Mesodiphenylhelianthrene, MDH)							
	<i>n</i> -C ₅ H ₁₂	4×10^9	7×10^{-6}		CP/Pa-14	S = A; used $k_d = 2.9 \times 10^4$ s ⁻¹ .	87F480
	<i>c</i> -C ₆ H ₁₂	7.5×10^9	6.7×10^{-6}		CP/Ac-23	S = A; Q = Car; used $k_d = 5.0 \times 10^4$ s ⁻¹ .	83F406
	C ₆ H ₅ CH ₂ OH	2.6×10^9 8×10^8 (k_r)	3×10^{-5}		CP/Pa-14	S = MB; used $k_d = 7.1 \times 10^4$ s ⁻¹ ; meas. $f_r^A = 0.35$.	87F479
	C ₆ H ₅ CH ₃	7.3×10^9	5.5×10^{-6}		CP/Ac-23	S = A; Q = Car; used $k_d = 4.0 \times 10^4$ s ⁻¹ .	83F406
	C ₆ H ₅ CH ₂ / MeOH (99:1)	5×10^9 1.5×10^9 (k_r)	8.2×10^{-6}		CP/Pa-14	S = MB; used $k_d = 4.0 \times 10^4$ s ⁻¹ ; meas. $f_r^A = 0.29$.	87F479
	CH ₃ COCH ₃	5×10^9 1.4×10^9 (k_r)	5.2×10^{-6}		CP/Pa-14	S = MB; used $k_d = 2.5 \times 10^4$ s ⁻¹ .	87F479
	CH ₃ COCH ₃	5.7×10^9	3.9×10^{-6}		CP/Ac-23	S = A; Q = Car; used $k_d = 2.2 \times 10^4$ s ⁻¹ .	83F406
	CHCl ₃	3.4×10^9	1.2×10^{-6}		CP/Ac-23	S = A; Q = Car; used $k_d = 4.1 \times 10^3$ s ⁻¹ .	83F406
	CS ₂	2.0×10^9		295	MP/Ld-2	S = TPP.	89A400
	CS ₂	1.1×10^9	6×10^{-7}		CP/Ac-23	S = A; Q = Car; used $k_d = 1.1 \times 10^3$ s ⁻¹ .	83F406
	EtOH	7.0×10^9		293	PL/Ad,Pb-5	S = An.	87F541
	MeOH/ C ₆ H ₅ CH ₃ (97:3)	4×10^9 1.3×10^9 (k_r)	2.6×10^{-5}		CP/Pa-14	S = MB; used $k_d = 1.1 \times 10^5$ s ⁻¹ ; meas. $f_r^A = 0.27$.	87F479
3.65 Diindeno[5,6-<i>a</i>:5',6'-<i>j</i>]perylene-8,17-dione, 1,2,3,10,11,12-hexahydro-							
	C ₆ H ₆	5.1×10^8	8.2×10^{-5}	298	CP/Ac-14	S = A; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	93F128
3.66 Fluorene, 9-(fluoren-9-ylidene)-							
	CH ₂ Cl ₂				CP/Ac,A'c-17	S = MB; A' = TME; meas. $k_r/k_r^A = 0.034$.	70F200
	dioxane/ MeOH (80:20)				CR/Ac,A'c-17	A' = TME; meas. $k_r/k_r^A = 0.034$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	70F200
3.67 Helianthrene (Dibenzo[<i>a,o</i>]perylene)							
	<i>n</i> -C ₅ H ₁₂	4×10^9	8×10^{-6}		CP/Pa-14	S = A; used $k_d = 2.9 \times 10^4$ s ⁻¹ .	87F480
	C ₆ H ₅ CH ₂ OH	2×10^9 (k_r)	3×10^{-5} (β_p)		CP/Pa-14	S = MB; used $k_d = 7.1 \times 10^4$ s ⁻¹ ; meas. $f_r^A = 0.99$.	87F479
	C ₆ H ₅ CH ₂ / MeOH (99:1)	4.7×10^9 (k_r)	8.6×10^{-6} (β_p)		CP/Pa-14	S = MB; used $k_d = 4.0 \times 10^4$ s ⁻¹ ; meas. $f_r^A = -1.0$.	87F479

TABLE 3. Rate constants for interaction of singlet oxygen with aromatic substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
3.67 Helianthrene (Dibenzo[<i>a,o</i>]perylene) — Continued							
	CH ₃ COCH ₃	4.6×10^9 (k_r)	5.5×10^{-6} (β_r)		CP/Pa-14	S = MB; used $k_d = 2.5 \times 10^4$ s ⁻¹ ; $f_r^A = -1.0$.	87F479
	MeOH/ C ₆ H ₅ CH ₃ (97:3)	5.1×10^9 (k_r)	2.2×10^{-5} (β_r)		CP/Pa-14	S = MB; used $k_d = 1.1 \times 10^5$ s ⁻¹ ; meas. $f_r^A = -1.0$.	87F479
3.68 Heterocoordianthrene (Dibenzoperylene-3,9-quinone, HCD)							
	1,2,4-C ₆ H ₃ Cl ₃	4×10^7	5×10^{-4}	298	CP/Ac-15	S = A; k estimated using $k_d(\text{C}_6\text{H}_5\text{Br}) = 2 \times 10^4$ s ⁻¹ .	767570
	C ₆ H ₅ CH ₃	6.8×10^7	5.9×10^{-4}		CP/Ac-15	S = A; used $k_d = 4.0 \times 10^4$ s ⁻¹ .	80F151
	C ₆ H ₆	3.6×10^8	1.2×10^{-4}	298	CP/Ac-14	S = A; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	93F128
	C ₆ H ₆	7×10^7	6×10^{-4}	298	CP/Ac-15	S = A; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	767570 777176
	CCl ₄	7×10^7	2×10^{-5}	298	CP/Ac-15	S = A; used $k_d = 1.4 \times 10^3$ s ⁻¹ .	767570
	CHCl ₃	7×10^7	3×10^{-4}	298	CP/Ac-15	S = A; used $k_d = 1.7 \times 10^4$ s ⁻¹ .	767570
	CS ₂	6.6×10^7		295	MP/Ld-2	S = TPP.	89A400
	CS ₂	8×10^7	6×10^{-5}	298	CP/Ac-15	S = A; used $k_d = 5.0 \times 10^3$ s ⁻¹ .	767570 777176
3.69 Indene							
	MeOH		2.0	293	CP/Oc-15	S = MB; $E_a = 11$ kJ mol ⁻¹ .	68F288
	MeOH		1.5	293	CP/Oc-15	S = RB; $E_a = 13$ kJ mol ⁻¹ .	68F288
3.70 Indene, 1,2-diphenyl-							
	CH ₃ COCH ₃	8.2×10^5 8.4×10^5		248 224	PL/Ld-2	S = MPDME.	83F195
3.71 Indene, 1-methyl-2-phenyl-							
	CH ₃ COCH ₃	2×10^6 1.0×10^6		298 223	PL/Ld-2	S = MPDME.	83F195
	CH ₃ COCH ₃	2×10^5 (k_r) 1×10^6 (k_r)		298 195	CP/Ac-17	S = RB; A' = 2M2P; used $k_r^{A'} = 8.1 \times 10^5$ L mol ⁻¹ s ⁻¹ .	83F195
3.72 1,4-Methanonaphthalene, 1,2,3,4-tetrahydro-							
	CH ₂ Cl ₂	3.9×10^4			PR/A'd-8	S = An; A' = DPBF.	79A457
3.73 1,4-Methanonaphthalene, 1,2,3,4-tetrahydro-5,8-dimethoxy-							
	C ₆ H ₆ / MeOH (75:25)	6×10^6		298	CP/A'c-20	S = RB; A' = <i>c</i> -C ₆ H ₁₀ ; used $k_d = 6.3 \times 10^4$ s ⁻¹ , $\beta_{A'} = 3.1$ mol L ⁻¹ .	78F586
	CH ₂ Cl ₂	1.3×10^7			PR/A'd-8	S = An; A' = DPBF.	79A457
3.74 Naphthalene							
	1-BuOH	5.2×10^8	1.0×10^{-4}	293	CP/Ac-15	S = MB; used $k_d = 5.2 \times 10^4$ s ⁻¹ .	78A266
3.75 Naphthalene, 1,2-dimethyl-							
	CH ₃ CN			288	CP/Oc-17	S = MB; A' = 1,5-Np(CH ₃) ₂ ; meas. $k_r/k_r^{A'} = 3.3$.	80F204
3.76 Naphthalene, 1,3-dimethyl-							
	CH ₃ CN			288	CP/Oc-17	S = MB; A' = 1,5-Np(CH ₃) ₂ ; meas. $k_r/k_r^{A'} = 1.0$.	80F204
3.77 Naphthalene, 1,4-dimethyl-							
	<i>c</i> -C ₆ H ₁₂	1.2×10^4 (k_r)		298	CP/Ac,A'c-17	S = A' = An; used $k_r^{A'} = 1.6 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.075$.	747312
	CH ₃ CN			288	CP/Oc-17	S = MB; A' = 1,5-Np(CH ₃) ₂ ; meas. $k_r/k_r^{A'} = 10$.	80F204
	EtOH/ H ₂ O (86:14)	1.3×10^5 (k_r)		278	CP/A'c-14,27	S = RB; A' = α -Terpinene; used $k_d = 8.8 \times 10^4$ s ⁻¹ .	86A216
	MeOH	4.2×10^4 (k_r)		278	CP/A'c-14,27	S = RB; A' = α -Terpinene; used $k_d = 9.5 \times 10^4$ s ⁻¹ .	86A216

TABLE 3. Rate constants for interaction of singlet oxygen with aromatic substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
3.77 Naphthalene, 1,4-dimethyl- — Continued							
	MeOH/ H ₂ O (80:20)	3.7×10^5 (k_r)		278	CP/A'c-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.3 \times 10^5$ s ⁻¹ .	86A216
	1-PrOH/ H ₂ O (73:27)	2.4×10^5 (k_r)		278	CP/A'c-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	86A216
3.78	Naphthalene, 1,6-dimethyl- CH ₃ CN			288	CP/Oc-17	S = MB; A' = 1,5-Np(CH ₃) ₂ ; meas. $k_r/k_r^{A'}$ = 0.52.	80F204
3.79	Naphthalene, 1,7-dimethyl- CH ₃ CN			288	CP/Oc-17	S = MB; A' = 1,5-Np(CH ₃) ₂ ; meas. $k_r/k_r^{A'}$ = 0.54.	80F204
3.80	Naphthalene, 1,8-dimethyl- CH ₃ CN			288	CP/Oc-17	S = MB; A' = 1,5-Np(CH ₃) ₂ ; meas. $k_r/k_r^{A'}$ = 4.4.	80F204
3.81	Naphthalene, 2,3-dimethyl- CH ₃ CN			288	CP/Oc-17	S = MB; A' = 1,5-Np(CH ₃) ₂ ; meas. $k_r/k_r^{A'}$ = 0.22.	80F204
3.82	Naphthalene, 2,6-dimethyl- CH ₃ CN			288	CP/Oc-17	S = MB; A' = 1,5-Np(CH ₃) ₂ ; meas. $k_r/k_r^{A'}$ = 0.12.	80F204
3.83	Naphthalene, 2,7-dimethyl- CH ₃ CN			288	CP/Oc-17	S = MB; A' = 1,5-Np(CH ₃) ₂ ; meas. $k_r/k_r^{A'}$ = 0.12.	80F204
3.84	Naphthalene, 1,1'-(1,2-dimethyl-1,2-diethenyl)bis-, (Z)- CCl ₄				CP/Ac,A''c,Pa-17	S = TPP; A' = (E)-2,3-Di(α -naphthyl)-2-butene; meas. $k_r/k_r^{A'}$ = 9.4; A'' = TME.	79F051
3.85	Naphthalene, 2,2'-(1,2-dimethyl-1,2-diethenyl)bis-, (Z)- CCl ₄				CP/Ac,A''c,Pa-17	S = TPP; A' = (E)-2,3-Di(β -naphthyl)-2-butene; meas. $k_r/k_r^{A'}$ = 9.1; A'' = TME.	79F051
3.86	Naphthalene, 1-methyl- CH ₃ CN			288	CP/Oc-17	S = MB; A' = 1,5-Np(CH ₃) ₂ ; meas. $k_r/k_r^{A'}$ = 0.39.	80F204
3.87	Naphthalene, 1-(2-methylpropenyl)- C ₆ H ₆		1.9	277	CP/Oc-14	S = TPP.	81F582
	CCl ₄		0.14	277	CP/Oc-14	S = TPP.	81F582
	CH ₃ COCH ₂ CH ₃		1.0	277	CP/Oc-14	S = RB.	81F582
	CHCl ₃		0.23	277	CP/Oc-14	S = TPP.	81F582
	EtOH		3.3	277	CP/Oc-14	S = RB.	81F582
3.88	1,4-Naphthalenedipropionate ion (NDP)						
	EtOH/ H ₂ O (86:14)	6.0×10^4 (k_r)		278	CP/A'c-14,27	S = RB; A' = α -Terpinene; used $k_d = 8.8 \times 10^4$ s ⁻¹ ; counter ion Na ⁺ .	86A216
	H ₂ O pH = 9.5-11.5		0.16	293	CR/Ac-31	¹ O ₂ * from MoO ₄ ²⁻ /H ₂ O ₂ .	89M015
	H ₂ O	1.4×10^6 (k_r)		278	CP/A'c-17	S = RB; A' = Rubrene-2,3,8,9-tetracarboxylate ion; used $k_d = 2.4 \times 10^5$ s ⁻¹ , $\beta_{A'} = 1.5 \times 10^{-3}$ mol L ⁻¹ ; counter ion Na ⁺ .	86A216
	MeOH	1.0×10^4 (k_r)		278	CP/A'c-14,27	S = RB; A' = α -Terpinene; used $k_d = 9.6 \times 10^4$ s ⁻¹ ; counter ion Na ⁺ .	86A216
	MeOH/ H ₂ O (80:20)	5.8×10^4 (k_r)		278	CP/A'c-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.3 \times 10^5$ s ⁻¹ ; counter ion Na ⁺ .	86A216
	1-PrOH/ H ₂ O (73:27)	1.3×10^5 (k_r)		278	CP/A'c-14,27	S = RB; A' = α -Terpinene; used $k_d = 1.1 \times 10^5$ s ⁻¹ ; counter ion Na ⁺ .	86A216

TABLE 3. Rate constants for interaction of singlet oxygen with aromatic substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
3.89	1,3-Naphthalenedipropionic acid, 4-methyl- CH ₃ CN	2 × 10 ⁷		263	CP/Ac-15	S = MB; used $k_d = 1.8 \times 10^4$ s ⁻¹ .	93F361
3.90	1,3-Naphthalenedipropionic acid, 4-methyl-, dimethyl ester CH ₃ CN	1 × 10 ⁸		263	CP/Ac-15	S = MB; used $k_d = 1.8 \times 10^4$ s ⁻¹ .	93F361
3.91	1-Naphthalenepropionate ion, 4-methyl- H ₂ O pH = 9.5-11.5		0.07	293	CR/Pa-31	¹ O ₂ * from MoO ₄ ²⁻ /H ₂ O ₂ .	89M015
3.92	1-Naphthalenepropionate ion, 4-methyl-, endoperoxide (MNPO ₂) H ₂ O	9.0 × 10 ⁸ (k_q)		308	CR/A'c-32	A' = BR ² ; used $k_d = 3 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from A.	83A317
3.93	1-Naphthalenepropionic acid, 4-methyl-, endoperoxide CH ₂ Cl ₂	8.5 × 10 ⁷ (k_q)		308	CR/A'c-32	A' = BRH ₂ ; used $k_d = 1 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from A.	83A317
3.94	Naphtho[1,8-bc:5,4-b',c']dipyran (1,6-Dioxapyrene) CD ₃ OD	5.8 × 10 ⁷			PL/Ld-2	S = HP.	93R310
3.95	Naphtho[1,2,3,4-rst]pentaphene-5,8-dione, 3,10-dimethyl- (Dimethylhomocoerdianthrone, HOCD) C ₆ H ₅ CH ₃		9 × 10 ⁻⁵		CP/Ac-15	S = DBrA.	82F446 84F197
	CS ₂	3.4 × 10 ⁸		295	MP/Ld-2	S = TPP.	89A400
3.96	Pentacene C ₆ H ₆	4.2 × 10 ⁹ (k_r)		298	CP/Ac,A'c-17	S = A; A' = DPBF; used $k_r^{A'} = 7.0 \times 10^8$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 6.0$.	747312
3.97	Phenalen-1-one (PHO) Perfluorodecalin	3.2 × 10 ⁴		295	PL/Ld-2	S = A.	91E427
3.98	1,1'-Spiro[indene]-5,5',6,6'-tetracarboxylic acid, 2,2',3,3'-tetrahydro-3,3,3',3'-tetramethyl-, tetramethyl ester MeOH	9.0 × 10 ⁷			CP/A'c-16	S = MB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	91F516
	MeOH	2.0 × 10 ⁷ (k_r)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_r^{A'} = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ .	91F516
3.99	Stilbene (Z)- CCl ₄ / MeOH (96:4)	3 × 10 ³			PL/A'd-8	S = MB; A' = DPBF.	777162
3.100	Stilbene, 4,4'-dimethoxy- CH ₃ CN		1.4		CP/Oc-18	S = RB, A' = 2,5-DMF; $\beta_r^{A'}$ not given.	93A103
3.101	Stilbene, α,β -dimethoxy- CH ₃ COCH ₃	9.7 × 10 ⁶ (k_r)		281	?	S = ?; A' = 1,4-Dioxene; used $k_{A'} = 2.2 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 44$.	70F733
3.102	Stilbene, α,α' -dimethyl-, (E)- CH ₃ CN	1.0 × 10 ⁶			PL/Ld-2	S = (C ₆ H ₅) ₂ CO.	91E697
	CH ₃ CN		0.11	286	CP/Oc-14	S = RB.	86A099
3.103	Stilbene, α,α' -dimethyl-, (Z)- CCl ₄				CP/Ac,A''c- Pa-17	S = TPP; A' = <i>trans</i> - α,α' -Dimethylstilbene; meas. $k_r/k_r^{A'} = 9.0$; A'' = TME; c.k. with TME.	79F051
	CH ₃ CN		0.014	286	CP/Oc-14	S = RB.	86A099
3.104	Stilbene, α -methyl-, (E)- CCl ₄ / MeOH (96:4)	3 × 10 ³			PL/A'd-8	S = MB; A' = DPBF.	777162

TABLE 3. Rate constants for interaction of singlet oxygen with aromatic substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
3.105	Stilbene, α -methyl-, (Z)- CCl ₄ / MeOH (96:4)	6×10^3			PL/A'd-8	S = MB; A' = DPBF.	777162
3.106	Stilbene-2,2'-disulfonate ion, 4,4'-diacetamido- H ₂ O	2×10^5			CP/A'c-23	S = MB, RB; A' = InH; used $k_A' = 7.7 \times 10^5$ L mol ⁻¹ s ⁻¹ ; counter ion Na ⁺ .	87F554
3.107	Stilbene-2,2'-disulfonate ion, 4,4'-diamino- H ₂ O	1.9×10^6			CP/A'c-23	S = MB, RB; A' = InH; used $k_A' = 7.7 \times 10^5$ L mol ⁻¹ s ⁻¹ ; counter ion Na ⁺ .	87F554
3.108	Styrene CCl ₄ / MeOH (96:4)	5×10^3			PL/A'd-8	S = MB; A' = DPBF.	777162
3.109	Styrene, 3-chloro- α,β,β -trimethyl- MeOH/ <i>tert</i> -BuOH (50:50)				CR/Pa,P'a-17	A' = 4, α,β,β -Tetramethylstyrene; meas. $k_f/k_t^{A'} = 0.44$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	71F577
	MeOH/ C ₅ H ₅ N (98:2)				CP/Pa,P'a-17	S = RB; A' = 4, α,β,β -Tetramethylstyrene; meas. $k_f/k_t^{A'} = 0.38$.	71F577
3.110	Styrene, 4-chloro- α,β,β -trimethyl- MeOH				CP/Pa,P'a-17	S = RB; A' = 2M2B; meas. $k_f/k_t^{A'} = 2.2$.	71F577
3.111	Styrene, 3-cyano- α,β,β -trimethyl- MeOH/ <i>tert</i> -BuOH (50:50)				CR/Pa,P'a-17	A' = 4, α,β,β -Tetramethylstyrene; meas. $k_f/k_t^{A'} = 0.25$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	71F577
	MeOH/ C ₅ H ₅ N (98:2)				CP/Pa,P'a-17	S = RB; A' = 4, α,β,β -Tetramethylstyrene; meas. $k_f/k_t^{A'} = 0.20$.	71F577
3.112	Styrene, 4-cyano- α,β,β -trimethyl- MeOH/ <i>tert</i> -BuOH (50:50)				CR/Pa,P'a-17	A' = 4, α,β,β -Tetramethylstyrene; meas. $k_f/k_t^{A'} = 0.15$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	71F577
	MeOH/ <i>tert</i> -BuOH (98:2)				CP/Pa,P'a-17	S = RB; A' = 4, α,β,β -Tetramethylstyrene; meas. $k_f/k_t^{A'} = 0.17$.	71F577
3.113	Styrene, α -cyclopropyl- β,β -trimethyl- CH ₃ COCH ₃				CP/Ac,A'c-17	S = Eos; A' = (Dicyclopropylmethylidene)cyclobutane; meas. $k_f/k_t^{A'} = 0.79$.	78F430
3.114	Styrene, β,β -dimethyl- C ₆ H ₆		0.33	277	CP/Oc-14	S = TPP.	81F582
	CCl ₄		0.05	277	CP/Oc-14	S = TPP.	81F582
	CH ₃ COCH ₂ CH ₃		0.25	277	CP/Oc-14	S = RB.	81F582
	CHCl ₃		0.08	277	CP/Oc-14	S = TPP.	81F582
	EtOH		0.40	277	CP/Oc-14	S = RB.	81F582
3.115	Styrene, 4-(dimethylamino)- α,β,β -trimethyl- MeOH/ <i>tert</i> -BuOH (50:50)				CR/Pa,P'a-17	A' = 4-CH ₃ OC ₆ H ₄ C(CH ₃)=C(CH ₃) ₂ ; meas. $k_f/k_t^{A'} = 2.9$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	71F577
	MeOH/ C ₅ H ₅ N (98:2)				CP/Pa,P'a-17	S = RB; A' = 4-CH ₃ OC ₆ H ₄ C(CH ₃)=C(CH ₃) ₂ ; meas. $k_f/k_t^{A'} = 2.0$.	71F577
3.116	Styrene, 4-methoxy- β -methyl- MeOH		-0.010	293	CP/Oc-15	S = RB; $E_a = 17$ kJ mol ⁻¹ .	68F288
3.117	Styrene, 3-methoxy- α,β,β -trimethyl- MeOH/ <i>tert</i> -BuOH (50:50)				CR/Pa,P'a-17	A' = 4, α,β,β -Tetramethylstyrene; meas. $k_f/k_t^{A'} = 0.72$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	71F577

TABLE 1. Rate constants for interaction of singlet oxygen with aromatic substrates. — Continued

No.	Solvent	k_d (L mol ⁻¹ s ⁻¹)	β (k_d/k_t) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
3.117	Styrene, 3-methoxy- α,β,β -trimethyl- — Continued						
	MeOH/ C ₅ H ₅ N (98:2)				CP/Pa,P'a-17	S = RB; A' = 4, α,β,β -Tetramethylstyrene; meas. $k_t/k_t^{A'} = 0.67$.	71F577
3.118	Styrene, 4-methoxy- α,β,β -trimethyl-						
	MeOH/ <i>tert</i> -BuOH (50:50)				CR/Pa,P'a-17	A' = 4, α,β,β -Tetramethylstyrene; meas. $k_t/k_t^{A'} = 1.3$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	71F577
	MeOH/ C ₅ H ₅ N (98:2)				CP/Pa,P'a-17	S = RB; A' = 4, α,β,β -Tetramethylstyrene; meas. $k_t/k_t^{A'} = 1.4$.	71F577
3.119	Styrene, β -methyl-, (<i>E</i> -)						
	CCl ₄ / MeOH (96:4)	2×10^3			PL/A'd-8	S = MB; A' = DPBF.	777162
3.120	Styrene, β -methyl-, (<i>Z</i> -)						
	CCl ₄ / MeOH (96:4)	5×10^3			PL/A'd-8	S = MB; A' = DPBF.	777162
3.121	Styrene, 3, α,β,β -tetramethyl-						
	MeOH/ <i>tert</i> -BuOH (50:50)				CR/Pa,P'a-17	A' = <i>p</i> -Chloro- α,β,β -trimethylstyrene; meas. $k_t/k_t^{A'} = 1.4$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	71F577
	MeOH/ C ₅ H ₅ N (98:2)				CP/Pa,P'a-17	S = RB; A' = <i>p</i> -Chloro- α,β,β -trimethylstyrene; meas. $k_t/k_t^{A'} = 1.5$.	71F577
3.122	Styrene, 4, α,β,β -tetramethyl-						
	MeOH/ <i>tert</i> -BuOH (50:50)				CR/Pa,P'a-17	A' = <i>p</i> -Chloro- α,β,β -trimethylstyrene; meas. $k_t/k_t^{A'} = 1.9$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	71F577
	MeOH/ C ₅ H ₅ N (98:2)				CP/Pa,P'a-17	S = RB; A' = <i>p</i> -Chloro- α,β,β -trimethylstyrene; meas. $k_t/k_t^{A'} = 2.2$.	71F577
3.123	Styrene, α,β,β -trimethyl- (TMS)						
	MeOH/ <i>tert</i> -BuOH (50:50)				CR/Pa,P'a-17	A' = 4, α,β,β -Tetramethylstyrene; meas. $k_t/k_t^{A'} = 0.83$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	71F577
	MeOH/ <i>tert</i> -BuOH (50:50)				CR/Pa,P'a-17	A' = 4-CH ₃ OC ₆ H ₄ C(CH ₃)=C(CH ₃) ₂ ; meas. $k_t/k_t^{A'} = 0.57$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	71F577
	MeOH/ C ₅ H ₅ N (98:2)				CP/Pa,P'a-17	S = RB; A' = 4-CH ₃ OC ₆ H ₄ C(CH ₃)=C(CH ₃) ₂ ; meas. $k_t/k_t^{A'} = 0.51$.	71F577
3.124	Tetracene						
	C ₆ H ₆		2.4×10^{-3}	298	CP/Ac-?	S = A.	767422
	C ₆ H ₆	1.2×10^7 (k_t)		298	CP/Ac,A'c-17	S = A' = Rub; used $k_t^{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_t/k_t^{A'} = 0.29$.	747312
	C ₆ H ₆			298	CP/Pa,P'a-17	S = A; A' = DMA; meas. $k_t/k_t^{A'} = 0.18$.	706079
	C ₆ H ₆		1.7×10^{-3}	298	CP/Ac-15	S = A.	706079
	C ₆ H ₆			298	CP/Pa,P'a-17	S = A; A' = DMBA; meas. $k_t/k_t^{A'} = 0.46$.	706079
	CCl ₄	6.9×10^6 (k_t)			CP/Ac-14,27	S = PP; used $k_d = 36$ s ⁻¹ .	82A421
	CCl ₄	5×10^6 (k_t)			CP/Ac-27,28	S = Ph a; used $k_d = 36$ s ⁻¹ ; $f_r^A = 1$.	79A010
	CCl ₄	5×10^6			MP/LI-12	S = PP, Ph a or BChl a; used $k_d = 36$ s ⁻¹ .	78E881 79A010
	CCl ₄	7×10^6			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	78E892
	CCl ₄	5×10^6			MP/LI-12	S = Ret; used $k_d = 36$ s ⁻¹ .	78F700
	CH ₂ Cl ₂	1.8×10^7	4.0×10^{-4}		CP/Ac-14	S = A; used $k_d = 7.3 \times 10^3$ s ⁻¹ .	75F654
3.125	Tetracene, 5,6,11,12-tetraphenyl- (Rubrene)						
	C ₅ H ₅ N				CP/Ac-17	S = A; A' = TME; meas. $k_t/k_t^{A'} = 2.1$.	66F041
	C ₅ H ₅ N				CP/Ac-17	S = MB; A' = TME; meas. $k_t/k_t^{A'} = 2.4$.	66F041
	C ₆ D ₆	4.3×10^7			PL/Ad-5	S = 3,6-Bis(dibutylamino)phenothiazinium bromide.	81A287

TABLE 3. Rate constants for interaction of singlet oxygen with aromatic substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
3.115 Tetracene, 5,6,11,12-tetraphenyl- (Rubrene) — Continued							
	c-C ₆ H ₁₂	1.5 × 10 ⁷	4.0 × 10 ⁻³	297	CP/Ac-15	S = A; used $k_d = 5.9 \times 10^4$ s ⁻¹ .	747207
	1,2,3-C ₆ H ₃ Cl ₃	5.0 × 10 ⁷	4 × 10 ⁻⁴	298	CP/Ac-15	S = A; used $k_d = 2.0 \times 10^4$ s ⁻¹ .	756223
	C ₆ H ₅ Br	1.6 × 10 ⁷	8 × 10 ⁻⁴	297	CP/Ac-15	S = A; used $k_d = 1.3 \times 10^4$ s ⁻¹ .	747207
	C ₆ H ₅ CH ₃	2.5 × 10 ⁷		293	PL/Ad-5	S = A.	82E072
	C ₆ H ₅ CH ₃	5.5 × 10 ⁷	9 × 10 ⁻⁴	298	CP/Ac-15	S = A; used $k_d = 5.0 \times 10^4$ s ⁻¹ .	756223
	C ₆ H ₅ CN	1.3 × 10 ⁸			PL/Ad-5	S = A.	83F075
	C ₆ H ₆	3.4 × 10 ⁷			CP/Ac-15	S = A; used $k_d = \geq 3.3 \times 10^4$ s ⁻¹ .	87E142
	C ₆ H ₆		1.0 × 10 ⁻³	298	CP/Ac-?	S = A.	767422
	C ₆ H ₆	4.7 × 10 ⁷	9 × 10 ⁻⁴	298	CP/Ac-15	S = A; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	756223
	C ₆ H ₆	4.2 × 10 ⁷	1.0 × 10 ⁻³	298	CP/Ac-15	S = A; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	747312
	C ₆ H ₆	4.3 × 10 ⁷ (k_r)		298	CP/Ac,A'c-17	S = A; A' = 1,2-Dithiolane-3-pentanoic acid; used $k_r^{A'} = 1.0 \times 10^8$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.43$; β derived assuming $f_r^{A'} = 2$.	74F641
	C ₆ H ₆		9 × 10 ⁻⁴	298	CP/Ac-23	S = A; A' = 1,2-Dithiolane-3-pentanoic acid.	74F641
	C ₆ H ₆		3.0 × 10 ⁻⁴	298	CP/Ac-15	S = A.	706079
	C ₆ H ₆			298	CP/Pa,P'a-17	S = A; A' = DMA; meas. $k_r/k_r^{A'} = 1.0$.	706079
	C ₆ H ₆			298	CP/Pa,P'a-17	S = A; A' = DMBA; meas. $k_r/k_r^{A'} = 2.8$.	706079
	C ₆ H ₆		1.7 × 10 ⁻³		CP/Ac-15	S = A.	55F004
	CCl ₄	2.3 × 10 ⁷	6 × 10 ⁻⁵	298	CP/Ac-15	S = A; used $k_d = 1.4 \times 10^3$ s ⁻¹ .	756223
	CCl ₄	1.4 × 10 ⁷	1 × 10 ⁻⁴	297	CP/Ac-15	S = A; used $k_d = 1.4 \times 10^3$ s ⁻¹ .	747207
	CD ₃ CN	8.0 × 10 ⁷			PL/Ad-5	S = 2-ACN.	81A287
	CD ₃ COCD ₃	2.8 × 10 ⁷			PL/Ad-5	S = 2-ACN.	81A287
	CDCl ₃	3.9 × 10 ⁷			PL/Ad-5	S = 2-ACN.	81A287
	CH ₂ Cl ₂	5.4 × 10 ⁷ (k_r)	2.2 × 10 ⁻⁴ (β_r)		CR/Ac-31	used $k_d = 1.2 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from triphenyl phosphite ozonide; $f_r^A = 1$.	85M406
	CHCl ₃	5.3 × 10 ⁷	3.1 × 10 ⁻⁴		CP/Ac-15	S = A; used $k_d = 1.7 \times 10^4$ s ⁻¹ .	777486
	CHCl ₃	5.9 × 10 ⁷	3 × 10 ⁻⁴	298	CP/Ac-15	S = A; used $k_d = 1.7 \times 10^4$ s ⁻¹ .	756223
	CHCl ₃	4.3 × 10 ⁷	4 × 10 ⁻⁴	297	CP/Ac-15	S = A; used $k_d = 1.7 \times 10^4$ s ⁻¹ .	747207
	CS ₂	4.4 × 10 ⁷		295	MP/Ld-2	S = TPP.	89A400
	CS ₂		1 × 10 ⁻⁶	295	CP/Ac-14	S = A; [Rub] = (8-16) × 10 ⁻⁶ mol L ⁻¹ .	89A400
	CS ₂		9 × 10 ⁻⁶	295	CP/Ac-14	S = A; [Rub] = (6-15) × 10 ⁻⁵ mol L ⁻¹ .	89A400
	CS ₂	5.6 × 10 ⁷	9 × 10 ⁻⁵	298	CP/Ac-15	S = A; used $k_d = 5.0 \times 10^3$ s ⁻¹ .	756223
	CS ₂	2.5 × 10 ⁷	2 × 10 ⁻⁴	297	CP/Ac-15	S = A; used $k_d = 5.0 \times 10^3$ s ⁻¹ .	747207
	EtOH	2.3 × 10 ⁷	3.6 × 10 ⁻³	297	CP/Ac-15	S = A; used $k_d = 8.3 \times 10^4$ s ⁻¹ .	747207
	MeOH	3.1 × 10 ⁷	4 × 10 ⁻³	297	CP/Ac-15	S = A; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	747207
3.126 Tetracene-2,3,8,9-tetracarboxylate, 5,6,11,12-tetraphenyl- (Rubrene-2,3,8,9-tetracarboxylate)							
	D ₂ O		9 × 10 ⁻⁵		CL/Ac-15	S = A.	81F043
	H ₂ O pH = 10.5		1.6 × 10 ⁻³	298	CR/Pa-31	¹ O ₂ * from MoO ₄ ²⁻ /H ₂ O ₂ .	88M109
	H ₂ O		1.5 × 10 ⁻³		CL/Ac-15	S = A.	81F043
3.127 Toluene							
	CCl ₄	3.9 × 10 ³		298	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; used $k_d = 32$ s ⁻¹ .	82E329
3.128 Toluene-d₈							
	CCl ₄	3.4 × 10 ²		298	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; used $k_d = 32$ s ⁻¹ .	82E329

TABLE 3. Rate constants for interaction of singlet oxygen with aromatic substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
3.129 Tribenzo[<i>a,f,j</i>]perylene, 9,18-diphenyl- (Mesodiphenylbenzheanthrene)							
	C ₆ H ₅ CH ₂ OH	4×10^9 1.0×10^8 (k_r)	2×10^{-5}		CL/Ac-14	S = RB; used $k_d = 7.1 \times 10^4$ s ⁻¹ ; meas. $f_r^A = 0.028$.	87F479
	C ₆ H ₅ CH ₃ / MeOH (99:1)	7×10^9 1.7×10^8 (k_r)	6.2×10^{-6}		CL/Ac-14	S = RB; used $k_d = 4.0 \times 10^4$ s ⁻¹ ; meas. $f_r^A = 0.025$.	87F479
	MeOH/ C ₆ H ₅ CH ₃ (97:3)	6.2×10^9 1.6×10^8 (k_r)	2×10^{-5}		CL/Ac-14	S = RB; used $k_d = 1.1 \times 10^5$ s ⁻¹ ; meas. $f_r^A = 0.026$.	87F479

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols.

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k_t) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.1 L-Alanine, glycyl-L-tyrosyl-							
	EtOH/ CH ₃ CN (80:20)	3.0×10^7 (k_t)			CP/Ac,A'c-17	S = RB; A' = DMA; used $k_t^{A'} = 8.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	93F413
	EtOH/ CH ₃ CN (80:20)	2.0×10^8			PL/Ld-2	S = RB; 0.01 mol L ⁻¹ KOH.	93F413
	H ₂ O pH = 11.5	2.0×10^9			CP/Ac-15	S = RB; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	93F413
	H ₂ O pH = 11.5	1.0×10^8 (k_t)			CP/Oc-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	93F413
4.2 Anthrone, 1,8-dihydroxy- (Anthralin)							
	C ₆ D ₆	2.8×10^4			PL/Ld-2	S = TPP.	90A300
	C ₆ H ₆	$\sim 4 \times 10^4$			PL/Ld-2	S = PPDME.	89E158
4.3 Anthrone, 1,8-dihydroxy-, conjugate base							
	CH ₃ CN	3.1×10^8	5.9×10^{-5}	295	CP/Ac-15	S = RB; used $k_d = 1.8 \times 10^4$ s ⁻¹ .	90A300
	CH ₃ CN	2×10^8 (k_t)			CP/Ac-17	S = RB; A' = TME; used $k_t^{A'} = 3.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_t/k_t^{A'} = 6$.	90A300
	D ₂ O pD = 9.4-11.4	3×10^8			PL/Ld-2	S = RB.	90A300
4.4 1,2-Benzenediol (Catechol)							
	CD ₃ OD	1.7×10^6		293	PL/Ld-2	S = HP.	90F411
	CH ₃ CN	2.9×10^6			PL/Ld-2	S = RB.	91A341
	D ₂ O	5.4×10^7			PL/Ld-2	S = RB.	91A341
	dioxane	1.4×10^6			PL/Ld-2	S = ZnTPP.	91A341
4.5 1,2-Benzenediol, 4-(2-aminoethyl)- (Dopamine)							
	D ₂ O	2.5×10^7			PL/Ld-2	S = MB.	91R251
	MeOH	1.0×10^6	0.092		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9 \times 10^4$ s ⁻¹ .	86F226
4.6 1,2-Benzenediol, 4-(2-amino-1-hydroxyethyl)- (Noradrenaline)							
	MeOH	1.6×10^6	0.055		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9 \times 10^4$ s ⁻¹ .	86F226
4.7 1,2-Benzenediol, 3,5-bis(1,1-dimethylethyl)-							
	CD ₃ OD	2.5×10^7		293	PL/Ld-2	S = HP.	90F411
	CD ₃ COCD ₃	1.3×10^7			PL/Ld-2	S = MPDME.	87F676
4.8 1,2-Benzenediol, 4-(1,1-dimethylethyl)-							
	CH ₂ Cl ₂	4×10^6			PL/Tb-3	S = TPP.	83A050
4.9 1,2-Benzenediol, 4-(2-methylamino-1-hydroxyethyl)- (Adrenaline)							
	MeOH	2.3×10^6	0.040		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9 \times 10^4$ s ⁻¹ .	86F226
4.10 1,3-Benzenediol (Resorcinol)							
	CD ₃ OD	6.5×10^5		293	PL/Ld-2	S = HP.	90F411
	CH ₃ CN	3.9×10^6			PL/Ld-2	S = RB.	91A341
	CH ₃ CN	2×10^5 (k_t)			CP/Ac,A'c-17	S = MPDME; A' = DMA; used $k_t^{A'} = 1.3 \times 10^8$ L mol ⁻¹ s ⁻¹ .	91A341
	D ₂ O	2×10^7			PL/Ld-2	S = RB.	91A341
	H ₂ O	2×10^7 (k_t)		293	CP/Oc-17	S = Eos; A' = His; used $k_t^{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A341
	dioxane	5.5×10^5			PL/Ld-2	S = ZnTPP.	91A341
4.11 1,3-Benzenediol, 4-chloro-							
	CH ₃ CN	1.9×10^7			PL/Ld-2	S = RB.	91A341

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.11 1,3-Benzenediol, 4-chloro- — Continued							
	CH ₃ CN	5×10^5 (k_p)			CP/Ac,A'c-17	S = MPDME; A' = DMA; used $k_r^{A'} = 1.3 \times 10^8$ L mol ⁻¹ s ⁻¹ .	91A341
	D ₂ O	2.2×10^7			PL/Ld-2	S = RB.	91A341
	H ₂ O	2.1×10^7 (k_p)		293	CP/Oc-17	S = Eos; A' = His; used $k_r^{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A341
	dioxane	6.5×10^5			PL/Ld-2	S = ZnTPP.	91A341
4.12 1,4-Benzenediol (Hydroquinone)							
	C ₂ H ₅ N	6.9×10^7			CP/A'c-23	S = A' = Rub; used $k_d = 6.0 \times 10^4$ s ⁻¹ , $k_{A'} = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	743112
	C ₆ H ₆ / MeOH (80:20)	7×10^7		298	CP/P'a-20	S = MB; A' = 2M2P; used $k_d = 1.0 \times 10^5$ s ⁻¹ , $\beta_{A'} = 0.04$ mol L ⁻¹ .	70F734
	CD ₃ OD	1.4×10^7		293	PL/Ld-2	S = HP.	90F411
	CH ₃ CN	5×10^5 (k_p)			CP/Ac,A'c-17	S = MPDME; A' = DMA; used $k_r^{A'} = 1.3 \times 10^8$ L mol ⁻¹ s ⁻¹ .	91A341
	CH ₃ CN	2.8×10^7			PL/Ld-2	S = RB.	91A341
	D ₂ O	2.9×10^8			PL/Ld-2	S = RB.	91A341
	EtOH	1.4×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	93M161
	EtOH/ H ₂ O (95:5)	$\sim 6 \times 10^6$			CR/LI-12	¹ O ₂ * from pyrogallol autooxidation by O ₂ /KOH; k_d not given.	78F605
	H ₂ O	2.5×10^7 (k_p)		293	CP/Oc-17	S = Eos; A' = His; used $k_r^{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A341
	H ₂ O	$\sim 4 \times 10^7$ (k_p)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; reported $k = (3.8 \pm 5.5) \times 10^7$ L mol ⁻¹ s ⁻¹ .	91F300
	dioxane	1.9×10^7			PL/Ld-2	S = ZnTPP.	91A341
4.13 1,4-Benzenediol, conjugate dibase (Hydroquinone dianion)							
	H ₂ O pH = 10.6	5.6×10^7		310	CR/LI-12	used $k_d = 3.2 \times 10^5$ s ⁻¹ ; soln. cont. 5×10^{-4} mol L ⁻¹ CoCl ₂ , ¹ O ₂ * from autoxidation of oxytetracycline.	92M228
4.14 1,4-Benzenediol, 2,5-bis(1,1-dimethylethyl)-							
	CD ₃ OD	1.9×10^8		293	PL/Ld-2	S = HP.	90F411
	MeOH	6.2×10^7	2.9×10^{-3}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	88F440
4.15 1,4-Benzenediol, 2,6-bis(1,1-dimethylethyl)-, 4-propanoate							
	MeOH	2.2×10^5	0.53		CP/A'c-16	S = MD; A' = DPF; used $k_d = 1.2 \times 10^5$ s ⁻¹ .	78A171
4.16 1,4-Benzenediol, 2,5-bis(2,2-dimethylpropyl)-							
	MeOH	6.9×10^7	2.6×10^{-3}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	88F440
4.17 1,4-Benzenediol, 2,5-bis-sec-dodecyl-							
	MeOH	6.4×10^7	2.8×10^{-3}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	88F440
4.18 1,4-Benzenediol, 2,5-bis-sec-hexadecyl-							
	MeOH	6.6×10^7	2.7×10^{-3}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	88F440
4.19 1,4-Benzenediol, 2,5-bis-sec-octyl-							
	MeOH	6.8×10^7	2.6×10^{-3}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	88F440
4.20 1,4-Benzenediol, chloro-							
	CH ₃ CN	1.6×10^7			PL/Ld-2	S = RB.	91A341
	CH ₃ CN	3×10^5 (k_p)			CP/Ac,A'c-17	S = MPDME; A' = DMA; used $k_r^{A'} = 1.3 \times 10^8$ L mol ⁻¹ s ⁻¹ .	91A341

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.10	1,4-Benzenediol, chloro- — Continued						
	D ₂ O	6×10^7			PL/Ld-2	S = RB.	91A341
	H ₂ O	1.7×10^7 (k_r)		293	CP/Oc-17	S = Eos; A' = His; used $k_r^{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A341
	dioxane	9.7×10^6			PL/Ld-2	S = ZnTPP.	91A341
4.11	1,4-Benzenediol, 2,3-dimethoxy-5-methyl-						
	EtOH	9.3×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	93M161
4.12	1,4-Benzenediol, 2,3-dimethyl-						
	EtOH	8.5×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	93M161
4.13	1,4-Benzenediol, 2,5-dimethyl-						
	EtOH	9.9×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	93M161
4.14	1,4-Benzenediol, 2,6-dimethyl-						
	EtOH	5.4×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	93M161
4.15	1,4-Benzenediol, 2-(3,7,11,15,19,23-hexamethyl-2,6,10,14,18,22-tetracosahexaenyl)-5,6-dimethoxy-3-methyl- (<i>all-E</i>) (Ubiquinol 10)						
	EtOH	1.6×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	93M161
4.16	1,4-Benzenediol, 2-(3-hydroxy-3,7,11,15-tetramethylhexadecyl)-3,6-dimethyl- (β -Tocopherol hydroquinone)						
	EtOH	1.2×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	93M161
4.17	1,4-Benzenediol, 2-(3-hydroxy-3,7,11,15-tetramethylhexadecyl)-5,6-dimethyl- (γ -Tocopherol hydroquinone)						
	EtOH	1.2×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	93M161
4.18	1,4-Benzenediol, 2-(3-hydroxy-3,7,11,15-tetramethylhexadecyl)-3,5,6-trimethyl- (α -Tocopherol hydroquinone)						
	EtOH	1.3×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	93M161
4.19	1,4-Benzenediol, 2-methyl-						
	EtOH	4.4×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	93M161
4.20	1,4-Benzenediol, phenyl- (2,5-Dihydroxybiphenyl)						
	H ₂ O pH = 8.0	2.4×10^7 (k_r)			CP/Oc-17	S = RB; A' = Met; used $k_r^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	93E536
4.31	1,4-Benzenediol, trimethyl-						
	EtOH	1.2×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	93M161
4.32	Benzenemethanol, 3,5-bis(1,1-dimethylethyl)-4-hydroxy-						
	C ₆ H ₆	4.1×10^5			CP/P'a-19	S = ZnTPP; A' = 2M2P; used $k_{A'} = 7.5 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 0.55$.	78A171
	MeOH	1.5×10^6	0.079		CP/A'c-16	S = MB; A' = DPF; used $k_d = 1.2 \times 10^5$ s ⁻¹ .	78A171
4.33	3-Benzenepropanoic acid, 3,5-bis(1,1-dimethylethyl)-4-hydroxy-, octadecyl ester						
	CCl ₄ / MeOH (98:2)	4.6×10^5			FP/A'd-5	S = MB; A' = DPBF.	78E238
	<i>i</i> -octane	$<1 \times 10^6$			CP/A'c-23	S = A' = Rub; No measurable effect.	732066

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.34	3-Benzenepropanoic acid, 4-hydroxy-						
	D ₂ O/ EtOH (75:25)	2.4×10^7		295	PL/Ld-2	S = RB.	94A113
4.35	Benzoate ion, 2-hydroxy- (Salicylate ion)						
	H ₂ O (ves) pH = 7.5	1.4×10^5 (k_t)		310	CP/Oc-17	S = RB; A' = His; used $k_t^{A'} = 2.8 \times 10^7$ L mol ⁻¹ s ⁻¹ ; DLPC liposomes.	93F231
	H ₂ O (ves) pH = 7.5	1.6×10^7	0.016	310	CP/Oc-14	S = AlCl(tspc); used $k_d = 2.5 \times 10^5$ s ⁻¹ ; DLPC liposomes.	93F231
	H ₂ O (ves) pH = 7.5	2.0×10^7	0.012	310	CP/Oc-14	S = MC 540; used $k_d = 2.5 \times 10^5$ s ⁻¹ ; DLPC liposomes.	93F231
	H ₂ O (ves) pH = 7.5	2.5×10^5 (k_t)		310	CP/Oc-17	S = MC 540; A' = His; used $k_t^{A'} = 2.8 \times 10^7$ L mol ⁻¹ s ⁻¹ ; DLPC liposomes.	93F231
	H ₂ O (ves) pH = 7.5	2.1×10^5 (k_t)		310	CP/Oc-17	S = AlCl(tspc); A' = His; used $k_t^{A'} = 2.8 \times 10^7$ L mol ⁻¹ s ⁻¹ ; DLPC liposomes.	93F231
	H ₂ O (ves) pH = 7.5	1.1×10^7	0.022	310	CP/Oc-14	S = RB; used $k_d = 2.5 \times 10^5$ s ⁻¹ ; DLPC liposomes.	93F231
4.36	Benzo-furan-5-ol, 2,3-dihydro-2,2,4,6,7-pentamethyl-						
	EtOH	3.6×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285
4.37	Benzo-furan-5-ol, 2,3-dihydro-2,4,6,7-tetramethyl-						
	EtOH	2.5×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285
4.38	Benzoic acid, 3,5-bis(1,1-dimethylethyl)-4-hydroxy-, 2,4-bis(1,1-dimethylethyl)phenyl ester						
	C ₆ H ₅ Br	$<1 \times 10^6$		273	MD/A'c-33	A' = Rub; No measurable effect.	737333
	<i>i</i> -octane	$<1 \times 10^6$			CP/A'c-23	S = A' = Rub; No measurable effect.	732066
4.39	Benzoic acid, 3,5-bis(1,1-dimethylethyl)-4-hydroxy-, methyl ester						
	1-BuOH	9.2×10^5		293	CP/A'c-23	S = MB; A' = Np; used $k_d = 5.2 \times 10^4$ s ⁻¹ , $k_{A'} = 5.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A266
4.40	Benzoic acid, 2-hydroxy-, methyl ester (Methyl salicylate)						
	H ₂ O	$<2 \times 10^6$ (k_t)		292	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; estd. using $pK_a = 9.8$.	87A180
4.41	Benzoic acid, 2-hydroxy-, methyl ester, conjugate base						
	H ₂ O pH = 10.0	1.6×10^8 (k_t)		292	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; estd. using $pK_a = 9.8$.	87A180
4.42	Benzophenone, 4-dodecyloxy-2-hydroxy-						
	CCl ₄ / MeOH (98:2)	$<2 \times 10^5$			FP/A'd-5	S = MB; A' = DPBF.	78E238
	<i>i</i> -octane	$<1 \times 10^6$			CP/A'c-23	S = A' = Rub; No measurable effect.	732066
4.43	Benzophenone, 2-hydroxy-4-octyloxy-						
	C ₆ H ₅ Br	$<1 \times 10^6$		273	MD/A'c-33	A' = Rub; No measurable effect.	737333
	CCl ₄ / CHCl ₃ (90:10)	1.0×10^4			CP/A'c-23	S = A' = Rub; used $k_d = 1.4 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k/(k_{A'}[A'] + k_d) = 10.0$ L mol ⁻¹ at $[A'] = 5 \times 10^{-6}$ mol L ⁻¹ .	74F645
4.44	1-Benzopyran-2-carboxylate ion, 3,4-dihydro-6-hydroxy-2,5,7,8-tetramethyl- (Trolox C anion)						
	CD ₃ OD	1.2×10^8		293	PL/Ld-2	S = HP.	90F411
	D ₂ O/ EtOH (50:50)	4.7×10^8		310	CR/LI-12	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90A184
	EtOH	8.1×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

4.4	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.41	1-Benzopyran-6-ol, 5,7-diethyl-3,4-dihydro-2-methyl-2-(4,8,12-trimethyltridecyl)-						
	EtOH	9.5×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285
4.42	1-Benzopyran-6-ol, 3,4-dihydro-2,8-dimethyl-2-(4,8,12-trimethyltridecyl)- (δ-Tocopherol)						
	<i>n</i> -C ₁₆ H ₃₄	5.0×10^6		298	MD/A'c-33	A' = Rub; used $k_d = 9 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88F415
	CHCl ₃ /EtOH (50:50)	1.6×10^8 1.7×10^6 (k_r)		310	CR/LI,Ac-12,31	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90A184
	EtOH	5.3×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285
	EtOH	1.0×10^8	8.3×10^{-4}	293	CP/P'a-22	S = MB; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; A' = Methyl linoleate; P' = Methyl linoleate hydroperoxide.	77F858
	EtOH	7×10^5 (k_r)		293	CP/P'a,Ac-17	S = MB; used $k_r A' = 7.3 \times 10^4$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r A' = 11$; A' = Methyl linoleate; P' = Methyl linoleate hydroperoxide.	77F858
	MeOH	1×10^8	1×10^{-3}	298	CP/Ac-15	S = MB; used $k_d = 1 \times 10^5$ s ⁻¹ .	72A019
4.47	1-Benzopyran-6-ol, 3,4-dihydro-2-methyl-5,7-di(1-methylethyl)-2-(4,8,12-trimethyltridecyl)-						
	EtOH	1.1×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285
4.48	1-Benzopyran-6-ol, 3,4-dihydro-1-methyl-1-(4,8,12-trimethyltridecyl)- (Tocol)						
	EtOH	2.8×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285
4.49	1-Benzopyran-6-ol, 3,4-dihydro-2,2,5,7,8-pentamethyl-						
	<i>c</i> -C ₆ H ₁₂	2.4×10^7			PL/A'd-8	S = 2-ACN; A' = DPBF; $\Delta H^\ddagger = -8.8$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -130$ J K ⁻¹ mol ⁻¹ ; studied at 278-357 K.	84E492
	C ₆ H ₅ CH ₃	1.5×10^8			PL/A'd-8	S = 2-ACN; A' = DPBF; $\Delta H^\ddagger = -15$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -138$ J K ⁻¹ mol ⁻¹ ; studied at 230-385 K.	84E492
	CH ₃ CN	5.7×10^8			PL/A'd-8	S = 2-ACN; A' = DPBF; $\Delta H^\ddagger = -15$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -130$ J K ⁻¹ mol ⁻¹ ; studied at 230-357 K.	84E492
	CH ₃ COCH ₃	2.6×10^8			PL/A'd-8	S = 2-ACN; A' = DPBF; $\Delta H^\ddagger = -8.4$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -109$ J K ⁻¹ mol ⁻¹ ; studied at 250-328 K.	84E492
	D ₂ O (mic) pD = 7.4	4.1×10^8			PL/A'd-5	S = MB; A' = DPBF; 0.1 mol L ⁻¹ CTAB.	81N048
	D ₂ O (mic) pD = 7.4	4.0×10^8			PL/A'd-5	S = MB; A' = DPBF; 0.1 mol L ⁻¹ SDS.	81N048
	EtOH	2.0×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285
	MeOH	4.0×10^7 (k_r)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_r A' = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ .	91F516
	MeOH	1.6×10^8			CP/A'c-16	S = MB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	91F516
	MeOH	3.4×10^8			PL/A'd-8	S = 2-ACN; A' = DPBF; $\Delta H^\ddagger = -5.9$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -100$ J K ⁻¹ mol ⁻¹ ; studied at 250-328 K.	84E492
4.50	1-Benzopyran-6-ol, 3,4-dihydro-2,5,7,8-tetramethyl-2-(4,8,12-trimethyltridecyl)- (α-Tocopherol)						
	<i>n</i> -C ₁₆ H ₃₄	4.2×10^7		298	MD/A'c-33	A' = Rub; used $k_d = 9 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88F415
	<i>c</i> -C ₆ H ₁₂	8.4×10^7			PL/A'd-8	S = 2-ACN; A' = DPBF.	84E492
	<i>c</i> -C ₆ H ₁₂	1.1×10^6 (k_r)		298	CP/Ac,A'c-17	S = A' = DPA; used $k_r A' = 1.2 \times 10^6$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r A' = 0.9$.	743114
	<i>c</i> -C ₆ H ₁₂	9.0×10^7	6.8×10^{-4}	298	CP/A'c-23	S = A' = Rub; used $k_d = 5.9 \times 10^4$ s ⁻¹ , $\beta_{A'} = 1.4 \times 10^{-3}$ mol L ⁻¹ .	743114

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.50 1-Benzopyran-6-ol, 3,4-dihydro-2,5,7,8-tetramethyl-2-(4,8,12-trimethyltridecyl)- (α-Tocopherol) — Continued							
	C ₅ H ₅ N	2.5 × 10 ⁸			CP/A'c-23	S = A' = Rub; used $k_d = 6.0 \times 10^4$ s ⁻¹ , $k_{A'} = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	743112
	C ₅ H ₅ N	2.1 × 10 ⁶ (k_r)			CP/Ac-14,28	S = PP; A' = Cholesterol; used $k_d = 6.0 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.9$ mol L ⁻¹ ; used $k_A = 2.5 \times 10^8$ L mol ⁻¹ s ⁻¹ .	743112
	C ₆ H ₅ CH ₃	2.2 × 10 ⁸			PL/A'd-8	S = 2-ACN; A' = DPBF; $\Delta H^\ddagger = -14$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -138$ J K ⁻¹ mol ⁻¹ ; studied at 230-385 K.	84E492
	C ₆ H ₆	1 × 10 ⁸ 2.1 × 10 ⁶ (k_r) 1.4 × 10 ⁸ (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
	C ₆ H ₆	1.7 × 10 ⁸	2.7 × 10 ⁻⁴	298	CP/A'c-23	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $\beta_{A'} = 1.0 \times 10^{-3}$ mol L ⁻¹ .	743114
	CCl ₄	5.2 × 10 ⁷			CL/LI-12	S = TPP; used $k_d = 1 \times 10^3$ s ⁻¹ .	85F667
	CCl ₄	1 × 10 ⁸			MP/LI-12	S = PP, TPP, Ph a or BPh a; used $k_d = 36$ s ⁻¹ .	79A010 78E892
	CCl ₄	10 ⁸			MP/LI-12	S = Ret; used $k_d = 36$ s ⁻¹ .	79F463 78F700
	CH ₂ Cl ₂	2.7 × 10 ⁷		298	CP/P'a or Oc-19	S = Chl a; A' = Soybean oil; used $k_{A'} = 1.0 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 2.6 \times 10^2$; measured peroxide formation.	91U128
	CH ₃ CN	5.9 × 10 ⁸			PL/A'd-8	S = 2-ACN; A' = DPBF; $\Delta H^\ddagger = -11$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -138$ J K ⁻¹ mol ⁻¹ ; studied at 230-357 K.	84E492
	CH ₃ COCH ₃	4.3 × 10 ⁸			PL/A'd-8	S = 2-ACN; A' = DPBF; $\Delta H^\ddagger = -12$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -122$ J K ⁻¹ mol ⁻¹ ; studied at 250-328 K.	84E492
	CHCl ₃	1.1 × 10 ⁸			CP/A'c-16	S = MB; A' = DPBF; used $k_d = 4.4 \times 10^3$ s ⁻¹ .	83A394
	CHCl ₃ /EtOH (50:50)	2.8 × 10 ⁸ 3.6 × 10 ⁶ (k_r)		310	CR/LI,Ac-12,31	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90A184
	CICF ₂ CCl ₂ F	3 × 10 ⁷		298	FP/Ld-2	S = Per.	82A322
	D ₂ O/EtOH (50:50)	4.5 × 10 ⁸		310	CR/LI-12	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90A184
	D ₂ O (mic)	6.4 × 10 ⁸			PL/A'd-5	S = 2-ACN; A' = DPBF; 0.1 mol L ⁻¹ SDS.	78E144
	EtOH		3.3 × 10 ⁻³	298	CP/Ac-15	S = 8-MOP.	92F192
	EtOH	2.1 × 10 ⁸		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285
	EtOH	1 × 10 ⁸			CP/A'c-19	S = RB; A' = Chl a; used $k_d = 1 \times 10^5$ s ⁻¹ .	78F404
	EtOH	2.6 × 10 ⁸	3.2 × 10 ⁻⁴	293	CP/P'a-22	S = MB; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; A' = Methyl linoleate; P' = Methyl linoleate hydroperoxide.	77F858
	EtOH	6.6 × 10 ⁶ (k_r)		293	CP/P'a,Ac-17	S = MB; used $k_r A' = 7.3 \times 10^4$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r A' = 91$; A' = Methyl linoleate; P' = Methyl linoleate hydroperoxide.	77F858
	MeOH	4.5 × 10 ⁸		297	CR/P'a-16	A' = TEMP; k_d not given; formn. of TEMPO monitored by esr; soln. cont. MeONa and CoCl ₂ , ¹ O ₂ * from autoxidation of adrenaline.	92D227
	MeOH	3.8 × 10 ⁸	4.8 × 10 ⁻⁴		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	88F440
	MeOH	3.0 × 10 ⁸			PL/A'd-8	S = 2-ACN; A' = DPBF; $\Delta H^\ddagger = -8$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -109$ J K ⁻¹ mol ⁻¹ ; studied at 250-328 K.	84E492
	MeOH	5 × 10 ⁷ (k_r)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_r A' = 1.6 \times 10^8$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r A' = 0.29$.	743113
	MeOH	6.7 × 10 ⁸	2.1 × 10 ⁻⁴		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	743113
	MeOH	1 × 10 ⁹	1 × 10 ⁻⁴	298	CP/Ac-15	S = MB; used $k_d = 1 \times 10^5$ s ⁻¹ .	72A019
	MeOH/H ₂ O (95:5)	2.6 × 10 ⁹		310	CR/LI-12	used $k_d = 1.8 \times 10^5$ s ⁻¹ ; soln. cont. 0.05 mol L ⁻¹ MeONa and 5 × 10 ⁻⁴ mol L ⁻¹ CoCl ₂ , ¹ O ₂ * from autoxidation of oxytetracycline.	92M228

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.53 1-Benzopyran-6-ol, 3,4-dihydro-2,5,7,8-tetramethyl-2-(4,8,12-trimethyltridecyl)- (α -Tocopherol) — Continued						
n-Octane	1×10^8			CP/A'c-23	S = A' = Rub; used $k_{A'} = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ ; k_d not given.	743112
4.54 1-Benzopyran-6-ol, 3,4-dihydro-2,5,7-trimethyl-2-(4,8,12-trimethyltridecyl)-						
EtOH	9.7×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; $^1O_2^*$ from MNPO ₂ .	91F285
4.55 1-Benzopyran-6-ol, 3,4-dihydro-2,5,8-trimethyl-2-(4,8,12-trimethyltridecyl)- (β -Tocopherol)						
<i>n</i> -C ₁₆ H ₃₄	2.3×10^7		298	MD/A'c-33	A' = Rub; used $k_d = 9 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88F415
CHCl ₃ /EtOH (50:50)	2.7×10^8 2.3×10^5 (k_r)		310	CR/LI,Ac- 12,31	used $k_d = 1 \times 10^5$ s ⁻¹ ; $^1O_2^*$ from NDPO ₂ .	90A184
EtOH	1.5×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; $^1O_2^*$ from MNPO ₂ .	91F285
MeOH	3.6×10^8	2.8×10^{-4}	298	CP/Ac-15	S = MB; used $k_d = 1 \times 10^5$ s ⁻¹ .	72A019
4.56 1-Benzopyran-6-ol, 3,4-dihydro-2,7,8-trimethyl-2-(4,8,12-trimethyltridecyl)- (γ -Tocopherol)						
<i>n</i> -C ₁₆ H ₃₄	1.1×10^7		298	MD/A'c-33	A' = Rub; used $k_d = 9 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88F415
CHCl ₃ /EtOH (50:50)	2.3×10^8 2.8×10^6 (k_r)		310	CR/LI,Ac- 12,31	used $k_d = 1 \times 10^5$ s ⁻¹ ; $^1O_2^*$ from NDPO ₂ .	90A184
EtOH	1.4×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; $^1O_2^*$ from MNPO ₂ .	91F285
EtOH	2.6×10^6 (k_r)		293	CP/P'a,Ac-17	S = MB; used $k_r^{A'} = 7.3 \times 10^4$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 36$; A' = Methyl linoleate; P' = Methyl linoleate hydroperoxide.	77F858
EtOH	1.8×10^8	4.5×10^{-4}	293	CP/P'a-22	S = MB; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; A' = Methyl linoleate; P' = Methyl linoleate hydroperoxide.	77F858
MeOH	1.9×10^8	5.4×10^{-4}	298	CP/Ac-15	S = MB; used $k_d = 1 \times 10^5$ s ⁻¹ .	72A019
4.57 1-Benzopyran-6-ol, 7-(1,1-dimethylethyl)-3,4-dihydro-2,2-dimethyl-						
MeOH	4.7×10^7 (k_r)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_r^{A'} = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ .	91F516
MeOH	1.9×10^8			CP/A'c-16	S = MB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	91F516
4.58 1-Benzopyran-6-ol, 7-(1,1-dimethylethyl)-3,4-dihydro-2-methyl-2-(4,8,12-trimethyltridecyl)-						
EtOH	1.2×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; $^1O_2^*$ from MNPO ₂ .	91F285
4.59 1-Benzopyran-6-ol, 8-(1,1-dimethylethyl)-3,4-dihydro-2-methyl-2-(4,8,12-trimethyltridecyl)-						
EtOH	1.6×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; $^1O_2^*$ from MNPO ₂ .	91F285
4.60 1-Benzopyran-4-one, 2-[3,4-bis(2-hydroxyethoxy)phenyl]-3-[6-O-(6-deoxy- α -mannopyranosyl- β -D-glucopyranosyl)oxy]-5-hydroxy-7-(2-hydroxyethoxy)- (Troloxetin)						
CD ₃ OD	7.0×10^4			CP/LI-12	S = RB; used $k_d = 3.7 \times 10^3$ s ⁻¹ .	93A326
MeOD	1.0×10^4 (k_r)			CP/Ac-14	S = RB; used $k_d = 1 \times 10^5$ s ⁻¹ ; MDH as actinometer.	93A326
4.61 1-Benzopyran-4-one, 3-[[6-O-(6-deoxy- α -mannopyranosyl)- β -glucopyranosyl]oxy]-2-(3,4-dihydroxyphenyl)-5,7-dihydroxy- (Rutin)						
CD ₃ OD	1.6×10^6			CP/LI-12	S = RB; used $k_d = 4.0 \times 10^3$ s ⁻¹ .	93A326
MeOD	1.1×10^5 (k_r)			CP/Ac-14	S = RB; used $k_d = 1 \times 10^5$ s ⁻¹ ; MDH as actinometer.	93A326
4.62 1-Benzopyran-4-one, 2-(2,3-dihydroxyphenyl)-2,3-dihydro-5,7-dihydroxy-, (Eriodictyol)						
CD ₃ OD	1.4×10^6			CP/LI-12	S = RB; used $k_d = 3.7 \times 10^3$ s ⁻¹ .	93A326

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.60 1-Benzopyran-4-one, 2-(3,4-dihydroxyphenyl)-5,7-dihydroxy- (Luteolin)							
	CD ₃ OD	1.3×10^6			CP/LI-12	S = RB; used $k_d = 3.7 \times 10^3$ s ⁻¹ .	93A326
	MeOD	1.8×10^4 (k_r)			CP/Ac-14	S = RB; used $k_d = 1 \times 10^5$ s ⁻¹ ; MDH as actinometer.	93A326
4.61 1-Benzopyran-4-one, 2-(3,4-dihydroxyphenyl)-3,5,7-trihydroxy- (Quercetin)							
	CH ₃ CN	9.3×10^3 (k_r)		295	CP/Ac, A'c-17	S = A' = An; used $k_r A' = 2.8 \times 10^5$ L mol ⁻¹ s ⁻¹ .	87A371
	CH ₃ COCH ₃	3.1×10^5		295	PL/Ld-2	S = An.	87A371
	CD ₃ OD	2.4×10^6			CP/LI-12	S = RB; used $k_d = 4.0 \times 10^3$ s ⁻¹ .	93A326
	MeOD	8.9×10^5 (k_r)			CP/Ac-14	S = RB; used $k_d = 1 \times 10^5$ s ⁻¹ ; MDH as actinometer.	93A326
4.62 1-Benzopyran-4-one, 5,6,7,8-tetramethoxy-2-(4-methoxyphenyl)- (Tangeretin)							
	CD ₃ OD	2.4×10^5			CP/LI-12	S = RB; used $k_d = 3.7 \times 10^3$ s ⁻¹ .	93A326
	MeOD	1.0×10^4 (k_r)			CP/Ac-14	S = RB; used $k_d = 1 \times 10^5$ s ⁻¹ ; MDH as actinometer.	93A326
4.63 1-Benzopyran-4-one, 2,3-dihydro-3,5,7-trihydroxy-2-(3,4-dihydroxyphenyl)- (Taxifolin)							
	CD ₃ OD	1.1×10^6			CP/LI-12	S = RB; used $k_d = 3.7 \times 10^3$ s ⁻¹ .	93A326
4.64 1-Benzopyran-4-one, 3,5,7-trihydroxy-2-(4-hydroxyphenyl)- (Kaempferol)							
	CD ₃ OD	7.1×10^5			CP/LI-12	S = RB; used $k_d = 3.7 \times 10^3$ s ⁻¹ .	93A326
	MeOD	4.8×10^5 (k_r)			CP/Ac-14	S = RB; used $k_d = 1 \times 10^5$ s ⁻¹ ; MDH as actinometer.	93A326
4.65 1-Benzopyran-4-one, 3,5,7-trihydroxy-2-phenyl- (Galangin)							
	CD ₃ OD	1.2×10^6			CP/LI-12	S = RB; used $k_d = 3.7 \times 10^3$ s ⁻¹ .	93A326
	MeOD	7.4×10^5 (k_r)			CP/Ac-14	S = RB; used $k_d = 1 \times 10^5$ s ⁻¹ ; MDH as actinometer.	93A326
4.66 Benzopyran-2-propanoic acid, 3,4-dihydro-6-hydroxy-2,5,7,8-tetramethyl-							
	EtOH	1.8×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285
4.67 1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro- (2R-trans)- (Catechin)							
	CD ₃ OD	5.8×10^6			CP/LI-12	S = RB; used $k_d = 3.7 \times 10^3$ s ⁻¹ .	93A326
4.68 Cinnamic acid, 3,4-dihydroxy-							
	CD ₃ OD	5.4×10^5		293	PL/Ld-2	S = HP.	88R236 90F411
4.69 Cinnamic acid, 2-hydroxy-							
	CD ₃ OD	2.1×10^4		293	PL/Ld-2	S = HP.	90F411
4.70 Cinnamic acid, 4-hydroxy-3-methoxy-							
	CD ₃ OD	3.5×10^5		293	PL/Ld-2	S = HP.	88R236 90F411
4.71 5-S-Cysteinylidopa							
	D ₂ O	2.9×10^7			PL/Ld-2	S = MB.	91R251
4.72 Flavanone, 4',5,7-trihydroxy- (Naringenin)							
	CD ₃ OD	5.0×10^4			CP/LI-12	S = RB; used $k_d = 3.7 \times 10^3$ s ⁻¹ .	93A326
4.73 Flavone, 5,7-dihydroxy- (Chrysin)							
	CD ₃ OD	2.4×10^5			CP/LI-12	S = RB; used $k_d = 3.7 \times 10^3$ s ⁻¹ .	93A326
	MeOD	6×10^3 (k_r)			CP/Ac-14	S = RB; used $k_d = 1 \times 10^5$ s ⁻¹ ; MDH as actinometer.	93A326

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

Fig.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.74 Flavone, 3-hydroxy-							
	C ₅ H ₅ N	7.5×10^7			PL/Ld-2	S = RB, TPP or H ₂ TPPS ⁴⁻ .	93U041 89A322
	C ₆ D ₆	1.6×10^4			PL/Ld-2	S = RB, TPP or H ₂ TPPS ⁴⁻ ; 95%-d.	93U041 89A322
	C ₆ H ₆	1.9×10^4			PL/Ld-2	S = RB, TPP or H ₂ TPPS ⁴⁻ .	93U041 89A322
	CCl ₄	1.7×10^4			PL/Ld-2	S = RB, TPP or H ₂ TPPS ⁴⁻ .	93U041 89A322
	CD ₃ CN	1.1×10^5			PL/Ld-2	S = RB, TPP or H ₂ TPPS ⁴⁻ .	93U041 89A322
	CD ₃ OD	9.0×10^4			PL/Ld-2	S = RB or H ₂ TPPS ⁴⁻ .	93U041 89A322
	CH ₃ CN	1.1×10^5			PL/Ld-2	S = RB or H ₂ TPPS ⁴⁻ .	93U041 89A322
	D ₂ O pD = 3	2.5×10^5			PL/Ld-2	S = RB or H ₂ TPPS ⁴⁻ .	93U041 89A322
	D ₂ O pD = 12	1.9×10^8			PL/Ld-2	S = RB or H ₂ TPPS ⁴⁻ .	93U041 89A322
	H ₂ O pH = 12	2.3×10^8			PL/Ld-2	S = RB or H ₂ TPPS ⁴⁻ .	93U041 89A322
	MeOH	2.3×10^5			PL/Ld-2	S = RB or H ₂ TPPS ⁴⁻ .	93U041 89A322
4.75 Flavone, 3,3',4',7-tetrahydroxy- (Fisetin)							
	CD ₃ OD	3.1×10^6			CP/LI-12	S = RB; used $k_d = 4.0 \times 10^3$ s ⁻¹ .	93A326
	MeOD	1.1×10^6 (k_r)			CP/Ac-14	S = RB; used $k_d = 1 \times 10^5$ s ⁻¹ ; MDH as actinometer.	93A326
4.76 Glycine, L-tyrosyl-							
	EtOH/ CH ₃ CN (80:20)	4.3×10^6			PL/Ld-2	S = ZnTPP.	91A252
	EtOH/ CH ₃ CN (80:20)	2.1×10^6 (k_r)			CP/Ac, A'c- 14,28	S = ZnTPP; A' = DMA; used $k_d = 5.3 \times 10^4$ s ⁻¹ ; used $k_A = 4.3 \times 10^6$ L mol ⁻¹ s ⁻¹ .	91A252
	EtOH/ CH ₃ CN (80:20)	1.2×10^8			PL/Ld-2	S = ZnTPP; 0.01 mol L ⁻¹ KOH.	91A252
	EtOH/ CH ₃ CN (80:20)	1×10^7 (k_r)			CP/Ac, A'c- 14,28	S = ZnTPP; A' = DMA; used $k_d = 5.3 \times 10^4$ s ⁻¹ ; used $k_A = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	91A252
	EtOH/ CH ₃ CN (80:20)	4.2×10^6			PL/Ld-2	S = ZnTPP; 0.01 mol L ⁻¹ HCl.	91A252
	EtOH/ CH ₃ CN (80:20)	$< 5 \times 10^4$ (k_r)			CP/Ac, A'c- 14,28	S = ZnTPP; A' = DMA; used $k_d = 5.3 \times 10^4$ s ⁻¹ ; used $k_A = 4.2 \times 10^6$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ HCl.	91A252
	H ₂ O pH = 10	3×10^7 (k_r)			CP/Oc-17	S = RB; A' = Met; used $k_r^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A252
	H ₂ O pH = 11.5	4.3×10^7 (k_r)			CP/Oc-17	S = Eos; A' = Met; used $k_r^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A252
4.77 1,6-Heptadiene-3,5-dione, 1,7-bis(4-hydroxy-3-methoxyphenyl)- (Curcumin)							
	C ₆ D ₆	2.5×10^5		295	CP/LI-12	S = TPP; used $k_d = 1.5 \times 10^3$ s ⁻¹ .	94E153
	CH ₃ CN	$< 7 \times 10^6$			CP/LI-12	S = RB; used $k_d = 1.7 \times 10^4$ s ⁻¹ .	94F069
4.78 Melanin (from DOPA)							
	D ₂ O pD = 7.5-8.1	1×10^8			PL/Ld-2	S = ?; rate per monomer unit.	87R227

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.78	Melanin (from DOPA) — Continued						
	D ₂ O pD = 7.6 ?	$\leq 2 \times 10^7$	$> 6.7 \times 10^{-3}$	296	CP/Oc-15	S = RB; used $k_d = 1.9 \times 10^4$ s ⁻¹ ; based on monomer unit of MW 150.	84F330
4.79	5,12-Naphthacenedione, 8-acetyl-10[(3-amino-2,3,6-trideoxy-hexopyranosyloxy)-tetrahydro-6,8,11-trihydroxy-1-methoxy- (Daunomycin)						
	D ₂ O pH = 7.4	$\sim 10^8$			PL/Ld-2	S = AlCl(tspc); cor. for aggregation of substrate.	89B024
	H ₂ O pH = 7.8	2×10^7 (k_r) 1×10^9 (k_q)		308	CR/Ac-31	used $k_d = 2.4 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ ; 15% dimer.	89M096
	H ₂ O (mic) pH = 7.8	1.7×10^9		308	CP/Ac-16	S = ?; A' = DPBF; used $k_d = 2.4 \times 10^5$ s ⁻¹ ; 15% dimer; 0.1 mol L ⁻¹ CTAB.	89M096
4.80	5,12-Naphthacenedione, 10-[(3-amino-2,3,6-trideoxy- α -L-lyxo-hexopyranosyloxy)-7,8,9,10-tetrahydro-6,8,11-trihydroxy-8-(hydroxyacetyl)-1-methoxy- (Adriamycin)						
	D ₂ O pH = 7.4	$\sim 10^8$			PL/Ld-2	S = AlCl(tspc); cor. for aggregation of substrate.	89B024
	H ₂ O pH = 7.8	2×10^7 (k_r) 9×10^8 (k_q)		308	CR/Ac-31	used $k_d = 2.4 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ ; 15% dimer.	89M096
	H ₂ O (mic) pH = 7.8	2.1×10^9		308	CP/Ac-16	S = ?; A' = DPBF; used $k_d = 2.4 \times 10^5$ s ⁻¹ ; 15% dimer; 0.1 mol L ⁻¹ CTAB.	89M096
4.81	12-Naphthaceneone, 8-acetyl-10[(3-amino-2,3,6-trideoxyhexopyranosyloxy)-tetrahydro-6,7,11-trihydroxy-5-imino-1-methoxy-						
	D ₂ O pH = 7.4	$\sim 10^7$			PL/Ld-2	S = AlCl(tspc).	89B024
	H ₂ O pH = 7.8	2×10^7 (k_r) 3×10^9 (k_q)		308	CR/Ac-31	used $k_d = 2.4 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ ; 15% dimer.	89M096
	H ₂ O (mic) pH = 7.8	3.5×10^9		308	CP/Ac-16	S = ?; A' = DPBF; used $k_d = 2.4 \times 10^5$ s ⁻¹ ; 15% dimer; 0.1 mol L ⁻¹ CTAB.	89M096
4.82	Naphthalene, 1,5-dihydroxy-						
	CD ₃ OD	6.1×10^6 1.6×10^6 (k_r)			CP/LI,Pa-12,28	S = RB; used $k_d = 4.4 \times 10^3$ s ⁻¹ ; P = 5-Hydroxy-1,4-naphthoquinone.	90F065
4.83	Naphthalene, 1,6-dihydroxy-						
	CD ₃ OD	3.2×10^6 1.2×10^6 (k_r)			CP/LI,Pa-12,28	S = RB; used $k_d = 4.4 \times 10^3$ s ⁻¹ ; P = 6-Hydroxy-1,4-naphthoquinone.	90F065
4.84	Naphthalene, 1,7-dihydroxy-						
	CD ₃ OD	3.6×10^6 6.8×10^5 (k_r)			CP/LI,Pa-12,28	S = RB; used $k_d = 4.4 \times 10^3$ s ⁻¹ ; P = 6-Hydroxy-1,4-naphthoquinone.	90F065
4.85	Naphthalene, 1,8-dihydroxy-						
	CD ₃ OD	5.3×10^7 3.0×10^7 (k_r)			CP/LI,Pa-12,28	S = RB; used $k_d = 4.4 \times 10^3$ s ⁻¹ ; P = 5-Hydroxy-1,4-naphthoquinone.	90F065
4.86	Naphthalene, 2,6-dihydroxy-						
	CD ₃ OD	1.9×10^6			CP/LI-12	S = RB; used $k_d = 4.4 \times 10^3$ s ⁻¹ .	90F065
4.87	Naphthalene, 2,7-dihydroxy-						
	CD ₃ OD	2.1×10^6			CP/LI-12	S = RB; used $k_d = 4.4 \times 10^3$ s ⁻¹ .	90F065
4.88	1-Naphthol						
	1-BuOH	7.6×10^6		293	PL/A'd-8	S = PP; A' = DPBF.	88F462
	1-BuOH	3.2×10^7		293	CP/A'c-23	S = MB; A' = Np; used $k_d = 5.2 \times 10^4$ s ⁻¹ , $k_{A'} = 5.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A266
	C ₆ H ₆	$\leq 5 \times 10^5$		293	PL/A'd-8	S = PP; A' = DPBF.	88F462 85A124

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

Subst.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.90	1-Naphthol						
	1-BuOH	3.2×10^7		293	PL/A'd-8	S = PP; A' = DPBF.	88F462
	1-BuOH	7.6×10^6		293	CP/A'c-23	S = MB; A' = Np; used $k_d = 5.2 \times 10^4$ s ⁻¹ , $k_{A'} = 5.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A266
	C ₆ H ₅ Cl	3.9×10^4		295	PL/Ld-2	S = Zn(pc).	87A371
	C ₆ H ₆	$\leq 1 \times 10^5$		293	PL/A'd-8	S = PP; A' = DPBF.	88F462 85A124
	C ₆ H ₆	1.8×10^4		295	PL/Ld-2	S = Zn(pc).	87A371
	CH ₃ CN	9.3×10^4		295	PL/Ld-2	S = Zn(pc).	87A371
	CH ₃ COCH ₃	4.0×10^4		295	PL/Ld-2	S = Zn(pc).	87A371
	CHCl ₃	7.1×10^4		295	PL/Ld-2	S = Zn(pc).	87A371
	2-PrOH	3.5×10^4		295	PL/Ld-2	S = Zn(pc).	87A371
4.91	1,4-Naphthoquinone, 5-hydroxy-						
	CD ₃ OD	1.8×10^7			CP/LI-12	S = RB; used $k_d = 4.4 \times 10^3$ s ⁻¹ .	90F065
4.92	1,4-Naphthoquinone, 6-hydroxy-						
	CD ₃ OD	5.9×10^6			CP/LI-12	S = RB; used $k_d = 4.4 \times 10^3$ s ⁻¹ .	90F065
4.93	Phenol						
	C ₆ H ₆ / MeOH (60:40)	$<10^4$			CP/A'c-23	S = A' = Rub; k_d and $k_{A'}$ not given.	88F650
	CD ₃ OD	2.5×10^4		293	PL/Ld-2	S = HP.	88R236 90F411
	D ₂ O	1.3×10^6			PL/Ld-2	S = HP or H ₂ TPPS ⁴⁻ ; calcd. from pH dependence (7-14) and pK _a .	90F411
	H ₂ O pH = 8.0 pH = 9.0 pH = 10.0	1×10^6 (k_r) 1.6×10^6 (k_r) 5.0×10^7 (k_r)			CP/Oc-17	S = RB; A' = Met; used $k_r^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	93E536
	H ₂ O	$\sim 3 \times 10^6$ (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a ; reported $k = (2.6 \pm 4.0) \times 10^6$ L mol ⁻¹ s ⁻¹ .	91F300
	H ₂ O	$<10^6$ (k_r)		292	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence (8-11.5) and pK _a = 9.9.	87A180
	H ₂ O pH = 8 pH = 9 pH = 10.3	2.0×10^7 6.1×10^7 2.7×10^8	0.026 8.2×10^{-3} 1.9×10^{-3}		CP/Ac-15	S = RB; used $k_d = 5 \times 10^5$ s ⁻¹ .	82A464
4.93	Phenol, 4-acetyl-						
	H ₂ O	1.5×10^6 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a .	91F300
4.94	Phenol, 4-acetyl-2,6-bis(1,1-dimethylethyl)-						
	1-BuOH	1.0×10^6		293	CP/A'c-23	S = MB; A' = Np; used $k_d = 5.2 \times 10^4$ s ⁻¹ , $k_{A'} = 5.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A266
4.95	Phenol, 4-amino-						
	D ₂ O pH = 7	1×10^8			PL/Ld-2	S = AlCl ₃ (tspc).	89R092
4.96	Phenol, 2-(benzotriazol-2-yl)-4,6-bis(1,1-dimethylpropyl)-						
	<i>i</i> -octane	$<1 \times 10^6$			CP/A'c-23	S = A' = Rub; No measurable effect.	732066

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.97	Phenol, 2-(benzotriazol-2-yl)-6-chloro-4-(1,1-dimethylethyl)-						
	CCl ₄ /CHCl ₃ (90:10)	1.0 × 10 ⁴			CP/A'c-23	S = A' = Rub; used $k_d = 1.4 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k/(k_{A'}[A'] + k_d) = 10.0$ L mol ⁻¹ s ⁻¹ at $[A'] = 5 \times 10^{-6}$ mol L ⁻¹ .	74F645
4.98	Phenol, 2-benzyl-						
	C ₆ H ₆ /MeOH (80:20)	1.4 × 10 ⁵			PL/Ld-2	S = PrPor.	93E536
	C ₆ H ₆	4.3 × 10 ⁴			PL/Ld-2	S = PrPor.	93E536
	EtOH	2.0 × 10 ⁵			PL/Ld-2	S = RB.	93E536
4.99	Phenol, 2,6-bis(1,1-dimethylethyl)-						
	1-BuOH	1.7 × 10 ⁶		293	CP/A'c-23	S = MB; A' = Np; used $k_d = 5.2 \times 10^4$ s ⁻¹ , $k_{A'} = 5.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A266
	C ₆ H ₆	2.0 × 10 ⁴ (k_T)			CP/Ac,A'c-17	S = HA; A' = BHT; used $k_T^{A'} = 1.2 \times 10^5$ L mol ⁻¹ s ⁻¹ .	89F350
	C ₆ H ₆	3.2 × 10 ⁴			CP/P'a-20	S = ZnTPP; A' = 2M2P; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.053$ mol L ⁻¹ ; Measured $(k[A] + k_d)/k_{A'} = 6.17 \times 10^{-2}$ mol L ⁻¹ at $[A] = 0.22$ mol L ⁻¹ .	78A171
	CD ₃ OD	2.6 × 10 ⁵		293	PL/Ld-2	S = HP.	88R236 90F411
	CH ₂ Cl ₂	7.5 × 10 ⁵			CP/A'c-33	S = A' = Rub; used $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; k_d not given.	84F199
	MeOH	3.0 × 10 ⁴ (k_T)			CP/Ac,A'c-17	S = HA; A' = BHT; used $k_T^{A'} = 2.2 \times 10^5$ L mol ⁻¹ s ⁻¹ .	89F350
	MeOH	1.0 × 10 ⁶	0.12		CP/A'c-16	S = MB; A' = DPF; used $k_d = 1.2 \times 10^5$ s ⁻¹ .	78A171
4.100	Phenol, 2,4-bis(1,1-dimethylethyl)-5-methoxy-						
	MeOH				CR/Pa,P'a-17	A' = TME; meas. $k_T/k_T^{A'} = 6.7 \times 10^{-3}$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	70F454
	MeOH				CP/Pa,P'a-17	S = RB; A' = TME; meas. $k_T/k_T^{A'} = 7.0 \times 10^{-3}$.	70F454
4.101	Phenol, 3,5-bis(1,1-dimethylethyl)-4-methoxy-						
	1-BuOH	2.6 × 10 ⁷		293	CP/Ac-15	S = MB; used $k_d = 5.2 \times 10^4$ s ⁻¹ .	78A266
	1-BuOH	2.7 × 10 ⁷		293	CP/A'c-23	S = MB; A' = Np; used $k_d = 5.2 \times 10^4$ s ⁻¹ , $k_{A'} = 5.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A266
4.102	Phenol, 2,6-bis(1,1-dimethylethyl)-4-methyl- (BHT)						
	1-BuOH	7.6 × 10 ⁶		293	CP/A'c-23	S = MB; A' = Np; used $k_d = 5.2 \times 10^4$ s ⁻¹ , $k_{A'} = 5.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A266
	C ₆ H ₆	1.3 × 10 ⁶ 4 × 10 ⁵ (k_T) 7.7 × 10 ⁵ (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
	C ₆ H ₆	6.6 × 10 ⁵			CP/P'a-20	S = ZnTPP; A' = 2M2P; used $k_{A'} = 7.5 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 0.88$.	78A171
	C ₆ H ₆	2.5 × 10 ⁶	0.016		CP/A'c-16	S = ZnTPP; A' = DPF; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	78A171
	C ₆ H ₆	1.2 × 10 ⁵ (k_T)			CP/Pa,P'a-17	S = ZnTPP; A' = 2M2P; used $k_T^{A'} = 7.5 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_T/k_T^{A'} = 0.16$.	78A171
	C ₆ H ₆	8.2 × 10 ⁵			CP/Pa-20	S = ZnTPP; A' = Car; used $k_{A'} = 1.2 \times 10^{10}$ L mol ⁻¹ s ⁻¹ ; Measured $(k_A/k_{A'}) = 1.46$.	78A171
	C ₆ H ₆	6.1 × 10 ⁵	0.06		CP/Pa-15	S = ZnTPP; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	78A171
	CCl ₄	3.7 × 10 ⁷			CL/LI-12	S = TPP; used $k_d = 1 \times 10^3$ s ⁻¹ .	85F667
	CCl ₄	9.8 × 10 ⁶ (k_T)			CP/Ac-17	S = A' = An; used $k_T^{A'} = 3.5 \times 10^5$ L mol ⁻¹ s ⁻¹ .	80F718
	CHCl ₃	6.5 × 10 ⁶			PL/Ld-2	S = MPDEE or PdMPDEE.	81A327

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.102	Phenol, 2,6-bis(1,1-dimethylethyl)-4-methyl- (BHT) — Continued						
	EtOH	3.4×10^6		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285
	MeOH	5.0×10^6	0.036		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	88F440
	MeOH	2.2×10^5 (k_t)			CP/Pa,P'a-17	S = MB; A' = 2M2P; used $k_t^{A'} = 6.3 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_t/k_t^{A'} = 0.36$.	78A171
	MeOH	5.6×10^6	0.021		CP/A'c-16	S = MB; A' = DPF; used $k_d = 1.2 \times 10^5$ s ⁻¹ .	78A171
	MeOH	4.2×10^6	0.03		CP/Pa-15	S = MB; used $k_d = 1.2 \times 10^5$ s ⁻¹ .	78A171
4.103	Phenol, 2,6-bis(1,1-dimethylethyl)-4-phenyl-						
	1-BuOH	3.9×10^6		293	CP/A'c-23	S = MB; A' = Np; used $k_d = 5.2 \times 10^4$ s ⁻¹ , $k_{A'} = 5.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A266
	MeOH	7.9×10^6	0.015		CP/A'c-16	S = MB; A' = DPF; used $k_d = 1.2 \times 10^5$ s ⁻¹ .	78A171
4.104	Phenol, 2,6-bis(1,1-dimethylethyl)-4-(phenylmethyl)-						
	MeOH	3.8×10^6	0.031		CP/A'c-16	S = MB; A' = DPF; used $k_d = 1.2 \times 10^5$ s ⁻¹ .	78A171
4.105	Phenol, 4-bromo-2,6-bis(1,1-dimethylethyl)-						
	1-BuOH	1.5×10^6		293	CP/A'c-23	S = MB; A' = Np; used $k_d = 5.2 \times 10^4$ s ⁻¹ , $k_{A'} = 5.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A266
	MeOH	8.4×10^5	0.14		CP/A'c-16	S = MB; A' = DPF; used $k_d = 1.2 \times 10^5$ s ⁻¹ .	78A171
4.106	Phenol, 2-chloro-						
	H ₂ O	-9×10^6 (k_t)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a ; reported $k = (9.2 \pm 9.4) \times 10^6$ L mol ⁻¹ s ⁻¹ .	91F300
4.107	Phenol, 3-chloro-						
	H ₂ O	5.4×10^6 (k_t)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a .	91F300
4.108	Phenol, 4-chloro-						
	H ₂ O	-6×10^6 (k_t)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a .	91F300
4.109	Phenol, 2-(5-chlorobenzotriazol-2-yl)-4,6-bis(1,1-dimethylethyl)-						
	C ₆ H ₅ Br	2.6×10^6		273	MD/A'c-33	A' = Rub; used $k_d = 1.3 \times 10^4$ s ⁻¹ , $k_{A'} = 4.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k/(k_d/[A'] + k_{A'}) = 2.0 \times 10^{-2}$ at $[A'] = 1.5 \times 10^{-4}$ mol L ⁻¹ .	737333
4.110	Phenol, 4-chloro-2,6-di(1,1-dimethylethyl)-						
	1-BuOH	3.2×10^6		293	CP/A'c-23	S = MB; A' = Np; used $k_d = 5.2 \times 10^4$ s ⁻¹ , $k_{A'} = 5.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A266
4.111	Phenol, 3-chloro-5-methoxy-						
	CH ₃ CN	1.2×10^7			PL/Ld-2	S = RB.	91A341
	H ₂ O	$<1 \times 10^3$ (k_t)		293	CP/Oc-17	S = Eos; A' = His; used $k_t^{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A341
	dioxane	5.3×10^5			PL/Ld-2	S = ZnTPP.	91A341
4.112	Phenol, 4-cyano-						
	H ₂ O	-2×10^5 (k_t)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a ; reported $k = (2.4 \pm 4.4) \times 10^5$ L mol ⁻¹ s ⁻¹ .	91F300
4.113	Phenol, 2,4-dichloro-						
	C ₆ H ₆ / MeOH (60:40)	$<10^4$			CP/A'c-23	S = A' = Rub.	88F650

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.113	Phenol, 2,4-dichloro- — Continued						
	H ₂ O	$\sim 5 \times 10^6$ (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a ; reported $k = (5.1 \pm 4.7) \times 10^6$ L mol ⁻¹ s ⁻¹ .	91F300
	H ₂ O	$< 5 \times 10^5$ (k_r)		292	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. over range of pH = 5.5 to 9.6; $pK_a = 7.8$.	87A180
4.114	Phenol, 2,6-dichloro- C ₆ H ₆ / MeOH (60:40)	$< 10^4$			CP/A'c-23	S = A' = Rub.	88F650
4.115	Phenol, 2,6-dimethoxy- H ₂ O	3.6×10^7 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
4.116	Phenol, 2,4-dimethyl- C ₆ H ₆	3.4×10^4 (k_r)			CP/Ac,A'c-17	S = HA; A' = BHT; used $k_r^{A'} = 1.2 \times 10^5$ L mol ⁻¹ s ⁻¹ .	89F350
	MeOH	5.0×10^4 (k_r)			CP/Ac,A'c-17	S = HA; A' = BHT; used $k_r^{A'} = 2.2 \times 10^5$ L mol ⁻¹ s ⁻¹ .	89F350
4.117	Phenol, 2,6-dimethyl- C ₆ H ₆	8×10^3 (k_r)			CP/Ac,A'c-17	S = HA; A' = BHT; used $k_r^{A'} = 1.2 \times 10^5$ L mol ⁻¹ s ⁻¹ .	89F350
	MeOH	1.0×10^4 (k_r)			CP/Ac,A'c-17	S = HA; A' = BHT; used $k_r^{A'} = 2.2 \times 10^5$ L mol ⁻¹ s ⁻¹ .	89F350
4.118	Phenol, 3,4-dimethyl- C ₆ H ₆	2.2×10^4 (k_r)			CP/Ac,A'c-17	S = HA; A' = BHT; used $k_r^{A'} = 1.2 \times 10^5$ L mol ⁻¹ s ⁻¹ .	89F350
	MeOH	3.9×10^4 (k_r)			CP/Ac,A'c-17	S = HA; A' = BHT; used $k_r^{A'} = 2.2 \times 10^5$ L mol ⁻¹ s ⁻¹ .	89F350
4.119	Phenol, 4-(1,1-dimethylethoxy)-2,6-bis(1,1-dimethylethyl)- 1-BuOH	2.4×10^7		293	CP/A'c-23	S = MB; A' = Np; used $k_d = 5.2 \times 10^4$ s ⁻¹ , $k_{A'} = 5.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A266
4.120	Phenol, 2-(1,1-dimethylethyl)- CD ₃ OD	2.6×10^5		293	PL/Ld-2	S = HP.	88R236 90F411
4.121	Phenol, 4-(1,1-dimethylethyl)- H ₂ O	$\sim 10^7$ (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a ; reported $k = (1.2 \pm 1.3) \times 10^7$ L mol ⁻¹ s ⁻¹ .	91F300
4.122	Phenol, 3-(1,1-dimethylethyl)-4-methoxy- CD ₃ OD	2.2×10^7		293	PL/Ld-2	S = HP.	88R236 90F411
4.123	Phenol, 2,4-dinitro- C ₆ H ₆	$< 1.4 \times 10^6$ (k_r)			CP/A'c-23	S = A' = Rub; used $k_d = \geq 3.3 \times 10^4$ s ⁻¹ , $k_{A'} = 3.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	87E142
4.124	Phenol, 2,5-dinitro- C ₆ H ₆	$< 1.6 \times 10^6$			CP/A'c-23	S = A' = Rub; used $k_d = \geq 3.3 \times 10^4$ s ⁻¹ , $k_{A'} = 3.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	87E142

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.125	Phenol, 2,6-dinitro- C ₆ H ₆	<2.0 × 10 ⁶			CP/A'c-23	S = A' = Rub; used $k_d = \geq 3.3 \times 10^4$ s ⁻¹ , $k_{A'} = 3.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	87E142
4.126	Phenol, 4-ethoxy-2,3,5,6-tetramethyl- MeOH	7.3 × 10 ⁷	1.6 × 10 ⁻³		CP/A'c-16	S = MB; A' = DPF; used $k_d = 1.2 \times 10^5$ s ⁻¹ .	78A171
4.127	Phenol, 4-[(1-hydroxy-2,2-dimethyl)propyl]-2-methoxy- CH ₃ CH(OCH ₃) ₂	8.5 × 10 ⁵	0.037		MP/Pa-15	S = 4-HOC ₆ H ₃ (3-OCH ₃)COCH ₃ ; used $k_d = 3.1 \times 10^4$ s ⁻¹ .	84F194
	CH ₃ CH(OCH ₃) ₂	1.1 × 10 ⁸			CP/Ac-32	S = 4-CH ₃ OC ₆ H ₄ COC ₂ H ₅ ; Q = Car; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $k_Q = 1.3 \times 10^{10}$ L mol ⁻¹ s ⁻¹ .	84F194
	CH ₃ CH(OCH ₃) ₂	1.2 × 10 ⁶	0.025		MP/Ac-15	S = 4-HOC ₆ H ₃ (3-OCH ₃)COCH ₃ ; used $k_d = 3.1 \times 10^4$ s ⁻¹ .	84F194
	CH ₃ CH(OCH ₃) ₂	3.4 × 10 ⁵	0.16		MP/Ac-16	S = 4-HOC ₆ H ₃ (3-OCH ₃)COCH ₃ ; A' = DABCO; used $k_d = 3.1 \times 10^4$ s ⁻¹ ; unexplained discrepancy in these data.	84F194
4.128	Phenol, 2-(2-hydroxyphenyl)-(2,2'-Dihydroxybiphenyl) D ₂ O pD = 8.5	2.7 × 10 ⁷			PL/Ld-2	S = RB.	93E536
	EtOH	7.5 × 10 ⁶			PL/Ld-2	S = RB.	93E536
4.129	Phenol, 2-methoxy- H ₂ O	-6 × 10 ⁶ (k_r)		300	MP/Ac, A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a ; reported $k = (0.6 \pm 1.8) \times 10^7$ L mol ⁻¹ s ⁻¹ .	91F300
4.130	Phenol, 3-methoxy- H ₂ O	-1 × 10 ⁷ (k_r)		300	MP/Ac, A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a ; reported $k = (1.3 \pm 1.0) \times 10^7$ L mol ⁻¹ s ⁻¹ .	91F300
4.131	Phenol, 4-methoxy- CD ₃ OD	5.8 × 10 ⁶		293	PL/Ld-2	S = HP.	88R236 90F411
	H ₂ O	-2 × 10 ⁷ (k_r)		300	MP/Ac, A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a ; reported $k = (2.2 \pm 2.2) \times 10^7$ L mol ⁻¹ s ⁻¹ .	91F300
4.132	Phenol, 4-methoxy-2,6-dimethyl- EtOH	2.5 × 10 ⁷		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285
4.133	Phenol, 4-methoxy-2,3,5,6-tetramethyl- EtOH	1.4 × 10 ⁷		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285
4.134	Phenol, 4-methoxy-2,3,6-trimethyl- EtOH	6.8 × 10 ⁷		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285
4.135	Phenol, 4-methyl- D ₂ O/EtOH (75:25)	2.4 × 10 ⁷		295	PL/Ld-2	S = RB.	94A113
	H ₂ O	1 × 10 ⁷ (k_r)		300	MP/Ac, A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a .	91F300
	H ₂ O	<5 × 10 ⁶ (k_r)		292	MP/Ac, A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. over the range pH = 8.3 to 11.5; pK _a = 10.2.	87A180

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.136	Phenol, 2,2'-methylenebis(6- <i>tert</i> -butyl-4-methyl- MeOH	2.6×10^7	7.0×10^{-3}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	88F440
4.137	Phenol, 2-nitro- H ₂ O	-1×10^6 (k_r)		300	MP/Ac, A'c-17	S = RB; A' = FFA; used $k_r A' = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a ; reported $k = (1.3 \pm 1.1) \times 10^6$ L mol ⁻¹ s ⁻¹ .	91F300
4.138	Phenol, 3-nitro- H ₂ O	-3×10^6 (k_r)		300	MP/Ac, A'c-17	S = RB; A' = FFA; used $k_r A' = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a ; reported $k = (2.7 \pm 1.8) \times 10^6$ L mol ⁻¹ s ⁻¹ .	91F300
4.139	Phenol, 4-nitro- H ₂ O	-3×10^5 (k_r)		300	MP/Ac, A'c-17	S = RB; A' = FFA; used $k_r A' = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a ; reported $k = (2.6 \pm 2.3) \times 10^5$ L mol ⁻¹ s ⁻¹ .	91F300
4.140	Phenol, pentachloro- H ₂ O	-2×10^5 (k_r)		300	MP/Ac, A'c-17	S = RB; A' = FFA; used $k_r A' = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a ; reported $k = (0.2 \pm 5.5) \times 10^6$ L mol ⁻¹ s ⁻¹ .	91F300
4.141	Phenol, 2-phenyl- (2-Hydroxybiphenyl) C ₆ H ₆ / MeOH (60:40)	7.3×10^4			PL/Ld-2	S = PrPor.	93E536
	C ₆ H ₆	2.3×10^4			PL/Ld-2	S = PrPor.	93E536
4.142	Phenol, 3-(phenylamino)- CH ₃ CN/ H ₂ O (96:4)	3.0×10^7	1.1×10^{-3}		CP/Pa-14	S = MB; used $k_d = 3.3 \times 10^4$ s ⁻¹ .	80F427
4.143	Phenol, 2,3,5,6-tetrafluoro- CD ₃ OD	3.0×10^4		293	PL/Ld-2	S = HP.	88R236 90F411
4.144	Phenol, 4-(1,1,3,3-tetramethylbutyl)-, salicylate <i>i</i> -octane	$<1 \times 10^6$			CP/A'c-23	S = A' = Rub; No measurable effect.	732066
4.145	Phenol, 2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)- <i>i</i> -octane	$<1.0 \times 10^6$			CP/A'c-23	S = A' = Rub; No measurable effect.	732066
4.146	Phenol, 2,4,6-trichloro- C ₆ H ₆ / MeOH (60:40)	$<10^4$			CP/A'c-16	S = A' = Rub.	88F650
	H ₂ O	2×10^7 (k_r)		300	MP/Ac, A'c-17	S = RB; A' = FFA; used $k_r A' = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a .	91F300
	H ₂ O	$<5 \times 10^5$ (k_r)		292	MP/Ac, A'c-17	S = RB; A' = FFA; used $k_r A' = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. over the range pH = 4.2 to 9.0; pK _a = 6.1.	87A180
4.147	Phenol, 2,4,6-tri(1,1-dimethylethyl)- 1-BuOH	3.7×10^6		293	CP/A'c-23	S = MB; A' = Np; used $k_d = 5.2 \times 10^4$ s ⁻¹ , $k_A = 5.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A266
	<i>c</i> -C ₆ H ₁₂	5.8×10^5			PL/A'd-8	S = 2-ACN; A' = DPBF; $\Delta H^\ddagger = -0.8$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -147$ J K ⁻¹ mol ⁻¹ ; studied at 278-357 K.	84E492
	C ₆ H ₅ CH ₃	1.4×10^6			PL/A'd-8	S = 2-ACN; A' = DPBF.	84E492
	C ₆ H ₆	2.6×10^5			CP/P'a-19	S = ZnTPP; A' = 2M2P; used $k_A = 7.5 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 0.34$.	78A171

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.147	Phenol, 2,4,6-tri(1,1-dimethylethyl)- — Continued						
	C ₆ H ₆	1.4×10^6	0.030		CP/A'c-16	S = ZnTPP; A' = DPF; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	78A171
	CH ₃ CN	2.5×10^6			PL/A'd-8	S = 2-ACN; A' = DPBF.	84E492
	CH ₃ COCH ₃	2.4×10^6			PL/A'd-8	S = 2-ACN; A' = DPBF.	84E492
	MeOH	2.8×10^6			PL/A'd-8	S = 2-ACN; A' = DPBF; $\Delta H^\ddagger = -3.4$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -135$ J K ⁻¹ mol ⁻¹ ; studied at 250-328 K.	84E492
	MeOH	3.4×10^6	0.034		CP/A'c-16	S = MB; A' = DPF; used $k_d = 1.2 \times 10^5$ s ⁻¹ .	78A171
	MeOH	6.3×10^4 (k_r)			CP/Pa,P'a-17	S = RB; A' = BHT; used $k_r^{A'} = 2.2 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.29$.	78A171
4.148	Phenol, 2,4,6-trimethyl-						
	EtOH	3.8×10^6		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285
4.149	Phenol, 2,4,6-triphenyl-						
	C ₆ H ₆	2.2×10^7	1.9×10^{-3}		CP/A'c-16	S = ZnTPP; A' = DPF; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	78A171
	CH ₃ CN	1.5×10^7	2.3×10^{-3}		CP/A'c-16	S = MB; A' = DPF; used $k_d = 3.3 \times 10^4$ s ⁻¹ .	78A171
	MeOH	2.5×10^8	4.6×10^{-4}		CP/A'c-16	S = MB; A' = DPF; used $k_d = 1.2 \times 10^5$ s ⁻¹ .	78A171
4.150	Phenoxide ion						
	C ₆ H ₆ / MeOH (60:40)	7.0×10^7			CP/A'c-23	S = A' = Rub; k_d and $k_{A'}$ not given; 6×10^{-3} mol L ⁻¹ KOH.	88F650
	D ₂ O	2.8×10^8			PL/Ld-2	S = HP or H ₂ TPPS ⁴⁻ ; calcd. from pH dependence (7-14) and pK_a .	90F411
	H ₂ O	1.6×10^8 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
	H ₂ O	1.8×10^8 (k_r)		292	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. over the range pH = 8.0 to 11.5.	87A180
4.151	Phenoxide ion, 4-acetyl-						
	H ₂ O	2.4×10^7 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
4.152	Phenoxide ion, 2-benzyl-						
	EtOH	1.6×10^8			PL/Ld-2	S = RB; 7.5×10^{-3} mol L ⁻¹ KOH.	93E536
	H ₂ O pH = 11	4.4×10^7 (k_r)			CP/Oc-17	S = RB; A' = Met; used $k_r^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	93E536
4.153	Phenoxide ion, 4-bromo-						
	C ₆ H ₅ COCH ₃ / MeOH (50:50)	6×10^7		295	CP/A'c-23	S = A' = Rub; used $k_d = 3 \times 10^4$ s ⁻¹ ; $k_{A'}$ not given; 0.01 mol L ⁻¹ KOH.	93F328
	C ₆ H ₆ / MeOH (80:20)	1.5×10^7 (k_r)		295	CP/Ac,A'c-17	S = Rub; A' = DMA; used $k_r^{A'} = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	93F328
	C ₆ H ₆ / MeOH (80:20)	1.5×10^7		295	CP/A'c-23	S = A' = Rub; used $k_d = 3.8 \times 10^4$ s ⁻¹ ; $k_{A'}$ not given; 0.01 mol L ⁻¹ KOH.	93F328
	CH ₃ CN/MeOH	6×10^7			CP/A'c-16	S = A' = Rub; used $k_d = 3 \times 10^5$ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	94F095
	H ₂ O pH = 11	1.1×10^9			CP/Ac-14	S = Eos; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	94F095
	H ₂ O pH = 11	1.5×10^8 (k_r)			CP/Ac,A'c-17	S = RB; A' = His; used $k_r^{A'} = 8.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	94F095
	H ₂ O pH = 11	1.5×10^8 (k_r)		295	CP/Oc-17	S = Eos; A' = Met; used $k_r^{A'} = 2.0 \times 10^7$ L mol ⁻¹ s ⁻¹ .	93F328
	H ₂ O pH = 11	1.1×10^9		295	CP/Oc-15	S = Eos; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	93F328

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.153 Phenoxide ion, 4-bromo- — Continued							
	MeOH/ C ₆ H ₆ (60:40)	1.6×10^7 (k_r)			CP/Ac,A'c-17	S = RB; A' = DMA; used $k_r^{A'} = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	94F095
	MeOH/ C ₆ H ₆ (60:40)	1.5×10^7			CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	94F095
4.154 Phenoxide ion, 4-bromo-2,6-dimethyl-							
	CH ₃ CN/MeOH	2.1×10^8			CP/A'c-16	S = A' = Rub; used $k_d = 3 \times 10^5$ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	94F095
	H ₂ O pH = 11	2.6×10^9			CP/Ac-14	S = Eos; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	94F095
	H ₂ O pH = 11	3.9×10^8 (k_r)			CP/Ac,A'c-17	S = RB; A' = His; used $k_r^{A'} = 8.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	94F095
	MeOH/ C ₆ H ₆ (60:40)	8×10^7			CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	94F095
	MeOH/ C ₆ H ₆ (60:40)	5×10^7 (k_r)			CP/Ac,A'c-17	S = RB; A' = DMA; used $k_r^{A'} = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	94F095
4.155 Phenoxide ion, 2-chloro-							
	H ₂ O	1.9×10^8 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
	H ₂ O pH = 11.5	1.7×10^7 (k_r)			CP/Oc-17	S = RB; A' = His; used $k_r^{A'} = 8.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F518
	H ₂ O pH = 11.5	2.3×10^8			CP/Ac,Oc-14	S = Eos; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	90F518
	MeOH	5.0×10^7			CP/A'c-23	S = A' = Rub; used $k_d = 1.4 \times 10^5$ s ⁻¹ , $k_{A'} = 5 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	90F518
4.156 Phenoxide ion, 3-chloro-							
	H ₂ O	1.6×10^8 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
	H ₂ O pH = 11.5	1.5×10^7 (k_r)			CP/Oc-17	S = RB; A' = His; used $k_r^{A'} = 8.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F518
	H ₂ O pH = 11.5	1.1×10^9			CP/Ac,Oc-14	S = Eos; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	90F518
	MeOH	1.5×10^7			CP/A'c-23	S = A' = Rub; used $k_d = 1.4 \times 10^5$ s ⁻¹ , $k_{A'} = 5 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	90F518
4.157 Phenoxide ion, 4-chloro-							
	C ₆ H ₅ COCH ₃ / MeOH (50:50)	6×10^7		295	CP/A'c-23	S = A' = Rub; used $k_d = 3 \times 10^4$ s ⁻¹ ; $k_{A'}$ not given; 0.01 mol L ⁻¹ KOH.	93F328
	C ₆ H ₆ / MeOH (80:20)	3×10^7		295	CP/A'c-23	S = A' = Rub; used $k_d = 3.8 \times 10^4$ s ⁻¹ ; $k_{A'}$ not given; 0.01 mol L ⁻¹ KOH.	93F328
	C ₆ H ₆ / MeOH (80:20)	3×10^7 (k_r)		295	CP/Ac,A'c-17	S = Rub; A' = DMA; used $k_r^{A'} = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	93F328
	H ₂ O pH = 11	8.0×10^8		295	CP/Oc-15	S = Eos; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	93F328
	H ₂ O pH = 11	1.0×10^8 (k_r)		295	CP/Oc-17	S = Eos; A' = Met; used $k_r^{A'} = 2.0 \times 10^7$ L mol ⁻¹ s ⁻¹ .	93F328
	H ₂ O	1.9×10^8 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
	H ₂ O pH = 11.5	3.1×10^7 (k_r)			CP/Oc-17	S = RB; A' = His; used $k_r^{A'} = 8.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F518
	H ₂ O pH = 11.5	4×10^8			CP/Ac,Oc-14	S = Eos; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	90F518

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k_t) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.157	Phenoxide ion, 4-chloro- — Continued						
	MeOH	3.3×10^7			CP/A'c-23	S = A' = Rub; used $k_d = 1.4 \times 10^5$ s ⁻¹ , $k_A = 5 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	90F518
4.158	Phenoxide ion, 4-cyano-						
	H ₂ O	6.2×10^6 (k_t)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
4.159	Phenoxide ion, 2,4-dichloro-						
	C ₆ H ₆ / MeOH (60:40)	5.7×10^7			CP/A'c-23	S = A' = Rub; k_d and k_A not given; 6×10^{-3} mol L ⁻¹ KOH;	88F650
	C ₆ H ₆ / MeOH (60:40)	4.5×10^6 (k_t)			CP/Ac,A'c-17	S = Eos; A' = DMA; used $k_t^{A'} = 4.8 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_d/k_t = 11.5$; 6×10^{-3} mol L ⁻¹ KOH.	88F650
	H ₂ O	1.7×10^8 (k_t)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
	H ₂ O	1.2×10^8 (k_t)		292	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. over the range pH = 5.5 to 9.6.	87A180
	H ₂ O pH = 10	3.1×10^9			CP/Ac-14	S = RB; used $k_d = 5 \times 10^5$ s ⁻¹ .	87F537
	H ₂ O pH = 10	2.1×10^9			CP/Ac,Oc-14	S = Eos; used $k_d = 5 \times 10^5$ s ⁻¹ .	87F537
	H ₂ O pH = 10	1.1×10^8 (k_t) 2.0×10^9 (k_d)			CP/Oc-17	S = Eos; A' = Met; used $k_t^{A'} = 5 \times 10^6$ L mol ⁻¹ s ⁻¹ ; used $k_A = 2.1 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87F537
4.160	Phenoxide ion, 2,6-dichloro-						
	C ₆ H ₆ / MeOH (60:40)	3.7×10^6 (k_t)			CP/Ac,A'c-17	S = Eos; A' = DMA; used $k_t^{A'} = 4.8 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_d/k_t = 14.5$; 6×10^{-3} mol L ⁻¹ KOH.	88F650
	C ₆ H ₆ / MeOH (60:40)	5.4×10^7			CP/A'c-23	S = A' = Rub; k_d and k_A not given; 6×10^{-3} mol L ⁻¹ KOH.	88F650
	H ₂ O pH = 10	1×10^9			CP/Ac-14	S = Eos; used $k_d = 5 \times 10^5$ s ⁻¹ .	87F537
	H ₂ O pH = 10	2×10^9			CP/Ac-14	S = RB; used $k_d = 5 \times 10^5$ s ⁻¹ .	87F537
	H ₂ O pH = 10	1.5×10^9			CP/Oc-14	S = Eos; used $k_d = 5 \times 10^5$ s ⁻¹ .	87F537
	H ₂ O pH = 10	5.7×10^7 (k_t) 1.4×10^9 (k_d)			CP/Oc-17	S = Eos; A' = Met; used $k_t^{A'} = 5 \times 10^6$ L mol ⁻¹ s ⁻¹ ; used $k_A = 1.5 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87F537
4.161	Phenoxide ion, 2,6-dimethoxy-						
	H ₂ O	8.6×10^8 (k_t)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
4.162	Phenoxide ion, 2,6-dimethyl-						
	CH ₃ CN/MeOH	2×10^8			CP/A'c-16	S = A' = Rub; used $k_d = 3 \times 10^5$ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	94F095
	H ₂ O pH = 11	2.8×10^9			CP/Ac-14	S = Eos; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	94F095
	H ₂ O pH = 11	2.0×10^8 (k_t)			CP/Ac,A'c-17	S = RB; A' = His; used $k_t^{A'} = 8.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	94F095
	MeOH/ C ₆ H ₆ (60:40)	3×10^7			CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	94F095
	MeOH/ C ₆ H ₆ (60:40)	1.2×10^7 (k_t)			CP/Ac,A'c-17	S = RB; A' = DMA; used $k_t^{A'} = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	94F095

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.163	Phenoxide ion, 4-(1,1-dimethylethyl)-						
	H ₂ O	3.6×10^8 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
4.164	Phenoxide ion, 2,4-dinitro-						
	H ₂ O	4×10^5 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; pK_a of 2,4-dinitrophenol = 4.07.	91F300
4.165	Phenoxide ion, 4-fluoro-						
	C ₆ H ₆ / MeOH (80:20)	2.0×10^8		295	CP/A'c-23	S = A' = Rub; used $k_d = 3.8 \times 10^4$ s ⁻¹ ; $k_{A'}$ not given; 0.01 mol L ⁻¹ KOH.	93F328
	C ₆ H ₆ / MeOH (80:20)	5.7×10^7 (k_r)		295	CP/Ac,A'c-17	S = Rub; A' = DMA; used $k_r^{A'} = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	93F328
	H ₂ O pH = 11	2.5×10^9		295	CP/Oc-15	S = Eos; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	93F328
	H ₂ O pH = 11	3.5×10^8 (k_r)		295	CP/Oc-17	S = Eos; A' = Met; used $k_r^{A'} = 2.0 \times 10^7$ L mol ⁻¹ s ⁻¹ .	93F328
4.166	Phenoxide ion, 2-(2-hydroxyphenyl)- (2,2'-Dihydroxybiphenyl, conjugate base)						
	D ₂ O pD = 11.8	1.2×10^8			PL/Ld-2	S = RB.	93E536
	EtOH	7×10^6 (k_r)			CP/Oc,A'c-17	S = RB; A' = DMA; used $k_r^{A'} = 4.4 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 7.5×10^{-3} mol L ⁻¹ KOH.	93E536
	EtOH	1.1×10^8			PL/Ld-2	S = RB; 7.5×10^{-3} mol L ⁻¹ KOH.	93E536
	EtOH	9.4×10^7			PL/Ld-2	S = RB; 7.5×10^{-3} mol L ⁻¹ KOH.	93E536
	H ₂ O pH = 11	2.2×10^7 (k_r)			CP/Oc-17	S = RB; A' = Met; used $k_r^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	93E536
4.167	Phenoxide ion, 5-hydroxy-2-phenyl- (2,5-Dihydroxybiphenyl, conjugate base)						
	EtOH	9.9×10^7			PL/Ld-2	S = RB; 7.5×10^{-3} mol L ⁻¹ KOH.	93E536
4.168	Phenoxide ion, 4-iodo-						
	C ₆ H ₆ / MeOH (80:20)	1.4×10^7		295	CP/A'c-23	S = A' = Rub; used $k_d = 3.8 \times 10^4$ s ⁻¹ ; $k_{A'}$ not given; 0.01 mol L ⁻¹ KOH.	93F328
	C ₆ H ₆ / MeOH (80:20)	1.0×10^7 (k_r)		295	CP/Ac,A'c-17	S = Rub; A' = DMA; used $k_r^{A'} = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	93F328
	H ₂ O pH = 11	8×10^7 (k_r)		295	CP/Oc-17	S = Eos; A' = Met; used $k_r^{A'} = 2.0 \times 10^7$ L mol ⁻¹ s ⁻¹ .	93F328
	H ₂ O pH = 11	1.0×10^9		295	CP/Oc-15	S = Eos; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	93F328
4.169	Phenoxide ion, 2-methoxy-						
	H ₂ O	4.4×10^8 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
4.170	Phenoxide ion, 3-methoxy-						
	H ₂ O	2.9×10^8 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
4.171	Phenoxide ion, 4-methoxy-						
	H ₂ O	6.7×10^8 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
4.172	Phenoxide ion, 4-methyl-						
	H ₂ O	3.5×10^8 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
	H ₂ O	3.7×10^8 (k_r)		292	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. over the range pH = 8.3 to 11.5.	87A180

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.173	Phenoxide ion, 2-methyl-4,6-dinitro-						
	H ₂ O	1.3×10^5 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; pK_a of 2-methyl-4,6-dinitrophenol = 4.7.	91F300
4.174	Phenoxide ion, 4-methyl-2,6-dinitro-						
	H ₂ O	1.4×10^7 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; pK_a of 4-methyl-2,6-dinitrophenol = 4.23.	91F300
4.175	Phenoxide ion, 4-methyl-2-nitro-						
	CH ₃ CN/ H ₂ O (90:10)	6×10^7 (k_r)			CP/Ac,A'c-17	S = RB; A' = 9-Anthracenemethanol; $k_r^{A'}$ not given; 0.01 mol L ⁻¹ KOH.	92N330
	CH ₃ CN/ H ₂ O (90:10)	3.4×10^8			PL/Ld-2	S = RB; 0.01 mol L ⁻¹ KOH.	92N330
	C ₆ H ₆ / MeOH (60:40)	2.9×10^7 (k_r)			CP/Ac,A'c-17	S = RB; A' = DMA; $k_r^{A'}$ not given; 0.01 mol L ⁻¹ KOH.	92N330
	C ₆ H ₆ / MeOH (60:40)	4.5×10^7			PL/Ld-2	S = RB; 0.01 mol L ⁻¹ KOH.	92N330
	H ₂ O pH = 10	2.8×10^7 (k_r)			CP/Oc-17	S = RB; A' = His; used $k_r^{A'} = 8.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F518 94F095
	H ₂ O pH = 10	4.3×10^9			CP/Ac,Oc-14	S = Eos; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	90F518 94F095
	MeOH/ C ₆ H ₆ (60:40)	2.9×10^7 (k_r)			CP/Ac,A'c-17	S = RB; A' = DMA; used $k_r^{A'} = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	94F095
	MeOH/ C ₆ H ₆ (60:40)	4.5×10^7			CP/A'c-23	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 5 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH; cor. for quenching of singlet rubrene by A.	90F518 94F095
4.176	Phenoxide ion, 2-nitro-						
	CH ₃ CN/ H ₂ O (90:10)	3.3×10^7			PL/Ld-2	S = RB; 0.01 mol L ⁻¹ KOH.	92N330
	CH ₃ CN/ H ₂ O (90:10)	5.8×10^6 (k_r)			CP/Ac,A'c-17	S = RB; A' = 9-Anthracenemethanol; $k_r^{A'}$ not given; 0.01 mol L ⁻¹ KOH.	92N330
	C ₆ H ₆ / MeOH (60:40)	3.2×10^6 (k_r)			CP/Ac,A'c-17	S = RB; A' = DMA; $k_r^{A'}$ not given; 0.01 mol L ⁻¹ KOH.	92N330
	C ₆ H ₆ / MeOH (60:40)	3.1×10^6			PL/Ld-2	S = RB; 0.01 mol L ⁻¹ KOH.	92N330
	H ₂ O	3.4×10^7 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
	H ₂ O pH = 10	1.5×10^9			CP/Ac,Oc-14	S = Eos; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	90F518 94F095
	H ₂ O pH = 10	1.6×10^7 (k_r)			CP/Oc-17	S = RB; A' = His; used $k_r^{A'} = 8.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F518 94F095
	MeOH/ C ₆ H ₆ (60:40)	3×10^6 (k_r)			CP/Ac,A'c-17	S = RB; A' = DMA; used $k_r^{A'} = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	94F095
	MeOH/ C ₆ H ₆ (60:40)	3.0×10^6			CP/A'c-23	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 5 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH; cor. for quenching of singlet rubrene by A.	90F518
4.177	Phenoxide ion, 3-nitro-						
	H ₂ O	6.1×10^7 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
	H ₂ O pH = 10	1.0×10^7 (k_r)			CP/Oc-17	S = RB; A' = His; used $k_r^{A'} = 8.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F518
	H ₂ O pH = 10	2.0×10^9			CP/Ac,Oc-14	S = Eos; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	90F518

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k_t) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.177 Phenoxide ion, 3-nitro- — Continued							
	MeOH/ C ₆ H ₆ (60:40)	9.0×10^6			CP/A'c-23	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 5 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH; cor. for quenching of singlet rubrene by A.	90F518
4.178 Phenoxide ion, 4-nitro-							
	H ₂ O	5.1×10^6 (k_t)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a .	91F300
	H ₂ O pH = 10	6×10^8			CP/Ac,Oc-14	S = Eos; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	90F518
	H ₂ O pH = 10	3×10^6 (k_t)			CP/Oc-17	S = RB; A' = His; used $k_t^{A'} = 8.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F518
	H ₂ O pH = 8.8	3×10^6 (k_t)		292	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; pK _a of 2-nitrophenol = 7.2.	87A180
	MeOH/ C ₆ H ₆ (60:40)	<10 ³			CP/A'c-23	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 5 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH; cor. for quenching of singlet rubrene by A.	90F518
4.179 Phenoxide ion, pentachloro-							
	H ₂ O	9.4×10^7 (k_t)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK _a .	91F300
4.180 Phenoxide ion, 2-phenyl- (2-Hydroxybiphenyl, conjugate base)							
	D ₂ O pD = 9.0	2×10^7			PL/Ld-2	S = RB.	93E536
	pD = 10.0	3.8×10^7					
	pD = 11.8	2.3×10^8					
	EtOH	2.2×10^8			PL/Ld-2	S = RB; 7.5×10^{-3} mol L ⁻¹ KOH.	93E536
	EtOH	4.3×10^7 (k_t)			CP/Oc,A'c-17	S = RB; A' = DMA; used $k_t^{A'} = 4.4 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 7.5×10^{-3} mol L ⁻¹ KOH.	93E536
	H ₂ O pH = 8.0	3.2×10^5 (k_t)			CP/Oc-17	S = RB; A' = Met; used $k_t^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	93E536
	pH = 9.0	3.2×10^6 (k_t)					
	pH = 10.0	5.9×10^6 (k_t)					
	pH = 11	4.4×10^7 (k_t)					
4.181 Phenoxide ion, 4-phenyl- (4-Hydroxybiphenyl, conjugate base)							
	C ₆ H ₆ / MeOH (80:20)	1×10^7 (k_t)		295	CP/Ac,A'c-17	S = Rub; A' = DMA; used $k_t^{A'} = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	93F328
	C ₆ H ₆ / MeOH (80:20)	4×10^7		295	CP/A'c-23	S = A' = Rub; used $k_d = 3.8 \times 10^4$ s ⁻¹ ; $k_{A'}$ not given; 0.01 mol L ⁻¹ KOH.	93F328
	D ₂ O pD = 11.8	7.8×10^7			PL/Ld-2	S = RB.	93E536
	D ₂ O pD = 11.8	8×10^7		295	CP/Oc-15	S = Eos; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	93F328
	EtOH	1.3×10^8			PL/Ld-2	S = RB; 7.5×10^{-3} mol L ⁻¹ KOH.	93E536
	H ₂ O pH = 11	3.8×10^7 (k_t)			CP/Oc-17	S = RB; A' = Met; used $k_t^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	93E536
	H ₂ O pH = 11	4×10^7 (k_t)		295	CP/Oc-17	S = Eos; A' = Met; used $k_t^{A'} = 2.0 \times 10^7$ L mol ⁻¹ s ⁻¹ .	93F328
4.182 Phenoxide ion, 2,4,6-trichloro-							
	C ₆ H ₆ / MeOH (60:40)	4.0×10^6 (k_t)			CP/Ac,A'c-17	S = Eos; A' = DMA; used $k_t^{A'} = 4.8 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_d/k_t = 4.5$; 6×10^{-3} mol L ⁻¹ KOH.	88F650
	C ₆ H ₆ / MeOH (60:40)	2.2×10^7			CP/A'c-23	S = A' = Rub; k_d and $k_{A'}$ not given; 6×10^{-3} mol L ⁻¹ KOH.	88F650

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.113 Phenoxide ion, 2,4,6-trichloro- — Continued							
	H ₂ O	1.7×10^8 (k_r)		300	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r A' = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. from pH dependence and pK_a .	91F300
	H ₂ O	1.2×10^8 (k_r)		292	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r A' = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; calcd. over the range pH = 4.2 to 9.0.	87A180
	H ₂ O pH = 10	6×10^8			CP/Ac-14	S = Eos; used $k_d = 5 \times 10^5$ s ⁻¹ .	87F537
	H ₂ O pH = 10	4×10^8			CP/Ac-14	S = RB; used $k_d = 5 \times 10^5$ s ⁻¹ .	87F537
	H ₂ O pH = 10	7.0×10^8			CP/Oc-14	S = Eos; used $k_d = 5 \times 10^5$ s ⁻¹ .	87F537
	H ₂ O pH = 10	5.9×10^7 (k_r) 6.4×10^8 (k_d)			CP/Oc-17	S = Eos; A' = Met; used $k_r A' = 5 \times 10^6$ L mol ⁻¹ s ⁻¹ ; used $k_A = 7.0 \times 10^8$ L mol ⁻¹ s ⁻¹ .	87F537
4.114 1-Phenylalanine, 3,4-dihydroxy- (DOPA)							
	D ₂ O	2.2×10^7			PL/Ld-2	S = MB.	91R251
	D ₂ O pD = 7.6	3×10^7	6×10^{-4}	296	CP/Oc-15	S = HP; used $k_d = 1.8 \times 10^4$ s ⁻¹ .	84F075
	H ₂ O	9×10^8	5.6×10^{-4}		CP/Ac-15	S = MB; used $k_d = 5 \times 10^5$ s ⁻¹ .	79F314
	MeOH/ H ₂ O (58:42)		1.2×10^{-3}	293	CP/Ac-15	S = NAZ.	79F315
	MeOH/ H ₂ O (58:42)		1.3×10^{-3}		CP/Ac-15	S = 5,8-DMOP.	81R052
	MeOH/ H ₂ O (58:42)		1.1×10^{-3}		CP/Ac-15	S = 5-MOP.	81R052
	MeOH/ H ₂ O (58:42)		1.3×10^{-3}		CP/Ac-15	S = Pso.	81R052
	MeOH/ H ₂ O (58:42)		1.3×10^{-3}		CP/Ac-15	S = TMPs.	81R052
	MeOH/ H ₂ O (58:42)		1×10^{-3}		CP/Ac-15	S = 8-MOP.	79F314
	MeOH/ H ₂ O (58:42)		1.2×10^{-3}		CP/Ac-15	S = MB.	79F314
4.115 2,2'-Spiro[1-benzopyran]-6,6'-diol, 7,7'-bis(1,1-dimethylethyl)-3,3',4,4'-tetrahydro-4,4,4',4'-tetramethyl-							
	MeOH	9.2×10^7			CP/A'c-16	S = MB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	91F516
	MeOH	2.2×10^7 (k_r)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_r A' = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ .	91F516
	MeOH	9.8×10^7	1.8×10^{-3}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	88F440
4.116 2,2'-Spiro[1-benzopyran]-6,6'-diol, 3,3',4,4'-tetrahydro-4,4,4',4',7,7'-hexamethyl-							
	MeOH	1.2×10^8			CP/A'c-16	S = MB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	91F516
	MeOH	3.1×10^7 (k_r)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_r A' = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ .	91F516
	MeOH	9.2×10^7	2.0×10^{-3}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	88F440
4.116 Tyramine							
	D ₂ O/ EtOH (75:25)	5×10^6		295	PL/Ld-2	S = RB.	94A113
	H ₂ O pH = 10	2.8×10^8 2.4×10^8 (k_r)		298	CP/Ac-?	S = MB; A' = N ₃ ; k and k_r by computer fit of rate parameters to experimental ϕ_{ox} versus [A].	777489
4.117 Tyrosine							
	D ₂ O pD = 8.4	8×10^6 (k_r)		293	CL/Ad-35	used $k_d = 2.9 \times 10^4$ s ⁻¹ ; high pressure O ₂ (0.195 mol L ⁻¹); statistical error of 30% and systematic error of the same order.	79A112

TABLE 4. Rate constants for interaction of singlet oxygen with phenols and naphthols. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.187 Tyrosine — Continued							
	D ₂ O/ EtOH (75:25)	$\sim 2 \times 10^6$		295	PL/Ld-2	S = RB.	94A113
	EtOH/ CH ₃ CN (80:20)	6.2×10^6			PL/Ld-2	S = ZnTPP.	91A252
	EtOH/ CH ₃ CN (80:20)	3.1×10^6 (k_t)			CP/Ac,A'c- 14,28	S = ZnTPP; A' = DMA; used $k_d = 5.3 \times 10^4$ s ⁻¹ ; used $k_A = 6.2 \times 10^6$ L mol ⁻¹ s ⁻¹ .	91A252
	EtOH/ CH ₃ CN (80:20)	5.5×10^6			PL/Ld-2	S = ZnTPP; 0.01 mol L ⁻¹ HCl.	91A252
	EtOH/ CH ₃ CN (80:20)	$< 5 \times 10^4$ (k_t)			CP/Ac,A'c- 14,28	S = ZnTPP; A' = DMA; used $k_d = 5.3 \times 10^4$ s ⁻¹ ; $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; used $k_A = 5.5 \times 10^6$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ HCl.	91A252
	EtOH/ CH ₃ CN (80:20)	1.8×10^8			PL/Ld-2	S = ZnTPP; 0.01 mol L ⁻¹ KOH.	91A252
	EtOH/ CH ₃ CN (80:20)	3×10^7 (k_t)			CP/Ac,A'c- 14,28	S = ZnTPP; A' = DMA; used $k_d = 5.3 \times 10^4$ s ⁻¹ ; used $k_A = 1.8 \times 10^8$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	91A252
	H ₂ O pH = 10	3.8×10^7 (k_t)			CP/Oc-17	S = RB; A' = Met; used $k_t^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A252
	H ₂ O pH = 11.5	5.2×10^7 (k_t)			CP/Oc-17	S = Eos; A' = Met; used $k_t^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A252
	H ₂ O pH = 7.0		0.017	283	CP/Oc-15	S = MB; The mechanism of oxidation is not clear.	65F029
4.188 L-Tyrosine, N-acetyl-, ethyl ester							
	D ₂ O/ EtOH (75:25)	8×10^6		295	PL/Ld-2	S = RB.	94A113
4.189 Tyrosine, glycyl-							
	D ₂ O/ EtOH (75:25)	1.1×10^7		295	PL/Ld-2	S = RB.	94A113
	EtOH/ CH ₃ CN (80:20)	3.5×10^6			PL/Ld-2	S = ZnTPP.	91A252
	EtOH/ CH ₃ CN (80:20)	3×10^5 (k_t)			CP/Ac,A'c- 14,28	S = ZnTPP; A' = DMA; used $k_d = 5.3 \times 10^4$ s ⁻¹ ; used $k_A = 3.5 \times 10^6$ L mol ⁻¹ s ⁻¹ .	91A252
	EtOH/ CH ₃ CN (80:20)	9.4×10^7			PL/Ld-2	S = ZnTPP; 0.01 mol L ⁻¹ KOH.	91A252
	EtOH/ CH ₃ CN (80:20)	2.7×10^6 (k_t)			CP/Ac,A'c- 14,28	S = ZnTPP; A' = DMA; used $k_d = 5.3 \times 10^4$ s ⁻¹ ; used $k_A = 9.4 \times 10^7$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ KOH.	91A252
	EtOH/ CH ₃ CN (80:20)	5.5×10^6			PL/Ld-2	S = ZnTPP; 0.01 mol L ⁻¹ HCl.	91A252
	EtOH/ CH ₃ CN (80:20)	$< 5 \times 10^4$ (k_t)			CP/Ac,A'c- 14,28	S = ZnTPP; A' = DMA; used $k_d = 5.3 \times 10^4$ s ⁻¹ ; used $k_A = 5.5 \times 10^6$ L mol ⁻¹ s ⁻¹ ; 0.01 mol L ⁻¹ HCl.	91A252
	H ₂ O pH = 10	1.4×10^7 (k_t)			CP/Oc-17	S = RB; A' = Met; used $k_t^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A252
	H ₂ O pH = 11.5	1.9×10^7 (k_t)			CP/Oc-17	S = Eos; A' = Met; used $k_t^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A252
4.190 Tyrosine, methyl ester							
	D ₂ O/ EtOH (75:25)	5×10^6		295	PL/Ld-2	S = RB.	94A113

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds.

