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

Alberta B. Ross and Pedatsur Neta

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

U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, Secretary
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, Director

Issued October 1982

Library of Congress Cataloging in Publication Data

Ross, Alberta B.
Rate constants for reactions of aliphatic carbon-centered radicals in aqueous solution.

(NSRDS-NBS ; 70)
"Issued October 1982."
1. Chemcial reaction, Rate of—Tables. 2. Radicals (Chemistry)—Tables. I. Neta, Pedatsur. II. Title. III. Series.
QC100.U573 no. 70 [QD502] 602'.18s 82-2096
[547.1'394] AACR2

NSRDS-NBS 70
Natl. Stand. Ref. Data Ser., Natl. Bur. Stand. (U.S.), 70, 103 pages (Oct. 1982)
CODEN: NSRDAP

© 1982 by the Secretary of Commerce on Behalf of the United States Government

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON: 1982

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402
Price $5.50
(Add 25 percent for other than U.S. mailing).

Foreword

The National Standard Reference Data System provides access to the quantitative data of physical science, critically evaluated and compiled for convenience and readily accessible through a variety of distribution channels. The System was established in 1963 by action of the President's Office of Science and Technology and the Federal Council for Science and Technology, and responsibility to administer it was assigned to the National Bureau of Standards.

NSRDS receives advice and planning assistance from a Review Committee of the National Research Council of the National Academy of Sciences-National Academy of Engineering. A number of Advisory Panels, each concerned with a single technical area, meet regularly to examine major portions of the program, assign relative priorities, and identify specific key problems in need of further attention. For selected specific topics, the Advisory Panels sponsor subpanels which make detailed studies of users' needs, the present state of knowledge, and existing data resources as a basis for recommending one or more data compilation activities. This assembly of advisory services contributes greatly to the guidance of NSRDS activities.

The System now includes a complex of data centers and other activities in academic institutions and other laboratories. Components of the NSRDS produce compilations of critically evaluated data, reviews of the state of quantitative knowledge in specialized areas, and computations of useful functions derived from standard reference data. The centers and projects also establish criteria for evaluation and compilation of data and recommend improvements in experimental techniques. They are normally associated with research in the relevant field.

The technical scope of NSRDS is indicated by the categories of projects active or being planned: nuclear properties, atomic and molecular properties, solid state properties, thermodynamic and transport properties, chemical kinetics, and colloid and surface properties.

Reliable data on the properties of matter and materials are a major foundation of scientific and technical progress. Such important activities as basic scientific research, industrial quality control, development of new materials for building and other technologies, measuring and correcting environmental pollution depend on quality reference data. In NSRDS, the Bureau's responsibility to support American science, industry, and commerce is vitally fulfilled.

E. Ambler.

ERNEST AMBLER, *Director*

Preface

This report is one of a series of data publications on radiation chemistry; the aim of the series is to compile, evaluate, and present the numerical results on processes occurring in systems which have been subjected to ionizing radiation. Various kinds of data are important in radiation chemistry. The quantities which were measured first were the observed radiation yields or G values (molecules formed or destroyed per 100 eV). Various indirect methods based on G values have been used to determine yields of transient species and relative rates of reactions. The spectral properties (optical, electron spin resonance) of transients have provided a direct method for their identification, and rates of the very fast reactions of transients which occur in irradiated systems have been measured directly by spectroscopic methods. Conductivity and luminescence methods have also provided a means of measuring properties of transients and their kinetics. Some reactions which occur in irradiated systems have also been studied by other methods, such as photochemistry, electric discharge, ultrasonics, chemical initiation, electron impact, etc. The emphasis in these publications is on the data of radiation chemistry, but where other pertinent data exist, they are included.

The data of radiation chemistry are voluminous; thousands of systems have been investigated. As a result there are certain collections, *e.g.* rate constants of particular types of reactions or certain properties of transients, for which tabulations of the data are considered essential, but for which critical assessment of each value is impossible. On the other hand, certain systems and properties have been studied so extensively that critical examination of these data is desirable and timely. Authors of this series of data publications have been asked to evaluate the extent to which the data can be critically assessed, to describe their criteria for evaluation, and to designate preferred values whenever possible.

Contents

		Page
Introduction		1
List of Abbreviations and Symbols		3
List of Aliphatic Radicals		4
Table 1.	Rate Constants for Reactions of Aliphatic Radicals with Inorganic Solutes in Aqueous Solution	7
Table 2.	Rate Constants for Reactions of Aliphatic Radicals with Organic Solutes in Aqueous Solution	33
Table 3.	Rate Constants for Acid– and Base–catalyzed Proton Transfer Reactions of Aliphatic Radicals in Aqueous Solution	73
Table 4.	Rate Constants for Second Order Decay of Selected Aliphatic Radicals in Aqueous Solution	77
Index to Radical Reactions		80
Radical Formula Index		83
Substrate Formula Index		85
References		89

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

Alberta B. Ross and Pedatsur Neta

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

Rate constants have been compiled for reactions of various transient aliphatic radicals produced mostly by radiolysis in aqueous solutions. In certain cases the radicals have been produced by photolysis or by a thermal chemical reaction. Data are included for aliphatic carbon-centered radicals only, i.e. substituted alkyl radicals in the broad sense, but not for oxyl or aminyl radicals. Reactions of the aliphatic radicals with inorganic and organic compounds are included.

Key words: Alkyl radicals; aminoalkyl radicals; aqueous solution; carboxyalkyl radicals; chemical kinetics; electron transfer; haloalkyl radicals; hydroxyalkyl radicals; photolysis; radical anions; radiolysis; rates.

Introduction

The radiolysis of water produces the short-lived intermediates, hydrated electrons, hydrogen atoms, and hydroxyl radicals, which react with a variety of aliphatic compounds to produce secondary radicals (73G030, 75G001, 75G002, 77G011).[1] In general, OH radicals and H atoms react with aliphatic compounds by hydrogen abstraction

$$OH + RH \rightarrow H_2O + \dot{R}$$

$$H + RH \rightarrow H_2 + \dot{R}$$

or by addition

$$OH + R_2C{=}CR_2 \rightarrow R_2\dot{C}\text{-}C(OH)R_2$$

$$H + R_2C{=}CR_2 \rightarrow R_2\dot{C}\text{-}CHR_2$$

while e_{aq}^- may add to form an anion radical

$$e_{aq}^- + R_2CO \rightarrow R_2\dot{C}O^-$$

or to dissociate the molecule

$$e_{aq}^- + RX \rightarrow \dot{R} + X^-$$

This compilation includes reaction rates for radicals produced by each of the above mechanisms and for similar radicals produced by photolysis or by chemical reactions in aqueous solutions.

[1]Literature references are cited following the tables.

The radicals studied most extensively are α-hydroxyalkyl radicals, produced by reaction of OH with alcohols or by addition of e_{aq}^- to a carbonyl group. These radicals react with many inorganic and organic compounds by one-electron reduction, although addition and abstraction reactions sometimes take place as well. Another type of reducing radical is produced by addition of e_{aq}^- to various acids, esters, and amides, mostly unsaturated. Alkyl radicals which do not contain a hydroxy or amino group on the carbon bearing the unpaired electron (or conjugated with it) are weaker reductants and react more slowly either by electron transfer or by addition or abstraction.

Alkyl radicals with an α-carbonyl group behave mostly as oxidizing radicals and react by one-electron transfer. This type of radical is produced in most cases by hydrogen abstraction from 1,2-glycols, followed by water elimination, e.g.

$$HOCH_2CH_2OH \rightarrow HOCH_2\dot{C}HOH \rightarrow \dot{C}H_2CHO$$

Most of the radicals included in these tables exhibit only weak absorptions in the UV, which are not very convenient for the study of their reaction rates by kinetic spectrophotometry. Many of the reactions have, therefore, been studied by following changes in optical absorption of the substrate or its reaction product.

In certain cases, the process monitored by kinetic spectrophotometry is not the only reaction occurring in the system. This happens under various conditions: a. The primary radical attacks the substrate at more than one site,

e.g. the OH radical abstracts hydrogen from alcohols mostly from the alpha position and to some extent from other sites. As a result the system contains a mixture of the reducing α-hydroxyalkyl radicals and the much less reactive β-hydroxy-and γ-hydroxy-, etc. or alkoxyl radicals. b. Both OH and H may react with the substrate but yield different radicals, e.g. OH and H adducts. c. The radical produced by the initial attack may undergo certain processes before reacting with the substrate, e.g. protonation on carbon, acid-base equilibria, water elimination. Under certain conditions more than one form of the radical may react with the substrate. d. The aliphatic radical may react with the substrate by more than one mechanism, e.g. electron transfer and addition, of which only one is spectrophotometrically monitored. e. The aliphatic radical may react with the substrate slowly and undergo radical-radical decay as a competing process.

In many of the above cases, the reaction observed constitutes the main process (>90%) so that the rate constant measured can be taken to represent that reaction. However, when the observation is made on a less dominant process, the experimental rate constant may not represent the real value for that reaction. In these cases, the experimental values are reported in the tables and marked "uncorrected". The corrected value can sometimes be derived after considering the unobserved reactions.

Arrangement of the Tables

A numbered list of the radicals for which reaction rate data have been compiled precedes the tables. Numbers have been assigned to the radicals for use in numbering the reactions in subsequent tables, to identify the radical and to provide a means of generating an index. A name and line formula are listed for most of the radicals. Line formulae for radicals containing rings are written with dashes at the left and right to indicate the cycle, as $-O\dot{C}HCH_2O(CH_2)_2-$ for the radical from dioxane (2,5-dioxacyclohexyl, 104). When more than one radical species may be involved the radicals are identified only by their origin, as "Radicals from glucose + OH".

Tables 1-3 contain the rate data for the reactions of the radicals with various substrates. Inorganic ions and molecules are grouped in table 1, in alphabetic order by the symbol for the main element. Organic substrates are listed alphabetically by name in table 2. Table 3 contains proton transfer reactions of radicals with acids, bases and buffer components. Entries for each substrate are numbered, and each reaction has an entry number including both the number of the substrate and the radical number. For example, the reaction of oxygen with methyl radical is 93.001, while oxygen with carboxymethyl radical is 93.035. Reactions of substrates with radicals in more than one acid-base form are listed in the tables under the same entry number.

Table 4 contains a few representative radical-radical reactions whose rates have been determined in most cases by measuring the second-order decay rate of the optical absorption ($2k/\epsilon$). The molar absorptivity, ϵ, used to calculate the rate constant k is given in the *Comments* column.

Products are listed only for those reactions for which evidence has been obtained on the nature of the products. The error limits given are those reported in the original papers; lacking such a statement the uncertainty in the rate constant should be assumed to be ± 25%. Many of the second order rate constants are derived from pseudo-first order rates for the decay of the transient radical or the substrate or the build-up of a product. Rate constants for certain reactions have been used as reference values to determine values for other reactions, which are labeled "rel."; in those cases the reference values are listed in the *Comments* column. The label "uncor." is used for observed values of k measured in systems in which more than one process is occurring.

Temperature is assumed to be ambient unless otherwise specified. The *Method* column indicates the method for generation of the transient and in the *Comments* column the method of measurement is indicated along with the source of the transient and other information such as activation energy, pK, etc. When the symbol R is used in a *Comment*, such as in G(R) or k(R + R), it refers to the radical of the same entry. *References* are indicated by the serial number from the Radiation Chemistry Data Center bibliographic data base, from which the reference list was generated. The first two digits of the serial number represent the year in which the work was published.

Indexes have been produced from tables 1-3 for reactions of (1) the radicals in order of their number and for (2) the radicals and substrates by molecular formula. The indexes follow the tables.

Acknowledgments

The assistance of Dr. W. Phillip Helman in providing programs for indexing and text processing is gratefully acknowledged. We also wish to thank Dr. Norman Lichtin and Dr. Guillermo Ferraudi for their useful comments on tables 3 and 1, respectively.

The Radiation Laboratory is operated under Contract DE-AC02-76ER00038 with the Department of Energy. The Radiation Chemistry Data Center is supported jointly by the Office of Standard Reference Data of the National Bureau of Standards and of the Office of Basic Energy Sciences and the Office of Health and Environmental Research of the Department of Energy. This is Radiation Laboratory Document No. NDRL-2196.

List of Abbreviations and Symbols

A	frequency factor
Ac	acetyl
ala	alanine
abs.	absorption
abstr.	abstraction
addn.	addition
alk.	alkaline
bpy	2,2′-bipyridine
BuOH	butanol
calcd.	calculated
chem.	chemical
c.k.	competition kinetics
concn.	concentration
condy.	conductivity
contg.	containing
cor.	corrected
CTAB	hexadecyltrimethylammonium bromide
detd.	determined
dien	diethylenetriamine
d.k.	decay kinetics (decay of radical absorption and bleaching of substrate absorption)
e–r.	electron radiolysis
ϵ	extinction coefficient (molar absorptivity)
E_a	activation energy
en	ethylenediamine
esr	electron spin resonance
estd.	estimated
EtOH	ethanol
Et_2O	ethyl ether
f.p.	flash photolysis
formn.	formation
γ–r.	gamma radiolysis
G	radiation yield (molecules per 100 eV)
gly	glycine or glycinato
$\Delta H\ddagger$	activation enthalpy
I	ionic strength
irradn.	irradiation
K	equilibrium constant
k	rate constant
k_f	specific rate of the forward reaction
k_r	specific rate of the reverse reaction
L	ligand
Me	methyl
meas.	measured
MeOH	methanol
NaLS	sodium dodecylsulfate
obs.	observed
o.d.	optical density
p.b.k.	product buildup kinetics
phot.	photolysis
pK_a	negative logarithm of the acid dissociation constant, e.g., where $AH + H_2O \rightleftharpoons A^- + H_3O^+$
PNAP	*p*–nitroacetophenone
PNBPA	*p*–nitrobenzoato(pentaammine)cobalt(III) ion
p.r.	pulse radiolysis
PrOH	propanol
R	radical
redn.	reduction
rel.	relative
RNO	*N,N*–dimethyl–*p*–nitrosoaniline
$\Delta S\ddagger$	activation entropy
satd.	saturated
soln.	solution

List of Aliphatic Radicals

Reactions of the following radicals are included in these tables; comments within the tables identify the compounds from which the radicals were derived. Only one acid–base form is listed below but different forms may be used in the tables, depending on pH. The entry numbers for the reactions in the tables include the three-digit numbers listed below following the decimal point. Thus, the first reaction in the tables is numbered 1.016 and involves the radical from *tert*-butanol, $\cdot CH_2C(CH_3)_2OH$, which is 016 in the following list. The numbers have been used to create an index to reactions of the various radicals; the index follows the tables. Radicals herein are restricted to carbon radicals and have been ordered from the most *hydrogen* substitution on carbon to the most *oxygen* substitution. That is, radicals ·CXYZ are ordered as X, Y, and Z progressively represent H, C, halogens, N, and O.

001	Methyl	$\cdot CH_3$
002	Ethyl	$\cdot CH_2CH_3$
002a	1–Methylethyl	$(CH_3)_2\dot{C}H$
002b	1,1–Dimethylethyl	$(CH_3)_3\dot{C}$
003	Radicals from pentane	$\cdot C_5H_{11}$
004	Cyclopentyl	$c\text{–}\dot{C}_5H_9$
005	2–Chloroethyl	$\cdot CH_2CH_2Cl$
006	2–Carboxy–2,2–dimethylethyl	$\cdot CH_2C(CH_3)_2CO_2H$
007	Radicals from oleate + OH	R
008	Radicals from linoleate + OH	R
009	Radicals from linolenate + OH	R
010	Radicals from arachidonate + OH	R
011	2–Aminoethyl	$\cdot CH_2CH_2NH_2$
012	2–Amino–2,2–dimethylethyl	$\cdot CH_2C(CH_3)_2NH_2$
013	2–Amino–2–carboxy–2–methylethyl	$\cdot CH_2C(CH_3)(NH_2)CO_2H$
014	2–Hydroxyethyl	$\cdot CH_2CH_2OH$
015	2–Hydroxypropyl	$\cdot CH_2CHOHCH_3$
016	2–Hydroxy–2,2–dimethylethyl	$\cdot CH_2C(CH_3)_2OH$
016a	Radicals from cyclopentene + OH	R
017	2–Carboxy–2–hydroxy–2–methylethyl	$\cdot CH_2C(CH_3)(OH)CO_2H$
018	Radicals from allyl alcohol + OH	R
019	Radicals from crotyl alcohol + OH	R
020	Formylmethyl	$\cdot CH_2CHO$
021	1–Formylethyl	$CH_3\dot{C}HCHO$
022	2–Hydroxyethenyl	$\cdot CH{=}CHOH$
023	2–Oxopropyl	$\cdot CH_2COCH_3$
024	1–Acetylethyl	$CH_3CO\dot{C}HCH_3$
025	2–Oxocyclohexyl	$\text{–}(CH_2)_4\dot{C}HCO\text{–}$
026	1–Formyl–2–hydroxyethyl	$HOCH_2\dot{C}HCHO$
027	4–Hydroxy–2–oxobutyl	$HOCH_2CH_2CO\dot{C}H_2$
028	1–Formyl–4–hydroxybutyl	$HOCH_2(CH_2)_2\dot{C}HCHO$
029	1–Formyl–5–hydroxypentyl	$HOCH_2(CH_2)_3\dot{C}HCHO$
030	Radicals from *meso*–erythritol	R
031	Radicals from xylitol	R
032	2–Oxo–3,4,5–trihydroxycyclohexyl	$\text{–}(CHOH)_3CH_2\dot{C}HCO\text{–}$
033	Radicals from sorbitol	R
034	Carbamoylmethyl	$\cdot CH_2CONH_2$
035	Carboxymethyl	$\cdot CH_2CO_2H$
036	Methoxycarbonylmethyl	$\cdot CH_2CO_2CH_3$
037	1–Carboxyethyl	$CH_3\dot{C}HCO_2H$
038	1–Carboxypropyl	$CH_3CH_2\dot{C}HCO_2H$
039	1–Carboxy–2–hydroxyethyl	$HOCH_2\dot{C}HCO_2H$
040	1–Carboxy–2–hydroxypropyl	$CH_3CHOH\dot{C}HCO_2H$
040a	1,2–Dicarboxyethyl	$HO_2C\dot{C}HCH_2CO_2H$
041	1,2–Dicarboxy–2–hydroxyethyl	$HO_2CCHOH\dot{C}HCO_2H$

042	Dicarboxymethyl	$\cdot CH(CO_2H)_2$
043	Chloromethyl	$\cdot CH_2Cl$
044	Difluoromethyl	$\cdot CHF_2$
045	Dichloromethyl	$\cdot CHCl_2$
046	Dichlorofluoromethyl	$\cdot CFCl_2$
047	Trifluoromethyl	$\cdot CF_3$
048	Trichloromethyl	$\cdot CCl_3$
049	1-Aminoethyl	$CH_3\dot{C}HNH_2$
050	1-Amino-1-methylethyl	$(CH_3)_2\dot{C}NH_2$
051	1-(*N*,*N*-Diethylamino)ethyl	$CH_3\dot{C}HN(C_2H_5)_2$
052	Triethylammonioethyl	$CH_3\dot{C}HN^+(C_2H_5)_3$
053	(*N*-Acetylamino)methyl	$CH_3CONH\dot{C}H_2$
054	(*N*-Formyl-*N*-methylamino)methyl	$HCON(CH_3)\dot{C}H_2$
055	(*N*-Acetyl-*N*-methylamino)methyl	$CH_3CON(CH_3)\dot{C}H_2$
056	Amino(carboxy)methyl	$NH_2\dot{C}HCO_2H$
057	Amino(carbamoyl)methyl	$NH_2\dot{C}HCONH_2$
058	Radicals from glycylglycinamide + OH	R
059	Carboxy(*N*-methylamino)methyl	$CH_3NH\dot{C}HCO_2H$
060	*N*-Acetylamino(carboxy)methyl	$CH_3CONH\dot{C}HCO_2H$
061	*N*-Acetyl-*N*-methylamino(carboxy)methyl	$CH_3CON(CH_3)\dot{C}HCO_2H$
062	Radical from glycine anhydride + OH	R
063	Radical from alanine anhydride + OH	R
064	Radical from sarcosine anhydride + OH	R
065	Radicals from diglycine + OH	R
066	Radicals from glycylsarcosine + OH	R
067	Radicals from acetyldiglycine + OH	R
068	Radicals from triglycine + OH	R
069	Radicals from acetyltriglycine + OH	R
070	Radicals from acetyltrialanine + OH	R
071	Radicals from acetyltrisarcosine + OH	R
072	Radicals from acetylserineamide + OH	R
073	Radicals from acetylasparagine + OH	R
074	Radical from 2-pyrrolidone-5-carboxylic acid	R
075	Hydroxymethyl	$\cdot CH_2OH$
076	1-Hydroxyethyl	$CH_3\dot{C}HOH$
077	1-Hydroxypropyl	$CH_3CH_2\dot{C}HOH$
078	1-Hydroxy-1-methylethyl	$(CH_3)_2\dot{C}OH$
079	1-Hydroxybutyl	$CH_3(CH_2)_2\dot{C}HOH$
080	1-Hydroxy-1-methylpropyl	$CH_3CH_2\dot{C}OHCH_3$
081	1-Hydroxy-2-methylpropyl	$(CH_3)_2CH\dot{C}HOH$
082	1-Hydroxypentyl	$CH_3(CH_2)_3\dot{C}HOH$
083	(Cyclohexyl)hydroxymethyl	$c\text{-}C_6H_{11}\dot{C}HOH$
084	1-Hydroxycyclobutyl	$-CH_2\dot{C}OH(CH_2)_2-$
085	1-Hydroxycyclopentyl	$-CH_2\dot{C}OH(CH_2)_3-$
086	1-Hydroxycyclohexyl	$-CH_2\dot{C}OH(CH_2)_4-$
087	1-Hydroxycycloheptyl	$-CH_2\dot{C}OH(CH_2)_5-$
088	1-Hydroxycyclooctyl	$-CH_2\dot{C}OH(CH_2)_6-$
089	2,2,2-Trifluoro-1-hydroxyethyl	$\cdot CHOHCF_3$
090	Acetoxymethyl	$CH_3CO_2\dot{C}H_2$
091	1-Sulfatoethyl	$CH_3\dot{C}HOSO_3^-$
092	Radicals from sodium dodecylsulfate	R
092a	Methoxymethyl	$\cdot CH_2OCH_3$
093	1-Ethoxyethyl	$CH_3\dot{C}HOC_2H_5$
093a	1,1-Dimethylethoxymethyl	$\cdot CH_2OC(CH_3)_3$
094	2-Tetrahydrofuryl	$-O\dot{C}H(CH_2)_3-$
094a	(Methoxymethoxy)methyl	$\cdot CH_2OCH_2OCH_3$
095	1,4-Dihydroxybutyl	$\cdot CHOHCH_2CH_2CH_2OH$
096	1,3-Dihydroxy-2,2-di(hydroxymethyl)propyl	$\cdot CHOHC(CH_2OH)_3$

097	2-Carboxy-1-hydroxy-1-methylethyl	$CH_3\dot{C}OHCH_2CO_2H$
098	2-Amino-1-hydroxyethyl	$NH_2CH_2\dot{C}HOH$
099	2-Amino-1-phosphoryloxyethyl	$NH_2CH_2\dot{C}HOPO_2OH$
100	2-Amino-2-carboxy-1-hydroxyethyl	$\cdot CHOHCH(NH_2)CO_2H$
101	1,2-Dihydroxyethyl	$\cdot CHOHCH_2OH$
102	1,2-Dihydroxypropyl	$\cdot CHOHCHOHCH_3$
103	1,2-Dihydroxy-1-methylpropyl	$CH_3\dot{C}OHCHOHCH_3$
104	2,5-Dioxacyclohexyl	$-O\dot{C}HCH_2O(CH_2)_2-$
105	Radicals from polyethyleneglycol	$-O\dot{C}HCH_2(OCH_2CH_2)_n-$
106	1,2,3-Trihydroxypropyl	$\cdot CHOHCHOHCH_2OH$ (+ $CH_2OH\dot{C}OHCH_2OH$)
107	1-Hydroxy-1-methyl-2-oxopropyl	$CH_3CO\dot{C}(O^-)CH_3$
108	Radicals from deoxyribose + OH	R
109	Radicals from ribose + OH	R
110	Radicals from ribose phosphate + OH	R
111	Radicals from glucose + OH	R
112	Radicals from sucrose + OH	R
113	Radical from ascorbate + OH	$\cdot A^-$
114	(Carbamoyl)hydroxymethyl	$\cdot CHOHCONH_2$
115	(Carboxy)hydroxymethyl	$\cdot CHOHCO_2H$
116	1-Carbamoyl-1-hydroxyethyl	$CH_3\dot{C}OHCONH_2$
117	1-Carboxy-1-hydroxyethyl	$CH_3\dot{C}OHCO_2H$
118	1-Hydroxy-1-(methoxycarbonyl)ethyl	$CH_3\dot{C}OHCO_2CH_3$
119	(Dicarboxy)hydroxymethyl	$HO_2C\dot{C}OHCO_2H$
120	1,2-Dicarboxy-1-hydroxyethyl	$HO_2C\dot{C}OHCH_2CO_2H$
121	1,2-Dicarboxy-1,2-dihydroxyethyl	$HO_2C\dot{C}OHCHOHCO_2H$
122	1,3-Dicarboxy-1-hydroxypropyl	$HO_2C\dot{C}OH(CH_2)_2CO_2H$
123	Dihydroxymethyl	$\cdot CH(OH)_2$
124	Dimethoxymethyl	$\cdot CH(OCH_3)_2$
125	2,5-Dioxacyclopentyl	$-O\dot{C}HO(CH_2)_2-$
126	2,2,2-Trichloro-1,1-dihydroxyethyl	$CCl_3\dot{C}(OH)_2$
127	Carbamoyl	$\cdot CONH_2$
128	Electron adduct of acrylamide	$[CH_2CHCONH_2]\cdot^-$
129	Electron adduct of crotonamide	$[CH_3CHCHCONH_2]\cdot^-$
130	Electron adduct of methacrylamide	$[CH_2C(CH_3)CONH_2]\cdot^-$
131	Electron adduct of β,β-dimethylacrylamide	$[(CH_3)_2CCHCONH_2]\cdot^-$
132	Electron adduct of *N,N*-dimethylacrylamide	$[CH_2CHCON(CH_3)_2]\cdot^-$
133	Electron adduct of Diamide	R
134	Electron adduct of acrylate	$[CH_2CHCO_2H]\cdot^-$
135	Electron adduct of crotonate	$[CH_3CHCHCO_2H]\cdot^-$
136	Electron adduct of methacrylate	$[CH_2C(CH_3)CO_2H]\cdot^-$
137	Electron adduct of β,β-dimethylacrylate	$[(CH_3)_2CCHCO_2H]\cdot^-$
138	Electron adduct of methyl methacrylate	$[CH_2C(CH_3)CO_2CH_3]\cdot^-$
139	Electron adduct of sorbate	$[CH_3CHCHCHCHCO_2H]\cdot^-$
141	Electron adduct of dimethyl fumarate	R
142	Electron adduct of glycine anhydride	R
143	Electron adduct of alanine anhydride	R
144	Electron adduct of sarcosine anhydride	R
146	Electron adduct of acetylglycylglycinamide	R
147	Carboxyl	$\cdot CO_2^-/\cdot CO_2H$
148	Electron adduct of methyl acetate	$CH_3\dot{C}(O^-)OCH_3$

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
	Ag					
1.	**Silver(I) ion**					
1.016	$\cdot CH_2C(CH_3)_2OH + Ag^+ \rightarrow Ag^0$		nat	p.r.	No electron transfer to give Ag^0 in 0.1 mol L^{-1} *tert*-BuOH.	78A410
1.075	$\cdot CH_2OH + Ag^+ \rightarrow Ag^0$		nat	p.r.	No electron transfer to give Ag^0 in 0.1 mol L^{-1} MeOH.	78A410
1.078	$(CH_3)_2\dot{C}OH + Ag^+ \rightarrow Ag^0$		nat	p.r.	No electron transfer to give Ag^0 in 0.1 mol L^{-1} 2-PrOH.	78A410
1.128	$[CH_2CHCONH_2]\cdot^- + Ag^+ \rightarrow Ag^0 + H^+ + CH_2{=}CHCONH_2$	$(1.1 \pm 0.4) \times 10^8$	~6	p.r.	P.b.k. at 313 nm in soln. contg. acrylamide.	70G052
1.147	$\cdot CO_2^- + Ag^+ \rightarrow AgCO_2$ $(+ Ag^+) \rightarrow Ag_2CO_2^+$		nat	p.r.	Ag^+ was reduced in 10^{-2} mol L^{-1} formate soln. contg. CO_2 by a complex mechanism.	78A410
2.	**Silver(I) ion, complex with Ag(0)**					
2.016	$\cdot CH_2C(CH_3)_2OH + Ag_2^+ \rightarrow 2\,Ag^+ + OH^- + CH_2{=}C(CH_3)_2$	2.0×10^9	nat	p.r.	Calcd. from best fit for increase in condy. as function of time in 0.1 mol L^{-1} *tert*-BuOH-5 x 10^{-4} mol L^{-1} $AgClO_4$ soln.	78A410
2.075	$\cdot CH_2OH + Ag_2^+ \rightarrow Ag_2CH_2OH^+ \rightarrow CH_2O + H^+ + Ag_2$	5.0×10^9	nat	p.r.	Calcd. from increase in condy. as function of time in 0.1 mol L^{-1} MeOH-5 x 10^{-4} mol L^{-1} $AgClO_4$ soln. assuming values for k(R + R), [Ag_2^+], [R], and [H_2O_2].	78A410
2.076	$CH_3\dot{C}HOH + Ag_2^+ \rightarrow CH_3CHO + H^+ + Ag_2$	1.0×10^9		p.r.	Calcd. from increase in condy. as function of time in EtOH-$AgClO_4$ soln. assuming values for k(R + R), [Ag_2^+], [R], and [H_2O_2].	78A410
2.078	$(CH_3)_2\dot{C}OH + Ag_2^+ \rightarrow (CH_3)_2CO + H^+ + Ag_2$	2.5×10^9		p.r.	Calcd. from increase in condy. as function of time in 0.1 mol L^{-1} 2-PrOH-5 x 10^{-4} mol L^{-1} $AgClO_4$ soln. assuming values for k(R + R), [Ag_2^+], [R], and [H_2O_2].	78A410
	Br					
3.	**Bromate ion**					
3.076	$CH_3\dot{C}HOH + BrO_3$	$<5 \times 10^6$	6	p.r.	D.k.; radical from ethanol.	72A018
	$CH_3\dot{C}HO^- + BrO_3^-$	$(3.0 \pm 0.5) \times 10^7$	11.8			
	Cd					
4.	**Cadmium(I) ions**					
4.016	$\cdot CH_2C(CH_3)_2OH + Cd^+ \rightarrow Cd^{2+} + (CH_3)_2C{=}CH_2 + OH^-$	$\sim 1 \times 10^9$	nat	p.r.	Calcd. from opt. and condy. studies in *tert*-BuOH-Cd^{2+} soln. assuming values for competing reactions.	75A064
	$\cdot CH_2C(CH_3)_2OH + Cd_2^{2+} \rightarrow OH^- + Cd^+ + (CH_3)_2C{=}CH_2 + Cd^{2+}$	$\sim 1 \times 10^9$	nat	p.r.	See above.	75A064
4.075	$\cdot CH_2OH + Cd^+ \rightarrow CdCH_2OH^+$	2×10^8	nat	p.r.	D.k. at 300 nm (Cd^+) in soln. contg. MeOH and Cd^{2+}, as well as condy. and p.b.k. at 240 nm (Cd_2^{2+}); assumed $k(Cd^+ + H_2O_2) = 1.5 \times 10^9$, k(R + R) = 1.2×10^9.	75A064

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
4.076	$CH_3\dot{C}HOH + Cd^+ \rightarrow CdCHOHCH_3^+$	$(1.3 \pm 0.6) \times 10^9$	nat	p.r.	D.k. at 300 nm (Cd^+) in soln. contg. EtOH and Cd^{2+}, as well as condy. and p.b.k. at 240 nm (Cd_2^{2+}); assumed $k(Cd^+ + H_2O_2) = 1.5 \times 10^9$, $k(R + R) = 1.15 \times 10^9$ and $2k(Cd^+ + Cd^+) = 3.0 \times 10^9$.	75A064
4.078	$(CH_3)_2\dot{C}OH + Cd^+ \rightarrow CdC(CH_3)_2OH^+$	$(2.4 \pm 1.2) \times 10^9$	nat	p.r.	D.k. at 300 nm (Cd^+) in soln. contg. 2-PrOH and Cd^{2+}, as well as condy. and p.b.k. at 240 nm (Cd_2^{2+}); assumed $k(Cd^+ + H_2O_2) = 1.5 \times 10^9$, $k(R + R) = 7 \times 10^8$ and $2k(Cd^+ + Cd^+) = 3.0 \times 10^9$.	75A064
4.105	$-O\dot{C}HCH_2(OCH_2CH_2O)_n- + Cd^+$	$<2 \times 10^8$	nat	p.r.	D.k. of Cd^+ in the presence of polyethylene glycol entirely by $Cd^+ + Cd^+$ ($2k = 5 \times 10^9$); $2k(R + R) = 2.2 \times 10^7$.	75A153
5.	**Cadmium(II) ion**					
5.016	$\cdot CH_2C(CH_3)_2OH + Cd^{2+}$	$<10^6$	nat	p.r.	Est. from lack of increase in Cd^+ in 0.1 mol L^{-1} Cd^{2+} soln. upon addn. of 0.1 mol L^{-1} *tert*-BuOH.	75A027
		$<2.5 \times 10^5$	nat	p.r.	No reaction.	75A153
5.075	$\cdot CH_2OH + Cd^{2+}$	$<10^2$	nat	p.r.	Est. from lack of increase in Cd^+ in 0.1 mol L^{-1} Cd^{2+} soln. upon addn. of 0.1 mol L^{-1} MeOH.	75A027
5.076	$CH_3\dot{C}HOH + Cd^{2+}$	$<2.5 \times 10^5$	nat	p.r.	No reaction.	75A153
5.078	$(CH_3)_2\dot{C}OH + Cd^{2+}$	$<10^6$		p.r.	Est. from lack of increase in Cd^+ in 0.1 mol L^{-1} Cd^{2+} soln. upon addn. of 0.1 mol L^{-1} 2-PrOH.	75A027
		$<2.5 \times 10^5$	nat	p.r.	No reaction	75A153
5.101	$\cdot CHOHCH_2OH + Cd^{2+}$	$<2.5 \times 10^5$	nat	p.r.	No reaction.	75A153
5.105	$-O\dot{C}HCH_2(OCH_2CH_2O)_n- + Cd^{2+}$	$<2.5 \times 10^5$	nat	p.r.	No reaction obs. in polyethylene glycol soln.	75A153
5.106	$\cdot CHOHCHOHCH_2OH + Cd^{2+}$	$<2.5 \times 10^5$	nat	p.r.	No reaction.	75A153
5.147	$\cdot CO_2^- + Cd^{2+} \rightarrow Cd^+ + CO_2$	$\sim 10^5$		p.r.	Est. from increase in Cd^+ in 0.1 mol L^{-1} Cd^{2+} soln. contg. 0.1 mol L^{-1} HCO_2^-, CO_2-satd.	75A027
		$(5.1 \pm 0.3) \times 10^6$	nat	p.r.	No details given.	75A153
	Co					
6.	**Cobalt(II) ions**					
6.016	$\cdot CH_2C(CH_3)_2OH + Co^{2+} \rightarrow Co^+$	$<10^6$	nat	p.r.	Est. from lack of increase in Co^+ in 0.1 mol L^{-1} Co^{2+} soln. upon addn. of 0.1 mol L^{-1} *tert*-BuOH.	75A027
6.075	$\cdot CH_2OH + Co^{2+} \rightarrow Co^+$	$<10^2$	nat	p.r.	Est. from lack of increase in Co^+ in 0.1 mol L^{-1} Co^{2+} soln. upon addn. of 0.1 mol L^{-1} MeOH.	75A027
6.078	$(CH_3)_2\dot{C}OH + Co^{2+} \rightarrow Co^+$	$<10^6$	nat	p.r.	Est. from lack of increase in Co^+ in 0.1 mol L^{-1} Co^{2+} soln. upon addn. of 0.1 mol L^{-1} 2-PrOH.	75A027
6.147	$\cdot CO_2^- + Co^{2+} \rightarrow CO_2 + Co^+$	$10^2 < k < 10^5$	nat	p.r.	Est. from lack of increase in Co^+ in 0.1 mol L^{-1} Co^{2+} soln. upon addn. of 0.1 mol L^{-1} formate, as well as γ-r. expts. (73G039).	75A027
7.	**Diaqua(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(II) ion**					
7.078	$(CH_3)_2\dot{C}OH + CoL(H_2O)_2^{2+} \rightarrow Co(I)$	5.5×10^9	1.25, 6.5	p.r.	P.b.k. in 2 mol L^{-1} 2-PrOH.	76A001
7.147	$\cdot CO_2^- + CoL(H_2O)_2^{2+} \rightarrow Co(I)$	4.7×10^9	6.5	p.r.	P.b.k. in 0.1 mol L^{-1} formate.	76A001

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
8.	**Diaqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,14-diene)cobalt(II) ion**					
8.078	$(CH_3)_2\dot{C}OH + CoL(H_2O)_2^{2+} \rightarrow Co(I)$	$\ll 10^7$	6.5	p.r.	No reaction in 2 mol L^{-1} 2-PrOH.	76A001
8.147	$\cdot CO_2^- + CoL(H_2O)_2^{2+} \rightarrow Co(I)$	$\ll 10^7$	6.5	p.r.	No reaction in 0.1 mol L^{-1} formate.	76A001
9.	**Diaqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(II) ion**					
9.001	$\cdot CH_3 + CoL(OH_2)_2^{2+} \rightarrow CH_3Co^{III}L(OH_2)_2^{2+}$	$\sim 7 \times 10^8$	1	f.p.	Radical from $Co(NH_3)_5O_2CCH_3^{2+}$ in $HClO_4$ soln.	74F644
		(1 to 2) x 10^8	9.5	p.r.	D.k. at 330 nm (Co^{II}) as well as p.b.k. at 280 nm in Ar-satd. 1 mol L^{-1} *tert*-BuOH soln. contg. 5 x 10^{-3} mol L^{-1} CH_3I.	76A203
9.016	$\cdot CH_2C(CH_3)_2OH + CoL(OH_2)_2^{2+}$	$<1 \times 10^7$		p.r.	No reaction obs.	78A200
9.020	$\cdot CH_2CHO + CoL(OH_2)_2^{2+} \rightarrow Co^{III}LCH_2CHO$	8 x 10^7	1–3, 7–10	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} ethylene glycol.	78A200
9.035	$\cdot CH_2CO_2^- + CoL(OH_2)_2^{2+}$	$<1 \times 10^7$		p.r.	No reaction obs.	78A200
9.075	$\cdot CH_2OH + CoL(OH_2)_2^{2+} \rightarrow Co^{III}LCH_2OH$	$(7 \pm 1) \times 10^7$	1–6	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	78A200
9.076	$CH_3\dot{C}HOH + CoL(OH_2)_2^{2+} \rightarrow Co^{III}LCHOHCH_3$	$(3.0 \pm 0.4) \times 10^7$	1–6	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH.	78A200
9.078	$(CH_3)_2\dot{C}OH + CoL(OH_2)_2^{2+}$	$\ll 10^7$	6.5	p.r.	No reaction obs. in soln. contg. 2 mol L^{-1} 2-PrOH.	76A001
		$<10^7$		p.r.	No reaction obs.	78A200
9.089	$\cdot CHOHCF_3 + CoL(OH_2)_2^{2+} \rightarrow Co^{III}LCHOHCF_3$	$(1 \pm 0.5) \times 10^7$	6	p.r.	P.b.k.	78A200
9.098	$NH_3^+CH_2\dot{C}HOH + CoL(OH_2)_2^{2+}$	4.0 x 10^7	7.0	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-aminoethanol; rate pH dependent.	78A200
9.101	$\cdot CHOHCH_2OH + CoL(OH_2)_2^{2+} \rightarrow Co^{III}LCHOHCH_2OH$	$\sim 1 \times 10^7$	3–7	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} ethylene glycol.	78A200
9.147	$\cdot CO_2^- + CoL(OH_2)_2^{2+}$	$\ll 10^7$	6.5	p.r.	No reaction obs. in soln. contg. 0.1 mol L^{-1} formate.	76A001
10.	**Cobal(II)amin (Vitamin B12r)**					
10.001	$\cdot CH_3$ + B12r → methylcobalamin	$\sim 1.5 \times 10^9$		f.p.	D.k. following irrad.-induced Co–CH_3 homolysis of methylcobalamin; back reaction.	77F005
10.016	$\cdot CH_2C(CH_3)_2OH$ + B12r → B12a (B12a *See* 54.)	2.4 x 10^8	5	p.r.	P.b.k. at 350–60 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} *tert*-BuOH.	75A169
10.078	$(CH_3)_2\dot{C}OH$ + B12r → B12s (Co^I) + $(CH_3)_2CO + H^+$	$(4 \pm 2) \times 10^9$		f.p.	D.k. at 474 nm in 90% 2-PrOH soln. of adenosyl cobalamin after homolysis of the adenosyl group.	79A158
10.101	$\cdot CHOHCH_2OH$ + B12r → B12a (B12a *See* 54.)	2.4 x 10^8		p.r.	P.b.k. at 525 nm as well as d.k. at 400 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} ethylene glycol.	75A169
10.147	$\cdot CO_2^-$ + B12r → CO_2 + B12s (Co^I)	8.2 x 10^8	9.2	p.r.	D.k. at 311 and 478 nm as well as p.b.k. at 386 and 280 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	74A105
10a.	**3,10,17,24-Tetrasulfophthalocyaninecobalt(II) ion dimer**					
10a.016	$\cdot CH_2C(CH_3)_2OH + (Co^{II}pts)_2^{8-} \rightarrow$ addn.	2.2 x 10^8	9	p.r.	P.b.k. at 440 nm in N_2O-satd. soln. contg. 0.1–0.2 mol L^{-1} *tert*-BuOH; mechanism suggested to involve addn. followed by splitting to give $(RCo^{III}pts)^{5-}$.	80A146
10a.075	$\cdot CH_2OH + (Co^{II}pts)_2^{8-} \rightarrow$ electron transfer	2.2 x 10^8	9	p.r.	D.k. in N_2O-satd. soln. contg. 0.1–0.2 mol L^{-1} MeOH; mechanism suggested to involve ligand-radical formation, followed by metal oxid. and dimer splitting to give $(Co^Ipts)^{7-}$.	80A146
10a.078	$(CH_3)_2\dot{C}OH + (Co^{II}pts)_2^{8-} \rightarrow$ electron transfer	1.5 x 10^9	9	p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH; see above.	80A146

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
11.	**Nitrilotriacetatocobaltate(II) ion**					
11.016	$\cdot CH_2C(CH_3)_2OH + Co^{II}NTA \rightarrow [NTACoCH_2C(CH_3)_2OH]^-$	$(1.1 \pm 0.2) \times 10^7$	7	p.r.	P.b.k. at 330 nm in N_2O–satd. soln. contg. 0.5 mol L^{-1} *tert*–BuOH.	79A255
11.147	$\cdot CO_2^- + Co^{II}NTA \rightarrow [NTACo(CO_2)]^{2-}$	$(7.3 \pm 0.7) \times 10^7$	7	p.r.	P.b.k. at 270 nm in N_2O–satd. soln. contg. 0.2 mol L^{-1} formate.	79A255
	Cobalt(III) ions					
12.	**Hexaamminecobalt(III) ion**					
12.035	$\cdot CH_2CO_2^- + Co(NH_3)_6^{3+}$	$<3.2 \times 10^6$	7.3	p.r.	D.k. in N_2O–satd. soln. contg. 0.01 mol L^{-1} acetate.	72A018
	$\cdot CH_2CO_2H + Co(NH_3)_6^{3+}$	$<1.0 \times 10^7$	2.5	p.r.	D.k. in Ar–satd. soln. contg. 0.01 mol L^{-1} acetic acid.	72A018
12.042	$\cdot CH(CO_2H)_2 + Co(NH_3)_6^{3+}$	$<8.0 \times 10^6$	2.5	p.r.	D.k. in Ar–satd. soln. contg. 0.01 mol L^{-1} malonic acid.	72A018
12.054	$HCON(CH_3)\dot{C}H_2 + Co(NH_3)_6^{3+}$	$<1.0 \times 10^7$	6.0	p.r.	D.k. in N_2O–satd. soln. contg. 0.01 mol L^{-1} dimethylformamide.	72A018
12.056	$NH_3^+\dot{C}HCO_2^- + Co(NH_3)_6^{3+}$	$<1.2 \times 10^7$	5.7	p.r.	D.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} glycine.	72A018
12.075	$\cdot CH_2O^- + Co(NH_3)_6^{3+} \rightarrow CH_2O + Co(NH_3)_6^{2+}$	$(9.0 \pm 1.4) \times 10^9$	12	p.r.	D.k. in N_2O–satd. soln. contg. 0.01 mol L^{-1} MeOH.	72A018
	$\cdot CH_2OH + Co(NH_3)_6^{3+} \rightarrow CH_2O + H^+ + Co(NH_3)_6^{2+}$	$(1.4 \pm 0.2) \times 10^8$	5–6	p.r.	D.k. in N_2O–satd. soln. contg. 0.01 mol L^{-1} MeOH.	72A018
		$(1.4 \pm 0.2) \times 10^8$	6.1	p.r.	D.k. in N_2O–satd. soln. contg. 1 mol L^{-1} MeOH.	77A100
		$(1.4 \pm 0.2) \times 10^8$	5.75			
		$(6 \pm 0.9) \times 10^7$	4.9			
		$(4.5 \pm 0.7) \times 10^7$	4.5			
		$<1 \times 10^7$	3.5			
12.076	$CH_3\dot{C}HO^- + Co(NH_3)_6^{3+}$	$(8.5 \pm 1.3) \times 10^9$	12	p.r.	D.k. in N_2O–satd. soln. contg. 0.01 mol L^{-1} EtOH; *e*–transfer.	72A018
	$CH_3\dot{C}HOH + Co(NH_3)_6^{3+}$	$(5.2 \pm 0.8) \times 10^7$	5–6			
12.078	$(CH_3)_2\dot{C}O^- + Co(NH_3)_6^{3+}$	$(5.0 \pm 0.8) \times 10^9$	12	p.r.	D.k. in N_2O–satd. soln. contg. 0.01 mol L^{-1} 2–PrOH; *e*–transfer.	72A018
	$(CH_3)_2\dot{C}HOH + Co(NH_3)_6^{3+}$	$(1.3 \pm 0.2) \times 10^7$	5–6			
12.093	$CH_3\dot{C}HOC_2H_5 + Co(NH_3)_6^{3+}$	$<5 \times 10^6$	5.5–6	p.r.	D.k. in N_2O–satd. soln. contg. ethyl ether.	77A100
12.104	$-O\dot{C}HCH_2O(CH_2)_2- + Co(NH_3)_6^{3+}$	$<2 \times 10^6$	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. dioxane.	77A100
12.107	$CH_3CO\dot{C}(O^-)CH_3 + Co(NH_3)_6^{3+}$	$<1.8 \times 10^5$	5.5	p.r.	D.k. in N_2O–satd. soln. contg. 0.01 mol L^{-1} biacetyl.	72A018
	$CH_3CO\dot{C}(OH)CH_3 + Co(NH_3)_6^{3+}$	$<2.0 \times 10^5$	1.2			
12.117	$CH_3\dot{C}(O^-)CO_2^- + Co(NH_3)_6^{3+}$	2.4×10^{10}	12.0	p.r.	D.k. in N_2O–satd. soln. contg. 0.01 mol L^{-1} lactate; *e*–transfer.	72A018
	$CH_3\dot{C}(OH)CO_2^- + Co(NH_3)_6^{3+}$	7.0×10^6	6.0			
12.127	$\cdot CONH_2 + Co(NH_3)_6^{3+}$	$<3.6 \times 10^7$	6.2	p.r.	D.k. in N_2O–satd. soln. contg. 0.01 mol L^{-1} formamide.	72A018
12.147	$\cdot CO_2^- + Co(NH_3)_6^{3+} \rightarrow CO_2 + Co(NH_3)_6^{2+}$	4.0×10^7	4.8	p.r.	D.k. in N_2O–satd. soln. contg. 0.01 mol L^{-1} formate.	72A018
		$(1.1 \pm 0.3) \times 10^8$ (rel.)	6.9	p.r.	C.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate rel. to $k(\cdot CO_2^- + PNBPA) = 1.9 \times 10^9$.[26.147]	73A075
13.	**Pentaammineaquacobalt(III) ion**					
13.075	$\cdot CH_2OH + Co(NH_3)_5OH_2^{3+} \rightarrow Co(II)$	$(1.5 \pm 0.5) \times 10^6$ (rel.)	3.5–4	γ–r.	Calcd. from $G(Co^{2+})$, dose rate and $k(R + R) = 2.4 \times 10^9$.	77A100
13.147	$\cdot CO_2^- + Co(NH_3)_5OH_2^{3+} \rightarrow Co(II)$	$(1.7 \pm 0.3) \times 10^8$ (rel.)	5.2	p.r.	C.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate; rel. to $k(\cdot CO_2^- + PNBPA) = 1.9 \times 10^9$.[26.147]	73A075
14.	**Pentaamminehydroxycobalt(III) ion**					
14.147	$\cdot CO_2^- + Co(NH_3)_5OH^{2+} \rightarrow Co(II)$	$<(3 \pm 1.5) \times 10^7$ (rel.)	7.8	p.r.	C.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate; rel. to $k(\cdot CO_2^- + PNBPA) = 1.9 \times 10^9$.[26.147]	73A075

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
15.	**Pentaamminebromocobalt(III) ion**					
15.075	$\cdot CH_2OH + Co(NH_3)_5Br^{2+}$	$(9.0 \pm 1.4) \times 10^7$	6.1	p.r.	D.k. in N_2O–satd. soln. contg. 1 mol L^{-1} MeOH.	77A100
		$(2.5 \pm 0.4) \times 10^7$	4.9			
		$(2.0 \pm 0.3) \times 10^7$	4.5			
		$(1.8 \pm 0.3) \times 10^7$	3.5			
		$(1.8 \pm 0.3) \times 10^7$	2.0			
		$(1.8 \pm 0.3) \times 10^7$	1.0			
15.076	$CH_3\dot{C}HOH + Co(NH_3)_5Br^{2+}$	$(1.5 \pm 0.2) \times 10^8$	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. EtOH.	77A100
15.078	$(CH_3)_2\dot{C}OH + Co(NH_3)_5Br^{2+}$	$(3.0 \pm 0.45) \times 10^8$	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. 2–PrOH.	77A100
15.093	$CH_3\dot{C}HOC_2H_5 + Co(NH_3)_5Br^{2+}$	$(1.6 \pm 0.2) \times 10^8$	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. ethyl ether.	77A100
15.104	$-O\dot{C}HCH_2O(CH_2)_2- + Co(NH_3)_5Br^{2+}$	$<2 \times 10^6$	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. dioxane.	77A100
16.	**Pentaamminechlorocobalt(III) ion**					
16.075	$\cdot CH_2OH + Co(NH_3)_5Cl^{2+}$	$(3 \pm 1) \times 10^6$ (rel.)	3.5–4	γ–r	Est. from effect of complex concn. on $G(Co^{2+})$ assuming $2k(R + R) = 2.4 \times 10^9$.	77A100
16.076	$CH_3\dot{C}HOH + Co(NH_3)_5Cl^{2+}$	$(3.0 \pm 0.4) \times 10^6$	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. EtOH.	77A100
16.078	$(CH_3)_2\dot{C}OH + Co(NH_3)_5Cl^{2+}$	$(4.0 \pm 0.6) \times 10^7$	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. 2–PrOH.	77A100
16.093	$CH_3\dot{C}HOC_2H_5 + Co(NH_3)_5Cl^{2+}$	$(1.4 \pm 0.2) \times 10^7$	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. ethyl ether.	77A100
16.104	$-O\dot{C}HCH_2O(CH_2)_2- + Co(NH_3)_5Cl^{2+}$	$\leqslant 2 \times 10^6$	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. dioxane.	77A100
16.147	$\cdot CO_2^- + Co(NH_3)_5Cl^{2+}$	$(1.5 \pm 0.3) \times 10^8$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(CO_2^- + PNBPA) = 1.9 \times 10^9$ in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate. [26.147]	73A075
17.	**Pentaamminefluorocobalt(III) ion**					
17.075	$\cdot CH_2OH + Co(NH_3)_5F^{2+}$	$(5.5 \pm 2) \times 10^5$ (rel.)	3.5–4	γ–r.	Est. from effect of complex concn. on $G(Co^{2+})$ assuming $2k(R + R) = 2.4 \times 10^9$.	77A100
18.	**Pentaammine(nitrito–N)cobalt(III) ion**					
18.147	$\cdot CO_2^- + Co(NH_3)_5NO_2^{2+}$	$<(2 \pm 1) \times 10^7$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(CO_2^- + PNBPA) = 1.9 \times 10^9$ in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate. [26.147]	73A075
19.	**Pentaammine(nitrato–O)cobalt(III) ion**					
19.147	$\cdot CO_2^- + Co(NH_3)_5NO_3^{2+}$	$(2.1 \pm 0.3) \times 10^8$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(CO_2^- + PNBPA) = 1.9 \times 10^9$ in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate. [26.147]	73A075
20.	**(Acetato)pentaamminecobalt(III) ion**					
20.001	$\cdot CH_3 + Co(NH_3)_5O_2CCH_3^{2+} \rightarrow CH_4 + Co^{2+} + 4NH_4^+ + NH_2^+ + CH_3CO_2H$	$(4 \pm 1) \times 10^3$ (rel.)		phot.	Est. from intensity dependence of CH_4 and C_2H_6 formn. assuming $k(R + R) = 2 \times 10^{10}$.	71F579
20.147	$\cdot CO_2^- + Co(NH_3)_5O_2CCH_3^{2+}$	$(1.1 \pm 0.3) \times 10^8$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(CO_2^- + PNBPA) = 1.9 \times 10^9$ in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate. [26.147]	73A075
21.	**Pentaammine(phenylacetato)cobalt(III) ion**					
21.147	$\cdot CO_2^- + Co(NH_3)_5O_2CCH_2C_6H_5^{2+}$	$(7.0 \pm 2) \times 10^7$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(CO_2^- + PNBPA) = 1.9 \times 10^9$ in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate. [26.147]	73A075

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
22.	**Pentaammine(4-nitrophenylacetato)cobalt(III) ion**					
22.147	$\cdot CO_2^- + Co(NH_3)_5O_2CCH_2C_6H_4NO_2^{2+}$	$(1.2 \pm 0.1) \times 10^9$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(CO_2^- + PNBPA) = 1.9 \times 10^9$ in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate. [26.147]	73A075
23.	**Pentaammine(benzoato)cobalt(III) ion**					
23.147	$\cdot CO_2^- + Co(NH_3)_5O_2CC_6H_5^{2+}$	$(4.5 \pm 2) \times 10^7$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(CO_2^- + PNBPA) = 1.9 \times 10^9$ in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate. [26.147]	73A075
24.	**Pentaammine(2-nitrobenzoato)cobalt(III) ion**					
24.078	$(CH_3)_2\dot{C}OH + Co(NH_3)_5O_2CC_6H_4NO_2^{2+}$	1.7×10^9	7.0	p.r.	P.b.k.	77A027
24.147	$\cdot CO_2^- + Co(NH_3)_5O_2CC_6H_4NO_2^{2+}$	2.0×10^9	7.0	p.r.	P.b.k.	77A027
25.	**Pentaammine(3-nitrobenzoato)cobalt(III) ion**					
25.078	$(CH_3)_2\dot{C}OH + Co(NH_3)_5O_2CC_6H_4NO_2^{2+}$	1.5×10^9	7.0	p.r.	P.b.k.	77A027
25.147	$\cdot CO_2^- + Co(NH_3)_5O_2CC_6H_4NO_2^{2+}$	1.5×10^9	7.0	p.r.	P.b.k.	77A027
26.	**Pentaammine(4-nitrobenzoato)cobalt(III) ion** (PNBPA)					
26.078	$(CH_3)_2\dot{C}OH + Co(NH_3)_5O_2CC_6H_4NO_2^{2+} \rightarrow$	2.6×10^9	4.5	p.r.	Condy. in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH.	74A002
	$(CH_3)_2CO + H^+ + Co^{III}(NH_3)_5O_2CC_6H_4\dot{N}O_2^-$	2.6×10^9	7.0	p.r.	P.b.k.	77A027
26.147	$\cdot CO_2^- + Co(NH_3)_5O_2CC_6H_4NO_2^{2+} \rightarrow CO_2 + Co^{III}(NH_3)_5O_2CC_6H_4\dot{N}O_2^-$	1.9×10^9	7.0	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	72G340 77A027
27.	**Pentaammine(2,4-dinitrobenzoato)cobalt(III) ion**					
27.078	$(CH_3)_2\dot{C}OH + Co(NH_3)_5O_2CC_6H_3(NO_2)_2^{2+}$	4.3×10^9	7.0	p.r.	P.b.k.	77A027
27.147	$\cdot CO_2^- + Co(NH_3)_5O_2CC_6H_3(NO_2)_2^{2+}$	7.5×10^9	7.0	p.r.	P.b.k.	77A027
28.	**Pentaammine(3,5-dinitrobenzoato)cobalt(III) ion**					
28.078	$(CH_3)_2\dot{C}OH + Co(NH_3)_5O_2CC_6H_3(NO_2)_2^{2+}$	2.9×10^9	7.0	p.r.	P.b.k.	77A027
28.147	$\cdot CO_2^- + Co(NH_3)_5O_2CC_6H_3(NO_2)_2^{2+}$	8.1×10^9	7.0	p.r.	P.b.k.	77A027
29.	**Hexaamminebis(μ-hydroxy)[μ-(4-nitrobenzoato)]dicobalt(III) ion**					
29.078	$(CH_3)_2\dot{C}OH + ...NO_2 \rightarrow (CH_3)_2CO + H^+ + ...\dot{N}O_2^-$	$(2 \pm 0.4) \times 10^9$	0.7–6.0	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	78A108
		$(1.4 \pm 0.4) \times 10^9$		p.r.	P.b.k. at 370 nm in soln. contg. 1% 2-PrOH; $\Delta H\ddagger = 3.1 \pm 2.0$ kcal mol^{-1} (13 kJ mol^{-1}); k decreases with concn. of 2-PrOH; $k = 1.25 \times 10^9$ in 99% D_2O–1% 2-PrOH.	80A066
29.101	$\cdot CHOHCH_2OH + ...NO_2 \rightarrow ...\dot{N}O_2$	$(8 \pm 2) \times 10^7$		p.r.	P.b.k. at 370 nm in soln. of 50% H_2O–50% ethylene glycol; $\Delta H\ddagger = 5.4 \pm 0.3$ kcal mol^{-1} (21 kJ mol^{-1})	80A066
30.	**Pentaammine(4-cyanobenzoato)cobalt(III) ion**					
30.147	$\cdot CO_2^- + Co(NH_3)_5O_2CC_6H_4CN^{2+}$	$(4.6 \pm 2) \times 10^7$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(CO_2^- + PNBPA) = 1.9 \times 10^9$ in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate. [26.147]	73A075
31.	**Pentaammine(pyridine)cobalt(III) ion**					
31.078	$(CH_3)_2\dot{C}OH + Co(NH_3)_5C_5H_5N^{3+} \rightarrow Co^{2+} + 5NH_3 + C_5H_5N + (CH_3)_2CO + H^+$	$\sim 10^9$	1–7	γ-r.	Est. from $G(Co^{2+})$ in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	79A213

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
31.147	$\cdot CO_2^- + Co(NH_3)_5C_5H_5N^{3+}$	$(3.3 \pm 0.4) \times 10^8$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(CO_2^- + PNBPA) = 1.9 \times 10^9$ in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate. [26.147]	73A075
32.	**Pentaammine(pyridinecarboxylato)cobalt(III) ion**					
32.147	$\cdot CO_2^- + Co(NH_3)_5O_2CC_5H_4N^{2+}$	$(5.1 \pm 2) \times 10^7$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(CO_2^- + PNBPA) = 1.9 \times 10^9$ in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate. [26.147]	73A075
33.	**Pentaammine(pyrazinecarboxylato)cobalt(III) ion**					
33.078	$(CH_3)_2\dot{C}OH + Co(NH_3)_5O_2CC_4H_3N_2^{2+} \rightarrow (CH_3)_2CO + ...\dot{N}H$	$(4.0 \pm 0.6) \times 10^8$	0–5	p.r.	P.b.k. in N_2O or Ar-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	78A222
34.	**Tetraammine(pyrazinecarboxylato-O,N)cobalt(III) ion**					
34.078	$(CH_3)_2\dot{C}OH + Co(NH_3)_4O_2CC_4H_3N_2^{2+} \rightarrow (CH_3)_2CO + Co^{II}$	$(9 \pm 2) \times 10^8$	5	p.r.	P.b.k. in N_2O or Ar-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	78A222
35.	**Hexaamminebis(μ-hydroxy)[μ-(pyrazinecarboxylato)](dicobalt(III) ion**					
35.078	$(CH_3)_2\dot{C}OH + ...N \rightarrow (CH_3)_2CO + ...\dot{N}H$	$(4.2 \pm 0.4) \times 10^8$	0–6	p.r.	P.b.k. in N_2O or Ar-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	78A222
36.	**Tris(ethylenediamine)cobalt(III) ion**					
36.075	$\cdot CH_2OH + Co(en)_3^{3+}$	no reaction	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. MeOH.	77A100
36.076	$CH_3\dot{C}HOH + Co(en)_3^{3+}$	no reaction	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	77A100
36.078	$(CH_3)_2\dot{C}OH + Co(en)_3^{3+}$	no reaction	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH.	77A100
37.	***cis*-Amminechlorobis(ethylenediamine)cobalt(III) ion**					
37.075	$\cdot CH_2OH + Co(NH_3)Cl(en)_2^{2+}$	$\leqslant 2 \times 10^6$	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. MeOH.	77A100
37.076	$CH_3\dot{C}HOH + Co(NH_3)Cl(en)_2^{2+}$	4.2×10^6	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	77A100
37.078	$(CH_3)_2\dot{C}OH + Co(NH_3)Cl(en)_2^{2+}$	2.2×10^7	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH.	77A100
37.093	$CH_3\dot{C}HOC_2H_5 + Co(NH_3)Cl(en)_2^{2+}$	4.6×10^6	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. Et_2O.	77A100
38.	***cis*-Aquachlorobis(ethylenediamine)cobalt(III) ion**					
38.075	$\cdot CH_2OH + Co(OH_2)Cl(en)_2^{2+}$	$(1.8 \pm 0.5) \times 10^6$	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. MeOH.	77A100
38.076	$CH_3\dot{C}HOH + Co(OH_2)Cl(en)_2^{2+}$	2.0×10^7	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	77A100
38.078	$(CH_3)_2COH + Co(OH_2)Cl(en)_2^{2+}$	8.2×10^7	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH.	77A100
38.093	$CH_3\dot{C}HOC_2H_5 + Co(OH_2)Cl(en)_2^{2+}$	3.5×10^7	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. Et_2O.	77A100
39.	***trans*-Dibromobis(ethylenediamine)cobalt(III) ion**					
39.075	$\cdot CH_2OH + Co(en)_2Br_2^+$	2.6×10^8	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. MeOH.	77A100
39.076	$CH_3\dot{C}HOH + Co(en)_2Br_2^+$	5.7×10^8	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	77A100
39.078	$(CH_3)_2\dot{C}OH + Co(en)_2Br_2^+$	6.8×10^8	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH.	77A100
39.093	$CH_3\dot{C}HOC_2H_5 + Co(en)_2Br_2^+$	6.5×10^8	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. Et_2O.	77A100
39.104	$-O\dot{C}HCH_2O(CH_2)_2- + Co(en)_2Br_2^+$	4.4×10^8	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. dioxane.	77A100
40.	***cis*-Bromobis(ethylenediamine)fluorocobalt(III) ion**					
40.075	$\cdot CH_2OH + CoBr(en)_2F^+$	$\leqslant 2 \times 10^6$	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. MeOH.	77A100
40.076	$CH_3\dot{C}HOH + CoBr(en)_2F^+$	2.8×10^7	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	77A100
40.078	$(CH_3)_2\dot{C}OH + CoBr(en)_2F^+$	1.1×10^8	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH.	77A100
40.093	$CH_3\dot{C}HOC_2H_5 + CoBr(en)_2F^+$	4.9×10^7	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. Et_2O.	77A100
41.	***cis*-Dichlorobis(ethylenediamine)cobalt(III) ion**					
41.075	$\cdot CH_2OH + CoCl_2(en)_2^+$	$\leqslant 5 \times 10^6$	3.5–4	p.r.	D.k. in N_2O-satd. soln. contg. MeOH.	77A100

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
41.076	$CH_3\dot{C}HOH + CoCl_2(en)_2^+$	3.8×10^7	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. EtOH.	77A100
41.078	$(CH_3)_2\dot{C}OH + CoCl_2(en)_2^+$	1.0×10^8	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. 2–PrOH.	77A100
42.	***trans*–Dichlorobis(ethylenediamine)cobalt(III) ion**					
42.075	$\cdot CH_2OH + CoCl_2(en)_2^+$	$(8 \pm 2) \times 10^6$	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. MeOH.	77A100
42.076	$CH_3\dot{C}HOH + CoCl_2(en)_2^+$	1.5×10^8	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. EtOH.	77A100
42.078	$(CH_3)_2\dot{C}OH + CoCl_2(en)_2^+$	3.8×10^8	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. 2–PrOH.	77A100
42.093	$CH_3\dot{C}HOC_2H_5 + CoCl_2(en)_2^+$	1.5×10^8	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. Et_2O.	77A100
42.104	$-O\dot{C}HCH_2O(CH_2)_2- + CoCl_2(en)_2^+$	3.5×10^7	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. dioxane.	77A100
43.	***trans*–Bis(ethylenediamine)difluorocobalt(III) ion**					
43.075	$\cdot CH_2OH + CoF_2(en)_2^+$	no reaction	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. MeOH.	77A100
43.076	$CH_3\dot{C}HOH + CoF_2(en)_2^+$	no reaction	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. EtOH.	77A100
43.078	$(CH_3)_2\dot{C}OH + CoF_2(en)_2^+$	no reaction	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. 2–PrOH.	77A100
44.	**Tris(2,2′–bipyridine)cobalt(III) ion**					
44.075	$\cdot CH_2OH + Co(bpy)_3^{3+} \rightarrow Co(bpy)_3^{2+}$	2×10^8	1,7	p.r.	P.b.k. at 326 nm in N_2O–satd. soln. contg. 0.25 mol L^{-1} MeOH.	79A034
44.078	$(CH_3)_2\dot{C}OH + Co(bpy)_3^{3+} \rightarrow Co(bpy)_3^{2+}$	$(2.5 \pm 0.3) \times 10^9$	0.5, 7.8	p.r.	P.b.k. at 330 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH.	79A034
44.147	$\cdot CO_2^- + Co(bpy)_3^{3+} \rightarrow Co(bpy)_3^{2+}$	$(7.6 \pm 0.2) \times 10^9$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(CO_2^- + PNBPA) = 1.9 \times 10^9$ in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate. [26.147]	73A075
		$(7.8 \pm 0.5) \times 10^9$	6.9	p.r.	P.b.k. at 330 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate.	79A034
45.	**Tris(1,10–phenanthroline)cobalt(III) ion**					
45.075	$\cdot CH_2OH + Co(phen)_3^{3+} \rightarrow$ addn. to ligand	8×10^8	1–7	p.r.	P.b.k. at 475 nm in N_2O–satd. soln. contg. 2.5 mol L^{-1} MeOH; c.k. with O_2 gave $(7 \pm 1) \times 10^8$ assuming $k(R + O_2) = 4.2 \times 10^9$.	80A227
45.076	$CH_3\dot{C}HOH + Co(phen)_3^{3+} \rightarrow$ addn. to ligand	3.8×10^9	1–7	p.r.	P.b.k. at 475 nm in N_2O–satd. soln. contg. 0.25 mol L^{-1} EtOH.	80A227
45.078	$(CH_3)_2\dot{C}OH + Co(phen)_3^{3+} \rightarrow Co(phen)_3^{2+}$	4.6×10^9	7.0	p.r.	P.b.k. at 360 nm in N_2O–satd. soln. contg. 0.5 mol L^{-1} 2–PrOH.	79A034
45a.	**Tris(5,6–dimethyl–1,10–phenanthroline)cobalt(III) ion**					
45a.075	$\cdot CH_2OH + Co(5,6\text{–}Me_2phen)_3^{3+} \rightarrow Co(5,6\text{–}Me_2phen)_3^{2+}$	4.9×10^8	~7	p.r.	P.b.k., as well as d.k. at 380 nm in N_2O–satd. soln. contg. 2.5 mol L^{-1} MeOH.	80A227
45a.076	$CH_3\dot{C}HOH + Co(5,6\text{–}Me_2phen)_3^{3+} \rightarrow Co(5,6\text{–}Me_2phen)_3^{2+}$	3.1×10^9	~7	p.r.	P.b.k., as well as d.k. at 380 nm in N_2O–satd. soln. contg. 0.25 mol L^{-1} EtOH.	80A227
45a.078	$(CH_3)_2\dot{C}OH + Co(5,6\text{–}Me_2phen)_3^{3+} \rightarrow Co(5,6\text{–}Me_2phen)_3^{2+}$	3.2×10^9	~7	p.r.	P.b.k., as well as d.k. at 380 nm in N_2O–satd. soln. contg. 0.25 mol L^{-1} 2–PrOH; same product from e_{aq}^- reaction.	80A227
46.	**Diaqua(5,7,7,12,14,14–hexamethyl–1,4,8,11–tetraazacyclotetradeca–4,11–diene)cobalt(III) ion**					
46.078	$(CH_3)_2\dot{C}OH + Co^{III} \rightarrow Co^{II}$	2.0×10^8	2.0	p.r.	P.b.k.	76A203
46.147	$\cdot CO_2^- + Co^{III} \rightarrow Co^{II}$	8.1×10^8	2.5	p.r.	P.b.k.	76A203
47.	**Aqua(5,7,7,12,14,14–hexamethyl–1,4,8,11–tetraazacyclotetradeca–4,11–diene)hydroxycobalt(III) ion**					
47.078	$(CH_3)_2\dot{C}OH + Co^{III} \rightarrow Co^{II}$	1.1×10^8	6.0	p.r.	P.b.k.	76A203
48.	**(5,7,7,12,14,14–hexamethyl–1,4,8,11–tetraazacyclotetradeca–4,11–diene)dihydroxycobalt(III) ion**					
48.078	$(CH_3)_2\dot{C}OH + Co^{III} \rightarrow Co^{II}$	1.1×10^8	10.0	p.r.	P.b.k.	76A203

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
49.	**Dichloro(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(III) ion**					
49.078	$(CH_3)_2\dot{C}OH + Co^{III} \rightarrow Co^{II}$	7.0×10^8	1.0	p.r.	P.b.k.	76A203
49.147	$\cdot CO_2^- + Co^{III} \rightarrow Co^{II}$	1.1×10^9	2.5	p.r.	P.b.k.	76A203
50.	**Diaqua(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion**					
50.078	$(CH_3)_2\dot{C}OH + Co^{III} \rightarrow Co^{II}$	1.9×10^9	1.0	p.r.	P.b.k.	76A203
50.147	$\cdot CO_2^- + Co^{III} \rightarrow Co^{II}$	6.4×10^9	2.5	p.r.	P.b.k.	76A203
51.	**Aquahydroxy(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion**					
51.078	$(CH_3)_2\dot{C}OH + Co^{III} \rightarrow Co^{II}$	5.5×10^8	5.0	p.r.	P.b.k.	76A203
52.	**Dihydroxy(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion**					
52.078	$(CH_3)_2\dot{C}OH + Co^{III} \rightarrow Co^{II}$	3.3×10^8	9.0	p.r.	P.b.k.	76A203
53.	**Cyanocob(III)alamin(Vitamin B12)**					
53.147	$\cdot CO_2^- + B12 \rightarrow B12r$ (B12r *See* 10.)	1.2×10^9	6.0	p.r.	P.b.k. at 530 nm as well as d.k. at 390 nm in soln. contg. 0.1 mol L^{-1} *tert*-BuOH, satd. with CO_2.	73G116
		no reaction		p.r.	No change in o.d. in N_2O or CO_2-satd. soln. contg. 0.1 mol L^{-1} formate, or CO_2-satd. soln. contg. 0.1 mol L^{-1} *tert*-BuOH.	74A105
54.	**Hydroxocob(III)alamin(Vitamin B12a)**					
54.147	$\cdot CO_2^- + B12a \rightarrow B12r$ (B12r *See* 10.)	1.45×10^9	9.2	p.r.	D.k. at 350 nm as well as p.b.k. at 310 nm in CO_2-satd. soln. contg. *tert*-BuOH.	74A105
	Cr					
55.	**Chromium(II) ion**					
55.006	$\cdot CH_2C(CH_3)_2CO_2H + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH_2C(CH_3)_2CO_2H$	1.1×10^8	~1	p.r.	P.b.k. in Ar-satd. soln. contg. pivalic acid-$HClO_4$.	74A146
55.016	$\cdot CH_2C(CH_3)_2OH + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH_2C(CH_3)_2OH$	1.0×10^8	~1	p.r.	P.b.k. in Ar-satd. soln. contg. *tert*-BuOH-$HClO_4$.	74A146
55.020	$\cdot CH_2CHO + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH_2CH(OH)_2$	$(3.5 \pm 0.5) \times 10^8$	~1	p.r.	P.b.k. in Ar-satd. soln. contg. ethylene glycol-$HClO_4$; $\cdot CHOHCH_2OH$ loses water in acid soln.	74A146
55.035	$\cdot CH_2CO_2H + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH_2CO_2H$	2.5×10^8	~1	p.r.	P.b.k. in Ar-satd. soln. contg. acetic acid-$HClO_4$.	74A146
55.037	$CH_3\dot{C}HCO_2H + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH(CH_3)CO_2H$	1.1×10^8	~1	p.r.	P.b.k. in Ar-satd. soln. contg. propionic acid-$HClO_4$.	74A146
55.042	$\cdot CH(CO_2H)_2 + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH(CO_2H)_2$	6.0×10^7	~1	p.r.	P.b.k. in Ar-satd. soln. contg. malonic acid-$HClO_4$.	74A146
55.054	$HCON(CH_3)\dot{C}H_2 + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH_2N(CH_3)CHO$	$(1.1 \pm 0.1) \times 10^8$	~5	p.r.	P.b.k. in Ar or N_2O-satd. soln. contg. dimethylformamide.	74A146
55.075	$\cdot CH_2OH + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH_2OH$	1.6×10^8	~1	p.r.	P.b.k. in Ar-satd. soln. contg. MeOH-$HClO_4$.	74A146
55.076	$CH_3\dot{C}HOH + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CHOHCH_3$	7.9×10^7	~1	p.r.	P.b.k. in Ar-satd. soln. contg. EtOH-$HClO_4$.	74A146
55.078	$(CH_3)_2\dot{C}OH + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}C(CH_3)_2OH$	5.1×10^7	~1	p.r.	P.b.k. in Ar-satd. soln. contg. 2-PrOH-$HClO_4$.	74A146
55.093	$CH_3\dot{C}HOC_2H_5 + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH(CH_3)OC_2H_5$	3.4×10^7	~1	p.r.	P.b.k. in Ar-satd. soln. contg. Et_2O-$HClO_4$.	74A146
55.101	$\cdot CHOHCH_2OH + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH_2CH(OH)_2$	$(1.5 \pm 0.2) \times 10^8$	3.0-4.5	p.r.	P.b.k. in Ar-satd. soln. contg. ethylene glycol-$HClO_4$; product same as in 55.020.	74A146
55.104	$-O\dot{C}HCH_2O(CH_2)_2- + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}R$	1.0×10^8	~1	p.r.	P.b.k. in Ar-satd. soln. contg. dioxane-$HClO_4$.	74A146
55.115	$\cdot CHOHCO_2H + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CHOHCO_2H$	1.4×10^8	~1	p.r.	P.b.k. in Ar-satd. soln. contg. glycolic acid-$HClO_4$.	74A146

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
55.117	$CH_3\dot{C}OHCO_2H + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}COH(CH_3)CO_2H$	9.2×10^7	~1	p.r.	P.b.k. in Ar-satd. soln. contg. lactic acid-$HClO_4$.	74A146
55.127	$\cdot CONH_2 + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CONH_2$	$(6.5 \pm 0.6) \times 10^8$	~5	p.r.	P.b.k. in Ar- or N_2O-satd. soln. contg. formamide.	74A146
55.147	$\cdot CO_2^-(\cdot CO_2H) + Cr^{II} \rightarrow Cr^{III}CO_2^-$	$(1.1 \pm 0.1) \times 10^9$	1.4	p.r.	D.k. in soln. contg. 1 mol L^{-1} formic acid; product spectrum similar to products containing C-Cr bonds [74A146].	73A057
56.	**Chromium(III) ion**					
56.147	$\cdot CO_2^-(\cdot CO_2H) + Cr^{III}$	no reaction	1.4	p.r.	D.k. in soln. contg. 1 mol L^{-1} formic acid.	73A057
	Cu					
57.	**Copper(I) ions**					
57.014	$\cdot CH_2CH_2OH + Cu^+ \rightarrow Cu^{II}CH_2CH_2OH^+ \rightarrow Cu^{2+} + C_2H_4 + OH^-$	$(1.9 \pm 0.6) \times 10^{10}$	4.5	p.r.	Est. from p.b.k. in N_2O-satd. soln. contg. ethylene and Cu^{2+}.	78A322
57.016	$\cdot CH_2C(CH_3)_2OH + Cu^+ \rightarrow Cu^{II}CH_2C(CH_3)_2OH^+ \rightarrow Cu^{2+} + OH^- + CH_2{=}C(CH_3)_2$	$(2.6 \pm 0.9) \times 10^{10}$	4.5	p.r.	Est. from p.b.k. at 400 nm in N_2O-satd. soln. contg. *tert*-BuOH and Cu^{2+}.	78A322
57.075	$\cdot CH_2OH + Cu^+ \rightleftharpoons Cu^{II}CH_2OH^+$	$\sim 10^{10}$	4.5	p.r.	Est. from growth and decay of absorption in soln. contg. MeOH and Cu^{2+}; $K \simeq 10^4$ dm^3 mol^{-1}.	78A322
		$\sim 6 \times 10^9$	4.0	p.r	Est. from growth and decay of absorption in soln. contg. MeOH and Cu^{2+}; $K \simeq 5 \times 10^3$ dm^3 mol^{-1}.	80A278
57.078	$(CH_3)_2\dot{C}OH + Cu^+$	$\sim 5 \times 10^9$	4.5	p.r.	Est. from growth and decay of absorption in soln. contg. 2-PrOH and Cu^{2+}.	78A322
58.	**Copper(I) ion, complex with ethylene**					
58.014	$\cdot CH_2CH_2OH + CuC_2H_4^+ \rightarrow 2C_2H_4 + Cu^{2+} + OH^-$	$(7.8 \pm 2.5) \times 10^7$	4.5	p.r.	Est. from effect of $[C_2H_4]$ on rate of formn. and decay of $CuC_2H_4^+$ at 227 nm; radical from OH + ethylene.	78A322
58.016	$\cdot CH_2C(CH_3)_2OH + CuC_2H_4^+ \rightarrow C_2H_4 + CH_2{=}C(CH_3)_2 + Cu^{2+} + OH^-$	$(5.3 \pm 1.6) \times 10^7$	4.5	p.r.	Est. from effect of $[C_2H_4]$ on rate of formn. and decay of $CuC_2H_4^+$ at 227 nm in soln. contg. *tert*-BuOH.	78A322
58a.	**Ethylenediaminetetraacetatocuprate(I) ion**					
58a.079	$CH_3CH_2CH_2\dot{C}HOH + CuEDTA^{3-} \rightarrow RCuEDTA^{3-}$	(4 to 5) x 10^9	7.5	p.r.	P.b.k. at 440 nm in soln. contg. 0.01 mol L^{-1} $CuEDTA^{2-}$ and 0.06 mol L^{-1} 1-BuOH assuming $2k(R + R) = 10^9$.	80A153
59.	**Copper(II) ions**					
59.001	$\cdot CH_3 + Cu_{aq}^{2+} \rightarrow CH_3Cu^{2+}$	$(7.4 \pm 0.6) \times 10^5$	~2	f.p.	P.b.k. in 10^{-2} mol L^{-1} $HClO_4$ soln. contg. 0.01-0.2 mol L^{-1} Cu^{2+} and $Co(NH_3)_5O_2CCH_3^{2+}$.	78F301
59.014	$\cdot CH_2CH_2OH + Cu_{aq}^{2+} \rightarrow Cu^{III}\text{-}CH_2CH_2OH^+ \rightarrow Cu^+ + \text{prod.}$	$(1.9 \pm 0.4) \times 10^7$ $(2.2 \pm 0.4) \times 10^7$	4.5 2	p.r.	P.b.k. at 270 nm ($Cu^IC_2H_4$) in N_2O-contg. ethylene (10^{-3} mol L^{-1}) soln.; $\cdot C_2H_5$ is present at pH 4.5 (~10%) and pH 2(~50%).	78A322
		$(3 \pm 1) \times 10^7$	6	p.r.	P.b.k. in soln. contg. (1-5) x 10^{-4} mol L^{-1} $CuSO_4$ satd. with ethylene-N_2O (1:1).	80A277
59.016	$\cdot CH_2C(CH_3)_2OH + Cu_{aq}^{2+} \rightarrow Cu^{III}\text{-}R \rightarrow Cu^+ + \text{prod.}$	$(2.7 \pm 0.5) \times 10^6$ $(3.2 \pm 0.6) \times 10^6$	4.5 3	p.r.	P.b.k. at 320 nm ($Cu^ICH_2CHCONH_2$) in N_2O-satd. soln. contg. *tert*-BuOH and acrylamide.	78A322
		$(5 \pm 2) \times 10^6$	6	p.r.	P.b.k. in N_2O-satd. soln. contg. (1-5) x 10^{-4} mol L^{-1} $CuSO_4$ and 0.1 mol L^{-1} *tert*-BuOH.	80A277