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
1.1	Angelicin						
	CCl ₄	6.5×10^3			MP/LI-12	S = TPP; used $k_d = 39$ s ⁻¹ .	83E813
1.2	Benzo[1,2- <i>b</i> :4,3- <i>b'</i>]dipyran, 1,2,3,8,9,10-hexahydro-3,3,5,6,8,8-hexamethyl-						
	EtOH	2.8×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285
1.3	Benzo[1,2- <i>b</i> :4,5- <i>b'</i>]dipyran, 2,3,4,7,8,9-hexahydro-2,2,5,7,7,10-hexamethyl-						
	EtOH	3.4×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	91F285
1.4	1-Benzopyran, 3,4-dihydro-6-methoxy-2,5,7,8-tetramethyl-2-(4,8,12-trimethyltridecyl)- (α-Tocopherol methyl ether)						
	CHCl ₃ /EtOH (50:50)	9.4×10^5 (k_p)		310	CR/Ac-31	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90A184
1.5	1-Benzopyran, 6-ethoxy-3,4-dihydro-2,5,7,8-tetramethyl-2-(4,8,12-trimethyltridecyl)- (α-Tocopherol ethyl ether)						
	CHCl ₃ /EtOH (50:50)	1.6×10^5 (k_p)		310	CR/Ac-31	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90A184
1.6	Coumarin, 7-(diethylamino)-						
	C ₆ H ₆	9×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 3.7 \times 10^4$ s ⁻¹ ; $k_{A'}$ not given.	87F569
1.7	Coumarin, 7-(diethylamino)-4-methyl-						
	C ₆ H ₆	9×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 3.7 \times 10^4$ s ⁻¹ ; $k_{A'}$ not given.	87F569
1.8	Cyclopenta[<i>b</i>][1]benzopyran, 2-phenyl-						
	C ₆ H ₆	7.8×10^5	0.054		CP/Ac-15	S = A; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	78F438
1.9	2-Furaldehyde						
	CH ₂ Cl ₂	5.1×10^4			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
	EtOH			293	CP/Oc-17	S = RB; A' = FFA; meas. $k_f/k_r^{A'} = 0.22$.	86F510
	MeOH	8.4×10^4 (k_p)	1.7 (β_p)	286	CP/Oc-14	S = RB or TPP; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	85F145
	MeOH		0.080		CP/A'c-16	S = MB; A' = DPBF.	72F510
	MeOH		0.60	293	CP/Oc-15	S = RB; $E_a = 21$ kJ mol ⁻¹ .	68F288
1.10	2-Furaldehyde, 5-(2-hydroxyethoxy)methyl-						
	EtOH			293	CP/Oc-17	S = RB; A' = FFA; meas. $k_f/k_r^{A'} = 0.43$.	86F510
1.11	2-Furaldehyde, 5-(hydroxymethyl)-						
	EtOH			293	CP/Oc-17	S = RB; A' = FFA; meas. $k_f/k_r^{A'} = 0.38$.	86F510
1.12	2-Furaldehyde, 5-(methoxymethyl)-						
	EtOH			293	CP/Oc-17	S = RB; A' = FFA; meas. $k_f/k_r^{A'} = 0.35$.	86F510
1.13	2-Furaldehyde, 5-methyl-						
	CH ₂ Cl ₂	5.3×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
	EtOH			293	CP/Oc-17	S = RB; A' = FFA; meas. $k_f/k_r^{A'} = 0.59$.	86F510
	MeOH	1.7×10^6 (k_p)	0.084 (β_p)	286	CP/Oc-14	S = RB or TPP; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	85F145
1.14	Furan						
	C ₆ H ₅ CH ₃	1.1×10^7			PR/A'd-5	S = Np; A' = DPBF; $\Delta H^\ddagger = 0$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -118$ J K ⁻¹ mol ⁻¹ ; studied at 223-353 K.	79A106
	CH ₂ Cl ₂	1.4×10^7			CP/A'c-16	S = MPDME; A' = DPBF; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F477
	CH ₂ Cl ₂	1.2×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
5.14 Furan — Continued							
	EtOH			293	CP/Oc-17	S = RB; A' = FFA; meas. $k_r/k_r^{A'} = 1$.	86F510
	MCH			298	PL/A'd-8	S = An; A' = DPBF; $\Delta V^\ddagger = -17$ cm ³ mol ⁻¹ ; studied at 0.1-400 MPa.	92A014
	MeOH	8.9×10^6 (k_r)	0.016 (β_r)	286	CP/Oc-14	S = RB or TPP; used $k_d = 1.4 \times 10^6$ s ⁻¹ .	85F145
	MeOH		2.6×10^{-3}		CP/A'c-16	S = MB; A' = DPBF.	72F510
	MeOH		4.5×10^{-3}	293	CP/Oc-15	S = RB; $E_a = 0.84$ kJ mol ⁻¹ .	68F288
5.15 Furan, 2-acetyl-							
	MeOH		0.022		CP/A'c-16	S = MB; A' = DPBF.	72F510
5.16 Furan, 2,5-bis(4-bromophenyl)-							
	CH ₂ Cl ₂	2.5×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
5.17 Furan, 2,5-bis(4-chlorophenyl)-							
	C ₆ H ₅ CH ₃	5.8×10^7			PR/A'd-5	S = Np; A' = DPBF; $\Delta H^\ddagger = 0$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -105$ J K ⁻¹ mol ⁻¹ ; studied at 223-353 K.	79A106
	CH ₂ Cl ₂	2.9×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
5.18 Furan, 2,5-bis(hydroxymethyl)- (BMHF)							
	EtOH			293	CP/Oc-17	S = RB; A' = FFA; meas. $k_r/k_r^{A'} = 1.2$.	86F510
	H ₂ O pH = 7		4.0×10^{-3}		CP/Ac-15	S = RB.	92N305
5.19 Furan, 2,5-bis(4-methoxyphenyl)-							
	CH ₂ Cl ₂	9.9×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
5.20 Furan, 2,5-bis(4-methylphenyl)-							
	CH ₂ Cl ₂	7.0×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
5.21 Furan, 2-bromo-							
	CH ₂ Cl ₂	6.7×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
5.22 Furan, 2-(4-bromophenyl)-							
	CH ₂ Cl ₂	1.0×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
5.23 Furan, 3-(4-bromophenyl)-							
	MeOH		4.4×10^{-3}		CP/A'c-16	S = MB; A' = DPBF.	72F510
5.24 Furan, 2-tert-butyl-							
	CH ₂ Cl ₂	6.1×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
	CH ₂ Cl ₂	6.4×10^7			CP/A'c-16	S = MPDME; A' = DPBF; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F477
5.25 Furan, 2-(4-chlorophenyl)-							
	1-BuOH		3.4×10^{-3} (β_r)	298	CP/Ac,A'c-17	S = RB; A' = DPF; used $\beta_r^{A'} = 9.5 \times 10^{-4}$ mol L ⁻¹ ; meas. $\beta_r^A/\beta_r^{A'}(\text{MeOH}) = 3.58$.	717398
	tert-BuOH		0.035 (β_r)	298	CP/Ac,A'c-17	S = RB; A' = DPF; used $\beta_r^{A'} = 9.5 \times 10^{-4}$ mol L ⁻¹ ; meas. $\beta_r^A/\beta_r^{A'}(\text{MeOH}) = 36.8$.	717398
	CH ₂ Cl ₂	1.0×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
	MeOH		2.9×10^{-3}		CP/A'c-16	S = MB; A' = DPBF.	72F510

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k_t) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.15 Furan, 2-(4-chlorophenyl)- — Continued							
	MeOH		2.7×10^{-3} (β_r)	298	CP/Ac,A'c-17	S = RB; A' = DPF; used $\beta_r A' = 9.5 \times 10^{-4}$ mol L ⁻¹ .	71F398
4.16 Furan, 2-(4-cyanophenyl)-							
	CH ₂ Cl ₂	4×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
4.17 Furan, 2,5-dibromo-							
	CH ₂ Cl ₂	2.0×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
4.18 Furan, 2,5-di-(1,1-dimethylethyl)-							
	C ₆ H ₅ CH ₃	2.3×10^8			PR/A'd-5	S = Np; A' = DPBF; $\Delta H^\ddagger = 0$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -94.1$ J K ⁻¹ mol ⁻¹ ; studied at 223-353 K.	79A106
	CH ₂ Cl ₂	1.5×10^8			CP/A'c-16	S = MPDME; A' = DPBF; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F477
	CH ₂ Cl ₂	9.4×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
4.19 Furan, 2,3-dihydro-							
	C ₆ H ₆	2.1×10^6 (k_t)	0.020 (β_r)	286	CP/Oc-29	S = RB or TPP; A' = 2,5-DMF; used $k_d = 4.2 \times 10^4$ s ⁻¹ ; meas. $k_q/k_t = \leq 0.1$; 32% [2+2] cycloaddition.	91F163
	CCl ₄	1.6×10^6 (k_t)	9.2×10^{-4} (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; used $k_d = 1.4 \times 10^3$ s ⁻¹ ; meas. $k_q/k_t = \leq 0.1$; 24% [2+2] cycloaddition.	91F163
	CH ₂ Cl ₂	3.2×10^6 (k_t)	3.0×10^{-3} (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; used $k_d = 9.3 \times 10^5$ s ⁻¹ ; meas. $k_q/k_t = \leq 0.1$; 74% [2+2] cycloaddition.	91F163
	CH ₃ CN	4.7×10^6 (k_t)	7.1×10^{-3} (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; used $k_d = 3.3 \times 10^4$ s ⁻¹ ; meas. $k_q/k_t = \leq 0.1$; 70% [2+2] cycloaddition.	91F163
	CH ₃ COCH ₃	2.8×10^6 (k_t)	0.014 (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; used $k_d = 3.8 \times 10^4$ s ⁻¹ ; meas. $k_q/k_t = \leq 0.1$; 71% [2+2] cycloaddition.	91F163
	CHCl ₃	1.0×10^6 (k_t)	3.9×10^{-3} (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; used $k_d = 4.0 \times 10^3$ s ⁻¹ ; meas. $k_q/k_t = \leq 0.1$; 73% [2+2] cycloaddition.	91F163
	MeOH	2.5×10^6 (k_t)	0.058 (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; meas. $k_q/k_t = \leq 0.1$.	91F163
4.20 Furan, 2,3-dihydro-4,5-dimethyl-							
	MeOH	1.1×10^8 (k_t)		286	CP/Oc-29	S = RB; A' = 2,5-DMF; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; meas. $k_q/k_t = \leq 0.1$; 80% [2+2] cycloaddition.	91F163
4.21 Furan, 2,3-dihydro-5-methyl-							
	C ₆ H ₆	1.5×10^7 (k_t)	2.9×10^{-3} (β_r)	286	CP/Oc-29	S = RB or TPP; A' = 2,5-DMF; used $k_d = 4.2 \times 10^4$ s ⁻¹ ; meas. $k_q/k_t = \leq 0.1$; 52% [2+2] cycloaddition.	91F163
	CH ₃ CN	3.4×10^7 (k_t)	9.7×10^{-4} (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; used $k_d = 3.3 \times 10^4$ s ⁻¹ ; meas. $k_q/k_t = \leq 0.1$; 85% [2+2] cycloaddition.	91F163
	CH ₃ COCH ₃	2.8×10^7 (k_t)	1.4×10^{-3} (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; used $k_d = 3.8 \times 10^4$ s ⁻¹ ; meas. $k_q/k_t = \leq 0.1$; 78% [2+2] cycloaddition.	91F163
	MeOH	1.4×10^7 (k_t)	0.010 (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; meas. $k_q/k_t = \leq 0.1$.	91F163
4.22 Furan, 2-(dimethoxymethyl)-5-(methoxymethyl)-							
	EtOH			293	CP/Oc-17	S = RB; A' = FFA; meas. $k_t/k_t A' = 1.0$.	86F510
4.23 Furan, 2,4-dimethyl-							
	MeOH		2.0×10^{-3}	293	CP/Oc-15	S = RB; $E_d = 6.3$ kJ mol ⁻¹ .	68F288

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
5.34 Furan, 2,5-dimethyl- (2,5-DMF)							
	C ₆ H ₅ CH ₃	6.3 × 10 ⁸			PR/A'd-5	S = Np; A' = DPBF; $\Delta H^\ddagger = 0$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -84.5$ J K ⁻¹ mol ⁻¹ ; studied at 223-353 K.	79A106
	CH ₂ Cl ₂	2.6 × 10 ⁸			CP/A'c-16	S = MPDME; A' = DPBF; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F477
	CH ₂ Cl ₂	1.3 × 10 ⁸			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
	CH ₃ COCH ₃	2.1 × 10 ⁸	1.8 × 10 ⁻⁴		CP/Oc-?	S = MB; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	75F652
	EtOH			293	CP/Oc-17	S = RB; A' = FFA; meas. $k_f/k_r^{A'} = 1.3$.	86F510
	EtOH	2.6 × 10 ⁸			CP/Oc-20	S = BXP; Q = DABCO; used $k_d = 8.3 \times 10^4$ s ⁻¹ , $k_Q = 1.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; soln. contg. TEMPO.	83F323
	EtOH	3.8 × 10 ⁸	2.2 × 10 ⁻⁴	298	CP/Ac-15	S = MB; used $k_d = 8.3 \times 10^4$ s ⁻¹ .	78F061
	EtOH		1.5 × 10 ⁻⁴		CP/Ac-15	S = MB.	78F201
	EtOH		1.6 × 10 ⁻⁴		CP/Ac-15	S = Ret.	78F201
	EtOH		3.3 × 10 ⁻³	273	CP/Oc-20	S = MB; A' = 1-Cyclohexylamino-4-phenylaminobenzene.	72F518
	H ₂ O pH = 7.0	8.2 × 10 ⁸ (k_r)		292	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	87A180
	H ₂ O	1.1 × 10 ⁹			PL/P'a-16	S = Ery; A' = TMPD; used $k_d = 3.3 \times 10^5$ s ⁻¹ ; P' = [TMPD] ⁺ .	82A080
	H ₂ O		3.3 × 10 ⁻⁴ (β_r)		CP/Ac-14	S = <i>N</i> -[5-Hydroxy-8-[[2-(methylsulfonyl)-4-nitrophenyl]azo]-1-naphthalenyl-1,3-benzenedisulfonamide, conjugate base.	79F412
	H ₂ O		5.5 × 10 ⁻⁴	298	CR/Oc-15	¹ O ₂ * from H ₂ O ₂ /NaOCl.	78A227
	H ₂ O	1.6 × 10 ⁹	3.2 × 10 ⁻⁴	298	CP/Ac-15	S = MB; used $k_d = 5.0 \times 10^5$ s ⁻¹ .	78F061
	H ₂ O	1.6 × 10 ⁹	3.1 × 10 ⁻⁴	298	CP/Ac-15	S = MB; used $k_d = 5.0 \times 10^5$ s ⁻¹ .	747044
	MeOH	1.8 × 10 ⁸ (k_r)		286	CP/Oc-14	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	91F163
	MeOH	3.8 × 10 ⁸			PL/Tb-3	S = Ery.	83A050
	MeOH	9 × 10 ⁷			PL/Tb-3	S = CH ₃ COCOCH ₃ .	80E606
	MeOH	3.9 × 10 ⁸	2.8 × 10 ⁻⁴	298	CP/Ac-15	S = MB; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	78F061
	MeOH	1.4 × 10 ⁸	1.0 × 10 ⁻³		CP/Oc-?	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	75F652
	MeOH	4 × 10 ⁸			PL/A'd-5	S = MB; A' = DPBF.	727260
	MeOH		2.8 × 10 ⁻⁴		CP/A'c-16	S = MB; A' = DPBF.	72F510 717398
	MeOH		-2 × 10 ⁻⁴	293	CP/Oc-15	S = RB; $E_a = 4.2$ kJ mol ⁻¹ .	68F288
	MeOH/ <i>tert</i> -BuOH (50:50)		1.6 × 10 ⁻⁴		CP/A'c-16	S = RB; A' = DPBF.	717398
	MeOH/ <i>tert</i> -BuOH (50:50)				CP/Ac,A'c-17	S = RB; A' = TME; meas. $k_f/k_r^{A'} = 2.4$.	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)				CR/Ac,A'c-17	A' = TME; meas. $k_f/k_r^{A'} = 1.5$; ¹ O ₂ * from H ₂ O ₂ /Ca(OCl) ₂ .	68F292
	MeOH/ <i>tert</i> -BuOH (50:50)				CR/Ac,A'c-17	A' = TME; meas. $k_f/k_r^{A'} = 5.2$; ¹ O ₂ * from H ₂ O ₂ /NaOCl.	68F292
5.35 Furan, 2-[(1,1-dimethylethoxy)methyl]-							
	EtOH			293	CP/Oc-17	S = RB; A' = FFA; meas. $k_f/k_r^{A'} = 1.0$.	86F510
5.36 Furan, 2-[2-(1,3-dioxolanyl)-							
	EtOH			293	CP/Oc-17	S = RB; A' = FFA; meas. $k_f/k_r^{A'} = 0.94$.	86F510
5.37 Furan, 2,3-diphenyl-							
	C ₆ H ₅ CH ₃	6.2 × 10 ⁷			PR/A'd-5	S = Np; A' = DPBF; $\Delta H^\ddagger = 0$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -104$ J K ⁻¹ mol ⁻¹ ; studied at 223-353 K.	79A106

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
3.38 Furan, 2,5-diphenyl-							
	1-BuOH	5.0×10^7	1.0×10^{-3}		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 5.2 \times 10^4$ s ⁻¹ ; Solvent contained 1% MeOH.	74F646
	1-BuOH		9.8×10^{-4} (β_r)	298	CP/Ac-17	S = RB; meas. $\beta_r/\beta_r(\text{MeOH}) = 1.03$, used $\beta_r(\text{MeOH}) = 9.5 \times 10^{-4}$ mol L ⁻¹ .	717398
	tert-BuOH	3.6×10^7	8.3×10^{-4}		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 3.0 \times 10^4$ s ⁻¹ ; Solvent contained 1% MeOH.	74F646
	tert-BuOH		8.0×10^{-4} (β_r)	298	CP/Ac-17	S = RB; meas. $\beta_r/\beta_r(\text{MeOH}) = 0.842$, used $\beta_r(\text{MeOH}) = 9.5 \times 10^{-4}$ mol L ⁻¹ .	717398
	C ₅ H ₅ N	6.1×10^7	9.9×10^{-4}		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 6.0 \times 10^4$ s ⁻¹ ; Solvent contained 1% MeOH.	74F646
	c-C ₆ H ₁₁ OH	5.3×10^7	1.2×10^{-3}		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 6.2 \times 10^4$ s ⁻¹ ; Solvent contained 1% MeOH.	74F646
	C ₆ H ₅ CH ₃	1.0×10^8			PR/A'd-5	S = Np; A' = DPBF; $\Delta H^\ddagger = 0$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -100$ J K ⁻¹ mol ⁻¹ ; studied at 223-353 K.	79A106
	C ₆ H ₅ CO ₂ CH ₃	4.1×10^7	6.1×10^{-4}		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 2.5 \times 10^4$ s ⁻¹ ; Solvent contained 1% MeOH.	74F646
	CH ₂ Cl ₂	7.0×10^7			CP/A'c-16	S = MPDME; A' = DPBF; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F477
	CH ₂ Cl ₂	5.2×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
	CH ₂ Cl ₂	5.1×10^7	1.4×10^{-4}		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 7.1 \times 10^3$ s ⁻¹ .	74F646
	CH ₃ CN	3.7×10^8	8.3×10^{-5}	293	CP/Pa-18	S = MB; A' = DPBF; used $k_d = 3 \times 10^4$ s ⁻¹ , $\beta_{A'} = 1.3 \times 10^{-5}$ mol L ⁻¹ ; P = 2,5-Diphenylfuran endoperoxide.	87F440
	CH ₃ CN	1.4×10^8	1.3×10^{-4}		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 1.8 \times 10^4$ s ⁻¹ .	74F646
	CH ₃ CO ₂ C ₂ H ₅	3.0×10^7	6.9×10^{-4}		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 2.1 \times 10^4$ s ⁻¹ .	74F646
	CH ₃ COCH ₃	1.4×10^8	1.7×10^{-4}		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 2.4 \times 10^4$ s ⁻¹ .	74F646
	CHCl ₃	2.2×10^7	2.0×10^{-4}		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 4.4 \times 10^3$ s ⁻¹ .	74F646
	D ₂ O		7.7×10^{-5} (β_r)	296	CP/Ac-17	S = MB; meas. $\beta_r/\beta_r(\text{H}_2\text{O}) = 0.115$, used $\beta_r(\text{H}_2\text{O}) = 4.6 \times 10^{-4}$ mol L ⁻¹ .	74R214
	D ₂ O pD = 7.1		1.2×10^{-4} (β_r)	296	CP/Ac-17	S = MB; meas. $\beta_r/\beta_r(\text{H}_2\text{O}) = 0.182$, used $\beta_r(\text{H}_2\text{O}) = 4.6 \times 10^{-4}$ mol L ⁻¹ .	74R214
	D ₂ O pD = 7.1		1.4×10^{-4} (β_r)	296	CP/Ac-17	S = MB; meas. $\beta_r/\beta_r(\text{H}_2\text{O}) = 0.206$, used $\beta_r(\text{H}_2\text{O}) = 4.6 \times 10^{-4}$ mol L ⁻¹ . Solvent contains 960 μM H ₂ O ₂ .	74R214
	D ₂ O pD = 7.1		1.1×10^{-4} (β_r)	296	CP/Ac-17	S = MB; meas. $\beta_r/\beta_r(\text{H}_2\text{O}) = 0.165$, used $\beta_r(\text{H}_2\text{O}) = 4.6 \times 10^{-4}$ mol L ⁻¹ . 1 μl/ml of catalase present in reaction medium.	74R214
	H ₂ O		4.6×10^{-4} (β_r)		CP/Ac-17	S = RB; meas. $\beta_r/\beta_r(\text{MeOH}) = 0.481$, used $\beta_r(\text{MeOH}) = 9.5 \times 10^{-4}$ mol L ⁻¹ .	717398
	HOCH ₂ CH ₂ OH		3.5×10^{-4} (β_r)		CP/Ac-17	S = RB; meas. $\beta_r/\beta_r(\text{MeOH}) = 0.366$, used $\beta_r(\text{MeOH}) = 9.5 \times 10^{-4}$ mol L ⁻¹ .	717398
	MeOH	1.0×10^8	8.8×10^{-4}		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	74F646
	MeOH	4.6×10^7			PL/A'd-8	S = RB; A' = DPBF.	737014
	MeOH	$\sim 5 \times 10^5$ (k_r)			CP/Ac-14	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; used $\phi_{\text{isc}}(\text{RB}) = 0.76$.	73F660
	MeOH		9.5×10^{-4}	298	CP/A'c-16	S = RB; A' = DPBF.	717398
	MeOH/H ₂ O (12:88)		4.2×10^{-4} (β_r)		CP/Ac-17	S = RB; meas. $\beta_r/\beta_r(\text{MeOH}) = 0.439$, used $\beta_r(\text{MeOH}) = 9.5 \times 10^{-4}$ mol L ⁻¹ ; solvent mixt. in mole %.	717398
	MeOH/H ₂ O (40:60)		4.2×10^{-4} (β_r)		CP/Ac-17	S = RB; meas. $\beta_r/\beta_r(\text{MeOH}) = 0.446$, used $\beta_r(\text{MeOH}) = 9.5 \times 10^{-4}$ mol L ⁻¹ ; solvent mixt. in mole %.	717398

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
5.38 Furan, 2,5-diphenyl- — Continued							
	MeOH/ H ₂ O (66:34)		5.9×10^{-4} (β_r)		CP/Ac-17	S = RB; meas. $\beta_r/\beta_r(\text{MeOH}) = 0.621$, used $\beta_r(\text{MeOH}) = 9.5 \times 10^{-4}$ mol L ⁻¹ ; solvent mixt. in mole %.	717398
	MeOH/ H ₂ O (81:19)		7.7×10^{-4} (β_r)		CP/Ac-17	S = RB; meas. $\beta_r/\beta_r(\text{MeOH}) = 0.806$, used $\beta_r(\text{MeOH}) = 9.5 \times 10^{-4}$ mol L ⁻¹ ; solvent mixture in mole %.	717398
	MeOH/ HOCH ₂ CH ₂ OH (75:25)		5.5×10^{-4} (β_r)		CP/Ac-17	S = RB; meas. $\beta_r/\beta_r(\text{MeOH}) = 0.578$, used $\beta_r(\text{MeOH}) = 9.5 \times 10^{-4}$ mol L ⁻¹ .	717398
	MeOH/ HOCH ₂ CH ₂ OH (50:50)		3.4×10^{-4} (β_r)		CP/Ac-17	S = RB; meas. $\beta_r/\beta_r(\text{MeOH}) = 0.355$, used $\beta_r(\text{MeOH}) = 9.5 \times 10^{-4}$ mol L ⁻¹ .	717398
	MeOH/ HOCH ₂ CH ₂ OH (25:75)		2.6×10^{-4} (β_r)		CP/Ac-17	S = RB; meas. $\beta_r/\beta_r(\text{MeOH}) = 0.278$, used $\beta_r(\text{MeOH}) = 9.5 \times 10^{-4}$ mol L ⁻¹ .	717398
	2-PrOH	4.8×10^7	1.0×10^{-3}		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 5.0 \times 10^4$ s ⁻¹ ; Solvent contained 1% MeOH.	74F646
	THF	7.5×10^7	5.9×10^{-4}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 4.3 \times 10^4$ s ⁻¹ .	74F646
	dioxane	2.7×10^7	1.1×10^{-3}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 2.9 \times 10^4$ s ⁻¹ .	74F646
5.39 Furan, 3,4-diphenyl-							
	MeOH		1.7×10^{-3}		CP/A'c-16	S = RB or MB; A' = DPBF.	72F510
5.40 Furan, 2-[(4-ethoxycarbonyl)phenyl]							
	CH ₂ Cl ₂	7×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
5.41 Furan, 3-(4-fluorophenyl)-							
	MeOH		3.4×10^{-3}		CP/A'c-16	S = MB; A' = DPBF.	72F510
5.42 Furan, 2-methoxy-							
	CH ₂ Cl ₂	1.6×10^8			CP/A'c-16	S = MPDME; A' = DPBF; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F477
	CH ₂ Cl ₂	1.2×10^8			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
	MeOH	1.6×10^8 (k_r)	9.2×10^{-4} (β_r)	286	CP/Oc-14	S = RB or TPP; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	85F145
	MeOH		4.0×10^{-4}		CP/A'c-16	S = MB; A' = DPBF.	72F510
5.43 Furan, 2-(methoxymethyl)-							
	MeOH		3.4×10^{-3}	293	CP/Oc-15	S = RB; $E_a = 5.0$ kJ mol ⁻¹ .	68F288
5.44 Furan, 2-(4-methoxyphenyl)-							
	1-BuOH		1.9×10^{-3} (β_r)		CP/Ac,A'c-17	S = RB or MB; A' = DPF; used $\beta_r^{A'} = 9.5 \times 10^{-4}$ mol L ⁻¹ ; meas. $\beta_r^A/\beta_r^{A'}(\text{MeOH}) = 2.0$.	72F510
	CH ₂ Cl ₂	3.7×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
	H ₂ O		5.9×10^{-4} (β_r)		CP/Ac,A'c-17	S = MB or RB; A' = DPF; used $\beta_r^{A'} = 9.5 \times 10^{-4}$ mol L ⁻¹ ; meas. $\beta_r^A/\beta_r^{A'}(\text{MeOH}) = 0.618$.	72F510
	HOCH ₂ CH ₂ OH		3.4×10^{-4} (β_r)		CP/Ac,A'c-17	S = MB or RB; A' = DPF; used $\beta_r^{A'} = 9.5 \times 10^{-4}$ mol L ⁻¹ ; meas. $\beta_r^A/\beta_r^{A'}(\text{MeOH}) = 0.36$.	72F510
	MeOH				CP/Ac,A'c-17	S = MB or RB; A' = DPF; meas. $k_r/k_r^{A'} = 0.92$.	72F510
5.45 Furan, 3-(4-methoxyphenyl)-							
	MeOH		1.9×10^{-3}		CP/A'c-16	S = MB; A' = DPBF.	72F510
5.46 Furan, 2-methyl-							
	1-BuOH		1.2×10^{-3}	296	CP/A'c-16	S = MB; A' = DPBF.	717398

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
§.46 Furan, 2-methyl- — Continued							
	<i>tert</i> -BuOH		6.9×10^{-4}	296	CP/A'c-16	S = MB; A' = DPBF.	717398
	C ₆ H ₅ Cl/ 2-PrOH (90:10)	1.3×10^8		273	CR/LI-12	used $k_d = 4.1 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from hydrotrioxide, e.g. (CH ₃) ₂ C(OH)OOH.	90M125
	CH ₂ Cl ₂	6.2×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
	CH ₂ Cl ₂	8.4×10^7			CP/A'c-16	S = MPDME; A' = DPBF; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F477
	EtOH			293	CP/Oc-17	S = RB; A' = FFA; meas. $k_r/k_r^{A'} = 1.2$.	86F510
	H ₂ O pH = 7.0	6.0×10^7			CP/Oc-19	S = HP; Q = N ₃ ⁻ ; used $k_Q = 2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A278
	H ₂ O (mic) pH = 7.0	1.0×10^8			CP/Oc-19	S = Chl a; Q = N ₃ ⁻ ; used $k_Q = 2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; 1, 2, or 5% Triton X-100.	78A278
	H ₂ O (mic) pH = 7.0	7.0×10^7			CP/Oc-19	S = HP; Q = N ₃ ⁻ ; used $k_Q = 2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; 1% Triton X-100.	78A278
	MeOH	9.9×10^7 (k_r)	1.4×10^{-3} (β_r)	286	CP/Oc-14	S = RB or TPP; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	85F145
	MeOH		1.1×10^{-3}	296	CP/A'c-16	S = MB; A' = DPBF.	72F510 717398
	MeOH		3.8×10^{-3}	293	CP/Oc-15	S = RB; $E_a = 1.7$ kJ mol ⁻¹ .	68F288
§.47 Furan, 2-(4-methylphenyl)-							
	CH ₂ Cl ₂	2.4×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
	MeOH				CP/Ac,A'c-17	S = MB or RB; A' = DPF; meas. $k_r/k_r^{A'} = 0.68$.	72F510
§.48 Furan, 3-(4-methylphenyl)-							
	MeOH		2.4×10^{-3}		CP/A'c-16	S = RB or MB; A' = DPBF.	72F510
§.49 Furan, 2-(4-nitrophenyl)-							
	CH ₂ Cl ₂	2.4×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
§.50 Furan, 2-phenyl-							
	1-BuOH		2.0×10^{-3} (β_r)	298	CP/Ac,A'c-17	S = RB; A' = DPF; used $\beta_r^{A'} = 9.5 \times 10^{-4}$ mol L ⁻¹ ; meas. $\beta_r^A/\beta_r^{A'}(\text{MeOH}) = 2.1$.	717398
	<i>tert</i> -BuOH		3.4×10^{-3} (β_r)	298	CP/Ac,A'c-17	S = RB; A' = DPF; used $\beta_r^{A'} = 9.5 \times 10^{-4}$ mol L ⁻¹ ; meas. $\beta_r^A/\beta_r^{A'}(\text{MeOH}) = 3.58$.	717398
	CH ₂ Cl ₂	1.8×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
	MeOH		1.7×10^{-3}	298	CP/Ac,A'c-17	S = MB or RB; A' = DPF; used $\beta_{A'} = 9.5 \times 10^{-4}$ mol L ⁻¹ .	72F510 717398
§.51 Furan, 3-phenyl-							
	MeOH		2.8×10^{-3}		CP/A'c-16	S = MB; A' = DPBF.	72F510
§.52 Furan, tetraphenyl-							
	C ₆ H ₅ CH ₃	2.8×10^8			PR/A'd-5	S = Np; A' = DPBF; $\Delta H^\ddagger = 0$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -91.2$ J K ⁻¹ mol ⁻¹ ; studied at 223-353 K.	79A106
	C ₆ H ₅ Cl/ 2-PrOH (90:10)	3.6×10^8		273	CR/LI-12	used $k_d = 4.1 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from hydrotrioxide, e.g. (CH ₃) ₂ C(OH)OOH.	90M125
	MeOH		-0.030	293	CP/Oc-15	S = RB; $E_a = 4.2$ kJ mol ⁻¹ .	68F288
§.53 Furan, 2-vinyl-							
	MeOH		1.8×10^{-3}	293	CP/Oc-15	S = RB; $E_a = 3.8$ kJ mol ⁻¹ .	68F288
§.54 2-Furancarboxylic acid							
	MeOH		0.012		CP/A'c-16	S = MB; A' = DPBF.	72F510

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
5.55	2-Furancarboxylic acid, 5-bromo-, ethyl ester						
	CH ₂ Cl ₂	1.5×10^4			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
5.56	2-Furancarboxylic acid, ethyl ester						
	CH ₂ Cl ₂	1.3×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
5.57	2-Furancarboxylic acid, methyl ester						
	CH ₂ Cl ₂	8.5×10^4			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
5.58	3-Furancarboxylic acid, 4,5-dihydro-2-methyl-, methyl ester						
	C ₆ H ₆	2.0×10^5 (k_r)	0.21 (β_r)	286	CP/Oc-29	S = RB or TPP; A' = 2,5-DMF; used $k_d = 4.2 \times 10^4$ s ⁻¹ ; meas. $k_q/k_r \leq 0.1$; 4% [2+2] cycloaddition.	91F163
	CCl ₄	2.0×10^5 (k_r)	7.2×10^{-3} (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; used $k_d = 1.4 \times 10^3$ s ⁻¹ ; meas. $k_q/k_r \leq 0.1$; 3% [2+2] cycloaddition.	91F163
	CH ₂ Cl ₂	2.4×10^5 (k_r)	0.041 (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; used $k_d = 9.5 \times 10^3$ s ⁻¹ ; meas. $k_q/k_r \leq 0.1$; 32% [2+2] cycloaddition.	91F163
	CH ₃ CN	8.8×10^5 (k_r)	0.038 (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; used $k_d = 3.3 \times 10^4$ s ⁻¹ ; meas. $k_q/k_r \leq 0.1$; 44% [2+2] cycloaddition.	91F163
	CH ₃ COCH ₃	6.1×10^5 (k_r)	0.063 (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; used $k_d = 3.8 \times 10^4$ s ⁻¹ ; meas. $k_q/k_r \leq 0.1$; 39% [2+2] cycloaddition.	91F163
	CHCl ₃	7.0×10^4 (k_r)	0.057 (β_r)	286	CP/Oc-29	S = TPP; A' = 2,5-DMF; used $k_d = 4.0 \times 10^3$ s ⁻¹ ; meas. $k_q/k_r \leq 0.1$; 36% [2+2] cycloaddition.	91F163
	MeOH	7.3×10^5 (k_r)	0.19 (β_r)	286	CP/Oc-29	S = RB; A' = 2,5-DMF; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; meas. $k_q/k_r \leq 0.1$; 29% [2+2] cycloaddition.	91F163
5.59	2,5-Furandicarboxaldehyde						
	CH ₂ Cl ₂	2.4×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
5.60	2,5-Furandicarboxylic acid, diethyl ester						
	CH ₂ Cl ₂	4.5×10^4			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
5.61	2,5-Furandicarboxylic acid, dimethyl ester						
	CH ₂ Cl ₂	2.0×10^4			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
5.62	3,4-Furandicarboxylic acid, diethyl ester						
	MeOH		-0.20	293	CP/Oc-15	S = RB; $E_a = 12.6$ kJ mol ⁻¹ .	68F288
5.63	2-Furannitrile						
	CH ₂ Cl ₂	1.1×10^4			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
5.64	2-Furannitrile, 5-methyl-						
	CH ₂ Cl ₂	1.5×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84F477
5.65	2-Furanmethanamine, N-methyl-						
	MeOH		0.013	293	CP/Oc-15	S = RB; $E_a = 4.2$ kJ mol ⁻¹ .	68F288
5.66	2-Furanmethanediol, diacetate						
	C ₆ H ₅ Cl/ 2-PrOH (90:10)	2.3×10^6		273	CR/LI-12	used $k_d = 4.1 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from hydrotrioxide, e.g. (CH ₃) ₂ C(OH)OOH.	90M125

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
5.67	2-Furanmethanol, α,α-diphenyl-						
	MeOH	9.9×10^6	9.2×10^{-3}	298	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F519
5.68	2-Furanmethanol, α-(diphenylmethyl)-						
	MeOH	1.1×10^7	8.0×10^{-3}	298	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F519
5.69	2-Furanmethanol, α-methyl-						
	MeOH	1.0×10^8	8.7×10^{-4}	298	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F519
5.70	2-Furanmethanol, α-phenyl-						
	MeOH	5.2×10^6	0.018	298	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F519
5.71	2-Furanmethanol, α-(2-phenylethyl)-						
	MeOH	2.5×10^7	3.6×10^{-3}	298	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F519
5.72	2-Furanmethanol, α-(phenylmethyl)-						
	MeOH	1.1×10^7	8.3×10^{-3}	298	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F519
5.73	2-Furanmethanol, α-(3-phenylpropyl)-						
	MeOH	8.9×10^8	1.0×10^{-4}	298	CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F519
5.74	3-Furanmethanol, 5-(phenylmethyl)-						
	MeOH	3.0×10^7		298	CP/Oc-15	S = RB; $\Delta S^\ddagger = -102.7$ J K ⁻¹ mol ⁻¹ ; $E_a = -0$ kJ mol ⁻¹ ; studied at 293-308 K; k_d not given.	92F465
	MeOH/H ₂ O (50:50)	1.6×10^8		298	CP/Oc-15	S = RB; $\Delta S^\ddagger = -87.2$ J K ⁻¹ mol ⁻¹ ; $E_a = -0$ kJ mol ⁻¹ ; studied at 293-308 K; k_d not given.	92F465
5.75	3-Furanmethanol, 5-(phenylmethyl)-, acetate						
	MeOH	6.4×10^7		298	CP/Oc-15	S = RB; $\Delta S^\ddagger = -96.5$ J K ⁻¹ mol ⁻¹ ; $E_a = -0$ kJ mol ⁻¹ ; studied at 293-308 K; k_d not given.	92F465
	MeOH/H ₂ O (50:50)	8.2×10^8		298	CP/Oc-15	S = RB; $\Delta S^\ddagger = -74.8$ J K ⁻¹ mol ⁻¹ ; $E_a = -0$ kJ mol ⁻¹ ; studied at 293-308 K; k_d not given.	92F465
5.76	3-Furanmethanol, 5-(phenylmethyl)-, ester with 2,2-dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylic acid (Bioresmethrin)						
	MeOH	5.3×10^7		298	CP/Oc-15	S = RB; $\Delta S^\ddagger = -97.9$ J K ⁻¹ mol ⁻¹ ; $E_a = -0$ kJ mol ⁻¹ ; studied at 293-308 K; k_d not given.	92F465
5.77	[2,2](2,5)Furanophane						
	MeOH	1.6×10^8	5.5×10^{-4}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F519
				298			
5.78	Furfuryl alcohol (FFA)						
	CD ₃ OD	3.0×10^7 (k_t) < 10^4 (k_q)		295	CP/Oc-15,27	S = RB; used $k_d = 4.0 \times 10^3$ s ⁻¹ .	91F332
	H ₂ O	1.4×10^8 (k_t)		298	CP/Oc-14	S = H ₂ TPPS ⁴⁻ ; used $k_d = 2.5 \times 10^5$ s ⁻¹ ; $E_a = 22.7$ kJ mol ⁻¹ ; log(A) = 12.1; studied at 288-318 K; phosphate buffer contg. 1.6% NaCl.	91R053
	H ₂ O pH = 10.0, 11.5	1.2×10^8 (k_t)		292	MP/Ac-17	S = RB; rel. to $k(\text{FFA}) = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ in H ₂ O at pH = 7.0.	87A180
	H ₂ O		3.0×10^{-3}	295	CP/Oc-14	S = HPD; 0.9% NaCl.	85F332
	H ₂ O	1.2×10^8	2.3×10^{-3}	295	CP/Oc-15	S = RB; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	84F381
	H ₂ O pH = 3.0, 8.0		1.8×10^{-3}	310	CP/Oc-14	S = PF.	617008
	MeOH		4.7×10^{-3}		CP/A'c-16	S = MB; A' = DPBF.	72F510
	MeOH		3.3×10^{-3}	293	CP/Oc-15	S = RB; $E_a = 2.9$ kJ mol ⁻¹ .	68F288
5.79	Furfurylamine						
	MeOH		0.030		CP/A'c-16	S = MB; A' = DPBF.	72F510

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
5.79 Furfurylamine — Continued							
	MeOH		9.0×10^{-3}	293	CP/Oc-15	S = RB; $E_a = 2.9$ kJ mol ⁻¹ .	68F288
5.80 Isobenzofuran							
	MeOH	9.2×10^7	9.8×10^{-4}		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F517
5.81 Isobenzofuran, 1,3-bis[4-(11-carboxynonyl)phenyl]-4,7-dihydro-5,6-dimethyl-, dianion							
	D ₂ O/ H ₂ O (95:5) pH = 10	3×10^8 (k_r)			CP/Ac,A'c-17	S = HP; A' = His; used $k_r^{A'} = 5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82F379
	H ₂ O pH = 10	7.1×10^7 (k_r)			CP/Ac,A'c-17	S = HP; A' = His; used $k_r^{A'} = 5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82F379
5.82 Isobenzofuran, 5,6-dimethyl-1,3-diphenyl-							
	MeOH	5.2×10^8 (k_r)			CP/Ac-14	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; used $\phi_{isc}(RB) = 0.76$.	73F660
5.83 Isobenzofuran, 1,3-diphenyl- (DPBF)							
	C ₆ H ₅ COCH ₃	9.0×10^8		293	PL/Ad-8	S = MB.	83A006 83A371
	1-BuOH	8.3×10^8 (k_r)			CP/Ac,A'c-17	S = MB; A' = DPF; used $k_r^{A'} = 5.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 17$; Solvent contained 1% MeOH.	74F646
	1-BuOH	8×10^8	7×10^{-5}		CP/Ac-15	S = MB; used $k_d = 5.2 \times 10^4$ s ⁻¹ ; Solvent contained 1% MeOH.	74F646
	1-BuOH	8×10^8			PL/Ad-8	S = MB.	737014
	1-BuOH		7.1×10^{-5} (β_r)	298	CP/Ac,A'c-17	S = RB; A' = DPF; used $\beta_r^{A'} = 9.5 \times 10^{-4}$ mol L ⁻¹ ; meas. $\beta_r/\beta_r^{A'}(\text{MeOH}) = 0.075$.	717398
	tert-BuOH	6.2×10^8 (k_r)			CP/Ac,A'c-17	S = MB; A' = DPF; used $k_r^{A'} = 3.6 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 17$; Solvent contained 1% MeOH.	74F646
	tert-BuOH	2.3×10^8	1×10^{-4}		CP/Ac-15	S = MB; used $k_d = 3.0 \times 10^4$ s ⁻¹ ; Solvent contained 1% MeOH.	74F646
	tert-BuOH	5.7×10^8			PL/Ad-8	S = MB; Solvent contained 1% MeOH.	737014
	tert-BuOH		4.9×10^{-5} (β_r)	298	CP/Ac,A'c-17	S = RB; A' = DPF; used $\beta_r^{A'} = 9.5 \times 10^{-4}$ mol L ⁻¹ ; meas. $\beta_r/\beta_r^{A'}(\text{MeOH}) = 0.052$.	717398
	Epibromohydrin	7.8×10^8			PL/Ad-8	S = MB.	74F646
	Propylene carbonate	1×10^9		293	PL/Ad-5	S = MB.	87E690
	C ₅ H ₅ N	6.5×10^8 (k_r)	9.1×10^{-5} (β_r)	298	CP/Ac-14	S = A; used $k_d = 5.9 \times 10^4$ s ⁻¹ .	84F240
	C ₅ H ₅ N	4.8×10^8 (k_r)			CP/Ac,A'c-17	S = RB; A' = DPF; used $k_r^{A'} = 6.1 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 7.9$; Solvent contained 1% MeOH.	74F646
	C ₅ H ₅ N	5×10^8			PL/Ad-8	S = RB; Solvent contained 1% MeOH.	74F646
	C ₅ H ₅ N	2.1×10^9			PL/Ad-8	S = MB.	737014
	C ₅ H ₅ N				CP/Ac,A'c-17	S = A' = Rub; meas. $k_r/k_r^{A'} = 22$.	66F041
	c-C ₆ H ₁₁ OH	6.5×10^8 (k_r)			CP/Ac,A'c-17	S = MB; A' = DPF; used $k_r^{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 12$; Solvent contained 1% MeOH.	74F646
	c-C ₆ H ₁₁ OH	1×10^8			PL/Ad-8	S = MB; Solvent contained 1% MeOH.	74F646
	c-C ₆ H ₁₁ OH	2×10^8	3×10^{-4}		CP/Ac-15	S = MB; used $k_d = 6.3 \times 10^4$ s ⁻¹ ; Solvent contained 1% MeOH.	74F646
	c-C ₆ H ₁₂	3.4×10^8			PL/Ad-5	S = 2-ACN; used $k_d = 5.0 \times 10^4$ s ⁻¹ .	84F005
	c-C ₆ H ₁₂	5.0×10^8 (k_r)	1.2×10^{-4} (β_r)	298	CP/Ac-14	S = A; used $k_d = 5.9 \times 10^4$ s ⁻¹ .	84F240
	c-C ₆ H ₁₂	5.4×10^8 (k_r)	1.1×10^{-4} (β_r)	298	CP/Ac-14	S = A; used $k_d = 5.9 \times 10^4$ s ⁻¹ .	84P629

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

Ref.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
Isobenzofuran, 1,3-diphenyl- (DPBF) — Continued							
	<i>c</i> -C ₆ H ₁₂	4.5 × 10 ⁸			PL/Ad-8	S = An.	82A349
	<i>c</i> -C ₆ H ₁₂	5.3 × 10 ⁸		303	CP/Ac-20	S = Py; used $k_d = 5.9 \times 10^5$ s ⁻¹ .	79N020
	<i>c</i> -C ₆ H ₁₂ (mic)	5.3 × 10 ⁸			PL/Tb-3	S = Ery; reverse micelles contg. 0.04 mol L ⁻¹ DAP and 0.1 mol L ⁻¹ water.	83A050
	<i>c</i> -C ₆ H ₁₂ (mic)	5.3 × 10 ⁸			CP/Ac-14	S = Fl ² ; used $k_d = 5.9 \times 10^4$ s ⁻¹ ; DAP reverse micelles.	80N021
	<i>n</i> -C ₆ H ₁₄	2.6 × 10 ⁸		298	PL/Ad-8	S = An; $\Delta V^\ddagger = -14$ cm ³ mol ⁻¹ ; studied at 0.1-400 MPa.	92A014 90A018
	<i>n</i> -C ₆ H ₁₄	4.4 × 10 ⁸ (k_r)	1.4 × 10 ⁻⁴ (β_r)	298	CP/Ac-14	S = A; used $k_d = 6.3 \times 10^4$ s ⁻¹ .	84F240
	<i>n</i> -C ₆ H ₁₄	1.2 × 10 ⁹			CP/Ac-14	S = An; used $k_d = 3 \times 10^4$ s ⁻¹ .	80E761
	<i>n</i> -C ₆ H ₁₄		1.5 × 10 ⁻⁵		CP/Pa-15	S = I ₂ .	72F521
	C ₆ H ₅ Br	6 × 10 ⁸	2 × 10 ⁻⁵		CP/Ac-15	S = MB; used $k_d = 1.3 \times 10^4$ s ⁻¹ ; Solvent contained 1% MeOH.	74F646
	C ₆ H ₅ Br	5 × 10 ⁸			PL/Ad-8	S = MB; Solvent contained 1% MeOH.	74F646
	C ₆ H ₅ Br/ MeOH (80:20)	7.0 × 10 ⁸			PL/Ad-8	S = MB.	737014
	C ₆ H ₅ Br/ MeOH (80:20)	5 × 10 ⁸	9 × 10 ⁻⁵		CP/Ac-15	S = MB; used $k_d = 4.3 \times 10^4$ s ⁻¹ .	74F646
	C ₆ H ₅ CH ₂ CH ₃	6.7 × 10 ⁸		293	PL/Ad-8	S = MB.	83A006 83A371
	C ₆ H ₅ CH ₃	8.9 × 10 ⁸			PL/Ld-2	S = PPDME; $\Delta H^\ddagger = -5$ (4) kJ mol ⁻¹ ; $\Delta S^\ddagger = -109$ (-70) J K ⁻¹ mol ⁻¹ ; $E_a = -3$ (7) kJ mol ⁻¹ ; studied at 183-363 K; pre-excimer-equilibrium limit (and diffusion limit).	88A427
	C ₆ H ₅ CH ₃		4 × 10 ⁻⁵		CP/Ac-15	S = Tetr.	84F197
	C ₆ H ₅ CH ₃	4.3 × 10 ⁸ (k_r)	1.2 × 10 ⁻⁴ (β_r)	298	CP/Ac-14	S = A; used $k_d = 5.0 \times 10^4$ s ⁻¹ .	84F240
	C ₆ H ₅ CH ₃	6.7 × 10 ⁸			PL/Ad-8	S = An.	82A349
	C ₆ H ₅ CH ₃	8.1 × 10 ⁸			PR/Ad-5	S = Np; $\Delta H^\ddagger = 0$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -82.4$ J K ⁻¹ mol ⁻¹ ; studied at 223-353 K.	79A106
	C ₆ H ₅ CHOHCH ₃	1.0 × 10 ⁹		293	PL/Ad-8	S = MB.	83A006 83A371
	C ₆ H ₅ CO ₂ CH ₃	2.8 × 10 ⁸	8.9 × 10 ⁻⁵		CP/Ac-15	S = MB; used $k_d = 2.5 \times 10^4$ s ⁻¹ ; Solvent contained 1% MeOH.	74F646
	C ₆ H ₅ CO ₂ CH ₃	4 × 10 ⁸			PL/Ad-8	S = MB; Solvent contained 1% MeOH.	74F646
	C ₆ H ₅ Cl	7.0 × 10 ⁸		293	PL/Ad-8	S = MB.	83A006 83A371
	C ₆ H ₅ Cl/ 2-PrOH (90:10)	7 × 10 ⁸		273	CR/LI-12	used $k_d = 4.1 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from hydrotrioxide, e.g. (CH ₃) ₂ C(OH)OOOH.	90M125
	C ₆ D ₆	2.8 × 10 ⁷			PL/Ad-5	S = 2-ACN.	81A287
	C ₆ H ₆	8.0 × 10 ⁸			PL/Ad-5	S = 2-ACN; used $k_d = 4.0 \times 10^4$ s ⁻¹ .	84F005
	C ₆ H ₆		6.0 × 10 ⁻⁵		CP/Ac-15	S = HCD.	84F197
	C ₆ H ₆	7.0 × 10 ⁸ (k_r)	6.0 × 10 ⁻⁵ (β_r)	298	CP/Ac-14	S = A; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	84F240
	C ₆ H ₆	6.7 × 10 ⁸			PL/Ad-5	S = 2-ACN.	81A287
	C ₆ H ₆		4.0 × 10 ⁻⁵		CP/Ac-15	S = Rub.	78E036
	C ₆ H ₆	9.4 × 10 ⁸			PR/Ad-5	S = Np, An, BP, Benzil.	78E263
	C ₆ H ₆	7.0 × 10 ⁸ (k_r)	6.0 × 10 ⁻⁵	298	CP/Ac, A'c-17	S = A' = Rub; used $k_r^{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 17$.	747312
	C ₆ H ₆	5 × 10 ⁸	8 × 10 ⁻⁵		CP/Ac-15	S = MB; used $k_d = 3.8 \times 10^4$ s ⁻¹ ; Solvent contained 1% MeOH.	74F646
	C ₆ H ₆	4 × 10 ⁸			PL/Ad-8	S = MB; Solvent contained 1% MeOH.	74F646

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
5.83 Isobenzofuran, 1,3-diphenyl- (DPBF) — Continued							
	C ₆ H ₆		6.0×10^{-5}	298	CP/Ac-15	S = A.	74F649
	C ₆ H ₆		6.0×10^{-5} (β)	298	CP/Ac,A'c-17	S = A' = Rub; meas. $k_r/k_r^{A'} = 17$; used $\beta_r^{A'} = 1.0 \times 10^{-3}$ mol L ⁻¹ .	74F649
	C ₆ H ₆	2×10^9		298	PL/Ad-8	S = An.	737438
	C ₆ H ₆ / MeOH (80:20)	2×10^9	2×10^{-5}		CP/Ac-15	S = MB; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	74F646
	C ₆ H ₆ / MeOH (80:20)	1.0×10^9 (k_r)			CP/Ac,A'c-17	S = MB; A' = DPF; $k_r^{A'}$ not given.	74F646
	C ₆ H ₆ / MeOH (80:20)	9×10^8			PL/Ad-8	S = MB.	737014
	CCl ₃ CH ₂ OH	3×10^8			PL/Ad-8	S = MB; Solvent contained 1% MeOH.	74F646
	CCl ₄	8×10^8			MP/LI-12	S = PP, Ph a or BPh a; used $k_d = 36$ s ⁻¹ .	79A010
	CCl ₄	8.0×10^8			MP/LI-12	S = Ret; used $k_d = 36$ s ⁻¹ .	79F463 78F700
	CCl ₄	1.1×10^8	1.2×10^{-5}	298	CP/Ac-15	S = MB; used $k_d = 1.4 \times 10^3$ s ⁻¹ .	78F061
	CCl ₄	2.6×10^8			PL/Ad-8	S = MB; Solvent contained 1% MeOH.	74F646
	CCl ₄ / MeOH (99:1)	7.3×10^8		298	FP/Ad-5	S = MB.	78E238
	CCl ₄ / MeOH (98:2)	2.9×10^8		293	PL/Ad-8	S = MB.	83A006 83A371
	CCl ₄ / MeOH (98:2)	4.8×10^8		298	FP/Ad-5	S = MB.	78E238
	CCl ₄ / MeOH (97:3)	5.4×10^8		298	FP/Ad-5	S = MB.	78E238
	CCl ₄ / MeOH (96:4)	5.2×10^8		298	FP/Ad-5	S = MB.	78E238
	CCl ₄ / MeOH (95:5)	6.0×10^8		298	FP/Ad-5	S = MB.	78E238
	CCl ₄ / MeOH (94:6)	2.5×10^8			PL/Ad-8	S = MB.	74F646
	CCl ₄ / MeOH (90:10)	3×10^8			PL/Ad-8	S = MB.	74F646
	CCl ₄ / MeOH (86:14)	2.6×10^8			PL/Ad-8	S = MB.	74F646
	CCl ₄ / MeOH (83:17)	2.6×10^8			PL/Ad-8	S = MB.	74F646
	CF ₃ CH ₂ OH	1.2×10^8 (k_r)			CP/Ac,A'c-17	S = MB; A' = DPF; $k_r^{A'}$ not given. Solvent contained 1% MeOH.	74F646
	CF ₃ CH ₂ OH	2×10^8	1×10^{-4}		CP/Ac-15	S = MB; used $k_d = 2.3 \times 10^4$ s ⁻¹ ; Solvent contained 1% MeOH.	74F646
	CF ₃ CH ₂ OH	6×10^8			PL/Ad-8	S = MB; Solvent contained 1% MeOH.	74F646
	CH ₂ Cl ₂	1.6×10^9	1.0×10^{-5}	298	CP/Ac-15	S = MB; used $k_d = 1.6 \times 10^4$ s ⁻¹ .	78F061
	CH ₂ Cl ₂	1.1×10^9		298	PL/Ad-5	S = MB.	78F061
	CH ₂ Cl ₂	8×10^8			PL/Ad-8	S = MB.	74F646
	CH ₂ Cl ₂	6.3×10^8 (k_r)			CP/Ac,A'c-17	S = MB; A' = DPF; used $k_r^{A'} = 8.6 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 7.3$.	74F646
	CH ₂ FCI ₂ OH	5×10^8			PL/Ad-8	S = MB; Solvent contained 1% MeOH.	74F646
	CH ₃ CHCl ₂	6.0×10^8		298	PL/Ad-5	S = MB.	78F061
	CH ₃ CHCl ₂	1.0×10^9	1.5×10^{-5}	298	CP/Ac-15	S = MB; used $k_d = 1.5 \times 10^4$ s ⁻¹ .	78F061
	CH ₃ CN	1.4×10^9		298	PL/Ad-8	S = An; $\Delta V^\ddagger = -15$ cm ³ mol ⁻¹ ; studied at 0.1-400 MPa.	92A014 90A018
	CH ₃ CN		1.3×10^{-5}	293	CP/Ac-14	S = MB.	87F440
	CH ₃ CN	1.1×10^9			PL/Ad-8	S = An.	82A349
	CH ₃ CN	1.3×10^9			PL/Ad-5	S = 2-ACN.	81A287
	CH ₃ CN	1×10^9	2×10^{-5}		CP/Ac-15	S = MB; used $k_d = 1.8 \times 10^4$ s ⁻¹ .	74F646

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
1.4.1 Isobenzofuran, 1,3-diphenyl- (DPBF) — Continued							
	CH ₃ CN	6.6×10^8			PL/Ad-8	S = MB.	74F646
	CH ₃ CN	1.1×10^9 (k_T)			CP/Ac,A'c-17	S = MB; A' = DPF; used $k_T^{A'} = 2.0 \times 10^8$ L mol ⁻¹ s ⁻¹ ; meas. $k_T/k_T^{A'} = 5.6$.	74F646
	CH ₃ CO ₂ C ₂ H ₅	8×10^8			PL/Ad-8	S = MB.	74F646
	CH ₃ CO ₂ C ₂ H ₅	3.5×10^8 (k_T)			CP/Ac,A'c-17	S = MB; A' = DPF; used $k_T^{A'} = 3.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_T/k_T^{A'} = 12$.	74F646
	CH ₃ COCH ₃	4.1×10^8 (k_T)	9.4×10^{-5} (β_T)	298	CP/Ac-14	S = A; used $k_d = 3.9 \times 10^4$ s ⁻¹ .	84F240
	CH ₃ COCH ₃	6.4×10^8			PL/Ad-8	S = An.	82A349
	CH ₃ COCH ₃	1.0×10^9			PL/Ad-5	S = 2-ACN.	81A287
	CH ₃ COCH ₃	5×10^8	5×10^{-5}		CP/Ac-15	S = MB; used $k_d = 2.4 \times 10^4$ s ⁻¹ .	74F646
	CH ₃ COCH ₃	6×10^8			PL/Ad-8	S = MB.	74F646
	CH ₃ COCH ₃	1.7×10^9 (k_T)			CP/Ac,A'c-17	S = MB; A' = DPF; used $k_T^{A'} = 1.8 \times 10^8$ L mol ⁻¹ s ⁻¹ ; meas. $k_T/k_T^{A'} = 9.4$.	74F646
	CHCl ₃	4.9×10^8			PL/Ad-5	S = 2-ACN.	81A287
	CHCl ₃	9.0×10^8	1.0×10^{-5}	298	CP/Ac-15	S = MB; used $k_d = 9.0 \times 10^3$ s ⁻¹ .	78F061
	CHCl ₃	7.0×10^8		298	PL/Ad-5	S = MB.	78F061
	CHCl ₃	1.4×10^8 (k_T)			CP/Ac,A'c-17	S = MB; A' = DPF; used $k_T^{A'} = 4.9 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_T/k_T^{A'} = 2.9$.	74F646
	CHCl ₃	3.6×10^8			PL/Ad-8	S = MB.	74F646
	CHCl ₃ / MeOH (90:10)	5×10^8	8×10^{-5}		CP/Ac-15	S = RB; used $k_d = 3.9 \times 10^4$ s ⁻¹ .	753071
	CHCl ₃ / MeOH (90:10)	5×10^8 (k_T)			CP/Ac-14	S = RB; k_T derived using $\phi_{isc}(RB) = 0.66$ and $k_A = 5 \times 10^8$ L mol ⁻¹ s ⁻¹ .	753071
	CS ₂		7.5×10^{-6}		CP/Ac-15	S = Rub.	84F197
	CS ₂ / MeOH (98:2)	3.0×10^8			FP/Ad-5	S = MB.	737334
	Cl ₂ CHCH ₂ OH	5.7×10^8			PL/Ad-8	S = MB.	74F646
	Cl ₂ CHCHCl ₂	4.4×10^8		298	PL/Ad-5	S = MB.	78F061
	Cl ₂ CHCHCl ₂	5.9×10^8	1.4×10^{-5}	298	CP/Ac-15	S = MB; used $k_d = 8.3 \times 10^3$ s ⁻¹ .	78F061
	CICF ₂ CCl ₂ F	9×10^8		293	PL/Ad-10	high pressure O ₂ .	79A113
	CICF ₂ CCl ₂ F	5×10^8 (k_T)		293	CL/Ad-36	high pressure O ₂ ; used $k_{O_2} = 2.5 \times 10^3$ L mol ⁻¹ s ⁻¹ .	79A113
	D ₂ O (mic)	1.0×10^9			PL/Ad-5	S = HYP; BRIJ 35 micelles.	88N343
	D ₂ O (mic)	6.2×10^8		295	PL/Ad-5	S = 2-ACN; 4.0×10^{-2} mol L ⁻¹ DDAB.	82N027
	D ₂ O (mic) pD = 7.4	1.0×10^9			PL/Ad-5	S = MB; 0.1 mol L ⁻¹ SDS.	81N048
	D ₂ O (mic) pD = 7.4	6.7×10^8			PL/Ad-5	S = MB; 0.1 mol L ⁻¹ CTAB.	81N048
	D ₂ O (mic)	1.3×10^9		293	PL/Ad-8	S = MB; 0.1 mol L ⁻¹ SDS.	80N018
	D ₂ O (mic)	6.7×10^8			PL/Ad-5	S = MB; 0.1 mol L ⁻¹ CTAB.	79N041
	D ₂ O (mic)	6.3×10^8			PL/Ad-5	S = 2-ACN; 0.1 mol L ⁻¹ Igepal CO-630.	79N041
	D ₂ O (mic)	6.6×10^8			PL/Ad-5	S = MB; 0.1 mol L ⁻¹ Igepal CO-660.	79N041
	D ₂ O (mic)	9.8×10^8			PL/Ad-5	S = 2-ACN; 0.05 mol L ⁻¹ sodium laurate.	79N041
	D ₂ O (mic)	6.6×10^8			PL/Ad-5	S = 2-ACN; 0.1 mol L ⁻¹ Brij 35.	79N041
	D ₂ O (mic)	1.0×10^9			PL/Ad-5	S = MB; 0.1 mol L ⁻¹ SDS.	79N041
	D ₂ O (mic)	1.1×10^9			PL/Ad-5	S = 2-ACN; 0.1 mol L ⁻¹ SDS.	79N041
	D ₂ O (mic)	6.5×10^8			PL/Ad-5	S = 2-ACN; 0.1 mol L ⁻¹ Igepal CO-660.	79N041
	D ₂ O (mic)	6.2×10^8			PL/Ad-5	S = 2-ACN; 0.1 mol L ⁻¹ CTAB.	79N041
	D ₂ O (mic)	8.4×10^8			PL/Ad-5	S = 2-ACN; 0.1 mol L ⁻¹ SDS.	78E144

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
5.83 Isobenzofuran, 1,3-diphenyl- (DPBF) — Continued							
	D ₂ O (ves) pD = 7	2.3×10^{10}	1.1×10^{-6}	293	CP/Ac-15	S = HYP; used $k_d = 2.5 \times 10^4$ s ⁻¹ ; 5×10^{-4} mol L ⁻¹ DPPC.	92N201
	DMF	1.1×10^9			CP/Ac-15	S = HPDME; used $k_d = 1.0 \times 10^5$ s ⁻¹ .	92F505
	DMF		2.0×10^{-5} (β_r)		CP/Ac-14	S = RB.	79F412
	DMSO	$\geq 2.8 \times 10^8$	1.2×10^{-4}		CP/Ac-15	S = CuTCPC; used $k_d = 3.3 \times 10^4$ s ⁻¹ .	89F260
	DMSO/H ₂ O (75:25)	6.9×10^8			CP/Ac-15	S = MB; used $k_d = 1.2 \times 10^5$ s ⁻¹ .	86R210
	EtOH	8.8×10^8			PL/Ad-5	S = HP.	91R206
	EtOH	1×10^9		291	CP/A'c-15	S = Zn(pc)(py) ₂ ; used $k_d = 7.1 \times 10^4$ s ⁻¹ .	88A284
	EtOH	1.1×10^9		291	PL/Ld-2	S = Zn(pc)(py) ₂ .	88A284
	EtOH	4.3×10^8 (k_r)	1.2×10^{-4} (β_r)	298	CP/Ac-14	S = A; used $k_d = 5.3 \times 10^4$ s ⁻¹ .	84F240
	EtOH	1.3×10^9	6.5×10^{-5}	298	CP/Ac-15	S = Eos; used $k_d = 8.3 \times 10^4$ s ⁻¹ .	78F061
	EtOH	1.0×10^9			PL/Ad-8	S = MB.	74F646
	EtOH		2×10^{-4}		CP/Ac-15	S = MB.	74F646
	H ₂ O (mic)	6.2×10^9		303	CP/Ac-20	S = HA; Q = N ₃ ⁻ ; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; 2.3×10^{-4} mol L ⁻¹ TDPB.	92N179
	H ₂ O (mic)	2.3×10^9		303	CP/Ac-20	S = HA; Q = N ₃ ⁻ ; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; 2.2×10^{-4} mol L ⁻¹ Triton X-100.	92N179
	H ₂ O (mic)	5.1×10^9		303	CP/Ac-20	S = HA; Q = N ₃ ⁻ ; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; 2.9×10^{-4} mol L ⁻¹ SDS.	92N179
	H ₂ O (mic)	2.2×10^{10}		313	CP/Ac-23	S = Py; Q = N ₃ ⁻ ; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; S and A' solubilized in SDS micelles.	78A174
	H ₂ O (mic)	2.8×10^{10}		313	CP/Ac-23	S = Py; Q = N ₃ ⁻ ; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; S and A' solubilized in DTAC micelles.	78A174
	H ₂ O (mic)	4.2×10^9	1.2×10^{-4}	298	CP/Ac-15	S = Eos; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; A solubilized in SDS micelles.	78F061
	H ₂ O (mic)	4.7×10^9	1.1×10^{-4}	298	CP/Ac-15	S = MB; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; S and A solubilized in SDS micelles.	78F061
	H ₂ O (mic)	5.2×10^9	9.7×10^{-5}		CP/Ac-15	S = MB; used $k_d = 5 \times 10^5$ s ⁻¹ ; A solubilized in SDS micelles.	767247
	H ₂ O (ves) pH = 7	2.5×10^{10}	1×10^{-5}	293	CP/Ac-15	S = HYP; used $k_d = 2.5 \times 10^5$ s ⁻¹ ; 5×10^{-4} mol L ⁻¹ DPPC.	92N201
	H ₂ O (ves)	$> 3 \times 10^6$		291	PL/Ld-2	S = Zn(pc)(py) ₂ ; unilamellar DPPC vesicles.	88A284
	H ₂ O (ves)	1×10^7		291	CP/A'c-15	S = Zn(pc)(py) ₂ ; used $k_d = 2.5 \times 10^5$ s ⁻¹ ; unilamellar DPPC vesicles.	88A284
	HCONH ₂ /D ₂ O (90:10)	1.1×10^9			PL/Ad-6	S = HP.	83E667
	HMN	3.9×10^8		298	PL/Ad-8	S = Δn ; $\Delta V_{\ddagger}^{\ddagger} = -6$ cm ³ mol ⁻¹ ; studied at 0.1-400 MPa.	92A014
	HOCH ₂ CH ₂ OH	1.5×10^9	3.2×10^{-4}		PL/Ad-8,16	S = MB or RB; k derived using β and $k_D = 5.1 \times 10^{-5}$ s ⁻¹ at [DPBF] = 1.7×10^{-5} mol L ⁻¹ .	737014
	MCH	3.7×10^8		298	PL/Ad-8	S = An; $\Delta V_{\ddagger}^{\ddagger} = -19$ cm ³ mol ⁻¹ ; studied at 0.1-400 MPa.	92A014 90A018
	MeOH	7.2×10^8		298	PL/Ad-8	S = An; $\Delta V_{\ddagger}^{\ddagger} = -20$ cm ³ mol ⁻¹ ; studied at 0.1-400 MPa.	92A014 90A018
	MeOH		8.0×10^{-5}		CP/Ac-14	S = MB.	90F157
	MeOH		7.8×10^{-5}		CP/Ac-14	S = RB.	90F157
	MeOH	9×10^8		293	PL/Ad-5	S = MB.	87E690
	MeOH		7×10^{-5}		CP/Ac-14	S = A; $f_r^A = -1.0$.	87F479
	MeOH	8.1×10^8			PL/Ad-5	S = 2-ACN.	84F005

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
Isobenzofuran, 1,3-diphenyl- (DPBF) — Continued						
MeOH	6.0×10^8 (k_r)	2.4×10^{-4} (β_r)	298	CP/Ac-14	S = A; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	84F240
MeOH	8.3×10^8			PL/Tb-3	S = Ery.	83A050
MeOH	8.1×10^8			PL/Ad-8	S = An.	82A349
MeOH	7.8×10^8			CP/Ac-14	S = FI ² ; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	80N021
MeOH		8.0×10^{-5} (β_r)		CP/Ac-14	S = <i>N</i> -[5-Hydroxy-8-[[2-(methylsulfonyl)-4-nitrophenyl]azo]-1-naphthalenyl-1,3-benzenedisulfonamide, conjugate base.	79F412
MeOH	7.8×10^8			CP/Ac-23	S = Py; Q = N ₃ ; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	78A174
MeOH	1.6×10^9	7.1×10^{-5}	298	CP/Ac-15	S = Ery; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	78F061
MeOH	1.6×10^9		298	PL/Ad-5	S = MB.	78F061
MeOH	1.6×10^9	6.8×10^{-5}	298	CP/Ac-15	S = MB; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	78F061
MeOH	1.0×10^9	1.1×10^{-4}	293	CP/Ac-14	S = Acridine Orange; used $k_d = 1.1 \times 10^5$ s ⁻¹ ; Complicated kinetic treatment.	767105
MeOH		6.4×10^{-5}		CP/Ac-15	S = MB.	767247
MeOH	1.3×10^9	7×10^{-5}		CP/Ac-15	S = MB; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	74F646
MeOH	1.4×10^9 (k_r)			CP/Ac,A'c-17	S = MB; A' = DPF; used $k_r^{A'} = 1.1 \times 10^8$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 12$.	74F646
MeOH	1×10^9			PL/Ad-8	S = RB.	737014
MeOH	1.3×10^9			PL/Ad-8	S = MB.	737014
MeOH	6.1×10^8 (k_r)	2.3×10^{-4} (β_r)		CP/Ac-14	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; used $\phi_{isc}(\text{RB}) = 0.76$.	73F660
MeOH	8×10^8			PL/Ad-5	S = MB.	727260
MeOH		7.3×10^{-5} (β_r)	298	CP/Ac,A'c-17	S = RB; A' = DPF; used $\beta_r^{A'} = 9.5 \times 10^{-4}$ mol L ⁻¹ .	717398
MeOH	7.0×10^8			PL/Ad-5	S = MB.	719325
MeOH/ D ₂ O (90:10)	1.6×10^9			PL/Ad-6	S = HP.	83E667
MeOH/ H ₂ O (50:50)	5.1×10^9	5.5×10^{-5}		PL/Ad-8,16	S = RB or MB; k derived from β and $k_D = (3.7 \pm 1.2) \times 10^{-5}$ s ⁻¹ at [DPBF] = 1.7×10^{-5} mol L ⁻¹ .	737014
MeOH/ HOCH ₂ CH ₂ OH (50:50)	1.9×10^9	6.3×10^{-5}		PL/Ad-8,16	S = MB or RB; k derived from β and $k_D = 1.6 \times 10^{-5}$ s ⁻¹ at [DPBF] = 1.9×10^{-5} mol L ⁻¹ .	737014
CH ₃ OCH ₂ CH ₂ OH	1.2×10^9		293	PL/Ad-5	S = MB.	87E690
2-PrOH	6.1×10^8 (k_r)			CP/Ac,A'c-17	S = MB; A' = DPF; used $k_r^{A'} = 4.8 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 13$; Solvent contained 1% MeOH.	74F646
2-PrOH	5×10^8	1×10^{-4}		CP/Ac-15	S = MB; used $k_d = 5.0 \times 10^4$ s ⁻¹ ; Solvent contained 1% MeOH.	74F646
2-PrOH	1.5×10^8			PL/Ad-8	S = MB; Solvent contained 1% MeOH.	74F646
THF	5.2×10^8 (k_r)	8.4×10^{-5} (β_r)	298	CP/Ac-14	S = A; used $k_d = 4.4 \times 10^4$ s ⁻¹ .	84F240
THF	8.3×10^8 (k_r)			CP/Ac,A'c-17	S = RB; A' = DPF; used $k_r^{A'} = 7.5 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 11$.	74F646
THF	5×10^8			PL/Ad-8	S = RB.	74F646
dioxane	3.1×10^8 (k_r)			CP/Ac,A'c-17	S = RB; A' = DPF; used $k_r^{A'} = 2.7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 11$.	74F646
dioxane	8.4×10^8			PL/Ad-8	S = RB.	74F646
dioxane	1.2×10^9			PL/Ad-8	S = MB.	737014
<i>i</i> -octane	4.4×10^8 (k_r)	1.2×10^{-4} (β_r)	298	CP/Ac-14	S = A; used $k_d = 5.0 \times 10^4$ s ⁻¹ .	84F240

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
5.84	Isobenzofuran, hexaphenyl-						
	MeOH	6.9×10^8 (k_p)			CP/Ac-14	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; used $\phi_{isc}(RB) = 0.76$.	73F660
5.85	Isobenzofuran, 1,3,4,7-tetraphenyl-						
	MeOH	6.6×10^8 (k_p)			CP/Ac-14	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; used $\phi_{isc}(RB) = 0.76$.	73F660
5.86	Psoralen						
	CCl ₄	5.6×10^3			MP/LI-12	S = TPP; used $k_d = 39$ s ⁻¹ .	83E813
5.87	Psoralen, 8-methoxy-						
	CCl ₄	9.4×10^3			MP/LI-12	S = TPP; used $k_d = 39$ s ⁻¹ .	83E813
	H ₂ O	2×10^9			CP/Ac-14	S = A; used $k_d = 2.6 \times 10^5$ s ⁻¹ .	83F188
5.88	Pyran, 5-acetyl-3,4-dihydro-6-methyl-						
	CCl ₄	1.2×10^5		283	CP/A'c-33	S = A' = Rub; used $k_d = 1.1 \times 10^3$ s ⁻¹ ; $k_{A'}$ not given.	90F329
	CH ₃ CN	6.8×10^2		283	CP/A'c-33	S = MB; A' = DPBF; used $k_d = 1.9 \times 10^4$ s ⁻¹ ; $k_{A'}$ not given.	90F329
	CHCl ₃	1.5×10^5		298	CP/A'c-33	S = A' = Rub; used $k_d = 7.1 \times 10^3$ s ⁻¹ ; $\Delta H^\ddagger = -22.6$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -221.6$ J K ⁻¹ mol ⁻¹ ; studied at 283-323 K; $k_{A'}$ not given.	90F329
5.89	Pyran, 5-benzoyl-3,4-dihydro-6-phenyl-						
	CH ₃ CN	1.9×10^3		283	CP/A'c-33	S = MB; A' = DPBF; used $k_d = 7.1 \times 10^3$ s ⁻¹ .	90F329
5.90	Pyran, 3,4-dihydro-						
	CCl ₄	7.9×10^4		283	CP/A'c-33	S = A' = Rub; used $k_d = 1.1 \times 10^3$ s ⁻¹ ; $k_{A'}$ not given.	90F329
	CH ₃ CN	1.8×10^5		283	CP/A'c-33	S = MB; A' = DPBF; used $k_d = 7.1 \times 10^3$ s ⁻¹ ; $k_{A'}$ not given.	90F329
	CH ₃ COCH ₃	7.2×10^4 (k_p)		281	?	S = RB; A' = 1,4-Dioxene; used $k_{A'} = 2.2 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 0.33$.	70F733
	CHCl ₃	7.1×10^4 6.1×10^4		298 323	CP/A'c-33	S = A' = Rub; used $k_d = 7.1 \times 10^3$ s ⁻¹ ; $k_{A'}$ not given.	90F329
5.91	Pyran, 3,4-dihydro-5,6-dimethyl-						
	MeOH	7.2×10^7 (k_p)		286	CP/Oc-29	S = RB; A' = 2,5-DMF; used $k_d = 1.4 \times 10^5$ s ⁻¹ , $k_{A'} = 1.8 \times 10^8$ L mol ⁻¹ s ⁻¹ ; meas. $k_d/k_r \leq 0.1$; 24% [2+2] cycloaddition.	91F163
5.92	Pyran-4-d, 2,3-dihydro-4-methyl-						
	C ₆ H ₆			?	?	S = TPP; A' = 2,3-Dihydro-4-methylpyran; meas. $k_r^A/k_r = 1.087$.	777645
	CH ₃ CN			?	?	S = MB; A' = 2,3-Dihydro-4-methylpyran; meas. $k_r^A/k_r = 1.787$.	777645
5.93	Pyran-4-t, 2,3-dihydro-4-methyl-						
	C ₆ H ₆				CP/Ac,A'c-17	S = TPP; A' = 2,3-Dihydro-4-methylpyran; meas. $k_r^A/k_r = 1.335$.	777645
	CH ₃ CN				Ac,A'c-17	S = MB; A' = 2,3-Dihydro-4-methylpyran; meas. $k_r^A/k_r = 1.211$.	777645
5.94	Pyran-5-t, 2,3-dihydro-4,4-dimethyl-						
	C ₆ H ₆				CP/Ac,A'c-17	S = TPP; A' = 2,3-Dihydro-4,4-dimethylpyran; meas. $k_r^A/k_r = 0.897$.	777645
	CH ₃ CN				CP/Ac,A'c-17	S = MB; A' = 2,3-Dihydro-4,4-dimethylpyran; meas. $k_r^A/k_r = 0.897$.	777645

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.95	Pyran-5-<i>t</i>, 2,3-dihydro-4-methyl-						
	C ₆ H ₆				CP/Ac,A'c-17	S = TPP; A' = 2,3-Dihydro-4-methylpyran; meas. $k_r^{A'}/k_r = 0.908$.	777645
	CH ₃ CN				CP/Ac,A'c-17	S = MB; A' = 2,3-Dihydro-4-methylpyran; meas. $k_r^{A'}/k_r = 0.866$.	777645
4.96	Pyran-6-<i>t</i>, 2,3-dihydro-4,4-dimethyl-						
	C ₆ H ₆				CP/Ac,A'c-17	S = TPP; A' = 2,3-Dihydro-4,4-dimethylpyran; meas. $k_r^{A'}/k_r = 0.994$.	777645
	CH ₃ CN				CP/Ac,A'c-17	S = MB; A' = 2,3-Dihydro-4,4-dimethylpyran; meas. $k_r^{A'}/k_r = 1.0$.	777645
4.97	Pyran-6-<i>t</i>, 2,3-dihydro-4-methyl-						
	C ₆ H ₆				CP/Ac,A'c-17	S = TPP; A' = 2,3-Dihydro-4-methylpyran; meas. $k_r^{A'}/k_r = 0.98$.	777645
	CH ₃ CN				CP/Ac,A'c-17	S = MB; A' = 2,3-Dihydro-4-methylpyran; meas. $k_r^{A'}/k_r = 1.07$.	777645
4.98	Pyran-5-carboxylic acid, 3,4-dihydro-6-methyl-, ethyl ester						
	C ₆ D ₆	4.3×10^4		298	CP/Oc-17	S = TPP; A' = DPBF; rel. to $k_A = 1 \times 10^5$ L mol ⁻¹ s ⁻¹ measured in CH ₃ CN.	90F329
	C ₆ H ₆	2.4×10^4		298	CP/Oc-17	S = TPP; A' = DPBF; rel. to $k_A = 1 \times 10^5$ L mol ⁻¹ s ⁻¹ measured in CH ₃ CN.	90F329
	CCl ₄	3.9×10^4		298	CP/A'c-33	S = A' = Rub; used $k_d = 1.1 \times 10^3$ s ⁻¹ ; $\Delta H^\ddagger = -22.6$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -191.5$ J K ⁻¹ mol ⁻¹ ; studied at 283-323 K; $k_{A'}$ not given.	90F329
	CCl ₄	4.3×10^4		298	CP/Oc-17	S = TPP; A' = DPBF; rel. to $k_A = 1 \times 10^5$ L mol ⁻¹ s ⁻¹ measured in CH ₃ CN.	90F329
	CD ₃ CN	1.1×10^5		298	CP/Oc-17	S = MB; A' = DPBF; rel. to $k_A = 1 \times 10^5$ L mol ⁻¹ s ⁻¹ measured in CH ₃ CN.	90F329
	CH ₂ Cl ₂	5.4×10^4		298	CP/Oc-17	S = TPP; A' = DPBF; rel. to $k_A = 1 \times 10^5$ L mol ⁻¹ s ⁻¹ measured in CH ₃ CN.	90F329
	CH ₃ CN	1.0×10^5		298	CP/A'c-33	S = MB; A' = DPBF; used $k_d = 1.9 \times 10^4$ s ⁻¹ ; $\Delta H^\ddagger = -22.8$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -222.5$ J K ⁻¹ mol ⁻¹ ; studied at 283-323 K; $k_{A'}$ not given.	90F329
	CHCl ₃	4.0×10^4		298	CP/A'c-33	S = A' = Rub; used $k_d = 7.1 \times 10^3$ s ⁻¹ ; $\Delta H^\ddagger = -19.1$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -220.9$ J K ⁻¹ mol ⁻¹ ; studied at 283-323 K; $k_{A'}$ not given.	90F329 91F497
4.99	Pyran-5-carboxylic acid, 3,4-dihydro-6-(1-methylethyl)-, ethyl ester						
	CCl ₄	5.5×10^3		298	CP/A'c-33	S = A' = Rub; k_d and $k_{A'}$ not given.	91F497
	CH ₃ CN	1.1×10^5		298	CP/A'c-33	S = MB; A' = DPBF; k_d and $k_{A'}$ not given.	91F497
	CHCl ₃	4.3×10^4		298	CP/A'c-33	S = A' = Rub; $\Delta H^\ddagger = -17.4$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -215$ J K ⁻¹ mol ⁻¹ ; studied at 273-323 K; k_d and $k_{A'}$ not given.	91F497
5.100	Pyran-5-carboxylic acid, 3,4-dihydro-6-phenyl-, ethyl ester						
	CCl ₄	2.8×10^4		283	CP/A'c-33	S = A' = Rub; used $k_d = 1.1 \times 10^3$ s ⁻¹ ; $k_{A'}$ not given.	90F329
	CH ₃ CN	1.1×10^5		283	CP/A'c-33	S = MB; A' = DPBF; used $k_d = 1.9 \times 10^4$ s ⁻¹ ; $k_{A'}$ not given.	90F329
	CHCl ₃	1.2×10^4		298	CP/A'c-33	S = A' = Rub; used $k_d = 7.1 \times 10^3$ s ⁻¹ ; $k_{A'}$ not given.	90F329 91F497
5.101	Pyran-5-carboxylic acid, 6-ethyl-3,4-dihydro-, ethyl ester						
	CH ₃ CN	4.1×10^4		298	CP/A'c-33	S = MB; A' = DPBF; k_d and $k_{A'}$ not given.	91F497

TABLE 5. Rate constants for interaction of singlet oxygen with furans, pyrans and other heterocyclic oxygen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
5.101 Pyran-5-carboxylic acid, 6-ethyl-3,4-dihydro-, ethyl ester — Continued							
	CHCl ₃	2.7×10^4		298	CP/A'c-33	S = A' = Rub; $\Delta H^\ddagger = -12.9$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -204.7$ J K ⁻¹ mol ⁻¹ ; studied at 273-323 K; k_d and k_A not given.	91F497
5.102 Sydnone, 3,4-diphenyl-							
	C ₆ H ₆	5.3×10^6		296	PL/A'd-5	S = NMTA; A' = DPBF.	86A203
	MeOH	2.8×10^6		296	PL/A'd-5	S = NMTA; A' = DPBF.	86A203
5.103 Sydnone, 4-methyl-3-(4-methylphenyl)-							
	<i>c</i> -C ₆ H ₁₂	$\sim 1.0 \times 10^7$		296	PL/A'd-5	S = CQ; A' = DPBF.	86A203
	C ₆ H ₆	4.0×10^7		296	PL/A'd-5	S = NMTA; A' = DPBF.	86A203
	CCl ₄	1.8×10^7		296	PL/A'd-5	S = CQ; A' = DPBF.	86A203
	CH ₃ CN	4.9×10^7		296	PL/A'd-5	S = CQ; A' = DPBF.	86A203
	CH ₃ COCH ₃	4.2×10^7		296	PL/A'd-5	S = NMTA; A' = DPBF.	86A203
	MeOH	1.7×10^7		296	PL/A'd-5	S = NMTA; A' = DPBF.	86A203
5.104 Sydnone, 3-(4-methylphenyl)-							
	C ₆ H ₆	$\leq 5 \times 10^5$		296	PL/A'd-5	S = CQ; A' = DPBF.	86A203
	MeOH	$\leq 5 \times 10^5$		296	PL/A'd-5	S = NMTA; A' = DPBF.	86A203
5.105 Sydnone, 3-methyl-4-phenyl-							
	C ₆ H ₆	2.7×10^6		296	PL/A'd-5	S = NMTA; A' = DPBF.	86A203
	MeOH	2.2×10^6		296	PL/A'd-5	S = NMTA; A' = DPBF.	86A203
5.106 Sydnone, 3-(4-methylphenyl)-4-phenyl-							
	C ₆ H ₆	5.4×10^6		296	PL/A'd-5	S = NMTA; A' = DPBF.	86A203
	MeOH	3.5×10^6		296	PL/A'd-5	S = NMTA; A' = DPBF.	86A203
5.107 Sydnone, 3-phenyl-							
	C ₆ H ₆	$\leq 5 \times 10^5$		296	PL/A'd-5	S = CQ; A' = DPBF.	86A203
	MeOH	$\leq 5 \times 10^5$		296	PL/A'd-5	S = NMTA; A' = DPBF.	86A203

TABLE 6. Rate constants for interaction of singlet oxygen with pyrroles, oxazoles, pyridines and other heterocyclic nitrogen compounds.

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.1	1,8-Acridinedione, 3,4,6,7,9,10-hexahydro-3,3,6,6-tetramethyl- CHCl ₃	2.0 × 10 ⁶			PL/Ld-2	S = MPDEE or PdMPDEE.	81A327
4.1	Carbazole, 2,3,4,9-tetrahydro-9-methyl- MeOH			293	CP/Ac-17	S = RB; A' = 9-Acetyl-2,3,4,9-tetrahydrocarbazole; meas. $k_r/k_r^{A'}$ = 59.	79F434
4.1	Carbazole, 2,3,4,9-tetrahydro-9-methyl-6-nitro- MeOH			293	CP/Ac-17	S = RB; A' = 9-Acetyl-2,3,4,9-tetrahydrocarbazole; meas. $k_r/k_r^{A'}$ = 4.8.	79F434
4.4	Cyclopenta[<i>b</i>]quinoline, 4-methyl-1,2-diphenyl- C ₆ H ₆	3.0 × 10 ⁶	0.014		CP/Ac-15	S = A; used k_d = 4.2 × 10 ⁴ s ⁻¹ .	78F438
4.4	Histamine H ₂ O pH = 7.1	2.8 × 10 ⁷		298	CP/Oc-19	S = Phenosafranine; Q = N ₃ ⁻ ; used k_Q = 2 × 10 ⁸ L mol ⁻¹ s ⁻¹ .	78A360
	H ₂ O	2.0 × 10 ⁸	2.5 × 10 ⁻³	298	CP/Ac-15	S = MB; used k_d = 5.0 × 10 ⁵ s ⁻¹ .	78F061
4.4	Imidazole D ₂ O pD = 7	2 × 10 ⁷			PL/Ld-2	S = Carboxyanthracene.	92E225
	D ₂ O/ EtOH (75:25)	1.4 × 10 ⁷ (k_r)		295	CP/Ac-14,28	S = RB; used k_d = 4.8 × 10 ⁴ s ⁻¹ ; DMA as actinometer, used k_A = 2.4 × 10 ⁷ L mol ⁻¹ s ⁻¹ .	94A113
	D ₂ O/ EtOH (75:25)	2.4 × 10 ⁷		295	PL/Ld-2	S = RB.	94A113
	H ₂ O	3.4 × 10 ⁷ (k_r)		298	CP/Oc-14	S = H ₂ TPPS ⁺ ; used k_d = 2.5 × 10 ⁵ s ⁻¹ ; E_a = 30.2 kJ mol ⁻¹ ; log(A) = 12.8; studied at 288-318 K; phosphate buffer contg. 1.6% NaCl.	91R053
	H ₂ O pH = 7.0	3.4 × 10 ⁷			CP/Oc-19	S = HP; Q = N ₃ ⁻ ; used k_Q = 2 × 10 ⁸ L mol ⁻¹ s ⁻¹ .	78A278
	H ₂ O pH = 7.1	4 × 10 ⁷		298	CP/Oc-19	S = Phenosafranine; Q = N ₃ ⁻ ; used k_Q = 2 × 10 ⁸ L mol ⁻¹ s ⁻¹ .	78A360
	H ₂ O (mic) pH = 7.0	2.0 × 10 ⁷			CP/Oc-19	S = Chl a; Q = N ₃ ⁻ ; used k_Q = 2 × 10 ⁸ L mol ⁻¹ s ⁻¹ ; 1% Triton X-100; k = 2.9 × 10 ⁷ and 3.9 × 10 ⁷ L mol ⁻¹ s ⁻¹ in 2% and 5% Triton X-100, resp.	78A278
	H ₂ O (mic) pH = 7.0	3.6 × 10 ⁷			CP/Oc-19	S = HP; Q = N ₃ ⁻ ; used k_Q = 2 × 10 ⁸ L mol ⁻¹ s ⁻¹ ; 1% Triton X-100.	78A278
4.7	Imidazole, 4-methyl- D ₂ O/ EtOH (75:25)	1.3 × 10 ⁸		295	PL/Ld-2	S = RB.	94A113
	D ₂ O/ EtOH (75:25)	1.1 × 10 ⁸ (k_r)		295	CP/Ac-14,28	S = RB; used k_d = 4.8 × 10 ⁴ s ⁻¹ ; DMA as actinometer, used k_A = 1.3 × 10 ⁸ L mol ⁻¹ s ⁻¹ .	94A113
4.8	Indole C ₆ H ₅ CH ₃	7.7 × 10 ⁵			PR/A'd-5	S = Np; A' = DPBF; ΔH^\ddagger = 0 kJ mol ⁻¹ ; ΔS^\ddagger = -141 J K ⁻¹ mol ⁻¹ ; studied at 223-353 K.	79A106
	CH ₃ CN	<10 ⁴ (k_r)			CP/Ac,A'c-17	S = ZnTPP; A' = An; used $k_r^{A'}$ = 1.2 × 10 ⁶ L mol ⁻¹ s ⁻¹ .	90F347
	CH ₃ CN	2.5 × 10 ⁶			PL/Ld-2	S = ZnTPP.	90F347
	D ₂ O/ EtOH (75:25)	1.9 × 10 ⁷		295	PL/Ld-2	S = RB.	94A113
	D ₂ O/ EtOH (75:25)	9 × 10 ⁶ (k_r)		295	CP/Ac-14,28	S = RB; used k_d = 4.8 × 10 ⁴ s ⁻¹ ; DMA as actinometer, used k_A = 1.9 × 10 ⁷ L mol ⁻¹ s ⁻¹ .	94A113
	H ₂ O pH = 7.2	7 × 10 ⁷			CP/Ac-14	S = RB; used k_d = 2.5 × 10 ⁵ s ⁻¹ .	88A385
4.9	Indole, 5,6-dimethoxy- CHCl ₃	4.3 × 10 ⁷	2.3 × 10 ⁻⁴		CP/A'c-16	S = A' = Rub; used k_d = 1 × 10 ⁴ s ⁻¹ .	84F670

TABLE 6. Rate constants for interaction of singlet oxygen with pyrroles, oxazoles, pyridines and other heterocyclic nitrogen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
6.10	Indole, 1,3-dimethyl- MeOH			293	CP/Ac-17	S = RB; A' = 9-Acetyl-2,3,4,9-tetrahydrocarbazole; meas. $k_f/k_r^{A'} = 13$.	79F434
6.11	Indole, 2,3-dimethyl- C ₆ H ₅ CH ₃	1.0 × 10 ⁸			PR/A'd-5	S = Np; A' = DPBF; $\Delta H^\ddagger = 0$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -99.2$ J K ⁻¹ mol ⁻¹ ; studied at 223-353 K.	79A106
	D ₂ O (ves)	4.8 × 10 ⁷		295	PL/A'd-5	S = 2-ACN; A' = DPBF; 4.0 × 10 ⁻² mol L ⁻¹ DDAB.	82N027
	D ₂ O (mic) pD = 7.4	7.0 × 10 ⁸			PL/A'd-5	S = MB; A' = DPBF; 0.1 mol L ⁻¹ SDS.	81N048
	D ₂ O (mic) pD = 7.4	4.4 × 10 ⁸			PL/A'd-5	S = MB; A' = DPBF; 0.1 mol L ⁻¹ CTAB.	81N048
6.12	Indole, 5-hydroxy- CHCl ₃	<2 × 10 ⁵	>0.05		CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F670
6.13	Indole, 5-methoxy- CHCl ₃	<2 × 10 ⁵	>0.05		CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F670
6.14	Indole, 5-methoxy-1,2,3-trimethyl- MeOH			293	CP/Ac-17	S = RB; A' = 9-Acetyl-2,3,4,9-tetrahydrocarbazole; meas. $k_f/k_r^{A'} = 98$.	79F434
6.15	Indole, 1-methyl- CH ₃ CN	3.7 × 10 ⁶			PL/Ld-2	S = ZnTPP.	90F347
	CH ₃ CN	<10 ⁴ (k_r)			CP/Ac,A'c-17	S = ZnTPP; A' = An; used $k_r^{A'} = 1.2 \times 10^6$ L mol ⁻¹ s ⁻¹ .	90F347
6.16	Indole, 3-methyl- C ₆ H ₅ CH ₃	9.2 × 10 ⁶			PR/A'd-5	S = Np; A' = DPBF; $\Delta H^\ddagger = 0$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -120$ J K ⁻¹ mol ⁻¹ ; studied at 223-353 K.	79A106
	CH ₂ Cl ₂	6 × 10 ⁶			PL/Ib-3	S = TPP.	83A050
	CH ₃ CN	6.8 × 10 ⁷			PL/Ld-2	S = ZnTPP.	90F347
	CH ₃ CN	2.3 × 10 ⁶ (k_r)			CP/Ac,A'c-17	S = ZnTPP; A' = An; used $k_r^{A'} = 1.2 \times 10^6$ L mol ⁻¹ s ⁻¹ .	90F347
	D ₂ O/ EtOH (75:25)	1.6 × 10 ⁸		295	PL/Ld-2	S = RB.	94A113
	D ₂ O/ EtOH (75:25)	1.2 × 10 ⁸ (k_r)		295	CP/Ac-14,28	S = RB; used $k_d = 4.8 \times 10^4$ s ⁻¹ ; DMA as actinometer, used $k_A = 1.6 \times 10^8$ L mol ⁻¹ s ⁻¹ .	94A113
6.17	Indole, 3-methyl-2-phenyl- C ₆ H ₅ CH ₃	2.1 × 10 ⁷			PR/A'd-5	S = Np; A' = DPBF; $\Delta H^\ddagger = 0$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -113$ J K ⁻¹ mol ⁻¹ ; studied at 223-353 K.	79A106
6.18	Indole, 1,2,3-trimethyl- MeOH			293	CP/Ac-17	S = RB; A' = 9-Acetyl-2,3,4,9-tetrahydrocarbazole; meas. $k_f/k_r^{A'} = 70$.	79F434
6.19	Indole, 1,2,3-trimethyl-5-nitro- MeOH			293	CP/Ac-17	S = RB; A' = 9-Acetyl-2,3,4,9-tetrahydrocarbazole; meas. $k_f/k_r^{A'} = 5.0$.	79F434
6.20	Indole-3-acetate ion H ₂ O pH = 7	9.2 × 10 ⁷ (k_r)			CP/Oc,A'c-17	S = RB; A' = His; used $k_r^{A'} = 8.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91F359
	H ₂ O pH = 7.0	1.0 × 10 ⁹	1.0 × 10 ⁻⁴		CP/Ac-18	S = FMN; Q = N ₃ ; used $k_d = 1.0 \times 10^5$ s ⁻¹ .	86A406

TABLE 6. Rate constants for interaction of singlet oxygen with pyrroles, oxazoles, pyridines and other heterocyclic nitrogen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
6.21	Indole-3-acetic acid						
	CH ₃ CN	4.6×10^5 (k_r)			CP/Ac-29	S = ZnTPP; A' = An; used $k_{A'} = 1.2 \times 10^6$ L mol ⁻¹ s ⁻¹ ; meas. $k_d/k_r = 40 \pm 6$; Used $k_A = 1.9 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F347
	CH ₃ CN	1.9×10^7			PL/Ld-2	S = ZnTPP.	90F347
	D ₂ O/ EtOH (75:25)	7.8×10^7		295	PL/Ld-2	S = RB.	94A113
	H ₂ O pH = 4				CP/A'c-29	S = RB; A' = Met; used $k_{A'} = 2.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_d/k_r = \geq 12 \pm 5$.	90F347
	H ₂ O pH = 4.5	7.7×10^8	1.3×10^{-4}		CP/Ac-18	S = FMN; Q = N ₃ ; used $k_d = 1.0 \times 10^5$ s ⁻¹ .	86A406
	H ₂ O pH = 3.0	5.9×10^8	1.7×10^{-4}		CP/Ac-18	S = FMN; Q = N ₃ ; used $k_d = 1.0 \times 10^5$ s ⁻¹ .	86A406
6.22	Indole-3-butyrate ion						
	H ₂ O pH = 7	7.2×10^7 (k_r)			CP/Oc-17	S = RB; A' = His; used $k_r^{A'} = 8.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91F359
6.23	3-Indolebutyric acid						
	CH ₃ CN	1.3×10^6 (k_r)			CP/A'c-29	S = ZnTPP; A' = An; used $k_{A'} = 1.2 \times 10^6$ L mol ⁻¹ s ⁻¹ ; meas. $k_d/k_r = 32 \pm 3$; Used $k_A = 4.5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F347
	CH ₃ CN	4.5×10^7			PL/Ld-2	S = ZnTPP.	90F347
	H ₂ O pH = 4				CP/A'c-29	S = RB; A' = Met; used $k_{A'} = 2.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_d/k_r = 11 \pm 5$.	90F347
6.24	Indole-3-carbinol						
	CH ₃ CN	6.1×10^5 (k_r)			CP/Ac,A'c-17	S = ZnTPP; A' = An; used $k_r^{A'} = 1.2 \times 10^6$ L mol ⁻¹ s ⁻¹ .	90F347
	CH ₃ CN	1.7×10^7			PL/Ld-2	S = ZnTPP.	90F347
6.25	Indole-2-carboxylic acid						
	CH ₃ CN	$<10^4$ (k_r)			CP/Ac,A'c-17	S = ZnTPP; A' = An; used $k_r^{A'} = 1.2 \times 10^6$ L mol ⁻¹ s ⁻¹ .	90F347
	CH ₃ CN	3.6×10^5			PL/Ld-2	S = ZnTPP.	90F347
6.26	Indole-3-carboxylate ion						
	H ₂ O pH = 7	1.4×10^7 (k_r)			CP/Oc,A'c-17	S = RB; A' = His; used $k_r^{A'} = 8.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91F359
6.27	Indole-3-carboxylic acid						
	CH ₃ CN	1.3×10^5 (k_r)			CP/Ac,A'c-17	S = ZnTPP; A' = An; used $k_r^{A'} = 1.2 \times 10^6$ L mol ⁻¹ s ⁻¹ .	90F347
	CH ₃ CN	5.2×10^5			PL/Ld-2	S = ZnTPP.	90F347
6.28	Indole-3-propionamide						
	D ₂ O/ EtOH (75:25)	7.7×10^7		295	PL/Ld-2	S = RB.	94A113
6.29	Indole-3-propionate ion						
	H ₂ O pH = 7	7.3×10^7 (k_r)			CP/Oc-17	S = RB; A' = His; used $k_r^{A'} = 8.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91F359
6.30	Indole-3-propionic acid						
	CH ₃ CN	6.1×10^5 (k_r)			CP/A'c-29	S = ZnTPP; A' = An; used $k_{A'} = 1.2 \times 10^6$ L mol ⁻¹ s ⁻¹ ; meas. $k_d/k_r = 54 \pm 8$; Used $k_A = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F347
	CH ₃ CN	3.3×10^7			PL/Ld-2	S = ZnTPP.	90F347
	D ₂ O/ EtOH (75:25)	6.6×10^7 (k_r)		295	CP/Ac-14,28	S = RB; used $k_d = 4.8 \times 10^4$ s ⁻¹ ; DMA as actinometer, used $k_A = 9.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	94A113

TABLE 6. Rate constants for interaction of singlet oxygen with pyrroles, oxazoles, pyridines and other heterocyclic nitrogen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
6.30 Indole-3-propionic acid — Continued							
	D ₂ O/ EtOH (75:25)	9.8×10^7		295	PL/Ld-2	S = RB.	94A113
	H ₂ O pH = 4				CP/A'c-29	S = RB; A' = Met; used $k_{A'} = 2.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_d/k_T = 15 \pm 4$.	90F347
6.31 Oxazole, 2,5-diphenyl-							
	H ₂ O/ D ₂ O (50:50 (mic))	1.6×10^8	2.2×10^{-3}	298	CP/Ac-15	S = MB; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; A solubilized in DTAC micelles; solvent mixt. in mole %.	78F061
	H ₂ O/ D ₂ O/ MeOH (20:50:30)	1.6×10^8	1.6×10^{-3}	298	CP/Ac-15	S = MB; used $k_d = 2.6 \times 10^5$ s ⁻¹ ; solvent mixt. in mole %.	78F061
6.32 Oxazole, 2,5-diphenyl-4-methyl-							
	C ₆ H ₆	3.9×10^7	2.0×10^{-3}		CP/Ac-14	S = ?; used $k_d = 8.0 \times 10^4$ s ⁻¹ .	81F622
	CH ₃ (CH ₂) ₄ OH		3.0×10^{-3}		CP/Ac-14	S = ?.	81F622
	DMSO		1.5×10^{-3}		CP/Ac-14	S = ?.	81F622
	EtOH	3.3×10^7	5.5×10^{-3}		CP/Ac-14	S = ?; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	81F622
	MeOH	3.5×10^7	5.8×10^{-3}		CP/Ac-14	S = ?; used $k_d = 2.0 \times 10^5$ s ⁻¹ .	81F622
	dioxane	1.6×10^7	1.8×10^{-3}		CP/Ac-14	S = ?; used $k_d = 2.9 \times 10^4$ s ⁻¹ .	81F622
6.33 Oxazole, 4-methyl-2-(3-chlorophenyl)-5-phenyl-							
	MeOH	1.7×10^7	0.012		CP/Ac-14	S = ?; used $k_d = 2.0 \times 10^5$ s ⁻¹ .	81F622
6.34 Oxazole, 4-methyl-2-(4-chlorophenyl)-5-phenyl-							
	MeOH	1.9×10^7	0.010		CP/Ac-14	S = ?; used $k_d = 2.0 \times 10^5$ s ⁻¹ .	81F622
6.35 Oxazole, 4-methyl-2-(4-methoxyphenyl)-5-phenyl-							
	MeOH	5.3×10^7	3.8×10^{-3}		CP/Ac-14	S = ?; used $k_d = 2.0 \times 10^5$ s ⁻¹ .	81F622
6.36 Oxazole, 4-methyl-2-(4-methylphenyl)-5-phenyl-							
	MeOH	3.7×10^7	5.3×10^{-3}		CP/Ac-14	S = ?; used $k_d = 2.0 \times 10^5$ s ⁻¹ .	81F622
6.37 Oxazole, 4-methyl-2-(4-nitrophenyl)-5-phenyl-							
	MeOH	1.2×10^7	0.017		CP/Ac-14	S = ?; used $k_d = 2.0 \times 10^5$ s ⁻¹ .	81F622
6.38 Phenoxazine							
	C ₆ H ₅ Br/ MeOH (67:33)	1.0×10^7			CP/A'c-23	S = A' = Rub; used $k_d = 4.9 \times 10^4$ s ⁻¹ , $k_{A'} = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777240
6.39 Pyrazolo[1',2':2,3][1,2,3]triazolo[4,5-a]phenazin-4-ium, 1,3-dimethyl-							
	c-C ₆ H ₁₂	4.5×10^7 (k_T)			CP/Ac-14	S = A; used $k_d = 5.9 \times 10^4$ s ⁻¹ .	80F548
	CHCl ₃	3.7×10^7 (k_T)			CP/Ac-14	S = A; used $k_d = 1.7 \times 10^4$ s ⁻¹ .	80F548
	CHCl ₃ / MeOH (80:20)	6.3×10^7 (k_T)			CP/Ac-14	S = RB; used $k_d = 5.4 \times 10^4$ s ⁻¹ ; Used ϕ_A for RB = 0.76.	80F548
	CHCl ₃ / MeOH (80:20)	4.2×10^7 (k_T)			CP/Ac-17	S = RB; A' = DPBF; used $k_T^{A'} = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ .	80F548
	CHCl ₃ / MeOH (80:20)	6.4×10^7 (k_T)			CP/Ac-14	S = A; used $k_d = 5.8 \times 10^4$ s ⁻¹ .	80F548
6.40 Pyridine							
	CCl ₄	2×10^3			PL/A'd-8	S = MB; A' = DPBF.	76F903
6.41 Pyridine, 3,5-diacetyl-1,4-dihydro-							
	CHCl ₃	4.7×10^6			PL/Ld-2	S = MPDEE or PdMPDEE.	81A327
6.42 Pyridine, 3,5-diacetyl-1,4-dihydro-2,6-dimethyl-							
	CHCl ₃	5.1×10^6			PL/Ld-2	S = MPDEE or PdMPDEE.	81A327

TABLE 6. Rate constants for interaction of singlet oxygen with pyrroles, oxazoles, pyridines and other heterocyclic nitrogen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
8.43	Pyridine, 3,5-dibenzoyl-1,4-dihydro-2,6-dimethyl- CHCl ₃	3.8×10^6			PL/Ld-2	S = MPDEE or PdMPDEE.	81A327
8.44	Pyridine-3,5-dicarboxamide, 1,4-dihydro-2,6-dimethyl- <i>N,N</i> -diphenyl- CHCl ₃	7.5×10^7			PL/Ld-2	S = MPDEE or PdMPDEE.	81A327
8.45	Pyridine-3,5-dicarboxamide, 1,4-dihydro-2,4,6-trimethyl- <i>N,N</i> -diphenyl- CHCl ₃	6.5×10^6			PL/Ld-2	S = MPDEE or PdMPDEE.	81A327
8.46	Pyridine-3,5-dicarboxylic acid, 1,4-dihydro-2,6-dimethyl-, dicyclohexyl ester CHCl ₃	6.0×10^6			PL/Ld-2	S = MPDEE or PdMPDEE.	81A327
8.47	Pyridine-3,5-dicarboxylic acid, 1,4-dihydro-2,6-dimethyl-, diethyl ester CHCl ₃	3.4×10^6			PL/Ld-2	S = MPDEE or PdMPDEE.	81A327
8.48	Pyridine-3,5-dicarboxylic acid, 1,4-dihydro-2,6-dimethyl-, dihexyl ester CHCl ₃	5.0×10^6			PL/Ld-2	S = MPDEE or PdMPDEE.	81A327
8.49	Pyridine-3,5-dicarboxylic acid, 1,4-dihydro-2,6-dimethyl-, di(1-methylethyl) ester CHCl ₃	6.6×10^6			PL/Ld-2	S = MPDEE or PdMPDEE.	81A327
8.50	Pyridine-3,5-dicarboxylic acid, 1,4-dihydro-2,6-diphenyl-, diethyl ester CHCl ₃	$<10^5$			PL/Ld-2	S = MPDEE or PdMPDEE.	81A327
8.51	Pyridine-3,5-dicarboxylic acid, 1,4-dihydro-2,4,6-trimethyl-, diethyl ester CHCl ₃	$<10^5$			PL/Ld-2	S = MPDEE or PdMPDEE.	81A327
8.52	Pyridine-3,5-dicarboxylic acid, 2,6-dimethyl-, diethyl ester CHCl ₃	$<10^5$			PL/Ld-2	S = MPDEE or PdMPDEE.	81A327
8.53	Pyridinium, 2,3-dihydro-1-methyl-4-phenyl- D ₂ O	1.7×10^6			PL/Ld-2	S = MB.	91R251
8.54	Pyridinium, 1-methyl- D ₂ O	6.5×10^5			PL/Ld-2	S = MB.	91R251
8.55	Pyridinium, 1-methyl-4-phenyl- D ₂ O	8.9×10^5			PL/Ld-2	S = MB.	91R251
8.56	Pyrido[4,3- <i>b</i>]indole, 2,3,4,4a,5,9b-hexahydro-2,8-dimethyl-, <i>cis</i> -(-), (Stobadine) D ₂ O pD = 7.4	1.3×10^8		310	CR/LI-12	used $k_d = 1.9 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	92A252
8.57	Pyrido[4,3- <i>b</i>]indole, <i>N</i> -acetyl-2,3,4,4a,5,9b-hexahydro-2,8-dimethyl- D ₂ O pD = 7.4	1×10^6		310	CR/LI-12	used $k_d = 1.9 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	92A252
8.58	Pyrido[4,3- <i>b</i>]indole, 1,2,3,4-tetrahydro-2,8-dimethyl- (Dehydrostobadine) D ₂ O pD = 7.4	1.7×10^8		310	CR/LI-12	used $k_d = 1.9 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	92A252
8.59	Pyrrole C ₅ H ₅ N	1.4×10^9		295	PL/Ld-2	S = An.	93E684
	C ₅ H ₅ N	2×10^8			CP/A'c-18	S = TPBC; A' = Tetr; used $k_d = 6.3 \times 10^4$ s ⁻¹ , $k_A = 7 \times 10^6$ L mol ⁻¹ s ⁻¹ ; cor. for $k_q(S) = 10^8$ L mol ⁻¹ s ⁻¹ .	86F670
	1,2-C ₆ H ₄ (CH ₃) ₂	1.8×10^8		295	PL/Ld-2	S = An.	93E684
	C ₆ H ₅ CH ₃	1.7×10^8		295	PL/Ld-2	S = An.	93E684
	C ₆ H ₅ CN	2.1×10^8		295	PL/Ld-2	S = An.	93E684

TABLE 6. Rate constants for interaction of singlet oxygen with pyrroles, oxazoles, pyridines and other heterocyclic nitrogen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
6.59 Pyrrole — Continued							
	C ₆ H ₆	1.5×10^8		295	PL/Ld-2	S = An.	93E684
	C ₆ H ₆	$<1 \times 10^6$			CP/A'c-18	S = TPBC; A' = Tetr; used $k_d = 3.3 \times 10^4$ s ⁻¹ , $k_A = 7 \times 10^6$ L mol ⁻¹ s ⁻¹ ; cor. for $k_q(S) = 10^8$ L mol ⁻¹ s ⁻¹ .	86F670
	CH ₃ COCH ₃	5.4×10^8		295	PL/Ld-2	S = An.	93E684
	CH ₃ COCH ₃	6×10^7			CP/A'c-18	S = TPBC; A' = Tetr; used $k_d = 2.0 \times 10^4$ s ⁻¹ , $k_A = 7 \times 10^6$ L mol ⁻¹ s ⁻¹ ; cor. for $k_q(S) = 10^8$ L mol ⁻¹ s ⁻¹ .	86F670
6.60 Pyrrole, 2,5-dimethyl-							
	MeOH		0.16	293	CP/Oc-15	S = RB; $E_a = 7.1$ kJ mol ⁻¹ .	68F288
6.61 Pyrrole, 1-(1,1-dimethylethyl)-							
	MeOH	1.2×10^8	1.2×10^{-4}		CP/Oc-?	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	75F652
	CH ₃ COCH ₃	3.9×10^7	9.7×10^{-4}		CP/Oc-?	S = MB; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	75F652
6.62 Pyrrole, 2-(1,1-dimethylethyl)-							
	CH ₃ COCH ₃	4.2×10^7	9.0×10^{-4}		CP/Oc-?	S = MB; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	75F652
	MeOH	1.5×10^8	9.3×10^{-4}		CP/Oc-?	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	75F652
6.63 Pyrrole, 3-(1,1-dimethylethyl)-							
	CH ₃ COCH ₃	2.9×10^7	1.3×10^{-3}		CP/Oc-?	S = MB; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	75F652
	MeOH	1.8×10^8	7.8×10^{-4}		CP/Oc-?	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	75F652
6.64 Pyrrole, 1-methyl-							
	C ₆ H ₆	3.7×10^8		295	PL/Ld-2	S = An.	93E684
	CCl ₄	1×10^9	5.5×10^{-8}		CP/LI-12	S = PdTPP; used $k_d = 55$ s ⁻¹ .	87A202
	CH ₃ COCH ₃	2.9×10^8		295	PL/Ld-2	S = An.	93E684
6.65 Pyrrole-2,4-dicarboxylic acid, 5,5'-methylenebis[3-methyl-, tetraethyl ester							
	CCl ₄	2×10^6	2.8×10^{-5}		CP/LI-12	S = PdTPP; used $k_d = 55$ s ⁻¹ .	87A202
6.66 Pyrrole-3,5-dicarboxylic acid, 2,4-dimethyl-, diethyl ester							
	CCl ₄	3×10^6	1.8×10^{-5}		CP/LI-12	S = PdTPP; used $k_d = 55$ s ⁻¹ .	87A202
6.67 Pyrrolo[2,3,4-<i>k</i>,<i>l</i>]acridine-10-one, 1-(4-bromophenyl)-2,3,5,7,8,9-hexahydro-4,4,8,8-tetramethyl-							
	CHCl ₃	2.6×10^8			PL/Ld-2	S = MPDEE.	89F368
6.68 Pyrrolo[2,3,4-<i>k</i>,<i>l</i>]acridine-10-one, 2,3,5,7,8,9-hexahydro-1-(4-methoxyphenyl)-4,4,8,8-tetramethyl-							
	CHCl ₃	2.5×10^8			PL/Ld-2	S = MPDEE.	89F368
6.69 Pyrrolo[2,3,4-<i>k</i>,<i>l</i>]acridine-10-one, 2,3,5,7,8,9-hexahydro-4,4,8,8-tetramethyl-1-phenyl-							
	CHCl ₃	4.2×10^8			PL/Ld-2	S = MPDEE.	89F368
6.70 Pyrrolo[3',2':3,4]cyclopenta[1,2-<i>b</i>]pyridine, 2-(4-ethoxycarbonylphenyl)-1,8-dihydro- (EPCP)							
	CH ₂ Cl ₂	3.6×10^8 (k_r)			CP/Ac-14	S = Rubi; used $k_d = 1 \times 10^4$ s ⁻¹ ; used $\phi_A(\text{Rubi}) = 0.31$.	92F270
	CH ₂ Cl ₂	4.0×10^8			PL/Ld-2	S = MB.	92F270
6.71 Quinoline							
	EtOH	$<1 \times 10^9$		273	CP/Oc-23	S = MB; A' = 2,5-DMF; No measurable effect.	72F518
6.72 Quinoline, 1,2-dihydro-2,2,4-trimethyl-, homopolymer (Permanax 45)							
	EtOH	9.6×10^8		273	CP/Oc-23	S = MB; A' = 2,5-DMF; used $k_d = 7.9 \times 10^4$ s ⁻¹ , $k_A = 5.3 \times 10^8$ L mol ⁻¹ s ⁻¹ ; k calcd. in [81Z251].	72F518

TABLE 6. Rate constants for interaction of singlet oxygen with pyrroles, oxazoles, pyridines and other heterocyclic nitrogen compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
73	Quinoline, 8-hydroxy- CHCl ₃	1.1×10^8	9.5×10^{-5}		CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F670
74	Quinoline, 6-methoxy- CHCl ₃	$<2 \times 10^5$	>0.05		CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F670

TABLE 7. Rate constants for the interaction of singlet oxygen with porphyrins, phthalocyanines and polypyrroles.

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
7.1 Bacteriochlorophyll a							
	(C ₂ H ₅) ₂ O	2.2 × 10 ⁸			PL/Ld-2	S = A.	90E324
	(C ₂ H ₅) ₂ O				CL/Ac,A'c-17	S = A' = Rub; meas. $k_t/k_r^{A'} = 0.035$.	84F193
	C ₅ H ₅ N	5.9 × 10 ⁸			PL/Ld-2	S = A.	90E324
	C ₅ H ₅ N				CL/Ac,A'c-17	S = A' = Rub; meas. $k_t/k_r^{A'} = 0.1$.	84F193
	C ₆ H ₆				CL/Ac,A'c-17	S = A' = Rub; meas. $k_t/k_r^{A'} = 0.82$.	84F193
	CCl ₄	9 × 10 ⁸ 3 × 10 ⁷ (k_r)			MP/LI-12,27	S = TPP; A' = Tetr; used $k_d = 39$ s ⁻¹ .	85F517
	CCl ₄	2 × 10 ⁷ (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 1 \times 10^9$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	82A421
	CCl ₄	10 ⁹			MP/LI-12	S = PP or Ph a; used $k_d = 36$ s ⁻¹ ; also see [78E881, 79A010].	77E617
	CH ₂ Cl ₂				CL/Ac,A'c-17	S = A' = Rub; meas. $k_t/k_r^{A'} = 1.1$.	84F193
	CH ₃ CN				CL/Ac,A'c-17	S = A' = Rub; meas. $k_t/k_r^{A'} = 1.0$.	84F193
	CH ₃ COCH ₃				CL/Ac,A'c-17	S = A' = Rub; meas. $k_t/k_r^{A'} = 0.41$.	84F193
	THF				CL/Ac,A'c-17	S = A' = Rub; meas. $k_t/k_r^{A'} = 0.015$.	84F193
	dioxane				CL/Ac,A'c-17	S = A' = Rub; meas. $k_t/k_r^{A'} = 0.044$.	84F193
7.2 Bacteriochlorophyll b							
	(C ₂ H ₅) ₂ O	5.8 × 10 ⁸			PL/Ld-2	S = A.	90E324
	C ₅ H ₅ N	1 × 10 ⁹			PL/Ld-2	S = A.	90E324
	CCl ₄	2 × 10 ⁹ 2 × 10 ⁸ (k_r)			MP/LI-12,27	S = TPP; A' = Tetr; used $k_d = 39$ s ⁻¹ .	85F517
7.3 Biline-1,19-dione, 3,8,12,17-tetraethyl-22,24-dihydro-2,7,13,18-tetramethyl- (Etiobiliverdin-IVγ)							
	CHCl ₃	1.8 × 10 ⁹ 4.3 × 10 ⁶ (k_r)			CP/Ac-15	S = RBCE; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; k_r derived using $\phi_{isc}(S) = 0.36$.	78F701
	MeOH	5.5 × 10 ⁹ 3.5 × 10 ⁶ (k_r)			CP/Ac-15	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_{isc}(S) = 0.76$.	78F701
7.4 Biline-1,19-dione, 3,8,12,17-tetraethyl-10,22,23,24-tetrahydro-2,7,13,18-tetramethyl- (Etiobilirubin-IVγ)							
	CHCl ₃	3.0 × 10 ⁹ 2.3 × 10 ⁹ (k_r)			CP/Ac-15	S = RBCE; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; k_r derived using $\phi_{isc}(S) = 0.36$.	78F701 79F104
	MeOH/ CHCl ₃ (90:10)	2.2 × 10 ⁹ 8.5 × 10 ⁸ (k_r)			CP/Ac-15	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_{isc}(S) = 0.76$.	78F701 79F104
7.5 Biline-8,12-dipropanoic acid, 2,17-diethenyl-1,10,19,22,23,24-hexahydro-3,7,13,18-tetramethyl-1,19-dioxo- (Bilirubin, BR)							
	C ₆ H ₅ CHOHCH ₃				CP/Ac-17	S = N-[2-[(2-Bromo-4,6-dinitrophenyl)azo]-5-[(2-cyanoethyl)(2-hydroxyethyl)amino]-4-methoxyphenyl]acetamide; $k_A = 0.5$ rel. to k_A in dibutyl terephthalate.	81F609
	<i>o</i> -Terphenyl/ (C ₆ H ₅) ₂ O (50:50)				CP/Ac-17	S = N-[2-[(2-Bromo-4,6-dinitrophenyl)azo]-5-[(2-cyanoethyl)(2-hydroxyethyl)amino]-4-methoxyphenyl]acetamide; $k_A = 0.47$ rel. to k_A in dibutyl terephthalate.	81F609
	(C ₆ H ₅) ₂ / (C ₆ H ₅) ₂ O (25:75)				CP/Ac-17	S = N-[2-[(2-Bromo-4,6-dinitrophenyl)azo]-5-[(2-cyanoethyl)(2-hydroxyethyl)amino]-4-methoxyphenyl]acetamide; $k_A = 0.3$ rel. to k_A in dibutyl terephthalate.	81F609
	C ₆ H ₆	2 × 10 ⁸ (k_r)			CP/A'c-17	S = A' = Rub; used $k_r^{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_t/k_r^{A'} = 4$.	763011
	CCl ₄	2 × 10 ⁸ (k_r)			CP/A'c-17	S = A' = Rub; used $k_r^{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_t/k_r^{A'} = 4$.	763011
	CCl ₄	2 × 10 ⁸ (k_r) 2 × 10 ⁹ (k_q)			CP/A'c-24	S = A' = Rub; used $k_A = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; k_r and k_q derived using $(k/k_A) = 54$, $(k_r/k_r^{A'}) = 4$.	763011

TABLE 7. Rate constants for the interaction of singlet oxygen with porphyrins, phthalocyanines and polypyrroles. — Continued

Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k_t) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
7.5 Bilirubin-8,12-dipropanoic acid, 2,17-diethenyl-1,10,19,22,23,24-hexahydro-3,7,13,18-tetramethyl-1,19-dioxo- (Bilirubin, BR) — Continued						
CHCl ₃	2.8 × 10 ⁹ 3.8 × 10 ⁸ (k_t)			CP/Ac-15	S = RBCE; k_t derived using $\phi_{isc}(S) = 0.36$.	79F104
CHCl ₃	2.1 × 10 ⁸ (k_t)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_t A' = 7 \times 10^8$ L mol ⁻¹ s ⁻¹ ; meas. $k_t/k_t A' = 0.30$.	753071
CHCl ₃	1.3 × 10 ⁹	8 × 10 ⁻⁶	296	CP/Ac-15	S = MB; used $k_d = 1.0 \times 10^4$ s ⁻¹ .	753071
CHCl ₃	1.5 × 10 ⁹	6.7 × 10 ⁻⁶		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 1.0 \times 10^4$ s ⁻¹ .	753071
CHCl ₃	4.3 × 10 ⁸ (k_t)			CP/Ac,P'a-17	S = MB; A' = TME; used $k_t A' = 4.8 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_t/k_t A' = 9.0$.	753071
CHCl ₃ / MeOH (90:10)	1.3 × 10 ⁹	3.1 × 10 ⁻⁵	296	CP/Ac-15	S = RB; used $k_d = 3.9 \times 10^4$ s ⁻¹ .	753071
CHCl ₃ / MeOH (90:10)	4.3 × 10 ⁸ (k_t)			CP/Ac-14	S = RB; k_t derived using $k_A = 2.5 \times 10^9$ L mol ⁻¹ s ⁻¹ and $\phi_{isc}(S) = 0.66$.	753071
CH ₂ Cl ₂	5.0 × 10 ⁸ (k_t) 5.0 × 10 ⁹ (k_t)		308	CR/Ac-19	A' = MNPO ₂ ; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 8.5 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	83A317
ClCF ₂ CCl ₂ F	1 × 10 ⁸ (k_t)			CL/Ad-36	high pressure O ₂ ; k_t derived using $k_{O_2} = 2.7 \times 10^5$ L mol ⁻¹ s ⁻¹ ; Previous value by same workers [747103] low due to overdepletion of A in solution exposed directly to laser beam.	777129
D ₂ O pD = 8.4	1.3 × 10 ⁹		293	PL/Ad-5	S = RB.	79A111
D ₂ O pD = 8.4	<4 × 10 ⁸ (k_t)		293	CP/Ac,A'c-17	S = RB; A' = DPBF; used $k_t A' = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ ; meas. $k_t/k_t A' = 0.4$.	79A111
D ₂ O (mic) pD = 8.4			293	CP/Ac,A'c-17	S = RB; A' = DPBF; meas. $k_t/k_t A' = 0.44$; 0.1 mol L ⁻¹ SDS.	80N018
D ₂ O (mic) pD = 8.4			293	CL/Ad-37	A' = DPBF; meas. $k_A/k_{A'} = 0.13$; high pressure oxygen (0.195 mol L ⁻¹); 0.1 mol L ⁻¹ SDS.	80N018
D ₂ O/EtOH	3.2 × 10 ⁹		310	CR/LI-12	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	89R188
H ₂ O	1 × 10 ⁹ (k_t) 4.7 × 10 ⁹ (k_t)		308	CR/Ac-19	A' = MNPO ₂ ; used $k_d = 3 \times 10^5$ s ⁻¹ , $k_{A'} = 9.0 \times 10^8$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ ; in the presence of excess albumin $k_q = 1.9 \times 10^9$ and $k_t = 8.4 \times 10^8$ L mol ⁻¹ s ⁻¹ .	83A317
MeOH	2.1 × 10 ⁹ 2.8 × 10 ⁸ (k_t)			CP/Ac-15	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; k_t derived using $\phi_{isc}(S) = 0.76$.	79F104
7.6 Bilirubin-8,12-dipropanoic acid, 2,17-diethenyl-1,10,19,22,23,24-hexahydro-3,7,13,18-tetramethyl-1,19-dioxo-, dimethyl ester (Bilirubin IX dimethyl ester)						
CHCl ₃	1.8 × 10 ⁹ 6.7 × 10 ⁸ (k_t)			CP/Ac-15	S = RBCE; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; k_t derived using $\phi_{isc}(S) = 0.36$.	78F701
MeOH	2.3 × 10 ⁹ 5.5 × 10 ⁸ (k_t)			CP/Ac-15	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; k_t derived using $\phi_{isc}(S) = 0.76$.	78F701
7.7 Bilirubin-8,12-dipropanoic acid, 2,17-diethenyl-1,19,22,24-tetrahydro-3,7,13,18-tetramethyl-1,19-dioxo- (Biliverdin)						
CH ₂ Cl ₂	4.6 × 10 ⁹		308	CR/Ac-19	A' = BRH ₂ ; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 5.0 \times 10^8$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	83A317
CHCl ₃	1.7 × 10 ⁹ 1.9 × 10 ⁶ (k_t)			CP/Ac-15	S = RBCE; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; k_t derived using $\phi_{isc}(S) = 0.36$.	78F701
CHCl ₃	≤3 × 10 ⁶ (k_t)			CP/Ac,A'c-17	S = A' = Rub; used $k_t A' = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_t/k_t A' = \leq 0.07$.	763011
CHCl ₃	3.3 × 10 ⁹	5 × 10 ⁻⁶		CP/A'c-23	S = A' = Rub; used $k_d = 1.4 \times 10^4$ s ⁻¹ .	763011
D ₂ O pD = 11.2	9.1 × 10 ⁸		310	CR/A'c-32	A' = DPBF; used $k_d = 1.5 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from Dopamine/H ₂ O ₂ .	89M038
D ₂ O pD = 11.2	1.1 × 10 ⁹		310	CR/A'c-32	A' = DPBF; used $k_d = 1.5 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from DOPA/H ₂ O ₂ .	89M038

TABLE 7. Rate constants for the interaction of singlet oxygen with porphyrins, phthalocyanines and polypyrroles. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
7.7 Biline-8,12-dipropanoic acid, 2,17-diethenyl-1,19,22,24-tetrahydro-3,7,13,18-tetramethyl-1,19-dioxo- (Biliverdin) — Continued							
	D ₂ O pD = 8.4	5.1×10^{10}			CL/A'd-16	A' = BR ² ; used $k_d = 5.0 \times 10^4$ s ⁻¹ ; high pressure O ₂ .	777129
	D ₂ O pD = 8.4	3.0×10^8 (k_r)			CL/Ad-35	used $k_d = 5.0 \times 10^4$ s ⁻¹ ; high pressure O ₂ ; k_r derived using $k_A = 5.1 \times 10^{10}$ L mol ⁻¹ s ⁻¹ .	777129
	D ₂ O pD = 13.4	5×10^8 (k_r)			CL/Ad-35	used $k_d = 5.0 \times 10^4$ s ⁻¹ ; high pressure O ₂ ; k_r derived using $k_A = 1.5 \times 10^{10}$ L mol ⁻¹ s ⁻¹ .	777129
	D ₂ O pD = 13.4	1.5×10^{10}			CL/A'd-16	A' = BR ² ; used $k_d = 5.0 \times 10^4$ s ⁻¹ ; high pressure O ₂ .	777129
	D ₂ O pD = 11.8	4.0×10^8 (k_r)			CL/Ad-35	used $k_d = 5.0 \times 10^4$ s ⁻¹ ; high pressure O ₂ ; k_r derived using $k_A = 6 \times 10^{10}$ L mol ⁻¹ s ⁻¹ .	777129
	D ₂ O pD = 11.8	6×10^{10}			CL/A'd-16	A' = BR ² ; used $k_d = 5.0 \times 10^4$ s ⁻¹ ; high pressure O ₂ .	777129
	D ₂ O/EtOH	2.3×10^9		310	CR/LI-12	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	89R188
	H ₂ O pH = 10.5	5×10^9			CR/LI-12	used $k_d = 5 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NaOCl/H ₂ O ₂ .	87M341
	MeOH	8.4×10^9 2.4×10^6 (k_r)			CP/Ac-15	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_{isc}(S) = 0.76$.	78F701
	MeOH/ H ₂ O (95:5)	4×10^9		310	CR/LI-12	used $k_d = 1.8 \times 10^5$ s ⁻¹ ; soln. cont. 0.05 mol L ⁻¹ MeONa and 5×10^{-4} mol L ⁻¹ CoCl ₂ , ¹ O ₂ * from autoxidation of oxytetracycline.	92M228
7.8 Biline-8,12-dipropanoic acid, 2,17-diethenyl-1,19,22,24-tetrahydro-3,7,13,18-tetramethyl-1,19-dioxo-, dimethyl ester (Biliverdin dimethyl ester)							
	CHCl ₃	1.4×10^9 1.2×10^6 (k_r)			CP/Ac-15	S = RBCE; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; k_r derived using $\phi_{isc}(S) = 0.36$.	78F701
	CICF ₂ CCl ₂ F	6×10^5 (k_r) 8×10^8 (k_q)			CL/A'd-35	A' = BRH ₂ ; high pressure O ₂ ; k derived using $k_{O_2} = 2.7 \times 10^3$ L mol ⁻¹ s ⁻¹ .	777129
	CICF ₂ CCl ₂ F	9×10^8			CL/A'd-16	A' = BRH ₂ ; high pressure O ₂ ; k derived using $k_{O_2} = 2.7 \times 10^3$ L mol ⁻¹ s ⁻¹ .	777129
	MeOH	3.3×10^9 1.6×10^6 (k_r)			CP/Ac-15	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_{isc}(S) = 0.76$.	78F701
7.9 Biline-8,12-dipropanoic acid, 2,17-diethyl-1,10,19,22,23,24-hexahydro-3,7,13,18-tetramethyl-1,19-dioxo- (Mesobilirubin)							
	CHCl ₃	2.8×10^9 5.9×10^8 (k_r)			CP/Ac-15	S = RBCE; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; k_r derived using $\phi_{isc}(S) = 0.36$.	78F701
	MeOH	2.5×10^9 7.9×10^8 (k_r)			CP/Ac-15	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; Soln. contg. 2% NH ₄ OH; k_r derived using $\phi_{isc}(S) = 0.76$.	78F701
7.10 Bilirubin ditaurate							
	D ₂ O/EtOH	1.2×10^9		310	CR/LI-12	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	89R188
7.11 Chlorophyll a							
	(C ₂ H ₅) ₂ O	1×10^8			PL/Ld-2	S = A.	90E324
	C ₃ D ₃ N	9×10^7			PL/Ld-2	S = A.	90E324
	C ₃ H ₅ N	5×10^7	0.02	293	CP/Oc-15	S = A; used $k_d = 1 \times 10^5$ s ⁻¹ .	75F669
	C ₆ H ₆	2.0×10^8			PL/Ld-2	S = TPP.	93R231
	C ₆ H ₆	7.3×10^8			CP/Oc-18	S = A; A' = 2M2P; used $k_d = 4 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.049$ mol L ⁻¹ .	88R136
	C ₆ H ₆ / EtOH (67:33)	1.2×10^7			CP/Ac-19	S = RB; A' = Car; used $k_d = 1 \times 10^5$ s ⁻¹ .	78F404
	CCl ₄	2×10^6 (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 7 \times 10^8$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	82A421
	CCl ₄	4×10^6 (k_r)			CP/Ac,A'c-14,27	S = A; A' = Tetr; k_r derived using $k_A = 7 \times 10^8$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$, $\phi_A = 0.55$.	79A010

TABLE 7. Rate constants for the interaction of singlet oxygen with porphyrins, phthalocyanines and polypyrroles. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
7.11 Chlorophyll a — Continued							
	CCl ₄	7×10^8			MP/LI-12	S = PP, TPP, Ph a or BChl a; used $k_d = 36 \text{ s}^{-1}$; also see [78E881, 78E892, 79A010].	77E617
	EtOH	2.0×10^7	5.0×10^{-3}		CP/Ac-15	S = RB; used $k_d = 1 \times 10^5 \text{ s}^{-1}$.	78F404
7.12 Chlorophyll b							
	C ₆ H ₆	4.2×10^8			CP/Oc-18	S = A; A' = 2M2P; used $k_d = 4 \times 10^4 \text{ s}^{-1}$, $\beta_{A'} = 0.049 \text{ mol L}^{-1}$.	88R136
	CCl ₄	6×10^5 (k_r)			CP/Ac, A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 3 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$, $f_r^{A'} = 1$.	82A421
7.13 Cyanoheмоglobin							
	H ₂ O pH = 7.0	1.2×10^9			CP/Oc-19	S = MB; Q = N ₃ ; used $k_Q = 5 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$; $k = 1.1 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ for subunit α and $2.0 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$ for subunit β .	83A395
7.14 Hematoporphyrin derivative							
	MeOH	5.1×10^8			CP/Oc-16	S = A; A' = FFA; used $k_d = 9.6 \times 10^4 \text{ s}^{-1}$.	88R142
7.15 Hematoporphyrin-human serum albumin complex							
	D ₂ O pH = 7.4	7×10^8			PL/Ld-2	S = A.	87A064
7.16 Methyl acetal of oxidized octaethylpurpurin ethyl ester							
	MeOH	1.2×10^8			PL/Ld-2	S = A.	90E491
7.17 Naphthalocyanine, bis(tribenzylsiloxy)silicon							
	CH ₂ Cl ₂	1.5×10^8			PL/Ld-2	S = A.	93E520
7.18 Naphthalocyanine, bis(trihexylsiloxy)silicon							
	C ₆ H ₆	1.1×10^{10}			PL/Ld-2	S = A.	88E657
	CHCl ₃	3.9×10^8			PL/Ld-2	S = TPP.	90E731 92R076
7.19 Naphthalocyanine, bis(trihexylsiloxy)tin							
	CHCl ₃	5.3×10^9			PL/Ld-2	S = TPP.	90E731 92R076
7.20 Naphthalocyanine, bis(triisobutylsiloxy)silicon							
	CH ₂ Cl ₂	1.5×10^8			PL/Ld-2	S = A.	93E520
7.21 Naphthalocyanine, 1,6,10,15,19,24,28,33-octabutoxy-, palladium(II)							
	C ₆ H ₆	8.8×10^9		295	PL/Ld-2	S = PPDME; energy transfer.	93A380
7.22 Naphthalocyanine, 2,11,20,29-tetrakis(1,1-dimethylethyl)-							
	CHCl ₃	1.0×10^{10}			PL/Ld-2	S = TPP.	90E731 92R076
7.23 Naphthalocyanine, 1,10,19,28-tetraphenyl-, hydroxyaluminum(III)							
	CHCl ₃	2.0×10^9			PL/Ld-2	S = TPP.	90E731 92R076
7.24 Naphthalocyanine, trihexylsiloxyaluminum							
	CHCl ₃	3.3×10^9			PL/Ld-2	S = TPP.	90E731 92R076
7.25 Naphthalocyanine, trihexylsiloxygallium							
	CHCl ₃	1.1×10^{10}			PL/Ld-2	S = TPP.	90E731 92R076

TABLE 7. Rate constants for the interaction of singlet oxygen with porphyrins, phthalocyanines and polypyrroles. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
7.26 Pheophytin a							
	C ₆ H ₆	7.4×10^7			CP/Oc-18	S = A; A' = 2M2P; used $k_d = 4 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.049$ mol L ⁻¹ .	88R136
	CCl ₄	1.4×10^4 (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	82A421
	CCl ₄	1×10^4 (k_r)			CP/Ac,A'c-14,27	S = A; A' = Tetr; k_r derived using $k_A = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	79A010
	CCl ₄	2×10^7			MP/LI-12	S = PP or BChl a; used $k_d = 36$ s ⁻¹ ; also see [78E881, 79A010].	77E617
7.27 Pheophytin b							
	C ₆ H ₆	3.0×10^7			CP/Oc-18	S = A; A' = 2M2P; used $k_d = 4 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.049$ mol L ⁻¹ .	88R136
	CCl ₄	10^3 (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 5 \times 10^6$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	82A421
7.28 20-Phorbinecarboxylic acid, 3,4-didehydro-3,4,8,9,13,14,18,19-octaethyl-18,19-dihydro-, ethyl ester (NT2H2)							
	MeOH	1.5×10^8			PL/Ld-2	S = A.	90E491
7.29 20-Phorbinecarboxylic acid, 3,4-didehydro-3,4,8,9,13,14,18,19-octaethyl-18,19-dihydro-, ethyl ester, dichlorotin(IV)							
	MeOH	1×10^7			PL/Ld-2	S = A.	90E491
7.30 20-Phorbinecarboxylic acid, 3,4,20,21-tetrahydro-3,4,8,9,13,14,18,19-octaethyl-18,19-dihydro-, ethyl ester (NT2)							
	C ₆ H ₆	$\sim 6 \times 10^7$			PL/Ld-2	S = A.	88R200
	MeOH	5×10^7			PL/Ld-2	S = A.	90E491
7.31 20-Phorbinecarboxylic acid, 3,4,20,21-tetrahydro-4,9,14,19-tetraethyl-18,19-dihydro-3,8,13,18-tetramethyl-, ethyl ester, zinc(II) (ZnET2)							
	C ₆ H ₆	5.4×10^8			PL/Ld-2	S = A.	88R200
7.32 3-Phorbinepropanoic acid, 9-acetyl-14-ethyl-13,14-dihydro-21-(methoxycarbonyl)-4,8,13,18-tetramethyl-20-oxo-, 3,7,11,15-tetramethyl-2-hexadecenyl ester (Bacteriopheophytin a)							
	(C ₂ H ₅) ₂ O	3×10^7			PL/Ld-2	S = A.	90E324
	CCl ₄	3×10^4 (k_r)			CP/Ac,A'c-14,27	S = TPP; A' = Tetr; k_r derived using $k_A = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	85F517
	CCl ₄	1.2×10^7			MP/LI-12	S = TPP; used $k_d = 39$ s ⁻¹ .	85F517
	CCl ₄	10^7			MP/LI-12	S = PP, Ph a or BChl a; used $k_d = 36$ s ⁻¹ ; also see [78E881, 79A010].	77E617
7.33 3-Phorbinepropanoic acid, 9-acetyl-14-ethylidene-13,14-dihydro-21-(methoxycarbonyl)-4,8,13,18-tetramethyl-20-oxo-, 3,7,11,15-tetramethyl-2-hexadecenyl ester (Bacteriopheophytin b)							
	(C ₂ H ₅) ₂ O	1.9×10^8			PL/Ld-2	S = A.	90E324
	C ₅ H ₅ N	2.8×10^8			PL/Ld-2	S = A.	90E324
	CCl ₄	3×10^6 (k_r)			CP/Ac,A'c-14,27	S = TPP; A' = Tetr; k_r derived using $k_A = 2 \times 10^8$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	85F517
	CCl ₄	2×10^8			MP/LI-12,27	S = TPP; used $k_d = 39$ s ⁻¹ .	85F517
7.34 3-Phorbinepropanoic acid, 3,4-didehydro-4,9-diethenyl-14-ethyl-21-(methoxycarbonyl)-4,8,13,18-tetramethyl-20-oxo-, magnesium(II), 3,7,11,15-tetramethyl-2-hexadecenyl ester (4-Vinylprotochlorophyll)							
	CCl ₄	$\leq 3 \times 10^5$ (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = \leq 1 \times 10^8$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	82A421
7.35 3-Phorbinepropanoic acid, 3,4-didehydro-4,9-diethenyl-14-ethyl-21-(methoxycarbonyl)-4,8,13,18-tetramethyl-20-oxo-, 3,7,11,15-tetramethyl-2-hexadecenyl ester (4-Vinylprotopheophytin)							
	CCl ₄	$\sim 2 \times 10^5$ (k_r)				S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 2 \times 10^8$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	82A421

TABLE 7. Rate constants for the interaction of singlet oxygen with porphyrins, phthalocyanines and polypyrroles. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
7.36	3-Phorbinopropanoic acid, 3,4-didehydro-9-ethenyl-14-ethyl-21-(methoxycarbonyl)-4,8,13,18-tetramethyl-20-oxo-, 2-amino-2-(methoxycarbonyl)ethyl ester, magnesium(II)						
	C ₆ H ₆	2.4 × 10 ⁸			PL/Ld-2	S = TPP.	93R231
	D ₂ O	1.0 × 10 ⁸			PL/Ld-2	S = Ru(bpy) ₃ ²⁺ .	93R231
7.37	3-Phorbinopropanoic acid, 3,4-didehydro-9-ethenyl-14-ethyl-21-(methoxycarbonyl)-4,8,13,18-tetramethyl-20-oxo-, magnesium(II) (Protochlorophyllide)						
	C ₆ H ₆	2.0 × 10 ⁸			PL/Ld-2	S = TPP.	93R231
	D ₂ O	1.6 × 10 ⁸			PL/Ld-2	S = Ru(bpy) ₃ ²⁺ .	93R231
7.38	3-Phorbinopropanoic acid, 3,4-didehydro-9-ethenyl-14-ethyl-21-(methoxycarbonyl)-4,8,13,18-tetramethyl-20-oxo-, 3,7,11,15-tetramethyl-2-hexadecenyl ester (Protopeophytin)						
	CCl ₄	~10 ⁸ (k_r)			CP/Ac,A'c-14,27	S = A; A' = Tetr; k_r derived using $k_A = 2 \times 10^8$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	79A010
	CCl ₄	2 × 10 ⁸			MP/LI-12	S = PP, Ph a or BChl a; used $k_d = 36$ s ⁻¹ ; also see [78E881, 79A010].	77E617
7.39	3-Phorbinopropanoic acid, 3,4-didehydro-9-ethenyl-14-ethyl-21-(methoxycarbonyl)-4,8,13,18-tetramethyl-20-oxo-, magnesium(II), 3,7,11,15-tetramethyl-2-hexadecenyl ester (Protochlorophyll)						
	CCl ₄	≤10 ⁶ (k_r)			CP/Ac,A'c-14,27	S = A; A' = Tetr; k_r derived using $k_A = \leq 1 \times 10^8$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	79A010
	CCl ₄	≤10 ⁸			MP/LI-12	S = PP, Ph a or BChl a; used $k_d = 36$ s ⁻¹ ; also see [78E881, 79A010].	77E617
7.40	Phthalocyanine, bis(tribenzylsiloxy)silicon						
	CH ₂ Cl ₂	1.4 × 10 ⁷			PL/Ld-2	S = A.	93E520
7.41	Phthalocyanine, bis(tripropylsiloxy)silicon						
	CH ₂ Cl ₂	1.6 × 10 ⁷			PL/Ld-2	S = A.	93E520
7.42	Phthalocyanine, 1,4,8,11,15,18,22,25-octabutoxy-						
	CHCl ₃	5.9 × 10 ⁹			PL/Ld-2	S = TPP.	90E731 92R076
7.43	Phthalocyanine, sulfo-, chloroaluminum(III) [AlCl(tspc)]						
	D ₂ O pH = 7	<10 ⁸			PL/Ld-2	S = A; No measurable effect; soln. contg. 2 × 10 ⁻³ mol L ⁻¹ phosphate buffer and 1% NaCl wt/wt.	90A022
7.44	Phthalocyanine, sulfo-, zinc(II)						
	D ₂ O pH = 7	<10 ⁸			PL/Ld-2	S = A; No measurable effect; soln. contg. 2 × 10 ⁻³ mol L ⁻¹ phosphate buffer and 1% NaCl wt/wt.	90A022
7.45	Phthalocyanine, tetracarboxy-, copper(II)						
	DMSO	≥1.4 × 10 ⁹			CP/Ac-16	S = A; A' = DPRF; used $k_d = 3.3 \times 10^4$ s ⁻¹ .	89F260
7.46	Phthalocyanine, 2,9,16,23-tetra(1,1-dimethylethyl)-						
	C ₆ F ₆	2 × 10 ⁸			PL/Ld-2	S = Fullerene-C ₇₀ .	93E301
	CHCl ₃	2.9 × 10 ⁸			PL/Ld-2	S = TPP.	90E731 92R076
7.47	Porphine, (acetato)-5,10,15,20-tetraphenyl-, iron(III)						
	CCl ₄	<10 ⁴ (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 1.5 \times 10^9$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	82A421
	CCl ₄	1.5 × 10 ⁹			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	78E892 79A010 80E548

TABLE 7. Rate constants for the interaction of singlet oxygen with porphyrins, phthalocyanines and polypyrroles. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
7.48	Porphine, (acetato)-5,10,15,20-tetraphenyl-, manganese(III)						
	CCl ₄	2.5×10^8			MP/LI-12	S = TPP; used $k_d = 36 \text{ s}^{-1}$.	80E548
7.49	Porphine, (chloro)-5,10,15,20-tetraphenyl-, iron(III)						
	CCl ₄	1×10^9			MP/LI-12	S = TPP; used $k_d = 36 \text{ s}^{-1}$.	80E548
7.50	Porphine, 2,3-dihydro-5,10,15,20-tetraphenyl- (Tetraphenylchlorin)						
	CCl ₄	1.2×10^2 (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 2 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$, $f_r^{A'} = 1$.	82A421
	CCl ₄	2×10^6			MP/LI-12	S = TPP; used $k_d = 36 \text{ s}^{-1}$.	79F824
7.51	Porphine, 2,3-dihydro-5,10,15,20-tetraphenyl-, cadmium(II)						
	CCl ₄	7×10^9			MP/LI-12	S = TPP; used $k_d = 36 \text{ s}^{-1}$.	79F824
7.52	Porphine, 2,3-dihydro-5,10,15,20-tetraphenyl-, copper(II)						
	CCl ₄	2×10^7			MP/LI-12	S = TPP; used $k_d = 36 \text{ s}^{-1}$.	79F824
7.53	Porphine, 2,3-dihydro-5,10,15,20-tetraphenyl-, zinc(II)						
	C ₅ H ₅ N	6×10^8 $< 1 \times 10^5$ (k_r)			CP/A'c-16,17	S = TPBC; A' = Tetr; used $k_d = 6.3 \times 10^4 \text{ s}^{-1}$, $k_{A'} = 7 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$.	86F610
	C ₆ H ₆	6×10^9 2.5×10^7 (k_r)			CP/A'c-16,17	S = TPBC; A' = Tetr; used $k_d = 3.3 \times 10^4 \text{ s}^{-1}$, $k_{A'} = 7 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$.	86F610
	CCl ₄	4×10^9 2×10^8 (k_r)			CP/A'c-16,17	S = TPBC; A' = Tetr; used $k_d = 36 \text{ s}^{-1}$, $k_{A'} = 7 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$.	86F610
	CCl ₄	2×10^8 (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 4.0 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$, $f_r^{A'} = 1$.	82A421
	CCl ₄	2×10^8 (k_r)			CP/Ac,A'c-14,27	S = PP, Ph a or BChl a; A' = Tetr; used $k_d = 36 \text{ s}^{-1}$, $k_{A'} = 5 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$; k_r derived using $k_A = 4.0 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$, $f_r^{A'} = 1$.	79A010
	CCl ₄	4×10^9			CP/LI-12	S = PP, TPP, Ph a or BChl a; used $k_d = 36 \text{ s}^{-1}$.	78E892 79A010
	CH ₃ COCH ₃	1×10^9 8×10^5 (k_r)			CP/A'c-16,17	S = TPBC; A' = Tetr; used $k_d = 2.0 \times 10^4 \text{ s}^{-1}$, $k_{A'} = 7 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$.	86F610
7.54	Porphine, 7,8,17,18-tetrahydro-5,10,15,20-tetraphenyl-, (E) (Tetraphenylbacteriochlorin-<i>trans</i>, TPBC)						
	CCl ₄	1×10^8			MP/LI-12	S = PP, TPP, Ph a or BChl a; used $k_d = 36 \text{ s}^{-1}$; also see [78E892, 79A010].	78E881
	CCl ₄	1.5×10^5 (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 1 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$, $f_r^{A'} = 1$.	82A421
	CCl ₄	2×10^5 (k_r)			CP/Ac,A'c-14,27	S = PP, Ph a or BChl a; A' = Tetr; k_r derived using $k_A = 1 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$, $f_r^{A'} = 1$.	78E892 79A010
7.55	Porphine, 5,10,15,20-tetrakis(4-iodophenyl)-, copper(II)						
	CCl ₄	2×10^7			MP/LI-12	S = TPP; used $k_d = 36 \text{ s}^{-1}$.	79F824
7.56	Porphine, 5,10,15,20-tetrakis(4-methoxyphenyl)-, copper(II)						
	CCl ₄	2×10^7			MP/LI-12	S = TPP; used $k_d = 36 \text{ s}^{-1}$.	79F824
7.57	Porphine, 5,10,15,20-tetrakis(4-sulfonatophenyl)- (H₂TPPS⁴⁻)						
	D ₂ O pH = 7	$< 10^8$			PL/Ld-2	S = A; No measurable effect; soln. contg. $2 \times 10^{-3} \text{ mol L}^{-1}$ phosphate buffer and 1% NaCl wt/wt.	90A022
7.58	Porphine, 5,10,15,20-tetrakis(4-sulfonatophenyl)-, dichlorotin(IV)						
	D ₂ O pH = 7	$< 10^8$			PL/Ld-2	S = A; No measurable effect; soln. contg. $2 \times 10^{-3} \text{ mol L}^{-1}$ phosphate buffer and 1% NaCl wt/wt.	90A022

TABLE 7. Rate constants for the interaction of singlet oxygen with porphyrins, phthalocyanines and polypyrroles. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
7.59 Porphine, 5,10,15,20-tetraphenyl- (TPP)							
	C ₆ D ₆	6×10^7			PL/Ld-2	S = MPDME.	83E235
	C ₆ H ₆	4.4×10^7			CP/Oc-18	S = A; A' = 2M2P; used $k_d = 4 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.049$ mol L ⁻¹ .	88R136
	CCl ₄	9×10^6		286	CP/Oc-29	S = A; A' = 2,3-Dihydrofuran; used $k_{A'} = 1.5 \times 10^6$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 6.0$.	91F163
	CCl ₄	2.9×10^7		286	CP/Oc-29	S = A; A' = TME; used $k_d = 1.4 \times 10^3$ s ⁻¹ , $\beta_{A'} = 1.0 \times 10^{-4}$ mol L ⁻¹ .	84F065
	CCl ₄	2.2×10^7		286	CP/Oc-29	S = A; A' = DMHD; meas. $k_A/k_{A'} = 220$, used $k_{A'} = 1.0 \times 10^5$ L mol ⁻¹ s ⁻¹ .	84F335
	CCl ₄	30 (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 9 \times 10^5$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	82A421
	CCl ₄	10^6			MP/LI-12	S = PP, TPP, Ph a or BChl a; used $k_d = 36$ s ⁻¹ ; also see [78E892, 79A010].	78E881
	CCl ₄	3×10^2 (k_r)			CP/Ac,A'c-14,27	S = A; A' = Tetr; used $k_d = 36$ s ⁻¹ ; k_r derived using $k_A = 1 \times 10^6$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	78E892 79A010
	CH ₂ Cl ₂	1.4×10^7		286	CP/Oc-29	S = A; A' = 2,3-Dihydrofuran; used $k_{A'} = 3.2 \times 10^6$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 4.5$.	91F163
	CH ₂ Cl ₂	1.7×10^7		286	CP/Oc-29	S = A; A' = TME; used $k_d = 9.5 \times 10^3$ s ⁻¹ , $\beta_{A'} = 4.0 \times 10^{-4}$ mol L ⁻¹ .	84F065
	CH ₂ Cl ₂	2.4×10^7		286	CP/Oc-29	S = A; A' = DMHD; meas. $k_A/k_{A'} = 8$; meas. $k_A/k_{A'} = 28$, used $k_{A'} = 8.6 \times 10^5$ L mol ⁻¹ s ⁻¹ .	84F335
	CHCl ₃	2.1×10^7		286	CP/Oc-29	S = A; A' = 2,3-Dihydrofuran; used $k_{A'} = 1.0 \times 10^6$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 20$.	91F163
	CHCl ₃	3.0×10^7		286	CP/Oc-29	S = A; A' = TME; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $\beta_{A'} = 3.6 \times 10^{-4}$ mol L ⁻¹ .	84F065
	CHCl ₃	1.9×10^7		286	CP/Oc-29	S = A; A' = DMHD; meas. $k_A/k_{A'} = 40$, used $k_{A'} = 4.5 \times 10^5$ L mol ⁻¹ s ⁻¹ .	84F335
7.60 Porphine, 5,10,15,20-tetraphenyl-, cadmium(II)							
	CCl ₄	3×10^6 (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 6.0 \times 10^5$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	82A421
	CCl ₄	6×10^8			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	79F824
7.61 Porphine, 5,10,15,20-tetraphenyl-, chloroaluminum(III)							
	CCl ₄	1×10^7			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	80E548
7.62 Porphine, 5,10,15,20-tetraphenyl-, cobalt(II)							
	CCl ₄	$<10^4$ (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 2.0 \times 10^9$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	82A421
	CCl ₄	2×10^9			MP/LI-12	S = PP, Ph a or BChl a; used $k_d = 36$ s ⁻¹ .	79A010
	CCl ₄	2×10^9			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	78E892
	CH ₃ COCH ₃ /H ₂ O (95:5)	3×10^8			PL/Ld-2	S = PdMP.	82A412
7.63 Porphine, 5,10,15,20-tetraphenyl-, copper(II)							
	CCl ₄	<40 (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 4 \times 10^6$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	82A421
	CCl ₄	5×10^6			MP/LI-12	S = PP, TPP, Ph a or BChl a; used $k_d = 36$ s ⁻¹ .	78E892 79A010
7.64 Porphine, 5,10,15,20-tetraphenyl-, dichlorotin(IV)							
	CCl ₄	2×10^6			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	80E548

TABLE 7. Rate constants for the interaction of singlet oxygen with porphyrins, phthalocyanines and polypyrroles. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
7.65 Porphine, 5,10,15,20-tetraphenyl-, magnesium(II)							
	C ₆ H ₆	5.0 × 10 ⁸			CP/Oc-18	S = A; A' = 2M2P; used $k_d = 4 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.049$ mol L ⁻¹ .	88R136
	C ₆ H ₆	1.2 × 10 ⁹			MP/Ac-33	S = A; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ ; A' = α -Tocopherol.	80F020
	CCl ₄	6 × 10 ⁶ (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 8.0 \times 10^8$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	82A421
	CCl ₄	8 × 10 ⁸			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	79F824
	CH ₂ Cl ₂	1 × 10 ⁸			MP/Ac-14	S = A; used $k_d = 9.5 \times 10^3$ s ⁻¹ .	80F020
	CH ₂ Cl ₂	2.3 × 10 ⁹			MP/Ac-33	S = A; Q = Car; used $k_d = 9.5 \times 10^3$ s ⁻¹ , $k_Q = 8.5 \times 10^9$ L mol ⁻¹ s ⁻¹ .	80F020
	CH ₂ Cl ₂	4 × 10 ⁷ (k_r)			MP/Ac-17	S = A; A' = TME; used $k_r^{A'} = 4.8 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.8$.	80F020
7.66 Porphine, 5,10,15,20-tetraphenyl-, manganese(III)							
	CCl ₄	2.5 × 10 ⁹			PL/Ld-2	S = PdMP.	82A412
7.67 Porphine, 5,10,15,20-tetraphenyl-, nickel(II)							
	CCl ₄	<10 ⁴ (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 1.5 \times 10^9$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	82A421
	CCl ₄	2 × 10 ⁹			MP/LI-12	S = PP, TPP, Ph a or BChl a; used $k_d = 36$ s ⁻¹ .	78E892 79A010
7.68 Porphine, 5,10,15,20-tetraphenyl-, zinc(II)							
	C ₆ H ₆	1.5 × 10 ⁸			CP/Oc-18	S = A; A' = 2M2P; used $k_d = 4 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.049$ mol L ⁻¹ .	88R136
	CCl ₄	8 × 10 ³ (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	82A421
	CCl ₄	4 × 10 ⁷			MP/LI-12	S = PP, TPP, Ph a or BChl a; used $k_d = 36$ s ⁻¹ ; see also [78E892, 79A010].	78E881
	CCl ₄	1 × 10 ⁴ (k_r)			CP/Ac,A'c-14,27	S = PP, Ph a or BChl a; A' = Tetr; used $k_d = 36$ s ⁻¹ ; k_r derived using $k_A = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	79A010
7.69 Porphine, 5,10,15,20-tetraphenyl[μ-oxobis-, iron(II)]							
	CCl ₄	4 × 10 ⁷			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	80E548
7.70 Porphine, 5,10,15,20-tetraphenyl(thiocyanato-S)-, iron(III)							
	CCl ₄	1 × 10 ⁹			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	80E548
7.71 Porphine, zinc(II)							
	CCl ₄	3 × 10 ⁷			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	79F824
7.72 Porphine-2,18-dipropanoic acid, 7,12-bis(1-hydroxyethyl)-3,8,13,17-tetramethyl- (Hematoporphyrin)							
	MeOH	7.7 × 10 ⁸			CP/Oc-16	S = A; A' = FFA; used $k_d = 9.6 \times 10^4$ s ⁻¹ .	88R142
	MeOH/ H ₂ O (90:10)	8.0 × 10 ⁸			CP/Oc-16	S = A; A' = FFA; used $k_d = 1.7 \times 10^5$ s ⁻¹ .	88R142
7.73 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl- (Protoporphyrin, PP)							
	DMAA	1.1 × 10 ⁷			PL/Ld-2	S = A.	92E274
7.74 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl-, acetatoferrate(III), dimethyl ester [FeMPDME(OAc)]							
	C ₃ H ₅ N	1 × 10 ⁹			CP/LI-12	S = TPP; used $k_d = 3.3 \times 10^4$ s ⁻¹ .	80E548
	CCl ₄	1 × 10 ⁹			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	80E548
7.75 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl-, cadmium(II) (CdPP)							
	CCl ₄	4 × 10 ⁸			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	79F824

TABLE 7. Rate constants for the interaction of singlet oxygen with porphyrins, phthalocyanines and polypyrroles. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
7.76 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl-, cobalt(II) (CoPP)							
	CCl ₄	3.0×10^9			PL/Ld-2	S = PdMP.	82A412
	CCl ₄	3×10^9			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	78E892
7.77 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl-, copper(II) (CuPP)							
	CCl ₄	5×10^6			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	79F824
7.78 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl-, dimethyl ester (PPDME)							
	C ₆ H ₅ Cl	1.0×10^9			PL/Ld-2	S = TPP.	88A507
	C ₆ H ₆	9.1×10^7			CP/Oc-18	S = A; A' = 2M2P; used $k_d = 4 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.049$ mol L ⁻¹ .	88R136
	CCl ₄	5×10^3 (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 5 \times 10^5$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	82A421
	CCl ₄	5×10^5			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	79F824
	CH ₂ Cl ₂	3.0×10^6			PL/Ld-2	S = A.	92E274
	CH ₂ Cl ₂	8.6×10^5			MP/Pa-25	S = A; A' = Cholesterol; used $k_d = 1.4 \times 10^4$ s ⁻¹ , $k_{A'} = 6.7 \times 10^4$ L mol ⁻¹ s ⁻¹ ; P = Dimethyl 7-(formylmethylene)-7,8-dihydro-8-hydroxy-3,8,13,17-tetramethyl-12-vinyl-2,18-porphinedipropionate; and Dimethyl 7-ethenyl-13-hydroxy-3,8,13,17-tetramethyl-12-(oxoethylidene)porphine-2,18-dipropionate.	82F018
	CH ₂ Cl ₂	8.3×10^5			MP/Pa-25	S = A; A' = DABCO; used $k_d = 1.4 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; see above.	82F018
	CH ₃ CN	1.5×10^7 (k_r)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.1 \times 10^9$ L mol ⁻¹ s ⁻¹ .	88A507
	CH ₃ CN	4.7×10^8			PL/Ld-2	S = TPP.	88A507
	CH ₃ CO ₂ C ₂ H ₅	6.7×10^6			PL/Ld-2	S = A.	92E274
	CH ₃ COCH ₃	6.3×10^6			PL/Ld-2	S = A.	92E274
	CHCl ₃	3.9×10^6			PL/Ld-2	S = A.	92E274
	DMAA	1.2×10^7			PL/Ld-2	S = A.	92E274
	DMF	1.2×10^7			PL/Ld-2	S = A.	92E274
	2-PrOH	3.9×10^8			PL/Ld-2	S = TPP.	88A507
7.79 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl-, dimethyl ester, nickel(II) (NiPPDME)							
	CCl ₄	2×10^9			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	78E892
7.80 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl-, nickel(II) (NiPP)							
	CCl ₄	2.0×10^9			PL/Ld-2	S = PdMP.	82A412
	CCl ₄	10^9			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	79F824
7.81 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl-, zinc(II) (ZnPP)							
	CCl ₄	2×10^3 (k_r)			CP/Ac,A'c-14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ , $f_r^{A'} = 1$.	82A421
	CCl ₄	2×10^7			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	79F824
7.82 Porphine-2,18-dipropanoic acid, 7,12-diethyl-3,8,13,17-tetramethyl-, cobalt(II) (CoMP)							
	CCl ₄	3.0×10^9			PL/Ld-2	S = PdMP.	82A412
	CH ₃ COCH ₃ /H ₂ O (95:5)	1.5×10^9			PL/Ld-2	S = PdMP.	82A412
	CHCl ₃	3.0×10^9			PL/Ld-2	S = MPDDE or PdMPDDE.	81E472
	CHCl ₃	2×10^9			PL/Ld-2	S = PdMP.	82A412

TABLE 7. Rate constants for the interaction of singlet oxygen with porphyrins, phthalocyanines and polypyrroles. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
7.83	Porphine-2,18-dipropanoic acid, 7,12-diethyl-3,8,13,17-tetramethyl-, di[4-(diphenylmethylaminocarbonyl-2-nitrophenylmethyl)] ester (MP-Nbb-NO₂)						
	CH ₂ Cl ₂	2.0 × 10 ⁷			PL/Ld-2	S = Zn(pc)(py) ₂ .	91E134
	CH ₂ Cl ₂	1.9 × 10 ⁷			PL/Ld-2	S = A.	91E134
7.84	Porphine-2,18-dipropanoic acid, 7,12-diethyl-3,8,13,17-tetramethyl-, diethyl ester, manganese(III) (MnMPDDEE)						
	CH ₃ COCH ₃ / H ₂ O (95:5)	1.5 × 10 ⁹			PL/Ld-2	S = PdMP.	82A412
7.85	Porphine-2,18-dipropanoic acid, 7,12-diethyl-3,8,13,17-tetramethyl-, dimethyl ester (MPDME)						
	CCl ₄	4 × 10 ² (k_r)			CP/Ac,A'c- 14,27	S = TPP, TPBC or MP; A' = Tetr; k_r derived using $k_A = 2 \times 10^6$ L mol ⁻¹ s ⁻¹ , $f_r A' = 1$.	82A421
	CCl ₄	3 × 10 ⁶			MP/LI-12	S = PP, Ph a or BChl a; used $k_d = 36$ s ⁻¹ .	79A010
	CCl ₄	2 × 10 ⁶			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	78E892
	CD ₃ CN	2.2 × 10 ⁷			PL/Ld-2	S = A.	83E235
	CD ₃ COCD ₃	1 × 10 ⁷			PL/Ld-2	S = A.	83E235
	CH ₂ Cl ₂	1.4 × 10 ⁷			PL/Ld-2	S = Zn(pc)(py) ₂ .	91E134
	CH ₃ CN	2.5 × 10 ⁷			PL/Ld-2	S = A.	83E235
	CH ₃ COCH ₃	4 × 10 ⁷			PL/Ld-2	S = A.	83E235
	DCON(CD ₃) ₂	1.0 × 10 ⁷			PL/Ld-2	S = A.	92E274
	DMAA- <i>d</i> ₉	1.4 × 10 ⁷			PL/Ld-2	S = A.	92E274
7.86	Porphine-2,18-dipropanoic acid, 7,12-diethyl-3,8,13,17-tetramethyl-, dimethyl ester, cobalt(II) (CoMPDME)						
	CCl ₄	3.0 × 10 ⁹		295	PL/Ld-2	S = PdMPDME or MPDME; decay at 1588 nm; decay at 1272 nm gave 3.5 × 10 ⁹ .	80E558
7.87	Porphine-2,18-dipropanoic acid, 7,12-diethyl-3,8,13,17-tetramethyl-, nickel(II) (NiMP)						
	CCl ₄	2.0 × 10 ⁹			PL/Ld-2	S = PdMP.	82A412
	CCl ₄	2 × 10 ⁹			MP/LI-12	S = TPP; used $k_d = 36$ s ⁻¹ .	78E892
	CH ₃ COCH ₃ / H ₂ O (95:5)	1.0 × 10 ⁹			PL/Ld-2	S = PdMP.	82A412
7.88	Porphine-2,18-dipropanoic acid, 7-[2-(dimethylamino)-2-oxoethyl]-8-ethyl-7,8-dihydro-3,7,12,17-tetramethyl, dimethyl ester, (Z) (CHLII)						
	CHCl ₃	2 × 10 ⁷			CL/LI-12	S = A; used $k_d = 4.8 \times 10^3$ s ⁻¹ .	90R006
7.89	Porphine-2,18-dipropanoic acid, 7-[2-(dimethylamino)-2-oxoethyl]-8-ethylidene-7,8-dihydro-3,7,12,17-tetramethyl, dimethyl ester (CHLI)						
	CDCl ₃	2.7 × 10 ⁸			CL/LI-12	S = A; used $k_d = 1.1 \times 10^2$ s ⁻¹ .	90R006
	CHCl ₃	3.2 × 10 ⁸			CL/LI-12	S = A; used $k_d = 4.8 \times 10^3$ s ⁻¹ .	90R006
7.90	Porphine-2,18-dipropanoic acid, 8-ethenyl-13-ethyl-3,7,12,17-tetramethyl- (EVD)						
	DMAA	2.3 × 10 ⁷			PL/Ld-2	S = A.	92E274
	DMAA- <i>d</i> ₉	2.2 × 10 ⁷			PL/Ld-2	S = A.	92E274
7.91	Porphine-2,18-dipropanoic acid, 8-ethenyl-13-ethyl-3,7,12,17-tetramethyl-, dimethyl ester (EVDDME)						
	DMAA	2.2 × 10 ⁷			PL/Ld-2	S = A.	92E274
7.92	Porphine-2,18-dipropanoic acid, 7-ethenyl-12-(1-hydroxyethyl)-3,8,13,17-tetramethyl- (HVD)						
	CH ₃ CO ₂ C ₂ H ₅	9.7 × 10 ⁶			PL/Ld-2	S = A.	92E274
	CH ₃ COCH ₃	9.2 × 10 ⁶			PL/Ld-2	S = A.	92E274
	DMAA	1.4 × 10 ⁷			PL/Ld-2	S = A.	92E274
	DMAA- <i>d</i> ₉	1.4 × 10 ⁷			PL/Ld-2	S = A.	92E274
	DMF	1.3 × 10 ⁷			PL/Ld-2	S = A.	92E274
7.93	Porphine-2,18-dipropanoic acid, 7-ethenyl-3,8,13,17-tetramethyl- (VD)						
	DMAA	1.7 × 10 ⁷			PL/Ld-2	S = A.	92E274

TABLE 7. Rate constants for the interaction of singlet oxygen with porphyrins, phthalocyanines and polypyrroles. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
7.94	Porphine-2,18-dipropanoic acid, 3,7,12,17-tetramethyl-, dimethyl ester (DPDME)						
	CD ₃ COCD ₃	6.9×10^6			PL/Ld-2	S = A.	92E274
	CDCl ₃	1.7×10^7			PL/Ld-2	S = A.	92E274
	DMAA- <i>d</i> ₉	1.1×10^7			PL/Ld-2	S = A.	92E274
7.95	Porphine-2,18-dipropanoic acid, 3,7,12,17-tetramethyl-, nickel(II) (NiDP)						
	CCl ₄	2.0×10^9			PL/Ld-2	S = MP.	82A412
7.96	Porphine-2,18-dipropanoic acid, 3,7,12,17-tetramethyl-, nickel(II), bis(piperidine)						
	CCl ₄ / <i>c</i> -C ₅ H ₁₀ NH (80:20)	2.0×10^8			PL/Ld-2	S = MP.	82A412
7.97	5-Porphinepropenoic acid, octaethyl-, ethyl ester (NTW)						
	MeOH	4.6×10^8			PL/Ld-2	S = A.	90E491
7.98	[22]Porphyrin-(2.2.2.2), octaethyl-, (di-<i>trans</i>)						
	C ₆ H ₆	8×10^9			PL/Ld-2	S = A; reversible energy transfer, $k_{\text{reverse}} = 1.9 \times 10^9$ L mol ⁻¹ s ⁻¹ .	92E555
7.99	[26] Porphyrin						
	CHCl ₃	4.2×10^8			CL/LI-12	S = A; used $k_d = 4.8 \times 10^3$ s ⁻¹ .	90E530
7.100	[26]Porphyrin-(2.4.2.4), 2,3,10,11,16,17,24,25-octaethyl-5,6,7,8,19,20,21,22-octahydro-						
	C ₆ H ₆	1.2×10^{10}			PL/Ld-2	S = ZnTPP.	92E555
7.101	Pyrrol-2-one, 3,4-diethyl-1,5-dihydro-5-[(5-methylpyrrol-2-yl)methylene]-						
	CHCl ₃	1.5×10^9 8.0×10^8 (k_r)			CP/Ac-15	S = RBCE; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; k_r derived using $\phi_{\text{isc}}(S) = 0.36$.	79F104
	MeOH	8×10^8 2.1×10^8 (k_r)			CP/Ac-15	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_{\text{isc}}(S) = 0.76$.	79F104
7.102	Pyrrol-2-one, 3,4-diethyl-5-[(4-ethyl-3,5-dimethylpyrrol-2-yl)methylene]-1,5-dihydro-						
	CHCl ₃	4.2×10^9 3.2×10^9 (k_r)			CP/Ac-15	S = RBCE; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; k_r derived using $\phi_{\text{isc}}(S) = 0.36$.	78F701 79F104
	CICF ₂ CCl ₂ F	7.5×10^8 (k_r)		293	CL/Ad-36	high pressure O ₂ ; used $k_{\text{O}_2} = 2.5 \times 10^3$ L mol ⁻¹ s ⁻¹ .	79A113
	CICF ₂ CCl ₂ F	6.6×10^8		293	PL/Ad-5	high pressure O ₂ .	79A113
	MeOH	2.7×10^9 1.4×10^9 (k_r)			CP/Ac-15	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_{\text{isc}}(S) = 0.76$.	78F701 79F104
7.103	Pyrrol-2-one, 5-[(3,5-dimethylpyrrol-2-yl)methylene]-4-ethyl-1,5-dihydro-3-methyl-						
	CHCl ₃	2.4×10^9 1.6×10^9 (k_r)			CP/Ac-15	S = RBCE; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; k_r derived using $\phi_{\text{isc}}(S) = 0.36$.	79F104
	MeOH	1.1×10^9 6×10^8 (k_r)			CP/Ac-15	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_{\text{isc}}(S) = 0.76$.	79F104
7.104	Pyrrol-2-one, 5-[(4,5-dimethylpyrrol-2-yl)methylene]-4-ethyl-1,5-dihydro-3-methyl-						
	CHCl ₃	2.5×10^9 1.7×10^9 (k_r)			CP/Ac-15	S = RBCE; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; k_r derived using $\phi_{\text{isc}}(S) = 0.36$.	79F104
	MeOH	2.3×10^9 9×10^8 (k_r)			CP/Ac-15	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_{\text{isc}}(S) = 0.76$.	79F104
7.105	Pyrrol-2-one, 3-ethenyl-5-[(4-ethyl-3,5-dimethylpyrrol-2-yl)methylene]-1,5-dihydro-4-methyl-						
	CHCl ₃	2.2×10^9 1.9×10^9 (k_r)			CP/Ac-15	S = RBCE; k_r derived using $\phi_{\text{isc}}(S) = 0.36$.	79F104
	MeOH	3.1×10^9 1.2×10^9 (k_r)			CP/Ac-15	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	79F104

TABLE 7. Rate constants for the interaction of singlet oxygen with porphyrins, phthalocyanines and polypyrroles. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
7.106	Pyrrol-2-one, 4-ethenyl-5-[(4-ethyl-3,5-dimethylpyrrol-2-yl)methylene]-1,5-dihydro-3-methyl-						
	ClCF ₂ CCl ₂ F	6.7×10^8 (k_r)		293	CL/Ad-36	high pressure O ₂ ; used $k_{O_2} = 2.5 \times 10^3$ L mol ⁻¹ s ⁻¹ .	79A113
	ClCF ₂ CCl ₂ F	1×10^9		293	PL/Ad-5	high pressure O ₂ .	79A113
7.107	Pyrrol-2-one, 4-ethyl-1,5-dihydro-3-methyl-5-[(5-methylpyrrol-2-yl)methylene]-						
	ClCF ₂ CCl ₂ F	3.4×10^8 (k_r)		293	CL/Ad-36	high pressure O ₂ ; used $k_{O_2} = 2.5 \times 10^3$ L mol ⁻¹ s ⁻¹ .	79A113
7.108	Pyrrol-2-one, 5-[(4-ethyl-3,5-dimethylpyrrol-2-yl)methylene]-1,5-dihydro-						
	CHCl ₃	4.4×10^9 3.0×10^9 (k_r)			CP/Ac-15	S = RBCE; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; k_r derived using $\phi_{isc}(S) = 0.36$.	79F104
	ClCF ₂ CCl ₂ F	7×10^8		293	PL/Ad-5	high pressure O ₂ .	79A113
	ClCF ₂ CCl ₂ F	7×10^8 (k_r)		293	CL/Ad-36	high pressure O ₂ ; used $k_{O_2} = 2.5 \times 10^3$ L mol ⁻¹ s ⁻¹ .	79A113
	MeOH	2×10^8 1×10^8 (k_r)			CP/Ac-15	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_{isc}(S) = 0.76$.	79F104

TABLE 8. Rate constants for the interaction of singlet oxygen with aliphatic and alicyclic amines.