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
59.035	$\cdot CH_2CO_2^- + Cu^{2+} \rightarrow Cu^{III}CH_2CO_2^+ \rightarrow Cu^+ +$ prod.	$(6.4 \pm 1.5) \times 10^6$	6.0	p.r.	D.k. in N_2O–satd. 10^{-2} mol L^{-1} acetate soln.	77A025
59.037	$CH_3\dot{C}HCO_2^- + Cu_{aq}^{2+} \rightarrow Cu^{III}$–R $\rightarrow Cu^+ +$ prod.	$(5 \pm 0.5) \times 10^8$	6	p.r.	P.b.k. in N_2O–satd. soln. contg. (2–10) x 10^{-5} mol L^{-1} $CuSO_4$ and 10^{-2} mol L^{-1} propionate.	80A277
59.041	$^-O_2CCHOH\dot{C}HCO_2^- + Cu_{aq}^{2+} \rightarrow Cu^{III}$–R $\rightarrow Cu^+ +$ prod.	$(8 \pm 0.3) \times 10^8$	6	p.r.	P.b.k. in N_2O–satd. soln. contg. (5–10) x 10^{-5} mol L^{-1} $CuSO_4$ and (2.5–10) x 10^{-4} mol L^{-1} fumarate; pH dependent, k = 8.0 x 10^8, 1.8 x 10^8, 1.2 x 10^8, 6.4 x 10^7, 3.1 x 10^7, and <2 x 10^7 at pH 5.0, 3.5, 3.0, 2.6, 2.1, and 1.5, resp.	80A277
59.048	$\cdot CCl_3$ (+ $\cdot CHCl_2$) + $Cu_{aq}^{2+} \rightarrow Cu^{III}$–$CCl_3 \rightarrow Cu^+ +$ prod.	$(3 \pm 1.5) \times 10^7$	6	p.r.	P.b.k. in Ar–satd. soln. contg. (2–10) x 10^{-5} mol L^{-1} $CuSO_4$ and (1–10) x 10^{-2} mol L^{-1} $CHCl_3$; $G(\cdot CHCl_2) = G(e_{aq}^-)$ and $G(\cdot CCl_3) = G(OH)$.	80A277
59.075	$\cdot CH_2OH + Cu_{aq}^{2+} \rightarrow Cu^+ + CH_2O + H^+$	$(1.1 \pm 0.2) \times 10^8$	5–6	p.r.	D.k. in N_2O–satd. 10^{-2} mol L^{-1} MeOH soln.	72A018
		$(1.6 \pm 0.3) \times 10^8$	2–5	p.r.	P.b.k. at 320 nm ($Cu^I CH_2CHCONH_2$) in soln. contg. MeOH and acrylamide (10^{-2} mol L^{-1}).	78A322
		$(1.9 \pm 0.4) \times 10^8$	⩽3	p.r.	D.k.	78A322
		$(1.6 \pm 0.2) \times 10^8$	6	p.r.	D.k. at ~300 nm (radical) in N_2O–satd. soln. contg. 0.1 mol L^{-1} MeOH.	80A277
59.076	$CH_3\dot{C}HOH + Cu_{aq}^{2+} \rightarrow Cu^+ + CH_3CHO + H^+$	$(7.4 \pm 1.1) \times 10^7$	5–6	p.r.	D.k. in N_2O–satd. 10^{-2} mol L^{-1} EtOH soln.	72A018
		$(9.4 \pm 1.9) \times 10^7$	2–5	p.r.	P.b.k. at 320 nm ($Cu^I CH_2CHCONH_2$) in soln. contg. EtOH and acrylamide (10^{-2} mol L^{-1}).	78A322
		$(9 \pm 2) \times 10^7$	6	p.r.	D.k. at ~300 nm (radical) in N_2O–satd. soln. contg. 0.1 mol L^{-1} EtOH.	80A277
59.078	$(CH_3)_2\dot{C}OH + Cu_{aq}^{2+} \rightarrow Cu^+ +$	$(4.5 \pm 0.7) \times 10^7$	5–6	p.r.	D.k. in N_2O–satd. 10^{-2} mol L^{-1} 2–PrOH soln.	72A018
		$(5.2 \pm 1.0) \times 10^7$	2–5	p.r.	P.b.k. at 320 nm ($Cu^I CH_2CHCONH_2$) in soln. contg. 2–PrOH and acrylamide (10^{-2} mol L^{-1}).	78A322
		$(5.0 \pm 1.0) \times 10^7$	⩽3	p.r.	D.k.	78A322
		$(5.0 \pm 1.5) \times 10^7$	6	p.r.	D.k. at ~300 nm (radical) in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH.	80A277
59.113	$\cdot A^- + Cu_{aq}^{2+}$ ($A\cdot^-$ = Radical from ascorbate)	$\ll 10^6$		phot.	Est.	78A394
59.147	$\cdot CO_2^- + Cu_{aq}^{2+} \rightarrow CO_2 + Cu^+$	$(1.5 \pm 0.3) \times 10^8$	6.8	p.r.	D.k. at 260 nm in N_2O–satd. formate (0.1 mol L^{-1}) soln.	78A176
60.	**(5,7,7,12,14,14–Hexamethyl–1,4,8,11–tetraazacyclotetradeca–4,11–diene)copper(II) ion**					
60.075	$\cdot CH_2OH + Cu^{II}L \rightarrow Cu^I L$	⩽2 x 10^6	3.5–10	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} MeOH; product ident. with that from e_{aq}^-.	80A189
	$\cdot CH_2O^- + Cu^{II}L \rightarrow Cu^I L$	9.0 x 10^8	12.0	p.r.	P.b.k. at 410 nm; no reduction obs. in neutral soln.; in methanolic soln. k = 2.2 x 10^4 was detd. by f.phot. (p.b.k. at 415 nm)[77F639].	76A039
60.076	$CH_3\dot{C}HOH + Cu^{II}L \rightarrow Cu^I L$	⩽2 x 10^6	3.5–10	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} EtOH; product ident. with that from e_{aq}^-.	80A189
60.078	$(CH_3)_2\dot{C}OH + Cu^{II}L \rightarrow Cu^I L$	⩽2 x 10^6	3.5–10	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH; product ident. with that from e_{aq}^-.	80A189
	$(CH_3)_2\dot{C}O^- + Cu^{II}L \rightarrow Cu^I L$	9.0 x 10^8	12.5	p.r.	P.b.k. at 410 nm; no redn. obs. in neutral soln.	76A039

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
60.147	$\cdot CO_2^- + Cu^{II}L \rightarrow Cu^{I}L$	2.3×10^9	7.0	p.r.	P.b.k. at 410 nm.	76A039
61.	**Glycylglycylglycinatocopper(II) complex**					
61.147	$\cdot CO_2^- + Cu^{II}(gly_3) \rightarrow Cu(I) + CO_2$	$(2.8 \pm 0.3) \times 10^8$	9.1	p.r.	D.k. at 550 nm (Cu^{II}) in N_2O-satd. formate (10^{-2} mol L^{-1}) soln. contg. Cu(II) and gly_3 in 1:5, 1:3 and 1:2 ratio.	76A016
62.	**(Oxidized glutathione)copper(II) complex**					
62.147	$\cdot CO_2^- + Cu^{II}(GSSG)_n \rightarrow Cu(I) + CO_2$	$(1.0 \pm 0.2) \times 10^8$	11	p.r.	D.k. at 595 nm (Cu^{II}) in N_2O-satd. soln. contg. formate ion; 10% of the $\cdot CO_2^-$ reacted with the disulfide $\rightarrow$ $GSSG^-$ (p.b.k. at 410 nm).	76A016
63.	**Histidinecopper(II) complex**					
63.147	$\cdot CO_2^- + Cu(II) \rightarrow Cu(I)$	$(4.1 \pm 0.4) \times 10^8$	11.0	p.r.	D.k. at 600 nm (Cu^{II}) in N_2O-satd. soln. contg. formate.	77A138
64.	**Glycylhistidinecopper(II) complex**					
64.147	$\cdot CO_2^- + Cu(II)$	$(4.5 \pm 0.3) \times 10^8$ $(1.6 \pm 0.2) \times 10^7$	6.6 11.0	p.r.	D.k. at 565 nm (Cu^{II}) in N_2O-satd. soln. contg. formate.	77A138
65.	**β-Alanylhistidinecopper(II) complex**					
65.147	$\cdot CO_2^- + Cu(II)$	$(3.5 \pm 0.4) \times 10^8$	7.5–11	p.r.	D.k. at 600 nm (Cu^{II}) in N_2O-satd. soln. contg. formate.	77A138
65a.	**Ethylenediaminetetraacetatocuprate(II) ion**					
65a.079	$CH_3CH_2CH_2\dot{C}HOH + CuEDTA^{2-}$	$(0.5 \text{ to } 1) \times 10^6$	7.5	p.r.	Calcd. from concn. effect on p.b.k. for $RCuEDTA^{3-}$; see 58a.079.	80A153
	Eu					
66.	**Europium(III) ion**					
66.147	$\cdot CO_2H(\cdot CO_2^-) + Eu(III) \rightarrow Eu(II)$	$\gg 7 \times 10^6$	1.4	p.r.	Est. from p.b.k. at 250 nm (Eu^{II}).	73A057
	Fe					
67.	**Iron(II) ion**					
67.078	$(CH_3)_2\dot{C}OH + Fe(H_2O)_6^{2+}$	2.9×10^6	~2	p.r.	Est. from change in abs. at 250 nm; product suggested to be $Fe(H_2O)_5R^{2+}$.	75A166
	Deuteroheme See 223.					
68.	**Iron(III) ions**					
68.075	$\cdot CH_2OH + Fe^{3+} \rightarrow Fe^{2+} + CH_2O + H^+$	1×10^8 (rel.)	~1	γ-r.	C.k. rel. to $k(R + C(NO_2)_4) = 5 \times 10^9$; obs. $C(NO_3)_3^-$ and Fe^{2+} yields.	77G411
		$(8 \pm 2) \times 10^7$			Unpubl. data, C.N.Barnes and G.V.Buxton.	78A322
68.076	$CH_3\dot{C}HOH + Fe^{3+} \rightarrow Fe^{2+} + H^+ + CH_3CHO$	2.7×10^8 (rel.)	~1	γ-r.	C.k. rel. to $k(R + C(NO_2)_4) = 5 \times 10^9$; obs. $C(NO_2)_3^-$ and Fe^{2+} yields.	77G411
		$(3.8 \pm 0.2) \times 10^8$			Unpubl. data, C.N.Barnes and G.V.Buxton.	78A322
68.078	$(CH_3)_2\dot{C}OH + Fe^{3+} \rightarrow Fe^{2+} + H^+ + (CH_3)_2CO$	$(4.5 \pm 0.4) \times 10^8$	~1	p.r.	D.k. at 270 nm in soln. contg. 1 mol L^{-1} 2-PrOH, 2×10^{-4} mol L^{-1} $Fe(ClO_4)_3$ and 0.5 mol L^{-1} $HClO_4$; $\mu = 1$ mol L^{-1}.	74A074
		1.8×10^8 (rel.)	~1	γ-r.	C.k. rel. to $k(R + C(NO_2)_4) = 5 \times 10^9$; obs. $C(NO_2)_3^-$ and Fe^{2+} yields.	77G411
		$(5.8 \pm 0.3) \times 10^8$			Unpubl. data, C.N.Barnes and G.V.Buxton.	78A322

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
69.	**Ferricyanide ion**					
69.001	$\cdot CH_3 + Fe(CN)_6^{3-}$	$(5 \pm 1) \times 10^6$	6–7	p.r.	D.k. at 420 nm in N_2O–satd. soln. contg. dimethyl sulfoxide.	81A003
69.002	$\cdot CH_2CH_3 + Fe(CN)_6^{3-}$	$(5.0 \pm 0.5) \times 10^7$	6–7	p.r.	D.k. at 420 nm in N_2O–satd. soln. contg. diethyl sulfoxide.	81A003
69.002a	$(CH_3)_2\dot{C}H + Fe(CN)_6^{3-}$	$(1.25 \pm 0.5) \times 10^9$	6–7	p.r.	D.k. at 420 nm in N_2O–satd. soln. contg. di-(1-methylethyl) sulfoxide.	81A003
69.002b	$(CH_3)_3\dot{C} + Fe(CN)_6^{3-}$	$(3.6 \pm 1.5) \times 10^9$	6–7	p.r.	D.k. at 420 nm in N_2O–satd. soln. contg. di-(*tert*-butyl) sulfoxide.	81A003
69.014	$\cdot CH_2CH_2OH + Fe(CN)_6^{3-}$	$\sim 10^7$	7	p.r.	D.k. in soln. of 10^{-2} mol L^{-1} ethylene contg. 10^{-2} mol L^{-1} N_2O.	69G522
69.035	$\cdot CH_2CO_2H + Fe(CN)_6^{3-}$	2×10^6	3.3	p.r.	D.k. at 420 nm in N_2O–satd. soln. contg. acetic acid.	81A003
69.043	$\cdot CH_2Cl + Fe(CN)_6^{3-}$	$<5 \times 10^5$	6–7	p.r.	D.k. at 420 nm in N_2O–satd. soln. contg. methylene chloride.	81A003
69.045	$\cdot CHCl_2 + Fe(CN)_6^{3-}$	$<5 \times 10^5$	6–7	p.r.	D.k. at 420 nm in N_2O–satd. soln. contg. chloroform.	81A003
69.056	$NH_2\dot{C}HCO_2^- + Fe(CN)_6^{3-}$	1×10^9		p.r.	D.k. at 420 nm in soln. contg. glycine.	76A082
69.075	$\cdot CH_2OH + Fe(CN)_6^{3-} \rightarrow CH_2O + H^+ + Fe(CN)_6^{4-}$	4.0×10^9	7	p.r.	D.k. at 410 nm (ferricyanide) in soln. contg. MeOH.	68G308 69G522
		$(4.2 \pm 0.4) \times 10^9$	~6	p.r.	Condy. change in N_2O–satd. soln. contg. MeOH.	70G254
	$\cdot CH_2O^- + Fe(CN)_6^{3-} \rightarrow CH_2O + Fe(CN)_6^{4-}$	3.1×10^9	13	p.r.	D.k. at 410 nm (ferricyanide) in soln. contg. MeOH.	68G308
69.076	$CH_3\dot{C}HOH + Fe(CN)_6^{3-}$	5.3×10^9	7	p.r.	D.k. at 410 nm in 0.1 mol L^{-1} EtOH soln.	69G522
		4×10^9		p.r.	D.k. at 420 nm in N_2O–satd. soln. contg. EtOH.	79N061
69.077	$CH_3CH_2\dot{C}HOH + Fe(CN)_6^{3-}$	3.7×10^9	7	p.r.	D.k. at 410 nm in 0.1 mol L^{-1} 1-PrOH soln.	69G522
69.078	$(CH_3)_2\dot{C}OH + Fe(CN)_6^{3-}$	4.7×10^9	7	p.r.	D.k. at 410 nm in 0.1 mol L^{-1} 2-PrOH soln.	69G522
		$(5.6 \pm 0.6) \times 10^9$	7.0	p.r.	D.k. at 420 nm.	73A104
69.080	$CH_3\dot{C}OHCH_2CH_3 + Fe(CN)_6^{3-}$	4.8×10^9	7	p.r.	D.k. at 410 nm in 0.1 mol L^{-1} 2-BuOH soln.	69G522
69.081	$(CH_3)_2CH\dot{C}HOH + Fe(CN)_6^{3-}$	3.0×10^9	7	p.r.	D.k. at 410 nm in 0.3 mol L^{-1} 2-methyl-1-propanol soln.	69G522
69.082	$CH_3(CH_2)_3\dot{C}HOH + Fe(CN)_6^{3-}$	$(9 \pm 2) \times 10^8$		p.r.	D.k. at 420 nm in N_2O–satd. soln. contg. 1-pentanol.	79N061
69.084	$-CH_2\dot{C}OH(CH_2)_2- + Fe(CN)_6^{3-} \rightarrow R{=}O + Fe(CN)_6^{4-} + H^+$	2.6×10^9	7	p.r.	D.k. at 410 nm in soln. contg. 10^{-3} mol L^{-1} cyclobutanone and 0.1 mol L^{-1} *tert*-BuOH at 2°C; $k = 5.3 \times 10^9$ at 64°C; $E_a = 2.1$ kcal mol^{-1} (8.8 kJ mol^{-1}).	76A103
69.085	$-CH_2\dot{C}OH(CH_2)_3- + Fe(CN)_6^{3-} \rightarrow R{=}O + Fe(CN)_6^{4-} + H^+$	2.3×10^9	7	p.r.	D.k. at 410 nm in soln. contg. 10^{-3} mol L^{-1} cyclopentanone and 0.1 mol L^{-1} *tert*-BuOH at 2°C; $k = 5.4 \times 10^9$ at 64°C; $E_a = 2.6$ kcal mol^{-1} (10.9 kJ mol^{-1}).	76A103
69.086	$-CH_2\dot{C}OH(CH_2)_4- + Fe(CN)_6^{3-} \rightarrow R{=}O + Fe(CN)_6^{3-} + H^+$	1.8×10^9	7	p.r.	D.k. at 410 nm in soln. contg. 10^{-3} mol L^{-1} cyclohexanone and 0.1 mol L^{-1} *tert*-BuOH at 2°C; $k = 5.0 \times 10^9$ at 64°C; $E_a = 2.9$ kcal mol^{-1} (12.1 kJ mol^{-1}).	76A103
		$(1.0 \pm 0.2) \times 10^9$		p.r.	D.k. at 420 nm in N_2O–satd. soln. contg. cyclohexanol.	79N061
69.087	$-CH_2\dot{C}OH(CH_2)_5- + Fe(CN)_6^{3-} \rightarrow R{=}O + Fe(CN)_6^{4-} + H^+$	2.1×10^9	7	p.r.	D.k. at 410 nm in soln. contg. 10^{-3} mol L^{-1} cycloheptanone and 0.1 mol L^{-1} *tert*-BuOH at 2°C; $k = 5.4 \times 10^9$ at 64°C; $E_a = 2.8$ kcal mol^{-1} (11.7 kJ mol^{-1}).	76A103
69.088	$-CH_2\dot{C}OH(CH_2)_6- + Fe(CN)_6^{3-} \rightarrow R{=}O + Fe(CN)_6^{4-} + H^+$	2.2×10^9	7	p.r.	D.k. at 410 nm in soln. contg. 10^{-3} mol L^{-1} cyclooctanone and 0.1 mol L^{-1} *tert*-BuOH at 2°C; $k = 5.4 \times 10^9$ at 64°C; $E_a = 2.8$ kcal mol^{-1} (11.7 kJ mol^{-1}).	76A103

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
69.091	$CH_3\dot{C}HOSO_3^- + Fe(CN)_6^{3-}$	$\approx 2 \times 10^8$		p.r.	D.k. at 420 nm in N_2O–satd. soln. contg. ethylsulfate ion; values are given also for radicals produced from reaction of OH with higher alkyl sulfates.	79N061
69.092a	$\cdot CH_2OCH_3 + Fe(CN)_6^{3-}$	$(4.3 \pm 0.23) \times 10^9$	6–7	p.r.	D.k. at 420 nm in N_2O–satd. soln. contg. dimethyl ether.	81A003
69.097	$CH_3(\dot{C}O^-)CH_2CO_2^- + Fe(CN)_6^{3-}$	$(7.3 \pm 0.7) \times 10^8$	7.0	p.r.	D.k. at 420 nm in soln. contg. acetoacetate ion (radical by reaction with e_{aq}^-).	73A104
69.100	$\cdot CHOHCH(NH_2)CO_2^- + Fe(CN)_6^{3-}$	3.2×10^9	7	p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L^{-1} serine.	69G522
69.101	$\cdot CHOHCH_2OH + Fe(CN)_6^{3-}$	3.6×10^9	7	p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L^{-1} ethylene glycol.	69G522
69.105	$R + Fe(CN)_6^{3-}$ (*R = Radicals from* polyethylene oxide)	2.1×10^9	7	p.r.	D.k. at 410 nm in soln. contg. ~2% polyethylene oxide.	69G522
69.106	$\cdot CHOHCHOHCH_2OH + Fe(CN)_6^{3-}$ (+ $CH_2\dot{C}OHCH_2OH$)	3.3×10^9	7	p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L^{-1} glycerol.	69G522
69.108	$R + Fe(CN)_6^{3-}$ (R = Radicals from deoxyribose)	2.8×10^9	7	p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L^{-1} deoxyribose	71G618
		1.4×10^9		p.r.	Soln. contains 2-deoxy-D-ribose.	78A175
69.111	$R + Fe(CN)_6^{3-}$ (R = Radicals from glucose)	1.9×10^9	7	p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L^{-1} glucose.	69G522
69.115	$\cdot CHOHCO_2^- + Fe(CN)_6^{3-}$	5×10^8	7	p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L^{-1} glycolate ion.	69G522
	$\cdot CHOHCO_2H + Fe(CN)_6^{3-}$	1.0×10^8	3.4	p.r.	D.k. at 420 nm in N_2O–satd. soln. contg. glycolate.	81A003
	$\cdot CH(O^-)CO_2^- + Fe(CN)_6^{3-}$	7.5×10^9	11.5			
69.117	$CH_3\dot{C}OHCO_2^- + Fe(CN)_6^{3-}$	1.5×10^9	7	p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L^{-1} lactate ion.	69G522
69.147	$\cdot CO_2^- + Fe(CN)_6^{3-} \rightarrow CO_2 + Fe(CN)_6^{4-}$	1.06×10^9	7	p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L^{-1} formate ion.	69G522
70.	**Pentacyanonitrosylferrate(III) ion**					
70.075	$\cdot CH_2OH + Fe(CN)_5NO^{2-} \rightarrow CH_2O + H^+ + Fe(CN)_5\dot{N}O^{3-}$	6.7×10^8	8.5	p.r.	P.b.k. in N_2O–satd. 0.5 mol L^{-1} MeOH soln.	77A120
70.078	$(CH_3)_2\dot{C}OH + Fe(CN)_5NO^{2-}$	2.9×10^9	7.0	p.r.	P.b.k. in N_2O–satd. 0.5 mol L^{-1} 2-PrOH soln.	77A120
70.147	$\cdot CO_2^- + Fe(CN)_5\dot{N}O^{2-} \rightarrow CO_2 + Fe(CN)_5\dot{N}O^{3-}$	3.7×10^8	7	p.r.	P.b.k. at 450 nm in N_2O–satd. 2×10^{-2} mol L^{-1} formate soln.; $I = 0.02$.	69G052
		4.0×10^8	7.0	p.r.	P.b.k. in N_2O–satd. 0.1 mol L^{-1} formate soln.	77A120
71.	**Pentacyanonitrosylferrate(III) radical ion (electron adduct)**					
71.006	$\cdot CH_2C(CH_3)_2CO_2^- + Fe(CN)_5\dot{N}O^{3-} \rightarrow Fe(CN)_5N(O)CH_2C(CH_3)_2CO_2^{4-}$	$(2.0 \pm 0.3) \times 10^9$	6.0–7.5	p.r.	D.k. at 380 nm (nitrosyl radical, $\epsilon = 3.5 \times 10^3$ L mol^{-1} cm^{-1}), as well as p.b.k. in soln. contg. 0.3 mol L^{-1} pivalate ion and 5×10^{-4} mol L^{-1} $Fe(CN)_5NO^{2-}$.	79A134
71.012	$\cdot CH_2C(CH_3)_2NH_3^+ + Fe(CN)_5\dot{N}O^{3-} \rightarrow Fe(CN)_5N(O)CH_2C(CH_3)_2NH_3^{2-}$	$(1.2 \pm 0.2) \times 10^{10}$	6.0–7.5	p.r.	D.k. at 380 nm (nitrosyl radical, $\epsilon = 3.5 \times 10^3$ L mol^{-1} cm^{-1}), as well as p.b.k. in soln. contg. 0.3 mol L^{-1} *tert*-butylamine and 5×10^{-4} mol L^{-1} $Fe(CN)_5NO^{2-}$.	79A134
71.013	$\cdot CH_2C(CH_3)(NH_3^+)CO_2^- + Fe(CN)_5\dot{N}O^{3-} \rightarrow Fe(CN)_5N(O)CH_2C(CH_3)(NH_3)CO_2^{3-}$	$(1.6 \pm 0.2) \times 10^9$	6.0–7.5	p.r.	D.k. at 380 nm (nitrosyl radical, $\epsilon = 3.5 \times 10^3$ L mol^{-1} cm^{-1}), as well as p.b.k. in soln. contg. 0.3 mol L^{-1} 2-aminoisobutyrate ion and 5×10^{-4} mol L^{-1} $Fe(CN)_5NO^{2-}$	79A134

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
71.016	$\cdot CH_2C(CH_3)_2OH + Fe(CN)_5\dot{N}O^{3-} \rightarrow Fe(CN)_5N(O)CH_2C(CH_3)_2OH^{3-}$	$(2.5 \pm 0.4) \times 10^9$	6.0–7.5	p.r.	D.k. at 380 nm (nitrosyl radical, $\epsilon = 3.5 \times 10^3$ L mol^{-1} cm^{-1}), as well as p.b.k. in soln. contg. 0.3 mol L^{-1} *tert*–BuOH and 5×10^{-4} mol L^{-1} $Fe(CN)_5NO^{2-}$.	79A134
71.017	$\cdot CH_2COH(CH_3)CO_2^- + Fe(CN)_5\dot{N}O^{3-} \rightarrow Fe(CN)_5N(O)CH_2COH(CH_3)CO_2^{4-}$	$(6.3 \pm 0.9) \times 10^8$	6.0–7.5	p.r.	D.k. at 380 nm (nitrosyl radical, $\epsilon = 3.5 \times 10^3$ L mol^{-1} cm^{-1}), as well as p.b.k. in soln. contg. 0.3 mol L^{-1} 2–hydroxyisobutyrate ion and 5×10^{-4} mol L^{-1} $Fe(CN)_5NO^{2-}$.	79A134
71.055	$CH_3CON(CH_3)\dot{C}H_2 + Fe(CN_5)\dot{N}O^{3-} \rightarrow Fe(CN)_5N(O)CH_2N(CH_3)C(O)CH_3^{3-}$	$(3.5 \pm 0.5) \times 10^{10}$	6.0–7.5	p.r.	D.k. at 380 nm (nitrosyl radical, $\epsilon = 3.5 \times 10^3$ L mol^{-1} cm^{-1}), as well as p.b.k. in soln. contg. 0.3 mol L^{-1} *N,N*–dimethylacetamide and 5×10^{-4} mol L^{-1} $Fe(CN)_5NO^{2-}$.	79A134
72.	**Tris(1,10-phenanthroline)iron(III) ion**					
72.016	$\cdot CH_2C(CH_3)_2OH + Fe(phen)_3^{3+} \rightarrow Fe(phen)_3^{2+}$	$\sim 10^7$	acid	p.r.	P.b.k. in soln. contg. *tert*–BuOH, H_2SO_4 and $HClO_4$; slower process follows fast H reaction.	79A174
	Deuterohemin See 222.					
	Hemin See 224.					
	Hemin c See 225.					
	Methemerythrin See 256.					
	Ga					
73.	**Gallium(II) ions**					
73.075	$\cdot CH_2OH + Ga^{2+} \rightarrow CH_2O + H^+ + Ga^+$	1.1×10^9	2.3	p.r.	D.k. in soln. contg. MeOH; Ga(II) formed from e_{aq}^- + Ga(III); cor. to $I = 0$.	79A190
	$\cdot CH_2OH + Ga(OH)^+ \rightarrow CH_2O + H_2O + Ga^+$	1.0×10^9	2.9			
	$\cdot CH_2O^- + Ga(OH)_6^{4-} \rightarrow$ prod.	7.8×10^8	12.0			
73.076	$\cdot CH_3\dot{C}HO^- + Ga(OH)_6^{4-} \rightarrow$ prod.	1.2×10^9	12.0	p.r.	D.k. in soln. contg. EtOH; Ga(II) from e_{aq}^- + Ga(III); cor. to $I = 0$.	79A190
73.078	$(CH_3)_2\dot{C}O^- + Ga(OH)_6^{4-} \rightarrow$ prod.	1.7×10^9	12.0	p.r.	D.k. in soln. contg. 2–PrOH; Ga(II) from e_{aq}^- + Ga(III); cor. to $I = 0$.	79A190
	Hg					
74.	**Mercuric bromide**					
74.078	$(CH_3)_2\dot{C}OH + HgBr_2 \rightarrow HgBr + Br^- + H^+ + (CH_3)_2CO$	$(2.4 \pm 0.6) \times 10^9$		p.r.	P.b.k. in N_2O–satd. 0.1 mol L^{-1} 2–PrOH soln.	76A042
74.147	$\cdot CO_2^- + HgBr_2 \rightarrow CO_2 + Hg(I)$	$\leqslant 9 \times 10^9$		p.r.	P.b.k. at 360 nm in soln. contg. formate ion; based on max. optical density in various solns.; rel. rates are $\cdot CO_2^-$ 1.0, $(CH_3)_2\dot{C}OH$ 0.89, $CH_3\dot{C}HOH$ 0.87, and $\cdot CH_2OH$ 0.63.	76A087
75.	**Mercuric chloride**					
75.078	$(CH_3)_2\dot{C}OH + HgCl_2 \rightarrow HgCl + Cl^- + H^+ + (CH_3)_2CO$	$(2.0 \pm 0.2) \times 10^9$		p.r.	P.b.k. in N_2O–satd. 0.1 mol L^{-1} 2–PrOH soln.	73G043 76A042
76.	**Mercuric iodide**					
76.076	$CH_3\dot{C}HOH + HgI_2$	$(7 \pm 2.5) \times 10^8$		p.r.	P.b.k. in N_2O–satd. soln. contg. EtOH.	78A165

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
76.078	$(CH_3)_2\dot{C}OH + HgI_2 \rightarrow HgI + I^- + H^+ + (CH_3)_2CO$	$(2.0 \pm 0.5) \times 10^9$		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	76A042
		$(1.0 \pm 0.5) \times 10^9$		p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	78A165
76.147	$\cdot CO_2^- + HgI_2$	$(3.0 \pm 1.0) \times 10^9$		p.r.	P.b.k. in N_2O-satd. soln. contg. formate ion.	78A165
77.	**Mercurous cyanide**					
77.016	$\cdot CH_2C(CH_3)_2OH + HgCN$	1.6×10^9		p.r.	Calcd. from increase in decay rate at 285 nm in soln. contg. *tert*-BuOH and $Hg(CN)_2$; $2k(HgCN + HgCN) = 3.4 \times 10^9$.	75A203
77.075	$\cdot CH_2OH + HgCN$	4.0×10^9		p.r.	Calcd. from increase in decay rate at 285 nm in soln. contg. MeOH and $Hg(CN)_2$; $2k(HgCN + HgCN) = 3.4 \times 10^9$.	75A203
77.076	$CH_3\dot{C}HOH + HgCN$	3.9×10^9		p.r.	Calcd. from increase in decay rate at 285 nm in soln. contg. EtOH and $Hg(CN)_2$; $2k(HgCN + HgCN) = 3.4 \times 10^9$.	75A203
77.078	$(CH_3)_2\dot{C}OH + HgCN$	2.4×10^9		p.r.	Calcd. from increase in decay rate at 285 nm in soln. contg. 2-PrOH and $Hg(CN)_2$; $2k(HgCN + HgCN) = 3.4 \times 10^9$.	75A203
78.	**Mercuric cyanide**					
78.147	$\cdot CO_2^- + Hg(CN)_2 \rightarrow CO_2 + Hg(I)$	$(3.4 \pm 0.2) \times 10^9$		p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. formate.	75A203
79.	**Mercuric thiocyanate**					
79.078	$(CH_3)_2\dot{C}OH + Hg(SCN)_2 \rightarrow HgSCN + SCN^- + H^+ + (CH_3)_2CO$	$(2.2 \pm 0.5) \times 10^9$		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	76A042
	I					
80.	**Iodine**					
80.001	$\cdot CH_3 + I_2 \rightarrow \cdot[CH_3I_2]$	6.0×10^9 (rel.)		p.r.	C.k. with O_2; radical from MeI; rel. to $k(CH_3 + O_2) = 4.7 \times 10^9$.	67G041
81.	**Iodate ion**					
81.076	$CH_3\dot{C}HOH + IO_3^-$	$<5 \times 10^6$	6	p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	72A018
	$CH_3\dot{C}HO^- + IO_3^-$	$(7.5 \pm 0.2) \times 10^8$	11.8			
	Ir					
	Iridium(IV) ions					
81a.	**Hexachloroiridate(IV) ion**					
81a.001	$\cdot CH_3 + IrCl_6^{2-}$	$(1.15 \pm 0.5) \times 10^9$	6–7	p.r.	D.k. at 490 nm in N_2O-satd. soln.; radical from dimethyl sulfoxide.	81A003
81a.002	$\cdot CH_2CH_3 + IrCl_6^{2-}$	$(3.1 \pm 0.8) \times 10^9$	6–7	p.r.	D.k. at 490 nm in N_2O-satd. soln.; radical from diethyl sulfoxide.	81A003
81a.002a	$(CH_3)_2\dot{C}H + IrCl_6^{2-}$	$(3.6 \pm 0.4) \times 10^9$	6–7	p.r.	D.k. at 490 nm in N_2O-satd. soln.; radical from di-(1-methylethyl) sulfoxide.	81A003
81a.002b	$(CH_3)_3\dot{C} + IrCl_6^{2-}$	$(3.8 \pm 1.1) \times 10^9$	6–7	p.r.	D.k. at 490 nm in N_2O-satd. soln.; radical from di-(*tert*-butyl) sulfoxide.	81A003
81a.005	$\cdot CH_2CH_2Cl + IrCl_6^{2-}$	$\sim 1 \times 10^9$	6–7	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. 1,2-dichloroethane.	81A003
81a.014	$\cdot CH_2CH_2OH + IrCl_6^{2-}$	$\sim 2 \times 10^9$	6–7	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. ethylene.	81A003
81a.016	$\cdot CH_2C(CH_3)_2OH + IrCl_6^{2-}$	$(1.2 \pm 0.16) \times 10^9$	6–7	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. *tert*-BuOH.	81A003
81a.020	$\cdot CH_2CHO + IrCl_6^{2-}$	1.7×10^9	7	p.r.	D.k. at 490 nm in soln. contg. 2-chloroethanol.	81A003

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
81a.035	$\cdot CH_2CO_2^- + IrCl_6^{2-}$	4.2×10^8	7	p.r.	D.k. at 490 nm in N_2O–satd. soln.	81A003
	$\cdot CH_2CO_2H + IrCl_6^{2-}$	1.4×10^9	3.3		contg. acetate.	
81a.040a	$^-O_2C\dot{C}HCH_2CO_2^- + IrCl_6^{2-}$	1.1×10^8	7	p.r.	D.k. at 490 nm in N_2O–satd. soln.	81A003
	$HO_2C\dot{C}HCH_2CO_2H + IrCl_6^{2-}$	4.6×10^8	3.3		contg. succinate.	
81a.043	$\cdot CH_2Cl + IrCl_6^{2-}$	$\sim 1 \times 10^9$	6–7	p.r.	D.k. at 490 nm in N_2O–satd. soln. contg. dichloromethane.	81A003
81a.048	$\cdot CCl_3 + IrCl_6^{2-}$	2.8×10^7	6–7	p.r.	D.k. at 490 nm in N_2O–satd. soln. contg. carbon tetrachloride.	81A003
81a.075	$\cdot CH_2OH + IrCl_6^{2-}$	6.0×10^9	6–7	p.r.	D.k. at 490 nm in N_2O–satd. soln. contg. MeOH.	81A003
81a.076	$CH_3\dot{C}HOH + IrCl_6^{2-}$	4.5×10^9	6–7	p.r.	D.k. at 490 nm in N_2O–satd. soln. contg. EtOH.	81A003
81a.078	$(CH_3)_2\dot{C}OH + IrCl_6^{2-}$	4.7×10^9	6–7	p.r.	D.k. at 490 nm in N_2O–satd. soln. contg. 2–PrOH.	81A003
81a.092	$\cdot CH_2OCH_3 + IrCl_6^{2-}$	6.5×10^9	6–7	p.r.	D.k. at 490 nm in N_2O–satd. soln. contg. dimethyl ether.	81A003
81a.093	$CH_3\dot{C}HOC_2H_5 + IrCl_6^{2-}$	5.7×10^9	6–7	p.r.	D.k. at 490 nm in N_2O–satd. soln. contg. diethyl ether.	81A003
81a.104	$-CH_2\dot{C}HOCH_2CH_2O- + IrCl_6^{2-}$	5.4×10^9	6–7	p.r.	D.k. at 490 nm in N_2O–satd. soln. contg. dioxane.	81A003
81a.115	$\cdot CHOHCO_2H + IrCl_6^{2-}$	2.3×10^9	3.3	p.r.	D.k. at 490 nm in N_2O–satd. soln.	81A003
	$\cdot CHOHCO_2^- + IrCl_6^{2-}$	2.0×10^9	6.9		contg. glycolate.	
	$\cdot CH(O^-)CO_2^- + IrCl_6^{2-}$	1.8×10^9	10.7			
81a.147	$\cdot CO_2^- + IrCl_6^{2-}$	1.7×10^9	6–7	p.r.	D.k. at 490 nm in N_2O–satd. soln. contg. formate.	81A003
	Mn					
82.	**Manganese(II) ions**					
82.147	$\cdot CO_2^- + Mn^{2+} \rightarrow CO_2 + Mn^+$	$<2 \times 10^5$		p.r.	No effect of Mn^{2+} on d.k. of $\cdot CO_2^-$ at 280 or 256 nm in N_2O–satd. soln. contg. 10^{-2} mol L^{-1} formate.	76A109
83.	**Permanganate ion**					
83.001	$\cdot CH_3 + MnO_4^-$	1.05×10^9	6–7	p.r.	D.k. at 545 nm in N_2O–satd. soln.; radical from dimethyl sulfoxide.	81A003
83.002	$\cdot CH_2CH_3 + MnO_4^-$	$\sim 2 \times 10^9$	6–7	p.r.	D.k. at 545 nm in N_2O–satd. soln. radical from diethyl sulfoxide.	81A003
83.016	$\cdot CH_2C(CH_3)_2OH + MnO_4^-$	1.3×10^9	6–7	p.r.	D.k. at 545 nm in N_2O–satd. soln. contg. *tert*–BuOH.	81A003
83.043	$\cdot CH_2Cl + MnO_4^-$	$\sim 1 \times 10^9$	6–7	p.r.	D.k. at 545 nm in N_2O–satd. soln. contg. dichloromethane.	81A033
83.045	$\cdot CHCl_2 + MnO_4^-$	$\sim 1 \times 10^9$	6–7	p.r.	D.k. at 545 nm in N_2O–satd. soln. contg. chloroform.	81A003
83.048	$\cdot CCl_3 + MnO_4^-$	$\sim 4 \times 10^8$	6–7	p.r.	D.k. at 545 nm in N_2O–satd. soln. contg. carbon tetrachloride.	81A003
83.078	$(CH_3)_2\dot{C}OH + MnO_4^-$	$(4.2 \pm 0.4) \times 10^9$	7.0	p.r.	D.k. at 545 nm in N_2O–satd. soln. contg. 2–PrOH.	73A104
83.097	$CH_3\dot{C}(O^-)CH_2CO_2^- + MnO_4^-$	$(4.8 \pm 0.5) \times 10^9$	9.2	p.r.	D.k. at 545 nm in Ar–satd. soln. contg. acetoacetate and *tert*–BuOH.	73A104
83.104	$-CH_2\dot{C}HOCH_2CH_2O- + MnO_4^-$	$(6.5 \pm 1.3) \times 10^9$	6–7	p.r.	D.k. at 545 nm in N_2O–satd. soln. contg. dioxane.	81A003
	Nitrogen compounds					
84.	**Hydroxylamine**					
84.078	$(CH_3)_2\dot{C}OH + NH_2OH \rightarrow \cdot NH_2$	$\leqslant 3 \times 10^3$	<2	chem.	Est. from esr in Ti(III)–NH_2OH soln. contg. 2–PrOH.	76D419

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
85.	**Nitrous oxide**					
85.078	$(CH_3)_2\dot{C}O^- + N_2O$	$(3.8 \pm 0.4) \times 10^4$ (rel.)	13.5	γ-r.	Est. from G(acetone) based on an assumed mechanism and values for competing reactions.	72G167
86.	**Nitrite ion**					
86.076	$CH_3\dot{C}HOH + NO_2^-$	$<5 \times 10^6$	6	p.r.	D.k. in N_2O-satd. EtOH soln.	72A018
87.	**Nitrate ion**					
87.076	$CH_3\dot{C}HOH + NO_3^-$	$<5 \times 10^6$	6	p.r.	D.k. in N_2O-satd. EtOH soln.	72A018
87.078	$(CH_3)_2\dot{C}OH + NO_3^-$	28		γ-r.	Calcd. from G for destruction of NO_3^- in soln. of 0.1–0.2 mol L^{-1} acetone, 0.2–0.4 mol L^{-1} 2-PrOH and 2.5×10^{-4} mol L^{-1} Ag^+ and 10^{-3} mol L^{-1} Na dodecylsulfate assuming $G(R) = 5.8$ and $2k(R + R) = 1.4 \times 10^9$.	80N062
	Ni					
88.	**Nickel(I) ion**					
88.004	$c\text{-}\dot{C}_5H_9 + Ni^+ \rightarrow C_5H_9Ni^+$	2.8×10^9		p.r.	D.k. at 300 nm (as well as p.b.k.) in soln. contg. $NiSO_4$ and cyclopentane.	74A037
88.016	$\cdot CH_2C(CH_3)_2OH + Ni^+ \rightarrow Ni^{2+} + CH_2{=}C(CH_3)_2 + OH^-$	3×10^9		p.r.	D.k. at 300 nm (Ni^+) in soln. contg. $NiSO_4$ and *tert*-BuOH; assume $G(Ni^+) = G(R) = 2.7$.	74A037
88.075	$\cdot CH_2OH + Ni^+ \rightarrow NiCH_2OH^+$	4.2×10^9		p.r.	D.k. at 300 nm (as well as p.b.k. at 250 nm); assume $G(Ni^+) = G(R) = 3.2$; soln. contains $NiSO_4$ and MeOH.	74A037
88.076	$CH_3\dot{C}HOH + Ni^+ \rightarrow NiCHOHCH_3^+$	2.3×10^9		p.r.	D.k. at 300 nm (as well as p.b.k.) in soln. cont. $NiSO_4$ and EtOH.	74A037
88.078	$(CH_3)_2\dot{C}OH + Ni^+ \rightarrow NiC(OH)(CH_3)_2^+$	1.4×10^9		p.r.	D.k. at 300 nm (as well as p.b.k.) in soln. contg. $NiSO_4$ and 2-PrOH.	74A037
88.147	$\cdot CO_2^- + Ni^+ \rightarrow NiCO_2$	6.6×10^9	5.0	p.r.	D.k. at 300 nm (as well as p.b.k.) in soln. contg. $NiSO_4$ and formate ion.	74A037
89.	**Nickel(II) ions**					
89.016	$\cdot CH_2C(CH_3)_2OH + Ni^{2+}$	$<10^6$		p.r.	Est. from lack of increase in Ni^+ in 0.1 mol L^{-1} Ni^{2+} on addn. of 0.1 mol L^{-1} *tert*-BuOH.	75A027
89.075	$\cdot CH_2OH + Ni^{2+}$	$<10^2$		p.r.	Est. from lack of increase in Ni^+ in 0.1 mol L^{-1} Ni^{2+} on addn. of 0.1 mol L^{-1} MeOH.	75A027
89.078	$(CH_3)_2\dot{C}OH + Ni^{2+}$	$<10^6$		p.r.	Est. from lack of increase in Ni^+ in 0.1 mol L^{-1} Ni^{2+} on addn. of 0.1 mol L^{-1} 2-PrOH.	75A027
89.147	$\cdot CO_2^- + Ni^{2+} \rightarrow CO_2 + Ni^+$	$10^2 < k < 10^5$		p.r.	Est. from lack of increase in Ni^+ in 0.1 mol L^{-1} Ni^{2+} on addn. of 0.1 mol L^{-1} formate ion.	75A027
90.	**Tetracyanonickelate(II) ion**					
90.147	$\cdot CO_2^- + Ni(CN)_4^{2-} \rightarrow CO_2 + Ni(CN)_4^{3-}$	$(1.2 \pm 0.1) \times 10^9$		p.r.	P.b.k. at 240 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	74A072
91.	**(5,7,7,12,12,14-Hexamethyl-1,4,8,11-tetraazacyclotetradecane)nickel(II) ion**					
91.147	$\cdot CO_2^- + Ni^{II}L \rightarrow Ni^{I}L + CO_2$	5.7×10^9	7.0	p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L^{-1} formate; Ni(I) is also formed by reaction of e_{aq}^-.	76A039
92.	**(5,7,7,12,12,14)Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)nickel(II) ion**					
92.147	$\cdot CO_2^- + Ni^{II}L \rightarrow Ni^{I}L + CO_2$	6.7×10^9	7.0	p.r.	P.b.k. in Ar-satd. 0.1 mol L^{-1} formate.	76A039

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
93.	**Oxygen**					
93.001	$\cdot CH_3 + O_2 \rightarrow CH_3O_2\cdot$	$(4.7 \pm 0.7) \times 10^9$	nat	p.r.	P.b.k. at 260 nm in soln. contg. CH_3Br, O_2 and N_2O or SCN^-; $E_a = 3.5 \pm 0.5$ kcal mol^{-1}(14.6 kJ mol^{-1}).	67G041
		$(3.2 \pm 0.4) \times 10^8$	5.5	p.r.	P.b.k. at 250 nm in soln. contg. CH_4 and O_2.	72G445
93.002	$\cdot CH_2CH_3 + O_2 \rightarrow C_2H_5O_2\cdot$	$(2.9 \pm 0.8) \times 10^9$	nat	p.r.	P.b.k. at 270 nm in soln. contg. 6×10^{-5} mol L^{-1} O_2 and ethane.	75A055
93.004	$c\text{-}\dot{C}_5H_9 + O_2 \rightarrow RO_2\cdot$	$(4.9 \pm 0.6) \times 10^9$	7	p.r.	P.b.k. at 270 nm in N_2O-satd. soln. contg. cyclopentane.	74A051
93.007	$R + O_2 \rightarrow RO_2\cdot$ (R = Radicals from oleate)	1.0×10^9	13	p.r.	P.b.k. at 280 nm in O_2–N_2O–contg. ~ 0.4–0.8×10^{-3} mol L^{-1} soap soln.	78A365
93.008	$R + O_2 \rightarrow RO_2\cdot$ (R = Radicals from linoleate)	3×10^9	10.5, 13	p.r.	D.k. at 280 nm in O_2–N_2O–contg. soln. of 10^{-5} mol L^{-1} soap and 0.02 mol L^{-1} phosphate.	78A365
93.009	$R + O_2 \rightarrow RO_2\cdot$ (R = Radicals from linolenate)	3×10^8	10.5, 13	p.r.	D.k. at 280 nm in O_2–N_2O–contg. soln. of 0.4–0.8 x 10^{-3} mol L^{-1} soap.	78A365
93.010	$R + O_2 \rightarrow RO_2\cdot$ (R = Radicals from arachidonate)	2×10^8	13	p.r.	D.k. at 280 nm in O_2–N_2O–contg. soln. of ~ 0.4–0.8×10^{-3} mol L^{-1} soap.	78A365
93.014	$\cdot CH_2CH_2OH + O_2 \rightarrow \cdot O_2CH_2CH_2OH$	$(6.6 \pm 1.3) \times 10^9$	1	p.r.	P.b.k. at 240 nm; radical from OH addn. in soln. contg. ethylene–O_2 (99:1); includes O_2 reaction with $\cdot C_2H_5$ from H addn.	67G269
93.035	$\cdot CH_2CO_2^- + O_2 \rightarrow \cdot O_2CH_2CO_2^-$	$(5.0 \pm 0.8) \times 10^8$	4–9	p.r.	D.k. at 350 nm in N_2O–satd. soln. contg. acetate ion.	73A052
		$(2.1 \pm 0.3) \times 10^9$	8.2	p.r.	D.k. at 366 nm in N_2O–satd. 0.01 mol L^{-1} acetate soln.; cor. for $k(R + R) = 5.5 \times 10^8$.	76A082
93.036	$\cdot CH_2CO_2CH_3 + O_2 \rightarrow \cdot O_2CH_2CO_2CH_3$	$(1.8 \pm 0.2) \times 10^9$	4	p.r.	D.k. at 340 nm in soln. contg. methyl chloroacetate and formate ion.	78A402
93.052	$CH_3\dot{C}HN^+(C_2H_5)_3 + O_2 \rightarrow$ addn.		13	p.r.	Est. that $k(R + R)/k(R + O_2) \simeq 10$.	78A095
93.057	$NH_2\dot{C}HCO_2^- + O_2$	$\sim 1 \times 10^9$	7.9	p.r.	D.k. at 307 nm in O_2–N_2O–satd. 0.2 mol L^{-1} glycine soln.; c.k. with ferricyanide also gave $\sim 10^9$ assuming $2k(R + \text{ferricyanide}) = 1 \times 10^9$.	76A082
93.062	$R + O_2 \rightarrow RO_2\cdot$ (R = Radical from glycine anhydride)	$(1.2 \pm 0.1) \times 10^9$ $(2.8 \pm 0.3) \times 10^8$	5.0 12.0	p.r.	D.k. at 360 nm in N_2O–satd. soln. contg. glycine anhydride.	71G554
93.063	$R + O_2 \rightarrow RO_2\cdot$ (R = Radical from alanine anhydride)	$(1.0 \pm 0.2) \times 10^9$ $(1.1 \pm 0.2) \times 10^9$	5.4 12.0	p.r.	D.k. at 360 nm in N_2O–satd. soln. alanine anhydride.	71G554
93.064	$R + O_2 \rightarrow RO_2\cdot$ (R = Radical from sarcosine anhydride)	$(9 \pm 2) \times 10^8$	5.2	p.r.	D.k. at 360 nm in N_2O–satd. soln. contg. sarcosine anhydride.	71G554
93.067	$R + O_2 \rightarrow RO_2\cdot$ (R = Radicals from acetyldiglycine)	$(5.5 \pm 0.8) \times 10^8$	5.5	p.r.	D.k. at 330 nm in N_2O–satd. soln. contg. acetyldiglycine.	73A052
93.075	$\cdot CH_2OH + O_2 \rightarrow \cdot O_2CH_2OH$	4.9×10^9 (rel.)	7	p.r.	C.k. in 0.1 mol L^{-1} MeOH soln. contg. ferricyanide; $k(R + \text{ferricyanide}) = 4.0 \times 10^9$.	69G522
		$(4.2 \pm 0.5) \times 10^9$	10.7	p.r.	Calcd. from abs. at 248 nm assuming $k[O_2]$ = rate of O_2^- formn. from peroxy radical.	74A099
93.076	$CH_3\dot{C}HOH + O_2 \rightarrow \cdot O_2CHOHCH_3$	3.6×10^8 (rel.)	7	p.r.	C.k. with RNO [$k(R + RNO) = 2.4 \times 10^9$].	69G156
		4.6×10^9 (rel.)	7	p.r.	C.k. in 0.1 mol L^{-1} EtOH soln. contg. ferricyanide; $k(R + \text{ferricyanide}) = 5.3 \times 10^9$.	69G522
93.077	$CH_3CH_2\dot{C}HOH + O_2$	4.7×10^9 (rel.)	7	p.r.	C.k. in 0.1 mol L^{-1} 1-PrOH soln. contg. ferricyanide; $k(R + \text{ferricyanide}) = 5.3 \times 10^9$.	69G522

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
93.078	$(CH_3)_2\dot{C}OH + O_2 \rightarrow$	6.2×10^8 (rel.)	7	p.r.	C.k. with RNO [k(R + RNO) = 3.2×10^9].	69G156
	$(CH_3)_2C(OH)O_2\cdot$	4.2×10^9 (rel.)	7	p.r.	C.k. in 0.1 mol L^{-1} 2-PrOH soln. contg. ferricyanide; k(R + ferricyanide) = 4.7×10^9.	69G522
		3.5×10^9 (rel.)	5–6	p.r.	C.k. in N_2O-satd. 0.1 mol L^{-1} 2-PrOH soln. with *p*-nitroacetophenone; k(R + PNAP) = 3.8×10^9.	71G618
		$(4.5 \pm 0.5) \times 10^9$	~1	p.r.	D.k. at 290–300 nm in air-satd. soln. contg. 1 mol L^{-1} 2-PrOH and 0.5 mol L^{-1} $HClO_4$.	74A074
93.080	$CH_3CH_2\dot{C}OHCH_3 + O_2$	4.0×10^9 (rel.)	7	p.r.	C.k. in soln. contg. 0.3 mol L^{-1} 2-BuOH with ferricyanide; k(R + ferricyanide) = 4.8×10^9.	69G522
93.081	$(CH_3)_2CH\dot{C}HOH + O_2$	3.4×10^9 (rel.)	7	p.r.	C.k. in soln. contg. 0.3 mol L^{-1} 2-methyl-1-propanol with ferricyanide; k(R + ferricyanide) = 3.0×10^9.	69G522
93.090	$CH_3CO_2\dot{C}H_2 + O_2 \rightarrow CH_3CO_2CH_2O_2\cdot$	$(1.35 \pm 0.15) \times 10^{10}$	6.4	p.r.	P.b.k. at 260 nm as well as d.k. at 260 nm in soln. contg. methyl acetate and N_2O.	78A402
93.100	$\cdot CHOHCH(NH_2)CO_2^- + O_2$	2.4×10^9 (rel.)	7	p.r.	C.k. in 0.3 mol L^{-1} serine soln. contg. ferricyanide; k(R + ferricyanide) = 3.2×10^9.	69G522
93.101	$\cdot CHOHCH_2OH + O_2$	3.2×10^9 (rel.)	7	p.r.	C.k. in soln. contg. 0.3 mol L^{-1} ethylene glycol with ferricyanide; k(R + ferricyanide) = 3.6×10^9.	69G522
93.105	$R + O_2$ (R = Radicals from polyethylene oxide)	$(1.9 - 2.9) \times 10^9$	7	p.r.	C.k. in soln. contg. ~2% polyethylene oxide with ferricyanide; k(R + ferricyanide) = 2.1×10^9.	69G522
93.106	$\cdot CHOHCHOHCH_2OH + O_2$ (+ $CH_2OH\dot{C}OHCH_2OH$)	3.3×10^9 (rel.)	7	p.r.	C.k. in soln. contg. 0.4 mol L^{-1} glycerol with ferricyanide; k(R + ferricyanide) = 3.3×10^9.	69G522
93.108	$R + O_2$ (R = Radicals from deoxyribose)	2.0×10^9 (rel.)	5–6	p.r.	C.k. with ferricyanide in N_2O-satd. soln. contg. deoxyribose; rel. to k(R + ferricyanide) = 2.8×10^9.	71G618
93.111	$R + O_2$ (R = Radicals from glucose)	1.6×10^9 (rel.)	7	p.r.	C.k. in soln. contg. 0.3 mol L^{-1} glucose and ferricyanide; k(R + ferricyanide) = 1.9×10^9.	69G522
93.113	$\cdot A^- + O_2$ (A = Radical from ascorbate)	$<5 \times 10^2$	8.6	p.r.	D.k. at 360 nm in N_2O-satd. soln. contg. ascorbate ion.	75A240
		$\sim 6 \times 10^2$		γ-r.	Obs. rate of consumption of O_2.	78A417
93.115	$\cdot CHOHCO_2^- + O_2$	1.8×10^9 (rel.)	7	p.r.	C.k. in 0.3 mol L^{-1} glycolate soln. contg. ferricyanide; k(R + ferricyanide) = 5×10^8.	69G522
93.117	$CH_3\dot{C}OHCO_2^- + O_2 \rightarrow CH_3C(\dot{O}_2)(OH)CO_2^-$	2.6×10^9 (rel.)	7	p.r.	C.k. in 0.3 mol L^{-1} lactate soln. contg. ferricyanide; k(R + ferricyanide) = 1.5×10^9.	69G522
		$(3.5 \pm 0.5) \times 10^8$	7.3	p.r.	D.k. at 270 nm in N_2O-satd. soln. contg. lactate ion.	73A052
93.123	$\cdot CH(OH)_2 + O_2 \rightarrow \cdot O_2CH(OH)_2 \rightleftharpoons \cdot O_2CH(OH)O^- + H^+$	7.7×10^8	5.7	p.r.	D.k. at 250 nm in N_2O-satd. soln. contg. formaldehyde, as well as condy. increase.	71G424
		$(4.5 \pm 0.7) \times 10^9$	3.5–6.5	p.r.	Condy. increase in oxygenated soln. contg. 5×10^{-3} mol L^{-1} formaldehyde; products are formate and H_2O_2.	80A282
93.126	$CCl_3\dot{C}(OH)_2 + O_2 \rightarrow \cdot O_2C(OH)_2CCl_3$	$(1.0 \pm 0.2) \times 10^8$	5.9	p.r.	D.k. at 250 nm in N_2O-satd. soln. contg. chloral.	73G062
93.141	$R + O_2$ (R = Electron adduct of dimethyl fumarate)	5.3×10^9	11	p.r.	D.k.	67G729
		2.2×10^9		p.r.	D.k.	73G097

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
93.147	$\cdot CO_2^- + O_2 \rightarrow CO_2 + O_2^-$	7.7 x 10^8 (rel.)	7	p.r.	C.k. with RNO in N_2O–std. soln. contg. formate; k(R + RNO) = 1.84 x 10^9.	69G156
		2.4 x 10^9 (rel.)	7	p.r.	C.k. with ferricyanide in 0.3 mol L^{-1} formate soln.; k(R + ferricyanide) = 1.06 x 10^9.	69G522
		(2.0 ± 0.4) x 10^9	8.0	p.r.	P.b.k. at 260 nm in 0.1 mol L^{-1} formate soln. satd. with oxygen.	76A072
		(4.2 ± 0.4) x 10^9	6.8	p.r.	D.k. at 270 nm and 300 nm in 0.18 mol L^{-1} formate ion.	76A132
		1 x 10^9 (rel.)	1–4	p.r.	Est. from buildup of $C(NO_2)_3^-$ in O_2–satd. 0.01 mol L^{-1} HCO_2H contg. $C(NO_2)_4$; rel. to k(R + TNM) = 4 x 10^9.(336.147)	78A177
94.	**Hydrogen peroxide**					
94.001	$\cdot CH_3 + H_2O_2$	$\leqslant 10^6$	nat	p.r.	Addn. of 10^{-3} and 10^{-2} mol L^{-1} H_2O_2 had no effect on second order d.k. of $\cdot CH_3$. Suggested that reaction is slow compared to R + R and may form HO_2.	75A055
94.003	$\cdot C_5H_{11} + H_2O_2$	3.4 x 10^4 (rel.)		γ–r.	Est. from dose rate effect on $G(H_2O_2)$, assuming $2k$(R + R) — 2 x 10^9 in soln. contg. 5 x 10^{-3} mol L^{-1} pentane and 10^{-2} mol L^{-1} N_2O.	76A254
94.004	c–$\dot{C}_5H_9 + H_2O_2$	4.6 x 10^4 (rel.)		γ–r.	Est. from dose rate effect on $G(H_2O_2)$, assuming $2k$(R + R) = 1.5 x 10^9 in soln. contg. 2.5 x 10^{-3} mol L^{-1} cyclopentane and 10^{-2} mol L^{-1} N_2O.	76A254
94.016a	R + H_2O_2 (R = Radicals from cyclopentene + OH, 73% addn., 23% abstraction)	3.7 x 10^4 (rel.)		γ–r.	Est. from dose rate effect on $G(H_2O_2)$, assuming $2k$(R + R) = 1.5 x 10^9, in soln. contg. 8.2 x 10^{-3} mol L^{-1} cyclopentene and 10^{-2} mol L^{-1} N_2O.	76A254
94.075	$\cdot CH_2OH + H_2O_2 \rightarrow CH_2O + H_2O + OH$	(4.0 ± 0.4) x 10^4 (rel.)		γ–r.	Calcd. from dose rate effect on H_2O_2 redn. in 0.99 mol L^{-1} MeOH soln. assuming $2k$(R + R) = 2.4 x 10^9.	70G338
		(2.3 ± 0.8) x 10^4 (rel.)		chem.	Calcd. from esr of Ti(III)–H_2O_2 soln. contg. MeOH and *tert*–BuOH; $2k$(R + R) = 2 x 10^9.	74D144
94.076	$CH_3\dot{C}HOH + H_2O_2 \rightarrow CH_3CHO + H_2O + OH$	1.5 x 10^5 (rel.)		γ–r.	Calcd. from dose rate effect on $G(H_2O_2)$ in soln. contg. EtOH assuming $2k$(R + R) = 2.0 x 10^9.	67G094
94.078	$(CH_3)_2\dot{C}OH + H_2O_2 \rightarrow CH_3COCH_3 + H_2O + OH$	5 x 10^5 (rel.)	1,7	phot.	Esr; effect of [H_2O_2] on [R] in soln. contg. 2–PrOH and acetone; $2k$(R + R) = 1.4 x 10^9.	71D227
94.093	$CH_3\dot{C}HOC_2H_5 + H_2O_2$	(5.5 ± 1.1) x 10^4 (rel.)		chem.	Calcd. from esr in Ti(III)–H_2O_2 soln. contg. Et_2O; assumed $2k$(R + R) = 3 x 10^9.	74D144
94.094	$-O\dot{C}H(CH_2)_3- + H_2O_2$	3.0 x 10^4 (rel.)		chem.	Calcd. from esr in Ti(III)–H_2O_2 soln. contg. tetrahydrofuran; assumed $2k$(R + R) = 3 x 10^9.	74D144
94.104	$-O\dot{C}HCH_2O(CH_2)_2- + H_2O_2$	(3.0 ± 0.6) x 10^4 (rel.)		chem.	Calcd. from esr in Ti(III)–H_2O_2 soln. contg. dioxane and *tert*–BuOH; assumed $2k$(R + R) = 2 x 10^9.	74D144
94.124	$\cdot CH(OCH_3)_2 + H_2O_2$	(1.1 ± 0.3) x 10^6 (rel.)		chem.	Calcd. from esr in Ti(III)–H_2O_2 soln. contg. dimethoxymethane; assumed $2k$(R + R) = 2 x 10^9.	74D144
94.125	$-O\dot{C}HO(CH_2)_2- + H_2O_2$	>6 x 10^4 (rel.)		chem.	Calcd. from esr in Ti(III)–H_2O_2 soln. contg. dioxolane; assumed $2k$(R + R) = 3 x 10^9.	74D144
94.147	$\cdot CO_2^- + H_2O_2$	<7 x 10^5 (rel.)	7	phot.	Calcd. from assumed chain mechanism in CO–H_2O_2 soln.; $k \leqslant 2.2$ x 10^6 assuming $2k$(R + R) $\leqslant 10^{10}$, recalcd. in 74D144 assuming $2k$(R + R) = 3 x 10^9.	63F005

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
	Pb					
95.	**Lead(I) ions**					
95.075	$\cdot CH_2OH + Pb^+ \rightarrow PbCH_2OH^+$	2.9×10^9		p.r.	D.k. at 300 nm (Pb^+) in soln. contg. Pb^{2+} and MeOH, knowing initial [R] and [Pb^+]; cor. for R + R.	76A170
95.076	$CH_3\dot{C}HOH + Pb^+ \rightarrow PbCHOHCH_3^+$	1.7×10^9		p.r.	D.k. at 300 nm (Pb^+) in soln. contg. Pb^{2+} and EtOH, knowing initial [R] and [Pb^+]; cor. for R + R.	76A170
95.078	$(CH_3)_2\dot{C}OH + Pb^+ \rightarrow PbC(CH_3)_2OH^+$	1.1×10^9		p.r.	D.k. at 300 nm (Pb^+) in soln. contg. 5×10^{-4} mol L^{-1} Pb^{2+} and 5×10^{-2} mol L^{-1} 2-PrOH knowing initial [R] and [Pb^+]; cor. for R + R.	76A170
95.096	$\cdot CHOHC(CH_2OH)_3 + Pb^+ \rightarrow PbCHOHC(CH_2OH)_3^+$	7.0×10^8		p.r.	D.k. at 300 nm (Pb^+) in soln. contg. Pb^{2+} and pentaerythritol knowing initial [R] and [Pb^+]; cor. for R + R.	76A170
96.	**Lead(II) ions**					
96.078	$(CH_3)_2\dot{C}OH + Pb^{2+} \rightarrow (CH_3)_2CO + Pb^+ + H^+$	3.0×10^4	5		P.b.k. at 300 nm in 1 mol L^{-1} 2-PrOH and 1 mol L^{-1} Pb^{2+} during 100 μs after pulse; Pb^+ formed initially by $e_{aq}^- + Pb^{2+}$.	76A170
	Pt					
97.	***trans*-Dichlorobis(ethylenediamine)platinum(IV) ion**					
97.075	$\cdot CH_2OH + Pt(en)_2Cl_2^{2+} \rightarrow Pt(III)$	$(6.9 \pm 1.0) \times 10^8$	7	p.r.	P.b.k. at 240–340 nm in N_2O-satd. soln. contg. 1–4 mol L^{-1} MeOH.	75A188
97.078	$(CH_3)_2\dot{C}OH + Pt(en)_2Cl_2^{2+} \rightarrow Pt(III)$	$(8.1 \pm 1.1) \times 10^8$	7	p.r.	P.b.k. at 260–340 nm in 2 mol L^{-1} 2-PrOH soln.; same product as from e_{aq}^- reaction.	75A188
	Rh					
98.	**Tris(2,2′-bipyridine)rhodium(III) ion**					
98.075	$\cdot CH_2OH + Rh(bpy)_3^{3+}$	$(2.2 \pm 0.2) \times 10^8$	7	p.r.	P.b.k.	74A167
98.078	$(CH_3)_2\dot{C}OH + Rh(bpy)_3^{3+}$	$(2.9 \pm 0.3) \times 10^9$	7	p.r.	P.b.k.; same product as from e_{aq}^-.	74A167
98.147	$\cdot CO_2^- + Rh(bpy)_3^{3+}$	$(6.2 \pm 0.6) \times 10^9$	7	p.r.	P.b.k.; same product as from e_{aq}^-.	74A167
98a.	**Tris(1,10-phenanthroline)rhodium(III) ion**					
98a.075	$\cdot CH_2OH + Rh(phen)_3^{3+} \rightarrow$ addn. to ligand	4×10^8		p.r.	P.b.k. at 475 nm in N_2O-satd. soln. contg. 2.5 mol L^{-1} MeOH.	80A227
98a.076	$CH_3\dot{C}HOH + Rh(phen)_3^{3+} \rightarrow$ addn. to ligand	2.5×10^9		p.r.	P.b.k. at 475 nm in N_2O-satd. soln. contg. 0.25 mol L^{-1} EtOH.	80A227
98a.078	$(CH_3)_2\dot{C}OH + Rh(phen)_3^{3+} \rightarrow Rh(phen)_3^{2+}$	3.2×10^9	~7	p.r.	P.b.k. at 365 nm in N_2O-satd. soln. contg. 0.25 mol L^{-1} 2-PrOH; same product as with e_{aq}^-.	80A227
	Ru					
	Ruthenium(II) ions					
99.	**Tris(2,2′-bipyridine)ruthenium(II) ion**					
99.016	$\cdot CH_2C(CH_3)_2OH + Ru(bpy)_3^{2+}$	$<10^6$	7	p.r.	P.b.k.; no reduction.	78A068
99.075	$\cdot CH_2O^- + Ru(bpy)_3^{2+} \rightarrow Ru(bpy)_3^+$	2.9×10^9	11–13	p.r.	Same product as from e_{aq}^- reaction; suggested to be $[Ru(bpy)_2(bpy^-)]^+$ [72G381].	78A068
	$\cdot CH_2OH + Ru(bpy)_3^{2+}$	$<10^6$	7	p.r.	No reduction.	78A068
99.076	$CH_3\dot{C}HO^- + Ru(bpy)_3^{2+}$	7.0×10^9	11–13	p.r.	Same product as from e_{aq}^- reaction.	78A068
	$CH_3\dot{C}HOH + Ru(bpy)_3^{2+}$	$<10^6$	7	p.r.	No reduction	78A068

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
99.078	$(CH_3)_2\dot{C}O^- + Ru(bpy)_3^{2+} \rightarrow Ru(bpy)_3^{+}$	4.9×10^9	11–13	p.r.	Same product as from e_{aq}^- reaction.	78A068
	$(CH_3)_2\dot{C}OH + Ru(bpy)_3^{2+}$	$<10^6$	7	p.r.	No reduction	78A068
		$\sim 1.5 \times 10^8$	1	p.r.	Radical addn. to ligand.	80A227
99.147	$\cdot CO_2^- + Ru(bpy)_3^{2+}$	$<10^6$	7	p.r.	No reduction.	78A068
99a.	**Tris(1,10-phenanthroline)ruthenium(II) ion**					
99a.075	$\cdot CH_2O^- + Ru(phen)_3^{2+} \rightarrow Ru(phen)_3^{+}$	5.2×10^9	11	p.r.	P.b.k. in N_2O–satd. soln. contg. 2.5 mol L^{-1} MeOH.	80A227
99a.076	$CH_3\dot{C}HO^- + Ru(phen)_3^{2+} \rightarrow Ru(phen)_3^{+}$	5.9×10^9	12	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.25 mol L^{-1} EtOH; $k \simeq 10^8$ at pH 1.	80A227
99a.078	$(CH_3)_2\dot{C}O^- + Ru(phen)_3^{2+} \rightarrow Ru(phen)_3^{+}$	3.7×10^9	13	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.25 mol L^{-1} 2–PrOH.	80A227
	$(CH_3)_2\dot{C}OH + Ru(phen)_3^{2+}$	8×10^8	1	p.r.	P.b.k. in Ar–satd. soln.	80A227
	Ruthenium(III) ions					
100.	**Hexaammineruthenium(III) ion**					
100.035	$\cdot CH_2CO_2H + Ru(NH_3)_6^{3+}$	$<3.0 \times 10^7$	2.5	p.r.	D.k. in Ar–satd. 0.01 mol L^{-1} acetic acid soln.	72A018
		$<5 \times 10^6$	3.9	p.r.	D.k. in N_2O–satd. 0.5–1 mol L^{-1} acetic acid soln.	77A100
	$\cdot CH_2CO_2^- + Ru(NH_3)_6^{3+}$	$<1 \times 10^7$	7.3	p.r.	D.k. in N_2O–satd. 0.01 mol L^{-1} acetate soln.	72A018
100.042	$\cdot CH(CO_2H)_2 + Ru(NH_3)_6^{3+}$	$<1.1 \times 10^8$	2.5	p.r.	D.k. in Ar–satd. 0.01 mol L^{-1} malonic acid soln.	72A018
100.054	$HCON(CH_3)\dot{C}H_2 + Ru(NH_3)_6^{3+}$	$<3.0 \times 10^7$	6.0	p.r.	D.k. in N_2O–satd. 10^{-2} mol L^{-1} dimethylformamide soln.; *e*–transfer.	72A018
100.056	$NH_2\dot{C}HCO_2^- + Ru(NH_3)_6^{3+}$	$(4.0 \pm 0.6) \times 10^8$	5.7	p.r.	D.k. in N_2O–satd. 0.01 mol L^{-1} glycine soln.; *e*–transfer.	72A018
100.075	$\cdot CH_2OH + Ru(NH_3)_6^{3+} \rightarrow CH_2O + H^+ + Ru(NH_3)_6^{2+}$	$(4.1 \pm 0.6) \times 10^7$	5–6	p.r.	D.k. in N_2O–satd 0.01 mol L^{-1} MeOH soln.	72A018
100.076	$CH_3\dot{C}HOH + Ru(NH_3)_6^{3+}$	$(5.5 \pm 1.6) \times 10^8$	5–6	p.r.	D.k. in N_2O–satd. 0.01 mol L^{-1} EtOH soln.; *e*–transfer.	72A018
100.078	$(CH_3)_2\dot{C}OH + Ru(NH_3)_6^{3+}$	$(9.2 \pm 1.4) \times 10^8$	5–6	p.r.	D.k. in N_2O–satd. 0.01 mol L^{-1} 2–PrOH soln.; *e*–transfer.	72A018
100.093	$CH_3\dot{C}HOC_2H_5 + Ru(NH_3)_6^{3+}$	$(1.0 \pm 0.15) \times 10^8$	3.5–4	p.r.	D.k. in N_2O–satd. 0.5–1 mol L^{-1} ethyl ether soln.	77A100
100.104	$-O\dot{C}HCH_2O(CH_2)_2- + Ru(NH_3)_6^{3+}$	$(5.0 \pm 0.75) \times 10^6$	3.5–4	p.r.	D.k. in N_2O–satd. 0.5–1 mol L^{-1} dioxane soln.	77A100
100.107	$CH_3CO\dot{C}(OH)CH_3 + Ru(NH_3)_6^{3+}$	$<3.8 \times 10^6$	1.2	p.r.	D.k. in Ar–satd. 10^{-2} mol L^{-1} biacetyl soln.	72A018
		2.0×10^9	5.5	p.r.	D.k. in N_2O–satd. 10^{-2} mol L^{-1} biacetyl soln.	72A018
100.117	$CH_3\dot{C}OHCO_2^- + Ru(NH_3)_6^{3+}$	$(2.5 \pm 0.4) \times 10^9$	6.0	p.r.	D.k. in N_2O–satd. 10^{-2} mol L^{-1} lactate ion; *e*–transfer.	72A018
100.127	$\cdot CONH_2 + Ru(NH_3)_6^{3+}$	$<7.0 \times 10^7$	6.2	p.r.	D.k. n N_2O–satd. 10^{-2} mol L^{-1} formamide soln.; *e*–transfer.	72A018
100.147	$\cdot CO_2^- + Ru(NH_3)_6^{3+} \rightarrow CO_2 + Ru(NH_3)_6^{2+}$	$(2.0 \pm 0.6) \times 10^9$	4.8	p.r.	D.k. in N_2O–satd. 10^{-2} mol L^{-1} formate soln.; *e*–transfer.	72A018
101.	**Bromopentaammineruthenium(III) ion**					
101.035	$\cdot CH_2CO_2H + Ru(NH_3)_5Br^{2+}$	$(4.6 \pm 0.7) \times 10^8$	3.9	p.r.	D.k. in N_2O–satd. 0.5–1 mol L^{-1} acetic acid.	77A100
101.093	$CH_3\dot{C}HOC_2H_5 + Ru(NH_3)_5Br^{2+}$	$(5.8 \pm 0.9) \times 10^8$	3.5–4	p.r.	D.k. in N_2O–satd. 0.5–1 mol L^{-1} ethyl ether soln.	77A100
101.104	$-O\dot{C}HCH_2O(CH_2)_2- + Ru(NH_3)_5Br^{2+}$	$(2.7 \pm 0.4) \times 10^8$	3.5–4	p.r.	D.k. in N_2O–satd. 0.5–1 mol L^{-1} dioxane soln.	77A100
102.	**Chloropentaammineruthenium(III) ion**					
102.035	$\cdot CH_2CO_2H + Ru(NH_3)_5Cl^{2+}$	$(4.0 \pm 0.6) \times 10^7$	3.9	p.r.	D.k. in N_2O–satd. soln. contg. 0.5–1 mol L^{-1} acetic acid.	77A100
102.075	$\cdot CH_2OH + Ru(NH_3)_5Cl^{2+}$	$(1.2 \pm 0.2) \times 10^8$	3.4–5	p.r.	D.k. in N_2O–satd. soln. contg. 0.5–1 mol L^{-1} methanol.	77A100

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
102.076	$CH_3\dot{C}HOH + Ru(NH_3)_5Cl^{2+}$	$(8.0 \pm 1.2) \times 10^8$	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. 0.5–1 mol L^{-1} ethanol.	77A100
102.078	$(CH_3)_2\dot{C}OH + Ru(NH_3)_5Cl^{2+}$	$(1.3 \pm 0.2) \times 10^9$	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. 0.5–1 mol L^{-1} 2–propanol.	77A100
102.093	$CH_3\dot{C}HOC_2H_5 + Ru(NH_3)_5Cl^{2+}$	$(2.6 \pm 0.4) \times 10^8$	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. 0.5–1 mol L^{-1} ethyl ether.	77A100
102.104	$-O\dot{C}HCH_2O(CH_2)_2- + Ru(NH_3)_5Cl^{2+}$	$(8.3 \pm 1.2) \times 10^7$	3.5–4	p.r.	D.k. in N_2O–satd. soln. contg. 0.5–1 mol L^{-1} dioxane.	77A100
103.	**Nitrosopentaammineruthenium(III) ion**					
103.078	$(CH_3)_2\dot{C}OH + Ru(NH_3)_5NO^{3+} \rightarrow Ru(NH_3)_5NO^{2+} + (CH_3)_2CO + H^+$	5.5×10^8	5.0	p.r.	P.b.k. at 280 nm in N_2O–satd. soln. contg. 0.5 mol L^{-1} 2–PrOH.	75A049
103.147	$\cdot CO_2^- + Ru(NH_3)_5NO^{3+} \rightarrow Ru(NH_3)_5NO^{2+} + CO_2$	3.1×10^9	6.6	p.r.	P.b.k. at 280 nm in N_2O–satd. soln. contg. 0.5 mol L^{-1} formate ion.	75A049
104.	**Nitrosopentaammineruthenium(III) radical ion (electron adduct)**					
104.006	$\cdot CH_2C(CH_3)_2CO_2^- + Ru(NH_3)_5\dot{N}O^{2+} \rightarrow [Ru(NH_3)_5N(O)CH_2C(CH_3)_2CO_2]^+$	$(2.9 \pm 0.4) \times 10^9$	6.0–7.5	p.r.	D.k. at 280 nm (nitrosyl radical, $\epsilon = 3.8 \times 10^3$ L mol^{-1} cm^{-1}), as well as p.b.k. in soln. contg. 0.3 mol L^{-1} pivalate ion and 5×10^{-4} mol L^{-1} $Ru(NH_3)_5NO^{3+}$.	79A134
104.012	$\cdot CH_2C(CH_3)_2NH_3^+ + Ru(NH_3)_5\dot{N}O^{2+} \rightarrow [Ru(NH_3)_5N(O)CH_2C(CH_3)_2NH_3]^{3+}$	$(2.0 \pm 0.3) \times 10^9$	6.0–7.5	p.r.	D.k. at 280 nm (nitrosyl radical, $\epsilon = 3.8 \times 10^3$ L mol^{-1} cm^{-1}), as well as p.b.k. in soln. contg. 0.3 mol L^{-1} *tert*–$BuNH_2$ and 5×10^{-4} mol L^{-1} $Ru(NH_3)_5NO^{3+}$.	79A134
104.013	$\cdot CH_2C(CH_3)(NH_3^+)CO_2^- + Ru(NH_3)_5\dot{N}O^{2+} \rightarrow [Ru(NH_3)_5N(O)CH_2C(CH_3)(NH_3)CO_2]^{2+}$	$(3.1 \pm 0.5) \times 10^9$	6.0–7.5	p.r.	D.k. at 280 nm (nitrosyl radical, $\epsilon = 3.8 \times 10^3$ L mol^{-1} cm^{-1}), as well as p.b.k. in soln. contg. 0.3 mol L^{-1} 2–aminoisobutyrate ion and 5×10^{-4} mol L^{-1} $Ru(NH_3)_5NO^{3+}$.	79A134
104.016	$\cdot CH_2C(CH_3)_2OH + Ru(NH_3)_5\dot{N}O^{2+} \rightarrow [Ru(NH_3)_5N(O)CH_2C(CH_3)_2OH]^{2+}$	$(3.7 \pm 0.6) \times 10^9$	6.0–7.5	p.r.	D.k. at 280 nm (nitrosyl radical, $\epsilon = 3.8 \times 10^3$ L mol^{-1} cm^{-1}), as well as p.b.k. in soln. contg. 0.3 mol L^{-1} *tert*–BuOH and 5×10^{-4} mol L^{-1} $Ru(NH_3)_5NO^{3+}$.	79A134
104.017	$\cdot CH_2C(CH_3)(OH)CO_2^- + Ru(NH_3)_5\dot{N}O^{2+} \rightarrow [Ru(NH_3)_5N(O)CH_2C(CH_3)(OH)CO_2]^+$	$(3.0 \pm 0.4) \times 10^9$	6.0–7.5	p.r.	D.k. at 280 nm (nitrosyl radical, $\epsilon = 3.8 \times 10^3$ L mol^{-1}cm^{-1}) as well as p.b.k. in soln. contg. 0.3 mol L^{-1} 2–hydroxyisobutyrate ion and 4×10^{-4} mol L^{-1} $Ru(NH_3)_5NO^{3+}$.	79A134
104.055	$CH_3CON(CH_3)\dot{C}H_2 + Ru(NH_3)_5\dot{N}O^{2+} \rightarrow [Ru(NH_3)_5N(O)CH_2N(CH_3)C(O)CH_3]^{2+}$	$(2.9 \pm 0.4) \times 10^9$	6.0–7.5	p.r.	D.k. at 280 nm (nitrosyl radical, $\epsilon = 3.8 \times 10^3$ L mol^{-1} cm^{-1}), as well as p.b.k. in soln. contg. 0.3 mol L^{-1} *N,N*–dimethylacetamide and 5×10^{-4} mol L^{-1} $Ru(NH_3)_5NO^{3+}$.	79A134
105.	**Tris(2,2′-bipyridine)ruthenium(III) ion**					
105.016	$\cdot CH_2C(CH_3)_2OH + Ru(bpy)_3^{3+}$	1.3×10^9	acid	p.r.		72G462
	$\rightarrow Ru(bpy)_3^{2+}$	$(1.9 \pm 0.2) \times 10^8$	4.6	p.r.	P.b.k. in N_2O–satd. soln. contg. *tert*–BuOH.	78A070
	Sulfur compounds					
106.	**Hydrogen sulfide**					
106.016	$\cdot CH_2C(CH_3)_2OH + H_2S \rightleftharpoons H_2\dot{S}CH_2C(CH_3)_2OH \rightarrow (CH_3)_3COH + \cdot SH$		6	p.r.	Effect of $[H_2S]$ on p.b.k. at 380 nm (complex) gave $K = 1 \times 10^{-3}$ mol L^{-1}; k(complex $\rightarrow$ *tert*–BuOH + ·SH) = 1.3×10^5 s^{-1}.	67G262
106.075	$\cdot CH_2OH + H_2S \rightleftharpoons H_2\dot{S}CH_2OH \rightarrow CH_3OH + \cdot SH$		6	p.r.	Effect of $[H_2S]$ on p.b.k. at 360 nm (complex) gave $K = 5.3 \times 10^{-4}$ mol L^{-1}; k(complex $\rightarrow$ MeOH + ·SH) = 2.3×10^5 s^{-1}.	67G262