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
8.1	8-Azabicyclo[3.2.1]octan-3-ol, 8-methyl-, α-(hydroxymethyl)benzeneacetate (Atropine)						
	CHCl ₃	4.3×10^7	2.3×10^{-4}		CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F670
8.2	Benzeneethanol, β-phenyl-α-pyrrolidinyl-						
	C ₆ H ₆	1.4×10^3			CP/Pa-16	S = RB; A' = DPBF; used $k_d = 4 \times 10^4$ s ⁻¹ ; P = Benzaldehyde.	89F238
	CD ₃ OD	6.5×10^6			PL/Ld-2	Unpublished data, E. Oliveros, M.T. Maurette and A. Braun.	89F238
8.3	[1]Benzopyrano[6,7,8-ij]quinolizin-11-one, 2,3,6,7-tetrahydro-						
	C ₆ H ₆	8×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 3.7 \times 10^4$ s ⁻¹ ; $k_{A'}$ not given.	87F569
8.4	[1]Benzopyrano[6,7,8-ij]quinolizin-11-one, 2,3,6,7-tetrahydro-9-methyl-						
	C ₆ H ₆	8×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 3.7 \times 10^4$ s ⁻¹ ; $k_{A'}$ not given.	87F569
8.5	Benzenemethanamine (Benzylamine)						
	CH ₃ CN	1.7×10^6			PL/Ld-2	S = RB.	89E324
	EtOH	$<1 \times 10^9$		273	CP/Oc-23	S = MB; A' = 2,5-DMF; No measurable effect.	72F518
	MeOH	2.6×10^5	0.34		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	736061
	2-PrOH	9.6×10^4			PL/Ld-2	S = RB.	89E324
8.6	Benzenemethanamine, N,N-di(phenylmethyl)- (Tribenzylamine)						
	MeOH/ C ₆ H ₆ (67:33)		1.4×10^{-5} (β_r)	298	CR/A'c-17	A' = Rub; used $\beta_r A' = 1.4 \times 10^{-3}$ mol L ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	80M378
8.7	1,1'-Bipiperidine						
	C ₆ H ₆	1.7×10^7			PL/Ld-2	S = Ac.	90E297
	CF ₃ CH ₂ OH	2.4×10^5			PL/Ld-2	S = RB.	90E297
	CH ₃ CN	2.8×10^7			PL/Ld-2	S = RB.	90E297
	2-PrOH	3.2×10^6			PL/Ld-2	S = RB.	90E297
8.8	1,1'-Bipyrrolidine						
	C ₆ H ₆	7.2×10^8			PL/Ld-2	S = Ac.	90E297
	CF ₃ CH ₂ OH	2.2×10^6			PL/Ld-2	S = RB.	90E297
	CH ₃ CN	3.5×10^8			PL/Ld-2	S = RB.	90E297
	2-PrOH	1.8×10^8			PL/Ld-2	S = RB.	90E297
8.9	Brucine						
	CHCl ₃	3.9×10^8	2.6×10^{-5}		CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F670
8.10	1,4-Butanediamine, N-(3-aminopropyl)- (Spermidine)						
	C ₅ H ₅ N	1.0×10^7 (k_r)			CP/A'c-17	S = A' = Rub; rel. to $k = 2.5 \times 10^7$ L mol ⁻¹ s ⁻¹ for DABCO.	92R313
8.11	1,4-Butanediamine, N,N-bis(3-aminopropyl)- (Spermine)						
	C ₅ H ₅ N	1.2×10^7 (k_r)			CP/A'c-17	S = A' = Rub; rel. to $k = 2.5 \times 10^7$ L mol ⁻¹ s ⁻¹ for DABCO.	92R313
8.12	Butylamine						
	CHCl ₃	2.4×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486
	EtOH	$<1 \times 10^9$		73	CP/Oc-23	S = MB; A' = 2,5-DMF; No measurable effect.	72F518
8.13	Butylamine, N,N-dibutyl-						
	<i>c</i> -C ₆ H ₁₂	3×10^7			PL/Ld-2	S = 2-ACN.	90N078

TABLE 8. Rate constants for the interaction of singlet oxygen with aliphatic and alicyclic amines. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
8.13 Butylamine, <i>N,N</i>-dibutyl- — Continued							
	CHCl ₃	5.8×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486
	EtOH	$<1 \times 10^9$		273	CP/Oc-23	S = MB; A' = 2,5-DMF; No measurable effect.	72F518
8.14 Butylamine, <i>N,N</i>-dimethyl-							
	C ₆ H ₆	4.4×10^8			PL/Ld-2	S = Ac.	89E324
	CF ₃ CH ₂ OH	1.9×10^5			PL/Ld-2	S = RB.	89E324
	CH ₃ CN	2.7×10^8			PL/Ld-2	S = RB.	89E324
	CH ₃ COCH ₃	3.5×10^8			PL/Ld-2	S = RB.	89E324
	2-PrOH	4.5×10^7			PL/Ld-2	S = RB.	89E324
8.15 <i>tert</i>-Butylamine							
	MeOH	6.6×10^5	0.14		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	736061
8.16 Chimasorb 944							
	C ₆ H ₆ / MeOH (80:20)	2.2×10^6			PL/A'd-8	S = MB; A' = DPBF; k calcd. for repeating unit.	84A167
	CHCl ₃	3.2×10^6		293	CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91P158
8.17 Cyclohexylamine							
	<i>c</i> -C ₆ H ₁₂ (mic)	4.6×10^7		313	CP/A'c-16	S = FI ² ; A' = DPBF; used $k_d = 5.9 \times 10^4$ s ⁻¹ ; DAP reverse micelles.	80N021
	MeOH	2.9×10^7		313	CP/A'c-16	S = FI ² ; A' = DPBF; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	80N021
	MeOH	8.0×10^4	1.1		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	736061
8.18 2,3-Diazabicyclo[2.2.1]heptane, 2,3-dimethyl-							
	CH ₃ CN	5.5×10^8			PL/Ld-2	S = RB.	90E297
8.19 1,4-Diazabicyclo[2.2.2]octane (DABCO)							
	1-BuOH	4.5×10^6	0.012		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 5.2 \times 10^4$ s ⁻¹ .	72F514
	C ₂ H ₅ CO ₂ CH ₃	2.5×10^8		293	PL/Ld-2	S = Pz and 2-ACN.	92E220
	C ₅ H ₅ N	3×10^8			CP/A'c-23	S = A' = Rub; used $k_d = 6.0 \times 10^4$ s ⁻¹ , $k_{A'} = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	743112
	C ₅ H ₅ N		3.2×10^{-4}		CP/Oc-20	S = RB; A' = (C ₂ H ₅) ₃ N.	72F512
	C ₅ H ₅ N		2.3×10^{-4}		CP/Oc-21	S = RB; A' = 2M2P.	72F512
	<i>c</i> -C ₆ H ₁₂	2.1×10^7			PL/Ld-2	S = 2-ACN.	90N078
	<i>c</i> -C ₆ H ₁₂ (mic)	5.0×10^8		313	CP/A'c-16	S = FI ² ; A' = DPBF; used $k_d = 5.9 \times 10^4$ s ⁻¹ ; DAP reverse micelles.	80N021
	1,2-C ₆ H ₄ Cl ₂				MD/A'c-23	A' = Rub; meas. $\beta_A/\beta_{A'} = 6.2$.	68F285
	C ₆ H ₅ Dr	2.6×10^7		273	MD/A'c-33	A' = Rub; used $k_d = 1.3 \times 10^4$ s ⁻¹ , $k_{A'} = 4.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k/[k_d/[A'] + k_{A'}] = 0.2$ at $[A'] = 1.5 \times 10^{-4}$ mol L ⁻¹ .	737333
	C ₆ H ₅ Br				MD/A'c-23	A' = DPBF; meas. $\beta_A/\beta_{A'} = 0.68$.	68F285
	C ₆ H ₅ CH ₃	2.4×10^8		293	PL/Ld-2	S = Pz and 2-ACN.	92E220
	C ₆ H ₅ CH ₃	2.2×10^8		298	PL/Ld-2	S = TPP; $\Delta V^\ddagger = -17$ cm ³ mol ⁻¹ ; studied at 0.1-120 MPa.	91A271
	C ₆ H ₅ CH ₃	2.1×10^8			PL/Ld-2	S = 2-ACN; $\Delta H^\ddagger = -7$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -126$ J K ⁻¹ mol ⁻¹ ; $E_a = -4$ kJ mol ⁻¹ ; studied at 183-363 K; pre-exciple-equilibrium limit activation parameters.	88A427 84E066
	C ₆ H ₅ CH ₃	6.7×10^8			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063

TABLE 8. Rate constants for the interaction of singlet oxygen with aliphatic and alicyclic amines. — Continued

Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
4.1) 1,4-Diazabicyclo[2.2.2]octane (DABCO) — Continued						
C ₆ H ₅ CH ₃				CP/A'c-23	S = A' = Rub; meas. $\beta_A/\beta_{A'} = 0.23$.	68F285
C ₆ H ₅ CN	3.7×10^8		298	PL/Ld-2	S = MB; $\Delta V^\ddagger = -10$ cm ³ mol ⁻¹ ; studied at 0.1-120 MPa.	91A271
C ₆ H ₆	2.9×10^8			PL/Ld-2	S = 2-ACN.	93N051
C ₆ H ₆	2.9×10^8			PL/Ld-2	S = TPP and ZnTPP.	92F251
C ₆ H ₆	2.6×10^8 2.7×10^8 (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
C ₆ H ₆	2.6×10^8			PL/Ld-2	S = 2-ACN.	84E066
C ₆ H ₆	1.4×10^7	2.9×10^{-3}		CP/Ac-16	S = A' = 1,2-Diphenyl-4-methylcyclopenta[b]quinoline; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	78F438
C ₆ H ₆		9.6×10^{-4}		CP/P'a-20	S = ZnTPP; A' = 2M2P.	727028
C ₆ H ₆ / MeOH (80:20)	1.6×10^7		298	CP/P'a-20	S = MB; A' = 2M2P; used $k_d = 1.0 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.040$ mol L ⁻¹ .	70F734
CCl ₄	4.7×10^7		295	PL/Ld-2	S = PdMPDME or MPDME; decay at 1588 nm; decay at 1272 nm gave 5×10^7 L mol ⁻¹ s ⁻¹ .	80E558
CCl ₄	7×10^6			MP/LI-12	S = PP, Ph a or BPh a; used $k_d = 36$ s ⁻¹ .	79A010
CCl ₄	6.6×10^6			MP/LI-12	S = Ret; used $k_d = 36$ s ⁻¹ .	79F463 78F700
CF ₃ CH ₂ OH	4.4×10^4			PL/Ld-2	S = RB.	89E324
CH ₂ Cl ₂	8.3×10^7		298	PL/Ld-2	S = MB; $\Delta V^\ddagger = -15$ cm ³ mol ⁻¹ ; studied at 0.1-120 MPa.	91A271
CH ₂ Cl ₂ / MeOH/ C ₅ H ₅ N (90:5:5)	3.3×10^7		298	CR/A'c-32	A' = Rub; used $k_d = 8 \times 10^3$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	747341
CH ₂ Cl ₂ / MeOH/ C ₅ H ₅ N (94:3:3)	3.3×10^7		298	CR/A'c-32	A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	727319
CH ₃ CN	4.0×10^8		298	PL/Ld-2	S = MB; $\Delta V^\ddagger = -11$ cm ³ mol ⁻¹ ; studied at 0.1-120 MPa.	91A271
CH ₃ CN	5.5×10^8		298	CP/P'a-17	S = DCA; A' = 2,3-Diphenyl-1,4-dioxene; used $k_{A'} = 1.7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A311
CH ₃ CN	4.9×10^8			PL/Ld-2	S = RB.	89E324
CH ₃ CN	4.0×10^8			PL/Ld-2	S = 2-ACN.	84E066
CH ₃ COCH ₃	1.8×10^8		298	PL/Ld-2	S = MB; $\Delta V^\ddagger = -15$ cm ³ mol ⁻¹ ; studied at 0.1-120 MPa.	91A271
CH ₃ COCH ₃	3.8×10^8			PL/Ld-2	S = 2-ACN.	84E066
CH ₃ COCH ₃	4.5×10^8			PL/Ld-2	S = MPDME.	83E235
CHCl ₃	3.5×10^7		298	PL/Ld-2	S = MB; $\Delta V^\ddagger = -19$ cm ³ mol ⁻¹ ; studied at 0.1-120 MPa.	91A271
CHCl ₃	1.8×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88P313
CHCl ₃	5.8×10^7	1.7×10^{-4}		CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F670
CHCl ₃	2.0×10^7			PL/Ld-2	S = MPDEE or PdMPDEE.	81A327
CHCl ₃	4.7×10^7			PL/Ld-2	S = MPDEE or PdMPDEE.	81E472
CHCl ₃	5.2×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486
CS ₂		1.7×10^{-4}		CP/P'a-20	S = ZnTPP; A' = 2M2P.	727028
CICF ₂ CCl ₂ F	2.1×10^7		298	FP/Ld-2	S = Per.	82A322
D ₂ O (mic) pD = 7.4	1.4×10^6		294	PL/A'd-5	S = 2-ACN; A' = DPBF; 0.1 mol L ⁻¹ SDS or CTAB.	81N048
EtOH	5.0×10^6			PL/Ld-2	S = 2-ACN.	84E066

TABLE 8. Rate constants for the interaction of singlet oxygen with aliphatic and alicyclic amines. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
8.19 1,4-Diazabicyclo[2.2.2]octane (DABCO) — Continued							
	EtOH	6.4×10^6			CP/P'a-19	S = RB; A' = 2,2,6,6-Tetramethyl-4-piperidinol; used $k_{A'} = 8 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 8$; P' = 2,2,6,6-Tetramethyl-4-hydroxypiperidine-1-oxyl detected by esr.	80D076
	EtOH	3.1×10^7			CP/A'c-19	S = RB; A' = Chl a; used $k_d = 1 \times 10^5$ s ⁻¹ .	78F404
	EtOH	5.3×10^6			CP/Ac-23	S = RB; A' = Hexamethylenedithiocarbamate; used $k_d = 1 \times 10^4$ s ⁻¹ , $k_{A'} = 1.5 \times 10^8$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/(k_d + k[A]) = 58$ at $[A] = 4.48 \times 10^{-4}$ mol L ⁻¹ .	727116
	H ₂ O pH = 8	2.8×10^8			CP/P'a-19	S = RB; A' = 2,2,6,6-Tetramethyl-4-piperidinol; meas. $k_A/k_{A'} = 7$; P' = 2,2,6,6-Tetramethyl-4-hydroxypiperidine-1-oxyl detected by esr.	80D076
	<i>i</i> -octane/ MeOH/ C ₅ H ₅ N (90:5:5)	3.9×10^7		298	CR/A'c-32	A' = Rub; used $k_d = 4.7 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	747341
	<i>i</i> -octane/ MeOH/ C ₅ H ₅ N (94:3:3)	3.5×10^7		298	CR/A'c-32	A' = Rub; used $k_d = 5.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	727319
	MeOH	5.4×10^8		313	CP/A'c-16	S = Fl ²⁺ ; A' = DPBF; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	80N021
	MeOH		6.5×10^{-3}		CP/P'a-20	S = ZnTPP; A' = 2M2P.	727028
	MeOH	7.3×10^6	0.012		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F514
	2-PrOH	3.6×10^6			PL/Ld-2	S = RB.	89E324
	<i>i</i> -octane	3.0×10^7		298	CP/A'c-23	S = A' = Rub; used $k_d = 4.7 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
8.20 Dibenzo[de,g]quinoline-2,9-diol, 5,6,6a,7-tetrahydro-1,10-dimethoxy-6-methyl- (Boldine)							
	CHCl ₃	2.4×10^7	4.2×10^{-4}		CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F670
8.21 Dibenzo[de,g]quinoline-2,9-diol, 5,6,6a,7-tetrahydro-1,2,9,10-tetramethoxy-6-methyl- (Glaucine)							
	CHCl ₃	3.1×10^7	3.2×10^{-4}		CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F670
8.22 1,9:3,5-Dimethanocyclopenta[d]cyclopenta[3,4][1,2]diazeto[1,2-α]pyridazine, decahydro-							
	CH ₃ CN	2.8×10^8			PL/Ld-2	S = RB.	90E297
8.23 Ethanol, 2-(diethylamino)-							
	CHCl ₃	3.0×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486
8.24 Ethylamine, <i>N,N</i>-diethyl-							
	C ₅ H ₅ N	2.5×10^7 (k_r)			CP/A'c-17	S = A' = Rub; rel. to $k = 2.5 \times 10^7$ L mol ⁻¹ s ⁻¹ for DABCO.	92R313
	C ₅ H ₅ N		2.7×10^{-3} (β_r)		CP/Oc-14,27	S = RB; A' = 2M2P.	72F512
	C ₅ H ₅ N		2.9×10^{-4} (β_q)		CP/Oc-14,27	S = RB; A' = 2M2P.	72F512
	C ₅ H ₅ N		4.2×10^{-4}		CP/Oc-20	S = RB; A' = 2M2P.	72F512
	<i>c</i> -C ₆ H ₁₂ (mic)	6.5×10^8		313	CP/A'c-16	S = Fl ²⁺ ; A' = DPBF; used $k_d = 5.9 \times 10^4$ s ⁻¹ ; DAP reverse micelles.	80N021
	<i>n</i> -C ₆ H ₁₄	4.8×10^7			CP/A'c-16	S = A' = Rub; k_d not given.	87F639
	C ₆ H ₆	1.8×10^8			CP/A'c-16	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	87F639
	CF ₃ CH ₂ OH	1.7×10^4			PL/Ld-2	S = RB.	89E324
	CH ₃ CN	3.3×10^8			PL/Ld-2	S = RB.	89E324
	CH ₃ CN	2.0×10^8			CP/A'c-16	S = RB; A' = DMA; used $k_d = 3.3 \times 10^4$ s ⁻¹ .	87F639
	CH ₃ COCH ₃	3.1×10^8			CP/A'c-16	S = RB; A' = DMA; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	87F639
	CHCl ₃	7.4×10^7			CP/A'c-16	S = RB; A' = DMA; k_d not given.	87F639
	CHCl ₃	6.5×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486

TABLE 8. Rate constants for the interaction of singlet oxygen with aliphatic and alicyclic amines. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
8.24	Ethylamine, <i>N,N</i>-diethyl- — Continued						
	EtOH	2.7×10^6 (k_r)	0.31 (β_r)		CP/Oc-19	S = RB; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; used (k_d/k_r) = 9.3.	75F655
	HCONH ₂	7.9×10^6			CP/A'c-16	S = RB; A' = DMA; k_d not given.	87F639
	MeOH	1.3×10^7			CP/A'c-16	S = RB; A' = DMA; used $k_d = 2.0 \times 10^4$ s ⁻¹ .	87F639
	MeOH	4.0×10^8		313	CP/A'c-16	S = FI ²⁻ ; A' = DPBF; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	80N021
	MeOH	9.3×10^6	9.7×10^{-3}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	736061
	MeOH	1.2×10^7	7.6×10^{-3}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F514
	MeOH/ C ₆ H ₆ (67:33)		4.9×10^{-4} (β_r)	298	CR/A'c-17	A' = Rub; used $\beta_r A' = 1.4 \times 10^{-3}$ mol L ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	80M378
	2-PrOH	3.6×10^7			PL/Ld-2	S = RB.	89E324
8.25	Ethylamine, <i>N,N</i>-diethyl-2-methoxy-						
	CHCl ₃	3.8×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486
8.26	Ethylamine, 1,1-dimethyl-<i>N,N</i>-bis(2-hydroxyethyl)-						
	CHCl ₃	1.1×10^9			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486
8.27	Ethylamine, <i>N</i>-ethyl-						
	C ₅ H ₅ N	5×10^6 (k_r)			CP/A'c-17	S = A' = Rub; rel. to $k = 2.5 \times 10^7$ L mol ⁻¹ s ⁻¹ for DABCO.	92R313
	<i>c</i> -C ₆ H ₁₂ (mic)	3.1×10^8		313	CP/A'c-16	S = FI ²⁻ ; A' = DPBF; used $k_d = 5.9 \times 10^4$ s ⁻¹ ; DAP reverse micelles.	80N021
	<i>n</i> -C ₆ H ₁₄	4.8×10^6			CP/A'c-16	S = A' = Rub; k_d not given.	87F639
	C ₆ H ₆	4.6×10^7			CP/A'c-16	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	87F639
	C ₆ H ₆ / MeOH (75:25)	2.4×10^6		298	CP/A'c-20	S = RB; A' = <i>c</i> -C ₆ H ₁₀ ; used $k_d = 6.3 \times 10^4$ s ⁻¹ , $\beta_{A'} = 3.1$ mol L ⁻¹ .	78F586
	CH ₃ CN	1.5×10^8			PL/Ld-2	S = RB.	89E324
	CH ₃ CN	8.6×10^7			CP/A'c-16	S = RB; A' = DMA; used $k_d = 3.3 \times 10^4$ s ⁻¹ .	87F639
	CH ₃ COCH ₃	1.0×10^8			CP/A'c-16	S = RB; A' = DMA; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	87F639
	CHCl ₃	1.2×10^7			CP/A'c-16	S = RB; A' = DMA; k_d not given.	87F639
	CHCl ₃	1.5×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486
	HCONH ₂	2.3×10^6			CP/A'c-16	S = RB; A' = DMA; k_d not given.	87F639
	MeOH	2.2×10^6			CP/A'c-16	S = RB; A' = DMA; used $k_d = 2.0 \times 10^4$ s ⁻¹ .	87F639
	MeOH	1.7×10^8		313	CP/A'c-16	S = FI ²⁻ ; A' = DPBF; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	80N021
	MeOH	1.9×10^6	0.048		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	736061
	MeOH/ C ₆ H ₆ (67:33)		4.0×10^{-4} (β_r)	298	CR/A'c-17	A' = Rub; used $\beta_r A' = 1.4 \times 10^{-3}$ mol L ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	80M378
	2-PrOH	3.8×10^6			PL/Ld-2	S = RB.	89E324
8.28	Ethylamine, 1-methyl-						
	MeOH	4.6×10^4	1.9		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	736061
8.29	Ethylamine, 1-methyl-<i>N,N</i>-(1-methylethyl)-						
	<i>c</i> -C ₆ H ₁₂	8.8×10^5			PL/Ld-2	S = 2-ACN.	90N078
	CHCl ₃	1.8×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486
8.30	Ethynediamine, tetraethyl-						
	CHCl ₃	3×10^8			CR/A'c-33	A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	81E003

TABLE 8. Rate constants for the interaction of singlet oxygen with aliphatic and alicyclic amines. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
8.31	1,7-Heptanediamine, <i>N,N</i> -diethyl- CHCl ₃	6.1 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486
8.32	Hexamethylenetetramine MeOH	1.9 × 10 ⁵	0.46		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	736061
8.33	Hydrazine, 1,2-diethyl-1,2-dimethyl- CH ₃ CN	6.8 × 10 ⁷			PL/Ld-2	S = RB.	90E297
8.34	Hydrazine, 1,2-dimethyl-1,2-dibutyl- C ₆ H ₆ CH ₃ CN	3.9 × 10 ⁷ 3.9 × 10 ⁷			PL/Ld-2 PL/Ld-2	S = Ac. S = RB.	90E297 90E297
8.35	Hydrazine, 1,1-dimethyl-2,2-di(2,2-dimethylpropyl)- CH ₃ CN	1.3 × 10 ⁶			PL/Ld-2	S = RB.	90E297
8.36	Hydrazine, 1,2-dimethyl-1,2-di(2,2-dimethylpropyl)- CH ₃ CN	5.3 × 10 ⁶			PL/Ld-2	S = RB.	90E297
8.37	Hydrazine, 1,1-dimethyl-2,2-di(2-methylpropyl)- CH ₃ CN	2.2 × 10 ⁷			PL/Ld-2	S = RB.	90E297
8.38	Hydrazine, 1,2-dimethyl-1,2-di(2-methylpropyl)- C ₆ H ₆ CH ₃ CN	5.9 × 10 ⁶ 1.3 × 10 ⁷			PL/Ld-2 PL/Ld-2	S = Ac. S = RB.	90E297 90E297
8.39	Hydrazine, 1,2-dimethyl-1,2-dipentyl- C ₆ H ₆ CH ₃ CN	9.3 × 10 ⁶ 4.7 × 10 ⁷			PL/Ld-2 PL/Ld-2	S = Ac. S = RB.	90E297 90E297
8.40	Hydrazine, 1,2-dimethyl-1,2-dipropyl- CH ₃ CN	4.4 × 10 ⁷			PL/Ld-2	S = RB.	90E297
8.41	Hydrazine, tetramethyl- C ₆ H ₆ CF ₃ CH ₂ OH CH ₃ CN 2-PrOH	1.8 × 10 ⁸ 1.2 × 10 ⁶ 1.9 × 10 ⁸ 2.1 × 10 ⁷			PL/Ld-2 PL/Ld-2 PL/Ld-2 PL/Ld-2	S = Ac. S = RB. S = RB. S = RB.	90E297 90E297 90E297 90E297
8.42	Hydrazine, tetra(methyl- <i>d</i> ₃)- CH ₃ CN	1.9 × 10 ⁸			PL/Ld-2	S = RB.	90E297
8.43	Hydrazine, tetra(2-methylpropyl)- CH ₃ CN	3.0 × 10 ⁵			PL/Ld-2	S = RB.	90E297
8.44	Hydrazine, 1,1,2-trimethyl-2-(2,2-dimethylpropyl)- CH ₃ CN	1.1 × 10 ⁸			PL/Ld-2	S = RB.	90E297
8.45	Hydrazine, 1,1,2-trimethyl-2-(2-methylpropyl)- C ₆ H ₆ CH ₃ CN	6.8 × 10 ⁷ 9.6 × 10 ⁷			PL/Ld-2 PL/Ld-2	S = Ac. S = RB.	90E297 90E297
8.46	Methylamine, <i>N,N</i> -bis(2-hydroxyethyl)- CHCl ₃	2.1 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486

TABLE 8. Rate constants for the interaction of singlet oxygen with aliphatic and alicyclic amines. — Continued

#	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
#.47	Methylamine, <i>N,N</i>-dimethyl-						
	MeOH	1.3×10^7	6.7×10^{-3}		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F519
#.48	Phenethylamine						
	<i>c</i> -C ₆ H ₁₂ (mic)	4.0×10^7		313	CP/A'c-16	S = Fl ² ; A' = DPBF; used $k_d = 5.9 \times 10^4$ s ⁻¹ ; DAP reverse micelles.	80N021
	MeOH	5.3×10^7		313	CP/A'c-16	S = Fl ² ; A' = DPBF; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	80N021
	MeOH		1.5		CP/A'c-16	S = RB; A' = DPBF.	736061
#.49	4-Phenylbutylamine						
	MeOH		0.98		CP/A'c-16	S = RB; A' = DPBF.	736061
#.50	3-Phenylpropylamine						
	MeOH		1.3		CP/A'c-16	S = RB; A' = DPBF.	736061
#.51	Piperazine						
	<i>c</i> -C ₆ H ₁₂	1.7×10^6			PL/Ld-2	S = 2-ACN.	90N078
	MeOH	1.2×10^6	0.073		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	736061
#.52	1-Piperidinamine, <i>N,N</i>-dimethyl-						
	CH ₃ CN	1.6×10^8			PL/Ld-2	S = RB.	90E297
#.53	Piperidine						
	2-BuOH	1.0×10^6			PL/Ld-2	S = RB.	89E324
	C ₆ H ₆ / MeOH (80:20)	3.5×10^6			PL/A'd-8	S = MB; A' = DPBF.	84A167
	CF ₃ CH ₂ OH	6.5×10^3			PL/Ld-2	S = RB.	89E324
	CH ₃ CN	5.6×10^7			PL/Ld-2	S = RB.	89E324
	CH ₃ COCH ₃	7.8×10^7			PL/Ld-2	S = RB.	89E324
	CHCl ₃	3.6×10^6			PL/Ld-2	S = TPP.	89E324
	CHCl ₃	5.8×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486
	MeOH	9.2×10^5	0.098		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	736061
	2-PrOH	9.1×10^5			PL/Ld-2	S = RB.	89E324
#.54	Piperidine, 4-amino-2,2,6,6-tetramethyl-						
	C ₆ H ₆ / MeOH (80:20)	1.8×10^6			PL/A'd-8	S = MB; A' = DPBF.	84A167
#.55	Piperidine, 1-butoxy-2,2,6,6-tetramethyl-						
	CH ₂ Cl ₂	3×10^5			CP/A'c-18	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88F059
#.56	Piperidine, 1-cyclohexyl-						
	MeOH	4.5×10^7	2.0×10^{-3}		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F519
#.57	Piperidine, 1,2-dimethyl-						
	C ₆ H ₆ / MeOH (80:20)	2.8×10^7			PL/A'd-8	S = MB; A' = DPBF.	84A167
#.58	Piperidine, 2,6-dimethyl-						
	C ₆ H ₆ / MeOH (80:20)	1.2×10^6			PL/A'd-8	S = MB; A' = DPBF.	84A167
	CHCl ₃	3.0×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486

TABLE 8. Rate constants for the interaction of singlet oxygen with aliphatic and alicyclic amines. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
8.59	Piperidine, 2-methyl-						
	C ₆ H ₆ / MeOH (80:20)	1.5 × 10 ⁶			PL/A'd-8	S = MB; A' = DPBF.	84A167
8.60	Piperidine, N-methyl-						
	C ₆ H ₆ / MeOH (80:20)	2.9 × 10 ⁷			PL/A'd-8	S = MB; A' = DPBF.	84A167
	CHCl ₃	5.3 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486
8.61	Piperidine, 1,2,2,6,6-pentamethyl-						
	C ₆ H ₆ / MeOH (80:20)	6.0 × 10 ⁷			PL/A'd-8	S = MB; A' = DPBF.	84A167
8.62	Piperidine, 1-(1-pyrrolidinyl)-						
	CH ₃ CN	2.6 × 10 ⁸			PL/Ld-2	S = RB.	90E297
8.63	Piperidine, 2,2,6,6-tetramethyl-						
	C ₆ H ₆ / MeOH (80:20)	4.0 × 10 ⁶			PL/A'd-8	S = MB; A' = DPBF.	84A167
	C ₆ H ₆	5.3 × 10 ⁵	0.061		CP/Pa-15	S = HA; used $k_d = 3.2 \times 10^4$ s ⁻¹ ; P = 2,2,6,6-Tetramethylpiperidine-N-oxyl; P monitored by esr.	90R162
	CH ₂ Cl ₂	3.9 × 10 ⁵			PL/Ld-2	S = TPP.	93E090
	CH ₂ Cl ₂	3.8 × 10 ⁵			CP/A'c-33	S = A' = Rub; used $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; k_d not given.	84F199
	EtOH	1.6 × 10 ⁵	0.51		CP/Pa-15	S = BXP; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; P = TEMPO monitored by esr.	83F323
	CH ₂ Cl ₂	4 × 10 ⁵			CP/A'c-18	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88F059
8.64	Piperidine, 2,2,6,6-tetramethyl-4,4'-[1,6-hexanediaminyl]bis-						
	C ₆ H ₆ / MeOH (80:20)	8.0 × 10 ⁶			PL/A'd-8	S = MB; A' = DPBF.	84A167
8.65	Piperidine, 2,2,6,6-tetramethyl-4,4'-[1,6-hexanediaminyl]bis-, polymer						
	C ₆ H ₆ / MeOH (80:20)	3.6 × 10 ⁷			PL/A'd-8	S = MB; A' = DPBF; k calcd. for repeating unit.	84A167
8.66	1-Piperidineethanol, diester with [[3,5-bis(1,1-dimethylethyl)-4-hydroxyphenyl]methyl]butylpropanedioic acid						
	C ₆ H ₆ / MeOH (80:20)	4.3 × 10 ⁶			PL/A'd-8	S = MB; A' = DPBF.	84A167
8.67	1-Piperidineethanol, 4-hydroxy-2,2,6,6-tetramethyl-, polymer with butanedioic acid (Tlauvin 622)						
	C ₆ H ₆ / MeOH (80:20)	<1 × 10 ⁵			PL/A'd-8	S = MB; A' = DPBF; k calcd. for repeating unit.	84A167
	CHCl ₃	2 × 10 ⁵		293	CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91P158
8.68	1-Piperidineethanol, 2,2,6,6-tetramethyl-						
	CHCl ₃	<2 × 10 ⁵			CP/A'c-33	S = A' = Rub; No measurable effect.	777486
8.69	1-Piperidineethanol, 2,2,6,6-tetramethyl-, acetate (ester)						
	CHCl ₃	<2 × 10 ⁵			CP/A'c-33	S = A' = Rub; No measurable effect.	777486
8.70	Piperidin-3-ol, 1-methyl-						
	C ₆ H ₆ / MeOH (80:20)	2.5 × 10 ⁷			PL/A'd-8	S = MB; A' = DPBF.	84A167

TABLE 8. Rate constants for the interaction of singlet oxygen with aliphatic and alicyclic amines. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
8.71	Piperidin-4-ol, 1-methyl-						
	C ₆ H ₆ /MeOH (80:20)	2.0 × 10 ⁷			PL/A'd-8	S = MB; A' = DPBF.	84A167
8.72	Piperidin-4-ol, 1,2,2,6,6-pentamethyl-						
	C ₆ H ₆ /MeOH (80:20)	6.0 × 10 ⁷			PL/A'd-8	S = MB; A' = DPBF.	84A167
	C ₆ H ₆ /EtOH (89:11)	2.3 × 10 ³ (k_r)		295	CP/Pa,A'c-17	S = RB; A' = Tetr; used $k_r A' = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r A' = 3.3 \times 10^{-5}$; P = nitroxide radical.	757445
	CH ₂ Cl ₂	5 × 10 ⁷		295	?	Method not given.	757445
	CH ₂ Cl ₂	5.2 × 10 ⁷	1.4 × 10 ⁻⁴		CP/A'c-19	S = A' = Tetr; used $k_d = 7.3 \times 10^3$ s ⁻¹ .	75F654
	CHCl ₃	3.3 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88P313
	CHCl ₃	9.2 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486
8.73	Piperidin-4-ol, 1,2,2,6,6-pentamethyl-, diester with [[3,5-bis(1,1-dimethylethyl)-4-hydroxyphenyl]methyl]butylpropanedioic acid (Tinuvin 144)						
	C ₆ H ₆ /MeOH (80:20)	1.5 × 10 ⁸			PL/A'd-8	S = MB; A' = DPBF.	84A167
8.74	Piperidin-4-ol, 1,2,2,6,6-pentamethyl-, diester with 1,10-decanedioic acid						
	CHCl ₃	1.8 × 10 ⁸			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88P313
8.75	Piperidin-4-ol, 1,2,2,6,6-pentamethyl-, triester with nitrilotriacetic acid						
	CHCl ₃	2.4 × 10 ⁸			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88P313
8.76	Piperidin-4-ol, 1,2,2,6-tetramethyl-, phenylacetate ester (Encatropine)						
	CHCl ₃	2 × 10 ⁶	5.3 × 10 ⁻³		CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F670
8.77	Piperidin-4-ol, 2,2,6,6-tetramethyl- (TEMP-4-OH)						
	C ₆ H ₆ /EtOH (50:50)	<1.0 × 10 ⁵			PL/A'd-8	S = MB; A' = DPBF.	84A167
	C ₆ H ₆ /EtOH (89:11)	2.9 × 10 ³ (k_r)		295	CP/Pa,A'c-17	S = RB; A' = Tetr; used $k_r A' = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r A' = 4.1 \times 10^{-5}$; P = TFMPOL.	757445
	C ₆ H ₆ /EtOH (89:11)	5 × 10 ⁵		295	CP/A'c-23	S = RB; A' = Tetr; used $k_d = 3 \times 10^4$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	757445
	CHCl ₃	2.6 × 10 ⁵			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88P313
	CHCl ₃	<2.0 × 10 ⁵			CP/A'c-33	S = A' = Rub; No measurable effect.	777486
	DMF	5.0 × 10 ⁷			CP/Pa-15	S = Pt(phen)(N ₃) ₂ ; P = 4-Hydroxy-2,2,6,6-tetramethylpiperidine <i>N</i> -oxyl; k_d not given.	90F196
	DMF	5.0 × 10 ⁷			MP/Pa-15	S = HP; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; P = 4-Hydroxy-2,2,6,6-tetramethylpiperidine <i>N</i> -oxyl; esr detection.	89F311
	DMSO	5.2 × 10 ⁶	0.01		CP/Pa-15	S = GV; used $k_d = 5.2 \times 10^4$ s ⁻¹ ; P = 4-Hydroxy-2,2,6,6-tetramethylpiperidine <i>N</i> -oxyl; esr detection.	89D112
	EtOH	8 × 10 ⁵			CP/Pa-15	S = RB; used $k_d = 8 \times 10^4$ s ⁻¹ ; P = 4-Hydroxy-2,2,6,6-tetramethylpiperidine <i>N</i> -oxyl; detected by esr.	80D076
	H ₂ O pH = 8	4 × 10 ⁷			CP/Pa-19	S = RB; Q = N ₃ ; used $k_Q = 2 \times 10^9$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 0.025$; P = 4-Hydroxy-2,2,6,6-tetramethylpiperidine <i>N</i> -oxyl; detected by esr.	80D076

TABLE 8. Rate constants for the interaction of singlet oxygen with aliphatic and alicyclic amines. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
8.78	Piperidin-4-ol, 2,2,6,6-tetramethyl-, diester with 1,10-decanedioic acid (Tinuvin 770)						
	C ₆ H ₆ / MeOH (80:20)	<1 × 10 ⁵			PL/A'd-8	S = MB; A' = DPBF.	84A167
	CHCl ₃	2 × 10 ⁵		293	CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91P158
	CHCl ₃	1.5 × 10 ⁵			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88P313
8.79	Piperidin-4-ol, 2,2,6,6-tetramethyl-, ester with copolymer of styrene + methacrylic acid						
	CHCl ₃	8.2 × 10 ⁵		293	CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91P158
8.80	Piperidin-4-ol, 2,2,6,6-tetramethyl-, triester with nitrilotriacetic acid						
	CHCl ₃	1.9 × 10 ⁶			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88P313
8.81	Propanenitrile, 3-(diethylamino)-						
	CHCl ₃	2.7 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486
8.82	1-Propanol, 3-(dimethylamino)-						
	C ₆ H ₆	6.8 × 10 ⁷			PL/Ld-2	S = Ac.	89E324
	CF ₃ CH ₂ OH	1.8 × 10 ⁵			PL/Ld 2	S = RB.	89E324
	CH ₃ CN	1.4 × 10 ⁸			PL/Ld-2	S = RB.	89E324
	CH ₃ COCH ₃	1.9 × 10 ⁸			PL/Ld-2	S = RB.	89E324
8.83	1-Propen-1-amine, N,N,2-trimethyl-						
	C ₆ H ₆	4.8 × 10 ⁸ (k_r)			CP/Ac,A'c-17	S = ZnTPP; A' = TME; used $k_r^{A'} = 4.8 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 10$.	75F656
	C ₆ H ₆ / CH ₃ CN (5:95)				CP/Ac,A'c-17	S = ZnTPP; A' = TME; meas. $k_r/k_r^{A'} = 9.4$.	75F656
	C ₆ H ₆ / CH ₃ CN (80:20)				CP/Ac,A'c-17	S = ZnTPP; A' = TME; meas. $k_r/k_r^{A'} = 7.8$.	75F656
	C ₆ H ₆ / DMSO (20:80)				CP/Ac,A'c-17	S = ZnTPP; A' = TME; meas. $k_r/k_r^{A'} = 9.1$.	75F656
	C ₆ H ₆ / DMSO (60:40)				CP/Ac,A'c-17	S = ZnTPP; A' = TME; meas. $k_r/k_r^{A'} = 7.6$.	75F656
	C ₆ H ₆ / DMSO (80:20)				CP/Ac,A'c-17	S = ZnTPP; A' = TME; meas. $k_r/k_r^{A'} = 11$.	75F656
	C ₆ H ₆ / MeOH (30:70)				CP/Ac,A'c-17	S = ZnTPP; A' = TME; meas. $k_r/k_r^{A'} = 2.9$.	75F656
	C ₆ H ₆ / MeOH (5:95)				CP/Ac,A'c-17	S = ZnTPP; A' = TME; meas. $k_r/k_r^{A'} = 2.2$.	75F656
	C ₆ H ₆ / n-C ₅ H ₁₂ (5:95)				CP/Ac,A'c-17	S = ZnTPP; A' = TME; meas. $k_r/k_r^{A'} = 7.1$.	75F656
8.84	Propylamine						
	CHCl ₃	2.3 × 10 ⁵			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486
8.85	Propylamine, 2-methyl-						
	CHCl ₃	4.1 × 10 ⁵			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486
8.86	Propylamine, N-propyl-						
	c-C ₆ H ₁₂	9.7 × 10 ⁶			PL/Ld-2	S = 2-ACN.	90N078

TABLE 8. Rate constants for the interaction of singlet oxygen with aliphatic and alicyclic amines. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
8.86	Propylamine, <i>N</i> -propyl- — Continued						
	CHCl ₃	1.8×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	777486
8.87	Propyn-1-amine, <i>N,N</i> -diethyl-						
	CHCl ₃	2×10^8			CR/A'c-33	A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	81E003
8.88	Pyrazolo[1,2- <i>a</i>][1,2]diazepine, hexahydro-						
	CH ₃ CN	7.1×10^8			PL/Ld-2	S = RB.	90E297
8.89	Pyrazolo[1,2- <i>a</i>]pyrazole, tetrahydro-						
	CH ₃ CN	7.7×10^8			PL/Ld-2	S = RB.	90E297
8.90	Pyrazolo[1,2- <i>a</i>]pyrazole, tetrahydro-2,2,6,6-tetramethyl-						
	C ₆ H ₆	1.8×10^9			PL/Ld-2	S = Ac.	90E297
	CH ₃ CN	1.3×10^9			PL/Ld-2	S = RB.	90E297
8.91	Pyridazine, hexahydro-1,2-dimethyl-						
	CH ₃ CN	4.6×10^8			PL/Ld-2	S = RB.	90E297
8.92	Pyridazino[1,2- <i>a</i>]pyridazine, octahydro-						
	C ₆ H ₆	2.8×10^8			PL/Ld-2	S = Ac.	90E297
	CF ₃ CH ₂ OH	2.5×10^6			PL/Ld-2	S = RB.	90E297
	CH ₃ CN	2.9×10^8			PL/Ld-2	S = RB.	90E297
	2-PrOH	7.4×10^7			PL/Ld-2	S = RB.	90E297
8.93	Pyridine, 3-(1-methyl-2-pyrrolidinyl)- (Nicotine)						
	CH ₃ CN/D ₂ O (80:20)	5.9×10^7 (k_q)			PL/A'd-5	S = 2-ACN; A' = DPBF; $k_i = 0$ estd. from lack of formation of O ₂ ⁻ , detd. from buildup of radical anion in soln. contg. $(2-20) \times 10^{-5}$ mol L ⁻¹ 1,4-benzoquinone in CH ₃ CN/D ₂ O (1:4).	81A191
	CHCl ₃	3.8×10^7	2.6×10^{-4}		CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F670
	MeOH		0.23	288	CP/Oc-?	S = RB; A' = α -Terpinene; meas. $k_q/k_r = 5.4$.	587004
8.94	Pyridine, 1,2,3,6-tetrahydro-1-methyl-4-phenyl-						
	D ₂ O	3.1×10^4			PL/Ld-2	S = MB; P = <i>N</i> -Methyl-4-phenyl-2,3-dihydropyridinium.	91R251
8.95	1-Pyrrolidinamine, <i>N,N</i> -dimethyl-						
	CH ₃ CN	5.6×10^8			PL/Ld-2	S = RB.	90E297
8.96	Pyrrolidine						
	<i>c</i> -C ₆ H ₁₂ (mic)	1.9×10^8		313	CP/A'c-16	S = FI ²⁻ ; A' = DPBF; used $k_d = 5.9 \times 10^4$ s ⁻¹ ; DAP reverse micelles.	80N021
	CF ₃ CH ₂ OH	1.5×10^4			PL/Ld-2	S = RB.	89E324
	CH ₃ CN	1.4×10^8			PL/Ld-2	S = RB.	89E324
	MeOH	6.5×10^7		313	CP/A'c-16	S = FI ²⁻ ; A' = DPBF; used $k_d = 1.4 \times 10^3$ s ⁻¹ .	80N021
	MeOH	2.1×10^6	0.042		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	736061
	2-PrOH	2.2×10^6			PL/Ld-2	S = RB.	89E324
8.97	Quinuclidine						
	MeOH	1.8×10^6	0.051		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	736061
8.98	Reserpine						
	CHCl ₃	2.7×10^7	3.8×10^{-4}		CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F670

TABLE 8. Rate constants for the interaction of singlet oxygen with aliphatic and alicyclic amines. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
8.99	Strychnine						
	C ₆ D ₆	8.8×10^8			PR/Ld-2	S = 2-ACN.	89E113
	C ₆ H ₅ CH ₃	9.3×10^8			PL/Ld-2	S = 2-ACN; $\Delta H^\ddagger = 4$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -77$ J K ⁻¹ mol ⁻¹ ; $E_a = 7$ kJ mol ⁻¹ ; studied at 183-363 K.	88A427 84E066
	C ₆ H ₆	9.0×10^8			PL/Ld-2	S = 2-ACN.	93E248
	C ₆ H ₆	1.0×10^9 (k_q)			PL/Ld-2	S = 2-ACN; comparison with TME shows strychnine 10 times less reactive, therefore k is at least 99% k_q .	84E066
	CH ₃ CN	6.4×10^8			PL/Ld-2	S = 2-ACN.	84E066
	CH ₃ COCl ₃	9.4×10^8			PL/Ld-2	S = 2-ACN.	84E066
	CHCl ₃	2.4×10^8	4.3×10^{-5}		CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F670
	EtOH	1.1×10^8			PL/Ld-2	S = 2-ACN.	84E066
8.100	Vincamine						
	CHCl ₃	4.3×10^7	2.3×10^{-4}		CP/A'c-16	S = A' = Rub; used $k_d = 1 \times 10^4$ s ⁻¹ .	84F670
8.101	Vabasan-17-oic acid, 19,20-dihydro-3-oxo-, methyl ester, (20α) (Dregamine)						
	C ₆ H ₆		1.5×10^{-3}		CP/Ac-15	S = ZnTPP.	78F474
	MeOH/ C ₆ H ₆ (67:33)		2.0×10^{-3}		CP/Ac-15	S = ZnTPP.	78F474

TABLE 9. Rate constants for the interaction of singlet oxygen with aromatic amines.

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
9.1	Aniline						
	EtOH				CP/A'c-20	S = Eos, Ery, or RB; A' = TME; meas. $k_A/k_{A'}$ = 3.0.	717299
	EtOH				CP/A'c-20	S = A; A' = TME; meas. $k_A/k_{A'}$ = 2.7.	717299
	c-C ₆ H ₁₂ (mic)	3.9×10^7			CP/A'c-16	S = FI ² ; A' = DPBF; used $k_d = 5.9 \times 10^4$ s ⁻¹ ; DAP reverse micelles.	80N021
	MeOH	2.0×10^9			CP/A'c-16	S = FI ² ; A' = DPBF; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	80N021
	MeOH/ C ₆ H ₆ (67:33)		1.5×10^{-4}	298	CR/A'c-17	A' = Rub; used $\beta_{A'} = 1.4 \times 10^{-3}$ mol L ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	80M378
9.2	Aniline, 4-bromo-N,N-dimethyl-						
	MeOH	2×10^7			PL/A'd-8	S = MB; A' = DPBF.	74F640
	MeOH		3×10^{-3}		CP/A'c-16	S = RB; A' = DPBF.	736061
9.3	Aniline, 3-chloro-N,N-dimethyl-						
	MeOH	1.1×10^7			PL/A'd-8	S = MB; A' = DPBF.	74F640
	MeOH		7.1×10^{-3}		CP/A'c-16	S = RB; A' = DPBF.	736061
9.4	Aniline, 4-chloro-N,N-dimethyl-						
	MeOH/ H ₂ O (50:50)	3.6×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	83A094
9.5	Aniline, 3,4-dimethoxy-N,N-dimethyl-						
	MeOH/ H ₂ O (50:50)	8.8×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	83A094
9.6	Aniline, N,N-dimethyl-						
	C ₃ H ₅ N	1.0×10^8	5.9×10^{-4}		CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.043$ mol L ⁻¹ .	757166
	c-C ₆ H ₁₂ (mic)	3.3×10^7			CP/A'c-16	S = FI ² ; A' = DPBF; used $k_d = 5.9 \times 10^4$ s ⁻¹ ; DAP reverse micelles.	80N021
	CH ₃ CN	4.8×10^8			PL/Ld-2	S = RB.	89E324
	MeOH	1.2×10^9			CP/A'c-16	S = FI ² ; A' = DPBF; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	80N021
	MeOH		0.029		CP/A'c-?	S = RB; A' = 2,5-DMF; solvent ?.	777055
	MeOH	1.2×10^8	7.6×10^{-4}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	736061
	MeOH	7.3×10^7			PL/A'd-8	S = MB; A' = DPBF.	737014
	MeOH/ C ₆ H ₆ (67:33)		2.2×10^{-3}	298	CR/A'c-17	A' = Rub; used $\beta_{A'} = 1.4 \times 10^{-3}$ mol L ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	80M378
	MeOH/ H ₂ O (50:50)	3.6×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	83A094
	2-PrOH	1.7×10^7			PL/Ld-2	S = RB.	89E324
9.7	Aniline, N,N-dimethyl-4-nitroso-						
	H ₂ O	6.8×10^7 (k_s)		298	CP/Ac-14	S = H ₂ TPPS ⁴⁻ ; used $k_d = 2.5 \times 10^5$ s ⁻¹ ; $E_a = 15.9$ kJ mol ⁻¹ ; log(A) = 10.6; studied at 288-318 K; used $\phi_A(S) = 0.7$, phosphate buffer contg. 1.6% NaCl.	91R053
9.8	Aniline, N,N-diphenyl- (Triphenylamine)						
	C ₆ H ₅ CH ₃	1.6×10^5		293	PL/Ld-2	S = RBEE(Bu ₃ N); Pz also used as S.	92E220
9.9	Aniline, 4-(ethoxycarbonyl)- (Ethyl 4-aminobenzoate)						
	CHCl ₃	8×10^4			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80A041

TABLE 9. Rate constants for the interaction of singlet oxygen with aromatic amines. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
9.10	Aniline, 4-formyl-<i>N,N</i>-dimethyl- (4-(Dimethylamino)benzaldehyde)						
	CHCl ₃	1.1 × 10 ⁶			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_A = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80A041
	MeOH	1 × 10 ⁶			PL/A'd-8	S = MB; A' = DPBF.	74F640
	MeOH		0.037		CP/A'c-16	S = RB; A' = DPBF.	736061
9.11	Aniline, 2-methoxy-<i>N,N</i>-dimethyl-						
	MeOH/ H ₂ O (50:50)	3.2 × 10 ⁸		308	CR/A'c-16	A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	83A094
9.12	Aniline, 3-methoxy-<i>N,N</i>-dimethyl-						
	MeOH	4.8 × 10 ⁷			PL/A'd-8	S = MB; A' = DPBF.	74F640
	MeOH		2 × 10 ⁻³		CP/A'c-16	S = RB; A' = DPBF.	736061
	MeOH/ H ₂ O (50:50)	8.4 × 10 ⁷		308	CR/A'c-16	A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	83A094
9.13	Aniline, 4-methoxy-<i>N,N</i>-dimethyl-						
	MeOH	2 × 10 ⁸			PL/A'd-8	S = MB; A' = DPBF.	74F640
	MeOH		5 × 10 ⁻⁴		CP/A'c-16	S = RB; A' = DPBF.	736061
	MeOH/ H ₂ O (50:50)	4.4 × 10 ⁸	6.2 × 10 ⁻⁴	308	CR/A'c-16	A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	83A094
9.14	Aniline, <i>N</i>-methyl-						
	<i>c</i> -C ₆ H ₁₂ (mic)	5.5 × 10 ⁷			CP/A'c-16	S = FI ² ; A' = DPBF; used $k_d = 5.9 \times 10^4$ s ⁻¹ ; DAP reverse micelles.	80N021
	MeOH	8.0 × 10 ⁸			CP/A'c-16	S = FI ² ; A' = DPBF; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	80N021
	MeOH	2.7 × 10 ⁷	3.4 × 10 ⁻³		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	736061
	MeOH/ C ₆ H ₆ (67:33)		5.3 × 10 ⁻⁴	298	CR/A'c-17	A' = Rub; used $\beta_{A'} = 1.4 \times 10^{-3}$ mol L ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	80M378
9.15	Aniline, <i>N,N</i>,2,4,6-pentamethyl-						
	MeOH/ H ₂ O (50:50)	1.5 × 10 ⁸		308	CR/A'c-16	A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	83A094
9.16	Aniline, <i>N</i>-phenyl- (Diphenylamine)						
	MeOH	6.1 × 10 ⁶	0.015		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	736061
	MeOH/ C ₆ H ₆ (67:33)		5.4 × 10 ⁻⁵	298	CR/A'c-17	A' = Rub; used $\beta_{A'} = 1.4 \times 10^{-3}$ mol L ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	80M378
9.17	Aniline, <i>N,N</i>,2,4-tetramethyl-						
	MeOH/ H ₂ O (50:50)	1.3 × 10 ⁸		308	CR/A'c-16	A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	83A094
9.18	Aniline, 4-(1,1,3,3-tetramethylbutyl)-<i>N</i>-[4-(1,1,3,3-tetramethylbutyl)phenyl]-						
	C ₆ H ₆ / EtOH (89:11)	2.6 × 10 ⁴ (k_r)		295	CP/Pa,A'c-17	S = RB; A' = Tetr; used $k_r^{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 3.7 \times 10^{-4}$; P = nitroxide radicals.	757445
	C ₆ H ₆ / EtOH (89:11)	7.3 × 10 ⁶		295	CP/A'c-23	S = RB; A' = Tetr; used $k_d = 3 \times 10^4$ s ⁻¹ , $k_A = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; A'' = Ni(II) dibutyldithiocarbamate. used $k_A'' = 1.6 \times 10^9$ L mol ⁻¹ s ⁻¹ .	757445
9.19	Aniline, <i>N,N</i>,4-trimethyl-						
	MeOH	1 × 10 ⁸			PL/A'd-8	S = MB; A' = DPBF.	74F640
	MeOH		5.5 × 10 ⁻⁴		CP/A'c-16	S = RB; A' = DPBF.	736061
	MeOH/ H ₂ O (50:50)	1.1 × 10 ⁸		308	CR/A'c-16	A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	83A094

TABLE 9. Rate constants for the interaction of singlet oxygen with aromatic amines. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
9.20	Anthracenamine, <i>N</i> -methyl-9,10-diphenyl- C ₆ H ₆	3.5×10^8	1.2×10^{-4}	298	CP/Ac-16	S = A; A' = 1,2-Dithiolane-3-pentanoic acid; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	757558
9.21	Benzoic acid, 4-(dimethylamino)-, ethyl ester CHCl ₃	6×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80A041
9.22	Benzonitrile, 4-(dimethylamino)- MeOH	5.7×10^5			PL/A'd-8	S = MB; A' = DPBF.	74F640
	MeOH		0.050		CP/A'c-16	S = RB; A' = DPBF.	736061
9.23	Biphenyl, 4,4'-diamino- EtOH	3.0×10^9		273	CP/Oc-23	S = MB; A' = 2,5-DMF; used $k_d = 7.9 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^8$ L mol ⁻¹ s ⁻¹ ; k calcd. in [81Z251].	72F518
9.24	Naphthalene, 2-amino- EtOH	9.6×10^8		273	CP/Oc-23	S = MB; A' = 2,5-DMF; used $k_d = 7.9 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^8$ L mol ⁻¹ s ⁻¹ ; k calcd. in [81Z251].	72F518
9.25	<i>o</i> -Phenylenediamine EtOH	3.4×10^9		273	CP/Oc-23	S = MB; A' = 2,5-DMF; used $k_d = 7.9 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^8$ L mol ⁻¹ s ⁻¹ ; k calcd. in [81Z251].	72F518
9.26	<i>o</i> -Phenylenediamine, <i>N,N,N',N'</i> -tetramethyl- MeOH/ H ₂ O (50:50)	1.1×10^9		308	CR/A'c-16	A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	83A094
9.27	<i>m</i> -Phenylenediamine, <i>N,N,N',N'</i> -tetramethyl- MeOH/ H ₂ O (50:50)	7.4×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	83A094
9.28	<i>p</i> -Phenylenediamine, <i>N</i> -cyclohexyl- <i>N'</i> -phenyl- EtOH	5.9×10^9		273	CP/Oc-20	S = MB; A' = 2,5-DMF; used $k_d = 7.9 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^8$ L mol ⁻¹ s ⁻¹ ; k calcd. in [81Z251].	72F518
	EtOH	1.1×10^{10}		273	CP/Oc-20	S = MB; A' = 2,5-DMF; used $k_{A'} = 2.3 \times 10^8$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 47$; k calcd. in [81Z251].	72F518
9.29	<i>p</i> -Phenylenediamine, <i>N,N'</i> -diphenyl- EtOH/ CHCl ₃ (50:50)	2.2×10^8		310	CR/LI-12	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90A184
9.30	<i>p</i> -Phenylenediamine, <i>N</i> -(1-methylethyl)- <i>N'</i> -phenyl- <i>n</i> -C ₁₀ H ₃₄	4.0×10^8		298	MD/A'c-33	A' = Rub; used $k_d = 9.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
	EtOH	6.7×10^9		273	CP/Oc-23	S = MB; A' = 2,5-DMF; used $k_d = 7.9 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^8$ L mol ⁻¹ s ⁻¹ ; k calcd. in [81Z251].	72F518
	<i>i</i> -octane	2.1×10^8		298	CP/A'c-23	S = A' = Rub; used $k_d = 4.7 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
	<i>i</i> -octane	3.3×10^8			CP/A'c-23	S = A' = Rub; used $k_d = 4 \times 10^4$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	732066
9.31	<i>p</i> -Phenylenediamine, <i>N,N,N',N'</i> -tetramethyl- H ₂ O	$\sim 3 \times 10^9$ (k_p)			PL/Pa-14	S = Ery; used $k_d = 3.3 \times 10^5$ s ⁻¹ ; P = [TMPD] ^{•+} ; used $\phi_A(\text{Ery}) = 0.68$.	82A080
	MeOH	1×10^9			PL/A'd-8	S = MB; A' = DPBF.	74F640
	MeOH		1.5×10^{-4}		CP/A'c-16	S = RB; A' = DPBF.	736061

TABLE 9. Rate constants for the interaction of singlet oxygen with aromatic amines. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
9.31	<i>p</i> -Phenylenediamine, <i>N,N,N',N'</i> -tetramethyl- — Continued						
	MeOH/ H ₂ O (50:50)	1.8×10^9	1.5×10^{-4}	308	CR/A'c-16	A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	83A094
9.32	Phenylhydrazine						
	C ₅ H ₅ N	1.4×10^8 (k_r)			PL/Ld-2	S = TPP, MPDEE or PdMP; meas. $\phi_{ox} = \phi_{\Delta}$.	80A398
	CCl ₄	8.6×10^6			PL/Ld-2	S = MPDEE.	80A398
	CH ₃ COCH ₃	9×10^7 (k_r)			PL/Ld-2	S = TPP, MPDEE or PdMP; meas. $\phi_{ox} = \phi_{\Delta}$.	80A398
	CHCl ₃	7.5×10^6			PL/Ld-2	S = TPP, MPDEE or PdMP.	80A398
9.33	Phthalazine-1,4-dione, 5-amino-2,3-dihydro-						
	H ₂ O pH = 10.1	9.3×10^8			CL/LI-12	S = RB; used $k_d = 2.4 \times 10^5$ s ⁻¹ .	90F502
	H ₂ O pH = 7.1	1.4×10^9			CL/LI-12	S = RB; used $k_d = 2.4 \times 10^5$ s ⁻¹ .	90F502

TABLE 10. Rate constants for the interaction of singlet oxygen with amino acids, peptides and proteins.

#	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
10.1	Alanine						
	D ₂ O pD = 8.4	2×10^6 (k_T)		293	CL/Ad-35	used $k_d = 2.9 \times 10^4$ s ⁻¹ ; high pressure O ₂ (0.195 mol L ⁻¹).	79A112
	D ₂ O pD = 8.1	1.3×10^6		295	CL/A'd-22	A' = BR ²⁻ ; used $k_d = 2.9 \times 10^4$ s ⁻¹ ; high pressure O ₂ ; recalculated. [79A112].	757147
	H ₂ O pH = 10.6	3.0×10^7		310	CR/LI-12	used $k_d = 3.2 \times 10^5$ s ⁻¹ ; soln. cont. 5×10^{-4} mol L ⁻¹ CoCl ₂ , ¹ O ₂ * from autoxidation of oxytetracycline.	92M228
	H ₂ O/ MeOH (50:50)	$\leq 1 \times 10^7$			PL/A'd-5	S = MB; A' = DPBF.	72F516
10.2	β-Alanine						
	H ₂ O pH = 7.0			283	CP/A'c-17	S = RB; A' = BHMF; meas. $k_T/k_T^{A'}$ = 0.82; sensitizer immobilized on glass beads.	88R064
10.3	β-Alanine, L-histidyl-						
	H ₂ O pH = 7.0			283	CP/A'c-17	S = RB; A' = BHMF; meas. $k_T/k_T^{A'}$ = 0.77; sensitizer immobilized on glass beads.	88R064
10.4	Albumin						
	D ₂ O	2×10^8			PL/Ld-2	S = RF, water-sol. TPP derivs., or Chl a in micelles contg. Triton X-100; average for bovine or human serum albumin.	86F149
	D ₂ O pH = 7	5×10^8			PL/Ld-2	S = SnTPPSCl ₂ ⁴⁻ ; Soln. contg. 2×10^{-3} mol L ⁻¹ phosphate buffer and 1% NaCl wt/wt; human serum albumin.	90A022
10.5	Aposuperoxide dismutase						
	D ₂ O pD = 8.1	1.1×10^9		295	CP/A'd-22	S = MB; A' = BR ²⁻ ; used $k_d = 5.0 \times 10^4$ s ⁻¹ .	757147
	D ₂ O pD = 8.1	2.5×10^9		295	CL/A'd-22	A' = BR ²⁻ ; used $k_d = 5.0 \times 10^4$ s ⁻¹ ; high pressure O ₂ .	757147
10.6	Arginine						
	H ₂ O pH = 7.1	$\leq 1 \times 10^6$		298	CP/Oc-19	S = Phenosafranin; No measurable effect.	78A360
10.7	Carbonic anhydrase						
	D ₂ O pD = 8.1	8.0×10^8		295	CL/A'd-22	A' = BR ²⁻ ; used $k_d = 5.0 \times 10^4$ s ⁻¹ ; high pressure O ₂ .	757147
	D ₂ O pD = 8.1	6.5×10^8		295	CP/A'd-22	S = MB; A' = BR ²⁻ ; used $k_d = 5.0 \times 10^4$ s ⁻¹ .	757147
10.8	Cytochrome b						
	H ₂ O pH = 7.4	1.4×10^8			CP/Ac, Oc-18	S = RB; A' = His; used $k_d = 4.5 \times 10^5$ s ⁻¹ , $k_{A'} = 1 \times 10^8$ L mol ⁻¹ s ⁻¹ ; in submitochondria particles.	90R212
10.9	Cytochrome C (ferro)						
	CH ₃ CN/ D ₂ O (80:20)	4.9×10^8			PL/A'd-5	S = 2-ACN; A' = DPBF.	80R072
	H ₂ O pH = 7.4	5.6×10^8			CP/Ac, Oc-18	S = RB; A' = His; used $k_d = 4.5 \times 10^5$ s ⁻¹ , $k_{A'} = 1 \times 10^8$ L mol ⁻¹ s ⁻¹ ; in submitochondria particles.	90R212
10.10	Cytochrome C oxidase						
	H ₂ O pH = 7.4	1.0×10^8			CP/Ac, Oc-18	S = RB; A' = His; used $k_d = 4.5 \times 10^5$ s ⁻¹ , $k_{A'} = 1 \times 10^8$ L mol ⁻¹ s ⁻¹ ; in submitochondria particles.	90R212
10.11	Dehydrogenase, 3-hydroxybutyrate						
	H ₂ O pH = 7.4	6.1×10^8			CP/Ac, Oc-18	S = RB; A' = His; used $k_d = 4.5 \times 10^5$ s ⁻¹ , $k_{A'} = 1 \times 10^8$ L mol ⁻¹ s ⁻¹ ; in submitochondria particles.	90R212

TABLE 10. Rate constants for the interaction of singlet oxygen with amino acids, peptides and proteins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
10.11	Dehydrogenase, 3-hydroxybutyrate — Continued						
	H ₂ O pH = 7.2	1.2 × 10 ⁹		295	CP/Ac,A'c-16	S = AlCl ₃ (tspc); A' = DPBF; estd. [¹ O ₂ *] from DPBF consumption in MeOH; k_d not given; enzyme inactivation rate in suspension of sub-mitochondria particles.	87R074
10.12	Dehydrogenase, nicotinamide adenine dinucleotide (reduced)						
	H ₂ O pH = 7.4	1.7 × 10 ⁸			CP/Ac,Oc-18	S = RB; A' = His; used $k_d = 4.5 \times 10^5$ s ⁻¹ , $k_{A'} = 1 \times 10^8$ L mol ⁻¹ s ⁻¹ ; in submitochondria particles.	90R212
10.13	Dehydrogenase, succinate						
	H ₂ O pH = 7.4	1.4 × 10 ⁹			CP/Ac,Oc-18	S = RB; A' = His; used $k_d = 4.5 \times 10^5$ s ⁻¹ , $k_{A'} = 1 \times 10^8$ L mol ⁻¹ s ⁻¹ ; in submitochondria particles.	90R212
10.14	Dismutase, superoxide						
	D ₂ O pD = 8.1	8.2 × 10 ⁸		295	CP/A'd-22	S = MR; A' = BR ²⁻ ; used $k_d = 5.0 \times 10^4$ s ⁻¹ .	757147
	D ₂ O pD = 8.1	2.6 × 10 ⁹		295	CL/A'd-22	A' = BR ²⁻ ; used $k_d = 5.0 \times 10^4$ s ⁻¹ ; high pressure O ₂ .	757147
	H ₂ O pH = 7.1	2.7 × 10 ⁹			CL/LI-12	S = RB; used $k_d = 2.4 \times 10^5$ s ⁻¹ .	90F502
10.15	Glycine						
	D ₂ O/ EtOH (75:25)	<1 × 10 ⁵		295	PL/Ld-2	S = RB.	94A113
10.16	Glycine, glycy-						
	D ₂ O/ EtOH (75:25)	<1 × 10 ⁵		295	PL/Ld-2	S = RB.	94A113
10.17	Glycine, glycyglycyl-						
	D ₂ O/ EtOH (75:25)	<1 × 10 ⁵		295	PL/Ld-2	S = RB.	94A113
10.18	Glycine, glycyglycylglycyl-						
	D ₂ O/ EtOH (75:25)	<1 × 10 ⁵		295	PL/Ld-2	S = RB.	94A113
10.19	Glycine, glycy-L-histidyl-						
	D ₂ O/ EtOH (75:25)	4.9 × 10 ⁷		295	PL/Ld-2	S = RB.	94A113
10.20	Glycine, histidyl-						
	CH ₃ CN/ H ₂ O (50:50)	1.4 × 10 ⁷			PL/Ld-2	S = RB or Eos.	93R059
	CH ₃ CN/ H ₂ O (50:50)	7.4 × 10 ⁶ (k_r)			CP/Ac,A'c-17	S = RB; A' = DMA; $k_r^{A'}$ not given.	93R059
	D ₂ O/ EtOH (75:25)	5.2 × 10 ⁷		295	PL/Ld-2	S = RB.	94A113
	H ₂ O pH = 7	6.5 × 10 ⁷			CP/A'c-18	S = RB; A' = TrpH; used $k_d = 2.5 \times 10^5$ s ⁻¹ , $k_{A'} = 6 \times 10^8$ L mol ⁻¹ s ⁻¹ .	93R059
	H ₂ O pH = 7	6.6 × 10 ⁷ (k_r)			CP/Oc-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	93R059
10.21	Glycine, tryptophyl-						
	EtOH/ CH ₃ CN (80:20)	1.0 × 10 ⁷			PL/Ld-2	S = ZnTPP.	91A252
	EtOH/ CH ₃ CN (80:20)	7.4 × 10 ⁵ (k_r)			CP/A'c-18	S = ZnTPP; A' = DMA; used $k_d = 5.3 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; used $k_A = 1.0 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A252
	H ₂ O pH = 7	3.3 × 10 ⁷ (k_r)			CP/Oc-17	S = RB; A' = Met; used $k_r^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A252

TABLE 10. Rate constants for the interaction of singlet oxygen with amino acids, peptides and proteins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
10.22	Glycine, L-tryptophylglycyl-						
	D ₂ O/ EtOH (75:25)	1.7×10^7 (k_p)		295	CP/Ac-14,28	S = RB; used $k_d = 4.8 \times 10^4$ s ⁻¹ ; DMA as actinometer, k_t derived using $k_A = 3.1 \times 10^7$ L mol ⁻¹ s ⁻¹ .	94A113
	D ₂ O/ EtOH (75:25)	3.1×10^7		295	PL/Ld-2	S = RB.	94A113
10.23	Histidine						
	D ₂ O/ EtOH (75:25)	4.6×10^7		295	PL/Ld-2	S = RB.	94A113
	D ₂ O/ EtOH (75:25)	3.4×10^7 (k_p)		295	CP/Ac-14,28	S = RB; used $k_d = 4.8 \times 10^4$ s ⁻¹ ; DMA as actinometer, k_t derived using $k_A = 4.6 \times 10^7$ L mol ⁻¹ s ⁻¹ .	94A113
	CH ₃ CN/ H ₂ O (50:50)	1.6×10^7			PL/Ld-2	S = RB or Eos.	93R059
	CH ₃ CN/ H ₂ O (50:50)	8.1×10^6 (k_p)			CP/Ac,A'c-17	S = RB; A' = DMA; $k_t^{A'}$ not given.	93R059
	D ₂ O pD = 7	4×10^7			PL/Ld-2	S = Carboxyanthracene.	92E225
	D ₂ O pH = ~7	4.4×10^7		293	PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	86A198
	D ₂ O pD = 7.4	6.1×10^7			PL/A'd-5	S = MB; A' = ADPA.	81N048 80A205
	D ₂ O pD = 8.4	1.0×10^8 (k_p)		293	CL/Ad-35	used $k_d = 2.9 \times 10^4$ s ⁻¹ ; high pressure O ₂ (0.195 mol L ⁻¹); unreactive at pH < 7.	79A112
	D ₂ O pD = 8.1	1.0×10^8		295	CL/A'd-22	A' = BR ²⁻ ; used $k_d = 2.9 \times 10^4$ s ⁻¹ ; high pressure O ₂ ; recalc. [79A112].	757147
	D ₂ O pD = 11.2	2.8×10^8		310	CR/A'c-32	A' = DPBF; used $k_d = 1.5 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from DOPA/H ₂ O ₂ .	89M038
	D ₂ O pD = 11.2	9.3×10^8		310	CR/A'c-32	A' = DPBF; used $k_d = 1.5 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from Dopamine/H ₂ O ₂ .	89M038
	D ₂ O (mic) pD = 9.3	6.7×10^7			PL/A'd-5	S = 2-ACN; A' = DPBF; in vesicles (4.0×10^{-2} mol L ⁻¹ DDAB).	82N027
	D ₂ O (mic) pD = 7.4	5.9×10^7			PL/A'd-5	S = 2-ACN; A' = DPBF; micellar soln. 0.1 mol L ⁻¹ SDS or CTAB.	81N048
	H ₂ O pH = 10.6	5.7×10^7		310	CR/LI-12	used $k_d = 3.2 \times 10^5$ s ⁻¹ ; soln. cont. 5×10^{-4} mol L ⁻¹ CoCl ₂ , ¹ O ₂ * from autoxidation of oxytetracycline.	92M228
	H ₂ O pH = 7	9.0×10^7			CP/A'c-18	S = RB; A' = TrpH; used $k_d = 2.5 \times 10^5$ s ⁻¹ , $k_A' = 6 \times 10^8$ L mol ⁻¹ s ⁻¹ .	93R059
	H ₂ O pH = 7	9.0×10^7 (k_p)			CP/Oc-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	93R059
	H ₂ O pH = 7.0			283	CP/A'c-17	S = RB; A' = BHMF; meas. $k_t/k_t^{A'} = 0.94$; sensitizer immobilized on glass beads.	88R064
	H ₂ O pH = 7.0			283	CP/A'c-17	S = RB; A' = BHMF; meas. $k_t/k_t^{A'} = 0.92$.	88R064
	H ₂ O pH = 7.1	3.2×10^7		298	CP/Oc-19	S = Phenosafranine; Q = NaN ₃ ; used $k_Q = 2.0 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A360
	H ₂ O	5.4×10^9	9.2×10^{-5}	298	CP/Ac-15	S = MB; used $k_d = 5.0 \times 10^5$ s ⁻¹ .	78F061
	H ₂ O pH = 7.0		3.4×10^{-3}	283	CP/Oc-15	S = MB; The mechanism of oxidation is not clear.	65F029
	H ₂ O pH = 8.0		2.9×10^{-3}		CP/Oc-15	S = PF.	617008
	H ₂ O (mic)	6.7×10^7			CP/A'c-16	S = 2-ACN; A' = DPBF; DDDAB liposomes.	85R008
	H ₂ O/ MeOH (50:50)	7×10^6 (k_p)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_t^{A'} = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ ; $k_t^{A'}$ in MeOH; k_t derived using $k_{TQ}^A = 1 \times 10^6$ L mol ⁻¹ s ⁻¹ and $k_A = 5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	72F516

TABLE 10. Rate constants for the interaction of singlet oxygen with amino acids, peptides and proteins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
10.23 Histidine — Continued							
	H ₂ O/ MeOH (50:50)	5×10^7			PL/A'd-5	S = MB; A' = DPBF.	72F516
	MeOH	1.1×10^7		297	CR/P'a-16	A' = TEMP; k_d not given; formn. of TEMPO monitored by esr; soln. cont. MeONa and CoCl ₂ , ¹ O ₂ * from autoxidation of adrenaline.	92D227
10.24 L-Histidine, β-alanyl- (Carnosine)							
	D ₂ O pD = 7	3×10^7			PL/Ld-2	S = Carboxyanthracene.	92E225
	H ₂ O pH = 7.0			283	CP/A'c-17	S = RB; A' = BHMF; meas. $k_r/k_r^{A'} = 0.72$.	88R064
	H ₂ O pH = 7.0			283	CP/A'c-17	S = RB; A' = BHMF; meas. $k_r/k_r^{A'} = 0.76$; sensitizer immobilized on glass beads.	88R064
10.25 Histidine, β-alanyl-1-methyl- (Anserine)							
	D ₂ O pD = 7	3×10^7			PL/Ld-2	S = Carboxyanthracene.	92E225
10.26 L-Histidine, N-(4-amino-1-oxobutyl)- (Homocarnosine)							
	H ₂ O pH = 7.0			283	CP/A'c-17	S = RB; A' = BHMF; meas. $k_r/k_r^{A'} = 0.91$.	88R064
	H ₂ O pH = 7.0			283	CP/A'c-17	S = RB; A' = BHMF; meas. $k_r/k_r^{A'} = 1.0$; sensitizer immobilized on glass beads.	88R064
10.27 Histidine, glycyl-							
	CH ₃ CN/ H ₂ O (50:50)	9.2×10^6 (k_r)			CP/Ac,A'c-17	S = RB; A' = DMA; $k_r^{A'}$ not given.	93R059
	CH ₃ CN/ H ₂ O (50:50)	3.8×10^7			PL/Ld-2	S = RB or Eos.	93R059
	H ₂ O pH = 7	2.3×10^8			CP/A'c-18	S = RB; A' = TrpH; used $k_d = 1.5 \times 10^5$ s ⁻¹ , $k_{A'} = 6 \times 10^8$ L mol ⁻¹ s ⁻¹ .	93R059
	H ₂ O pH = 7	8.3×10^7 (k_r)			CP/Oc-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	93R059
10.28 L-Histidine, glycylglycyl-							
	D ₂ O/ EtOH (75:25)	5.6×10^7		295	PL/Ld 2	S = RB.	94A113
10.29 Luciferase							
	H ₂ O pH = 8.0	1.9×10^9 (k_r)		277	CP/Ac-17	S = RB; A' = His; used $k_r^{A'} = 2.8 \times 10^7$ L mol ⁻¹ s ⁻¹ ; sensitizer immobilized on glass beads.	86R129
10.30 Lysozyme							
	D ₂ O pD = 5.9	4.7×10^7 (k_r) 5.9×10^8 (k_d)		293	CP/Ac-14,28	S = Acridine Orange; used $k_d = 5.0 \times 10^4$ s ⁻¹ .	767105
	D ₂ O pD = 8.1	1.5×10^9		295	CL/A'd-22	A' = BR ²⁻ ; used $k_d = 5.0 \times 10^4$ s ⁻¹ ; high pressure O ₂ .	757147
	D ₂ O	1.3×10^9	4.0×10^{-5}	291	CP/Ac-15	S = 8-MOP; used $k_d = 5.0 \times 10^4$ s ⁻¹ .	757485
	D ₂ O	2.5×10^8 (k_r)			CP/Ac-28	S = Eos; used $k_d = 5.0 \times 10^4$ s ⁻¹ .	733045
	H ₂ O pH = 5.9	2.9×10^7 (k_r) 4.1×10^8 (k_d)		293	CP/Ac-14,28	S = Acridine Orange; used $k_d = 5.0 \times 10^5$ s ⁻¹ .	767105
	H ₂ O	1.3×10^8 (k_r)			CP/Ac-28	S = Eos; used $k_d = 5.0 \times 10^5$ s ⁻¹ .	733045
10.31 Phenylalanine							
	D ₂ O/ EtOH (75:25)	7×10^5		295	PL/Ld-2	S = RB.	94A113

TABLE 10. Rate constants for the interaction of singlet oxygen with amino acids, peptides and proteins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
10.32	Subtilisin BPN'						
	D ₂ O pH = 7.0	3×10^7 (k_r)			CP/Ac-14,27	S = HP; used $k_d = 1.5 \times 10^4$ s ⁻¹ ; k_r estimated using $\phi_{\Delta}(\text{HP}) = 0.75$.	83R008
10.33	Trypsin						
	H ₂ O pH = 7.0	8×10^9		298	CP/LI-12	S = Ret; used $k_d = 3.5 \times 10^5$ s ⁻¹ .	80R116
	H ₂ O pH = 8.0	7.1×10^9	7.0×10^{-5}	288	CP/Pa-15	S = MB and FMN; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; β calculated from data reported in [66F197].	73F659
10.34	Tryptamine						
	D ₂ O/ EtOH (75:25)	2.7×10^7 (k_r)		295	CP/Ac-14,28	S = RB; used $k_d = 4.8 \times 10^4$ s ⁻¹ ; DMA as actinometer, k_r derived using $k_A = 5.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	94A113
	D ₂ O/ EtOH (75:25)	5.2×10^7		295	PL/Ld-2	S = RB.	94A113
	H ₂ O pH = 7	7.8×10^9 (k_r)			CP/Oc-17	S = RB; A' = FFA; used $k_r^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	93F191
	MeOH/ H ₂ O (50:50)	9×10^6 (k_r)			CP/A'c-17	S = RB; A' = DPBF; used $k_r^{A'} = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ ; derived $k_q = 4.6 \times 10^7$ L mol ⁻¹ s ⁻¹ using $k_A = 5.5 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A291
	MeOH/ H ₂ O (50:50)	5.5×10^7			CP/Ac-15	S = RB; used $k_d = 2.8 \times 10^5$ s ⁻¹ .	82A291
10.35	Tryptamine, N-methoxycarbonyl-						
	MeOH/ H ₂ O (50:50)	3.2×10^7		308	CR/Ac-31	used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	82A291
	MeOH/ H ₂ O (50:50)	3.2×10^7			CP/Ac-15	S = RB; used $k_d = 2.8 \times 10^5$ s ⁻¹ .	82A291
	MeOH/ H ₂ O (50:50)	1.3×10^7 (k_r)		308	CR/A'c-17,31	A' = DPBF; used $k_r^{A'} = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ ; derived $k_q = 1.9 \times 10^7$ L mol ⁻¹ s ⁻¹ using $k_A = 3.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A291
	MeOH/ H ₂ O (50:50)	7×10^6 (k_r)			CP/A'c-17	S = RB; A' = DPBF; used $k_r^{A'} = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ ; derived $k_q = 2.5 \times 10^7$ L mol ⁻¹ s ⁻¹ using $k_A = 3.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A291
10.36	Tryptophan						
	<i>n</i> -C ₇ H ₁₆ /H ₂ O (mic)	-3×10^7			PL/Ld-2	S = RB; reverse micelles contg. 0.25 mol L ⁻¹ AOT.	84N114
	MeOH/ D ₂ O (90:10)	1.3×10^7		293	PL/Ld-2	S = HP.	84F327
	MeOH/ H ₂ O (50:50)	3.8×10^7 1.0×10^7 (k_r) 2.8×10^7 (k_q)			CP/Ac, Oc-14,29	S = RB; A' = 2,5-DMF; used $k_d = 2.9 \times 10^5$ s ⁻¹ ; meas. $k_q/k_r = 2.8$.	83A397
	D ₂ O pH = ~7	5.6×10^7		293	PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	86A198
	D ₂ O	-5×10^7			PL/Ld-2	S = RF, H ₂ TPPS ⁴⁻ , or Chl in Triton X-100 micelles.	86F149
	D ₂ O	3.6×10^7 (k_r)		293	CP/Ac-14	S = HP; k_d not given; used $\phi_{\Delta}(\text{HP}) = 0.11$.	84F327
	D ₂ O pD = 7.4	7.2×10^7		293	PL/Ld-2	S = HP.	84F327
	D ₂ O pD = 7.4	6.1×10^7			PL/A'd-5	S = MB; A' = ADPA.	81N048
	D ₂ O pD = 8.4	3×10^7 (k_r)		293	CL/Ad-35	used $k_d = 2.9 \times 10^4$ s ⁻¹ ; high pressure O ₂ (0.195 mol L ⁻¹).	79A112
	D ₂ O pD = 8.1	5.1×10^7		295	CL/A'd-22	A' = BR ²⁻ ; used $k_d = 2.9 \times 10^4$ s ⁻¹ ; high pressure O ₂ ; recalcul. [79A112].	757147

TABLE 10. Rate constants for the interaction of singlet oxygen with amino acids, peptides and proteins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
10.36 Tryptophan — Continued							
	D ₂ O/ MeOH (70:30)	6.0×10^7		293	PL/Ld-2	S = HP.	84F327
	D ₂ O/ HCONH ₂ (70:30)	5.2×10^7		293	PL/Ld-2	S = HP.	84F327
	D ₂ O (mic) pD = 7.4	4.2×10^7			PL/A'd-5	S = 2-ACN; A' = DPBF; 0.1 mol L ⁻¹ CTAB.	81N048
	D ₂ O (mic) pD = 7.4	4.0×10^7			PL/A'd-5	S = 2-ACN; A' = DPBF; 0.1 mol L ⁻¹ SDS.	81N048
	D ₂ O/ EtOH (75:25)	1.3×10^7 (k_t)		295	CP/Ac-14,28	S = RB; used $k_d = 4.8 \times 10^4$ s ⁻¹ , DMA as actinometer, k_t derived using $k_A = 3.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	94A113
	D ₂ O/ EtOH (75:25)	3.2×10^7		295	PL/Ld-2	S = RB.	94A113
	EtOH	$\leq 5.0 \times 10^6$			PL/A'd-5	S = MB; A' = DPBF.	78A338
	EtOH/ CH ₃ CN (80:20)	6.3×10^6			PL/Ld-2	S = ZnTPP.	91A252
	EtOH/ CH ₃ CN (80:20)	4.8×10^5 (k_t)			CP/Ac,A'c-14,28	S = ZnTPP; A' = DMA; used $k_d = 5.3 \times 10^4$ s ⁻¹ , $k_A = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; k_t derived using $k_A = 6.3 \times 10^6$ L mol ⁻¹ s ⁻¹ .	91A252
	H ₂ O pH = 10.6	2.6×10^7		310	CR/LI-12	used $k_t = 3.2 \times 10^5$ s ⁻¹ ; soln. cont. 5×10^{-4} mol L ⁻¹ CoCl ₂ , ¹ O ₂ * from autoxidation of oxytetracycline.	92M278
	H ₂ O pH = 7	3.2×10^7 (k_t)			CP/Oc-17	S = RB; A' = Met; used $k_t A' = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A252
	H ₂ O	5.9×10^7 (k_t)		298	CP/Ac-14	S = H ₂ TPPS ⁴⁻ ; used $k_d = 2.5 \times 10^5$ s ⁻¹ , $E_a = 15.9$ kJ mol ⁻¹ ; log(A) = 10.6; studied at 288-318 K; used $\phi_A(S) = 0.7$, phosphate buffer contg. 1.6% NaCl.	91R053
	H ₂ O pH = 7	6.0×10^7 5×10^6 (k_t)			CP/Pa-14	S = GaCl(tspc); used $k_d = 2.4 \times 10^5$ s ⁻¹ ; P = Hydroperoxytryptophan; k_t estd. assuming $\phi_A(S) = 0.5$.	87F104
	H ₂ O pH = 7.4	6.6×10^7 (k_t)		293	CP/Ac-14	S = HP; used $k_d = 2.5 \times 10^5$ s ⁻¹ ; k_d not given; used $\phi_A(HP) = 0.41$.	84F327
	H ₂ O pH = 7.0		1.8×10^{-3}	283	CP/Oc-15	S = MB; The mechanism of oxidation is not clear.	65F029
	H ₂ O/ MeOH (50:50)	9.0×10^7			CP/Pa-14	S = RB or GaCl(tspc); used $k_d = 2.8 \times 10^5$ s ⁻¹ ; P = Hydroperoxytryptophan.	87F104
	H ₂ O/ MeOH (50:50) pH = 10				CP/A'c-17	S = RB; A' = His; meas. $k_t/k_t A' = 0.6$; sensitizer immobilized on glass beads.	83F166
	H ₂ O/ MeOH (50:50)	7.1×10^7			CP/Ac-15	S = RB; used $k_d = 2.8 \times 10^5$ s ⁻¹ .	82A291
	H ₂ O/ MeOH (50:50)	3×10^6 (k_t)			CP/A'c-17	S = RB; A' = DPBF; used $k_t A' = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ ; derived $k_t = 6.8 \times 10^7$ L mol ⁻¹ s ⁻¹ using $k_A = 7.1 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A291
	H ₂ O/ MeOH (50:50)	2.1×10^7		308	CR/Ac-31	used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	82A291
	H ₂ O/ MeOH (50:50)	5×10^6 (k_t)		308	CR/A'c-17,31	A' = DPBF; used $k_t A' = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ ; derived $k_t = 1.6 \times 10^7$ L mol ⁻¹ s ⁻¹ , using $k_A = 2.1 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A291
	H ₂ O/ MeOH (50:50)	3.0×10^7			PL/A'd-5	S = MB; A' = DPBF.	78A338
	H ₂ O/ MeOH (50:50)	4×10^7			PL/A'd-5	S = MB; A' = DPBF.	72F516

TABLE 10. Rate constants for the interaction of singlet oxygen with amino acids, peptides and proteins. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
10.36 Tryptophan — Continued							
	H ₂ O/ MeOH (50:50)	4×10^6 (k_r)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_r^{A'} = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ ; $k_r^{A'}$ in MeOH; k_r derived using $k_{TQ}^A = 2.0 \times 10^9$ L mol ⁻¹ s ⁻¹ and $k_A = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	72F516
	HCONH ₂ / D ₂ O (90:10)	8.7×10^7		293	PL/Ld-2	S = HP.	84F327
	HCONHCH ₃	1.3×10^8			PL/A'd-5	S = MB; A' = DPBF.	78A338
	MeOH	6×10^6			PL/A'd-5	S = MB; A' = DPBF.	78A338
10.37 Tryptophan, N-acetyl-							
	D ₂ O/ EtOH (75:25)	4.2×10^7		295	PL/Ld-2	S = RB.	94A113
10.38 Tryptophan, N-acetyl-, methyl ester							
	D ₂ O/ EtOH (75:25)	3.2×10^7		295	PL/Ld-2	S = RB.	94A113
	MeOH/ H ₂ O (50:50)	6×10^6 (k_r)		308	CR/A'c 17,31	A' = DPBF; used $k_r^{A'} = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ ; derived $k_d = 1.8 \times 10^7$ L mol ⁻¹ s ⁻¹ , using $k_A = 2.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A291
	MeOH/ H ₂ O (50:50)	4×10^6 (k_r)			CP/A'c-17	S = RB; A' = DPBF; used $k_r^{A'} = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ ; derived $k_d = 5.9 \times 10^7$ L mol ⁻¹ s ⁻¹ using $k_A = 6.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A291
	MeOH/ H ₂ O (50:50)	2.4×10^7		308	CR/Ac-31	used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	82A291
	MeOH/ H ₂ O (50:50)	6.3×10^7			CP/Ac-15	S = RB; used $k_d = 2.8 \times 10^5$ s ⁻¹ .	82A291
10.39 L-Tryptophan, L-alanyl-							
	D ₂ O/ EtOH (75:25)	2.7×10^7 (k_r)		295	CP/Ac-14,28	S = RB; used $k_d = 4.8 \times 10^4$ s ⁻¹ ; DMA as actinometer, k_r derived using $k_A = 4.0 \times 10^7$ L mol ⁻¹ s ⁻¹ .	94A113
	D ₂ O/ EtOH (75:25)	4.0×10^7		295	PL/Ld-2	S = RB.	94A113
10.40 L-Tryptophan, ethyl ester							
	D ₂ O/ EtOH (75:25)	3.1×10^7		295	PL/Ld-2	S = RB.	94A113
10.41 Tryptophan, glycy-							
	EtOH/ CH ₃ CN (80:20)	1.2×10^7			PL/Ld-2	S = ZnTPP.	91A252
	EtOH/ CH ₃ CN (80:20)	9.8×10^5 (k_r)			CP/Ac,A'c-14,28	S = ZnTPP; A' = DMA; used $k_d = 5.3 \times 10^4$ s ⁻¹ , $k_A = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; k_r derived using $k_A = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A252
	H ₂ O pH = 7	5.1×10^7 (k_r)			CP/Oc-17	S = RB; A' = Met; used $k_r^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91A252
	H ₂ O pH = 7	$\sim 2 \times 10^8$	2×10^{-3}		CP/LI-12	S = Ery; used $k_d = 3 \times 10^5$ s ⁻¹ .	90F511
10.42 Tryptophan, methyl ester							
	MeOH/ H ₂ O (50:50)	4×10^6 (k_r)			CP/A'c-17	S = RB; A' = DPBF; used $k_r^{A'} = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ ; derived $k_d = 3.5 \times 10^7$ using $k_A = 3.9 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A291
	MeOH/ H ₂ O (50:50)	3.9×10^7			CP/Ac-15	S = RB; used $k_d = 2.8 \times 10^5$ s ⁻¹ .	82A291
10.43 Tryptophanamide							
	D ₂ O/ EtOH (75:25)	3.1×10^7		295	PL/Ld-2	S = RB.	94A113
10.44 L-Tryptophanamide, N-acetyl-							
	D ₂ O/ EtOH (75:25)	3.1×10^7		295	PL/Ld-2	S = RB.	94A113

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes.

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.1 Acridine, 3,6-diamino- (Proflavine)							
	D ₂ O pH = 5.9	3×10^8			CP/A'c-25	S = A; A' = Lysozyme; used $k_d = 5 \times 10^4$ s ⁻¹ , $k_{A'}$ = 6.4×10^8 L mol ⁻¹ s ⁻¹ ; Authors suggest that values are high due to quenching of sensitizer triplet.	81R011
	H ₂ O pH = 5.9	7×10^8			CP/A'c-25	S = A; A' = Lysozyme; used $k_d = 5 \times 10^5$ s ⁻¹ , $k_{A'}$ = 4.4×10^8 L mol ⁻¹ s ⁻¹ .	81R011
11.2 Acridinium, 3,6-diamino-10-methyl- (Acriflavine)							
	D ₂ O pH = 5.9	3×10^8			CP/A'c-25	S = A; A' = Lysozyme; used $k_d = 5 \times 10^4$ s ⁻¹ , $k_{A'}$ = 6.4×10^8 L mol ⁻¹ s ⁻¹ .	81R011
	H ₂ O pH = 5.9	9×10^8			CP/A'c-25	S = A; A' = Lysozyme; used $k_d = 5 \times 10^5$ s ⁻¹ , $k_{A'}$ = 4.4×10^8 L mol ⁻¹ s ⁻¹ .	81R011
11.3 9,10-Anthraquinone, 1-amino-							
	2-PrOH/ H ₂ O (83:17)			295	CR/Ac-32	A' = 1,2-AQ(NH ₂) ₂ ; meas. $k_A/k_{A'}$ = 0.02; ¹ O ₂ * from NaOCl/H ₂ O ₂ .	88F582
11.4 9,10-Anthraquinone, 2-amino-							
	2-PrOH/ H ₂ O (83:17)			295	CR/Ac-32	A' = 1,2-AQ(NH ₂) ₂ ; meas. $k_A/k_{A'}$ = 0.15; ¹ O ₂ * from NaOCl/H ₂ O ₂ .	88F582
11.5 9,10-Anthraquinone, 1-amino-4-hydroxy-							
	CCl ₄	4×10^6 < 10^5 (k_t)			MP/LI-12,27	S = TPP; used $k_d = 36$ s ⁻¹ .	82A384
	CH ₃ COCH ₃			294	CP/Ac-19	S = A; A' = [(CH ₃) ₂ NCS ₂] ₂ Ni; meas. $k_A/k_{A'}$ = 0.061.	80F634
	2-PrOH/ H ₂ O (83:17)			295	CR/Ac-32	A' = 1,2-AQ(NH ₂) ₂ ; meas. $k_A/k_{A'}$ = 0.55; ¹ O ₂ * from NaOCl/H ₂ O ₂ .	88F582
11.6 9,10-Anthraquinone, 1-amino-2-methyl-							
	CCl ₄	1×10^5 < 10^5 (k_t)			MP/LI-12,27	S = TPP; used $k_d = 36$ s ⁻¹ .	82A384
11.7 9,10-Anthraquinone, 1,4-bis(methylamino)-							
	CH ₃ COCH ₃			294	CP/Ac-19	S = A; A' = [(CH ₃) ₂ NCS ₂] ₂ Ni; meas. $k_A/k_{A'}$ = 0.12.	80F634
11.8 9,10-Anthraquinone, 1,4-diamino-							
	C ₅ H ₅ N	1.4×10^9			PL/Ld-2	S = An.	87E959
	C ₅ H ₅ N	2×10^9			CP/A'c-16	S = TPBC; A' = Tetr; used $k_d = 1.6 \times 10^5$ s ⁻¹ .	85F675
	C ₆ H ₆	2.0×10^8			PL/Ld-2	S = An.	87E959
	C ₆ H ₆	3×10^8			CP/A'c-16	S = TPBC; A' = Tetr; used $k_d = 3.0 \times 10^5$ s ⁻¹ .	85F675
	CCl ₄	1×10^8 < 10^5 (k_t)			MP/LI-12,27	S = TPP; used $k_d = 36$ s ⁻¹ .	82A384
	CH ₃ COCH ₃	6.2×10^8			PL/Ld-2	S = An.	87E959
	CH ₃ COCH ₃	9×10^8			CP/A'c-16	S = TPBC; A' = Tetr; used $k_d = 5.1 \times 10^5$ s ⁻¹ .	85F675
	2-PrOH/ H ₂ O (83:17)			295	CR/Ac-32	A' = 1,2-AQ(NH ₂) ₂ ; meas. $k_A/k_{A'}$ = 0.04; ¹ O ₂ * from NaOCl/H ₂ O ₂ .	88F582
11.9 9,10-Anthraquinone, 1,5-diamino-							
	2-PrOH/ H ₂ O (83:17)			295	CR/Ac-32	A' = 1,2-AQ(NH ₂) ₂ ; meas. $k_A/k_{A'}$ = 0.15; ¹ O ₂ * from NaOCl/H ₂ O ₂ .	88F582
11.10 9,10-Anthraquinone, 1,8-diamino-							
	2-PrOH/ H ₂ O (83:17)			295	CR/Ac-32	A' = 1,2-AQ(NH ₂) ₂ ; meas. $k_A/k_{A'}$ = 0.13; ¹ O ₂ * from NaOCl/H ₂ O ₂ .	88F582

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.11	9,10-Anthraquinone, 2,6-diamino-						
	2-PrOH/ H ₂ O (83:17)			295	CR/Ac-32	A' = 1,2-AQ(NH ₂) ₂ ; meas. $k_A/k_{A'}$ = 0.33; ¹ O ₂ * from NaOCl/H ₂ O ₂ .	88F582
11.12	9,10-Anthraquinone, 1,5-diaminobromo-4,8-dihydroxy-						
	CCl ₄	1×10^7 <10 ⁵ (k_r)			MP/LI-12,27	S = TPP; used k_d = 36 s ⁻¹ .	82A384
11.13	9,10-Anthraquinone, 1,4-diamino-2-methoxy-						
	CCl ₄	1×10^8 <10 ⁵ (k_r)			MP/LI-12,27	S = TPP; used k_d = 36 s ⁻¹ .	82A384
	2-PrOH/ H ₂ O (83:17)			295	CR/Ac-32	A' = 1,2-AQ(NH ₂) ₂ ; meas. $k_A/k_{A'}$ = 0.05; ¹ O ₂ * from NaOCl/H ₂ O ₂ .	88F582
11.14	9,10-Anthraquinone, 1,4,5,8-tetraamino-						
	2-PrOH/ H ₂ O (83:17)			295	CR/Ac-32	A' = 1,2-AQ(NH ₂) ₂ ; meas. $k_A/k_{A'}$ = 0.14; ¹ O ₂ * from NaOCl/H ₂ O ₂ .	88F582
11.15	Benzene, 1-bromo-4-(diazophenylmethyl)-						
	CH ₃ CN	9.1×10^8 (k_r)			CP/Ac,A'c-17	S = MB; A' = DDM; used $k_r^{A'}$ = 1.4×10^9 L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'}$ = 0.65.	777113
11.16	Benzene, 1,1'-(diazomethylene)bis- (Diazodiphenylmethane, DDM)						
	CH ₃ CN	-6×10^8		300	PL/Pb-5	S = MB; P = Benzophenone oxide.	84A339
	CH ₃ CN	1.1×10^9	2.9×10^{-5}		CP/Ac-15	S = MB; used k_d = 3.3×10^4 s ⁻¹ .	777113
	CH ₃ CN	1.4×10^9 (k_r)			CP/Ac,A'c-17	S = MB; A' = DMA; used $k_r^{A'}$ = 1.7×10^8 L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'}$ = 8.0.	777113
	CH ₃ CN	2.4×10^9 (k_r)			CR/Ac,A'c-17	A' = DMA; used $k_r^{A'}$ = 1.7×10^8 L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'}$ = 14; ¹ O ₂ * from (PhO) ₃ PO ₃ .	777113
	CHCl ₃	1.1×10^9 (k_r)			CR/Ac,A'c-17	A' = DMA; used $k_r^{A'}$ = 9.3×10^7 L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'}$ = 12; ¹ O ₂ * from (PhO) ₃ PO ₃ .	777113
	CHCl ₃	8.3×10^8	2×10^{-5}		CP/Ac-15	S = MB; used k_d = 1.7×10^4 s ⁻¹ .	777113
	MeOH	6.7×10^8	2.1×10^{-4}		CP/Ac-15	S = MB; used k_d = 1.4×10^4 s ⁻¹ .	777113
11.17	Benzene, 1,1'-(diazomethylene)bis[4-chloro-						
	CH ₃ CN	7.3×10^8 (k_r)			CP/Ac,A'c-17	S = MB; A' = DMA; used $k_r^{A'}$ = 1.7×10^8 L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'}$ = 4.3.	777113
	CH ₃ CN	6.6×10^8	5×10^{-5}		CP/Ac-15	S = MB; used k_d = 3.3×10^4 s ⁻¹ .	777113
	CH ₃ CN	7.5×10^8 (k_r)			CP/Ac,A'c-17	S = MB; A' = DDM; used $k_r^{A'}$ = 1.4×10^9 L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'}$ = 0.54.	777113
	MeOH	3.8×10^8 (k_r)			CP/Ac,A'c-17	S = MB; A' = DDM; used $k_r^{A'}$ = 6.7×10^8 L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'}$ = 0.58.	777113
11.18	Benzene, 1,1'-(diazomethylene)bis[4-methyl-						
	CH ₃ CN	2.3×10^9 (k_r)			CP/Ac,A'c-17	S = MB; A' = DDM; used $k_r^{A'}$ = 1.4×10^9 L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'}$ = 1.6.	777113
	MeOH	9.4×10^8 (k_r)			CP/Ac,A'c-17	S = MB; A' = DDM; used $k_r^{A'}$ = 6.7×10^8 L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'}$ = 1.4.	777113
11.19	Benzene, 1,1'-(diazomethylene)bis[2,4,6-trimethyl-						
	CH ₃ CN	1.2×10^7			PL/Pb-5	S = MB; P = 2,4,6,2',4',6'-Hexamethylbenzophenone oxide.	89A105
11.20	Benzene, 1-methoxy-4-(diazophenylmethyl)-						
	CH ₃ CN	2.0×10^9 (k_r)			CP/Ac,A'c-17	S = MB; A' = DDM; used $k_r^{A'}$ = 1.4×10^9 L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'}$ = 1.4.	777113

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.21	1,4-Benzenediamine, <i>N</i> ⁴ -(6-amino-3-phenylpyrazolo[5,1- <i>c</i>]-1,2,4-triazol-7-ylidene)- <i>N</i> ¹ , <i>N</i> ¹ -diethyl-3-methyl- EtOH	4.3×10^5 (k_r)			CP/Ac-17	S = AlCl(tspc); A' = Azo dye 10; used $k_r^{A'} = 2.4 \times 10^6$ L mol ⁻¹ s ⁻¹ ; values from graph.	91A448
11.22	1,4-Benzenediamine, <i>N</i> ¹ , <i>N</i> ¹ -diethyl-3-methyl- <i>N</i> ⁴ -(6-methyl-3-phenylpyrazolo[5,1- <i>c</i>]-1,2,4-triazol-7-ylidene)- EtOH	3.5×10^5 (k_r)			CP/Ac-17	S = AlCl(tspc); A' = Azo dye 10; used $k_r^{A'} = 2.4 \times 10^6$ L mol ⁻¹ s ⁻¹ ; values from graph.	91A448
11.23	1,4-Benzenediamine, <i>N</i> ¹ , <i>N</i> ¹ -diethyl-3-methyl- <i>N</i> ⁴ -[6-(phenylamino)-3-phenylpyrazolo[5,1- <i>c</i>]-1,2,4-triazol-7-ylidene]- EtOH	8.5×10^5 (k_r)			CP/Ac-17	S = AlCl(tspc); A' = Azo dye 10; used $k_r^{A'} = 2.4 \times 10^6$ L mol ⁻¹ s ⁻¹ ; values from graph.	91A448
11.24	1,4-Benzenediamine, <i>N</i> ¹ , <i>N</i> ¹ -diethyl-3-methyl- <i>N</i> ⁴ -(3-phenylpyrazolo[5,1- <i>c</i>]-1,2,4-triazol-7-ylidene)- EtOH	2.7×10^5 (k_r)			CP/Ac-17	S = AlCl(tspc); A' = Azo dye 10; used $k_r^{A'} = 2.4 \times 10^6$ L mol ⁻¹ s ⁻¹ ; values from graph.	91A448
11.25	1,4-Benzenediamine, <i>N</i> ¹ , <i>N</i> ¹ -diethyl-3-methyl- <i>N</i> ⁴ -[3-phenyl-6-(2-thienyl)pyrazolo[5,1- <i>c</i>]-1,2,4-triazol-7-ylidene]- EtOH	3.2×10^5 (k_r)			CP/Ac-17	S = AlCl(tspc); A' = Azo dye 10; used $k_r^{A'} = 2.4 \times 10^6$ L mol ⁻¹ s ⁻¹ ; values from graph.	91A448
11.26	Benzenepropanamide, α -[[[(4-diethylamino)-2,6-dimethylphenyl]imino]- β -oxo- <i>N</i> -phenyl]- C ₅ H ₅ N	6.3×10^7			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.043$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.27	Benzenepropanamide, α -[[[(4-diethylamino)-2-methylphenyl]imino]- β -oxo- <i>N</i> -phenyl]- C ₅ H ₅ N	7.9×10^6			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.043$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.28	Benzenepropanamide, α -[[[(4-diethylamino)phenyl]imino]- β -oxo- <i>N</i> -phenyl]- C ₅ H ₅ N	4.0×10^6			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.043$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
	C ₅ H ₅ N	1.6×10^7			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.043$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.29	Benz[e]indolium, 2-[7-(1,3-dihydro-1,1-dimethyl-3-(sulfobutyl)benz[e]indol-2-ylidene)-1,3,5-heptatrienyl]-1,1-dimethyl-3-(sulfobutyl)-, hydroxide, inner salt, Na salt DMSO	2.5×10^5 (k_r)	0.061	295	CL/Ac-15	S = Th; used $k_d = 1.3 \times 10^4$ s ⁻¹ ; k_r derived using $\phi_{\Delta}(S) = 0.87$.	82F531
	MeOH	1.5×10^6 (k_r)	0.11	295	CL/Ac-15	S = Th; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_{\Delta}(S) = 0.87$.	82F531
11.30	Benz[e]indolium, 2-[2-[3-[[1,3-dihydro-1,1-dimethyl-3-(3-sulfopropyl)benz[e]indol-2-ylidene]ethylidene]-2-[4-(ethoxycarbonyl)-1-piperidinyl]-1-cyclopenten-1-yl]ethenyl]-1,1-dimethyl-3-(3-sulfopropyl)-, hydroxide, inner salt, compound with triethyl DMSO	1.7×10^6 (k_r)	9×10^{-3}	295	CL/Ac-15	S = Th; used $k_d = 1.3 \times 10^4$ s ⁻¹ ; k_r derived using $\phi_{\Delta}(S) = 0.87$.	82F531
	MeOH	1.0×10^7 (k_r)	0.016	295	CL/Ac-15	S = Th; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_{\Delta}(S) = 0.87$.	82F531
11.31	1-Benzopyrylium, 8-[5-(6,7-dihydro-2,4-diphenyl-1-benzopyran-8-yl)-2,4-pentadienylidene]-5,6,7,8-tetrahydro-2,4-diphenyl-, perchlorate CH ₃ CN	3×10^{10}			PL/A'd-5	S = MB; A' = DPBF.	727260
11.32	Benzothiazolium, 2-[[2-butoxy-3-[(3-ethyl-2-benzothiazolylidene)methyl]-4-oxo-2-cyclobuten-1-ylidene]methyl]-3-ethyl- CHCl ₃	1.4×10^9		293	CP/Pa-20	S = A; Q = Ni[S ₂ C ₂ (C ₆ H ₅) ₂] ₂ ; used $k_d = 1.7 \times 10^4$ s ⁻¹ .	90F554

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.33 Benzothiazolium, 5-chloro-2-[2-[3-[(5-chloro-3-ethyl-1-benzothiazolylidene)ethylidene]-2-(diphenylamino)-1-cyclopenten-1-yl)ethenyl]-3-ethyl-, perchlorate							
	Propylene carbonate	9.8×10^9 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690
	Propylene carbonate	1.6×10^8 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
	DMSO	3.8×10^6 (k_r)	3.9×10^{-3}	295	CL/Ac-15	S = Th; used $k_d = 1.3 \times 10^4$ s ⁻¹ ; k_r derived using $\phi_{\Delta}(S) = 0.87$.	82F531
	MeOH	1.4×10^7 (k_r)	0.011	295	CL/Ac-15	S = Th; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_{\Delta}(S) = 0.87$.	82F531
11.34 Benzothiazolium, 2-[7-(5-chloro-1,3,3-trimethyl-2-indolylidene)-1-(1,3,5-heptatrienyl)-3-methyl-, iodide							
	Propylene carbonate	$<1 \times 10^7$ (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690
	Propylene carbonate	3×10^7 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
11.35 Benzothiazolium, 2-[7-(5-fluoro-1,3,3-trimethyl-2-indolylidene)-1-(1,3,5-heptatrienyl)-3-methyl-, iodide							
	Propylene carbonate	7×10^7 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
	Propylene carbonate	2.0×10^8 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690
11.36 Benzothiazolium, 2-[7-(5-methoxy-1,3,3-trimethyl-2-indolylidene)-1-(1,3,5-heptatrienyl)-3-methyl-, iodide							
	Propylene carbonate	1.2×10^9 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690
	Propylene carbonate	1.7×10^8 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
11.37 Benzothiazolium, 3-methyl-2-[7-(1,3,3-trimethyl-2-indol-2-ylidene)-1,3,5-heptatrienyl]-, iodide							
	Propylene carbonate	1.7×10^8 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
	Propylene carbonate	2.2×10^9 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690
11.38 Benzothiazolium, 2-[7-(1,3,3,5-tetramethyl-2-indolylidene)-1-(1,3,5-heptatrienyl)-3-methyl-, iodide							
	Propylene carbonate	2.5×10^8 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690
	Propylene carbonate	6×10^7 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
11.39 3-Benzoxazolepropanesulfonic acid, 2-[4-(1,3-dibutyltetrahydro-4,6-dioxo-2-thioxo-5-pyrimidinylidene)-2-butenylidene]-, sodium salt (Merocyanine 540)							
	CD ₃ OD	2.1×10^9		294	PL/Ld-2	S = An.	91R017
	D ₂ O (ves)	5.6×10^9			CP/Ac-15	S = A; used $k_d = 4.0 \times 10^4$ s ⁻¹ ; soln. contg. DLPC.	92A123
	H ₂ O/ MeOH (50:50)	3.0×10^7 (k_r)			CP/Ac, A'c-17	S = A; A' = DPBF; $k_r^{A'}$ not given.	92A123
	H ₂ O/ MeOH (50:50)	4.5×10^9			CP/Ac-15	S = A; used $k_d = 9.1 \times 10^4$ s ⁻¹ .	92A123
	H ₂ O (ves)	9.3×10^7 (k_r)			CP/Ac, A'c-17	S = A; A' = DPBF; $k_r^{A'}$ not given; soln. contg. DLPC.	92A123
	H ₂ O (ves)	5.8×10^9			CP/Ac-15	S = A; used $k_d = 4.0 \times 10^4$ s ⁻¹ ; soln. contg. DLPC.	92A123
11.40 2,3'-Biindolium, 1,1,3-trimethyl-2'-[2-(1,3,3-trimethylindolylidene)methyl]-, iodide							
	MeOH	$\leq 3.0 \times 10^4$ (k_r)			CP/Ac-15	S = 2-ACN; used $k_d = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_{\Delta}(S) = 0.75$.	767071

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k_t) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.41	2,2'-Carbocyanine, 1,1'-diethyl-, chloride						
	MeOH	3.4×10^7 (k_t)			CP/Ac-15	S = 2-ACN; used $k_d = 1.9 \times 10^5$ s ⁻¹ ; k_t derived using $\phi_\Delta(S) = 0.75$.	767071
11.42	4,4'-Carbocyanine, 1,1'-diethyl-						
	MeOH	2.0×10^9			PL/Ld-2	S = T(m-HOP)P.	90R164
11.43	4,4'-Carbocyanine, 1,1'-diethyl-, toluenesulfonate						
	CD ₃ OD	1.6×10^8 (k_t)			CP/Ac-15	S = 2-ACN; used $k_d = 1.3 \times 10^4$ s ⁻¹ ; k_t derived using $\phi_\Delta(S) = 0.75$.	767071
	MeOH	1.1×10^8 (k_t)			CP/Ac-15	S = 2-ACN, RB, Py, and fluorenone; used $k_d = 1.9 \times 10^5$ s ⁻¹ ; k_t derived using ϕ_Δ for each S, k_t is an average for the 4 sensitizers.	767071
11.44	Crystal Violet						
	CH ₃ CN		5.8		CP/Ac-15	S = A.	82F525
11.45	2,2'-Cyanine, 1,1'-diethyl-, iodide						
	MeOH	-4.0×10^5 (k_t)			CP/Ac-15	S = 2-ACN; used $k_d = 1.9 \times 10^5$ s ⁻¹ ; k_t derived using $\phi_\Delta(S) = 0.75$.	767071
11.46	Cyclobutendylium, 1,3-bis[4-(diethylamino)-2-hydroxyphenyl]-2,4-dihydroxy-						
	CHCl ₃	1.2×10^9	1.4×10^{-5}	293	CP/Pa-20	S = A; A' = Ni[S ₂ C ₂ (C ₆ H ₅) ₂] ₂ ; used $k_d = 1.7 \times 10^4$ s ⁻¹ .	90F554
11.47	Cyclobutendylium, 1,3-bis[4-(dimethylamino)-2-methylphenyl]-2,4-dihydroxy-						
	CHCl ₃	2.2×10^9		293	CP/Pa-20	S = A; A' = Ni[S ₂ C ₂ (C ₆ H ₅) ₂] ₂ ; used $k_d = 1.7 \times 10^4$ s ⁻¹ .	90F554
11.48	Cyclobutendylium, 1,3-bis[4-(N-methyl-N-octadecylamino)-2-methylphenyl]-2,4-dihydroxy-						
	CHCl ₃	1.4×10^9		293	CP/Pa-20	S = A; A' = Ni[S ₂ C ₂ (C ₆ H ₅) ₂] ₂ ; used $k_d = 1.7 \times 10^4$ s ⁻¹ .	90F554
11.49	2,5-Cyclohexadien-1-one, 4-[[4-(diethylamino)-2,5-dimethylphenyl]imino]-3,5-dimethyl-						
	C ₅ H ₅ N	1.0×10^9			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'}$ = 0.043 mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.50	Diazene, 1-[4-N-(2-cyanoethyl)-N-ethylaminophenyl]-2-(4-methoxyphenyl)-						
	CH ₂ Cl ₂	2.7×10^4 (k_t)			CP/Ac,A'c-17	S = MB; A' = DMA; used $k_t^{A'} = 2.1 \times 10^7$ L mol ⁻¹ s ⁻¹ in benzene [747312].	89F024
	CH ₂ Cl ₂	2×10^6			PL/Ld-2	S = TPP.	89F024
11.51	Diazene, 1-[4-N-(2-cyanoethyl)-N-ethylaminophenyl]-2-phenyl-						
	CH ₂ Cl ₂	2×10^6			PL/Ld-2	S = TPP.	89F024
	CH ₂ Cl ₂	2.9×10^4 (k_t)			CP/Ac,A'c-17	S = MB; A' = DMA; used $k_t^{A'} = 2.1 \times 10^7$ L mol ⁻¹ s ⁻¹ in benzene [747312].	89F024
11.52	Diazene, 1-(4-diethylaminophenyl)-2-(2,4-dinitrophenyl)-						
	CH ₂ Cl ₂	1×10^6			PL/Ld-2	S = MB.	89F024
11.53	Diazene, 1-(4-diethylaminophenyl)-2-(4-methoxyphenyl)-						
	CD ₃ OD				CP/Ac-17	S = MB; A' = 4-(Diethylamino)azobenzene; meas. $k_t/k_t^{A'} = 14$; Rel. to A' in MeOH.	84F350
	CD ₃ OD/ D ₂ O (80:20)				CP/Ac-17	S = MB; A' = 4-(Diethylamino)azobenzene; meas. $k_t/k_t^{A'} = 74$; Rel. to A' in MeOH.	84F350
	CH ₂ Cl ₂	1.3×10^4 (k_t)			CP/Ac,A'c-17	S = MB; A' = DMA; used $k_t^{A'} = 2.1 \times 10^7$ L mol ⁻¹ s ⁻¹ in benzene [747312].	89F024
	CH ₂ Cl ₂	1.0×10^7			PL/Ld-2	S = TPP.	89F024

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.53	Diazene, 1-(4-diethylaminophenyl)-2-(4-methoxyphenyl)- — Continued						
	MeOH/ H ₂ O (80:20)				CP/Ac-17	S = MB; A' = 4-(Diethylamino)azobenzene; meas. $k_r/k_r^{A'}$ = 6; Rel. to A' in MeOH.	84F350
	MeOH/ H ₂ O (50:50)				CP/Ac-17	S = MB; A' = 4-(Diethylamino)azobenzene; meas. $k_r/k_r^{A'}$ = 22; Rel. to A' in MeOH.	84F350
	MeOH				CP/Ac-17	S = MB; A' = 4-(Diethylamino)azobenzene; meas. $k_r/k_r^{A'}$ = 1.	84F350
11.54	Diazene, 1-(4-diethylaminophenyl)-2-(3-nitrophenyl)-						
	CH ₂ Cl ₂	3×10^6			PL/Ld-2	S = TPP.	89F024
11.55	Diazene, 1-(4-diethylaminophenyl)-2-(4-nitrophenyl)-						
	CH ₂ Cl ₂	4×10^6			PL/Ld-2	S = MB.	89F024
	CH ₂ Cl ₂	1.7×10^4 (k_r)			CP/Ac, A'c-17	S = MB; A' = DMA; used $k_r^{A'} = 2.1 \times 10^7$ L mol ⁻¹ s ⁻¹ in benzene [747312].	89F024
11.56	Diazene, 1-(4-diethylaminophenyl)-2-phenyl-						
	CD ₃ OD				CP/Ac-17	S = MB; $k_r^A/k_r^A(\text{MeOH}) = 11$.	84F350
	CD ₃ OD/ D ₂ O (80:20)				CP/Ac-17	S = MB; $k_r^A/k_r^A(\text{MeOH}) = 44$.	84F350
	CH ₂ Cl ₂	1.1×10^4 (k_r)			CP/Ac, A'c-17	S = MB; A' = DMA; used $k_r^{A'} = 2.1 \times 10^7$ L mol ⁻¹ s ⁻¹ in benzene [747312].	89F024
	CH ₂ Cl ₂	6.5×10^6			PL/Ld-2	S = TPP.	89F024
	MeOH/ H ₂ O (50:50)				CP/Ac-17	S = MB; $k_r^A/k_r^A(\text{MeOH}) = 24$.	84F350
	MeOH/ H ₂ O (80:20)				CP/Ac-17	S = MB; $k_r^A/k_r^A(\text{MeOH}) = 7$.	84F350
11.57	Diazene, diphenyl-						
	CH ₂ Cl ₂	$< 1 \times 10^5$			PL/Ld-2	S = TPP.	89F024
11.58	Diazene, 1-[4-N-ethyl-N-(2-hydroxyethyl)aminophenyl]-2-(4-methoxyphenyl)-						
	CH ₂ Cl ₂	9×10^6			PL/Ld-2	S = TPP.	89F024
	CH ₂ Cl ₂	1.3×10^4 (k_r)			CP/Ac, A'c-17	S = MB; A' = DMA; used $k_r^{A'} = 2.1 \times 10^7$ L mol ⁻¹ s ⁻¹ in benzene [747312].	89F024
11.59	Diazene, 1-(4-methoxy-1-naphthyl)-2-phenyl-						
	CH ₂ Cl ₂	1.5×10^6			PL/Ld-2	S = TPP.	89F024
	CH ₂ Cl ₂	1.4×10^4 (k_r)			CP/Ac, A'c-17	S = MB; A' = DMA; used $k_r^{A'} = 2.1 \times 10^7$ L mol ⁻¹ s ⁻¹ in benzene [747312].	89F024
11.60	Diazene, 1-(4-methylphenyl)-2-[1-(phenylaminocarbonyl)-2-oxopropyl]-						
	DMAA	4.0×10^6 (k_r)			CP/A'c-17	S = RB; A' = DMA; used $k_r^{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86F622
	DMF	3.0×10^6 (k_r)			CP/A'c-17	S = RB; A' = DMA; used $k_r^{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86F622
11.61	Diazene, 1-(4-nitrophenyl)-2-phenyl-						
	CH ₂ Cl ₂	$< 1 \times 10^5$			PL/Ld-2	S = TPP.	89F024
11.62	Diazene, 1-phenyl-2-[1-(phenylaminocarbonyl)-2-oxopropyl]-						
	DMAA	3×10^5 (k_r)			CP/A'c-17	S = RB; A' = DMA; used $k_r^{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86F622
	DMF	1×10^5 (k_r)			CP/A'c-17	S = RB; A' = DMA; used $k_r^{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86F622
	2-PrOH	3.2×10^6 (k_r)			CP/A'c-17	S = RB; A' = DMA; used $k_r^{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86F622

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.63	Fluorene, 9-diazo-						
	CH ₃ CN	6.6×10^7		300	PL/Pb-5	S = MB; P = 9-Fluorenone oxide.	85A206
	CH ₃ CN	1.0×10^8 (k_r)			CP/Ac,A'c-17	S = MB; A' = DMA; used $k_r^{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.59$.	777113
	CH ₃ CN	1.0×10^8	3.3×10^{-4}		CP/Ac-15	S = MB; used $k_d = 3.3 \times 10^4$ s ⁻¹ .	777113
	CHCl ₂	5.1×10^7	3×10^{-4}		CP/Ac-15	S = MB; used $k_d = 1.7 \times 10^4$ s ⁻¹ .	777113
	CHCl ₃	6.8×10^7 (k_r)			CR/Ac,A'c-17	A' = DMA; used $k_r^{A'} = 9.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.74$; ¹ O ₂ * from (PhO) ₃ PO ₃ .	777113
	MeOH	3.3×10^7	4.2×10^{-3}		CP/Ac-15	S = MB; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	777113
11.64	Fluorescein, 2',7'-dibromo-4'-(hydroxymercuri)-, disodium salt (Merbromin)						
	CH ₃ CN/ H ₂ O (50:50)	2.0×10^8			PL/Ld-2	S = A.	93F069
11.65	Fluorescein dianion, 2',4',5',7'-tetrabromo- (Eosin)						
	CH ₃ CN	7.2×10^7			CP/Oc-19	S = A; A' = 2M2P; used $k_d = 1.7 \times 10^4$ s ⁻¹ .	84F191
	CH ₃ CN/ H ₂ O (50:50)	2.7×10^7			PL/Ld-2	S = A.	93F069
	MeOH	2.4×10^7			CP/Oc-19	S = A; A' = 2M2P; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	84F191
11.66	Fluorescein dianion, 3,4,5,6-tetrachloro-2',4',5',7'-tetraiodo- (Rose Bengal, RB)						
	CD ₃ COCD ₃	9.9×10^6			PL/Ld-2	S = A.	89E324
	CH ₃ CN	5.0×10^7			CP/Oc-19	S = A; A' = 2M2P; used $k_d = 1.7 \times 10^4$ s ⁻¹ .	84F191
	CH ₃ CN/ H ₂ O (50:50)	1.5×10^7			PL/Ld-2	S = A.	93F069
	MeOH	2.0×10^7			CP/Oc-19	S = A; A' = 2M2P; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	84F191
11.67	3,5-Heptanedione, 4-[[2-ethyl-4-(diethylamino)phenyl]imino]-2,2,6,6-tetramethyl-						
	C ₅ H ₅ N	-1.6×10^7			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.043$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.68	Indene-1,3-dione, 2-(2-quinolyldiene)- (Quinophthalone)						
	CH ₃ COCH ₃			294	CP/Ac-19	S = A; A' = [(CH ₃) ₂ NCS ₂] ₂ Ni; meas. $k_A/k_{A'} = 0.068$.	80F634
11.69	Indigo						
	CHCl ₃				CP/Ac-17	S = A; A' = [(CH ₃) ₂ NCS ₂] ₂ Ni; meas. $k_r/k_r^{A'} = -0.025$.	79F582
11.70	Indolium, 2-[7-[4-bromo-1-(1,3,3-trimethyl-2-indol-2-ylidene)]-1,3,5-heptatrienyl]-1,3,3-trimethyltetrafluoroborate						
	Propylene carbonate	2.7×10^8 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690
	Propylene carbonate	3.0×10^8 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
11.71	Indolium, 2-[7-[4-chloro-1-(1,3,3-trimethyl-2-indol-2-ylidene)]-1,3,5-heptatrienyl]-1,3,3-trimethyl-, tetrafluoroborate						
	Propylene carbonate	3.6×10^8 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
	Propylene carbonate	2.6×10^8 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690
11.72	Indolium, 2-[7-[4-iodo-1-(1,3,3-trimethyl-2-indol-2-ylidene)]-1,3,5-heptatrienyl]-1,3,3-trimethyl-, iodide						
	Propylene carbonate	1.5×10^9 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690
	Propylene carbonate	2.6×10^8 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.73	Indolium, 2-[7-[4-iodo-1-(1,3,3-trimethyl-2-indol-2-ylidene)]-1,3,5-heptatrienyl]-1,3,3-trimethyl-, tetrafluoroborate						
	Propylene carbonate	1.1×10^8 (k_t)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_t^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
	Propylene carbonate	4×10^7 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_t$, k_q calcd. knowing k_t from $k_t/k_t^{A'}$.	87E690
11.74	Indolium, 2-[7-(1,3,3-trimethyl-2-indol-2-ylidene)-1-[4-(2,2-dimethoxyethyl)-1,3,5-heptatrienyl]-1,3,3-trimethyl-, tetrafluoroborate						
	Propylene carbonate	8×10^7 (k_t)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_t^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
	Propylene carbonate	8.9×10^8 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_t$, k_q calcd. knowing k_t from $k_t/k_t^{A'}$.	87E690
11.75	Indolium, 2-[7-(1,3,3-trimethyl-2-indol-2-ylidene)-1-[4-(1-piperidinio)-1,3,5-heptatrienyl]-1,3,3-trimethyl-, bis(tetrafluoroborate)						
	Propylene carbonate	1.4×10^9 (k_t)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_t^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
	Propylene carbonate	1.9×10^9 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_t$, k_q calcd. knowing k_t from $k_t/k_t^{A'}$.	87E690
11.76	Indolium, 2-[7-(1,3,3-trimethyl-2-indol-2-ylidene)-1-[4-[3-(1,3,3-trimethyl-2-indolylidene)-2-propenyl]-1,3,5-heptatrienyl]-1,1,3-trimethyl-, tetrafluoroborate						
	Propylene carbonate	2.0×10^9 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_t$, k_q calcd. knowing k_t from $k_t/k_t^{A'}$.	87E690
	Propylene carbonate	3.8×10^8 (k_t)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_t^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
11.77	Leucomalachite Green						
	C ₆ H ₅ CH ₃	$<1 \times 10^5$ (k_t)		298	CP/Ac,A'c-17	S = A' = 9-Phenylanthracene.	79F148
	C ₆ H ₅ CH ₃	2×10^8	3×10^{-4}	298	CP/Ac-18	S = A' = DMA; used $k_d = 5.3 \times 10^4$ s ⁻¹ , $\beta_{A'} = 1.5 \times 10^{-3}$ mol L ⁻¹ ; meas. $\beta_A/\beta_{A'} = 0.2$.	79F148
11.78	Methanesulfonamide, N-[2-[[4-(1,5-dihydro-3-methyl-5-oxo-1-phenylpyrazol-4-ylidene)amino]methylphenyl]ethylamino]ethyl-						
	MeOH	3×10^7 (k_t) 5×10^6 (k_q)		298	CP/Ac,A'c-17,19	S = MB; A' = DPA; used $k_t^{A'} = 1.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	87F542
11.79	2-Naphthalenecarboxamide, 4-[[4-(aminocarbonyl)phenyl]azo]-3-hydroxy-N-(2-methoxyphenyl)-						
	DMAA	7.0×10^6			CP/A'c-17	S = RB; A' = DMA; used $k_t^{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86F622
	DMF	3.6×10^6			CP/A'c-17	S = RB; A' = DMA; used $k_t^{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86F622
11.80	2-Naphthalenecarboxamide, 3-hydroxy-4-[(4-methylphenyl)azo]-N-phenyl-						
	DMAA	2.0×10^6			CP/A'c-17	S = RB; A' = DMA; used $k_t^{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86F622
	DMF	1.9×10^6			CP/A'c-17	S = RB; A' = DMA; used $k_t^{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86F622
11.81	1-Naphthalenone, 4-[[2,6-dimethyl-4-(diethylamino)phenyl]imino]-2-(2-methoxy-5-fluorosulfonylphenyl)aminocarbonyl-						
	C ₅ H ₅ N	1.4×10^9			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.043$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
	C ₆ H ₆	4.7×10^9			CP/Oc-20	S = azine; A' = 2M2P; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.053$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
	CH ₃ CN	3.9×10^{10}			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.3 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.018$ mol L ⁻¹ ; No evidence of chemical reaction.	757166

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.82	1-Naphthalenone, 4-[4-(diphenylamino)phenyl]imino]- C ₅ H ₅ N	$\leq 3.2 \times 10^6$			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'}$ = 0.043 mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.83	1-Naphthalenone, 4-[(N-methyl-N-phenyl)amino]imino- CH ₂ Cl ₂	8.9×10^7			PL/Ld-2	S = MB.	89F024
	CH ₂ Cl ₂	2×10^3 (k_r)			CP/Ac, A'c-17	S = MB; A' = DMA; used $k_r^{A'} = 2.1 \times 10^7$ L mol ⁻¹ s ⁻¹ in benzene [747312].	89F024
11.84	1-Naphthalenone, 4-[4-(phenylamino)phenyl]imino]- C ₅ H ₅ N	$\leq 4.0 \times 10^7$			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'}$ = 0.043 mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.85	1-Naphthol, 5-[3-(aminosulfonyl)phenyl]sulfonylamino-4-[2-(methylsulfonyl)-4-nitrophenylazo]-, conjugate base						
	DMF	9.3×10^6 (k_r) 5.6×10^7 (k_q)	7.7×10^{-3}		CP/Ac-14	S = RB; used $k_d = 7.1 \times 10^4$ s ⁻¹ ; k_q includes possible back energy transfer; k_r derived using $\phi_{\Delta}(S) = 0.4$; soln. contains NH ₄ OH.	79F412
	H ₂ O	1.3×10^8 (k_r)	2.5×10^{-3} (β_r)		CP/Ac-14	S = A; used $k_d = 3.3 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_{\Delta}(S) = 1.3 \times 10^{-4}$; soln. contains NH ₄ OH.	79F412
	MeOH	4.8×10^6 (k_r) 7.2×10^7 (k_q)			CP/Ac-14	S = A; used $k_d = 1.3 \times 10^5$ s ⁻¹ ; k_q includes possible back energy transfer; k_r derived using $\phi_{\Delta}(S) = 1.6 \times 10^{-3}$; soln. contains NH ₄ OH.	79F412
11.86	1-Naphthol, 5-[3-(aminosulfonyl)phenyl]sulfonylamino-4-[2-(methylsulfonyl)-4-nitrophenylazo]-, conjugate dibase						
	DMF		2.6×10^{-3}		CP/Ac-14	S = RB; soln. contains NH ₄ OH.	79F412
	DMF	2.7×10^7 (k_r)			CP/Ac-16	S = A; A' = DPBF; used $k_d = 7.1 \times 10^4$ s ⁻¹ ; soln. contains NH ₄ OH.	79F412
	H ₂ O	5×10^8 (k_r)	7×10^{-4} (β_r)		CP/Ac-16	S = A; A' = 2,5-DMF; used $k_d = 3.3 \times 10^5$ s ⁻¹ ; soln. contains NH ₄ OH.	79F412
	MeOH		1.3×10^{-3}		CP/Ac-14	S = RB; soln. contains NH ₄ OH.	79F412
	MeOH	1.0×10^7 (k_r)			CP/Ac-16	S = A; A' = DPBF; used $k_d = 1.3 \times 10^5$ s ⁻¹ ; soln. contains NH ₄ OH.	79F412
11.87	1-Naphthol, 4-(4-chlorophenylazo)- MeOH			293	CP/Ac-17	S = MB; A' = 4-Phenylazo-1-naphthol; meas. $k_r/k_r^{A'} = 0.40$.	81A403
11.88	1-Naphthol, 5-methoxy-4-[2-(methylsulfonyl)-4-nitrophenylazo]-, conjugate base						
	DMF	4.3×10^7 (k_r)			CP/Ac-14	S = RB; used $k_d = 1 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_{\Delta}(S) = 0.4$; soln. contains NH ₄ OH.	79F412
	DMF	4.6×10^7 (k_r) 2.6×10^8 (k_q)			CP/Ac-14	S = A; used $k_d = 1 \times 10^5$ s ⁻¹ ; k_q includes possible back energy transfer; k_r derived using $\phi_{\Delta}(S) = 2.7 \times 10^{-4}$; soln. contains NH ₄ OH.	79F412
11.89	1-Naphthol, 4-(4-methoxyphenylazo)- MeOH			293	CP/Ac-17	S = MB; A' = 4-Phenylazo-1-naphthol; meas. $k_r/k_r^{A'} = 1.9$.	81A403
11.90	1-Naphthol, 4-(4-methylphenylazo)- CD ₃ OD				CP/Ac-17	S = MB; A' = 4-(Diethylamino)azobenzene; meas. $k_r/k_r^{A'} = 2.5 \times 10^2$; Rel. to A' in MeOH.	84F350
	CD ₃ OD/D ₂ O (80:20)				CP/Ac-17	S = MB; A' = 4-(Diethylamino)azobenzene; meas. $k_r/k_r^{A'} = 5.3 \times 10^2$; Rel. to A' in MeOH.	84F350
	CH ₂ Cl ₂	8.1×10^4 (k_r)			CL/Ac, A'c-17	S = MB; A' = DMA; used $k_r^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	89F024

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.90	1-Naphthol, 4-(4-methylphenylazo)- — Continued						
	CH ₂ Cl ₂	1.3 × 10 ⁷			PL/Ld-2	S = TPP; charge-transfer; $k = 2.6 \times 10^7$ L mol ⁻¹ s ⁻¹ normalized to 100% hydrazone form.	89F024
	MeOH/ H ₂ O (80:20)				CP/Ac-17	S = MB; A' = 4-(Diethylamino)azobenzene; meas. $k_r/k_r^{A'} = 50$; Rel. to A' in MeOH.	84F350
	MeOH/ H ₂ O (50:50)				CP/Ac-17	S = MB; A' = 4-(Diethylamino)azobenzene; meas. $k_r/k_r^{A'} = 1.6 \times 10^2$; Rel. to A' in MeOH.	84F350
	MeOH				CP/Ac-17	S = MB; A' = 4-(Diethylamino)azobenzene; meas. $k_r/k_r^{A'} = 26$.	84F350
	MeOH			293	CP/Ac-17	S = MB; A' = 4-Phenylazo-1-naphthol; meas. $k_r/k_r^{A'} = 1.8$.	81A403
11.91	1-Naphthol, 4-(4-nitrophenylazo)-						
	MeOH			293	CP/Ac-17	S = MB; A' = 4-Phenylazo-1-naphthol; meas. $k_r/k_r^{A'} = 0.06$.	81A403
11.92	1-Naphthol, 4-phenylazo-						
	CH ₂ Cl ₂	2.1 × 10 ⁷			PL/Ld-2	S = MB; charge-transfer; $k = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ normalized to 100% hydrazone form.	89F024
	CH ₂ Cl ₂	2.2 × 10 ⁴ (k_r)			CL/Ac,A'c-17	S = MB; A' = DMA; used $k_r^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	89F024
11.93	2-Naphthol, 1-(4-aminophenylazo)-						
	CH ₃ COCH ₃			294	CP/Ac-19	S = A; A' = [(CH ₃) ₂ NCS ₂] ₂ Ni; meas. $k_A/k_{A'} = 0.67$.	80F634
11.94	2-Naphthol, 1-(4-bromophenylazo)-						
	MeOH			293	CP/Ac-17	S = MB; A' = 1-Phenylazo-2-naphthol; meas. $k_r/k_r^{A'} = 0.58$.	81A403
11.95	2-Naphthol, 1-(4-chlorophenylazo)-						
	MeOH			293	CP/Ac-17	S = MB; A' = 1-Phenylazo-2-naphthol; meas. $k_r/k_r^{A'} = 0.54$.	81A403
11.96	2-Naphthol, 1-[4-(dimethylamino)phenylazo]-						
	MeOH			293	CP/Ac-17	S = MB; A' = 1-Phenylazo-2-naphthol; meas. $k_r/k_r^{A'} = 3.8$.	81A403
11.97	2-Naphthol, 1-(4-fluorophenylazo)-						
	MeOH			293	CP/Ac-17	S = MB; A' = 1-Phenylazo-2-naphthol; meas. $k_r/k_r^{A'} = 0.69$.	81A403
11.98	2-Naphthol, 1-(4-hydroxyphenylazo)-						
	MeOH			293	CP/Ac-17	S = MB; A' = 1-Phenylazo-2-naphthol; meas. $k_r/k_r^{A'} = 1.6$.	81A403
11.99	2-Naphthol, 1-(4-iodophenylazo)-						
	MeOH			293	CP/Ac-17	S = MB; A' = 1-Phenylazo-2-naphthol; meas. $k_r/k_r^{A'} = 0.50$.	81A403
11.100	2-Naphthol, 1-(4-methoxyphenylazo)-						
	CH ₂ Cl ₂	3.5 × 10 ⁶			PL/Ld-2	S = MB; charge-transfer; $k = 4.5 \times 10^6$ L mol ⁻¹ s ⁻¹ normalized to 100% hydrazone form.	89F024
	MeOH			293	CP/Ac-17	S = MB; A' = 1-Phenylazo-2-naphthol; meas. $k_r/k_r^{A'} = 1.6$.	81A403
11.101	2-Naphthol, 1-(4-methyl-2-nitrophenylazo)-						
	DMAA	6 × 10 ⁵			CP/A'c-17	S = RB; A' = DMA; used $k_r^{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86F622

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.101	2-Naphthol, 1-(4-methyl-2-nitrophenylazo)- — Continued						
	DMF	$\leq 2 \times 10^5$			CP/A'c-17	S = RB; A' = DMA; used $k_r^{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86F622
	2-PrOH	$\leq 7 \times 10^5$			CP/A'c-17	S = RB; A' = DMA; used $k_r^{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86F622
11.102	2-Naphthol, 1-(4-methylphenylazo)-						
	CD ₃ OD				CP/Ac-17	S = MB; A' = 4-(Diethylamino)azobenzene; meas. $k_r/k_r^{A'} = 2.7 \times 10^2$; Rel. to A' in MeOH.	84F350
	CD ₃ OD/D ₂ O (80:20)				CP/Ac-17	S = MB; A' = 4-(Diethylamino)azobenzene; meas. $k_r/k_r^{A'} = 3.5 \times 10^2$; Rel. to A' in MeOH.	84F350
	CH ₂ Cl ₂	3×10^6			PL/Ld-2	S = MB; charge-transfer; $k = 4 \times 10^6$ L mol ⁻¹ s ⁻¹ normalized to 100% hydrazone form.	89F024
	MeOH/ H ₂ O (50:50)				CP/Ac-17	S = MB; A' = 4-(Diethylamino)azobenzene; meas. $k_r/k_r^{A'} = 42$; Rel. to A' in MeOH.	84F350
	MeOH/ H ₂ O (80:20)				CP/Ac-17	S = MB; A' = 4-(Diethylamino)azobenzene; meas. $k_r/k_r^{A'} = 16$; Rel. to A' in MeOH.	84F350
	MeOH			293	CP/Ac-17	S = MB; A' = 1-Phenylazo-2-naphthol; meas. $k_r/k_r^{A'} = 1.3$.	81A403
	MeOH				CP/Ac-17	S = MB; A' = 4-(Diethylamino)azobenzene; meas. $k_r/k_r^{A'} = 6$.	84F350
11.103	2-Naphthol, 1-(4-nitrophenylazo)-						
	MeOH			293	CP/Ac-17	S = MB; A' = 1-Phenylazo-2-naphthol; meas. $k_r/k_r^{A'} = 0.15$.	81A403
	DMAA	1.1×10^6			CP/A'c-17	S = RB; A' = DMA; used $k_r^{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86F622
	DMF	1×10^7			CP/A'c-17	S = RB; A' = DMA; used $k_r^{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86F622
	2-PrOH	5.5×10^6			CP/A'c-17	S = RB; A' = DMA; used $k_r^{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86F622
11.104	2-Naphthol, 1-phenylazo-						
	CH ₂ Cl ₂	2.0×10^4 (k_r)			CL/Ac,A'c-17	S = MB; A' = DMA; used $k_r^{A'} = 2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	89F024
	CH ₂ Cl ₂	2×10^6			PL/Ld-2	S = MB; charge-transfer; $k = 2.5 \times 10^6$ L mol ⁻¹ s ⁻¹ normalized to 100% hydrazone form.	89F024
11.105	Naphtho[1,2-d]thiazolium, 1-ethyl-2-[(1-ethylnaphtho[1,2-d]thiazol-2-ylidene)methyl]-, chloride						
	MeOH	4.0×10^5 (k_r)			CP/Ac-15	S = 2-ACN; used $k_d = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.75$.	767071
11.106	Naphtho[1,2-d]thiazolium, 1-ethyl-2-[(1-ethylnaphtho[1,2-d]thiazol-2-ylidene)methyl]-1-butenyl-, bromide						
	MeOH	7.3×10^7 (k_r)			CP/Ac-15	S = 2-ACN; used $k_d = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.75$.	767071
11.107	Naphtho[1,2-d]thiazolium, 1-ethyl-2-[(1-ethylnaphtho[1,2-d]thiazol-2-ylidene)-1-propenyl]-, toluenesulfonate						
	MeOH	1.6×10^7 (k_r)			CP/Ac-15	S = 2-ACN; used $k_d = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.75$.	767071
11.108	Naphtho[2,3-d]thiazolium, 2-[2-(diphenylamino)-3-[3-(4-methoxy-4-oxobutyl)naphtho[2,3-d]thiazol-2-ylidene]ethylidene]-1-cyclopenten-1-yl]ethenyl]-3-(4-methoxy-4-oxobutyl)-, perchlorate						
	DMSO	2.3×10^6 (k_r)	6×10^{-3}		CL/Ac-15	S = Th; used $k_d = 1.3 \times 10^4$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.87$.	82F531
	MeOH	1.4×10^7 (k_r)	0.012		CL/Ac-15	S = Th; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.87$.	82F531