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
106.076	$CH_3\dot{C}HOH + H_2S \rightleftharpoons H_2\dot{S}CHOHCH_3 \rightarrow CH_3CH_2OH + \cdot SH$		6	p.r.	Effect of [H_2S] on p.b.k. at 380 nm (complex) gave $K = 6.4 \times 10^{-4}$ mol L^{-1}; k(complex → EtOH + ·SH) = 4.6×10^5 s^{-1}.	67G262
106.077	$CH_3CH_2\dot{C}HOH + H_2S \rightleftharpoons H_2\dot{S}CHOHCH_2CH_3 \rightarrow CH_3CH_2CH_2OH + \cdot SH$		6	p.r.	Effect of [H_2S] on p.b.k. at 380 nm (complex) gave $K = 5.7 \times 10^{-4}$ mol L^{-1}; k(complex → 1-PrOH + ·SH) = 3.8×10^5 s^{-1}.	67G262
106.078	$(CH_3)_2\dot{C}OH + H_2S \rightleftharpoons H_2\dot{S}COH(CH_3)_2 \rightarrow (CH_3)_2CHOH + \cdot SH$		6	p.r.	Effect of [H_2S] on p.b.k. at 380 nm (complex) gave $K = 1.1 \times 10^{-3}$ mol L^{-1}; k(complex → 2-PrOH + ·SH) = 8.6×10^5 s^{-1}.	67G262
107.	**Sulfur dioxide**					
107.147	$\cdot CO_2^- + SO_2 \rightarrow SO_2^- + CO_2$	$(7.6 \pm 1) \times 10^8$	3.1	p.r.	P.b.k. at 320 nm in soln. contg. 1 mol L^{-1} formate; $2k$(R + R) = 7.6×10^9.	75A118
108.	**Tetrathionate ion**					
108.147	$\cdot CO_2^- + S_4O_6^{2-} \rightarrow CO_2 + S_4O_6^{3-}$	5.8×10^7		p.r.	P.b.k. at 370 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate, as well as d.k. at 280 nm.	73A027
	Sc					
109.	**Scandium(III) ions**					
109.147	$\cdot CO_2^-(\cdot CO_2H)$ + Sc(III)		1.4	p.r.	No reaction in 1 mol L^{-1} formic acid and 1×10^{-2} mol L^{-1} Sc(III).	73A057
	Ti					
110.	**Titanium(III) ions**					
110.035	$\cdot CH_2CO_2H + Ti^{3+} \rightarrow Ti^{3+}\text{-}CH_2CO_2H \rightarrow$ Ti(IV)	$(4 \pm 1) \times 10^6$	0.5	p.r.	Complex formn. deduced from transient spectra.	79A341
110.042	$\cdot CH(CO_2H)_2$ + Ti(III) → Ti(IV)	8×10^6	~0	e-r.	Calcd. from effect of [Ti^{III}] on on esr signal intensity; $2k$(R + R) ≈ 10^9.	73G249
110.075	$\cdot CH_2OH$ + Ti(III)			p.r.	No reaction in soln. contg. 1 mol L^{-1} MeOH and 10^{-2} mol L^{-1} Ti(III).	73A057
110.147	$\cdot CO_2^-$ + Ti(III) → Ti(II)	$\sim 5 \times 10^6$	1.4	p.r.	D.k. in 1 mol L^{-1} formic acid soln.; pK_a($\cdot CO_2H$) = 1.4.	73A057
	$\cdot CO_2H(\cdot CO_2^-) + Ti^{3+} \rightarrow Ti^{3+}\text{-}CO_2H \rightarrow$ Ti(II)	$(4 \pm 1) \times 10^6$	0.5	p.r.	Complex formn. deduced from transient spectra.	79A341
	Tl					
111.	**Thallium(I) ion**					
111.076	$CH_3\dot{C}HO^- + Tl^+ \rightarrow Tl_2^+$	1.5×10^9	13	p.r.	P.b.k. at 420 nm in soln. contg. 0.1 mol L^{-1} EtOH and 2×10^{-4} mol L^{-1} Tl^+; no reaction in neutral or acid soln.	80A123
111.078	$(CH_3)_2\dot{C}O^- + Tl^+ \rightarrow Tl_2^+$	3.0×10^9	13	p.r.	P.b.k. at 420 nm in soln. contg. 0.1 mol L^{-1} 2-PrOH and 1×10^{-4} mol L^{-1} Tl^+; no reaction in neutral or acid soln. See also 79G191.	80A123
111.147	$\cdot CO_2^- + Tl^+ \rightarrow Tl_2^+$	2.3×10^6	13	p.r.	P.b.k. at 420 nm in soln. contg. 1 mol L^{-1} formate and 1.5×10^{-2} mol L^{-1} Tl^+; reaction also obs. for neutral and acid soln.	80A123

TABLE 1. Rate constants for reactions of aliphatic radicals with inorganic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
111a.	**Thallium(I) ion, complex with Tl(0)**					
111a.075	$\cdot CH_2OH + Tl_2^+ + H^+ \rightarrow CH_3OH + 2\ Tl^+$	4.0×10^9	6	p.r.	Calcd. from d.k. at 420 nm. and condy. change in soln. contg. alcohol and Tl^+ assuming values for $2k(Tl_2^+ + Tl_2^+)$, $k(Tl_2^+ + H_2O_2)$ and $2k(R + R)$.	80A123
111a.076	$CH_3\dot{C}HOH + Tl_2^+ + H^+ \rightarrow CH_3CH_2OH + 2\ Tl^+$	3.0×10^9	6	p.r.	See above.	80A123
111a.078	$(CH_3)_2\dot{C}OH + Tl_2^+ + H^+ \rightarrow (CH_3)_2CHOH + 2\ Tl^+$	3.0×10^9	6	p.r.	See above.	80A123
	Yb					
112.	**Ytterbium(III) ions**					
112.147	$\cdot CO_2^-(\cdot CO_2H) + Yb(III)$		1.4	p.r.	No reaction in soln. contg. 1 mol L^{-1} formic acid and 10^{-2} mol L^{-1} Yb(III).	73A057
	Zn					
113.	**Zinc(I) ion**					
113.016	$\cdot CH_2C(CH_3)_2OH + Zn^+ (+ H^+) \rightarrow Zn^{2+} + (CH_3)_3COH$	$(1.0 \pm 0.3) \times 10^9$	7	p.r.	Calcd. from d.k. at 310 nm (Zn^+) in *tert*-BuOH–$ZnSO_4$ soln. assuming $k(H + H) = 1.3 \times 10^{10}$, $k(Zn^+ + Zn^+) = 4 \times 10^8$, $k(R + R) = 6.5 \times 10^8$ and $k(Zn^+ + H) = 2.8 \times 10^9$.	77A011
113.075	$\cdot CH_2OH + Zn^+ (+ H^+) \rightarrow Zn^{2+} + CH_3OH$	$(2.5 \pm 0.3) \times 10^9$	7	p.r.	Calcd. from d.k. at 310 nm (Zn^+) in N_2O–MeOH–$ZnSO_4$ soln. taking $k(Zn^+ + Zn^+) = 4.5 \times 10^8$, $k(Zn^+ + H_2O_2) = 2.4 \times 10^9$, $k(Zn^+ + N_2O) = 1.6 \times 10^7$ and $k(R + R) = 1.5 \times 10^9$.	77A011
113.078	$(CH_3)_2\dot{C}OH + Zn^+ (+ H^+) \rightarrow Zn^{2+} + (CH_3)_2CHOH$	$(1.3 \pm 0.25) \times 10^9$	~3,7	p.r.	Calcd. from d.k. at 310 nm (Zn^+) in 2-PrOH–$ZnSO_4$ soln. taking $k(Zn^+ + Zn^+) = 4.5 \times 10^8$.	77A011
113.147	$\cdot CO_2^- + Zn^+ (+ H^+) \rightarrow Zn^{2+} + HCO_2^-$	$\sim 4 \times 10^9$		p.r.	Est. from first-order decay at 310 nm (Zn^+) in formate–$ZnSO_4$ soln.	77A011
114.	**Zinc(II) ion**					
114.016	$\cdot CH_2C(CH_3)_2OH + Zn^{2+}$	$<10^6$		p.r.	Est. from lack of increase in Zn^+ in 0.1 mol L^{-1} Zn^{2+} soln. upon addn. of 0.1 mol L^{-1} *tert*-BuOH.	75A027
114.075	$\cdot CH_2OH + Zn^{2+}$	$<10^2$		p.r.	Est. from lack of increase in Zn^+ in 0.1 mol L^{-1} Zn^{2+} soln. upon addn. of 0.1 mol L^{-1} MeOH.	75A027
114.078	$(CH_3)_2\dot{C}OH + Zn^{2+}$	$<10^6$		p.r.	Est. from lack of increase in Zn^+ in 2-PrOH.	75A027
114.147	$\cdot CO_2^- + Zn^{2+}$	$<10^2$		p.r.	Est. from lack of increase in Zn^+ in 0.1 mol L^{-1} Zn^{2+} soln. upon addn. of 0.1 mol L^{-1} formate ion.	75A027
		$<2 \times 10^4$		p.r.	No reaction in 0.5 mol L^{-1} $ZnSO_4$.	77A011
	Zinc hematoporphyrin See 221.					
	Zinc(II)–Insulin See 233a.					

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
115.	**Acetic acid**					
115.001	$\cdot CH_3 + CH_3CO_2H \rightarrow CH_4 + \cdot CH_2CO_2H$	2×10^2	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}–H_2O_2 soln.; est. from esr meas. and values for competing reactions.	75D188
116.	**Acetone**					
116.001	$\cdot CH_3 + CH_3COCH_3 \rightarrow CH_4 + \cdot CH_2COCH_3$	$0.99[k(R + R]^{0.5}$	nat	phot.	Est. from quantum yields of CH_4, CO, and C_2H_6.	60F004
		$1.00[k(R + R)]^{0.5}$	nat	phot.	Obs. yields of CH_4 and C_2H_6; log k (in cm^3 mol^{-1}s^{-1}) = [(4.47 ± 0.05)–(1335 ± 18)/T] – 0.5 log k(R + R).	69F176
117.	**Acetonitrile**					
117.001	$\cdot CH_3 + CH_3CN \rightarrow CH_4 + \cdot CH_2CN$	$<3 \times 10^2$	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}–H_2O_2 soln.; est. from esr.	75D188
118.	**Acetophenone**					
118.076	$CH_3\dot{C}HO^- + C_6H_5COCH_3 \rightarrow CH_3CHO + (C_6H_5COCH_3)\cdot^-$	1.1×10^9	13	p.r.	P.b.k. at 440 nm in N_2O–satd. soln. contg. 1 mol L^{-1} EtOH; pH dependent, k extrapolated to pH 14.	73G122
118.078	$(CH_3)_2\dot{C}O^- + C_6H_5COCH_3 \rightarrow CH_3COCH_3 + (C_6H_5COCH_3)\cdot^-$	7.8×10^8	13	p.r.	P.b.k. at 440 nm in acetone soln.	67G729
		9×10^8	13	p.r.	P.b.k. at 440 nm in N_2O–satd. soln. contg. 1 mol L^{-1} 2–PrOH; pH dependent, k extrapolated to pH 14.	73G122
118.142	$R + C_6H_5COCH_3 \rightarrow (C_6H_5COCH_3)\cdot^-$ (R = Electron adduct of glycine anhydride)	$(2.3 \pm 0.3) \times 10^9$ $(2.0 \pm 0.3) \times 10^9$	5.2 12.3	p.r.	P.b.k. at 280 nm (320 at pH 12.3) in soln. contg. 1 mol L^{-1} *tert*–BuOH.	71G554
118.143	$R + C_6H_5COCH_3 \rightarrow (C_6H_5COCH_3)\cdot^-$ (R = Electron adduct of alanine anhydride)	$(2.0 \pm 0.3) \times 10^9$ $(1.5 \pm 0.4) \times 10^9$	5.2 12.2	p.r.	P.b.k. at 280 nm (320 at pH 12.2) in soln. contg. 1 mol L^{-1} *tert*–BuOH.	71G554
118.144	$R + C_6H_5COCH_3 \rightarrow (C_6H_5COCH_3)\cdot^-$ (R = Electron adduct of sarcosine anhydride)	$(2.0 \pm 0.2) \times 10^9$ $(2.1 \pm 0.2) \times 10^9$	5.2 12.4	p.r.	P.b.k. at 280 nm (320 at pH 12.4) in soln. contg. 1 mol L^{-1} *tert*–BuOH.	71G554
118.147	$\cdot CO_2^- + C_6H_5COCH_3 \rightarrow CO_2 + (C_6H_5COCH_3)\cdot^-$	1×10^7	12	p.r.	P.b.k. at 440 nm.	68G308
119.	**Acetylene**					
119.022	$\cdot CH{=}CHOH + CH{=}CH$	$(8.8 \pm 0.9) \times 10^6$	4.0, 6.0	p.r.	Radical from OH + C_2H_2; p.b.k. at 290 nm; E_a = 25.1 kJ mol^{-1}; product thought to be hydroxybutadienyl which reacts to give hydroxyhexatrienyl (p.b.k. at 260 nm, $k = 5 \times 10^6$ L mol^{-1}s^{-1}).	78A007
120.	**3–Acetylpyridine**					
120.078	$(CH_3)_2\dot{C}OH + CH_3COC_5H_4NH^+ \rightarrow$ *e*–transfer	$(8.6 \pm 1.7) \times 10^9$	0.6	p.r.	P.b.k.; no *e*–transfer in neutral soln.; pK_a = 4.9.	74A089
121.	**Acridine**					
121.075	$\cdot CH_2OH + C_{13}H_9NH^+$	5.0×10^8	2.0	p.r.	P.b.k. in N_2O–satd. soln. contg. MeOH; ~30% *e*–transfer; no reaction at pH 7.6; pK_a = 5.6.	74A127
121.078	$(CH_3)_2\dot{C}O^- + C_{13}H_9N \rightarrow (CH_3)_2CO + \cdot A^-$	3×10^9	13	p.r.	P.b.k. in N_2O–satd. soln. contg. 2–PrOH.	79A305
	$(CH_3)_2\dot{C}OH + C_{13}H_9N \rightarrow \cdot AR + \cdot A$ (50% redn., 50% addn.)	3.0×10^8	7.6	p.r.	P.b.k. in N_2O–satd. soln. contg. 2–PrOH; ~40% *e*–transfer.	74A127
		$\sim 3 \times 10^8$	7–9	p.r.	P.b.k.	79A305
	$(CH_3)_2\dot{C}OH + C_{13}H_9NH^+ \rightarrow (CH_3)_2CO + H^+ + \cdot AH$	3.7×10^9	2.0	p.r.	P.b.k. in N_2O–satd. soln. contg. 2–PrOH; ~90% *e*–transfer.	74A127
		3.3×10^9	4	p.r.	P.b.k.	79A305

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
121.147	$\cdot CO_2^- + AH^+ \rightarrow \cdot AH$	$\sim 3 \times 10^8$	7	p.r.	P.b.k.; at pH 13 adduct is formed ($\cdot CO_2^- + A \rightarrow \cdot ACO_2^-$).	79A305
122.	**Acriflavin *(3,10-Diamino-10-methylacridinium chloride)***					
122.147	$\cdot CO_2^- + A$	$(3.7 \pm 0.4) \times 10^8$		p.r.	D.k. (dye) in Ar-satd. 0.1 mol L^{-1} formate; same product as concurrent fast reaction with e_{aq}^-.	70G241
123.	**Acrylamide**					
123.016	$\cdot CH_2C(CH_3)_2OH + CH_2{=}CHCONH_2 \rightarrow$ $HOC(CH_3)_2CH_2CH_2\dot{C}HCONH_2$	$(4.5 \pm 1.4) \times 10^7$ $(6.8 \pm 2) \times 10^7$ (rel.)	4.5 3	p.r.	C.k. in N_2O-satd. soln. contg. *tert*-BuOH and Cu^{2+}; rel. to $k(R + Cu^{2+}) = 2.7 \times 10^6$ at pH 4.5 and 3.2×10^6 at pH 3.	78A322
123.075	$\cdot CH_2OH + CH_2{=}CHCONH_2 \rightarrow$ $HOCH_2CH_2\dot{C}HCONH$	$(2.6 \pm 0.8) \times 10^7$ (rel.)	2–5	p.r.	C.k. in N_2O-satd. soln. contg. MeOH and Cu^{2+}; rel. to $k(R + Cu^{2+}) = 1.6 \times 10^8$.	78A322
123.076	$CH_3\dot{C}HOH + CH_2{=}CHCONH_2 \rightarrow$ $CH_3CHOHCH_2\dot{C}HCONH_2$	$(2.6 \pm 0.8) \times 10^7$ (rel.)	2–5	p.r.	C.k. in N_2O-satd. soln. contg. EtOH and Cu^{2+}; rel. to $k(R + Cu^{2+}) = 9.4 \times 10^7$.	78A322
123.078	$(CH_3)_2\dot{C}OH + CH_2{=}CHCONH_2 \rightarrow$ $(CH_3)_2C(OH)CH_2\dot{C}HCONH_2$	$(4.1 \pm 1.2) \times 10^7$ (rel.)	2–5	p.r.	C.k. in N_2O-satd. soln. contg. 2-PrOH and Cu^{2+}; rel. to $k(R + Cu^{2+}) = 5.2 \times 10^7$.	78A322
123.128	$[CH_2CHCONH_2]\cdot^- + CH_2{=}CHCONH_2 \rightarrow$ $HOC(NH_2){=}CH(CH_2)_2\dot{C}HCONH_2$	$(2.5 \pm 0.4) \times 10^5$	~6	p.r.	D.k. at 275 nm.	70G052
123.147	$\cdot CO_2^- + CH_2{=}CHCONH_2 \rightarrow$ addn.	$\sim(4 \pm 1) \times 10^7$	~5	p.r.	Electron transfer not obs.	70G052
124.	**Adenosine**					
124.078	$(CH_3)_2\dot{C}OH + A \rightarrow$ *e*-transfer $(CH_3)_2\dot{C}O^- + A$	4.7×10^7 $<10^6$ $<10^6$	2.2 7.0 13.6	p.r.	P.b.k.	75A060
125.	**Adenosine monophosphate**					
125.147	$\cdot CO_2^- + A$	$<10^6$	8.3	p.r.	P.b.k. at 550 nm (A^-) in N_2O-satd. 0.1 mol L^{-1} formate.	68G441
126.	**Alloxan**					
126.147	$\cdot CO_2^- + A\ (+ H^+) \rightarrow$ $CO_2 + \cdot AH$	$(3.7 \pm 1.1) \times 10^7$	4.8	p.r.	P.b.k. at 310 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; cor. for decay of $\cdot CO_2^-$.	79A327 80A197
127.	**2-Amino-5-nitrothiazole**					
127.078	$(CH_3)_2\dot{C}OH + NX \rightarrow$ $(CH_3)_2CO + NX^- + H^+$	2.0×10^9		p.r.	P.b.k.	76A075
128.	**4-Aminophenoxide ion**					
128.020	$\cdot CH_2CHO + NH_2C_6H_4O^- \rightarrow$ $CH_3CHO + NH_2C_6H_4O\cdot$	2.1×10^9	~11.5	p.r.	Soln. contg. N_2O and ethylene glycol.	79A051
129.	**4-Aminopyrimidine**					
129.078	$(CH_3)_2\dot{C}OH + A$ $(CH_3)_2\dot{C}O^- + A$		0.8– 13.0	p.r.	No *e*-transfer.	77A034
130.	**Aniline**					
130.036	$\cdot CF_3 + C_6H_5NH_2 \rightarrow$ addn.	$(4.7 \pm 0.9) \times 10^6$	9–10	p.r.	P.b.k. at 330 nm in N_2O-satd. soln. contg. CF_3Cl; c.k. rel. to $k(CF_3 + HCO_2^-) = 3.4 \times 10^5$ gave $k = 5.6 \times 10^6$.	70G407
131.	**9,10-Anthraquinone**					
131.078	$(CH_3)_2\dot{C}OH + A \rightarrow$ semiquinone	$(1.6 \pm 0.1) \times 10^9$	7.0	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 2-PrOH.	73A104

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
131.097	$CH_3\dot{C}(O^-)CH_2CO_2^- + A \rightarrow$ semiquinone	$(6.7 \pm 0.7) \times 10^8$	9.2	p.r.	P.b.k. at 400 nm in Ar-satd. soln. contg. acetoacetate and 1 mol L^{-1} *tert*-BuOH.	73A104
132.	**9,10-Anthraquinone-1-sulfonate ion**					
132.147	$\cdot CO_2^- + A \rightarrow$ semiquinone	1.0×10^9	3	p.r.	P.b.k.	72G391
		3.3×10^9	7			
133.	**9,10-Anthraquinone-2-sulfonate ion**					
133.056	$NH_2\dot{C}HCO_2^- + A \rightarrow$ semiquinone	$(2.2 \pm 0.2) \times 10^9$	8.0	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycine.	73A104
133.068	$R + A \rightarrow$ semiquinone (R = Radicals from triglycine)	$(1.4 \pm 0.1) \times 10^9$	10	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. triglycine.	73A104
133.078	$(CH_3)_2\dot{C}OH + A \rightarrow$ semiquinone	$(3.0 \pm 0.3) \times 10^9$	7.0	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 2-PrOH.	73A104
		$(5.6 \pm 0.6) \times 10^9$		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	76A070
133.097	$CH_3\dot{C}(O^-)CH_2CO_2^- + A \rightarrow$ semiquinone	$(2.1 \pm 0.2) \times 10^9$	9.2	p.r.	P.b.k. at 400 nm. in Ar-satd. soln. contg. acetoacetate and *tert*-BuOH.	73A104
133.115	$\cdot CHOHCO_2^- + A \rightarrow$ semiquinone	$(7.1 \pm 0.7) \times 10^8$	7.0	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycolate.	73A104
133.147	$\cdot CO_2^- + A \rightarrow$ semiquinone	2.8×10^9	3	p.r.	P.b.k. in soln. contg. formate.	72G391
		3.1×10^9	7			
		$(1.6 \pm 0.2) \times 10^9$	7	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. formate.	73A104
134.	**9,10-Anthraquinone-2,6-disulfonate ion**					
134.056	$NH_2\dot{C}HCO_2^- + A \rightarrow$ semiquinone	$(2.6 \pm 0.3) \times 10^9$	8.0	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycine.	73A104
134.068	$R + A \rightarrow$ semiquinone (R = Radicals from triglycine)	$(1.8 \pm 0.2) \times 10^9$	10	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. triglycine.	73A104
134.078	$(CH_3)_2\dot{C}OH + A \rightarrow$ semiquinone	$(4.6 \pm 0.5) \times 10^9$	7.0	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 2-PrOH.	73A104
134.097	$CH_3\dot{C}(O^-)CH_2CO_2^- + A \rightarrow$ semiquinone	$(7.2 \pm 0.7) \times 10^8$	9.2	p.r.	P.b.k. at 400 nm. in Ar-satd. soln. contg. acetoacetate and *tert*-BuOH.	73A104
134.117	$CH_3\dot{C}OHCO_2H + A$	3.0×10^9	7.0	p.r.	P.b.k. in N_2O-satd. soln. contg. 5×10^{-3} mol L^{-1} lactate; 58% *e*-transfer.	75A051
134.147	$\cdot CO_2^- + A \rightarrow$ semiquinone	$(2.4 \pm 0.2) \times 10^9$	7.0	p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	73A104
135.	**Ascorbate ion**					
135.020	$\cdot CH_2CHO + A^- (+ H_2O) \rightarrow CH_3CHO + \cdot A^- + OH^-$	8.8×10^7	7	p.r.	Radical from $ClCH_2CH_2OH$ by reaction with OH and HCl elimination.	79A051
135.042	$\cdot CH(CO_2^-)_2 + AH^- \rightarrow CH_2(CO_2^-)_2 + \cdot A^-$	$(1.3 \pm 0.1) \times 10^7$	7.5	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.8 mol L^{-1} malonate.	73R006
135.075	$\cdot CH_2OH + AH^-$	$<10^6$		p.r.		77A036
135.078	$(CH_3)_2\dot{C}OH + AH^- \rightarrow (CH_3)_2CHOH + \cdot A^-$	$(1.2 \pm 0.1) \times 10^6$	6.1	p.r.	P.b.k. in soln. contg. 1 mol L^{-1} acetone and 2 mol L^{-1} 2-PrOH.	73R006
136.	**Azobenzene**					
136.075	$\cdot CH_2O^- + C_6H_5N{=}NC_6H_5 \rightarrow CH_2O + [C_6H_5N{=}NC_6H_5]\cdot^-$	1×10^9	14	p.r.	P.b.k. at 380 nm in soln. contg. MeOH; *k* same for *syn*- and *anti*-isomers.	77A169
136.078	$(CH_3)_2\dot{C}OH + C_6H_5N{=}NC_6H_5 \rightarrow (CH_3)_2CO + H^+ + \cdot[C_6H_5N{=}NC_6H_5]^-$	4×10^8	~7	p.r.	P.b.k. at 380 nm in soln. contg. 2-PrOH; *anti*- isomer.	77A169
	$(CH_3)_2\dot{C}O^- + C_6H_5N{=}NC_6H_5 \rightarrow (CH_3)_2CO + \cdot[C_6H_5N{=}NC_6H_5]^-$	2×10^9	14	p.r.	P.b.k. at 380 nm in soln. contg. 2-PrOH; *anti*-isomer.	77A169
137.	**Benzophenone**					
137.075	$\cdot CH_2O^- + (C_6H_5)_2CO \rightarrow CH_2O + (C_6H_5)_2\dot{C}O^-$	1.2×10^8	13	p.r.	P.b.k. at 610 nm in N_2O-satd. soln. 1 mol L^{-1} MeOH.	75A125

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
137.076	$CH_3\dot{C}HO^- + (C_6H_5)_2CO \rightarrow CH_3CHO + (C_6H_5)_2\dot{C}O^-$	1×10^9	13	p.r.	P.b.k. at 610 nm in N_2O–satd. soln. contg. EtOH; $E_a \approx 3.1$ kcal mol^{-1} (13 kJ mol^{-1}).	74A010
		2.6×10^8	13	p.r.	P.b.k. at 610 nm in N_2O–satd. soln.	75A125
137.078	$(CH_3)_2\dot{C}O^- + (C_6H_5)_2CO \rightarrow (CH_3)_2CO + (C_6H_5)_2\dot{C}O^- \rightarrow$	1.2×10^9	12	p.r.	P.b.k.	68G308
		$(1.6 \pm 0.2) \times 10^9$	13.1	p.r.	P.b.k. at 605 nm in N_2O–satd. soln. contg. 2 mol L^{-1} 2–PrOH.	72G359
		7.0×10^8	13	p.r.	P.b.k. at 610 nm in N_2O–satd. soln. contg. 2–PrOH.	75A125
137.142	$R + (C_6H_5)_2CO \rightarrow (C_6H_5)_2\dot{C}O^-$ (R = Electron adduct of glycine anhydride)	$(2.2 \pm 0.3) \times 10^9$ $(2.5 \pm 0.4) \times 10^9$	5.5 12.3	p.r	P.b.k. at 330 nm (320 at pH 12.3) in soln. contg. 1 mol L^{-1} *tert*–BuOH.	71G554
137.143	$R + (C_6H_5)_2CO \rightarrow (C_6H_5)_2\dot{C}O^-$ (R = Electron adduct of alanine anhydride)	$(1.6 \pm 0.2) \times 10^9$ $(1.9 \pm 0.3) \times 10^9$	5.2 12.2	p.r.	P.b.k. at 330 nm (320 at pH 12.2) in soln. contg. 1 mol L^{-1} *tert*–BuOH.	71G554
137.144	$R + (C_6H_5)_2CO \rightarrow (C_6H_5)_2\dot{C}O^-$ (R = Electron adduct of sarcosine anhydride)	$(2.3 \pm 0.2) \times 10^9$ $(2.4 \pm 0.2) \times 10^9$	5.2 12.2	p.r.	P.b.k. at 330 nm (320 at pH 12.2) in soln. contg. 1 mol L^{-1} *tert*–BuOH.	71G554
138.	**Benzoquinone**					
138.056	$NH_2\dot{C}HCO_2^- + Q \rightarrow$ semiquinone	$(3.9 \pm 0.4) \times 10^9$	8.0	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. glycine.	73A104
138.062	$R + Q \rightarrow$ semiquinone (R = Radical from glycine anhydride)	2.2×10^9	10.5	p.r.	P.b.k. in N_2O–satd. soln. contg. glycine anhydride; 87% *e*–transfer.	73A052
138.068	$R + Q \rightarrow$ semiquinone (R = Radicals from triglycine)	$(2.5 \pm 0.2) \times 10^9$	10	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. triglycine	73A104
138.075	$\cdot CH_2OH + Q \rightarrow CH_2O + H^+ + \cdot Q^-$	6.1×10^9	nat	p.r.	P.b.k. at 430nm in N_2O–satd. soln. contg. 1 mol L^{-1} MeOH.	71G619
		4.8×10^9	6.2	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 1 mol L^{-1} MeOH.	73G049
138.076	$CH_3\dot{C}HOH + Q \rightarrow CH_3CHO + H^+ + \cdot Q^-$	4.5×10^9	nat	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 1 mol L^{-1} EtOH.	71G619
138.078	$(CH_3)_2\dot{C}OH + Q \rightarrow (CH_3)_2CO + H^+ + \cdot Q^-$	5.0×10^9	nat	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 1 mol L^{-1} 2–PrOH.	71G619
		$(5.4 \pm 0.5) \times 10^9$	7.0	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. 2–PrOH.	73A104
		5×10^9	6.9	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 0.2 mol L^{-1} 2–PrOH.	73G049
		5.0×10^9	7	p.r.	P.b.k. in soln. contg. 1 mol L^{-1} acetone and 1 mol L^{-1} 2–PrOH.	73C125
138.092	$R + Q \rightarrow \cdot Q^-$ (R = Radicals from sodium dodecylsulfate)	1.2×10^9		p.r.	P.b.k. at 430 nm in soln. contg. 0.1 mol L^{-1} sodium dodecylsulfate k(R + micelle) = 9.9×10^8.	78A261
138.108	$R + Q \rightarrow$ semiquinone (R = Radicals from deoxyribose)	2.7×10^9	5.6	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. deoxyribose.	73G049
138.115	$\cdot CHOHCO_2^- + Q \rightarrow \cdot Q^-$	2.2×10^9	7.0	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. glycolate 72% *e*–transfer.	73A052 73A104
138.116	$CH_3\dot{C}OHCONH_2 + Q \rightarrow \cdot Q^-$	2.0×10^9 3.6×10^9	5.0 7.3	p.r.	P.b.k. in N_2O–satd. soln. contg. lactamide.	73A052
138.117	$CH_3\dot{C}OHCO_2^- + Q \rightarrow \cdot Q^-$	6.5×10^9 $\sim 7.0 \times 10^9$	7.3 10.8	p.r.	P.b.k. in N_2O–satd. soln. contg. lactate; 97% *e*–transfer.	73A052
138.147	$\cdot CO_2^- + Q \rightarrow CO_2 + \cdot Q^-$	6.6×10^9	~ 7	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.2 mol L^{-1} formate.	71G619
		7×10^9	6.9	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate.	73G049
		$(6.6 \pm 0.7) \times 10^9$	7.0	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. formate.	73A104
139.	**3–Benzoyl–1–methylpyridinium ion**					
139.078	$(CH_3)_2\dot{C}OH + C_6H_5COC_5H_4N^+CH_3 \rightarrow (CH_3)_2CO + (C_6H_5COHC_5H_4NCH_3)\cdot^+$	$(2.3 \pm 0.3) \times 10^9$	5.0, 1.0	p.r.	P.b.k. at 530 nm in N_2O–satd. soln. contg. 2 mol L^{-1} 2–PrOH.	72G359

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
140.	**2-Benzoylpyridine**					
140.078	$(CH_3)_2\dot{C}OH + C_6H_5COC_5H_4NH^+ \rightarrow (CH_3)_2CO + (C_6H_5COHC_5H_4NH)\cdot^+$	$(3.0 \pm 0.3) \times 10^9$	1.0	p.r.	P.b.k. at 500 nm, as well as at 330 nm, in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
	$(CH_3)_2\dot{C}OH + C_6H_5COC_5H_4N \rightarrow (CH_3)_2CO + (C_6H_5COC_5H_4NH)\cdot$	$(1.5 \pm 0.2) \times 10^8$	5.9	p.r.	P.b.k. at 500 nm, as well as at 330 nm, in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
	$(CH_3)_2\dot{C}O^- + C_6H_5COC_5H_4N \rightarrow (CH_3)_2CO + (C_6H_5COC_5H_4N)\cdot^-$	$(2.3 \pm 0.2) \times 10^9$	13.2	p.r.	P.b.k. at 550 nm, as well as at 330 nm, in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
141.	**3-Benzoylpyridine**					
141.078	$(CH_3)_2\dot{C}OH + C_6H_5COC_5H_4NH^+ \rightarrow (CH_3)_2CO + (C_6H_5COHC_5H_4NH)\cdot^+$	$(1.7 \pm 0.2) \times 10^9$	0.9	p.r.	P.b.k. at 500 nm, as well as at 330 nm (at pH 0.5 giving $k = 2.3 \times 10^9$) in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
	$(CH_3)_2\dot{C}OH + C_6H_5COC_5H_4N \rightarrow (CH_3)_2CO + (C_6H_5COC_5H_4NH)\cdot$	$(1.0 \pm 0.2) \times 10^8$	5.1	p.r.	P.b.k. at 530 nm, as well as at 330 nm in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
	$(CH_3)_2\dot{C}O^- + C_6H_5COC_5H_4N \rightarrow (CH_3)_2CO + (C_6H_5COC_5H_4N)\cdot^-$	$(2.0 \pm 0.2) \times 10^9$	13.0	p.r.	P.b.k. at 605 nm, as well as at 341 nm, in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
142.	**4-Benzoylpyridine**					
142.078	$(CH_3)_2\dot{C}OH + C_6H_5COC_5H_4NH^+ \rightarrow (CH_3)_2CO + (C_6H_5COHC_5H_4NH)\cdot^+$	$(2.5 \pm 0.2) \times 10^9$	0.7	p.r.	P.b.k. at 510 nm in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
	$(CH_3)_2\dot{C}OH + C_6H_5COC_5H_4N \rightarrow (CH_3)_2CO + (C_6H_5COC_5H_4NH)\cdot$	$(2.4 \pm 0.4) \times 10^8$	7.7	p.r.	P.b.k. at 500 nm in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
	$(CH_2)_2\dot{C}O^- + C_6H_5COC_5H_4N \rightarrow (CH_3)_2CO + (C_6H_5COC_5H_4N)\cdot^-$	$(2.5 \pm 0.2) \times 10^9$	13.2	p.r.	P.b.k. at 575 nm in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
	Benzyl viologen See 1,1'-Dibenzyl-4,4'-bipyridinium ion 171.					
	Biacetyl See 2,3-Butanedione 148.					
143.	**2,2'-Bipyridine**					
143.075	$\cdot CH_2OH$ + bpy	$<10^6$	7	p.r.	P.b.k.	79A148
	$\cdot CH_2O^-$ + bpy	$<10^6$	alk.	p.r.	P.b.k.	79A148
143.078	$(CH_3)_2\dot{C}OH$ + bpy	$<10^6$	7	p.r.	P.b.k.	79A148
	$(CH_3)_2\dot{C}OH + bpyH^+ \rightarrow (CH_3)_2CO + bpyH_2\cdot^+$	3.5×10^8	1.4, 3.7	p.r.	P.b.k. at 375 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH.	79A148
	$(CH_3)_2\dot{C}O^- + bpy \rightarrow (CH_3)_2CO + bpy\cdot^-$	1.3×10^8	13.0	p.r.	P.b.k. at 365 nm in soln. contg. 0.1 mol L^{-1} 2-PrOH and 0.1 mol L^{-1} acetone.	79A148
143.147	$\cdot CO_2^-$ + bpy	$<10^6$	7	p.r.	P.b.k.	79A148
	$\cdot CO_2^- + bpyH^+$	5.0×10^8	4.4	p.r.	P.b.k. at 375 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} formate.	79A148
144.	**1,1'-Bis(2-hydroxyethyl)-4,4'-bipyridinium ion**					
144.147	$\cdot CO_2^- + BP^{2+} \rightarrow CO_2 + \cdot BP^+$	1.9×10^{10}	6.8	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	78A321
145.	**2-Bromo-5-nitrothiazole**					
145.078	$(CH_3)_2\dot{C}OH + NX \rightarrow (CH_3)_2CO + H^+ + \cdot NX^-$	3.0×10^9		p.r.	P.b.k.	76A075
146.	**5-Bromouracil**					
146.078	$(CH_3)_2\dot{C}OH$ + BrU	2×10^7 (rel.)		p.r.	C.k. rel. to k(R + PNAP) = 3.8×10^9.	73A140
146.147	$\cdot CO_2^- + BrU \rightarrow CO_2 + Br^- + U\cdot$	$>1.0 \times 10^8$		p.r.	P.b.k. at 440 nm ($BrUCO_2^-$) in N_2O-satd. soln. contg. formate.	69G826

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
147.	**Butadiene**					
147.001	$\cdot CH_3 + C_4H_6 \rightarrow$ addn.	1.25×10^6 (rel.)		γ-r.	C.k. with MeOH in soln. contg. MeI; obs. $G(CH_4)$; rel. to $k(CH_3 + O_2) = 4.7 \times 10^9$.	67G041
147.047	$\cdot CF_3 + C_4H_6 \rightarrow$ addn.	$(5.8 \pm 1.0) \times 10^8$ (rel.)	9–10	γ-r.	C.k. with 2-PrOH in soln. contg. CF_3Cl; rel. to $k(CF_3 + HCO_2^-) = 3.4 \times 10^5$.	70G407
148.	**2,3-Butanedione**					
148.075	$\cdot CH_2OH + CH_3COCOCH_3$ (B) $\rightarrow$ $CH_2O + H^+ + \cdot B^-$	1.1×10^8		p.r.	P.b.k. at 300 nm in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} MeOH.	68G249
		$(6.5 \pm 1) \times 10^7$	5–6	p.r.	D.k. in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} MeOH.	72A018
148.076	$CH_3\dot{C}HOH + B \rightarrow$ $CH_3CHO + H^+ + \cdot B^-$	5.6×10^8		p.r.	P.b.k. at 300 nm in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} EtOH.	68G249
148.077	$CH_3CH_2\dot{C}HOH + B \rightarrow$ $CH_3CH_2CHO + H^+ + \cdot B^-$	6.8×10^8		p.r.	P.b.k. at 300 nm in N_2O-satd. soln. contg. 1-PrOH.	68G249
148.078	$(CH_3)_2\dot{C}OH + B \rightarrow$ $(CH_3)_2CO + H^+ + \cdot B^-$	8.6×10^8		p.r.	P.b.k. at 300 nm in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} 2-PrOH.	68G249
		6.0×10^8	5–6	p.r.	D.k. in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} 2-PrOH.	72A018
148.080	$CH_3CH_2\dot{C}OHCH_3 + B \rightarrow$ $CH_3COCH_2CH_3 + H^+ + \cdot B^-$	7.2×10^8		p.r.	P.b.k. at 300 nm in N_2O-satd. soln. contg. 2-BuOH.	68G249
148.083	$c\text{-}C_6H_{11}\dot{C}HOH + B \rightarrow$ $C_6H_{11}CHO + H^+ + \cdot B^-$	2.6×10^8		p.r.	P.b.k. at 300 nm in N_2O-satd. soln. contg. cyclohexanemethanol.	68G249
148.117	$CH_3\dot{C}OHCO_2^- + B$	2.8×10^7	6.0	p.r.	D.k. in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} lactate.	72A018
149.	**1-Butene**					
149.001	$\cdot CH_3 + C_4H_8 \rightarrow$ addn.	3.0×10^4 (rel.)		γ-r.	C.k. with MeOH in soln. contg. MeI; obs. $G(CH_4)$; rel. to $k(CH_3 + O_2) = 4.7 \times 10^9$.	67G041
149.047	$\cdot CF_3 + C_4H_8 \rightarrow$ addn.	$(5.3 \pm 0.7) \times 10^7$ (rel.)	9–10	γ-r.	C.k. with 2-PrOH; rel. to $k(CF_3 + HCO_2^-) = 3.4 \times 10^5$.	70G407
	1,1′-Butylene-2,2′-bipyridinium ion See Tetramethylene-2,2′-bipyridinium ion 341.					
150.	**Camphor**					
150.147	$\cdot CO_2^- + RC{=}O$	$\leqslant 10^6$	13	p.r.	D.k. of $\cdot CO_2^-$ at 260 nm. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.1 mol L^{-1} NaOH same in the presence and absence of 10^{-3} mol L^{-1} camphor.	79A191
151.	**3-Carbamoyl-1-methylpyridinium ion**					
151.078	$(CH_3)_2\dot{C}OH + CH_3N^+C_5H_4CONH_2$	$(3.6 \pm 0.7) \times 10^8$	9.5	p.r.	P.b.k. (pyridinyl radical) in N_2O-satd. soln. contg. 1–2 mol L^{-1} 2-PrOH.	74A089
151.147	$\cdot CO_2^- + CH_3N^+C_5H_4CONH_2$	4.6×10^9	8.5	p.r.	P.b.k. at 420 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	68G441
152.	**Carbon tetrachloride**					
152.075	$\cdot CH_2OH + CCl_4 \rightarrow$ $\cdot CCl_3 + Cl^- + CH_2O + H^+$	$\leqslant 10^6$		p.r.	Condy.; $G(Cl^-) \approx 0.3G(\cdot CH_2OH)$.	71G778
152.078	$(CH_3)_2\dot{C}OH + CCl_4 \rightarrow$ $\cdot CCl_3 + Cl^- + (CH_3)_2CO + H^+$	1.0×10^8		p.r.	Condy.; build-up of HCl in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	71G778
		7×10^8 (rel.)		p.r.	C.k. with p-nitroacetophenone in soln. contg. 2-PrOH and acetone; rel. to $k(R + PNAP) = 3.8 \times 10^9$.	73A140 73A150
152.093	$CH_3\dot{C}HOC_2H_5 + CCl_4 \rightarrow Cl^-$	2.5×10^7		p.r.	Condy.; buildup of HCl in N_2O-satd. soln. contg. Et_2O.	71G778

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
152.094	$-O\dot{C}H(CH_2)_3- + CCl_4 \rightarrow Cl^-$	2.0×10^7		p.r.	Condy.; buildup of HCl in N_2O-satd. soln. contg. tetrahydrofuran.	71G778
152.147	$\cdot CO_2^- + CCl_4$	no reaction		p.r.	Condy.	71G778
153.	**3-Carboxy-1-methylpyridinium ion**					
153.078	$(CH_3)_2\dot{C}OH + CH_3N^+C_5H_4CO_2^-$	1.0×10^8	9.2	p.r.	P.b.k. (pyridinyl radical) at 400 nm in N_2O-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH.	74A106
154.	**4-Carboxy-1-methylpyridinium ion**					
154.075	$\cdot CH_2O^- + CH_3N^+C_5H_4CO_2^-$	3.8×10^9	12.7	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	79A051
154.076	$CH_3\dot{C}HO^- + CH_3N^+C_5H_4CO_2^-$	3.8×10^9	12.7	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	79A051
154.078	$(CH_3)_2\dot{C}OH + CH_3N^+C_5H_4CO_2^-$	1.5×10^9	8.6	p.r.	P.b.k. at 400 nm in soln contg. 0.5 mol L^{-1} 2-PrOH.	79A106
	Catechol See 1,2-Dihydroxybenzene 176.					
155.	**Chloral hydrate**					
155.078	$(CH_3)_2\dot{C}OH + Cl_3CH(OH)_2$	1×10^6 (rel.)		p.r.	C.k. with *p*-nitroacetophenone in soln. contg. 2-PrOH and acetone; rel. to k(R + PNAP) = 3.8×10^9.	73A140 73A150
	Chloranil See Tetrachlorobenzoquinone 338.					
156.	**Chloroacetic acid**					
156.001	$\cdot CH_3 + ClCH_2CO_2H \rightarrow CH_4 + Cl\dot{C}HCO_2H$	3.0×10^3	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}-H_2O_2 soln.; est. from esr meas. and values for competing reactions.	75D188
156a.	***m*-Chlorobenzonitrile**					
156a.078	$(CH_3)_2\dot{C}O^- + ClC_6H_4CN \rightarrow (CH_3)_2CO + (ClC_6H_4CN)\cdot^-$	$(2 \pm 0.5) \times 10^8$	13	p.r.	P.b.k. at 310 nm (radical anion); $k < 10^7$ at pH 7.	81A001
157.	**Chloroform**					
157.078	$(CH_3)_2\dot{C}OH + CHCl_3$	$<1 \times 10^7$ (rel.)		p.r.	C.k. with *p*-nitroacetophenone in soln. contg. 2-PrOH and acetone; rel. to k(R + PNAP) = 3.8×10^9.	73A140
158.	***p*-Chloronitrobenzene**					
158.111	R + $ClC_6H_4NO_2$ (R = Radicals from glucose)	4.0×10^8		p.r.		77R167
158.147	$\cdot CO_2^- + ClC_6H_4NO_2$	3×10^8		p.r.		77R167
159.	**Crystal Violet**					
159.056	$NH_2\dot{C}HCO_2^- +$ dye	1.2×10^9	7	p.r.	D.k. at 525 nm in N_2O-satd. soln. contg. glycine; 56% *e*-transfer.	73A078
159.078	$(CH_3)_2\dot{C}OH +$ dye	2.3×10^9	7	p.r.	D.k. at 525 nm in N_2O-satd. soln. contg. 2-PrOH; 84% *e*-transfer.	73A078
159.147	$\cdot CO_2^- +$ dye $\rightarrow CO_2 +$ dye$^-$	1.5×10^9	7	p.r.	D.k. at 520 nm as well as p.b.k. at ~400 nm.	73A078
160.	**Cyanoacetic acid**					
160.001	$\cdot CH_3 + CNCH_2CO_2H \rightarrow CH_4 + CN\dot{C}HCO_2H$	$>6.6 \times 10^3$	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}-H_2O_2 soln.; est. from esr and values for competing reactions.	75D188
	2-Cyanoethanol See 3-Hydroxypropionitrile 230.					

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
160a.	**Cystamine**					
160a.142	R + Cys → e-transfer (R = Electron adduct of glycine anhydride)	(1.2 ± 0.3) x 10^8	5.7, 11.0	p.r.	D.k. at 265 nm (R) in soln. contg. 1 mol L^{-1} *tert*-BuOH.	71G554
160a.143	R + Cys → e-transfer (R = Electron adduct of alanine anhydride)	(1.1 ± 0.2) x 10^8	5.1, 11.4	p.r.	D.k. at 265 nm (R) in soln. contg. 1 mol L^{-1} *tert*-BuOH.	71G554
161.	**Cysteamine**					
161.016	$\cdot CH_2C(CH_3)_2OH$ + RSH → $(CH_3)_3COH$ + RS·	1.8 x 10^7		p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. *tert*-BuOH.	68G132
161.018	R′ + RSH (R′ = Radicals from allyl alcohol)	<1 x 10^7		p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. allyl alcohol.	68G132
161.033	$\cdot CH_2COCH_3$ + RSH → CH_3COCH_3 + RS·	~4 x 10^8		p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. acetone.	68G132
161.075	$\cdot CH_2OH$ + RSH → CH_3OH + RS·	6.8 x 10^7	7.6	p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. MeOH; $k \simeq 1 \times 10^7$ at pH 12.	68G132
		2.9 x 10^7	7	p.r.	D.k. in N_2O-satd. soln. contg. MeOH.	72R003
161.076	$CH_3\dot{C}HOH$ + RSH → CH_3CH_2OH + RS·	1.4 x 10^8		p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. EtOH.	68G132
161.078	$(CH_3)_2\dot{C}OH$ + RSH → $(CH_3)_2CHOH$ + RS·	4.2 x 10^8		p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. 2-PrOH.	68G132
		2.0 x 10^8	7	p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH.	72R003
161.079	$CH_3CH_2CH_2\dot{C}HOH$ + RSH → $CH_3CH_2CH_2CH_2OH$ + RS·	8.2 x 10^7		p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. 1-BuOH.	68G132
161.081	$(CH_3)_2CH\dot{C}HOH$ + RSH → $(CH_3)_2CHCH_2OH$ + RS·	1.4 x 10^8		p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. 2-methyl-1-propanol.	68G132
161.095	$\cdot CHOHCH_2CH_2CH_2OH$ + RSH → $(CH_2CH_2OH)_2$ + RS·	1.1 x 10^8		p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. 1,4-butanediol.	68G132
161.111	R′ + RSH → R′H + RS· (R′ = Radicals from glucose)	3.2 x 10^7		p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. glucose.	68A132
162.	**Cysteine**					
162.075	$\cdot CH_2OH$ + RSH → CH_3OH + RS·	0.5[$k(CH_2OH + O_2)$]		γ-r.	C.k. with O_2; obs. CH_2O and glycol yields.	69G524
		4.2 x 10^7	7	p.r.	D.k. in N_2O-satd. soln. contg. MeOH.	72R003
162.062	R + Cys → no e-transfer (R = Radicals from glycine anhydride + OH)	<10^7	6,10, 12	p.r.	No change in d.k. at 265 nm on addn. of cysteine in N_2O-satd. soln.	71G554
162.142	R + Cys → e-transfer (R = Electron adduct of glycine anhydride)	(2.1 ± 0.4) x 10^8	6.4	p.r.	D.k. at 265 nm in soln. contg. 1 mol L^{-1} *tert*-BuOH.	71G554
162.143	R + Cys → e-transfer (R = Electron adduct of alanine anhydride)	(1.4 ± 0.3) x 10^8	7.4	p.r.	D.k. at 265 nm in soln. contg. 1 mol L^{-1} *tert*-BuOH.	71G554
162.144	R + Cys → e-transfer (R = Electron adduct of sarcosine anhydride)	(1.5 ± 0.3) x 10^8	7.0	p.r.	D.k. at 265 nm in soln. contg. 1 mol L^{-1} *tert*-BuOH.	71G554
163.	**Cytochrome c**					
163.016	$\cdot CH_2C(CH_3)_2OH$ + Fe^{3+}cyt c			p.r.	No reaction; p.b.k. at 550 nm in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} *tert*-BuOH.	78A288
163.062	R + Fe^{3+}cyt c (R = Radical from glycine anhydride)	<10^7	6.8	p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. glycine anhydride.	78A288
163.075	$\cdot CH_2OH$ + Fe^{3+}cyt c → Fe^{2+} cyt c	(3.0 ± 0.5) x 10^7	7	p.r.	Abs. change at 550 and 435 nm in N_2O-satd. soln. contg. MeOH; 100% redn.	79A153

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
163.076	$CH_3\dot{C}HOH + Fe^{3+}$cyt c → Fe^{2+}cyt c	2.4×10^8	2.0	p.r.		77A128
		$(1.4 \pm 0.2) \times 10^8$	7	p.r.	Abs. change at 550 and 435 nm in N_2O–satd. soln. contg. EtOH; 100% redn.	79A153
		1.8×10^8	~7	p.r.	Abs. change at 550 and 450 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} EtOH; see also 74A007 and 77A128.	79A312
163.078	$(CH_3)_2\dot{C}OH + Fe^{3+}$cyt c → Fe^{2+}cyt c	3.8×10^8	7	p.r.	P.b.k. at 550 nm; radical from 2–PrOH.	75A012
		1.6×10^8	9.3			
163.096	$\cdot CHOHC(CH_2OH)_3 + Fe^{3+}$cyt c → Fe^{2+}cyt c	$<10^6$	5.6	p.r.	P.b.k. at 550 nm; radical from pentaerythritol.	75A012
		1.4×10^8	9.1			
		1.6×10^8	9.8			
163.106	$\cdot CHOHCHOHCH_2OH + Fe^{3+}$cyt c (+ $CH_2OH\dot{C}OHCH_2OH$)	2.5×10^6	7	p.r.	P.b.k. at 550 nm; radicals from glycerol.	75A012
163.113	$\cdot A^- + Fe^{3+}$cyt c → A + Fe^{2+}cyt c ($\cdot A^-$ = radical from ascorbate ion)	6.6×10^3	7.4	p.r.	D.k. at 360 nm in N_2O–satd. soln. contg. ascorbate	75A240
163.117	$CH_3\dot{C}OHCO_2^- + Fe^{3+}$cyt c → Fe^{2+}cyt c	$(2.4 \pm 0.2) \times 10^8$		p.r.	P.b.k. at 550 nm in soln. contg. lactate.	74A007
		2.3×10^8	7	p.r.	P.b.k. at 550 nm in N_2O–satd. soln.	75A012
		2.5×10^8	11		contg. 0.2 mol L^{-1} lactate.	
163.120	$^-O_2C\dot{C}OHCH_2CO_2^- + Fe^{3+}$cyt c → Fe^{2+}cyt c	$(8.5 \pm 0.8) \times 10^7$	6.4	p.r.	P.b.k. at 550 nm in malate soln.; E_a = 3 kcal mol^{-1} (12 kJ mol^{-1}).	74A007
163.121	$^-O_2C\dot{C}OHCHOHCO_2^- + Fe^{3+}$cyt c	1.7×10^8	7	p.r.	P.b.k. at 550 nm in tartrate soln.	75A012
163.142	R + Fe^{3+}cyt c (R = Electron adduct of glycine anhydride)	8×10^8	6.8	p.r.	P.b.k. at 500 nm in soln. contg. glycine anhydride.	78A288
163.147	$\cdot CO_2^- + Fe^{3+}$cyt c → $CO_2 + Fe^{2+}$cyt c	$\sim 5 \times 10^8$	>4	p.r.	P.b.k. at 550 nm in soln. contg. 0.03–1 mol L^{-1} formate; concn. effect.	71G327
		$\sim 3 \times 10^9$	<4			
		6.9×10^8	7	p.r.	P.b.k. at 550 nm in N_2O–satd. soln.	75A012
		2.5×10^8	10.8		contg. formate.	
		1.0×10^9	6.2	p.r.	Abs. change at 450 and 550 nm	76A127
		6.3×10^8	8.7		in 0.1 mol L^{-1} formate soln.; at pH 6.2 E_a = 2.7 kcal mol^{-1} and $A = 1.0 \times 10^{11}$; at pH 8.7 E_a = 3.0 and $A = 1.0 \times 10^{11}$.	
		$(7 \pm 0.5) \times 10^8$	7.4	p.r.	P.b.k. in N_2O–satd. 0.1 mol L^{-1} formate; $k = (5.0 \pm 0.6) \times 10^8$ in basic soln.	77A096
		7.4×10^8	6.7	p.r.		77A128
		9.4×10^8	2.0			
		1.3×10^9	7.0	p.r.	P.b.k. at 550 nm in 1 atm N_2O, and 0.01 mol L^{-1} formate.	78A288
		1.0×10^8	~7	p.r.	D.k. in formate soln.; I = 0.1.	79A312
164.	**Cytochrome c, acetylated**					
164.076	$CH_3\dot{C}HOH$ + Ac–cyt c	2.5×10^8	~7	p.r.	Abs. change at 550 and 450 nm in N_2O–satd. 0.1 mol L^{-1} EtOH soln.; I = 0.005.	79A312
164.147	$\cdot CO_2^-$ + Ac–cyt c	1.5×10^9	~7	p.r.	D.k. at 550 nm in formate soln.; I = 0.1.	79A312
165.	**Cytochrome c, carboxymethylated**					
165.076	$CH_3\dot{C}HOH$ + Cxm–cyt c	3.5×10^8	~7	p.r.	Abs. change at 550 nm and 450 nm in N_2O–satd. 0.1 mol L^{-1} EtOH soln.	79A312
165.121	$^-O_2C\dot{C}OHCHOHCO_2^-$ + Cxm–cyt c	2.8×10^7	7	p.r.	Radical from tartrate ion	78A288
165.147	$\cdot CO_2^-$ + Cxm–cyt c	1.4×10^8	7	p.r.	Radical from formate ion.	78A288
		1.3×10^8	~7	p.r.	D.k. at 550 nm in formate soln.; I = 0.1.	79A312
167.	**Cytochrome c, succinylated**					
167.076	$CH_3\dot{C}HOH$ + Suc–cyt c	1.8×10^9	~7	p.r.	Abs. change at 550 and 450 nm in N_2O–satd. 0.1 mol L^{-1} EtOH soln.	79A312

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
167.147	$\cdot CO_2^- + $ Suc–cyt c	4.0×10^9	~7	p.r.	D.k. at 550 nm in formate soln.; $I = 0.1$.	79A312
168.	**Cytochrome c_3**					
168.147	$\cdot CO_2^- + $ cyt c_3	2.1×10^8	8.1	p.r.	D.k. in N_2O–satd. formate soln.	78A232
169.	**Cytochrome P450**					
169.147	$\cdot CO_2^- + $ cyt P450				No redn. obs. in N_2O–satd. soln. contg. formate.	79A036
	Deuteroheme See 223.					
	Deuterohemin See 222.					
	Deuteroporphyrin dimethyl ester See 221a.					
170.	**Diamide *(Tetramethyldiazenedicarboxamide)***					
170.078	$(CH_3)_2\dot{C}OH + D \rightarrow D^- + H^+ + (CH_3)_2CO$	$\sim 2.5 \times 10^9$		p.r.	P.b.k. at 400 nm.	75A194
170.147	$\cdot CO_2^- + D \rightarrow D^- + CO_2$; $D = (CH_3)_2NCON{=}NCON(CH_3)_2$	$\sim 2.5 \times 10^9$		p.r.	P.b.k. at 400 nm.	75A194
171.	**1,1′-Dibenzyl-4,4′-bipyridinium ion *(Benzyl viologen)***					
171.078	$(CH_3)_2\dot{C}OH + BV^{2+} \rightarrow (CH_3)_2CO + H^+ + BV^{\cdot +}$	$(3.0 \pm 0.1)\ 10^9$		p.r.	P.b.k. at 400 or 600 nm in N_2O–satd. soln. contg. 0.2 mol L^{-1} 2-PrOH.	76A070
171.147	$\cdot CO_2^- + BV^{2+} \rightarrow CO_2 + BV^{\cdot +}$	6.7×10^9	7.0	p.r.	P.b.k. at 680 nm in N_2O–satd. soln. contg. 0.2 mol L^{-1} formate.	76A169
		1.7×10^{10}	6.8	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate.	78A321
172.	**1,1′-Di(carboxyethyl)-4,4′-bipyridinium ion**					
172.147	$\cdot CO_2^- + BP^{2+} \rightarrow CO_2 + BP^{\cdot +}$	2.0×10^9	7.0	p.r.	P.b.k. at 680 nm in N_2O–satd. soln. contg. 0.2 mol L^{-1} formate.	76A169
173.	**Dichloroindophenol**					
173.056	$NH_2\dot{C}HCO_2^- + $ dye	3.6×10^9	7	p.r.	D.k. at 600 nm in N_2O–satd. soln. contg. glycine; 87% e–transfer.	73A078
173.075	$\cdot CH_2OH + $ dye	3.2×10^9	7	p.r.	D.k. at 600 nm in N_2O–satd. soln. contg. MeOH; 99% e–transfer.	73A078
173.078	$(CH_3)_2\dot{C}OH + $ dye	4.4×10^9	7	p.r.	D.k. at 600 nm in N_2O–satd. soln. contg. 2-PrOH; 88% e–transfer.	73A078
173.147	$\cdot CO_2^- + $ dye	3.5×10^9	7	p.r.	D.k. at 600 nm in N_2O–satd. soln. contg. formate, as well as p.b.k. at ~400 nm; 100% e–transfer.	73A078
174.	**Dichloromethane**					
174.078	$(CH_3)_2\dot{C}OH + CH_2Cl_2 \rightarrow \cdot CH_2Cl + (CH_3)_2CO + H^+ + Cl^-$			γ–r.	No redn. in soln. contg. 1.5×10^{-3} mol L^{-1} Na dodecyl sulfate, 0.2 mol L^{-1} 2-PrOH and 0.1 mol L^{-1} acetone.	79G191
		$\approx 10^6$		p.r.		80A011
175.	**1,1′-Di(4-cyanophenyl)-4,4′-bipyridinium ion**					
175.147	$\cdot CO_2^- + BP^{2+} \rightarrow CO_2 + BP^{\cdot +}$	1.4×10^{10}	6.8	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate.	78A321
	Diethyl ketone See 3-Pentanone 305.					
176.	**1,2-Dihydroxybenzene *(Catechol)***					
176.020	$\cdot CH_2CHO + HOC_6H_4O^- \rightarrow CH_3CHO + {}^-OC_6H_4O\cdot$	7.4×10^8	~11.5	p.r.	Soln. contg. N_2O and ethylene glycol.	79A051
177.	**1,3-Dihydroxybenzene *(Resorcinol)***					

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
177.020	$\cdot CH_2CHO + HOC_6H_4O^- \rightarrow CH_3CHO + {}^-C_6H_4O\cdot$	1.6×10^9	~11.5	p.r.	Soln. contg. N_2O and ethylene glycol.	79A051
	1,4–Dihydroxybenzene See Hydroquinone 227.					
178.	**1,3–Dihydroxy–2–nitrobenzene**					
178.078	$(CH_3)_2\dot{C}OH + (OH)_2C_6H_3NO_2 \rightarrow (CH_3)_2CO + H^+ + (OH)_2C_6H_3\dot{N}O_2^-$	6.8×10^8	7	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH.	76A020
179.	**2–(3,4–Dihydroxyphenyl)ethylamine *(Dopamine)***					
179.113	$\cdot A^- + (OH)_2C_6H_3CH_2CH_2NH_2$ ($\cdot A^-$ = Radical from ascorbate)	$(3.6 \pm 0.4) \times 10^2$	8.4	p.r.	D.k. at 360 nm in N_2O–satd. soln. contg. ascorbate.	75A240
180.	**2,3–Dimethylbenzoquinone**					
180.078	$(CH_3)_2\dot{C}OH + Q \rightarrow (CH_3)_2CO + H^+ + Q\cdot^-$	3.5×10^9	7	p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2–PrOH and 1 mol L^{-1} acetone.	73G125
181.	**2,5–Dimethylbenzoquinone**					
181.078	$(CH_3)_2\dot{C}OH + Q \rightarrow (CH_3)_2CO + H^+ + Q\cdot^-$	3.9×10^9	7	p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2–PrOH and 1 mol L^{-1} acetone.	73G125
181.097	$CH_3\dot{C}(O^-)CH_2CO_2^- + Q \rightarrow Q\cdot^-$	3.3×10^9	9.2	p.r.	P.b.k. at 400 nm in Ar–satd. soln. contg. *tert*–BuOH + acetoacetate ion.	73A104
182.	**2,6–Dimethylbenzoquinone**					
182.078	$(CH_3)_2\dot{C}OH + Q \rightarrow (CH_3)_2\dot{C}OH + H^+ + Q\cdot^-$	4.2×10^9		p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2–PrOH and 1 mol L^{-1} acetone.	73G125
183.	**1,1'–Dimethyl–4,4'–bipyridinium ion *(Methyl viologen)***					
183.075	$\cdot CH_2OH + MV^{2+} \rightarrow CH_2O + H^+ + MV\cdot^+$	3×10^8		p.r.	N_2O–satd. 3% MeOH soln.	77A177
183.147	$\cdot CO_2^- + MV^{2+} \rightarrow CO_2 + MV\cdot^+$	1.5×10^{10}		p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate.	73A074
184.	**Dimethyl fumarate**					
184.078	$(CH_3)_2\dot{C}OH + CH_3O_2CCH{=}CHCO_2CH_3$	4.0×10^9 (uncor.)	7.0	p.r.	12% e–transfer.	73G097
184.147	$\cdot CO_2^- + CH_3O_2CCH{=}CHCO_2CH_3$	9×10^8 (uncor.)	7.0	p.r.	>80% e–transfer.	73G097
185.	**2,3–Dimethylnaphthoquinone**					
185.078	$(CH_3)_2\dot{C}OH + Q \rightarrow (CH_3)_2CO + H^+ + Q\cdot^-$	3.9×10^9	7	p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2–PrOH and 1 mol L^{-1} acetone.	73G125
185a.	**N,N–Dimethyl–4–nitrosoaniline *(RNO)***					
185a.075	$\cdot CH_2OH + RNO$	$(7.9 \pm 0.3) \times 10^8$	7	p.r.	D.k. at 440 nm in N_2O–satd. soln., contg. MeOH.	69G156
185a.076	$CH_3\dot{C}HOH + RNO$	$(2.4 \pm 0.04) \times 10^9$	7	p.r.	D.k. at 440 nm in N_2O–satd. soln. contg. 0.5 mol L^{-1} EtOH.	69G156
185a.078	$(CH_3)_2\dot{C}OH + RNO$	$(3.2 \pm 0.05) \times 10^9$	7	p.r.	D.k. at 440 nm in N_2O–satd. soln. contg. 0.5 mol L^{-1} 2–PrOH.	69G156
185a.147	$\cdot CO_2^- + RNO$	$(1.8 \pm 0.01) \times 10^9$	7	p.r.	D.k. at 440 nm in N_2O–satd. soln. contg. 0.25 mol L^{-1} formate.	69G156
186.	**3,5–Dinitroanisole**					
186.078	$(CH_3)_2\dot{C}OH + dNA \rightarrow (CH_3)_2CO + H^+ + dNA\cdot^-$	2.5×10^9	7	p.r.	P.b.k. at 310 nm in soln. contg. 0.1 mol L^{-1} 2–PrOH; reaction observed as a slower process following fast e_{aq}^- reaction.	79A176
187.	**1,2–Dinitrobenzene**					
187.078	$(CH_3)_2\dot{C}OH + C_6H_4(NO_2)_2 \rightarrow (CH_3)_2CO + H^+ + [C_6H_4(NO_2)_2]\cdot^-$	2.9×10^9	7	p.r.	P.b.k. in N_2O–satd. soln. contg. 2–PrOH; k at pH 0.8 within 20–30%.	76A111

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
188.	**1,3-Dinitrobenzene**					
188.078	$(CH_3)_2\dot{C}OH + C_6H_4(NO_2)_2 \rightarrow (CH_3)_2CO + H^+ + [C_6H_4(NO_2)_2]\cdot^-$	3.6×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20–30%.	76A111
189.	**1,4-Dinitrobenzene**					
189.078	$(CH_3)_2\dot{C}OH + C_6H_4(NO_2)_2 \rightarrow (CH_3)_2CO + H^+ + [C_6H_4(NO_2)_2]\cdot^-$	3.2×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20–30%.	76A111
190.	**2,4-Dinitrobenzoate ion**					
190.078	$(CH_3)_2\dot{C}OH + {}^-O_2CC_6H_3(NO_2)_2 \rightarrow (CH_3)_2CO + H^+ + [{}^-O_2CC_6H_3(NO_2)_2]\cdot^-$	2.9×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20–30%.	76A111
190.147	$\cdot CO_2^- + {}^-O_2CC_6H_3(NO_2)_2 \rightarrow CO_2 + [{}^-O_2CC_6H_3(NO_2)_2]\cdot^-$	1.8×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	76A111
191.	**2,5-Dinitrobenzoate ion**					
191.078	$(CH_3)_2\dot{C}OH + {}^-O_2CC_6H_3(NO_2)_2 \rightarrow (CH_3)_2CO + H^+ + [{}^-O_2CC_6H_3(NO_2)_2]\cdot^-$	3.3×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20–30%.	76A111
191.147	$\cdot CO_2^- + {}^-O_2CC_6H_3(NO_2)_2 \rightarrow CO_2 + [{}^-O_2CC_6H_3(NO_2)_2]\cdot^-$	1.9×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	76A111
192.	**3,4-Dinitrobenzoate ion**					
192.078	$(CH_3)_2\dot{C}OH + {}^-O_2CC_6H_3(NO_2)_2 \rightarrow (CH_3)_2CO + H^+ + [{}^-O_2CC_6H_3(NO_2)_2]\cdot^-$	3.2×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20–30%.	76A111
192.147	$\cdot CO_2^- + {}^-O_2CC_6H_3(NO_2)_2 \rightarrow CO_2 + [{}^-O_2CC_6H_3(NO_2)_2]\cdot^-$	1.8×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	76A111
193.	**3,5-Dinitrobenzoate ion**					
193.078	$(CH_3)_2\dot{C}OH + {}^-O_2CC_6H_3(NO_2)_2 \rightarrow (CH_3)_2CO + H^+ + [{}^-O_2CC_6H_3(NO_2)_2]\cdot^-$	3.1×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20–30%.	76A111
193.147	$\cdot CO_2^- + {}^-O_2CC_6H_3(NO_2)_2 \rightarrow CO_2 + [{}^-O_2CC_6H_3(NO_2)_2]\cdot^-$	2.5×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	76A111
194.	**3,5-Dinitrobenzonitrile**					
194.111	$R + (NO_2)_2C_6H_3CN \rightarrow [(NO_2)_2C_6H_3CN]\cdot^-$ (R = Radicals from glucose)	1.0×10^9		p.r.		77R167
195.	**1-(2,4-Dinitrophenyl)pyridinium ion**					
195.100	$R + (NO_2)_2C_6H_4N^+C_5H_5 \rightarrow [(NO_2)_2C_6H_4N^+C_5H_5]\cdot^-$ (R = Radicals from glucose)	1.0×10^9		p.r.		77R167
195.147	$\cdot CO_2^- + (NO_2)_2C_6H_4N^+C_5H_5 \rightarrow [(NO_2)_2C_6H_4N^+C_5H_5]\cdot^-$	4×10^8		p.r.		77R167
196.	**1,1′-Diphenyl-4,4′-bipyridinium ion**					
196.147	$\cdot CO_2^- + BP^{2+} \rightarrow CO_2 + BP\cdot^+$	1.3×10^{10}	6.8	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	78A321
197.	**Dithiothreitol**					
197.016	$\cdot CH_2C(CH_3)_2OH + HSCH_2CHOHCHOHCH_2SH \rightarrow (CH_3)_3COH + RS\cdot$ ($\rightarrow RSSR^-$)	$(6.8 \pm 0.6) \times 10^7$	7	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH.	73A020
197.075	$\cdot CH_2OH + RSH \rightarrow CH_3OH + RS\cdot$	$(6.8 \pm 0.6) \times 10^7$	7	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	73A020
197.078	$(CH_3)_2\dot{C}OH + RSH \rightarrow (CH_3)_2CHOH + RS\cdot$	$(2.1 \pm 0.2) \times 10^8$	7	p.r.	P.b.k. at 390 nm in soln. of 2 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	73A020

Dopamine See 2-(3,4-Dihydroxyphenyl)ethylamine 179.

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
198.	**Duroquinone**					
198.078	$(CH_3)_2\dot{C}OH + Q \rightarrow (CH_3)_2CO + H^+ + \cdot Q^-$	4.0×10^9	7	p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	73G125
199.	**Eosin**					
199.076	$CH_3\dot{C}HOH + S \rightarrow CH_3CHO + \cdot S^- + H^+$	$(1.1 \pm 0.2) \times 10^9$	8.5–9.0	p.r.	P.b.k. at 405 nm in soln. contg. 10^{-2} mol L^{-1} EtOH and 10^{-3} mol L^{-1} H_2O_2.	67G038
199.147	$\cdot CO_2^- + S \rightarrow CO_2 + \cdot S^- + H^+$	$(2.5 \pm 0.5) \times 10^8$	8.5–9.0	p.r.	P.b.k. at 405 nm in soln. contg. 10^{-2} mol L^{-1} HCO_2^- and 10^{-3} mol L^{-1} H_2O_2.	67G038
200.	**Ethanol**					
200.001	$\cdot CH_3 + CH_3CH_2OH \rightarrow CH_4 + CH_3\dot{C}HOH$	5.9×10^2 (rel.)		γ-r.	C.k. with O_2; radical from MeI; rel. to $k(CH_3 + O_2) = 4.7 \times 10^9$.	67G041
200.014	$\cdot CH_2CH_2OH + C_2H_5OH \rightarrow C_2H_5OH + CH_3\dot{C}HOH$	16 ± 3		γ-r.	Calcd. from obs. yields and assumed mechanism in oxid. of EtOH by H_2O_2.	70G338
200.047	$\cdot CF_3 + C_2H_5OH \rightarrow CF_3H + C_2H_4OH$	$(4.6 \pm 0.5) \times 10^4$ (rel.)	9–10	γ-r.	C.k. with $\cdot CF_3$ addn. to propylene; obs. CF_3H yield; rel. to $k(CF_3 + HCO_2^-) = 3.4 \times 10^5$.	70G407
201.	**Ethyl acetate**					
201.001	$\cdot CH_3 + CH_3CO_2Et \rightarrow CH_4 + CH_3CO_2\dot{C}HCH_3$	$<1.7 \times 10^3$	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}–H_2O_2 soln.; est. from esr meas. and values for competing reactions.	75D188
202.	**Ethylene**					
202.001	$\cdot CH_3 + CH_2{=}CH_2 \rightarrow \cdot CH_2CH_2CH_3$	4.9×10^3 (rel.)		γ-r.	C.k. with 2-PrOH in soln. contg. MeI; obs. $G(CH_4)$; rel. to $k(\cdot CH_3 + O_2) = 4.7 \times 10^9$.	67G041
202.014	$\cdot CH_2CH_2OH + CH_2{=}CH_2 \rightarrow \cdot CH_2CH_2CH_2CH_2OH$	$(1.6 \pm 0.5) \times 10^6$ (rel.)	4.5	p.r.	Radical from OH + ethylene; contains ~10% (pH 4.5) and ~50% (pH 2) $\cdot C_2H_5$; obs. rate of addn. of Cu^+ to ethylene (Cu^+ from OH + Cu^{2+} in N_2O–satd. soln.); rel. to $k(R + Cu^{2+}) = 1.9 \times 10^7$ (pH 4.5) and 2.2×10^7 (pH 2).	78A322
		$(4.1 \pm 1.2) \times 10^6$ (rel.)	2			
		$(3 \pm 2) \times 10^4$ (rel.)		γ-r.	Calcd. from dose rate effect on yields of α,ω–diols in N_2O–satd. soln. contg. ethylene assuming termination rate constant of chain reaction is 5×10^8.	80A054
202.046	$\cdot CFCl_2 + CH_2{=}CH_2 \rightarrow CFCl_2CH_2\dot{C}H_2$	$\sim 4 \times 10^7$	5.9	p.r.	Est. from condy meas. in soln. contg. $CFCl_3$.	71G026
202.047	$\cdot CF_3 + CH_2{=}CH_2 \rightarrow \cdot CH_2CH_2CF_3$	$(4.0 \pm 0.6) \times 10^7$ (rel.)	9–10	γ-r.	C.k. with 2-PrOH (H abstr. by CF_3); obs. CF_3H yield; rel. to $k(\cdot CF_3 + HCO_2^-) = 3.4 \times 10^5$.	70G407
		$\sim 7 \times 10^8$	5.9	p.r.	Est. from condy. meas. in soln. contg. CF_3Cl.	71G026
203.	**1,1′-Ethylene-2,2′-bipyridinium ion**					
203.147	$\cdot CO_2^- + BP^{2+} \rightarrow CO_2 + \cdot BP^+$	4.0×10^9	7.0	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.2 mol L^{-1} formate ion.	76A169
		1.2×10^{10}	6.8	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate ion.	78A321
204.	**Ethylene glycol**					
204.075	$\cdot CH_2OH + HOCH_2CH_2OH \rightarrow CH_3OH + HO\dot{C}HCH_2OH$	$\sim 10^3$–10^4		γ-r.	Est. from dose effect on yields in MeOH soln.	71G929

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
205.	**Ethyl ether**					
205.048	$\cdot CCl_3 + CH_3CH_2OEt \rightarrow CHCl_3 + CH_3\dot{C}HOEt$	35		γ-r.	Calcd. from dependence of $G(Cl^-)$ on dose rate in soln. contg. 2×10^{-3} mol L^{-1} CCl_4 and 0.5 mol L^{-1} ethyl ether; assume $2k(R + R) = 10^9$.	71G778
206.	***N*-Ethylmaleimide *(NEM)***					
206.016	$\cdot CH_2C(CH_3)_2OH + NEM \rightarrow \cdot NEM\text{-}R$			p.r.	No *e*-transfer; very low addn. rate; radical from *tert*-BuOH.	72G144
206.053	$CH_3CONH\dot{C}H_2 + NEM \rightarrow \cdot NEM\text{-}R$	$\sim 10^8$	6–7	p.r.	100% addn. based on abs. spectra; radical from *N*-methylacetamide.	72G144
206.075	$\cdot CH_2OH + NEM \rightarrow \cdot NEM^- + \cdot NEM\text{-}CH_2OH$	2.4×10^9 (uncor.)	6–7	p.r.	P.b.k. in N_2O-satd. soln. contg. MeOH; 15% *e*-transfer, 85% addn. based on abs. spectra.	72G144
206.078	$(CH_3)_2\dot{C}OH + NEM \rightarrow \cdot NEM^- + \cdot NEM\text{-}R$	5.0×10^9 (uncor.)	6–7	p.r.	47% *e*-transfer, 50% addn. based on abs. spectra; radical from 2-PrOH.	72G144
206.109	R + NEM (R = Radicals from ribose)	2.1×10^9 (uncor.)	6–7	p.r.	30% *e*-transfer, 20% addn. based on abs. spectra.	72G144
206.141	R + NEM $\rightarrow \cdot NEM^-$ (R = Electron adduct of dimethyl fumarate)	2.2×10^9		p.r.	D.k.	73G097
206.147	$\cdot CO_2^- + NEM \rightarrow CO_2 + \cdot NEM^-$	5.4×10^9	6–7	p.r.	P.b.k. in N_2O-satd. soln. contg. formate; 100% *e*-transfer based on abs. spectra.	72G144
207.	**4-Ethylphenoxide ion**					
207.020	$\cdot CH_2CHO + C_2H_5C_6H_4O^- (+ H_2O) \rightarrow CH_3CHO + OH^- + C_2H_5C_6H_4O\cdot$	7.0×10^7	~11.5	p.r.	Soln. contg. N_2O and ethylene glycol.	79A051
208.	**Ferredoxin**					
208.147	$\cdot CO_2^-$ + ferredoxin	$(8.0 \pm 0.7) \times 10^7$	7.5	p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	73A064
	Flagyl See Metronidazole 271.					
	Flavin mononucleotide (FMN) See Riboflavin 5′-phosphate 334.					
209.	**Fluorescein**					
209.076	$CH_3\dot{C}HOH$ + Dye $\rightarrow$ semiquinone	4.5×10^8	10.8	p.r.	D.k. at 500 nm in N_2O-satd. soln. contg. EtOH.	73A078
209.147	$\cdot CO_2^-$ + Dye $\rightarrow$ semiquinone	$(2.6 \pm 0.9) \times 10^7$	10.4	p.r.	P.b.k. in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} formate.	68G172
210.	**Folic acid**					
210.078	$(CH_3)_2\dot{C}OH + FH_2^+$ $(CH_3)_2\dot{C}OH + FH \rightarrow (CH_3)_2CO + H^+ + \cdot FH^-$	1.1×10^9 4.0×10^8	~0.5 6.0	p.r.	P.b.k.; structure and abs. spectra of reduced species dependent on pH.	76A060
211.	**Formaldehyde**					
211.075	$\cdot CH_2OH + CH_2(OH)_2 \rightarrow CH_3OH + \cdot CH(OH)_2$	$\sim 10^4$–10^5		γ-r.	Est. from dose effects on yields in soln. contg. MeOH.	71G929
212.	**Formate ion**					
212.047	$\cdot CF_3 + HCO_2^- \rightarrow CF_3H + \cdot CO_2^-$	$(3.4 \pm 0.7) \times 10^5$	9–10	p.r.	P.b.k. at 270 nm (CO_2^-); radical from $CF_3Cl + e_{aq}^-$.	70G407
213.	***N*-Formylkynurenine**					
213.147	$\cdot CO_2^- + FK (+ H^+) \rightarrow CO_2 + \cdot FKH$	$>3 \times 10^7$	7.6	p.r.	P.b.k. (semiquinone) in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	75F361