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_q/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.109	2,2'-Oxatricarbocyanine, 3,3'-diethyl-, iodide						
	Propylene carbonate	3.2×10^8 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r A' = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
	Propylene carbonate	9×10^8 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r A'$.	87E690
11.110	Pentadienylum, 1,1,5,5-tetrakis[4-(diethylamino)phenyl]-						
	CH ₃ CN/ C ₆ H ₆ (80:20)	1×10^8 1×10^5 (k_r) 6.6×10^7 (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
11.111	Pentanamide, 2-[[[4-(diethylamino)-2-methylphenyl]imino]-4,4-dimethyl-3-oxo-N-phenyl]-						
	C ₅ H ₅ N	2.5×10^7			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.043$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.112	Pentanamide, 2-[[[4-(diethylamino)phenyl]imino]-4,4-dimethyl-3-oxo-N-phenyl]-						
	C ₅ H ₅ N	7.9×10^6			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.043$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.113	Phenothiazinium, 3,7-bis(dimethylamino)- (Methylene Blue, MB)						
	CCl ₄ / MeOH (98:2)	$<5 \times 10^7$		293	PL/A'd-5	S = A; A' = DPBF; no effect of [MB] on decay rate up to 1.9×10^{-5} mol L ⁻¹ .	83A371
	CHCl ₃		6.8×10^{-4}		CP/Oc-19	S = A; A' = 2M2P.	84F673
	D ₂ O pH = 5.9	4×10^8			CP/A'c-25	S = A; A' = Lysozyme; used $k_d = 5 \times 10^4$ s ⁻¹ , $k_{A'} = 6.4 \times 10^8$ L mol ⁻¹ s ⁻¹ .	81R011
	H ₂ O pH = 5.9	3×10^8			CP/A'c-25	S = A; A' = Lysozyme; used $k_d = 5 \times 10^5$ s ⁻¹ , $k_{A'} = 4.4 \times 10^8$ L mol ⁻¹ s ⁻¹ .	81R011
	MeOD	1.6×10^7			PL/Ld-2	S = A.	88A165
	MeOH	2.3×10^8	4.8×10^{-4}		CP/Ac-14	S = A; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	87F479
11.114	Phenothiazinium, 3,7-diamino- (Thionine)						
	D ₂ O	6.8×10^7			PL/Ld-2	S = MPDME.	83E235
11.115	Propanediamide, 2-[[[4-(diethylamino)-2-ethylphenyl]imino]-N,N'-diphenyl]-						
	C ₅ H ₅ N	-1.6×10^7			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.043$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.116	1,3-Propanedione, 2-[[[2-ethyl-4-(diethylamino)phenyl]imino]-1,3-diphenyl]-						
	C ₅ H ₅ N	-1.6×10^7			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.043$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.117	Pyrazole, 4,5-dihydro-5-[4-(diethylamino)phenyl]-3-[2-[4-(diethylamino)phenyl]ethenyl]-1-phenyl-						
	MeOH/ C ₆ H ₆ (68:32)	5.8×10^9			CP/P'a-23	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ , $k_{A'} = 6.3 \times 10^8$ L mol ⁻¹ s ⁻¹ .	83A063
11.118	Pyrazole, 4,5-dihydro-5-[4-(dimethylamino)phenyl]-3-[2-[4-(dimethylamino)phenyl]ethenyl]-1-phenyl-						
	MeOH/ C ₆ H ₆ (80:20)	1.9×10^9			CP/P'a-23	S = RB; A' = 2M2P; used $k_d = 1.8 \times 10^5$ s ⁻¹ , $k_{A'} = 8.1 \times 10^5$ L mol ⁻¹ s ⁻¹ .	83A063
11.119	Pyrazole, 4,5-dihydro-1,5-diphenyl-3-(2-phenylethenyl)-						
	MeOH/ C ₆ H ₆ (80:20)	7.2×10^8			CP/P'a-23	S = RB; A' = 2M2P; used $k_d = 1.8 \times 10^5$ s ⁻¹ , $k_{A'} = 8.1 \times 10^5$ L mol ⁻¹ s ⁻¹ .	83A063
	MeOH/ C ₆ H ₆ (68:32)	1.7×10^8			CP/P'a-23	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ , $k_{A'} = 6.3 \times 10^8$ L mol ⁻¹ s ⁻¹ .	83A063

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.120	Pyrazole, 4,5-dihydro-5-(4-methoxyphenyl)-3-[2-(4-methoxyphenyl)ethenyl]-1-phenyl-						
	MeOH/ C ₆ H ₆ (80:20)	6.0 × 10 ⁸			CP/P'a-23	S = RB; A' = 2M2P; used $k_d = 1.8 \times 10^5$ s ⁻¹ , $k_{A'} = 8.1 \times 10^5$ L mol ⁻¹ s ⁻¹ .	83A063
	MeOH/ C ₆ H ₆ (68:32)	1.3 × 10 ⁹			CP/P'a-23	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ , $k_{A'} = 6.3 \times 10^8$ L mol ⁻¹ s ⁻¹ .	83A063
11.121	2-Pyrazoline, 3-(4-chlorophenyl)-1,5-diphenyl-						
	CH ₂ Cl ₂				CP/Ac-17	S = MB; A' = 1,3,5-Triphenyl-2-pyrazoline; meas. $k_r/k_r^{A'} = 2.1$.	86F225
11.122	2-Pyrazoline, 5-(4-chlorophenyl)-1,3-diphenyl-						
	CH ₂ Cl ₂				CP/Ac-17	S = MB; A' = 1,3,5-Triphenyl-2-pyrazoline; meas. $k_r/k_r^{A'} = 1.5$.	86F225
11.123	2-Pyrazoline, 5-deutero-1,3,5-triphenyl-						
	CH ₂ Cl ₂				CP/Ac-17	S = MB; A' = 1,3,5-Triphenyl-2-pyrazoline; meas. $k_r/k_r^{A'} = 0.48$; electron transfer.	86F225
11.124	2-Pyrazoline, 3-(4-methoxyphenyl)-1,5-diphenyl-						
	CH ₂ Cl ₂				CP/Ac-17	S = MB; A' = 1,3,5-Triphenyl-2-pyrazoline; meas. $k_r/k_r^{A'} = 0.3$.	86F225
11.125	2-Pyrazoline, 5-(4-methoxyphenyl)-1,3-diphenyl-						
	CH ₂ Cl ₂				CP/Ac-17	S = MB; A' = 1,3,5-Triphenyl-2-pyrazoline; meas. $k_r/k_r^{A'} = 0.8$.	86F225
11.126	2-Pyrazoline, 3-(4-methylphenyl)-1,5-diphenyl-						
	CH ₂ Cl ₂				CP/Ac-17	S = MB; A' = 1,3,5-Triphenyl-2-pyrazoline; meas. $k_r/k_r^{A'} = 0.7$.	86F225
11.127	2-Pyrazoline, 5-(4-methylphenyl)-1,3-diphenyl-						
	CH ₂ Cl ₂				CP/Ac-17	S = MB; A' = 1,3,5-Triphenyl-2-pyrazoline; meas. $k_r/k_r^{A'} = 1.1$.	86F225
11.128	3-Pyrazolinone, 4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbonyl-2-phenyl-						
	MeOH	4 × 10 ⁷ (k_r) 4 × 10 ⁶ (k_q)		298	CP/Ac, A'c- 17,19	S = MB; A' = DPA; used $k_r^{A'} = 1.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	87F542
11.129	3-Pyrazolinone, 4-[4-(ethyl(2-hydroxyethyl)amino)-2-methylphenyl]imino-5-methyl-2-phenyl-						
	MeOH	4 × 10 ⁷ (k_r) 5 × 10 ⁶ (k_q)		298	CP/Ac, A'c- 17,19	S = MB; A' = DPA; used $k_r^{A'} = 1.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	87F542
11.130	3-Pyrazolinone, 4-[4-[(2-hydroxyethyl)ethylamino]phenyl]imino-5-methyl-2-phenyl-						
	MeOH	2 × 10 ⁷ (k_r) 5 × 10 ⁶ (k_q)		298	CP/Ac, A'c- 17,19	S = MB; A' = DPA; used $k_r^{A'} = 1.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	87F542
11.131	Pyrazolo[1,2-a]benzotriazole						
	CH ₃ CN	5 × 10 ⁶	3 × 10 ⁻³		CP/Ac-15	S = RB; used $k_d = 1.6 \times 10^4$ s ⁻¹ .	83F136
11.132	Pyrazolo[1,2-a]benzotriazole, 1,3-dimethyl-						
	CH ₃ CN	2 × 10 ⁷	8 × 10 ⁻⁴		CP/Ac-15	S = RB; used $k_d = 1.6 \times 10^4$ s ⁻¹ .	83F136
11.133	Pyrazol-3-one, 4-[(4-aminophenyl)imino]-2,4-dihydro-5-methyl-2-phenyl-						
	CH ₃ CN	5.0 × 10 ⁷			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.3 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.018$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
	MeOH	4 × 10 ⁶ (k_q)		298	CP/Ac, A'c-19	S = MB; A' = DPA.	87F542

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.134	Pyrazol-3-one, 4-[(4-amino-2,3,5,6-tetramethylphenyl)imino]-2,4-dihydro-5-methyl-2-phenyl-						
	CH ₃ CN	5.0×10^8			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.3 \times 10^4$ s ⁻¹ , $\beta_{A'}$ = 0.018 mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.135	Pyrazol-3-one, 2-(4-bromophenyl)-4-(4-diethylamino-2-methylphenyl)-2,4-dihydro-imino-5-methylcarbonyl-						
	MeOH	4×10^7 (k_r)		298	CP/Ac,A'c-17	S = MB; A' = DPA; used $k_r A' = 1.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	87F542
11.136	Pyrazol-3-one, 2-(3-chlorophenyl)-4-(4-diethylamino-2-methylphenyl)-2,4-dihydro-imino-5-methylcarbonyl-						
	MeOH	4×10^7 (k_r)		298	CP/Ac,A'c-17	S = MB; A' = DPA; used $k_r A' = 1.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	87F542
11.137	Pyrazol-3-one, 2-(4-chlorophenyl)-4-(4-diethylamino-2-methylphenyl)-2,4-dihydro-imino-5-methylcarbonyl-						
	MeOH	4×10^7 (k_r) 4×10^6 (k_q)		298	CP/Ac,A'c-17,19	S = MB; A' = DPA; used $k_r A' = 1.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	87F542
11.138	Pyrazol-3-one, 4-[[4-(diethylamino)-2,6-dimethylphenyl]imino]-2,4-dihydro-5-(benzoylamino)-2-phenyl-						
	C ₅ H ₅ N	1.0×10^9			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'}$ = 0.043 mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.139	Pyrazol-3-one, 4-[[4-(diethylamino)-2,6-dimethylphenyl]imino]-2,4-dihydro-5-(1,1-dimethylethyl)-2-phenyl-						
	C ₅ H ₅ N	1.0×10^9			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'}$ = 0.043 mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.140	Pyrazol-3-one, 4-[[4-(diethylamino)-2,6-dimethylphenyl]imino]-2,4-dihydro-5-methyl-2-phenyl-						
	C ₅ H ₅ N	6.3×10^8			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'}$ = 0.043 mol L ⁻¹ ; No evidence of chemical reaction.	757166
	C ₆ H ₆	1.1×10^9			CP/Oc-20	S = azine; A' = 2M2P; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $\beta_{A'}$ = 0.053 mol L ⁻¹ ; No evidence of chemical reaction.	757166
	CH ₃ CN	4.0×10^9			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.3 \times 10^4$ s ⁻¹ , $\beta_{A'}$ = 0.018 mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.141	Pyrazol-3-one, 4-[[4-(diethylamino)-2-methylphenyl]imino]-2,4-dihydro-5-(1,1-dimethylethyl)-2-phenyl-						
	C ₅ H ₅ N	1.7×10^8			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'}$ = 0.043 mol L ⁻¹ ; No evidence of chemical reaction.	757166
	C ₆ H ₆	1.3×10^8			CP/Oc-20	S = azine; A' = 2M2P; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $\beta_{A'}$ = 0.053 mol L ⁻¹ ; No evidence of chemical reaction.	757166
	CH ₃ CN	1.3×10^9			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.3 \times 10^4$ s ⁻¹ , $\beta_{A'}$ = 0.018 mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.142	Pyrazol-3-one, 4-(4-diethylamino-2-methylphenyl)imino-2,4-dihydro-5-methylcarbonyl-2-(3-methoxyphenyl)-						
	MeOH	5×10^7 (k_r)		298	CP/Ac,A'c-17	S = MB; A' = DPA; used $k_r A' = 1.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	87F542
11.143	Pyrazol-3-one, 4-(4-diethylamino-2-methylphenyl)imino-2,4-dihydro-5-methylcarbonyl-2-(3-methylphenyl)-						
	MeOH	4×10^7 (k_r) 4×10^6 (k_q)		298	CP/Ac,A'c-17,19	S = MB; A' = DPA; used $k_r A' = 1.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	87F542
11.144	Pyrazol-3-one, 4-[[4-(diethylamino)-2-methylphenyl]imino]-2,4-dihydro-5-methyl-2-phenyl-						
	C ₅ H ₅ N	4.0×10^7			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'}$ = 0.043 mol L ⁻¹ ; No evidence of chemical reaction.	757166

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.144	Pyrazol-3-one, 4-[[4-(diethylamino)-2-methylphenyl]imino]-2,4-dihydro-5-methyl-2-phenyl- — Continued						
	MeOH	4×10^7 (k_r) 5×10^6 (k_q)		298	CP/Ac,A'c-17,19	S = MB; A' = DPA; used $k_r^{A'} = 1.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	87F542
11.145	Pyrazol-3-one, 4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbonyl-2,4-dihydro-2-(4-nitrophenyl)-						
	MeOH	4×10^7 (k_r)		298	CP/Ac,A'c-17	S = MB; A' = DPA; used $k_r^{A'} = 1.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	87F542
11.146	Pyrazol-3-one, 4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbonyl-2,4-dihydro-2-(2,4,6-trichlorophenyl)-						
	MeOH	4×10^7 (k_r)		298	CP/Ac,A'c-17	S = MB; A' = DPA; used $k_r^{A'} = 1.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	87F542
11.147	Pyrazol-3-one, 4-[[4-(diethylamino)phenyl]imino]-2,4-dihydro-5-methyl-2-phenyl-						
	C ₅ H ₅ N	4.0×10^7			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.043$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
	C ₆ H ₆	1.2×10^7			CP/Oc-20	S = azine; A' = 2M2P; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.053$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
	CH ₃ CN	4.0×10^8			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.3 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.018$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
	MeOH	3×10^7 (k_r) 4×10^6 (k_q)		298	CP/Ac,A'c-17,19	S = MB; A' = DPA; used $k_r^{A'} = 1.8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	87F542
11.148	Pyrazol-3-one, 2,4-dihydro-4-[[4-methoxyphenyl]imino]-5-methyl-2-phenyl-						
	C ₅ H ₅ N				CP/Oc-20	S = RB; A' = 2M2P; No measurable effect.	757166
	CH ₃ CN				CP/Oc-20	S = RB; A' = 2M2P; No measurable effect.	757166
11.149	Pyrazol-3-one, 4-[[4-(dimethylamino)-3,5-dimethylphenyl]imino]-2,4-dihydro-5-methyl-2-phenyl-						
	CH ₃ CN	6.3×10^6			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.3 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.018$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.150	Pyrazol-3-one, 4-[[4-(dimethylamino)phenyl]imino]-2,4-dihydro-5-methyl-2-phenyl-						
	C ₅ H ₅ N	4.0×10^7			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.043$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
	MeOH	4×10^6 (k_q)		298	CP/Ac,A'c-19	S = MB; A' = DPA.	87F542
11.151	Pyrazol-3-one, 4-[[4-(dimethylamino)-2,3,5,6-tetramethylphenyl]imino]-2,4-dihydro-5-methyl-2-phenyl-						
	CH ₃ CN	4.0×10^6			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.3 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.018$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.152	Pyrazol-3-one, 4-[[4-(diphenylamino)phenyl]imino]-2,4-dihydro-5-methyl-2-phenyl-						
	C ₅ H ₅ N	5.0×10^7			CP/Oc-20	S = RB; A' = 2M2P; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $\beta_{A'} = 0.043$ mol L ⁻¹ ; No evidence of chemical reaction.	757166
11.153	Pyrazol-3-one, 4,4'-[(2,3,5,6-tetramethyl-1,4-phenylene)dinitrilo]bis[2,4-dihydro-5-methyl-2-phenyl]-						
	C ₅ H ₅ N				CP/Oc-20	S = MB; A' = 2M2P; No measurable effect.	757166
	CH ₃ CN				CP/Oc-20	S = RB; A' = 2M2P; No measurable effect.	757166
11.154	Pyrazolo[5,1-c]-1,2,4-triazole, 7-[4-(N-ethyl-[N-(2-methylsulfonylamino)ethyl]amino-2-methylphenylimino)-6-methyl-3-[4-[3-(3-butyl-4-hydroxyphenoxy)(dodecyl)methoxy]carbonylamino]phenyl]propyl]-						
	EtOH	$< 6 \times 10^7$			PLA'd-8	S = An; A' = DPBF.	91A448
11.155	Pyrazolo[5,1-c]-1,2,4-triazole-6-carboxylic acid, 7-[[4-(diethylamino)-2-methylphenyl]imino]-3-phenyl-, ethyl ester						
	EtOH	2×10^8			PLA'd-8	S = An; A' = DPBF.	91A448

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.155	Pyrazolo[5,1-c]-1,2,4-triazole-6-carboxylic acid, 7-[[4-(diethylamino)-2-methylphenyl]imino]-3-phenyl-, ethyl ester — Continued						
	EtOH	1.4×10^6 (k_r)			CP/Ac-17	S = AlCl(tspc); A' = Azo dye 10; used $k_r^{A'} = 2.4 \times 10^6$ L mol ⁻¹ s ⁻¹ ; values from graph.	91A448
	EtOH	9×10^7			CP/A'c-16	S = AlCl(tspc); A' = DPBF; used $k_d = 8 \times 10^4$ s ⁻¹ .	91A448
11.156	Pyrido[2,1-b]benzothiazolium, 4-[(2,3-dihydro)pyrido[2,1-b]benzothiazol-4-yl)methylene]-1,2,3,4-tetrahydro-, iodide						
	MeOH	2.7×10^7 (k_r)			CP/Ac-15	S = 2-ACN; used $k_d = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.75$.	767071
11.157	Pyrylium, 2,6-bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)selenapyran-4-ylidene]-3-propenyl]-						
	MeOH/ H ₂ O (50:50)	4×10^6 (k_r)			CP/Ac-14	S = RB; used $k_d = 1.7 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(\text{RB}) = 0.77$.	90F157
	MeOH/ H ₂ O (50:50)	3×10^6 (k_r)			CP/Ac-14	S = MB; used $k_d = 1.7 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(\text{MB}) = 0.50$.	90F157
11.158	Pyrylium, 2,6-bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)telluropyran-4-ylidene]-3-propenyl]-						
	MeOH/ H ₂ O (50:50)	8.5×10^7 (k_r)			CP/Ac-14	S = MB; used $k_d = 1.7 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(\text{MB}) = 0.50$.	90F157
	MeOH/ H ₂ O (50:50)	9.4×10^7 (k_r)			CP/Ac-14	S = RB; used $k_d = 1.7 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(\text{RB}) = 0.77$.	90F157
11.159	Pyrylium, 4,4'-(1,3-propenyl)bis[2,6-di(1,1-dimethylethyl)-						
	MeOH/ H ₂ O (50:50)	3×10^5 (k_r)			CP/Ac-14	S = RB; used $k_d = 1.7 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(\text{RB}) = 0.77$.	90F157
11.160	Selenopyrylium, 2,6-bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)selenopyran-4-ylidene]-3-propenyl]-						
	MeOH/ H ₂ O (50:50)	5×10^6 (k_r)			CP/Ac-14	S = RB; used $k_d = 1.7 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(\text{RB}) = 0.77$.	90F157
11.161	Telluropyrylium, 2,6-bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)telluropyran-4-ylidene]-3-propenyl]-						
	MeOH/ H ₂ O (99:1)	9×10^6 (k_r)			CP/Ac-14	S = MB; used $k_d = 1 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(\text{MB}) = 0.50$.	90F157 92F189
	MeOH/ H ₂ O (50:50)	1.8×10^8 (k_r)			CP/Ac-14	S = MB; used $k_d = 1.7 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(\text{MB}) = 0.50$.	90F157
	MeOH/ H ₂ O (50:50)	1.8×10^8 (k_r)			CP/Ac-14	S = RB; used $k_d = 1.7 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(\text{RB}) = 0.77$.	90F157
	H ₂ O	8×10^8 (k_r)			CP/Ac-14	S = MB; used $k_d = 2.4 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(\text{MB}) = 0.50$.	90F157 92F189
11.162	Telluropyrylium, 2,6-diphenyl-4-(2,6-diphenyltelluropyran-4-ylidene)methyl-						
	MeOH/ H ₂ O (99:1)	1×10^7 (k_r)		298	CP/Ac-14	S = RB; used $k_d = 1 \times 10^5$ s ⁻¹ .	92F189
11.163	2,2'-Thiacarbocyanine, 5,5'-dichloro-3,3-diethyl-, bromide						
	MeOH	1.3×10^6 (k_r)			CP/Ac-15	S = 2-ACN; used $k_d = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.75$.	767071
11.164	2,2'-Thiacarbocyanine, 5,5'-dichloro-3,9,3'-triethyl-, bromide						
	MeOH	7.1×10^6 (k_r)			CP/Ac-15	S = 2-ACN; used $k_d = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.75$.	767071
11.165	2,2'-Thiacarbocyanine, 5,5'-dicyano-3,9,3'-triethyl-, tetrafluoroborate						
	MeOH	3.3×10^6 (k_r)			CP/Ac-15	S = 2-ACN; used $k_d = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.75$.	767071
11.166	2,2'-Thiacarbocyanine, 3,3'-diethyl-, toluenesulfonate						
	MeOH	3.5×10^6 (k_r)			CP/Ac-15	S = 2-ACN; used $k_d = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.75$.	767071

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_q/k_r) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.167	2,2'-Thiocarbocyanine, 3,3'-diethyl-5,5'-dimethoxy-, toluenesulfonate						
	MeOH	6.7×10^6 (k_r)			CP/Ac-15	S = 2-ACN; used $k_q = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.75$.	767071
11.168	2,2'-Thiocarbocyanine, 3,3'-diethyl-8,10-dimethyl-, toluenesulfonate						
	MeOH	2.9×10^8 (k_r)			CP/Ac-15	S = 2-ACN; used $k_q = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.75$.	767071
11.169	2,2'-Thiocarbocyanine, 3,3'-diethyl-8,10-ethanediy-, toluenesulfonate						
	MeOH	1.2×10^8 (k_r)			CP/Ac-15	S = 2-ACN; used $k_q = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.75$.	767071
11.170	2,2'-Thiocarbocyanine, 3,3'-diethyl-8,9-(1,3-propanediyl)-, iodide						
	MeOH	1.5×10^8 (k_r)			CP/Ac-15	S = 2-ACN; used $k_q = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.75$.	767071
11.171	2,2'-Thiocarbocyanine, 3,9,3'-triethyl-, bromide						
	MeOH	1.6×10^7 (k_r)			CP/Ac-15	S = 2-ACN; used $k_q = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.75$.	767071
11.172	2,2'-Thiocarbocyanine, 3,9,3'-triethyl-5,5'-dimethoxy-, toluenesulfonate						
	MeOH	3.1×10^7 (k_r)			CP/Ac-15	S = 2-ACN; used $k_q = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.75$.	767071
11.173	2,2'-Thiadibocarbocyanine, 3,3'-diethyl-, iodide						
	MeOH	1.3×10^7 (k_r)			CP/Ac-15	S = 2-ACN; used $k_q = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.75$.	767071
11.174	2,2'-Thiatricarbocyanine, 3,3'-diethyl-, iodide						
	Propylene carbonate	2.7×10^9 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690
	Propylene carbonate	3.8×10^8 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
	MeOH	5.1×10^7 (k_r)			CP/Ac-15	S = 2-ACN; used $k_q = 1.9 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(S) = 0.75$.	767071
11.175	Thiopyrylium, 2,6-bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)selenopyran-4-ylidene]-3-propenyl]-						
	MeOH/ H ₂ O (50:50)	9.0×10^6 (k_r)		298	CP/Ac-14	S = RB; used $k_q = 1.7 \times 10^5$ s ⁻¹ .	92F189
11.176	Thiopyrylium, 2,6-bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)thiopyran-4-ylidene]-3-propenyl]-						
	MeOH/ H ₂ O (50:50)	1.3×10^7 (k_r)			CP/Ac-14	S = RB; used $k_q = 1.7 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_\Delta(RB) = 0.77$.	90F157
11.177	1,2,3-Triazolo[1,2-a]benzotriazole						
	CH ₃ CN	4×10^4	0.4		CP/Ac-15	S = RB; used $k_q = 1.6 \times 10^4$ s ⁻¹ .	83F136
11.178	Tricarbocyanine, 5,5'-dichloro-1,1',3,3,3',3'-hexamethyl-, iodide						
	Propylene carbonate	4.0×10^9 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690
	Propylene carbonate	4×10^7 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
11.179	Tricarbocyanine, 5,5'-difluoro-1,1',3,3,3',3'-hexamethyl-, iodide						
	Propylene carbonate	7×10^7 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
	Propylene carbonate	1.0×10^9 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690

TABLE 11. Rate constants for the interaction of singlet oxygen with diazo compounds and dyes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_q/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.180	Tricarbocyanine, 5,5'-dimethoxy-1,1',3,3,3',3'-hexamethyl-, iodide						
	Propylene carbonate	1.5×10^8 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
	Propylene carbonate	2.6×10^9 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690
11.181	Tricarbocyanine, 1,1',3,3,3',3'-hexamethyl-, fluoride						
	Propylene carbonate	8×10^7 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
	Propylene carbonate	5.4×10^8 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690
11.182	Tricarbocyanine, 1,1',3,3,3',3'-hexamethyl-, iodide						
	Propylene carbonate	7×10^7 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
	Propylene carbonate	1.8×10^9 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690
	DMSO	1.9×10^5 (k_r)	0.078		CL/Ac-15	S = Th; used $k_d = 1.3 \times 10^4$ s ⁻¹ ; k_r derived using $\phi_{\Delta}(S) = 0.87$.	82F531
	MeOH	1.2×10^6 (k_r)	0.14		CL/Ac-15	S = Th; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; k_r derived using $\phi_{\Delta}(S) = 0.87$.	82F531
11.183	Tricarbocyanine, 1,1',3,3,3',3'-hexamethyl-, perchlorate						
	Propylene carbonate	1.0×10^8 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
	Propylene carbonate	7.7×10^8 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690
	CH ₃ CN/ C ₆ H ₆ (80:20)	8×10^7 1.6×10^6 (k_r) 4×10^7 (k_q)		298	CP/Ac, A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
11.184	Tricarbocyanine, 1,1',3,3,3',3',5,5'-octamethyl-, iodide						
	Propylene carbonate	5×10^7 (k_r)		293	PL/A'd-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.0 \times 10^9$ L mol ⁻¹ s ⁻¹ .	87E690
	Propylene carbonate	5.8×10^8 (k_q)		293	PL/A'd-5	S = MB; A' = DPBF; Measured $k_q + k_r$, k_q calcd. knowing k_r from $k_r/k_r^{A'}$.	87E690

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes.

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
12.1	Acetatobis(acetylacetonato)manganese(III)						
	CH ₃ COCH ₃ / H ₂ O (95:5)	2.2×10^7			PL/Ld-2	S = PdMP.	82A412
12.2	Ammine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II)						
	C ₆ H ₅ CH ₃	4.8×10^8			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.3	Aniline[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II)						
	C ₆ H ₅ CH ₃	1.9×10^8			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.4	Aqua[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II)						
	C ₆ H ₅ CH ₃	1.2×10^8			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.5	Aqua[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II)						
	C ₆ H ₅ CH ₃	1.4×10^8			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.6	Bis(acetylacetonato)chloroacetatomanganese(III)						
	CH ₃ COCH ₃ / H ₂ O (95:5)	2.7×10^7			PL/Ld-2	S = PdMP.	82A412
12.7	Bis(acetylacetonato)cobalt(II)						
	C ₆ H ₅ CH ₃	1×10^8			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
	CCl ₄ / CHCl ₃ (90:10)	1.5×10^8			CP/A'c-23	S = A' = Rub; used $k_d = 1.4 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k_A/(k_A[A'] + k_d) = 8.2 \times 10^4$ L mol ⁻¹ at $[A'] = 5 \times 10^{-6}$ mol L ⁻¹ .	74F645
12.8	Bis(acetylacetonato)copper(II)						
	C ₆ H ₅ CH ₃	1×10^8			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
	CCl ₄ / CHCl ₃ (90:10)	3.7×10^6			CP/A'c-23	S = A' = Rub; used $k_d = 1.4 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k_A/(k_A[A'] + k_d) = 2.1 \times 10^3$ L mol ⁻¹ at $[A'] = 5 \times 10^{-6}$ mol L ⁻¹ .	74F645
12.9	Bis(acetylacetonato)manganese(III)						
	CH ₃ COCH ₃ / H ₂ O (95:5)	2.5×10^7			PL/Ld-2	S = PdMP.	82A412
12.10	Bis(acetylacetonato)nickel(II)						
	BuOCH ₂ CH ₂ OH	7.5×10^7		273	MD/A'c-33	A' = Rub; used $k_d = 3.8 \times 10^5$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	727319
	C ₆ H ₅ Br	6.5×10^7		273	MD/A'c-33	A' = Rub; used $k_d = 1.3 \times 10^4$ s ⁻¹ , $k_{A'} = 4.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k/[(k_d/[A']) + k_{A'}] = 0.5$ at $[A'] = 1.5 \times 10^{-4}$ mol L ⁻¹ . A exists as a trimer in solution.	737333
	C ₆ H ₅ CH ₃	3×10^8			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
	CCl ₄ / CHCl ₃ (90:10)	8.2×10^7			CP/A'c-23	S = A' = Rub; used $k_d = 1.4 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k_A/(k_A[A'] + k_d) = 4.6 \times 10^4$ L mol ⁻¹ at $[A'] = 5 \times 10^{-6}$ mol L ⁻¹ .	74F645
	CH ₂ Cl ₂	1.5×10^8		298	CP/A'c-23	S = A' = Rub; used $k_d = 8 \times 10^3$ s ⁻¹ , $k_{A'} = 8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
	CH ₂ Cl ₂	7.5×10^7			CP/A'c-23	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	732066

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
12.10 Bis(acetylacetonato)nickel(II) — Continued							
	CH ₃ COCH ₃ / H ₂ O (95:5)	1.5 × 10 ⁸			PL/Ld-2	S = PdMP.	82A412
	CH ₂ Cl ₂	1.8 × 10 ⁸			CP/A'-c-19	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88F059
12.11 Bis(acetylacetonato)nickel(II) dihydrate							
	CCl ₄ / MeOH (98:2)	6.6 × 10 ⁷			FP/A'-d-5	S = MB; A' = DPBF.	78E238
12.12 Bis(acetylacetonato)trichloroacetatomanganese(III)							
	CH ₃ COCH ₃ / H ₂ O (95:5)	2.2 × 10 ⁷			PL/Ld-2	S = PdMP.	82A412
12.13 Bis(acetylacetonato)zinc(II)							
	CCl ₄ / CHCl ₃ (90:10)	1.1 × 10 ⁷			CP/A'-c-23	S = A' = Rub; used $k_d = 1.4 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k_A/(k_{A'}[A'] + k_d) = 6.1 \times 10^3$ L mol ⁻¹ at $[A'] = 5 \times 10^{-6}$ mol L ⁻¹ .	74F645
12.14 Bis(5-bromo-2-hydroxybenzaldehydato)nickel(II) dihydrate							
	CHCl ₃	5.3 × 10 ⁷			CP/A'-c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
12.15 Bis(2-butene-2,3-dithiolato)nickel(II)							
	C ₆ H ₅ CH ₃	2.8 × 10 ¹⁰			CP/A'-c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
	CH ₃ CN/ C ₆ H ₆ (80:20)	1.3 × 10 ¹⁰ 9 × 10 ⁵ (k_p) 1.4 × 10 ¹⁰ (k_q)		298	CP/Ac, A'-c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.16 Bis(O-butyl-3,5-di-(1,1-dimethylethyl)-4-hydroxybenzylphosphonato)nickel(II)							
	BuOCH ₂ CH ₂ OH	3.4 × 10 ⁷		273	MD/A'-c-33	A' = Rub; used $k_d = 3.8 \times 10^5$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	727319
	C ₆ H ₅ Br	1.3 × 10 ⁷		273	MD/A'-c-33	A' = Rub; used $k_d = 1.3 \times 10^4$ s ⁻¹ , $k_{A'} = 4.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k/[(k_d/[A']) + k_{A'}] = 0.1$ at $[A'] = 1.5 \times 10^{-4}$ mol L ⁻¹ . A exists as a trimer in solution.	737333
	C ₆ H ₅ CH ₃	2.0 × 10 ⁸			CP/A'-c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
	C ₆ H ₆	1.4 × 10 ⁷			PL/A'-d-8	S = MB; A' = DPBF.	76F902
	CCl ₄ / CHCl ₃ (90:10)	9.0 × 10 ⁶			CP/A'-c-23	S = A' = Rub; used $k_d = 1.4 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k_A/(k_{A'}[A'] + k_d) = 5.2 \times 10^3$ L mol ⁻¹ at $[A'] = 5 \times 10^{-6}$ mol L ⁻¹ .	74F645
	CH ₂ Cl ₂	1.6 × 10 ⁷		298	CP/A'-c-23	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	74F642
	CH ₂ Cl ₂	1.4 × 10 ⁷		298	CP/A'-c-23	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	727319
	CH ₂ Cl ₂ / MeOH/ C ₅ H ₅ N (94:3:3)	1.0 × 10 ⁷		298	CR/A'-c-32	A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	727319
12.17 Bis[2-[(butylimino)methyl]-4-bromophenolato]nickel(II)							
	CHCl ₃	3.7 × 10 ⁹			CP/A'-c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
12.18 Bis[2-[(butylimino)methyl]-4-methoxyphenolato]nickel(II)							
	n-C ₁₆ H ₃₄	4.0 × 10 ⁸		298	MD/A'-c-33	A' = Rub; used $k_d = 9.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
	n-C ₁₆ H ₃₄	2.0 × 10 ⁸		298	MD/A'-c-33	A' = Rub; used $k_d = 9.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	727319

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
12.18 Bis[2-[(butylimino)methyl]-4-methoxyphenolato]nickel(II) — Continued							
	CH ₂ Cl ₂	2.0 × 10 ⁹		298	CP/A'c-23	S = A' = Rub; used $k_d = 8 \times 10^3$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
	CHCl ₃	3.4 × 10 ⁹			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
	<i>i</i> -octane/ MeOH/ C ₅ H ₅ N (94:3:3)	3.5 × 10 ⁹		298	CR/A'c-32	A' = Rub; used $k_d = 5.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	727319
	<i>i</i> -octane	2.6 × 10 ⁹		298	CP/A'c-23	S = A' = Rub; used $k_d = 4.7 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
12.19 Bis[2-[(butylimino)methyl]phenolato]nickel(II)							
	CHCl ₃	2.8 × 10 ⁹			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
12.20 Bis[3-(cyclohexylimino)methyl]-5-ethyl-2-thiophenethionato]cobalt(II)							
	C ₆ H ₅ CH ₃	2.7 × 10 ⁹			PL/Ld-2	S = TPP.	88A507
	C ₆ H ₅ CH ₃	3.5 × 10 ⁷ (k_r)			CP/Ac,A'c-17	S = PP; A' = DPBF; used $k_r A' = 6.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	88A507
	CH ₃ CN	1.9 × 10 ⁹			PL/Ld-2	S = TPP.	88A507
	CH ₃ CN	8.5 × 10 ⁶ (k_r)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_r A' = 1.1 \times 10^9$ L mol ⁻¹ s ⁻¹ .	88A507
12.21 Bis[3-(cyclohexylimino)methyl]-5-ethyl-2-thiophenethionato]nickel(II)							
	C ₆ H ₅ CH ₃	4.7 × 10 ⁹			PL/Ld-2	S = TPP.	88A507
	C ₆ H ₅ CH ₃	5.0 × 10 ⁷ (k_r)			CP/Ac,A'c-17	S = PP; A' = DPBF; used $k_r A' = 6.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	88A507
	CH ₃ CN	1.3 × 10 ⁷ (k_r)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_r A' = 1.1 \times 10^9$ L mol ⁻¹ s ⁻¹ .	88A507
	CH ₃ CN	8.4 × 10 ⁹			PL/Ld-2	S = TPP.	88A507
12.22 Bis[3-(cyclohexylimino)methyl]-5-ethyl-2-thiophenonato]copper(II)							
	C ₆ H ₅ CH ₃	5.0 × 10 ⁷ (k_r)			CP/Ac,A'c-17	S = PP; A' = DPBF; used $k_r A' = 6.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	88A507
	C ₆ H ₅ CH ₃	1.5 × 10 ⁹			PL/Ld-2	S = TPP.	88A507
12.23 Bis[3-(cyclohexylimino)methyl]-5-ethyl-2-thiophenethionato]zinc(II)							
	C ₆ H ₅ CH ₃	5.0 × 10 ⁷			PL/Ld-2	S = TPP.	88A507
	C ₆ H ₅ CH ₃	1.3 × 10 ⁷ (k_r)			CP/Ac,A'c-17	S = PP; A' = DPBF; used $k_r A' = 6.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	88A507
	CH ₃ CN	9.0 × 10 ⁶ (k_r)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_r A' = 1.1 \times 10^9$ L mol ⁻¹ s ⁻¹ .	88A507
	CH ₃ CN	1.9 × 10 ⁸			PL/Ld-2	S = TPP.	88A507
	CHCl ₃	1.2 × 10 ⁸			PL/Ld-2	S = TPP.	88A507
12.24 Bis[2-[(cyclohexylimino)methyl]phenolato]nickel(II)							
	C ₆ H ₅ CH ₃	4.7 × 10 ⁹			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.25 Bis[1,2-di(2-bromophenyl)-1,2-ethenedithiolato]nickel(II)							
	CH ₃ CN/ C ₆ H ₆ (80:20)	1.1 × 10 ¹⁰ 9 × 10 ⁵ (k_r) 1.1 × 10 ¹⁰ (k_d)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.26 Bis(dibutylthiocarbamate)cobalt(II)							
	CCl ₄ / MeOH (98:2)	1.2 × 10 ⁹			FP/A'd-5	S = MB; A' = DPBF.	78E238

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.27	Bis(dibutyldithiocarbamato)copper(II)						
	CCl ₄ / MeOH (98:2)	<5 × 10 ⁸			FP/A'd-5	S = MB; A' = DPBF; no effect for [A] = 5 × 10 ⁻⁶ mol L ⁻¹ .	78E238
11.28	Bis(dibutyldithiocarbamato)nickel(II)						
	<i>n</i> -C ₁₆ H ₃₄	9.7 × 10 ⁸		298	MD/A'c-33	A' = Rub; used $k_d = 9 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88F415
	<i>n</i> -C ₁₆ H ₃₄	1.0 × 10 ⁹		298	MD/A'c-33	A' = Rub; used $k_d = 9.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
	<i>n</i> -C ₁₆ H ₃₄	9.0 × 10 ⁸		298	MD/A'c-33	A' = Rub; used $k_d = 9.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	727319
	C ₆ H ₅ Br	2.6 × 10 ⁸		273	MD/A'c-33	A' = Rub; used $k_d = 1.3 \times 10^4$ s ⁻¹ , $k_{A'} = 4.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k/[(k_d/[A']) + k_{A'}] = 2.0$ at [A'] = 1.5 × 10 ⁻⁴ mol L ⁻¹ .	737333
	C ₆ H ₅ CH ₃	4.3 × 10 ⁹			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
	C ₆ H ₆	6 × 10 ⁹ 5.2 × 10 ⁹ (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
	C ₆ H ₆ / EtOH (89:11)	1.6 × 10 ⁹		295	CP/P'a-19	S = RB; A' = TEMP-4-OH; used $k_d = 3 \times 10^4$ s ⁻¹ ; P' = TEMPOL.	757445
	CCl ₄ / MeOH (98:2)	4.1 × 10 ⁹			FP/A'd-5	S = MB; A' = DPBF.	78E238
	CH ₂ Cl ₂	1.2 × 10 ⁹		293	CP/Oc-22	S = Chl a; A' = Soybean oil; used $k_d = 1.0 \times 10^4$ s ⁻¹ .	91U026 90U480
	CH ₂ Cl ₂	3.5 × 10 ⁹	2.1 × 10 ⁻⁶		CP/A'c-19	S = A' = Tetr; used $k_d = 7.3 \times 10^3$ s ⁻¹ .	75F654
	CH ₂ Cl ₂	9.0 × 10 ⁹		298	CP/A'c-23	S = A' = Rub; used $k_d = 8 \times 10^3$ s ⁻¹ , $k_{A'} = 8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
	CH ₂ Cl ₂	8.0 × 10 ⁹		298	CP/A'c-23	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	74F642
	CH ₂ Cl ₂ / MeOH/ C ₅ H ₅ N (94:3:3)	≥1.0 × 10 ⁹		298	CR/A'c-32	A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ . Interference by chelate ozonide reaction to give colored products.	727319
	CHCl ₃	7.7 × 10 ⁹			CP/P'a-17	S = 1,5-Diamino-4,8-dihydroxyanthraquinone; A' = DMA; used $k_r^{A'} = 3.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	80E446
	CHCl ₃	8.1 × 10 ⁹			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
	CS ₂ / MeOH (98:2)	4 × 10 ⁹			FP/A'd-5	S = MB; A' = DPBF.	737334
	DMF	2.0 × 10 ⁹			CP/A'c-25	S = TTMPP; A' = DPBF; used $k_d = 1.0 \times 10^5$ s ⁻¹ , $k_{A'} = 1.1 \times 10^9$ L mol ⁻¹ s ⁻¹ .	92F505
	DMF	3.6 × 10 ¹⁰		301	MP/P'a-19	S = Pt(phen)(BCAT); A' = 2,2,6,6-Tetramethyl-4-piperidinol; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; P' = 2,2,6,6-Tetramethyl-4-hydroxypiperidine-1-oxyl detected by esr.	89F181
	DMF	1.1 × 10 ¹⁰			MP/P'a-19	S = HP; A' = TEMP-4-OH; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; P' = TEMPOL; esr detection.	89F311
	DMF	~2 × 10 ¹⁰		301	MP/P'a-19	S = Pt(phen)(N ₃) ₂ ; A' = TEMPO-4-OH; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; P' = TEMPOL; detected by esr.	88A276
	<i>i</i> -octane	1.7 × 10 ¹⁰		298	CP/A'c-23	S = A' = Rub; used $k_d = 4.7 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
	<i>i</i> -octane	7.0 × 10 ⁹		298	CP/A'c-23	S = A' = Rub; used $k_d = 4.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	727319
12.29	Bis(dibutyldithiocarbamato)zinc(II)						
	C ₆ H ₅ Br	≤1 × 10 ⁶		273	MD/A'c-33	A' = Rub; No measurable effect.	737333
	CS ₂ / MeOH (98:2)	2 × 10 ⁷			FP/A'd-5	S = MB; A' = DPBF.	737334

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
12.29	Bis(dibutyldithiocarbamato)zinc(II) — Continued						
	<i>i</i> -octane	$\leq 1 \times 10^6$			CP/A'c-23	S = A' = Rub; used $k_d = 4.7 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
12.30	Bis[O,O'-di-(4- <i>tert</i> -butylphenyl)phosphorodithiolato]cobalt(II)						
	C ₆ H ₆	1.2×10^9			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78F497
12.31	Bis[O,O'-di-(4- <i>tert</i> -butylphenyl)phosphorodithiolato]copper(II)						
	C ₆ H ₆	7.0×10^6			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78F497
12.32	Bis[O,O'-di-(4- <i>tert</i> -butylphenyl)phosphorodithiolato]nickel(II)						
	C ₆ H ₆	2.3×10^9			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78F497
12.33	Bis[1,2-di(2-chlorophenyl)-1,2-ethenedithiolato]nickel(II)						
	CH ₃ CN/ C ₆ H ₆ (80:20)	1.1×10^{10} 1×10^6 (k_r) 1.2×10^{10} (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.34	Bis[1,2-di(4-chlorophenyl)-1,2-ethenedithiolato]nickel(II)						
	CH ₃ CN/ C ₆ H ₆ (80:20)	1.2×10^{10} 1.1×10^6 (k_r) 1.2×10^{10} (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.35	Bis(dicyclohexylphosphinodithiolato)nickel(II)						
	CHCl ₃	5.7×10^9			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
12.36	Bis(O,O'-dicyclohexylphosphorodithiolato)cobalt(II)						
	C ₆ H ₅ CH ₃	2.7×10^9			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.37	Bis[1,2-di(2,4-dichlorophenyl)-1,2-ethenedithiolato]nickel(II)						
	CH ₃ CN/ C ₆ H ₆ (80:20)	1.2×10^{10} 3.1×10^6 (k_r) 1.3×10^{10} (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.38	Bis[1,2-di(3,4-dichlorophenyl)-1,2-ethenedithiolato]nickel(II)						
	CH ₃ CN/ C ₆ H ₆ (80:20)	1.2×10^{10} 2.4×10^6 (k_r) 1.2×10^{10} (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.39	Bis[1,2-di(dimethylaminophenyl)-1,2-ethenedithiolato]nickel(II)						
	CH ₃ CN/ C ₆ H ₆ (80:20)	9.8×10^9 3×10^5 (k_r) 9.8×10^9 (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.40	Bis(diethyldithiocarbamato)nickel(II)						
	CCl ₄ / MeOH (98:2)	6.6×10^9			FP/A'd-5	S = MB; A' = DPBF.	78E238
	DMF	3×10^{10}			301 MP/P'a-19	S = Pt(DHBA)(DPA); A' = TEMP-4-OH; used $k_d = 1.4 \times 10^5$ s ⁻¹ , $k_{A'} = 6.7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; P' = TEMPOL; detected by esr.	94F004
	DMF	1.5×10^{10}			301 CP/P'a-19	S = Pt(phen)(DMT); A' = 2,2,6,6-Tetramethyl-4-piperidinol; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; P' = TEMPOL obs. by esr.	92F210
	DMF	1.3×10^{11}			CP/A'c-22	S = A' = Pt(phen)(DMT); used $k_d = 1.4 \times 10^5$ s ⁻¹ .	91F098

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
12.41	Bis[1,2-di(4-ethylphenyl)-1,2-ethenedithiolato]cobalt(II)						
	C ₆ H ₆	5.5 × 10 ⁹ 1.6 × 10 ⁶ (k_r) 5.4 × 10 ⁹ (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.42	Bis[1,2-di(4-ethylphenyl)-1,2-ethenedithiolato]nickel(II)						
	C ₆ H ₆	7.8 × 10 ⁹ 1 × 10 ⁵ (k_r) 7.1 × 10 ⁹ (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.43	Bis[1,2-di(4-ethylphenyl)-1,2-ethenedithiolato]platinum(II)						
	C ₆ H ₆	8.5 × 10 ⁹ 2 × 10 ⁷ (k_r) 8.0 × 10 ⁹ (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.44	Bis(O,O'-diethylphosphorodithiolato)nickel(II)						
	CH ₃ CN/ C ₆ H ₆ (80:20)	6.8 × 10 ⁹ 3.6 × 10 ⁵ (k_r) 8.2 × 10 ⁹ (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
	CHCl ₃	9.5 × 10 ⁹			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
12.45	Bis[2,3-dihydro-N-2-pyridinyl-3-(2-pyridinylimino)isoindol-1-amine]nickel(II)						
	CHCl ₃	1.6 × 10 ⁸			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
12.46	Bis(diisopropylthiocarbamato)cobalt(II)						
	<i>n</i> -C ₁₆ H ₃₄	9.0 × 10 ⁸		298	MD/A'c-33	A' = Rub; used $k_d = 9.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
	CH ₂ Cl ₂	1.9 × 10 ⁹			CP/A'c-23	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	732066
	<i>i</i> -octane	1.9 × 10 ⁹		298	CP/A'c-23	S = A' = Rub; used $k_d = 4.7 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
12.47	Bis(diisopropylthiocarbamato)copper(II)						
	CH ₂ Cl ₂	<1.0 × 10 ⁷			CP/A'c-23	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	732066
12.48	Bis(diisopropylthiocarbamato)iron(III)						
	<i>n</i> -C ₁₆ H ₃₄	1.2 × 10 ⁹		298	MD/A'c-33	A' = Rub; used $k_d = 9.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
	CH ₂ Cl ₂	4.3 × 10 ⁹		298	CP/A'c-23	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 8 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
	CH ₂ Cl ₂	3.9 × 10 ⁹		298	CP/A'c-23	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	74F642
	CH ₂ Cl ₂	3.8 × 10 ⁹			CP/A'c-23	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	732066
	<i>i</i> -octane	3.8 × 10 ⁹		298	CP/A'c-23	S = A' = Rub; used $k_d = 4.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	74F642
12.49	Bis(diisopropylthiocarbamato)manganese(I)						
	CH ₂ Cl ₂	<1.0 × 10 ⁷			CP/A'c-23	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	732066
12.50	Bis(diisopropylthiocarbamato)nickel(II)						
	CH ₂ Cl ₂	3.4 × 10 ⁹			CP/A'c-23	S = A' = Rub; used $k_d = 4.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	732066

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
12.51	Bis(diisopropylthiocarbamato)zinc(II)						
	CH ₂ Cl ₂	<1.0 × 10 ⁷			CP/A'c-23	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	732066
12.52	Bis(O,O'-diisopropylphosphorodithiolato)nickel(II)						
	C ₂ H ₅ CO ₂ CH ₃	6.4 × 10 ⁹		293	PL/Ld-2	S = Pz and 2-ACN.	92E220
	C ₆ H ₅ CH ₃	6.5 × 10 ⁹		293	PL/Ld-2	S = Pz and 2-ACN.	92E220
	CCl ₄ / MeOH (98:2)	7.6 × 10 ⁹			FP/A'd-5	S = MB; A' = DPBF.	78E238
	CH ₂ Cl ₂	5.4 × 10 ⁹			CP/A'c-23	S = A' = Rub; used $k_d = 4.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	732066
12.53	Bis[1,2-di(4-methoxyphenyl)-1,2-ethanedithionato]nickelate(I), tetrabutylammonium salt						
	CH ₃ CN/ C ₆ H ₆ (80:20)	8.6 × 10 ⁹ 8.4 × 10 ⁶ (k_r) 8.9 × 10 ⁹ (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.54	Bis[1,2-di(4-methoxyphenyl)-1,2-ethenedithiolato]nickel(II)						
	CH ₃ CN/ C ₆ H ₆ (80:20)	1.0 × 10 ¹⁰ 4 × 10 ⁵ (k_r) 1.0 × 10 ¹⁰ (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.55	Bis(dimethyldithiocarbamato)bismuth(II)						
	C ₆ H ₆ / EtOH (89:11)			295	CP/P'a-19	S = RB; A' = TEMP-4-OH; P' = TEMPOL; no effect for [A] = 1.8 × 10 ⁻⁵ mol L ⁻¹ .	757445
	CH ₂ Cl ₂	9.2 × 10 ⁴	0.067		CP/A'c-19	S = A' = Tetr; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $\beta_{A'} = 4.0 \times 10^{-4}$ mol L ⁻¹ .	75F654
12.56	Bis(dimethyldithiocarbamato)nickel(II)						
	DMF	3 × 10 ³			CP/A'c-19	S = RB; A' = DMA; used $k_d = 1.4 \times 10^5$ s ⁻¹ , $k_{A'} = 1.4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86F622
12.57	Bis[2-[(1,1-dimethylethylimino)methyl]phenolato]nickel(II)						
	C ₆ H ₆	2.6 × 10 ⁸			PL/A'd-8	S = MB; A' = DPBF.	76F902
12.58	Bis[4-(1,1-dimethylethyl)phenylsalicylato]nickel(II)						
	CCl ₄ / CHCl ₃ (90:10)	1.5 × 10 ⁷			CP/A'c-23	S = A' = Rub; used $k_d = 1.4 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k_A/(k_A[A'] + k_d) = 8.5 \times 10^3$ L mol ⁻¹ at [A'] = 5 × 10 ⁻⁶ mol L ⁻¹ .	74F645
12.59	Bis[3,5-di(1-methylethyl)salicylato]cobalt(II)						
	C ₆ H ₅ CH ₃	3.0 × 10 ⁷			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.60	Bis[3,5-di(1-methylethyl)salicylato]nickel(II)						
	C ₆ H ₅ CH ₃	5.0 × 10 ⁷			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.61	Bis[O,O'-di(4-methylphenyl)phosphorodithiolato]cobalt(II)						
	C ₆ H ₆	1.1 × 10 ⁹			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78F497
12.62	Bis[O,O'-di(4-methylphenyl)phosphorodithiolato]copper(II)						
	C ₆ H ₆	2.0 × 10 ⁶			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78F497
12.63	Bis[O,O'-di(4-methylphenyl)phosphorodithiolato]nickel(II)						
	C ₆ H ₆	2.3 × 10 ⁹			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78F497

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.64	Bis(diphenyldithiocarbamato)nickel(II)						
	CHCl ₃	6.3×10^9			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
	<i>i</i> -octane	$<1.0 \times 10^6$		298	CP/A'c-23	S = A' = Rub; used $k_d = 4.7 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
11.65	Bis(1,2-diphenyl-1,2-ethanedithionato)nickelate(I), tetrabutylammonium salt						
	CH ₃ CN/ C ₆ H ₆ (80:20)	9.2×10^9 4.3×10^6 (k_p) 9.7×10^9 (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
11.66	Bis[1,2-diphenyl-1,2-ethanedithiolato]nickel(II)						
	C ₆ H ₅ CH ₃	2.2×10^{10}			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
	CH ₃ CN/ C ₆ H ₆ (80:20)	1.3×10^{10} 9×10^5 (k_p) 1.2×10^{10} (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
	CHCl ₃	1.6×10^{10}		293	CP/P'a-23	S = A' = 2,4-Di[2-hydroxy-4-(diethylamino)phenyl]squarylium; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 1.2 \times 10^9$ L mol ⁻¹ s ⁻¹ ; meas. $k_{A'}/k_{A''} = 13$.	90F554
	CHCl ₃	1.1×10^{10}			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
11.67	Bis(O,O'-diphenylphosphorodithiolato)chromium(II)						
	C ₆ H ₆	3.2×10^6			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78F497
11.68	Bis(O,O'-diphenylphosphorodithiolato)cobalt(II)						
	C ₆ H ₆	1.2×10^9			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78F497
11.69	Bis(O,O'-diphenylphosphorodithiolato)copper(II)						
	C ₆ H ₆	1.7×10^6			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78F497
11.70	Bis(O,O'-diphenylphosphorodithiolato)lead(II)						
	C ₆ H ₆	3.4×10^7			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78F497
11.71	Bis(O,O'-diphenylphosphorodithiolato)nickel(II)						
	C ₆ H ₆	2.5×10^9			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78F497
	CHCl ₃	1.1×10^{10}			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
11.72	Bis(O,O'-diphenylphosphorodithiolato)zinc(II)						
	C ₆ H ₆	5.0×10^6			CP/A'c-23	S = A' = Rub; used $k_d = 3 \times 10^7$ s ⁻¹ .	78F497
11.73	Bis(dithioacetylacetonate)cobalt(II)						
	C ₆ H ₅ CH ₃	9.4×10^8		293	PL/Ld-2	S = An or PPDME; $E_a = 4.2$ kJ mol ⁻¹ ; log(A) = 9.7.	86A540
	CH ₂ Cl ₂	1.8×10^8		293	PL/Ld-2	S = An or PPDME.	86A540
	CH ₃ CN	7.2×10^8		293	PL/Ld-2	S = An or PPDME.	86A540
	CH ₃ COCH ₃	9.0×10^8		293	PL/Ld-2	S = An or PPDME.	86A540
	CHCl ₃	7.4×10^8		293	PL/Ld-2	S = An or PPDME.	86A540

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
12.74	Bis(dithioacetylacetonato)nickel(II)						
	C ₆ H ₅ Br	2.3 × 10 ⁸		273	MD/A'c-23	A' = Rub; used $k_d = 1.3 \times 10^4$ s ⁻¹ , $k_{A'} = 4.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k/[(k_d/[A']) + k_{A'}] = 1.8$ at $[A'] = 1.5 \times 10^{-5}$ mol L ⁻¹ .	73733
12.75	Bis[1,2-di(4-trifluoromethylphenyl)-1,2-ethanedithionato]nickelate(I), tetrabutylammonium salt						
	CH ₃ CN/ C ₆ H ₆ (80:20)	1.1 × 10 ¹⁰ 2.1 × 10 ⁶ (k_p) 1.0 × 10 ¹⁰ (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.76	Bis[1,2-di(4-trifluoromethylphenyl)-1,2-ethenedithiolato]nickel(II)						
	CH ₃ CN/ C ₆ H ₆ (80:20)	1.4 × 10 ¹⁰ 2.7 × 10 ⁶ (k_p) 1.4 × 10 ¹⁰ (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.77	Bis[1,2-di(3,4,5-trimethoxyphenyl)-1,2-ethanedithionato]nickelate(I), tetrabutylammonium salt						
	CH ₃ CN/ C ₆ H ₆ (80:20)	7.0 × 10 ⁹ 4.9 × 10 ⁶ (k_p) 7.6 × 10 ⁹ (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.78	Bis[1,2-di(3,4,5-trimethoxyphenyl)-1,2-ethanedithionato]nickelate(I), 4-[1,5,5-tri(4-diethylaminophenyl)pentadienyldene]anilinium salt						
	CH ₃ CN/ C ₆ H ₆ (80:20)	5.6 × 10 ⁹ 5 × 10 ⁵ (k_p) 5.1 × 10 ⁹ (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.79	Bis[1,2-di(3,4,5-trimethoxyphenyl)-1,2-ethenedithiolato]nickel(II)						
	CH ₃ CN/ C ₆ H ₆ (80:20)	9.7 × 10 ⁹ 4 × 10 ⁵ (k_p) 9.6 × 10 ⁹ (k_q)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
12.80	Bis[2-[(dodecylimino)methyl]phenolato]cobalt(II)						
	C ₆ H ₅ CH ₃	2.4 × 10 ⁹			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.81	Bis[2-[(dodecylimino)methyl]phenolato]copper(II)						
	C ₆ H ₅ CH ₃	5.0 × 10 ⁷			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.82	Bis[2-[(dodecylimino)methyl]phenolato]nickel(II)						
	C ₆ H ₅ CH ₃	7.0 × 10 ⁹			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.83	Bis[O-ethyl-3,5-di-(1,1-dimethylethyl)-4-hydroxybenzylphosphonato]nickel(II)						
	CH ₂ Cl ₂	3.6 × 10 ⁶	2.0 × 10 ⁻³		CP/A'c-19	S = A' = Tetr; used $k_d = 7.3 \times 10^3$ s ⁻¹ .	75F654
	CHCl ₃	2.2 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
12.84	Bis[5-ethyl-3-[(3-pyridinylimino)methyl]-2-thiophenethionato]cobalt(II)						
	C ₆ H ₅ CH ₃	5.0 × 10 ⁷ (k_p)			CP/Ac,A'c-17	S = PP; A' = DPBF; used $k_r^{A'} = 6.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	88A507
	C ₆ H ₅ CH ₃	1.5 × 10 ⁹			PL/Ld-2	S = TPP.	88A507
	CH ₃ CN	4.0 × 10 ⁶ (k_p)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.1 \times 10^9$ L mol ⁻¹ s ⁻¹ .	88A507
	CH ₃ CN	2.0 × 10 ⁹			PL/Ld-2	S = TPP.	88A507
12.85	Bis[1,1,1,4,4,4-hexafluoro-2-butene-2,3-dithiolato]nickel(II)						
	CHCl ₃	8.1 × 10 ⁹			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.86	Bis[hydrotris(1-pyrazolyl)borato]nickel(II) CHCl ₃	2.1×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
11.87	Bis(2'-hydroxyacetophenone oximato)nickel(II) C ₆ H ₅ CH ₃	5.2×10^9			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
11.88	Bis(2-hydroxybenzaldehydato)nickel(II) dihydrate CHCl ₃	4.6×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
11.89	Bis(2-hydroxybenzaldehyde oximato)nickel(II) C ₆ H ₅ CH ₃	5.9×10^9			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
11.90	Bis[2-hydroxybenzaldehyde phenylhydrazone]nickel(II) C ₆ H ₅ CH ₃	7.5×10^9			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
11.91	Bis[2'-hydroxy-4'- <i>tert</i> -butyloctadecanophenone oximato]palladium(II) C ₆ H ₆	6.0×10^7		298	PL/A'd-8	S = An; A' = DPBF.	737438
11.92	Bis(2-hydroxy-5-methoxybenzaldehydato)nickel(II) dihydrate CHCl ₃	1.2×10^8			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
11.93	Bis[2'-hydroxy-4'-methylacetophenone oximato]nickel(II) C ₆ H ₆	3.0×10^9		298	PL/A'd-8	S = An; A' = DPBF.	737438
11.94	Bis[2-hydroxy-5-methylbenzophenonato]nickel(II) C ₆ H ₅ CH ₃	3.9×10^9			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
11.95	Bis[2'-hydroxy-4'-methyl-dodecanophenone oximato]nickel(II) C ₆ H ₅ CH ₃	5.7×10^9			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
	C ₆ H ₆	2.7×10^9		298	PL/A'd-8	S = An; A' = DPBF.	737438
11.96	Bis[2-(iminomethyl)phenolato]nickel(II) CHCl ₃	3.2×10^9			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
11.97	Bis(4-imino-2-pentanonato)nickel(II) C ₆ H ₅ CH ₃	7.2×10^9			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
11.98	Bis[O-(1-methylethyl)carbonodithionato]nickel(II) <i>i</i> -octane	5.4×10^9		298	CP/A'c-23	S = A' = Rub; used $k_d = 4.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	74F642
11.99	Bis[4-methyl-1,2-benzenedithiolato]cobalt(II) tetrabutylammonium salt C ₆ H ₅ CH ₃	3.5×10^9			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
11.100	Bis[4-methyl-1,2-benzenedithiolato]nickel(II) tetrabutylammonium salt C ₆ H ₅ CH ₃	5.8×10^9			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
12.101	Bis[2-[(1-methylethylimino)methyl]phenolato]nickel(II)						
	C ₆ H ₅ CH ₃	5.9×10^9			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
	CHCl ₃	2.6×10^9			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
12.102	Bis[<i>N</i> -methyl-7-(methylimino)-1,3,5-cycloheptatrien-1-aminato]nickel(II)						
	CHCl ₃	6.1×10^9			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
12.103	Bis(4-methylphenyldithiocarbamato)nickel(II)						
	CHCl ₃	1.1×10^{10}			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
12.104	Bis[<i>N</i> -(4-methylphenyl)-7-[(4-methylphenyl)imino]-1,3,5-cycloheptatrien-1-aminato]nickel(II)						
	CHCl ₃	5.6×10^9			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
12.105	Bis[2-[(1-methylpropylimino)methyl]phenolato]nickel(II)						
	C ₆ H ₅ CH ₃	4.0×10^9			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.106	Bis[2-[(4-(phenylamino)phenyl)imino]methyl]phenolato]nickel(II)						
	C ₆ H ₅ CH ₃	1.7×10^9			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.107	Bis(phenyldithiocarbamato)nickel(II)						
	C ₆ H ₆	4.4×10^9		303	CP/P'a-16	S = A' = Rub; k_d not given.	87A107
	CHCl ₃	1.1×10^{10}			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
	ClCF ₂ CCl ₂ F	7.2×10^9		303	CR/P'a-32	A' = Rub; ¹ O ₂ * from DMNO ₂ ; $k_{A'}$ and k_d not given.	87A107
12.108	Bis[2-[(phenylimino)methyl]phenolato]cobalt(II)						
	C ₆ H ₅ CH ₃	3.2×10^9			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.109	Bis[2-[(phenylimino)methyl]phenolato]copper(II)						
	C ₆ H ₅ CH ₃	4.0×10^8			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.110	Bis[2-[(phenylimino)methyl]phenolato]nickel(II)						
	C ₆ H ₅ CH ₃	7.8×10^9			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.111	Bis[2,2'-thiobis[<i>O</i> , <i>O'</i> -di(4- <i>tert</i> -butylphenyl)phosphorodithiolato]cadmium(II)						
	C ₆ H ₆	8.4×10^6			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78F497
12.112	Bis[2,2'-thiobis[<i>O</i> , <i>O'</i> -di(4- <i>tert</i> -butylphenyl)phosphorodithiolato]cobalt(II)						
	C ₆ H ₆	8.7×10^8			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78F497
12.113	Bis[2,2'-thiobis[<i>O</i> , <i>O'</i> -di(4- <i>tert</i> -butylphenyl)phosphorodithiolato]lead(II)						
	C ₆ H ₆	1.0×10^7			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78F497
12.114	Bis[2,2'-thiobis[<i>O</i> , <i>O'</i> -di(4- <i>tert</i> -butylphenyl)phosphorodithiolato]nickel(II)						
	C ₆ H ₆	2.2×10^9			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78F497

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes. — Continued

Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.115 Bis[2,2'-thiobis(<i>O,O'</i>-di(4-<i>tert</i>-butylphenyl)phosphorodithiolato)zinc(II)]						
C ₆ H ₆	4.4 × 10 ⁶			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	78F497
11.116 Bis(2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)phenolato]nickel(II)]						
<i>n</i> -C ₁₆ H ₃₄	1.3 × 10 ⁸		298	MD/A'c-33	A' = Rub; used $k_d = 9.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	727319
C ₆ H ₅ Br	3.9 × 10 ⁷		273	MD/A'c-33	A' = Rub; used $k_d = 1.3 \times 10^4$ s ⁻¹ , $k_{A'} = 4.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k_A/(k_d/[A'] + k_{A'}) = 0.3$ at $[A'] = 1.5 \times 10^{-4}$ mol L ⁻¹ .	737333
C ₆ H ₅ CH ₃	2.7 × 10 ⁸			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
C ₆ H ₆	1.1 × 10 ⁸			PL/A'd-8	S = MB; A' = DPBF.	76F902
CCl ₄ /CHCl ₃ (90:10)	5.7 × 10 ⁷			CP/A'c-23	S = A' = Rub; used $k_d = 1.4 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k_A/(k_A[A'] + k_d) = 3.2 \times 10^4$ L mol ⁻¹ at $[A'] = 5 \times 10^{-6}$ mol L ⁻¹ .	74F645
CS ₂ /MeOH (98:2)	5 × 10 ⁸			FP/A'd-5	S = MB; A' = DPBF.	737334
<i>i</i> -octane/MeOH/ C ₅ H ₅ N (94:3:3)	2.0 × 10 ⁸		298	CR/A'c-32	A' = Rub; used $k_d = 5.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	727319
<i>i</i> -octane	9.6 × 10 ⁷		298	CP/A'c-23	S = A' = Rub; used $k_d = 4.7 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
<i>i</i> -octane	1.3 × 10 ⁸		298	CP/A'c-23	S = A' = Rub; used $k_d = 4.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	727319
11.117 Bis[3,4,6-trichloro-1,2-benzenedithiolato]nickelate(I), tetrabutylammonium salt						
CH ₃ CN/ C ₆ H ₆ (80:20)	6.5 × 10 ⁹ 1 × 10 ⁶ (k_p) 6.7 × 10 ⁹ (k_d)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 3.4 \times 10^4$ s ⁻¹ , $k_{A'} = 4.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
11.118 Bis(2,4,6-trimethylbenzenesulfonato)nickel(II)]						
C ₆ H ₆ /EtOH (50:50)	1 × 10 ⁷ 3 × 10 ⁷ (k_d)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 5.6 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
11.119 Bromocarbonylbis(triphenylphosphine)iridium						
CH ₂ Cl ₂	2.5 × 10 ⁸			PL/Ld-2	S = TPP.	94A126
11.120 Butylamine[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II)]						
C ₆ H ₅ CH ₃	2.5 × 10 ⁸			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
11.121 Butylamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)phenolato]cobalt(II)]						
C ₆ H ₅ CH ₃	3.7 × 10 ⁸			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
11.122 Butylamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)phenolato]nickel(II)]						
<i>n</i> -C ₁₆ H ₃₄	1.0 × 10 ⁸		298	MD/A'c-33	A' = Rub; used $k_d = 9.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
<i>n</i> -C ₁₆ H ₃₄	8.0 × 10 ⁷		298	MD/A'c-33	A' = Rub; used $k_d = 9.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	727319
BuOCH ₂ CH ₂ OH	2.8 × 10 ⁸		273	MD/A'c-33	A' = Rub; used $k_d = 3.8 \times 10^5$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	727319
C ₆ H ₅ Br	1.3 × 10 ⁸		273	MD/A'c-33	A' = Rub; used $k_d = 1.3 \times 10^4$ s ⁻¹ , $k_{A'} = 4.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k_A/(k_A[A'] + k_{A'}) = 1.0$ at $[A'] = 1.5 \times 10^{-4}$ mol L ⁻¹ . A exists as a tetramer in solution.	737333
C ₆ H ₅ CH ₃	4.0 × 10 ⁸			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
C ₆ H ₆	1.1 × 10 ⁸			PL/A'd-8	S = MB; A' = DPBF.	76F902

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
12.122 Butylamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) — Continued							
	CCl ₄ /CHCl ₃ (90:10)	1.1 × 10 ⁸			CP/A'c-23	S = A' = Rub; used $k_d = 1.4 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k_A/(k_{A'}[A'] + k_d) = 6.1 \times 10^4$ L mol ⁻¹ at $[A'] = 5 \times 10^{-6}$ mol L ⁻¹ .	74F645
	CH ₂ Cl ₂	3.7 × 10 ⁷		293	CP/Oc-22	S = Chl a; A' = Soybean oil; used $k_d = 1.0 \times 10^4$ s ⁻¹ .	91U026
	CHCl ₃	1.7 × 10 ⁸			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
	CS ₂ / MeOH (98:2)	2 × 10 ⁸			FP/A'd-5	S = MB; A' = DPBF.	737334
	<i>i</i> -octane/ MeOH/ C ₅ H ₅ N (94:3:3)	2.7 × 10 ⁸		298	CR/A'c-32	A' = Rub; used $k_d = 5.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	727319
	<i>i</i> -octane	2.0 × 10 ⁸		298	CP/A'c-23	S = A' = Rub; used $k_d = 4.7 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
	<i>i</i> -octane	1.4 × 10 ⁸		298	CP/A'c-23	S = A' = Rub; used $k_d = 4.0 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	74F642
	<i>i</i> -octane	1.8 × 10 ⁸		298	CP/A'c-23	S = A' = Rub; used $k_d = 4 \times 10^4$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	727319
12.123 Carbonylchlorobis(triphenylphosphine)iridium							
	C ₆ D ₆	3.9 × 10 ⁸	3.5 × 10 ⁻⁶		PL/Ac,A'c- 15,27	S = MB; A' = TME; used $k_d = 1.1 \times 10^2$ s ⁻¹ ; assumed $f_r^{A'} = 1$.	93A050
	C ₆ D ₆	4.3 × 10 ⁸			PL/Ld-2	S = MB.	93A050
	CDCl ₃	2.6 × 10 ⁸			PL/Ld-2	S = MB.	93A050
	CH ₂ Cl ₂	2.6 × 10 ⁸			PL/Ld-2	S = TPP.	94A126
	CHCl ₃	2 × 10 ⁷ (k_r)			CP/Ac,A'c-17	S = MB; A' = DMA; used $k_r^{A'} = 2.9 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.67$.	93A050
12.124 Carbonylchlorobis(triphenylphosphine)rhodium							
	CDCl ₃	3.1 × 10 ⁸			PL/Ld-2	S = MB or C ₆₀ .	93E539
	CDCl ₃	1 × 10 ⁸ (k_r)			PL/Ac,A'c- 15,27	S = MB or C ₆₀ ; A' = TME; assumed $f_r^{A'} = 1$; used $k_A = 3.1 \times 10^8$ L mol ⁻¹ s ⁻¹ .	93E539
12.125 Carbonyliodobis(triphenylphosphine)iridium							
	CH ₂ Cl ₂	3 × 10 ⁸			PL/Ld-2	S = TPP.	94A126
12.126 Cobalt(II) acetate							
	CH ₃ COCH ₃ / H ₂ O (95:5)	4 × 10 ⁷			PL/Ld-2	S = PdMP.	82A412
12.127 Cobalt(II) chloride hexahydrate							
	BuOCH ₂ CH ₂ OH	4.8 × 10 ⁷		273	MD/A'c-33	A' = Rub; used $k_d = 3.8 \times 10^5$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	727319
12.128 Cobalt(II) ion							
	CH ₃ COCH ₃ / H ₂ O (95:5)	2 × 10 ⁷			PL/Ld-2	S = PdMP.	82A412
12.129 Copper(II) ion							
	D ₂ O	6.4 × 10 ⁷			PL/Ld-2	S = RB.	84N150
12.130 Cyclohexylamine[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II)							
	C ₆ H ₅ CH ₃	3.4 × 10 ⁸			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.131 Cyclohexylamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II)							
	C ₆ H ₅ CH ₃	1.8 × 10 ⁸			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
12.132	Didodecylamine[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II) C ₆ H ₅ CH ₃	3.2 × 10 ⁸			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.133	1,1'-(7,13-Dimethyl-1,4,8,12-tetraazacyclopentadeca-4,7,12,15-tetraene-6,14-diyl)bis(ethanoato)nickel(II) CHCl ₃	1.6 × 10 ⁹			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A050
12.134	Dodecylamine[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II) C ₆ H ₅ CH ₃	3.9 × 10 ⁸			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.135	Dodecylamine[2,2'-thiobis(4-(1,1,3,3-tetramethylbutyl))phenolato]nickel(II) C ₆ H ₅ CH ₃	2.6 × 10 ⁸			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.136	2,2'-[1,2-Ethanediybis(nitrilododecylidene)]bis[4-methylphenolato]nickel(II) C ₆ H ₅ CH ₃	4.8 × 10 ⁹			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.137	2,2'-[1,2-Ethanediybis(nitriloethylidene)]bis[phenolato]nickel(II) C ₆ H ₅ CH ₃	3.4 × 10 ⁹			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.138	[[3,3']-(1,2-Ethanediybis(nitrilomethylidene))bis[5-ethyl-2-thiophenethionato]]copper(II) C ₆ H ₅ CH ₃ C ₆ H ₅ CH ₃ CH ₃ CN CH ₃ CN	2.9 × 10 ⁸ 4.3 × 10 ⁵ (k_T) 3.4 × 10 ⁸ 4.0 × 10 ⁵ (k_T)			PL/Ld-2 CP/Ac,A'c-17 PL/Ld-2 CP/Ac,A'c-17	S = TPP. S = PP; A' = DPBF; used $k_T A' = 6.7 \times 10^8$ L mol ⁻¹ s ⁻¹ . S = TPP. S = MB; A' = DPBF; used $k_T A' = 1.1 \times 10^9$ L mol ⁻¹ s ⁻¹ .	88A507 88A507 88A507 88A507
12.139	2,2'-[1,2-Ethanediybis(nitrilomethylidene)]bis[phenolato]cobalt(II) C ₆ H ₅ CH ₃	1.0 × 10 ¹⁰			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.140	2,2'-[1,2-Ethanediybis(nitrilomethylidene)]bis[phenolato]nickel(II) C ₆ H ₅ CH ₃	5.3 × 10 ⁹			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.141	Ethylamine[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II) C ₆ H ₅ CH ₃	4.1 × 10 ⁸			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.142	Ethylamine[2,2'-thiobis(4-(1,1,3,3-tetramethylbutyl))phenolato]nickel(II) C ₆ H ₅ CH ₃	3.1 × 10 ⁸			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
12.143	[N,N'-Ethylenebis(5-sulfosalicylideneiminato)]nickelate(II) disodium salt H ₂ O	1.6 × 10 ⁹			CR/A'c-32	A' = AES; used $k_{A'} = 4.7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_{A'}/k_{A'} = 34$; ¹ O ₂ * from H ₂ O ₂ /OCl ⁻ .	85A177
12.144	Ferrocene C ₆ H ₆ CCl ₄ /CHCl ₃ (90:10)	9 × 10 ⁶ 3.0 × 10 ⁶		98	PLJA'd-8 CP/A'c-23	S = An; A' = DPBF. S = A' = Rub; used $k_d = 1.4 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k_{A'}/(k_{A'}[A'] + k_d) = 1.7 \times 10^3$ L mol ⁻¹ at [A'] = 5 × 10 ⁻⁶ mol L ⁻¹ .	737438 74F645
12.145	Hexaamminecobalt(III) ion D ₂ O	1.2 × 10 ⁶			PL/Ld-2	S = RB.	84N150

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
12.146	Hydroxybis(dimethylglyoximato)pyridinecobalt(II) CH ₂ Cl ₂ / MeOH (90:10)	4.5 × 10 ⁷			PL/A'd-5	S = MB; A' = DPBF.	87F655
12.147	Hydroxybis(dimethylglyoximato)triethylaminocobalt(II) CH ₂ Cl ₂ / MeOH (90:10)	1.5 × 10 ⁸			PL/A'd-5	S = MB; A' = DPBF.	87F655
12.148	Hydroxybis(dimethylglyoximato)triphenylphosphinecobalt(II) CH ₂ Cl ₂ / MeOH (90:10)	<5 × 10 ⁶			PL/A'd-5	S = MB; A' = DPBF.	87F655
12.149	Hydroxybis(diphenylglyoximato)pyridinecobalt(II) CH ₂ Cl ₂ / MeOH (90:10)	2 × 10 ⁷			PL/A'd-5	S = MB; A' = DPBF.	87F655
12.150	Hydroxybis(diphenylglyoximato)triphenylphosphinecobalt(II) CH ₂ Cl ₂ / MeOH (90:10)	<5 × 10 ⁶			PL/A'd-5	S = MB; A' = DPBF.	87F655
12.151	Manganese(II) chloride hexahydrate BuOCH ₂ CH ₂ OH	<1.0 × 10 ⁶		273	MD/A'c-33	A' = Rub; used $k_d = 3.8 \times 10^5$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	727319
12.152	Manganese(II) chloride tetrahydrate <i>i</i> -octane	≤1.0 × 10 ⁶		298	CP/A'c-23	S = A' = Rub; used $k_d = 4.7 \times 10^4$ s ⁻¹ , $k_{A'} = 7.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	747341
12.153	[4-Methyl-1,2-benzenedithiolato](2,2'-bipyridine)nickel(II) [Ni(bpy)(DMT)] DMF	7 × 10 ⁹			MP/P'a-19	S = HP; A' = TEMP-4-OH; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; P' = TEMPOL; esr detection.	89F311
12.154	[4-Methyl-1,2-benzenedithiolato](1,10-phenanthroline)nickel(II) DMF	1.1 × 10 ¹⁰			MP/P'a-19	S = HP; A' = TEMP-4-OH; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; P' = TEMPOL; esr detection.	89F311
12.155	[4-Methyl-1,2-benzenedithiolato](1,10-phenanthroline)platinum(II) [Pt(phen)(DMT)] DMF	4.7 × 10 ⁹			CP/Ac-19	S = A; Q = Bis(diethylthiocarbamato)nickel(II); used $k_d = 1.4 \times 10^5$ s ⁻¹ .	91F098
12.156	2,2'-Methylenebis[O,O'-di(4- <i>tert</i> -butylphenyl)dithiophosphate]cobalt(II) C ₆ H ₆	1.8 × 10 ⁸			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A434
12.157	2,2'-Methylenebis[O,O'-di(4- <i>tert</i> -butylphenyl)dithiophosphate]lead(II) C ₆ H ₆	4.3 × 10 ⁷			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A434
12.158	2,2'-Methylenebis[O,O'-di(4- <i>tert</i> -butylphenyl)dithiophosphate]nickel(II) C ₆ H ₆	2.7 × 10 ⁸			CP/A'c-23	S = A' = Rub; used $k_d = 2.8 \times 10^4$ s ⁻¹ , $k_{A'} = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A434
12.159	Methylthiolato(triethylphosphino)gold(I) C ₆ H ₆ ClCF ₂ CCl ₂ F	3.7 × 10 ⁷ 4.5 × 10 ⁷		303 303	CP/P'a-19 CR/P'a-32	S = A' = Rub; k_d not given. A' = Rub; ¹ O ₂ * from DMNO ₂ ; k_d and $k_{A'}$ not given.	87A107 87A107
12.160	2,2'-[1,8-Naphthylenebis(nitrilomethylidyne)]bis[phenolato]nickel(II) C ₆ H ₅ CH ₃	1.2 × 10 ¹⁰			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
11.161	Nickel(II) acetate CH ₃ COCH ₃ /H ₂ O (95:5)	2×10^7			PL/Ld-2	S = PdMP.	82A412
11.162	Nickel(II) dichloride C ₅ H ₅ N	1.6×10^7			PL/Ld-2	S = PdMP.	82A412
	CH ₃ COCH ₃ /H ₂ O (95:5)	3×10^7			PL/Ld-2	S = PdMP.	82A412
11.163	Nickel(II) dichloride hexahydrate BuOCH ₂ CH ₂ OH	3.1×10^8		273	MD/A'c-33	A' = Rub; used $k_d = 3.8 \times 10^5$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	727319
	C ₆ H ₆ /EtOH (50:50)	9.2×10^7 8.9×10^7 (k_d)		298	CP/Ac,A'c-23	S = A' = Rub; used $k_d = 5.6 \times 10^4$ s ⁻¹ , $k_{A'} = 3.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	90F360
11.164	Nickel(II) ion D ₂ O pD = 10.6	3.3×10^7		295	PL/A'd-5	S = 2-ACN; A' = BR ²⁻ .	82N021
11.165	Nickelocene <i>tert</i> -BuOH	2.8×10^9		295	PL/A'd-5	S = DMTBP; A' = DPBF.	87E181
	<i>c</i> -C ₆ H ₁₂	4.5×10^9		295	PL/A'd-5	S = DMTBP; A' = DPBF.	87E181
	C ₆ H ₆	5.4×10^9		295	PL/A'd-5	S = DMTBP; A' = DPBF.	87E181
	CCl ₄	2.7×10^9		295	PL/A'd-5	S = DMTBP; A' = DPBF.	87E181
	CH ₃ CN	6.4×10^9		295	PL/A'd-5	S = DMTBP; A' = DPBF.	87E181
	CH ₃ COCH ₃	4.8×10^9		295	PL/A'd-5	S = DMTBP; A' = DPBF.	87E181
	CHCl ₃	4.4×10^9		295	PL/A'd-5	S = DMTBP; A' = DPBF.	87E181
	MeOH	6.8×10^9		295	PL/A'd-5	S = DMTBP; A' = DPBF.	87E181
	2-PrOH	2.9×10^9		295	PL/A'd-5	S = DMTBP; A' = DPBF.	87E181
11.166	2,2'-[1,2-Phenylenebis(nitrilomethylidyne)]bis[phenolato]nickel(II) C ₆ H ₅ CH ₃	3.7×10^9			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
11.167	[<i>N,N'</i> - <i>o</i> -Phenylenebis(5-sulfosalicylideneiminato)]nickelate(II) disodium salt H ₂ O	$\sim 10^8$			CR/A'c-32	A' = AES; used $k_{A'} = 4.7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 10$; ¹ O ₂ * from H ₂ O ₂ /OCl ⁻ ; k is concn. dependent.	85A177
11.168	Propylamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) C ₆ H ₅ CH ₃	3.0×10^8			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
11.169	[<i>N,N'</i> -Propylenebis(5-sulfosalicylideneiminato)]nickelate(II) disodium salt H ₂ O	1.3×10^9			CR/A'c-32	A' = AES; used $k_{A'} = 4.7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_A/k_{A'} = 28$; ¹ O ₂ * from H ₂ O ₂ /OCl ⁻ .	85A177
11.170	Tetra- <i>O</i> -acetylglucose-1-thiolato(triethylphosphino)gold(I) (Auranofin) C ₆ H ₆	2×10^6		303	CP/P'a-19	S = A' = Rub; k_d not given.	87A107
	ClCF ₂ CCl ₂ F	7.5×10^6		303	CR/P'a-32	A' = Rub; ¹ O ₂ * from DMNO ₂ ; $k_{A'}$ and k_d not given.	87A107
11.171	Triethanolamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) C ₆ H ₅ CH ₃	1.1×10^8			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063

TABLE 12. Rate constants for the interaction of singlet oxygen with metal complexes. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
12.172	Tris(acetylacetonato)chromate(III)						
	CCl ₄ /CHCl ₃ (90:10)	5.0×10^5			CP/A'c-23	S = A' = Rub; used $k_d = 1.4 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k_A/(k_{A'}[A'] + k_d) = 3.0 \times 10^2$ L mol ⁻¹ at $[A'] = 5 \times 10^{-6}$ mol L ⁻¹ .	74F645
12.173	Tris(acetylacetonato)cobalt(III)						
	CCl ₄ /CHCl ₃ (90:10)	9.2×10^8			CP/A'c-23	S = A' = Rub; used $k_d = 1.4 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k_A/(k_{A'}[A'] + k_d) = 5.2 \times 10^5$ L mol ⁻¹ at $[A'] = 5 \times 10^{-6}$ mol L ⁻¹ .	74F645
	CH ₂ Cl ₂ /MeOH (90:10)	6.5×10^8			PL/A'd-5	S = MB; A' = DPBF.	87F655
12.174	Tris(acetylacetonato)iron(III)						
	CCl ₄ /CHCl ₃ (90:10)	8.7×10^7			CP/A'c-23	S = A' = Rub; used $k_d = 1.4 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Measured $k_A/(k_{A'}[A'] + k_d) = 4.9 \times 10^4$ L mol ⁻¹ at $[A'] = 5 \times 10^{-6}$ mol L ⁻¹ .	74F645
12.175	Tris(acetylacetonato)manganese(III)						
	C ₆ H ₅ CH ₃	5×10^8			CP/A'c-25	S = A' = Rub; used $k_d = 1 \times 10^5$ s ⁻¹ , $k_{A'} = 1.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	752063
	CH ₃ COCH ₃ /H ₂ O (95:5)	1.6×10^8			PL/Ld-2	S = PdMP.	82A412
12.176	Tris(2,2'-bipyridine)cobalt(II) ion						
	CH ₃ COCH ₃ /H ₂ O (95:5)	$< 1 \times 10^6$			PL/Ld-2	S = PdMP.	82A412
12.177	Tris(2,2'-bipyridine)ruthenium(II) dichloride						
	CCl ₄ /MeOH (98:2)	$\leq 1.0 \times 10^9$			FP/A'd-5	S = MB; A' = DPBF; no effect for $[A] = 1 \times 10^{-6}$ mol L ⁻¹ .	78E238
12.178	Tris(1,10-phenanthroline)cobalt(II) ion						
	CH ₃ COCH ₃ /H ₂ O (95:5)	$< 1 \times 10^6$			PL/Ld-2	S = PdMP.	82A412

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds.

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.1	Azepine-1-carbodithioate ion, hexahydro- (Hexamethylenedithiocarbamate)						
	EtOH	1.5×10^8			CP/Oc-23	S = RB; A' = Car; used $k_d = 1.0 \times 10^4$ s ⁻¹ , $k_{A'} = 5.0 \times 10^9$ L mol ⁻¹ s ⁻¹ ; Measured $k_{A'}/(k_d + k_A [A]) = 7 \times 10^4$ L mol ⁻¹ at $[A] = 3.35 \times 10^{-4}$ mol L ⁻¹ .	727116
13.2	Benzamide, 2-(methylseleno)-<i>N</i>-phenyl-						
	CD ₃ OD	9.2×10^6			PL/Ld-2	S = H ₂ TPPS ⁺ .	91R262
13.3	Benzamide, 2-(methylthio)-<i>N</i>-phenyl-						
	CD ₃ OD	7.8×10^5			PL/Ld-2	S = H ₂ TPPS ⁺ .	91R262
13.4	Benzamide, <i>N</i>-phenyl-2-(phenylmethyl)seleno-						
	CD ₃ OD	5.2×10^6			PL/Ld-2	S = H ₂ TPPS ⁺ .	91R262
13.5	Benzamide, <i>N</i>-phenyl-2-(phenylmethyl)thio-						
	CD ₃ OD	3.4×10^5			PL/Ld-2	S = H ₂ TPPS ⁺ .	91R262
13.6	Benzenamine, <i>N,N</i>-dimethyl-4-(methylthio)-						
	C ₆ H ₆	3.0×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 5.4 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	85M098
	MeOH/ H ₂ O (50:50)	3.6×10^8		308	CR/A'c-16	A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	85M098
13.7	Benzene, 1-bromo-4-(methylthio)-						
	CHCl ₃	1.1×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
13.8	Benzene, (butylthio)-						
	CH ₃ COCH ₃	1.6×10^6			PL/Ld-2	S = RB.	91F286 92F225
	CH ₃ COCH ₃	1.1×10^4 (k_t)			CP/Ac,A'c-17	S = RB; A' = Limonene; used $k_t^{A'} = 1.7 \times 10^5$ L mol ⁻¹ s ⁻¹ .	92F225
13.9	Benzene, 1-(butylthio)-3-chloro-						
	CH ₃ COCH ₃	5.3×10^5			PL/Ld-2	S = RB.	91F286 92F225
13.10	Benzene, 1-(butylthio)-4-chloro-						
	CH ₃ COCH ₃	7.7×10^5			PL/Ld-2	S = RB.	91F286 92F225
13.11	Benzene, 1-(butylthio)-4-fluoro-						
	CH ₃ COCH ₃	1.3×10^6			PL/Ld-2	S = RB.	91F286 92F225
13.12	Benzene, 1-(butylthio)-4-methoxy-						
	CH ₃ COCH ₃	4.3×10^6			PL/Ld-2	S = RB.	91F286 92F225
13.13	Benzene, 1-(butylthio)-4-methyl-						
	CH ₃ COCH ₃	2.8×10^6			PL/Ld-2	S = RB.	91F286 92F225
13.14	Benzene, 1-chloro-3-(methylthio)-						
	CHCl ₃	5.5×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
13.15	Benzene, 1-chloro-4-(methylthio)-						
	CHCl ₃	1.0×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.15	Benzene, 1-chloro-4-(methylthio)- — Continued						
	MeOH	8.3×10^5			CP/A'c-16	S = RB; A' = DPF; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	79A086
13.16	Benzene, 1-chloro-4-(phenylthio)-						
	MeOH				CP/Ac,Pa-17	S = RB; A' = (C ₆ H ₅) ₂ S; meas. $k_f/k_r^{A'} = 0.93$.	80F104
13.17	Benzene, [(2,3-dimethyl-2-butenyl)thio]-						
	CH ₃ COCH ₃	2.3×10^6			PL/Ad-5	S = RB.	89F298
13.18	Benzene, [(2,3-dimethyl-2-butenyl)thio]-4-methoxy-						
	CH ₃ COCH ₃	7.6×10^6			PL/Ad-5	S = RB.	89F298
13.19	Benzene, [(2,3-dimethyl-2-butenyl)thio]-4-methyl-						
	CH ₃ COCH ₃	3.1×10^6			PL/Ad-5	S = RB.	89F298
13.20	Benzene, 1-(1,1-dimethylethyl)-4-(methylthio)-						
	CHCl ₃	4.7×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
13.21	Benzene, 1-fluoro-4-(methylthio)-						
	CHCl ₃	1.9×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
13.22	Benzene, 1-methoxy-4-(methylthio)-						
	C ₆ H ₆	2×10^6		308	CR/A'c-16	A' = DPBF; used $k_d = 5.4 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	85M098
	CHCl ₃	7.6×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
	MeOH	5.3×10^6			CP/A'c-16	S = RB; A' = DPF; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	79A086
	MeOH/ H ₂ O (50:50)	4.6×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	85M098
13.23	Benzene, 1-methoxy-4-(phenylthio)-						
	MeOH				CP/Ac,Pa-17	S = RB; A' = (C ₆ H ₅) ₂ S; meas. $k_f/k_r^{A'} = 2.5$.	80F104
13.24	Benzene, 1-methyl-3-(methylthio)-						
	CHCl ₃	3.1×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
13.25	Benzene, 1-methyl-4-(methylthio)-						
	C ₆ H ₆	1.5×10^6		308	CR/A'c-16	A' = DPBF; used $k_d = 5.4 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	85M098
	CHCl ₃	4.6×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
	MeOH	3.1×10^6			CP/A'c-16	S = RB; A' = DPF; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	79A086
	MeOH/ H ₂ O (50:50)	3.2×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	85M098
13.26	Benzene, 1-methyl-4-(phenylthio)-						
	MeOH				CP/Ac,Pa-17	S = RB; A' = (C ₆ H ₅) ₂ S; meas. $k_f/k_r^{A'} = 1.9$.	80F104
13.27	Benzene, methylseleno-						
	CCl ₄	1.4×10^8		296	CR/LI-12	used $k_d = 1.7 \times 10^3$ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	90F069
13.28	Benzene, methyltelluro-						
	CCl ₄	3.8×10^9		296	CR/LI-12	used $k_d = 1.7 \times 10^3$ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	90F069

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.29	Benzene, (methylthio)-						
	C ₆ H ₆	8×10^5		308	CR/A'c-16	A' = DPBF; used $k_d = 5.4 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	85M098
	CCl ₄	7.1×10^6		296	CR/LI-12	used $k_d = 1.7 \times 10^3$ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	90F069
	CHCl ₃	2.3×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
	MeOH	2.0×10^6			CP/A'c-16	S = RB; A' = DPF; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	79A086
	MeOH/H ₂ O (50:50)	2.3×10^7		308	CR/A'c-16	A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	85M098
13.30	Benzene, [(methylthio)methyl]-						
	CHCl ₃	1.2×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
13.31	Benzene, 1-nitro-4-(phenylthio)-						
	MeOH				CP/Ac, Pa-17	S = RB; A' = (C ₆ H ₅) ₂ S; meas. $k_f/k_t^{A'} = 0.30$.	80F104
13.32	Benzene, [(phenylmethyl)seleno]-						
	CHCl ₃	6×10^6		253	CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82N064
13.33	Benzene, [(phenylmethyl)thio]-						
	CHCl ₃	8.5×10^5		253	CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82N064
13.34	Benzene, 1,1'-thiobis-						
	CHCl ₃	8.0×10^4			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
	MeOH	$\sim 1.0 \times 10^5$			CP/A'c-16	S = RB; A' = DPF; used $k_d = 1.1 \times 10^5$ s ⁻¹ ; Theoretical intercept of 1.0 used in calculation.	79A086
13.35	Benzenemethanesulfenamide, <i>N,N</i> -diethyl-						
	C ₆ H ₆	2.0×10^6			PL/Ld-2	S = TPP.	94F024
13.36	1,2-Benziselenazol-3-one, 7-chloro-2-phenyl-						
	CD ₃ OD	3.0×10^5			PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	91R262
13.37	1,2-Benziselenazol-3-one, 7-fluoro-2-phenyl-						
	CD ₃ OD	4.5×10^5			PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	91R262
13.38	1,2-Benziselenazol-3-one, 7-methoxy-2-phenyl-						
	CD ₃ OD	1.3×10^6			PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	91R262
13.39	1,2-Benziselenazol-3-one, 7-nitro-2-phenyl-						
	CD ₃ OD	1.1×10^5			PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	91R262
13.40	1,2-Benziselenazol-3-one, 2-phenyl						
	CD ₃ OD	2.5×10^6			PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	91R262
13.41	1,2-Benzisothiazol-3-one, 2-phenyl-						
	CD ₃ OD	2.3×10^5			PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	91R262
13.42	Benzyl mercaptan						
	MeOH	1.2×10^5	0.73		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F519
13.43	Bicyclo[2.2.1]heptane-2-thione						
	CHCl ₃	1.8×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A059 83F028

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.44	Bicyclo[2.2.1]heptane-2-thione, 3,3-dimethyl-						
	CHCl ₃	1 × 10 ⁵			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A093 83F028
13.45	Bicyclo[2.2.1]heptane-2-thione, 1,3,3,7,7-pentamethyl-						
	CHCl ₃	5.8 × 10 ⁴			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A059 83F028
13.46	Bicyclo[2.2.1]heptane-2-thione, 1,3,3-trimethyl- (Thiofenchone)						
	CHCl ₃	5.1 × 10 ⁵			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A093 83F028
13.47	Bicyclo[2.2.1]heptane-2-thione, 1,7,7-trimethyl- (Thiocamphor)						
	CHCl ₃	8.1 × 10 ⁴			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A093 83F028
13.48	Bicyclo[3.1.1]hept-3-ene-2-thione, 4,6,6-trimethyl-						
	CHCl ₃	5.6 × 10 ⁵			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	85F151
13.49	2,3-Butanediol, 1,4-dimercapto-, <i>erythro</i> - (Dithioerythritol)						
	CHCl ₃ / EtOH (50:50)	7.4 × 10 ⁸ 2.9 × 10 ⁶ (k_t)		310	CR/LI,Ac- 12,14	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90E622
13.50	2,3-Butanediol, 1,4-dimercapto-, <i>threo</i> - (Dithiothreitol)						
	CHCl ₃ / EtOH (50:50)	9.8 × 10 ⁸ 2.8 × 10 ⁶ (k_t)		310	CR/LI,Ac- 12,14	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90E622
	D ₂ O pD = 7.4	1.5 × 10 ⁶ (k_t)		310	CR/Ac-17	A' = CysSH; used $k_r^{A'} = 8.3 \times 10^6$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	91R055
	D ₂ O pD = 7.4	1.9 × 10 ⁶		310	CR/LI-12	used $k_d = 1.9 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	91R055
13.51	1-Butanethiol						
	MeOH	5.3 × 10 ⁴	1.7		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F519
13.52	1-Butanol, 4-(4-methylphenyl)thio-						
	CH ₃ COCH ₃	4.1 × 10 ⁴ (k_t)			CP/Ac-17	S = RB; A' = Limonene; used $k_r^{A'} = 1.7 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_q/k_t = 64.9$.	91F286 92F225
	CH ₃ COCH ₃	2.7 × 10 ⁶			PL/Ld-2	S = RB.	91F286 92F225
13.53	2-Butene, [(2-methyl-3-(phenylsulfinyl))-						
	C ₆ H ₆		11 (β_p)		CP/Ac-17	S = TPP; A' = Linalool; used $\beta_r^{A'} = 0.18$ mol L ⁻¹ .	89F400
13.54	2-Butene, 2-(phenylsulfinyl)- (E)						
	C ₆ H ₆		26 (β_p)		CP/Ac-17	S = TPP; A' = Linalool; used $\beta_r^{A'} = 0.18$ mol L ⁻¹ .	89F400
13.55	2-Butene, 2-(phenylsulfinyl)- (Z)						
	C ₆ H ₆		>1 × 10 ² (β_p)		CP/Ac-17	S = TPP; A' = Linalool; used $\beta_r^{A'} = 0.18$ mol L ⁻¹ .	89F400
13.56	<i>tert</i> -Butyl ethyl sulfide						
	CHCl ₃	6.4 × 10 ⁶			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
13.57	Butyl methyl sulfide						
	CHCl ₃	2.9 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.58	<i>tert</i> -Butyl propyl sulfide						
	CHCl ₃	7.2×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
13.59	<i>sec</i> -Butyl propyl sulfide						
	CHCl ₃	1.1×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
13.60	1,3-Cyclobutanedithione, 2,2,4,4-tetramethyl-						
	CHCl ₃	2.2×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A093
13.61	Cyclobutanethione, 2,2,4,4-tetramethyl-						
	CHCl ₃	3.1×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A093
13.62	Cyclobutanone, 2,2,4,4-tetramethyl-3-thioxo-						
	CHCl ₃	8.5×10^4			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A093
13.63	Cyclohexanamine, <i>N,N'</i> -[dithiobis[(5-ethyl-2,3-thiophenediyl)methylidene]]bis-						
	C ₆ H ₅ CH ₃	2.9×10^8			PL/Ld-2	S = TPP.	88A507
	C ₆ H ₅ CH ₃	3.2×10^8 (k_r)			CP/Ac,A'c-17	S = PP; A' = DPBF; used $k_r^{A'} = 6.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	88A507
	CH ₃ CN	1.1×10^8 (k_r)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.1 \times 10^9$ L mol ⁻¹ s ⁻¹ .	88A507
	CH ₃ CN	3.7×10^8			PL/Ld-2	S = TPP.	88A507
	CHCl ₃	5.6×10^7			PL/Ld-2	S = TPP.	88A507
13.64	Cyclohexanamine, <i>N</i> -[[5-methyl-2-(methylthio)-3-thienyl]methylene]-						
	C ₆ H ₅ CH ₃	2.5×10^5			PL/Ld-2	S = TPP.	88A507
	CH ₃ CN	2.0×10^5 (k_r)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_r^{A'} = 1.1 \times 10^9$ L mol ⁻¹ s ⁻¹ .	88A507
	CH ₃ CN	2.2×10^6			PL/Ld-2	S = TPP.	88A507
	CHCl ₃	6.0×10^5			PL/Ld-2	S = TPP.	88A507
	2-PROH	3.4×10^5			PL/Ld-2	S = TPP.	88A507
13.65	2-Cyclohexene-1-thione, 3,5,5-trimethyl-						
	CHCl ₃	6.1×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	85F151
13.66	2-Cyclopentene-1-thione, 3-(4-methoxyphenyl)-						
	CHCl ₃	2.3×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	85F151
13.67	Cysteine						
	CHCl ₃ /EtOH (50:50)	2.4×10^8 7×10^7 (k_r)			310 CR/LI,Ac-12,14	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90E622
	D ₂ O pD = 7.4	8.3×10^6			310 CR/LI-12	used $k_d = 1.9 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	91R055
	D ₂ O	$\leq 4 \times 10^4$			PL/Ld-2	S = H ₂ TPPS ⁴⁻ or H ₂ TMppP ⁴⁺ ; calcd. from $k_{\text{obs}} = 8.9 \times 10^6$ at pH 7 and $pK_a(\text{D}_2\text{O}) = 8.6$.	88A164
	D ₂ O	1×10^5			PL/Ld-2	S = RF, water-sol. TPP derivs., or Chl a in micelles contg. Triton X-100.	86F149
	D ₂ O/EtOH (75:25)	5×10^7			295 PL/Ld-2	S = RB.	94A113
	EtOH	8×10^6			CP/Pa-15	S = Ret; used $k_d = 3.5 \times 10^5$ s ⁻¹ ; CysS* obs. by esr.	85A443

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.68	Cysteine, negative ion						
	D ₂ O	1.5×10^8			PL/Ld-2	S = H ₂ TPPS ⁴⁻ or H ₂ TMpyP ⁴⁺ ; calcd. from $k_{\text{obs}} = 8.9 \times 10^6$ at pH 7 and $pK_a = 8.6$.	88A164
13.69	L-Cysteine, N-acetyl-						
	D ₂ O pD = 7.4	6×10^5 (k_r)		310	CR/Ac-17	A' = CysSH; used $k_r A' = 8.3 \times 10^6$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	91R055
	D ₂ O pD = 7.4	6×10^5		310	CR/LI-12	used $k_d = 1.9 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	91R055
	D ₂ O	$\leq 4 \times 10^4$			PL/Ld-2	S = H ₂ TPPS ⁴⁻ or H ₂ TMpyP ⁴⁺ ; calcd. from $k_{\text{obs}} = 2.5 \times 10^6$ at pH 7 and $pK_a(\text{D}_2\text{O}) = 10.0$.	88A164
13.70	L-Cysteine, N-acetyl-, negative ion						
	D ₂ O	2.1×10^8			PL/Ld-2	S = H ₂ TPPS ⁴⁻ or H ₂ TMpyP ⁴⁺ ; calcd. from $k_{\text{obs}} = 2.5 \times 10^6$ at pH 7 and $pK_a = 8.6$.	88A164
13.71	Dibenzyl sulfide						
	CHCl ₃	6.4×10^6		253	CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_A' = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82N064
	MeOH		5.5×10^{-3}	293	CP/Oc-15	S = FICl ₄ ²⁻ ; $E_a = 1.7$ kJ mol ⁻¹ .	68F288
	MeOH		9.0×10^{-3}	293	CP/Oc-15	S = MB; $E_a = 7.1$ kJ mol ⁻¹ .	68F288
	MeOH		0.012	293	CP/Oc-15	S = RB; $E_a = 3.8$ kJ mol ⁻¹ .	68F288
	MeOH		6.7×10^{-3}	293	CP/Oc-15	S = FIBr ₄ Cl ₄ ²⁻ ; $E_a = 5.4$ kJ mol ⁻¹ .	68F288
	MeOH		8.0×10^{-3}	293	CP/Oc-15	S = DNT; $E_a = 6.7$ kJ mol ⁻¹ .	68F288
13.72	Dibutyl sulfide						
	CHCl ₃	2.3×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_A' = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
	EtOH			298	?	S = Chrysene, 2-bromochrysene, MB; meas. $k_d/k_r = \sim 0.7$.	74F648
	MeOH	2.5×10^7	7.2×10^{-3}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	85F480
	MeOH	8.2×10^6	0.011		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F519
13.73	Di-sec-butyl sulfide						
	CHCl ₃	1.8×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_A' = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
13.74	Di-tert-butyl sulfide						
	CHCl ₃	1×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_A' = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
	MeOH	$\sim 1.5 \times 10^5$			CP/A'c-16	S = RB; A' = DPF; used $k_d = 1.1 \times 10^5$ s ⁻¹ ; Theoretical intercept of 1.0 used in calculation.	79A086
13.75	Diethyl disulfide						
	MeOH	1.6×10^7	5.5×10^{-3}		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F519
13.76	Diethyl sulfide						
	(C ₂ H ₅) ₂ O	5×10^6	6.0×10^{-3} 4.1×10^{-3}	296 195	CP/A'c-16	S = ZnTPP; A' = DPF; used $k_d = 3 \times 10^4$ s ⁻¹ .	82F357
	C ₆ H ₅ CH ₃	1.4×10^7	2.9×10^{-3}	296	CP/A'c-16	S = ZnTPP; A' = DPF; used $k_d = 4.0 \times 10^4$ s ⁻¹ .	82F357
	C ₆ H ₆	2.0×10^7			CP/A'c-16	S = ZnTPP; A' = DPF; used $k_d = 4 \times 10^4$ s ⁻¹ .	79A086
	C ₆ H ₆	7.6×10^6			CP/Pa-20	S = ZnTPP; A' = Car; used $k_d = 4.0 \times 10^4$ s ⁻¹ , $k_A' = 1.3 \times 10^{10}$ L mol ⁻¹ s ⁻¹ ; Measured $k_A/(k_{d1} + k[A]) = 1.7 \times 10^4$ L mol ⁻¹ at $[A] = 0.1$ mol L ⁻¹ ; k calcd. in [81Z251].	71F580
	C ₆ H ₆				CP/Ac-20	S = ZnTPP; A' = DPA; meas. $k_A/k_A' = 6.0$.	71F580

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.76	Diethyl sulfide — Continued						
	C ₆ H ₆		0.032		CP/Pa-15	S = ZnTPP.	71F580
	C ₆ H ₆ / MeOH (80:20)	6×10^6 3×10^5 (k_r)		298	CP/Pa-20	S = MB; A' = 2M2P; used $k_d = 1.0 \times 10^5$ s ⁻¹ , $\beta_{A'}$ = 0.04 mol L ⁻¹ ; P = Diethyl sulfoxide.	70F734
	CH ₃ CN	2.1×10^7			PL/Ld-2	S = Ac.	89A099
	CH ₃ COCH ₃	2.7×10^7	8.9×10^{-4} 9.7×10^{-4}	296 195	CP/A'c-16	S = RB; A' = DPF; used $k_d = 2.4 \times 10^4$ s ⁻¹ .	82F357
	CICF ₂ CCl ₂ F	3.2×10^6			PL/Ld-2	S = DNT.	87A072
	H ₂ O pH = 7.0	2×10^7 (k_r)		292	MP/Ac,A'c-17	S = RB; A' = FFA; used $k_r A' = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	87A180
	MeOH	2.1×10^7	8.7×10^{-3}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	85F480
	MeOH	1.7×10^7	6.6×10^{-3} 0.011	296 195	CP/A'c-16	S = RB; A' = DPF; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	82F357
	MeOH	1.7×10^7			CP/A'c-16	S = MB; A' = DPF; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	79A086
	MeOH		0.02		CP/Pa-15	S = ZnTPP.	71F580
13.77	Diisobutyl sulfide						
	MeOH	2.9×10^7	6.1×10^{-3}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	85F480
13.78	Diisopropyl sulfide						
	CHCl ₃	2.2×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
	MeOH	2.5×10^6			CP/A'c-16	S = RB; A' = DPF; used $k_d = 1.1 \times 10^5$ s ⁻¹ .	79A086
13.79	Dimethyldithiocarbamate ion						
	H ₂ O pH = 7.1	-8×10^7		298	CP/Oc-19	S = Phenosafranine; Q = NaN ₃ ; used $k_Q = 2.0 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A360
13.80	Dimethyl sulfide						
	C ₆ H ₆ / MeOH (50:50)			293	MP/Pa-17	S = TPP; rate is 19 times faster than in benzene.	81F311
	MeOH	5.8×10^7	3.1×10^{-3}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	85F480
13.81	Dimethyl sulfoxide						
	C ₆ H ₆ / MeOH (50:50)			293	MP/Pa-17	S = TPP; A' = CH ₃ SCH ₃ ; meas. $k_r/k_r A' = 4.2 \times 10^{-3}$.	81F311
	C ₆ H ₆			293	MP/Pa-17	S = TPP; A' = CH ₃ SCH ₃ ; meas. $k_r/k_r A' = 0.021$.	81F311
13.82	Dipropyl sulfide						
	MeOH	3.1×10^7	5.8×10^{-3}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ .	85F480
13.83	Diselenide, diphenyl-						
	CCl ₄	1.2×10^6		296	CR/LI-12	used $k_d = 1.7 \times 10^3$ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	90F069
13.84	Disulfide, diphenyl-						
	CCl ₄	3.0×10^5		296	CR/LI-12	used $k_d = 1.7 \times 10^3$ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	90F069
13.85	Ditelluride, diphenyl-						
	CCl ₄	1.1×10^8		296	CR/LI-12	used $k_d = 1.7 \times 10^3$ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	90F069
13.86	1,5-Dithiacyclooctane						
	C ₆ H ₅ CH ₃	1.7×10^7		298	PL/Ld-2	S = TPP.	92F104
	CH ₃ COCH ₃	3.7×10^7 (k_r)		298	CP/Pa-17	S = RB; A' = TME; used $k_r A' = 2.7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	92F104
	CH ₃ COCH ₃	5.3×10^7		298	PL/Ld-2	S = RB.	92F104

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.86 1,5-Dithiacyclooctane — Continued							
	CHCl ₃	8.2×10^6 (k_r)			CP/Pa-17	S = TPP; A' = TME; used $k_r A' = 2.7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	92F103
	CHCl ₃	1.2×10^7			PL/Ld-2	S = TPP.	92F103
	2-PrOH	2.4×10^7		298	PL/Ld-2	S = RB.	92F104
13.87 1,5-Dithiacyclooctane 1-oxide							
	CH ₃ COCH ₃	2.4×10^5 (k_r)		298	CP/Pa-17	S = RB; A' = DMHD; used $k_r A' = 7.4 \times 10^5$ L mol ⁻¹ s ⁻¹ .	92F104
	CH ₃ COCH ₃	3.3×10^6		298	PL/Ld-2	S = RB.	92F104
	CHCl ₃	8.7×10^4 (k_r)			CP/Pa-17	S = TPP; A' = 2M2P; used $k_r A' = 7.6 \times 10^5$ L mol ⁻¹ s ⁻¹ .	92F103
	CHCl ₃	2.1×10^5			PL/Ld-2	S = TPP.	92F103
13.88 1,4-Dithiane							
	C ₆ H ₅ CH ₃	2.0×10^6		298	PL/Ld-2	S = TPP.	92F104
	CH ₃ CN		-0.050		CP/Pa-15	S = RB; Slope estimated as tangent to curve.	71F580
	CH ₃ CN		0.017		CP/Pa-15	S = RB; Solvent contains 0.52% H ₂ O by molarity.	71F580
	CH ₃ CN		9.8×10^{-3}		CP/Pa-15	S = RB; Solvent contains 0.05% H ₂ O by molarity.	71F580
	CH ₃ CN/ H ₂ O (95:5)		6.7×10^{-3}		CP/Pa-15	S = RB.	71F580
	CH ₃ CN/ H ₂ O (61:39)		0.017		CP/Pa-15	S = RB.	71F580
	CH ₃ COCH ₃	4.8×10^6		298	PL/Ld-2	S = RB.	92F104
	CH ₃ COCH ₃	2.4×10^5 (k_r)		293	CP/Pa-17	S = RB; A' = DMHD; used $k_r A' = 7.4 \times 10^5$ L mol ⁻¹ s ⁻¹ ; $\Delta H^\ddagger = -26$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -226$ J K ⁻¹ mol ⁻¹ ; studied at 202-293 K; P = sulfoxide + sulfone.	91F170
	2-PrOH	2.1×10^6		298	PL/Ld-2	S = RB.	92F104
13.89 1,3-Dithiane-2-thione, 4,5-diphenyl-							
	C ₆ H ₆ / MeOH (83:17)		1.4×10^{-3}	293	CP/Oc-15	S = MB.	77F794
13.90 1,2-Dithiolane-3-pentanoic acid (Lipoic acid)							
	C ₆ H ₆	1.0×10^8	3.5×10^{-4}	298	CP/A'c-23	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	74F641
	CHCl ₃ / EtOH (50:50)	1.3×10^8		310	CR/LI-12	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90E622
13.91 Ethanesulfonate ion, 2,2'-dithiobis- (Dimesna)							
	CHCl ₃ / EtOH (50:50)	6×10^6		310	CR/LI-12	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90E622
13.92 Ethanesulfonate ion, 2-mercapto-, (Mesna)							
	CHCl ₃ / EtOH (50:50)	2.4×10^7 2.8×10^6 (k_r)		310	CR/LI,Ac- 12,14	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90E622
	D ₂ O pD = 7.4	2.7×10^6		310	CR/LI-12	used $k_d = 1.9 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	91R055
13.93 Ethanethiol, 2-amino- (Cysteamine)							
	CHCl ₃ / EtOH (50:50)	4.1×10^7 1.1×10^7 (k_r)		310	CR/LI,Ac- 12,14	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90E622
	H ₂ O	8.3×10^6			PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	91R020

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.94	Ethanethiol, 2-[(3-aminopropyl)amino]-						
	CHCl ₃ /EtOH (50:50)	5.3×10^7 7.0×10^6 (k_r)		310	CR/LI,Ac- 12,14	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90E622
	H ₂ O	7.4×10^6			PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	91R020
13.95	Ethanethiol, 2-hydroxy-,						
	D ₂ O	$\leq 4 \times 10^4$			PL/Ld-2	S = H ₂ TPPS ⁴⁻ or H ₂ TMpyP ⁴⁺ ; calcd. from $k_{\text{obs}} = 3.0 \times 10^5$ at pH 7 and $pK_a(\text{D}_2\text{O}) = 9.9$.	88A164
13.96	Ethanethiol, 2-hydroxy-, negative ion						
	D ₂ O	3.0×10^8			PL/Ld-2	S = H ₂ TPPS ⁴⁻ or H ₂ TMpyP ⁴⁺ ; calcd. from $k_{\text{obs}} = 3.0 \times 10^5$ at pH 7.	88A164
13.97	Ethanol, 2-(4-methylphenyl)thio-						
	CH ₃ COCH ₃	4.2×10^4 (k_r)			CP/Ac-17	S = RB; A' = Limonene; used $k_r^{A'} = 1.7 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_q/k_r = 34.8$.	91F286 92F225
	CH ₃ COCH ₃	1.5×10^6			PL/Ld-2	S = RB.	91F286 92F225
13.98	Fluorene, 9-(phenylsulfonyl)-, anion						
	<i>tert</i> -BuOH		4.6×10^{-4}	303	CP/Pa-15	S = RB; P = 9-Fluorenone.	707250
	<i>tert</i> -BuOH		3.8×10^{-4}	303	CP/Pa-15	S = A; P = 9-Fluorenone.	707250
13.99	Glutathione						
	CHCl ₃ /EtOH (50:50)	5.9×10^7 1.7×10^6 (k_r)		310	CR/LI,Ac- 12,14	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90E622
	D ₂ O pD = 7.4	2.4×10^6		310	CR/LI-12	used $k_d = 1.9 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	91R055
	D ₂ O	8.7×10^5			PL/Ld-2	S = MB ⁺ .	91R251
	D ₂ O	$\leq 4 \times 10^4$			PL/Ld-2	S = H ₂ TPPS ⁴⁻ or H ₂ TMpyP ⁴⁺ ; calcd. from $k_{\text{obs}} = 2.9 \times 10^6$ at pH 7 and $pK_a(\text{D}_2\text{O}) = 9.2$.	88A164
13.100	Glutathione, negative ion						
	D ₂ O	1.9×10^8			PL/Ld-2	S = H ₂ TPPS ⁴⁻ or H ₂ TMpyP ⁴⁺ ; calcd. from $k_{\text{obs}} = 2.9 \times 10^6$ at pH 7 and pK_a .	88A164
13.101	Glycine, N-(2-mercapto-1-oxopropyl)-						
	D ₂ O pD = 7.4	4.1×10^6		310	CR/LI-12	used $k_d = 1.9 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	91R055
	D ₂ O	$\leq 4 \times 10^4$			PL/Ld-2	S = H ₂ TPPS ⁴⁻ or H ₂ TMpyP ⁴⁺ ; calcd. from $k_{\text{obs}} = 2.7 \times 10^6$ at pH 7 and $pK_a(\text{D}_2\text{O}) = 10.4$.	88A164
13.102	Glycine, N-(2-mercapto-1-oxopropyl)-, negative ion.						
	D ₂ O	1.8×10^8			PL/Ld-2	S = H ₂ TPPS ⁴⁻ or H ₂ TMpyP ⁴⁺ ; calcd. from $k_{\text{obs}} = 2.7 \times 10^6$ at pH 7 and pK_a .	88A164
13.103	1-Hexanol, 6-(4-methylphenyl)thio-						
	CH ₃ COCH ₃	6.1×10^3 (k_r)			CP/Ac-17	S = RB; A' = α -Pinene; used $k_r^{A'} = 4.3 \times 10^4$ L mol ⁻¹ s ⁻¹ ; meas. $k_q/k_r = 359$.	91F286 92F225
	CH ₃ COCH ₃	2.2×10^6			PL/Ld-2	S = RB.	91F286 92F225
13.104	Imidazole-4-ethanaminium, α-carboxy-2,3-dihydro-N,N,N-trimethyl-2-thioxo-, S, (Ergothioneine)						
	D ₂ O pD = 7	2×10^7			PL/Ld-2	S = Carboxyanthracene.	92E225
	D ₂ O pD = 7.4	3.1×10^7		310	CR/LI-12	used $k_d = 1.9 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	91R055

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.104 Imidazole-4-ethanaminium, α-carboxy-2,3-dihydro-<i>N,N,N</i>-trimethyl-2-thioxo-, <i>S</i>, (Ergothioneine) — Continued							
	D ₂ O pH = 7	2.3 × 10 ⁷			PL/Ld-2	S = H ₂ TPPS ⁴⁻ or H ₂ TMpyP ⁴⁺ ; observed value; pK _a (D ₂ O) = 8.4.	88A164
	H ₂ O pH = 7.0			283	CP/A'c-17	S = RB; A' = BHMF; meas. $k_r/k_r^{A'}$ = 1.1; sensitizer immobilized on glass beads.	88R064
	H ₂ O pH = 7.0			283	CP/A'c-17	S = RB; A' = BHMF; meas. $k_r/k_r^{A'}$ = 0.20.	88R064
13.105 Imidazole-4-ethanaminium, α-carboxy-2,3-dihydro-<i>N,N,N</i>-trimethyl-2-thioxo-, ion							
	D ₂ O	5.0 × 10 ⁸			PL/Ld-2	S = H ₂ TPPS ⁴⁻ or H ₂ TMpyP ⁴⁺ ; calcd. from k_{obs} = 2.3 × 10 ⁷ at pH 7 and pK _a (D ₂ O) = 8.4.	88A164
13.106 Imidazole-4-propionic acid, α-amino-2,3-dihydro-2-thioxo-, (<i>S</i>)							
	H ₂ O pH = 7.0			283	CP/A'c-17	S = RB; A' = BHMF; meas. $k_r/k_r^{A'}$ = 1.1; sensitizer immobilized on glass beads.	88R064
	H ₂ O pH = 7.0			283	CP/A'c-17	S = RB; A' = BHMF; meas. $k_r/k_r^{A'}$ = 0.26.	88R064
13.107 L-Leucine, L-methionyl-							
	D ₂ O/ EtOH (75:25)	2.1 × 10 ⁷		295	PL/Ld-2	S = RB.	94A113
13.108 Methionine							
	CH ₃ CN/ H ₂ O (50:50)	3 × 10 ⁶ (k_r)			CP/Ac, A'c-17	S = RB; A' = DMA; $k_r^{A'}$ not given.	93R059
	CH ₃ CN/ H ₂ O (50:50)	9 × 10 ⁶			PL/Ld-2	S = RB or Eos.	93R059
	D ₂ O pD = 7.4	1.3 × 10 ⁷		310	CR/LI-12	used k_d = 1.9 × 10 ⁴ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	91R055
	D ₂ O pD = 11.2	4.1 × 10 ⁸		310	CR/A'c-32	A' = DPRF; used k_d = 1.5 × 10 ⁴ s ⁻¹ ; ¹ O ₂ * from Dopamine/H ₂ O ₂ .	89M038
	D ₂ O pD = 11.2	2.1 × 10 ⁸		310	CR/A'c-32	A' = DPBF; used k_d = 1.5 × 10 ⁴ s ⁻¹ ; ¹ O ₂ * from DOPA/H ₂ O ₂ .	89M038
	D ₂ O pD = 7.4	1.5 × 10 ⁷			PL/A'd-5	S = MB; A' = ADPA.	81N048
	D ₂ O pD = 8.4	1.6 × 10 ⁷ (k_r)		293	CL/Ad-35	used k_d = 2.9 × 10 ⁴ s ⁻¹ ; high pressure O ₂ (0.195 mol L ⁻¹); statistical error of 30% and systematic error of the same order.	79A112
	D ₂ O pD = 11	1.6 × 10 ⁷			CP/A'c-16	S = RB; A' = DPF; k_d not given; plots are nonlinear, used slope as [A] → 0.	777433
	D ₂ O pD = 7	3.3 × 10 ⁷			CP/A'c-16	S = RB; A' = DPF; k_d not given; plots are nonlinear, used slope as [A] → 0.	777433
	D ₂ O pD = 8.1	1.7 × 10 ⁷		295	CL/A'c-22	A' = BRH ₂ ; used k_d = 2.9 × 10 ⁴ s ⁻¹ ; high pressure O ₂ ; recalcd. [79A112].	757147
	D ₂ O (mic) pD = 7.4	1.8 × 10 ⁷			PL/A'd-5	S = 2-ACN; A' = DPBF; 0.1 mol L ⁻¹ SDS.	81N048
	D ₂ O (mic) pD = 7.4	1.6 × 10 ⁷			PL/A'd-5	S = 2-ACN; A' = DPBF; 0.1 mol L ⁻¹ CTAB.	81N048
	D ₂ O/ EtOH (75:25)	1.3 × 10 ⁷		295	PL/Ld-2	S = RB.	94A113
	H ₂ O pH = 10.6	2.8 × 10 ⁷		310	CR/LI-12	used k_d = 3.2 × 10 ⁵ s ⁻¹ ; soln. cont. 5 × 10 ⁻⁴ mol L ⁻¹ CoCl ₂ ; ¹ O ₂ * from autoxidation of oxytetracycline.	92M228
	H ₂ O pH = 7	2.1 × 10 ⁷ (k_r)			CP/Oc-17	S = RB; A' = FFA; used $k_r^{A'}$ = 1.2 × 10 ⁸ L mol ⁻¹ s ⁻¹ .	93R059
	H ₂ O pH = 7	2.1 × 10 ⁷			CP/A'c-18	S = RB; A' = TrpH; used k_d = 2.5 × 10 ⁵ s ⁻¹ , $k_{A'}$ = 6 × 10 ⁸ L mol ⁻¹ s ⁻¹ .	93R059

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.108 Methionine — Continued							
	H ₂ O pH = 10	4×10^7			CP/Ac-16	S = Eos; A' = 2,4-Cl ₂ C ₆ H ₃ O'; used $k_d = 5 \times 10^5$ s ⁻¹ .	87F537
	H ₂ O pH = 7.1	8.6×10^6		298	CP/Oc-19	S = Phenosafranine; Q = NaN ₃ ; used $k_Q = 2.0 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A360
	H ₂ O pH = 11	$\leq 5.0 \times 10^7$			CP/A'c-16	S = RB; A' = DPF; used $k_d = 1 \times 10^6$ s ⁻¹ ; Plots are nonlinear. Used slope as [A] → 0.	777433
	H ₂ O pH = 7	1.2×10^7			CP/A'c-16	S = RB; A' = DPF; used $k_d = 1 \times 10^6$ s ⁻¹ ; Plots are nonlinear. Used slope as [A] → 0.	777433
	H ₂ O pH = 6		0.052	298	CP/Ac-14	S = PF; β derived using $\phi_{isc}(PF) = 0.73$.	70F732
	H ₂ O		0.020	283	CP/Oc-15	S = MB; The mechanism of oxidation is not clear.	65F029
	H ₂ O/ MeOH (50:50)	3×10^7			PL/A'd-5	S = MB; A' = DPBF.	72F516
	H ₂ O/ MeOH (50:50)	5×10^6 (k_t)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_t^{A'} = 8 \times 10^8$ L mol ⁻¹ s ⁻¹ ; k_t derived using $k_{TQ}^A = 3 \times 10^8$ L mol ⁻¹ s ⁻¹ and $k_A = 3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	72F516
13.109 Methionine, glycy-							
	CH ₃ CN/ H ₂ O (50:50)	1.5×10^6 (k_t)			CP/Ac,A'c-17	S = RB; A' = DMA; $k_t^{A'}$ not given.	93R059
	CH ₃ CN/ H ₂ O (50:50)	1.5×10^7			PL/Ld-2	S = RB or Eos.	93R059
	D ₂ O/ EtOH (75:25)	2.1×10^7		295	PL/Ld-2	S = RB.	94A113
	H ₂ O pH = 7	1.3×10^7 (k_t)			CP/Oc-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	93R059
	H ₂ O pH = 7	9.0×10^7			CP/A'c-18	S = RB; A' = TrpH; used $k_d = 1.5 \times 10^5$ s ⁻¹ , $k_{A'} = 6 \times 10^8$ L mol ⁻¹ s ⁻¹ .	93R059
13.110 Methionine, S-methyl-N-(phenylmethyl)carbonyl-, methyl ester							
	CHCl ₃	1.4×10^7			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
13.111 Methionine methyl ester							
	CH ₃ CN/ H ₂ O (50:50)	1.2×10^6 (k_t)			CP/Ac,A'c-17	S = RB; A' = DMA; $k_t^{A'}$ not given.	93R059
	CH ₃ CN/ H ₂ O (50:50)	1.4×10^7			PL/Ld-2	S = RB or Eos.	93R059
	H ₂ O pH = 7	1.0×10^8			CP/A'c-18	S = RB; A' = TrpH; used $k_d = 1.5 \times 10^5$ s ⁻¹ , $k_{A'} = 6 \times 10^8$ L mol ⁻¹ s ⁻¹ .	93R059
	H ₂ O pH = 7	7×10^6 (k_t)			CP/Oc-17	S = RB; A' = FFA; used $k_t^{A'} = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	93R059
13.112 Morpholine, 4-[(phenylmethyl)thio]-							
	C ₆ H ₆	1.5×10^6 (k_t)			CP/Pa,P'a-17	S = TPP; A' = Octalin; used $k_t^{A'} = 1.8 \times 10^6$ L mol ⁻¹ s ⁻¹ ; P = 4-[(Phenylmethyl)sulfinyl]morpholine; $k_{obs} = 2.9 \times 10^6$ L mol ⁻¹ s ⁻¹ , $f_t^A = 2$.	94F024
	C ₆ H ₆	1.5×10^6 (k_t)			CP/Pa,P'a-17	S = TPP; A' = Adamantylideneadamantane; used $k_t^{A'} = 3.5 \times 10^5$ L mol ⁻¹ s ⁻¹ ; P = 4-[(Phenylmethyl)sulfinyl]morpholine; $k_{obs} = 2.9 \times 10^6$ L mol ⁻¹ s ⁻¹ , $f_t^A = 2$.	94F024
	C ₆ H ₆	1.3×10^6			PL/Ld-2	S = TPP; product formation rate studies suggest no physical quenching.	94F024

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.113	2-Naphthalenethione, 1,2-dihydro-1,1-dimethyl- CHCl ₃	4.3×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	85F151
13.114	2-Naphthalenethione, 1,2-dihydro-1,1,3-trimethyl- CHCl ₃	6.7×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	85F151
13.115	Octanoate ion, 6,8-dimercapto- (Dihydrolipoate ion) CHCl ₃ / EtOH (50:50)	5×10^6 5×10^6 (k_r)		310	CR/LI,Ac- 12,14	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90E622
13.116	Penicillamine D ₂ O pD = 7.4 H ₂ O	4.6×10^6 2.4×10^6		310	CR/LI-12 PL/Ld-2	used $k_d = 1.9 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ . S = H ₂ TPPS ⁴⁻ .	91R055 91R020
13.117	3-Pentanethione, 2,2,4,4-tetramethyl- CHCl ₃	1.0×10^4			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A093
13.118	1-Pentanol, 5-(4-methylphenyl)thio- CH ₃ COCH ₃ CH ₃ COCH ₃	1.5×10^4 (k_r) 2.9×10^6			CP/Ac-17 PL/Ld-2	S = RB; A' = α -Pinene; used $k_r^{A'} = 4.3 \times 10^4$ L mol ⁻¹ s ⁻¹ ; meas. $k_d/k_r = 192$. S = RB.	91F286 92F225 91F286 92F225
13.119	3-Pentanol, 3,4-dimethyl-1-[(4-methylphenyl)thio]- CH ₃ COCH ₃ CH ₃ COCH ₃ CH ₃ COCH ₃	6.5×10^4 (k_r) 3.7×10^6 7.1×10^4 (k_r)		293	CP/Ac-17 PL/Ld-2 CP/Ac-17	S = RB; A' = Limonene; used $k_r^{A'} = 1.7 \times 10^5$ L mol ⁻¹ s ⁻¹ ; $\Delta H^\ddagger = -22$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -226$ J K ⁻¹ mol ⁻¹ ; studied at 195-293 K; $k_r = 9.7 \times 10^5$ L mol ⁻¹ s ⁻¹ at 223 K when A' = Cyclopentene and $k_r^{A'} = 3.9 \times 10^4$ L mol ⁻¹ s ⁻¹ . S = RB. S = RB; A' = Limonene; used $k_r^{A'} = 1.7 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_d/k_r = 51.1$.	91F170 91F286 92F225 91F286 92F225
13.120	Phenol, 4-(methylthio)- C ₆ H ₆ MeOH/ H ₂ O (50:50) MeOH/ H ₂ O (50:50)	1.1×10^7 1.3×10^8 (k_r) 1.6×10^8		308	CR/A'c-16 CR/A'c-17 CR/A'c-16	A' = DPBF; used $k_d = 5.4 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ . A' = DPBF; ¹ O ₂ * from MNPO ₂ . $k_r^{A'}$ not given. A' = DPBF; used $k_d = 2.8 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	85M098 85M098 85M098
13.121	Phenothiazine C ₆ H ₅ Br/ MeOH (67:33) MeOH/ C ₆ H ₆ (90:10) MeOH/ C ₆ H ₆ (80:20) MeOH/ C ₆ H ₆ (20:80) MeOH/ HOCH ₂ CH ₂ OH (25:75)	4.2×10^7			CP/A'c-23 288 CP/Pa-17 288 CP/Pa-17 288 CP/Pa-17 288 CP/Pa-17	S = A' = Rub; used $k_d = 4.9 \times 10^4$ s ⁻¹ , $k_{A'} = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ . S = MB; measured ($\beta_r/\beta_r(\text{MeOH})$) = 0.94. S = MB; measured ($\beta_r/\beta_r(\text{MeOH})$) = 1.0. S = MB; measured ($\beta_r/\beta_r(\text{MeOH})$) = 1.5. S = MB; measured ($\beta_r/\beta_r(\text{MeOH})$) = 0.34.	777240 757623 757623 757623 757623

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.121	Phenothiazine — Continued						
	MeOH/ HOCH ₂ CH ₂ OH (75:25)			288	CP/Pa-17	S = MB; measured ($\beta/\beta_r(\text{MeOH})$) = 0.51.	757623
13.122	Phenothiazine, 2-chloro-10-dimethylaminopropyl- (Chlorpromazine)						
	C ₆ H ₅ Br/ MeOH (67:33)	3.5×10^7			CP/A'c-23	S = A' = Rub; used $k_d = 4.9 \times 10^4 \text{ s}^{-1}$, $k_{A'} = 4 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$.	777240
13.123	Phenothiazine, 10-methyl-						
	C ₆ H ₅ Br/ MeOH (67:33)	$\leq 1.2 \times 10^6$			CP/A'c-23	S = A' = Rub; used $k_d = 4.9 \times 10^4 \text{ s}^{-1}$, $k_{A'} = 4 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$.	777240
	CHCl ₃	2.9×10^6		253	CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4 \text{ s}^{-1}$, $k_{A'} = 5.3 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$.	82N064
	H ₂ O/1-BuOH/c- C ₆ H ₁₂ (72:16:4) (mic)	8.4×10^4 (k_r)		289	CP/LI,Pa- 12,27	S = RB; used $k_d = 1.6 \times 10^5 \text{ s}^{-1}$; P = 10-Methylphenothiazine-5-oxide; 8% SDS; used $k_q = 5.0 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$, $\phi_A(\text{RB}) = 0.75$.	87N090
	MeOD	5.3×10^6 2.7×10^5 (k_r) 5.0×10^6 (k_q)		289	CP/LI,Pa- 12,27	S = RB; used $k_d = 4.4 \times 10^3 \text{ s}^{-1}$; P = 10-Methylphenothiazine-5-oxide; used $\phi_A(\text{RB}) = 0.75$.	87N090
13.124	Phenothiazine, 10-(12-sulfonatododecyl)-						
	H ₂ O (mic)	4.9×10^5 (k_r) 1.1×10^6 (k_q)		289	CP/LI,Pa- 12,27	S = RB; used $k_d = 2.5 \times 10^5 \text{ s}^{-1}$; P = 10-(12-Sulfonatododecyl)phenothiazine-9-oxide; [A] = $10^{-2} \text{ mol L}^{-1}$; counter ion Na ⁺ ; used $\phi_A(\text{RB}) = 0.75$.	87N090
13.125	Piperidine, 1-[(phenylmethyl)thio]-						
	C ₆ H ₆	3.6×10^6			PL/Ld-2	S = TPP.	94F024
13.126	Pivalothiophenone						
	CHCl ₃	4.3×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4 \text{ s}^{-1}$, $k_{A'} = 5.3 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$.	82A093
13.127	Pivalothiophenone, 4'-chloro-						
	CHCl ₃	2.0×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4 \text{ s}^{-1}$, $k_{A'} = 5.3 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$.	82A093
13.128	Pivalothiophenone, 4'-fluoro-						
	CHCl ₃	3.6×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4 \text{ s}^{-1}$, $k_{A'} = 5.3 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$.	82A093
13.129	Pivalothiophenone, 4'-methoxy-						
	CHCl ₃	9.2×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4 \text{ s}^{-1}$, $k_{A'} = 5.3 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$.	82A093
13.130	L-Proline, 1-(3-mercapto-2-methyl-1-oxopropyl)-, (S)- (Captopril)						
	CHCl ₃ / EtOH (50:50)	4×10^6		310	CR/LI-12	used $k_d = 1 \times 10^5 \text{ s}^{-1}$; ¹ O ₂ * from NDPO ₂ .	90E622
	D ₂ O pD = 7.4	$< 1 \times 10^5$		310	CR/LI-12	used $k_d = 1.9 \times 10^4 \text{ s}^{-1}$; ¹ O ₂ * from NDPO ₂ .	91R055
13.131	1-Propanethiol, 3-amino-2-hydroxy-						
	H ₂ O	8×10^5			PL/Ld-2	S = H ₂ TPPS ⁺ .	91R020
13.132	1-Propanol, 3-(3-chlorophenyl)thio-						
	CH ₃ COCH ₃	6.0×10^5			PL/Ld-2	S = RB.	91F286 92F225

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.133	1-Propanol, 3-(4-chlorophenyl)thio- CH ₃ COCH ₃	8.6 × 10 ⁵			PL/Ld-2	S = RB.	91F286 92F225
13.134	1-Propanol, 3-(4-fluorophenyl)thio- CH ₃ COCH ₃	1.3 × 10 ⁶			PL/Ld-2	S = RB.	91F286 92F225
13.135	1-Propanol, 3-(4-methoxyphenyl)thio- CH ₃ COCH ₃	4.1 × 10 ⁶			PL/Ld-2	S = RB.	91F286 92F225
13.136	1-Propanol, 3-(4-methylphenyl)thio- CH ₃ COCH ₃	7.1 × 10 ⁴ (k_T)			CP/Ac-17	S = RB; A' = Limonene; used $k_T^{A'} = 1.7 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_q/k_T = 31.3$.	91F286 92F225
	CH ₃ COCH ₃	2.3 × 10 ⁶			PL/Ld-2	S = RB.	91F286 92F225
13.137	1-Propanol, 3-(phenylthio)- CH ₃ COCH ₃	3.3 × 10 ⁴ (k_T)			CP/Ac-17	S = RB; A' = α -Pinene; used $k_T^{A'} = 4.3 \times 10^4$ L mol ⁻¹ s ⁻¹ .	92F225
	CH ₃ COCH ₃	1.5 × 10 ⁶			PL/Ld-2	S = RB.	91F286 92F225
13.138	Pyran-4-thione CH ₂ Cl ₂		2 × 10 ⁻³	298	CP/Pa-15	S = MB; P = Pyran-4-one.	717403
13.139	Pyran-4-thione, 2,6-dimethyl- CH ₂ Cl ₂		3 × 10 ⁻⁴	298	CP/Pa-15	S = MB; P = 2,6-Dimethylpyran-4-one.	717403
13.140	Pyran-4-thione, 2,6-diphenyl- CH ₂ Cl ₂		1.4 × 10 ⁻³	298	CP/Ac-15	S = MB.	717403
13.141	Pyrazole-3-selone, 4-(aminomethylene)-2,4-dihydro-5-methyl-2-phenyl-, (Z)- 1-BuOH	1.8 × 10 ⁸ (k_T)	6.1 × 10 ⁻⁴ (β_T)	295	CP/Ac-14	S = A; used $k_d = 1.1 \times 10^5$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	<i>c</i> -C ₆ H ₁₂	1.2 × 10 ⁹ (k_T)	4.8 × 10 ⁻⁵ (β_T)	295	CP/Ac-14	S = A; used $k_d = 5.9 \times 10^4$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	CCl ₄	1.3 × 10 ⁶ (k_T)	3 × 10 ⁻⁵ (β_T)	295	CP/Ac-14	S = A; used $k_d = 38$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	CDCl ₃	2.6 × 10 ⁷ (k_T)	4.5 × 10 ⁻⁵ (β_T)	295	CP/Ac-14	S = A; used $k_d = 1.2 \times 10^3$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	CH ₃ CN	1.3 × 10 ⁸ (k_T)	1.3 × 10 ⁻⁴ (β_T)	295	CP/Ac-14	S = A; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	CHCl ₃	2.0 × 10 ⁷ (k_T)	2.0 × 10 ⁻⁴ (β_T)	295	CP/Ac-14	S = A; used $k_d = 4.0 \times 10^3$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	EtOH	2.8 × 10 ⁸ (k_T)	3.5 × 10 ⁻⁴ (β_T)	295	CP/Ac-14	S = A; used $k_d = 1 \times 10^5$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	EtOH	1.3 × 10 ⁸ (k_T)	7.4 × 10 ⁻⁴ (β_T)	295	CP/Ac-14	S = Ery; used $k_d = 1 \times 10^5$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	EtOH	2.2 × 10 ⁸ (k_T)	4.5 × 10 ⁻⁴ (β_T)	295	CP/Ac-14	S = Eos; used $k_d = 1 \times 10^5$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	EtOH	7 × 10 ⁷ (k_T)	1.4 × 10 ⁻³ (β_T)	295	CP/Ac-14	S = Rhodamine S; used $k_d = 1 \times 10^5$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	EtOH	8 × 10 ⁷ (k_T)	1.2 × 10 ⁻³ (β_T)	295	CP/Ac-14	S = MB; used $k_d = 1 \times 10^5$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	MeOH	2.6 × 10 ⁸ (k_T)	5.5 × 10 ⁻⁴ (β_T)	295	CP/Ac-14	S = A; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	MeOH- <i>d</i> ₃		3.1 × 10 ⁻⁴ (β_T)	295	CP/Ac-14	S = A; used $\phi_\Delta(S)$.	85F646
	2-PrOH		3.1 × 10 ⁻⁴ (β_T)	295	CP/Ac-14	S = A; used $\phi_\Delta(S)$.	85F646
	dioxane	3.6 × 10 ⁸ (k_T)	9.1 × 10 ⁻⁵ (β_T)	295	CP/Ac-14	S = A; used $k_d = 3.3 \times 10^4$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
13.142	Pyrazole-3-thione, 4-(aminomethylene)-2,4-dihydro-5-methyl-2-phenyl- 1-BuOH	9.2 × 10 ⁷ (k_T)	1.2 × 10 ⁻³ (β_T)	295	CP/Ac-14	S = A; used $k_d = 1.1 \times 10^5$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	<i>c</i> -C ₆ H ₁₂	5 × 10 ⁸ (k_T)	1.1 × 10 ⁻⁴ (β_T)	295	CP/Ac-14	S = A; used $k_d = 5.9 \times 10^4$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	C ₆ H ₅ CH ₃	1.4 × 10 ⁸ (k_T)	2.7 × 10 ⁻⁴ (β_T)	295	CP/Ac-14	S = A; used $k_d = 4.2 \times 10^4$ s ⁻¹ ; used $\phi_\Delta(S)$.	84F244

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.142 Pyrazole-3-thione, 4-(aminomethylene)-2,4-dihydro-5-methyl-2-phenyl- — Continued							
	<i>n</i> -C ₇ H ₁₆	7.0 × 10 ⁸ (k_T)	8.4 × 10 ⁻⁵ (β_T)		CP/Ac-14	S = A; used $k_d = 5.9 \times 10^4$ s ⁻¹ ; used $\phi_\Delta(S)$.	84F244
	CCl ₄	1.9 × 10 ⁶ (k_T)	2 × 10 ⁻⁵ (β_T)	295	CP/Ac-14	S = A; used $k_d = 38$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	CDCl ₃	2.4 × 10 ⁷ (k_T)	5.0 × 10 ⁻⁵ (β_T)	295	CP/Ac-14	S = A; used $k_d = 1.2 \times 10^3$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	CH ₃ CN	1.3 × 10 ⁸ (k_T)	1.3 × 10 ⁻⁴ (β_T)	295	CP/Ac-14	S = A; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	CH ₃ CN	2.8 × 10 ⁸ (k_T)	6.7 × 10 ⁻⁵ (β_T)		CP/Ac-14	S = A; used $k_d = 3.3 \times 10^4$ s ⁻¹ ; used $\phi_\Delta(S)$.	84F244
	CHCl ₃	1.9 × 10 ⁷ (k_T)	2.1 × 10 ⁻⁴ (β_T)	295	CP/Ac-14	S = A; used $k_d = 4.0 \times 10^3$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	CHCl ₃	7.4 × 10 ⁷ (k_T)	2.3 × 10 ⁻⁴ (β_T)		CP/Ac-14	S = A; used $k_d = 1.7 \times 10^4$ s ⁻¹ ; used $\phi_\Delta(S)$.	84F244
	EtOH	8.3 × 10 ⁷ (k_T)	1.2 × 10 ⁻³ (β_T)	295	CP/Ac-14	S = A; used $k_d = 1 \times 10^5$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	EtOH/ H ₂ O (96:4)	8.5 × 10 ⁷ (k_T)	9.7 × 10 ⁻⁴ (β_T)		CP/Ac-14	S = A; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; used $\phi_\Delta(S)$.	84F244
	MeOH	8.4 × 10 ⁷ (k_T)	1.7 × 10 ⁻³ (β_T)	295	CP/Ac-14	S = A; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	MeOH	8.7 × 10 ⁷ (k_T)	1.6 × 10 ⁻³ (β_T)		CP/Ac-14	S = A; used $k_d = 1.4 \times 10^5$ s ⁻¹ ; used $\phi_\Delta(S)$.	84F244
	MeOH- <i>d</i> ₃		8.1 × 10 ⁻⁴ (β_T)	295	CP/Ac-14	S = A; used $\phi_\Delta(S)$.	85F646
	2-ProH		7.3 × 10 ⁻⁴ (β_T)	295	CP/Ac-14	S = A; used $\phi_\Delta(S)$.	85F646
	dioxane	1.0 × 10 ⁸ (k_T)	3.3 × 10 ⁻⁴ (β_T)	295	CP/Ac-14	S = A; used $k_d = 3.3 \times 10^4$ s ⁻¹ ; used $\phi_\Delta(S)$.	85F646
	dioxane	2.0 × 10 ⁸ (k_T)	1.5 × 10 ⁻⁴ (β_T)		CP/Ac-14	S = A; used $k_d = 3.1 \times 10^4$ s ⁻¹ ; used $\phi_\Delta(S)$.	84F244
13.143 Thiacyclohex-2-ene, 2-methyl-, 1-oxide							
	C ₆ H ₆		>1 × 10 ² (β_T)		CP/Ac-17	S = TPP; A' = Linalool; used $\beta_T A' = 0.18$ mol L ⁻¹ .	89F400
13.144 Thiacyclopent-2-ene, 2-methyl-, 1-oxide							
	C ₆ H ₆		>1 × 10 ² (β_T)		CP/Ac-17	S = TPP; A' = Linalool; used $\beta_T A' = 0.18$ mol L ⁻¹ .	89F400
13.145 Thiane							
	C ₆ H ₅ CH ₃	1.3 × 10 ⁷		298	PL/Ld-2	S = TPP.	92F104
	C ₆ H ₅ CH ₃	2 × 10 ⁷ (k_T)		198	CP/Pa-17	S = TPP; A' = TME; used $k_T A' = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; $\Delta H^\ddagger = -21$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -205$ J K ⁻¹ mol ⁻¹ ; studied at 198-293 K; P = sulfoxide + sulfone.	91F170
	CH ₃ COCH ₃	1.6 × 10 ⁷		298	PL/Ld-2	S = RB.	92F104
	CH ₃ COCH ₃	4.7 × 10 ⁵ (k_T)		298	CP/Pa-17	S = RB; A' = TME; used $k_T A' = 2.7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	92F104
	CH ₃ COCH ₃	9.4 × 10 ⁶ (k_T)		198	CP/Pa-17	S = RB; A' = TME; used $k_T A' = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; $\Delta H^\ddagger = -17$ kJ mol ⁻¹ ; $\Delta S^\ddagger = -192$ J K ⁻¹ mol ⁻¹ ; studied at 198-293 K; P = sulfoxide + sulfone.	91F170
	CHCl ₃	1.3 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
	2-ProH	1.4 × 10 ⁷		298	PL/Ld-2	S = RB.	92F104
13.146 Thiopane							
	CHCl ₃	1.3 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
13.147 Thiopin, 4,5-didehydro-2,3,6,7-tetrahydro-3,3,6,6-tetramethyl-							
	CHCl ₃	3.5 × 10 ⁶			CR/A'c-33	A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	81E003
13.148 Thiopin, 4,5-didehydro-2,3,6,7-tetrahydro-3,3,6,6-tetramethyl-, 1,1-dioxide							
	CHCl ₃	3 × 10 ⁵			CR/A'c-33	A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	81E003
13.149 Thiopin, 4,5-didehydro-2,3,6,7-tetrahydro-3,3,6,6-tetramethyl-, 1-oxide							
	CHCl ₃	7.2 × 10 ⁴			CR/A'c-33	A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	81E003

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.150	Thiepin, 2,3,6,7-tetrahydro-3,3,6,6-tetramethyl- CHCl ₃	3.5×10^6			CR/A'c-33	A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	81E003
13.151	Thiirane, 2,3-diphenyl-, (E) ClCF ₂ CCl ₂ F	4.3×10^3			PL/Ld-2	S = DNT.	87A072
13.152	Thiirane, methyl- ClCF ₂ CCl ₂ F	6.6×10^4			PL/Ld-2	S = DNT.	87A072
13.153	Thiobenzamide, 4-chloro- CH ₂ Cl ₂			273	CP/Ac,A'c-17	S = Poly-RB; A' = C ₆ H ₅ CSNH ₂ ; meas. $k_f/k_T^{A'}$ = 0.80.	84F196
13.154	Thiobenzamide, 4-methoxy- CH ₂ Cl ₂			273	CP/Ac,A'c-17	S = Poly-RB; A' = C ₆ H ₅ CSNH ₂ ; meas. $k_f/k_T^{A'}$ = 1.1.	84F196
13.155	Thiobenzamide, 4-methyl- CH ₂ Cl ₂			273	CP/Ac,A'c-17	S = Poly-RB; A' = C ₆ H ₅ CSNH ₂ ; meas. $k_f/k_T^{A'}$ = 1.0.	84F196
13.156	Thiobenzamide, 4-nitro- CH ₂ Cl ₂			273	CP/Ac,A'c-17	S = Poly-RB; A' = C ₆ H ₅ CSNH ₂ ; meas. $k_f/k_T^{A'}$ = 0.45.	84F196
13.157	Thiobenzamide, 4-(trifluoromethyl)- CH ₂ Cl ₂			273	CP/Ac,A'c-17	S = Poly-RB; A' = C ₆ H ₅ CSNH ₂ ; meas. $k_f/k_T^{A'}$ = 0.52.	84F196
13.158	Thiobenzophenone, 4-chloro- CHCl ₃	1.1×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A093
13.159	Thiobenzophenone, 4,4'-dichloro- CHCl ₃	2×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A093
13.160	Thiobenzophenone, 4,4'-dimethoxy- CHCl ₃	9.6×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A093
13.161	Thiobenzophenone, 4,4'-dimethyl- CHCl ₃	3.7×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A093
13.162	Thiobenzophenone, 4-methoxy- CHCl ₃	5.4×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A093
13.163	Thiobenzophenone, 4-phenyl- CHCl ₃	3.1×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82A093
13.164	2,2'-Thiodiethanol						
	MeOH		0.016	293	CP/Oc-15	S = FICl ₄ ²⁻ ; $E_a = 6.3$ kJ mol ⁻¹ .	68F288
	MeOH		0.013	293	CP/Oc-15	S = FIBr ₄ Cl ₄ ²⁻ ; $E_a = 3.8$ kJ mol ⁻¹ .	68F288
	MeOH		0.010	293	CP/Oc-15	S = DNT; $E_a = 8.4$ kJ mol ⁻¹ .	68F288
	MeOH		0.022	293	CP/Oc-15	S = MB; $E_a = 7.5$ kJ mol ⁻¹ .	68F288
	MeOH		0.025	293	CP/Oc-15	S = RB; $E_a = 5.4$ kJ mol ⁻¹ .	68F288

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.165	Thioketene, di-<i>tert</i>-butyl- CHCl ₃	1.2 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84A070
13.166	Thioketene, 2,2,6,6-tetramethylcyclohexyl- CHCl ₃	9.9 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	84A070
13.167	Thiophene MeOH	2.0 × 10 ⁵	0.45		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F519
	MeOH		≥6.0 × 10 ²	293	CP/Oc-15	S = RB; $E_a = 25$ kJ mol ⁻¹ .	68F288
13.168	Thiophene, tetrahydro- CHCl ₃	4.2 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085
	MeOH	2.8 × 10 ⁶	0.032		CP/A'c-16	S = MB; A' = DPBF; used $k_d = 9.0 \times 10^4$ s ⁻¹ .	72F519
13.169	2,5-Thiophenedithione, 3,4-bis[(cyclohexylamino)methylene]dihydro-, (Z,Z) C ₆ H ₅ CH ₃	1.0 × 10 ⁷ (k_T)			CP/Ac,A'c-17	S = PP; A' = DPBF; used $k_T^{A'} = 6.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	88A507
	C ₆ H ₅ CH ₃	9.0 × 10 ⁷			PL/Ld-2	S = TPP.	88A507
	CH ₃ CN	4.0 × 10 ⁶ (k_T)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_T^{A'} = 1.1 \times 10^9$ L mol ⁻¹ s ⁻¹ .	88A507
	CH ₃ CN	1.6 × 10 ⁸			PL/Ld-2	S = TPP.	88A507
	CHCl ₃	4.8 × 10 ⁷			PL/Ld-2	S = TPP.	88A507
13.170	2-Thiophenethione, 3-[(cyclohexylamino)methylene]-5-ethyl-, (Z)- C ₆ H ₅ CH ₃	1.8 × 10 ⁸ (k_T)			CP/Ac,A'c-17	S = PP; A' = DPBF; used $k_T^{A'} = 6.7 \times 10^8$ L mol ⁻¹ s ⁻¹ .	88A507
	C ₆ H ₅ CH ₃	1.6 × 10 ⁸			PL/Ld-2	S = TPP.	88A507
	CH ₃ CN	7.7 × 10 ⁸ (k_T)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_T^{A'} = 1.1 \times 10^9$ L mol ⁻¹ s ⁻¹ .	88A507
	CH ₃ CN	9.0 × 10 ⁸			PL/Ld-2	S = TPP.	88A507
	CHCl ₃	2.5 × 10 ⁸			PL/Ld-2	S = TPP.	88A507
	2-PrOH	5.5 × 10 ⁸			PL/Ld-2	S = TPP.	88A507
13.171	2-Thiophenethione, 3,3'-[1,2-ethanediy]bis(iminomethylidene)]bis[5-ethyl-, (Z,Z) C ₆ H ₅ Cl	2.1 × 10 ⁸			PL/Ld-2	S = TPP.	88A507
	CH ₃ CN	5.8 × 10 ⁸			PL/Ld-2	S = TPP.	88A507
	CH ₃ CN	2.7 × 10 ⁸ (k_T)			CP/Ac,A'c-17	S = MB; A' = DPBF; used $k_T^{A'} = 1.1 \times 10^9$ L mol ⁻¹ s ⁻¹ .	88A507
	CHCl ₃	2.0 × 10 ⁸			PL/Ld-2	S = TPP.	88A507
13.172	Thiopyran-4-thione CH ₂ Cl ₂		<1.0 × 10 ⁻⁴	298	CP/Pa-15	S = MB; P = Thiopyran-4-one.	717403
13.173	Thiopyran-4-thione, 2,6-diphenyl- CH ₂ Cl ₂		2.6 × 10 ⁻³	298	CP/Ac-15	S = MB.	717403
13.174	Thiourea C ₃ H ₅ N	6 × 10 ⁷ (k_T)			PL/Ld-2	S = PdMP; meas. $\phi_{ox} = \phi_{\Delta}$.	80A398
	C ₃ H ₅ N	9 × 10 ⁷		273	CP/LI-12	S = MP; used $k_d = 5.9 \times 10^4$ s ⁻¹ .	78F549
	CH ₃ COCH ₃	2.5 × 10 ⁷ (k_T)			PL/Ld-2	S = PdMP; meas. $\phi_{ox} = \phi_{\Delta}$.	80A398
	CH ₃ COCH ₃	1.3 × 10 ⁸		273	CP/LI-12	S = MP; used $k_d = 5.0 \times 10^4$ s ⁻¹ .	78F549
	EtOH/ H ₂ O (96:4)	-1 × 10 ⁸		273	CP/LI-12	S = MP; k_d not given.	78F549

TABLE 13. Rate constants for the interaction of singlet oxygen with sulfur, selenium, and tellurium compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13.174	Thiourea — Continued						
	H ₂ O pH = 7.1	4.4×10^6		298	CP/Oc-19	S = Phenosafranine; Q = NaN ₃ ; used $k_Q = 2.0 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A360
	MeOH		0.024		CL/Oc-15	S = Ru(bpy) ₃ ²⁺ .	777221
	MeOH		0.040	293	CP/Oc-15	S = MB; $E_a = 6.3$ kJ mol ⁻¹ .	68F288
13.175	Thiourea, allyl-						
	<i>i</i> -C ₅ H ₁₁ OH		0.023	293	CP/Oc-14	S = Chl a.	56F007
	C ₅ H ₅ N	-2.7×10^7		285	CP/P'a-20	S = A' = DMA; meas. $k_A/k_{A'} = 0.7$; k derived using $(k(\text{TME})/k_{A'}) = 1.1$ and $k(\text{TME}) = 4.0 \times 10^7$ L mol ⁻¹ s ⁻¹ .	737202
	<i>c</i> -C ₆ H ₁₁ OH		$\leq 1 \times 10^{-3}$	293	CP/Oc-14	S = Chl a.	56F007
	C ₆ H ₅ CH ₂ OH		9.2×10^{-3}	293	CP/Oc-14	S = Chl a.	56F007
	H ₂ O pH = 7.1	4×10^6		298	CP/Oc-19	S = Phenosafranine; Q = NaN ₃ ; used $k_Q = 2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78F020
	H ₂ O pH = 5-9		0.01	310	CP/Oc-15	S = PF.	617008
	H ₂ O (mic) pH = 7.0	4.5×10^6			CP/Oc-19	S = Chl a; Q = N ₃ ⁻ ; used $k_Q = 2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; S solubilized in Triton X-100 micelles (1.0 % by volume).	78A278
	MeOH		0.10	293	CP/Oc-15	S = Chl a.	56F007
13.176	Thiourea, methyl-						
	H ₂ O pH = 7.1	2×10^6		298	CP/Oc-19	S = Phenosafranine; Q = NaN ₃ ; used $k_Q = 2 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78A360
13.177	1,4-Thioxane						
	CHCl ₃	1.5×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	79A085

TABLE 14. Rate constants for the interaction of singlet oxygen with inorganic compounds.