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
214.	**Fumarate ion**					
214.047	$\cdot CF_3 + {}^-O_2CCH{=}CHCO_2^- \rightarrow {}^-O_2C\dot{C}HCH(CF_3)CO_2^-$	$\sim 10^8$		*e*–r.	Est. from esr.	71G284
214.075	$\cdot CH_2OH + {}^-O_2CCH{=}CHCO_2^- \rightarrow {}^-O_2C\dot{C}HCH(CH_2OH)CO_2^-$	$\sim 10^7$		*e*–r.	Est. by esr from dose rate effect on $\cdot CH_2OH$ and adduct radical (in 1 mol L^{-1} MeOH and 0.01 mol L^{-1} fumarate) assuming $2k(R + R) = 2.4 \times 10^9$; other radicals adding to fumarate ion were $\cdot CH_3$, $\cdot CHOHCH_3$, $(CH_3)_2\dot{C}OH$, $\cdot CHOHCH_2OH$, $\cdot CH_2NH_2$, $\cdot CH_2Cl$, $\cdot CHClCO_2^-$, $\cdot CO_2^-$, $\cdot CF_3$, and $\cdot CH(CO_2^-)CH_2CO_2^-$.	71G284
214.113	$\cdot A^- + {}^-O_2CCH{=}CHCO_2^-$ ($\cdot A^-$ = ascorbate radical)	<10	8.7	p.r.	D.k. at 360 nm in N_2O–satd. soln. contg. ascorbate ion.	75A240
214.147	$\cdot CO_2^- + {}^-O_2CCH{=}CHCO_2H$	2.0×10^7 (uncor.)	4.0	p.r.	>30% *e*–transfer; no *e*–transfer at pH 10.0.	73G097
215.	**Fumaric acid**					
215.078	$(CH_3)_2\dot{C}OH + HO_2CCH{=}CHCO_2H$	9.0×10^8 (uncor.)	0.5	p.r.	14% *e*–transfer.	73G097
215a.	**Glutathione**					
215a.142	R + GSH → *e* tranefer (R = Electron adduct of glycine anhydride)	$(1.8 \pm 0.3) \times 10^8$	6.4, 7.4	p.r.	D.k. at 265 nm in soln. contg. 1 mol L^{-1} *tert*–BuOH.	71G554
216.	**Glutathione disulfide**					
216.078	$(CH_3)_2\dot{C}OH + GSSG$	$\ll 10^7$	7	p.r.	No 420 nm abs. ($RSSR^-$) obs. in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH.	72G388
216.142	$R + GSSG \rightarrow (GSSG)^-$ (R = Electron adduct of glycine anhydride)	$(4.0 \pm 0.4) \times 10^7$	6.2	p.r.	D.k. at 265 nm in soln. contg. 1 mol L^{-1} *tert*–BuOH.	71G554
216.147	$\cdot CO_2^- + GSSG$	$\ll 10^7$		p.r.	No 420 nm abs. ($RSSR^-$) obs. in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate.	72G388
217.	**Glycine**					
217.001	$\cdot CH_3 + H_2NCH_2CO_2^- \rightarrow CH_4 + H_2N\dot{C}HCO_2^-$	$\sim 1.2 \times 10^2$ (rel.)	~ 10	phot.	$\cdot CH_3$ from cumene hydroperoxide; obs. formn. of CH_4 and C_2H_6; assume $2k(R + R) = 2 \times 10^9$; $k_H/k_D = 10.5$ at pH 11.5 [74F528].	70F280
	$\cdot CH_3 + H_3N^+CH_2CO_2^-$	~ 4 (rel.)				
218.	**Glycine anhydride**					
218.147	$\cdot CO_2^- + -NHCH_2CONHCH_2C(O)-$	$<10^7$	6.2	p.r.	No *e*–transfer obs. in N_2O–satd. soln. contg. 0.2 mol L^{-1} formate.	71G554
219.	**Glycolic acid**					
219.001	$\cdot CH_3 + HOCH_2CO_2H \rightarrow CH_4 + HO\dot{C}HCO_2H$	3.6×10^3	~ 1	chem.	Radical from dimethylsulfoxide in Ti^{III}–H_2O_2 soln.; est. from esr meas. and values for competing reactions.	75D188
220.	**Hematoporphyrin**					
220.075	$\cdot CH_2OH + PH_2 \rightarrow \cdot PH_2^-$	$\leqslant 1 \times 10^7$	7.0	p.r.	P.b.k. at 600–650 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} MeOH.	74A040
	$\cdot CH_2O^- + PH_2 \rightarrow \cdot PH_2^-$	$(3.3 \pm 0.5) \times 10^8$	13.0			
220.076	$CH_3\dot{C}HO^- + PH_2 \rightarrow \cdot PH_2^-$	$(7.0 \pm 1.0) \times 10^8$	13	p.r.	P.b.k. at 600–650 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} EtOH.	74A040
220.078	$(CH_3)_2\dot{C}OH + PH_2 \rightarrow \cdot PH_2^-$	$(2.4 \pm 0.4) \times 10^8$	7.0	p.r.	P.b.k. at 600–650 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH.	74A040
	$(CH_3)_2\dot{C}O^- + PH_2 \rightarrow \cdot PH_2^-$	$(1.1 \pm 0.2) \times 10^9$	13.0			
220.147	$\cdot CO_2^- + PH_2 \rightarrow \cdot PH_2^-$	$(4 \pm 1) \times 10^7$	13.0	p.r.	P.b.k. at 600–650 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate.	74A040

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
221.	**Zinc hematoporphyrin**					
221.078	$(CH_3)_2\dot{C}O^- + ZnP \rightarrow (CH_3)_2CO + ZnP\cdot^-$	$(1.0 \pm 0.1) \times 10^9$	13.0	p.r.	P.b.k. at 600–650 nm in N_2O–satd. soln. contg. 1 mol L^{-1} 2–PrOH.	74A040
221a.	**Deuteroporphyrin dimethyl ester**					
221a.001	$\cdot CH_3 + DP$	(1 to 2) x 10^7	~13	p.r.	Est. from abs. change in soln. contg. 6.5 mol L^{-1} 2–PrOH, 0.7 mol L^{-1} acetone and 2.3 x 10^{-2} mol L^{-1} CH_3I; cor. for $\cdot CH_3 + \cdot CH_3$.	81A002
221a.078	$(CH_3)_2\dot{C}O^- + DP \rightarrow DP^-$	$(6 \pm 1) \times 10^8$	~13	p.r.	Abs. change in soln. contg. 6.5 mol L^{-1} 2–PrOH and 0.7 mol L^{-1} acetone.	81A002
	Deuteroporphyrin (ferri) See Deuterohemin 222.					
	Deuteroporphyrin (ferro) See Deuteroheme 223.					
222.	**Deuterohemin**					
222.001	$\cdot CH_3 + DH(Fe^{III}) \rightarrow$ addn.	$(2.3 \pm 0.5) \times 10^9$ ~1.3 x 10^9	~13 7	p.r.	Abs. change in soln. contg. 6.5 mol L^{-1} 2–PrOH and 4.1 x 10^{-3} mol L^{-1} methyl iodide.	81A002
222.050	$\cdot CCl_3 + DH(Fe^{III})$	$\leqslant 10^6$	7.2	p.r.	No spectral change in soln. contg. 6.5 mol L^{-1} 2–PrOH, 5 x 10^{-3} mol L^{-1} CCl_4 and 10^{-4} mol L^{-1} deuterohemin.	80A011
222.078	$(CH_3)_2\dot{C}OH + DH(Fe^{III}) \rightarrow DH(Fe^{II})$	3.7 x 10^8	7.2	p.r.	D.k. in Ar–satd. soln. contg. 6.5 mol L^{-1} 2–PrOH and 3.4 x 10^{-2} mol L^{-1} acetone.	80A011
	$(CH_3)_2\dot{C}O^- + DH(Fe^{III}) \rightarrow DH(Fe^{II})$	$(9 \pm 1) \times 10^6$	~13	p.r.	D.k. in soln. contg. 6.5 mol L^{-1} 2–PrOH.	81A002
223.	**Deuteroheme**					
223.001	$\cdot CH_3 + DH(Fe^{II}) \rightarrow$ addn.	$(3.9 \pm 0.5) \times 10^9$	7	p.r.	Abs. change in 6.5 mol L^{-1} 2–PrOH soln. of deuterohemin chemically reduced by dithionite to which methyl chloride was added.	81A002
223.043	$\cdot CH_2Cl + DH(Fe^{II})$	2 x 10^9	7.2	p.r.	Abs. change in soln. of deuterohemin chemically reduced by dithionite to which 4 x 10^{-2} mol L^{-1} CH_2Cl_2 was added.	80A011
223.048	$\cdot CCl_3 + DH(Fe^{II})$	$(2 \pm 1) \times 10^9$	7.2	p.r.	Abs. change in soln. contg. 6.5 mol L^{-1} 2–PrOH, 3.2 x 10^{-2} mol L^{-1} acetone, CCl_4, and deuterohemin, the latter reduced by $(CH_3)_2\dot{C}OH$.	80A011
223.078	$(CH_3)_2\dot{C}OH + DH(Fe^{II})$	$(6.3 \pm 0.5) \times 10^8$	7	p.r.	Abs. change in 6.5 mol L^{-1} 2–PrOH soln. of deuterohemin chemically reduced by dithionite to which 0.7 mol L^{-1} acetone was added.	81A002
224.	**Hemin *(Protoferriheme IX)***					
224.076	$CH_3\dot{C}HO^- + H(Fe^{III}) \rightarrow H(Fe^{II})$	$(9.0 \pm 1.0) \times 10^8$	13	p.r.	Soln. 30% EtOH, N_2O–satd.	74A040
	$CH_3\dot{C}HOH + H(Fe^{III}) \rightarrow H(Fe^{II})$	7.7 x 10^8	7	p.r.	Redn. obs. at 560 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} EtOH.	77A128
		$(5.6 \pm 0.6) \times 10^8$ $(1.6 \pm 0.6) \times 10^9$	9.2 4.0	p.r.	D.k. at 490 nm in N_2O–satd. soln. contg. 1 mol L^{-1} EtOH and 0.2 mol L^{-1} Na dodecylsulfate (micelles).	78A033
225.	**Hemin c**					
225.078	$(CH_3)_2\dot{C}OH + H(Fe^{III}) \rightarrow H(Fe^{II})$	$(2.8 \pm 0.6) \times 10^9$	7.0	p.r.	P.b.k. at 413 nm in N_2O–satd. soln. contg. 0.04 mol L^{-1} 2–PrOH.	75A241
225.096	$\cdot CHOHC(CH_2OH)_3 + H(Fe^{III}) \rightarrow H(Fe^{II})$	$(3.0 \pm 0.6) \times 10^8$ $(2.8 \pm 0.6) \times 10^8$	7.0 11.8	p.r.	P.b.k. at 413 nm in N_2O–satd. soln. contg. 0.25 mol L^{-1} pentaerythritol.	75A241

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
225.106	$CH_2OH\dot{C}OHCH_2OH + H(Fe^{III}) \rightarrow H(Fe^{II})$ (+ $CH_2OHCHOH\dot{C}HOH$)	$(1.3 \pm 0.3) \times 10^9$	7.0	p.r.	P.b.k. in N_2O–satd. soln. contg. 10^{-2} mol L^{-1} glycerol.	75A241
225.117	$CH_3\dot{C}OHCO_2^- + H(Fe^{III}) \rightarrow H(Fe^{II})$	$(5.6 \pm 1.1) \times 10^8$	7.0	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.025 mol L^{-1} lactate.	75A241
225.121	$O_2CCHOH\dot{C}OHCO_2^- + H(Fe^{III}) \rightarrow H(Fe^{II})$	$(8.1 \pm 1.6) \times 10^7$	7.0	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.02 mol L^{-1} tartrate.	75A241
225.147	$\cdot CO_2^- + H(Fe^{III}) \rightarrow H(Fe^{II})$	$(1.3 \pm 0.3) \times 10^9$	7.0	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.02 mol L^{-1} formate.	75A241
226.	**Hemoglobin**					
226.075	$\cdot CH_2OH + H(Fe^{III}) \rightarrow H(Fe^{II})$	$(9.5 \pm 1.5) \times 10^6$	7	p.r.	Abs. change at 550 and 435 nm in N_2O–satd. soln. contg. MeOH; 100% redn.	79A153
226.076	$CH_3\dot{C}HOH + H(Fe^{III}) \rightarrow H(Fe^{II})$	$(4.0 \pm 0.4) \times 10^7$	7	p.r.	Abs. change at 550 and 435 nm in N_2O–satd. soln. contg. EtOH; 100% redn.	79A153
227.	**Hydroquinone**					
227.016	$\cdot CH_2C(CH_3)_2OH + HOC_6H_4OH \rightarrow (CH_3)_3COH + OC_6H_4O\cdot$	$\leqslant 2 \times 10^6$	11.5	p.r.	Semiquinone not formed in *tert*–BuOH soln.	79A051
227.020	$\cdot CH_2CHO + HOC_6H_4O^- \rightarrow CH_3CHO + {}^-OC_6H_4O\cdot$	$(2.2 \pm 0.1) \times 10^9$	~11.5	p.r.	Soln. contg. N_2O and ethylene glycol or 2–methoxy– or 2–ethoxy–ethanol.	79A051
	$\cdot CH_2CHO + HOC_6H_4OH$	$\leqslant 2 \times 10^6$	7.2	p.r.	Radical from 2–chloroethanol.	79A051
227.021	$CH_3\dot{C}HCHO + HOC_6H_4O^-$	$(1.2 \pm 0.1) \times 10^9$	~11.5	p.r.	P.b.k. at 430 nm (semiquinone) in N_2O–satd. soln. contg. 1,2–propanediol; radical mixture.	79A051
227.023	$CH_3CO\dot{C}H_2 + HOC_6H_4O^-$					
227.024	$CH_3CO\dot{C}H_2CH_3 + HOC_6H_4O^-$	$(5.6 \pm 0.5) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 2,3–butanediol.	79A051
227.025	$-(CH_2)_4\dot{C}HCO- + HOC_6H_4O^-$	$(5.5 \pm 1.9) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 1,2–cyclohexanediol.	79A051
227.026	$HOCH_2\dot{C}HCHO + HOC_6H_4O^-$ (and $HOCH_2CO\dot{C}H_2$)	$(1.3 \pm 0.1) \times 10^9$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 2,3–epoxypropanol; radical also obtained from glycerol, $k = (1.5 \pm 0.1) \times 10^9$ and glycerol 2–phosphate, $k = (1.7 \pm 0.2) \times 10^9$.	79A051
227.027	$HOCH_2CH_2CO\dot{C}H_2 + HOC_6H_4O^-$	$(6.2 \pm 0.8) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 2–hydroxyfuran.	79A051
227.028	$HO(CH_2)_3\dot{C}HCHO + HOC_6H_4O^-$	$(8.6 \pm 1.2) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 2–(hydroxymethyl)furan.	79A051
227.029	$HO(CH_2)_4\dot{C}HCHO + HOC_6H_4O^-$	$(5.2 \pm 0.9) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 2–(hydroxymethyl)pyran.	79A051
227.030	$R + HOC_6H_4O^-$ (R = Radicals from erythritol)	$(1.3 \pm 0.3) \times 10^9$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. *meso*–erythritol.	79A051
227.031	$R + HOC_6H_4O^-$ (R = Radicals from xylitol)	$(1.2 \pm 0.1) \times 10^9$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. xylitol.	79A051
227.032	$-(CHOH)_3CH_2\dot{C}HCO- + HOC_6H_4O^-$	$(6.4 \pm 1.1) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. *meso*–inositol.	79A051
227.033	$R + HOC_6H_4O^-$ (R = Radicals from sorbitol)	$(9.8 \pm 1.3) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. sorbitol.	79A051
227.109	$R + HOC_6H_4O^-$ (R = Radicals from ribose)	$(9.6 \pm 1) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. ribose.	79A051
227.111	$R + HOC_6H_4O^-$ (R = Radicals from glucose)	$(7.1 \pm 0.9) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. glucose.	79A051

1–(2–Hydroxyethyl)–2–methyl–5–nitroimidazole See Metronidazole 271.

1–(2–Hydroxy–3–methoxypropyl)–2–nitroimidazole See Misonidazole 272.

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
228.	**2-Hydroxy-1,4-naphthoquinone**					
228.042	R + Q → ·Q$^-$ (R = Radicals from triglycine)	1.9 x 10^9	10	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. triglycine.	73A104
228.056	$NH_2\dot{C}HCO_2^-$ + Q → ·Q$^-$	(3.1 ± 0.3) x 10^9	8.0	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycine.	73A104
228.078	$(CH_3)_2\dot{C}OH$ + Q → ·Q$^-$	(3.4 ± 0.3) x 10^9	7.0	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 2-PrOH.	73A104
228.097	$CH_3\dot{C}(O^-)CH_2CO_2^-$ + Q → ·Q$^-$	(1.5 ± 0.2) x 10^9	9.2	p.r.	P.b.k. at 400 nm in Ar-satd. soln. contg. acetoacetate ion and *tert*-BuOH.	73A104
228.115	·$CHOHCO_2^-$ + Q → ·Q$^-$	(9.1 ± 0.9) x 10^8	7.0	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycolate.	73A104
228.147	·CO_2^- + Q → ·Q$^-$	(1.95 ± 0.2) x 10^9	7.0	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. formate.	73A104
229.	**3-Hydroxy-2-nitrobenzoate ion**					
229.078	$(CH_3)_2\dot{C}OH$ + $^-O_2CC_6H_3(OH)NO_2$ → $(CH_3)_2CO$ + H^+ + $^-O_2CC_6H_3(OH)\dot{N}O_2^-$	3.3 x 10^8	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	76A020
230.	**3-Hydroxypropionitrile**					
230.001	·CH_3 + $CNCH_2CH_2OH$ → CH_4 + $CNCH_2\dot{C}HOH$	<1.6 x 10^3	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}-H_2O_2 soln.; est from esr meas. and values for competing reactions.	75D188
	4-Hydroxy-2,2,6,6-tetramethyl-1-piperidinyloxy See Tetramethylhydroxypiperidinyloxy(TMPN) 343.					
231.	**Indigo disulfonate**					
231.056	$NH_2\dot{C}HCO_2^-$ + Dye	2.8 x 10^9	9	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. glycine; 71% *e*-transfer.	73A078
231.075	·CH_2OH + Dye	2.0 x 10^9 1.9 x 10^9	7 9	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. MeOH; *e*-transfer 75% at pH 7 and 62% at pH 9.	73A078
231.078	$(CH_3)_2\dot{C}OH$ + Dye	4.0 x 10^9	7,9	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. 2-PrOH; 88% *e*-transfer.	73A078
231.147	·CO_2^- + Dye → CO_2 + Dye$^-$	2.0 x 10^9	7.0	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. formate.	73A078
		2.1 x 10^9	7.0	p.r.	P.b.k. at 400 nm.	73A078
232.	**Indigo tetrasulfonate**					
232.056	$NH_2\dot{C}HCO_2^-$ + Dye	2.6 x 10^9	7.0	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. glycine; 78% *e*-transfer.	73A078
232.075	·CH_2OH + Dye	3.0 x 10^9	7	p.r.	D.k. at 610 nm in N_2O-satd. ssoln. contg. MeOH; 80% *e*-transfer.	73A078
232.078	$(CH_3)_2\dot{C}OH$ + Dye	4.2 x 10^9	7	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. 2-PrOH; 89% *e*-transfer.	73A078
233.	**Indophenol**					
233.075	·CH_2OH + Dye	3.1 x 10^9	9	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. MeOH; 92% *e*-transfer.	73A078
233.078	$(CH_3)_2\dot{C}OH$ + Dye	4.0 x 10^9	9	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. 2-PrOH; 86% *e*-transfer.	73A078
233.147	·CO_2^- + Dye → CO_2 + Dye$^-$	2.8 x 10^9	9.0	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. formate.	73A078
		2.7 x 10^9	9.0	p.r.	P.b.k. at ~400 nm.	73A078
233a.	**Zinc(II) Insulin**					
233a.147	·CO_2^- + Zn(II)Insulin	6 x 10^8	9.0	p.r.	P.b.k. at 420 nm in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} formate; based on monomer concn.	80A204

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
234.	**Iodoacetamide**					
234.078	$(CH_3)_2\dot{C}OH + ICH_2CONH_2$	4×10^8 (rel.)		p.r.	C.k. with *p*-nitroacetophenone in soln. contg. 2-PrOH and acetone; rel. to k(R + PNAP) = 3.8×10^9.	73A140
235.	**Iodoacetate ion**					
235.078	$(CH_3)_2\dot{C}OH + ICH_2CO_2^-$	7×10^7 (rel.)		p.r.	C.k. with *p*-nitroacetophenone in soln. contg. 2-PrOH and acetone; rel. to k(R + PNAP) = 3.8×10^9.	73A140
236.	**Iodoacetic acid**					
236.016	$\cdot CH_2C(CH_3)_2OH + ICH_2CO_2H \rightarrow ICH_2C(CH_3)_2OH + \cdot CH_2CO_2H$	$(1.3 \pm 0.3) \times 10^7$ (rel.)	1	chem.	Est. from esr meas. in Ti^{III}–H_2O_2 soln. contg. *tert*-BuOH; rel. to $2k(\cdot CH_2CO_2H + \cdot CH_2CO_2H) = 1.8 \times 10^9$.	74D286
236.075	$\cdot CH_2OH + ICH_2CO_2H \rightarrow \cdot CH_2CO_2H$ + prod.	$(2.1 \pm 0.7) \times 10^8$ (rel.)	1	chem.	Est. from esr meas. in Ti^{III}–H_2O_2 soln. contg. MeOH; rel. to $2k(\cdot CH_2CO_2H + \cdot CH_2CO_2H) = 1.8 \times 10^9$.	74D286
		$<3.5 \times 10^8$		p.r.	P.b.k. at 330 nm.	74D286
237.	**Iodoacetonitrile**					
237.016	$\cdot CH_2C(CH_3)_2OH + ICH_2CN \rightarrow ICH_2C(CH_3)_2OH + \cdot CH_2CN$	2.0×10^7 (rel.)	1	chem.	Est. from esr meas. in Ti^{III}–H_2O_2 soln. contg. *tert*-BuOH; rel. to $2k(\cdot CH_2CN + \cdot CH_2CN) = 2 \times 10^9$.	74D286
238.	**Iodoethanol**					
238.016	$\cdot CH_2C(CH_3)_2OH + ICH_2CH_2OH \rightarrow ICH_2C(CH_3)_2OH + \cdot CH_2CH_2OH$	1.5×10^5 (rel.)	1	chem.	Est. from esr meas in Ti^{III}–H_2O_2 soln. contg. *tert*-BuOH; rel. to $2k(\cdot CH_2CH_2OH + \cdot CH_2CH_2OH) = 1.9 \times 10^9$.	74D286
238a.	**Iodomethane**					
238a.078	$(CH_3)_2\dot{C}O^- + CH_3I \rightarrow \cdot CH_3$ $(CH_3)_2\dot{C}OH + CH_3I$	$(1.1 \pm 0.1) \times 10^8$ $<10^5$	~13 7	p.r.	C.k. with PNAP in soln. contg. 6.5 mol L^{-1} 2-PrOH and 0.68 mol L^{-1} acetone assuming $k = 2.2 \times 10^9$ (279.078).	81A002
239.	**3-Iodopropionic acid**					
239.016	$\cdot CH_2C(CH_3)_2OH + ICH_2CH_2CO_2H \rightarrow ICH_2C(CH_3)_2OH + \cdot CH_2CH_2CO_2H$	1.8×10^5 (rel.)	1	chem.	Est. from esr meas. in Ti^{III}–H_2O_2 soln. contg. *tert*-BuOH; rel. to $2k(\cdot CH_2CH_2CO_2H + \cdot CH_2CH_2CO_2H) = 2.4 \times 10^9$.	74D286
239.075	$\cdot CH_2OH + ICH_2CH_2CO_2H \rightarrow \cdot CH_2CH_2CO_2H$ + prod.	1.0×10^5 (rel.)	1	chem.	Est. from esr meas. in Ti^{III}–H_2O_2 soln. contg. MeOH; rel. to $2k(\cdot CH_2CH_2CO_2H + \cdot CH_2CH_2CO_2H) = 2.4 \times 10^9$.	74D286
240.	**3-Iodotyrosine**					
240.147	$\cdot CO_2^- + IC_6H_3(OH)CH_2CH(^+NH_3)CO_2H \rightarrow CO_2 + I^- + \cdot Ar$	$(1.3 \pm 0.1) \times 10^5$	3.0	X-r.	Est. from dependence of tyrosine yields on irrad. time in soln. contg. 10^{-2} mol L^{-1} formate assuming $2k$(R + R) = 5.0×10^8.	72G610
241.	**Isobutylene**					
241.001	$\cdot CH_3 + (CH_3)_2C{=}CH_2 \rightarrow$ addn.	3.9×10^4 (rel.)		γ-r.	C.k. with MeOH in soln. contg. MeI obs. $G(CH_4)$; rel. to $k(\cdot CH_3 + O_2) = 4.7 \times 10^9$.	67G041
242.	**Isobutyric acid**					
242.001	$\cdot CH_3 + (CH_3)_2CHCO_2H \rightarrow CH_4 + (CH_3)_2\dot{C}CO_2H$	9.0×10^3 (rel.)	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}–H_2O_2–soln.; est. from esr meas. and values for competing reactions.	75D188

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
243.	**Isobutyronitrile**					
243.001	$\cdot CH_3 + (CH_3)_2CHCN \rightarrow CH_4 + (CH_3)_2\dot{C}CN$	4.5×10^3 (rel.)	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}–H_2O_2–soln.; est. from esr meas. and values for competing reactions.	75D188
244.	**Isonicotinamide**					
244.078	$(CH_3)_2\dot{C}OH + NH^+ \rightarrow (CH_3)_2CO + H^+ + \cdot NH$	$(3.1 \pm 0.6) \times 10^9$	0.7	p.r.	P.b.k. (pyridinyl radical) in N_2O–satd. soln. contg. 2–PrOH.	74A089
245.	**Isonicotinic acid**					
245.078	$(CH_3)_2\dot{C}OH + H^+NC_5H_4CO_2H$	2.0×10^9	0.4	p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N_2O–satd. soln. contg. 0.5 mol L^{-1} 2–PrOH.	74A106
	$(CH_3)_2\dot{C}OH + H^+NC_5H_4CO_2^-$	8.5×10^8	3.2			
	$(CH_3)_2\dot{C}OH + NC_5H_4CO_2^-$	$<1 \times 10^6$	9.0			
	$(CH_3)_2\dot{C}O^- + NC_5H_4CO_2^-$	2×10^8	13.3			
	Isopropanol See 2–Propanol 314.					
246.	**α–Ketoglutarate ion**					
246.113	$\cdot A^- + {}^-O_2CCH_2CH_2COCO_2^-$ ($\cdot A^-$ = ascorbate radical)	<10	9.7	p.r.	D.k. at 360 nm in N_2O–satd. soln. contg. ascorbate ion.	75A240
247.	**Lactate ion**					
247.113	$\cdot A^- + CH_3CHOHCO_2^-$ ($\cdot A^-$ = ascorbate radical)	<10	8.6	p.r.	D.k. at 360 nm in N_2O–satd. soln. contg. ascorbate ion	75A240
248.	**Lactic acid**					
248.001	$\cdot CH_3 + CH_3CHOHCO_2H \rightarrow CH_4 + CH_3\dot{C}OHCO_2H$	1.2×10^4	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}–H_2O_2 soln.; est. from esr meas. and values for competing reactions.	75D188
249.	**Lipoate ion**					
249.076	$CH_3\dot{C}HOH + RSSR \rightarrow (RSSR)^- + CH_3CHO + H^+$	1.0×10^8	7	p.r.	P.b.k. at 410 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} EtOH.	70G560
249.078	$(CH_3)_2\dot{C}OH + RSSR \rightarrow (RSSR)^- + (CH_3)_2CO + H^+$	1.8×10^8	7	p.r.	P.b.k. at 410 nm in soln. contg. 1 mol L^{-1} acetone and 2–PrOH.	70G560
249.147	$\cdot CO_2^- + RSSR \rightarrow (RSSR)^- + CO_2$	5.5×10^8	7	p.r.	P.b.k. at 410 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate ion.	70G560
		5.6×10^8	6.1–9.2	p.r.	P.b.k. at 410 nm; $k = 9 \times 10^8$ at pH 3.	75A195
	RSSR = $-SCH_2CH_2CH[(CH_2)_4CO_2^-]S-$					
250.	**Lumazine**					
250.078	$(CH_3)_2\dot{C}OH + LH_2 \rightarrow (CH_3)_2CO + LH_3\cdot$	$(1.3 \pm 0.1) \times 10^9$	0.8, 5.1	p.r.	P.b.k. in N_2O–satd. solns. of 1–2 mol L^{-1} 2–PrOH; 100%, 70% and 85% *e*–transfer at acid pH and pH 9.5 and 14.0, resp.	75A056
	$(CH_3)_2\dot{C}OH + LH^- \rightarrow (CH_3)_2CO + LH_2\cdot^-$	$(1.7 \pm 0.2) \times 10^8$ (uncor.)	9.5			
	$(CH_3)_2\dot{C}O^- + L^{2-} \rightarrow (CH_3)_2CO + LH\cdot^{2-}$	$(1.0 \pm 0.2) \times 10^9$ (uncor.)	14.0			
251.	**Lysozyme**					
251.147	$\cdot CO_2^- + lys \rightarrow CO_2 + (-SS-)^-$	$\sim 5 \times 10^8$	~6	p.r.	P.b.k. at 420 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate and 2×10^{-4} mol L^{-1} lysozyme; value from graph; k pH–dependent.	75A080
252.	**Maleic acid**					
252.078	$(CH_3)_2\dot{C}OH + HO_2CCH{=}CHCO_2H$	2.2×10^8 (uncor.)	0.5	p.r.	18% *e*–transfer; no *e*–transfer at pH 10.0 (dianion).	73G097
252.147	$\cdot CO_2^- + HO_2CCH{=}CHCO_2^-$	1.1×10^8 (uncor.)	5.2	p.r.	⩾ 65% *e*–transfer; no *e*–transfer at at pH 10.5 (dianion).	73G097
	Menaquinone See 2–Methylnaphthoquinone 262.					

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
253.	**2-Mercaptoethanol**					
253.014	$\cdot CH_2CH_2OH + HO(CH_2)_2SH \rightarrow CH_3CH_2OH + HO(CH_2)_2\cdot S$	$(4.7 \pm 0.7) \times 10^7$	10	p.r.	P.b.k. ($RSSR^-$) in Ar-satd. soln.; radical from $e_{aq}^- + HO(CH_2)_2SH$.	69G553
253.016	$\cdot CH_2C(CH_3)_2OH + HO(CH_2)_2SH \rightarrow (CH_3)_3COH + HO(CH_2)_2S\cdot$	$(8.2 \pm 1.2) \times 10^7$	10	p.r.	P.b.k. at 420 nm ($RSSR^-$) in N_2O-satd. soln. contg. 0.1 mol L^{-1} *tert*-BuOH.	69G553
253.075	$\cdot CH_2OH + HO(CH_2)_2SH \rightarrow CH_3OH + HO(CH_2)_2S\cdot$	$(1.3 \pm 0.2) \times 10^8$	10	p.r.	P.b.k. ($RSSR^-$) in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	69G553
253.076	$CH_3\dot{C}HOH + HO(CH_2)_2SH \rightarrow CH_3CH_2OH + HO(CH_2)_2S\cdot$	$(2.3 \pm 0.3) \times 10^8$	10	p.r.	P.b.k. ($RSSR^-$) in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	69G553
253.078	$(CH_3)_2\dot{C}OH + HO(CH_2)_2SH \rightarrow (CH_3)_2CHOH + HO(CH_2)_2S\cdot$	$(5.1 \pm 0.8) \times 10^8$	10	p.r.	P.b.k. ($RSSR^-$) in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	69G553
253a.	**3-Mercaptopropionate ion**					
253a.142	$R + HSCH_2CH_2CO_2^- \rightarrow e$-transfer (R = Electron adduct of glycine anhydride)	$(3.0 \pm 0.3) \times 10^8$	5.3,	p.r.	D.k. at 265 nm in soln. contg. 1 mol L^{-1} *tert*-BuOH.	71G554
254.	**Methanethiol**					
254.001	$\cdot CH_3 + CH_3SH \rightarrow CH_4 + CH_3S\cdot$	$(7.4 \pm 1) \times 10^7$	11	p.r.	P.b.k. ($RSSR^-$) in Ar-satd. soln.; radical from e_{aq}^- reaction with CH_3SH.	69G553
255.	**Methanol**					
255.001	$\cdot CH_3 + CH_3OH \rightarrow CH_4 + \cdot CH_2OH$	2.2×10^2 (rel.)		γ-r.	C.k. with O_2; radical from MeI; rel. to $k(CH_3 + O_2) = 4.7 \times 10^9$.	67G041
		$\geqslant 1 \times 10^2$	1	phot.	Radical from $Co(NH_3)_5O_2CCH_3^{2+}$; est. from effect of addn. of MeOH on CH_4 and C_2H_6 yields.	71F579
255.047	$\cdot CF_3 + CH_3OH \rightarrow CF_3H + \cdot CH_2OH$	$(8.1 \pm 1.2) \times 10^3$ (rel.)	9–10	γ-r.	C.k. with addn. of $\cdot CF_3$ to propylene; obs. $G(CF_3H)$; rel. to $k(CF_3 + HCO_2^-) = 3.4 \times 10^5$.	70G407
255.113	$\cdot A^- + CH_3OH$ ($\cdot A^-$ = ascorbate radical)	<0.1	8.8	p.r.	D.k. at 360 nm in N_2O-satd. soln. contg. ascorbate ion.	75A240
256.	**Methemerythrin**					
256.147	$\cdot CO_2^- + MFe^{3+}$	6.8×10^7	8.2	p.r.	D.k. at 360 nm in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} formate; $I = 0.03$.	79A204
257.	**3-Methoxy-2-nitrotoluene**					
257.078	$(CH_3)_2\dot{C}OH + ArNO_2 \rightarrow (CH_3)_2CO + Ar\dot{N}O_2^-$	2.3×10^8	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	76A020
258.	**4-Methoxyphenoxide ion**					
258.020	$\cdot CH_2CHO + CH_3OC_6H_4O^- (+ H_2O) \rightarrow CH_3CHO + CH_3C_6H_4O\cdot + OH^-$	9.8×10^8	~11.5	p.r.	Soln. contg. N_2O and ethylene glycol.	79A051
259.	**2-Methylbenzoquinone**					
259.078	$(CH_3)_2\dot{C}OH + Q \rightarrow (CH_3)_2CO + H^+ + \cdot Q^-$	3.5×10^9	7	p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	73G125
260.	**Methylene blue**					
260.056	$NH_2\dot{C}HCO_2^- + MB^+$	3.7×10^9	7	p.r.	D.k. at 580 nm in N_2O-satd. soln. contg. glycine; 86% e-transfer.	73A078
260.075	$\cdot CH_2OH + MB^+$	3.4×10^9	7	p.r.	D.k. at 580 nm in N_2O-satd. soln. contg. MeOH; 91% e-transfer.	73A078
260.078	$(CH_3)_2\dot{C}OH + MB^+$	$(4 \pm 2) \times 10^9$		p.r.		73A150
		4.4×10^9	7	p.r.	D.k. at 580 nm in N_2O-satd. soln. contg. 2-PrOH; 91% e-transfer.	73A078

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
260.147	$\cdot CO_2^- + MB^+ \rightarrow CO_2 + MB\cdot$	5.6×10^9	~9	p.r.	D.k. at 580 nm in soln. contg. 0.1 mol L^{-1} formate.	65G396
	$\cdot CO_2H + MB^+ \rightarrow CO_2 + H^+ + MB\cdot$	$\sim 2 \times 10^9$	1.75	p.r.	D.k. at 580 nm.	65G396
	$\cdot CO_2H + MBH^{2+} \rightarrow CO_2 + \cdot MBH_2^+ + H^+$	$\sim 10^9$	H_o= -0.8	p.r.	D.k. at 660 nm.	65G396
	$\cdot CO_2H + MBH_2^{3+} \rightarrow CO_2 + \cdot MBH_2^{2+} + H^+$	$\sim 7 \times 10^8$	H_o= -5.7	p.r.	D.k. at 420 nm.	65G396
261.	**1-Methylguanosine**					
261.078	$(CH_3)_2\dot{C}OH + MG^+ \rightarrow (CH_3)_2CO + MG\cdot + H^+$	8.0×10^7	0.5	p.r.	P.b.k.	75A060
	Methyl iodide See Iodomethane 238a.					
	1-Methylisonicotinic acid See 4-Carboxy-1-methylpyridinium ion 154.					
	Methyl mercaptan See Methanethiol 254.					
262.	**2-Methyl-1,4-naphthoquinone**					
262.011	$\cdot CH_2CH_2NH_2 + Q$		7.5	p.r.	P.b.k. in soln. contg. ethylamine; 10% *e*-transfer; see 262.049.	73A047
262.016	$\cdot CH_2C(CH_3)_2OH + Q$		7.0, 12.4	p.r.	P.b.k. in soln. contg. 0.05 mol L^{-1} *tert*-BuOH; ⩽5% *e*-transfer.	73A047
262.034	$\cdot CH_2CONH_2$ (or $CH_3CO\dot{N}H$) $+ Q \rightarrow \cdot Q^-$	$(1.1 \pm 0.1) \times 10^9$ (uncor.)	6.0, 10.9	p.r.	P.b.k. at 395 nm in soln. contg. acetamide; ~17% *e*-transfer.	73A047
262.049	$CH_3\dot{C}HNH_2 + Q \rightarrow \cdot Q^-$	$(3.3 \pm 0.3) \times 10^9$ (uncor.)	11.6	p.r.	P.b.k. at 395 nm in soln. contg. ethylamine; 34% *e*-transfer.	73A047
262.050	$(CH_3)_2\dot{C}NH_2 + Q \rightarrow \cdot Q^-$	$(3.6 \pm 0.4) \times 10^9$ (uncor.)	11.4	p.r.	P.b.k. at 395 nm in soln. contg. isopropylamine; 41% *e*-transfer; 14% *e*-transfer at pH 9.0.	73A047
262.051	$CH_3\dot{C}HN(C_2H_5)_2 + Q \rightarrow \cdot Q^-$	$(4.6 \pm 0.5) \times 10^9$ (uncor.)	11.6	p.r.	P.b.k. at 395 nm in soln. contg. triethylamine; 37% *e*-transfer; ~10% *e*-transfer at pH 6.	73A047
262.053	$CH_3CONH\dot{C}H_2 + Q \rightarrow \cdot Q^-$	$(2.0 \pm 0.2) \times 10^9$ (uncor.)	6.0, 10.9	p.r.	P.b.k. at 395 nm in soln. contg. *N*-methylacetamide; 19% *e*-transfer.	73A047
262.055	$CH_3CON(CH_3)\dot{C}H_2 + Q$		6.0, 10.9	p.r	11% *e*-transfer in soln. contg. *N,N*-dimethylacetamide.	73A047
262.056	$NH_2\dot{C}HCO_2^- + Q \rightarrow \cdot Q^-$	3.8×10^9 (uncor.)	6.2	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycine; 78% *e*-transfer.	72R057
		$(5.5 \pm 0.6) \times 10^9$ (uncor.)	5.4	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. glycine; 71% *e*-transfer.	73A047
		$(4.0 \pm 0.4) \times 10^9$ (uncor.)	8.0	p.r.	P.b.k. at 395 nm in soln. contg. glycine; 79% *e*-transfer.	73A047 73A104
262.057	$NH_3^+\dot{C}HCONH_2 + Q \rightarrow \cdot Q^-$	$(3.6 \pm 0.4) \times 10^9$ (uncor.)	3.2	p.r.	P.b.k. at 395 nm in soln. contg. glycinamide; 24% *e*-transfer.	73A047
	$NH_2\dot{C}HCONH_2 + Q$	5×10^9 (uncor.)	8.0	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycinamide; 38% *e*-transfer.	72R057
		$(5.4 \pm 0.5) \times 10^9$ (uncor.)	10.4	p.r.	P.b.k. at 395 nm in soln. contg. glycinamide; 41% *e*-transfer.	73A047
262.058	$R + Q \rightarrow \cdot Q^-$ (R = Radicals from glycyl glycinamide)	$(8.5 \pm 0.9) \times 10^8$ $(8.5 \pm 0.9) \times 10^8$ (uncor.)	6.8 11.0	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. glycylglycinamide; 25% *e*-transfer at pH 6.8 (16% *e*-transfer at pH 5.5 and 45% at pH 11.0).	73A047
262.059	$CH_3NH\dot{C}HCO_2^- + Q \rightarrow \cdot Q^-$	$(1.1 \pm 0.1) \times 10^9$ (uncor.)	6.0	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. sarcosine; 33% *e*-transfer.	73A047
		$(1.7 \pm 0.2) \times 10^9$ (uncor.)	12.5	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. sarcosine; 64% *e*-transfer.	73A047
262.061	$CH_3CON(CH_3)\dot{C}HCO_2^- + Q \rightarrow \cdot Q^-$	$(1.3 \pm 0.1) \times 10^9$ $(1.0 \pm 0.1) \times 10^9$ (uncor.)	7.0 12.5	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. acetylsarcosine; 39% *e*-transfer at pH 7, 38% at pH 12.5.	73A047