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
14.1 Ammonia							
	MeOH/ C ₆ H ₆ (67:33)		3.3×10^{-4} (β_r)	298	CR/A'c-17	A' = Rub; used $\beta_r A' = 1.4 \times 10^{-3}$ mol L ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	80M378
14.2 Azide ion							
	<i>n</i> -C ₇ H ₁₆ /H ₂ O (mic)	3.3×10^8			PL/Ld-2	S = RB; reverse micelles contg. 0.25 mol L ⁻¹ AOT and 2% H ₂ O.	84N114
	CH ₃ CN	4.8×10^9			PL/Ld-2	S = MB.	89A346
	DMF	1.2×10^8			CP/Ac-22	S = A' = Pt(phen)(DMT); used $k_d = 1.4 \times 10^5$ s ⁻¹ .	89F462
	DMSO	6×10^8			CP/P'a-25	S = GV; A' = TEMP-4-OH; used $k_d = 5.2 \times 10^4$ s ⁻¹ , $k_{A'} = 5.2 \times 10^6$ l. mol ⁻¹ s ⁻¹ ; P = 4-Hydroxy-2,2,6,6-tetramethylpiperidine <i>N</i> -oxyl; counter ion = Na ⁺ , measured by esr.	89D112
	D ₂ O	3×10^8			PL/Ld-2	S = MB; k for $I \rightarrow 0$; at $I = 3$ (tetramethylammonium chloride) $k = 7.9 \times 10^8$, at $I = 3$ (NaCl) $k = 7.1 \times 10^8$ L mol ⁻¹ s ⁻¹ .	92F181
	D ₂ O pD = 11.2	9×10^7		310	CR/A'c-32	A' = DPBF; used $k_d = 1.5 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from DOPA/H ₂ O ₂ .	89M038
	D ₂ O pD = 11.2	5×10^7		310	CR/A'c-32	A' = DPBF; used $k_d = 1.5 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from Dopamine/H ₂ O ₂ .	89M038
	D ₂ O pH = 7.0	6.3×10^8	4.0×10^{-5}		CP/LI-12	S = RB; used $k_d = 2.5 \times 10^4$ s ⁻¹ .	87E150
	D ₂ O pH = 7.0	6.9×10^8	3.1×10^{-5}		CP/LI-12	S = Eos; used $k_d = 2.2 \times 10^4$ s ⁻¹ .	87E150
	D ₂ O	4.4×10^8			PL/Ld-2	S = H ₂ TPPS ⁴⁻ ; counter ion Na ⁺ .	86F149
	D ₂ O pD = 7.4	5.1×10^8			PL/A'd-5	S = MB; A' = ADPA.	81N048
	D ₂ O (mic) pD = 7.4	3.9×10^8			PL/A'd-5	S = 2-ACN; A' = DPBF; 0.1 mol L ⁻¹ SDS.	81N048
	D ₂ O (mic) pD = 7.4	8.2×10^8			PL/A'd-5	S = 2-ACN; A' = DPBF; 0.1 mol L ⁻¹ CTAB.	81N048
	D ₂ O (ves)	1.1×10^8			CP/A'c-16	S = RB; A' = DMA; used $k_d = 1.8 \times 10^4$ s ⁻¹ ; 0.05% egg yolk lecithin.	86N104
	EtOH	2.2×10^8			PL/Ld-2	S = MB; k for $I \rightarrow 0$; at $I = 3$ (tetramethylammonium chloride) $k = 5.5 \times 10^8$ L mol ⁻¹ s ⁻¹ .	92F181
	EtOH	2.0×10^8			CP/A'c-16	S = MC 540; A' = DPBF; used $k_d = 6.5 \times 10^4$ s ⁻¹ .	88F151
	EtOH/ H ₂ O (96:4)	3.9×10^8			CP/P'a-18	S = HA; A' = TEMP; used $k_d = 6.5 \times 10^4$ s ⁻¹ ; P = 2,2,6,6-Tetramethylpiperidine- <i>N</i> -oxyl; monitored by esr.	90R162
	H ₂ O pH = 10.6	2.9×10^7		310	CR/LI-12	used $k_d = 3.2 \times 10^5$ s ⁻¹ ; soln. cont. 5×10^{-4} mol L ⁻¹ CoCl ₂ , ¹ O ₂ * from autoxidation of oxytetracycline.	92M228
	H ₂ O pH = 7	4.5×10^8			CP/A'c-18	S = RB; A' = TrpH; used $k_d = 2.5 \times 10^5$ s ⁻¹ , $k_{A'} = 6 \times 10^8$ L mol ⁻¹ s ⁻¹ .	93R059
	H ₂ O pH = 5.4	3.8×10^8			CL/LI-12	S = RB; used $k_d = 2.4 \times 10^5$ s ⁻¹ .	91E570 89E798
	H ₂ O pH = 4.7-8.1	$<7 \times 10^5$ (k_r) 5.0×10^8 (k_q)		298	CP/A'c-16,17	S = RB, Humic acids; A' = FFA; used $k_d = 2.5 \times 10^5$ s ⁻¹ ; meas. $k_r/k_r A' \leq 0.0061$; used $k_r A' = 1.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; counter ion Na ⁺ .	87A063
	H ₂ O pH = 7.0	5.8×10^8	4.1×10^{-4}		CP/LI-12	S = Eos or RB; used $k_d = 2.4 \times 10^5$ s ⁻¹ .	87E150
	H ₂ O pH = 10	1×10^9			CP/Oc-16	S = Eos; A' = 2,4-Cl ₂ C ₆ H ₃ O ⁻ ; used $k_d = 5 \times 10^5$ s ⁻¹ .	87F537

TABLE 14. Rate constants for the interaction of singlet oxygen with inorganic compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
14.2 Azide ion — Continued							
	H ₂ O pH = 7	6.4×10^8		298	CP/A'c-16	S = UP; A' = TrpH; used $k_d = 3 \times 10^5$ s ⁻¹ .	86F678
	H ₂ O	1.5×10^9			CP/Oc-22	S = MB; A' = PBN; used $k_d = 5 \times 10^5$ s ⁻¹ .	80A339
	H ₂ O pH = 8.4	1.7×10^9		298	CP/A'c-20	S = MB; A' = TrpH; used $k_d = 5.0 \times 10^5$ s ⁻¹ .	78F061
	H ₂ O	2.1×10^9			CP/P'a-23	S = A' = 1-AnS; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; A'' = KI, P'' = I ₃ ⁻ .	78F183
	H ₂ O (mic)	2.5×10^8		303	CP/A'c-20	S = HA; A' = DPBF; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; 2.9×10^{-4} mol L ⁻¹ SDS.	92N179
	H ₂ O (mic)	6.0×10^8		303	CP/A'c-20	S = HA; A' = DPBF; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; 2.2×10^{-4} mol L ⁻¹ Triton X-100.	92N179
	H ₂ O (mic)	7.6×10^8		303	CP/A'c-20	S = HA; A' = DPBF; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; 2.3×10^{-4} mol L ⁻¹ TDPB.	92N179
	H ₂ O (mic)	1.8×10^9		313	CP/A'c-23	S = Py; A' = DPBF; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; A' and S solubilized in DTAC micelles.	78A174
	H ₂ O (mic)	7.9×10^8		313	CP/A'c-23	S = Py; A' = DPBF; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; A' and S solubilized in SDS micelles.	78A174
	H ₂ O (mic) pH = 7.0	2.3×10^9		298	CP/A'c-20	S = MB; A' = DMA; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; A' solubilized in DTAC micelles.	78F061
	H ₂ O (mic) pH = 7.0	2.2×10^9		298	CP/A'c-20	S = MB; A' = 2,5-Diphenyloxazole; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; A' solubilized in DTAC micelles.	78F061
	H ₂ O (ves)	1.7×10^8			CP/A'c-16	S = A' = MC 540; used $k_d = 4.0 \times 10^4$ s ⁻¹ ; soln. contg. DLPC.	92A123
	H ₂ O (ves)	9.9×10^7			CP/A'c-16	S = RB; A' = DMA; used $k_d = 2.5 \times 10^5$ s ⁻¹ ; 0.05% egg yolk lecithin.	86N104
	H ₂ O/ MeOH (80:20)	1.3×10^9			CP/P'a-23	S = A' = 1-AnS; used $k_d = 4.0 \times 10^5$ s ⁻¹ ; A'' = KI, P'' = I ₃ ⁻ .	78F183
	H ₂ O/ MeOH (60:40)	1.1×10^9			CP/P'a-23	S = A' = 1-AnS; used $k_d = 3.2 \times 10^5$ s ⁻¹ ; A'' = KI, P'' = I ₃ ⁻ .	78F183
	H ₂ O/ MeOH (40:60)	5.2×10^8			CP/P'a-23	S = A' = 1-AnS; used $k_d = 2.5 \times 10^5$ s ⁻¹ ; A'' = KI, P'' = I ₃ ⁻ .	78F183
	H ₂ O/ MeOH (20:80)	3.0×10^8			CP/P'a-23	S = A' = 1-AnS; used $k_d = 1.9 \times 10^5$ s ⁻¹ ; A'' = KI, P'' = I ₃ ⁻ .	78F183
	MeOH	1.6×10^8		297	CR/P'a-16	A' = TEMP; formn. of TEMP monitored by esr; soln. cont. MeONa and CoCl ₂ , ¹ O ₂ * from autoxidation of adrenaline; k_d not given.	92D227
	MeOH	2.3×10^8			CP/A'c-16	S = MC 540; A' = DPBF; used $k_d = 1 \times 10^5$ s ⁻¹ .	88F151
	MeOH	2.3×10^8		303	PL/Tb-3	S = Ery; $E_a = 7.2$ kJ mol ⁻¹ ; studied at 303-323 K.	82A140
	MeOH	2.3×10^8			CP/A'c-23	S = Py; A' = DPBF; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	78A174
	MeOH	2.2×10^8			PL/A'd-5	S = MB; A' = DPBF.	72F515
	MeOH/ C ₆ H ₆ (67:33)		0.018 (β_r)	298	CR/A'c-17	A' = Rub; used $\beta_r A' = 1.4 \times 10^{-3}$ mol L ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	80M378
	MeOH/ HOCH ₂ CH ₂ OH (90:10)	2.5×10^8		303	PL/Tb-3	S = Ery.	82A140
	MeOH/ HOCH ₂ CH ₂ OH (80:20)	3.0×10^8		303	PL/Tb-3	S = Ery.	82A140
	MeOH/ HOCH ₂ CH ₂ OH (70:30)	3.8×10^8		303	PL/Tb-3	S = Ery.	82A140

TABLE 14. Rate constants for the interaction of singlet oxygen with inorganic compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
14.1 Azide ion — Continued							
	MeOH/ HOCH ₂ CH ₂ OH (60:40)	4.9×10^8		303	PL/Tb-3	S = Ery.	82A140
	MeOH/ HOCH ₂ CH ₂ OH (50:50)	6.9×10^8		303	PL/Tb-3	S = Ery.	82A140
14.3 Hydrogen azide							
	H ₂ O pH = 1.9	$< 2 \times 10^6$		298	CP/A'c-16	S = MB; A' = FFA; used $k_d = 2.5 \times 10^5$ s ⁻¹ .	87A063
14.4 Bromide ion							
	C ₆ H ₅ Br/ CH ₃ COCH ₃ (67:33)	$\leq 10^6$			CP/A'c-23	S = A' = Rub; No measurable effect; LiBr or tetrabutylammonium bromide.	767126
	C ₆ H ₅ Br/ CH ₃ COCH ₃ (67:33)	$\sim 1 \times 10^6$			CP/A'c-23	S = A' = Rub; used $k_d = 3.2 \times 10^4$ s ⁻¹ , $k_{A'} = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ ; dicyclohexano-18-crown-6-polyether, potassium bromide.	767126
	C ₆ H ₅ Br/ MeOH (67:33)	$\leq 10^6$			CP/A'c-23	S = A' = Rub; No measurable effect; LiBr or tetrabutylammonium bromide.	767126
14.5 Chloride ion							
	C ₆ H ₅ Br/ CH ₃ COCH ₃ (67:33)	$\leq 10^6$			CP/A'c-23	S = A' = Rub; No measurable effect; tetrabutylammonium chloride.	767126
	C ₆ H ₅ Br/ MeOH (67:33)	$\leq 10^6$			CP/A'c-23	S = A' = Rub; No measurable effect; tetrabutylammonium chloride.	767126
	CH ₃ CN	2.4×10^4			PL/Ld-2	S = MB; 0.1 mol L ⁻¹ tetraethylammonium chloride	89A346
	D ₂ O	10^3			PL/Ld-2	S = RF, H ₂ TPPS ⁴⁻ , or Chl in Triton X-100 micelles; counter ion Na ⁺ .	86F149
14.6 Deuterium peroxide							
	D ₂ O	8.8×10^2		293	PL/Ld-2	S = PTSA; soln. contg. 2-9 mol L ⁻¹ D ₂ O ₂ .	89A506
14.7 Hydrazine hydrate							
	C ₂ H ₅ N	8.7×10^7 (k_r)			PL/Ld-2	S = TPP, MPDEE or PdMP; meas. $\phi_{ox} = \phi_{\Delta}$.	80A398
	CCl ₄	6.1×10^5			PL/Ld-2	S = MPDEE.	80A398
	CH ₃ COCH ₃	5.5×10^7 (k_r)			PL/Ld-2	S = TPP, MPDEE or PdMP; meas. $\phi_{ox} = \phi_{\Delta}$.	80A398
	MeOH/ C ₆ H ₆ (67:33)		4.0×10^{-4} (β_r)	298	CR/A'c-17	A' = Rub; used $\beta_r^{A'} = 1.4 \times 10^{-3}$ mol L ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	80M378
14.8 Hydroxide-d ion							
	D ₂ O	5.5×10^3		293	PL/Ld-2	S = PTSA; soln. contg. 0.5-6 mol L ⁻¹ NaOD.	89A506
14.9 Iodide ion							
	C ₆ H ₅ Br/ CH ₃ COCH ₃ (67:33)	9.1×10^7			CP/A'c-23	S = A' = Rub; used $k_d = 3.2 \times 10^4$ s ⁻¹ , $k_{A'} = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ ; [CH ₃ (CH ₂) ₂ CH ₂] ₄ NI.	767126
	C ₆ H ₅ Br/ CH ₃ COCH ₃ (67:33)	8.1×10^7			CP/A'c-23	S = A' = Rub; used $k_d = 3.2 \times 10^4$ s ⁻¹ , $k_{A'} = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ ; from LiI.	767126
	C ₆ H ₅ Br/ CH ₃ COCH ₃ (67:33)	2.8×10^8			CP/A'c-23	S = A' = Rub; used $k_d = 3.2 \times 10^4$ s ⁻¹ , $k_{A'} = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ ; dicyclohexano-18-crown-6-polyether potassium iodide.	767126
	C ₆ H ₅ Br/ MeOH (67:33)	$\leq 10^6$			CP/A'c-23	S = A' = Rub; No measurable effect; LiI or KI or tetrabutylammonium iodide.	767126

TABLE 14. Rate constants for the interaction of singlet oxygen with inorganic compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
14.9 Iodide ion — Continued							
	D ₂ O pH = -7	8.7 × 10 ⁵			PL/Ld-2	S = 2-AnS.	88A398
	H ₂ O pH = -7	8.7 × 10 ⁵			PL/Ld-2	S = 2-AnS.	88A398
	H ₂ O	8.7 × 10 ⁶	0.058		CP/Pa-23	S = A' = 1-AnS; Q = N ₃ ⁻ ; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; P = Triiodine ion.	78F183
	H ₂ O	7.2 × 10 ⁶		301	CP/Pa-23	S = 1-AnS; Q = NaN ₃ ; used $k_d = 5.0 \times 10^5$ s ⁻¹ , $k_Q = 2.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; P = Triiodine ion; from KI.	777074
	H ₂ O	7.2 × 10 ⁶		301	CP/Pa-23	S = 1,5-Anthracenedisulfonate ion; Q = NaN ₃ ; used $k_d = 5.0 \times 10^5$ s ⁻¹ , $k_Q = 2.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; P = Triiodine ion; from KI.	777074
	H ₂ O	6.4 × 10 ⁶		301	CP/Pa-23	S = 2-AnS; Q = NaN ₃ ; used $k_d = 5.0 \times 10^5$ s ⁻¹ , $k_Q = 2.2 \times 10^8$ L mol ⁻¹ s ⁻¹ ; P = Triiodine ion; from KI.	777074
	H ₂ O/ MeOH (60:40)	3.0 × 10 ⁶	0.11		CP/Pa-23	S = A' = 1-AnS; Q = N ₃ ⁻ ; used $k_d = 3.2 \times 10^5$ s ⁻¹ ; P = Triiodine ion; from KI.	78F183
	H ₂ O/ MeOH (20:80)	3.4 × 10 ⁵	0.56		CP/Pa-23	S = A' = 1-AnS; Q = N ₃ ⁻ ; used $k_d = 1.9 \times 10^5$ s ⁻¹ ; P = Triiodine ion; from KI.	78F183
	H ₂ O/ MeOH (40:60)	1.5 × 10 ⁶	0.16		CP/Pa-23	S = A' = 1-AnS; Q = N ₃ ⁻ ; used $k_d = 2.5 \times 10^5$ s ⁻¹ ; P = Triiodine ion; from KI.	78F183
	H ₂ O/ MeOH (80:20)	5.6 × 10 ⁶	0.072		CP/Pa-23	S = A' = 1-AnS; Q = N ₃ ⁻ ; used $k_d = 4.0 \times 10^5$ s ⁻¹ ; P = Triiodine ion; from KI.	78F183
14.10 Iodine							
	C ₆ H ₆	1.4 × 10 ⁹			PL/A'd-8	S = An; A' = DPBF; Quenching is non-linear.	84E291
14.11 Nitrite ion							
	H ₂ O pH = 8.3	3.1 × 10 ⁶			CP/Oc-16	S = Eos; A' = N ₃ ⁻ ; used $k_d = 2.5 \times 10^5$ s ⁻¹ , $k = 7.4 \times 10^4$ L mol ⁻¹ sec ⁻¹ was also evaluated; $k = 4.4 \times 10^4$ L mol ⁻¹ sec ⁻¹ was also quoted [92D008].	88F485
14.12 Oxygen							
	Perfluorodecalin	4.1 × 10 ³		295	PL/Ld-2	S = PHO.	91E427
	<i>n</i> -C ₆ F ₁₄	2.6 × 10 ³		295	PL/Ld-2	S = PHO.	91E427
	C ₆ H ₆	-6 × 10 ⁴			CP/A'c-?	S = A' = DMA; Reported as unpublished data.	73F659
	CCl ₄	3.9 × 10 ³		295	PL/Ld-2	S = PHO.	91E427
	CS ₂	1.3 × 10 ⁴		298	FP/Ld-2	S = Per.	82A322
	CICF ₂ CCl ₂ F	3.2 × 10 ³		295	PL/Ld-2	S = PHO.	91E427
	CICF ₂ CCl ₂ F	9.2 × 10 ²		298	FP/Ld-2	S = Per.	82A322
	CICF ₂ CCl ₂ F	2.5 × 10 ³		293	PL/A'd-10	A' = DPBF; high pressure O ₂ .	79A113
	CICF ₂ CCl ₂ F	2.7 × 10 ³			PL/A'd-10	A' = DPBF; high pressure O ₂ .	747102
	H ₂ O pH = 6.2		0.060		CP/A'c-19	S = Ac; A' = Leuco fluorescein.	68F287
	H ₂ O pH = 6.2		1.9 × 10 ⁻³		CP/A'c-19	S = Th ⁺ ; A' = Leuco fluorescein.	68F287
	H ₂ O pH = 6.2		1.2 × 10 ⁻³		CP/A'c-19	S = MB; A' = Leuco fluorescein.	68F287
	H ₂ O pH = 6.2		2.2 × 10 ⁻³		CP/A'c-19	S = Eos; A' = Leuco fluorescein.	68F287
	O ₂	5.9 × 10 ²		77	PL/Ld-2	Liquid oxygen, direct laser excitation.	82E575
	O ₂	6.0 × 10 ²		77	PL/Ld-2	Liquid oxygen, direct laser excitation, 1064 nm.	80E616

TABLE 14. Rate constants for the interaction of singlet oxygen with inorganic compounds. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
14.12 Oxygen — Continued							
	O ₂	6.0×10^2		77	PL/Ld-2	Liquid oxygen, direct laser excitation, 1060 nm; $k = 1.3 \times 10^3$ (7300) ^{0.5} [719112].	746110
14.13 Oxygen-18							
	Perfluorodecalin	60		295	PL/Ld-2	S = PHO.	91E427
	<i>n</i> -C ₆ F ₁₄	1×10^2		295	PL/Ld-2	S = PHO.	91E427
	ClCF ₂ CCl ₂ F	1×10^2		295	PL/Ld-2	S = PHO.	91E427
	O ₂	3		77	PL/Ld-2	Liquid oxygen, direct laser excitation.	82E575
14.14 Superoxide radical anion							
	C ₆ H ₅ Br/ CH ₃ CN (67:33)	3.6×10^7			CP/A'c-23	S = A' = Rub; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $k_{A'} = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ ; Showed $k_q \gg k_r$; tetrabutylammonium superoxide.	757578
	CH ₃ CN	2×10^8			PL/Ld-2	S = 2-ACN; KO ₂ /18-crown-6.	91A394
	CH ₃ CN	2×10^8			PL/Ld-2	S = Ru(bpy) ₃ ²⁺ ; KO ₂ /18-crown-6.	91A394
	CH ₃ CN	7×10^9	5×10^{-6}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 3.3 \times 10^4$ s ⁻¹ ; tetramethylammonium superoxide.	766072
	DMSO	1.6×10^9	3.3×10^{-5}		CP/A'c-16	S = RB; A' = DPBF; used $k_d = 5.2 \times 10^4$ s ⁻¹ ; tetramethylammonium superoxide.	766072

TABLE 15. Rate constants for the interaction of singlet oxygen with oximes, hydrazones, nitrones, nitroso compounds and *N*-oxides.

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
15.1 Acetaldehyde, (2,6-diphenylpyran-4-ylidene)-, dimethyl hydrazone							
	MeOH/ C ₆ H ₆ (80:20)	3.0×10^9 (k_r)			CP/A'c-17	S = RB; A' = 2M2P; used $k_r^{A'} = 8.1 \times 10^5$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 3.7 \times 10^3$.	86A438
	MeOH/ C ₆ H ₆ (80:20)	2.2×10^{10} (k_r)			CP/A'c-17	S = RB; A' = DPBF; used $k_r^{A'} = 6.3 \times 10^8$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 35$.	86A438
15.2 Acetone oxime							
	MeOH	$\leq 1.0 \times 10^4$ (k_r)			CP/A'c-17	S = RB; A' = 2M2B; used $k_r^{A'} = 1.3 \times 10^6$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 7.7 \times 10^{-3}$.	767197
15.3 Acetone, (1-methylethylidene)hydrazone (Acetone azine)							
	CCl ₃ F			253	CP/Pa-17	S = TPP; A' = 3,4,4,5-Tetramethylpyrazole; meas. $k_r/k_r^{A'} = 3.1$.	79F278
	CCl ₄			253	CP/Pa-17	S = TPP; A' = 3,4,4,5-Tetramethylpyrazole; meas. $k_r/k_r^{A'} = 3.2$; with 10^{-4} mol L ⁻¹ TPP.	79F278
	CCl ₄			253	CP/Pa-17	S = TPP; A' = 3,4,4,5-Tetramethylpyrazole; meas. $k_r/k_r^{A'} = 3.8$; with 10^{-6} mol L ⁻¹ TPP.	79F278
	CDCl ₃			253	CP/Pa-17	S = TPP; A' = 3,4,4,5-Tetramethylpyrazole; meas. $k_r/k_r^{A'} = 3.2$.	79F278
	CH ₂ Cl ₂			253	CP/Pa-17	S = TPP; A' = 3,4,4,5-Tetramethylpyrazole; meas. $k_r/k_r^{A'} = 3.3$.	79F278
	CHCl ₃			253	CP/Pa-17	S = TPP; A' = 3,4,4,5-Tetramethylpyrazole; meas. $k_r/k_r^{A'} = 3.0$.	79F278
	CHCl ₃			253	CP/Pa-17	S = MB; A' = 3,4,4,5-Tetramethylpyrazole; meas. $k_r/k_r^{A'} = 3.8$.	79F278
15.4 Benzaldehyde, 4-diethylamino-, diphenylhydrazone							
	MeOH/ C ₆ H ₆ (80:20)	1.8×10^9			CP/P'a-23	S = RB; A' = 2M2P; used $k_d = 1.8 \times 10^5$ s ⁻¹ , $k_{A'} = 8.1 \times 10^5$ L mol ⁻¹ s ⁻¹ .	83A063
	MeOH/ C ₆ H ₆ (68:32)	8.8×10^8			CP/P'a-23	S = RB; A' = DPBF; used $k_d = 1.8 \times 10^5$ s ⁻¹ , $k_{A'} = 6.3 \times 10^8$ L mol ⁻¹ s ⁻¹ .	83A063
15.5 Benzenamine, <i>N</i>-(diphenylmethylene)-, <i>N</i>-oxide (Triphenyl nitron)							
	<i>c</i> -C ₆ H ₁₂	5×10^6		296	PL/A'd-8	S = ZnTPP; A' = DPBF.	91A297
	C ₆ H ₆	3.9×10^7		296	PL/A'd-8	S = ZnTPP; A' = DPBF.	91A297
	CH ₃ CN	3.3×10^7		296	PL/A'd-8	S = MB; A' = DPBF.	91A297
	MeOH	1.0×10^7		296	PL/A'd-8	S = MB; A' = DPBF.	91A297
15.6 Benzenamine, <i>N</i>-fluoren-9-ylidene, <i>N</i>-oxide (Phenyl fluorenyl nitron)							
	C ₆ H ₆	6.2×10^7		296	PL/A'd-8	S = ZnTPP; A' = DPBF.	91A297
15.7 Benzenamine, <i>N</i>-[(2-hydroxyphenyl)methylene]-, <i>N</i>-oxide (2-Hydroxyphenyl phenyl nitron)							
	C ₆ H ₆	4.5×10^7		296	PL/A'd-8	S = ZnTPP; A' = DPBF.	91A297
15.8 Benzenamine, 4-methyl-<i>N</i>-(phenylmethylene)-, <i>N</i>-oxide (4-Methylphenyl phenyl nitron)							
	C ₆ H ₆	4.3×10^7		296	PL/A'd-8	S = ZnTPP; A' = DPBF.	91A297
15.9 Benzenamine, <i>N</i>-[(4-methylphenyl)methylene]-, <i>N</i>-oxide (Phenyl 4-methylphenyl nitron)							
	<i>c</i> -C ₆ H ₁₂	2.1×10^7		296	PL/A'd-8	S = ZnTPP; A' = DPBF.	91A297
	C ₆ H ₆	5.5×10^7		296	PL/A'd-8	S = ZnTPP; A' = DPBF.	91A297
	CH ₃ CN	4.6×10^7		296	PL/A'd-8	S = MB; A' = DPBF.	91A297
	MeOH	7.7×10^7		296	PL/A'd-8	S = MB; A' = DPBF.	91A297
15.10 Benzenamine, <i>N</i>-(phenylmethylene)-, <i>N</i>-oxide (Diphenyl nitron)							
	<i>c</i> -C ₆ H ₁₂	8×10^6		296	PL/A'd-8	S = ZnTPP; A' = DPBF.	91A297
	C ₆ H ₆	3.7×10^7		296	PL/A'd-8	S = ZnTPP; A' = DPBF.	91A297

TABLE 15. Rate constants for the interaction of singlet oxygen with oximes, hydrazones, nitrones, nitroso compounds and *N*-oxides. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
15.10	Benzenamine, <i>N</i>-(phenylmethylene)-, <i>N</i>-oxide (Diphenyl nitron) — Continued						
	CH ₃ CN	3.3×10^7		296	PL/A'd-8	S = MB; A' = DPBF.	91A297
	MeOH	5.1×10^7		296	PL/A'd-8	S = MB; A' = DPBF.	91A297
15.11	Benzenemethanamine, <i>N</i>-hydroxy-<i>N</i>-(phenylmethyl)- (Dibenzylhydroxylamine)						
	CCl ₄	1.2×10^4	2.2×10^{-3}		CP/Pa-14	S = DCA; used $k_d = 26 \text{ s}^{-1}$; P = α -Phenyl- <i>N</i> -benzylnitron.	92F491
15.12	Benzenmethanamine, <i>N</i>-(phenylmethylene)-, <i>N</i>-oxide (Phenyl benzyl nitron)						
	C ₆ H ₆	1.4×10^7		296	PL/A'd-8	S = ZnTPP; A' = DPBF.	91A297
15.13	Benzophenone oximate anion						
	MeOH	3.4×10^5 (k_p)			CP/A'c,Pa-17	S = RB; A' = 2M2B; used $k_r^{A'} = 1.3 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$; meas. $k_r/k_r^{A'} = 0.26$; P = Benzophenone.	767197
15.14	Benzophenone oxime						
	MeOH	7.7×10^4 (k_p)			CP/A'c,Pa-17	S = RB; A' = 2M2B; used $k_r^{A'} = 1.3 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$; meas. $k_r/k_r^{A'} = 0.059$; P = Benzophenone.	767197
15.15	Benzophenone oxime <i>O</i>-methyl ether						
	MeOH	2.0×10^5 (k_p)			CP/A'c,Pa-17	S = RB; A' = 2M2B; used $k_r^{A'} = 1.3 \times 10^6 \text{ L mol}^{-1} \text{ s}^{-1}$; meas. $k_r/k_r^{A'} = 0.15$; P = Benzophenone.	767197
15.16	Cyclohexane, 1,4-dichloro-1,4-dinitroso-, (<i>E</i>)-						
	CH ₂ Cl ₂ / MeOH (69:31)	5.3×10^9			CR/A'c-32	A' = Rub; used $k_d = 1.9 \times 10^4 \text{ s}^{-1}$, $k_{A'} = 4.0 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$; ¹ O ₂ * from (PhO) ₃ PO ₃ .	76F900
15.17	Cyclohexane, 1,4-dichloro-1,4-dinitroso-, (<i>Z</i>)-						
	CH ₂ Cl ₂ / MeOH (69:31)	9.2×10^9			CP/A'c-32	S = Chl a; A' = DPBF; used $k_d = 2.1 \times 10^4 \text{ s}^{-1}$, $k_{A'} = 8 \times 10^8 \text{ L mol}^{-1} \text{ s}^{-1}$; Assumed that quenching is due to equilibrium mixture of this species with 1,4-dichloro-2,3-diazabicyclo[2.2.2]oct-2-ene 2,3-dioxide.	76F900
	CH ₂ Cl ₂ / MeOH (69:31)	1.2×10^{10}			CR/A'c-32	A' = Rub; used $k_d = 2.1 \times 10^4 \text{ s}^{-1}$, $k_{A'} = 4.0 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$; ¹ O ₂ * from (PhO) ₃ PO ₃ ; Assumed that quenching is due to this species in equilibrium with 1,4-dichloro-2,3-diazabicyclo[2.2.2]oct-2-ene 2,3-dioxide.	76F900
15.18	2,3-Diazabicyclo[2.2.2]oct-2-ene, 1,4-dichloro-, 2,3-dioxide						
	CH ₂ Cl ₂ / MeOH (69:31)	8.0×10^7			CR/A'c-32	A' = Rub; used $k_d = 2.1 \times 10^4 \text{ s}^{-1}$, $k_{A'} = 4.0 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$; ¹ O ₂ * from (PhO) ₃ PO ₃ ; Assumed that quenching is due to this species only.	76F900
15.19	Dimethylglyoxime						
	CH ₂ Cl ₂ / MeOH (90:10)	1×10^6			PL/A'd-5	S = MB; A' = DPBF.	87F655
15.20	3,7,4,6-Ethanediyliidenepentaleno[1,6-<i>cd</i>]pyridazine, 3,7a-dichloro-3a,4,5,5a,6,7,7a,7b-octahydro-, 1,2-dioxide						
	CH ₂ Cl ₂ / MeOH (69:31)	$< 2 \times 10^6$			CR/A'c-32	A' = Rub; used $k_d = 2.1 \times 10^4 \text{ s}^{-1}$, $k_{A'} = 4.0 \times 10^7 \text{ L mol}^{-1} \text{ s}^{-1}$; ¹ O ₂ * from (PhO) ₃ PO ₃ .	76F900
15.21	Ethylamine, <i>N</i>-ethoxy-						
	<i>n</i> -C ₆ H ₁₄	3×10^4			CP/A'c-16	S = A' = Rub; k_d not given.	87F639
	CH ₃ CN	8×10^5			CP/A'c-16	S = RB; A' = DMA; used $k_d = 3.3 \times 10^4 \text{ s}^{-1}$.	87F639
15.22	Ethylamine, <i>N</i>-ethyl-<i>N</i>-ethoxy-						
	<i>n</i> -C ₆ H ₁₄	6×10^5			CP/A'c-16	S = A' = Rub; k_d not given.	87F639

TABLE 15. Rate constants for the interaction of singlet oxygen with oximes, hydrazones, nitrones, nitroso compounds and *N*-oxides. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
15.22	Ethylamine, <i>N</i> -ethyl- <i>N</i> -ethoxy- — Continued						
	CH ₃ CN	2.1 × 10 ⁶			CP/A'c-16	S = RB; A' = DMA; used $k_d = 3.3 \times 10^4$ s ⁻¹ .	87F639
15.23	Ethylamine, <i>N</i> -ethyl- <i>N</i> -hydroxy-						
	<i>n</i> -C ₆ H ₁₄	2.5 × 10 ⁷			CP/A'c-16	S = A' = Rub; k_d not given.	87F639
	C ₆ H ₆	2.7 × 10 ⁷			CP/A'c-16	S = A' = Rub; used $k_d = 4.2 \times 10^4$ s ⁻¹ .	87F639
	CH ₃ CN	1.8 × 10 ⁷			CP/A'c-16	S = RB; A' = DMA; used $k_d = 3.3 \times 10^4$ s ⁻¹ .	87F639
	CH ₃ COCH ₃	2.5 × 10 ⁷			CP/A'c-16	S = RB; A' = DMA; used $k_d = 3.8 \times 10^4$ s ⁻¹ .	87F639
	CHCl ₃	1.2 × 10 ⁷			CP/A'c-16	S = RB; A' = DMA; k_d not given.	87F639
	D ₂ O	<10 ⁵			CP/LI-12	S = RB; used $k_d = 1.8 \times 10^4$ s ⁻¹ .	93D154
	HCONH ₂	1.0 × 10 ⁷			CP/A'c-16	S = RB; A' = DMA; k_d not given.	87F639
	MeOH	3 × 10 ⁶			CP/A'c-16	S = RB; A' = DMA; used $k_d = 2.0 \times 10^4$ s ⁻¹ .	87F639
15.24	Ethylamine, <i>N</i> -ethyl- <i>N</i> -hydroxy-, conjugate acid						
	D ₂ O pH = 8.5	<5 × 10 ³			CP/LI-12	S = RB; used $k_d = 1.8 \times 10^4$ s ⁻¹ .	93D154
15.25	Isoindole, 1,1,3-triphenyl-, 2-oxide						
	C ₆ H ₆	8 × 10 ⁶		296	PL/A'd-8	S = ZnTPP; A' = DPBF.	91A297
15.26	Nitroxide, bis[4-(1,1-dimethylethyl)phenyl]-						
	C ₆ H ₅ CH ₃	1.6 × 10 ⁷		293	PL/Ld-2	S = An and PP; $E_a = 1.0$ kJ mol ⁻¹ ; log(A) = 7.4.	86E108
	CH ₃ CN	1.7 × 10 ⁷		293	PL/Ld-2	S = An and PP.	86E108
	CH ₃ CN/ MeOH (96:4)	7.5 × 10 ⁶			PL/Ld-2	S = HP.	92F402
15.27	Nitroxide, bis[4-(1-methyl-1-phenylethyl)phenyl]-						
	C ₆ H ₅ CH ₃	2.5 × 10 ⁶		293	PL/Ld-2	S = An and PP; $E_a = 5.0$ kJ mol ⁻¹ ; log(A) = 7.3.	86E108
15.28	Piperidin-1-ol, 2,2,6,6-tetramethyl- (TEMPOH)						
	CH ₂ Cl ₂	1.5 × 10 ⁸			CP/A'c-18	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88F059
15.29	1-Piperidinyloxy, 4-amino-2,2,6,6-tetramethyl-						
	C ₆ H ₆ / MeOH (80:20)	8.5 × 10 ⁵			PL/A'd-8	S = MB; A' = DPBF.	84A167
15.30	1-Piperidinyloxy, 4-azido-2,2,6,6-tetramethyl-						
	CH ₃ CN/ MeOH (96:4)	8.3 × 10 ⁶			PL/Ld-2	S = HP.	92F402
15.31	1-Piperidinyloxy, 4-hydroxy-4-(2-naphthyl)-2,2,6,6-tetramethyl-,						
	CHCl ₃	1.0 × 10 ⁵		293	PL/Ld-2	S = An and PP; $E_a = 7.5$ kJ mol ⁻¹ ; log(A) = 6.3.	86E108
15.32	1-Piperidinyloxy, 4-hydroxy-4-(2-phenylethynyl)-2,2,6,6-tetramethyl-						
	CHCl ₃	7.5 × 10 ⁴		293	PL/Ld-2	S = An and PP; $E_a = 1.3$ kJ mol ⁻¹ ; log(A) = 5.1.	86E108
	EtOH	1.7 × 10 ⁵		293	PL/Ld-2	S = An and PP.	86E108
15.33	1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl- (TEMPOL)						
	C ₆ H ₅ CH ₃	1.6 × 10 ⁵		293	PL/Ld-2	S = An and PP; $E_a = 5.4$ kJ mol ⁻¹ ; log(A) = 6.2.	86E108
	CCl ₄	9.8 × 10 ⁴			PL/Ld-2	S = TPP.	93E090
	CH ₂ Cl ₂	9.5 × 10 ⁴			PL/Ld-2	S = TPP.	93E090
	CH ₃ CN	1.4 × 10 ⁵		293	PL/Ld-2	S = An and PP.	86E108
	CHCl ₃	1.2 × 10 ⁶			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88P313
	CHCl ₃	1.1 × 10 ⁵		293	PL/Ld-2	S = An and PP.	86E108

TABLE 15. Rate constants for the interaction of singlet oxygen with oximes, hydrazones, nitrones, nitroso compounds and *N*-oxides. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
15.33	1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl- (TEMPO) — Continued						
	EtOH	1.2×10^5		293	PL/Ld-2	S = An and PP.	86E108
15.34	1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl-, benzoate						
	CHCl ₃	1.4×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88P313
15.35	1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl-, butyrate						
	CHCl ₃	1.1×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88P313
15.36	1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl-, crotonate						
	CHCl ₃	1.6×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88P313
15.37	1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl-, diester with 1,10-decanedioic acid						
	CHCl ₃	3.1×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88P313
15.38	1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl-, diester with 1,6-hexanedioic acid						
	CHCl ₃	3.1×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88P313
15.39	1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl-, diester with terephthalic acid						
	CHCl ₃	3.4×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88P313
15.40	1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl-, methacrylate						
	CHCl ₃	1.7×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88P313
15.41	1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl-, pentanoate						
	CHCl ₃	1.7×10^6			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88P313
15.42	1-Piperidinyloxy, 4-iodo-2,2,6,6-tetramethyl-						
	CH ₃ CN/ MeOH (96:4)	3.7×10^5			PL/Ld-2	S = HP.	92F402
15.43	1-Piperidinyloxy, 2,2,6,6-tetramethyl- (TEMPO)						
	C ₆ H ₆ / MeOH (80:20)	$<1.0 \times 10^5$			PL/A'd-8	S = MB; A' = DPBF.	84A167
	C ₆ H ₅ CH ₃	5.5×10^5		293	PL/Ld-2	S = An and PP; $E_a = 8.4$ kJ mol ⁻¹ ; log(A) = 7.2.	86E108
	CCl ₄	1.4×10^5			PL/Ld-2	S = TPP.	93E090
	CH ₂ Cl ₂	1.6×10^5			PL/Ld-2	S = TPP.	93E090
	CH ₂ Cl ₂	2.8×10^6			CP/A'c-18	S = A' = Rub; used $k_d = 7.3 \times 10^3$ s ⁻¹ , $k_{A'} = 7 \times 10^7$ L mol ⁻¹ s ⁻¹ .	88F039
	CH ₃ CN	4.3×10^5		293	PL/Ld-2	S = An and PP.	86E108
	EtOH	2.5×10^5		293	PL/Ld-2	S = An and PP.	86E108
15.44	4-Piperidone, 2,2,6,6-tetramethyl-1-oxyl- (TAN)						
	C ₆ H ₅ CH ₃	1.2×10^6		293	PL/Ld-2	S = An and PP; $E_a = 6.7$ kJ mol ⁻¹ ; log(A) = 7.3.	86E108
	CCl ₄	6.2×10^5			PL/Ld-2	S = TPP.	93E090
	CH ₂ Cl ₂	6.3×10^5			PL/Ld-2	S = TPP.	93E090
	CH ₃ CN	1.3×10^6		293	PL/Ld-2	S = An and PP.	86E108
	EtOH	1.3×10^6		293	PL/Ld-2	S = An and PP.	86E108
	MeOH/ C ₆ H ₆ (67:33)		3.4×10^{-5}	298	CR/A'c-17	A' = Rub; used $\beta_{A'} = 1.4 \times 10^{-3}$ mol L ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	80M378

TABLE 15. Rate constants for the interaction of singlet oxygen with oximes, hydrazones, nitrones, nitroso compounds and *N*-oxides. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
15.45	2-Propanamine, 2-methyl-<i>N</i>-(1-methyl-4-pyridylmethylene)-, <i>N</i>-oxyl						
	H ₂ O	8.0×10^7			CP/Ac-23	S = MB; Q = N ₃ ; used $k_d = 5 \times 10^5$ s ⁻¹ , $k_Q = 1.5 \times 10^9$ L mol ⁻¹ s ⁻¹ .	80A339
15.46	2-Propanamine, 2-methyl-<i>N</i>-phenylmethylene-, <i>N</i>-oxyl (Phenyl <i>N</i>-<i>tert</i>-butyl nitron, PBN)						
	C ₆ H ₅ CH ₃	9.0×10^6		293	PL/A'd-8	S = PP; A' = DPBF; $E_a = 0.4 \pm 0.4$ kJ mol ⁻¹ ; studied at 223-293 K.	88F462
	C ₆ H ₅ CH ₃	9.0×10^6		293	PL/Ld-2	S = PP; $E_a = 0.4 \pm 0.4$ kJ mol ⁻¹ ; studied at 223-293 K.	86A307
	C ₆ H ₅ CH ₃	$\leq 1 \times 10^5$ (k_r)		293	CP/A'c-17	S = PP; A' = Tetr; used $k_r A' = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86A307 88F462
	C ₆ H ₆	8.3×10^6		293	PL/A'd-8	S = PP; A' = DPBF.	84A247 85F538
	C ₆ H ₆	1.4×10^5 (k_r)		293	CL/Ac, A'c-17	S = PP; A' = Tetr; used $k_r A' = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r A' = 0.011$.	84A247 85F538
	CH ₃ CN	1.8×10^7		293	PL/A'd-8	S = PP; A' = DPBF.	88F462
	CH ₃ CN	1.8×10^7		293	PL/Ld-2	S = PP.	86A307
	CH ₃ CN	$\leq 1 \times 10^5$ (k_r)		293	CP/A'c-17	S = PP; A' = Tetr; used $k_r A' = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86A307
	CHCl ₃	4.4×10^6		293	PL/A'd-8	S = PP; A' = DPBF.	88F462
	CHCl ₃	4.4×10^6		293	PL/Ld-2	S = PP.	86A307
	CHCl ₃	$\leq 1 \times 10^5$ (k_r)		293	CP/A'c-17	S = PP; A' = Tetr; used $k_r A' = 1.2 \times 10^7$ L mol ⁻¹ s ⁻¹ .	86A307
	H ₂ O	1.4×10^8			CP/Ac-23	S = MB; Q = N ₃ ; used $k_d = 5 \times 10^5$ s ⁻¹ , $k_Q = 1.5 \times 10^9$ L mol ⁻¹ s ⁻¹ .	80A339
15.47	2-Propanamine, 2-methyl-<i>N</i>-(4-pyridylmethylene)-, <i>N,N</i>-dioxyl- (4-POBN)						
	H ₂ O	1.2×10^8			CP/Ac-23	S = MB; Q = N ₃ ; used $k_d = 5 \times 10^5$ s ⁻¹ , $k_Q = 1.5 \times 10^9$ L mol ⁻¹ s ⁻¹ .	80A339
15.48	2-Propanamine, 2-methyl-<i>N</i>-(4-pyridylmethylene)-, <i>N</i>-oxyl (4-PyBN)						
	H ₂ O	1.4×10^8			CP/Ac-23	S = MB; Q = N ₃ ; used $k_d = 5 \times 10^5$ s ⁻¹ , $k_Q = 1.5 \times 10^9$ L mol ⁻¹ s ⁻¹ .	80A339
15.49	2-Propanamine, 2-methyl-<i>N</i>-(2-sulfonatophenyl)methylene-, <i>N</i>-oxyl (2-SSPB)						
	H ₂ O	9.4×10^7			CP/Ac-23	S = MB; Q = N ₃ ; used $k_d = 5 \times 10^5$ s ⁻¹ , $k_Q = 1.5 \times 10^9$ L mol ⁻¹ s ⁻¹ .	80A339
15.50	Propane, 2-methyl-2-nitroso-						
	CH ₂ Cl ₂ / MeOH (94:6)	9.3×10^9			CR/A'c-32	A' = Rub; used $k_d = 1.1 \times 10^4$ s ⁻¹ , $k_{A'} = 4.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from (PhO) ₃ PO ₃ .	76F900
15.51	Pyrrole, 3,4-dihydro-2,2,3-trimethyl-, 1-oxide						
	CHCl ₃	5×10^7			CP/A'c-16	S = MB; A' = DPBF; k_d not given; $k = k_q$ (No reaction observed).	75F653
15.52	Pyrrole, 3,4-dihydro-3,5,5-trimethyl-, 1-oxide						
	CHCl ₃	2.1×10^7			CP/A'c-16	S = MB; A' = DPBF; k_d not given.	75F653
15.53	1-Pyrrolidinyloxy, 3-cyano-2,2,5,5-tetramethyl-4-nitro-						
	CH ₃ CN/ MeOH (96:4)	1.7×10^5			PL/Ld-2	S = HP.	92F402
15.54	1-Pyrrolidinyloxy, 2,5-di-(4-hydroxy-3-nitrophenyl)-2,5-dimethyl-						
	CH ₃ CN/ MeOH (96:4)	3.1×10^5			PL/Ld-2	S = HP.	92F402

TABLE 15. Rate constants for the interaction of singlet oxygen with oximes, hydrazones, nitrones, nitroso compounds and *N*-oxides. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
13,55	1-Pyrrolidinyloxy, 2-(4-fluoro-3-nitrophenyl)-2,5,5-trimethyl- CH ₃ CN/ MeOH (96:4)	1.7×10^5			PL/Ld-2	S = HP.	92F402
13,56	1-Pyrrolinyl-1-oxy, 5,5-dimethyl- H ₂ O	1.8×10^7			CP/Ac-23	S = MB; Q = N ₃ [•] ; used $k_d = 5 \times 10^5$ s ⁻¹ , $k_Q = 1.5 \times 10^9$ L mol ⁻¹ s ⁻¹ .	80A339

TABLE 16. Rate constants for the interaction of singlet oxygen with some compounds of biological interest.

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
16.1	Adenosine						
	D ₂ O pH = -7	<2 × 10 ⁵		293	PL/Ld-2	S = H ₂ TPPS ⁴⁻ ; No reaction at [A] = 2 × 10 ⁻² mol L ⁻¹ .	86A198
	H ₂ O pH = 7.1	≤1 × 10 ⁶		298	CP/Oc-19	S = Phenosafranin; No measurable effect.	78A360
16.2	Adenosine 5'-monophosphate						
	D ₂ O pH = -7	4.3 × 10 ⁴		293	PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	86A198
16.3	Adenosine triphosphate						
	D ₂ O	4 × 10 ⁴			PL/Ld-2	S = RF, H ₂ TPPS ⁴⁻ , or Chl in Triton X-100 micelles.	86F149
16.4	4-Androsten-3-one, 17-hydroxy-4-methyl-		>2 × 10 ²		CP/Ac-18	S = Poly-RB or RB or MB; A' = Linalool; used $\beta_{A'} = 0.18$ mol L ⁻¹ ; solvent is CH ₂ Cl ₂ or MeOH or C ₆ H ₆ .	80F111
16.5	Androst-5-en-17-one, 3-(acetyloxy)- (3β)		6.3	293	CP/Oc-14	S = HP.	57F008
	C ₆ H ₆ / C ₅ H ₅ N (91:9)						
16.6	Ascorbate ion						
	C ₅ H ₅ N	1.1 × 10 ⁷		303	CR/A'c-23	A' = DMA; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $k_{A'} = 2.1 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from MNPO ₂ .	83F407
	C ₅ H ₅ N	8.4 × 10 ⁶		303	CP/A'c-23	S = TPP; A' = DMA; used $k_d = 3.1 \times 10^4$ s ⁻¹ , $k_{A'} = 2.1 \times 10^7$ L mol ⁻¹ s ⁻¹ .	83F407
	C ₅ H ₅ N	7 × 10 ⁷			PL/Ld-2	S = TPP, MPDEE or PdMP.	80A398
	CD ₃ OD	1.5 × 10 ⁸		293	PL/Ld-2	S = HP.	90F411
	CH ₃ COCH ₃	9 × 10 ⁵			PL/Ld-2	S = TPP, MPDEE or PdMP.	80A398
	D ₂ O pH = -7	1.6 × 10 ⁸		293	PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	86A198
	D ₂ O	4 × 10 ⁷			PL/Ld-2	S = RF, water-sol. TPP derivs., or Chl a in micelles contg. Triton X-100; counter ion Na ⁺ .	86F149
	D ₂ O pD = 7.2	2.5 × 10 ⁶			CP/LI-12	S = Chrysenesulfonate ion; used $k_d = 1.8 \times 10^4$ s ⁻¹ .	83A205
	H ₂ O pH = 6.8	8.3 × 10 ⁶			CP/LI-12	S = Chrysenesulfonate ion; used $k_d = 2.6 \times 10^5$ s ⁻¹ .	83A205
	MeOH		0.012	293	CP/Oc-15	S = RB; $E_a = 6.3$ kJ mol ⁻¹ .	68F288
16.7	Azirino[2',3':3,4]pyrrolo[1,2-a]indole-4,7-dione, 6-amino-8-[[aminocarbonyloxy]methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl- (Mitomycin C)						
	H ₂ O	8.9 × 10 ⁹		297	CP/Ac-14	S = RF; used $k_d = 5.0 \times 10^5$ s ⁻¹ .	79F816
16.8	Benzo[e]naphtho[2',3':5,6]fluoreno[1,9ab]oxepin-5,10,19-trione, 5c,8,8a,16-tetrahydro-1,8,11,15,18-pentahydroxy-13-methyl- (Rubellin A)						
	CD ₃ OD	≤8 × 10 ⁶			CP/LI-12	S = RB; used $k_d = 4.2 \times 10^3$ s ⁻¹ .	92F063
16.9	Benzo[ghi]perylene-4,11-dione, 1-acetyl-1,2-dihydro-5,10-dihydroxy-2-(1-hydroxyethyl)-3,7,8,12-tetramethoxy- (Elsinochrome B)						
	CD ₃ OD	≤5.5 × 10 ⁶			CP/LI-12	S = RB; used $k_d = 4.2 \times 10^3$ s ⁻¹ .	92F063
16.10	Benzo[ghi]perylene-4,11-dione, 1,2-diacetyl-1,2-dihydro-5,10-dihydroxy-3,7,8,12-tetramethoxy-, trans- (Elsinochrome A)						
	CD ₃ OD	≤5 × 10 ⁶			CP/LI-12	S = RB; used $k_d = 4.2 \times 10^3$ s ⁻¹ .	92F063
16.11	Benzopyran-6-ol, 3,4-dihydro-2,5,7,8-tetramethyl-2-(4,8,12-trimethyltridecyl)-, acetate (α-Tocopheryl acetate)						
	C ₅ H ₅ N	≤1.6 × 10 ⁶			CP/A'c-23	S = A' = Rub; used $k_d = 6.0 \times 10^4$ s ⁻¹ , $k_{A'} = 4 \times 10^7$ L mol ⁻¹ s ⁻¹ .	743112

TABLE 16. Rate constants for the interaction of singlet oxygen with some compounds of biological interest. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
16.12	1,4-Benzoquinone						
	C ₆ H ₆ / EtOH (67:33)	1.6 × 10 ⁷			CP/A'c-19	S = RB; A' = Chl a; used $k_d = 1 \times 10^5$ s ⁻¹ .	78F404
	EtOH	3.4 × 10 ⁷			CP/A'c-19	S = RB; A' = Chl a; used $k_d = 1 \times 10^5$ s ⁻¹ .	78F404
16.13	1,4-Benzoquinone, methyl-						
	C ₆ H ₅ CH ₃	<10 ⁴			PL/Ld-2	S = TPP.	93Y025
16.14	Cholesterol						
	C ₅ H ₅ N		0.89	293	CP/Oc-14	S = HP.	57F008
	C ₆ D ₆	5.7 × 10 ⁴			PL/Ld-2	S = TPP.	89A331
	MeOH/ H ₂ O (95:5)	2.5 × 10 ⁸		310	CR/LI-12	used $k_d = 1.8 \times 10^5$ s ⁻¹ ; soln. cont. 0.05 mol L ⁻¹ MeONa and 5 × 10 ⁻⁴ mol L ⁻¹ CoCl ₂ , ¹ O ₂ * from autoxidation of oxytetracycline.	92M228
16.15	Cholesteryl benzoate						
	C ₆ H ₆ / C ₅ H ₅ N (91:9)		4.0	293	CP/Oc-14	S = HP.	57F008
16.16	Cobrynic acid, bis(cyano)-7-de(carboxymethyl)-7,8-didehydro-, hexamethyl ester						
	C ₆ D ₆	8 × 10 ⁶		293	CP/Ac-14	S = A; k_d not given.	83F222
	CHCl ₃	5 × 10 ⁶		293	CP/Ac-14	S = A; k_d not given.	83F222
	MeOH	6 × 10 ⁶		293	CP/Ac-14	S = A; used $k_d = 1 \times 10^5$ s ⁻¹ .	83F222
16.17	Coenzyme A						
	CHCl ₃ / EtOH (50:50)	8.9 × 10 ⁷ 1.2 × 10 ⁶ (k_r)		310	CR/LI,Ac-12,14	used $k_d = 1 \times 10^5$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	90E622
16.18	Cytidine						
	H ₂ O pH = 7.1	≤1 × 10 ⁶		298	CI/Oc-19	S = Phenosafraninc; No measurable effect.	78A360
16.19	Cytidine 5'-monophosphate						
	D ₂ O pH = -7	2.8 × 10 ⁴		293	PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	86A198
16.20	Cytosine						
	D ₂ O pH = -7	<8 × 10 ⁴		293	PL/Ld-2	S = H ₂ TPPS ⁴⁻ ; No reaction at [A] = 5 × 10 ⁻² mol L ⁻¹ .	86A198
	DMSO/ H ₂ O (75:25)	6.8 × 10 ⁴		298	CP/A'c-16	S = MB; A' = DPBF; used $k_d = 1.2 \times 10^5$ s ⁻¹ .	86R210
16.21	2'-Deoxyadenosine 5'-monophosphate						
	H ₂ O pH = 7.0, 10.5	<10 ⁵			PL/Ld-2	S = RB.	87A043
	D ₂ O pH = -7	7.5 × 10 ⁴		293	PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	86A198
16.22	2'-Deoxycytidine-5'-monophosphate						
	H ₂ O pH = 7.0, 10.5	<10 ⁵			PL/Ld-2	S = RB.	87A043
16.23	2'-Deoxyguanosine 5'-monophosphate						
	D ₂ O pH = -7	5 × 10 ⁶		293	PL/Ld-2	S = H ₂ TPPS ⁴⁻ .	86A198
	H ₂ O pH = 7.0	5.3 × 10 ⁶			PL/Ld 2	S = RB.	87A043
	pH = 10.5	5.7 × 10 ⁷					

TABLE 16. Rate constants for the interaction of singlet oxygen with some compounds of biological interest. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
16.24	Deoxyribonucleic acid (DNA)						
	D ₂ O pH = 7	7 × 10 ⁵			PL/Ld-2	S = AlCl(tspc).	89R092
	H ₂ O pH = 7.0 pH = 10.5	5.1 × 10 ⁵ 2.3 × 10 ⁶			PL/Ld-2	S = RB.	87A043
16.25	3'-Deoxythymidine 5'-monophosphate						
	D ₂ O pH = -7	1.4 × 10 ⁵		293	PL/Ld-2	S = H ₂ TPPS ⁶⁺ .	86A198
16.26	Ergosterol						
	C ₅ H ₅ N		4.5 × 10 ⁻³	293	CP/Oc-14	S = HP.	57F008
	C ₆ H ₆	2.1 × 10 ⁷			PL/Ld-2	S = TPP.	87E055
16.27	Ergosterol acetate						
	CHCl ₃	2.7 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81F445
16.28	1,3,5(10),8-Estratetraen-17-one, 3-methoxy-						
	MeOH	1.6 × 10 ⁷ (k_r)	9.2 × 10 ⁻³ (β_r)		CP/Ac-14	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	91F405
16.29	1,3,5(10),9(11)-Estratetraen-17-one, 3-(acetyloxy)-						
	MeOH	5.5 × 10 ⁵ (k_r)		273	CP/Ac-17	S = RB; A' = 3-Methoxy-1,3,5(10),9(11)-estratetraen-17-one; used $k_r^{A'} = 4.3 \times 10^6$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.13$.	89A202
16.30	1,3,5(10),9(11)-Estratetraen-17-one, 3-(benzoyloxy)-						
	MeOH	7.5 × 10 ⁵ (k_r)		273	CP/Ac-17	S = RB; A' = 3-Methoxy-1,3,5(10),9(11)-estratetraen-17-one; used $k_r^{A'} = 4.3 \times 10^6$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.17$.	89A202
16.31	1,3,5(10),9(11)-Estratetraen-17-one, 3-hydroxy-						
	MeOH	6.8 × 10 ⁶ (k_r)		273	CP/Ac-17	S = RB; A' = 3-Methoxy-1,3,5(10),9(11)-estratetraen-17-one; used $k_r^{A'} = 4.3 \times 10^6$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 1.6$.	89A202
16.32	1,3,5(10),9(11)-Estratetraen-17-one, 3-methoxy-						
	MeOH	4.3 × 10 ⁶ (k_r)	0.033 (β_r)	273	CP/Ac-14	S = RB; used $k_d = 1.4 \times 10^5$ s ⁻¹ .	89A202
16.33	1,3,5(10),9(11)-Estratetraen-17-one, 3-(toluenesulfonyloxy)-						
	MeOH	2.7 × 10 ⁵ (k_r)		273	CP/Ac-17	S = RB; A' = 3-Methoxy-1,3,5(10),9(11)-estratetraen-17-one; used $k_r^{A'} = 4.3 \times 10^6$ L mol ⁻¹ s ⁻¹ ; meas. $k_r/k_r^{A'} = 0.06$.	89A202
16.34	Glucose						
	D ₂ O	1.4 × 10 ⁴			PL/Ld-2	S = RF, water-sol. TPP derivs., or Chl a in micelles contg. Triton X-100.	86F149
16.35	Guanine						
	DMSO/ H ₂ O (75:25)	5.0 × 10 ⁵		298	CP/A'c-16	S = MB; A' = DPBF; used $k_d = 1.2 \times 10^5$ s ⁻¹ , $k_{A'} = 6.9 \times 10^8$ L mol ⁻¹ s ⁻¹ .	86R210
16.36	Guanosine						
	D ₂ O pD = 7.4	6.2 × 10 ⁶		310	CR/LI-12	used $k_d = 1.9 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	91R127
	H ₂ O pH = 7.1	≤ 1 × 10 ⁶		298	CP/Oc-19	S = Phenosafranine; No measurable effect.	78A360
	H ₂ O/ MeOH (50:50)	≤ 1 × 10 ⁷			PL/A'd-5	S = MB; A' = DPBF.	72F516

TABLE 16. Rate constants for the interaction of singlet oxygen with some compounds of biological interest. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
16.37	Guanosine, 2'-deoxy-						
	D ₂ O pD = 7.4	5.2×10^6		310	CR/LI-12	used $k_d = 1.9 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from NDPO ₂ .	91R127
	D ₂ O pH = -7	5×10^6		293	PL/Ld-2	S = H ₂ TPPS ⁺ .	86A198
	H ₂ O pH = 10				CP/A'c-17	S = MB; A' = BHMF; meas. $k_r/k_r^{A'} = 0.4$; sensitizer is immobilized on glass beads.	83F166
16.38	Guanosine 5'-monophosphate						
	D ₂ O pH = -7	5×10^6		293	PL/Ld-2	S = H ₂ TPPS ⁺ .	86A198
16.39	Imidazo[1,2-a]pyrazin-3-one, 4-methyl-6-[4-[2-[3-carboxy-4-(6-hydroxy-3-xanthenon-9-yl)phenylthiocarbamylethoxy]phenyl]- (FCLA)						
	H ₂ O pH = 7.1	8.0×10^7			CL/LI-12	S = RB; used $k_d = 2.4 \times 10^5$ s ⁻¹ .	90F502
16.40	Imidazo[1,2-a]pyrazin-3-one, 2-methyl-6-(4-methoxyphenyl)- (MCLA)						
	H ₂ O pH = 5.4	2.9×10^9			CL/LI-12	S = RB; used $k_d = 2.4 \times 10^5$ s ⁻¹ .	91E570 89E798
16.41	Imidazo[1,2-a]pyrazin-3-one, 2-methyl-6-phenyl- (CLA)						
	H ₂ O pH = 7.1	6.3×10^8			CL/LI-12	S = RB; used $k_d = 2.4 \times 10^5$ s ⁻¹ .	90F502
16.42	Inosine diphosphate, ester with 1,4-dihydro-1-β-D-ribofuranosyl-3-pyridinecarboxamide						
	CH ₃ CN/ D ₂ O (80:20)	1.6×10^8			PL/A'd-5	S = 2-ACN; A' = DPBF.	81A191
	CH ₃ CN/ D ₂ O (20:80)	8.8×10^7 (k_r) 7.9×10^7 (k_q)			PL/A'd-5	S = 2-ACN; A' = DPBF; k_r calcd. from k_A ; $56 \pm 11\%$ electron transfer giving O ₂ ⁻ , detd. from buildup of radical anion in soln. contg. (2-20) × 10 ⁻⁵ mol L ⁻¹ 1,4-benzoquinone.	81A191
16.43	Methyl stearate						
	C ₅ H ₅ N	$\leq 5 \times 10^4$ (k_r)			CP/Ac,A'c-17	S = PP; A' = Cholesterol; No measurable effect.	743115
16.44	1,4-Naphthoquinone, 2-methyl-						
	EtOH	2.4×10^6			CP/A'c-19	S = RB; A' = Chl a; used $k_d = 1 \times 10^5$ s ⁻¹ .	78F404
16.45	1,8-Naphthyridine-3-carboxylic acid, 1,4-dihydro-1-ethyl-7-methyl-4-oxo- (Nalidixic acid)						
	D ₂ O pH = 4.4	-2.5×10^8			PL/Ld-12	S = A; used $k_d = 3 \times 10^4$ s ⁻¹ ; estd. from increased lifetime on decreasing concn.	88R070
16.46	1,8-Naphthyridine-3-carboxylic acid, 1,4-dihydro-1-ethyl-7-methyl-4-oxo-, anion (Nalidixic acid anion)						
	D ₂ O pH = 8.9	-1×10^8			PL/Ld-12	S = A; used $k_d = 3 \times 10^4$ s ⁻¹ ; estd. from increased lifetime on decreasing concn.	88R070
16.47	Nicotinamide adenine dinucleotide						
	D ₂ O	3×10^4			PL/Ld-2	S = RF, water-sol. TPP derivs., or Chl a in micelles contg. Triton X-100.	86F149
	D ₂ O	$< 5 \times 10^6$			PL/A'd-5	S = 2-ACN; A' = DPBF.	80R072 81A191
16.48	Nicotinamide adenine dinucleotide, reduced						
	CH ₃ CN/ MeOH (75:25)	7.5×10^7			PL/A'd-5	S = 2-ACN; A' = DPBF.	81A191
	CH ₃ CN/ D ₂ O (20:80)	4.3×10^7 (k_r) 3.6×10^7 (k_q)			PL/A'd-5	S = 2-ACN; A' = DPBF; k_r calcd. from k_A ; $54.5 \pm 15\%$ electron transfer giving O ₂ ⁻ , detd. from buildup of radical anion in soln. contg. (2-20) × 10 ⁻⁵ mol L ⁻¹ 1,4-benzoquinone.	81A191

TABLE 16. Rate constants for the interaction of singlet oxygen with some compounds of biological interest. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
16.48	Nicotinamide adenine dinucleotide, reduced — Continued						
	D ₂ O	2×10^7			PL/Ld-2	S = RF, water-sol. TPP derivs., or Chl a in micelles contg. Triton X-100.	86F149
	D ₂ O (mic)	7.9×10^7			PL/A'd-5	S = 2-ACN; A' = DPBF; 0.1 mol L ⁻¹ SDS.	80R072 81A191
	H ₂ O pH = 7.4	$\sim 2 \times 10^9$			CP/Oc-19	S = FMN; Q = N ₃ ⁻ ; used $k_Q = 2 \times 10^9$ L mol ⁻¹ s ⁻¹ .	81A422
16.49	Nicotinamide adenine dinucleotide phosphate						
	D ₂ O	2×10^5			PL/Ld-2	S = RF, H ₂ TPPS ⁴⁻ , or Chl in Triton X-100 micelles.	86F149
16.50	Nicotinamide-adenine dinucleotide phosphate, reduced						
	CH ₃ CN/ D ₂ O (80:20)	1.3×10^8			PL/A'd-5	S = 2-ACN; A' = DPBF.	81A191
	CH ₃ CN/ D ₂ O (20:80)	8.4×10^7 (k_p) 5.0×10^7 (k_q)			PL/A'd-5	S = 2-ACN; A' = DPBF; k_p calcd. from k_A ; $63 \pm 9\%$ electron transfer giving O ₂ ⁻ , detd. from buildup of radical anion in soln. contg. (2-20) $\times 10^{-5}$ mol L ⁻¹ 1,4-benzoquinone.	81A191
16.51	Nicotinamide mononucleotide, reduced						
	CH ₃ CN/ D ₂ O (80:20)	8.0×10^7			PL/A'd-5	S = 2-ACN; A' = DPBF.	81A191
16.52	Ommochrome						
	D ₂ O pD = 7.5-8.1	3×10^6			PL/Ld-2	S = ?; rate is per monomer unit of MW = 600; ommochromes extracted from shrimp eyes contain pigments of the ommin group, e.g. phenothiazine-phenoxazine structures with 3-amino-3-carboxy-1-oxopropyl side chains.	87R227
16.53	3,10-Perylenedione, 4,9-dihydroxy-1,12-bis(2-hydroxypropyl)-2,6,7,11-tetramethoxy- (Phleichrome)						
	CD ₃ OD	$\leq 6 \times 10^6$			CP/LI-12	S = RB; used $k_d = 4.2 \times 10^3$ s ⁻¹ .	92F063
16.54	Perylo[1,12-def]-1,3-dioxepin-5,11-dione, 6-amino-12-hydroxy-8,9-bis(2-hydroxypropyl)-7,10-dimethoxy- (Aminocercosporin)						
	CD ₃ OD	$\leq 3 \times 10^6$			CP/LI-12	S = RB; used $k_d = 4.2 \times 10^3$ s ⁻¹ .	92F063
16.55	Perylo[1,12-def]-1,3-dioxepin-5,11-dione, 6,12-dihydroxy-8,9-bis(2-hydroxypropyl)-7,10-dimethoxy- (Cercosporin)						
	CD ₃ OD	3.5×10^6			CP/LI-12	S = RB; used $k_d = 4.2 \times 10^3$ s ⁻¹ .	92F063
16.56	Perylo[1,12-def]-1,3-dioxepin-5,12-dione, 6,11-diamino-8,9-bis(2-hydroxypropyl)-7,10-dimethoxy-						
	CD ₃ OD	3.6×10^6			CP/LI-12	S = RB; used $k_d = 4.2 \times 10^3$ s ⁻¹ .	92F063
16.57	Perylo[1,12-def]-1,3-dioxepin-6,11-dione, 8,9-bis(2-hydroxypropyl)-5,7,10,12-tetramethoxy-						
	CD ₃ OD	1.1×10^7			CP/LI-12	S = RB; used $k_d = 4.2 \times 10^3$ s ⁻¹ .	92F063
16.58	Perylo[1,12-def]-1,3-dioxepin-6,11-dione, 5-hydroxy-8,9-bis(2-hydroxypropyl)-7,10,12-trimethoxy-						
	CD ₃ OD	$\leq 10^7$			CP/LI-12	S = RB; used $k_d = 4.2 \times 10^3$ s ⁻¹ .	92F063
16.59	Phenanthro[1,10,9,8-opqra]perylene-7,14-dione, 1,3,4,6,8,13-hexahydroxy-10,11-dialkyl-						
	CH ₃ CN	2.0×10^{10}			PL/Ld-2	S = Riboflavine tetrabutryrate; Red pigment extracted from <i>Blepharima japonicum</i> ; on irradiation red form converts to blue form which reacts with ¹ O ₂ [*] with $k = 4.4 \times 10^{10}$ L mol ⁻¹ s ⁻¹ ; k probably overestimated due to impurities in the crude extracts.	92R107
16.60	Phenanthro[1,10,9,8-opqra]perylene-7,14-dione, 1,3,4,6,8,13-hexahydroxy-10,11-dimethyl- (Hypericin, HYP)						
	EtOH	5.0×10^9			PL/Ld-2	S = Riboflavine tetrabutryrate.	92R107

TABLE 16. Rate constants for the interaction of singlet oxygen with some compounds of biological interest. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
16.61	Pregna-5,16-dien-20-one, 3-(acetyloxy)- (3β)						
	C ₆ H ₆ / C ₅ H ₅ N (91:9)		4.7	293	CP/Oc-14	S = HP.	57F008
16.62	Pregna-5-en-20-one, 3-hydroxy-, (3β)						
	C ₅ H ₅ N		1.7	293	CP/Oc-15	S = HP.	587002
	C ₆ H ₆ / C ₅ H ₅ N (60:40)		1.8	293	CP/Oc-15	S = HP.	587002
	C ₆ H ₆ / C ₅ H ₅ N (71:29)		1.8	293	CP/Oc-14	S = HP.	57F008
16.63	Purine, 6-amino- (Adenine)						
	D ₂ O pH = -7	<4 × 10 ⁵		293	PL/Ld-2	S = H ₂ TPPS ⁴⁻ ; No reaction at [A] = 9 × 10 ⁻³ mol L ⁻¹ .	86A198
	DMSO/ H ₂ O (75:25)	7.2 × 10 ⁴		298	CP/A'c-16	S = MB; A' = DPBF; used $k_d = 1.2 \times 10^5$ s ⁻¹ , $k_{A'}$ = 6.9 × 10 ⁸ L mol ⁻¹ s ⁻¹ .	86R210
	H ₂ O pH = 7.1	≤1 × 10 ⁶		298	CP/Oc-19	S = Phenosafranine; No measurable effect.	78A360
16.64	Purin-2,6,8-trione, 7,9-dihydro-, anion (Urate ion)						
	D ₂ O pD = 7.4	3.6 × 10 ⁸		298	PL/Ld-2	S = H ₂ TMpyP ⁴⁺ .	90R134
	H ₂ O pH = 7.0			283	CP/A'c-17	S = RB; A' = BHMF; meas. $k_t/k_r^{A'} = 1.0$; sensitizer immobilized on glass beads.	88R064
	H ₂ O pH = 7.0			283	CP/A'c-17	S = RB; A' = BHMF; meas. $k_t/k_r^{A'} = 0.50$.	88R064
16.65	2-Pyrimidinamine, N,N,4,5-tetramethyl-6-(phenylmethoxy)-						
	CHCl ₃	9.0 × 10 ⁶			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81A363
16.66	Pyrimidin-4-ol, 5-butyl-2-(dimethylamino)-6-methyl- (Dimethirimol)						
	CHCl ₃	5.5 × 10 ⁶			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81A363
16.67	Pyrimidin-4-ol, 5-butyl-2-(ethylamino)-6-methyl- (Ethirimol)						
	CHCl ₃	2.3 × 10 ⁶			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81A363
16.68	Pyrimidin-4-ol, 2-(diethylamino)-6-methyl-						
	CHCl ₃	7.0 × 10 ⁵			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81A363
16.69	Pyrimidin-4-ol, 2-(dimethylamino)-5,6-dimethyl-						
	CHCl ₃	1.2 × 10 ⁷			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81A363
	H ₂ O pH = 4.0	4.4 × 10 ⁷			CP/Oc-15	S = RB; used $k_d = 5 \times 10^5$ s ⁻¹ .	83A315
	pH = 7.0	8 × 10 ⁷					
	pH = 9.0	1.4 × 10 ⁸					
	H ₂ O	9.0 × 10 ⁷		296	CP/Oc-15	S = RB; used $k_d = 5 \times 10^5$ s ⁻¹ , $\Delta S^\ddagger = 150.5$ J K ⁻¹ mol ⁻¹ ; $E_a = 71.9$ kJ mol ⁻¹ ; studied at 279-296 K.	83A315
16.70	Pyrimidin-4-ol, 2-(dimethylamino)-6-methyl-						
	CHCl ₃	1.0 × 10 ⁶			CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	81A363

TABLE 16. Rate constants for the interaction of singlet oxygen with some compounds of biological interest. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
16.71	Rhodopsin H ₂ O pH = 8	1.1×10^9			CP/Pa-15	S = Ret; used $k_d = 3.5 \times 10^5$ s ⁻¹ ; membrane suspension; sulfur radicals obs. by esr.	85A44 ¹
16.72	Riboflavin MeOD	6.0×10^7			PL/Ld-2	S = A.	88A16 ⁵
16.73	Sitosteryl acetate C ₆ H ₆ /C ₅ H ₅ N (91:9)		6.5	293	CP/Oc-14	S = HP.	57F008
16.74	Stigmasteryl acetate C ₆ H ₆ /C ₅ H ₅ N (91:9)		4.1	293	CP/Oc-14	S = HP.	57F008
16.75	Sucrose D ₂ O	3×10^4			PL/Ld-2	S = RF, water-sol. TPP derivs., or Chl a in micelles contg. Triton X-100.	86F14 ⁹
16.76	4-Thiouridine D ₂ O pH = -7	1.2×10^6		293	PL/Ld-2	S = H ₂ TPPS ⁴⁺ .	86A198
16.77	Thymidine D ₂ O pH = -7	3×10^4		293	PL/Ld-2	S = H ₂ TPPS ⁴⁺ .	86A198
16.78	Thymidine 5'-monophosphate H ₂ O pH = 7.0, 10.5	$<10^5$			PL/Ld-2	S = RB.	87A043
16.79	Thymine D ₂ O pH = -7	$<1.6 \times 10^5$		293	PL/Ld-2	S = H ₂ TPPS ⁴⁺ ; No reaction at [A] = 2.5×10^{-2} mol L ⁻¹ .	86A198
	DMSO/H ₂ O (75:25)	2.5×10^4		298	CP/A'-c-16	S = MB; A' = DPBF; used $k_d = 1.2 \times 10^5$ s ⁻¹ .	86R210
	H ₂ O pH = 7.1	$\leq 1 \times 10^6$		298	CP/Oc-19	S = Phenosafranine; No measurable effect.	78A360
16.80	Uridine D ₂ O pH = -7	5×10^4		293	PL/Ld-2	S = H ₂ TPPS ⁴⁺ .	86A198

TABLE 17. Rate constants for the interaction of singlet oxygen with miscellaneous substrates.

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
17.1	Acetic acid						
	CCl ₄	2.3×10^3			MP/LI-12	S = TPP; used $k_d = 42$ s ⁻¹ .	83E425 83F151
17.2	Acetone						
	CCl ₄	1.9×10^3		298	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; used $k_d = 32$ s ⁻¹ .	82E329
17.3	Acetone- <i>d</i> ₆						
	CCl ₄	95		298	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; used $k_d = 32$ s ⁻¹ .	82E329
17.4	Acetonitrile						
	CCl ₄	9×10^2		298	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; used $k_d = 32$ s ⁻¹ .	82E329
17.5	Acetonitrile- <i>d</i> ₃						
	CCl ₄	55		298	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; used $k_d = 32$ s ⁻¹ .	82E329
17.6	Butanoic acid						
	C ₆ D ₆	3.7×10^3			PL/Ld-2	S = TPP.	89A331
17.7	Butanoic acid, 3,3-dimethyl-2-oxo-						
	MeOH	$\sim 1 \times 10^6$			PL/A'd-5	S = MB; A' = DPBF.	79A386
17.8	1-Butanol						
	CCl ₄	2×10^3			PL/A'd-8	S = MB; A' = DPBF.	76F903
17.9	Chloroform						
	CCl ₄	5×10^2		298	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; used $k_d = 32$ s ⁻¹ .	82E329
17.10	Chloroform- <i>d</i>						
	CCl ₄	22		298	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; used $k_d = 32$ s ⁻¹ .	82E329
17.11	2,5-Cyclohexadien-4-one, 1,2-ethanediylidenebis[3-[2-hydroxy-5-methyl-3-(1,1-dimethylethyl)benzyl]-5-(1,1-dimethylethyl)]-						
	CH ₂ Cl ₂	8.2×10^9		303	CP/Oc-23	S = MB; A' = TME; used $k_d = 1.2 \times 10^4$ s ⁻¹ , $k_{A'} = 3.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; k calcd. in [81Z251].	76F921
17.12	2,5-Cyclohexadien-4-one, 4,4'-(1,2-ethanediylidene)bis[2,6-bis(1,1-dimethylethyl)]-						
	CH ₂ Cl ₂	5.4×10^9		303	CP/Oc-23	S = MB; A' = Rub; used $k_d = 1.2 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; k calcd. in [81Z251].	76F921
	CH ₂ Cl ₂	2.3×10^9		303	CP/Oc-23	S = MB; A' = CHD; used $k_d = 1.2 \times 10^4$ s ⁻¹ , $k_{A'} = 3.5 \times 10^6$ L mol ⁻¹ s ⁻¹ ; k calcd. in [81Z251].	76F921
	CH ₂ Cl ₂	4.3×10^9		303	CP/Oc-23	S = MB; A' = TME; used $k_d = 1.2 \times 10^4$ s ⁻¹ , $k_{A'} = 4.0 \times 10^7$ L mol ⁻¹ s ⁻¹ ; k calcd. in [81Z251].	76F921
17.13	Cyclohexane						
	CCl ₄	6.4×10^3		298	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; used $k_d = 32$ s ⁻¹ .	82E329
17.14	Cyclohexane- <i>d</i> ₁₂						
	CCl ₄	3.4×10^2		298	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; used $k_d = 32$ s ⁻¹ .	82E329
17.15	1,3-Cyclohexanedione, 5,5-dimethyl-						
	D ₂ O pD = 11.2	9×10^7		310	CR/A'c-32	A' = DPBF; used $k_d = 1.5 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from Dopamine/H ₂ O ₂ .	89M038

TABLE 17. Rate constants for the interaction of singlet oxygen with miscellaneous substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
17.15	1,3-Cyclohexanedione, 5,5-dimethyl- — Continued						
	D ₂ O pD = 11.2	1.2 × 10 ⁸		310	CR/A'-c-32	A' = DPBF; used $k_d = 1.5 \times 10^4$ s ⁻¹ ; ¹ O ₂ * from DOPA/H ₂ O ₂ .	89M038
17.16	Dichloromethane						
	CCl ₄	1.1 × 10 ³		298	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; used $k_d = 32$ s ⁻¹ .	82E329
17.17	Dichloromethane-d₂						
	CCl ₄	5.3 × 10 ²		298	CP/LI-12	S = Benz[de]anthracen-7-one, phenalenone or fluorenone; used $k_d = 32$ s ⁻¹ .	82E329
17.18	1,1-Dimethylethyl methyl ether						
	CD ₃ OD	4.1 × 10 ³			CP/LI-12	S = RB; used $k_d = 4.0 \times 10^3$ s ⁻¹ .	92A386
	(CH ₃) ₃ COCH ₃	4.1 × 10 ³			PL/Ld-2	S = TPP.	92A386
17.19	2,2-Dimethylpropyl methyl ether						
	CD ₃ OD	4.9 × 10 ³			CP/LI-12	S = RB; used $k_d = 4.0 \times 10^3$ s ⁻¹ .	92A386
	(CH ₃) ₃ CCH ₂ OCH ₃	2.9 × 10 ³			PL/Ld-2	S = TPP.	92A386
17.20	1,4-Dioxane						
	CCl ₄	7 × 10 ²			PL/A'd-8	S = MB; A' = DPBF.	76F903
17.21	Disilirane, 1,1,2,2-tetrakis(2,4,6-trimethylphenyl)-						
	C ₆ H ₆	6.4 × 10 ⁴			CP/LI-12	S = TPP; k_d not given.	93F160
17.22	Docosanoic acid (Behenic acid)						
	CCl ₄	1.1 × 10 ⁴			MP/LI-12	S = TPP; used $k_d = 42$ s ⁻¹ .	83E425 83F151
17.23	Dodecane						
	CCl ₄	1.1 × 10 ⁴ (k_q)			MP/LI-12	S = TPP; used $k_d = 39$ s ⁻¹ .	83E813
17.24	Dodecanoic acid						
	CCl ₄	6.1 × 10 ³			MP/LI-12	S = TPP; used $k_d = 42$ s ⁻¹ .	83E425 83F151
17.25	Dodecyl sulfate, sodium salt						
	H ₂ O (mic)	1.0 × 10 ⁹		313	CP/A'-c-23	S = Py; A' = DPBF; Q = NaN ₃ ; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; S and A' solubilized in SDS micelles.	78A174
17.26	Dodecyltrimethylammonium chloride						
	H ₂ O (mic)	1.7 × 10 ⁸		313	CP/A'-c-23	S = Py; A' = DPBF; Q = NaN ₃ ; used $k_d = 5.0 \times 10^5$ s ⁻¹ ; S and A' solubilized in DTAC micelles.	78A174
17.27	Eicosanoic acid (Arachidic acid)						
	C ₆ D ₆	1.2 × 10 ⁴			PL/Ld-2	S = TPP.	89A331
	CCl ₄	1.0 × 10 ⁴			MP/LI-12	S = TPP; used $k_d = 42$ s ⁻¹ .	83E425 83F151
17.28	Ethane, iodo-						
	C ₆ H ₅ Br/ CH ₃ COCH ₃ (67:33)	≤10 ⁶			CP/A'-c-23	S = A' = Rub; No measurable effect.	767126
	C ₆ H ₅ Br/ MeOH (67:33)	≤10 ⁶			CP/A'-c-23	S = A' = Rub; No measurable effect.	767126
	C ₆ H ₆	2 × 10 ⁴			PL/A'd-8	S = An; A' = DPBF.	76F902

TABLE 17. Rate constants for the interaction of singlet oxygen with miscellaneous substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
17.29	Ethanol						
	CCl ₄	2×10^3			PL/A'd-8	S = MB; A' = DPBF.	76F903
17.30	Ethylene-propylene-ethylidenenorbornene terpolymer						
	c-C ₆ H ₁₂	3.6×10^4 (k_r)		298	CP/Ac-17	S = A' = DPBF; used $k_r A' = 5.4 \times 10^8$ L mol ⁻¹ s ⁻¹ ; [A] = 5 g/L, assuming that reaction is only at the ethylenenorbornene groups, $k = 8.8 \times 10^7$.	84P629
17.31	Formamide, <i>N,N</i> -dimethyl-						
	EtOH	3.0×10^2 (k_r)			CP/Pa-19	S = RB; used $k_d = 8.3 \times 10^4$ s ⁻¹ ; used k_d/k_r (not reported); k_r derived assuming a singlet oxygen mechanism.	75F655
17.32	Fullerene-C ₆₀						
	C ₆ D ₆	5×10^5			PL/Ld-2	S = TPP.	91E003
	CCl ₄	6.1×10^4			PL/Ld-2	S = A.	93E091
17.33	Fullerene-C ₇₀						
	C ₆ F ₆	3×10^6			PL/Ld-2	S = A.	93E301
17.34	Heptane						
	CCl ₄ / MeOH (96:4)	4×10^2			PL/A'd-8	S = MB; A' = DPBF.	777162
17.35	Heptane, 3-methyl -						
	CCl ₄ / MeOH (96:4)	6×10^2			PL/A'd-8	S = MB; A' = DPBF.	777162
17.36	Heptane, 4-methyl -						
	CCl ₄ / MeOH (96:4)	5×10^2			PL/A'd-8	S = MB; A' = DPBF.	777162
17.37	Hexadecanoic acid						
	C ₆ D ₆	1.2×10^4			PL/Ld-2	S = TPP.	89A331
	CCl ₄	8.0×10^3			MP/LI-12	S = TPP; used $k_d = 42$ s ⁻¹ .	83E425 83F151
17.38	Hexanoic acid						
	C ₆ D ₆	5.6×10^3			PL/Ld-2	S = TPP.	89A331
	CCl ₄	3.9×10^3			MP/LI-12	S = TPP; used $k_d = 42$ s ⁻¹ .	83E425 83F151
17.39	Malonic acid						
	D ₂ O	4×10^4			PL/Ld-2	S = RF, water-sol. TPP derivs., or Chl a in micelles contg. Triton X-100.	.86F149
17.40	Methanol						
	CCl ₄	3×10^3			PL/A'd-8	S = MB; A' = DPBF.	76F903
17.41	5,8-Methano-[1,2,4]triazolo[1,2- <i>a</i>]pyridazine-1,3-dione, tetrahydro-2-methyl-						
	CH ₂ Cl ₂	4×10^4			PR/A'd-8	S = An; A' = DPBF.	79A457
17.42	Methyl esters of fatty acids from peanut oil						
	MeOH/ CHCl ₃ (80:20)	8×10^4			PL/Ld-2	S = ZnTPP.	91U181
17.43	Methyl esters of fatty acids from soybean oil						
	MeOH	1.7×10^5			CP/A'c-33	S = A' = Rub; used $k_d = 1.4 \times 10^5$ s ⁻¹ , $k_A = 6 \times 10^7$ L mol ⁻¹ s ⁻¹ .	91U201
	MeOH/ CHCl ₃ (80:20)	3.6×10^5			PL/Ld-2	S = ZnTPP.	91U181

TABLE 17. Rate constants for the interaction of singlet oxygen with miscellaneous substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) · (mol L ⁻¹)	T (K)	Method	Comment	Ref.
17.44	Methyl esters of fatty acids from sunflower oil MeOH/ CHCl ₃ (80:20)	9 × 10 ⁴			PL/Ld-2	S = ZnTPP.	91U181
17.45	4-Morpholineethanesulfonic acid (MES) D ₂ O	1.6 × 10 ⁴			PL/Ld-2	S = RF, water-sol. TPP derivs., or Chl a in micelles contg. Triton X-100.	86F149
17.46	Oxadisilirane, 2,2,3,3-tetrakis(2,6-diethylphenyl)- C ₆ H ₆	8.4 × 10 ⁴			CP/LI-12	S = TPP; k_d not given.	93F160 90F241
17.47	Oxadisilirane, 2,2,3,3-tetrakis(2,6-diisopropylphenyl)- C ₆ H ₆	7.1 × 10 ⁴			CP/LI-12	S = TPP; k_d not given.	93F160 90F241
17.48	Oxalate ion D ₂ O	2 × 10 ⁴			PL/Ld-2	S = RF, water-sol. TPP derivs., or Chl a in micelles contg. Triton X-100; counter ion K ⁺ .	86F149
17.49	Oxirane, 2,3-diphenyl-, (E)- ClCF ₂ CCl ₂ F	5.0 × 10 ³			PL/Ld-2	S = DNT.	87A072
17.50	Pentane CCl ₄	5.9 × 10 ³			MP/LI-12	S = TPP; used $k_d = 39$ s ⁻¹ .	83E813
17.51	Pentanedioic acid, 2-oxo- (α-Ketoglutaric acid) MeOH	~3 × 10 ⁶			PL/A'd-5	S = MB; A' = DPBF.	79A386
17.52	Phosphoric acid, mono(2-aminoethyl) mono(2,3-dihydroxypropyl) ester (Phosphatidylethanolamine) CCl ₄	10 ⁵			MP/LI-12	S = PP; used $k_d = 36$ s ⁻¹ .	79F463
17.53	Phosphoric acid, mono(2-dimethylammonioethyl) mono(2,3-dihydroxypropyl) ester (Phosphatidylcholine, Lecithin) CCl ₄ D ₂ O (ves) H ₂ O (ves)	10 ⁵ 7.4 × 10 ⁵ 7.5 × 10 ⁵			MP/LI-12 CP/Pa-15 CP/Pa-15	S = PP; used $k_d = 36$ s ⁻¹ . S = RB; used $k_d = 1.8 \times 10^4$ s ⁻¹ ; P = Lecithin hydroperoxide; 0.05% egg yolk lecithin, ave. MW per monomer = 750. S = RB; used $k_d = 2.5 \times 10^5$ s ⁻¹ ; P = Lecithin hydroperoxide; 0.05% egg yolk lecithin.	79F463 86N104 86N104
17.54	Phycol-400 D ₂ O	2.4 × 10 ⁷			PL/Ld-2	S = RF, water-sol. TPP derivs., or Chl a in micelles contg. Triton X-100.	86F149
17.55	Polycarbonate CH ₂ Cl ₂	3.9 × 10 ³			PL/Ld-2	S = An or Ac.	86E884
17.56	Poly(ethylene glycol) D ₂ O	4 × 10 ⁴			PL/Ld-2	S = RF, water-sol. TPP derivs., or Chl a in micelles contg. Triton X-100.	86F149
17.57	Poly(methyl methacrylate) CH ₂ Cl ₂	2.2 × 10 ³			PL/Ld-2	S = An.	86E809
17.58	Polystyrene CH ₂ Cl ₂	3.3 × 10 ³			PL/Ld-2	S = An or Ac.	86E884
17.59	1,3-Propanediol, 2-amino-2-(hydroxymethyl)- (Tris) D ₂ O	1.5 × 10 ⁴			PL/Ld-2	S = RF, water-sol. TPP derivs., or Chl a in micelles contg. Triton X-100.	86F149

TABLE 17. Rate constants for the interaction of singlet oxygen with miscellaneous substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
17.60	Propanoic acid, 2-oxo-3-phenyl- (Phenylpyruvic acid) MeOH	$<7 \times 10^6$			PL/A'd-5	S = MB; A' = DPBF.	79A386
17.61	2-Propanol CCl ₄	2×10^3			PL/A'd-8	S = MB; A' = DPBF.	76F903
17.62	2-Propanol, 2-methyl- (tert-BuOH) CCl ₄	2×10^3			PL/A'd-8	S = MB; A' = DPBF.	76F903
17.63	Quadricyclane CHCl ₃	4.8×10^4			CR/A'c-33	A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ ; ¹ O ₂ * from DMNO ₂ .	81E003
17.64	Singlet oxygen C ₆ F ₆	2.6×10^7			PL/Ld-2	S = Chr; self-annihilation from high intensity photolysis; M = ¹ O ₂ *.	87F333
	<i>c</i> -C ₆ H ₁₂	$<4 \times 10^7$			PL/Ld-2	S = Chr; self-annihilation from high intensity photolysis; M = ¹ O ₂ *.	87F333
	CCl ₄	1×10^9			PL/Ld-2	S = PdMPDME; [¹ O ₂ *] estd. from sensitizer triplet concn.	79E846
	O ₂	2×10^5		77	PL/Ld-2	In liquid ¹⁸ O ₂ $k = (2 \pm 0.6) \times 10^6$. Emission is monitored at 635 nm.	82E575
17.65	Soybean oil CH ₂ Cl ₂	1.4×10^5	0.073	293	CP/Oc-15	S = Chl a; used $k_d = 1.0 \times 10^4$ s ⁻¹ .	91U026
	CH ₂ Cl ₂	1.0×10^5	0.11	298	CP/Pa-15	S = Chl a; used $k_d = 1.1 \times 10^4$ s ⁻¹ ; measured peroxide formation.	91U180 91U128
17.66	Stearic acid C ₆ D ₆	1.2×10^4			PL/Ld-2	S = TPP.	89A331
	CCl ₄	9.0×10^3			MP/LI-12	S = TPP; used $k_d = 42$ s ⁻¹ .	83E425 83F151
17.67	Tetradecanoic acid (Myristic acid) C ₆ D ₆	9.9×10^3			PL/Ld-2	S = TPP.	89A331
17.68	Tetrahydrofuran CCl ₄	2×10^3			PL/A'd-8	S = MB; A' = DPBF.	76F903
17.69	1,2,4-Triazolobenzo[1,3]cyclopropa[1,2,3-cd]cyclopropa[gh]pentalene, 1,2,5,6,6a,6b,6c,6d-octahydro-1,6[1',2']-4-methyl-3,5-dioxo- CH ₂ Cl ₂	1.0×10^5			PR/A'd-8	S = An; A' = DPBF.	79A457
17.70	1,2,4-Triazolo[1,3]cyclopropa[1,2,3-cd]cyclopropa[gh]pentalene, 1,2,5,6,6a,6b,6c,6d-octahydro-1,6[1',2']-4-methyl-3,5-dioxo- CH ₂ Cl ₂	3.4×10^4			PR/A'd-8	S = An; A' = DPBF.	79A457
17.71	Tributyl phosphite CH ₃ COCH ₃				CP/Pa,P'a-17	S = RB; A' = (C ₂ H ₅ O) ₃ P; meas. $k_f/k_r^{A'}$ = 0.78.	747495
17.72	Tricyclohexyl phosphite CH ₃ COCH ₃				CP/Pa,P'a-17	S = RB; A' = (C ₂ H ₅ O) ₃ P; meas. $k_f/k_r^{A'}$ = 0.60.	747495
17.73	Triethyl phosphite CH ₃ COCH ₃				CP/Pa,P'a-17	S = MB; A' = (CH ₃ O) ₃ P; meas. $k_f/k_r^{A'}$ = 1.5.	747495
	C ₆ H ₆ /MeOH (80:20)	2.5×10^7			CP/Pa-19	S = RB; A' = Car; k_d and $k_{A'}$ not given.	747495
17.74	Trimethyl phosphite C ₆ H ₆	4.7×10^4			PL/Ld-2	S = Ac.	89A099

TABLE 17. Rate constants for the interaction of singlet oxygen with miscellaneous substrates. — Continued

No.	Solvent	k (L mol ⁻¹ s ⁻¹)	β (k_d/k) (mol L ⁻¹)	T (K)	Method	Comment	Ref.
17.74	Trimethyl phosphite — Continued						
	C ₆ H ₆ / MeOH (80:20)	1.5 × 10 ⁷			CP/Pa-19	S = RB; A' = Car; k_d and $k_{A'}$ not given.	747495
	C ₆ H ₆ / MeOH (80:20)	3.9 × 10 ⁴			PL/Ld-2	S = Ac.	89A099
	CH ₃ CN	6.6 × 10 ⁴			PL/Ld-2	S = Ac.	89A099
	CH ₃ COCH ₃	6.3 × 10 ⁴			PL/Ld-2	S = Ac.	89A099
	MeOD	2.7 × 10 ⁴			PL/Ld-2	S = Ac.	89A099
17.75	Triphenylphosphine						
	CH ₂ Cl ₂ / MeOH (90:10)	5 × 10 ⁶			PL/A'd-5	S = MB; A' = DPBF.	87F655
	CHCl ₃	8.5 × 10 ⁶		253	CP/A'c-33	S = A' = Rub; used $k_d = 1.7 \times 10^4$ s ⁻¹ , $k_{A'} = 5.3 \times 10^7$ L mol ⁻¹ s ⁻¹ .	82N064
	MeOH		6.0 × 10 ⁻³	293	CP/Oc-15	S = MB; $E_a = 5.0$ kJ mol ⁻¹ .	68F288
	MeOH		5.0 × 10 ⁻³	293	CP/Oc-15	S = RB; $E_a = 5.9$ kJ mol ⁻¹ .	68F288
17.76	Undecanoic acid						
	C ₆ D ₆	9.3 × 10 ³			PL/Ld-2	S = TPP.	89A331
17.77	Urea						
	H ₂ O pH = 7.0			283	CP/A'c-17	S = RB; A' = BHMF; meas. $k_r/k_r^{A'} = 1.1$.	88R064
17.78	Urea, allyl-						
	H ₂ O pH = 7.1	<2 × 10 ⁵		298	CP/Oc-19	S = Phenosafranine; Q = NaN ₃ ; used $k_Q = 2.0 \times 10^8$ L mol ⁻¹ s ⁻¹ .	78F020
17.79	Valeric acid						
	C ₆ D ₆	4.0 × 10 ³			PL/Ld-2	S = TPP.	89A331

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13. Molecular Formula Index

Br ⁻	Bromide ion	14.4	C ₄ H ₃ BrO	2-Bromofuran	5.21
(Cl ₂ D) ₂	Dichloromethane- <i>d</i> ₂	17.17	C ₄ H ₄ O	Furan	5.14
CCl ₃ D	Chloroform- <i>d</i>	17.10	C ₄ H ₄ S	Thiophene	13.167
CHCl ₃	Chloroform	17.9	C ₄ H ₅ N	Pyrrole	6.59
CH ₂ Cl ₂	Dichloromethane	17.16	C ₄ H ₅ N ₃ O	Cytosine	16.20
CH ₄ N ₂ O	Urea	17.77	C ₄ H ₆ CoO ₄	Cobalt(II) acetate	12.126
CH ₄ N ₂ S	Thiourea	13.174	C ₄ H ₆ N ₂	4-Methylimidazole	6.7
CH ₄ O	Methanol	17.40	C ₄ H ₆ NiO ₄	Nickel(II) acetate	12.161
C ₂ D ₃ N	Acetonitrile- <i>d</i> ₃	17.5	C ₄ H ₆ O	(<i>E</i>)-2-Butenal	2.44
C ₂ H ₃ N	Acetonitrile	17.4		2,3-Dihydrofuran	5.29
C ₂ H ₄ O ₂	Acetic acid	17.1	C ₄ H ₆ O ₂	(<i>E</i>)-2-Butenoic acid	2.57
C ₂ H ₅ I	Iodoethane	17.28		3-Butenoic acid	2.59
C ₂ H ₅ NO ₂	Glycine	10.15		1,4-Dioxene	2.183
C ₂ H ₅ OS ⁻	2-Hydroxyethylsulfide ion	13.96		Methacrylic acid	2.252
C ₂ H ₅ O ₃ S ₂ ⁻	2-Mercaptoethanesulfonate ion	13.92	C ₄ H ₈	2-Butene	2.46
C ₂ H ₆ N ₂ S	<i>N</i> -Methylthiourea	13.176		(<i>E</i>)-2-Butene	2.47
C ₂ H ₆ O	Ethanol	17.29		(<i>Z</i>)-2-Butene	2.48
C ₂ H ₆ OS	Dimethyl sulfoxide	13.81		2-Methylpropene	2.337
	2-Mercaptoethanol	13.95	C ₄ H ₈ N ₂ O	<i>N</i> -Allylurea	17.78
C ₂ H ₆ S	Dimethyl sulfide	13.80	C ₄ H ₈ N ₂ O ₂	Dimethylglyoxime	15.19
C ₂ H ₇ NS	Cysteamine	13.93	C ₄ H ₈ N ₂ O ₃	Glycylglycine	10.16
C ₂ O ₄ ²⁻	Oxalate ion	17.48	C ₄ H ₈ N ₂ S	Allylthiourea	13.175
C ₃ D ₆ O	Acetone- <i>d</i> ₆	17.3	C ₄ H ₈ O	Tetrahydrofuran	17.68
C ₃ H ₄ N ₂	Imidazole	6.6		Ethyl vinyl ether	2.224
C ₃ H ₄ O	Acrolein	2.1	C ₄ H ₈ OS	1,4-Thioxane	13.177
C ₃ H ₄ O ₂	1,3-Dioxole	2.199	C ₄ H ₈ O ₂	Butyric acid	17.6
C ₃ H ₄ O ₄	Malonic acid	17.39		1,4-Dioxane	17.20
C ₃ H ₆ NO ₂ S ⁻	Cysteine, negative ion	13.68	C ₄ H ₈ O ₆ S ₄ ²⁻	2,2'-Dithiobisethanesulfonate ion	13.91
C ₃ H ₆ NS ₂ ⁻	Dimethyldithiocarbamate ion	13.79	C ₄ H ₈ S	Tetrahydrothiophene	13.168
C ₃ H ₆ O	Acetone	17.2	C ₄ H ₈ S ₂	1,4-Dithiane	13.88
C ₃ H ₆ S	Methylthiirane	13.152	C ₄ H ₉ N	Pyrrolidine	8.96
C ₃ H ₇ NO	Acetone oxime	15.2	C ₄ H ₉ NO	2-Methyl-2-nitrosopropane	15.50
	<i>N,N</i> -Dimethylformamide	17.31	C ₄ H ₁₀ N ₂	Piperazine	8.51
C ₃ H ₇ NO ₂	Alanine	10.1	C ₄ H ₁₀ O	1-Butanol	17.8
	β-Alanine	10.2		2-Methyl-2-propanol	17.62
C ₃ H ₇ NO ₂ S	Cysteine	13.67	C ₄ H ₁₀ O ₂ S	2,2'-Thiodiethanol	13.164
C ₃ H ₈ O	2-Propanol	17.61	C ₄ H ₁₀ O ₂ S ₂	Dithioerythritol	13.49
C ₃ H ₉ N	Isopropylamine	8.28		Dithiothreitol	13.50
	Trimethylamine	8.47	C ₄ H ₁₀ S	1-Butanethiol	13.51
	Propylamine	8.84		Diethyl sulfide	13.76
C ₃ H ₉ NOS	3-Amino-2-hydroxypropanethiol	13.131	C ₄ H ₁₀ S ₂	Diethyl disulfide	13.75
C ₃ H ₉ O ₃ P	Trimethyl phosphite	17.73, 17.74	C ₄ H ₁₁ N	Butylamine	8.12
C ₄ D ₁₂ N ₂	Tetra(methyl- <i>d</i> ₃)hydrazine	8.42		<i>tert</i> -Butylamine	8.15
C ₄ H ₂ Br ₂ O	2,5-Dibromofuran	5.27		Diethylamine	8.27
				Isobutylamine	8.85
			C ₄ H ₁₁ NO	<i>O,N</i> -Diethylhydroxylamine	15.21
				<i>N,N</i> -Diethylhydroxylamine	15.23
			C ₄ H ₁₁ NO ₃	2-Amino-2-(hydroxymethyl)-1,3-propanediol	17.59

$C_4H_{12}NO^+$	<i>N,N</i> -Diethylhydroxylammonium ion	15.24	$C_5H_{13}NO$	3-Dimethylamino-1-propanol	8.82
$C_4H_{12}N_2$	Tetramethylhydrazine	8.41	$C_5H_{13}NO_2$	<i>N</i> -Methyldiethanolamine	8.46
C_5H_3NO	2-Furanitrile	5.63	$C_5H_{14}NO_6P$	Phosphatidylethanolamine	17.52
$C_5H_3N_4O_3^-$	Urate ion	16.64	$C_5H_{14}N_2S$	2-[(3-Aminopropyl)amino]ethanethiol	13.94
C_5H_4OS	Pyran-4-thione	13.138	$C_6Cl_5O^-$	Pentachlorophenoxide ion	4.179
$C_5H_4O_2$	2-Furaldehyde	5.9	C_6D_6	Benzene- <i>d</i> ₆	3.27
$C_5H_4O_3$	2-Furancarboxylic acid	5.54	C_6D_{12}	2,3-Dimethyl-2-butene- <i>d</i> ₁₂	2.54
$C_5H_4S_2$	Thiopyran-4-thione	13.172		Cyclohexane- <i>d</i> ₁₂	17.14
C_5H_5N	Pyridine	6.40	C_6HCl_5O	Pentachlorophenol	4.140
$C_5H_5N_5$	Adenine	16.63	$C_6H_2Cl_3O^-$	2,4,6-Trichlorophenoxide ion	4.182
$C_5H_5N_5O$	Guanine	16.35	$C_6H_2F_4O$	2,3,5,6-Tetrafluorophenol	4.143
C_5H_6	Cyclopentadiene	2.140	$C_6H_3Cl_2O^-$	2,4-Dichlorophenoxide ion	4.159
$C_5H_6N_2O_2$	Thymine	16.79		2,6-Dichlorophenoxide ion	4.160
C_5H_6O	2-Methylfuran	5.46	$C_6H_3Cl_3O$	2,4,6-Trichlorophenol	4.146
$C_5H_6O_2$	2-Methoxyfuran	5.42	$C_6H_3N_2O_5^-$	2,4-Dinitrophenoxide ion	4.164
	Furfuryl alcohol	5.78	$C_6H_4BrO^-$	4-Bromophenoxide ion	4.153
$C_5H_6O_5$	2-Ketoglutaric acid	17.51	$C_6H_4ClO^-$	2-Chlorophenoxide ion	4.155
C_5H_7N	<i>N</i> -Methylpyrrole	6.64		3-Chlorophenoxide ion	4.156
C_5H_7NO	Furfurylamine	5.79		4-Chlorophenoxide ion	4.157
C_5H_8	Isoprene	2.42	$C_6H_4Cl_2$	1,3-Dichlorobenzene	3.35
	1-Methylcyclobutene	2.98		1,4-Dichlorobenzene	3.36
	Cyclopentene	2.156	$C_6H_4Cl_2O$	2,4-Dichlorophenol	4.113
	(<i>E</i>)-Piperylene	2.328		2,6-Dichlorophenol	4.114
	(<i>Z</i>)-Piperylene	2.329	$C_6H_4FO^-$	4-Fluorophenoxide ion	4.165
$C_5H_8NO_3S^-$	<i>N</i> -Acetylcysteine, negative ion	13.70	$C_6H_4IO^-$	4-Iodophenoxide ion	4.168
	2-Mercaptopropionylglycine, negative ion	13.102	$C_6H_4NO_3^-$	2-Nitrophenoxide ion	4.176
C_5H_8O	2,3-Dihydro-5-methylfuran	5.31		3-Nitrophenoxide ion	4.177
	3,4-Dihydropyran	5.90		4-Nitrophenoxide ion	4.178
$C_5H_8O_2$	(<i>E</i>)-2-Methyl-2-butenic acid	2.58	$C_6H_4N_2O_5$	2,4-Dinitrophenol	4.123
	4-Pentenoic acid	2.315		2,5-Dinitrophenol	4.124
$C_5H_9NO_3S$	<i>N</i> -Acetyl-L-cysteine	13.69		2,6-Dinitrophenol	4.125
	2-Mercaptopropionylglycine	13.101	$C_6H_4O_2$	1,4-Benzoquinone	16.12
$C_5H_9N_3$	Histamine	6.5	$C_6H_4O_2^{2-}$	1,4-Benzenediol dianion	4.13
C_5H_{10}	2-Methyl-2-butene	2.56	$C_6H_4O_3$	2,5-Furandicarboxaldehyde	5.59
	1-Pentene	2.302	C_6H_5Br	Bromobenzene	3.30
	(<i>E</i>)-2-Pentene	2.304	C_6H_5Cl	Chlorobenzene	3.31
	(<i>Z</i>)-2-Pentene	2.305	C_6H_5ClO	2-Chlorophenol	4.106
$C_5H_{10}O$	2-Methoxy-2-butene	2.55		3-Chlorophenol	4.107
	3-Methyl-2-buten-1-ol	2.60		4-Chlorophenol	4.108
$C_5H_{10}O_2$	Valeric acid	17.79	$C_6H_5ClO_2$	4-Chlororesorcinol	4.11
$C_5H_{10}S$	Thiane	13.145		Chloro-1,4-benzenediol	4.20
$C_5H_{11}N$	Piperidine	8.53	C_6H_5NO	5-Methyl-2-furanitrile	5.64
$C_5H_{11}NO_2S$	Methionine	13.108	$C_6H_5NO_2$	Nitrobenzene	3.47
	Penicillamine	13.116	$C_6H_5NO_3$	2-Nitrophenol	4.137
C_5H_{12}	Pentane	17.50		3-Nitrophenol	4.138
$C_5H_{12}O$	1,1-Dimethylethyl methyl ether	17.18		4-Nitrophenol	4.139
$C_5H_{12}S$	Butyl methyl sulfide	13.57	$C_6H_5O^-$	Phenoxide ion	4.150

C_6H_6	Benzvalene 2.3 Benzene 3.26	$C_6H_{10}O$	2,3-Dihydro-4,5-dimethylfuran 5.30 1-Methoxycyclopentene 2.160
$C_6H_6D_6$	(<i>E</i>)-2,3-Dimethyl-2-butene- d_6 2.52 (<i>Z</i>)-2,3-Dimethyl-2-butene- d_6 2.53	$C_6H_{10}OS$	2-Methylthiacyclohex-2-ene-1-oxide 13.143
C_6H_6O	Phenol 4.92 2-Vinylfuran 5.53	$C_6H_{10}O_3$	3,3-Dimethyl-2-oxobutyric acid 17.7
$C_6H_6O_2$	1,2-Benzenediol 4.4 1,3-Benzenediol 4.10 1,4-Benzenediol 4.12 5-Methylfurfural 5.13 2-Acetylfuran 5.15	$C_6H_{11}NO$	5,5-Dimethyl-1-pyrroline-1-oxyl 15.56
$C_6H_6O_3$	5-(Hydroxymethyl)furfural 5.11 Methyl 2-furoate 5.57	$C_6H_{11}N_3O_4$	Glycylglycylglycine 10.17
C_6H_7N	Aniline 9.1	C_6H_{12}	2,3-Dimethyl-1-butene 2.45 2,3-Dimethyl-2-butene 2.51 Cyclohexane 17.13 2-Hexene 2.244 (<i>E</i>)-3-Hexene 2.245 (<i>Z</i>)-3-Hexene 2.246
C_6H_7NO	4-Aminophenol 4.95		2-Methyl-2-pentene 2.307 3-Methyl-2-pentene 2.308 (<i>E</i>)-3-Methyl-2-pentene 2.309 (<i>Z</i>)-3-Methyl-2-pentene 2.310 (<i>E</i>)-4-Methyl-2-pentene 2.311 (<i>Z</i>)-4-Methyl-2-pentene 2.312
$C_6H_7O_6^-$	Ascorbate ion 16.6		
C_6H_8	1,3-Cyclohexadiene 2.103		
$C_6H_8Cl_2N_2O_2$	<i>trans</i> -1,4-Dichloro-1,4-dinitrosocyclohexane 15.16 <i>cis</i> -1,4-Dichloro-1,4-dinitrosocyclohexane 15.17 1,4-Dichloro-2,3-diazabicyclo[2.2.2]oct-2-ene-2,3-dioxide 15.18	$C_6H_{12}BiN_2S_4$	Bis(dimethyldithiocarbamato)bismuth(II) 12.55
$C_6H_8N^+$	1-Methylpyridinium 6.54	$C_6H_{12}N_2$	Acetone azine 15.3 1,4-Diazabicyclo[2.2.2]octane 8.19 Tetrahydropyrazolo[1,2- <i>a</i>]pyrazole 8.89
$C_6H_8N_2$	<i>o</i> -Phenylenediamine 9.25 Phenylhydrazine 9.32	$C_6H_{12}N_2NiS_4$	Bis(dimethyldithiocarbamato)nickel(II) 12.56
C_6H_8O	2,4-Dimethylfuran 5.33 2,5-Dimethylfuran 5.34	$C_6H_{12}N_4$	Hexamethylenetetramine 8.32
$C_6H_8O_2$	Furfuryl methyl ether 5.43 α -Methylfurfuryl alcohol 5.69 2,3-Dioxabicyclo[2.2.2]oct-5-ene 2.182	$C_6H_{12}O$	(<i>E</i>)-3-Methyl-2-penten-1-ol 2.319 (<i>Z</i>)-3-Methyl-2-penten-1-ol 2.320 4-Methyl-3-penten-2-ol 2.323 1-Ethoxy-2-methyl-1-propene 2.336
$C_6H_8O_3$	2,5-Bis(hydroxymethyl)furan 5.18	$C_6H_{12}OS_2$	1,5-Dithiacyclooctane 1-oxide 13.87
C_6H_9DO	4-Methyl-2,3-dihydropyran-4- <i>d</i> 5.92	$C_6H_{12}O_2$	Hexanoic acid 17.38 Ketene diethyl acetal 2.221 (<i>E</i>)-1,2-Diethoxyethene 2.222 (<i>Z</i>)-1,2-Diethoxyethene 2.223
C_6H_9N	2,5-Dimethylpyrrole 6.60		
C_6H_9NO	<i>N</i> -Methylfurfurylamine 5.65	$C_6H_{12}O_6$	Glucose 16.34
$C_6H_9N_3O_2$	Histidine 10.23	$C_6H_{12}S$	Thiepane 13.146
$C_6H_9N_3O_2S$	2-Thiol-L-histidine 13.106	$C_6H_{12}S_2$	1,5-Dithiacyclooctane 13.86
C_6H_9OT	4-Methyl-2,3-dihydropyran-4- <i>t</i> 5.93 4-Methyl-2,3-dihydropyran-3- <i>t</i> 5.95 4-Methyl-2,3-dihydropyran-2- <i>t</i> 5.97	$C_6H_{13}N$	Cyclohexylamine 8.17 2-Methylpiperidine 8.59 <i>N</i> -Methylpiperidine 8.60 <i>N,N</i> -Dimethylisobutenylamine 8.83
C_6H_{10}	2,3-Dimethyl-1,3-butadiene 2.39 2-Ethyl-1,3-butadiene 2.41 Cyclohexene 2.116 Methylenecyclopentane 2.153 1-Methylcyclopentene 2.161 Isopropylidenecyclopropane 2.170 1,5-Hexadiene 2.240 (<i>E,E</i>)-2,4-Hexadiene 2.241 (<i>E,Z</i>)-2,4-Hexadiene 2.242 4-Methyl-1,3-pentadiene 2.300	$C_6H_{13}NO$	3-Hydroxy- <i>N</i> -methylpiperidine 8.70 4-Hydroxy- <i>N</i> -methylpiperidine 8.71
		$C_6H_{13}NO_2S$	Methionine methyl ester 13.111
		$C_6H_{13}NO_4S$	4-Morpholineethanesulfonic acid 17.45
		$C_6H_{14}N_2$	Hexahydro-1,2-dimethylpyridazine 8.91 <i>N,N</i> -Dimethyl-1-pyrrolidinamine 8.95
		$C_6H_{14}N_4O_2$	Arginine 10.6

C ₆ H ₁₄ O	2,2-Dimethylpropyl methyl ether 17.19	C ₇ H ₈ S	Thioanisole 13.29
C ₆ H ₁₄ S	<i>tert</i> -Butyl ethyl sulfide 13.56		Benzyl mercaptan 13.42
	Diisopropyl sulfide 13.78	C ₇ H ₈ Se	Methylselenobenzene 13.27
	Dipropyl sulfide 13.82	C ₇ H ₈ Te	Methyltellurobenzene 13.28
C ₆ H ₁₅ N	<i>N,N</i> -Dimethyl-1-butanamine 8.14	C ₇ H ₉ N	Benzylamine 8.5
	Triethylamine 8.24		<i>N</i> -Methylaniline 9.14
	Diisopropylamine 8.29	C ₇ H ₁₀	1,3-Cycloheptadiene 2.99
	Dipropylamine 8.86		1-Methyl-1,4-cyclohexadiene 2.107
C ₆ H ₁₅ NO	<i>N,N</i> -Diethylethanolamine 8.23	C ₇ H ₁₀ O	2,3-Dimethyl-2-cyclopenten-1-one 2.165
	<i>O,N,N</i> -Triethylhydroxylamine 15.22	C ₇ H ₁₀ O ₂	2-Hydroxy-3-methyl-2-cyclohexen-1-one 2.128
C ₆ H ₁₆ N ₂	1,2-Diethyl-1,2-dimethylhydrazine 8.33		3-Methoxy-2-methyl-2-cyclopenten-1-one 2.167
C ₆ H ₂₆ N ₂	Tetra(2-methylpropyl)hydrazine 8.43		3-Isopropylidene-2-furanone 2.227
C ₇ D ₈	Toluene- <i>d</i> ₈ 3.128	C ₇ H ₁₀ O ₃	Methyl 4,5-dihydro-2-methyl-3-furancarboxylate 5.58
C ₇ H ₄ NO ⁻	4-Cyanophenoxide ion 4.158	C ₇ H ₁₀ S	Bicyclo[2.2.1]heptane-2-thione 13.43
C ₇ H ₅ NO	4-Cyanophenol 4.112	C ₇ H ₁₁ N ₃ O	4-Hydroxy-6-methyl-2-(dimethylamino)pyrimidine 16.70
C ₇ H ₅ N ₂ O ₅ ⁻	2-Methyl-4,6-dinitrophenoxide ion 4.173		
	4-Methyl-2,6-dinitrophenoxide ion 4.174	C ₇ H ₁₁ OT	4,4-Dimethyl-2,3-dihydropyran-3- <i>t</i> 5.94
C ₇ H ₅ O ₃ ⁻	Salicylate ion 4.35		4,4-Dimethyl-2,3-dihydropyran-2- <i>t</i> 5.96
C ₇ H ₆ ClNS	4-Chlorothiobenzamide 13.153	C ₇ H ₁₂	<i>trans</i> -2-Cyclopropyl-2-butene 2.49
C ₇ H ₆ Cl ₂ O	2,6-Dichloroanisole 3.37		Methylenecyclohexane 2.112
C ₇ H ₆ NO ₃ ⁻	4-Methyl-2-nitrophenoxide ion 4.175		1-Methylcyclohexene 2.122
C ₇ H ₆ N ₂ O ₂ S	4-Nitrothiobenzamide 13.156		4-Methylcyclohexene 2.123
C ₇ H ₆ O ₂	Methyl-1,4-benzoquinone 16.13		Ethylidenecyclopentane 2.152
C ₇ H ₇ BrO ₃	Ethyl 5-bromo-2-furoate 5.55		1,2-Dimethylcyclopentene 2.158
C ₇ H ₇ BrS	4-Bromophenyl methyl sulfide 13.7		1,5-Dimethylcyclopentene 2.159
C ₇ H ₇ ClO	2-Chloroanisole 3.34		1-Cyclopropyl-2-methylpropene 2.335
C ₇ H ₇ ClO ₂	3-Chloro-5-methoxyphenol 4.111	C ₇ H ₁₂ NS ₂ ⁻	Hexamethylenedithiocarbamate 13.1
C ₇ H ₇ ClS	3-Chlorophenyl methyl sulfide 13.14		
	4-Chlorophenyl methyl sulfide 13.15	C ₇ H ₁₂ O	5,6-Dimethyl-3,4-dihydropyran 5.91
C ₇ H ₇ FS	4-Fluorophenyl methyl sulfide 13.21		2-(Cyclopentylidene)ethanol 2.218
C ₇ H ₇ NO ₃	2-Nitroanisole 3.44		3,4-Dimethyl-3-penten-2-one 2.324
C ₇ H ₇ O ⁻	4-Methylphenoxide ion 4.172	C ₇ H ₁₃ N	1-(Diethylamino)-2-methylacetylene 8.87
C ₇ H ₇ O ₂ ⁻	2-Methoxyphenoxide ion 4.169		Quinuclidine 8.97
	3-Methoxyphenoxide ion 4.170	C ₇ H ₁₃ NO	4,5,5-Trimethyl- Δ^1 -pyrroline- <i>N</i> -oxide 15.51
	4-Methoxyphenoxide ion 4.171		2,4,4-Trimethyl- Δ^1 -pyrroline- <i>N</i> -oxide 15.52
C ₇ H ₈	Norbornadiene 2.4	C ₇ H ₁₄	1-Heptene 2.228
	Quadricyclane 17.63		(<i>Z</i>)-2-Heptene 2.229
	Toluene 3.127		2,4-Dimethyl-2-pentene 2.306
C ₇ H ₈ O	Anisole 3.43	C ₇ H ₁₄ N ₂	2,3-Dimethyl-2,3-diazabicyclo[2.2.1]heptane 8.18
	4-Methylphenol 4.135		Diethyl(2-cyanoethyl)amine 8.81
C ₇ H ₈ OS	4-(Methylmercapto)phenol 13.120	C ₇ H ₁₄ N ₂ O ₃ S	Glycylmethionine 13.109
	2,6-Dimethylpyran-4-thione 13.139	C ₇ H ₁₄ O	(<i>E</i>)-3,4-Dimethyl-2-penten-1-ol 2.316
C ₇ H ₈ O ₂	Methylhydroquinone 4.29		(<i>Z</i>)-3,4-Dimethyl-2-penten-1-ol 2.317
	2-Methoxyphenol 4.129		3-Ethyl-2-penten-1-ol 2.318
	3-Methoxyphenol 4.130	C ₇ H ₁₅ N	1,2-Dimethylpiperidine 8.57
	4-Methoxyphenol 4.131		2,6-Dimethylpiperidine 8.58
C ₇ H ₈ O ₃	5-(Methoxymethyl)furan-2-carboxaldehyde 5.12	C ₇ H ₁₆	Heptane 17.34
	2-[2-(1,3-Dioxolanyl)]furan 5.36	C ₇ H ₁₆ N ₂	<i>N,N</i> -Dimethyl-1-piperidinamine 8.52
	Ethyl 2-furoate 5.56		

$C_7H_{16}S$	<i>tert</i> -Butyl propyl sulfide 13.58 <i>sec</i> -Butyl propyl sulfide 13.59	$C_8H_{10}O$	1-Phenylethanol 3.55 2,2-Dimethylcyclohexa-3,5-dien-1-one 2.108 2,3-Dimethylidene-7-oxabicyclo[2.2.1]heptane 2.295 2,4-Dimethylphenol 4.116 2,6-Dimethylphenol 4.117 3,4-Dimethylphenol 4.118
$C_7H_{17}NO$	Diethyl(2-methoxyethyl)amine 8.25	$C_8H_{10}OS$	4-Methoxyphenyl methyl sulfide 13.22
$C_7H_{18}AuPS$	Methylthiolato(triethylphosphino)gold(I) 12.159	$C_8H_{10}O_2$	1,2-Dimethoxybenzene 3.38 1,3-Dimethoxybenzene 3.39 1,4-Dimethoxybenzene 3.40 1,4-Dihydroxy-2,3-dimethylbenzene 4.22 1,4-Dihydroxy-2,5-dimethylbenzene 4.23 1,4-Dihydroxy-2,6-dimethylbenzene 4.24 6,6-Dimethylfulvene endoperoxide 2.150
$C_7H_{18}N_2$	1,1,2-Trimethyl-2-(2-methylpropyl)hydrazine 8.45	$C_8H_{10}O_3$	2-Acetoxy-3-methyl-2-cyclopenten-1-one 2.163 3-Acetoxy-2-methyl-2-cyclopenten-1-one 2.164 2,6-Dimethoxyphenol 4.115
$C_7H_{19}N_3$	Spermidine 8.10	$C_8H_{10}O_4$	5-(2-Hydroxyethoxy)methylfuran-2-carboxaldehyde 5.10
$C_8F_{12}NiS_4$	Bis[1,1,1,4,4,4-hexafluoro-2-butene-2,3-dithiolato]nickel(II) 12.85	$C_8H_{10}S$	Methyl 3-methylphenyl sulfide 13.24 Methyl 4-methylphenyl sulfide 13.25 Benzyl methyl sulfide 13.30
$C_8H_6F_3NS$	4-(Trifluoromethyl)thiobenzamide 13.157	$C_8H_{11}D$	<i>endo</i> -2-Methylenenorbornane-3- <i>d</i> 2.13 <i>exo</i> -2-Methylenenorbornane-3- <i>d</i> 2.14
$C_8H_6N_2O_2$	3-Phenylsydnone 5.107	$C_8H_{11}N$	<i>N,N</i> -Dimethylaniline 9.6 Phenethylamine 6.46
$C_8H_6N_4$	1,2,3-Triazolo[1,2- <i>a</i>]benzotriazole 11.177	$C_8H_{11}NO$	Tyramine 4.186
C_8H_6O	Isobenzofuran 5.80	$C_8H_{11}NO_2$	3,4-Dihydroxyphenethylamine 4.5
C_8H_7N	Indole 6.8	$C_8H_{11}NO_3$	Noradrenaline 4.6
C_8H_7NO	5-Hydroxyindole 6.12	$C_8H_{11}N_3O_2$	Tetrahydro-2-methyl-5,8-methano-[1,2,4]triazolo[1,2- <i>a</i>]pyridazine-1,3-dione 17.41
$C_8H_7N_3O_2$	Luminol 9.33	C_8H_{12}	2-Methylenenorbornane 2.11 2-Methylnorborn-2-ene 2.21 (Cyclopropylmethylene)cyclobutane 2.95 1,3-Cyclooctadiene 2.129 1,5-Cyclooctadiene 2.133 Cyclooctyne 2.139
$C_8H_7O_2^-$	4-Acetylphenoxide ion 4.151	$C_8H_{12}N_4O_3$	Histidylglycine 10.20 Glycylhistidine 10.27
$C_8H_7O_3^-$	Methyl salicylate, conjugate base 4.41	$C_8H_{12}NiS_4$	Bis(2-butene-2,3-dithiolato)nickel(II) 12.15
C_8H_8	1,3,5,7-Cyclooctatetraene 2.136 Styrene 3.108	$C_8H_{12}O$	2-Methoxybicyclo[2.2.1]cycloheptene 2.20 2,5-Cyclooctadien-1-ol 2.134 2-(Isopropylidene)cyclopentanone 2.155 2-Ethyl-3-methyl-2-cyclopenten-1-one 2.166
$C_8H_8BrO^-$	4-Bromo-2,6-dimethylphenoxide ion 4.154	$C_8H_{12}OS$	2,2,4,4-Tetramethyl-3-thioxocyclobutanone 13.62
$C_8H_8Br_2$	Cyclooctatetraene dibromide 2.32		
C_8H_8O	Acetophenone 3.2 5,6-Dimethylidene-7-oxa-2-bicyclo[2.2.1]heptene 2.297		
$C_8H_8O_2$	Methyl benzoate 3.57 4'-Hydroxyacetophenone 4.93		
$C_8H_8O_3$	Methyl salicylate 4.40		
$C_8H_8O_5$	Dimethyl 2,5-furandicarboxylate 5.61		
$C_8H_9ClO_2$	2-Chloro-1,4-dimethoxybenzene 3.32 5-Chloro-1,3-dimethoxybenzene 3.33		
C_8H_9NOS	4-Methoxythiobenzamide 13.154		
C_8H_9NS	4-Methylthiobenzamide 13.155		
$C_8H_9O^-$	2,6-Dimethylphenoxide ion 4.162		
$C_8H_9O_3^-$	2,6-Dimethoxyphenoxide ion 4.161		
C_8H_{10}	2-Methylnorborna-2,5-diene 2.6 5-Methylene-2-norbornene 2.22 Ethylbenzene 3.41 6,6-Dimethylfulvene 2.149		
$C_8H_{10}BrN$	4-Bromo- <i>N,N</i> -dimethylaniline 9.2		
$C_8H_{10}ClN$	3-Chloro- <i>N,N</i> -dimethylaniline 9.3 4-Chloro- <i>N,N</i> -dimethylaniline 9.4		
$C_8H_{10}N_2O$	<i>N,N</i> -Dimethyl-4-nitrosoaniline 9.7		

$C_8H_{12}O_2$	5-Acetyl-3,4-dihydro-6-methylpyran 5.88 5,5-Dimethyl-1,3-cyclohexanedione 17.15 6-Hydroperoxy-1,4-cyclooctadiene 2.130	$C_8H_{20}N_2$	1,2-Dimethyl-1,2-dipropylhydrazine 8.40 1,1,2-Trimethyl-2-(2,2-dimethylpropyl)hydrazine 8.44
$C_8H_{12}S_2$	2,2,4,4-Tetramethyl-1,3-cyclobutanedithione 13.60	$C_8H_{20}NiO_4P_2S_4$	Bis(<i>O,O'</i> -diethylphosphorodithiolato)nickel(II) 12.44
$C_8H_{13}N$	1- <i>tert</i> -Butylpyrrole 6.61 2- <i>tert</i> -Butylpyrrole 6.62 3- <i>tert</i> -Butylpyrrole 6.63	$C_8H_{21}NO_6P^+$	Phosphatidylcholine 17.53
$C_8H_{13}N_3O$	4-Hydroxy-5,6-dimethyl-2-(dimethylamino)pyrimidine 16.69	$C_9H_6NO_2^-$	Indole-3-carboxylate ion 6.26
C_8H_{14}	2-Cyclopropyl-3-methyl-2-butene 2.50 1- <i>tert</i> -Butylcyclobutene 2.97 Methylenecycloheptane 2.101 1-Methylcycloheptene 2.102 Ethylidenecyclohexane 2.110 1,2-Dimethylcyclohexene 2.117 1,3-Dimethylcyclohexene 2.118 1,4-Dimethylcyclohexene 2.119 1,6-Dimethylcyclohexene 2.120 Cyclooctene 2.137 2,5-Dimethyl-2,4-hexadiene 2.243	C_9H_7N	Quinoline 6.71
$C_8H_{14}N_4O_5$	Glycylglycylglycylglycine 10.18	C_9H_7NO	8-Hydroxyquinoline 6.73
$C_8H_{14}NiO_2S_4$	Bis[<i>O</i> -(1-methylethyl)carbonodithionato]nickel(II) 12.98	$C_9H_7NO_2$	Indole-2-carboxylic acid 6.25 Indole-3-carboxylic acid 6.27
$C_8H_{14}O$	2-(Cyclohexylidene)ethanol 2.216	$C_9H_7N_3$	Pyrazolo[1,2- <i>a</i>]benzotriazole 11.131
$C_8H_{14}OS$	2-Methyl-5-isopropylthiacyclopent-2-ene-1-oxide 13.144	C_9H_8	Indene 3.69
$C_8H_{14}O_2S_2$	1,2-Dithiolane-3-pentanoic acid 13.90	$C_9H_8N_2O_2$	3-(4-Methylphenyl)sydnone 5.104 3-Methyl-4-phenylsydnone 5.105
$C_8H_{14}S$	2,2,4,4-Tetramethylcyclobutanethione 13.61	$C_9H_8O_2$	(<i>E</i>)-Cinnamic acid 2.91
$C_8H_{15}O_2S_2^-$	Dihydrolipoate ion 13.115	$C_9H_8O_3$	2-Hydroxycinnamic acid 4.69 Phenylpyruvic acid 17.60
C_8H_{16}	4-Octene, (<i>E</i>)- 2.287 4-Octene, (<i>Z</i>)- 2.288 2,3,4-Trimethyl-1-pentene 2.303 2,3,4-Trimethyl-2-pentene 2.313 2,4,4-Trimethyl-2-pentene 2.314	$C_9H_8O_4$	3,4-Dihydroxycinnamic acid 4.68
$C_8H_{16}N_2$	1,1'-Bipyrrolidine 8.8 Hexahydropyrazolo[1,2- <i>a</i>][1,2]diazepine 8.88 Octahydropyridazino[1,2- <i>a</i>]pyridazine 8.92	C_9H_9N	1-Methylindole 6.15 3-Methylindole 6.16
$C_8H_{16}O$	(<i>E</i>)-3,4,4-Trimethyl-2-penten-1-ol 2.321 (<i>Z</i>)-3,4,4-Trimethyl-2-penten-1-ol 2.322	C_9H_9NO	5-Methoxyindole 6.13 Indole-3-carbinol 6.24
$C_8H_{16}O_3$	1,1,2-Triethoxyethene 2.226	C_9H_{10}	5,6-Dimethylidene-2-bicyclo[2.2.1]heptene 2.19 (<i>E</i>)- β -Methylstyrene 3.119 (<i>Z</i>)- β -Methylstyrene 3.120
C_8H_{18}	3-Methylheptane 17.35 4-Methylheptane 17.36	$C_9H_{10}N_2$	4-(Dimethylamino)benzotrile 9.22
$C_8H_{18}S$	Dibutyl sulfide 13.72 Di- <i>sec</i> -butyl sulfide 13.73 Di- <i>tert</i> -butyl sulfide 13.74 Diisobutyl sulfide 13.77	$C_9H_{10}O$	2-Methylacetophenone enol 2.219
$C_8H_{19}NO_2$	Di(2-hydroxyethyl)- <i>tert</i> -butylamine 8.26	$C_9H_{10}O_3$	3-(<i>p</i> -Hydroxyphenyl)propionic acid 4.34
		$C_9H_{10}O_5$	Furfural diacetate 5.66
		$C_9H_{11}ClOS$	3-(3-Chlorophenyl)thio-1-propanol 13.132 3-(4-Chlorophenyl)thio-1-propanol 13.133
		$C_9H_{11}FOS$	3-(4-Fluorophenyl)thio-1-propanol 13.134
		$C_9H_{11}NO$	<i>p</i> -Dimethylaminobenzaldehyde 9.10
		$C_9H_{11}NO_2$	Ethyl 4-aminobenzoate 9.9 Phenylalanine 10.31
		$C_9H_{11}NO_3$	Tyrosine 4.187
		$C_9H_{11}NO_4$	3-(3,4-Dihydroxyphenyl)-L-alanine 4.183
		C_9H_{12}	2,3-Dimethylenebicyclo[2.2.1]heptane 2.8 (<i>E,E</i>)-1-Phenyl-1,3-pentadiene 2.301
		$C_9H_{12}N_2O_5S$	4-Thiouridine 16.76
		$C_9H_{12}N_2O_6$	Uridine 16.80
		$C_9H_{12}O$	2,4,6-Trimethylphenol 4.148

C ₉ H ₁₂ OS	2-(4-Methylphenyl)thioethanol 13.97 3-Phenylthio-1-propanol 13.137	C ₉ H ₁₅ N ₃ O ₂ S	Ergothioneine 13.104
C ₉ H ₁₂ O ₂	3,4,5,6,7,8-Hexahydro-1-benzopyran-2-one 2.92 Trimethylhydroquinone 4.31 Cyclohexylidenemethyl acetate 2.255 4-Methoxy-2,6-dimethylphenol 4.132	C ₉ H ₁₆	Ethylidenecycloheptane 2.100 1-Methylcyclooctene 2.138 1- <i>tert</i> -Butylcyclopentene 2.157
C ₉ H ₁₂ O ₃	1,2,3-Trimethoxybenzene 3.52 1,2,4-Trimethoxybenzene 3.53 1,3,5-Trimethoxybenzene 3.54	C ₉ H ₁₆ NO ₂	2,2,6,6-Tetramethyl-4-piperidone <i>N</i> -oxyl 15.44
C ₉ H ₁₂ O ₄	Ubiquinol 0 4.21	C ₉ H ₁₇ INO	4-Iodo-2,2,6,6-tetramethylpiperidin-1-oxyl 15.42
C ₉ H ₁₃ N	3-Phenylpropylamine 8.50 <i>N,N</i> ,4-Trimethylaniline 9.19	C ₉ H ₁₇ N ₄ O	4-Azido-2,2,6,6-tetramethylpiperidin-1-oxyl 15.30
C ₉ H ₁₃ NO	2-Methoxy- <i>N,N</i> -dimethylaniline 9.11 3-Methoxy- <i>N,N</i> -dimethylaniline 9.12 4-Methoxy- <i>N,N</i> -dimethylaniline 9.13	C ₉ H ₁₈	1-Nonene 2.263 4-Methyl-4-octene 2.289 (<i>E</i>)-4-Methyl-4-octene 2.290 (<i>Z</i>)-4-Methyl-4-octene 2.291
C ₉ H ₁₃ NO ₃	Adrenaline 4.9	C ₉ H ₁₈ NO	2,2,6,6-Tetramethylpiperidine- <i>N</i> -oxyl 15.43
C ₉ H ₁₃ NS	<i>p</i> -(Dimethylamino)thioanisole 13.6	C ₉ H ₁₈ NO ₂	4-Hydroxy-2,2,6,6-tetramethylpiperidine- <i>N</i> -oxyl 15.33
C ₉ H ₁₃ N ₃ O ₅	Cytidine 16.18	C ₉ H ₁₈ N ₂	1-(1-Pyrrolidinyl)piperidine 8.62
C ₉ H ₁₄	(1-Cyclopropylethylidene)cyclobutane 2.94 1,1-Bis(cyclopropyl)-1-propene 2.333	C ₉ H ₁₈ O ₂	5-Hydroperoxy-4-methyl-3-octene 2.286
C ₉ H ₁₄ N ₃ O ₂ S ⁻	Ergothioneine ion 13.105	C ₉ H ₁₈ S	Di- <i>tert</i> -butylthioketone 13.117
C ₉ H ₁₄ N ₃ O ₃	2,2,5,5-Tetramethyl-3-cyano-4-nitropyrrolidin-1-oxyl 15.53	C ₉ H ₁₉ N	2,2,6,6-Tetramethylpiperidine 8.63
C ₉ H ₁₄ N ₃ O ₇ P	2'-Deoxycytidine-5'-monophosphate 16.22	C ₉ H ₁₉ NO	2,2,6,6-Tetramethylpiperidin-4-ol 8.77 2,2,6,6-Tetramethylpiperidin-1-ol 15.28
C ₉ H ₁₄ N ₃ O ₈ P	Cytidine 5'-monophosphate 16.19	C ₉ H ₁₉ N ₂ O	4-Amino-2,2,6,6-tetramethylpiperidine- <i>N</i> -oxyl 15.29
C ₉ H ₁₄ N ₄ O ₃	Histidinyl-β-alanine 10.3 Carnosine 10.24	C ₉ H ₂₀ N ₂	4-Amino-2,2,6,6-tetramethylpiperidine 8.54
C ₉ H ₁₄ O	2-Ethyl-3-methyl-2-cyclohexen-1-one 2.127 6-Methoxy-1,4-cyclooctadiene 2.131	C ₁₀ H ₆ O ₃	5-Hydroxy-1,4-naphthoquinone 4.90 6-Hydroxy-1,4-naphthoquinone 4.91
C ₉ H ₁₄ O ₂	2-[(1,1-Dimethylethoxy)methyl]furan 5.35 Acetoxymethylidenecyclohexane 2.111 (<i>E,Z</i>)-4,5-Diethylidene-2,2-dimethyl-1,3-dioxolane 2.197 (<i>Z,Z</i>)-4,5-Diethylidene-2,2-dimethyl-1,3-dioxolane 2.198	C ₁₀ H ₇ BrO	2-(4-Bromophenyl)furan 5.22 3-(4-Bromophenyl)furan 5.23
C ₉ H ₁₄ O ₃	5-Ethoxycarbonyl-3,4-dihydro-6-methylpyran 5.98	C ₁₀ H ₇ ClO	2-(4-Chlorophenyl)furan 5.25
C ₉ H ₁₄ O ₄	5-Methoxymethyl-2-(dimethoxymethyl)furan 5.32	C ₁₀ H ₇ FO	3-(4-Fluorophenyl)furan 5.41
C ₉ H ₁₄ S	3,3-Dimethylbicyclo[2.2.1]heptane-2-thione 13.44 3,5,5-Trimethyl-2-cyclohexene-1-thione 13.65	C ₁₀ H ₇ NO ₃	2-(4-Nitrophenyl)furan 5.49
C ₉ H ₁₅ NO ₃ S	Captopril 13.130	C ₁₀ H ₈	Naphthalene 3.74
C ₉ H ₁₅ N ₃ O	2-(Diethylamino)-4-hydroxy-6-methylpyrimidine 16.68	C ₁₀ H ₈ NO ₂ ⁻	Indole-3-acetate ion 6.20
		C ₁₀ H ₈ O	1-Naphthol 4.88 2-Naphthol 4.89 2-Phenylfuran 5.50 3-Phenylfuran 5.51
		C ₁₀ H ₈ O ₂	1,5-Dihydroxynaphthalene 4.82 1,6-Dihydroxynaphthalene 4.83 1,7-Dihydroxynaphthalene 4.84 1,8-Dihydroxynaphthalene 4.85 2,6-Dihydroxynaphthalene 4.86 2,7-Dihydroxynaphthalene 4.87
		C ₁₀ H ₉ N	2-Naphthylamine 9.24
		C ₁₀ H ₉ NO	6-Methoxyquinoline 6.74
		C ₁₀ H ₉ NO ₂	Indole-3-acetic acid 6.21

$C_{10}H_{10}$	2-Methyl-5-(1-methylethyl)-1,3-cyclohexadiene 2.106	$C_{10}H_{14}N_5O_7P$	Adenosine 5'-monophosphate 16.2 2'-Deoxyguanosine 5'-monophosphate 16.23
$C_{10}H_{10}Fe$	Ferrocene 12.144	$C_{10}H_{14}N_5O_8P$	Guanosine 5'-monophosphate 16.38
$C_{10}H_{10}N_2O_2$	4-Methyl-3-(4-methylphenyl)sydnone 5.103	$C_{10}H_{14}NiO_4$	Bis(acetylacetonato)nickel(II) 12.10
$C_{10}H_{10}Ni$	Nickelocene 12.165	$C_{10}H_{14}NiO_4 \cdot 2H_2O$	Bis(acetylacetonato)nickel(II) dihydrate 12.11
$C_{10}H_{10}O$	2,3,5,6-Tetramethylidene-7-oxabicyclo[2.2.1]heptane 2.296	$C_{10}H_{14}NiS_4$	Bis(dithioacetylacetonato)nickel(II) 12.74
$C_{10}H_{10}O_3$	2,3,5,6-Tetramethylidene-7-oxa-2-bicyclo[2.2.1]heptane monoendoperoxide 2.357	$C_{10}H_{14}O$	2-Cyclopentylidenecyclopentanone 2.154 2- <i>tert</i> -Butylphenol 4.120 4- <i>tert</i> -Butylphenol 4.121
$C_{10}H_{10}O_4$	4-Hydroxy-3-methoxycinnamic acid 4.70	$C_{10}H_{14}OS$	3-(4-Methylphenyl)thio-1-propanol 13.136
$C_{10}H_{11}N$	1,3-Dimethylindole 6.10 2,3-Dimethylindole 6.11	$C_{10}H_{14}O_2$	<i>p</i> - <i>tert</i> -Butylcatechol 4.8 4-Methoxy-2,3,6-trimethylphenol 4.134
$C_{10}H_{11}NO_2$	5,6-Dimethoxyindole 6.9	$C_{10}H_{14}O_2S$	3-(4-Methoxyphenyl)thio-1-propanol 13.135
$C_{10}H_{12}$	4,5,6,7-Tetrahydro-4,7-methanoindene 2.254 β,β -Dimethylstyrene 3.114	$C_{10}H_{14}O_4$	1,2,3,4-Tetramethoxybenzene 3.49 1,2,3,5-Tetramethoxybenzene 3.50 1,2,4,5-Tetramethoxybenzene 3.51
$C_{10}H_{12}N_2$	Tryptamine 10.34	$C_{10}H_{14}O_4Zn$	Bis(acetylacetonato)zinc(II) 12.13
$C_{10}H_{12}O$	Anethole 3.116	$C_{10}H_{14}S$	(Butylthio)benzene 13.8 4,6,6-Trimethylbicyclo[3.1.1]hept-3-ene-2-thione 13.48
$C_{10}H_{12}OS$	(<i>E</i>)-2-Phenylsulfinyl-2-butene 13.54 (<i>Z</i>)-2-Phenylsulfinyl-2-butene 13.55 1-Phenylsulfinyl-2-methylpropene 2.338	$C_{10}H_{14}S_4$	1,5,7-Trimethyl-3-methylidene-2,6,9,10-tetrathiaadamantane 2.253
$C_{10}H_{12}O_5$	2,5-Bis(ethoxycarbonyl)furan 5.60 Diethyl 3,4-furandicarboxylate 5.62	$C_{10}H_{15}N$	4-Phenylbutylamine 8.49 <i>N,N</i> ,2,4-Tetramethylaniline 9.17
$C_{10}H_{13}ClS$	1-(Butylthio)-3-chlorobenzene 13.9 1-(Butylthio)-4-chlorobenzene 13.10	$C_{10}H_{15}NO_2$	3,4-Dimethoxy- <i>N,N</i> -dimethylaniline 9.5
$C_{10}H_{13}FS$	1-(Butylthio)-4-fluorobenzene 13.11	$C_{10}H_{15}N_2O_7P$	3'-Deoxythymidine 5'-monophosphate 16.25
$C_{10}H_{13}NO_3$	Tyrosine, methyl ester 4.190	$C_{10}H_{15}N_2O_8P$	Thymidine 5'-monophosphate 16.78
$C_{10}H_{13}N_5O_4$	Adenosine 16.1 2'-Deoxyguanosine 16.37	$C_{10}H_{15}N_5O_4$	Glycyl-L-histidylglycine 10.19 Glycylglycyl-L-histidine 10.28
$C_{10}H_{13}N_5O_5$	Guanosine 16.36	$C_{10}H_{16}$	7,7-Dimethyl-2-methylenenorbornane 2.9 2,7,7-Trimethylnorborn-2-ene 2.23 2-Carene 2.26 4-Carene 2.27 3-Carene 2.28 α -Thujene 2.30 α -Terpinene 2.105 Terpinolene 2.121 Limonene 2.124 Octalin 2.261 2,6-Dimethyl-2,4,6-octatriene 2.285 α -Pinene 2.326 β -Pinene 2.327 1,1-Bis(cyclopropyl)-2-methyl-1-propene 2.334
$C_{10}H_{13}O^-$	4-(<i>tert</i> -Butyl)phenoxide ion 4.163		
$C_{10}H_{14}$	2,3-Dimethylenebicyclo[2.2.2]octane 2.33 (Dicyclopropylmethylidene)cyclopropane 2.168		
$C_{10}H_{14}CoO_4$	Bis(acetylacetonato)cobalt(II) 12.7		
$C_{10}H_{14}CoS_4$	Bis(dithioacetylacetonate)cobalt(II) 12.73		
$C_{10}H_{14}CuO_4$	Bis(acetylacetonato)copper(II) 12.8		
$C_{10}H_{14}N_2$	Nicotine 8.93		
$C_{10}H_{14}N_2O$	α -(4-Pyridyl)- <i>tert</i> -butyl nitrone 15.48		
$C_{10}H_{14}N_2O_2$	α -(4-Pyridyl 1-oxide)- <i>N-tert</i> -butylnitron 15.47		
$C_{10}H_{14}N_2O_5$	Thymidine 16.77		
$C_{10}H_{14}N_5O_6P$	2'-Deoxyadenosine 5'-monophosphate 16.21		

$C_{10}H_{16}N_2$	<i>N,N,N',N'</i> -Tetramethyl- <i>o</i> -phenylenediamine 9.26	$C_{10}H_{20}N_2$	1,1'-Bipiperidine 8.7
	<i>N,N,N',N'</i> -Tetramethyl- <i>m</i> -phenylenediamine 9.27		1,2-Bis(diethylamino)acetylene 8.30
	<i>N,N,N',N'</i> -Tetramethyl- <i>p</i> -phenylenediamine 9.31	$C_{10}H_{20}N_2NiS_4$	Bis(diethyldithiocarbamato)nickel(II) 12.40
$C_{10}H_{16}N_2NiO_2$	Bis(4-imino-2-pentanonato)nickel(II) 12.97	$C_{10}H_{20}O$	(<i>E</i>)-3,7-Dimethyl-2-octen-1-ol 2.292
$C_{10}H_{16}N_3O_6S^-$	Glutathione, negative ion 13.100		(<i>Z</i>)-3,7-Dimethyl-2-octen-1-ol 2.293
$C_{10}H_{16}N_4O_2$	Homocarnosine 10.26		Citronellol 2.294
$C_{10}H_{16}N_4O_3$	Anserine 10.25	$C_{10}H_{20}O_4$	Tetraethoxyethene 2.225
$C_{10}H_{16}N_5O_{13}P_3$	Adenosine triphosphate 16.3	$C_{10}H_{21}N$	1,2,2,6,6-Pentamethylpiperidine 8.61
$C_{10}H_{16}O$	Pulegone 2.115	$C_{10}H_{21}NO$	1,2,2,6,6-Pentamethyl-4-piperidinol 8.72
$C_{10}H_{16}OS$	3,3,6,6-Tetramethylthiacyclohept-4-yne 1-oxide 13.149	$C_{10}H_{24}N_2$	1,2-Dimethyl-1,2-dibutylhydrazine 8.34
$C_{10}H_{16}OSi$	2-(Trimethylsilyloxy)norborno-2,5-diene 2.7		1,1-Dimethyl-2,2-di(2-methylpropyl)hydrazine 8.37
$C_{10}H_{16}O_2$	6,6-Dimethylcyclohex-1-enyl acetate 2.126		1,2-Dimethyl-1,2-di(2-methylpropyl)hydrazine 8.38
$C_{10}H_{16}O_2S$	3,3,6,6-Tetramethylthiacyclohept-4-yne 1,1-dioxide 13.148	$C_{10}H_{26}N_4$	Spermine 8.11
$C_{10}H_{16}O_3$	6-Ethyl-3,4-dihydropyran-5-carboxylic acid ethyl ester 5.101	$C_{10}H_{0}N_2$	Tetrahydro-2,2,6,6-tetramethylpyrazolo[1,2- <i>a</i>]pyrazole 8.90
$C_{10}H_{16}S$	Thiofenchone 13.46	$C_{11}H_6O_3$	Angelicin 5.1
	Thiocamphor 13.47		Psoralen 5.86
	3,3,6,6-Tetramethylthiacyclohept-4-yne 13.147	$C_{11}H_7NO$	2-(4-Cyanophenyl)furan 5.26
$C_{10}H_{17}N_3O_6S$	Glutathione 13.99	$C_{11}H_8O_2$	2-Methyl-1,4-naphthoquinone 16.44
$C_{10}H_{18}$	<i>p</i> -Menth-1-ene 2.125	$C_{11}H_{10}$	1-Methylnaphthalene 3.86
	Ethylidenecyclooctane 2.135	$C_{11}H_{10}Cl_2N_2O_2$	Azo dioxide 6 15.20
	(<i>E</i>)-2,6-Dimethyl-2,6-octadiene 2.275	$C_{11}H_{10}NO_2^-$	Indole-3-propionate ion 6.29
	(<i>Z</i>)-2,6-Dimethyl-2,6-octadiene 2.276	$C_{11}H_{10}O$	2-(4-Methylphenyl)furan 5.47
	2,7-Dimethyl-2,6-octadiene 2.277		3-(4-Methylphenyl)furan 5.48
$C_{10}H_{18}MnO_6^+$	Bis(acetylacetonato)manganese(III) 12.9	$C_{11}H_{10}O_2$	2-(4-Methoxyphenyl)furan 5.44
$C_{10}H_{18}O$	2-(Cyclooctylidene)ethanol 2.217		3-(4-Methoxyphenyl)furan 5.45
	Linalool 2.280		α -Phenylfurfuryl alcohol 5.70
	(<i>E</i>)-3,7-Dimethyl-2,6-octadien-1-ol 2.281	$C_{11}H_{11}NO_2$	Indole-3-propionic acid 6.30
	(<i>E</i>)-3,7-Dimethyl-2,7-octadien-1-ol 2.282	$C_{11}H_{11}N_3$	1,3-Dimethylpyrazolo[1,2- <i>a</i>]benzotriazole 11.132
	(<i>Z</i>)-3,7-Dimethyl-2,7-octadien-1-ol 2.283	$C_{11}H_{11}N_3O_2$	1,2,5,6,6 <i>a</i> ,6 <i>b</i> ,6 <i>c</i> ,6 <i>d</i> -Octahydro-1,6[1',2']-4-methyl-3,5-dioxo-1,2,4-triazolo[1,3]cyclopropa[1,2,3- <i>cd</i>]cyclopropa[<i>gh</i>]pentalene 17.70
$C_{10}H_{18}OSi$	2-(Trimethylsilyloxy)norborno-2-ene 2.24	$C_{11}H_{11}N_3S$	4-(Aminomethylene)-3-methyl-1-phenyl-2-pyrazoline-5-thione 13.142
$C_{10}H_{18}O_2$	7 Hydroperoxy 2,7 dimethyl 2,5 octadiene 2.274	$C_{11}H_{11}N_3Se$	4-(Aminomethylene)-3-methyl-1-phenyl-2-pyrazoline-5-selone 13.141
	Hydroperoxy-2,6-dimethyl-2,6-octadiene 2.278	$C_{11}H_{12}$	2-Benzyl-1,3-butadiene 2.43
	6-Hydroperoxy-2,7-dimethyl-2,7-octadiene 2.279		1,2,3,4-Tetrahydro-1,4-methanonaphthalene 3.72
$C_{10}H_{18}O_3$	Monohydroperoxy-3,7-dimethyl-2,6-octadien-1-ol 2.284	$C_{11}H_{12}N_2O$	Indole-3-propionamide 6.28
$C_{10}H_{18}S$	3,3,6,6-Tetramethylthiacyclohept-4-ene 13.150	$C_{11}H_{12}N_2O_2$	Indole, 1,2,3-trimethyl-5-nitro- Tryptophan 10.36
	Di- <i>tert</i> -butylthioetene 13.165	$C_{11}H_{13}Cl$	<i>m</i> -Chloro- α,β,β -trimethylstyrene 3.109
			<i>p</i> -Chloro- α,β,β -trimethylstyrene 3.110
		$C_{11}H_{13}ClS$	4'-Chloropivalothiophenone 13.127

$C_{11}H_{13}FS$	4'-Fluoropivalothiophenone	13.128	$C_{11}H_{22}O_2$	Undecanoic acid	17.76
$C_{11}H_{13}N$	1,2,3-Trimethylindole	6.18	$C_{11}H_{23}NO$	<i>N</i> -(2-Hydroxyethyl)-2,2,6,6-tetramethylpiperidine	8.68
$C_{11}H_{13}N_3O$	Tryptophanamide	10.43	$C_{11}H_{26}N_2$	<i>N,N</i> -Diethyl-1,7-heptanediamine	8.31
$C_{11}H_{14}$	3-Methyl-1-phenyl-2-butene	3.45	$C_{12}H_2Cl_6NiS_4 \cdot C_{16}H_{36}N$	Bis[3,4,6-trichloro-1,2-benzenedithiolato]nickelate(I), tetrabutylammonium salt	12.117
	α,β,β -Trimethylstyrene	3.123	$C_{12}H_8O_4$	8-Methoxypsoralen	5.87
$C_{11}H_{14}N_2O_2$	<i>N</i> -Methoxycarbonyltryptamine	10.35	$C_{12}H_9ClS$	1-Chloro-4-(phenylthio)benzene	13.16
$C_{11}H_{14}N_2O_4$	<i>L</i> -Tyrosylglycine	4.76	$C_{12}H_9NO$	Phenoxazine	6.38
	Glycyltyrosine	4.189	$C_{12}H_9NO_2S$	1-Nitro-4-(phenylthio)benzene	13.31
$C_{11}H_{14}OS$	2-Methyl-3-phenylsulfinyl-2-butene	13.53	$C_{12}H_9NS$	Phenothiazine	13.121
$C_{11}H_{14}S$	Pivalothiophenone	13.126	$C_{12}H_9N_3O_2$	4-Nitroazobenzene	11.61
$C_{11}H_{15}NO$	Phenyl- <i>N-tert</i> -butylnitron	15.46	$C_{12}H_9O^-$	2-Phenylphenoxide	4.180
$C_{11}H_{15}NOS$	4-[(Phenylmethyl)thio]morpholine	13.112		4-Phenylphenoxide ion	4.181
$C_{11}H_{15}NO_2$	3,5-Diacetyl-1,4-dihydropyridine	6.41	$C_{12}H_9O_2^-$	2,2'-Dihydroxybiphenyl, conjugate base	4.166
	Ethyl 4-(dimethylamino)benzoate	9.21		2,5-Dihydroxybiphenyl, conjugate base	4.167
$C_{11}H_{15}NO_4S$	2-Sulfonatophenyl- <i>N-tert</i> -butylnitron	15.49	$C_{12}H_{10}N_2$	Azobenzene	11.57
$C_{11}H_{16}$	Nopadiene	2.25	$C_{12}H_{10}N_3S^+$	Thionine cation	11.114
	2,3-Dimethylenebicyclo[3.2.2]nonane	2.31	$C_{12}H_{10}O$	2'-Acetonaphthone	3.1
	(Dicyclopropylmethylidene)cyclobutane	2.96		2-Hydroxybiphenyl	4.141
	1,1,2-Tricyclopopylene	2.169	$C_{12}H_{10}O_2$	2,5-Dihydroxybiphenyl	4.30
$C_{11}H_{16}O$	2- <i>tert</i> -Butyl-4-hydroxyanisole	4.122		2,2'-Dihydroxybiphenyl	4.128
$C_{11}H_{16}OS$	1-(Butylthio)-4-methoxybenzene	13.12	$C_{12}H_{10}S$	Diphenyl sulfide	13.34
	4-(4-Methylphenyl)thio-1-butanol	13.52	$C_{12}H_{10}S_2$	Diphenyl disulfide	13.84
$C_{11}H_{16}O_2$	4-Methoxy-2,3,5,6-tetramethylphenol	4.133	$C_{12}H_{10}Se_2$	Diphenyldiselenide	13.83
$C_{11}H_{16}O_5$	Pentamethoxybenzene	3.48	$C_{12}H_{10}Te_2$	Diphenylditelluride	13.85
$C_{11}H_{16}S$	1-(Butylthio)-4-methylbenzene	13.13	$C_{12}H_{11}N$	Diphenylamine	9.16
	Methyl 4- <i>tert</i> -butylphenyl sulfide	13.20	$C_{12}H_{11}NO$	3-Hydroxydiphenylamine	4.142
$C_{11}H_{17}N$	<i>N,N</i> ,2,4,6-Pentamethylaniline	9.15	$C_{12}H_{11}N_2O_3^-$	Nalidixic acid, anion	16.46
$C_{11}H_{17}NS$	<i>N,N</i> -Diethylbenzenemethanesulfenamide	13.35	$C_{12}H_{12}$	1,2-Dimethylnaphthalene	3.75
$C_{11}H_{17}N_2O^+$	α -(1-Methyl-4-pyridyl)- <i>tert</i> -butyl nitron	15.45		1,3-Dimethylnaphthalene	3.76
$C_{11}H_{17}N_2O_8P$	Nicotinamide mononucleotide, reduced	16.51		1,4-Dimethylnaphthalene	3.77
$C_{11}H_{18}O$	3-Methyl-2-pentyl-2-cyclopenten-1-one	2.162		1,6-Dimethylnaphthalene	3.78
$C_{11}H_{18}O_3$	6-Isopropyl-3,4-dihydropyran-5-carboxylic acid ethyl ester	5.99		1,7-Dimethylnaphthalene	3.79
$C_{11}H_{18}S$	2,2,6,6-Tetramethylcyclohexylthioacetone	13.166		1,8-Dimethylnaphthalene	3.80
$C_{11}H_{19}N_3O$	Dimethirimol	16.66		2,3-Dimethylnaphthalene	3.81
	Ethirimol	16.67		2,6-Dimethylnaphthalene	3.82
$C_{11}H_{20}OSi$	6-(Trimethylsiloxy)-1,4-cyclooctadiene	2.132		2,7-Dimethylnaphthalene	3.83
$C_{11}H_{21}N$	<i>N</i> -Cyclohexylpiperidine	8.56	$C_{12}H_{12}N^+$	<i>N</i> -Methyl-4-phenylpyridinium	6.55
$C_{11}H_{22}N_2O_3S$	<i>L</i> -Methionyl- <i>L</i> -leucine	13.107	$C_{12}H_{12}NO_2^-$	Indole-3-butyrate ion	6.22
			$C_{12}H_{12}N_2$	Benzidine	9.23
			$C_{12}H_{12}N_2O_3$	Nalidixic acid	16.45
			$C_{12}H_{12}OS$	3-(4-Methoxyphenyl)-2-cyclopentene-1-thione	13.66

C ₁₂ H ₁₂ O ₂	α-Benzylfurfuryl alcohol 5.72 4-Hydroxymethyl-2-(phenylmethyl)furan 5.74 [2,2](2,5)Furanophane 5.77	C ₁₂ H ₁₈ OS	5-(4-Methylphenyl)thio-1-pentanol 13.118
C ₁₂ H ₁₂ S	1,1-Dimethyl-2-naphthalenethione 13.113	C ₁₂ H ₁₈ O ₂	Durohydroquinone monoethyl ether 4.126
C ₁₂ H ₁₃ N	<i>m</i> -Cyano-α,β,β-trimethylstyrene 3.111 <i>p</i> -Cyano-α,β,β-trimethylstyrene 3.112	C ₁₂ H ₁₈ O ₃	4-(1-Hydroxy-2,2-dimethyl)propyl-2-methoxyphenol 4.127
C ₁₂ H ₁₃ NO	(<i>E</i>)-1-Methyl-3-(β-methoxylvinyl)indole 2.247 (<i>Z</i>)-1-Methyl-3-(β-methoxylvinyl)indole 2.248	C ₁₂ H ₁₈ O ₆	Hexamethoxybenzene 3.42
C ₁₂ H ₁₃ NO ₂	3-Indolebutyric acid 6.23	C ₁₂ H ₂₀	(Cyclohexylidene)cyclohexane 2.109 1,1-Bis(cyclobutyl)-2-methyl-1-propene 2.332
C ₁₂ H ₁₄	4,5,6,7-Tetrahydrospirocyclopropane[4,7]methanoindene 2.345	C ₁₂ H ₂₀ O	2- <i>tert</i> -Butylfuran 5.24 2,5-Di- <i>tert</i> -butylfuran 5.28 2-(Cyclohexylidene)cyclohexanol 2.113
C ₁₂ H ₁₄ Cl ₃ MnO ₆	Bis(acetylacetonato)trichloroacetato-manganese(III) 12.12	C ₁₂ H ₂₀ OSi	7,7-Dimethyl-2-(trimethylsiloxy)-norborna-2,5-diene 2.5
C ₁₂ H ₁₄ N ⁺	<i>N</i> -Methyl-4-phenyl-2,3-dihydropyridinium 6.53	C ₁₂ H ₂₀ S	1,3,3,7,7-Pentamethylbicyclo[2.2.1]heptane-2-thione 13.45
C ₁₂ H ₁₄ N ₂ O ₂	Tryptophan, methyl ester 10.42	C ₁₂ H ₂₂ O	(<i>E,E</i>)-8,10-Dodecadienol 2.204
(C ₁₂ H ₁₅ N) _n	Permanax 45 6.72	C ₁₂ H ₂₂ O ₂	(<i>E,E</i>)-1,4-Di(<i>tert</i> -butoxy)-1,3-butadiene 2.36 (<i>E,Z</i>)-1,4-Di(<i>tert</i> -butoxy)-1,3-butadiene 2.37 (<i>Z,Z</i>)-1,4-Di(<i>tert</i> -butoxy)-1,3-butadiene 2.38
C ₁₂ H ₁₅ N	<i>N</i> -Methyl-4-phenyl-1,2,3,6-tetrahydropyridine 8.94	C ₁₂ H ₂₂ O ₁₁	Sucrose 16.75
C ₁₂ H ₁₅ NO	5-Methoxy-1,2,3-trimethylindole 6.14	C ₁₂ H ₂₄ O ₂	Dodecanoic acid 17.24
C ₁₂ H ₁₆	Tetramethyl- <i>o</i> -xylylene 2.104 3,α,β,β-Tetramethylstyrene 3.121 4,α,β,β-Tetramethylstyrene 3.122	C ₁₂ H ₂₆	Dodecane 17.23
C ₁₂ H ₁₆ ClMnO ₆	Bis(acetylacetonato)chloroacetatomanganese(III) 12.6	C ₁₂ H ₂₆ O ₄ S	Dodecyl sulfate, sodium salt 17.25
C ₁₂ H ₁₆ N ₂ O ₅ S	5- <i>S</i> -Cysteinyldopa 4.71	C ₁₂ H ₂₇ N	Tributylamine 8.13
C ₁₂ H ₁₆ O	<i>m</i> -Methoxy-α,β,β-trimethylstyrene 3.117 <i>p</i> -Methoxy-α,β,β-trimethylstyrene 3.118	C ₁₂ H ₂₇ O ₃ P	Tributyl phosphite 17.71
C ₁₂ H ₁₆ OS	4'-Methoxypivalothiophenone 13.129	C ₁₂ H ₂₈ N ₂	1,1-Dimethyl-2,2-di(2,2-dimethylpropyl)hydrazine 8.35 1,2-Dimethyl-1,2-di(2,2-dimethylpropyl)hydrazine 8.36 1,2-Dimethyl-1,2-dipentylhydrazine 8.39
C ₁₂ H ₁₆ O ₂	2,3-Dihydro-5-hydroxy-2,4,6,7-tetramethylbenzofuran 4.37	C ₁₂ H ₂₈ NiO ₄ P ₂ S ₄	Bis(<i>O,O'</i> -diisopropylphosphorodithiolato)nickel(II) 12.52
C ₁₂ H ₁₆ S	2,3-Dimethyl-2-butenyl phenyl sulfide 13.17	C ₁₃ H ₈ ClNOSe	7-Chloro-2-phenyl-1,2-benzisoselenazol-3-one 13.36
C ₁₂ H ₁₇ MnO ₆	Acetatobis(acetylacetonato)manganese(III) 12.1	C ₁₃ H ₈ Cl ₂ N ₂	Diazodi(4-chlorophenyl)methane 11.17
C ₁₂ H ₁₇ NO ₄	Diethyl 2,4-dimethylpyrrole-3,5-dicarboxylate 6.66	C ₁₃ H ₈ Cl ₂ S	4,4'-Dichlorothiobenzophenone 13.159
C ₁₂ H ₁₇ NS	1-[(Phenylmethyl)thio]piperidine 13.125	C ₁₃ H ₈ FNOSe	7-Fluoro-2-phenyl-1,2-benzisoselenazol-3-one 13.37
C ₁₂ H ₁₈	Hexamethylbicyclo[2.2.0]hexa-2,5-diene 2.29 (Dicyclopropylmethylidene)cyclopentane 2.151	C ₁₃ H ₈ N ₂	9-Diazofluorene 11.63
C ₁₂ H ₁₈ O	2-(Cyclohexylidene)cyclohexanone 2.114	C ₁₃ H ₈ N ₂ O ₃ Se	7-Nitro-2-phenyl-1,2-benzisoselenazol-3-one 13.39
		C ₁₃ H ₈ O	Phenalen-1-one 3.97
		C ₁₃ H ₉ BrN ₂	Diazo(4-bromophenyl)phenylmethane 11.15

- $C_{13}H_9ClS$ 4-Chlorothiobenzophenone 13.158
 $C_{13}H_9NOS$ 2-Phenyl-1,2-benzisothiazol-3-one 13.41
 $C_{13}H_9NOSe$ Ebselen 13.40
 $C_{13}H_{10}NO^-$ Benzophenone oximate anion 15.13
 $C_{13}H_{10}N_2$ Diazodiphenylmethane 11.16
 $C_{13}H_{10}O$ Benzophenone 3.58
 $C_{13}H_{11}NO$ Diphenyl nitron 15.10
 Benzophenone oxime 15.14
 $C_{13}H_{11}NO_2$ 2-Hydroxyphenyl phenyl nitron 15.7
 $C_{13}H_{11}NS$ 10-Methylphenothiazine 13.123
 $C_{13}H_{11}N_3$ 3,6-Diaminoacridine 11.1
 $C_{13}H_{11}N_3O$ 2 Methyl 6 phenylimidazo[1,2-*a*]pyrazin-3-one 16.41
 $C_{13}H_{11}O^-$ 2-Benzylphenoxide ion 4.152
 $C_{13}H_{12}O$ 2-Methoxybiphenyl 3.59
 2-Benzylphenol 4.98
 $C_{13}H_{12}OS$ 1-Methoxy-4-(phenylthio)benzene 13.23
 $C_{13}H_{12}O_3$ 2-[(4-Ethoxycarbonyl)phenyl]furan 5.40
 $C_{13}H_{12}S$ 1-Methyl-4-(phenylthio)benzene 13.26
 Benzyl phenyl sulfide 13.33
 $C_{13}H_{12}Se$ Benzyl phenyl selenide 13.32
 $C_{13}H_{14}N_2O_2$ 9-Methyl-6-nitro-2,3,4,9-tetrahydrocarbazole 6.3
 $C_{13}H_{14}N_2O_3$ *N*-Acetyltryptophan 10.37
 $C_{13}H_{14}O_2$ α -Phenethylfurfuryl alcohol 5.71
 $C_{13}H_{14}S$ 1,1,3-Trimethyl-2-naphthalenethione 13.114
 $C_{13}H_{15}N$ 9-Methyl-2,3,4,9-tetrahydrocarbazole 6.2
 $C_{13}H_{15}NO_2$ 7-(Diethylamino)coumarin 5.6
 $C_{13}H_{15}N_3O_2$ *N*-Acetyl-L-tryptophanamide 10.44
 $C_{13}H_{15}N_3O_3$ Tryptophylglycine 10.21
 Glycyltryptophan 10.41
 $C_{13}H_{16}$ α -Cyclopropyl- β,β -trimethylstyrene 3.113
 $C_{13}H_{16}FN_2O_3$ 2-(4-Fluoro-3-nitrophenyl)-2,5,5-trimethylpyrrolidin-1-oxyl 15.55
 $C_{13}H_{16}N_2$ Dehydrostobadine 6.58
 $C_{13}H_{16}N_2O$ 5'-Oxo-3'-ethyl-5,4'-dimethyl-1',5'-dihydro-(2,2')-dipyromethene 7.107
 5'-Oxo-4-ethyl-3,5-dimethyl-1',5'-dihydro-(2,2')-dipyromethene 7.108
 $C_{13}H_{16}N_2O_2$ L-Tryptophan, ethyl ester 10.40
 $C_{13}H_{16}O_2$ 1,2,3,4-Tetrahydro-5,8-dimethoxy-1,4-methanonaphthalene 3.73
 $C_{13}H_{17}NO_4$ 3,5-Diethoxycarbonyl-2,6-dimethylpyridine 6.52
N-Acetyl-L-tyrosine, ethyl ester 4.188
 $C_{13}H_{18}N_2$ Stobadine 6.56
 $C_{13}H_{18}OS$ 2,3-Dimethyl-2-butenyl 4-methoxyphenyl sulfide 13.18
 $C_{13}H_{18}O_2$ Acetoxymethylideneadamantane 2.2
 2,3-Dihydro-5-hydroxy-2,2,4,6,7-pentamethylbenzofuran 4.36
 Adamantylidenemethyl acetate 2.256
 $C_{13}H_{18}S$ 2,3-Dimethyl-2-butenyl 4-methylphenyl sulfide 13.19
 $C_{13}H_{19}N$ *p*-(*N,N*-Dimethylamino)- α,β,β -trimethylstyrene 3.115
 $C_{13}H_{19}NO_2$ 3,5-Diacetyl-1,4-dihydro-2,6-dimethylpyridine 6.42
 $C_{13}H_{19}NO_4$ 3,5-Diethoxycarbonyl-1,4-dihydro-2,6-dimethylpyridine 6.47
 $C_{13}H_{19}NS_2$ *N*-[[[(5-Methyl-2-(methylthio)-3-thienyl)methylene]cyclohexanamine 13.64
 3-[(Cyclohexylamino)methylene]-5-ethyl-2-thiophenethione 13.170
 $C_{13}H_{20}$ 2-Isopropylideneadamantane 2.353
 $C_{13}H_{20}CoN_5O_5$ Hydroxybis(dimethylglyoximate)pyridinecobalt 12.146
 $C_{13}H_{20}O$ β -Ionone 2.61
 $C_{13}H_{20}OS$ 6-(4-Methylphenyl)thio-1-hexanol 13.103
 $C_{13}H_{22}NO_3$ 2,2,6,6-Tetramethyl-4-piperidinol-1-oxyl crotonate 15.36
 2,2,6,6-Tetramethyl-4-piperidinol-1-oxyl methacrylate 15.40
 $C_{13}H_{24}$ (*E*)-2,6,9-Trimethyl-1,6-decadiene 2.171
 (*Z*)-2,6,9-Trimethyl-1,6-decadiene 2.172
 (*E*)-2,6-Dimethyl-1,6-undecadiene 2.359
 (*Z*)-2,6-Dimethyl-1,6-undecadiene 2.360
 $C_{13}H_{24}NO_3$ 2,2,6,6-Tetramethyl-4-piperidinol-1-oxyl butyrate 15.35
 $C_{13}H_{25}NO_2$ *N*-(2-Acetoxyethyl)-2,2,6,6-tetramethylpiperidine 8.69
 $C_{13}H_{27}NO$ 1-Butoxy-2,2,6,6-tetramethylpiperidine 8.55
 $C_{14}H_8Br_2NiO_4 \cdot 2H_2O$ Bis(5-bromo-2-hydroxybenzaldehydato)nickel(II) dihydrate 12.14
 $C_{14}H_8Cl_2$ 9,10-Dichloroanthracene 3.7
 $C_{14}H_8O_2$ Naphtho[1,8-*bc*:5,4-*b',c'*]dipyran 3.94
 $C_{14}H_8O_6S_2^{2-}$ 1,5-Anthracenedisulfonate ion 3.17
 $C_{14}H_9BrN_2O_4$ 1,5-Diaminobromo-4,8-dihydroxyanthraquinone 11.12
 $C_{14}H_9Cl$ 1-Chloroanthracene 3.4
 9-Chloroanthracene 3.5

$C_{14}H_9NO_2$	1-Aminoanthraquinone 11.3 2-Aminoanthraquinone 11.4	$C_{14}H_{13}NO$	4-Methylphenyl phenyl nitron 15.8 Phenyl 4-methylphenyl nitron 15.9 α -Phenyl- <i>N</i> -benzyl nitron 15.12 Benzophenone oxime <i>O</i> -methyl ether 15.15
$C_{14}H_9NO_3$	1-Amino-4-hydroxyanthraquinone 11.5	$C_{14}H_{13}NOS$	2-(Methylthio)- <i>N</i> -phenylbenzamide 13.3
$C_{14}H_9O_3^-$	1,8-Dihydroxy-9-anthrone, conjugate base 4.3	$C_{14}H_{13}NOSe$	2-(Methylseleno)- <i>N</i> -phenylbenzamide 13.2
$C_{14}H_9O_3S^-$	1-Anthracenesulfonate ion 3.18 2-Anthracenesulfonate ion 3.19	$C_{14}H_{13}N_3O_2$	2-Methyl-6-(4-methoxyphenyl)imidazo[1,2- <i>a</i>]pyrazin-3-one 16.40
$C_{14}H_{10}$	Anthracene 3.3	$C_{14}H_{14}$	1-(β,β -Dimethylvinyl)naphthalene 3.87
$C_{14}H_{10}N_2O_2$	1,4-Diaminoanthraquinone 11.8 1,5-Diaminoanthraquinone 11.9 1,8-Diaminoanthraquinone 11.10 2,6-Diaminoanthraquinone 11.11 3,4-Diphenylsydnone 5.102	$C_{14}H_{14}N_3^+$	3,6-Diamino-10-methylacridinium 11.2
$C_{14}H_{10}NiO_4 \cdot 2H_2O$	Bis(2-hydroxybenzaldehydato)nickel(II) dihydrate 12.88	$C_{14}H_{14}O_3$	4-Acetoxyethyl-2-(phenylmethyl)furan 5.75
$C_{14}H_{10}O_3$	1,8-Dihydroxy-9-anthrone 4.2	$C_{14}H_{14}S$	Dibenzyl sulfide 13.71
$C_{14}H_{11}NO_2Se$	7-Methoxy-2-phenyl-1,2-benzisoseleazol-3-one 13.38	$C_{14}H_{15}NO$	<i>N,N</i> -Dibenzylhydroxylamine 15.11
$C_{14}H_{12}$	(<i>Z</i>)-Stilbene 3.99	$C_{14}H_{15}O_2^-$	4-Methyl-1-naphthalenepropionate ion 3.91
$C_{14}H_{12}Cl_4$	5,6,7,8-Tetrachloro-1,2,3,4-tetrahydro-9-isopropylidene-1,4-methanonaphthalene 2.258	$C_{14}H_{15}O_4^-$	4-Methyl-1-naphthalenepropionate ion endoperoxide 3.92
$C_{14}H_{12}CoS_4$	Bis[4-methyl-1,2-benzenedithiolato]cobalt(II) tetrabutylammonium salt 12.99	$C_{14}H_{16}$	1,2,3,4-Tetrahydro-9-isopropylidene-1,4-methanonaphthalene 2.260
$C_{14}H_{12}F_4$	5,6,7,8-Tetrafluoro-1,2,3,4-tetrahydro-9-isopropylidene-1,4-methanonaphthalene 2.259	$C_{14}H_{16}N_2O_3$	<i>N</i> -Acetyltryptophan methyl ester 10.38
$C_{14}H_{12}N_2NiO_2$	Bis[2-(iminomethyl)phenolato]nickel(II) 12.96	$C_{14}H_{16}O_2$	α -(3-Phenylpropyl)furfuryl alcohol 5.73
$C_{14}H_{12}N_2NiO_4$	Bis(2-hydroxybenzaldehyde oximato)nickel(II) 12.89	$C_{14}H_{16}O_3$	5-Ethoxycarbonyl-3,4-dihydro-6-phenylpyran 5.100
$C_{14}H_{12}N_2NiS_4$	Bis(phenyldithiocarbamato)nickel(II) 12.107	$C_{14}H_{16}O_4$	4-Methyl-1-naphthalenepropionic acid endoperoxide 3.93
$C_{14}H_{12}N_2O$	Diazo(4-methoxyphenyl)phenylmethane 11.20	$C_{14}H_{17}NO_2$	7-(Diethylamino)-4-methylcoumarin 5.7
$C_{14}H_{12}N_2O_6S_2^{2-}$	4,4'-Diaminostilbene-2,2'-disulfonate ion 3.107	$C_{14}H_{17}N_3O_3$	L-Alanyl-L-tryptophan 10.39
$C_{14}H_{12}N_4O_2$	1,4,5,8-Tetraaminoanthraquinone 11.14	$C_{14}H_{17}O_4^-$	6-Hydroxy-2,5,7,8-tetramethylchroman-2-carboxylate ion 4.44
$C_{14}H_{12}NiS_4$	Bis[4-methyl-1,2-benzenedithiolato]nickel(II) tetrabutylammonium salt 12.100	$C_{14}H_{18}N_2O$	5'-Oxo-3',4'-diethyl-5-methyl-1',5'-dihydro-(2,2')-dipyrrromethene 7.101 5'-Oxo-3'-ethyl-4',3,5-trimethyl-1',5'-dihydro-(2,2')-dipyrrromethene 7.103 5'-Oxo-4',4,5-trimethyl-3'-ethyl-1',5'-dihydro-(2,2')-dipyrrromethene 7.104
$C_{14}H_{12}O$	(<i>E</i>)-2,3-Diphenyloxirane 17.49	$C_{14}H_{19}NO_3S$	CBZ-L-Methionine methyl ester 13.110
$C_{14}H_{12}OS$	4-Methoxythiobenzophenone 13.162	$C_{14}H_{19}N_3O_5$	Glycyl-L-tyrosyl-L-alanine 4.1
$C_{14}H_{12}S$	(<i>E</i>)-2,3-Diphenylthiirane 13.151	$C_{14}H_{20}N_2$	Caged hydrazine 8.22
		$C_{14}H_{20}O_2$	6-Hydroxy-2,2,5,7,8-pentamethylchroman 4.49 1-Adamantylideneethyl acetate 2.220
		$C_{14}H_{21}BrO$	4-Bromo-2,6-di- <i>tert</i> -butylphenol 4.105
		$C_{14}H_{21}ClO$	2,6-Di- <i>tert</i> -butyl-4-chlorophenol 4.110
		$C_{14}H_{21}NO_4$	3,5-Diethoxycarbonyl-1,4-dihydro-2,4,6-trimethylpyridine 6.51
		$C_{14}H_{22}$	2-Isobutylideneadamantane 2.355
		$C_{14}H_{22}O$	2,6-Di- <i>tert</i> -butylphenol 4.99

$C_{14}H_{22}OS$	3-Hydroxy-3,4-dimethylpentyl <i>p</i> -methylphenyl sulfide 13.119	$C_{15}H_{12}O_6$	Dihydroluteolin 4.59
$C_{14}H_{22}O_2$	3,5-Di- <i>tert</i> -butylcatechol 4.7 2,5-Di- <i>tert</i> -butylhydroquinone 4.14	$C_{15}H_{12}O_7$	Dihydroquercetin 4.63
$C_{14}H_{26}$	4,8-Dimethyl-4,8-dodecadiene 2.201 (<i>E,E</i>)-4,8-Dimethyl-4,8-dodecadiene 2.202	$C_{15}H_{12}S_3$	4,5-Diphenyl-1,3-dithiane-2-thione 13.89
$C_{14}H_{26}NO_3$	2,2,6,6-Tetramethyl-4-piperidinol-1-oxyl pentanoate 15.41	$C_{15}H_{13}N$	3-Methyl-2-phenylindole 6.17
$C_{14}H_{26}O$	2-(Cyclododecylidene)ethanol 2.215	$C_{15}H_{14}$	(<i>E</i>)- α -Methylstilbene 3.104 (<i>Z</i>)- α -Methylstilbene 3.105
$C_{14}H_{26}O_2$	Monohydroperoxides of 4,8-dimethyl-4,8-dodecadiene 2.203	$C_{15}H_{14}N_2$	Diazodi(4-methylphenyl)methane 11.18
$C_{14}H_{28}CoN_2S_4$	Bis(diisopropyldithiocarbamate)cobalt(II) 12.46	$C_{15}H_{14}O_2S$	4,4'-Dimethoxythiobenzophenone 13.160
$C_{14}H_{28}CuN_2S_4$	Bis(diisopropyldithiocarbamate)copper(II) 12.47	$C_{15}H_{14}O_6$	Catechin 4.67
$C_{14}H_{28}FeN_2S_4^+$	Bis(diisopropyldithiocarbamate)iron(III) 12.48	$C_{15}H_{14}S$	4,4'-Dimethylthiobenzophenone 13.161
$C_{14}H_{28}MnN_2S_4$	Bis(diisopropyldithiocarbamate)manganese(II) 12.49	$C_{15}H_{15}NO_2$	Coumarin LD-490 8.3
$C_{14}H_{28}N_2NiS_4$	Bis(diisopropyldithiocarbamate)nickel(II) 12.50	$C_{15}H_{15}N_3O_2$	1,2,5,6,6a,6b,6c,6d-Octahydro-1,6[1',2']-4-methyl-3,5-dioxo-1,2,4-triazolobenzo[1,3]cyclopropa[1,2,3- <i>cd</i>]cyclopropa[<i>gh</i>]pentalene 17.69
$C_{14}H_{28}N_2S_4Zn$	Bis(diisopropyldithiocarbamate)zinc(II) 12.51	$C_{15}H_{18}N_2$	1-Isopropylamino-4-phenylaminobenzene 9.30
$C_{14}H_{28}O_2$	Tetradecanoic acid 17.67	$C_{15}H_{18}N_4O_4$	L-Tryptophylglycylglycine 10.22
$C_{14}H_{31}CoN_5O_5$	Hydroxybis(dimethylglyoximate)triethylamine-cobalt(II) 12.147	$C_{15}H_{18}N_4O_5$	Mitomycin C 16.7
$C_{15}H_9O_2^-$	9-Anthroate ion 3.21	$C_{15}H_{19}N_3O$	4-Benzyl-5,6-dimethyl-2-(dimethylamino)pyrimidine 16.65
$C_{15}H_{10}O_3$	3-Hydroxyflavone 4.74	$C_{15}H_{20}N_2O$	<i>N</i> -Acetylstobadine 6.57
$C_{15}H_{10}O_4$	5,7-Dihydroxyflavone 4.73	$C_{15}H_{21}CoO_6$	Tris(acetylacetonato)cobalt(III) 12.173
$C_{15}H_{10}O_5$	Galangin 4.65	$C_{15}H_{21}CrO_6$	Tris(acetylacetonato)chromate(III) 12.172
$C_{15}H_{10}O_6$	Luteolin 4.60 Kaempferol 4.64 Fisetin 4.75	$C_{15}H_{21}FeO_6$	Tris(acetylacetonato)iron(III) 12.174
$C_{15}H_{10}O_7$	Quercetin 4.61	$C_{15}H_{21}MnO_6$	Tris(acetylacetonato)manganese(III) 12.175
$C_{15}H_{11}NO$	2,5-Diphenyloxazole 6.31	$C_{15}H_{22}O_2$	7-(1,1-Dimethylethyl)-3,4-dihydro-2,2-dimethyl-1-benzopyran-6-ol 4.54
$C_{15}H_{11}NO_2$	1-Amino-2-methylanthraquinone 11.6	$C_{15}H_{23}NO_4$	1,4-Dihydro-2,6-dimethyl-3,5-di(1-methylethoxycarbonyl)pyridine 6.49
$C_{15}H_{12}$	9-Methylanthracene 3.13	$C_{15}H_{24}$	Caryophyllene 2.34
$C_{15}H_{12}N_2O_2$	3-(4-Methylphenyl)-4-phenylsydnone 5.106	$C_{15}H_{24}O$	2,6-Di- <i>tert</i> -butyl-4-methylphenol 4.102
$C_{15}H_{12}N_2O_3$	1,4-Diamino-2-methoxyanthraquinone 11.13	$C_{15}H_{24}O_2$	3,5-Di- <i>tert</i> -butyl-4-hydroxybenzyl alcohol 4.32 2,4-Di- <i>tert</i> -butyl-5-methoxyphenol 4.100 2,6-Di- <i>tert</i> -butyl-4-methoxyphenol 4.101
$C_{15}H_{12}O$	9-Methoxyanthracene 3.12	$(C_{15}H_{25}NO_4)_n$	Tinuvin 622 8.67
$C_{15}H_{12}O_5$	4',5,7-Trihydroxyflavanone 4.72	$C_{15}H_{26}$	2,6,10-Trimethyl-2,6,10-dodecatriene 2.210
		$C_{15}H_{26}O_2$	Hydroperoxy-2,6,10-trimethyl-2,6,10-dodecatriene 2.209
		$C_{15}H_{26}O_4$	Dihydroperoxy-2,6,10-trimethyl-2,6,10-dodecatriene 2.208
		$C_{15}H_{34}ClN$	Dodecyltrimethylammonium chloride 17.26
		$C_{16}H_{10}Br_2O$	2,5-Bis(4-bromophenyl)furan 5.16
		$C_{16}H_{10}Cl_2O$	2,5-Bis(4-chlorophenyl)furan 5.17
		$C_{16}H_{10}N_2O_2$	Indigo 11.69

$C_{16}H_{11}BrN_2O$	1-(4-Bromophenylazo)-2-naphthol 11.94	$C_{16}H_{14}O_4$	2,3-Di(4-hydroxyphenyl)-1,4-dioxene 2.189
$C_{16}H_{11}ClN_2O$	4-(4-Chlorophenylazo)-1-naphthol 11.87 1-(4-Chlorophenylazo)-2-naphthol 11.95	$C_{16}H_{14}O_4^{2-}$	1,4-Naphthalenedipropionate ion 3.88
$C_{16}H_{11}FN_2O$	1-(4-Fluorophenylazo)-2-naphthol 11.97	$C_{16}H_{15}N_3O_2$	1-(Phenylazo)-1-(phenylaminocarbonyl)-2-propanone 11.62
$C_{16}H_{11}IN_2O$	1-(4-Iodophenylazo)-2-naphthol 11.99	$C_{16}H_{16}$	1,1-Diphenyl-2-methylpropene 3.46 <i>trans</i> - α,α' -Dimethylstilbene 3.102 <i>cis</i> - α,α' -Dimethylstilbene 3.103
$C_{16}H_{11}N_3O_3$	4-(4-Nitrophenylazo)-1-naphthol 11.91 1-(4-Nitrophenylazo)-2-naphthol 11.103	$C_{16}H_{16}ClN_3O$	2-(2'-Hydroxy-3'-chloro-5'- <i>tert</i> -butylphenyl)benzotriazole 4.97
$C_{16}H_{12}ClNO$	4-Methyl-2-(3-chlorophenyl)-5-phenyloxazole 6.33 4-Methyl-2-(4-chlorophenyl)-5-phenyloxazole 6.34	$C_{16}H_{16}N_2NiO_4$	Bis(2'-hydroxyacetophenone oximato)nickel(II) 12.87
$C_{16}H_{12}Cl_2O_2$	2,3-Di(3-chlorophenyl)-1,4-dioxene 2.186 2,3-Di(4-chlorophenyl)-1,4-dioxene 2.187	$C_{16}H_{16}N_2NiS_4$	Bis(4-methylphenyldithiocarbamate)nickel(II) 12.103
$C_{16}H_{12}N_2Na_2NiO_8S_2$	[<i>N,N'</i> -Ethylenebis(5-sulfosalicylideneiminato)]nickelate(II) disodium salt 12.143	$C_{16}H_{16}O_2$	4,4'-Dimethoxystilbene 3.100 α,β -Dimethoxystilbene 3.101
$C_{16}H_{12}N_2O$	4-Phenylazo-1-naphthol 11.92 1-Phenylazo-2-naphthol 11.104	$C_{16}H_{17}NO_2$	2,3,6,7-Tetrahydro-9-methyl[1]benzopyran[6,7,8- <i>ij</i>]quinolizin-11-one 8.4
$C_{16}H_{12}N_2O_2$	1-(4-Hydroxyphenylazo)-2-naphthol 11.98	$C_{16}H_{17}N_5O_4$	4-(Diethylamino)-2',4'-dinitroazobenzene 11.52
$C_{16}H_{12}N_2O_3$	4-Methyl-2-(4-nitrophenyl)-5-phenyloxazole 6.37	$C_{16}H_{18}CuN_2S_4$	[[3,3]-[1,2-Ethanediybis(nitrilomethylidyne)]bis(5-ethyl-2-thiophenethionato)]copper(II) 12.138
$C_{16}H_{12}O$	2,3-Diphenylfuran 5.37 2,5-Diphenylfuran 5.38 3,4-Diphenylfuran 5.39	$C_{16}H_{18}N_3S^+$	Methylene Blue cation 11.113
$C_{16}H_{13}NO$	2,5-Diphenyl-4-methyloxazole 6.32	$C_{16}H_{18}N_4O_2$	4-(Diethylamino)-3'-nitroazobenzene 11.54 4-(Diethylamino)-4'-nitroazobenzene 11.55
$C_{16}H_{13}N_3O$	1-(<i>p</i> -Aminophenylazo)-2-naphthol 11.93	$C_{16}H_{18}NiO_3S$	Aqua[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II) 12.4
$C_{16}H_{14}$	1,4-Diphenyl-1,3-butadiene 2.40 9,10-Dimethylanthracene 3.10 1-Methyl-2-phenylindene 3.71	$C_{16}H_{19}N_3$	4-(Diethylamino)azobenzene 11.56
$C_{16}H_{14}CoN_2O_2$	2,2'-[1,2-Ethanediybis(nitrilomethylidyne)]bis[phenolato]cobalt(II) 12.139	$C_{16}H_{20}N_2O$	5'-Oxo-4'-vinyl-4-ethyl-3',3,5-trimethyl-1',5'-dihydro-(2.2')-dipyromethene 7.105 5'-Oxo-4-ethyl-3'-ethenyl-3,5,4'-trimethyl-1',5'-dihydro-(2.2')-dipyromethene 7.106
$C_{16}H_{14}N_2Na_2NiO_8S_2$	[<i>N,N'</i> -Propylenebis(5-sulfosalicylideneiminato)]nickelate(II) disodium salt 12.169	$C_{16}H_{20}N_2S_4$	(<i>Z,Z</i>)-3,3'-[1,2-Ethanediybis(iminomethylidyne)]bis[5-ethyl-2-thiophenethione] 13.171
$C_{16}H_{14}N_2NiO_2$	2,2'-[1,2-Ethanediybis(nitrilomethylidyne)]bis[phenolato]nickel(II) 12.140	$C_{16}H_{20}O_2$	5,8-Dimethoxy-1,2,3,4-tetrahydro-9-isopropylidene-1,4-methanonaphthalene 2.257
$C_{16}H_{14}N_2O_2$	1,4-Bis(methylamino)anthraquinone 11.7	$C_{16}H_{22}NO_3$	2,2,6,6-Tetramethyl-4-piperidinol-1-oxyl benzoate 15.34
$C_{16}H_{14}NiO_6 \cdot 2H_2O$	Bis(2-hydroxy-5-methoxybenzaldehydato)nickel(II) dihydrate 12.92	$C_{16}H_{22}O_4$	3-(6-Hydroxy-2,5,7,8-tetramethylchroman-2-yl)propionic acid 4.66
$C_{16}H_{14}O_2$	9,10-Dimethoxyanthracene 3.8 2,3-Diphenyl-1,4-dioxene 2.194		

- $C_{16}H_{24}O_2$ 4-Acetyl-2,6-di-*tert*-butylphenol 4.94
 $C_{16}H_{24}O_3$ Methyl 3,5-di-*tert*-butyl-4-hydroxybenzoate 4.39
 $C_{16}H_{26}O$ 2,6-Di-*tert*-butyl-4-methylanisole 3.29
 $C_{16}H_{26}O_2$ 1,3-Dimethoxy-4,6-di-*tert*-butylbenzene 3.28
 2,5-Di-*tert*-amylhydroquinone 4.16
 $C_{16}H_{32}O_2$ Hexadecanoic acid 17.37
 $C_{17}H_{10}O$ Benzanthrone 3.25
 $C_{17}H_{12}N_2PtS_2$ [4-Methyl-1,2-benzenedithiolato](1,10-phenanthroline)platinum(II) 12.155
 $C_{17}H_{12}OS$ 2,6-Diphenylpyran-4-thione 13.140
 $C_{17}H_{12}S_2$ 2,6-Diphenylthiopyran-4-thione 13.173
 $C_{17}H_{13}Cl_2$ 1,4-Bis(4-chlorophenyl)-1,3-cyclopentadiene 2.141
 $C_{17}H_{13}F_2$ 1,4-Bis(4-fluorophenyl)-1,3-cyclopentadiene 2.142
 $C_{17}H_{13}N_3O_3$ 1-(4-Methyl-2-nitrophenylazo)-2-naphthol 11.101
 $C_{17}H_{14}Cl$ 1-(4-Chlorophenyl)-4-phenyl-1,3-cyclopentadiene 2.146
 $C_{17}H_{14}N_2NiS_2$ [4-Methyl-1,2-benzenedithiolato](2,2'-bipyridine)nickel(II) 12.153
 $C_{17}H_{14}N_2O$ 1-Methoxy-4-(phenylazo)naphthalene 11.59
 1,4-Naphthoquinone *N*-methyl-*N*-phenylhydrazone 11.83
 4-(4-Methylphenylazo)-1-naphthol 11.90
 1-(4-Methylphenylazo)-2-naphthol 11.102
 $C_{17}H_{14}N_2O_2$ 4-(4-Methoxyphenylazo)-1-naphthol 11.89
 1-(4-Methoxyphenylazo)-2-naphthol 11.100
 $C_{17}H_{14}O_2$ α,α -Diphenylfurfuryl alcohol 5.67
 $C_{17}H_{15}$ 1,4-Diphenyl-1,3-cyclopentadiene 2.147
 $C_{17}H_{15}NO$ 4-Methyl-2-(4-methylphenyl)-5-phenyloxazole 6.36
 $C_{17}H_{15}NO_2$ 4-Methyl-2-(4-methoxyphenyl)-5-phenyloxazole 6.35
 $C_{17}H_{15}NO_3S$ (*Z*)-1-(Phenylsulfonyl)-3-(β -methoxylvinyl)indole 2.249
 $C_{17}H_{15}N_3O_2$ 4-(4'-Methoxyphenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one 11.148
 $C_{17}H_{15}N_5$ 1,3-Dimethylpyrazolo[1',2':2.3][1.2,3]-triazolo[4,5-*a*]phenazin-4-ium 6.39
 $C_{17}H_{16}N_4O$ 4-(4'-Aminophenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one 11.133
 $C_{17}H_{16}O_3$ 2-(4-Methoxyphenyl)-3-phenyl-1,4-dioxene 2.195
 $C_{17}H_{17}N_3O_2$ 1-(4-Methylphenylazo)-1-(phenylaminocarbonyl)-2-propanone 11.60
 $C_{17}H_{18}N_4$ 4-[*N*-(2-Cyanoethyl)-*N*-ethylamino]azobenzene 11.51
 $C_{17}H_{18}O_4$ 4-Methyl-1,3-naphthalenedipropionic acid 3.89
 $C_{17}H_{19}ClN_2S$ Chlorpromazine 13.122
 $C_{17}H_{19}ClO$ 2-(3-Chlorophenoxyethylidene)adamantane 2.350
 2-(4-Chlorophenoxyethylidene)adamantane 2.351
 $C_{17}H_{20}N_4O_6$ Riboflavine 16.72
 $C_{17}H_{21}N_3O$ 4-(Diethylamino)-4'-methoxyazobenzene 11.53
 $C_{17}H_{21}N_3O_2$ 4-[*N*-Ethyl-*N*-(2-hydroxyethyl)amino]-4'-methoxyazobenzene 11.58
 $C_{17}H_{22}NO_2$ 4-Hydroxy-4-(2-phenylethynyl)-2,2,6,6-tetramethylpiperidine *N*-oxyl 15.32
 $C_{17}H_{23}NO_2$ 3,4,6,7,9,10-Hexahydro-3,3,6,6-tetramethyl-1,8-acridinedione 6.1
 $C_{17}H_{23}NO_3$ Atropine 8.1
 $C_{17}H_{24}N_2O$ 5'-Oxo-3',4',4'-triethyl-3,5-dimethyl-1',5'-dihydro-(2,2')-dipyrrromethene 7.102
 $C_{17}H_{24}N_4NiO_2$ 1,1'-(7,13-Dimethyl-1,4,8,12-tetraazacyclopentadeca-4,7,12,15-tetraene-6,14-diy)bis[ethanoato]nickel(II) 12.133
 $C_{17}H_{25}NO_3$ Eucatropine 8.76
 $C_{17}H_{26}O_3$ 3,5-Di-*tert*-butyl-4-hydroxyphenyl propionate 4.15
 $C_{18}H_{11}NO_2$ Quinophthalone 11.68
 $C_{18}H_{12}$ Benz[*a*]anthracene 3.23
 Tetracene 3.124
 $C_{18}H_{12}O$ 2-Phenylcyclopenta[*b*][1]benzopyran 5.8
 $C_{18}H_{14}N_3O_6S^-$ 5-Methoxy-4-[2-(methylsulfonyl)-4-nitrophenyl]azo-1-naphthoxide ion 11.88
 $C_{18}H_{15}ClO$ 1-(4-Chlorophenyl)-4-(4-methoxyphenyl)-1,3-cyclopentadiene 2.145
 $C_{18}H_{15}N$ Triphenylamine 9.8
 $C_{18}H_{15}P$ Triphenylphosphine 17.75
 $C_{18}H_{16}$ 1,2,5,6,6*a*,6*b*,6*c*,6*d*-Octahydro-1,6-*o*-benzenobenzo[1,3]cyclopropa[1,2,3-*cd*]cyclopropa[*gh*]pentalene 2.181
 $C_{18}H_{16}N_2$ *N,N'*-Diphenyl-*p*-phenylenediamine 9.29

$C_{18}H_{16}N_2O_8S_2^{2-}$ 4,4'-Diacetamidostilbene-2,2'-disulfonate ion 3.106	$C_{18}H_{22}O$ 2-(4-Methylphenoxymethylidene)adamantane 2.354
$C_{18}H_{16}O$ 2,5-Bis(4-methylphenyl)furan 5.20 1-(4-Methoxyphenyl)-4-phenyl-1,3-cyclopentadiene 2.148	$C_{18}H_{22}O_2$ 2-(4-Methoxyphenoxymethylidene)adamantane 2.352
$C_{18}H_{16}O_2$ α -Benzhydrylfurfuryl alcohol 5.68 5-Benzoyl-3,4-dihydro-6-phenylpyran 5.89	$C_{18}H_{23}NNiO_2S$ Ethylamine[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II) 12.141
$C_{18}H_{16}O_3$ 2,5-Bis(4-methoxyphenyl)furan 5.19	$C_{18}H_{24}O_2$ <i>exo,exo</i> -2,3-Dioxymethyl-7-adamantylidenenorbornane 2.10
$C_{18}H_{16}O_6S_2^{2-}$ 9,10-Anthracenediethanesulfonate ion 3.15	$C_{18}H_{26}O_2$ 1,2,3,8,9,10-Hexahydro-3,3,5,6,8,8-hexamethylbenzo[1,2- <i>b</i> :4,3- <i>b'</i>]dipyran 5.2 2,3,4,7,8,9-Hexahydro-2,2,5,7,7,10-hexamethylbenzo[1,2- <i>b</i> :4,5- <i>b'</i>]dipyran 5.3
$C_{18}H_{17}NO$ β -Phenyl- α -pyrrolidinylbenzeneethanol 8.2	$C_{18}H_{28}N_2S_3$ 3,4-Bis[(cyclohexylamino)methylene]dihydro-2,5-thiophenedithione 13.169
$C_{18}H_{17}N_3O$ 1-[4-(Dimethylamino)phenylazo]-2-naphthol 11.96	$C_{18}H_{30}O$ 2,4,6-Tri- <i>tert</i> -butylphenol 4.147
$C_{18}H_{18}N_2NiO_2$ 2,2'-[1,2-Ethanediybis(nitriloethylidyne)]-bis[phenolato]nickel(II) 12.137	$C_{18}H_{30}O_2$ Linolenic acid 2.267 4- <i>tert</i> -Butoxy-2,6-di- <i>tert</i> -butylphenol 4.119
$C_{18}H_{18}N_3O_7$ 2,5-Di-(4-hydroxy-3-nitrophenyl)-2,5-dimethylpyrrolidin-1-oxyl 15.54	$C_{18}H_{32}O_2$ Linoleic acid 2.264
$C_{18}H_{18}N_4O$ 4-(4'-Dimethylaminophenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one 11.150	$C_{18}H_{33}O_3P$ Tricyclohexyl phosphite 17.72
$C_{18}H_{18}O_2$ 1,4-Di(4,4'-dimethoxyphenyl)-1,3-butadiene 2.35 2,3-Di(4-methylphenyl)-1,4-dioxene 2.193	$C_{18}H_{34}O_2$ Oleic acid 2.271
$C_{18}H_{18}O_4$ 2,3-Di(3-methoxyphenyl)-1,4-dioxene 2.190 2,3-Di(4-methoxyphenyl)-1,4-dioxene 2.191	$C_{18}H_{36}CoN_2S_4$ Bis(dibutylthiocarbamato)cobalt(II) 12.26
$C_{18}H_{19}NO_2$ 2-(4-Dimethylaminophenyl)-3-phenyl-1,4-dioxene 2.192	$C_{18}H_{36}CuN_2S_4$ Bis(dibutylthiocarbamato)copper(II) 12.27
$C_{18}H_{20}B_2N_{12}Ni$ Bis[hydrotris(1-pyrazolyl)borato]nickel(II) 12.86	$C_{18}H_{36}N_2NiS_4$ Bis(dibutylthiocarbamato)nickel(II) 12.28
$C_{18}H_{20}N_2NiO_4$ Bis[2'-hydroxy-4'-methylacetophenone oximato]nickel(II) 12.93	$C_{18}H_{36}N_2S_4Zn$ Bis(dibutylthiocarbamato)zinc(II) 12.29
$C_{18}H_{20}N_4O$ 4-[<i>N</i> -(2-Cyanoethyl)- <i>N</i> -ethylamino]-4'-methoxyazobenzene 11.50	$C_{18}H_{36}O_2$ Stearic acid 17.66
$C_{18}H_{20}O_2$ 3-Hydroxy-1,3,5(10),9(11)-estratetraen-17-one 16.31	$C_{19}H_{13}NO$ Phenyl fluorenyl nitron 15.6
$C_{18}H_{20}O_4$ 6,11-Dimethyl-4,6,8,10,12-hexadecapentaene-2,3,14,15-tetraone (<i>all-E</i>) 2.234	$C_{19}H_{13}O_2S^-$ 9-(Phenylsulfonyl)fluoren-9-yl anion 13.98
$C_{18}H_{22}N_2$ 1-Cyclohexylamino-4-phenylaminobenzene 9.28	$C_{19}H_{14}N_2NiS_2$ [4-Methyl-1,2-benzenedithiolato](1,10-phenanthroline)nickel(II) 12.154
$C_{18}H_{22}N_4Ni$ Bis[<i>N</i> -methyl-7-(methylimino)-1,3,5-cycloheptatrien-1-aminato]nickel(II) 12.102	$C_{19}H_{14}S$ 4-Phenylthiobenzophenone 13.163
$C_{18}H_{22}NiO_6S_2$ Bis(2,4,6-trimethylbenzenesulfonato)nickel(II) 12.118	$C_{19}H_{15}NO$ Triphenyl nitron 15.5
	$C_{19}H_{16}N_2O_2$ 2-(4-Ethoxycarbonylphenyl)-1,8-dihydropyrrolo[3',2':3,4]cyclopenta[1,2- <i>b</i>]pyridine 6.70
	$C_{19}H_{18}N_2O_2$ 1,4-Dioxene, 2-(4-cyanophenyl)-3-(4-dimethylaminophenyl)- 2.184
	$C_{19}H_{19}$ 1,4-Bis(4-methylphenyl)-1,3-cyclopentadiene 2.144

- $C_{19}H_{19}O_2$ 1,4-Bis(4-methoxyphenyl)-1,3-cyclopentadiene 2.143
 $C_{19}H_{21}NO_4$ Boldine 8.20
 $C_{19}H_{22}N_2$ Bis(2,4,6-trimethylphenyl)diazomethane 11.19
 $C_{19}H_{22}N_2O_3$ Dregamine 8.101
 $C_{19}H_{22}O_2$ 3-Methoxyestra-1,3,5(10),8-tetraen-17-one 16.28
 3-Methoxy-1,3,5(10),9(11)-estratetraen-17-one 16.32
 $C_{19}H_{22}O_3$ *endo*-7-Adamantylidenenorbornane-2,3-dicarboxylic acid anhydride 2.15
exo-7-Adamantylidenenorbornane-2,3-dicarboxylic acid anhydride 2.16
 $C_{19}H_{22}O_4$ Dimethyl 4-methyl-1,3-naphthalenedipropionate 3.90
 $C_{19}H_{24}NO_2$ 4-Hydroxy-4-(2-naphthyl)-2,2,6,6-tetramethylpiperidine-1-oxyl 15.31
 $C_{19}H_{30}O_2$ Methyl arachidonate 2.213
 $C_{19}H_{32}O_2$ Methyl linolenate 2.269
 $C_{19}H_{34}O_2$ Methyl linoleate 2.265
 $C_{19}H_{36}O_2$ Methyl oleate 2.272
 $C_{19}H_{38}O_2$ Methyl stearate 16.43
 $C_{20}H_2Cl_4I_4O_5^{2-}$ Rose Bengal dianion 11.66
 $C_{20}H_6Br_4O_5^{2-}$ Eosin dianion 11.65
 $C_{20}H_8Br_2HgNa_2O_6$ Mercurochrome 11.64
 $C_{20}H_{12}N_2Na_2NiO_8S_2$ [*N,N'*-*o*-Phenylenebis(5-sulfosalicylideneiminato)]nickelate(II) disodium salt 12.167
 $C_{20}H_{12}N_4Zn$ Porphinatozinc(II) 7.71
 $C_{20}H_{14}$ 9-Phenylanthracene 3.14
 $C_{20}H_{14}N_2NiO_2$ 2,2'-[1,2-Phenylenebis(nitrilomethylidyne)]-bis[phenolato]nickel(II) 12.166
 $C_{20}H_{14}O$ 1,3-Diphenylisobenzofuran 5.83
 $C_{20}H_{16}$ 9,10-Dimethylbenz[*a*]anthracene 3.24
 $C_{20}H_{16}O_4^{2-}$ 9,10-Anthracenedipropionate ion 3.16
 $C_{20}H_{17}NOS$ *N*-Phenyl-2-(phenylmethyl)thiobenzamide 13.5
 $C_{20}H_{17}NOSe$ *N*-Phenyl-2-(phenylmethyl)selenobenzamide 13.4
 $C_{20}H_{20}N_2O_4$ 2,3-Di(4-acetaminophenyl)-1,4-dioxene 2.185
 $C_{20}H_{20}O_2$ 1,2,5,6,6*a*,6*b*,6*c*,6*d*-Octahydro-9,12-dimethoxy-1,6-*o*-benzenobenzo[1,3]cyclopropa[1,2,3-*cd*]cyclopropa[*gh*]pentalene 2.180
 $C_{20}H_{20}O_7$ Tanageretin 4.62
 $C_{20}H_{22}N_4O$ 4-(4'-Amino-2',3',5',6'-tetramethylphenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one 11.134
 4-(4'-Diethylaminophenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one 11.147
 4-(4'-Dimethylamino-3',5'-dimethylphenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one 11.149
 $C_{20}H_{22}N_4O_2$ 2,4-Dihydro-4-[4-(2-hydroxyethyl)ethylamino]phenyl]imino-5-methyl-2-phenylpyrazol-3-one 11.130
 $C_{20}H_{22}O_3$ 3-Acetyloxy-1,3,5(10),9(11)-estratetraen-17-one 16.29
 $C_{20}H_{24}ClN_3O$ 2-(3',5'-Di-*tert*-butyl-2'-hydroxyphenyl)-5-chlorobenzotriazole 4.109
 $C_{20}H_{24}N_2NiO_2$ Bis[2-[(1-methylethylimino)methyl]phenolato]nickel(II) 12.101
 $C_{20}H_{24}N_2O_2$ 1,4-Dioxene, 2,3-di(4-dimethylaminophenyl)- 2.188
 $C_{20}H_{24}O_4$ Crocetin 2.93
 $C_{20}H_{26}NO$ Bis(4-*tert*-butylphenyl)nitroxide 15.26
 $C_{20}H_{26}N_2O$ *N,N*-Diethyl-3,5-dimethyl-4-(4'-oxo-2',6'-dimethylcyclohexadienyliden)aminoaniline 11.49
 $C_{20}H_{26}O$ 4-Phenyl-2,6-di-*tert*-butylphenol 4.103
 $C_{20}H_{27}NNiO_2S$ Butylamine[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II) 12.120
 $C_{20}H_{28}$ Adamantylideneadamantane 2.356
 $C_{20}H_{28}O$ *exo,exo*-2,3-(2¹-Oxatrimethylene)-7-adamantylidenenorbornane 2.12
 11-(*Z*)-Retinal 2.339
 13-(*Z*)-Retinal 2.340
 (*all-E*)-Retinal 2.341
 $C_{20}H_{28}O_2$ (*all-E*)-Retinoic acid 2.342
 $C_{20}H_{30}O$ (*all-E*)-Retinol 2.343
 $C_{20}H_{30}O_2$ 17-Hydroxy-4-methyl-4-androsten-3-one 16.4
 Abietic acid 2.325
 $C_{20}H_{32}O_2$ Arachidonic acid 2.212
 $C_{20}H_{34}$ 2,6,10,14-Tetramethyl-2,6,10,14-hexadecatetraene 2.235
 $C_{20}H_{34}AuO_9PS$ Tetra-*O*-acetylglucose-1-thiolato(triethylphosphino)gold(I) 12.170

$C_{20}H_{34}O_2$	Ethyl linolenate	2.268	$C_{21}H_{29}N_7O_{14}P_2$	Nicotinamide adenine dinucleotide, reduced	16.48
$C_{20}H_{40}O$	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	2.238	$C_{21}H_{30}N_7O_{17}P_3$	Nicotinamide-adenine dinucleotide phosphate, reduced	16.50
$C_{20}H_{40}O_2$	Eicosanoic acid	17.27	$C_{21}H_{30}O_3$	7-Dehydroandrosterone-3-acetate	16.5
$C_{21}H_{14}$	1,2-Diphenylindene	3.70	$C_{21}H_{31}NO_4$	3,5-Dicyclohexyloxycarbonyl-1,4-dihydro-2,6-dimethylpyridine	6.46
$C_{21}H_{17}ClN_2$	3-(4-Chlorophenyl)-1,5-diphenyl-2-pyrazoline	11.121	$C_{21}H_{32}O_2$	Pregnenolone	16.62
	5-(4-Chlorophenyl)-1,3-diphenyl-2-pyrazoline	11.122	$C_{21}H_{35}NO_4$	3,5-Dihexyloxycarbonyl-1,4-dihydro-2,6-dimethylpyridine	6.48
$C_{21}H_{17}DN_2$	5-Deutero-1,3,5-triphenyl-2-pyrazoline	11.123	$C_{21}H_{36}N_7O_{16}P_3S$	Coenzyme A	16.17
$C_{21}H_{18}BrNO$	<i>N</i> -Benzhydryl-4-bromomethylbenzamide	3.22	$C_{21}H_{42}O$	Methyl phytol ether	2.237
$C_{21}H_{19}BrCl_2N_2S_2$	5,5'-Dichloro-3,3-diethyl-2,2'-thiacarbocyanine bromide	11.163	$C_{22}H_{14}$	Dibenz[<i>a,h</i>]anthracene	3.61
				Pentacene	3.96
$C_{21}H_{19}N_3O_2$	1,4-Dihydro-2,6-dimethyl-3,5-diphenylaminocarbonylpyridine	6.44	$C_{22}H_{16}N_2O$	4-(2',3'-Benzo-4'-oxocyclohexadienylidene)amino- <i>N</i> -phenylaniline	11.84
$C_{21}H_{20}N_2O$	4-[2-(<i>N,N</i> -Dimethylhydrazono)ethylidene]-2,6-diphenylpyran	15.1	$C_{22}H_{18}O$	1,3-Diphenyl-5,6-dimethylisobenzofuran	5.82
$C_{21}H_{20}O_6$	Curcumin	4.77	$C_{22}H_{20}N_2$	3-(4-Methylphenyl)-1,5-diphenyl-2-pyrazoline	11.126
$C_{21}H_{21}N$	Tribenzylamine	8.6		5-(4-Methylphenyl)-1,3-diphenyl-2-pyrazoline	11.127
$C_{21}H_{22}N_2O_2$	Strychnine	8.99	$C_{22}H_{20}N_2O$	3-(4-Methoxyphenyl)-1,5-diphenyl-2-pyrazoline	11.124
$C_{21}H_{22}N_6$	Pyrazole dye 4	11.24		5-(4-Methoxyphenyl)-1,3-diphenyl-2-pyrazoline	11.125
$C_{21}H_{23}N_7$	Pyrazole dye 6	11.21	$C_{22}H_{22}Cl_3N_5O_2$	2,4-Dihydro-4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbamylyl-2-(2,4,6-trichlorophenyl)pyrazol-3-one	11.146
$C_{21}H_{24}N_4O$	4-(4'-Diethylamino-2'-methylphenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one	11.144	$C_{22}H_{23}N_3O_2$	1,4-Dihydro-2,4,6-trimethyl-3,5-diphenylaminocarbonylpyridine	6.45
$C_{21}H_{24}N_4O_2$	2,4-Dihydro-4-[4-[ethyl(2-hydroxyethyl)amino]-2-methylphenyl]imino-5-methyl-2-phenylpyrazol-3-one	11.129	$C_{22}H_{24}BrN_5O_2$	2,4-Dihydro-2-(4-bromophenyl)-4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbamylylpyrazol-3-one	11.135
$C_{21}H_{25}NO_4$	Glaucine	8.21	$C_{22}H_{24}ClN_5O_2$	2,4-Dihydro-2-(3-chlorophenyl)-4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbamylylpyrazol-3-one	11.136
$C_{21}H_{26}N_2O_3$	Vincamine	8.100		2,4-Dihydro-2-(4-chlorophenyl)-4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbamylylpyrazol-3-one	11.137
$C_{21}H_{26}N_7O_{13}P_2^+$	Nicotinamide adenine dinucleotide	16.47	$C_{22}H_{24}N_2O_2$	2,4-Di[2-methyl-4-(dimethylamino)phenyl]squarylium	11.47
$C_{21}H_{26}O_3$	2-Hydroxy-4-octyloxybenzophenone	4.43	$C_{22}H_{24}N_6$	Pyrazole dye 3	11.22
	4-(1,1,3,3-Tetramethylbutyl)phenyl salicylate	4.144			
$C_{21}H_{28}N_6O_{15}P_2$	Nicotinamide hypoxanthine dinucleotide, reduced	16.42			
$C_{21}H_{28}N_7O_{17}P_3$	Nicotinamide adenine dinucleotide phosphate	16.49			
$C_{21}H_{28}O$	4-Benzyl-2,6-di- <i>tert</i> -butylphenol	4.104			
$C_{21}H_{28}O_4$	<i>endo</i> -2,3-Di(methoxycarbonyl)-7-adamantylidenenorbornane	2.17			
	<i>exo</i> -2,3-Di(methoxycarbonyl)-7-adamantylidenenorbornane	2.18			

- $C_{22}H_{24}N_6O_4$ 2,4-Dihydro-4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbamyl-2-(4-nitrophenyl)pyrazol-3-one 11.145
- $C_{22}H_{25}N_5O_2$ 2,4-Dihydro-4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbamyl-2-phenylpyrazol-3-one 11.128
- $C_{22}H_{26}Br_2N_2NiO_2$ Bis[2-[(butylimino)methyl]-4-bromophenolato]nickel(II) 12.17
- $C_{22}H_{26}N_4O$ 4-(4'-Diethylamino-2',6'-dimethylphenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one 11.140
4-(4'-Dimethylamino-2',3',5',6'-tetramethylphenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one 11.151
- $C_{22}H_{26}O_3$ Bioresmethrin 5.76
- $C_{22}H_{27}N_5O_3S$ 2,4-Dihydro-4-[4-[(2-methylsulfamylethyl)ethylamino]-2-methylphenyl]imino-5-methyl-2-phenylpyrazol-3-one 11.78
- $C_{22}H_{28}N_2NiO_2$ Bis[2-[(butylimino)methyl]phenolato]nickel(II) 12.19
Bis[2-[(1,1-dimethylethylimino)methyl]-phenolato]nickel(II) 12.57
Bis[2-[(1-methylpropylimino)methyl]-phenolato]nickel(II) 12.105
- $C_{22}H_{29}NNiO_2S$ Cyclohexylamine[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II) 12.130
- $C_{22}H_{29}N_3O$ 2-(2'-Hydroxy-3',5'-di-*tert*-pentylphenyl)benzotriazole 4.96
- $C_{22}H_{32}O_2$ Docosahexaenoic acid 2.200
Retinyl acetate 2.344
- $C_{22}H_{32}O_6$ 6,11-Dimethyl-2,2,15,15-tetramethoxy-4,6,8,10,12-hexadecapentaene-3,14-dione (*all-E*) 2.233
- $C_{22}H_{38}O_2$ 2,5-Di-*sec*-octylhydroquinone 4.19
- $C_{22}H_{42}O_2$ Phytol acetate 2.239
- $C_{22}H_{44}O$ Ethyl phytol ether 2.236
- $C_{22}H_{44}O_2$ Docosanoic acid 17.22
- $C_{23}H_{17}H_5O_9S_3^{2-}$ *N*-[5-Hydroxy-8-[[2-(methylsulfonyl)-4-nitrophenyl]azo]-1-naphthalenyl]-1,3-benzenedisulfonamide, conjugate dibase 11.86
- $C_{23}H_{18}H_5O_9S_3^{-}$ *N*-[5-Hydroxy-8-[[2-(methylsulfonyl)-4-nitrophenyl]azo]-1-naphthalenyl]-1,3-benzenedisulfonamide, conjugate base 11.85
- $C_{23}H_{20}N_2$ 4,5-Dihydro-1,5-diphenyl-3-(2-phenylethenyl)pyrazole 11.119
- $C_{23}H_{21}IN_2S_2$ 3,8,3',10'-Di(1,3-propanediyl)-2,2'-thiocarbocyanine iodide 11.156
- $C_{23}H_{23}BrCl_2N_2S_2$ 5,5'-Dichloro-3,9,3'-triethyl-2,2'-thiocarbocyanine bromide 11.164
- $C_{23}H_{23}IN_2$ 1,1'-Diethyl-2,2'-cyanine iodide 11.45
- $C_{23}H_{23}IN_2S_2$ 3,3'-Diethyl-2,2'-thiadicarbocyanine iodide 11.173
- $C_{23}H_{23}NO_2$ 3,5-Dibenzoyl-1,4-dihydro-2,6-dimethylpyridine 6.43
- $C_{23}H_{23}NO_4$ 3,5-Diethoxycarbonyl-1,4-dihydro-2,6-diphenylpyridine 6.50
- $C_{23}H_{25}BrN_2S_2$ 3,9,3'-Triethyl-2,2'-thiocarbocyanine bromide 11.171
- $C_{23}H_{25}N_3$ 4-Diethylaminobenzaldehyde diphenylhydrazone 15.4
- $C_{23}H_{26}N_2$ Leucomalachite Green 11.77
- $C_{23}H_{26}N_2O_4$ Brucine 8.9
- $C_{23}H_{27}N_5O_2$ 2,4-Dihydro-4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbamyl-2-(3-methylphenyl)pyrazol-3-one 11.143
- $C_{23}H_{27}N_5O_3$ 2,4-Dihydro-4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbamyl-2-(3-methoxyphenyl)pyrazol-3-one 11.142
- $C_{23}H_{28}O_4$ 2,2'-Spirobis[3,4-dihydro-6-hydroxy-4,4,7-trimethyl-1-benzopyran] 4.185
- $C_{23}H_{29}N_3O_2$ *N,N*-Diethyl-4-[*N*-(phenylaminocarbonyl)-pivaloylmethylene]aminoaniline 11.112
- $C_{23}H_{30}N_2O_8$ 4,4'-Dimethyl-3,3',5,5'-tetracarboxy-2,2'-dipyrrylmethane 6.65
- $C_{23}H_{30}O_3$ RO 10-9359 2.262
- $C_{23}H_{32}O_2$ 2,2'-Methylenebis(6-*tert*-butyl-4-methylphenol) 4.136
- $C_{23}H_{32}O_3$ 16-Dehydropregnenolone-3-acetate 16.61
- $C_{23}H_{36}N_2O_2$ 4-(*N*-Dipivaloylmethylene)amino-3,*N,N*-triethylaniline 11.67
- $C_{23}H_{46}$ (*Z*)-9-Tricosene 2.349
- $C_{24}H_{16}N_2NiO_2$ 2,2'-[1,8-Naphthylenebis(nitrilomethylidyne)]-bis[phenolato]nickel(II) 12.160
- $C_{24}H_{18}O$ 2,4,6-Triphenylphenol 4.149
- $C_{24}H_{19}N_3O_2$ 1-(4-Methylphenylazo)-3-(phenylaminocarbonyl)-2-naphthol 11.80

$C_{24}H_{20}CoO_4P_2S_4$ Bis(<i>O,O'</i> - diphenylphosphorodithiolato)cobalt(II) 12.68	$C_{24}H_{32}N_2NiO_4$ Bis[2-[(butylimino)methyl]-4- methoxyphenolato]nickel(II) 12.18
$C_{24}H_{20}CrO_4P_2S_4$ Bis(<i>O,O'</i> - diphenylphosphorodithiolato)chromium(II) 12.67	$C_{24}H_{36}O_2$ Phenyl linoleate 2.266
$C_{24}H_{20}CuO_4P_2S_4$ Bis(<i>O,O'</i> - diphenylphosphorodithiolato)copper(II) 12.69	$C_{24}H_{38}O_2$ Phenyl oleate 2.273
$C_{24}H_{20}NiO_4P_2S_4$ Bis(<i>O,O'</i> - diphenylphosphorodithiolato)nickel(II) 12.71	$C_{24}H_{42}N_2O_6$ Bis(2,2,6,6-tetramethyl-4-piperidinol-1-oxyl) 1,6-hexanedioate 15.38
$C_{24}H_{20}O_4P_2PbS_4$ Bis(<i>O,O'</i> - diphenylphosphorodithiolato)lead(II) 12.70	$C_{24}H_{44}CoO_4P_2S_4$ Bis(<i>O,O'</i> - dicyclohexylphosphorodithiolato)cobalt(II) 12.36
$C_{24}H_{20}O_4P_2S_4Zn$ Bis(<i>O,O'</i> - diphenylphosphorodithiolato)zinc(II) 12.72	$C_{24}H_{44}NiP_2S_4$ Bis(dicyclohexylphosphinodithiolato)nickel(II) 12.35
$C_{24}H_{22}CoN_4S_4$ Bis[5-ethyl-3-[(3-pyridinylimino)methyl]-2- thiophenethionato],cobalt(II) 12.84	$C_{24}H_{50}N_4$ <i>N,N'</i> -Bis[4-(2,2,6,6-tetramethylpiperidinyl)]- 1,6-hexanediamine 8.64
$C_{24}H_{25}BrN_2O$ 1-(4-Bromophenyl)-4,4,8,8-tetramethyl- 2,3,4,5,7,8,9,10-octahydropyrrolo[4.3.2- <i>m,n</i>]acridine-10-one 6.67	$(C_{24}H_{50}N_4)_n$ Poly(<i>N,N'</i> -Bis[4-(2,2,6,6- tetramethylpiperidinyl)]-1,6- hexanediamine) 8.65
$C_{24}H_{25}IN_2S_2$ 3,3'-Diethyl-8,9-(1,3-propanediyl)-2,2'- thiocarbocyanine iodide 11.170	$C_{25}H_{19}N$ 1,2-Diphenyl-4- methylcyclopenta[<i>b</i>]quinoline 6.4
$C_{24}H_{26}N_2O$ 1-Phenyl-4,4,8,8-tetramethyl- 2,3,4,5,7,8,9,10-octahydropyrrolo[4,3,2- <i>m,n</i>]acridine-10-one 6.69	$C_{25}H_{20}N_4O_4$ 1-(4-Aminocarbonylphenylazo)-3-(2- methoxyphenylaminocarbonyl)-2- naphthol 11.79
$C_{24}H_{26}N_6O_2$ Pyrazole dye 2 11.155	$C_{25}H_{23}BF_4N_4S_2$ 5,5'-Dicyano-3,9,3'-triethyl-2,2'- thiocarbocyanine tetrafluoroborate 11.165
$C_{24}H_{28}N_2O_4$ 2,4-Di[2-hydroxy-4- (diethylamino)phenyl]squarylium 11.46	$C_{25}H_{24}N_2O_2$ 4,5-Dihydro-5-(4-methoxyphenyl)-3-[2-(4- methoxyphenyl)ethenyl]- 1-phenylpyrazole 11.120
$C_{24}H_{28}O_4$ 6,6'-Diapo- ψ,ψ -carotenedioic acid 2.174 9- <i>cis</i> -6,6'-Diapo- ψ,ψ -carotenedioic acid 2.179	$C_{25}H_{24}N_6S$ Pyrazole dye 5 11.25
$C_{24}H_{30}N_4O$ 4-(4'-Diethylamino-2'-methylphenyl)imino- 3-(2-methyl-2- propyl)-1-phenyl-2-pyrazolin-5-one 11.141	$C_{25}H_{24}O_3$ 3-Benzoyloxy-1,3,5(10),9(11)-estratetraen- 17-one 16.30
$C_{24}H_{31}N_3O_2$ <i>N,N</i> -Diethyl-3-methyl-4-[<i>N</i> - (phenylaminocarbonyl)- pivaloylmethylene]aminoaniline 11.111	$C_{25}H_{25}ClN_2$ 1,1'-Diethyl-2,2'-carbocyanine chloride 11.41
$C_{24}H_{32}NO_3S_2^-$ 10-(12-Sulfonatododecyl)phenothiazine 13.124	$C_{25}H_{25}IN_2O_2$ 3,3'-Diethyl-2,2'-oxatricarbocyanine iodide 11.109
	$C_{25}H_{25}IN_2S_2$ 3,3'-Diethyl-2,2'-thiatricarbocyanine iodide 11.174
	$C_{25}H_{25}N_2^+$ 1,1'-Diethyl-4,4'-carbocyanine 11.42
	$C_{25}H_{25}N_3O_2$ 4-[<i>N</i> -Benzoyl(phenylaminocarbonyl)- methylene]amino- <i>N,N</i> -diethylaniline 11.28
	$C_{25}H_{26}O_5S$ 3-Tosyloxy-1,3,5(10),9(11)-estratetraen-17- one 16.33
	$C_{25}H_{28}N_2O_2$ 1-(4-Methoxyphenyl)-4,4,8,8-tetramethyl- 2,3,4,5,7,8,9,10-octahydropyrrolo[4,3,2- <i>m,n</i>]acridine-10-one 6.68
	$C_{25}H_{30}ClN_3$ Crystal Violet 11.44

- $C_{25}H_{30}O_4$ Bixin 2.177
 $C_{25}H_{32}N_4O$ 4-(4'-Diethylamino-2',6'-dimethylphenyl)imino-3-(2-methyl-2-propyl)-1-phenyl-2-pyrazolin-5-one 11.139
 $C_{25}H_{34}O_3$ 4-Dodecyloxy-2-hydroxybenzophenone 4.42
 $C_{26}H_{14}O_2$ Anthra[1,9-*bc*:4,10-*b'c'*]dichromene 3.20
 Benzo[1,2,3-*kl*:4,5,6-*k'l'*]dixanthene 3.56
 $C_{26}H_{16}$ 9,9'-Bifluorenylidene 3.66
 $C_{26}H_{17}Cl$ 1-Chloro-9,10-diphenylanthracene 3.6
 $C_{26}H_{18}$ 9,10-Diphenylanthracene 3.11
 $C_{26}H_{19}NO$ 1,1,3-Triphenylisoindole *N*-oxyl 15.25
 $C_{26}H_{20}CoN_2O_2$ Bis[2-[(phenylimino)methyl]phenolato]cobalt(II) 12.108
 $C_{26}H_{20}CuN_2O_2$ Bis[2-[(phenylimino)methyl]phenolato]copper(II) 12.109
 $C_{26}H_{20}N_2NiO_2$ Bis[2-[(phenylimino)methyl]phenolato]nickel(II) 12.110
 $C_{26}H_{20}N_2NiS_4$ Bis(diphenyldithiocarbamato)nickel(II) 12.64
 $C_{26}H_{22}N_4NiO_2$ Bis[2-hydroxybenzaldehyde phenylhydrazone]nickel(II) 12.90
 $C_{26}H_{26}ClIN_2S$ 3-Methyl-2-[7-(5-chloro-1,3,3-trimethyl-2-indolylidene)-1-(1,3,5-heptatrienyl)benzothiazolium iodide 11.34
 $C_{26}H_{26}FIN_2S$ 3-Methyl-2-[7-(5-fluoro-1,3,3-trimethyl-2-indolylidene)-1-(1,3,5-heptatrienyl)benzothiazolium iodide 11.35
 $C_{26}H_{27}IN_2S$ 3-Methyl-2-[7-(1,3,3-trimethyl-2-indol-2-ylidene)-1,3,5-heptatrienyl]benzothiazolium iodide 11.37
 $C_{26}H_{27}N_3O_2$ 4-[*N*-Benzoyl(phenylaminocarbonyl)methylene]amino-*N,N*-diethyl-3-methylaniline 11.27
 $C_{26}H_{30}CoN_4O_5P$ Hydroxybis(dimethylglyoximate)triphenylphosphinecobalt(II) 12.148
 $C_{26}H_{32}CoO_6$ Bis[3,5-di(1-methylethyl)salicylato]cobalt(II) 12.59
 $C_{26}H_{32}N_2NiO_2$ Bis[2-[(cyclohexylimino)methyl]phenolato]nickel(II) 12.24
 $C_{26}H_{32}NiO_6$ Bis[3,5-di(1-methylethyl)salicylato]nickel(II) 12.60
 $C_{26}H_{32}O_4$ *trans*-Methylbixin 2.175
 Methylbixin 2.176
 $C_{26}H_{33}N_3NaO_6S_2$ Merocyanine 540 11.39
 $C_{26}H_{34}O_2$ Phenyl linolenate 2.270
 $C_{26}H_{36}CoN_2S_4$ Bis[3-(cyclohexylimino)methyl]-5-ethyl-2-thiophenethionato]cobalt(II) 12.20
 $C_{26}H_{36}CuN_2O_2S_2$ Bis[3-(cyclohexylimino)methyl]-5-ethyl-2-thiophenonato]copper(II) 12.22
 $C_{26}H_{36}N_2NiS_4$ Bis[3-(cyclohexylimino)methyl]-5-ethyl-2-thiophenethionato]nickel(II) 12.21
 $C_{26}H_{36}N_2S_4$ *N,N'*-[Dithiobis(5-ethyl-2,3-thiophenediyl)methylidene]biscyclohexanamine 13.63
 $C_{26}H_{36}N_2S_4Zn$ Bis[3-(cyclohexylimino)methyl]-5-ethyl-2-thiophenethionato]zinc(II) 12.23
 $C_{26}H_{36}O_2$ Phenyl arachidonate 2.214
 $C_{26}H_{36}O_6$ 8,13-Dimethyl-2,2,19,19-tetramethoxy-4,6,8,10,12,14,16-eicosaseptaene-3,18-dione (*all-E*) 2.211
 $C_{26}H_{38}N_2O_6$ Bis(2,2,6,6-tetramethyl-4-piperidinol-1-oxyl)terephthalate 15.39
 $C_{26}H_{44}O_2$ Tocol 4.48
 $C_{27}H_{21}N$ 1-Methylamino-9,10-diphenylanthracene 9.20
 $C_{27}H_{23}ClN_2S_2$ 3,3'-Diethyl-4,5,4',5'-dibenzo-2,2'-thiacyanine chloride 11.105
 $C_{27}H_{27}N_7$ Pyrazole dye 7 11.23
 $C_{27}H_{28}N_2O_2$ 4-(Dibenzoylmethylene)amino-3,*N,N*-triethylaniline 11.116
 $C_{27}H_{28}N_2O_9$ 5-Iminodaunomycin 4.81
 $C_{27}H_{29}IN_2OS$ 3-Methyl-2-[7-(5-methoxy-1,3,3-trimethyl-2-indolylidene)-1-(1,3,5-heptatrienyl)benzothiazolium iodide 11.36
 $C_{27}H_{29}IN_2S$ 3-Methyl-2-[7-(1,3,3,5-tetramethyl-2-indolylidene)-1-(1,3,5-heptatrienyl)benzothiazolium iodide 11.38

$C_{27}H_{29}NO_{10}$	Daunomycin 4.79	$C_{28}H_{28}CuO_4P_2S_4$	Bis[<i>O,O'</i> -di(4-methylphenyl)phosphorodithiolato]copper(II) 12.62
$C_{27}H_{29}NO_{11}$	Adriamycin 4.80	$C_{28}H_{28}N_2O_3S_3$	3,3'-Diethyl-2,2'-thiacarbocyanine toluenesulfonate 11.166
$C_{27}H_{29}N_3O_2$	4-[<i>N</i> -Benzoyl(phenylaminocarbonyl)methylene]amino- <i>N,N</i> -diethyl-3,5-dimethylaniline 11.26	$C_{28}H_{28}NiO_4P_2S_4$	Bis[<i>O,O'</i> -di(4-methylphenyl)phosphorodithiolato]nickel(II) 12.63
$C_{27}H_{30}N_4$	5-[<i>p</i> -(Dimethylamino)phenyl]-3-[<i>p</i> -(dimethylamino)styryl]-1-phenyl-2-pyrazoline 11.118	$C_{28}H_{29}N_2O_2S_2^-$	Squarylium Dye 3a 11.32
$C_{27}H_{30}N_4O_2$	4-[<i>N</i> -Di(phenylaminocarbonyl)methylene]amino-3, <i>N,N</i> -triethylaniline 11.115	$C_{28}H_{29}N_5O_2$	4-(4'-Diethylamino-2',6'-dimethylphenyl)imino-3-(benzoylamino)-1-phenyl-2-pyrazolin-5-one 11.138
$C_{27}H_{30}O_{16}$	Rutin 4.58	$C_{28}H_{32}O_4$	6,10,15,19-Tetramethyl-4,6,8,10,12,14,16,18,20-tetracosanoic acid-2,3,22,23-tetraone (<i>all-E</i>) 2.348
$C_{27}H_{44}$	3,5-Cholestadiene 2.89	$C_{28}H_{42}NiO_3S$	Aqua[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) 12.5
$C_{27}H_{44}O$	Vitamin D ₃ 2.361	$C_{28}H_{42}O_2S$	2,2'-Thiobis[4-(1,1,3,3-tetramethylbutyl)phenol] 4.145
$C_{27}H_{46}O$	Cholesterol 16.14	$C_{28}H_{43}N$	4,4'-Di- <i>tert</i> -octyldiphenylamine 9.18
$C_{27}H_{46}O_2$	δ -Tocopherol 4.46	$C_{28}H_{43}NNiO_2S$	Ammine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) 12.2
$C_{28}H_{12}Cl_8NiS_4$	Bis[1,2-di(2,4-dichlorophenyl)-1,2-ethenedithiolato]nickel(II) 12.37		Dodecylamine[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II) 12.134
	Bis[1,2-di(3,4-dichlorophenyl)-1,2-ethenedithiolato]nickel(II) 12.38	$C_{28}H_{44}O$	Ergosterol 16.26
$C_{28}H_{14}O_2$	Heterocoerdianthrone 3.68	$C_{28}H_{46}O$	4-Methyl-4-cholesten-3-one 2.90
$C_{28}H_{16}$	Dibenzo[<i>a,j</i>]perylene 3.63	$C_{28}H_{48}O_2$	5,7-Dimethyltocol 4.51
	Helianthrene 3.67		β -Tocopherol 4.52
$C_{28}H_{16}Br_4NiS_4$	Bis[1,2-di(2-bromophenyl)-1,2-ethenedithiolato]nickel(II) 12.25		γ -Tocopherol 4.53
$C_{28}H_{16}Cl_4NiS_4$	Bis[1,2-di(2-chlorophenyl)-1,2-ethenedithiolato]nickel(II) 12.33	$C_{28}H_{50}O_3$	β -Tocopherol hydroquinone 4.26
	Bis[1,2-di(4-chlorophenyl)-1,2-ethenedithiolato]nickel(II) 12.34		γ -Tocopherol hydroquinone 4.27
$C_{28}H_{20}N_2O$	4-(2',3'-Benzo-4'-oxocyclohexadienyliden)amino- <i>N,N</i> -diphenylaniline 11.82	$C_{28}H_{52}N_2O_4$	Tinuvin 770 8.78
$C_{28}H_{20}NiS_4$	Bis[1,2-diphenyl-1,2-ethenedithiolato]nickel(II) 12.66	$C_{28}H_{52}N_2O_6$	Bis(2,2,6,6-tetramethyl-4-piperidinol-1-oxyl) 1,10-decanedioate 15.37
$C_{28}H_{20}O$	Tetraphenylfuran 5.52	$C_{29}H_{20}O$	Tetraphenylcyclopentadienone 3.60
$C_{28}H_{20}O_2$	Tetraphenyl- <i>p</i> -dioxin 2.196	$C_{29}H_{26}O_{10}$	Cercosporin 16.55
$C_{28}H_{22}N_4O$	4-(4'-Diphenylaminophenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one 11.152	$C_{29}H_{27}NO_9$	Aminocercosporin 16.54
$C_{28}H_{22}NiO_4$	Bis[2-hydroxy-5-methylbenzophenonato]nickel(II) 12.94	$C_{29}H_{30}N_2O_8$	Diaminocercosporin 16.56
$C_{28}H_{22}O_2$	1,4-Dimethoxy-9,10-diphenylanthracene 3.9	$C_{29}H_{31}Cl_2IN_2$	5,5'-Dichloro-1,1',3,3,3',3'-hexamethyltricarbocyanine, iodide 11.178
$C_{28}H_{28}CoO_4P_2S_4$	Bis[<i>O,O'</i> -di(4-methylphenyl)phosphorodithiolato]cobalt(II) 12.61		

- $C_{29}H_{31}F_2IN_2$ 5,5'-Difluoro-1,1',3,3,3',3'-hexamethyltricarbocyanine, iodide 11.179
- $C_{29}H_{32}BBrF_4N_2$ 2-[7-(4-Bromo-1,3,3-trimethyl-2-indol-2-ylidene)-1,3,5-heptatrienyl]-1,3,3-trimethylindolium, tetrafluoroborate 11.70
- $C_{29}H_{32}BClF_4N_2$ 2-[7-(4-Chloro-1,3,3-trimethyl-2-indol-2-ylidene)-1,3,5-heptatrienyl]-1,3,3-trimethylindolium, tetrafluoroborate 11.71
- $C_{29}H_{32}BF_4IN_2$ 2-[7-(4-Iodo-1,3,3-trimethyl-2-indol-2-ylidene)-1,3,5-heptatrienyl]-1,3,3-trimethylindolium, tetrafluoroborate 11.73
- $C_{29}H_{32}I_2N_2$ 2-[7-(4-Iodo-1,3,3-trimethyl-2-indol-2-ylidene)-1,3,5-heptatrienyl]-1,3,3-trimethylindolium, iodide 11.72
- $C_{29}H_{32}O_8$ 1,1'-Spirobis[2,3-dihydro-5,6-di(methoxycarbonyl)-3,3-dimethylindene] 3.98
- $C_{29}H_{33}ClN_2O_4$ 1,1',3,3,3',3'-Hexamethyltricarbocyanine, perchlorate 11.183
- $C_{29}H_{33}FN_2$ 1,1',3,3,3',3'-Hexamethyltricarbocyanine, fluoride 11.181
- $C_{29}H_{33}IN_2$ 1,1',3,3,3',3'-Hexamethyltricarbocyanine, iodide 11.182
- $C_{29}H_{40}O_4$ 2,2'-Spirobis[7-*tert*-butyl-3,4-dihydro-6-hydroxy-4,4-dimethylbenzopyran] 4.184
- $C_{29}H_{42}O_3$ 2',4'-Di-*tert*-butylphenyl 3,5-di-*tert*-butyl-4-hydroxybenzoate 4.38
- $C_{29}H_{43}OSe^+$ 2,6-Bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)selenapyran-4-ylidene]-3-propenyl]pyrylium 11.157
- $C_{29}H_{43}OTe^+$ 2,6-Bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)telluropyran-4-ylidene]-3-propenyl]pyrylium 11.158
- $C_{29}H_{43}O_2^+$ 4,4'-(1,3-Propenyl)bis[2,6-di(1,1-dimethylethyl)pyrylium 11.159
- $C_{29}H_{43}SSe^+$ 2,6-Bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)selenopyran-4-ylidene]-3-propenyl]thiopyrylium 11.175
- $C_{29}H_{43}S_2^+$ 2,6-Bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)thiopyran-4-ylidene]-3-propenyl]thiopyrylium 11.176
- $C_{29}H_{43}Se_2^+$ 2,6-Bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)selenopyran-4-ylidene]-3-propenyl]selenopyrylium 11.160
- $C_{29}H_{43}Te_2^+$ 2,6-Bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)telluropyran-4-ylidene]-3-propenyl]telluropyrylium 11.161
- $C_{29}H_{50}O_2$ α -Tocopherol 4.50
- $C_{29}H_{52}O_3$ α -Tocopherol hydroquinone 4.28
- $C_{30}H_{16}O_8$ Hypericin 16.60
- $C_{30}H_{18}O_2$ Dimethylhomocordianthrone 3.95
- $C_{30}H_{22}O_9$ Rubellin A 16.8
- $C_{30}H_{24}Cl_2N_6Ru$ Tris(2,2'-bipyridine)ruthenium(II) dichloride 12.177
- $C_{30}H_{24}CoN_6^{2+}$ Tris(2,2'-bipyridine)cobalt(II) ion 12.176
- $C_{30}H_{24}O_{10}$ Elsinochrome A 16.10
- $C_{30}H_{26}O_{10}$ Elsinochrome B 16.9
- $C_{30}H_{28}N_4NiO_4$ Nickel(II) deuteroporphyrin 7.95
- $C_{30}H_{28}N_6O_2$ 4,4'-[2,3,5,6-Tetramethylphenylenebis]-3-methyl-1-phenyl-2-pyrazolin-5-one 11.153
- $C_{30}H_{28}O_{10}$ Methylcercosporin 16.58
- $C_{30}H_{30}FN_3O_5S$ 4-[2',3'-Benzo-4'-oxo-5'-(2-methoxy-5-fluorosulfonyl)phenyl]amino-*N,N*-diethylaniline 11.81
- $C_{30}H_{30}NO$ Bis[4-(1-methyl-1-phenylethyl)phenyl]nitroxide 15.27
- $C_{30}H_{30}N_2O_3S_3$ 3,3'-Diethyl-8,10-ethanediyl-2,2'-thiacarbocyanine toluenesulfonate 11.169
- $C_{30}H_{30}O_{10}$ Phleichrome 16.53
- $C_{30}H_{32}N_2O_3S_3$ 3,3'-Diethyl-8,10-dimethyl-2,2'-thiacarbocyanine toluenesulfonate 11.168
- $C_{30}H_{32}N_2O_5S_3$ 3,3'-Diethyl-5,5'-dimethoxy-2,2'-thiacarbocyanine toluenesulfonate 11.167
- $C_{30}H_{40}O$ β -*apo*-8'-Carotenal 2.62
- $C_{30}H_{42}O$ β -*apo*-8'-Carotenol 2.86
- $C_{30}H_{42}O_2$ 1,2-Ethandiylidenebis[3,5-di(1,1-dimethylethyl)-2,5-cyclohexadien-4-one] 17.12
- $C_{30}H_{44}$ C_{30} -Carotene analog 2.77

$C_{30}H_{44}O_4$	C_{30} -Capsorubin 2.205 C_{30} -Epiisocapsorubin 2.206 C_{30} -Isocapsorubin 2.207	$C_{32}H_{32}N_2O_3S_3$	1,1'-Diethyl-4,4'-carbocyanine toluenesulfonate 11.43
$C_{30}H_{46}O_2$	Ergosterol acetate 16.27	$C_{32}H_{32}N_4O_4$	7-Ethenyl-3,8,13,17-tetramethylporphine-2,18-dipropanoic acid 7.93
$C_{30}H_{47}NNiO_2S$	Ethylamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) 12.142	$C_{32}H_{34}N_4O_4$	Deuteroporphyrin, dimethyl ester 7.94
$C_{30}H_{50}$	Squalene 2.346	$C_{32}H_{36}N_2O_3S_3$	3,9,3'-Triethyl-5,5'-dimethoxy-2,2'-thiacarbocyanine toluenesulfonate 11.172
$C_{30}H_{52}O_2$	α -Tocopherol methyl ether 5.4 5,7-Diethyltolcol 4.45	$C_{32}H_{44}O_2$	Ethyl β -apo-8'-carotenoate 2.85
$C_{30}H_{54}O_2$	2,5-Di-sec-dodecylhydroquinone 4.17	$C_{32}H_{44}O_6$	6,10,15,19-Tetramethyl-2,2,23,23-tetramethoxytetracos-4,6,8,10,12,14,16,18,20-nonaenc-3,22-dione (all-E) 2.347
$C_{30}H_{56}N_2O_4$	Di(1,2,2,6,6-pentaamethyl-4-piperidinol) 1,10-decanedioate 8.74	$C_{32}H_{44}O_{14}$	emi-Crocin 2.178
$C_{31}H_{29}BrN_2S_2$	3,9,3'-Triethyl-4,5,4',5'-dibenzo-2,2'-thiacarbocyanine bromide 11.106	$C_{32}H_{51}CoNO_2S$	Butylamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]cobalt(II) 12.121
$C_{31}H_{30}O_{10}$	Dimethylcercosporin 16.57	$C_{32}H_{51}NNiO_2S$	Butylamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) 12.122
$C_{31}H_{32}IN_3$	1,3,3,1',3',3'-Hexamethyl-8,10-indolo-2,2'-carbocyanine iodide 11.40	$C_{32}H_{56}O_2$	5,7-Di(1-methylethyl)tolcol 4.47
$C_{31}H_{37}IN_2$	1,1',3,3,3',3',5,5'-Octamethyltricarbocyanine, iodide 11.184	$C_{33}H_{30}CoN_5O_5$	Hydroxybis(diphenylglyoximato)pyridine-cobalt(II) 12.149
$C_{31}H_{37}IN_2O_2$	5,5'-Dimethoxy-1,1',3,3,3',3'-hexamethyltricarbocyanine, iodide 11.180	$C_{33}H_{34}N_4O_6$	Biliverdin 7.7
$C_{31}H_{38}N_4$	Pyrazole, 4,5-dihydro-5-[4-(diethylamino)phenyl]-3-[2-[4-(diethylamino)phenyl]ethenyl]-1-phenyl- 11.117	$C_{33}H_{36}N_4O_6$	Bilirubin 7.5
$C_{31}H_{38}N_4O_2$	Etiobiliverdin-IV γ 7.3	$C_{33}H_{40}N_2O_9$	Reserpine 8.98
$C_{31}H_{40}N_4O_2$	Etiobilirubin-IV γ 7.4	$C_{33}H_{40}N_4O_6$	Mesobilirubin IX 7.9
$C_{31}H_{49}NNiO_2S$	Propylamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) 12.168	$C_{33}H_{41}BF_4N_2O$	2-[7-(1,3,3-Trimethyl-2-indol-2-ylidene)-1-[4-(2,2-dimethoxyethyl)-1,3,5-heptatrienyl]-1,1,3-trimethylindolium, tetrafluoroborate 11.74
$C_{31}H_{50}O_2$	Stigmasteryl acetate 16.74	$C_{33}H_{42}O_{19}$	Troloxerutin 4.57
$C_{31}H_{52}O_2$	Sitosteryl acetate 16.73	$C_{33}H_{60}N_4O_6$	Tri(2,2,6,6-tetramethyl-4-piperidinol) nitrilotriacetate 8.80
$C_{31}H_{52}O_3$	α -Tocopheryl acetate 16.11	$C_{34}H_{22}O_2$	1,2,3,10,11,12-Hexahydroindeno[5,6- <i>a</i> :5',6'- <i>j</i>]perylene-8,17-dione 3.65
$C_{31}H_{54}O_2$	α -Tocopherol ethyl ether 5.5 7- <i>tert</i> -Butyl-5-methyltolcol 4.55 8- <i>tert</i> -Butyl-5-methyltolcol 4.56	$C_{34}H_{32}CdN_4O_4$	Cadmium(II) protoporphyrin 7.75
$C_{32}H_{12}AlClN_8O_9S_3$	Chloroaluminum(III) sulfophthalocyanine 7.43	$C_{34}H_{32}CoN_4O_4$	Cobalt(II) protoporphyrin 7.76
$C_{32}H_{16}F_{12}NiS_4$	Bis[1,2-di(4-trifluoromethylphenyl)-1,2-ethenedithiolato]nickel(II) 12.76	$C_{34}H_{32}CuN_4O_4$	Copper(II) protoporphyrin 7.77
$C_{32}H_{22}O$	1,3,4,7-Tetraphenylisobenzofuran 5.85	$C_{34}H_{32}N_4NiO_4$	Nickel(II) protoporphyrin 7.80
$C_{32}H_{28}NiO_4S_4$	Bis[1,2-di(4-methoxyphenyl)-1,2-ethenedithiolato]nickel(II) 12.54	$C_{34}H_{32}N_4O_4Zn$	Zinc(II) protoporphyrin IX 7.81

- $C_{34}H_{34}N_4O_4$ Protoporphyrin IX 7.73
- $C_{34}H_{34}NiO_6$ Bis[4-(1,1-dimethylethyl)phenylsalicylato]nickel(II) 12.58
- $C_{34}H_{36}CoN_4O_4$ Cobalt(II) mesoporphyrin 7.82
- $C_{34}H_{36}N_4NiO_4$ Nickel(II) mesoporphyrin 7.87
- $C_{34}H_{36}N_4O_4$ 8-Ethenyl-13-ethyl-3,7,12,17-tetramethylporphine-2,18-dipropanoic acid 7.90
- $C_{34}H_{36}N_4O_5$ Monohydroxyethyl vinyl deuteroporphyrin 7.92
- $C_{34}H_{38}N_4O_6$ Hematoporphyrin IX 7.72
- $C_{34}H_{42}B_2F_8N_3$ 2-[7-(1,3,3-Trimethyl-2-indol-2-ylidene)-1-[4-(1-piperidino)-1,3,5-heptatrienyl]-1,3,3-trimethylindolium, bis(tetrafluoroborate) 11.75
- $C_{34}H_{47}NNiO_2S$ Aniline[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) 12.3
- $C_{34}H_{48}O_4$ C_{34} -Capsorubin 2.231
 C_{34} -Epiisocapsorubin 2.232
- $C_{34}H_{50}O_2$ Cholesteryl benzoate 16.15
- $C_{34}H_{53}NNiO_2S$ Cyclohexylamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) 12.131
- $C_{34}H_{55}NNiO_5S$ Triethanolamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) 12.171
- $C_{34}H_{56}NiO_8P_2$ Bis[*O*-ethyl-3,5-di-(1,1-dimethylethyl)-4-hydroxybenzylphosphonato]nickel(II) 12.83
- $C_{35}H_{25}Te_2^+$ 2,6-Diphenyl-4-(2,6-diphenyltelluropyran-4-ylidene)methyltelluropyrylium 11.162
- $C_{35}H_{32}MgN_4O_5$ Protochlorophyllide 7.37
- $C_{35}H_{38}N_4O_6$ Biliverdin, dimethyl ester 7.8
- $C_{35}H_{40}N_4O_6$ Bilirubin IX dimethyl ester 7.6
- $C_{35}H_{50}$ C_{35} -Carotene analog 2.78
- $C_{35}H_{62}O_3$ Octadecyl 3-(3',5'-di-*tert*-butyl-4'-hydroxyphenyl)propionate 4.33
- $(C_{35}H_{66}N_8)_n$ Chimasorb 944 8.16
- $C_{36}H_{16}CuN_8O_8$ Copper(II) tetracarboxyphthalocyanine 7.45
- $C_{36}H_{24}CoN_6^{2+}$ Tris(1,10-phenanthroline)cobalt(II) ion 12.178
- $C_{36}H_{24}N_{10}Ni$ Bis[2,3-dihydro-*N*-2-pyridinyl-3-(2-pyridinylimino)isoindol-1-amine]nickel(II) 12.45
- $C_{36}H_{26}N_5O_7S^-$ 2-Methyl-6-[4-[2-[3-carboxy-4-(6-hydroxy-3-xanthenon-9-yl)-phenylthiocarbamylethoxy]phenyl]imidazole-*a*]pyrazin-3-one 16.39
- $C_{36}H_{26}O_2$ 1,2,3,4,11,12,13,14-Octahydrodinaphtho[2,3-*a*:2',3'-*j*]perylene-9,19-dione 3.62
- $C_{36}H_{32}N_2O_3S_3$ 3,3'-Diethyl-4,5,4',5'-dibenzo-2,2'-thiocarbocyanine toluenesulfonate 11.107
- $C_{36}H_{36}CoS_4$ Bis[1,2-di(4-ethylphenyl)-1,2-ethenedithiolato]cobalt(II) 12.41
- $C_{36}H_{36}N_4NiO_4$ Nickel(II) protoporphyrin, dimethyl ester 7.79
- $C_{36}H_{36}NiS_4$ Bis[1,2-di(4-ethylphenyl)-1,2-ethenedithiolato]nickel(II) 12.42
- $C_{36}H_{36}PtS_4$ Bis[1,2-di(4-ethylphenyl)-1,2-ethenedithiolato]platinum(II) 12.43
- $C_{36}H_{38}N_4O_4$ Protoporphyrin IX, dimethyl ester 7.78
- $C_{36}H_{40}CoN_4O_4$ Cobalt(II) mesoporphyrin IX, dimethyl ester 7.86
- $C_{36}H_{40}N_4NiS_4$ Bis[1,2-di(dimethylaminophenyl)-1,2-ethenedithiolato]nickel(II) 12.39
- $C_{36}H_{40}N_4O_4$ 8-Ethenyl-13-ethyl-3,7,12,17-tetramethylporphine-2,18-dipropanoic acid, dimethyl ester 7.91
- $C_{36}H_{42}N_4O_4$ Mesoporphyrin IX, dimethyl ester 7.85
- $C_{36}H_{54}N_2NiO_2$ 2,2'-[1,2-Ethanediy]bis(nitridodecylidene)]bis[4-methylphenolato]nickel(II) 12.136
- $C_{36}H_{66}N_4O_6$ Tri(1,2,2,6,6-pentamethyl-4-piperidinol) nitri-lotriacetate 8.75
- $C_{37}H_{30}BrIrOP_2$ Bromocarbonylbis(triphenylphosphine)iridium 12.119
- $C_{37}H_{30}ClIrOP_2$ Carbonylchlorobis(triphenylphosphine)iridium 12.123

$C_{37}H_{30}ClOP_2Rh$ Carbonylchlorobis(triphenylphosphine)- rhodium 12.124	$C_{39}H_{60}O_4$ Ubiquinol 10 4.25
$C_{37}H_{30}IrOP_2$ Carbonyliodobis(triphenylphosphine)iridium 12.125	$C_{40}H_{24}$ Mesodiphenylhelianthrene 3.64
$C_{37}H_{42}N_4O_2$ Zinc(II) etiopurpurin ethyl ester 7.31	$C_{40}H_{44}NiO_{12}S_4$ Bis[1,2-di(3,4,5-trimethoxyphenyl)-1,2- ethenedithiolato]nickel(II) 12.79
$C_{37}H_{46}Si_2$ 1,1,2,2-Tetrakis(2,4,6- trimethylphenyl)disilirane 17.21	$C_{40}H_{48}CdO_4P_2S_6$ Bis[2,2'-thiobis[O,O'-di(4- <i>tert</i> - butylphenyl)phosphorodithiolato]cadmium(II) 12.111
$C_{37}H_{48}N_6O_{12}S_2$ Bilirubin ditaurate 7.10	$C_{40}H_{48}CoO_4P_2S_6$ Bis[2,2'-thiobis[O,O'-di(4- <i>tert</i> - butylphenyl)phosphorodithiolato]cobalt(II) 12.112
$C_{38}H_{30}N_4NiO_2$ Bis[2-[(4- (phenylamino)phenyl)imino]methyl]- phenolato]nickel(II) 12.106	$C_{40}H_{48}NiO_4P_2S_6$ Bis[2,2'-thiobis[O,O'-di(4- <i>tert</i> - butylphenyl)phosphorodithiolato]nickel(II) 12.114
$C_{38}H_{43}FeN_4O_6$ Iron(III) (acetato)mesoporphyrin IX, dimethyl ester 7.74	$C_{40}H_{48}O_4P_2PbS_6$ Bis[2,2'-thiobis[O,O'-di(4- <i>tert</i> - butylphenyl)phosphorodithiolato]lead(II) 12.113
$C_{38}H_{44}MnN_4O_4^+$ Manganese(III) mesoporphyrin diethyl ester 7.84	$C_{40}H_{48}O_4P_2S_6Zn$ Bis[2,2'-thiobis[O,O'-di(4- <i>tert</i> - butylphenyl)phosphorodithiolato]zinc(II) 12.115
$C_{38}H_{45}N_5O_5$ (Z)-Dimethyl 7-[2-(dimethylamino)-2- oxoethyl]-8-ethylidene-7,8-dihydro- 3,7,12,17-tetramethylporphine-2,18- dipropionate 7.89	$C_{40}H_{50}N_4$ Octaethyl[22]porphyrin-(2.2.2.2) (di- <i>trans</i>) 7.98
$C_{38}H_{47}N_5O_5$ (Z)-Dimethyl 7-[2-(dimethylamino)-2- oxoethyl]-8-ethyl-7,8-dihydro-3,7,12,17- tetramethylporphine-2,18-dipropionate 7.88	$C_{40}H_{52}CoO_4P_2S_4$ Bis[O,O'-di-(4- <i>tert</i> - butylphenyl)phosphorodithiolato]cobalt(II) 12.30
$C_{38}H_{60}CoN_2O_2$ Bis[2- [(dodecylimino)methyl]phenolato]cobalt(II) 12.80	$C_{40}H_{52}CuO_4P_2S_4$ Bis[O,O'-di-(4- <i>tert</i> - butylphenyl)phosphorodithiolato]copper(II) 12.31
$C_{38}H_{60}CuN_2O_2$ Bis[2- [(dodecylimino)methyl]phenolato]copper(II) 12.81	$C_{40}H_{52}NiO_4P_2S_4$ Bis[O,O'-di-(4- <i>tert</i> - butylphenyl)phosphorodithiolato]nickel(II) 12.32
$C_{38}H_{60}N_2NiO_2$ Bis[2- [(dodecylimino)methyl]phenolato]nickel(II) 12.82	$C_{40}H_{52}OSi_2$ 2,2,3,3-Tetrakis(2,6- diethylphenyl)oxadisilirane 17.46
$C_{38}H_{60}N_2NiO_4$ Bis[2'-hydroxy-4'-methyl-dodecanophenone oximato]nickel(II) 12.95	$C_{40}H_{52}O_2$ β,β -Carotene-4,4'-dione 2.83
$C_{38}H_{64}NiO_8P_2$ Bis[O-butyl-3,5-di-(1,1-dimethylethyl)-4- hydroxybenzylphosphonato]nickel(II) 12.16	$C_{40}H_{52}O_4$ Astaxanthin 2.82
$C_{38}H_{70}O_2$ 2,5-Di- <i>sec</i> -hexadecylhydroquinone 4.18	$C_{40}H_{54}O$ β,β -Caroten-4-one 2.88
$C_{39}H_{34}Cl_3N_3O_4S_2$ IR 140 11.33	$C_{40}H_{56}$ α -Carotene 2.63 9- <i>cis</i> - β -Carotene 2.64 15,15'-(Z)- β -Carotene 2.65 β -Carotene 2.66 γ -Carotene 2.76 Lycopene, (<i>all-E</i>)- 2.250
$C_{39}H_{39}MgN_5O_7$ Protochlorophyllide 2-amino-2- (methoxycarbonyl)ethyl ester 7.36	$C_{40}H_{56}O$ β,β -Caroten-3-ol 2.87

- $C_{40}H_{56}O_2$ Xanthophyll 2.75
 β,β -Carotene-3,3'-diol, (3*R*,3'*R*)- 2.79
 β,β -Carotene-4,4'-diol, *all-E*- 2.81
 Dihydroxylycopene 2.251
- $C_{40}H_{56}O_4$ Violaxanthin 2.80
 C_{40} -Epiisocapsorubin 2.84
- $C_{40}H_{58}$ Neurosporene 2.70
- $C_{40}H_{60}$ ζ -Carotene 2.72
- $C_{40}H_{62}$ 15-*cis*-Phytofluene 2.73
- $C_{40}H_{64}$ 15-(*Z*)-Phytoene 2.74
- $C_{40}H_{67}NNiO_2S$
 Didodecylamine[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II) 12.132
 Dodecylamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) 12.135
- $C_{40}H_{68}N_2O_5$ A12 8.66
- $C_{41}H_{50}N_4O_2$ 2,3,7,8,12,13,17,18-Octaethyl-5-porphinepropenoic acid ethyl ester 7.97
- $C_{41}H_{52}Cl_2N_4O_2Sn$
 Tin(IV) dichloro[octaethyldihydropurpurin ethyl ester] 7.29
- $C_{41}H_{52}N_4O_2$ Octaethylpurpurin ethyl ester 7.30
- $C_{41}H_{54}N_4O_2$ Octaethyldihydropurpurin ethyl ester 7.28
- $C_{41}H_{58}O_2$ Spheroidenone 2.69
- $C_{41}H_{60}O$ Spheroidene 2.68
- $C_{42}H_{28}$ Rubrene 3.125
- $C_{42}H_{38}N_4Ni$ Bis[*N*-(4-methylphenyl)-7-[(4-methylphenyl)imino]-1,3,5-cycloheptatrien-1-aminato]nickel(II) 12.104
- $C_{42}H_{52}CoO_4P_2S_4$
 2,2'-Methylenebis[*O,O'*-di(4-*tert*-butylphenyl)dithiophosphate]cobalt(II) 12.156
- $C_{42}H_{52}NiO_4P_2S_4$
 2,2'-Methylenebis[*O,O'*-di(4-*tert*-butylphenyl)dithiophosphate]nickel(II) 12.158
- $C_{42}H_{52}O_4P_2PbS_4$
 2,2'-Methylenebis[*O,O'*-di(4-*tert*-butylphenyl)dithiophosphate]lead(II) 12.157
- $C_{42}H_{54}O_2^{2-}$ 4,4'-(4,7-Dihydro-5,6-dimethylisobenzofuran-1,3-diyl)bis(benzene-*p*-decanoate ion) 5.81
- $C_{42}H_{58}O_6$ Fucoxanthin 2.67
- $C_{42}H_{60}O_2$ Spirilloxanthin 2.71
- $C_{42}H_{72}N_2O_5$ Tinuvin 144 8.73
- $C_{43}H_{47}N_2NaO_6S_2$
 IR 125 11.29
- $C_{43}H_{58}N_4O_4$ Methyl acetal of oxidized octaethylpurpurin ethyl ester 7.16
- $C_{44}H_{24}Cl_2N_4O_{12}S_4Sn^{4-}$
 Dichloro[5,10,15,20-tetrakis(4-sulfonatophenyl)porphinatostannate(IV) ion] 7.58
- $C_{44}H_{24}CuI_4N_4$
 5,10,15,20-Tetrakis(4-iodophenyl)porphine, copper(II) 7.55
- $C_{44}H_{26}$ Mesodiphenylbenzheanthrene 3.129
- $C_{44}H_{26}N_4O_{12}S_4^{4-}$
 5,10,15,20-Tetrakis(4-sulfonatophenyl)porphine 7.57
- $C_{44}H_{28}AlClN_4$
 5,10,15,20-Tetraphenylporphinato(chloro)aluminum(III) ion 7.61
- $C_{44}H_{28}CdN_4$ 5,10,15,20-Tetraphenylporphinatocadmium(II) 7.60
- $C_{44}H_{28}ClFeN_4$
 Chloro(5,10,15,20-tetraphenylporphinato)iron(III) 7.49
- $C_{44}H_{28}Cl_2N_4Sn$
 Dichloro(5,10,15,20-tetraphenylporphinato)tin(IV) 7.64
- $C_{44}H_{28}CoN_4$ 5,10,15,20-Tetraphenylporphinatocobalt(II) 7.62
- $C_{44}H_{28}CuN_4$ 5,10,15,20-Tetraphenylporphinatocopper(II) 7.63
- $C_{44}H_{28}MgN_4$
 5,10,15,20-Tetraphenylporphinatomagnesium(II) 7.65
- $C_{44}H_{28}MnN_4^+$
 Manganese(III) 5,10,15,20-tetraphenylporphyrin 7.66
- $C_{44}H_{28}N_4Zn$ 5,10,15,20-Tetraphenylporphinatozinc(II) 7.68
- $C_{44}H_{28}NiN_4$ Nickel(II) 5,10,15,20-tetraphenylporphyrin 7.67
- $C_{44}H_{30}CdN_4$ Cadmium(II) tetraphenylchlorin 7.51
- $C_{44}H_{30}CuN_4$ Copper(II) tetraphenylchlorin 7.52
- $C_{44}H_{30}N_4$ 5,10,15,20-Tetraphenylporphine 7.59
- $C_{44}H_{30}N_4Zn$ Zinc(II) tetraphenylchlorin 7.53
- $C_{44}H_{30}O$ Hexaphenylisobenzofuran 5.84
- $C_{44}H_{32}N_4$ Tetraphenylchlorin 7.50
- $C_{44}H_{34}N_4$ *trans*-Tetraphenylbacteriochlorin 7.54
- $C_{44}H_{46}N_4$ 2,3,10,11,16,17,24,25-Octaethyl-5,6,7,8,19,20,21,22-octahydro[26]porphyrin-(2.4.2.4) 7.100

$C_{44}H_{48}BF_4N_3$	2-[7-(1,3,3-Trimethyl-2-indol-2-ylidene)-1-[4-[3-(1,3,3-trimethyl-2-indolyidene)-2-propenyl]-1,3,5-heptatrienyl]-1,1,3-trimethylindolium, tetrafluoroborate	11.76	$C_{50}H_{50}N_6NiO_4$	Nickel(II) deuteroporphyrin bis(piperidine)	7.96
$C_{44}H_{56}NNiS_4$	Bis(1,2-diphenyl-1,2-ethanedithionato)nickelate(I), tetrabutylammonium salt	12.65	$C_{50}H_{68}$	Decapreno- β -carotene	2.230
$C_{44}H_{64}O_{24}$	Crocin	2.173	$C_{50}H_{72}N_8O_5S$	Magenta dye 9	11.154
$C_{45}H_{28}FeN_5S$	5,10,15,20-Tetraphenylporphinato(thiocyanato-S)iron(III)	7.70	$C_{50}H_{72}O_2$	P-438 (9 conjugated bonds)	2.299
$C_{45}H_{59}N_4ClO_4$	4-[1,5,5-Tri(4-diethylaminophenyl)-pentadienylidene]anilinium perchlorate	11.110	$C_{50}H_{74}O_2$	P-422 (8 conjugated bonds)	2.298
$C_{46}H_{24}O_8^{4-}$	Rubrene-2,3,8,9-tetracarboxylate ion	3.126	$C_{51}H_{67}CoN_6O_{12}$	Hexamethyl Co α Co β -dicyano-7-de(carboxymethyl)-7,8-didehydrocobyrate	16.16
$C_{46}H_{31}FeN_4O_2$	Iron(III) (acetato)5,10,15,20-tetraphenylporphyrin	7.47	$C_{53}H_{48}ClN_3O_8S_2$	IR 132	11.108
$C_{46}H_{31}MnN_4O_2$	Acetato(5,10,15,20-tetraphenylporphinato)manganese(III)	7.48	$C_{54}H_{88}N_2O_4$	2,4-Di[2-methyl-4-(<i>N</i> -methyl- <i>N</i> -octadecylamino)phenyl]squarylium	11.48
$C_{46}H_{38}CoN_4O_5P$	Hydroxybis(diphenylglyoximato)-triphenylphosphinecobalt(II)	12.150	$C_{55}H_{70}MgN_4O_5$	Protochlorophyll	7.39
$C_{46}H_{58}O_4$	1,2-Ethanediyliidenebis[3-[2-hydroxy-5-methyl-3-(1,1-dimethylethyl)benzyl]-5-(1,1-dimethylethyl)]-2,5-cyclohexadien-4-one	17.11	$C_{55}H_{70}MgN_4O_6$	Chlorophyll <i>b</i>	7.12
$C_{47}H_{39}ClO_6$	2,3,2',3'-Bis(1,4,10,13-trideca-4,6,8,10-tetraen)tetrayl[4,6-diphenylpyrylium] perchlorate	11.31	$C_{55}H_{72}MgN_4O_5$	Chlorophyll <i>a</i>	7.11
$C_{48}H_{36}CuN_4O_4$	5,10,15,20-Tetrakis(4-methoxyphenyl)porphinatocopper(II)	7.56	$C_{55}H_{72}MgN_4O_6$	Bacteriochlorophyll <i>b</i>	7.2
$C_{48}H_{44}NNiO_4S_4$	Bis[1,2-di(4-methoxyphenyl)-1,2-ethanedithionato]nickelate(I), tetrabutylammonium salt	12.53	$C_{55}H_{72}N_4O_5$	Protopheophytin	7.38
$C_{48}H_{50}N_8$	Tetra- <i>tert</i> -butylphthalocyanine	7.46	$C_{55}H_{72}N_4O_6$	Pheophytin <i>b</i>	7.27
$C_{48}H_{52}F_{12}NNiS_4$	Bis[1,2-di(4-trifluoromethylphenyl)-1,2-ethanedithionato]nickelate(I), tetrabutylammonium salt	12.75	$C_{55}H_{74}MgN_4O_6$	Bacteriochlorophyll <i>a</i>	7.1
$C_{48}H_{66}N_4^{2+}$	[26] Porphyrin	7.99	$C_{55}H_{74}N_4O_5$	Pheophytin <i>a</i>	7.26
$C_{48}H_{68}OSi_2$	2,2,3,3-Tetrakis(2,6-diisopropylphenyl)oxadisilirane	17.47	$C_{55}H_{74}N_4O_6$	Bacteriopheophytin <i>b</i>	7.33
			$C_{55}H_{76}N_4O_6$	Bacteriopheophytin <i>a</i>	7.32
			$C_{56}H_{73}N_5O_8S_2$	IR 144	11.30
			$C_{56}H_{80}NNiO_{12}S_4$	Bis[1,2-di(3,4,5-trimethoxyphenyl)-1,2-ethanedithionato]nickelate(I), tetrabutylammonium salt	12.77
			$C_{56}H_{84}NiO_4S_2$	Bis(2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)phenolato]nickel(II)	12.116
			$C_{56}H_{96}NiO_4Pd$	Bis[2'-hydroxy-4'- <i>tert</i> -butyloctadecanophenone oximato]palladium(II)	12.91
			$C_{57}H_{72}MgN_4O_5$	4-Vinylprotochlorophyll	7.34

$C_{57}H_{74}N_4O_5$	4-Vinylprotopheophytin	7.35	Cl_2Ni	Nickel(II) dichloride	12.162
C_{60}	Fullerene- C_{60}	17.32	$Cl_2Ni \cdot 6H_2O$	Nickel(II) dichloride hexahydrate	12.163
$C_{60}H_{80}$	Dodecapreno- β -carotene	2.358	Co^{2+}	Cobalt(II) ion	12.128
$C_{64}H_{58}N_8$	2,11,20,29-Tetra- <i>tert</i> -butylnaphthalocyanine	7.22	$CoH_{18}N_6^{3+}$	Hexaamminecobalt(III) ion	12.145
$C_{64}H_{80}N_8O_8$	1,4,8,11,15,18,22,25-Octabutoxyphthalocyanine	7.42	Cu^{2+}	Copper(II) ion	12.129
$C_{66}H_{62}AlN_8OSi$	Bis(tri- <i>n</i> -hexyloxysiloxy)-2,3-naphthalocyaninatoaluminum	7.24	DO^-	Hydroxide- <i>d</i> ion	14.8
$C_{66}H_{62}GaN_8OSi$	Bis(tri- <i>n</i> -hexyloxysiloxy)-2,3-naphthalocyaninatogallium	7.25	D_2O_2	Deuterium peroxide	14.6
C_{70}	Fullerene- C_{70}	17.33	HN_3	Hydrogen azide	14.3
$C_{72}H_{41}AlN_8O$	[1,10,19,28-Tetraphenylnaphthalocyanine]-hydroxyaluminum(III)	7.23	H_4N_2	Hydrazine hydrate	14.7
$C_{72}H_{86}N_8O_2Si_3$	Bis(triisobutylsiloxy)silicon 2,3-naphthalocyanine	7.20	I^-	Iodide ion	14.9
$C_{74}H_{66}N_8O_2Si_3$	Bis(tribenzylsiloxy)silicon phthalocyanine	7.40	I_2	Iodine	14.10
$C_{76}H_{70}N_8O_{10}$	Mesoporphyrin di[4-(diphenylmethylaminocarbonyl-2-nitrophenylmethyl)] ester	7.83	NH_3	Ammonia	14.1
$C_{80}H_{89}N_8O_8Pd$	1,6,10,15,19,24,28,33-Octabutoxynaphthalocyaninatopalladium(II)	7.21	NO_2^-	Nitrite ion	14.11
$C_{84}H_{102}N_8O_2Si_2Sn$	Bis(tri- <i>n</i> -hexyloxysiloxy)-2,3-naphthalocyaninatotin	7.19	N_3^-	Azide ion	14.2
$C_{84}H_{102}N_8O_2Si_3$	Bis(tri- <i>n</i> -hexyloxysiloxy)-2,3-naphthalocyaninatosilicon	7.18	Ni^+	Nickel(I) ion	12.164
$C_{85}H_{103}N_4NiO_{12}S_4$	Bis[1,2-di(3,4,5-trimethoxyphenyl)-1,2-ethanedithionato]nickelate(I), 4-[1,5,5-tri(4-diethylaminophenyl)-pentadienylidene]anilinium salt	12.78	O_2	Oxygen	14.12
$C_{88}H_{56}Fe_2N_8O$	μ -Oxobis[5,10,15,20-tetraphenylporphinatoiron(II)]	7.69	$^{18}O_2$	Oxygen-18	14.13
$C_{90}H_{74}N_8O_2Si_3$	Bis(tribenzylsiloxy)silicon 2,3-naphthalocyanine	7.17	O_2^-	Superoxide radical anion	14.14
Cl^-	Chloride ion	14.5			
$Cl_2Co \cdot 6H_2O$	Cobalt(II) chloride hexahydrate	12.127			
$Cl_2Mn \cdot 6H_2O$	Manganese(II) chloride hexahydrate	12.151			
$Cl_2Mn \cdot 4H_2O$	Manganese(II) chloride tetrahydrate	12.152			

14. Chemical Name Index

Entry numbers for Tables 2-17 are printed in bold face following the names. Entry numbers are printed in smaller type, not bold, for entries in which the chemical species have been used as reference substrates and relative rates have been determined. For example, Acetone azine appears in Table 15 (entry 15.3) but rate constants for another substrate relative to k_r for acetone azine are found in entry 2.40. There is no entry in the tables for 9-Acetyl-2,3,4,9-tetrahydrocarbazole but relative data are found in entries 6.2, 6.3, 6.10, 6.14, 6.18 and 6.19.

- A12 **8.66**
 A 31 **8.64**
 Abietic acid **2.325**
 Acetaldehyde, (2,6-diphenylpyran-4-ylidene)-, dimethyl hydrazone **15.1**
 Acetamide, *N*-[4-[[4-(diethylamino)-2-methylphenyl]imino]-4,5-dihydro-5-oxo-1-(4-bromophenyl)pyrazol-3-yl]- **11.135**
 Acetamide, *N*-[4-[[4-(diethylamino)-2-methylphenyl]imino]-4,5-dihydro-5-oxo-1-(3-chlorophenyl)pyrazol-3-yl]- **11.136**
 Acetamide, *N*-[4-[[4-(diethylamino)-2-methylphenyl]imino]-4,5-dihydro-5-oxo-1-(4-chlorophenyl)pyrazol-3-yl]- **11.137**
 Acetamide, *N*-[4-[[4-(diethylamino)-2-methylphenyl]imino]-4,5-dihydro-5-oxo-1-(3-methoxyphenyl)pyrazol-3-yl]- **11.142**
 Acetamide, *N*-[4-[[4-(diethylamino)-2-methylphenyl]imino]-4,5-dihydro-5-oxo-1-(3-methylphenyl)pyrazol-3-yl]- **11.143**
 Acetamide, *N*-[4-[[4-(diethylamino)-2-methylphenyl]imino]-4,5-dihydro-5-oxo-1-(4-nitrophenyl)pyrazol-3-yl]- **11.145**
 Acetamide, *N*-[4-[[4-(diethylamino)-2-methylphenyl]imino]-4,5-dihydro-5-oxo-1-phenylpyrazol-3-yl]- **11.128**
 Acetamide, *N*-[4-[[4-(diethylamino)-2-methylphenyl]imino]-4,5-dihydro-5-oxo-1-(2,4,6-trichlorophenyl)pyrazol-3-yl]- **11.146**
 Acetatobis(acetylacetonato)manganese(III) **12.1**
 Acetato(7,12-diethyl-3,8,13,17-tetramethylporphine-2,18-dipropanoato)ferrate(III), dimethyl ester **7.74**
 Acetatoiron(III) tetraphenylporphyrin **7.47**
 Acetato(5,10,15,20-tetraphenylporphinato)iron(III) **7.47**
 Acetato(5,10,15,20-tetraphenylporphinato)manganese(III) **7.48**
 Acetic acid **17.1**
 2'-Acetonaphthone **3.1**
 Acetone **17.2**
 Acetone d_6 **17.3**
 Acetone azine **15.3, 2.40**
 Acetone oxime **15.2**
 Acetonitrile **17.4**
 Acetonitrile- d_3 **17.5**
 Acetophenone **3.2**
 Acetophenone, 4'-hydroxy- **4.93**
N-(2-Acetoxyethyl)-2,2,6,6-tetramethylpiperidine **8.69**
 2-Acetoxy-3-methyl-2-cyclopenten-1-one **2.163**
 3-Acetoxy-2-methyl-2-cyclopenten-1-one **2.164**
 Acetoxymethylideneadamantane **2.2**
 Acetoxymethylidene-cyclohexane **2.111**
 4-Acetoxymethyl-2-(phenylmethyl)furan **5.75**
N-Acetylcysteine, negative ion **13.70**
N-Acetyl-L-cysteine **13.69**
 4-Acetyl-2,6-di-*tert*-butylphenol **4.94**
 5-Acetyl-3,4-dihydro-6-methylpyran **5.88**
 Acetylene, 1,2-bis(diethylamino) **8.30**
 Acetylene, 1-(diethylamino)-2-methyl- **8.87**
 2-Acetylfuran **5.15**
N-Acetyl-2,3,4,4a,5,9b-hexahydro-2,8-dimethylpyrido[4,3-*b*]indole **6.57**
 2-Acetylnaphthalene **3.1**
 3-Acetyloxy-1,3,5(10),9(11)-estratetraen-17-one **16.29**
 4-Acetylphenol **4.93**
 4-Acetylphenoxide ion **4.151**
N-Acetylstobadine **6.57**
 9-Acetyl-2,3,4,9-tetrahydrocarbazole **6.2, 6.3, 6.10, 6.14, 6.18, 6.19**
N-Acetyltryptophan **10.37**
N-Acetyl-L-tryptophanamide **10.44**
N-Acetyltryptophan methyl ester **10.38**
N-Acetyl-L-tyrosine, ethyl ester **4.188**
 Acridine, 3,6-diamino- **11.1**
 1,8-Acridinedione, 3,4,6,7,9,10-hexahydro-3,3,6,6-tetramethyl- **6.1**
 Acridinium, 3,6-diamino-10-methyl- **11.2**
 Acriflavine cation **11.2**
 Acrolein **2.1**
 Adamantane, 2-(hydroxymethylene)-, acetate **2.2**
 Adamantylideneadamantane **2.356, 13.112**
 1-Adamantylideneethyl acetate **2.220**
 Adamantylidenemethyl acetate **2.256, 2.126**
endo-7-Adamantylidenenorbornane-2,3-dicarboxylic acid anhydride **2.15**
exo-7-Adamantylidenenorbornane-2,3-dicarboxylic acid anhydride **2.16**
 Adenine **16.63**
 Adenosine **16.1**
 Adenosine monophosphate **16.2**
 Adenosine 5'-monophosphate **16.2**
 Adenosine triphosphate **16.3**
 Adenosine triphosphate, ester with 1- β -D-ribofuranosyl-3-pyridinecarboxamide **16.50**
 5'-Adenylic acid **16.2**

- Adrenaline **4.9**
 Adriamycin **4.80**
 Alanine **10.1**
 β -Alanine **10.2**
 β -Alanine, L-histidyl- **10.3**
 L-Alanine, glycyl-L-tyrosyl- **4.1**
 β -Alanyl-L-histidine **10.24**
 β -Alanyl-1-methylhistidine **10.25**
 L-Alanyl-L-tryptophan **10.39**
 Albumin **10.4**
 Alloocimine **2.285**
 Allylthiourea **13.175**
 N-Allylurea **17.78**
 Aluminum, tetranaphtho[2,3-*b*:2',3'-*g*:2'',3''-*l*:2'',3'''-*g*]porphyrinatobis(trihexylsilanolato)- **7.24**
 Aluminum(III) chloro(5,10,15,20-tetraphenylporphyrin) **7.61**
 Aluminum(III) hydroxy[1,10,19,28-tetraphenyl-naphthalocyanine] **7.23**
 1-Aminoanthraquinone **11.3**
 2-Aminoanthraquinone **11.4**
 1-(4-Aminocarbonylphenylazo)-3-(2-methoxyphenylaminocarbonyl)-2-naphthol **11.79**
 Aminocercosporin **16.54**
 5-Amino-2,3-dihydro-1,4-phthalazinedione **9.33**
 2-Aminoethanethiol **13.93**
 3-(2-Aminoethyl)indole **10.34**
p-(2-Aminoethyl)phenol **4.186**
 1-Amino-4-hydroxyanthraquinone **11.5**
 2-Amino-2-(hydroxymethyl)-1,3-propanediol **17.59**
 3-Amino-2-hydroxypropanethiol **13.131**
 2-Amino-6-hydroxypurine **16.35**
 1-Amino-2-methylanthraquinone **11.6**
 α -(Aminomethyl)-3,4-dihydroxybenzyl alcohol **4.6**
 4-(Aminomethylene)-3-methyl-1-phenyl-2-pyrazoline-5-selone **13.141**
 4-(Aminomethylene)-3-methyl-1-phenyl-2-pyrazoline-5-thione **13.142**
 2-Amino-4-(methylthio)butanoic acid **13.108, 4.30, 4.76, 4.92, 4.152, 4.153, 4.157, 4.159, 4.160, 4.165, 4.166, 4.168, 4.180, 4.181, 4.182, 4.187, 4.189, 10.21, 10.36, 10.41**
 2-Aminonaphthalene **9.24**
 4-Aminophenol **4.95**
 1-(*p*-Aminophenylazo)-2-naphthol **11.93**
 4-(4'-Aminophenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one **11.133**
 3-Aminophthalhydrazide **9.33**
 1-Aminopropane **8.84**
 2-[(3-Aminopropyl)amino]ethanethiol **13.94**
 N-(3-Aminopropyl)-1,4-butanediamine **8.10**
 6-Aminopurine **16.63**
 4-Amino-2-pyrimidinone **16.20**
 N-[3-(Aminosulfonyl)phenyl]-3-[(3-cyano-5-hydroxy-1-phenylpyrazol-4-yl)azo]-4-methoxybenzenesulfonamide **11.21, 11.22, 11.23, 11.25, 11.155**
 4-(4'-Amino-2',3',5',6'-tetramethylphenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one **11.134**
 4-Amino-2,2,6,6-tetramethylpiperidine **8.54**
 4-Amino-2,2,6,6-tetramethylpiperidine-N-oxyl **15.29**
 Ammine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) **12.2**
 Ammonia **14.1**
 Amylene **2.56, 2.122, 2.161, 2.307, 2.309, 2.310, 3.110, 15.11, 15.13, 15.14, 15.15**
 4-Androsten-3-one, 17-hydroxy-4-methyl- **16.4**
 Androst-5-en-17-one, 3-(acetyloxy)- (3 β) **16.5**
 Anethole **3.116**
 Angelicin **5.1**
 Aniline **9.1**
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 Aniline, 3-chloro-*N,N*-dimethyl- **9.3**
 Aniline, 4-chloro-*N,N*-dimethyl- **9.4**
 Aniline, 3,4-dimethoxy-*N,N*-dimethyl- **9.5**
 Aniline, *N,N*-dimethyl- **9.6**
 Aniline, *N,N*-dimethyl-4-nitroso- **9.7**
 Aniline, 4-(1,2-dimethyl-1-propenyl)-*N,N*-dimethyl- **3.110**
 Aniline, *N,N*-diphenyl- **9.8**
 Aniline, 4-(ethoxycarbonyl)- **9.9**
 Aniline, 4-formyl-*N,N*-dimethyl- **9.10**
 Aniline, 2-methoxy-*N,N*-dimethyl- **9.11**
 Aniline, 3-methoxy-*N,N*-dimethyl- **9.12**
 Aniline, 4-methoxy-*N,N*-dimethyl- **9.13**
 Aniline, *N*-methyl- **9.14**
 Aniline, *N,N*,2,4,6-pentamethyl- **9.15**
 Aniline, *N*-phenyl- **9.16**
 Aniline, *N,N*,2,4-tetramethyl- **9.17**
 Aniline, 4-(1,1,3,3-tetramethylbutyl)-*N*-[4-(1,1,3,3-tetramethylbutyl)phenyl]- **9.18**
 Aniline, *N,N*,4-trimethyl- **9.19**
 Aniline[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) **12.3**
m-Anilinophenol **4.142**
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 Anisole, 2,6-dichloro- **3.37**
 Anisole, 4-(methylthio)- **13.22**
 2-Anisyl-3-methyl-2-butene **3.118, 3.115, 3.123**
 1-Anisyl-1-propene **3.116**
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 Anthracene **3.3, 3.23, 3.61, 3.77, 4.61, 4.102, 6.8, 6.15, 6.16, 6.24, 6.25, 6.27**
 Anthracene, 1-chloro- **3.4**
 Anthracene, 9-chloro- **3.5**

- Anthracene, 1-chloro-9,10-diphenyl- 3.6
Anthracene, 9,10-dichloro- 3.7
Anthracene, 9,10-dimethoxy- 3.8
Anthracene, 1,4-dimethoxy-9,10-diphenyl- 3.9
Anthracene, 9,10-dimethyl- 3.10, 3.124, 3.125, 4.1, 4.10, 4.11, 4.12, 4.20, 4.153, 4.154, 4.157, 4.159, 4.160, 4.162, 4.165, 4.166, 4.168, 4.175, 4.176, 4.180, 4.181, 4.182, 11.16, 11.17, 11.60, 11.62, 11.63, 11.77, 11.79, 11.80, 11.90, 11.92, 11.101, 11.103, 11.104, 12.28, 12.123, 13.175
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Anthracene, 9-methyl- 3.13
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9,10-Anthraquinone, 2-amino- 11.4
9,10-Anthraquinone, 1-amino-4-hydroxy- 11.5
9,10-Anthraquinone, 1-amino-2-methyl- 11.6
9,10-Anthraquinone, 1,4-bis(methylamino)- 11.7
9,10-Anthraquinone, 1,2-diamino- 11.3, 11.4, 11.5, 11.8, 11.9, 11.10, 11.11, 11.13, 11.14
9,10-Anthraquinone, 1,4-diamino- 11.8
9,10-Anthraquinone, 1,5-diamino- 11.9
9,10-Anthraquinone, 1,8-diamino- 11.10
9,10-Anthraquinone, 2,6-diamino- 11.11
9,10-Anthraquinone, 1,5-diaminobromo-4,8-dihydroxy- 11.12
9,10-Anthraquinone, 1,4-diamino-2-methoxy- 11.13
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 Benzenamine, 4-(1,2-dimethyl-1-propenyl)-*N,N*-dimethyl- 3.115
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 1,4-Benzenediamine, *N*-cyclohexyl- N' -phenyl- 9.28
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 1,2-Benzenediol, 4-(2-methylamino-1-hydroxy)ethyl- 4.9
 1,3-Benzenediol 4.10
 1,3-Benzenediol, 4-chloro- 4.11
 1,4-Benzenediol 4.12
 1,4-Benzenediol, 2,6-bis(1,1-dimethylethyl)-, 4-propanoate 4.15
 1,4-Benzenediol, chloro- 4.20
 1,4-Benzenediol, 2,5-di-*tert*-butyl- 4.14
 1,4-Benzenediol, 2,5-di(2,2-dimethylpropyl)- 4.16
 1,4-Benzenediol, 2,5-di-*sec*-dodecyl- 4.17
 1,4-Benzenediol, 2,5-di-*sec*-hexadecyl- 4.18
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 1,4-Benzenediol, 2,3-dimethyl- 4.22
 1,4-Benzenediol, 2,5-dimethyl- 4.23
 1,4-Benzenediol, 2,6-dimethyl- 4.24
 1,4-Benzenediol, 2,5-di-*sec*-octyl- 4.19
 1,4-Benzenediol, 2-(3,7,11,15,19,23-hexamethyl-2,6,10,14,18,22-tetracosahexaenyl)-5,6-dimethoxy-3-methyl- (*all-E*) 4.25
 1,4-Benzenediol, 2-(3-hydroxy-3,7,11,15-tetramethylhexadecyl)-3,6-dimethyl- 4.26
 1,4-Benzenediol, 2-(3-hydroxy-3,7,11,15-tetramethylhexadecyl)-5,6-dimethyl- 4.27
 1,4-Benzenediol, 2-(3-hydroxy-3,7,11,15-tetramethylhexadecyl)-3,5,6-trimethyl- 4.28
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 Benzenemethanamine, *N*-hydroxy-*N*-(phenylmethyl)- 15.11
 Benzenemethanamine, *N*-(phenylmethylene)-, *N*-oxide 15.12
 Benzenemethanesulfenamide, *N,N*-diethyl- 13.35
 Benzenemethanol, 3,5-bis(1,1-dimethylethyl)-4-hydroxy- 4.32
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 Benzenemethanol, α -methyl- 3.55
 Benzenepropanamide, α -[[[(4-diethylamino)-2,6-dimethylphenyl]imino]- β -oxo-*N*-phenyl- 11.26
 Benzenepropanamide, α -[[[(4-diethylamino)-2-methylphenyl]imino]- β -oxo-*N*-phenyl- 11.27
 Benzenepropanamide, α -[[[(4-diethylamino)phenyl]imino]- β -oxo-*N*-phenyl- 11.28
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- 3-Benzenepropanoic acid, 3,5-bis(1,1-dimethylethyl)-4-hydroxy-, octadecyl ester **4.33**
- 3-Benzenepropanoic acid, 4-hydroxy- **4.34**
- Benzenesulfonamide, *N*-[3-(aminosulfonyl)phenyl]-3-[(3-cyano-5-hydroxy-1-phenylpyrazol-4-yl)azo]-4-methoxy- **11.21, 11.22, 11.23, 11.24, 11.25, 11.155**
- Benzenesulfonate ion, 2,2'-(1,2-ethenediyl)bis[5-(acetylamino)- **3.106**
- Benzenesulfonate ion, 2,2'-(1,2-ethenediyl)bis[5-amino- **3.107**
- N*-Benzhydryl-4-bromomethylbenzamide **3.22**
- α -Benzhydrylfurfuryl alcohol **5.68**
- Benzidine **9.23**
- Benz[*e*]indolium, 2-[7-(1,3-dihydro-1,1-dimethyl-3-(sulfo-butyl)benz[*e*]indol-2-ylidene)-1,3,5-heptatrienyl]-1,1-dimethyl-3-(sulfo-butyl)-, hydroxide, inner salt, Na salt **11.29**
- Benz[*e*]indolium, 2-[2-[3-[[1,3-dihydro-1,1-dimethyl-3-(3-sulfopropyl)benz[*e*]indol-2-ylidene]ethylidene]-2-[4-(ethoxycarbonyl)-1-piperidinyl]-1-cyclopenten-1-yl]ethenyl]-1,1-dimethyl-3-(3-sulfopropyl)-, hydroxide, inner salt, compound with triethylamin **11.30**
- 1,2-Benziselenazol-3-one, 7-chloro-2-phenyl- **13.36**
- 1,2-Benziselenazol-3-one, 7-fluoro-2-phenyl- **13.37**
- 1,2-Benziselenazol-3-one, 7-methoxy-2-phenyl- **13.38**
- 1,2-Benziselenazol-3-one, 7-nitro-2-phenyl- **13.39**
- 1,2-Benziselenazol-3-one, 2-phenyl **13.40**
- 1,2-Benzisothiazol-3-one, 2-phenyl- **13.41**
- Benzoate ion, 2-hydroxy- **4.35**
- Benzo[1,3]cyclopropa[1,2,3-*cd*]cyclopropa[*gh*]pentalene, 1,2,5,6,6a,6b,6c,6d-octahydro-1,6-*o*-benzeno- **2.181**
- Benzo[1,3]cyclopropa[1,2,3-*cd*]cyclopropa[*gh*]pentalene, 1,2,5,6,6a,6b,6c,6d-octahydro-9,12-dimethoxy-1,6-*o*-benzeno- **2.180**
- Benzo[1,2-*b*:4,3-*b'*]dipyran, 1,2,3,8,9,10-hexahydro-3,3,5,6,8,8-hexamethyl- **5.2**
- Benzo[1,2-*b*:4,5-*b'*]dipyran, 2,3,4,7,8,9-hexahydro-2,2,5,7,7,10-hexamethyl- **5.3**
- Benzo[1,2,3-*kl*:4,5,6-*kl'*]dixanthene **3.56**
- 3,4-Benzofuran **5.80**
- Benzo[*c*]furan **5.80**
- Benzofuran-5-ol, 2,3-dihydro-2,2,4,6,7-pentamethyl- **4.36**
- Benzofuran-5-ol, 2,3-dihydro-2,4,6,7-tetramethyl- **4.37**
- Benzoic acid, 4-amino-, ethyl ester **9.9**
- Benzoic acid, 3,5-bis(1,1-dimethylethyl)-4-hydroxy-, 2,4-bis(1,1-dimethylethyl)phenyl ester **4.38**
- Benzoic acid, 3,5-bis(1,1-dimethylethyl)-4-hydroxy-, methyl ester **4.39**
- Benzoic acid, 4-(dimethylamino)-, ethyl ester **9.21**
- Benzoic acid, methyl ester **3.57**
- Benzo[*e*]naphtho[2',3':5,6]fluoreno[1,9*ab*]oxepin-5,10,19-trione, 5*c*,8,8*a*,16-tetrahydro-1,8,11,15,18-pentahydroxy-13-methyl- **16.8**
- Benzonitrile, 4-(dimethylamino)- **9.22**
- Benzonitrile, 3-(1,2-dimethyl-1-propenyl)- **3.111**
- Benzonitrile, 4-(1,2-dimethyl-1-propenyl)- **3.112**
- Benzonitrile, 4-hydroxy- **4.112**
- 4-(2',3'-Benzo-4'-oxocyclohexadienylidene)amino-*N,N*-diphenylaniline **11.82**
- 4-(2',3'-Benzo-4'-oxocyclohexadienylidene)amino-*N*-phenylaniline **11.84**
- 4-[2',3'-Benzo-4'-oxo-5'-(2-methoxy-5-fluorosulfonyl)phenyl]amino-*N,N*-diethylaniline **11.81**
- Benzo[*ghi*]perylene-4,11-dione, 1-acetyl-1,2-dihydro-5,10-dihydroxy-2-(1-hydroxyethyl)-3,7,8,12-tetramethoxy- **16.9**
- Benzo[*ghi*]perylene-4,11-dione, 1,2-diacetyl-1,2-dihydro-5,10-dihydroxy-3,7,8,12-tetramethoxy-, *trans*- **16.10**
- Benzophenone **3.58**
- Benzophenone, 4-dodecyloxy-2-hydroxy- **4.42**
- Benzophenone, 2-hydroxy-4-octyloxy- **4.43**
- Benzophenone oximate anion **15.13**
- Benzophenone oxime **15.14**
- Benzophenone oxime *O*-methyl ether **15.15**
- 1-Benzopyran, 3,4-dihydro-6-methoxy-2,5,7,8-tetramethyl-2-(4,8,12-trimethyltridecyl)- **5.4**
- 1-Benzopyran, 6-ethoxy-3,4-dihydro-2,5,7,8-tetramethyl-(4,8,12-trimethyltridecyl)- **5.5**
- 1-Benzopyran-2-carboxylic acid, 3,4-dihydro-6-hydroxy-2,5,7,8-tetramethyl-, ion(1-) **4.44**
- 1-Benzopyran-6-ol, 5,7-diethyl-3,4-dihydro-2-methyl-2-(4,8,12-trimethyltridecyl)- **4.45**
- 1-Benzopyran-6-ol, 3,4-dihydro-2,8-dimethyl-2-(4,8,12-trimethyltridecyl)- **4.46**
- 1-Benzopyran-6-ol, 3,4-dihydro-2-methyl-5,7-di(1-methylethyl)-2-(4,8,12-trimethyltridecyl)- **4.47**
- 1-Benzopyran-6-ol, 3,4-dihydro-1-methyl-1-(4,8,12-trimethyltridecyl)- **4.48**
- 1-Benzopyran-6-ol, 3,4-dihydro-2,2,5,7,8-pentamethyl- **4.49**
- 1-Benzopyran-6-ol, 3,4-dihydro-2,5,7,8-tetramethyl-2-(4,8,12-trimethyltridecyl)- **4.50**
- 1-Benzopyran-6-ol, 3,4-dihydro-2,5,7,8-tetramethyl-2-(4,8,12-trimethyltridecyl)-, acetate **16.11**
- 1-Benzopyran-6-ol, 3,4-dihydro-2,5,7-trimethyl-2-(4,8,12-trimethyltridecyl)- **4.51**
- 1-Benzopyran-6-ol, 3,4-dihydro-2,5,8-trimethyl-2-(4,8,12-trimethyltridecyl)- **4.52**
- 1-Benzopyran-6-ol, 3,4-dihydro-2,7,8-trimethyl-2-(4,8,12-trimethyltridecyl)- **4.53**
- 1-Benzopyran-6-ol, 7-(1,1-dimethylethyl)-3,4-dihydro-2,2-dimethyl- **4.54**
- 1-Benzopyran-6-ol, 7-(1,1-dimethylethyl)-3,4-dihydro-2-methyl-2-(4,8,12-trimethyltridecyl)- **4.55**
- 1-Benzopyran-6-ol, 8-(1,1-dimethylethyl)-3,4-dihydro-2-methyl-2-(4,8,12-trimethyltridecyl)- **4.56**

- 1-Benzopyran-6-ol, 2,2'-spirobis[7-*tert*-butyl-3,4-dihydro-4,4-dimethyl- 4.184
- 1-Benzopyran-6-ol, 2,2'-spirobis[3,4-dihydro-4,4,7-trimethyl- 4.185
- 1-Benzopyran-4-one, 2-[3,4-bis(2-hydroxyethoxy)phenyl]-3-[6-*O*-(6-deoxy- α -L-mannopyranosyl)- β -D-glycopyranosyl]oxy]-5-hydroxy-7-(2-hydroxyethoxy)- 4.57
- 1-Benzopyran-4-one, 3-[[6-*O*-(6-deoxy- α -mannopyranosyl)- β -glucopyranosyl]oxy]-2-(3,4-dihydroxyphenyl)-5,7-dihydroxy- 4.58
- 1-Benzopyran-4-one, 3,7-dihydroxy-2-(3,4-dihydroxyphenyl)- 4.75
- 1-Benzopyran-4-one, 2-(2,3-dihydroxyphenyl)-2,3-dihydro-5,7-dihydroxy-, (S) 4.59
- 1-Benzopyran-4-one, 2-(3,4-dihydroxyphenyl)-5,7-dihydroxy- 4.60
- 1-Benzopyran-4-one, 2-(3,4-dihydroxyphenyl)-3,5,7-trihydroxy- 4.61
- 1-Benzopyran-4-one, 3-hydroxy-2-phenyl- 4.74
- 1-Benzopyran-4-one, 5,6,7,8-tetramethoxy-2-(4-methoxyphenyl)- 4.62
- 1-Benzopyran-4-one, 3,5,7-trihydroxy-2,3-dihydro-2-(3,4-dihydroxyphenyl)- 4.63
- 1-Benzopyran-4-one, 3,5,7-trihydroxy-2-(4-hydroxyphenyl)- 4.64
- 1-Benzopyran-4-one, 3,5,7-trihydroxy-2-phenyl- 4.65
- [1]Benzopyrano[6,7,8-*ij*]quinolizin-11-one, 2,3,6,7-tetrahydro- 8.3
- [1]Benzopyrano[6,7,8-*ij*]quinolizin-11-one, 2,3,6,7-tetrahydro-9-methyl- 8.4
- 1-Benzopyran-2-propanoic acid, 3,4-dihydro-6-hydroxy-2,5,7,8-tetramethyl- 4.66
- 1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro- (2*R-trans*)- 4.67
- 1-Benzopyrylium, 8-[5-(6,7-dihydro-2,4-diphenyl-1-benzopyran-8-yl)-2,4-pentadienylidene]-5,6,7,8-tetrahydro-2,4-diphenyl-, perchlorate 11.31
- 1,4-Benzoquinone 16.12
- 1,4-Benzoquinone, methyl- 16.13
- Benzothiazolium, 2-[[2-butoxy-3-[(3-ethyl-2-benzothiazolylidene)methyl]-4-oxo-2-cyclobuten-1-ylidene]methyl]-3-ethyl- 11.32
- Benzothiazolium, 5-chloro-2-[2-[3-[(5-chloro-3-ethyl-2-benzothiazolylidene)ethylidene]-2-(diphenylamino)-1-cyclopenten-1-yl)ethenyl]-3-ethyl-, perchlorate 11.33
- Benzothiazolium, 5-chloro-2-[(5-chloro-3-ethyl-2-benzothiazolylidene)methyl]-1-butenyl]-3-ethyl-, bromide 11.164
- Benzothiazolium, 5-chloro-2-[3-(5-chloro-3-ethylbenzothiazolylidene)-1-propenyl-3-ethyl-, bromide 11.163
- Benzothiazolium, 2-[7-(5-chloro-1,3,3-trimethyl-2-indolylidene)-1-(1,3,5-heptatrienyl)-3-methyl-, iodide 11.34
- Benzothiazolium, 5-cyano-2-[(5-cyano-3-ethyl-2-benzothiazolylidene)methyl]-1-butenyl]-3-ethyl-, tetrafluoroborate 11.165
- Benzothiazolium, 3-ethyl-2-[(3-ethyl-2-benzothiazolylidene)ethyl]-1-methylethenyl-, toluenesulfonate 11.168
- Benzothiazolium, 3-ethyl-2-[7-(3-ethyl-2-benzothiazolylidene)-1,3,5-heptatrienyl]-, iodide 11.174
- Benzothiazolium, 3-ethyl-2-[(3-ethyl-2-benzothiazolylidene)methyl]-1-butenyl]-, bromide 11.171
- Benzothiazolium, 3-ethyl-2-[3-(3-ethyl-2-benzothiazolylidene)methyl]-1-cyclopentenyl-, iodide 11.170
- Benzothiazolium, 3-ethyl-2-[3-(3-ethyl-2-benzothiazolylidene)methyl]-1-cyclopenten-1-yl]-, toluenesulfonate 11.169
- Benzothiazolium, 3-ethyl-2-[5-(3-ethyl-2-benzothiazolylidene)-1,3-pentadienyl]-, iodide 11.173
- Benzothiazolium, 3-ethyl-2-[3-(3-ethylbenzothiazolylidene)-1-propenyl, toluenesulfonate 11.166
- Benzothiazolium, 3-ethyl-2-[(3-ethyl-5-methoxy-2-benzothiazolylidene)methyl]-1-butenyl]-5-methoxy-, toluenesulfonate 11.172
- Benzothiazolium, 3-ethyl-2-[3-(3-ethyl-5-methoxybenzothiazolylidene)-1-propenyl-5-methoxy-, toluenesulfonate 11.167
- Benzothiazolium, 2-[7-(5-fluoro-1,3,3-trimethyl-2-indolylidene)-1-(1,3,5-heptatrienyl)-3-methyl-, iodide 11.35
- Benzothiazolium, 2-[7-(5-methoxy-1,3,3-trimethyl-2-indolylidene)-1-(1,3,5-heptatrienyl)-3-methyl-, iodide 11.36
- Benzothiazolium, 3-methyl-2-[7-(1,3,3-trimethyl-2-indol-2-ylidene)-1,3,5-heptatrienyl]-, iodide 11.37
- Benzothiazolium, 2-[7-(1,3,3,5-tetramethyl-2-indolylidene)-1-(1,3,5-heptatrienyl)-3-methyl-, iodide 11.38
- Benzotriazole, 2-(2'-hydroxy-3'-chloro-5'-*tert*-butylphenyl)- 4.97
- Benzotriazole, 2-(2'-hydroxy-3',5'-di-*tert*-pentylphenyl)- 4.96
- 3-Benzoxazolepropanesulfonic acid, 2-[4-(1,3-dibutyltetrahydro-4,6-dioxo-2-thioxo-5-pyrimidinylidene)-2-butenylidene]-, sodium salt 11.39
- Benzoxazolium, 3-ethyl-2-[7-(3-ethyl-2-benzoxazolylidene)-1,3,5-heptatrienyl]-, iodide 11.109
- 5-Benzoyl-3,4-dihydro-6-phenylpyran 5.89

- 3-Benzoyloxy-1,3,5(10),9(11)-estratetraen-17-one **16.30**
- 4-[*N*-Benzoyl(phenylaminocarbonyl)methylene]amino-*N,N*-diethylaniline **11.28**
- 4-[*N*-Benzoyl(phenylaminocarbonyl)methylene]amino-*N,N*-diethyl-3,5-dimethylaniline **11.26**
- 4-[*N*-Benzoyl(phenylaminocarbonyl)methylene]amino-*N,N*-diethyl-3-methylaniline **11.27**
- Benzvalene **2.3**
- Benzyl alcohol, α -(aminomethyl)-3,4-dihydroxy- **4.6**
- Benzylamine **8.5**
- Benzylamine, *N*-benzyl-*N*-hydroxy- **15.11**
- 2-Benzyl-1,3-butadiene **2.43**
- 4-Benzyl-2,6-di-*tert*-butylphenol **4.104**
- α -Benzylfurfuryl alcohol **5.72**
- p,p'*-Benzylidenebis(*N,N*-dimethylaniline) **11.77**
- Benzyl mercaptan **13.42**
- Benzyl methyl sulfide **13.30**
- 4-Benzoyloxy-5,6-dimethyl-2-(dimethylamino)pyrimidine **16.65**
- 2-Benzylphenol **4.98**
- 2-Benzylphenoxide ion **4.152**
- Benzyl phenyl selenide **13.32**
- Benzyl phenyl sulfide **13.33**
- 2-(Benzylseleno)-*N*-phenylbenzamide **13.4**
- Benzyl sulfide **13.71**
- Biadamantylidene **2.356, 13.112**
- Bicyclo[2.2.1]hepta-2,5-diene **2.4**
- Bicyclo[2.2.1]hepta-2,5-diene, 7,7-dimethyl-2-(trimethylsiloxy)- **2.5**
- Bicyclo[2.2.1]hepta-2,5-diene, 2-methyl- **2.6**
- Bicyclo[2.2.1]hepta-2,5-diene, 2-(trimethylsiloxy)- **2.7**
- Bicyclo[2.2.1]heptane, 2,3-bis(methylene)- **2.8, 2.19, 2.140, 2.295, 2.296, 2.297, 2.357**
- Bicyclo[2.2.1]heptane, 7,7-dimethyl-2-methylene- **2.9**
- Bicyclo[2.2.1]heptane, 2,3-dioxymethyl-7-tricyclo[3.3.1.1^{3,7}]decylidene- (*exo,exo*) **2.10**
- Bicyclo[2.2.1]heptane, 2-methylene- **2.11, 2.9, 2.13, 2.14, 2.21, 2.23**
- Bicyclo[2.2.1]heptane, 2,3-(2¹-oxatrimethylene)-7-tricyclo[3.3.1.1^{3,7}]decylidene- (*exo,exo*) **2.12**
- Bicyclo[2.2.1]heptane-2-*d*, 3-methylene-, *endo*- **2.13**
- Bicyclo[2.2.1]heptane-2-*d*, 3-methylene-, *exo*- **2.14**
- Bicyclo[2.2.1]heptane-2,3-dicarboxylic acid, 7-tricyclo[3.3.1.1^{3,7}]decylidene-, anhydride (*endo,endo*) **2.15**
- Bicyclo[2.2.1]heptane-2,3-dicarboxylic acid, 7-tricyclo[3.3.1.1^{3,7}]decylidene-, anhydride (*exo,exo*) **2.16**
- Bicyclo[2.2.1]heptane-2,3-dicarboxylic acid, 7-tricyclo[3.3.1.1^{3,7}]decylidene-, dimethyl ester (*endo,endo*) **2.17**
- Bicyclo[2.2.1]heptane-2,3-dicarboxylic acid, 7-tricyclo[3.3.1.1^{3,7}]decylidene-, dimethyl ester (*exo,exo*) **2.18**
- Bicyclo[2.2.1]heptane-2-thione **13.43**
- Bicyclo[2.2.1]heptane-2-thione, 3,3-dimethyl- **13.44**
- Bicyclo[2.2.1]heptane-2-thione, 1,3,3,7,7-pentamethyl- **13.45**
- Bicyclo[2.2.1]heptane-2-thione, 1,3,3-trimethyl- **13.46**
- Bicyclo[2.2.1]heptane-2-thione, 1,7,7-trimethyl- **13.47**
- Bicyclo[2.2.1]hept-2-ene, 5,6-bis(methylene)- **2.19**
- Bicyclo[2.2.1]hept-2-ene, 7,7-dimethyl-2-(trimethylsiloxy)- **2.5, 2.7, 2.24**
- Bicyclo[2.2.1]hept-2-ene, 2-methoxy- **2.20**
- Bicyclo[2.2.1]hept-2-ene, 2-methyl- **2.21, 2.23**
- Bicyclo[2.2.1]hept-2-ene, 5-methylene- **2.22, 2.6, 2.11, 2.12, 2.153**
- Bicyclo[2.2.1]hept-2-ene, 2,7,7-trimethyl- **2.23, 2.9, 2.11**
- Bicyclo[2.2.1]hept-2-ene, 2-(trimethylsiloxy)- **2.24**
- Bicyclo[3.1.1]hept-2-ene, 2-ethenyl-6,6-dimethyl- **2.25**
- Bicyclo[4.1.0]hept-2-ene, 3,7,7-trimethyl- **2.26**
- Bicyclo[4.1.0]hept-2-ene, 4,7,7-trimethyl- **2.27**
- Bicyclo[4.1.0]hept-3-ene, 3,7,7-trimethyl- **2.28**
- Bicyclo[3.1.1]hept-3-ene-2-thione, 4,6,6-trimethyl- **13.48**
- Bicyclo[2.2.0]hexa-2,5-diene, hexamethyl- **2.29**
- Bicyclo[3.1.0]hex-2-ene, 4-methyl-1-(1-methylethyl)-, (*1R*)- **2.30**
- Bicyclo[3.2.2]nonane, 6,7-bis(methylene)- **2.31**
- Bicyclo[4.2.0]octa-2,4-diene, 7,8-dibromo- **2.32**
- Bicyclo[2.2.2]octane, 2,3-bis(methylene)- **2.33**
- Bicyclo[7.2.0]undec-4-ene, 4,11,11-trimethyl-8-methylene- [*IR*-(*IR**,*4E,9S**)]- **2.34**
- Bicyclo[7.2.0]undec-4-ene, 4,11,11-trimethyl-8-methylene- [*IR*-(*IR**,*4Z,9S**)]- **2.34**
- Bifluorenylidene **3.66**
- 9,9'-Bifluorenylidene **3.66**
- 2,3'-Biindolium, 1,1,3-trimethyl-2'-[2-(1,3,3-trimethylindolylidene)methyl]-, iodide **11.40**
- Bilene-1,19-dione, 3,8,12,17-tetraethyl-22,24-dihydro-2,7,13,18-tetramethyl- **7.3**
- Bilene-1,19-dione, 3,8,12,17-tetraethyl-10,22,23,24-tetrahydro-2,7,13,18-tetramethyl- **7.4**
- Bilene-8,12-dipropanoic acid, 2,17-diethenyl-1,10,19,22,23,24-hexahydro-3,7,13,18-tetramethyl-1,19-dioxo- **7.5, 3.60**
- Bilene-8,12-dipropanoic acid, 2,17-diethenyl-1,10,19,22,23,24-hexahydro-3,7,13,18-tetramethyl-1,19-dioxo-, dimethyl ester **7.6**
- Bilene-8,12-dipropanoic acid, 2,17-diethenyl-1,19,22,24-tetrahydro-3,7,13,18-tetramethyl-1,19-dioxo- **7.7**
- Bilene-8,12-dipropanoic acid, 2,17-diethyl-1,10,19,22,23,24-hexahydro-3,7,13,18-tetramethyl-1,19-dioxo- **7.9**

- (15*E*)-Biline-8,12-dipropanoic acid, 2,17-diethenyl-1,19,22,24-tetrahydro-3,7,13,18-tetramethyl-1,19-dioxo-, dimethyl ester **7.8**
- Bilirubin **7.5, 3.60**
- Bilirubin ditaurate **7.10**
- Bilirubin IX **7.5, 3.60**
- Bilirubin IX dimethyl ester **7.6**
- Biliverdin **7.7**
- Biliverdin, dimethyl ester **7.8**
- Biliverdin IX **7.7**
- Bioresmethrin **5.76**
- o,o'*-Biphenol **4.128**
- Biphenyl, 4,4'-diamino- **9.23**
- Biphenyl, 2,2'-dihydroxy- **4.128**
- Biphenyl, 2,2'-dihydroxy-, conjugate base **4.166**
- Biphenyl, 2,5-dihydroxy-, conjugate base **4.167**
- Biphenyl, 2-hydroxy-, conjugate base **4.180**
- Biphenyl, 4-hydroxy-, conjugate base **4.181**
- Biphenyl, 2-methoxy- **3.59**
- 1,1'-Biphenyl-2,5-diol **4.30**
- 1,1'-Biphenyl-2-ol **4.141**
- [1,1'-Biphenyl]-4-ol, 2,6-bis(1,1-dimethylethyl)- **4.103**
- 1,1'-Bipiperidine **8.7**
- 1,1'-Bipyrrolidine **8.8**
- Bis(acetylacetonato)acetatomanganese(III) **12.1**
- Bis(acetylacetonato)chloroacetatomanganese(III) **12.6**
- Bis(acetylacetonato)cobalt(II) **12.7**
- Bis(acetylacetonato)copper(II) **12.8**
- Bis(acetylacetonato)manganese(III) **12.9**
- Bis(acetylacetonato)nickel(II) **12.10**
- Bis(acetylacetonato)nickel(II) dihydrate **12.11**
- Bis(acetylacetonato)trichloroacetatomanganese(III) **12.12**
- Bis(acetylacetonato)zinc(II) **12.13**
- N,N*-Bis(3-aminopropyl)-1,4-butanediamine **8.11**
- Bis(5-bromo-2-hydroxybenzaldehydato)nickel(II) dihydrate **12.14**
- 2,5-Bis(4-bromophenyl)furan **5.16**
- Bis(2-butene-2,3-dithiolato)nickel(II) **12.15**
- Bis[*O*-butyl-3,5-di-(1,1-dimethylethyl)-4-hydroxybenzylphosphonato]nickel(II) **12.16**
- Bis[2-[(butylimino)methyl]-4-bromophenolato]nickel(II) **12.17**
- Bis[2-[(butylimino)methyl]-4-methoxyphenolato]nickel(II) **12.18**
- Bis[2-[(butylimino)methyl]phenolato]nickel(II) **12.19**
- Bis(4-*tert*-butylphenyl)nitroxide **15.26**
- 1,4-Bis(4-chlorophenyl)-1,3-cyclopentadiene **2.141**
- 2,5-Bis(4-chlorophenyl)furan **5.17**
- 1,1-Bis(cyclobutyl)-2-methyl-1-propene **2.332**
- 3,4-Bis[(cyclohexylamino)methylene]dihydro-2,5-thiophenedithione **13.169**
- Bis[3-(cyclohexylimino)methyl]-5-ethyl-2-thiophenethionato]cobalt(II) **12.20**
- Bis[3-(cyclohexylimino)methyl]-5-ethyl-2-thiophenethionato]nickel(II) **12.21**
- Bis[3-(cyclohexylimino)methyl]-5-ethyl-2-thiophenethionato]zinc(II) **12.23**
- Bis[3-(cyclohexylimino)methyl]-5-ethyl-2-thiophenonato]copper(II) **12.22**
- Bis[2-[(cyclohexylimino)methyl]phenolato]nickel(II) **12.24**
- 1,1-Bis(cyclopropyl)-2-methyl-1-propene **2.334**
- 1,1-Bis(cyclopropyl)-1-propene **2.333**
- Bis[1,2-di(2-bromophenyl)-1,2-ethenedithiolato]nickel(II) **12.25**
- Bis(dibutylidithiocarbamato)cobalt(II) **12.26**
- Bis(dibutylidithiocarbamato)copper(II) **12.27**
- Bis(dibutylidithiocarbamato)nickel(II) **12.28**
- Bis(dibutylidithiocarbamato)zinc(II) **12.29**
- Bis[*O,O'*-di-(4-*tert*-butylphenyl)phosphorodithiolato]cobalt(II) **12.30**
- Bis[*O,O'*-di-(4-*tert*-butylphenyl)phosphorodithiolato]copper(II) **12.31**
- Bis[*O,O'*-di-(4-*tert*-butylphenyl)phosphorodithiolato]nickel(II) **12.32**
- Bis[1,2-di(2-chlorophenyl)-1,2-ethenedithiolato]nickel(II) **12.33**
- Bis[1,2-di(4-chlorophenyl)-1,2-ethenedithiolato]nickel(II) **12.34**
- Bis(dicyclohexylphosphinodithiolato)nickel(II) **12.35**
- Bis(*O,O'*-dicyclohexylphosphorodithiolato)cobalt(II) **12.36**
- Bis[1,2-di(2,4-dichlorophenyl)-1,2-ethenedithiolato]nickel(II) **12.37**
- Bis[1,2-di(3,4-dichlorophenyl)-1,2-ethenedithiolato]nickel(II) **12.38**
- Bis[1,2-di(dimethylaminophenyl)-1,2-ethenedithiolato]nickel(II) **12.39**
- 1,2-Bis(diethylamino)acetylene **8.30**
- Bis(diethylidithiocarbamato)nickel(II) **12.40**
- Bis[1,2-di(4-ethylphenyl)-1,2-ethenedithiolato]cobalt(II) **12.41**
- Bis[1,2-di(4-ethylphenyl)-1,2-ethenedithiolato]nickel(II) **12.42**
- Bis[1,2-di(4-ethylphenyl)-1,2-ethenedithiolato]platinum(II) **12.43**
- Bis(*O,O'*-diethylphosphorodithiolato)nickel(II) **12.44**
- Bis[2,3-dihydro-*N*-2-pyridinyl-3-(2-pyridinylimino)isoindol-1-amine]nickel(II) **12.45**
- Bis(diisopropylidithiocarbamato)cobalt(II) **12.46**
- Bis(diisopropylidithiocarbamato)copper(II) **12.47**
- Bis(diisopropylidithiocarbamato)iron(III) **12.48**
- Bis(diisopropylidithiocarbamato)manganese(II) **12.49**
- Bis(diisopropylidithiocarbamato)nickel(II) **12.50**
- Bis(diisopropylidithiocarbamato)zinc(II) **12.51**

- Bis[diisopropylthiophosphato]nickel(II) **12.52**
 Bis(*O,O'*-diisopropylphosphorodithiolato)nickel(II) **12.52**
 Bis[1,2-di(4-methoxyphenyl)-1,2-ethanedithionato]nickelate(I), tetrabutylammonium salt **12.53**
 Bis[1,2-di(4-methoxyphenyl)-1,2-ethanedithiolato]nickel(II) **12.54**
 1,4-Bis(*N,N*-dimethylamino)benzene **9.31**
 3,7-Bis(dimethylamino)phenothiazinium **11.113**
N-[4-Bis[4-(dimethylamino)phenyl]methylene]2,5-cyclohexadien-1-ylidene]-*N*-methylmethanaminium chloride **11.44**
 Bis(dimethylthiocarbamato)bismuth(II) **12.55**
 Bis(dimethylthiocarbamato)nickel(II) **12.56**
 Bis(1,2-dimethyl-1,2-ethanedithiolato)nickel(II) **12.15**
 2,6-Bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)selenapyran-4-ylidene]-3-propenyl]pyrylium **11.157**
 2,6-Bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)selenopyran-4-ylidene]-3-propenyl]selenopyrylium **11.160**
 2,6-Bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)selenopyran-4-ylidene]-3-propenyl]thiopyrylium **11.175**
 2,6-Bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)telluropyran-4-ylidene]-3-propenyl]pyrylium **11.158**
 2,6-Bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)telluropyran-4-ylidene]-3-propenyl]telluropyrylium **11.161**
 2,6-Bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)thiopyran-4-ylidene]-3-propenyl]thiopyrylium **11.176**
 Bis[2-[(1,1-dimethylethylimino)methyl]phenolato]nickel(II) **12.57**
 Bis[4-(1,1-dimethylethyl)phenylsalicylato]nickel(II) **12.58**
 Bis[3,5-di(1-methylethyl)salicylato]cobalt(II) **12.59**
 Bis[3,5-di(1-methylethyl)salicylato]nickel(II) **12.60**
 Bis[*O,O'*-di(4-methylphenyl)phosphorodithiolato]cobalt(II) **12.61**
 Bis[*O,O'*-di(4-methylphenyl)phosphorodithiolato]copper(II) **12.62**
 Bis[*O,O'*-di(4-methylphenyl)phosphorodithiolato]nickel(II) **12.63**
 Bis(diphenylthiocarbamato)nickel(II) **12.64**
 Bis(1,2-diphenyl-1,2-ethanedithionato)nickelate(I), tetrabutylammonium salt **12.65**
 Bis[1,2-diphenyl-1,2-ethanedithiolato]nickel(II) **12.66**
 Bis(*O,O'*-diphenylphosphorodithiolato)chromium(II) **12.67**
 Bis(*O,O'*-diphenylphosphorodithiolato)cobalt(II) **12.68**
 Bis(*O,O'*-diphenylphosphorodithiolato)copper(II) **12.69**
 Bis(*O,O'*-diphenylphosphorodithiolato)lead(II) **12.70**
 Bis(*O,O'*-diphenylphosphorodithiolato)nickel(II) **12.71**
 Bis(*O,O'*-diphenylphosphorodithiolato)zinc(II) **12.72**
 Bis(dithioacetylacetonate)cobalt(II) **12.73**
 Bis(dithioacetylacetonato)nickel(II) **12.74**
 Bis[1,2-di(trifluoromethyl)-1,2-ethanedithiolato]nickel(II) **12.85**
 Bis[1,2-di(4-trifluoromethylphenyl)-1,2-ethanedithionato]nickelate(I), tetrabutylammonium salt **12.75**
 Bis[1,2-di(4-trifluoromethylphenyl)-1,2-ethanedithiolato]nickel(II) **12.76**
 Bis[1,2-di(3,4,5-trimethoxyphenyl)-1,2-ethanedithionato]nickelate(I), tetrabutylammonium salt **12.77**
 Bis[1,2-di(3,4,5-trimethoxyphenyl)-1,2-ethanedithionato]nickelate(I), 4-[1,5,5-tri(4-diethylaminophenyl)pentadienylidene]anilinium salt **12.78**
 Bis[1,2-di(3,4,5-trimethoxyphenyl)-1,2-ethanedithiolato]nickel(II) **12.79**
 Bis[2-[(dodecylimino)methyl]phenolato]cobalt(II) **12.80**
 Bis[2-[(dodecylimino)methyl]phenolato]copper(II) **12.81**
 Bis[2-[(dodecylimino)methyl]phenolato]nickel(II) **12.82**
 9,10-Bis(ethanesulfonate)anthracene **3.15, 12.143, 12.167, 12.169**
 2,5-Bis(ethoxycarbonyl)furan **5.60**
 Bis[*O*-ethyl-3,5-di-(1,1-dimethylethyl)-4-hydroxybenzylphosphonato]nickel(II) **12.83**
 Bis[5-ethyl-3-[(3-pyridinylimino)methyl]-2-thiophenethionato]cobalt(II) **12.84**
 1,4-Bis(4-fluorophenyl)-1,3-cyclopentadiene **2.142**
 Bis[1,1,1,4,4,4-hexafluoro-2-butene-2,3-dithiolato]nickel(II) **12.85**
 Bis[hydrotris(1-pyrazolyl)borato]nickel(II) **12.86**
 Bis(2'-hydroxyacetophenone oximato)nickel(II) **12.87**
 Bis(2-hydroxybenzaldehydato)nickel(II) dihydrate **12.88**
 Bis(2-hydroxybenzaldehyde oximato)nickel(II) **12.89**
 Bis[2-hydroxybenzaldehyde phenylhydrazone]nickel(II) **12.90**
 Bis[2'-hydroxy-4'-*tert*-butyloctadecanophenone oximato]palladium(II) **12.91**
 7,12-Bis(1-hydroxyethyl)-3,8,13,17-tetramethylporphine-2,18-dipropanoic acid **7.72**
 Bis(2-hydroxy-5-methoxybenzaldehydato)nickel(II) dihydrate **12.92**
 Bis[2'-hydroxy-4'-methylacetophenone oximato]nickel(II) **12.93**
 Bis[2-hydroxy-5-methylbenzophenonato]nickel(II) **12.94**
 Bis[2'-hydroxy-4'-methyldecaphenone oximato]nickel(II) **12.95**
 2,5-Bis(hydroxymethyl)furan **5.18, 10.2, 10.3, 10.23, 10.24, 10.26, 13.104, 13.106, 16.37, 16.64, 17.77**
 Bis[(2-hydroxy-5-methylphenyl)phenylmethanonato]nickel(II) **12.94**
 Bis[2-(iminomethyl)phenolato]nickel(II) **12.96**
 Bis(4-imino-2-pentanonato)nickel(II) **12.97**

- 1,2-Bis(isopropylidene)-3,5-cyclohexadiene **2.104**
 2,5-Bis(methoxycarbonyl)furan **5.61**
 1,4-Bis(4-methoxyphenyl)-1,3-cyclopentadiene **2.143**
 1,1-Bis(4-methoxyphenyl)ethylene **3.100**
 2,5-Bis(4-methoxyphenyl)furan **5.19**
 1,4-Bis(methylamino)anthraquinone **11.7**
 Bis[4-methyl-1,2-benzenedithiolato]cobalt(II) tetrabutylammonium salt **12.99**
 Bis[4-methyl-1,2-benzenedithiolato]nickel(II) tetrabutylammonium salt **12.100**
 Bis[*O*-(1-methylethyl)carbonodithionato]nickel(II) **12.98**
 Bis[2-[(1-methylethylimino)methyl]phenolato]nickel(II) **12.101**
 Bis[*N*-methyl-7-(methylimino)-1,3,5-cycloheptatrien-1-aminato]nickel(II) **12.102**
 1,4-Bis(4-methylphenyl)-1,3-cyclopentadiene **2.144**
 Bis(4-methylphenyl)dithiocarbamate]nickel(II) **12.103**
 Bis[4-(1-methyl-1-phenylethyl)phenyl]nitroxide **15.27**
 2,5-Bis(4-methylphenyl)furan **5.20**
 Bis(4-methylphenyl)methanethione **13.161**
 Bis[*N*-(4-methylphenyl)-7-[(4-methylphenyl)imino]-1,3,5-cycloheptatrien-1-aminato]nickel(II) **12.104**
 Bis[2-[(1-methylpropylimino)methyl]phenolato]nickel(II) **12.105**
 Bismuth(II) bis(dimethyldithiocarbamate) **12.55**
 Bis(2,4-pentanedionato)cobalt(II) **12.7**
 Bis(2,4-pentanedionato)copper(II) **12.8**
 Bis(2,4-pentanedionato)zinc(II) **12.13**
 Bis(2,4-pentanedithionato)cobalt **12.73**
 Bis[2-pentene-2,4-dithiolato]nickel(II) **12.74**
 1,4-Bis(*N*-phenylamino)benzene **9.29**
 Bis[2-[(4-(phenylamino)phenyl)imino)methyl]phenolato]nickel(II) **12.106**
 Bis(phenyldithiocarbamate)nickel(II) **12.107**
 Bis[2-[(phenylimino)methyl]phenolato]cobalt(II) **12.108**
 Bis[2-[(phenylimino)methyl]phenolato]copper(II) **12.109**
 Bis[2-[(phenylimino)methyl]phenolato]nickel(II) **12.110**
 9,10-Bis(2-sulfonatoethyl)anthracene **3.15, 12.143, 12.167, 12.169**
 Bis(2,2,6,6-tetramethyl-4-piperidinol-1-oxyl) 1,10-decanedioate **15.37**
 Bis(2,2,6,6-tetramethyl-4-piperidinol-1-oxyl) 1,6-hexanedioate **15.38**
 Bis(2,2,6,6-tetramethyl-4-piperidinol-1-oxyl) terephthalate **15.39**
N,N'-Bis[4-(2,2,6,6-tetramethylpiperidinyl)]-1,6-hexanediamine **8.64**
 Bis[2,2'-thiobis[*O,O'*-di(4-*tert*-butylphenyl)phosphorodithiolato]cadmium(II) **12.111**
 Bis[2,2'-thiobis[*O,O'*-di(4-*tert*-butylphenyl)phosphorodithiolato]cobalt(II) **12.112**
 Bis[2,2'-thiobis[*O,O'*-di(4-*tert*-butylphenyl)phosphorodithiolato]lead(II) **12.113**
 Bis[2,2'-thiobis[*O,O'*-di(4-*tert*-butylphenyl)phosphorodithiolato]nickel(II) **12.114**
 Bis[2,2'-thiobis[*O,O'*-di(4-*tert*-butylphenyl)phosphorodithiolato]zinc(II) **12.115**
 Bis(2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)phenolato]nickel(II) **12.116**
 Bis(tribenzylsiloxy)silicon 2,3-naphthalocyanine **7.17**
 Bis(tribenzylsiloxy)silicon phthalocyanine **7.40**
 Bis[3,4,6-trichloro-1,2-benzenedithiolato]nickelate(I), tetrabutylammonium salt **12.117**
 2,3,2',3'-Bis(1,4,10,13-trideca-4,6,8,10-tetraen)tetrayl[4,6-diphenylpyrylium] perchlorate **11.31**
 Bis(tri-*n*-hexyloxysiloxy)-2,3-naphthalocyaninatoaluminum **7.24**
 Bis(tri-*n*-hexyloxysiloxy)-2,3-naphthalocyaninatogallium **7.25**
 Bis(tri-*n*-hexyloxysiloxy)-2,3-naphthalocyaninatosilicon **7.18**
 Bis(tri-*n*-hexyloxysiloxy)-2,3-naphthalocyaninatotin **7.19**
 Bis(trihexylsiloxy)silicon 2,3-naphthalocyanine **7.18**
 Bis(trihexylsiloxy)tin 2,3-naphthalocyanine **7.19**
 Bis(triisobutylsiloxy)silicon 2,3-naphthalocyanine **7.20**
 Bis(2,4,6-trimethylbenzenesulfonato)nickel(II) **12.118**
 Bis(2,4,6-trimethylphenyl)diazomethane **11.19**
 Bis(tripropylsiloxy)silicon phthalocyanine **7.41**
 Bixin **2.177**
 Blepharismine **16.59**
 Boldine **8.20**
 Bromide ion **14.4**
 Bromobenzene **3.30**
 Bromocarbonylbis(triphenylphosphine)iridium **12.119**
 4-Bromo-2,6-di-*tert*-butylphenol **4.105**
 1-Bromo-4-(dimethylamino)benzene **9.2**
 4-Bromo-*N,N*-dimethylaniline **9.2**
 4-Bromo-2,6-dimethylphenoxide ion **4.154**
 2-Bromofuran **5.21**
 4-Bromophenoxide ion **4.153**
 1-(4-Bromophenylazo)-2-naphthol **11.94**
 2-(4-Bromophenyl)furan **5.22**
 3-(4-Bromophenyl)furan **5.23**
 4-Bromophenyl methyl sulfide **13.7**
p-Bromophenyl methyl sulfide **13.7**
 1-(4-Bromophenyl)-4,4,8,8-tetramethyl-2,3,4,5,7,8,9,10-octahydropyrrolo[4,3,2-*m,n*]acridine-10-one **6.67**
p-Bromothioanisole **13.7**
 2-[7-(4-Bromo-1,3,3-trimethyl-2-indol-2-ylidene)-1,3,5-heptatrienyl]-1,3,3-trimethylindolium, tetrafluoroborate **11.70**
 Brucine **8.9**
 Buckminsterfullerene **17.32**
 1,3-Butadiene, 1,4-di(4,4'-dimethoxyphenyl)- **2.35**

- 1,3-Butadiene, 1,4-di(1,1-dimethylethoxy)-, (*E,E*)- 2.36
 1,3-Butadiene, 1,4-di(1,1-dimethylethoxy)-, (*E,Z*)- 2.37
 1,3-Butadiene, 1,4-di(1,1-dimethylethoxy)-, (*Z,Z*)- 2.38
 1,3-Butadiene, 2,3-dimethyl- 2.39
 1,3-Butadiene, 1,4-diphenyl- 2.40, 2.35
 1,3-Butadiene, 2-ethyl- 2.41
 1,3-Butadiene, 2-methyl- 2.42
 1,3-Butadiene, 2-(phenylmethyl)- 2.43
 Butanamide, 2-(4-methylphenylazo)-3-oxo-*N*-phenyl- 11.60
 Butanamide, 3-oxo-*N*-phenyl-2-(phenylazo)- 11.62
 1-Butaneamine 8.12
 1,4-Butanediamine, *N*-(3-aminopropyl)- 8.10
 1,4-Butanediamine, *N,N'*-bis(3-aminopropyl)- 8.11
 Butanedioic acid, polymer with 4-hydroxy-2,2,6,6-tetramethylpiperidineethanol 8.67
 2,3-Butanediol, 1,4-dimercapto-, *erythro*- 13.49
 2,3-Butanediol, 1,4-dimercapto-, *threo*- 13.50
 1-Butanethiol 13.51
 Butanoic acid 17.6
 Butanoic acid, 3,3-dimethyl-2-oxo- 17.7
 Butanoic acid, 4-(methylthio)-2-[[[(phenylmethyl)carbonyl]amino]-, methyl ester 13.110
 1-Butanol 17.8
 1-Butanol, 4-(4-methylphenyl)thio- 13.52
tert-Butanol 17.62
 (*E*)-2-Butenal 2.44
trans-2-Butenal 2.44
 1-Butene, 2,3-dimethyl- 2.45
 2-Butene 2.46
 2-Butene, (*E*) 2.47, 2.48
 2-Butene, (*Z*) 2.48
 2-Butene, 2-anisyl-3-methyl- 3.118, 3.115, 3.123
 2-Butene, 2-cyclopropyl-, (*E*) 2.49
 2-Butene, 2-cyclopropyl-3-methyl- 2.50
 2-Butene, 2,3-dimethyl- 2.51, 2.38, 2.50, 2.52, 2.53, 2.56, 2.103, 2.117, 2.140, 2.168, 2.170, 2.184, 2.185, 2.186, 2.187, 2.188, 2.189, 2.190, 2.191, 2.192, 2.193, 2.194, 2.195, 2.196, 2.223, 2.225, 2.303, 2.310, 2.332, 2.334, 3.10, 3.11, 3.28, 3.66, 3.125, 4.3, 4.100, 5.34, 7.5, 7.65, 8.83, 9.1, 13.86, 13.145
 2-Butene, 2,3-dimethyl-, (*d*₁₂)- 2.54
 2-Butene, 2,3-dimethyl-*d*₆, (*E*)- 2.52
 2-Butene, 2,3-dimethyl-*d*₆, (*Z*)- 2.53
 2-Butene, 2,3-di(α -naphthyl)-, (*E*)- 3.84
 2-Butene, 2,3-di(α -naphthyl)-, (*Z*)- 3.84
 2-Butene, 2,3-di(β -naphthyl)-, (*E*)- 3.85
 2-Butene, 2,3-di(β -naphthyl)-, (*Z*)- 3.85
 2-Butene, 2,3-diphenyl-, (*E*)- 3.102, 3.103
 2-Butene, 2,3-diphenyl-, (*Z*)- 3.103
 2-Butene, 2-methoxy- 2.55
 2-Butene, 2-methyl- 2.56, 2.122, 2.161, 2.307, 2.309, 2.310, 3.110, 15.2, 15.13, 15.14, 15.15
 2-Butene, [(2-methyl-3-(phenylsulfinyl))- 13.53
 2-Butene, 2-(phenylsulfinyl)- (*E*) 13.54
 2-Butene, 2-(phenylsulfinyl)- (*Z*) 13.55
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 (*Z*)-2-Butene 2.48
 2-Butenoic acid, 2-methyl-, (*E*) 2.58
 3-Butenoic acid 2.59
 (*E*)-2-Butenoic acid 2.57
 2-Buten-1-ol, 3-methyl- 2.60
 1-Buten-3-one, 1-(2,6,6-trimethyl-1-cyclohexen-1-yl)- 2.4
 4-*tert*-Butoxy-2,6-di-*tert*-butylphenol 4.119
 1-Butoxy-2,2,6,6-tetramethylpiperidine 8.55
 Butyl alcohol 17.8
tert-Butyl alcohol 17.62
 Butylamine 8.12
 Butylamine, *N,N*-dibutyl- 8.13
 Butylamine, *N,N*-dimethyl- 8.14
tert-Butylamine 8.15
 Butylamine[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II) 12.120
 Butylamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]cobalt(II) 12.121
 Butylamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) 12.122
 Butylated hydroxytoluene 4.102, 4.99, 4.116, 4.117, 4.118, 4.147
p-tert-Butylcatechol 4.8
 1-*tert*-Butylcyclobutene 2.97
 1-*tert*-Butylcyclohexene 2.97, 2.98, 2.102, 2.122, 2.198, 2.199, 2.161
 1-*tert*-Butylcyclopentene 2.157
n-Butyldimethylamine 8.14
tert-Butyl ethyl sulfide 13.56
 2-*tert*-Butylfuran 5.24
 2-*tert*-Butyl-4-hydroxyanisole 4.122
n-Butyl mercaptan 13.51
tert-Butyl methyl ether 17.18
 Butyl methyl sulfide 13.57
 7-*tert*-Butyl-5-methyltolcol 4.55
 8-*tert*-Butyl-5-methyltolcol 4.56
 2-*tert*-Butylphenol 4.120
 4-*tert*-Butylphenol 4.121
 4-(*tert*-Butyl)phenoxide ion 4.163
N-tert-Butyl- α -phenylnitron 15.46
 2-Butyl propyl sulfide 13.59
sec-Butyl propyl sulfide 13.59
tert-Butyl propyl sulfide 13.58
 1-*tert*-Butylpyrrole 6.61
 2-*tert*-Butylpyrrole 6.62
 3-*tert*-Butylpyrrole 6.63

- sec*-Butyl sulfide 13.73
p-tert-Butylthioanisole 13.20
 (Butylthio)benzene 13.8
 1-(Butylthio)-3-chlorobenzene 13.9
 1-(Butylthio)-4-chlorobenzene 13.10
 1-(Butylthio)-4-fluorobenzene 13.11
 1-(Butylthio)-4-methoxybenzene 13.12
 1-(Butylthio)-4-methylbenzene 13.13
 Butyric acid 17.6
 C₆₀ 17.32
 C₇₀ 17.33
 Cadmium(II) bis[2,2'-thiobis[*O,O'*-di(4-*tert*-butylphenyl)dithiophosphate]] 12.111
 Cadmium(II) protoporphyrin 7.75
 Cadmium(II) tetraphenylchlorin 7.51
 Cadmium(II) tetraphenylporphyrin 7.60
 Caffeic acid 4.68
 Caged hydrazine 8.22
 Canthaxanthin 2.83
 Caproic acid 17.38
 Captopril 13.130
 Carbamic acid, [2-(indol-3-yl)ethyl]-, methyl ester 10.35
 Carbazole, 9-acetyl-2,3,4,9-tetrahydro- 6.2, 6.3, 6.10, 6.14, 6.18, 6.19
 Carbazole, 2,3,4,9-tetrahydro-9-methyl- 6.2
 Carbazole, 2,3,4,9-tetrahydro-9-methyl-6-nitro- 6.3
 4-Carboethoxyaniline 9.9
 2,2'-Carbocyanine, 1,1'-diethyl-, chloride 11.41
 4,4'-Carbocyanine, 1,1'-diethyl- 11.42
 4,4'-Carbocyanine, 1,1'-diethyl-, toluenesulfonate 11.43
 3-Carbomethoxy-4,5-dihydro-2-methylfuran 5.58
 3-Carbomethoxy-2-methyl-4,5-dihydrofuran 5.58
 Carbonate hydrolyase 10.7
 Carbonic anhydrase 10.7
 Carbon seventy-atom molecule 17.33
 Carbon sixty-atom molecule 17.32
 Carbonylbis(triphenylphosphine)iridium(I) chloride 12.123
 Carbonylbis(triphenylphosphine)rhodium(I) chloride 12.124
 Carbonylchlorobis(triphenylphosphine)iridium 12.123
 Carbonylchlorobis(triphenylphosphine)rhodium 12.124
 Carbonyliodobis(triphenylphosphine)iridium 12.125
 [1-Carboxy-2-[2-mercaptoimidazol-4(5)yl]ethyl]trimethylammonium ion 13.104
 [1-Carboxy-2-[2-mercaptoimidazol-4(5)yl]ethyl]trimethylammonium ion(1-) 13.105
 2-Carene 2.26
 3-Carene 2.28
 4-Carene 2.27
 Carnosine 10.24
 L-Carnosine 10.24
 β -*apo*-8'-Carotenal 2.62
 9-*cis*- β -Carotene 2.64
 15,15'-*cis*- β -Carotene 2.65
 15,15'-(*Z*)- β -Carotene 2.65
 15-*cis*- β -Carotene 2.65
 15(*Z*)- ψ -Carotene, 7,7',8,8',11,11',12,12'-octahydro- 2.74
 α -Carotene 2.63
 (*all-E*)- ψ -Carotene 2.250
all-trans- ψ -Carotene 2.250
 β -Carotene 2.66, 2.183
 β , β -Carotene, 3'-(acetyloxy)-6',7'-didehydro-5,6-epoxy-5,5',6,6',7,8-hexahydro-3,3',5'-trihydroxy-8-oxo-, (3*S*,3'*S*,5*R*,5'*R*,6*S*,6'*R*)- 2.67
 β , ψ -Carotene 2.76
 ψ -Carotene, 3,4-didehydro-1,2,7',8'-tetrahydro-1-methoxy-(*all-E*)- 2.68
 ψ -Carotene, 3,4-didehydro-1,2,7',8'-tetrahydro-1-methoxy-2-oxo-(*all-E*)- 2.69
 ψ -Carotene, 7,8-dihydro-(*all-E*)- 2.70
 ψ -Carotene, dihydroxy-, (*all-E*)- 2.251
 ψ -Carotene, 3,3',4,4'-tetrahydro-1,1',2,2'-tetrahydro-1,1'-dimethoxy-(*all-E*)- 2.71
 ψ -Carotene, 7,8,11,12-tetrahydro- 2.72
 ψ , ψ -Carotene, 7,7',8,8',11,12-hexahydro-, 15-*cis*- 2.73
 (*E*)- β , ϵ -Carotene, 3,3'-dihydroxy-(3*R*,3'*R*,6'*R*)- 2.75
 γ -Carotene 2.76
 ζ -Carotene 2.72
 Carotene analog, C-30 2.77
 Carotene analog, C-35 2.78
 (3*R*,3'*R*,6'*R*)- β , ϵ -Carotene-3,3'-diol 2.75
all-trans- β , β -Carotene-4,4'-diol 2.81
 β , β -Carotene-3,3'-diol, (3*R*,3'*R*)- 2.79
 β , β -Carotene-3,3'-diol, 5,6:5',6'-diepoxy-5,5',6,6'-tetrahydro-(*all-E*) 2.80
 β , β -Carotene-4,4'-diol, *all-E*- 2.81
 β -Carotene-4,4'-dione, 3,3'-dihydroxy- 2.82
 β , β -Carotene-4,4'-dione 2.83
 κ , κ -Carotene-6,6'-dione, 2,2'-dihydroxy-(2*S*,2'*S*,5*R*,5'*R*) 2.84
 β -*apo*-8-Carotenoic acid, ethyl ester 2.85
 β -*apo*-8'-Carotenol 2.86
 β , β -Caroten-3-ol 2.87
 β , β -Caroten-4-one 2.88
 Carvomenthene 2.125
 Caryophyllene 2.34
 (-)-Caryophyllene 2.34
 β -Caryophyllene 2.34
 γ -Caryophyllene 2.34
 Catechin 4.67
 (+)-(2*R*,3*S*)-Catechin 4.67
 Catechol 4.4
 Catechol, 3,5-di-*tert*-butyl- 4.7
 CBZ-L-Methionine methyl ester 13.110

- C₃₀-Capsorubin 2.205
 C₃₄-Capsorubin 2.231
 C-30 Carotene 2.77
 C-35 Carotene 2.78
 C₃₀-Carotene analog 2.77
 C₃₅-Carotene analog 2.78
 C₃₀-Epiisocapsorubin 2.206
 C₃₄-Epiisocapsorubin 2.232
 C₄₀-Epiisocapsorubin 2.84
 Cercosporin 16.55
 Chalcogenopyrylium dye 1a 11.159
 Chimasorb 944 8.16
 Chloride ion 14.5
 Chloroaluminum(III) sulfophthalocyanine 7.43
 2-Chloroanisole 3.34
 1-Chloroanthracene 3.4
 9-Chloroanthracene 3.5
 Chlorobenzene 3.31
 Chloro-1,4-benzenediol 4.20
 1-Chloro-3-(butylthio)benzene 13.9
 1-Chloro-4-(butylthio)benzene 13.10
 5-Chloro-2-[2-[3-[(5-chloro-3-ethyl-2-benzothiazolylidene)ethylidene]-2-(diphenylamino)-1-cyclopenten-1-yl]ethenyl]-3-ethylbenzothiazolium perchlorate 11.33
 4-Chloro-1,3-dihydroxybenzene 4.11
 2-Chloro-1,4-dimethoxybenzene 3.32
 5-Chloro-1,3-dimethoxybenzene 3.33
 1-Chloro-3-(dimethylamino)benzene 9.3
 2-Chloro-10-dimethylaminopropylphenothiazine 13.122
 3-Chloro-*N,N*-dimethylaniline 9.3
 4-Chloro-*N,N*-dimethylaniline 9.4
 2-Chloro-*N,N*-dimethylphenothiazine-10-propanamine 13.122
 1-Chloro-9,10-diphenylanthracene 3.6
 Chloroform 17.9
 Chloroform-*d* 17.10
 Chlorohydroquinone 4.20
 3-Chloro-5-methoxyphenol 4.111
 2-Chlorophenol 4.106
 3-Chlorophenol 4.107
 4-Chlorophenol 4.108
 2-Chlorophenoxide ion 4.155
 3-Chlorophenoxide ion 4.156
 4-Chlorophenoxide ion 4.157
 2-(3-Chlorophenoxyethylidene)adamantane 2.350
 2-(4-Chlorophenoxyethylidene)adamantane 2.351
 1-(4-Chlorophenylazo)-2-naphthol 11.95
 4-(4-Chlorophenylazo)-1-naphthol 11.87
 7-Chloro-2-phenyl-1,2-benzisoxazol-3-one 13.36
 3-(4-Chlorophenyl)-1,5-diphenyl-2-pyrazoline 11.121
 5-(4-Chlorophenyl)-1,3-diphenyl-2-pyrazoline 11.121
 2-(4-Chlorophenyl)furan 5.25
 1-(4-Chlorophenyl)-4-(4-methoxyphenyl)-1,3-cyclopentadiene 2.145
 3-Chlorophenyl methyl sulfide 13.14
 4-Chlorophenyl methyl sulfide 13.15
m-Chlorophenyl methyl sulfide 13.14
 1-(4-Chlorophenyl)-4-phenyl-1,3-cyclopentadiene 2.146
 4-Chlorophenyl phenyl sulfide 13.16
 1-Chloro-4-(phenylthio)benzene 13.16
 3-(3-Chlorophenyl)thio-1-propanol 13.132
 3-(4-Chlorophenyl)thio-1-propanol 13.133
 Chlorophyll *a* 7.11
 Chlorophyll *b* 7.12
 4'-Chloropivalothiophenone 13.127
 4-Chlororesorcinol 4.11
 Chloro(5,10,15,20-tetraphenylporphinato)iron(III) 7.49
m-Chlorothioanisole 13.14
 4-Chlorothiobenzamide 13.153
 4-Chlorothiobenzophenone 13.158
 2-[7-(4-Chloro-1,3,3-trimethyl-2-indol-2-ylidene)-1,3,5-heptatrienyl]-1,3,3-trimethylindolium tetrafluoroborate 11.71
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p-Chloro- α,β,β -trimethylstyrene 3.110, 3.121, 3.122
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 3,5-Cholestadiene 2.89
 $\Delta^{3,5}$ -Cholestadiene 2.89
 4-Cholesten-3-one, 4-methyl- 2.90
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 6-Chromanol, 2,8-dimethyl-2-(4,8,12-trimethyltridecyl) 4.46
 6-Chromanol, 2,5,8-trimethyl-2-(4,8,12-trimethyltridecyl) 4.52
 6-Chromanol, 2,7,8-trimethyl-2-(4,8,12-trimethyltridecyl) 4.53
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 C.I. 12120 11.101
 C.I. 42555 11.44
 C.I. 60700 11.6
 C.I. 60710 11.5
 C.I. 61500 11.7
 C.I. 62015 11.13
 C.I. 64500 11.14
 Cinnamic acid, 3,4-dihydroxy- 4.68
 (*E*)-Cinnamic acid 2.91
 Cinnamic acid, 2-hydroxy- 4.69

- Cinnamic acid, 4-hydroxy-3-methoxy- **4.70**
trans-Cinnamic acid **2.91**
 C₃₀-Isocapsorubin **2.207**
 Citronellol **2.294**
 Cleland's Reagent **13.50**
 Cobalt(II), bis[3-(cyclohexylimino)methyl]-5-ethyl-2-thiophenethionato]- **12.20**
 Cobalt(II), bis[5-ethyl-3-[(3-pyridinylimino)methyl]-2-thiophenethionato]- **12.84**
 Cobalt, bis(cyano)[tetramethyl-12,13-didehydro-2,18-bis(2-methoxy-2-oxoethyl)-3,5,8,8,13,15,18,19-octamethyl-3,7,12,17-corrinetrapropanoato- **16.16**
 Cobalt, [[2,2'-(1,2-ethanediy]bis(nitrilomethylidyne]bis(phenolato)](2-*N,N',O,O'*- **12.139**
 Cobalt(II) acetate **12.126**
 Cobalt(II) bis(acetylacetonate) **12.7**
 Cobalt(II) bis(dibutylthiocarbamate) **12.26**
 Cobalt(II) bis[*O,O'*-di(4-*tert*-butylphenyl)dithiophosphate] **12.30**
 Cobalt(II) bis[*O,O'*-dicyclohexyldithiophosphate] **12.36**
 Cobalt(II) bis[*O,O'*-dicyclohexylphosphorodithiolato]- **12.36**
 Cobalt(II) bis[1,2-di(4-ethylphenyl)-1,2-ethenedithiolato]- **12.41**
 Cobalt(II) bis(diisopropylthiocarbamate) **12.46**
 Cobalt(II) bis[3,5-diisopropylsalicylate] **12.59**
 Cobalt(II) bis[*O,O'*-di(4-methylphenyl)dithiophosphate] **12.61**
 Cobalt(II) bis[*O,O'*-diphenyldithiophosphate] **12.68**
 Cobalt(II) bis(dithioacetylacetonate) **12.73**
 Cobalt(II) bis[2-(*N*-dodecylformimidoyl)phenol] **12.80**
 Cobalt(II) bis[2-(*N*-phenylformimidoyl)phenol] **12.108**
 Cobalt(II) bis[2,2'-thiobis[*O,O'*-di(4-*tert*-butylphenyl)dithiophosphate]] **12.112**
 Cobalt(II) bis[μ-toluene-3,4-dithiolato]TBA₂ **12.99**
 Cobalt(II) butylamine[2,2'-thiobis(4-*tert*-octyl)phenolate] **12.121**
 Cobalt(II) chloride hexahydrate **12.127**
 Cobalt(II) 2,2'-[ethylenebis(nitrilomethylidyne)]diphenol **12.139**
 Cobalt(II) hydroxybis(2,3-butanedione dioximato)triethylamine **12.147**
 Cobalt(II) ion **12.128**
 Cobalt(II) mesoporphyrin **7.82**
 Cobalt(II) mesoporphyrin IX, dimethyl ester **7.86**
 Cobalt(II) 2,2'-methylenebis[*O,O'*-di(4-*tert*-butylphenyl)dithiophosphate] **12.156**
 Cobaltous acetate **12.126**
 Cobalt(II) protoporphyrin **7.76**
 Cobalt(II) 5,10,15,20-tetraphenylporphyrin **7.62**
 Cobalt(III) tris(acetylacetonate) **12.173**
 Cobalt(II) tris(2,2'-bipyridine) **12.176**
 Cobalt(II) tris(1,10-phenanthroline) **12.178**
 Cobrynic acid, bis(cyano)-7-de(carboxymethyl)-7,8-didehydro-, hexamethyl ester **16.16**
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 Copper(II), bis[3-(cyclohexylimino)methyl]-5-ethyl-2-thiophenonato]- **12.22**
 Copper(II), [[3,3]-[1,2-ethanediy]bis(nitrilomethylidyne)]bis[5-ethyl-2-thiophenethionato]]- **12.138**
 Copper(II) bis(acetylacetonate) **12.8**
 Copper(II) bis(dibutylthiocarbamate) **12.27**
 Copper(II) bis[*O,O'*-di(4-*tert*-butylphenyl)dithiophosphate] **12.31**
 Copper(II) bis(diisopropylthiocarbamate) **12.47**
 Copper(II) bis[*O,O'*-di(4-methylphenyl)dithiophosphate] **12.62**
 Copper(II) bis[*O,O'*-diphenyldithiophosphate] **12.69**
 Copper(II) bis[2-(*N*-dodecylformimidoyl)phenol] **12.81**
 Copper(II) bis[2-(*N*-phenylformimidoyl)phenol] **12.109**
 Copper(II) ion **12.129**
 Copper(II) protoporphyrin **7.77**
 Copper(II) tetracarboxyphthalocyanine **7.45**
 Copper(II) tetra(4-iodophenyl)porphyrin **7.55**
 Copper(II) tetra(4-methoxyphenyl)porphyrin **7.56**
 Copper(II) tetraphenylchlorin **7.52**
 Copper(II) tetraphenylporphyrin **7.63**
 Copper(II) 5,10,15,20-tetraphenylporphyrin **7.63**
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 Coumarin 102 **8.4**
 Coumarin 460 **5.7**
 Coumarin 47 **5.7**
 Coumarin, 7-(diethylamino)- **5.6**
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 Coumarin, 3,4,5,6,7,8-hexahydro- **2.92**
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 C₂₂-Polyene-tetrone-diacetal **2.211**
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p-Cresol **4.135**
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 Crocin **2.173**
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 (*E*)-Crotonaldehyde **2.44**
 (*E*)-Crotonic acid **2.57**
 Cryptoxanthin **2.87**
 Crystal Violet **11.44**
 Curcumin **4.77**
 Cu,Zn-Erythrocuprein **10.14**
 2,2'-Cyanine, 1,1'-diethyl-, iodide **11.45**

- 4-Cyano-*N,N*-dimethylaniline 9.22
 4-[*N*-(2-Cyanoethyl)-*N*-ethylamino]azobenzene 11.51
 4-[*N*-(2-Cyanoethyl)-*N*-ethylamino]-4'-methoxyazobenzene 11.50
 2-Cyanofuran 5.63
 Cyanoheamoglobin 7.13
 4-Cyanophenol 4.112
 4-Cyanophenoxide ion 4.158
 2-(4-Cyanophenyl)-3-(4-dimethylaminophenyl)-1,4-dioxene 2.184
 2-(4-Cyanophenyl)furan 5.26
m-Cyano- α,β,β -trimethylstyrene 3.111
p-Cyano- α,β,β -trimethylstyrene 3.112
 Cyclobutane, (1-cyclopropylethylidene)- 2.94
 Cyclobutane, (cyclopropylmethylene)- 2.95
 Cyclobutane, (dicyclopropylmethylidene)- 2.96, 2.49, 2.50, 2.94, 2.95, 2.151, 2.168, 2.169, 2.333, 2.334, 2.335, 3.113
 1,3-Cyclobutanedithione, 2,2,4,4-tetramethyl- 13.60
 Cyclobutanethione, 2,2,4,4-tetramethyl- 13.61
 Cyclobutanone, 2,2,4,4-tetramethyl-3-thioxo- 13.62
 Cyclobutendiylum, 1,3-bis[4-(diethylamino)-2-hydroxyphenyl]-2,4-dihydroxy- 11.46, 12.66
 Cyclobutendiylum, 1,3-bis[4-(dimethylamino)-2-methylphenyl]-2,4-dihydroxy- 11.47
 Cyclobutendiylum, 1,3-bis[4-(*N*-methyl-*N*-octadecylamino)-2-methylphenyl]-2,4-dihydroxy- 11.48
 Cyclobutene, 1-*tert*-butyl- 2.97
 Cyclobutene, 1-methyl- 2.98
 2-(Cyclododecylidene)ethanol 2.215
 1,3-Cycloheptadiene 2.99
 Cycloheptane, ethylidene- 2.100
 Cycloheptane, methylene- 2.101
 Cycloheptene, 1-methyl- 2.102
 1,3-Cyclohexadiene 2.103
 1,3-Cyclohexadiene, 5,6-bis(1-methylethylidene)- 2.104
 1,3-Cyclohexadiene, 1-methyl-4-(1-methylethyl)- 2.105
 1,3-Cyclohexadiene, 2-methyl-5-(1-methylethyl)- 2.106
 1,4-Cyclohexadiene, 1-methyl- 2.107
 2,4-Cyclohexadien-1-one, 6,6-dimethyl- 2.108
 2,5-Cyclohexadien-1-one, 4-[[4-(diethylamino)-2,5-dimethylphenyl]imino]-3,5-dimethyl- 11.49
 2,5-Cyclohexadien-1-one, 4,4'-(1,2-ethanediylidene)bis[2,6-bis(1,1-dimethylethyl)- 17.12
 2,5-Cyclohexadien-4-one, 1,2-ethanediylidenebis[3-[2-hydroxy-5-methyl-3-(1,1-dimethylethyl)benzyl]-5-(1,1-dimethylethyl)]- 17.11
 Cyclohexanamine, *N,N'*-[dithiobis[(5-ethyl-2,3-thiophenediyl)methylidene]]bis- 13.63
 Cyclohexanamine, *N*-[[[(5-methyl-2-(methylthio)-3-thienyl)methylene]- 13.64
 Cyclohexane 17.13
 Cyclohexane, cyclohexylidene- 2.109
 Cyclohexane-*d*₁₂ 17.14
 Cyclohexane, 1,4-dichloro-1,4-dinitroso-, (*E*)- 15.16
 Cyclohexane, 1,4-dichloro-1,4-dinitroso-, (*Z*)- 15.17
 Cyclohexane, ethylidene- 2.110
 Cyclohexane, (hydroxymethylene)-, acetate 2.111
 Cyclohexane, methylene- 2.112, 2.101, 2.153
 1,3-Cyclohexanedione, 5,5-dimethyl- 17.15
 Cyclohexanol, 2-(cyclohexylidene)- 2.113
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 Cyclohexanone, 5-methyl-2-(1-methylethenyl)- 2.115
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 Cyclohexene, 1-*tert*-butyl- 2.97, 2.98, 2.102, 2.122, 2.138, 2.157, 2.161
 Cyclohexene, 1,2-dimethyl- 2.117, 2.161
 Cyclohexene, 1,3-dimethyl- 2.118
 Cyclohexene, 1,4-dimethyl- 2.119
 Cyclohexene, 2,3-dimethyl- 2.120, 2.156
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 Cyclohexene, 1-methyl-4-(1-methylethenyl)-, (*R*)- 2.124, 13.8, 13.52, 13.97, 13.119, 13.136
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 2-Cyclohexene-1-thione, 3,5,5-trimethyl- 13.65
 Cyclohexen-1-ol, 6,6-dimethyl-, acetate 2.126
 2-Cyclohexen-1-one, 2-ethyl-3-methyl- 2.127
 2-Cyclohexen-1-one, 2-hydroxy-3-methyl- 2.128
 Cyclohexylamine 8.17
 Cyclohexylamine[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II) 12.130
 Cyclohexylamine[2,2'-thiobis[4-(1.1.3.3-tetramethylbutyl)]phenolato]nickel(II) 12.131
 4-Cyclohexylaminodiphenylamine 9.28
 3-[(Cyclohexylamino)methylene]-5-ethyl-2-thiophenethione 13.170
 1-Cyclohexylamino-4-phenylaminobenzene 9.28
 (Cyclohexylidene)cyclohexane 2.109
 2-(Cyclohexylidene)cyclohexanol 2.113
 2-(Cyclohexylidene)cyclohexanone 2.114
 2-(Cyclohexylidene)ethanol 2.216
 Cyclohexylidenemethyl acetate 2.255
N-Cyclohexylpiperidine 8.56
 1,3-Cyclooctadiene 2.129
 1,4-Cyclooctadiene, 6-hydroperoxy- 2.130
 1,4-Cyclooctadiene, 6-methoxy- 2.131
 1,4-Cyclooctadiene, 6-(trimethylsiloxy)- 2.132
 1,5-Cyclooctadiene 2.133, 2.137
 2,5-Cyclooctadien-1-ol 2.134
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- Cyclooctatetraene 2.136
 1,3,5,7-Cyclooctatetraene 2.136
 Cyclooctatetraene dibromide 2.32
 Cyclooctene 2.137
 Cyclooctene, 1-methyl- 2.138
 2-(Cyclooctylidene)ethanol 2.217
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 Cyclopenta[*b*][1]benzopyran, 2-phenyl- 5.8
 Cyclopentadiene 2.140
 1,3-Cyclopentadiene, 1,4-bis(4-chlorophenyl)- 2.141
 1,3-Cyclopentadiene, 1,4-bis(4-fluorophenyl)- 2.142
 1,3-Cyclopentadiene, 1,4-bis(4-methoxyphenyl)- 2.143
 1,3-Cyclopentadiene, 1,4-bis(4-methylphenyl)- 2.144
 1,3-Cyclopentadiene, 1-(4-chlorophenyl)-4-(4-methoxyphenyl)- 2.145
 1,3-Cyclopentadiene, 1-(4-chlorophenyl)-4-phenyl- 2.146
 1,3-Cyclopentadiene, 1,4-diphenyl- 2.147
 1,3-Cyclopentadiene, 1-(4-methoxyphenyl)-4-phenyl- 2.148
 1,3-Cyclopentadiene, 5-(1-methylethylidene)- 2.149
 1,3-Cyclopentadiene, 5-(1-methylethylidene)-, endoperoxide 2.150
 Cyclopentadienone, tetraphenyl- 3.60
 Cyclopentane, (dicyclopropylmethylidene)- 2.151
 Cyclopentane, ethylidene- 2.152
 Cyclopentane, methylene- 2.153
 Cyclopentanone, 2-cyclopentylidene- 2.154
 Cyclopentanone, 2-(1-methylethenyl)- 2.155
 Cyclopenta[*b*]quinoline, 4-methyl-1,2-diphenyl- 6.4
 Cyclopentene 2.156, 2.244
 Cyclopentene, 1-*tert*-butyl- 2.157
 Cyclopentene, 1,2-dimethyl- 2.158
 Cyclopentene, 1,5-dimethyl- 2.159
 Cyclopentene, 1-methoxy- 2.160
 Cyclopentene, 1-methyl- 2.161, 2.22, 2.122
 2-Cyclopentene-1-thione, 3-(4-methoxyphenyl)- 13.66
 2-Cyclopenten-1-one, 2-acetoxy-3-methyl- 2.163
 2-Cyclopenten-1-one, 3-acetoxy-2-methyl- 2.164
 2-Cyclopenten-1-one, 2,3-dimethyl- 2.165
 2-Cyclopenten-1-one, 2-ethyl-3-methyl- 2.166
 2-Cyclopenten-1-one, 3-methoxy-2-methyl- 2.167
 2-Cyclopenten-1-one, 3-methyl-2-pentyl- 2.162
 2-Cyclopentylidene-cyclopentanone 2.154
 2-(Cyclopentylidene)ethanol 2.218
 Cyclopropane, (cyclopropylcyclopropylidene-methyl)- 2.168
 Cyclopropane, (dicyclopropylmethylidene)- 2.168
 Cyclopropane, 1,1-di-1-propenyl- 2.333, 2.334
 Cyclopropane, 1,1',1''-(1-ethenyl-2-ylidene)tris- 2.169
 Cyclopropane, (1-methylethylidene)- 2.170
 Cyclopropane, 1-methyl-1-propenyl- (*E*) 2.49
 Cyclopropane, (2-methyl-1-propenyl)- 2.335
 Cyclopropanecarboxylic acid, 2,2-dimethyl-3-(2-methyl-1-propenyl), ester with 5-(phenylmethyl)-3-furanmethanol 5.76
trans-2-Cyclopropyl-2-butene 2.49
 (1-Cyclopropylethylidene)cyclobutane 2.94
 2-(Cyclopropylidene)propane 2.170
 2-Cyclopropyl-3-methyl-2-butene 2.50
 (Cyclopropylmethylene)cyclobutane 2.95
 1-Cyclopropyl-2-methyl-1-phenylpropene 3.113
 1-Cyclopropyl-2-methylpropene 2.335
 α -Cyclopropyl- β,β -trimethylstyrene 3.113
 Cysteamine 13.93
 Cysteine 13.67, 13.50, 13.69
 L-Cysteine, *N*-acetyl- 13.69
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 5-*S*-Cysteinyl-dopa 4.71
 Cytidine 16.18
 Cytidine monophosphate 16.19
 Cytidine 5'-monophosphate 16.19
 5'-Cytidylic acid 16.19
 Cytochrome a 10.10
 Cytochrome a₃ 10.10
 Cytochrome aa₃ 10.10
 Cytochrome b 10.8
 Cytochrome b₂ 10.8
 Cytochrome C (ferro) 10.9
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 Cytosine 16.20
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 1,6-Decadiene, 2,6,9-trimethyl-, (*E*)- 2.171
 1,6-Decadiene, 2,6,9-trimethyl-, (*Z*)- 2.172
 Decanedioic acid, bis(2,2,6,6-tetramethylpiperidin-4-yl) ester 8.78
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 7-Dehydroandrosterone-3-acetate 16.5
 Dehydrogenase, 3-hydroxybutyrate 10.11
 Dehydrogenase, nicotinamide adenine dinucleotide (reduced) 10.12
 Dehydrogenase, succinate 10.13
 16-Dehydropregnenolone-3-acetate 16.61
 Dehydrostobadine 6.58
 Deoxyadenosine monophosphate 16.21
 2'-Deoxyadenosine 5'-monophosphate 16.21
 Deoxyadenylic acid 16.21
 2'-Deoxy-5'-adenylic acid 16.21
 Deoxycytidine monophosphate 16.22
 2'-Deoxycytidine-5'-monophosphate 16.22
 Deoxycytidylic acid 16.22

- 2'-Deoxy-5'-cytidylic acid **16.22**
 2'-Deoxyguanosine **16.37**
 2'-Deoxyguanosine 5'-monophosphate **16.23**
 Deoxyguanylic acid **16.23**
 Deoxyribonucleic acid **16.24**
 3'-Deoxythymidine 5'-monophosphate **16.25**
 Deoxythymidine 5'-monophosphate **16.25**
 Deuterium peroxide **14.6**
 Deuteroporphyrin, dimethyl ester **7.94**
 5-Deutero-1,3,5-triphenyl-2-pyrazoline **11.123**
 4,4'-Diacetamidostilbene-2,2'-disulfonate ion **3.106**
 2,3-Di(4-acetaminophenyl)-1,4-dioxene **2.185**
 3,5-Diacetyl-1,4-dihydro-2,6-dimethylpyridine **6.42**
 3,5-Diacetyl-1,4-dihydropyridine **6.41**
 3,6-Diaminoacridine **11.1**
 1,2-Diaminoanthraquinone **11.3, 11.4, 11.5, 11.8, 11.9, 11.10, 11.11, 11.13, 11.14**
 1,4-Diaminoanthraquinone **11.8**
 1,5-Diaminoanthraquinone **11.9**
 1,8-Diaminoanthraquinone **11.10**
 2,6-Diaminoanthraquinone **11.11**
 1,2-Diaminobenzene **9.25**
 4,4'-Diaminobiphenyl **9.23**
 1,5-Diaminobromo-4,8-dihydroxyanthraquinone **11.12**
 Diaminocercosporin **16.56**
 Diaminodiphosphopyridine nucleotide, reduced **16.42**
 1,4-Diamino-2-methoxyanthraquinone **11.13**
 3,6-Diamino-10-methylacridinium **11.2**
 3,7-Diaminophenothiazinium **11.114**
 4,4'-Diaminostilbene-2,2'-disulfonate ion **3.107**
 2,5-Di-*tert*-amylhydroquinone **4.16**
 8,8'-Diapo- ψ -carotenedioic acid, bis(6-*O*- β -D-glucopyranosyl- β -D-glucopyranosyl) ester **2.173**
 6,6'-Diapo- ψ , ψ -carotenedioic acid **2.174**
 6,6'-Diapo- ψ , ψ -carotenedioic acid, dimethyl ester **2.175**
 6,6'-Diapo- ψ , ψ -carotenedioic acid, dimethyl ester, 9-*cis*- **2.176**
 6,6'-Diapo- ψ , ψ -carotenedioic acid, monomethyl ester, 9-*cis*- **2.177**
 8,8'-Diapocarotenedioic acid **2.93**
 8,8'-Diapocarotenedioic acid, mono(6-*O*- β -D-glucopyranosyl- β -D-glucopyranosyl) ester **2.178**
 9-*cis*-6,6'-Diapo- ψ , ψ -carotenedioic acid **2.179**
 Diaquabis(acetylacetonato)manganese(III) ion **12.9**
 2,3-Diazabicyclo[2.2.1]heptane, 2,3-dimethyl- **8.18**
 1,4-Diazabicyclo[2.2.2]octane **8.19**
 2,3-Diazabicyclo[2.2.2]oct-2-ene, 1,4-dichloro-, 2,3-dioxide **15.18**
 Diazene, 1-[4-*N*-(2-cyanoethyl)-*N*-ethylaminophenyl]-2-(4-methoxyphenyl)- **11.50**
 Diazene, 1-[4-*N*-(2-cyanoethyl)-*N*-ethylaminophenyl]-2-phenyl- **11.51**
 Diazene, 1-(4-diethylaminophenyl)-2-(2,4-dinitrophenyl) **11.52**
 Diazene, 1-(4-diethylaminophenyl)-2-(4-methoxyphenyl) **11.53**
 Diazene, 1-(4-diethylaminophenyl)-2-(3-nitrophenyl)- **11.54**
 Diazene, 1-(4-diethylaminophenyl)-2-(4-nitrophenyl)- **11.55**
 Diazene, 1-(4-diethylaminophenyl)-2-phenyl- **11.56, 11.90, 11.102**
 Diazene, diphenyl- **11.57**
 Diazene, 1-[4-*N*-ethyl-*N*-(2-hydroxyethyl)aminophenyl]-2-(4-methoxyphenyl)- **11.58**
 Diazene, 1-(4-methoxy-1-naphthyl)-2-phenyl- **11.59**
 Diazene, 1-(4-methylphenyl)-2-[1-(phenylaminocarbonyl)-2-oxopropyl]- **11.60**
 Diazene, 1-(4-nitrophenyl)-2-phenyl- **11.61**
 Diazene, 1-phenyl-2-[1-(phenylaminocarbonyl)-2-oxopropyl]- **11.62**
 Diazobis(2,4,6-trimethylphenyl)methane **11.19**
 Diazo(4-bromophenyl)phenylmethane **11.15**
 Diazodi(4-chlorophenyl)methane **11.17**
 Diazodi(4-methylphenyl)methane **11.18**
 Diazodiphenylmethane **11.16, 11.15, 11.17, 11.18, 11.20**
 9-Diazo fluorene **11.63**
 Diazo(4-methoxyphenyl)phenylmethane **11.20**
 1,2,5,6-Dibenzanthracene **3.61**
 Dibenz[*a,h*]anthracene **3.61**
 Dibenzo[3,4:5,6][2]benzopyranof[7,8,1-*mna*]xanthene **3.20**
 Dibenzo[*fg,uv*]naphtho[2,3-*c*]pentaphene-9,19-dione, 1,2,3,4,11,12,13,14-octahydro- **3.62**
 Dibenzo[*a,j*]perylene **3.63**
 Dibenzo[*a,o*]perylene **3.67**
 Dibenzo[*a,o*]perylene, 7,16-diphenyl- **3.64**
 Dibenzo[*aj*]perylene-8,16-dione **3.68**
 1,2,7,8-Dibenzoperylene-3,9-quinone **3.68**
 Dibenzo[*de,g*]quinoline-2,9-diol, 5,6,6a,7-tetrahydro-1,10-dimethoxy-6-methyl- **8.20**
 Dibenzo[*de,g*]quinoline-2,9-diol, 5,6,6a,7-tetrahydro-1,2,9,10-tetramethoxy-6-methyl- **8.21**
 3,5-Dibenzoyl-1,4-dihydro-2,6-dimethylpyridine **6.43**
 4-(Dibenzoylmethylene)amino-3,*N,N*-triethylaniline **11.116**
N,N-Dibenzylhydroxylamine **15.11**
 Dibenzyl sulfide **13.71**
 2,5-Dibromofuran **5.27**
 (*E,E*)-1,4-Di(*tert*-butoxy)-1,3-butadiene **2.36**
 (*E,Z*)-1,4-Di(*tert*-butoxy)-1,3-butadiene **2.37**
 (*Z,Z*)-1,4-Di(*tert*-butoxy)-1,3-butadiene **2.38**
 3,5-Di-*tert*-butylcatechol **4.7**
 2,6-Di-*tert*-butyl-4-chlorophenol **4.110**
 2,6-Di-*tert*-butyl-*p*-cresol **4.102, 4.99, 4.116, 4.117, 4.118, 4.147**

- 2,5-Di-*tert*-butylfuran 5.28
 2,5-Di-*tert*-butylhydroquinone 4.14
 3,5-Di-*tert*-butyl-4-hydroxybenzyl alcohol 4.32
 2-(3',5'-Di-*tert*-butyl-2'-hydroxyphenyl)-5-chlorobenzotriazole 4.109
 3,5-Di-*tert*-butyl-4-hydroxyphenyl propionate 4.15
 3,5-Di-*tert*-butyl-4-hydroxytoluene 4.102, 4.99, 4.116, 4.117, 4.118, 4.147
 1,1-Di-*tert*-butyl-2-methoxyethene 2.353, 2.355
 2,4-Di-*tert*-butyl-5-methoxyphenol 4.100
 2,6-Di-*tert*-butyl-4-methoxyphenol 4.101
 2,6-Di-*tert*-butyl-4-methylanisole 3.29
 2,6-Di-*tert*-butyl-4-methylphenol 4.102, 4.99, 4.116, 4.117, 4.118, 4.147
 2,6-Di-*tert*-butylphenol 4.99, 2.280
 2',4'-Di-*tert*-butylphenyl 3,5-di-*tert*-butyl-4-hydroxybenzoate 4.38
 Dibutyl sulfide 13.72
 Di-2-butyl sulfide 13.73
 Di-*sec*-butyl sulfide 13.73
 Di-*tert*-butyl sulfide 13.74
 Di-*tert*-butylthioetene 13.165
 Di-*tert*-butylthioetone 13.117
 2,6-Dichloroanisole 3.37
 9,10-Dichloroanthracene 3.7
 1,3-Dichlorobenzene 3.35
 1,4-Dichlorobenzene 3.36
 1,4-Dichloro-2,3-diazabicyclo[2.2.2]oct-2-ene-2,3-dioxide 15.18
 5,5'-Dichloro-3,3-diethyl-2,2'-thiocarbocyanine bromide 11.163
cis-1,4-Dichloro-1,4-dinitrosocyclohexane 15.17
trans-1,4-Dichloro-1,4-dinitrosocyclohexane 15.16
 5,5'-Dichloro-1,1',3,3',3'-hexamethyltricarbo-cyanine, iodide 11.178
 Dichloromethane 17.16
 Dichloromethane-*d*₂ 17.17
 2,4-Dichlorophenol 4.113
 2,6-Dichlorophenol 4.114
 2,4-Dichlorophenoxide ion 4.159
 2,6-Dichlorophenoxide ion 4.160
 2,3-Di(3-chlorophenyl)-1,4-dioxene 2.186
 2,3-Di(4-chlorophenyl)-1,4-dioxene 2.187
 Dichloro[5,10,15,20-tetrakis(4-sulfonatophenyl)porphinatostannate(IV) ion 7.58
 Dichloro(5,10,15,20-tetraphenylporphinato)tin(IV) 7.64
 4,4'-Dichlorothiobenzophenone 13.159
 5,5'-Dichloro-3,9,3'-triethyl-2,2'-thiocarbocyanine bromide 11.164
 5,5'-Dicyano-3,9,3'-triethyl-2,2'-thiocarbocyanine tetrafluoroborate 11.165
 3,5-Dicyclohexyloxycarbonyl-1,4-dihydro-2,6-dimethylpyridine 6.46
 Dicyclopentadienyliron 12.144
 Dicyclopentadienylnickel 12.165
 (Dicyclopropylmethylidene)cyclobutane 2.96, 2.49, 2.50, 2.94, 2.95, 2.151, 2.168, 2.169, 2.333, 2.334, 2.335, 3.113
 (Dicyclopropylmethylidene)cyclopentane 2.151
 (Dicyclopropylmethylidene)cyclopropane 2.168
 1,1-Dicyclopropyl-2-methylpropene 2.334
 1,1-Dicyclopropylpropene 2.333
 3,4-Didehydro-9-ethenyl-14-ethyl-21-(methoxycarbonyl)-4,8,13,18-tetramethyl-20-oxo-3-phorbinepropanoatomagnesate, hydrogen 7.37
 1,4-Di(4,4'-dimethoxyphenyl)-1,3-butadiene 2.35
 2,3-Di(4-dimethylaminophenyl)-1,4-dioxene 2.188
 Didodecylamine[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II) 12.132
 2,5-Di-*sec*-dodecylhydroquinone 4.17
 4a,9a:9,10-Diethenoanthracene, 1,4,9,10-tetrahydro- 2.181
 4a,9a:9,10-Diethenoanthracene, 1,4,9,10-tetrahydro-5,8-dimethoxy- 2.180
 2,17-Diethenyl-1,10,19,22,23,24-hexahydro-3,7,13,18-tetramethyl-1,19-dioxobiline-8,12-dipropanoic acid 7.5, 7.6, 3.60
 2,17-Diethenyl-1,19,22,24-tetrahydro-3,7,13,18-tetramethyl-1,19-dioxobiline-8,12-dipropanoic acid 7.7
 7,12-Diethenyl-3,8,13,17-tetramethylporphine-2,18-dipropanoatozincate(II) 7.81
 7,12-Diethenyl-3,8,13,17-tetramethylporphine-2,18-dipropanoic acid 7.73
 7,12-Diethenyl-3,8,13,17-tetramethylporphine-2,18-dipropanoic acid, dimethyl ester 7.78
 3,5-Diethoxycarbonyl-1,4-dihydro-2,6-dimethylpyridine 6.47
 3,5-Diethoxycarbonyl-1,4-dihydro-2,6-diphenylpyridine 6.50
 3,5-Diethoxycarbonyl-1,4-dihydro-2,4,6-trimethylpyridine 6.51
 3,5-Diethoxycarbonyl-2,6-dimethylpyridine 6.52
 3,4-Diethoxycarbonylfuran 5.62
 1,1-Diethoxyethene 2.221
cis-1,2-Diethoxyethene 2.223, 2.222
 (*E*)-1,2-Diethoxyethene 2.222
trans-1,2-Diethoxyethene 2.222
 (*Z*)-1,2-Diethoxyethene 2.223, 2.222
 Diethylamine 8.27
 4-(Diethylamino)azobenzene 11.56, 11.53, 11.90, 11.102
 4-Diethylaminobenzaldehyde diphenylhydrazone 15.4
 7-(Diethylamino)coumarin 5.6
 4-(4'-Diethylamino-2',6'-dimethylphenyl)imino-3-(benzoylamino)-1-phenyl-2-pyrazolin-5-one 11.138

- 4-(4'-Diethylamino-2',6'-dimethylphenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one **11.140**
- 4-(4'-Diethylamino-2',6'-dimethylphenyl)imino-3-(2-methyl-2-propyl)-1-phenyl-2-pyrazolin-5-one **11.139**
- 4-(Diethylamino)-2',4'-dinitroazobenzene **11.52**
- 2-(Diethylamino)ethanol **8.23**
- Diethyl(7-aminoheptyl)amine **8.31**
- 2-(Diethylamino)-4-hydroxy-6-methylpyrimidine **16.68**
- 4-(Diethylamino)-4'-methoxyazobenzene **11.53**
- 1-(Diethylamino)-2-methylacetylene **8.87**
- 7-(Diethylamino)-4-methylcoumarin **5.7**
- 4-(4'-Diethylamino-2'-methylphenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one **11.144**
- 4-(4'-Diethylamino-2'-methylphenyl)imino-3-(2-methyl-2-propyl)-1-phenyl-2-pyrazolin-5-one **11.141**
- 4-(Diethylamino)-3'-nitroazobenzene **11.54**
- 4-(Diethylamino)-4'-nitroazobenzene **11.55**
- 4-(4'-Diethylaminophenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one **11.147**
- N,N*-Diethylbenzenemethanesulfenamide **13.35**
- 1,1'-Diethyl-4,4'-carbocyanine **11.42**
- 1,1'-Diethyl-2,2'-carbocyanine chloride **11.41**
- 1,1'-Diethyl-4,4'-carbocyanine toluenesulfonate **11.43**
- 1,1'-Diethyl-2,2'-cyanine iodide **11.45**
- Diethyl(2-cyanoethyl)amine **8.81**
- 3,3'-Diethyl-4,5,4',5'-dibenzo-2,2'-thiacarbocyanine toluenesulfonate **11.107**
- 3,3'-Diethyl-4,5,4',5'-dibenzo-2,2'-thiacyanine chloride **11.105**
- Diethyl 1,4-dihydro-2,4,6-trimethyl-3,5-pyridine-dicarboxylate **6.51**
- 3,3'-Diethyl-5,5'-dimethoxy-2,2'-thiacarbocyanine toluenesulfonate **11.167**
- 1,2-Diethyl-1,2-dimethylhydrazine **8.33**
- N,N*-Diethyl-3,5-dimethyl-4-(4'-oxo-2',6'-dimethylcyclohexadienylidene)aminoaniline **11.49**
- Diethyl 2,6-dimethyl-3,5-pyridinedicarboxylate **6.52**
- Diethyl 2,4-dimethylpyrrole-3,5-dicarboxylate **6.66**
- 3,3'-Diethyl-8,10-dimethyl-2,2'-thiacarbocyanine toluenesulfonate **11.168**
- Diethyl disulfide **13.75**
- 3,3'-Diethyl-8,10-ethanediyl-2,2'-thiacarbocyanine toluenesulfonate **11.169**
- N,N*-Diethylethanolamine **8.23**
- Diethyl 3,4-furandicarboxylate **5.62**
- N,N*-Diethyl-1,7-heptanediamine **8.31**
- 2,17-Diethyl-1,10,19,22,23,24-hexahydro-3,7,13,18-tetramethyl-1,19-dioxobiline-8,12-dipropanoic acid **7.9**
- Diethyl(2-hydroxyethyl)amine **8.23**
- N,N*-Diethylhydroxylamine **15.23**
- O,N*-Diethylhydroxylamine **15.21**
- N,N*-Diethylhydroxylammonium ion **15.24**
- (*E,Z*)-4,5-Diethylidene-2,2-dimethyl-1,3-dioxolane **2.197**
- (*Z,Z*)-4,5-Diethylidene-2,2-dimethyl-1,3-dioxolane **2.198**
- Diethyl(2-methoxyethyl)amine **8.25**
- N,N*-Diethyl-3-methyl-4-[*N*-(phenylaminocarbonyl)pivaloylmethylene]aminoamine **11.111**
- 3,3'-Diethyl-2,2'-oxatricarbocyanine iodide **11.109**
- N,N*-Diethyl-4-[*N*-(phenylaminocarbonyl)pivaloylmethylene]aminoamine **11.112**
- 3,3'-Diethyl-8,9-(1,3-propanediyl)-2,2'-thiacarbocyanine iodide **11.170**
- Diethyl sulfide **13.76**
- 7,12-Diethyl-3,8,13,17-tetramethylporphine-2,18-dipropanoatocobaltate(II), dimethyl ester **7.86**
- 7,12-Diethyl-3,8,13,17-tetramethylporphine-2,18-dipropanoic acid, cobalt(II) **7.82**
- 7,12-Diethyl-3,8,13,17-tetramethylporphine-2,18-dipropanoic acid, dimethyl ester **7.85**
- 3,3'-Diethyl-2,2'-thiacarbocyanine toluenesulfonate **11.166**
- 3,3'-Diethyl-2,2'-thiadcarbocyanine iodide **11.173**
- 3,3'-Diethyl-2,2'-thiatricarbocyanine iodide **11.174**
- 5,7-Diethyltolcol **4.45**
- 5,5'-Difluoro-1,1',3,3,3',3'-hexamethyltricarbo-cyanine, iodide **11.179**
- 2,5-Di-*sec*-hexadecylhydroquinone **4.18**
- 3,5-Dihexyloxycarbonyl-1,4-dihydro-2,6-dimethylpyridine **6.48**
- 2,4-Dihydro-4-(4-aminophenyl)imino-5-methyl-2-phenylpyrazol-3-one **11.133**
- 2,4-Dihydro-2-(4-bromophenyl)-4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbamylypyrazol-3-one **11.135**
- 2,4-Dihydro-2-(3-chlorophenyl)-4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbamylypyrazol-3-one **11.136**
- 2,4-Dihydro-2-(4-chlorophenyl)-4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbamylypyrazol-3-one **11.137**
- 2,4-Dihydro-4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbamyly-2-(3-methoxyphenyl)pyrazol-3-one **11.142**
- 2,4-Dihydro-4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbamyly-2-(3-methylphenyl)pyrazol-3-one **11.143**
- 2,4-Dihydro-4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbamyly-2-(4-nitrophenyl)pyrazol-3-one **11.145**
- 2,4-Dihydro-4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbamyly-2-phenylpyrazol-3-one **11.128**
- 2,4-Dihydro-4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbamyly-2-(2,4,6-trichlorophenyl)pyrazol-3-one **11.146**
- 2,4-Dihydro-4-(4-diethylamino-2-methylphenyl)imino-5-methyl-2-phenylpyrazol-3-one **11.144**

- 2,4-Dihydro-4-(4-diethylaminophenyl)imino-5-methyl-2-phenylpyrazol-3-one **11.147**
- 2,4-Dihydro-4-(4-dimethylaminophenyl)imino-5-methyl-2-phenylpyrazol-3-one **11.150**
- 1,4-Dihydro-2,6-dimethyl-3,5-di(1-methylethoxycarbonyl)pyridine **6.49**
- 1,4-Dihydro-2,6-dimethyl-3,5-diphenylaminocarbonylpyridine **6.44**
- 2,3-Dihydro-4,5-dimethylfuran **5.30**
- 4,4'-(4,7-Dihydro-5,6-dimethylisobenzofuran-1,3-diyl)bis(benzene-*p*-decanoate ion) **5.81**
- 2-[7-(1,3-dihydro-1,1-dimethyl-3-(sulfobutyl)benz[e]indol-2-ylidene)-1,3,5-heptatrienyl]-1,1-dimethyl-3-(sulfobutyl)benz[e]indolium, hydroxide, inner salt, Na salt **11.29**
- 2-[2-[3-[[1,3-dihydro-1,1-dimethyl-3-(3-sulfopropyl)benz[e]indol-2-ylidene]ethylidene]-2-[4-(ethoxycarbonyl)-1-piperidinyl]-1-cyclopenten-1-yl]ethenyl]-1,1-dimethyl-3-(3-sulfopropyl)benz[e]indolium, hydroxide, inner salt, compound with triethylamine **11.30**
- 2,3-Dihydro-1,4-dioxin **2.183, 2.122, 2.222, 2.223, 2.224, 3.101, 5.90**
- 4,5-Dihydro-1,5-diphenyl-3-(2-phenylethenyl)pyrazole **11.119**
- 2,4-Dihydro-4-[4-[ethyl(2-hydroxyethyl)amino]-2-methylphenyl]imino-5-methyl-2-phenylpyrazol-3-one **11.129**
- 1,4-Dihydro-1-ethyl-7-methyl-4-oxo-1,8-naphthyridine-3-carboxylate ion **16.46**
- 1,4-Dihydro-1-ethyl-7-methyl-4-oxo-1,8-naphthyridine-3-carboxylic acid **16.45**
- 2,3-Dihydrofuran **5.29, 7.59**
- 14,15-Dihydro-14-hydroxy-eburnamenine-14-carboxylic acid, methyl ester **8.100**
- 2,4-Dihydro-4-[4-[(2-hydroxyethyl)ethylamino]phenyl]imino-5-methyl-2-phenylpyrazol-3-one **11.130**
- 2,3-Dihydro-5-hydroxy-2,2,4,6,7-pentamethylbenzofuran **4.36**
- 2,3-Dihydro-5-hydroxy-2,4,6,7-tetramethylbenzofuran **4.37**
- 3,4-Dihydro-6-hydroxy-2,5,7,8-tetramethylbenzopyran-2-propionic acid **4.66**
- 3,4-Dihydrojasmane **2.162**
- Dihydrolipoate ion **13.115**
- Dihydroluteolin **4.59**
- 4,5-Dihydro-5-(4-methoxyphenyl)-3-[2-(4-methoxyphenyl)ethenyl]-1-phenylpyrazole **11.120**
- 2,3-Dihydro-5-methylfuran **5.31**
- 4,5-Dihydro-2-methylfuran **5.31**
- 2,4-Dihydro-4-[4-[(2-methylsulfamylethyl)ethylamino]-2-methylphenyl]imino-5-methyl-2-phenylpyrazol-3-one **11.78**
- 3,4-Dihydro-1-methyl-1-(4,8,12-trimethyltridecyl)-1-benzopyran-6-ol **4.48**
- Dihyronicotinamide adenine dinucleotide **16.48**
- 3,4-Dihydro-2,2,5,7,8-pentamethylbenzopyran-6-ol **4.49**
- Dihydroperoxy-2,6,10-trimethyl-2,6,10-dodecatriene **2.208**
- Dihydropyran **5.90**
- 2,3-Dihydropyran **5.90**
- 3,4-Dihydropyran **5.90**
- Dihydroquercetin **4.63**
- 1,4-Dihydro-2,4,6-trimethyl-3,5-diphenylaminocarbonylpyridine **6.45**
- 4,5-Dihydro-1,3,5-triphenylpyrazole **11.121, 11.122, 11.123, 11.124, 11.125, 11.126, 11.127**
- 1,8-Dihydroxy-9-anthrone **4.2**
- 1,8-Dihydroxy-9-anthrone, conjugate base **4.3**
- 1,2-Dihydroxybenzene **4.4**
- 1,3-Dihydroxybenzene **4.10**
- 1,4-Dihydroxybenzene **4.12**
- 1,4-Dihydroxybenzene ion(2-) **4.13**
- 2,2'-Dihydroxybiphenyl **4.128**
- 2,2'-Dihydroxybiphenyl, conjugate base **4.166**
- 2,5-Dihydroxybiphenyl **4.30**
- 2,5-Dihydroxybiphenyl, conjugate base **4.167**
- 2,3-Dihydroxy-1,4-butanedithiol (*R*,R**)(±) **13.50**
- 2,3-Dihydroxy-1,4-butanedithiol (*R*,S**) **13.49**
- 3,3'-Dihydroxy-β-carotene-4,4'-dione **2.82**
- 3,4-Dihydroxycinnamic acid **4.68**
- 2,4-Di[2-hydroxy-4-(diethylamino)phenyl]squarylium **11.46, 12.66**
- 2,2'-Dihydroxydiethyl sulfide **13.164**
- 3,7-Dihydroxy-2-(3,4-dihydroxyphenyl)-1-benzopyran-4-one **4.75**
- 1,4-Dihydroxy-2,3-dimethylbenzene **4.22**
- 1,4-Dihydroxy-2,5-dimethylbenzene **4.23**
- 1,4-Dihydroxy-2,6-dimethylbenzene **4.24**
- Di(2-hydroxyethyl)-*tert*-butylamine **8.26**
- Di(2-hydroxyethyl)methylamine **8.46**
- 5,7-Dihydroxyflavone **4.73**
- Dihydroxylycopene **2.251**
- l*-3,4-Dihydroxy-α-(methylaminomethyl)benzyl alcohol **4.9**
- 1,4-Dihydroxy(methyl)benzene **4.29**
- 2,4-Dihydroxy-5-methylpyrimidine **16.79**
- 1,5-Dihydroxynaphthalene **4.82**
- 1,6-Dihydroxynaphthalene **4.83**
- 1,7-Dihydroxynaphthalene **4.84**
- 1,8-Dihydroxynaphthalene **4.85**
- 2,6-Dihydroxynaphthalene **4.86**
- 2,7-Dihydroxynaphthalene **4.87**
- 2,5-Di-(4-hydroxy-3-nitrophenyl)-2,5-dimethylpyrrolidin-1-oxyl **15.54**
- 3,4-Dihydroxyphenethylamine **4.5**
- 3-(3,4-Dihydroxyphenyl)-*L*-alanine **4.183**

- (*E*)-2-(3,4-Dihydroxyphenyl)-3,4-dihydro-1-benzopyran-3,5,7-triol **4.67**
- 2,3-Di(4-hydroxyphenyl)-1,4-dioxene **2.189**
- 2-(3,4-Dihydroxyphenyl)-3,5,7-trihydroxy-1-benzopyran-4-one **4.61**
- Diindeno[5,6-*a*:5',6'-*j*]perylene-8,17-dione, 1,2,3,10,11,12-hexahydro- **3.65**
- Diisobutyl sulfide **13.77**
- Diisopropylamine **8.29**
- Diisopropyl sulfide **13.78**
- Dimedone **17.15**
- erythro*-1,4-Dimercapto-2,3-butanediol **13.49**
- threo*-1,4-Dimercapto-2,3-butanediol **13.50**
- 3,4-Dimercaptotoluene(2,2'-bipyridine)nickel(II) **12.153**
- 3,4-Dimercaptotoluene(1,10-phenanthroline)nickel(II) **12.154**
- 3,4-Dimercaptotoluene(1,10-phenanthroline)platinum(II) **12.155**
- Dimesna dianion **13.91**
- 1,9:3,5-Dimethanocyclopenta[*d*]cyclopenta-[3,4][1,2]diazeto[1,2-*a*]pyridazine, decahydro- **8.22**
- Dimethirimol **16.66**
- 9,10-Dimethoxyanthracene **3.8**
- 1,2-Dimethoxybenzene **3.38**
- 1,3-Dimethoxybenzene **3.39**
- 1,4-Dimethoxybenzene **3.40**
- 1,4-Dimethoxybenzonorbornene **3.73**
- endo*-2,3-Di(methoxycarbonyl)-7-adamantylidenenorbornane **2.17**
- exo*-2,3-Di(methoxycarbonyl)-7-adamantylidenenorbornane **2.18**
- 1,3-Dimethoxy-4,6-di-*tert*-butylbenzene **3.28**
- 3,4-Dimethoxy-*N,N*-dimethylaniline **9.5**
- 1,4-Dimethoxy-9,10-diphenylanthracene **3.9**
- 1,2-Dimethoxy-1,2-diphenylethene **3.101**
- 5,5'-Dimethoxy-1,1',3,3',3'-hexamethyltricyanane, iodide **11.180**
- 5,6-Dimethoxyindole **6.9**
- 2,3-Dimethoxy-5-methyl-1,4-benzenediol **4.21**
- 2,3-Dimethoxy-5-methylhydroquinone **4.21**
- 2,6-Dimethoxyphenol **4.115**
- 2,6-Dimethoxyphenoxide ion **4.161**
- 2,3-Di(3-methoxyphenyl)-1,4-dioxene **2.190**
- 2,3-Di(4-methoxyphenyl)-1,4-dioxene **2.191**
- 1,2-Dimethoxystilbene **3.101**
- 4,4'-Dimethoxystilbene **3.100**
- α,β -Dimethoxystilbene **3.101**
- 2,3-Dimethoxystrychnidin-10-one **8.9**
- 5,8-Dimethoxy-1,2,3,4-tetrahydro-9-isopropylidene-1,4-methanonaphthalene **2.257**
- 4,4'-Dimethoxythiobenzophenone **13.160**
- 11,17-Dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]yohimban-16-carboxylic acid methyl ester **8.98**
- 4-(Dimethylamino)benzaldehyde **9.10**
- p*-Dimethylaminobenzaldehyde **9.10**
- 4-(Dimethylamino)benzotrile **9.22**
- 4-(4'-Dimethylamino-3',5'-dimethylphenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one **11.149**
- 2-Dimethylamino-5,6-dimethylpyrimidin-4-ol **16.69**
- 1-[4-(Dimethylamino)phenylazo]-2-naphthol **11.96**
- 5-[*p*-(Dimethylamino)phenyl]-3-[*p*-(dimethylamino)styryl]-1-phenyl-2-pyrazoline **11.118**
- 4-(4'-Dimethylaminophenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one **11.150**
- 2-(4-Dimethylaminophenyl)-3-phenyl-1,4-dioxene **2.192**
- 3-Dimethylamino-1-propanol **8.82**
- 4-(4'-Dimethylamino-2',3',5',6'-tetramethylphenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one **11.151**
- p*-(Dimethylamino)thioanisole **13.6**
- p*-(*N,N*-Dimethylamino)- α,β,β -trimethylstyrene **3.115**
- N,N*-Dimethylaniline **9.6**
- N,N*-Dimethyl-*m*-anisidine **9.12**
- N,N*-Dimethyl-*o*-anisidine **9.11**
- N,N*-Dimethyl-*p*-anisidine **9.13**
- 9,10-Dimethylanthracene **3.10, 3.124, 3.125, 4.1, 4.10, 4.11, 4.12, 4.20, 4.153, 4.154, 4.157, 4.159, 4.160, 4.162, 4.165, 4.166, 4.168, 4.175, 4.176, 4.180, 4.181, 4.182, 11.16, 11.17, 11.60, 11.62, 11.63, 11.77, 11.79, 11.80, 11.90, 11.92, 11.101, 11.103, 11.104, 12.20, 12.123, 13.175**
- 9,10-Dimethyl-1,2-benzanthracene **3.24, 3.124, 3.125**
- 9,10-Dimethylbenz[*a*]anthracene **3.24, 3.124, 3.125**
- 3,3-Dimethylbicyclo[2.2.1]heptane-2-thione **13.44**
- 2,3-Dimethyl-1,3-butadiene **2.39**
- N,N*-Dimethyl-1-butanamine **8.14**
- 2,3-Dimethyl-1-butene **2.45**
- 2,3-Dimethyl-2-butene **2.51, 2.38, 2.50, 2.52, 2.53, 2.56, 2.103, 2.117, 2.140, 2.168, 2.170, 2.184, 2.185, 2.186, 2.187, 2.188, 2.189, 2.190, 2.191, 2.192, 2.193, 2.194, 2.195, 2.196, 2.223, 2.225, 2.303, 2.310, 2.332, 2.334, 3.10, 3.11, 3.28, 3.66, 3.125, 4.3, 4.100, 5.34, 7.5, 7.65, 8.83, 9.1, 13.86, 13.145**
- 2,3-Dimethyl-2-butene-*d*₁₂ **2.54**
- cis*-2,3-Dimethyl-2-butene-*d*₆ **2.53**
- (*E*)-2,3-Dimethyl-2-butene-*d*₆ **2.52**
- trans*-2,3-Dimethyl-2-butene-*d*₆ **2.52**
- (*Z*)-2,3-Dimethyl-2-butene-*d*₆ **2.53**
- 2,3-Dimethyl-2-butenyl 4-methoxyphenyl sulfide **13.18**
- 2,3-Dimethyl-2-butenyl 4-methylphenyl sulfide **13.19**
- 2,3-Dimethyl-2-butenyl phenyl sulfide **13.17**
- Dimethylcercosporin **16.57**
- 2,2-Dimethylcyclohexa-3,5-dien-1-one **2.108**
- 5,5-Dimethyl-1,3-cyclohexanedione **17.15**
- 1,2-Dimethylcyclohexene **2.117, 2.161**
- 1,3-Dimethylcyclohexene **2.118**

- 1,4-Dimethylcyclohexene **2.119**
 1,6-Dimethylcyclohexene **2.120, 2.156**
 2,3-Dimethylcyclohexene **2.120, 2.156**
 6,6-Dimethylcyclohex-1-enyl acetate **2.126**
 1,2-Dimethylcyclopentene **2.158**
 1,5-Dimethylcyclopentene **2.159**
 2,3-Dimethyl-2-cyclopenten-1-one **2.165**
 2,3-Dimethyl-2,3-diazabicyclo[2.2.1]heptane **8.18**
 1,2-Dimethyl-1,2-dibutylhydrazine **8.34**
 2,4-Dimethyl-3,5-dicarbethoxypyrrole **6.66**
 1,1-Dimethyl-2,2-di(2,2-dimethylpropyl)hydrazine **8.35**
 1,2-Dimethyl-1,2-di(2,2-dimethylpropyl)hydrazine **8.36**
 1,1'-(1,2-Dimethyl-1,2-diethenyl)bisnaphthalene, (*E*)- **3.84**
 2,2'-(1,2-Dimethyl-1,2-diethenyl)bisnaphthalene, (*E*)- **3.85**
 (15*E*)-Dimethyl-2,17-diethenyl-1,19,22,24-tetrahydro-3,7,13,18-tetramethyl-1,19-dioxobilinc-8,12-dipropanoate **7.8**
 4,5-Dimethyl-2,3-dihydrofuran **5.30**
 4,4-Dimethyl-2,3-dihydropyran-2-*t* **5.96**
 4,4-Dimethyl-2,3-dihydropyran-3-*t* **5.94**
 5,6-Dimethyl-3,4-dihydropyran **5.91**
 (*Z*)-Dimethyl 7-[2-(dimethylamino)-2-oxoethyl]-8-ethyl-7,8-dihydro-3,7,12,17-tetramethylporphine-2,18-dipropionate **7.88**
 (*Z*)-Dimethyl 7-[2-(dimethylamino)-2-oxoethyl]-8-ethylidene-7,8-dihydro-3,7,12,17-tetramethylporphine-2,18-dipropionate **7.89**
 2,4-Di[2-methyl-4-(dimethylamino)phenyl]squarylium **11.47**
 1,1-Dimethyl-2,2-di(2-methylpropyl)hydrazine **8.37**
 1,2-Dimethyl-1,2-di(2-methylpropyl)hydrazine **8.38**
 1,2-Dimethyl-1,2-dipentylhydrazine **8.39**
 1,2-Dimethyl-1,2-dipropylhydrazine **8.40**
 Dimethyldithiocarbamate ion **13.79**
 4,8-Dimethyl-4,8-dodecadiene **2.201**
 (*E,E*)-4,8-Dimethyl-4,8-dodecadiene **2.202**
 2,3-Dimethylenebicyclo[2.2.1]heptane **2.8, 2.19, 2.140, 2.295, 2.296, 2.297, 2.357**
 2,3-Dimethylenebicyclo[3.2.2]nonane **2.31**
 6,7-Dimethylenebicyclo[3.2.2]nonane **2.31**
 2,3-Dimethylenebicyclo[2.2.2]octane **2.33**
 1,1-Dimethylethanol **17.62**
 2-[(1,1-Dimethylethoxy)methyl]furan **5.35**
 7-(1,1-Dimethylethyl)-3,4-dihydro-2,2-dimethyl-1-benzopyran-6-ol **4.54**
 2-(1,1-Dimethylethyl)-3,3-dimethyl-1-butene-1-thione **13.165**
 1,1-Dimethylethyl ethyl sulfide **13.56**
 1,1-Dimethylethyl methyl ether **17.18**
 4-(1,1-Dimethylethyl)phenol **4.121**
 1,1-Dimethylethyl propyl sulfide **13.58**
 5,7-Di(1-methylethyl)tocol **4.47**
N,N-Dimethylformamide **17.31**
 6,6-Dimethylfulvene **2.149**
 6,6-Dimethylfulvene endoperoxide **2.150**
 2,4-Dimethylfuran **5.33**
 2,5-Dimethylfuran **5.34, 7.59, 9.28**
 Dimethyl 2,5-furandicarboxylate **5.61**
 Dimethylglyoxime **15.19**
 6,11-Dimethyl-4,6,8,10,12-hexadecapentaene-2,3,14,15-tetraone (*all-E*) **2.234**
 2,5-Dimethyl-2,4-hexadiene **2.243, 13.87, 13.88**
 2,2'-Dimethyl-4,4',5,5',7,7'-hexahydroxymesonaphthodanthrone **16.60**
 Dimethylhomocoerdianthrone **3.95**
 4-[2-(*N,N*-Dimethylhydrazono)ethylidene]-2,6-diphenylpyran **15.1**
 2,7-Dimethyl-6-hydroperoxy-2,7-octadiene **2.279**
 2,7-Dimethyl-7-hydroperoxy-2,5-octadiene **2.274**
 2,3-Dimethylhydroquinone **4.22**
 2,5-Dimethylhydroquinone **4.23**
 2,6-Dimethylhydroquinone **4.24**
 2,3-Dimethylidenebicyclo[2.2.1]heptane **2.8, 2.19, 2.140, 2.295, 2.296, 2.297, 2.357**
 5,6-Dimethylidene-2-bicyclo[2.2.1]heptene **2.19**
 2,3-Dimethylidene-7-oxabicyclo[2.2.1]heptane **2.295**
 5,6-Dimethylidene-7-oxa-2-bicyclo[2.2.1]heptene **2.297**
 1,3-Dimethylindole **6.10**
 2,3-Dimethylindole **6.11**
N,N-Dimethylisobutenylamine **8.83**
 7,7-Dimethyl-2-methylenenorbornane **2.9**
 Dimethyl 4-methyl-1,3-naphthalenedipropionate **3.90**
 Dimethyl 3,3'-(4-methyl-1,3-naphthylene)dipropionate **3.90**
 2,4-Di[2-methyl-4-(*N*-methyl-*N*-octadecylamino)phenyl]squarylium **11.48**
 1,2-Dimethylnaphthalene **3.75**
 1,3-Dimethylnaphthalene **3.76**
 1,4-Dimethylnaphthalene **3.77**
 1,5-Dimethylnaphthalene **3.75, 3.76, 3.77, 3.78, 3.79, 3.80, 3.81, 3.82, 3.83, 3.86**
 1,6-Dimethylnaphthalene **3.78**
 1,7-Dimethylnaphthalene **3.79**
 1,8-Dimethylnaphthalene **3.80**
 2,3-Dimethylnaphthalene **3.81**
 2,6-Dimethylnaphthalene **3.82**
 2,7-Dimethylnaphthalene **3.83**
 1,1-Dimethyl-2-naphthalenethione **13.113**
 3,10-Dimethylnaphtho[1,2,3,4-*rsz*]pentaphene-5,8-dione **3.95**
N,N-Dimethyl-4-nitrosoaniline **9.7**
 2,7-Dimethyl-2,6-octadiene **2.277**
cis-2,6-Dimethyl-2,6-octadiene **2.276**

- (*E*)-2,6-Dimethyl-2,6-octadiene **2.275**
trans-2,6-Dimethyl-2,6-octadiene **2.275**
 (*Z*)-2,6-Dimethyl-2,6-octadiene **2.276**
 3,7-Dimethyl-1,6-octadien-3-ol **2.280, 2.338, 13.53, 13.54, 13.55, 13.143, 13.144**
 (*E*)-3,7-Dimethyl-2,6-octadien-1-ol **2.281**
 (*E*)-3,7-Dimethyl-2,7-octadien-1-ol **2.282**
 (*Z*)-3,7-Dimethyl-2,7-octadien-1-ol **2.283**
 2,6-Dimethyl-2,4,6-octatriene **2.285**
 3,7-Dimethyl-6-octen-1-ol **2.294**
 (*E*)-3,7-Dimethyl-2-octen-1-ol **2.292**
 (*Z*)-3,7-Dimethyl-2-octen-1-ol **2.293**
 3,3-Dimethyl-2-oxobutyric acid **17.7**
 2,4-Dimethyl-2-pentene **2.306**
 (*E*)-3,4-Dimethyl-2-penten-1-ol **2.316**
 (*Z*)-3,4-Dimethyl-2-penten-1-ol **2.317**
 3,4-Dimethyl-3-penten-2-one **2.324**
 2,4-Dimethylphenol **4.116**
 2,6-Dimethylphenol **4.117**
 3,4-Dimethylphenol **4.118**
 2,6-Dimethylphenoxide ion **4.162**
 2,3-Di(4-methylphenyl)-1,4-dioxene **2.193**
 2,2-Dimethyl-1-phenyl-1-propanethione **13.126**
N,N-Dimethyl-1-piperidinamine **8.52**
 1,2-Dimethylpiperidine **8.57**
 2,6-Dimethylpiperidine **8.58**
 (1,2-Dimethyl-1-propenyl)benzene **3.123, 2.96**
 1-(1,2-Dimethyl-1-propenyl)-4-methoxybenzene **3.118, 3.115, 3.123**
 2,2-Dimethylpropyl methyl ether **17.19**
 Di(1-methylpropyl) sulfide **13.73**
 2,6-Dimethylpyran-4-thione **13.139**
 1,3-Dimethylpyrazolo[1,2-*a*]benzotriazole **11.132**
 1,3-Dimethylpyrazolo[1',2':2,3][1,2,3]triazolo[4,5-*a*]phenazin-4-ium **6.39**
 2,5-Dimethylpyrrole **6.60**
N,N-Dimethyl-1-pyrrolidinamine **8.95**
 5,5-Dimethyl-1-pyrroline-1-oxyl **15.56**
cis- α,α' -Dimethylstilbene **3.103**
trans- α,α' -Dimethylstilbene **3.102, 3.103**
 β,β -Dimethylstyrene **3.114**
 Dimethyl sulfide **13.80, 13.81**
 Dimethyl sulfoxide **13.81**
 1,1'-(7,13-Dimethyl-1,4,8,12-tetraazacyclopentadeca-4,7,12,15-tetraene-6,14-diyl)bis[ethanoato]nickel(II) **12.133**
 4,4'-Dimethyl-3,3',5,5'-tetracarboxy-2,2'-dipyrrylmethane **6.65**
 8,13-Dimethyl-2,2,19,19-tetramethoxy-4,6,8,10,12,14,16-icosaeptaene-3,18-dione (*all-E*) **2.211**
 6,11-Dimethyl-2,2,15,15-tetramethoxy-4,6,8,10,12-hexadecapentaene-3,14-dione (*all-E*) **2.233**
 Dimethyl 3,7,12,17-tetramethylporphine-2,18-dipropanoate **7.94**
 2,2-Dimethyl-3-thiahexane **13.58**
 2,2-Dimethyl-3-thiapentane **13.56**
 4,4'-Dimethylthiobenzophenone **13.161**
 3,3-Dimethylthiocamphor **13.45**
 5,7-Dimethyltolcol **4.51**
N,N-Dimethyl-*p*-toluidine **9.19**
 7,7-Dimethyl-2-(trimethylsiloxy)-norborna-2,5-diene **2.5**
 7,7-Dimethyl-2-(trimethylsiloxy)norborn-2-ene **2.5, 2.7, 2.24**
 (*E*)-2,6-Dimethyl-1,6-undecadiene **2.359**
 (*Z*)-2,6-Dimethyl-1,6-undecadiene **2.360**
 1-(β,β -Dimethylvinyl)naphthalene **3.87**
 (*E*)-2,3-Di(α -naphthyl)-2-butene **3.84**
 (*E*)-2,3-Di(β -naphthyl)-2-butene **3.85**
 (*Z*)-2,3-Di(α -naphthyl)-2-butene **3.84**
 (*Z*)-2,3-Di(β -naphthyl)-2-butene **3.85**
 2,4-Dinitrophenol **4.123**
 2,5-Dinitrophenol **4.124**
 2,6-Dinitrophenol **4.125**
 2,4-Dinitrophenoxide ion **4.164**
 4,4'-Di-*tert*-octyldiphenylamine **9.18**
 2,5-Di-*sec*-octylhydroquinone **4.19**
 2,3-Dioxabicyclo[2.2.1]hept-5-ene, 7-(1-methylethylidene)- **2.150**
 2,3-Dioxabicyclo[2.2.2]oct-5-ene **2.182**
 3,6-Dioxacyclohexene **2.183, 2.122, 2.222, 2.223, 2.224, 3.101, 5.90**
 3,5-Dioxacyclopentene **2.199**
 Dioxane **17.20**
 1,4-Dioxane **17.20**
 1,6-Dioxapyrene **3.94**
 13,14-Dioxatricyclo[8.2.1.1^{4,7}]tetradeca-4,6,10,12-tetraene **5.77**
 1,4-Dioxene **2.183, 2.122, 2.222, 2.223, 2.224, 3.101, 5.90**
 1,4-Dioxene, 2-(4-cyanophenyl)-3-(4-dimethylaminophenyl)- **2.184**
 1,4-Dioxene, 2,3-di(4-acetaminophenyl)- **2.185**
 1,4-Dioxene, 2,3-di(3-chlorophenyl)- **2.186**
 1,4-Dioxene, 2,3-di(4-chlorophenyl)- **2.187**
 1,4-Dioxene, 2,3-di(4-dimethylaminophenyl)- **2.188**
 1,4-Dioxene, 2,3-di(4-hydroxyphenyl)- **2.189**
 1,4-Dioxene, 2,3-di(3-methoxyphenyl)- **2.190**
 1,4-Dioxene, 2,3-di(4-methoxyphenyl)- **2.191**
 1,4-Dioxene, 2-(4-dimethylaminophenyl)-3-phenyl- **2.15**
 1,4-Dioxene, 2,3-di(4-methylphenyl)- **2.193**
 1,4-Dioxene, 2,3-diphenyl- **2.194, 8.19**
 1,4-Dioxene, 2-(4-methoxyphenyl)-3-phenyl- **2.195**
 1,4-Dioxene, 2,3,5,6-tetraphenyl- **2.196**
p-Dioxene **2.183, 2.122, 2.222, 2.223, 2.224, 3.101, 5.90**
 1,3-Dioxolane, 4,5-diethylidene-2,2-dimethyl-, (*E,Z*) **2.1**

- 1,3-Dioxolane, 4,5-diethylidene-2,2-dimethyl-, (Z,Z) **2.198**
 1,3-Dioxolane, 2-(2-furanyl)- **5.36**
 2-[2-(1,3-Dioxolanyl)]furan **5.36**
 1,3-Dioxole **2.199**
 Dioxygen anion **14.14**
exo,exo-2,3-Dioxymethyl-7-adamantylidenenorbornane **2.10**
 Di(1,2,2,6,6-pentaamethyl-4-piperidinol) 1,10-decanedioate **8.74**
 2,5-Di-*tert*-pentylhydroquinone **4.16**
 Diphenylamine **9.16**
 4-[*N*-Di(phenylaminocarbonyl)methylene]amino-3,*N,N*-triethylaniline **11.115**
 2-[2-[2-(Diphenylamino)-3-[3-(4-methoxy-4-oxobutyl)naphtho[2,3-*d*]thiazol-2-ylidene]ethylidene]1-cyclopenten-1-yl]ethenyl]-3-(4-methoxy-4-oxobutyl)naphtho[2,3-*d*]thiazolium, perchlorate **11.108**
 4-(4'-Diphenylaminophenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one **11.152**
 9,10-Diphenylanthracene **3.11, 4.50, 11.78, 11.128, 11.129, 11.130, 11.135, 11.136, 11.137, 11.142, 11.143, 11.144, 11.145, 11.146, 11.147, 13.76**
 2,5-Diphenyl-3,4-benzofuran **5.83, 2.51, 3.60, 3.96, 3.98, 4.49, 4.54, 4.184, 4.185, 6.39, 7.5, 7.78, 8.19, 10.23, 10.34, 10.35, 10.36, 10.38, 10.42, 11.33, 11.37, 11.38, 11.70, 11.71, 11.72, 11.73, 11.75, 11.76, 11.109, 11.174, 11.178, 11.179, 11.180, 11.181, 11.182, 11.183, 11.184, 12.20, 12.21, 12.22, 12.23, 12.24, 12.84, 12.138, 13.63, 13.64, 13.108, 13.169, 13.170, 13.171, 15.1, 17.30**
 1,4-Diphenyl-1,3-butadiene **2.40, 2.35**
 (*E*)-2,3-Diphenyl-2-butene **3.102, 3.103**
 (*Z*)-2,3-Diphenyl-2-butene **3.103**
 1,4-Diphenyl-1,3-cyclopentadiene **2.147**
 Diphenyldiazene **11.57**
 1,3-Diphenyl-5,6-dimethylisobenzofuran **5.82**
 1,2-Diphenyl-3,6-dioxacyclohexene **2.194, 8.19**
 2,3-Diphenyl-1,4-dioxene **2.194, 8.19**
 2,6-Diphenyl-4-(2,6-diphenyltelluropyran-4-ylidene)methyltelluropyrylium **11.162**
 Diphenyldiselenide **13.83**
 Diphenyl disulfide **13.84**
 Diphenylditelluride **13.85**
 4,5-Diphenyl-1,3-dithiane-2-thione **13.89**
 4,5-Diphenyl 1,3-dithiole-2-thione **13.89**
 2,3-Diphenylfuran **5.37**
 2,5-Diphenylfuran **5.38, 4.50, 5.25, 5.44, 5.47, 5.50, 5.83**
 3,4-Diphenylfuran **5.39**
 α,α -Diphenylfurfuryl alcohol **5.67**
 1,2-Diphenylindene **3.70**
 1,3-Diphenylisobenzofuran **5.83, 2.51, 3.60, 3.96, 3.98, 4.49, 4.54, 4.184, 4.185, 6.39, 7.5, 7.78, 8.19, 10.23, 10.34, 10.35, 10.36, 10.38, 10.42, 11.33, 11.37, 11.38, 11.70, 11.71, 11.72, 11.73, 11.75, 11.76, 11.109, 11.174, 11.178, 11.179, 11.180, 11.181, 11.182, 11.183, 11.184, 12.20, 12.21, 12.22, 12.23, 12.84, 12.138, 13.63, 13.64, 13.108, 13.169, 13.170, 13.171, 15.1, 17.30**
 1,2-Diphenyl-4-methylcyclopenta[*b*]quinoline **6.4**
 2,5-Diphenyl-4-methyloxazole **6.32**
 1,1-Diphenyl-2-methylpropene **3.46**
 Diphenyl nitron **15.10**
 2,5-Diphenyloxazole **6.31**
 (*E*)-2,3-Diphenyloxirane **17.49**
trans-Diphenyloxirane **17.49**
N,N'-Diphenyl-*p*-phenylenediamine **9.29**
 2,6-Diphenylpyran-4-thione **13.140**
 Diphenyl sulfide **13.34, 13.16, 13.23, 13.26, 13.31**
 3,4-Diphenylsydnone **5.102**
 (*E*)-2,3-Diphenylthiirane **13.151**
trans-Diphenylthiirane **13.151**
 2,6-Diphenylthiopyran-4-thione **13.173**
 9,18-Diphenyltribenzo[*a,f,j*]perylene **3.129**
 4-(*N*-Dipivaloylmethylene)amino-3,*N,N*-triethylaniline **11.67**
 3,8,3',10'-Di(1,3-propanediyl)-2,2'-thiacarbocyanine iodide **11.156**
 Dipropylamine **8.86**
 Dipropyl sulfide **13.82**
 Diselenide, diphenyl- **13.83**
 Disilirane, 1,1,2,2-tetrakis(2,4,6-trimethylphenyl)- **17.21**
 Dismutase, superoxide **10.14**
 Disodium [*N,N'*-ethylenebis(5-sulfosalicylideneiminato)]nickelate(II) **12.143**
 Disodium [*N,N'*-*o*-phenylenebis(5-sulfosalicylideneiminato)]nickelate(II) **12.167**
 Disodium [*N,N'*-propylenebis(5-sulfosalicylideneiminato)]nickelate(II) **12.169**
 Disperse Blue 1 **11.14**
 Disperse Blue 14 **11.7**
 Disperse blue polyester **11.12**
 Disperse bright pink **11.13**
 Disperse Orange **11.6**
 Disperse Orange 11 **11.6**
 Disperse Red 11 **11.13**
 Disperse Red 15 **11.5**
 Disperse red 2S **11.5**
 Disperse violet K **11.8**
 Disulfide, diphenyl- **13.84**
 Ditelluride, diphenyl- **13.85**
 Di(2,2,6,6-tetramethyl-4-piperidinol) 1,10-decanedioate **8.78**
 1,5-Dithiacyclooctane **13.86**
 1,5-Dithiacyclooctane 1-oxide **13.87**

- 1,4-Dithiane **13.88**
 1,3-Dithiane-2-thione, 4,5-diphenyl- **13.89**
 Dithiazanine iodide **11.173**
 2,2'-Dithiobisethanesulfonate ion **13.91**
N,N'-[Dithiobis[(5-ethyl-2,3-thiophenediyl)methylidene]]biscyclohexanamine **13.63**
 1,5-Dithiocane **13.86**
 1,5-Dithiocane 1-oxide **13.87**
 Dithioerythritol **13.49**
 1,2-Dithiolane-3-pentanoic acid **13.90, 3.125**
 Dithiothreitol **13.50**
 Docosahexaenoic acid **2.200**
 Docosanoic acid **17.22**
 4,8-Dodecadiene, 4,8-dimethyl- **2.201**
 4,8-Dodecadiene, 4,8-dimethyl-, (*E,E*)- **2.202**
 4,8-Dodecadiene, hydroperoxy-4,8-dimethyl- **2.203**
 (*E,E*)-8,10-Dodecadienol **2.204**
 Dodecane **17.23**
 Dodecanoic acid **17.24**
 2,4,6,8,10-Dodecapentaene-1,12-dione, 1,12-bis(3-hydroxy-1,2,2-trimethylcyclopentyl)-4,7-dimethyl-[1*R*-[1 α [2*E*,4*E*,6*E*,8*E*,10*E*,12(1*R**,3*R**)],3 α]- **2.205, 2.206**
 2,4,6,8,10-Dodecapentaene-1,12-dione, 1,12-bis(4-hydroxy-1,2,2-trimethylcyclopentyl)-4,7-dimethyl-[1*R*-[1 α [2*E*,4*E*,6*E*,8*E*,10*E*,12(1*R**,4*R**)],4 β]- **2.207**
 Dodecapreno- β -carotene **2.358**
 2,6,10-Dodecatriene, dihydroperoxy-2,6,10-trimethyl- **2.208**
 2,6,10-Dodecatriene, hydroperoxy-2,6,10-trimethyl- **2.209**
 2,6,10-Dodecatriene, 2,6,10-trimethyl- **2.210**
 Dodecylamine[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II) **12.134**
 Dodecylamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) **12.135**
 4-Dodecyloxy-2-hydroxybenzophenone **4.42**
 Dodecyl sulfate, sodium salt **17.25**
 Dodecyltrimethylammonium chloride **17.26**
 Dopa-melanin **4.78**
 Dopamine **4.5**
 Doxorubicin **4.80**
 Dregamine **8.101**
 Durohydroquinone monoethyl ether **4.126**
 Ebselen **13.40**
 E.C. 1.1.1.30 **10.11**
 E.C. 1.3.99.1 **10.13**
 E.C. 1.6.99.3 **10.12**
 E.C. 1.9.3.1 **10.10**
 E.C. 1.15.1.1 **10.14**
 E.C. 3.4.4.4 **10.33**
 E.C. 4.2.1.1 **10.7**
 Echinenone **2.88**
 Ehrlich's Reagent **9.10**
 4,6,8,10,12,14,16-Eicosaheptaene-3,18-dione, 8,13-dimethyl-2,2,19,19-tetramethoxy- (*all-E*) **2.211**
 Eicosanoic acid **17.27**
 5,8,11,14-Eicosatetraenoic acid **2.212**
 5,8,11,14-Eicosatetraenoic acid, phenyl ester **2.214**
 Elsinochrome A **16.10**
 Elsinochrome B **16.9**
 emi-Crocin **2.178**
 3,6-Endoperoxycyclohexene **2.182**
 Eosin dianion **11.65**
 1,4-Epidioxynaphthalene-1-propanoic acid, 4-methyl- **3.91**
 1,4-Epidioxynaphthalene-1-propanoic acid, 4-methyl-, anion **3.92**
 Epinephrine **4.9**
 Ergosta-5,7,22-trien-3-ol (3 β) **16.26**
 Ergosta-5,7,22-trien-3-ol acetate **16.27**
 Ergosterol **16.26**
 Ergosterol acetate **16.27**
 Ergothioneine **13.104**
 Ergothioneine ion **13.105**
 Eriodictyol **4.59**
 Estra-1,3,5(10),8-tetraen-17-one, 3-methoxy- **16.28**
 1,3,5(10),9(11)-Estratetraen-17-one, 3-(acetyloxy)- **16.29**
 1,3,5(10),9(11)-Estratetraen-17-one, 3-(benzoyloxy)- **16.30**
 1,3,5(10),9(11)-Estratetraen-17-one, 3-hydroxy- **16.31**
 1,3,5(10),9(11)-Estratetraen-17-one, 3-methoxy- **16.32, 16.29, 16.30, 16.31, 16.33**
 1,3,5(10),9(11)-Estratetraen-17-one, 3-(toluenesulfonyloxy)- **16.33**
 1,2-Ethandiyldienebis[3,5-di(1,1-dimethylethyl)-2,5-cyclohexadien-4-one] **17.12**
 Ethane, iodo- **17.28**
 (*Z,Z*)-3,3'-[1,2-Ethanediy]bis(iminomethylidene)]bis[5-ethyl-2-thiophenethione] **13.171**
 2,2'-[1,2-Ethanediy]bis(nitrilodecylidene)]bis[4-methylphenolato]nickel(II) **12.136**
 2,2'-[1,2-Ethanediy]bis(nitriloethylidene)]bis[phenolato]nickel(II) **12.137**
 [[3,3]-[1,2-Ethanediy]bis(nitrilomethylidene)]bis[5-ethylthiophenethionato]]copper(II) **12.138**
 2,2'-[1,2-Ethanediy]bis(nitrilomethylidene)]bis[phenolato]cobalt(II) **12.139**
 2,2'-[1,2-Ethanediy]bis(nitrilomethylidene)]bis[phenolato]nickel(II) **12.140**
 1,2-Ethanediyldienebis[3-[2-hydroxy-5-methyl-3-(1,1-dimethylethyl)benzyl]-5-(1,1-dimethylethyl)]-2,5-cyclohexadien-4-one **17.11**

- 3,7,4,6-Ethanediyliidenepentaleno[1,6-*cd*]pyridazine, 3,7a-dichloro-3a,4,5,5a,6,7,7a,7b-octahydro-, 1,2-dioxide 15.20
- Ethanesulfonate ion, 2,2'-dithiobis- 13.91
- Ethanesulfonic acid, 2-mercapto-, ion(1-) 13.92
- Ethanethiol, 2-amino- 13.93
- Ethanethiol, 2-[(3-aminopropyl)amino]- 13.94
- Ethanethiol, 2-hydroxy-, 13.95
- Ethanethiol, 2-hydroxy-, negative ion 13.96
- Ethanol 17.29
- Ethanol, 2-cyclododecylidene- 2.215
- Ethanol, 2-cyclohexylidene- 2.216
- Ethanol, 2-cyclooctylidene- 2.217
- Ethanol, 2-cyclopentylidene- 2.218
- Ethanol, 2-(diethylamino)- 8.23
- Ethanol, 2,2'-[(1,1-dimethylethyl)imino]bis- 8.26
- Ethanol, 1-(2-methylene-3,5-cyclohexadienylidene)- 2.219
- Ethanol, 2-(4-methylphenyl)thio- 13.97
- Ethanol, 1-tricyclo[3.3.1.1^{3,7}]decylidene-, acetate 2.220
- Ethanone, 1-(3,4-dihydro-6-methyl-2*H*-pyran-5-yl)- 5.88
- Ethanone, 1-(4-hydroxyphenyl)-, ion(1-) 4.151
- Ethene, 1,1-bis(4-methoxyphenyl)- 3.100
- Ethene, 1,1-diethoxy- 2.221
- Ethene, 1,2-diethoxy-, (*E*)- 2.222
- Ethene, 1,2-diethoxy-, (*Z*)- 2.223, 2.222
- Ethene, ethoxy- 2.224
- Ethene, tetraethoxy- 2.225
- Ethene, 1,1,2-tricyclopropyl- 2.169
- Ethene, 1,1,2-triethoxy- 2.226
- Ethenylbenzene 3.108
- 9-Ethenyl-14-ethyl-13-formyl-21-(methoxycarbonyl)-4,8,18-trimethyl-20-oxo-3-phorbinepropanoic acid, 3,7,11,15-tetramethyl-2-hexadecenyl ester 7.27
- 9-Ethenyl-14-ethyl-21-(methoxycarbonyl)-4,8,13,18-tetramethyl-20-oxo-3-phorbinepropanoic acid, 3,7,11,15-tetramethyl-2-hexadecenyl ester 7.26
- 8-Ethenyl-13-ethyl-3,7,12,17-tetramethylporphine-2,18-dipropanoic acid 7.90
- 8-Ethenyl-13-ethyl-3,7,12,17-tetramethylporphine-2,18-dipropanoic acid, dimethyl ester 7.91
- 7-Ethenyl-12-(1-hydroxyethyl)-3,8,13,17-tetramethylporphine-2,18-dipropanoic acid 7.92
- 7-Ethenyl-3,8,13,17-tetramethylporphine-2,18-dipropanoic acid 7.93
- Ether, methyl 1-methylpropenyl 2.55
- Ethirimol 16.67
- 5-Ethoxycarbonyl-3,4-dihydro-6-methylpyran 5.98
- 5-Ethoxycarbonyl-3,4-dihydro-6-phenylpyran 5.100
- 2-(4-Ethoxycarbonylphenyl)-1,8-dihydropyrrolo[3',2':3,4]cyclopenta[1,2-*b*]pyridine 6.70
- 2-[(4-Ethoxycarbonyl)phenyl]furan 5.40
- Ethoxyethene 2.224
- 1-Ethoxy-2-methyl-1-propene 2.336
- Ethyl alcohol 17.29
- Ethylamine, *N,N*-diethyl- 8.24
- Ethylamine, *N,N*-diethyl-2-methoxy- 8.25
- Ethylamine, 3,4-dihydroxyphenyl- 4.5
- Ethylamine, 1,1-dimethyl-*N,N*-bis(2-hydroxyethyl)- 8.26
- Ethylamine, *N*-ethoxy- 15.21
- Ethylamine, *N*-ethyl- 8.27
- Ethylamine, *N*-ethyl-*N*-ethoxy- 15.22
- Ethylamine, *N*-ethyl-*N*-hydroxy- 15.23
- Ethylamine, *N*-ethyl-*N*-hydroxy-, conjugate acid 15.24
- Ethylamine, 1-methyl- 8.28
- Ethylamine, 1-methyl-*N,N*-(1-methylethyl)- 8.29
- Ethylamine[2,2'-thiobis(3,4-dimethylphenolato)]nickel(II) 12.141
- Ethylamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) 12.142
- Ethyl 4-aminobenzoate 9.9
- Ethyl *p*-aminobenzoate 9.9
- Ethylbenzene 3.41
- Ethyl 5-bromo-2-furoate 5.55
- 2-Ethyl-1,3-butadiene 2.41
- Ethyl β -*apo*-8'-carotenoate 2.85
- 6-Ethyl-3,4-dihydropyran-5-carboxylic acid ethyl ester 5.101
- Ethyl 4-(dimethylamino)benzoate 9.21
- Ethyl *p*-dimethylaminobenzoate 9.21
- Ethyl disulfide 13.75
- [*N,N'*-Ethylenebis(5-sulfosalicylideneiminato)]nickelate(II) disodium salt 12.143
- Ethylene-propylene-ethylidenenorbornene terpolymer 17.30
- 3-Ethyl-2-[7-(3-ethyl-2-benzothiazolyldiene)-1,3,5-heptatrienyl]benzothiazolium iodide 11.174
- 3-Ethyl-2-[5-(3-ethyl-2-benzothiazolyldiene)-1,3-pentadienyl]benzothiazolium iodide 11.173
- 3-Ethyl-2-[7-(3-ethyl-2-benzoxazolyldiene)-1,3,5-heptatrienyl]benzoxazolium iodide 11.109
- 1-Ethyl-2-[(1-ethyl-2-quinolinylidene)methyl]quinolinium iodide 11.45
- 1-Ethyl-4-[3-(1-ethyl-4-quinolinylidene)-1-propenyl]quinolinium 11.42
- 1-Ethyl-2-[3-(1-ethyl-2-quinolinylidene)-1-propenyl]quinolinium chloride 11.41
- Ethyl 2-furoate 5.56
- 4-[*N*-Ethyl-*N*-(2-hydroxyethyl)amino]-4'-methoxyazobenzene 11.58
- Ethylidenecycloheptane 2.100
- Ethylidenecyclohexane 2.110
- Ethylidenecyclooctane 2.135
- Ethylidenecyclopentane 2.152
- Ethyl iodide 17.28
- Ethyl linolenate 2.268

- 2-Ethyl-3-methyl-2-cyclohexen-1-one **2.127**
 2-Ethyl-3-methyl-2-cyclopenten-1-one **2.166**
 3-Ethyl-2-penten-1-ol **2.318**
 Ethyl phytyl ether **2.236**
 Ethyl sulfide **13.76**
 Ethyl vinyl ether **2.224**
 Ethylenediamine, tetraethyl- **8.30**
 Etiobilirubin-IV γ **7.4**
 Etiobiliverdin-IV γ **7.3**
 Eucatropine **8.76**
 Fatty acid methyl esters from peanut oil **17.42**
 Fatty acid methyl esters from soybean oil **17.43**
 Fatty acid methyl esters from sunflower oil **17.44**
 Ferric acetylacetonate **12.174**
 Ferrocene **12.144**
 Ferrocyclochrom C **10.9**
 Ferrocyclochrom C oxygen oxidoreductase **10.10**
 Ferulic acid **4.70**
 Fisetin **4.75**
 Flavanone, 4',5,7-trihydroxy- **4.72**
 Flavocyclochrom b_2 (Fe³⁺) **10.8**
 Flavone, 5,7-dihydroxy- **4.73**
 Flavone, 3-hydroxy- **4.74**
 Flavone, 3,3',4',7-tetrahydroxy- **4.75**
 Fluorene, 9-diazo- **11.63**
 Fluorene, 9-(fluoren-9-ylidene)- **3.66**
 Fluorene, 9-(phenylsulfonyl)-, anion **13.98**
 9-(Fluoren-9-ylidene)fluorene **3.66**
 Fluorescein, 2',7'-dibromo-4'-(hydroxymercuri)-, disodium salt **11.64**
 Fluorescein dianion, 2',4',5',7'-tetrabromo- **11.65**
 Fluorescein dianion, 3,4,5,6-tetrachloro-2',4',5',7'-tetraiodo- **11.66**
 1-Fluoro-4-(butylthio)benzene **13.11**
 2-(4-Fluoro-3-nitrophenyl)-2,5,5-trimethylpyrrolidin-1-oxyl **15.55**
 4-Fluorophenoxide ion **4.165**
 1-(4-Fluorophenylazo)-2-naphthol **11.97**
 7-Fluoro-2-phenyl-1,2-benzisoseleazol-3-one **13.37**
 3-(4-Fluorophenyl)furan **5.41**
 4-Fluorophenyl methyl sulfide **13.21**
p-Fluorophenyl methyl sulfide **13.21**
 3-(4-Fluorophenyl)thio-1-propanol **13.134**
 4'-Fluoropivalothiophenone **13.128**
p-Fluorothiobenzene **13.21**
 Formamide, *N,N*-dimethyl- **17.31**
 Fucoxanthin **2.67**
 Fullerene-C₆₀ **17.32**
 Fullerene-C₇₀ **17.33**
 2-Furaldehyde **5.9**
 2-Furaldehyde, 5-(2-hydroxyethoxy)methyl- **5.10**
 2-Furaldehyde, 5-(hydroxymethyl)- **5.11**
 2-Furaldehyde, 5-(methoxymethyl)- **5.12**
 2-Furaldehyde, 5-methyl- **5.13**
 Furan **5.14**
 Furan, 2-acetyl- **5.15**
 Furan, 2,5-bis(4-bromophenyl)- **5.16**
 Furan, 2,5-bis(4-chlorophenyl)- **5.17**
 Furan, 2,5-bis(ethoxycarbonyl)- **5.60**
 Furan, 2,5-bis(hydroxymethyl)- **5.18, 10.2, 10.3, 10.23, 10.24, 10.26, 13.104, 13.106, 16.37, 16.64, 17.77**
 Furan, 2,5-bis(methoxycarbonyl)- **5.61**
 Furan, 2,5-bis(4-methoxyphenyl)- **5.19**
 Furan, 2,5-bis(4-methylphenyl)- **5.20**
 Furan, 2-bromo- **5.21**
 Furan, 2-(4-bromophenyl)- **5.22**
 Furan, 3-(4-bromophenyl)- **5.23**
 Furan, 2-*tert*-butyl- **5.24**
 Furan, 2-(4-chlorophenyl)- **5.25**
 Furan, 2-cyano-5-methyl- **5.64**
 Furan, 2-(4-cyanophenyl)- **5.26**
 Furan, 2,5-dibromo- **5.27**
 Furan, 2,5-di-*tert*-butyl- **5.28**
 Furan, 2,3-dihydro- **5.29, 7.59**
 Furan, 2,3-dihydro-4,5-dimethyl- **5.30**
 Furan, 2,3-dihydro-5-methyl- **5.31**
 Furan, 2-(dimethoxymethyl)-5-(methoxymethyl)- **5.32**
 Furan, 2,4-dimethyl- **5.33**
 Furan, 2,5-dimethyl- **5.34, 7.59, 9.28**
 Furan, 2-[(1,1-dimethylethoxy)methyl]- **5.35**
 Furan, 2-[2-(1,3-dioxolanyl)-] **5.36**
 Furan, 2,3-diphenyl- **5.37**
 Furan, 2,5-diphenyl- **5.38, 4.50, 5.25, 5.44, 5.47, 5.50, 5.83**
 Furan, 3,4-diphenyl- **5.39**
 Furan, 2-[(4-ethoxycarbonyl)phenyl] **5.40**
 Furan, 3-(4-fluorophenyl)- **5.41**
 Furan, 2-methoxy- **5.42**
 Furan, 2-(methoxymethyl)- **5.43**
 Furan, 2-(4-methoxyphenyl)- **5.44**
 Furan, 3-(4-methoxyphenyl)- **5.45**
 Furan, 2-methyl- **5.46**
 Furan, 2-(4-methylphenyl)- **5.47**
 Furan, 3-(4-methylphenyl)- **5.48**
 Furan, 2-(4-nitrophenyl)- **5.49**
 Furan, 2-phenyl- **5.50**
 Furan, 3-phenyl- **5.51**
 Furan, tetraphenyl- **5.52**
 Furan, 2-vinyl- **5.53**
 2-Furancarboxaldehyde, 5-(2-hydroxyethoxy)methyl- **5.1**
 2-Furancarboxaldehyde, 5-(hydroxymethyl)- **5.11**
 2-Furancarboxaldehyde, 5-(methoxymethyl)- **5.12**
 2-Furancarboxaldehyde, 5-methyl **5.13**

- 2-Furancarboxylic acid 5.54
 2-Furancarboxylic acid, 5-bromo-, ethyl ester 5.55
 2-Furancarboxylic acid, ethyl ester 5.56
 2-Furancarboxylic acid, methyl ester 5.57
 3-Furancarboxylic acid, 4,5-dihydro-2-methyl-, methyl ester 5.58
 2,5-Furandicarboxaldehyde 5.59
 2,5-Furandicarboxylic acid, diethyl ester 5.60
 2,5-Furandicarboxylic acid, dimethyl ester 5.61
 3,4-Furandicarboxylic acid, diethyl ester 5.62
 2,5-Furandimethanol 5.18, 10.2, 10.3, 10.23, 10.24, 10.26, 13.104, 13.106, 16.37, 16.64, 17.77
 2-Furanitrile 5.63
 2-Furanitrile, 5-methyl- 5.64
 2-Furanmethanamine, *N*-methyl- 5.65
 2-Furanmethanediol, diacetate 5.66
 2-Furanmethanol, α,α -diphenyl- 5.67
 2-Furanmethanol, α -(diphenylmethyl)- 5.68
 2-Furanmethanol, α -methyl- 5.69
 2-Furanmethanol, α -phenyl- 5.70
 2-Furanmethanol, α -(2-phenylethyl)- 5.71
 2-Furanmethanol, α -(phenylmethyl)- 5.72
 2-Furanmethanol, α -(3-phenylpropyl)- 5.73
 3-Furanmethanol, 5-(phenylmethyl)- 5.74
 3-Furanmethanol, 5-(phenylmethyl)-, acetate 5.75
 3-Furanmethanol, 5-(phenylmethyl)-, ester with 2,2-dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylic acid 5.76
 2-Furanone, 3-(1-methylethylidene)- 2.227
 [2,2](2,5)Furanophane 5.77
 Furfural 5.9
 Furfural diacetate 5.66
 Furfuryl alcohol 5.78, 2.51, 4.1, 4.12, 4.40, 4.41, 4.92, 4.93, 4.106, 4.107, 4.108, 4.112, 4.113, 4.115, 4.121, 4.129, 4.130, 4.131, 4.135, 4.137, 4.138, 4.139, 4.140, 4.146, 4.150, 4.151, 4.155, 4.156, 4.157, 4.158, 4.159, 4.161, 4.163, 4.164, 4.169, 4.170, 4.171, 4.172, 4.173, 4.174, 4.176, 4.177, 4.178, 4.179, 4.182, 5.9, 5.10, 5.11, 5.12, 5.13, 5.14, 5.18, 5.32, 5.34, 5.35, 5.36, 5.46, 10.20, 10.23, 10.27, 10.34, 13.76, 13.108, 13.109, 13.111
 Furfurylamine 5.79
 Furfuryl methyl ether 5.43
 Furo[2,3-*h*][1]benzopyran-2-one 5.1
 Furo[3,2-*g*][1]benzopyran-7-one 5.86
 Furo[3,2-*g*][1]benzopyran-7-one, 9-methoxy- 5.87
 2-Furoic acid 5.54
 2-Furonitrile 5.63
 Furyl methyl ketone 5.15
 Galangin 4.65
 Gallium, tetranaphtho[2,3-*b*:2',3'-*g*:2'',3''-*l*:2'',3''-*q*]porphyrinatobis(trihexylsilylanolato)- 7.25
 Gentian Violet 11.44
 Geraniol 2.281
 Glaucine 8.21
 Glucose 16.34
 Glutamylcysteinylglycine, negative ion 13.100
 γ -L-Glutamyl-L-cysteinylglycine 13.99
 Glutathione 13.99
 Glutathione, negative ion 13.100
 Glycero-3-phosphocholine 17.53
 Glycine 10.15
 Glycine, glycy- 10.16
 Glycine, glycyglycyl- 10.17
 Glycine, glycyglycylglycyl- 10.18
 Glycine, glycy-L-histidyl- 10.19
 Glycine, histidyl- 10.20
 Glycine, *N*-(2-mercapto-1-oxopropyl)- 13.101
 Glycine, *N*-(2-mercapto-1-oxopropyl)-, negative ion 13.102
 Glycine, tryptophyl- 10.21
 Glycine, L-tryptophylglycyl- 10.22
 Glycine, L-tyrosyl- 4.76
 Glycylglycine 10.16
 Glycylglycylglycine 10.17
 Glycylglycylglycylglycine 10.18
 Glycylglycyl-L-histidine 10.28
 Glycylhistidine 10.27
 Glycyl-L-histidylglycine 10.19
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 Glycyltyrosine 4.189
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 3,5-Heptanedione, 4-[[2-ethyl-4-(diethylamino)phenyl]imino]-2,2,6,6-tetramethyl- 11.67
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- (*Z*)-2-Heptene **2.229**
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 Hexacosatridecaene, 3,7,11,16,20,24-hexamethyl-
 1,26-bis(2,6,6-trimethyl-1-cyclohexyl- **2.230**
 2,4,6,8,10,12,14-Hexadecaheptaene-1,16-dione, 1,16-bis(3-
 hydroxy-1,2,2-trimethylcyclopentyl)-6,11-dimethyl-
 [1*R*-[1 α [2*E*,4*E*,6*E*,8*E*,10*E*,12*E*,14*E*,16(1*R**,3*S**)],3 β]-
2.231
 2,4,6,8,10,12,14-Hexadecaheptaene-1,16-dione, 1,16-bis(4-
 hydroxy-1,2,2-trimethylcyclopentyl)-6,11-dimethyl-
 [1*R*-[1 α [2*E*,4*E*,6*E*,8*E*,10*E*,12*E*,14*E*,16(1*R**,4*S**)],4 β]-
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 4,6,8,10,12-Hexadecapentaene-3,14-dione, 6,11-dimethyl-
 2,2,15,15-tetramethoxy- (*all-E*) **2.233**
 4,6,8,10,12-Hexadecapentaene-2,3,14,15-tetraone, 6,11-
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 2-Hexadecene, 1-ethoxy-3,7,11,15-tetramethyl- **2.236**
 2-Hexadecene, 1-methoxy-3,7,11,15-tetramethyl- **2.237**
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 3,4,5,6,7,8-Hexahydro-1-benzopyran-2-one **2.92**
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 8,17-dione **3.65**
 Hexahydro-1,2-dimethylpyridazine **8.91**
cis-(-)-2,3,4,4*a*,5,9*b*-Hexahydro-2,8-dimethylpyrido[4,3-
b]indole **6.56**
 1,2,3,8,9,10-Hexahydro-3,3,5,6,8,8-hexamethylbenzo[1,2-
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 2,3,4,7,8,9-Hexahydro-2,2,5,7,7,10-hexamethylbenzo[1,2-
b:4,5-*b'*]dipyran **5.3**
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 3,4,6,7,9,10-Hexahydro-3,3,6,6-tetramethyl-1,8-
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 Hexamethoxybenzene **3.42**
 1,2,3,4,5,6-Hexamethylbicyclo[2.2.0]hexa-2,5-diene **2.29**
 Hexamethylbicyclo[2.2.0]hexa-2,5-diene **2.29**
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 Hexamethylenedithiocarbamate **13.1**
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 1,3,3,1',3',3'-Hexamethyl-8,10-indolo-2,2'-carbocyanine
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 2,6,10,15,19,23-Hexamethyl-2,6,10,14,18,22-
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 Histidine, glycyl- **10.27**
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 Hydrazine, 1,1-dimethyl-2,2-di(2,2-dimethylpropyl)- **8.35**
 Hydrazine, 1,2-dimethyl-1,2-di(2,2-dimethylpropyl)- **8.36**
 Hydrazine, 1,1-dimethyl-2,2-di(2-methylpropyl)- **8.37**
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 Hydrazine, 1,2-dimethyl-1,2-dipentyl- **8.39**
 Hydrazine, 1,2-dimethyl-1,2-dipropyl- **8.40**
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Hydroquinone, 2,5-di-*sec*-hexadecyl- **4.18**
Hydroquinone, 2,3-dimethoxy-5-methyl- **4.21**
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Hydroquinone, 2,5-dimethyl- **4.23**
Hydroquinone, 2,6-dimethyl- **4.24**
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Hydroquinone dianion **4.13**
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2-Hydroxybiphenyl **4.141**
2-Hydroxybiphenyl, conjugate base **4.180**
4-Hydroxybiphenyl, conjugate base **4.181**
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Hydroxybis(dimethylglyoximate)triphenylphosphinecobalt(II) **12.148**
Hydroxybis(diphenylglyoximate)pyridinecobalt(II) **12.149**
Hydroxybis(diphenylglyoximate)triphenylphosphinecobalt(II) **12.150**
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2-Hydroxycinnamic acid **4.69**
o-Hydroxycinnamic acid **4.69**
6-Hydroxy-1,4-cyclooctadiene **2.134**
4-Hydroxy-5,6-dimethyl-2-(dimethylamino)pyrimidine **16.69**
3-Hydroxy-3,4-dimethylpentyl *p*-methylphenyl sulfide **13.119**
4-(1-Hydroxy-2,2-dimethyl)propyl-2-methoxyphenol **4.127**
2-(2'-Hydroxy-3',5'-di-*tert*-pentylphenyl)benzotriazole **4.96**
3-Hydroxydiphenylamine **4.142**
3-Hydroxy-1,3,5(10),9(11)-estratetraen-17-one **16.31**
5-(2-Hydroxyethoxy)methylfuran-2-carboxaldehyde **5.10**
2-Hydroxyethylsulfide ion **13.96**
N-(2-Hydroxyethyl)-2,2,6,6-tetramethylpiperidine **8.68**
Hydroxyethylvinyldeuteroporphyrin **7.92**
3-Hydroxyflavone **4.74**
5-Hydroxyindole **6.12**
Hydroxylamine, *N,N*-dibenzyl- **15.11**
Hydroxylamine, *N,N*-diethyl- **15.23**
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4-Hydroxy-3-methoxycinnamic acid **4.70**
17-Hydroxy-4-methyl-4-androsten-3-one **16.4**
2-Hydroxy-3-methyl-2-cyclohexen-1-one **2.128**
4-Hydroxy-6-methyl-2-(dimethylamino)pyrimidine **16.70**
5-(Hydroxymethyl)furan-2-carboxaldehyde **5.11**
5-(Hydroxymethyl)furfural **5.11**
4-Hydroxymethyl-2-(phenylmethyl)furan **5.74**
3-Hydroxy-*N*-methylpiperidine **8.70**
4-Hydroxy-*N*-methylpiperidine **8.71**
N-[5-Hydroxy-8-[[2-(methylsulfonyl)-4-nitrophenyl]azo]-1-naphthalenyl]-1,3-benzenedisulfonamide, conjugate base **11.85**
N-[5-Hydroxy-8-[[2-(methylsulfonyl)-4-nitrophenyl]azo]-1-naphthalenyl]-1,3-benzenedisulfonamide, conjugate dibase **11.86**
2-Hydroxynaphthalene **4.89**
5-Hydroxy-1,4-naphthoquinone **4.90**
6-Hydroxy-1,4-naphthoquinone **4.91**
4-Hydroxy-4-(2-naphthyl)-2,2,6,6-tetramethylpiperidine-1-oxyl **15.31**
2-Hydroxy-4-octyloxybenzophenone **4.43**
6-Hydroxy-2,2,5,7,8-pentamethylchroman **4.49**
4-Hydroxy-1,2,2,6,6-pentamethylpiperidine **8.72**
1-(4-Hydroxyphenylazo)-2-naphthol **11.98**
4-Hydroxy-4-(2-phenylethynyl)-2,2,6,6-tetramethylpiperidine *N*-oxyl **15.32**
N-[(2-Hydroxyphenyl)methylene]benzenamine, *N*-oxide **15.7**
2-Hydroxyphenyl phenyl nitron **15.7**
3-(*p*-Hydroxyphenyl)propionic acid **4.34**
N-(3-Hydroxypropyl)-*N,N*-dimethylamine **8.82**
8-Hydroxyquinoline **6.73**
6-Hydroxy-2,5,7,8-tetramethylchroman-2-carboxylate ion **4.44**
3-(6-Hydroxy-2,5,7,8-tetramethylchroman-2-yl)propionic acid **4.66**
4-Hydroxy-2,2,6,6-tetramethylpiperidine **8.77, 8.19**
4-Hydroxy-2,2,6,6-tetramethylpiperidine-1-oxyl **15.33**
4-Hydroxy-2,2,6,6-tetramethylpiperidine *N*-oxyl **15.33**
p-Hydroxythioanisole **13.120**
3-Hydroxytyramine **4.5**
dl-Hyoscyamine **8.1**
Hypericin **16.60**
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- Imidazole-4-ethanaminium, α -carboxy-2,3-dihydro-*N,N,N*-trimethyl-2-thioxo-, *S*, inner salt **13.104**
- Imidazole-4-ethanaminium, α -carboxy-2,3-dihydro-*N,N,N*-trimethyl-2-thioxo-, ion **13.105**
- Imidazole-4-propionic acid, α -amino-2,3-dihydro-2-thioxo-, (*S*) **13.106**
- Imidazo[1,2-*a*]pyrazin-3-one, 4-methyl-6-[4-[2-[3-carboxy-4-(6-hydroxy-3-xanthenon-9-yl)phenylthiocarbamylethoxy]phenyl]-2-ylidene)]- **16.39**
- Imidazo[1,2-*a*]pyrazin-3-one, 2-methyl-6-(4-methoxyphenyl)- **16.40**
- Imidazo[1,2-*a*]pyrazin-3-one, 2-methyl-6-phenyl- **16.41**
- 5-Iminodaunomycin **4.81**
- Indene **3.69**
- Indene, 1,2-diphenyl- **3.70**
- Indene, 1-methyl-2-phenyl- **3.71**
- Indene, 3-methyl-2-phenyl- **3.71**
- Indene, 1,1'-spirobis[5,6-di(methoxycarbonyl)-3,3-dimethyl]- **3.98**
- Indene-1,3-dione, 2-(2-quinolylidene)- **11.68**
- Indigo **11.69**
- Indole **6.8**
- Indole, 5,6-dimethoxy- **6.9**
- Indole, 1,3-dimethyl- **6.10**
- Indole, 2,3-dimethyl- **6.11**
- Indole, 5-hydroxy- **6.12**
- Indole, 5-methoxy- **6.13**
- Indole, 5-methoxy-1,2,3-trimethyl- **6.14**
- Indole, 1-methyl- **6.15**
- Indole, 3-methyl- **6.16**
- Indole, 1-methyl-3-(β -methoxyvinyl)- (*E*) **2.247, 2.248**
- Indole, 1-methyl-3-(β -methoxyvinyl)- (*Z*) **2.248**
- Indole, 3-methyl-2-phenyl- **6.17**
- Indole, 1-(phenylsulfonyl)-3-(β -methoxyvinyl)- (*E*) **2.247, 2.249**
- Indole, 1-(phenylsulfonyl)-3-(β -methoxyvinyl)- (*Z*) **2.249**
- Indole, 1,2,3-trimethyl- **6.18**
- Indole, 1,2,3-trimethyl-5-nitro- **6.19**
- Indole-3-acetate ion **6.20**
- Indole-3-acetic acid **6.21**
- Indole-3-butyrate ion **6.22**
- Indole-3-butyric acid **6.23**
- 3-Indolebutyric acid **6.23**
- Indole-3-carbinol **6.24**
- Indole-3-carboxylate ion **6.26**
- Indole-2-carboxylic acid **6.25**
- Indole-3-carboxylic acid **6.27**
- 3-Indolemethanol **6.24**
- Indole-3-propanamide, α -amino- **10.43**
- Indole-3-propionamide **6.28**
- Indole-3-propionate ion **6.29**
- Indole-3-propionic acid **6.30**
- Indolium, 2-[7-[4-bromo-1-(1,3,3-trimethyl-2-indol-2-ylidene)]-1,3,5-heptatrienyl]-1,3,3-trimethyltetrafluoroborate **11.70**
- Indolium, 5-chloro-1-[7-(5-chloro-1,3-dihydro)-1,3,3-trimethylindol-2-ylidene]-1,3,5-heptatrienyl]-, iodide **11.178**
- Indolium, 2-[7-[4-chloro-1-(1,3,3-trimethyl-2-indol-2-ylidene)]-1,3,5-heptatrienyl]-1,3,3-trimethyltetrafluoroborate **11.71**
- Indolium, 1-[7-(1,3-dihydro)-1,3,3,5-tetramethylindol-2-ylidene]-1,3,5-heptatrienyl]-, iodide **11.184**
- Indolium, 1-[7-(1,3-dihydro)-1,3,3-trimethylindol-2-ylidene]-1,3,5-heptatrienyl]-, fluoride **11.181**
- Indolium, 1-[7-(1,3-dihydro)-1,3,3-trimethylindol-2-ylidene]-1,3,5-heptatrienyl]-, iodide **11.182**
- Indolium, 1-[7-(1,3-dihydro)-1,3,3-trimethylindol-2-ylidene]-1,3,5-heptatrienyl]-, perchlorate **11.183**
- Indolium, 5-fluoro-1-[7-(5-fluoro-1,3-dihydro)-1,3,3-trimethylindol-2-ylidene]-1,3,5-heptatrienyl]-, iodide **11.179**
- Indolium, 2-[7-[4-iodo-1-(1,3,3-trimethyl-2-indol-2-ylidene)]-1,3,5-heptatrienyl]-1,3,3-trimethyl-, iodide **11.72**
- Indolium, 2-[7-[4-iodo-1-(1,3,3-trimethyl-2-indol-2-ylidene)]-1,3,5-heptatrienyl]-1,3,3-trimethyl-, tetrafluoroborate **11.73**
- Indolium, 5-methoxy-1-[7-(5-methoxy-1,3-dihydro)-1,3,3-trimethylindol-2-ylidene]-1,3,5-heptatrienyl]-, iodide **11.180**
- Indolium, 2-[7-(1,3,3-trimethyl-2-indol-2-ylidene)-1-[4-(2,2-dimethoxyethyl)-1,3,5-heptatrienyl]-1,1,3-trimethyl-, tetrafluoroborate **11.74**
- Indolium, 2-[7-(1,3,3-trimethyl-2-indol-2-ylidene)-1-[4-(1-piperidino)-1,3,5-heptatrienyl]-1,3,3-trimethyl bis(tetrafluoroborate) **11.75**
- Indolium, 2-[7-(1,3,3-trimethyl-2-indol-2-ylidene)-1-[4-(1,3,3-trimethyl-2-indolylidene)-2-propenyl]-1,3,5-heptatrienyl]-1,1,3-trimethyl-, tetrafluoroborate **11.76**
- 5-Indolol **6.12**
- Inosine diphosphate, ester with 1,4-dihydro-1- β -D-ribofuranosyl-3-pyridinecarboxamide **16.42**
- Iodide ion **14.9**
- Iodine **14.10**
- Iodoethane **17.28**
- 4-Iodophenoxide ion **4.168**
- 1-(4-Iodophenylazo)-2-naphthol **11.99**
- 4-Iodo-2,2,6,6-tetramethylpiperidin-1-oxyl **15.42**
- 2-[7-(4-Iodo-1,3,3-trimethyl-2-indol-2-ylidene)-1,3,5-heptatrienyl]-1,3,3-trimethylindolium iodide **11.72**
- 2-[7-(4-Iodo-1,3,3-trimethyl-2-indol-2-ylidene)-1,3,5-heptatrienyl]-1,3,3-trimethylindolium tetrafluoroborate **11.73**
- β -Ionone **2.61**

- IR 125 **11.29**
 IR 132 **11.108**
 IR 140 **11.33**
 IR 144 **11.30**
 Iridium(I) bromocarbonylbis(triphenylphosphine) **12.119**
 Iridium(I) carbonylchlorobis(triphenylphosphine) **12.123**
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 Iron(III) (acetato)5,10,15,20-tetraphenylporphyrin **7.47**
 Iron(III) bis(diisopropylidithiocarbamate) **12.48**
 Iron(III) (chloro)5,10,15,20-tetraphenylporphyrin **7.49**
 Iron(II) 5,10,15,20-tetraphenylporphyrin, μ -oxobis- **7.69**
 Iron(III) (thiocyanato-S)5,10,15,20-tetraphenylporphyrin **7.70**
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 Isobenzofuran, 1,3-bis[4-(11-carboxynonyl)phenyl]-4,7-dihydro-5,6-dimethyl-, dianion **5.81**
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 Isobutylamine **8.85**
 Isobutylene **2.337**
 2-Isobutylideneadamantane **2.355**
 Isobutyl sulfide **13.77**
 (-)-Isocaryophyllene. **2.34**
 Isodicyclopentadiene **2.254**
 Isoindole, 1,1,3-triphenyl-, 2-oxide **15.25**
 Isoprene **2.42**
 Isopropanol **17.61**
 Isopropyl alcohol **17.61**
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 1-Isopropylamino-4-phenylaminobenzene **9.30**
 6-Isopropyl-3,4-dihydropyran-5-carboxylic acid ethyl ester **5.99**
 2-Isopropylideneadamantane **2.353**
 2-(Isopropylidene)cyclopentanone **2.155**
 Isopropylidene-cyclopropane **2.170**
 3-Isopropylidene-2-furanone **2.227**
 1-Isopropyl-4-methyl-1,3-cyclohexadiene **2.105**
 4-Isopropyl-1-methylcyclohexene **2.125**
 Isopropyl sulfide **13.78**
 Isopsoralen **5.1**
 Isostilbene **3.99**
 Isozeaxanthin **2.81**
 Juglone **4.90**
 Kaempferol **4.64**
 Ketene diethyl acetal **2.221**
 2-Ketoglutaric acid **17.51**
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 Lead(II) bis[2,2'-thiobis[*O,O'*-di(4-*tert*-butylphenyl)dithiophosphate]] **12.113**
 Lead(II) 2,2'-methylenebis[*O,O'*-di(4-*tert*-butylphenyl)dithiophosphate] **12.157**
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 L-I-leucine, L-methionyl- **13.107**
 Leucomalachite Green **11.77**
 Limonene **2.124**, 13.8, 13.52, 13.97, 13.119, 13.136
 Linalool **2.280**, 2.338, 13.53, 13.54, 13.55, 13.143, 13.144
 Linoleic acid **2.264**
 Linolenic acid **2.267**
 Linolenic acid, phenyl ester **2.270**
 Lipoic acid **13.90**, 3.125
 Luciferase **10.29**
 Luminofor Red-Violet 440RT **11.121**, 11.122, 11.123, 11.124, 11.125, 11.126, 11.127
 Luminol **9.33**
 Luminor 8 **11.121**, 11.122, 11.123, 11.124, 11.125, 11.126, 11.127
 2,6-Lupetidine **8.58**
 Lutein **2.75**
 (*all-E*)-Lutein **2.75**
all-trans-Lutein **2.75**
 Luteolin **4.60**
 Lycopene **2.250**
 Lycopene, (*all-E*)- **2.250**
 (*all-E*)-Lycopene **2.250**
all-trans-Lycopene **2.250**
 Lycopene, dihydroxy- **2.251**
 Lysine decarboxylase (*B. cadaveris*) **10.30**
 Lysozyme **10.30**
 LysRSSR **10.30**
 Magenta dye 9 **11.154**
 Magnesium(II) tetraphenylporphyrin **7.65**
 Magnesium(II) 5,10,15,20-tetraphenylporphyrin **7.65**
 Malonic acid **17.39**
 Manganese(III) (acetato)5,10,15,20-tetraphenylporphyrin **7.48**
 Manganese(II) bis(diisopropylidithiocarbamate) **12.49**
 Manganese(II) chloride hexahydrate **12.151**
 Manganese(II) chloride tetrahydrate **12.152**
 Manganese(III) mesoporphyrin diethyl ester **7.84**
 Manganese(III) 5,10,15,20-tetraphenylporphyrin **7.66**
 Manganese(III) tris(acetylacetonate) **12.175**

- Melanin (from DOPA) 4.78
 Menadione 16.44
 Menaquinone 16.44
p-Menth-1-ene 2.125
 Merbromin 11.64
 2-Mercaptoethanesulfonate ion 13.92
 2-Mercaptoethanol 13.95
 2-Mercaptoethanol, negative ion 13.96
 (*S*)-1-(3-Mercapto-2-methyl-1-oxopropyl)-L-proline 13.130
 2-Mercaptopropionylglycine 13.101
 2-Mercaptopropionylglycine, negative ion 13.102
N-(2-Mercaptopropionyl)glycine 13.101
 Mercurochrome 11.64
 Merocyanine 540 11.39
 Mesitol 4.148
 Mesobilirubin IX 7.9
 Mesodiphenylbenzhelianthrene 3.129
 Mesodiphenylhelianthrene 3.64
 Mesoporphyrin di[4-(diphenylmethylaminocarbonyl-2-nitrophenylmethyl) ester 7.83
 Mesoporphyrin diester with *N*-benzhydryl-4-bromomethyl-3-nitrobenzamide 7.83
 Mesoporphyrin IX, dimethyl ester 7.85
 Methacrylic acid 2.252
 Methanediol, 2-furanyl-, diacetate 5.66
 Methanesulfonamide, *N*-[2-[[4-(1,5-dihydro-3-methyl-5-oxo-1-phenylpyrazol-4-ylidene)amino]-methylphenyl]ethylamino]ethyl- 11.78
 Methanethione, bis(4-chlorophenyl)- 13.159
 Methanethione, bis(4-methylphenyl)- 13.161
 Methanethione, (4-chlorophenyl)phenyl- 13.158
 Methanethione, (4-methoxyphenyl)phenyl- 13.162
 Methanethione, (2,2,6,6-tetramethylcyclohexylidene)- 13.166
 2,5-Methano-1,3-dithiolo[4,5-*d'*][1,3]dithiin, dihydro-2,3a,5-trimethyl-7-methylene- 2.253
 4,7-Methanoindene, 4,5,6,7-tetrahydro- 2.254
 Methanol 17.40
 Methanol, cyclohexylidene-, acetate 2.255
 Methanol, 1-tricyclo[3.3.1.1^{3,7}]decylidene-, acetate 2.256, 2.126
 1,4-Methanonaphthalene, 5,8-dimethoxy-1,2,3,4-tetrahydro-9-isopropylidene- 2.257
 1,4-Methanonaphthalene, 5,6,7,8-tetrachloro-1,2,3,4-tetrahydro-9-isopropylidene- 2.258
 1,4-Methanonaphthalene, 5,6,7,8-tetrafluoro-1,2,3,4-tetrahydro-9-isopropylidene- 2.259
 1,4-Methanonaphthalene, 1,2,3,4-tetrahydro- 3.72
 1,4-Methanonaphthalene, 1,2,3,4-tetrahydro-5,8-dimethoxy- 3.73
 1,4-Methanonaphthalene, 1,2,3,4-tetrahydro-9-isopropylidene- 2.260
 5,8-Methano-[1,2,4]triazolo[1,2-*a*]pyridazine-1,3-dione, tetrahydro-2-methyl- 17.41
 Methenamine 8.32
 Methionine 13.108, 4.30, 4.76, 4.92, 4.152, 4.153, 4.157, 4.158, 4.160, 4.165, 4.166, 4.168, 4.180, 4.181, 4.182, 4.187, 4.188, 10.21, 10.36, 10.41
 Methionine, glycyl- 13.109
 Methionine, *S*-methyl-*N*-(phenylmethyl)carbonyl-, methyl ester 13.110
 Methionine methyl ester 13.111
 L-Methionyl-L-leucine 13.107
 Methone 17.15
 Methoxsalen 5.87
 9-Methoxyanthracene 3.12
 Methoxybenzene 3.43
 2-Methoxybicyclo[2.2.1]cycloheptene 2.20
 2-Methoxybiphenyl 3.59
o-Methoxybiphenyl 3.59
 2-Methoxy-2-butene 2.55
 1-Methoxy-4-(butylthio)benzene 13.12
 2-(Methoxycarbonyl)phenoxide ion 4.41
N-Methoxycarbonyltryptamine 10.35
 6-Methoxy-1,4-cyclooctadiene 2.131
 1-Methoxycyclopentene 2.160
 3-Methoxy-4,6-di-*tert*-butylphenol 4.100
 2-Methoxy-*N,N*-dimethylaniline 9.11
 3-Methoxy-*N,N*-dimethylaniline 9.12
 4-Methoxy-*N,N*-dimethylaniline 9.13
 4-Methoxy-2,6-dimethylphenol 4.132
 3-Methoxyestra-1,3,5(10),8-tetraen-17-one 16.28
 3-Methoxy-1,3,5(10),9(11)-estratetraen-17-one 16.32, 16.29, 16.30, 16.31, 16.33
 2-Methoxyfuran 5.42
 9-Methoxyfuro[3,2-*g*][1]benzopyran-7-one 5.87
 5-Methoxyindole 6.13
 3-Methoxy-2-methyl-2-cyclopenten-1-one 2.167
 5-Methoxymethyl-2-(dimethoxymethyl)furan 5.32
 5-(Methoxymethyl)furan-2-carboxaldehyde 5.12
 5-Methoxy-4-[2-(methylsulfonyl)-4-nitrophenyl]azo-1-naphthoxide ion 11.88
 1-Methoxy-2-nitrobenzene 3.44
 2-Methoxynorbornene 2.20
 2-Methoxyphenol 4.129
 3-Methoxyphenol 4.130
 4-Methoxyphenol 4.131
 2-Methoxyphenoxide ion 4.169
 3-Methoxyphenoxide ion 4.170
 4-Methoxyphenoxide ion 4.171
 2-(4-Methoxyphenoxymethylidene)adamantane 2.352
 1-Methoxy-4-(phenylazo)naphthalene 11.59
 1-(4-Methoxyphenylazo)-2-naphthol 11.100
 4-(4-Methoxyphenylazo)-1-naphthol 11.89

- 7-Methoxy-2-phenyl-1,2-benzisoselenazol-3-one 13.38
 3-(4-Methoxyphenyl)-2-cyclopentene-1-thione 13.66
 3-(4-Methoxyphenyl)-1,5-diphenyl-2-pyrazoline 11.124
 5-(4-Methoxyphenyl)-1,3-diphenyl-2-pyrazoline 11.125
 2-(4-Methoxyphenyl)furan 5.44
 3-(4-Methoxyphenyl)furan 5.45
 4-(4'-Methoxyphenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one 11.148
 4-Methoxyphenyl methyl sulfide 13.22
 1-(4-Methoxyphenyl)-4-phenyl-1,3-cyclopentadiene 2.148
 2-(4-Methoxyphenyl)-3-phenyl-1,4-dioxene 2.195
 (4-Methoxyphenyl)phenylmethanethione 13.162
 4-Methoxyphenyl phenyl sulfide 13.23
 1-(4-Methoxyphenyl)-4,4,8,8-tetramethyl-2,3,4,5,7,8,9,10-octahydropyrrolo[4,3,2-*m,n*]acridine-10-one 6.68
 1-Methoxy-4-(phenylthio)benzene 13.23
 3-(4-Methoxyphenyl)thio-1-propanol 13.135
 4'-Methoxypivalothiophenone 13.129
 3-Methoxypsoralen 5.87
 6-Methoxyquinoline 6.74
 4-Methoxy-2,3,5,6-tetramethylphenol 4.133
p-Methoxythioanisole 13.22
 4-Methoxythiobenzamide 13.154
 4-Methoxythiobenzophenone 13.162
 5-Methoxy-1,2,3-trimethylindole 6.14
 4-Methoxy-2,3,6-trimethylphenol 4.134
m-Methoxy- α,β,β -trimethylstyrene 3.117
p-Methoxy- α,β,β -trimethylstyrene 3.118, 3.115, 3.123
 Methyl acetal of oxidized octaethylpurpurin ethyl ester 7.16
 2-Methylacetophenone enol 2.219
 Methyl alcohol 17.40
 Methylamine, *N,N*-bis(2-hydroxyethyl)- 8.46
 Methylamine, *N,N*-dimethyl- 8.47
 1-Methylamino-9,10-diphenylanthracene 9.20
 Methyl *tert*-amyl ether 17.19
N-Methylaniline 9.14
 9-Methylanthracene 3.13
 Methyl arachidonate 2.213
 [4-Methyl-1,2-benzenedithiolato](2,2'-bipyridine)nickel(II) 12.153
 [4-Methyl-1,2-benzenedithiolato](1,10-phenanthroline)nickel(II) 12.154
 [4-Methyl-1,2-benzenedithiolato](1,10-phenanthroline)platinum(II) 12.155
 Methyl benzoate 3.57
 Methyl-1,4-benzoquinone 16.13
 α -Methylbenzyl alcohol 3.55
 Methylbixin 2.176
trans-Methylbixin 2.175
 Methyl 4-bromophenyl sulfide 13.7
 2-Methyl-1,3-butadiene 2.42
 2-Methyl-2-butene 2.56, 2.122, 2.161, 2.307, 2.309, 2.310, 3.110, 15.2, 15.13, 15.14, 15.15
 (*E*)-2-Methyl-2-butenic acid 2.58
 3-Methyl-2-buten-1-ol 2.60
 Methyl *tert*-butyl ether 17.18
 Methyl 4-*tert*-butylphenyl sulfide 13.20
 Methyl butyl sulfide 13.57
 1-Methyl-4-(butylthio)benzene 13.13
 2-Methyl-6-[4-[2-[3-carboxy-4-(6-hydroxy-3-xanthenon-9-yl)phenylthiocarbamylethoxy]-phenyl]imidazo[1,2-*a*]pyrazin-3-one 16.39
 Methylcercosporin 16.58
 4-Methyl-2-(3-chlorophenyl)-5-phenyloxazole 6.33
 4-Methyl-2-(4-chlorophenyl)-5-phenyloxazole 6.34
 Methyl 3-chlorophenyl sulfide 13.14
 3-Methyl-2-[7-(5-chloro-1,3,3-trimethyl-2-indolylidene)-1-(1,3,5-heptatrienyl)benzothiazolium iodide 11.34
 4-Methyl-4-cholesten-3-one 2.90
 1-Methylcyclobutene 2.98
 1-Methylcycloheptene 2.102
 1-Methyl-1,4-cyclohexadiene 2.107
 3-Methyl-1,2-cyclohexanedione, 2-enol 2.128
 1-Methylcyclohexene 2.122, 2.11, 2.21, 2.120, 2.153, 2.161, 2.236, 2.237, 2.238, 2.239, 2.243, 2.309, 2.326, 2.327
 4-Methylcyclohexene 2.123
 1-Methylcyclooctene 2.138
 1-Methylcyclopentene 2.161, 2.22, 2.122
 Methyl 3,5-di-*tert*-butyl-4-hydroxybenzoate 4.39
N-Methyldiethanolamine 8.46
 5-Methyl-2,3-dihydrofuran 5.31
 Methyl 4,5-dihydro-2-methyl-3-furancarboxylate 5.58
 4-Methyl-2,3-dihydropyran-2-*t* 5.97
 4-Methyl-2,3-dihydropyran-3-*t* 5.95
 4-Methyl-2,3-dihydropyran-4-*d* 5.92
 4-Methyl-2,3-dihydropyran-4-*t* 5.93
 6-Methyl-3,4-dihydropyran-5-carboxylic acid ethyl ester 5.98
 Methyl 4-(1,1-dimethylethyl)phenyl sulfide 13.20
 2-Methyl-4,6-dinitrophenoxide ion 4.173
 4-Methyl-2,6-dinitrophenoxide ion 4.174
 Methylene, bis(cyclopropyl)cyclobutenylidene- 2.96, 2.49, 2.50, 2.94, 2.95, 2.151, 2.168, 2.169, 2.333, 2.334, 2.335, 3.113
 2-Methylenebicyclo[2.2.1]heptane 2.11, 2.9, 2.13, 2.14, 2.21, 2.23
 5-Methylenebicyclo[2.2.1]hept-2-ene 2.22, 2.6, 2.11, 2.21, 2.153
 2,2'-Methylenebis(6-*tert*-butyl-4-methylphenol) 4.136
 2,2'-Methylenebis[*O,O'*-di(4-*tert*-butylphenyl)dithiophosphate]cobalt(II) 12.156
 2,2'-Methylenebis[*O,O'*-di(4-*tert*-butylphenyl)dithiophosphate]lead(II) 12.157

- 2,2'-Methylenebis[*O,O'*-di(4-*tert*-butylphenyl)dithiophosphate]nickel(II) 12.158
- Methylene Blue cation 11.113
- Methylene chloride 17.16
- Methylene-*d*₂ chloride 17.17
- Methylenecycloheptane 2.101
- Methylenecyclohexane 2.112, 2.101, 2.153
- Methylenecyclopentane 2.153
- 2-Methylenenorbornane 2.11, 2.9, 2.13, 2.14, 2.21, 2.23
- endo*-2-Methylenenorbornane-3-*d* 2.13
- exo*-2-Methylenenorbornane-3-*d* 2.14
- 5-Methylene-2-norbornene 2.22, 2.6, 2.11, 2.21, 2.153
- Methyl esters of fatty acids from peanut oil 17.42
- Methyl esters of fatty acids from soybean oil 17.43
- Methyl esters of fatty acids from sunflower oil 17.44
- Methyl 4-fluorophenyl sulfide 13.21
- 3-Methyl-2-[7-(5-fluoro-1,3,3-trimethyl-2-indolylidene)-1-(1,3,5-heptatrienyl)benzothiazolium iodide] 11.35
- 2-Methylfuran 5.46
- 5-Methylfuran-2-carboxaldehyde 5.13
- 5-Methyl-2-furanitrile 5.64
- 5-Methylfurfural 5.13
- α -Methylfurfuryl alcohol 5.69
- N*-Methylfurfurylamine 5.65
- Methyl 2-furoate 5.57
- 3-Methylheptane 17.35
- 4-Methylheptane 17.36
- Methylhydroquinone 4.29
- 4-Methylimidazole 6.7
- 2,2'-Methyliminodiethanol 8.46
- 1-Methylindole 6.15
- 3-Methylindole 6.16
- 2-Methyl-5-isopropylthiacyclopent-2-ene-1-oxide 13.144
- Methyl linoleate 2.265, 4.46, 4.50, 4.53
- Methyl linolenate 2.269
- 4-(Methylmercapto)phenol 13.120
- (*E*)-1-Methyl-3-(β -methoxylvinyl)indole 2.247, 2.248
- (*Z*)-1-Methyl-3-(β -methoxylvinyl)indole 2.248
- 2-Methyl-6-(4-methoxyphenyl)imidazo[1,2-*a*]pyrazin-3-one 16.40
- 4-Methyl-2-(4-methoxyphenyl)-5-phenyloxazole 6.35
- Methyl 4-methoxyphenyl sulfide 13.22
- 3-Methyl-2-[7-(5-methoxy-1,3,3-trimethyl-2-indolylidene)-1-(1,3,5-heptatrienyl)benzothiazolium iodide] 11.36
- (*R*)-1-Methyl-4-(1-methylethenyl)cyclohexene 2.124, 13.8, 13.52, 13.97, 13.119, 13.136
- 1-Methyl-4-(1-methylethyl)-1,3-cyclohexadiene 2.105
- 2-Methyl-5-(1-methylethyl)-1,3-cyclohexadiene 2.106
- 4-Methyl-2-(4-methylphenyl)-5-phenyloxazole 6.36
- Methyl 3-methylphenyl sulfide 13.24
- Methyl 4-methylphenyl sulfide 13.25
- 4-Methyl-3-(4-methylphenyl)sydnone 5.103
- Methyl 1-methylpropenyl ether 2.55
- N*-[[[(5-Methyl-2-(methylthio)-3-thienyl)methylene]cyclohexanamine] 13.64
- 1-Methylnaphthalene 3.86
- 4-Methyl-1,3-naphthalenedipropionic acid 3.89
- 4-Methyl-1-naphthalenepropionate ion 3.91
- 4-Methyl-1-naphthalenepropionate ion endoperoxide 3.92
- 4-Methyl-1-naphthalenepropionic acid endoperoxide 3.93
- 2-Methyl-1,4-naphthoquinone 16.44
- 3,3'-(4-Methyl-1,3-naphthylene)dipropionic acid 3.89
- Methyl 2-naphthyl ketone 3.1
- 4-Methyl-2-nitrophenoxide ion 4.175
- 1-(4-Methyl-2-nitrophenylazo)-2-naphthol 11.101
- 4-Methyl-2-(4-nitrophenyl)-5-phenyloxazole 6.37
- 2-Methyl-2-nitrosopropane 15.50
- 9-Methyl-6-nitro-2,3,4,9-tetrahydrocarbazole 6.3
- 2-Methylnorborna-2,5-diene 2.6
- 2-Methylnorborn-2-ene 2.21, 2.23
- 4-Methyl-4-octene 2.289
- cis*-4-Methyl-4-octene 2.290
- (*E*)-4-Methyl-4-octene 2.290
- trans*-4-Methyl-4-octene 2.291
- (*Z*)-4-Methyl-4-octene 2.291
- Methyl oleate 2.272
- 4-Methyl-1,3-pentadiene 2.300
- 2-Methyl-2-pentene 2.307, 2.66, 2.86, 2.92, 2.122, 2.243, 2.250, 2.256, 2.311, 2.312, 2.343, 3.71, 4.32, 4.102, 4.147, 13.87, 15.1
- 3-Methyl-2-pentene 2.308
- cis*-3-Methyl-2-pentene 2.310
- cis*-4-Methyl-2-pentene 2.312, 2.116
- (*E*)-3-Methyl-2-pentene 2.309
- (*E*)-4-Methyl-2-pentene 2.311
- trans*-3-Methyl-2-pentene 2.309
- trans*-4-Methyl-2-pentene 2.311
- (*Z*)-3-Methyl-2-pentene 2.310
- (*Z*)-4-Methyl-2-pentene 2.312, 2.116
- 2-Methyl-2-penten-4-ol 2.323
- 4-Methyl-3-penten-2-ol 2.323
- (*E*)-3-Methyl-2-penten-1-ol 2.319
- (*Z*)-3-Methyl-2-penten-1-ol 2.320
- 3-Methyl-2-pentyl-2-cyclopenten-1-one 2.162
- 4-Methylphenol 4.135
- 10-Methylphenothiazine 13.123
- N*-Methylphenothiazine 13.123
- 4-Methylphenoxide ion 4.172
- 2-(4-Methylphenoxymethylidene)adamantane 2.354
- 1-(4-Methylphenylazo)-2-naphthol 11.102
- 4-(4-Methylphenylazo)-1-naphthol 11.90

- 1-(4-Methylphenylazo)-3-(phenylaminocarbonyl)-2-naphthol **11.80**
- 1-(4-Methylphenylazo)-1-(phenylaminocarbonyl)-2-propanone **11.60**
- 3-Methyl-1-phenyl-2-butene **3.45**
- N*-Methyl-4-phenyl-2,3-dihydropyridinium **6.53**
- 3-(4-Methylphenyl)-1,5-diphenyl-2-pyrazoline **11.126**
- 5-(4-Methylphenyl)-1,3-diphenyl-2-pyrazoline **11.127**
- 2-(4-Methylphenyl)furan **5.47**
- 3-(4-Methylphenyl)furan **5.48**
- 2-Methyl-6-phenylimidazo[1,2-*a*]pyrazin-3-one **16.41**
- 1-Methyl-2-phenylindene **3.71**
- 3-Methyl-2-phenylindene **3.71**
- 3-Methyl-2-phenylindole **6.17**
- 2-Methyl-*N*-phenylmethylene-2-propanamine *N*-oxyl **15.46**
- 4-Methylphenyl phenyl nitron **15.8**
- 4-Methylphenyl phenyl sulfide **13.26**
- 3-(4-Methylphenyl)-4-phenylsydnone **5.106**
- 2-Methyl-1-phenyl-1-propene **3.114**
- N*-Methyl-4-phenylpyridinium **6.55**
- Methyl phenyl sulfide **13.29**
- 2-Methyl-3-phenylsulfanyl-2-butene **13.53**
- 3-Methyl-4-phenylsydnone **5.105**
- 3-(4-Methylphenyl)sydnone **5.104**
- N*-Methyl-4-phenyl-1,2,3,6-tetrahydropyridine **8.94**
- 1-Methyl-4-(phenylthio)benzene **13.26**
- 4-(4-Methylphenyl)thio-1-butanol **13.52**
- 2-(4-Methylphenyl)thioethanol **13.97**
- 6-(4-Methylphenyl)thio-1-hexanol **13.103**
- 5-(4-Methylphenyl)thio-1-pentanol **13.118**
- 3-(4-Methylphenyl)thio-1-propanol **13.136**
- Methyl phosphite **17.73, 17.74**
- Methyl phytol ether **2.237**
- 2-Methylpiperidine **8.59**
- N*-Methylpiperidine **8.60**
- 1-Methyl-3-piperidinol **8.70**
- 1-Methyl-4-piperidinol **8.71**
- N*-Methyl-4-piperidinol **8.71**
- 2-Methyl-2-propaneamine **8.15**
- 2-Methyl-2-propanol **17.62**
- 2-Methylpropene **2.337**
- 2-Methylpropenoic acid **2.252**
- 1,1'-(2-Methyl-1-propenylidene)bisbenzene **3.46**
- (2-Methylpropylidene)tricyclo[3.3.1.1^{3,7}]decane **2.355**
- 2-Methylpropyl methyl ether **17.18**
- 1-Methylpropyl propyl sulfide **13.59**
- 1-Methylpyridinium **6.54**
- 4-(*N*-Methylpyridinium)-*tert*-butylnitron **15.45**
- α -(1-Methyl-4-pyridyl)-*tert*-butyl nitron **15.45**
- 1-Methylpyrrole **6.64**
- N*-Methylpyrrole **6.64**
- Methyl salicylate **4.40**
- Methyl salicylate, conjugate base **4.41**
- Methylselenobenzene **13.27**
- 2-(Methylseleno)-*N*-phenylbenzamide **13.2**
- Methyl stearate **16.43**
- cis*- α -Methylstilbene **3.105**
- (*E*)- α -Methylstilbene **3.104**
- trans*- α -Methylstilbene **3.104**
- (*Z*)- α -Methylstilbene **3.105**
- cis*- β -Methylstyrene **3.120**
- (*E*)- β -Methylstyrene **3.119**
- trans*- β -Methylstyrene **3.119**
- (*Z*)- β -Methylstyrene **3.120**
- Methyl sulfide **13.80, 13.81**
- Methyl sulfoxide **13.81**
- Methyltellurobenzene **13.28**
- 9-Methyl-2,3,4,9-tetrahydrocarbazole **6.2**
- 3-Methyl-2-[7-(1,3,3,5-tetramethyl-2-indolylidene)-1-(1,3,5-heptatrienyl)benzothiazolium, iodide] **11.38**
- 2-Methylthiacyclohex-2-ene-1-oxide **13.143**
- 1-Methyl-3-(1-thiaethyl)benzene **13.24**
- 3-Methyl-4-thiaheptane **13.59**
- Methylthiirane **13.152**
- p*-Methylthioanisole **13.25**
- 4-Methylthiobenzamide **13.155**
- Methylthiolato(triethylphosphino)gold(I) **12.159**
- 2-(Methylthio)-*N*-phenylbenzamide **13.3**
- N*-Methylthiourea **13.176**
- 3-Methyl-2-[7-(1,3,3-trimethyl-2-indol-2-ylidene)-1,3,5-heptatrienyl]benzothiazolium, iodide **11.37**
- m*-Methyl- α,β,β -trimethylstyrene **3.121**
- p*-Methyl- α,β,β -trimethylstyrene **3.122, 3.109, 3.111, 3.112, 3.117, 3.118, 3.123**
- 5-Methyluracil **16.79**
- Mitomycin C **16.7**
- Monohydroperoxides of 4,8-dimethyl-4,8-dodecadiene **2.203**
- Monohydroperoxides of *trans*-2,6-dimethyl-2,6-octadiene **2.278**
- Monohydroperoxy-3,7-dimethyl-2,6-octadien-1-ol **2.284**
- Monohydroperoxygeraniol **2.284**
- Monohydroxyethyl vinyl deuteroporphyrin **7.92**
- Morpholine, 4-[(phenylmethyl)thio]- **13.112**
- 4-Morpholineethanesulfonic acid **17.45**
- Muscalure **2.349**
- Myristic acid **17.67**
- NADH dehydrogenase **10.12**
- Nagarse **10.32**
- Nalidixic acid **16.45**
- Nalidixic acid, anion **16.46**
- Naphthacene **3.124, 3.12, 7.53, 8.72, 8.77, 9.18, 15.46**

- 5,12-Naphthacenedione, 8-acetyl-10[(3-amino-2,3,6-trideoxy-hexopyranosyloxy)-tetrahydro-6,8,11-trihydroxy-1-methoxy]- **4.79**
- 5,12-Naphthacenedione, 10-[(3-amino-2,3,6-trideoxy- α -L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-8-(hydroxyacetyl)-1-methoxy- **4.80**
- 12-Naphthaceneone, 8-acetyl-10[(3-amino-2,3,6-trideoxyhexopyranosyloxy)-tetrahydro-6,7,11-trihydroxy-5-imino-1-methoxy]- **4.81**
- 2-Naphthalenamine **9.24**
- Naphthalene **3.74**
- Naphthalene, 2-acetyl- **3.1**
- Naphthalene, 2-amino- **9.24**
- Naphthalene, 1,5-dihydroxy- **4.82**
- Naphthalene, 1,6-dihydroxy- **4.83**
- Naphthalene, 1,7-dihydroxy- **4.84**
- Naphthalene, 1,8-dihydroxy- **4.85**
- Naphthalene, 2,6-dihydroxy- **4.86**
- Naphthalene, 2,7-dihydroxy- **4.87**
- Naphthalene, 1,2-dimethyl- **3.75**
- Naphthalene, 1,3-dimethyl- **3.76**
- Naphthalene, 1,4-dimethyl- **3.77**
- Naphthalene, 1,5-dimethyl- **3.75, 3.76, 3.77, 3.78, 3.79, 3.80, 3.81, 3.82, 3.83, 3.86**
- Naphthalene, 1,6-dimethyl- **3.78**
- Naphthalene, 1,7-dimethyl- **3.79**
- Naphthalene, 1,8-dimethyl- **3.80**
- Naphthalene, 2,3-dimethyl- **3.81**
- Naphthalene, 2,6-dimethyl- **3.82**
- Naphthalene, 2,7-dimethyl- **3.83**
- Naphthalene, 1,1'-(1,2-dimethyl-1,2-diethenyl)bis-, (*E*)- **3.84**
- Naphthalene, 2,2'-(1,2-dimethyl-1,2-diethenyl)bis-, (*E*)- **3.85**
- Naphthalene, 2,2'-(1,2-dimethyl-1,2-diethenyl)bis-, (*Z*)- **3.84, 3.85**
- Naphthalene, 1-methoxy-4-(phenylazo)- **11.59**
- Naphthalene, 1-methyl- **3.86**
- Naphthalene, 1-(2-methyl-1-propenyl)- **3.87**
- Naphthalene, 1,2,3,4,5,6,7,8-octahydro- **2.261, 13.112**
- 2-Naphthalenecarboxamide, 4-[[4-(aminocarbonyl)phenyl]azo]-3-hydroxy-*N*-(2-methoxyphenyl)- **11.79**
- 2-Naphthalenecarboxamide, 3-hydroxy-4-[[4-methylphenyl]azo]-*N*-phenyl- **11.80**
- 1,5-Naphthalenediol **4.82**
- 1,6-Naphthalenediol **4.83**
- 1,7-Naphthalenediol **4.84**
- 1,8-Naphthalenediol **4.85**
- 2,6-Naphthalenediol **4.86**
- 2,7-Naphthalenediol **4.87**
- 1,4-Naphthalenedipropionate ion **3.88**
- 3,3'-(1,4-Naphthalene)dipropionate ion **3.88**
- 1,3-Naphthalenedipropionic acid, 4-methyl- **3.89**
- 1,3-Naphthalenedipropionic acid, 4-methyl-, dimethyl ester **3.90**
- 1-Naphthalenepropionate ion, 4-methyl- **3.91**
- 1-Naphthalenepropionate ion, 4-methyl-, endoperoxide **3.92**
- 1-Naphthalenepropionic acid, 4-methyl-, endoperoxide **3.93**
- 2-Naphthalenethione, 1,2-dihydro-1,1-dimethyl- **13.113**
- 2-Naphthalenethione, 1,2-dihydro-1,1,3-trimethyl- **13.114**
- 1-Naphthalenone, 4-[[2,6-dimethyl-4-(diethylamino)phenyl]imino]-2-(2-methoxy-5-fluorosulfonylphenyl)aminocarbonyl- **11.81**
- 1-Naphthalenone, 4-[[4-(diphenylamino)phenyl]imino]- **11.82**
- 1-Naphthalenone, 4-[(*N*-methyl-*N*-phenyl)amino]imino- **11.83**
- 1-Naphthalenone, 4-[[4-(phenylamino)phenyl]imino]- **11.84**
- Naphthalocyanine, bis(tribenzylsiloxy)silicon **7.17**
- Naphthalocyanine, bis(tri-*n*-hexyloxysiloxy)silicon **7.18**
- Naphthalocyanine, bis(trihexylsiloxy)silicon **7.18**
- Naphthalocyanine, bis(trihexylsiloxy)tin **7.19**
- Naphthalocyanine, bis(triisobutylsiloxy)silicon **7.20**
- Naphthalocyanine, 1,6,10,15,19,24,28,33-octabutoxy-, palladium(II) **7.21**
- Naphthalocyanine, 2,11,20,29-tetrakis(1,1-dimethylethyl) **7.22**
- Naphthalocyanine, 1,10,19,28-tetraphenyl-, hydroxyaluminum(III) **7.23**
- Naphthalocyanine, trihexylsiloxyaluminum **7.24**
- Naphthalocyanine, trihexylsiloxygallium **7.25**
- Naphtho[1,8-*bc*:5,4-*b'*,*c'*]dipyran **3.94**
- 1-Naphthol **4.88**
- 1-Naphthol, 5-[[3-(aminosulfonyl)phenyl]sulfonylamino]-4-[2-(methylsulfonyl)-4-nitrophenylazo]-, conjugate base **11.85**
- 1-Naphthol, 5-[[3-(aminosulfonyl)phenyl]sulfonylamino]-4-[2-(methylsulfonyl)-4-nitrophenylazo]-, conjugate dibase **11.86**
- 1-Naphthol, 4-(4-chlorophenylazo)- **11.87**
- 1-Naphthol, 5-methoxy-4-[2-(methylsulfonyl)-4-nitrophenyl]azo-, conjugate base **11.88**
- 1-Naphthol, 4-(4-methoxyphenylazo)- **11.89**
- 1-Naphthol, 4-(4-methylphenylazo)- **11.90**
- 1-Naphthol, 4-(4-nitrophenylazo)- **11.91**
- 1-Naphthol, 4-phenylazo- **11.92, 11.87, 11.89, 11.90, 11.91**
- 2-Naphthol **4.89**
- 2-Naphthol, 1-(4-aminophenylazo)- **11.93**
- 2-Naphthol, 1-(4-bromophenylazo)- **11.94**
- 2-Naphthol, 1-(4-chlorophenylazo)- **11.95**
- 2-Naphthol, 1-[4-(dimethylamino)phenylazo]- **11.96**
- 2-Naphthol, 1-(4-fluorophenylazo)- **11.97**

- 2-Naphthol, 1-(4-hydroxyphenylazo)- **11.98**
 2-Naphthol, 1-(4-iodophenylazo)- **11.99**
 2-Naphthol, 1-(4-methoxyphenylazo)- **11.100**
 2-Naphthol, 1-(4-methyl-2-nitrophenylazo)- **11.101**
 2-Naphthol, 1-(4-methylphenylazo)- **11.102**
 2-Naphthol, 1-(4-methylphenylazo)-3-(phenylaminocarbonyl)- **11.80**
 2-Naphthol, 1-(4-nitrophenylazo)- **11.103**
 2-Naphthol, 1-phenylazo- **11.104**, *11.94*, *11.95*, *11.96*, *11.97*, *11.98*, *11.99*, *11.100*, *11.102*, *11.103*
 4-Naphthol, 1-(4-methylphenylazo)- **11.90**
 4-Naphthol, 1-phenylazo- **11.91**
 α -Naphthol **4.88**
 β -Naphthol **4.89**
 Naphtho[1,2,3,4-*rst*]pentaphene-5,8-dione, 3,10-dimethyl- **3.95**
 1,4-Naphthoquinone, 5-hydroxy- **4.90**
 1,4-Naphthoquinone, 6-hydroxy- **4.91**
 1,4-Naphthoquinone, 2-methyl- **16.44**
 1,4-Naphthoquinone *N*-methyl-*N*-phenylhydrazone **11.83**
 Naphtho[1,2-*d*]thiazolium, 1-ethyl-2-[(1-ethylnaphtho[1,2-*d*]thiazol-2-ylidene)methyl]-, chloride **11.105**
 Naphtho[1,2-*d*]thiazolium, 1-ethyl-2-[(1-ethylnaphtho[1,2-*d*]thiazol-2-ylidene)methyl]-1-butenyl-, bromide **11.106**
 Naphtho[1,2-*d*]thiazolium, 1-ethyl-2-[(1-ethylnaphtho[1,2-*d*]thiazol-2-ylidene)-1-propenyl]-, toluenesulfonate **11.107**
 Naphtho[2,3-*d*]thiazolium, 2-[2-(2-(diphenylamino)-3-[3-(4-methoxy-4-oxobutyl)naphtho[2,3-*d*]thiazol-2-ylidene]ethylidene]1-cyclopenten-1-yl]ethenyl]-3-(4-methoxy-4-oxobutyl)-, perchlorate **11.108**
 2-Naphthylamine **9.24**
 2,2'-[1,8-Naphthylenebis(nitrilomethylidyne)]-bis[phenolato]nickel(II) **12.160**
 1,8-Naphthyridine-3-carboxylic acid, 1,4-dihydro-1-ethyl-7-methyl-4-oxo- **16.45**
 1,8-Naphthyridine-3-carboxylic acid, 1,4-dihydro-1-ethyl-7-methyl-4-oxo-, anion **16.46**
 Naringenin **4.72**
 Nealloocimene **2.285**
 Neurosporene **2.70**
 (*all-E*)-Neurosporene **2.70**
 (*all-trans*)-Neurosporene **2.70**
 Nickel(I), bis(1,2-diphenyl-1,2-ethanedithionato)-, tetrabutylammonium salt **12.65**
 Nickel(II), bis[3-(cyclohexylimino)methyl]-5-ethyl-2-thiophenethionato]- **12.21**
 Nickel(II), bis[1,2-di(2-bromophenyl)-1,2-ethenedithiolato]- **12.25**
 Nickel(II), bis[1,2-di(2-chlorophenyl)-1,2-ethenedithiolato]- **12.33**
 Nickel(II), bis[1,2-di(4-chlorophenyl)-1,2-ethenedithiolato]- **12.34**
 Nickel(II), bis[1,2-di(4-ethylphenyl)-1,2-ethenedithiolato]- **12.42**
 Nickel(II), 3,4-dimercaptotoluene(2,2'-bipyridine) **12.153**
 Nickel(II), 3,4-dimercaptotoluene(1,10-phenanthroline) **12.154**
 Nickel(II) acetate **12.161**
 Nickel(II) ammine[2,2'-thiobis(4-*tert*-octyl)phenolate] **12.2**
 Nickel(II) aniline[2,2'-thiobis(4-*tert*-octyl)phenolate] **12.3**
 Nickel(II) aquo[2,2'-thiobis(3,4-dimethyl)phenolate] **12.4**
 Nickel(II) aquo[2,2'-thiobis(4-*tert*-octyl)phenolate] **12.5**
 Nickelate(1-), bis[1,2-di(4-trifluoromethylphenyl)-1,2-ethanedithionato]-, tetrabutylammonium salt **12.75**
 Nickel(II) bis(acetylacetonate) **12.10**
 Nickel(II) bis(acetylacetonate) dihydrate **12.11**
 Nickel(II) bis[2-(*N*-(*p*-anilinophenyl)formimidoyl)phenol] **12.106**
 Nickel(II) bis[1,3-bis(2-pyridylimino)isoindoline] **12.45**
 Nickel(II) bis(5-bromosalicylaldehyde)·2H₂O **12.14**
 Nickel(II) bis[*O*-butyl-3,5-di-*tert*-butyl-4-hydroxybenzylphosphonate] **12.16**
 Nickel(II) bis[2-(*N*-butylformimidoyl)-4-bromophenol] **12.17**
 Nickel(II) bis[2-(*N*-butylformimidoyl)-4-methoxyphenol] **12.18**
 Nickel(II) bis[2-(*N*-butylformimidoyl)phenol] **12.19**
 Nickel(II) bis[2-(*N*-*sec*-butylformimidoyl)phenol] **12.105**
 Nickel(II) bis[2-(*N*-*tert*-butylformimidoyl)phenol] **12.57**
 Nickel(II) bis[*p*-*tert*-butylphenylsalicylate] **12.58**
 Nickel(II) bis[2-(*N*-cyclohexylformimidoyl)phenol] **12.24**
 Nickel(II) bis(dibutylthiocarbamate) **12.28**
 Nickel(II) bis[*O*,*O'*-di(4-*tert*-butylphenyl)dithiophosphate] **12.32**
 Nickel(II) bis(dicyclohexyldithiophosphinate) **12.35**
 Nickel(II) bis[1,2-di(2,4-dichlorophenyl)-1,2-ethenedithiolato]- **12.37**
 Nickel(II) bis[1,2-di(3,4-dichlorophenyl)-1,2-ethenedithiolato]- **12.38**
 Nickel(II) bis[1,2-di(dimethylaminophenyl)-1,2-ethenedithiolato]- **12.39**
 Nickel(II) bis(diethylthiocarbamate) **12.40**
 Nickel(II) bis(*O*,*O'*-diethylthiophosphate) **12.44**
 Nickel(II) bis(*O*,*O'*-diethylphosphorodithiolato)- **12.44**
 Nickel(II) bis(diisopropylthiocarbamate) **12.50**
 Nickel(II) bis(diisopropylthiophosphate) **12.52**
 Nickel(II) bis(*O*,*O'*-diisopropylthiophosphate) **12.52**
 Nickel(II) bis(*O*,*O'*-diisopropylphosphorodithiolato)- **12.52**
 Nickel(II) bis[3,5-diisopropylsalicylate] **12.60**
 Nickel(I) bis[1,2-di(4-methoxyphenyl)-1,2-ethanedithionato]-, tetrabutylammonium salt **12.53**
 Nickel(II) bis[1,2-di(4-methoxyphenyl)-1,2-ethenedithiolato]- **12.54**
 Nickel(II) bis(dimethylthiocarbamate) **12.56**
 Nickel(II) bis(1,2-dimethyl-1,2-ethenedithiolato)- **12.15**

- Nickel(II) bis[*O,O'*-di(4-methylphenyl)dithiophosphate] **12.63**
- Nickel(II) bis(diphenyldithiocarbamate) **12.64**
- Nickel(II) bis(*O,O'*-diphenyldithiophosphate) **12.71**
- Nickel(II) bis[1,2-diphenyl-1,2-ethenedithiolato]- **12.66**
- Nickel(II) bis(*O,O'*-diphenyl phosphorodithioato)- **12.71**
- Nickel(II) bis[dithioacetylacetonate] **12.74**
- Nickel(II) bis(dithiobenzil) **12.66**
- Nickel(II) bis[dithiobiacetyl] **12.15**
- Nickel(II) bis(dithiohexafluorobiacetyl) **12.85**
- Nickel(I) bis[1,2-di(4-trifluoromethylphenyl)-1,2-ethenedithiolato]-, tetrabutylammonium salt **12.75**
- Nickel(II) bis[1,2-di(4-trifluoromethylphenyl)-1,2-ethenedithiolato]- **12.76**
- Nickel(I) bis[1,2-di(3,4,5-trimethoxyphenyl)-1,2-ethanedithionato]-, tetrabutylammonium salt **12.77**
- Nickel(II) bis[1,2-di(3,4,5-trimethoxyphenyl)-1,2-ethenedithiolato]- **12.79**
- Nickel(II) bis[2-(*N*-dodecylformimidoyl)phenol] **12.82**
- Nickel(II) bis[*O*-ethyl-3,5-di-*tert*-butyl-4-hydroxybenzylphosphonate] **12.83**
- Nickel(II) bis[2-(formimidoyl)phenol] **12.96**
- Nickel(II) bis[hydrotris(1-pyrazolyl)borate] **12.86**
- Nickel(II) bis(2'-hydroxyacetophenone oxime) **12.87**
- Nickel(II) bis[2'-hydroxy-4'-methylacetophenone oxime] **12.93**
- Nickel(II) bis[2-hydroxy-5-methylbenzophenone] **12.94**
- Nickel(II) bis[2'-hydroxy-4'-methyl-dodecanophenone oxime] **12.95**
- Nickel(II) bis[4-imino-2-pentene-2-ol] **12.97**
- Nickel(II) bis[2-(*N*-isopropylformimidoyl)phenol] **12.101**
- Nickel(II) bis[isopropylxanthate] **12.98**
- Nickel bis(mesitylenesulfonate) **12.118**
- Nickel(II) bis(5-methoxysalicylaldehyde)·2H₂O **12.92**
- Nickel(II) bis(1-methylamino-2-methyliminocycloheptatriene) **12.102**
- Nickel(II) bis[*O*-(1-methylethyl) carbonodithionato]- **12.98**
- Nickel(II) bis[1-(4'-methylphenyl)amino-2-(4'-methylphenyl)iminocycloheptatriene] **12.104**
- Nickel(II) bis(4-methylphenyldithiocarbamate) **12.103**
- Nickel(II) bis[2-*N*-phenylaminoformimidoylphenol] **12.90**
- Nickel(II) bis(phenyldithiocarbamate) **12.107**
- Nickel(II) bis[2-(*N*-phenylformimidoyl)phenol] **12.110**
- Nickel(II) bis(salicylaldehyde) dihydrate **12.88**
- Nickel(II) bis(salicylaldehyde oxime) **12.89**
- Nickel(II) bis[2,2'-thiobis[*O,O'*-di(4-*tert*-butylphenyl)dithiophosphate]] **12.114**
- Nickel(II) bis[2,2'-thiobis(4-*tert*-octyl)phenolate] **12.116**
- Nickel(II) bis[μ-toluene-3,4-dithiolato] tetrabutylammonium salt **12.100**
- Nickel(I) bis[3,4,6-trichloro-1,2-benzenedithiolato]-, tetrabutylammonium salt **12.117**
- Nickel(II) butylamine[2,2'-thiobis(3,4-dimethyl)phenolate] **12.120**
- Nickel(II) butylamine[2,2'-thiobis(4-*tert*-octyl)phenolate] **12.122**
- Nickel chloride **12.162**
- Nickel chloride hexahydrate **12.163**
- Nickel(II) cyclohexylamine[2,2'-thiobis(3,4-dimethyl)phenolate] **12.130**
- Nickel(II) cyclohexylamine[2,2'-thiobis(4-*tert*-octyl)phenolate] **12.131**
- Nickel(II) deuteroporphyrin **7.95**
- Nickel(II) deuteroporphyrin bis(piperidine) **7.96**
- Nickel(II) dibutyldithiocarbamate **12.28**
- Nickel(II) dichloride **12.162**
- Nickel(II) dichloride hexahydrate **12.163**
- Nickel(II) didodecylamine[2,2'-thiobis(3,4-dimethyl)phenolate] **12.132**
- Nickel dimethyldithiocarbamate **12.56**
- Nickel(II) dodecylamine[2,2'-thiobis(3,4-dimethyl)phenolate] **12.134**
- Nickel(II) dodecylamine[2,2'-thiobis(4-*tert*-octyl)phenolate] **12.135**
- Nickel(II) ethylamine[2,2'-thiobis(3,4-dimethyl)phenolate] **12.141**
- Nickel(II) ethylamine[2,2'-thiobis(4-*tert*-octyl)phenolate] **12.142**
- Nickel(II) 2,2'-[ethylenebis(nitrilodecylidyne)]di-*p*-cresol **12.136**
- Nickel(II) 2,2'-[ethylenebis(nitriloethylidyne)]diphenol **12.137**
- Nickel(II) 2,2'-[ethylenebis(nitrilomethylidyne)]diphenol **12.140**
- Nickel(I) ion **12.164**
- Nickel(II) mesoporphyrin **7.87**
- Nickel(II) 2,2'-methylencbis[*O,O'*-di(4-*tert*-butylphenyl)dithiophosphate] **12.158**
- Nickel(II) 2,2'-[1,8-naphthylenebis(nitrilomethylidyne)]diphenol **12.160**
- Nickelocene **12.165**
- Nickelous acetate **12.161**
- Nickel(II) 2,2'-[*o*-phenylenebis(nitrilomethylidyne)]diphenol **12.166**
- Nickel(II) propylamine[2,2'-thiobis(4-*tert*-octyl)phenolate] **12.168**
- Nickel(II) protoporphyrin **7.80**
- Nickel(II) protoporphyrin, dimethyl ester **7.79**
- Nickel(II) tetraphenylporphyrin **7.67**
- Nickel(II) 5,10,15,20-tetraphenylporphyrin **7.67**
- Nickel(II) triethanolamine[2,2'-thiobis(4-*tert*-octyl)phenolate] **12.171**
- Nicotinamide adenine dinucleotide **16.47**
- Nicotinamide adenine dinucleotide, reduced **16.48**
- Nicotinamide adenine dinucleotide phosphate **16.49**

- Nicotinamide-adenine dinucleotide phosphate, reduced **16.50**
- Nicotinamide hypoxanthine dinucleotide, reduced **16.42**
- Nicotinamide mononucleotide, reduced **16.51**
- Nicotinamide ribose monophosphate, reduced **16.51**
- Nicotine **8.93**
- Nitrite ion **14.11**
- 2-Nitroanisole **3.44**
- 4-Nitroazobenzene **11.61**
- Nitrobenzene **3.47**
- nitron 3 **15.25**
- 2-Nitrophenol **4.137**
- 3-Nitrophenol **4.138**
- 4-Nitrophenol **4.139**
- 2-Nitrophenoxide ion **4.176**
- 3-Nitrophenoxide ion **4.177**
- 4-Nitrophenoxide ion **4.178**
- 1-(4-Nitrophenylazo)-2-naphthol **11.103**
- 4-(4-Nitrophenylazo)-1-naphthol **11.91**
- 4-(*p*-Nitrophenylazo)-1-naphthol **11.91**
- 7-Nitro-2-phenyl-1,2-benzisoselesenzol-3-one **13.39**
- 2-(4-Nitrophenyl)furan **5.49**
- 4-Nitrophenyl phenyl sulfide **13.31**
- 1-Nitro-4-(phenylthio)benzene **13.31**
- 4-Nitroso-*N,N*-dimethylaniline **9.7**
- 4-Nitrothiobenzamide **13.156**
- Nitroxide, bis[4-(1,1-dimethylethyl)phenyl]- **15.26**
- Nitroxide, bis[4-(1-methyl-1-phenylethyl)phenyl]- **15.27**
- 2,4,6,8-Nonatetraenoic acid, 9-(4-methoxy-2,3,6-trimethylphenyl)-3,7-dimethyl-, ethyl ester, (*all-E*)- **2.262**
- 1-Nonene **2.263**
- Nopadiene **2.25**
- Noradrenalin **4.6**
- Norbixin **2.179**
- trans*-Norbixin **2.174**
- Norbornadiene **2.4**
- Norepinephrine **4.6**
- 1,6,10,15,19,24,28,33-Octabutoxynaphthalocyaninatopalladium(II) **7.21**
- 1,4,8,11,15,18,22,25-Octabutoxyphthalocyanine **7.42**
- Octa(3,6-butoxy)phthalocyanine **7.42**
- 9,12-Octadecadienoic acid, methyl ester **2.265, 4.46, 4.50, 4.53**
- 9,12-Octadecadienoic acid, phenyl ester **2.266**
- (*Z,Z*)-9,12-Octadecadienoic acid **2.264**
- Octadecanoic acid **17.66**
- 6,9,12,15-Octadecatetraenoic acid, methyl ester **2.213**
- 9,12,15-Octadecatrienoic acid, ethyl ester (*all-Z*)- **2.268**
- 9,12,15-Octadecatrienoic acid, methyl ester **2.269**
- 9-Octadecenoic acid **2.271**
- 9-Octadecenoic acid, methyl ester **2.272**
- 9-Octadecenoic acid, phenyl ester **2.273**
- Octadecyl 3-(3',5'-di-*tert*-butyl-4'-hydroxyphenyl)propionate **4.33**
- 2,5-Octadiene, 7-hydroperoxy-2,7-dimethyl- **2.274**
- 2,6-Octadiene, 2,6-dimethyl-, (*E*)- **2.275**
- 2,6-Octadiene, 2,6-dimethyl-, (*Z*)- **2.276**
- 2,6-Octadiene, 2,7-dimethyl- **2.277**
- 2,6-Octadiene, hydroperoxy-2,6-dimethyl- **2.278**
- 2,7-Octadiene, 6-hydroperoxy-2,7-dimethyl- **2.279**
- 1,6-Octadien-3-ol, 3,7-dimethyl- **2.280, 2.338, 13.53, 13.54, 13.55, 13.143, 13.144**
- 2,6-Octadien-1-ol, 3,7-dimethyl-, (*E*)- **2.281**
- 2,7-Octadien-1-ol, 3,7-dimethyl-, (*E*)- **2.282**
- 2,7-Octadien-1-ol, 3,7-dimethyl-, (*Z*)- **2.283**
- 2,7-Octadien-1-ol, 6-hydroperoxy-3,7-dimethyl- **2.284**
- Octaethyldihydropurpurin ethyl ester **7.28**
- 2,3,10,11,16,17,24,25-Octaethyl-5,6,7,8,19,20,21,22-octadehydro[26]porphyrin-(2.4.2.4) **7.100**
- 2,3,7,8,12,13,17,18-Octaethyl-5-porphinepropenoic acid ethyl ester **7.97**
- Octaethyl[22]porphyrin-(2.2.2.2) (*di-trans*) **7.98**
- Octaethylpurpurin ethyl ester **7.30**
- 1,2,5,6,6*a*,6*b*,6*c*,6*d*-Octahydro-1,6-*o*-benzenobenzo[1,3]cyclopropa[1,2,3-*cd*]cyclopropa[*gh*]pentalene **2.181**
- 1,2,5,6,6*a*,6*b*,6*c*,6*d*-Octahydro-9,12-dimethoxy-1,6-*o*-benzenobenzo[1,3]cyclopropa[1,2,3-*cd*]cyclopropa[*gh*]pentalene **2.180**
- 1,2,3,4,11,12,13,14-Octahydrodinaphtho[2,3-*a*:2',3'-*j*]perylene-9,19-dione **3.62**
- 1,2,5,6,6*a*,6*b*,6*c*,6*d*-Octahydro-1,6[1',2']-4-methyl-3,5-dioxo-1,2,4-triazolobenzo[1,3]cyclopropa[1,2,3-*cd*]cyclopropa[*gh*]pentalene **17.69**
- 1,2,5,6,6*a*,6*b*,6*c*,6*d*-Octahydro-1,6[1',2']-4-methyl-3,5-dioxo-1,2,4-triazolo[1,3]cyclopropa[1,2,3-*cd*]cyclopropa[*gh*]pentalene **17.70**
- Octahydropyridazino[1,2-*a*]pyridazine **8.92**
- Octalin **2.261, 13.112**
- $\Delta^{9,10}$ -Octalin **2.261, 13.112**
- (*all-E*)-3,7,11,15,20,24,28,32-Octamethyl-1,34-bis(2,6,6-trimethyl-1-cyclohexen-1-yl)-1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33-tritriacontaeptaecaene **2.358**
- 1,1',3,3',3',5,5'-Octamethyltricyanocyanine, iodide **11.184**
- Octanoate ion, 6,8-dimercapto- **13.115**
- 2,4,6-Octatriene, 2,6-dimethyl- **2.285**
- 3-Octene, 5-hydroperoxy-4-methyl- **2.286**
- 4-Octene, (*E*)- **2.287**
- 4-Octene, (*Z*)- **2.288**
- 4-Octene, 4-methyl- **2.289**
- 4-Octene, 4-methyl-, (*E*)- **2.290**
- 4-Octene, 4-methyl-, (*Z*)- **2.291**

- cis*-4-Octene **2.288**
(E)-4-Octene **2.287**
trans-4-Octene **2.287**
(Z)-4-Octene **2.288**
 2-Octen-1-ol, 3,7-dimethyl-, (*E*)- **2.292**
 2-Octen-1-ol, 3,7-dimethyl-, (*Z*)- **2.293**
 6-Octen-1-ol, 3,7-dimethyl- **2.294**
 Oleic acid **2.271**
 Ommochrome **16.52**
 $\Delta^{1,6}$ -Oxabicyclo[4.4.0]decen-3-one **2.92**
 7-Oxabicyclo[2.2.1]heptane, 2,3-bis(methylene)- **2.295**
 7-Oxabicyclo[2.2.1]heptane, 2,3,5,6-tetrakis(methylene)- **2.296**
 7-Oxabicyclo[2.2.1]hept-2-ene, 5,6-bis(methylene)- **2.297**
 Oxadisilirane, 2,2,3,3-tetrakis(2,6-diethylphenyl)- **17.46**
 Oxadisilirane, 2,2,3,3-tetrakis(2,6-diisopropylphenyl)- **17.47**
 Oxalate ion **17.48**
 1-Oxa-4-thiacyclohexane **13.177**
 1,4-Oxathiane **13.177**
 2,2'-Oxatricarbocyanine, 3,3'-diethyl-, iodide **11.109**
exo,exo-2,3-(2¹-Oxatrimethylene)-7-adamantylidenenorbornane **2.12**
 Oxazole, 2,5-diphenyl- **6.31**
 Oxazole, 2,5-diphenyl-4-methyl- **6.32**
 Oxazole, 4-methyl-2-(3-chlorophenyl)-5-phenyl- **6.33**
 Oxazole, 4-methyl-2-(4-chlorophenyl)-5-phenyl- **6.34**
 Oxazole, 4-methyl-2-(4-methoxyphenyl)-5-phenyl- **6.35**
 Oxazole, 4-methyl-2-(4-methylphenyl)-5-phenyl- **6.36**
 Oxazole, 4-methyl-2-(4-nitrophenyl)-5-phenyl- **6.37**
 Oxirane, 2,3-diphenyl-, (*E*)- **17.49**
 μ -Oxobis[5,10,15,20-tetraphenylporphinatoiron(II)] **7.69**
 5'-Oxo-3',4'-diethyl-5-methyl-1',5'-dihydro-(2,2')-dipyrrromethene **7.101**
 5'-Oxo-3'-ethyl-5,4'-dimethyl-1',5'-dihydro-(2,2')-dipyrrromethene **7.107**
 5'-Oxo-4-ethyl-3,5-dimethyl-1',5'-dihydro-(2,2')-dipyrrromethene **7.108**
 5'-Oxo-4-ethyl-3'-ethenyl-3,5,4'-trimethyl-1',5'-dihydro-(2,2')-dipyrrromethene **7.106**
 5'-Oxo-3'-ethyl-4',3,5-trimethyl-1',5'-dihydro-(2,2')-dipyrrromethene **7.103**
 α -Oxoglutaric acid **17.51**
 Oxolane **17.68**
 2-Oxo-3-phenylpropionic acid **17.60**
 4-Oxo-2,2,6,6-tetramethylpiperidinoxy free radical **15.44**
 5'-Oxo-3',4',4-triethyl-3,5-dimethyl-1',5'-dihydro-(2,2')-dipyrrromethene **7.102**
 5'-Oxo-4',4,5-trimethyl-3'-ethyl-1',5'-dihydro-(2,2')-dipyrrromethene **7.104**
 5'-Oxo-4'-vinyl-4-ethyl-3',3,5-trimethyl-1',5'-dihydro-(2,2')-dipyrrromethene **7.105**
 Oxygen **14.12**
 Oxygen-18 **14.13**
 Oxygen, lowest excited singlet state **17.64**
 Palladium(II) bis[2'-hydroxy-4'-*tert*-butyloctadecanophenone oxime] **12.91**
 Palmitic acid **17.37**
 Pantetheine-adenosine triphosphate **16.17**
 Para Red **11.103**
 P-422 (8 conjugated bonds) **2.298**
 P-438 (9 conjugated bonds) **2.299**
 PDS **8.79**
 Penicillamine **13.116**
 Pentacene **3.96**
 Pentachlorophenol **4.140**
 Pentachlorophenoxide ion **4.179**
 1,3-Pentadiene, 4-methyl- **2.300**
 1,3-Pentadiene, 1-phenyl-, (*E,E*)- **2.301**
(E)-1,3-Pentadiene **2.328**
(Z)-1,3-Pentadiene **2.329**
 Pentadienylium, 1,1,5,5-tetrakis[4-(diethylamino)phenyl]- **11.110**
 Pentamethoxybenzene **3.48**
N,N,2,4,6-Pentamethylaniline **9.15**
 1,3,3,7,7-Pentamethylbicyclo[2.2.1]heptane-2-thione **13.**
 Pentamethylene sulfide **13.145**
 1,2,2,6,6-Pentamethylpiperidine **8.61**
 1,2,2,6,6-Pentamethylpiperidin-4-ol **8.72**
 Pentanamide, 2-[[4-(diethylamino)-2-methylphenyl]imino]4,4-dimethyl-3-oxo-*N*-phenyl- **11.111**
 Pentanamide, 2-[[4-(diethylamino)phenyl]imino]-4,4-dimethyl-3-oxo-*N*-phenyl- **11.112**
 Pentane **17.50**
 Pentane, 3-(methoxymethylene)-2,2,4,4-tetramethyl- **2.355**
n-Pentane **17.50**
 Pentanedioic acid, 2-oxo- **17.51**
 2,4-Pentanedione iron(III) derivative **12.174**
 2,4-Pentanedione nickel(II) derivative **12.10**
 3-Pentaneithione, 2,2,4,4-tetramethyl- **13.117**
 Pentanoic acid **17.79**
 1-Pentanol, 5-(4-methylphenyl)thio- **13.118**
 3-Pentanol, 3,4-dimethyl-1-[(4-methylphenyl)thio]- **13.1**
 1-Pentene **2.302**
 1-Pentene, 2,3,4-trimethyl- **2.303**
 2-Pentene, (*E*)- **2.304**
 2-Pentene, (*Z*)- **2.305**
 2-Pentene, 2,4-dimethyl- **2.306**
 2-Pentene, 2-methyl- **2.307, 2.66, 2.86, 2.92, 2.122, 2.243, 2.250, 2.256, 2.311, 2.312, 2.343, 3.71, 4.32, 4.102, 4.147, 13.87, 15.1**
 2-Pentene, 3-methyl- **2.308**
 2-Pentene, 3-methyl-, (*E*)- **2.309**

- 2-Pentene, 3-methyl-, (Z)- 2.310
 2-Pentene, 4-methyl-, (E)- 2.311
 2-Pentene, 4-methyl-, (Z)- 2.312, 2.116
 2-Pentene, 2,3,4-trimethyl- 2.313
 2-Pentene, 2,4,4-trimethyl- 2.314
cis-2-Pentene 2.305
 (E)-2-Pentene 2.304
trans-2-Pentene 2.304
 (Z)-2-Pentene 2.305
 4-Pentenoic acid 2.315
 2-Penten-1-ol, 3,4-dimethyl-, (E)- 2.316
 2-Penten-1-ol, 3,4-dimethyl-, (Z)- 2.317
 2-Penten-1-ol, 3-ethyl- 2.318
 2-Penten-1-ol, 3-methyl-, (E)- 2.319
 2-Penten-1-ol, 3-methyl-, (Z)- 2.320
 2-Penten-1-ol, 3,4,4-trimethyl-, (E)- 2.321
 2-Penten-1-ol, 3,4,4-trimethyl-, (Z)- 2.322
 2-Penten-4-ol, 2-methyl- 2.323
 3-Penten-2-ol, 4-methyl- 2.323
 3-Penten-2-one, 3,4-dimethyl- 2.324
 Perinaphthenone 3.97
 Permanax 45 6.72
 Perspex 17.57
 3,10-Perylenedione, 4,9-dihydroxy-1,12-bis(2-hydroxypropyl)-2,6,7,11-tetramethoxy- 16.53
 Perylo[1,12-*def*]-1,3-dioxepin-5,11-dione, 6-amino-12-hydroxy-8,9-bis(2-hydroxypropyl)-7,10-dimethoxy- 16.54
 Perylo[1,12-*def*]-1,3-dioxepin-5,11-dione, 6,12-dihydroxy-8,9-bis(2-hydroxypropyl)-7,10-dimethoxy- 16.55
 Perylo[1,12-*def*]-1,3-dioxepin-5,12-dione, 6,11-diamino-8,9-bis(2-hydroxypropyl)-7,10-dimethoxy- 16.56
 Perylo[1,12-*def*]-1,3-dioxepin-6,11-dione, 8,9-bis(2-hydroxypropyl)-5,7,10,12-tetramethoxy- 16.57
 Perylo[1,12-*def*]-1,3-dioxepin-6,11-dione, 5-hydroxy-8,9-bis(2-hydroxypropyl)-7,10,12-trimethoxy- 16.58
 Phenalenone 3.97
 Phenalen-1-one 3.97
 1-Phenanthrenecarboxylic acid, 1,2,3,4,4a,4b,5,6,10,10a-decahydro-1,4a-dimethyl-7-(1-methylethyl)-, [1*R*-(1 α ,4 α β ,4 β α ,10 α)]- 2.325
 Phenanthro[1,10,9,8-*opqra*]perylene-7,14-dione, 1,3,4,6,8,13-hexahydroxy-10,11-dialkyl- 16.59
 Phenanthro[1,10,9,8-*opqra*]perylene-7,14-dione, 1,3,4,6,8,13-hexahydroxy-10,11-dimethyl- 16.60
 Phenethylamine 8.48
 α -Phenethylfurfuryl alcohol 5.71
 Phenol 4.92
 Phenol, 4-acetyl- 4.93
 Phenol, 4-acetyl-2,6-bis(1,1-dimethylethyl)- 4.94
 Phenol, 2-acetyl-5-dodecyloxy- 4.42
 Phenol, 4-amino- 4.95
 Phenol, 2-(benzotriazol-2-yl)-4,6-bis(1,1-dimethylpropyl)- 4.96
 Phenol, 2-(benzotriazol-2-yl)-6-chloro-4-(1,1-dimethylethyl)- 4.97
 Phenol, 2-benzyl- 4.98
 Phenol, 2,6-bis(1,1-dimethylethyl)- 4.99, 2.280
 Phenol, 2,4-bis(1,1-dimethylethyl)-5-methoxy- 4.100
 Phenol, 3,5-bis(1,1-dimethylethyl)-4-methoxy- 4.101
 Phenol, 2,6-bis(1,1-dimethylethyl)-4-methyl- 4.102, 4.99, 4.116, 4.117, 4.118, 4.147
 Phenol, 2,6-bis(1,1-dimethylethyl)-4-phenyl- 4.103
 Phenol, 2,6-bis(1,1-dimethylethyl)-4-(phenylmethyl)- 4.104
 Phenol, 4-bromo-2,6-bis(1,1-dimethylethyl)- 4.105
 Phenol, 2-*tert*-butyl- 4.120
 Phenol, 4-*tert*-butyl- 4.121
 Phenol, 2-chloro- 4.106
 Phenol, 3-chloro- 4.107
 Phenol, 4-chloro- 4.108
 Phenol, 2-(5-chlorobenzotriazol-2-yl)-4,6-bis(1,1-dimethylethyl)- 4.109
 Phenol, 4-chloro-2,6-di(1,1-dimethylethyl)- 4.110
 Phenol, 2-chloro-4-hydroxy- 4.20
 Phenol, 4-chloro-3-hydroxy- 4.11
 Phenol, 3-chloro-5-methoxy- 4.111
 Phenol, 4-cyano- 4.112
 Phenol, 2,4-dichloro- 4.113
 Phenol, 2,6-dichloro- 4.114
 Phenol, 2,6-dimethoxy- 4.115
 Phenol, 2,6-dimethoxy-, ion(1-) 4.161
 Phenol, 2,4-dimethyl- 4.116
 Phenol, 2,6-dimethyl- 4.117
 Phenol, 3,4-dimethyl- 4.118
 Phenol, 4-(1,1-dimethylethoxy)-2,6-bis(1,1-dimethylethyl)- 4.119
 Phenol, 3-(1,1-dimethylethyl)-4-methoxy- 4.122
 Phenol, 2,4-dinitro- 4.123
 Phenol, 2,5-dinitro- 4.124
 Phenol, 2,6-dinitro- 4.125
 Phenol, 4-ethoxy-2,3,5,6-tetramethyl- 4.126
 Phenol, 4-(1-hydroxy-2,2-dimethyl)propyl-2-methoxy- 4.127
 Phenol, 2-(2-hydroxyphenyl)- 4.128
 Phenol, 2-methoxy- 4.129
 Phenol, 3-methoxy- 4.130
 Phenol, 4-methoxy- 4.131
 Phenol, 4-methoxy-2,6-dimethyl- 4.132
 Phenol, 4-methoxy-2,3,5,6-tetramethyl- 4.133
 Phenol, 4-methoxy-2,3,6-trimethyl- 4.134
 Phenol, 4-methyl- 4.135
 Phenol, 2,2'-methylenebis(6-*tert*-butyl-4-methyl- 4.136
 Phenol, 4-(methylthio)- 13.120

- Phenol, 2-nitro- 4.137
 Phenol, 3-nitro- 4.138
 Phenol, 4-nitro- 4.139
 Phenol, pentachloro- 4.140
 Phenol, 2-phenyl- 4.141
 Phenol, 3-(phenylamino)- 4.142
 Phenol, 2-[(phenylimino)methyl]-, *N*-oxide 15.7
 Phenol, 2,3,5,6-tetrafluoro- 4.143
 Phenol, 4-(1,1,3,3-tetramethylbutyl)-, salicylate 4.144
 Phenol, 2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)- 4.145
 Phenol, 2,4,6-tri-*tert*-butyl- 4.147
 Phenol, 2,4,6-trichloro- 4.146
 Phenol, 2,4,6-trimethyl- 4.148
 Phenol, 2,4,6-triphenyl- 4.149
 Phenolate ion 4.150
 Phenothiazine 13.121
 Phenothiazine, 2-chloro-10-dimethylaminopropyl- 13.122
 Phenothiazine, 10-methyl- 13.123
 Phenothiazine, 10-(12-sulfonatododecyl)- 13.124
 Phenothiazine-10-propanamine, 2-chloro-*N,N*-dimethyl- 13.122
 Phenothiazinium, 3,7-bis(dimethylamino)- 11.113
 Phenothiazinium, 3,7-diamino- 11.114
 12-(10'-Phenothiazinyl)dodecyl-1-sulfonate ion 13.124
 Phenoxazine 6.38
 Phenoxide ion 4.150
 Phenoxide ion, 4-acetyl- 4.151
 Phenoxide ion, 2-benzyl- 4.152
 Phenoxide ion, 4-bromo- 4.153
 Phenoxide ion, 4-bromo-2,6-dimethyl- 4.154
 Phenoxide ion, 2-chloro- 4.155
 Phenoxide ion, 3-chloro- 4.156
 Phenoxide ion, 4-chloro- 4.157
 Phenoxide ion, 4-cyano- 4.158
 Phenoxide ion, 2,4-dichloro- 4.159
 Phenoxide ion, 2,6-dichloro- 4.160
 Phenoxide ion, 2,6-dimethoxy- 4.161
 Phenoxide ion, 2,6-dimethyl- 4.162
 Phenoxide ion, 4-(1,1-dimethylethyl)- 4.163
 Phenoxide ion, 2,4-dinitro- 4.164
 Phenoxide ion, 4-fluoro- 4.165
 Phenoxide ion, 4-hydroxy-, conjugate base 4.13
 Phenoxide ion, 2-(2-hydroxyphenyl)- 4.166
 Phenoxide ion, 5-hydroxy-2-phenyl- 4.167
 Phenoxide ion, 4-iodo- 4.168
 Phenoxide ion, 2-methoxy- 4.169
 Phenoxide ion, 3-methoxy- 4.170
 Phenoxide ion, 4-methoxy- 4.171
 Phenoxide ion, 4-methyl- 4.172
 Phenoxide ion, 2-methyl-4,6-dinitro- 4.173
 Phenoxide ion, 4-methyl-2,6-dinitro- 4.174
 Phenoxide ion, 4-methyl-2-nitro- 4.175
 Phenoxide ion, 2-nitro- 4.176
 Phenoxide ion, 3-nitro- 4.177
 Phenoxide ion, 4-nitro- 4.178
 Phenoxide ion, pentachloro- 4.179
 Phenoxide ion, 2-phenyl- 4.180
 Phenoxide ion, 4-phenyl- 4.181
 Phenoxide ion, 2,4,6-trichloro- 4.182
 2-(Phenoxymethylidene)adamantane 2.350, 2.351, 2.352, 2.354
 Phenylalanine 10.31
 L-Phenylalanine, 3,4-dihydroxy- 4.183
o-Phenylanisole 3.59
 9-Phenylanthracene 3.14
 Phenyl arachidonate 2.214
 1-Phenylazo-2-naphthol 11.104, 11.94, 11.95, 11.96, 11.97, 11.98, 11.99, 11.100, 11.102, 11.103
 4-Phenylazo-1-naphthol 11.92, 11.87, 11.89, 11.90, 11.91
 1-(Phenylazo)-1-(phenylaminocarbonyl)-2-propanone 11.62
 2-Phenyl-1,2-benzisoselenazol-3-one 13.40
 2-Phenyl-1,2-benzisothiazol-3-one 13.41
 2-Phenylbenzo[*b*]cyclopenta[*e*]pyran 5.8
 Phenyl benzyl nitron 15.12
 α -Phenyl-*N*-benzylnitron 15.12
 4-Phenylbutylamine 8.49
 Phenyl-*N-tert*-butylnitron 15.46
 2-Phenylcyclopenta[*b*][1]benzopyran 5.8
 4-Phenyl-2,6-di-*tert*-butylphenol 4.103
 6-Phenyl-3,4-dihydropyran-5-carboxylic acid ethyl ester 5.100
 Phenyl disulfide 13.84
 2,2'-[1,2-Phenylenebis(nitrilomethylidene)]-bis[phenolato]nickel(II) 12.166
 [*N,N'*-*o*-Phenylenebis(5-sulfosalicylideneiminato)]nickelate(II) disodium salt 12.167
m-Phenylenediamine, *N,N,N',N'*-tetramethyl- 9.27
o-Phenylenediamine 9.25
o-Phenylenediamine, *N,N,N',N'*-tetramethyl- 9.26
p-Phenylenediamine, *N*-cyclohexyl-*N'*-phenyl- 9.28
p-Phenylenediamine, *N,N'*-diphenyl- 9.29
p-Phenylenediamine, *N*-(1-methylethyl)-*N'*-phenyl- 9.3
p-Phenylenediamine, *N,N,N',N'*-tetramethyl- 9.31
 1-Phenylethanol 3.55
 2-Phenylethylamine 8.48
 Phenyl fluorenyl nitron 15.6
 2-Phenylfuran 5.50
 3-Phenylfuran 5.51
 α -Phenylfurfuryl alcohol 5.70
 Phenylhydrazine 9.32
 Phenylhydroquinone 4.30

- Phenyl linoleate **2.266**
Phenyl linolenate **2.270**
5-(Phenylmethyl)-3-furanylmethyl 2,2-dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylate **5.76**
Phenyl 4-methylphenyl nitron **15.9**
4-[(Phenylmethyl)thio]morpholine **13.112**
1-[(Phenylmethyl)thio]piperidine **13.125**
Phenyl 9,12-octadecadienoate **2.266**
Phenyl 9-octadecenoate **2.273**
Phenyl oleate **2.273**
(*E,E*)-1-Phenyl-1,3-pentadiene **2.301**
4-Phenylphenolate anion **4.181**
2-Phenylphenoxide **4.180**
4-Phenylphenoxide ion **4.181**
N-Phenyl-2-(phenylmethyl)selenobenzamide **13.4**
N-Phenyl-2-(phenylmethyl)thiobenzamide **13.5**
(*E*)-1-Phenylpropene **3.119**
(*Z*)-1-Phenylpropene **3.120**
3-Phenylpropylamine **8.50**
 α -(3-Phenylpropyl)furfuryl alcohol **5.73**
 β -Phenyl- α -pyrrolidinylbenzeneethanol **8.2**
Phenylpyruvic acid **17.60**
Phenyl sulfide **13.34**, *13.16*, *13.23*, *13.26*, *13.31*
(*E*)-2-Phenylsulfinyl-2-butene **13.54**
(*Z*)-2-Phenylsulfinyl-2-butene **13.55**
1-Phenylsulfinyl-2-methylpropene **2.338**
9-(Phenylsulfonyl)fluorene anion **13.98**
9-(Phenylsulfonyl)fluoren-9-yl anion **13.98**
(*E*)-1-(Phenylsulfonyl)-3-(β -methoxylvinyl)indole **2.247**, **2.249**
(*Z*)-1-(Phenylsulfonyl)-3-(β -methoxylvinyl)indole **2.249**
3-Phenylsydnone **5.107**
1-Phenyl-4,4,8,8-tetramethyl-2,3,4,5,7,8,9,10-octahydropyrrolo[4,3,2-*m,n*]acridine-10-one **6.69**
4-Phenylthiobenzophenone **13.163**
3-Phenylthio-1-propanol **13.137**
Pheophytin *a* **7.26**
Pheophytin *b* **7.27**
Phleochrome **16.53**
20-Phorbinecarboxylic acid, 3,4-didhydro-3,4,8,9,13,14,18,19-octaethyl-18,19-dihydro-, ethyl ester **7.28**
20-Phorbinecarboxylic acid, 3,4-didehydro-3,4,8,9,13,14,18,19-octaethyl-18,19-dihydro-, ethyl ester, dichlorotin(IV) **7.29**
20-Phorbinecarboxylic acid, 3,4,20,21-tetradehydro-3,4,8,9,13,14,18,19-octaethyl-18,19-dihydro-, ethyl ester **7.30**
20-Phorbinecarboxylic acid, 3,4,20,21-tetradehydro-4,9,14,19-tetraethyl-18,19-dihydro-3,8,13,18-tetramethyl-, ethyl ester, zinc(II) **7.31**
3-Phorbinepropanoic acid, 9-acetyl-14-ethyl-13,14-dihydro-21-(methoxycarbonyl)-4,8,13,18-tetramethyl-20-oxo-, 3,7,11,15-tetramethyl-2-hexadecenyl ester **7.32**
3-Phorbinepropanoic acid, 9-acetyl-14-ethylidene-13,14-dihydro-21-(methoxycarbonyl)-4,8,13,18-tetramethyl-20-oxo-, 3,7,11,15-tetramethyl-2-hexadecenyl ester **7.33**
3-Phorbinepropanoic acid, 3,4-didehydro-4,9-diethenyl-14-ethyl-21-(methoxycarbonyl)-4,8,13,18-tetramethyl-20-oxo-, 3,7,11,15-tetramethyl-2-hexadecenyl ester, magnesium complex **7.34**, **7.35**
3-Phorbinepropanoic acid, 3,4-didehydro-9-ethenyl-14-ethyl-21-(methoxycarbonyl)-4,8,13,18-tetramethyl-20-oxo-, 2-amino-2-(methoxycarbonyl)ethyl ester, magnesium(II), **7.36**
3-Phorbinepropanoic acid, 3,4-didehydro-9-ethenyl-14-ethyl-21-(methoxycarbonyl)-4,8,13,18-tetramethyl-20-oxo-, magnesium(II) **7.37**
3-Phorbinepropanoic acid, 3,4-didehydro-9-ethenyl-14-ethyl-21-(methoxycarbonyl)-4,8,13,18-tetramethyl-20-oxo-, 3,7,11,15-tetramethyl-2-hexadecenyl ester **7.38**, **7.39**
Phosphatidylcholine **17.53**
Phosphatidylethanolamine **17.52**
5-*O*-Phosphono- β -D-ribofuranosyl-3-pyridinecarboxamide **16.51**
Phosphoric acid, mono(2-aminoethyl) mono(2,3-dihydroxypropyl) ester **17.52**
Phosphoric acid, mono(2-dimethylammonioethyl) mono(2,3-dihydroxypropyl) ester **17.53**
Phthalazine-1,4-dione, 5-amino-2,3-dihydro- **9.33**
Phthalocyanine, bis(tribenzylsiloxy)silicon **7.40**
Phthalocyanine, bis(tripropylsiloxy)silicon **7.41**
Phthalocyanine, 1,4,8,11,15,18,22,25-octabutoxy- **7.42**
Phthalocyanine, sulfo-, chloroaluminum(III) **7.43**
Phthalocyanine, sulfo-, zinc(II) **7.44**
Phthalocyanine, tetracarboxy-, copper(II) **7.45**
Phthalocyanine, 2,9,16,23-tetra(1,1-dimethylethyl)- **7.46**
Phycol-400 **17.54**
15-*cis*-Phytoene **2.74**
15-(*Z*)-Phytoene **2.74**
15-*cis*-Phytofluene **2.73**
Phytol **2.238**
Phytyl acetate **2.239**
Pigment Red 1 **11.103**
Pigment Red 3 **11.101**
Pinacyanol chloride **11.41**
 α -Pinene **2.326**, *13.103*, *13.118*, *13.137*
 β -Pinene **2.327**
2-Pipecoline **8.59**
Piperazine **8.51**
1-Piperidinamine, *N,N*-dimethyl- **8.52**
Piperidine **8.53**

- Piperidine, 4-amino-2,2,6,6-tetramethyl- **8.54**
 Piperidine, 1-butoxy-2,2,6,6-tetramethyl- **8.55**
 Piperidine, 1-cyclohexyl- **8.56**
 Piperidine, 1,2-dimethyl- **8.57**
 Piperidine, 2,6-dimethyl- **8.58**
 Piperidine, 2-methyl- **8.59**
 Piperidine, *N*-methyl- **8.60**
 Piperidine, *N*-methyl-4-hydroxy- **8.71**
 Piperidine, 1,2,2,6,6-pentamethyl- **8.61**
 Piperidine, 1-[(phenylmethyl)thio]- **13.125**
 Piperidine, 1-(1-pyrrolidinyl)- **8.62**
 Piperidine, 2,2,6,6-tetramethyl- **8.63**
 Piperidine, 2,2,6,6-tetramethyl-4,4'-[1,6-hexanediaminyl]bis- **8.64**
 Piperidine, 2,2,6,6-tetramethyl-4,4'-[1,6-hexanediaminyl]bis-, polymer **8.65**
 1-Piperidineethanol, diester with [[3,5-bis(1,1-dimethylethyl)-4-hydroxyphenyl]methyl]butylpropanedioic acid **8.66**
 1-Piperidineethanol, 4-hydroxy-2,2,6,6-tetramethyl-, polymer with butanedioic acid **8.67**
 1-Piperidineethanol, 2,2,6,6-tetramethyl- **8.68**
 1-Piperidineethanol, 2,2,6,6-tetramethyl-, acetate (ester) **8.69**
 Piperidin-1-ol, 2,2,6,6-tetramethyl- **15.28**
 Piperidin-3-ol, 1-methyl- **8.70**
 Piperidin-4-ol, 1-methyl- **8.71**
 Piperidin-4-ol, 1,2,2,6,6-pentamethyl- **8.72**
 Piperidin-4-ol, 1,2,2,6,6-pentamethyl-, diester with [[3,5-bis(1,1-dimethylethyl)-4-hydroxyphenyl]methyl]butylpropanedioic acid **8.73**
 Piperidin-4-ol, 1,2,2,6,6-pentamethyl-, diester with 1,10-decanedioic acid **8.74**
 Piperidin-4-ol, 1,2,2,6,6-pentamethyl-, triester with nitrilotriacetic acid **8.75**
 Piperidin-4-ol, 1,2,2,6-tetramethyl-, phenylacetate ester **8.76**
 Piperidin-4-ol, 2,2,6,6-tetramethyl- **8.77, 8.19**
 Piperidin-4-ol, 2,2,6,6-tetramethyl-, diester with 1,10-decanedioic acid **8.78**
 Piperidin-4-ol, 2,2,6,6-tetramethyl-, ester with copolymer of styrene + methacrylic acid **8.79**
 Piperidin-4-ol, 2,2,6,6-tetramethyl-, triester with nitrilotriacetic acid **8.80**
 1-Piperidinyloxy, 4-amino-2,2,6,6-tetramethyl- **15.29**
 1-Piperidinyloxy, 4-azido-2,2,6,6-tetramethyl- **15.30**
 1-Piperidinyloxy, 4,4'-[(1,10-dioxo-1,10-decanediyl)bis(oxy)]2,2,6,6-tetramethyl- **15.37**
 1-Piperidinyloxy, 4,4'-[(1,6-dioxo-1,6-hexanediy)bis(oxy)]2,2,6,6-tetramethyl- **15.38**
 1-Piperidinyloxy, 4-hydroxy-4-(2-naphthyl)-2,2,6,6-tetramethyl-, **15.31**
 1-Piperidinyloxy, 4-hydroxy-4-(2-phenylethynyl)-2,2,6,6-tetramethyl- **15.32**
 1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl- **15.33**
 1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl-, benzoate **15.34**
 1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl-, butyrate **15.35**
 1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl-, crotonate **15.36**
 1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl-, diester with 1,10-decanedioic acid **15.37**
 1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl-, diester with 1,6-hexanedioic acid **15.38**
 1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl-, diester with terephthalic acid **15.39**
 1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl-, methacrylate **15.40**
 1-Piperidinyloxy, 4-hydroxy-2,2,6,6-tetramethyl-, pentanoate **15.41**
 1-Piperidinyloxy, 4-iodo-2,2,6,6-tetramethyl- **15.42**
 1-Piperidinyloxy, 4,4'-[1,4-phenylenebis(carbonyloxy)]bis[2,2,6,6-tetramethyl-] **15.39**
 1-Piperidinyloxy, 2,2,6,6-tetramethyl- **15.43**
 1-Piperidinyloxy, 2,2,6,6-tetramethyl-4-[(2-methyl-1-oxo-2-propenyl)oxy]- **15.40**
 1-Piperidinyloxy, 2,2,6,6-tetramethyl-4-(2-oxo-1-butenyl)oxy- **15.36**
 1-Piperidinyloxy, 2,2,6,6-tetramethyl-4-(1-oxobutoxy)- **15.35**
 4-Piperidone, 2,2,6,6-tetramethyl-1-oxyl- **15.44**
 (*E*)-Piperylene **2.328**
 (*Z*)-Piperylene **2.329**
 Pivalothiophenone **13.126**
 Pivalothiophenone, 4'-chloro- **13.127**
 Pivalothiophenone, 4'-fluoro- **13.128**
 Pivalothiophenone, 4'-methoxy- **13.129**
 Platinum(II) bis[1,2-di(4-ethylphenyl)-1,2-ethenedithiolato]- **12.43**
 Platinum(II) 3,4-dimercaptotoluene(1,10-phenanthroline) **12.155**
 Poly(*N,N'*-Bis[4-(2,2,6,6-tetramethylpiperidinyl)]-1,6-hexanediamine) **8.65**
 Polybutadiene **2.330**
cis-Poly(butadiene) **2.330**
Z-Poly(butadiene) **2.330**
 Polycarbonate **17.55**
 Polyester of succinic acid and 4-hydroxy-1-(2-hydroxyethyl)-2,2,6,6-tetramethylpiperidine **8.67**
 Poly(ethylene glycol) **17.56**
 Polyisoprene **2.331**
cis-Poly(isoprene) **2.331**
Z-Poly(isoprene) **2.331**

- Poly(methyl methacrylate) **17.57**
 Polystyrene **17.58**
 Polystyrene-substituted with 4-(2,2,6,6-tetramethylpiperidinyl) alkanoate **8.79**
 Poly[[6-[(1,1,3,3-tetramethylbutyl)amino]-1,3,5-triazine-2,4-diyl]][(2,2,6,6-tetramethyl-4-piperidinyl)imino]-1,6-hexanediyl[(2,2,6,6-tetramethyl-4-piperidinyl)imino] **8.16**
 Porphinatozinc(II) **7.71**
 Porphine, (acetato)5,10,15,20-tetraphenyl-, iron(III) **7.47**
 Porphine, (acetato)5,10,15,20-tetraphenyl-, manganese(III) **7.48**
 Porphine, 2,3-dihydro-5,10,15,20-tetraphenyl- **7.50**
 Porphine, 2,3-dihydro-5,10,15,20-tetraphenyl-, cadmium(II) **7.51**
 Porphine, 2,3-dihydro-5,10,15,20-tetraphenyl-, copper(II) **7.52**
 Porphine, 2,3-dihydro-5,10,15,20-tetraphenyl-, zinc(II) **7.53**
 Porphine, 7,8,17,18-tetrahydro-5,10,15,20-tetraphenyl-, (E) **7.54**
 Porphine, 5,10,15,20-tetrakis(4-iodophenyl)-, copper(II) **7.55**
 Porphine, 5,10,15,20-tetrakis(4-methoxyphenyl)-, copper(II) **7.56**
 Porphine, tetrakis(4-sulfonatophenyl)- **7.57**
 Porphine, 5,10,15,20-tetrakis(4-sulfonatophenyl)- **7.57**
 Porphine, 5,10,15,20-tetrakis(4-sulfonatophenyl)-, dichlorotin(IV) **7.58**
 Porphine, 5,10,15,20-tetraphenyl- **7.59**
 Porphine, 5,10,15,20-tetraphenyl-, cadmium(II) **7.60**
 Porphine, 5,10,15,20-tetraphenyl-, chloroaluminum(III) **7.61**
 Porphine, 5,10,15,20-tetraphenyl-, cobalt(II) **7.62**
 Porphine, 5,10,15,20-tetraphenyl-, copper(II) **7.63**
 Porphine, 5,10,15,20-tetraphenyl-, dichlorotin(IV) **7.64**
 Porphine, 5,10,15,20-tetraphenyl-, magnesium(II) **7.65**
 Porphine, 5,10,15,20-tetraphenyl-, manganese(III) **7.66**
 Porphine, 5,10,15,20-tetraphenyl-, nickel(II) **7.67**
 Porphine, 5,10,15,20-tetraphenyl-, zinc(II) **7.68**
 Porphine, zinc(II) **7.71**
 Porphine-2,18-dipropanoic acid, 7,12-bis(1-hydroxyethyl)-3,8,13,17-tetramethyl- **7.72**
 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl- **7.73**
 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl-, acetatoferrate(III), dimethyl ester **7.74**
 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl-, cadmium(II) **7.75**
 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl-, cobalt(II) **7.76**
 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl-, copper(II) **7.77**
 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl-, dimethyl ester **7.78**
 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl-, dimethyl ester, nickel(II) **7.79**
 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl-, nickel(II) **7.80**
 Porphine-2,18-dipropanoic acid, 7,12-diethenyl-3,8,13,17-tetramethyl-, zinc(II) **7.81**
 Porphine-2,18-dipropanoic acid, 7,12-diethyl-3,8,13,17-tetramethyl-, cobalt(II) **7.82**
 Porphine-2,18-dipropanoic acid, 7,12-diethyl-3,8,13,17-tetramethyl-, di[4-(diphenylmethylaminocarbonyl)-2-nitrophenylmethyl] ester **7.83**
 Porphine-2,18-dipropanoic acid, 7,12-diethyl-3,8,13,17-tetramethyl-, diethyl ester, manganese(III) **7.84**
 Porphine-2,18-dipropanoic acid, 7,12-diethyl-3,8,13,17-tetramethyl-, dimethyl ester **7.85**
 Porphine-2,18-dipropanoic acid, 7,12-diethyl-3,8,13,17-tetramethyl-, dimethyl ester, cobalt(II) **7.86**
 Porphine-2,18-dipropanoic acid, 7,12-diethyl-3,8,13,17-tetramethyl-, nickel(II) **7.87**
 Porphine-2,18-dipropanoic acid, 7-[2-(dimethylamino)-2-oxoethyl]-8-ethyl-7,8-dihydro-3,7,12,17-tetramethyl, dimethyl ester, (Z) **7.88**
 Porphine-2,18-dipropanoic acid, 7-[2-(dimethylamino)-2-oxoethyl]-8-ethylidene-7,8-dihydro-3,7,12,17-tetramethyl, dimethyl ester. **7.89**
 Porphine-2,18-dipropanoic acid, 8-ethenyl-13-ethyl-3,7,12,17-tetramethyl- **7.90**
 Porphine-2,18-dipropanoic acid, 8-ethenyl-13-ethyl-3,7,12,17-tetramethyl-, dimethyl ester **7.91**
 Porphine-2,18-dipropanoic acid, 7-ethenyl-12-(1-hydroxyethyl)-3,8,13,17-tetramethyl- **7.92**
 Porphine-2,18-dipropanoic acid, 7-ethenyl-3,8,13,17-tetramethyl- **7.93**
 Porphine-2,18-dipropanoic acid, 3,7,12,17-tetramethyl-, dimethyl ester **7.94**
 Porphine-2,18-dipropanoic acid, 3,7,12,17-tetramethyl-, nickel(II) **7.95**
 Porphine-2,18-dipropanoic acid, 3,7,12,17-tetramethyl-, nickel(II), bis(piperidine) **7.96**
 5-Porphinepropenoic acid, octaethyl-, ethyl ester **7.97**
 [22]Porphyrin-(2.2.2.2), octaethyl-, (di-trans) **7.98**
 [26]Porphyrin **7.99**
 [26]Porphyrin-(2.4.2.4), 2,3,10,11,16,17,24,25-octaethyl-5,6,7,8,19,20,21,22-octadehydro- **7.100**
 PPO **6.31**
 Pregna-5,16-dien-20-one, 3-(acetyloxy)- (3 β) **16.61**
 Pregnenolone **16.62**
 Pregn-5-en-20-one, 3-hydroxy-, (3 β) **16.62**
 Proflavine **11.1**
 L-Proline, 1-(3-mercapto-2-methyl-1-oxopropyl)-, (S)- **13.130**

- 2-Propanamine, 2-methyl-*N*-(1-methyl-4-pyridylmethylene)-, *N*-oxyl 15.45
- 2-Propanamine, 2-methyl-*N*-phenylmethylene-, *N*-oxyl 15.46
- 2-Propanamine, 2-methyl-*N*-(4-pyridylmethylene)-, *N,N*-dioxyl- 15.47
- 2-Propanamine, 2-methyl-*N*-(4-pyridylmethylene)-, *N*-oxyl 15.48
- 2-Propanamine, 2-methyl-*N*-(2-sulfonatophenyl)methylene-, *N*-oxyl 15.49
- Propane, 1-(1,1-dimethylethylthio)- 13.58
- Propane, 2-methyl-2-nitroso- 15.50
- Propane, 1-methyl-1-(propylthio)- 13.59
- Propanediamide, 2-[[[4-diethylamino)-2-ethylphenyl]imino]-*N,N'*-diphenyl- 11.115
- Propanedioic acid, [[3,5-bis(1,1-dimethylethyl)-4-hydroxyphenyl]methyl]butyl-, bis[2-(2,2,6,6-tetramethyl-1-piperidinyl)ethyl] ester 8.66
- 1,3-Propanediol, 2-amino-2-(hydroxymethyl)- 17.59
- 1,3-Propanedione, 2-[[2-ethyl-4-(diethylamino)phenyl]imino]-1,3-diphenyl- 11.116
- Propanenitrile, 3-(diethylamino)- 8.81
- 1-Propanethiol, 3-amino-2-hydroxy- 13.131
- 1-Propanethione, 1-(4-chlorophenyl)-2,2-dimethyl- 13.127
- 1-Propanethione, 1-(4-fluorophenyl)-2,2-dimethyl- 13.128
- 1-Propanethione, 1-(4-methoxyphenyl)-2,2-dimethyl- 13.129
- Propanoic acid, 2-oxo-3-phenyl- 17.60
- 1-Propanol, 3-(3-chlorophenyl)thio- 13.132
- 1-Propanol, 3-(4-chlorophenyl)thio- 13.133
- 1-Propanol, 3-(dimethylamino)- 8.82
- 1-Propanol, 3-(4-fluorophenyl)thio- 13.134
- 1-Propanol, 3-(4-methoxyphenyl)thio- 13.135
- 1-Propanol, 3-(4-methylphenyl)thio- 13.136
- 1-Propanol, 3-(phenylthio)- 13.137
- 2-Propanol 17.61
- 2-Propanol, 1-amino-3-thio- 13.131
- 2-Propanone 17.2
- 2-Propanone, (1-methylethylidene)hydrazone 15.3, 2.40
- 2-Propanone, 1-(4-methylphenylazo)-1-(phenylaminocarbonyl)- 11.60
- 2-Propanone, 1-(phenylazo)-1-(phenylaminocarbonyl)- 11.62
- 2-Propanone azine 15.3, 2.40
- Propenal 2.1
- 1-Propen-1-amine, *N,N,N*-trimethyl- 8.83
- 1-Propene, 1-anisyl- 3.116
- Propene, 1,1-bis(cyclobutyl)-2-methyl- 2.332
- Propene, 1,1-bis(cyclopropyl)- 2.333
- Propene, 1,1-bis(cyclopropyl)-2-methyl- 2.334
- Propene, 1-cyclopropyl-2-methyl- 2.335
- Propene, 1-ethoxy-2-methyl- 2.336
- Propene, 2-methyl- 2.337
- Propene, 2-methyl-1-naphthalenyl- 3.87
- Propene, 2-methyl-1-phenyl- 3.114
- Propene, 2-methyl-1-(phenylsulfinyl)- 2.338
- 2-Propenoic acid, 3-(2-hydroxyphenyl)- 4.69
- p*-Propenylanisole 3.116
- 4,4'-(1,3-Propenyl)bis[2,6-di(1,1-dimethylethyl)pyrylium] 11.159
- Propylamine 8.84
- Propylamine, 2-methyl- 8.85
- Propylamine, *N*-propyl- 8.86
- Propylamine[2,2'-thiobis[4-(1,1,3,3-tetramethylbutyl)]phenolato]nickel(II) 12.168
- [*N,N'*-Propylenebis(5-sulfosalicylideneiminato)]nickelate(II) disodium salt 12.169
- Propylene sulfide 13.152
- Propyn-1-amine, *N,N*-diethyl- 8.87
- Protease Type VII 10.32
- Protochlorophyll 7.39
- Protochlorophyllide 7.37
- Protochlorophyllide 2-amino-2-(methoxycarbonyl)ethyl ester 7.36
- Protopheophytin 7.38
- Protoporphyrin IX 7.73
- Protoporphyrin IX, dimethyl ester 7.78
- Pseudoisocyanine 11.45
- Psoralen 5.86
- Psoralen, 8-methoxy- 5.87
- Pulegone 2.115
- Purine, 6-amino- 16.63
- Purin-2,6,8-trione, 7,9-dihydro-, ion(1-) 16.64
- Pyran-4-*d*, 2,3-dihydro-4-methyl- 5.92
- Pyran-4-*d*, 3,4-dihydro-4-methyl- 5.92
- Pyran-4-*t*, 2,3-dihydro-4-methyl- 5.93
- Pyran-4-*t*, 3,4-dihydro-4-methyl- 5.93
- Pyran-5-*t*, 2,3-dihydro-4,4-dimethyl- 5.94
- Pyran-5-*t*, 3,4-dihydro-4,4-dimethyl- 5.94
- Pyran-5-*t*, 2,3-dihydro-4-methyl- 5.95
- Pyran-5-*t*, 3,4-dihydro-4-methyl- 5.95
- Pyran-6-*t*, 2,3-dihydro-4,4-dimethyl- 5.96
- Pyran-6-*t*, 3,4-dihydro-4,4-dimethyl- 5.96
- Pyran-6-*t*, 2,3-dihydro-4-methyl- 5.97
- Pyran-6-*t*, 3,4-dihydro-4-methyl- 5.97
- Pyran, 5-benzoyl-3,4-dihydro-6-phenyl- 5.89
- Pyran, 3,4-dihydro- 5.90
- Pyran, 3,4-dihydro-5,6-dimethyl- 5.91
- Pyran, 5,6-dihydro-2,3-dimethyl- 5.91
- Pyran, 3,4-dihydro-6-methyl-5-acetyl- 5.88
- Pyran, 5-ethoxycarbonyl-3,4-dihydro-6-methyl- 5.98
- Pyran, 5-ethoxycarbonyl-3,4-dihydro-6-phenyl- 5.100
- Pyran-5-carboxylic acid, 3,4-dihydro-6-methyl-, ethyl ester 5.98

- Pyran-5-carboxylic acid, 3,4-dihydro-6-(1-methylethyl)-, ethyl ester **5.99**
- Pyran-5-carboxylic acid, 3,4-dihydro-6-phenyl-, ethyl ester **5.100**
- Pyran-5-carboxylic acid, 6-ethyl-3,4-dihydro-, ethyl ester **5.101**
- Pyran-4-thione **13.138**
- Pyran-4-thione, 2,6-dimethyl- **13.139**
- Pyran-4-thione, 2,6-diphenyl- **13.140**
- Pyrazole, 4,5-dihydro-5-[4-(diethylamino)phenyl]-3-[2-[4-(diethylamino)phenyl]ethenyl]-1-phenyl- **11.117**
- Pyrazole, 4,5-dihydro-5-[4-(dimethylamino)phenyl]-3-[2-[4-(dimethylamino)phenyl]ethenyl]-1-phenyl- **11.118**
- Pyrazole, 4,5-dihydro-1,5-diphenyl-3-(2-phenylethenyl)- **11.119**
- Pyrazole, 4,5-dihydro-5-(4-methoxyphenyl)-3-[2-(4-methoxyphenyl)ethenyl]-1-phenyl- **11.120**
- Pyrazole, 3,4,4,5-tetramethyl- **15.3**
- Pyrazole dye 2 **11.155**
- Pyrazole dye 3 **11.22**
- Pyrazole dye 4 **11.24**
- Pyrazole dye 5 **11.25**
- Pyrazole dye 6 **11.21**
- Pyrazole dye 7 **11.23**
- Pyrazole-3-selone, 4-(aminomethylene)-2,4-dihydro-5-methyl-2-phenyl-, (*Z*)- **13.141**
- Pyrazole-3-thione, 4-(aminomethylene)-2,4-dihydro-5-methyl-2-phenyl- **13.142**
- 2-Pyrazoline, 3-(4-chlorophenyl)-1,5-diphenyl- **11.121**
- 2-Pyrazoline, 5-(4-chlorophenyl)-1,3-diphenyl- **11.122**
- 2-Pyrazoline, 5-deutero-1,3,5-triphenyl- **11.123**
- 2-Pyrazoline, 1,5-diphenyl-3-styryl- **11.119**
- 2-Pyrazoline, 3-(4-methoxyphenyl)-1,5-diphenyl- **11.124**
- 2-Pyrazoline, 5-(4-methoxyphenyl)-1,3-diphenyl- **11.125**
- 2-Pyrazolinc, 5-[*p*-methoxyphenyl]-3-[*p*-methoxystyryl]-1-phenyl- **11.120**
- 2-Pyrazoline, 3-(4-methylphenyl)-1,5-diphenyl- **11.126**
- 2-Pyrazolinc, 5-(4-methylphenyl)-1,3-diphenyl- **11.127**
- 2-Pyrazoline, 1,3,5-triphenyl- **11.121, 11.122, 11.123, 11.124, 11.125, 11.126, 11.127**
- 3-Pyrazolinone, 4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbonyl-2-phenyl- **11.128**
- 3-Pyrazolinone, 4-[4-[ethyl(2-hydroxyethyl)amino]-2-methylphenyl]imino-5-methyl-2-phenyl- **11.129**
- 3-Pyrazolinone, 4-[4-[(2-hydroxyethyl)ethylamino]phenyl]imino-5-methyl-2-phenyl- **11.130**
- 3-Pyrazolinone, 4-[4-[(2-methylsulfamylethyl)ethylamino]-2-methylphenyl]imino-5-methyl-2-phenyl- **11.78**
- Pyrazolo[1,2-*a*]benzotriazole **11.131**
- Pyrazolo[1,2-*a*]benzotriazole, 1,3-dimethyl- **11.132**
- Pyrazolo[1,2-*a*]benzotriazol-4-ium, hydroxide, inner salt **11.131**
- Pyrazolo[1,2-*a*][1,2]diazepine, hexahydro- **8.88**
- Pyrazol-3-one, 4-[(4-aminophenyl)imino]-2,4-dihydro-5-methyl-2-phenyl- **11.133**
- Pyrazol-3-one, 4-[(4-amino-2,3,5,6-tetramethylphenyl)imino]-2,4-dihydro-5-methyl-2-phenyl- **11.134**
- Pyrazol-3-one, 2-(4-bromophenyl)-4-(4-diethylamino-2-methylphenyl)-2,4-dihydro-imino-5-methylcarbonyl- **11.135**
- Pyrazol-3-one, 2-(3-chlorophenyl)-4-(4-diethylamino-2-methylphenyl)-2,4-dihydro-imino-5-methylcarbonyl- **11.136**
- Pyrazol-3-one, 2-(4-chlorophenyl)-4-(4-diethylamino-2-methylphenyl)-2,4-dihydro-imino-5-methylcarbonyl- **11.137**
- Pyrazol-3-one, 4-[[4-(diethylamino)-2,6-dimethylphenyl]imino]-2,4-dihydro-5-(benzoylamino)-2-phenyl- **11.138**
- Pyrazol-3-one, 4-[[4-(diethylamino)-2,6-dimethylphenyl]imino]-2,4-dihydro-5-(1,1-dimethylethyl)-2-phenyl- **11.139**
- Pyrazol-3-one, 4-[[4-(diethylamino)-2,6-dimethylphenyl]imino]-2,4-dihydro-5-methyl-2-phenyl- **11.140**
- Pyrazol-3-one, 4-[[4-(diethylamino)-2-methylphenyl]imino]-2,4-dihydro-5-(1,1-dimethylethyl)-2-phenyl- **11.141**
- Pyrazol-3-one, 4-(4-diethylamino-2-methylphenyl)imino-2,4-dihydro-5-methylcarbonyl-2-(3-methoxyphenyl)- **11.142**
- Pyrazol-3-one, 4-(4-diethylamino-2-methylphenyl)imino-2,4-dihydro-5-methylcarbonyl-2-(3-methylphenyl)- **11.143**
- Pyrazol-3-one, 4-[[4-(diethylamino)-2-methylphenyl]imino]-2,4-dihydro-5-methyl-2-phenyl- **11.144**
- Pyrazol-3-one, 4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbonyl-2,4-dihydro-2-(4-nitrophenyl)- **11.145**
- Pyrazol-3-one, 4-(4-diethylamino-2-methylphenyl)imino-5-methylcarbonyl-2,4-dihydro-2-(2,4,6-trichlorophenyl)- **11.146**
- Pyrazol-3-one, 4-[[4-(diethylamino)phenyl]imino]-2,4-dihydro-5-methyl-2-phenyl- **11.147**
- Pyrazol-3-one, 2,4-dihydro-4-[(4-methoxyphenyl)imino]-5-methyl-2-phenyl- **11.148**
- Pyrazol-3-one, 4-[[4-(dimethylamino)-3,5-dimethylphenyl]imino]-2,4-dihydro-5-methyl-2-phenyl- **11.149**
- Pyrazol-3-one, 4-[[4-(dimethylamino)phenyl]imino]-2,4-dihydro-5-methyl-2-phenyl- **11.150**
- Pyrazol-3-one, 4-[[4-(dimethylamino)-2,3,5,6-tetramethylphenyl]imino]-2,4-dihydro-5-methyl-2-phenyl- **11.151**
- Pyrazol-3-one, 4-[[4-(diphenylamino)phenyl]imino]-2,4-dihydro-5-methyl-2-phenyl- **11.152**

- Pyrazol-3-one, 4,4'-[(2,3,5,6-tetramethyl-1,4-phenylene)dinitrilo]bis[2,4-dihydro-5-methyl-2-phenyl]- **11.153**
 Pyrazolo[1,2-*a*]pyrazole, tetrahydro- **8.89**
 Pyrazolo[1,2-*a*]pyrazole, tetrahydro-2,2,6,6-tetramethyl- **8.90**
 Pyrazolo[5,1-*c*]-1,2,4-triazole, 7-[4-(*N*-ethyl- [*N*-(2-methylsulfonylamino)ethyl]amino-2-methylphenylimino)-6-methyl-3-[4-[3-[(3-butyl-4-hydroxyphenoxy(dodecyl)methoxy]-carbonylamino)phenyl]propyl]- **11.154**
 Pyrazolo[5,1-*c*]-1,2,4-triazole-6-carboxylic acid, 7-[[4-(diethylamino)-2-methylphenyl]imino]-3-phenyl-, ethyl ester **11.155**
 Pyrazolo[1',2':2,3][1,2,3]triazolo[4,5-*a*]phenazin-4-ium, 1,3-dimethyl- **6.39**
 Pyridazine, hexahydro-1,2-dimethyl- **8.91**
 Pyridazino[1,2-*a*]pyridazine, octahydro- **8.92**
 Pyridine **6.40**
 Pyridine, 3,5-diacetyl-1,4-dihydro- **6.41**
 Pyridine, 3,5-diacetyl-1,4-dihydro-2,6-dimethyl- **6.42**
 Pyridine, 3,5-dibenzoyl-1,4-dihydro-2,6-dimethyl- **6.43**
 Pyridine, 3-(1-methyl-2-pyrrolidinyl)- **8.93**
 Pyridine, 1,2,3,6-tetrahydro-1-methyl-4-phenyl- **8.94**
 3-Pyridinecarboxamide, 1,4-dihydro-1-(5-*O*-phosphono- β -D-ribofuranosyl)- **16.51**
 Pyridine-3,5-dicarboxamide, 1,4-dihydro-2,6-dimethyl-*N,N*-diphenyl- **6.44**
 Pyridine-3,5-dicarboxamide, 1,4-dihydro-2,4,6-trimethyl-*N,N*-diphenyl- **6.45**
 Pyridine-3,5-dicarboxylic acid, 1,4-dihydro-2,6-dimethyl-, dicyclohexyl ester **6.46**
 Pyridine-3,5-dicarboxylic acid, 1,4-dihydro-2,6-dimethyl-, diethyl ester **6.47**
 Pyridine-3,5-dicarboxylic acid, 1,4-dihydro-2,6-dimethyl-, dihexyl ester **6.48**
 Pyridine-3,5-dicarboxylic acid, 1,4-dihydro-2,6-dimethyl-, di(1-methylethyl) ester **6.49**
 Pyridine-3,5-dicarboxylic acid, 1,4-dihydro-2,6-diphenyl-, diethyl ester **6.50**
 Pyridine-3,5-dicarboxylic acid, 1,4-dihydro-2,4,6-trimethyl-, diethyl ester **6.51**
 Pyridine-3,5-dicarboxylic acid, 2,6-dimethyl-, diethyl ester **6.52**
 Pyridinium, 2,3-dihydro-1-methyl-4-phenyl- **6.53**
 Pyridinium, 4-[[[1,1-dimethylethyl]imino]methyl]-1-methyl- **15.45**
 Pyridinium, 1-methyl- **6.54**
 Pyridinium, 1-methyl-4-phenyl- **6.55**
 Pyrido[2,1-*b*]benzothiazolium, 4-[(2,3-dihydro)pyrido[2,1-*b*]benzothiazol-4-yl)methylene]-1,2,3,4-tetrahydro-, iodide **11.156**
 Pyrido[4,3-*b*]indole, *N*-acetyl-2,3,4,4*a*,5,9*b*-hexahydro-2,8-dimethyl- **6.57**
 Pyrido[4,3-*b*]indole, 2,3,4,4*a*,5,9*b*-hexahydro-2,8-dimethyl- *cis*-(-), **6.56**
 Pyrido[4,3-*b*]indole, 1,2,3,4-tetrahydro-2,8-dimethyl- **6.58**
 α -(4-Pyridyl)-*tert*-butyl nitron **15.48**
 α -(4-Pyridyl 1-oxide)-*N-tert*-butyl nitron **15.47**
 2-Pyrimidinamine, *N,N*,4,5-tetramethyl-6-(phenylmethoxy)- **16.65**
 Pyrimidin-4-ol, 5-butyl-2-(dimethylamino)-6-methyl- **16.66**
 Pyrimidin-4-ol, 5-butyl-2-(ethylamino)-6-methyl- **16.67**
 Pyrimidin-4-ol, 2-(diethylamino)-6-methyl- **16.68**
 Pyrimidin-4-ol, 2-(dimethylamino)-5,6-dimethyl- **16.69**
 Pyrimidin-4-ol, 2-(dimethylamino)-6-methyl- **16.70**
 4-Pyrimidinone, 5-butyl-2-(dimethylamino)-6-methyl- **16.66**
 4-Pyrimidinone, 5-butyl-2-(ethylamino)-6-methyl- **16.67**
 4-Pyrimidinone, 2-(diethylamino)-6-methyl- **16.68**
 4-Pyrimidinone, 2-(dimethylamino)-5,6-dimethyl- **16.69**
 4-Pyrimidinone, 2-(dimethylamino)-6-methyl- **16.70**
 Pyrocatechol **4.4**
 Pyrrole **6.59**
 Pyrrole, 3,4-dihydro-2,2,3-trimethyl-, 1-oxide **15.51**
 Pyrrole, 3,4-dihydro-3,5,5-trimethyl-, 1-oxide **15.52**
 Pyrrole, 2,5-dimethyl- **6.60**
 Pyrrole, 1-(1,1-dimethylethyl)- **6.61**
 Pyrrole, 2-(1,1-dimethylethyl)- **6.62**
 Pyrrole, 3-(1,1-dimethylethyl)- **6.63**
 Pyrrole, 1-methyl- **6.64**
 Pyrrole-2,4-dicarboxylic acid, 5,5'-methylenebis[3-methyl-, tetraethyl ester **6.65**
 Pyrrole-3,5-dicarboxylic acid, 2,4-dimethyl-, diethyl ester **6.66**
 1-Pyrrolidinamine, *N,N*-dimethyl- **8.95**
 Pyrrolidine **8.96**
 1-Pyrrolidinyl, 3-cyano-2,2,5,5-tetramethyl-4-nitro- **15.53**
 1-Pyrrolidinyl, 2,5-di-(4-hydroxy-3-nitrophenyl)-2,5-dimethyl- **15.54**
 1-Pyrrolidinyl, 2-(4-fluoro-3-nitrophenyl)-2,5,5-trimethyl- **15.55**
 1-(1-Pyrrolidinyl)piperidine **8.62**
 1-Pyrroline-1-oxyl, 5,5-dimethyl- **15.56**
 Pyrrolo[2,3,4-*k,l*]acridine-10-one, 1-(4-bromophenyl)-2,3,5,7,8,9-hexahydro-4,4,8,8-tetramethyl- **6.67**
 Pyrrolo[2,3,4-*k,l*]acridine-10-one, 2,3,5,7,8,9-hexahydro-1-(4-methoxyphenyl)-4,4,8,8-tetramethyl- **6.68**
 Pyrrolo[2,3,4-*k,l*]acridine-10-one, 2,3,5,7,8,9-hexahydro-4,4,8,8-tetramethyl-1-phenyl- **6.69**
 Pyrrolo[3',2':3,4]cyclopenta[1,2-*b*]pyridine, 2-(4-ethoxycarbonylphenyl)-1,8-dihydro- **6.70**
 Pyrrol-2-one, 3,4-diethyl-1,5-dihydro-5-[(5-methylpyrrol-2-yl)methylene]- **7.101**

- Pyrrol-2-one, 3,4-diethyl-5-[(4-ethyl-3,5-dimethylpyrrol-2-yl)methylene]-1,5-dihydro- **7.102**
 Pyrrol-2-one, 5-[(3,5-dimethylpyrrol-2-yl)methylene]-4-ethyl-1,5-dihydro-3-methyl- **7.103**
 Pyrrol-2-one, 5-[(4,5-dimethylpyrrol-2-yl)methylene]-4-ethyl-1,5-dihydro-3-methyl- **7.104**
 Pyrrol-2-one, 3-ethenyl-5-[(4-ethyl-3,5-dimethylpyrrol-2-yl)methylene]-1,5-dihydro-4-methyl- **7.105**
 Pyrrol-2-one, 4-ethenyl-5-[(4-ethyl-3,5-dimethylpyrrol-2-yl)methylene]-1,5-dihydro-3-methyl- **7.106**
 Pyrrol-2-one, 4-ethyl-1,5-dihydro-3-methyl-5-[(5-methylpyrrol-2-yl)methylene]- **7.107**
 Pyrrol-2-one, 5-[(4-ethyl-3,5-dimethylpyrrol-2-yl)methylene]-1,5-dihydro- **7.108**
 Pirylium, 2,6-bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)selenapyran-4-ylidene]-3-propenyl]- **11.157**
 Pirylium, 2,6-bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)telluropyran-4-ylidene]-3-propenyl]- **11.158**
 Pirylium, 4,4'-(1,3-propenyl)bis[2,6-di(1,1-dimethylethyl)- **11.159**
 PZ 25 **13.41**
 PZ 51 **13.40**
 Quadricyclane **17.63**
 Quadricyclo[2.2.1.0^{2,6}.0^{3,5}]heptane **17.63**
 Quercetin **4.61**
 Quinaldine Blue **11.41**
 Quinoline **6.71**
 Quinoline, 1,2-dihydro-2,2,4-trimethyl-, homopolymer **6.72**
 Quinoline, 2-(1,3-dioxindolidene)- **11.68**
 Quinoline, 8-hydroxy- **6.73**
 Quinoline, 6-methoxy- **6.74**
 Quinolinium, 1-ethyl-2-[(1-ethyl-2-quinolinylidene)methyl]-, iodide **11.45**
 Quinolinium, 1-ethyl-2-[3-(1-ethyl-2-quinolinylidene)-1-propenyl]-, chloride **11.41**
 Quinolinium, 1-ethyl-4-[3-(1-ethyl-4-quinolinylidene)-1-propenyl]- **11.42**
 Quinolinium, 1-ethyl-4-[3-(1-ethyl-4-quinolinylidene)-1-propenyl]-, toluenesulfonate **11.43**
 8-Quinolinal **6.73**
 Quinone **16.12**
 Quinophthalone **11.68**
 Quinuclidine **8.97**
 Reserpine **8.98**
 Resorcinol **4.10**
 Resorcinol dimethyl ether **3.39**
 11-*cis*-Retinal **2.339**
 11-*(Z)*-Retinal **2.339**
 13-*cis*-Retinal **2.340**
 13-*(Z)*-Retinal **2.340**
 (*all-E*)-Retinal **2.341**
all-trans-Retinal **2.341**
 Retinoic acid **2.342**
 (*all-E*)-Retinoic acid **2.342**
all-trans-Retinoic acid **2.342**
 (*all-E*)-Retinol **2.343**
all-trans-Retinol **2.343**
 Retinol acetate **2.344**
 Retinyl acetate **2.344**
 Rhodopsin **16.71**
 Riboflavine **16.72**
 RO 10-9359 **2.262**
 Rose Bengal dianion **11.66**
 Rubellin A **16.8**
 Rubidomycin **4.79**
 Rubrene **3.125, 3.8, 3.10, 3.24, 3.124, 5.83, 7.5, 7.7, 8.6, 8.19, 8.24, 8.27, 9.1, 9.6, 9.14, 9.16, 14.1, 14.2, 14.7, 15.44**
 Rubrene-2,3,8,9-tetracarboxylate ion **3.126, 3.88**
 Rutin **4.58**
 Saccharose **16.75**
 Salcomine **12.139**
 Salicylate ion **4.35**
 Sarcina phytoene (3 conjugated bonds) **2.74**
 Sarcina phytofluene **2.73**
 9,10-Secocholesta-5,7,10(19)-trien-3-ol (3 β) **2.361**
 Selenopyrylium, 2,6-bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)selenopyran-4-ylidene]-3-propenyl]- **11.160**
 Silane, (bicyclo[2.2.1]hepta-2,5-dien-2-yloxy)trimethyl- **2.7**
 Silane, (bicyclo[2.2.1]hept-2-en-2-yloxy)trimethyl- **2.24**
 Silane, (2,5-cyclooctadien-1-yloxy)trimethyl- **2.132**
 Silane, (7,7-dimethylbicyclo[2.2.1]hepta-2,5-dien-2-yloxy)trimethyl- **2.5**
 Silane, (7,7-dimethylbicyclo[2.2.1]hept-2-en-2-yloxy)trimethyl- **2.5, 2.7, 2.24**
 Silicon, [2,3-*b*:2',3'-*g*:2'',3''-*l*:2''',3'''-*q*]porphyrinatobis(tribenzylsilanolato)- **7.40**
 Silicon, [2,3-*b*:2',3'-*g*:2'',3''-*l*:2''',3'''-*q*]porphyrinatobis(tripropylsilanolato)- **7.41**
 Silicon, tetranaphtho[2,3-*b*:2',3'-*g*:2'',3''-*l*:2''',3'''-*q*]porphyrinatobis(tribenzylsilanolato)- **7.17**
 Silicon, tetranaphtho[2,3-*b*:2',3'-*g*:2'',3''-*l*:2''',3'''-*q*]porphyrinatobis(trihexylsilanolato)- **7.18**
 Silicon, tetranaphtho[2,3-*b*:2',3'-*g*:2'',3''-*l*:2''',3'''-*q*]porphyrinatobis(triisobutylsilanolato)- **7.20**
 Singlet oxygen **17.64**
 Sitosteryl acetate **16.73**
 Skatole **6.16**
 Sodium dodecyl sulfate **17.25**
 Sodium lauryl sulfate **17.25**
 Solvent Yellow 14 **11.104, 11.94, 11.95, 11.96, 11.97, 11.98, 11.99, 11.100, 11.102, 11.103**
 Soybean oil **17.65, 2.62, 4.50**

- Spermidine **8.10**
 Spermine **8.11**
 Spheroidene **2.68**
 (*all-E*)-Spheroidene **2.68**
 (*all-trans*)-Spheroidene **2.68**
 Spheroidenone **2.69**
 (*all-E*)-Spheroidenone **2.69**
 (*all-trans*)-Spheroidenone **2.69**
 Spirilloxanthin **2.71**
 (*all-E*)-Spirilloxanthin **2.71**
 (*all-trans*)-Spirilloxanthin **2.71**
 2,2'-Spirobi[1-benzopyran]-6,6'-diol, 7,7'-bis(1,1-dimethylethyl)-3,3',4,4'-tetrahydro-4,4,4',4'-tetramethyl- **4.184**
 2,2'-Spirobi[1-benzopyran]-6,6'-diol, 3,3',4,4'-tetrahydro-4,4,4',4',7,7'-hexamethyl- **4.185**
 1,1'-Spirobi[indene]-5,5',6,6'-tetracarboxylic acid, 2,2',3,3'-tetrahydro-3,3,3',3'-tetramethyl-, tetramethyl ester **3.98**
 2,2'-Spirobis[7-*tert*-butyl-3,4-dihydro-6-hydroxy-4,4-dimethylbenzopyran] **4.184**
 2,2'-Spirobis[2-(7-*tert*-butyl-6-hydroxy-4,4-dimethyl-1-benzopyran)] **4.184**
 1,1'-Spirobis[2,3-dihydro-5,6-di(methoxycarbonyl)-3,3-dimethylindene] **3.98**
 2,2'-Spirobis[3,4-dihydro-6-hydroxy-4,4,7-trimethyl-1-benzopyran] **4.185**
 Spirocyclopropane[4,7]methanoindene, 4,5,6,7-tetrahydro- **2.345**
 Squalene **2.346**
 Squarylium Dye 1a **11.46, 12.66**
 Squarylium Dye 3a **11.32**
 Squarylium Dye 1b **11.47**
 Squarylium Dye 1c **11.48**
 Stearic acid **17.66**
 Stigmasta-5,22-dien-3-ol acetate (3 β) **16.74**
 Stigmasta-5-en-3-ol acetate (3 β) **16.73**
 Stigmasteryl acetate **16.74**
cis-Stilbene **3.99**
 Stilbene, 4,4'-dimethoxy- **3.100**
 Stilbene, α,β -dimethoxy- **3.101**
 Stilbene, α,α' -dimethyl-, (*E*)- **3.102, 3.103**
 Stilbene, α,α' -dimethyl-, (*Z*)- **3.103**
 Stilbene, α -methyl-, (*E*)- **3.104**
 Stilbene, α -methyl-, (*Z*)- **3.105**
 Stilbene (*Z*)- **3.99**
 (*Z*)-Stilbene **3.99**
 Stilbene-2,2'-disulfonate ion, 4,4'-diacetamido- **3.106**
 Stilbene-2,2'-disulfonate ion, 4,4'-diamino- **3.107**
 (*E*)-Stilbene oxide **17.49**
 Stobadine **6.56**
 Strychnidin-10-one **8.99**
 Strychnine **8.99**
l-Strychnine **8.99**
 Styrene **3.108**
 Styrene, 3-chloro- α,β,β -trimethyl- **3.109**
 Styrene, 4-chloro- α,β,β -trimethyl- **3.110, 3.121, 3.122**
 Styrene, 3-cyano- α,β,β -trimethyl- **3.111**
 Styrene, 4-cyano- α,β,β -trimethyl- **3.112**
 Styrene, α -cyclopropyl- β,β -trimethyl- **3.113**
 Styrene, β,β -dimethyl- **3.114**
 Styrene, 4-(dimethylamino)- α,β,β -trimethyl- **3.115**
 Styrene, 4-methoxy- β -methyl- **3.116**
 Styrene, 3-methoxy- α,β,β -trimethyl- **3.117**
 Styrene, 4-methoxy- α,β,β -trimethyl- **3.118, 3.115, 3.123**
 Styrene, β -methyl-, (*E*)- **3.119**
 Styrene, β -methyl-, (*Z*)- **3.120**
 Styrene, 3, α,β,β -tetramethyl- **3.121**
 Styrene, 4, α,β,β -tetramethyl- **3.122, 3.109, 3.111, 3.112, 3.117, 3.118, 3.123**
 Styrene, α,β,β -trimethyl- **3.123, 2.96**
 Subtilisin B **10.32**
 Subtilisin BPN' **10.32**
 Subtilisin Novo **10.32**
 Succinate dehydrogenase **10.13**
 Sucrose **16.75**
 Sudan I **11.104, 11.94, 11.95, 11.96, 11.97, 11.98, 11.99, 11.100, 11.102, 11.103**
 Sulfinylbismethane **13.81**
 10-(12-Sulfonatododecyl)phenothiazine **13.124**
 2-Sulfonatophenyl-*N-tert*-butylnitron **15.49**
 Superoxide dismutase **10.14**
 Superoxide ion **14.14**
 Superoxide radical anion **14.14**
 Sydnone, 3,4-diphenyl- **5.102**
 Sydnone, 4-methyl-3-(4-methylphenyl)- **5.103**
 Sydnone, 3-(4-methylphenyl)- **5.104**
 Sydnone, 3-methyl-4-phenyl- **5.105**
 Sydnone, 3 (4 methylphenyl) 4-phenyl **5.106**
 Sydnone, 3-phenyl- **5.107**
 Tangeretin **4.62**
 Taxifolin **4.63**
 Telluropyrylium, 2,6-bis(1,1-dimethylethyl)-4-[1-[2,6-bis(1,1-dimethylethyl)telluropyran-4-ylidene]-3-propenyl]- **11.161**
 Telluropyrylium, 2,6-diphenyl-4-(2,6-diphenyltelluropyran-4-ylidene)methyl- **11.162**
 TEMPAMIN **15.29**
 [1,1',3',1''-Terphenyl]-2'-ol, 5'-phenyl- **4.149**
 α -Terpinene **2.105**
 Terpinolene **2.121**
 Tetra-*O*-acetylglucose-1-thiolato(triethylphosphino)gold(I) **12.170**
 1,4,5,8-Tetraaminoanthraquinone **11.14**

- 29,30,31,32-
Tetraazapentacyclo[24.2.1.1^{4,7}.1^{12,15}.1^{18,21}]dotriaconta-
1,3,5,7,9,10,11,13,15(31),16,18,20,26(29),27-
pentadecaen-22,24-diyne, 5,6,13,14,19,20,27,28-
octaethyl- **7.100**
- 25,26,27,28-
Tetraazapentacyclo[20.2.1.1^{4,7}.1^{10,13}.1^{16,19}]octacosa-
1(25),2,4,6,8,10(27),11,13,15,17,19,21,23-tridecaene,
5,6,11,12,17,18,23,24-octaethyl- **7.98**
- Tetrabenzofulvalene **3.66**
- 2',4',5',7'-Tetrabromofluorescein dianion **11.65**
- Tetrabutylammonium bis[1,2-diphenyl-1,2-
ethenedithiolato]nickelate(I) **12.65**
- Tetrabutylammonium bis[1,2-di(4-trifluoromethylphenyl)-
1,2-ethenedithiolato]nickelate(I) **12.75**
- 2,11,20,29-Tetra-*tert*-butyl-naphthalocyanine **7.22**
- Tetra(6-*tert*-butyl)-2,3-naphthalocyanine **7.22**
- Tetra-*tert*-butylphthalocyanine **7.46**
- Tetracene **3.124**, **3.12**, **7.53**, **8.72**, **8.77**, **9.18**, **15.46**
- Tetracene, 5,6,11,12-tetraphenyl- **3.125**, **3.8**, **3.10**, **3.24**,
3.124, **5.83**, **7.5**, **7.7**, **8.6**, **8.19**, **8.24**, **8.27**, **9.1**, **9.6**, **9.14**,
9.16, **14.1**, **14.2**, **14.7**, **15.44**
- Tetracene-2,3,8,9-tetracarboxylate, 5,6,11,12-tetraphenyl-
3.126, **3.88**
- 5,6,7,8-Tetrachloro-1,2,3,4-tetrahydro-9-isopropylidene-
1,4-methanonaphthalene **2.258**
- 3,4,5,6-Tetrachloro-2',4',5',7'-tetraiodofluorescein dianion
11.66
- 4,6,8,10,12,14,16,18,20-Tetracosanonaene-3,22-dione,
6,10,15,19-tetramethyl-2,2,23,23-tetramethoxy- (*all*-
E) **2.347**
- 4,6,8,10,12,14,16,18,20-Tetracosanonaene-2,3,22,23-
tetraone, 6,10,15,19-tetramethyl- (*all*-*E*) **2.348**
- Tetracyclo[3.2.0.0^{2,7}.0^{4,6}]heptane **17.63**
- Tetracyclone **3.60**
- Tetradecanoic acid **17.67**
- 2,9,16,23-Tetra(1,1-dimethylethyl)phthalocyanine **7.46**
- Tetraethoxyethene **2.225**
- 2,3,5,6-Tetrafluorophenol **4.143**
- 5,6,7,8-Tetrafluoro-1,2,3,4-tetrahydro-9-isopropylidene-1,4-
methanonaphthalene **2.259**
- Tetraglycine **10.18**
- 7,8,11,12-Tetrahydro- ψ -carotene **2.72**
- 1,2,3,4-Tetrahydro-5,8-dimethoxy-1,4-methanonaphthalene
3.73
- Tetrahydrofuran **17.68**
- 1,2,3,4-Tetrahydro-9-isopropylidene-1,4-
methanonaphthalene **2.260**
- 4,5,6,7-Tetrahydro-4,7-methanoindene **2.254**
- 1,2,3,4-Tetrahydro-1,4-methanonaphthalene **3.72**
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- Tryptophanamide **10.43**
- L-Tryptophanamide, *N*-acetyl- **10.44**
- Tryptophylglycine **10.21**
- L-Tryptophylglycylglycine **10.22**
- Tyramine **4.186**
- Tyrosine **4.187**
- Tyrosine, glycyl- **4.189**
- L-Tyrosine, *N*-acetyl-, ethyl ester **4.188**
- Tyrosine, methyl ester **4.190**
- L-Tyrosylglycine **4.76**
- Ubiquinol 0 **4.21**
- Ubiquinol 10 **4.25**
- 1,6-Undecadiene, 2,6-dimethyl-, (*E*)- **2.359**
- 1,6-Undecadiene, 2,6-dimethyl-, (*Z*)- **2.360**
- Undecanoic acid **17.76**
- Urate ion **16.64**
- Urea **17.77**
- Urea, allyl- **17.78**
- Uric acid anion **16.64**
- Uridine **16.80**
- Valeric acid **17.79**
- Vaska's complex **12.123**
- Veratrole **3.38**
- Vincamine **8.100**
- Vinylacetic acid **2.59**
- 2-Vinylfuran **5.53**
- 4-Vinylprotochlorophyll **7.34**
- 4-Vinylprotopheophytin **7.35**
- Violaxanthin **2.80**
- Vitamin A **2.343**
- Vitamin A acid **2.342**
- Vitamin B₂ **16.72**
- Vitamin D₃ **2.361**
- Vobasan-17-oic acid, 19,20-dihydro-3-oxo-, methyl ester, (20 α) **8.101**
- WR-1065 **13.94**
- Xanthophyll **2.75**
- Xanthotoxin **5.87**
- 2,4-Xylenol **4.116**
- 2,6-Xylenol **4.117**
- 3,4-Xylenol **4.118**
- Zeaxanthin **2.79**
- Zinc(II), bis[3-(cyclohexylimino)methyl]-5-ethyl-2-thiophenethionato]- **12.23**
- Zinc(II) bis(acetylacetonate) **12.13**
- Zinc(II) bis(dibutyldithiocarbamate) **12.29**
- Zinc(II) bis(diisopropyldithiocarbamate) **12.51**
- Zinc(II) bis(*O,O'*-diphenyldithiophosphate) **12.72**
- Zinc(II) bis[2,2'-thiobis[*O,O'*-di(4-*tert*-butylphenyl)dithiophosphate]] **12.115**
- Zinc(II) etiopurpurin ethyl ester **7.31**
- Zinc(II) porphyrin **7.71**
- Zinc(II) protoporphyrin **7.81**
- Zinc(II) protoporphyrin IX **7.81**
- Zinc(II) sulfophthalocyanine **7.44**
- Zinc(II) tetraphenylchlorin **7.53**
- Zinc(II) tetraphenylporphyrin **7.68**
- Zinc(II) 5,10,15,20-tetraphenylporphyrin **7.68**