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
262.062	R + Q → ·Q$^-$ (R = Radical from glycine anhydride)	(4.0 ± 0.4) x 10^9 (uncor.)	10.9	p.r.	P.b.k. at 395 nm in N_2O–satd. soln. contg. glycine anhydride; 88% *e*–transfer; no *e*–transfer at pH 6.7.	73A047
		5.0 x 10^9 (uncor.)	10.9	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. glycine anhydride; 85% *e*–transfer; no *e*–transfer at pH 7.0.	72R057
262.063	R + Q → ·Q$^-$ (R = Radical from alanine anhydride	(3.1 ± 0.3) x 10^9 (uncor.)	10.9	p.r.	P.b.k. at 395 nm in soln. contg. alanine anhydride, 75% *e*–transfer.	73A047
262.065	R + Q → ·Q$^-$ (R = Radicals from diglycine)	(1.2 ± 0.1) x 10^9 (uncor.)	6.6 11.0	p.r.	P.b.k. at 395 nm in N_2O–satd. soln. contg. diglycine; 19% *e*–transfer at pH 6.6 and 47% at pH 11.	73A047
262.066	R + Q → ·Q (R = Radicals from glycylsarcosine)	(1.0 ± 0.1) x 10^9 (uncor.)	10.9	p.r.	P.b.k. at 395 nm in N_2O–satd. soln. contg. glycylsarcosine; 46% *e*–transfer (20% at pH 6.8).	73A047
262.067	R + Q → ·Q$^-$ (R = Radicals from acetyldiglycine)	(3.8 ± 0.4) x 10^9 (uncor.)	12.3	p.r.	P.b.k. at 395 nm in N_2O–satd. soln. contg. acetyldiglycine; 55% *e*–transfer.	73A047
262.068	R + Q → ·Q$^-$ (R = Radicals from triglycine)	(1.8 ± 0.2) x 10^9 (uncor.)	7.0	p.r.	P.b.k. at 395 nm in N_2O–satd. soln. contg. triglycine; 11% *e*–transfer.	73A047
		(1.9 ± 0.2) x 10^9 (uncor.)	10	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. triglycine.	73A104
		(1.8 ± 0.2) x 10^9 (uncor.)	12.0	p.r.	P.b.k. at 395 nm in N_2O–satd. soln. contg. triglycine; 77% *e*–transfer.	73A047
262.069	R + Q → ·Q$^-$ (R = Radicals from acetyltriglycine)	(3.7 ± 0.4) x 10^9 (uncor.)	12.5	p.r.	P.b.k. at 395 nm in N_2O–satd. soln. contg. acetyltriglycine; 50% *e*–transfer.	73A047
262.070	R + Q → ·Q$^-$ (R = Radicals from acetyltrialanine)	(2.1 ± 0.2) x 10^9 (uncor.)	6.9	p.r.	P.b.k. at 395 nm in N_2O–satd. soln. contg. acetyltrialanine; 18% *e*–transfer.	73A047
		(2.6 ± 0.3) x 10^9 (uncor.)	12.3	p.r.	P.b.k. at 395 nm in N_2O–satd. soln. contg. acetyltrialanine; 47% *e*–transfer.	73A047
262.071	R + Q → ·Q$^-$ (R = Radicals from acetyltrisarcosine)	(1.3 ± 0.1) x 10^9 (uncor.)	12.5	p.r.	P.b.k. at 395 nm in N_2O–satd. soln. contg. acetyltrisarcosine; 39% *e*–transfer at pH 12.5 and 7.0.	73A047
262.072	R + Q → ·Q$^-$ (R = Radicals from acetylserineamide)	(1.5 ± 0.2) x 10^9 (1.9 ± 0.2) x 10^9 (uncor.)	6, 9, 11.0	p.r.	P.b.k. at 395 nm in N_2O–satd. soln. contg. acetylserineamide; 52%, 57%, and 68% *e*–transfer, resp., at pH 6, 9, and 11.	73A047
262.073	R + Q → ·Q$^-$ (R = Radicals from acetylasparagine)	(1.5 ± 0.2) x 10^9 (uncor.)	12.5	p.r.	P.b.k. at 395 nm in N_2O–satd. soln. contg. acetylasparagine; 39% *e*–transfer; ~12 % *e*–transfer at pH 3.2 and 6.0.	73A047
262.075	·CH_2OH + Q → ·Q$^-$	(3.7 ± 0.4) x 10^9	7.0	p.r.	P.b.k. at 395 nm in 0.5 mol L^{-1} MeOH; 88% *e*–transfer.	73A047
	·CH_2O^- + Q → ·Q$^-$	(4.4 ± 0.4) x 10^9	12.4	p.r.	P.b.k. at 395 nm in soln. contg. 0.5 mol L^{-1} MeOH; 92% *e*–transfer.	73A047
262.076	$CH_3\dot{C}HOH$ + Q → ·Q$^-$	(3.8 ± 0.4) x 10^9	7.0	p.r.	P.b.k. at 395 nm in soln. contg. 0.5 mol L^{-1} EtOH; 90% *e*–transfer.	73A047
	$CH_3\dot{C}HO^-$ + Q → ·Q$^-$	(4.2 ± 0.4) x 10^9	12.5	p.r.	P.b.k. at 395 nm in soln. contg. 0.5 mol L^{-1} EtOH; 92% *e*–transfer.	73A047
262.078	$(CH_3)_2\dot{C}OH$ + Q → ·Q$^-$	6.2 x 10^9	6.9	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. 2–PrOH; 80% *e*–transfer.	72R057
		(4.2 ± 0.4) x 10^9	7	p.r.	P.b.k. in soln. cont. 1 mol L^{-1} acetone and 1 mol L^{-1} 2–PrOH.	73G125
		(4.1 ± 0.4) x 10^9	7.0	p.r.	P.b.k. in soln. contg. 0.5 mol L^{-1} 2–PrOH; 91% *e*–transfer.	73A047
		(4.8 ± 0.5) x 10^9	7.0	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. 2–PrOH.	73A104
	$(CH_3)_2\dot{C}O^-$ + Q → ·Q$^-$	(4.2 ± 0.4) x 10^9	12.4	p.r.	P.b.k. in soln. contg. 0.5 mol L^{-1} EtOH; 91% *e*–transfer.	73A047

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
262.079	$CH_3CH_2CH_2\dot{C}HOH + Q \rightarrow \cdot Q^-$	$(4.1 \pm 0.4) \times 10^9$ $(4.2 \pm 0.4) \times 10^9$ (uncor.)	7.0 12.7	p.r.	P.b.k. in soln. contg. 0.05 mol L^{-1} 1-BuOH; 32.3% (pH 7) and 40% (pH 12.7) *e*-transfer.	73A047
262.097	$CH_3\dot{C}(O^-)CH_2CO_2^- + Q \rightarrow \cdot Q^-$	$(3.7 \pm 0.4) \times 10^9$	9.2	p.r.	P.b.k. at 395 nm in soln. contg. acetoacetate and 1 mol L^{-1} *tert*-BuOH; 95% *e*-transfer.	73A047 73A104
262.108	$R + Q \rightarrow \cdot Q^-$ (R = Radicals from deoxyribose)	4×10^9 (uncor.)	6.8	p.r.	P.b.k. at 400 nm in soln. contg. deoxyribose; 74% *e*-transfer.	72R057
		$(2.1 \pm 0.2) \times 10^9$ (uncor.)	6.8	p.r.	P.b.k. in soln. contg. 0.05 mol L^{-1} deoxyribose; 81% *e*-transfer.	73A047
262.109	$R + Q \rightarrow \cdot Q^-$ (R = Radicals from ribose)	2.6×10^9 (uncor.)	6.9	p.r.	P.b.k. in N_2O-satd. soln. contg. ribose; 44% *e*-transfer.	72R057
		$(1.4 \pm 0.1) \times 10^9$ (uncor.)	6.9	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.5 mol L^{-1} ribose; 60% *e*-transfer.	73A047
262.110	$R + Q \rightarrow Q^-$ (R = Radicals from ribose phosphate)	4.0×10^9 (uncor.)	6.8	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. ribose-5-phosphate; 25% *e*-transfer.	72R057
262.113	$\cdot A^- + Q \rightarrow \cdot Q^-$ ($\cdot A^-$ = Radical from ascorbate)	$\sim 1.3 \times 10^9$ $(3.8 \pm 0.4) \times 10^9$ (uncor.)	3.3 9.0	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.05 mol L^{-1} ascorbic acid; 43 and 38% *e*-transfer, resp., at pH 3.3 and 9.0.	73A047
262.114	$\dot{C}HO^-CONH_2 + Q \rightarrow \cdot Q^-$	$(2.3 \pm 0.2) \times 10^9$ (uncor.)	7.1	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. glycolamide; 48% *e*-transfer.	73A047
262.115	$\dot{C}HOHCO_2H + Q \rightarrow \cdot Q^-$	$(9.2 \pm 0.9) \times 10^8$ (uncor.)	3.2	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. glycolic acid; 13% *e*-transfer.	73A047
	$\dot{C}HOHCO_2^- + Q \rightarrow \cdot Q^-$	$(1.5 \pm 0.2) \times 10^9$ (uncor.)	6.5	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. glycolate ion; 69% *e*-transfer	73A047 73A104
	$\dot{C}HO^-CO_2^- + Q \rightarrow \cdot Q^-$	$(1.6 \pm 0.2) \times 10^9$ (uncor.)	10.6	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. glycolate ion; 77% *e*-transfer.	73A047
262.117	$CH_3\dot{C}OHCO_2^- + Q \rightarrow \cdot Q^-$	$(1.4 \pm 0.1) \times 10^9$ (uncor.)	6.5	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. lactate ion; 55% *e*-transfer.	73A047
	$CH_3\dot{C}(O^-)CO_2^- + Q \rightarrow \cdot Q^-$	$(1.9 \pm 0.2) \times 10^9$ (uncor.)	10.6	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. lactate ion; 72% *e*-transfer (15% at pH 3.2).	73A047
262.118	$CH_3\dot{C}(O^-)CO_2CH_3 + Q \rightarrow \cdot Q^-$	$(2.3 \pm 0.2) \times 10^9$ (uncor.)	10.4	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. methyl lactate; 74% *e*-transfer (20% at pH 3.2).	73A047
262.119	$\dot{C}O^-(CO_2^-)_2 + Q \rightarrow \cdot Q^-$	$(2.5 \pm 0.3) \times 10^9$	9.2	p.r.	P.b.k. at 395 nm in soln. contg. ketomalonate and 1 mol L^{-1} *tert*-BuOH; 94% *e*-transfer.	73A047
262.120	$^-O_2C\dot{C}(OH)CH_2CO_2^- + Q \rightarrow \cdot Q^-$	$(1.1 \pm 0.1) \times 10^9$ (uncor.)	7.0	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. malate; 47% *e*-transfer.	73A047
		$(3.1 \pm 0.3) \times 10^9$	6.2	p.r.	P.b.k. at 395 nm in soln. contg. oxaloacetate and 1 mol L^{-1} *tert*-BuOH; 92% *e*-transfer.	73A047
262.121	$HO_2CCHOH\dot{C}(OH)CO_2H + Q \rightarrow \cdot Q^-$	$(7.0 \pm 0.7) \times 10^8$ (uncor.)	3.2	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. tartaric acid; 14% *e*-transfer.	73A047
	$^-O_2CCHOH\dot{C}(OH)CO_2^- + Q \rightarrow \cdot Q^-$	$(7.0 \pm 0.7) \times 10^8$ (uncor.)	11.0	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. tartrate ion; 69% *e*-transfer.	73A047
262.122	$^-O_2C(CH_2)_2\dot{C}(O^-)CO_2^- + Q \rightarrow \cdot Q^-$	$(3.8 \pm 0.4) \times 10^9$	10.2	p.r.	P.b.k. at 395 nm in soln. contg. α-ketoglutarate and 1 mol L^{-1} *tert*-BuOH; 94% *e*-transfer.	73A047
262.142	$R + Q \rightarrow \cdot Q^-$ (R = Electron adduct of glycine anhydride)	$(4.9 \pm 0.5) \times 10^9$	6.9	p.r.	P.b.k. at 395 nm in soln. contg. glycine anhydride; 98% *e*-transfer.	73A047
262.143	$R + Q \rightarrow \cdot Q^-$ (R = Electron adduct of alanine anhydride)	$(4.8 \pm 0.5) \times 10^9$	6.0	p.r.	P.b.k. at 395 nm in soln. contg. alanine anhydride; 92% *e*-transfer.	73A047
262.144	$R + Q \rightarrow \cdot Q^-$ (R = Electron adduct of sarcosine anhydride)	$(4.6 \pm 0.5) \times 10^9$	6.0	p.r.	P.b.k. at 395 nm in soln. contg. sarcosine anhydride; 91% *e*-transfer.	73A047
262.146	$R + Q \rightarrow \cdot Q^-$ (R = Electron adduct of acetylglycylglycinamide)	$(2.7 \pm 0.3) \times 10^9$	7.0	p.r.	P.b.k. at 395 nm; 99% *e*-transfer.	73A047

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
262.147	$\cdot CO_2^- + Q \rightarrow \cdot Q^-$	5.4×10^9	6.9	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. formate; 100% e–transfer.	72R057
		$(4.8 \pm 0.5) \times 10^9$	7	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. formate.	73A047 73A104
	1–Methylnicotinamide See 3–Carbamoyl–1–methylpyridinium ion 151.					
	1–Methylnicotinate ion See 3–Carboxy–1–methylpyridinium ion 153.					
	3–Methyl–2–nitroanisole See 3–Methoxy–2–nitrotoluene 257.					
263.	**3–Methyl–2–nitrobenzoate ion**					
263.078	$(CH_3)_2\dot{C}OH + NO_2B \rightarrow (CH_3)_2CO + H^+ + \cdot NO_2B^{2-}$	1.9×10^8	7	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH.	76A020
264.	**2–Methyl–5–nitroimidazole**					
264.078	$(CH_3)_2\dot{C}OH + NX \rightarrow (CH_3)_2CO + H^+ + NX^-$	2.5×10^9		p.r.	P.b.k.	76A075
265.	**3–Methyl–2–nitrophenol**					
265.078	$(CH_3)_2\dot{C}OH + CH_3(OH)C_6H_3NO_2 \rightarrow (CH_3)_2CO + H^+ + CH_3(OH)C_6H_3\dot{N}O_2^-$	2.9×10^9		p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH.	76A020
266.	**4–Methylphenoxide ion**					
266.020	$\cdot CH_2CHO + CH_3C_6H_4O^- (+ H_2O) \rightarrow CH_3CHO + CH_3C_6H_4O\cdot + OH^-$	9.0×10^7	~11.5	p.r.	Soln. contg. N_2O and ethylene glycol.	79A051
267.	**Methyl propionate**					
267.001	$\cdot CH_3 + C_2H_5CO_2CH_3 \rightarrow CH_4 + CH_3\dot{C}HCO_2CH_3$	2.9×10^3 (rel.)	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}–H_2O_2–soln.; est. from esr meas. and values of competing reactions.	75D188
268.	**3–Methylpterin**					
268.075	$\cdot CH_2OH + PtH^+$	6×10^7 (uncor.)	0.8	p.r.	P.b.k. in N_2O–satd. soln. contg. MeOH; ~45% e–transfer.	76A060
268.076	$CH_3\dot{C}HOH + Pt$	3.2×10^7 (uncor.)	6.3	p.r.	P.b.k. in N_2O–satd. soln. contg. EtOH; 55% e–transfer.	76A060
268.078	$(CH_3)_2\dot{C}OH + PtH^+$	1.9×10^9	0.8	p.r.	P.b.k. in N_2O–satd. soln. contg. 2–PrOH; 100% e–transfer.	76A060
	$(CH_3)_2\dot{C}OH + Pt$	2.9×10^8	7.0			
269.	**9–Methylpurine**					
269.076	$CH_3\dot{C}HOH + MP \rightarrow MPH\cdot$	$<2 \times 10^7$	8.2	p.r.	P.b.k.; N_2O–satd. soln. contg. EtOH.	76A060
	$CH_3\dot{C}HO^- + MP \rightarrow MP^-$	5.1×10^8	13.6			
269.078	$(CH_3)_2\dot{C}OH + MPH^+ \rightarrow MPH_3\cdot^{2+}$	1.9×10^9	~0	p.r.	P.b.k. in N_2O–satd. soln. contg. 2–PrOH.	76A060
	$(CH_3)_2\dot{C}OH + MP \rightarrow MPH\cdot$	1.7×10^8	8.6			
	$(CH_3)_2\dot{C}O^- + MP \rightarrow MP^-$	8.7×10^8	13.6			
	1–Methyl–3–pyridinecarboxylate ion See 3–Carboxy–1–methylpyridinium ion 153.					
	1–Methyl–4–pyridinecarboxylate ion See 4–Carboxy–1–methylpyridinium ion 154.					
	Methylviologen See 1,1′–Dimethyl–4,4′–bipyridinium ion 183.					
270.	**Metmyoglobin**					
270.075	$\cdot CH_2OH + M(Fe^{III}) \rightarrow CH_2O + H^+ + M(Fe^{II})$	$(2.4 \pm 0.5) \times 10^7$	7	p.r.	95% redn. of hemoprotein in N_2O–satd. soln. contg. MeOH; obs. abs. change at 550 and 435 nm.	79A153
270.076	$CH_3\dot{C}HOH + M(Fe^{III})$	$(5.5 \pm 0.5) \times 10^7$	7	p.r.	95% redn. of hemoprotein in N_2O–satd. soln. contg. EtOH.	79A153
270.078	$(CH_3)_2\dot{C}OH + M(Fe^{III}) \rightarrow M(Fe^{II})$	$\sim 1 \times 10^8$	7.5	p.r.	$G = 2.2$.	79A371
270.121	$^-O_2CCHOH\dot{C}OHCO_2^- + M(Fe^{III})$	$(3.5 \pm 0.7) \times 10^7$	7	p.r.	Redn. in soln. contg. 10^{-2} mol L^{-1} tartrate.	78A288

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
270.147	$\cdot CO_2^- + M(Fe^{III})$	$(2.0 \pm 0.4) \times 10^9$	7	p.r.	Redn. in soln. contg. 10^{-2} mol L^{-1} formate.	78A288
		2.9×10^9	8.2	p.r.	D.k. at 360 nm in N_2O–satd. soln. contg. 10^{-2} mol L^{-1} formate; $I = 0.03$.	79A204
271.	**Metronidazole *[1-(2-Hydroxyethyl)-2-methyl-5-nitroimidazole]***					
271.075	$\cdot CH_2OH + RNO_2$	10^8		p.r.	D.k. at 320 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} MeOH.	74A135
271.076	$CH_3\dot{C}HOH + RNO_2$	2×10^8		p.r.	D.k. at 320 nm in N_2O–satd. soln. contg. EtOH.	74A135
271.078	$(CH_3)_2\dot{C}OH + RNO_2$	7×10^8		p.r.	D.k. at 320 nm in N_2O–satd. soln. contg. 2–PrOH.	74A135
271.147	$\cdot CO_2^- + RNO_2$	8×10^8		p.r.	D.k. at 320 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate ion; also c.k. gave 8×10^8 rel. to $k(\cdot CO_2^- +$ TAN) $= 6 \times 10^8$ [342.147].	74A135
272.	**Misonidazole *[1-(2-Hydroxy-3-methoxypropyl)-2-nitroimidazole]***					
272.078	$(CH_3)_2\dot{C}OH + RNO_2 \rightarrow (CH_3)_2CO + H^+ + RNO_2^-$	$(2.8 \pm 0.4) \times 10^9$		p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH.	76A070
273.	**1,4–Naphthoquinone**					
273.078	$(CH_3)_2\dot{C}OH + Q \rightarrow \cdot Q^-$	3.6×10^9	7	p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2–PrOH and 1 mol L^{-1} acetone.	73G125
274.	**1,4–Naphthoquinone–2–sulfonate ion**					
274.056	$NH_2\dot{C}HCO_2^- + Q \rightarrow \cdot Q^-$	$(3.3 \pm 0.3) \times 10^9$	8.0	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. glycine.	73A104
274.068	$R + Q \rightarrow \cdot Q^-$ (R = Radicals from triglycine)	$(2.0 \pm 0.2) \times 10^9$	10	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. triglycine.	73A104
274.115	$\cdot CHOHCO_2^- + Q \rightarrow \cdot Q^-$	$(1.7 \pm 0.2) \times 10^9$	7.0	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. glycolate ion.	73A104
275.	**Nicotinamide**					
275.078	$(CH_3)_2\dot{C}OH + NH^+ \rightarrow (CH_3)_2CO + \cdot NH + H^+$	$(2.1 \pm 0.4) \times 10^8$	0.9	p.r.	P.b.k.; no *e*–transfer in neutral soln.	74A089
		4.0×10^8	1.9	p.r.	P.b.k. at ~400 nm in N_2O–satd. soln. contg. 0.5 mol L^{-1} 2–PrOH.	74A106
	$(CH_3)_2\dot{C}OH + N$	$<1 \times 10^6$	9.2	p.r.	P.b.k. at ~400 nm in N_2O–satd. soln. contg. 0.5 mol L^{-1} 2–PrOH.	74A106
276.	**Nicotinamide–adenine dinucleotide**					
276.056	$NH_2\dot{C}HCO_2^- + NAD^+$	1.5×10^9	6.0	p.r.		73A104
276.075	$\cdot CH_2OH + NAD^+$	1.0×10^9	6.0	p.r.		73A104
276.078	$(CH_3)_2\dot{C}OH + NAD^+ \rightarrow (CH_3)_2CO + H^+ + \cdot NAD$	1.0×10^9		p.r.	Est. from buildup and decay of ·NAD at 400 nm in soln. contg. 1 mol L^{-1} acetone, 1 mol L^{-1} 2–PrOH, 2×10^{-4} mol L^{-1} O_2 and 2×10^{-5} mol L^{-1} benzoquinone.	70R013
		1.0×10^9	6.0	p.r.		73A104
276.147	$\cdot CO_2^- + NAD^+ \rightarrow CO_2 + \cdot NAD$	1.6×10^9	6.4	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate.	68G441
277.	**Nicotinic acid**					
277.078	$(CH_3)_2\dot{C}OH + H^+NC_5H_4CO_2H$	3.5×10^8	0.0	p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N_2O–satd. soln. contg. 0.5 mol L^{-1} 2–PrOH.	74A106
	$(CH_3)_2\dot{C}OH + H^+NC_5H_4CO_2^-$	1.8×10^8	3.4			
	$(CH_3)_2\dot{C}OH + NC_5H_4CO_2^-$	$<1 \times 10^6$	8.2			
	$(CH_3)_2\dot{C}O^- + NC_5H_4CO_2^-$	$>1 \times 10^8$	13.1			

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
278.	**Nifuroxime *[anti-5-Nitro-2-furaldoxime]***					
278.018	R + NF (R = Radicals from allyl alcohol)	5.1 x 10^9 (uncor.)	7	p.r.	P.b.k. at 395 nm (NF^-) in N_2O-satd. soln. contg. allyl alcohol; 3% *e*-transfer.	73A062 73A099
278.019	R + NF (R = Radicals from crotyl alcohol)	5.6 x 10^9 (uncor.)	7	p.r.	P.b.k. at 390 nm (NF^-) in N_2O-satd. soln. contg. crotyl alcohol; 24% *e*-transfer.	73A099
		2.4 x 10^9 (uncor.)	7	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. crotyl alcohol; 10% *e*-transfer.	73A052
278.037	$CH_3\dot{C}HCO_2^-$ + NF	4.0 x 10^9 (uncor.)	7	p.r.	P.b.k. at 390 nm (NF^-) in N_2O-satd. soln. contg. 0.2 mol L^{-1} propionate ion; 2% *e*-transfer based on abs. spectra.	73A099
278.038	$CH_3CH_2\dot{C}HCO_2^-$ + NF	4.9 x 10^9 (uncor.)	7	p.r.	P.b.k. at 390 nm (NF^-) in N_2O-satd. soln. contg. 0.2 mol L^{-1} butyrate ion; 2% *e*-transfer.	73A099
278.039	$HOCH_2\dot{C}HCO_2^-$ + NF	6 x 10^9 (uncor.)	7	p.r.	P.b.k. at 390 nm in soln. contg. 4 x 10^{-4} mol L^{-1} acrylate ion; 65% *e*-transfer.	73A099
278.040	$CH_3CHOH\dot{C}HCO_2^-$ + NF	5.5 x 10^9 (uncor.)	7	p.r.	P.b.k. at 390 nm in soln. contg. crotonate ion; 25% *e*-transfer.	73A099
278.041	$^-O_2C\dot{C}HCHOHCO_2^-$ + NF	2.4 x 10^9 (uncor.)	7	p.r.	P.b.k. at 390 nm in soln. contg. maleate ion; 3% *e*-transfer.	73A099
278.042	$\cdot CH(CO_2^-)_2$ + NF	1.3 x 10^9 (uncor.)	7	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} malonate ion; 3% *e*-transfer.	73A099
278.075	$\cdot CH_2OH$ + NF → NF^-	8 x 10^8	7	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} MeOH; 90% *e*-transfer.	73A099
278.076	$CH_3\dot{C}HOH$ + NF → NF^-	>1.5 x 10^9 (uncor.)	7	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} EtOH; > 75% *e*-transfer.	73A099
278.077	$CH_3CH_2\dot{C}HOH$ + NF → NF^-	3.2 x 10^9 (uncor.)	7	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 1-PrOH; 52% *e*-transfer.	73A062
		3.2 x 10^9	7	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. 1-PrOH; 95% *e*-transfer.	73A099
278.078	$(CH_3)_2\dot{C}OH$ + NF → NF^-	3.3 x 10^9	7	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH; 100% *e*-transfer.	73A099
		3.5 x 10^9		p.r.	P.b.k.	76A075
278.079	$CH_3CH_2CH_2\dot{C}HOH$ + NF → NF^-	5.1 x 10^9 (uncor.)	7	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 1-BuOH; 75% *e*-transfer.	73A099
		3.4 x 10^9 (uncor.)	7	p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. 1-BuOH; 32% *e*-transfer.	73A062
278.099	$NH_3^+CH_2\dot{C}HOPO_3^{2-}$ + NF	3.0 x 10^9 (uncor.)	7	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} *o*-phosphoryl-ethanolamine; 1% *e*-transfer.	73A099
278.106	$CH_2OHCHOH\dot{C}HOH$ + NF (+ $CH_2OH\dot{C}OHCH_2OH$)	1.3 x 10^9 (uncor.)	7	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} glycerol; 20% *e*-transfer.	73A099
278.108	R + NF → NF^- (R + Radicals from deoxyribose)	1.4 x 10^9 (uncor.)	7	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} deoxyribose; 70% *e*-transfer.	73A099
278.109	R + NF → NF^- (R = Radicals from ribose)	1.5 x 10^9 (uncor.)	7	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} ribose; 50% *e*-transfer.	73A099
278.110	R + NF (R = Radicals from ribose phosphate)	1.7 x 10^9 (uncor.)	7	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 10^{-3} mol L^{-1} ribose phosphate; 10% *e*-transfer.	73A099

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
278.117	$CH_3\dot{C}OHCO_2^- + NF \rightarrow NF^-$	1.5×10^9	7	p.r.	P.b.k. at 390 nm in N_2O–satd. soln. contg. 0.2 mol L^{-1} lactate ion; 100% *e*–transfer.	73A099
278.120	$^-O_2CCH_2\dot{C}OHCO_2^- + NF$	1.2×10^8 (uncor.)	7	p.r.	P.b.k. at 390 nm in N_2O–satd. soln. contg. 0.2 mol L^{-1} malate ion; 30% *e*–transfer.	73A099
278.147	$\cdot CO_2^- + NF \rightarrow NF^-$	2.7×10^9		p.r.	P.b.k. at 390 nm in CO_2–satd. soln. contg. *tert*–BuOH or 0.2 mol L^{-1} formate; 100% *e*–transfer.	73A099
279.	**p–Nitroacetophenone**					
279.018	R + PNAP (R = Radicals from allyl alcohol)	2.7×10^9 (uncor.)	7	p.r.	P.b.k. at 360 and 550 nm ($PNAP^-$) in N_2O–satd. soln. contg. allyl alcohol; 3% *e*–transfer.	73A062
279.019	R + PNAP (R = Radicals from crotyl alcohol)	2.0×10^9 (uncor.)	7	p.r.	P.b.k. at 360 and 550 nm ($PNAP^-$) in N_2O–satd. soln. contg. crotyl alcohol; 9% *e*–transfer.	73A062
279.075	$\cdot CH_2OH + PNAP \rightarrow$ addn.	1×10^8	7	p.r.	P.b.k. at 330 nm in N_2O–satd. soln. contg. MeOH.	73G122
	$\cdot CH_2OH + PNAP \rightarrow PNAP^-$	1×10^7	7	p.r.	P.b.k. at 550 nm in N_2O–satd. soln. contg. MeOH.	73G122
	$\cdot CH_2O^- + PNAP \rightarrow PNAP^-$	$(4.7 \pm 0.5) \times 10^9$	13	p.r.	P.b.k. at 550 nm in N_2O–satd. soln. contg. MeOH.	73G122
279.076	$CH_3\dot{C}HOH + PNAP \rightarrow PNAP^-$	$(8 \pm 2) \times 10^8$	11	p.r.	P.b.k. at 550 nm in N_2O–satd. soln. contg. EtOH.	73G122
279.077	$CH_3CH_2\dot{C}HOH + PNAP$	2.4×10^9 (uncor.)	7	p.r.	P.b.k. at 360 and 550 nm in N_2O–satd. soln. contg. 1–PrOH; 45% *e*–transfer.	73A062
279.078	$(CH_3)_2\dot{C}OH + PNAP \rightarrow PNAP^-$	$(3.8 \pm 0.4) \times 10^9$	11	p.r.	P.b.k. at 550 nm in N_2O–satd. soln. contg. 2–PrOH.	73G122
		2.2×10^9	~13	p.r.	*P.b.k. at 355 nm in soln. contg.* 6.5 mol L^{-1} 2–PrOH and 0.68 mol L^{-1} acetone.	*81A002*
279.079	$CH_3CH_2CH_2\dot{C}HOH + PNAP$	2.2×10^9 (uncor.)	7	p.r.	P.b.k. at 360 and 550 nm in N_2O–satd. soln. contg. 1–BuOH; 24% *e*–transfer.	73A062
279.108	R + PNAP $\rightarrow PNAP^-$ (R = Radicals from deoxyribose)	$(1.0 \pm 0.3) \times 10^9$		p.r.	P.b.k.; 47% *e*–transfer.	75A207
279.111	R + PNAP $\rightarrow PNAP^-$ (R = Radicals from glucose)	9×10^8		p.r.		77R167
279.147	$\cdot CO_2^- + PNAP \rightarrow PNAP^-$	$(1.0 \pm 0.1) \times 10^9$	10	p.r.	P.b.k. at 550 nm in N_2O–satd. soln. contg. formate ion.	73G122
		7×10^8		p.r.	Radical from formate.	77R167
280.	**o–Nitroaniline**					
280.078	$(CH_3)_2\dot{C}OH + NH_2C_6H_4NO_2 \rightarrow (CH_3O_2CO + H^+ + NH_2C_6H_4\dot{N}O_2^-$	9.2×10^8	7	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH.	76A020
281.	**m–Nitroaniline**					
281.078	$(CH_3)_2\dot{C}OH + NH_2C_6H_4NO_2 \rightarrow (CH_3)_2CO + H^+ + NH_2C_6H_4\dot{N}O_2^-$	1.5×10^9	7	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH.	76A020
282.	**p–Nitroaniline**					
282.078	$(CH_3)_2\dot{C}OH + NH_2C_6H_4NO_2 \rightarrow (CH_3)_2CO + H^+ + NH_2C_6H_4\dot{N}O_2^-$	7.2×10^8	7	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH.	76A020
		$(1.9 \pm 0.2) \times 10^9$	10.7	p.r.	P.b.k. at 380 nm in N_2O–satd. soln. soln. contg. 0.1 mol L^{-1} 2–PrOH.	77A118
283.	**Nitrobenzene**					
283.018	R + $C_6H_5NO_2$ (R = Radicals from allyl alcohol)	~1.5×10^9 (uncor.)	7	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. allyl alcohol; 5% *e*–transfer.	73A062

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
283.019	R + $C_6H_5NO_2$ (R = Radicals from crotyl alcohol)	~1 x 10^9 (uncor.)	7	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. crotyl alcohol; 8% *e*-transfer.	73A062
283.075	$\cdot CH_2OH + C_6H_5NO_2 \rightarrow CH_2O + C_6H_5\dot{N}O_2^-$	$<10^7$	7	p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	66G432
		(6.0 ± 0.9) x 10^7	5-6	p.r.	N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	72A018
	$\cdot CH_2O^- + C_6H_5NO_2 \rightarrow CH_2O + C_6H_5\dot{N}O_2^-$	2.7 x 10^9	13	p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	66G432
283.076	$CH_3\dot{C}HOH + C_6H_5NO_2 \rightarrow CH_3CHO + H^+ + C_6H_5\dot{N}O_2^-$	3.3 x 10^8	7	p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	66G432
		(2.4 ± 0.7) x 10^8	5-6	p.r.	N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	72A018
	$CH_3\dot{C}HO^- + C_6H_5NO_2 \rightarrow CH_3CHO + C_6H_5\dot{N}O_2^-$	3.1 x 10^9	13	p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	66G432
		3 x 10^9	13	p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. EtOH; $E_a \simeq 3.3$ kcal mol^{-1} (14 kJ mol^{-1}).	74A010
283.077	$CH_3CH_2\dot{C}HOH + C_6H_5NO_2 \rightarrow CH_3CH_2CHO + H^+ + C_6H_5\dot{N}O_2^-$	3.5 x 10^8	7	p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1-PrOH; 68% *e*-transfer.	66G432
		1.0 x 10^9 (uncor.)	7	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 1-PrOH; 60% *e*-transfer.	73A062
	$CH_3CH_2\dot{C}HO^- + C_6H_5NO_2 \rightarrow CH_3CH_2CHO + C_6H_5\dot{N}O_2^-$	3.1 x 10^9	13	p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1-PrOH.	66G432
283.078	$(CH_3)_2\dot{C}OH + C_6H_5NO_2 \rightarrow (CH_3)_2CO + H^+ + C_6H_5\dot{N}O_2^-$	1.6 x 10^9	7	p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	66G432
	$(CH_3)_2\dot{C}O^- + C_6H_5NO_2 \rightarrow (CH_3)_2CO + C_6H_5\dot{N}O_2^-$	3.0 x 10^9	13	p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	66G432
283.079	$CH_3CH_2CH_2\dot{C}HOH + C_6H_5NO_2 \rightarrow CH_3CH_2CH_2CHO + H^+ + C_6H_5\dot{N}O_2^-$	4.0 x 10^8	7	p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1-BuOH; 35% *e*-transfer.	66G432
		1.1 x 10^9 (uncor.)	7	p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 1-BuOH; 31% *e*-transfer;	73A062
	$CH_3CH_2CH_2\dot{C}HO^- + C_6H_5NO_2 \rightarrow CH_3CH_2CH_2CHO + C_6H_5\dot{N}O_2^-$	3.1 x 10^9	13	p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1-BuOH.	66G432
283.081	$(CH_3)_2CH\dot{C}HOH + C_6H_5NO_2 \rightarrow (CH_3)_2CHCHO + H^+ + C_6H_5\dot{N}O_2^-$	3.9 x 10^8	7	p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-methyl-1-propanol; 39% *e*-transfer.	66G432
	$(CH_3)_2CH\dot{C}HO^- + C_6H_5NO \rightarrow (CH_3)_2CHCHO + C_6H_5\dot{N}O_2^-$	2.9 x 10^9	13	p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 2-methyl-1-propanol.	66G432
283.084	$-CH_2\dot{C}OH(CH_2)_2- + C_6H_5NO_2 \rightarrow R{=}O + H^+ + C_6H_5\dot{N}O_2^-$	1.5 x 10^9		p.r.	P.b.k. at 280 nm in soln. contg. 10^{-3} mol L^{-1} cyclobutanone and 0.1 mol L^{-1} *tert*-BuOH at 2°C; k = 3.2 x 10^9 at 64°C; E_a = 2.3 kcal mol^{-1} (9.6 kJ mol^{-1}).	76A103
283.085	$-CH_2\dot{C}OH(CH_2)_3- + C_6H_5NO_2 \rightarrow R{=}O + C_6H_5\dot{N}O_2^-$	1.4 x 10^9		p.r.	P.b.k. at 280 nm in soln. contg. 10^{-3} mol L^{-1} cyclopentanone and 0.1 mol L^{-1} *tert*-BuOH at 2°C; k = 5.2 x 10^9 at 64°C; E_a = 4.0 kcal mol^{-1} (17 kJ mol^{-1}).	76A103
283.086	$-CH_2\dot{C}OH(CH_2)_4- + C_6H_5NO_2 \rightarrow R{=}O + C_6H_5\dot{N}O_2^-$	7 x 10^8		p.r.	P.b.k. at 280 nm in soln. contg. 10^{-3} mol L^{-1} cyclohexanone and 0.1 mol L^{-1} *tert*-BuOH at 2°C; k = 2.0 x 10^9 at 64°C E_a = 3.1 kcal mol^{-1} (13 kJ mol^{-1}).	76A103
283.087	$-CH_2\dot{C}OH(CH_2)_5- + C_6H_5NO_2 \rightarrow R{=}O + C_6H_5\dot{N}O_2^-$	1.4 x 10^9		p.r.	P.b.k. at 280 nm in soln. contg. 10^{-3} mol L^{-1} cycloheptanone and 0.1 mol L^{-1} *tert*-BuOH at 2°C; k = 4.9 x 10^9 at 64°C; E_a = 3.8 kcal mol^{-1} (16 kJ mol^{-1}).	76A103

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
283.088	$-CH_2\dot{C}OH(CH_2)_6- + C_6H_5NO_2 \rightarrow$ $R{=}O + C_6H_5\dot{N}O_2^-$	1.6×10^9		p.r.	P.b.k. at 280 nm in soln. contg. 10^{-3} mol L^{-1} cyclooctanone and 0.1 mol L^{-1} *tert*-BuOH at 2°C; $k = 5.2 \times 10^9$ at 64°C; $E_a = 3.7$ kcal mol^{-1} (15.5 kJ mol^{-1}).	76A103
283.093	$CH_3\dot{C}HOC_2H_5 + C_6H_5NO_2$	2.5×10^8		p.r.	D.k.; radical from ethyl ether.	77A100
283.104	$-O\dot{C}HCH_2O(CH_2)_2- + C_6H_5NO_2$	2.5×10^7		p.r.	D.k.; radical from dioxane.	77A100
283.117	$CH_3\dot{C}OHCO_2^- + C_6H_5NO_2$	$(6.5 \pm 2) \times 10^7$	6.0	p.r.	N_2O-satd. soln. contg. 0.1 mol L^{-1} lactate ion.	72A018
283.123	$\cdot CH(OH)_2 + C_6H_5NO_2 \rightarrow$ $HCO_2^- + 2\,H^+ + C_6H_5\dot{N}O_2^-$	1.9×10^9	5.8	p.r.	P.b.k. at 290 nm in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} formaldehyde; also condy.	71G424
	$\cdot CH(OH)O^- + C_6H_5NO_2 \rightarrow$ $HCO_2^- + H^+ + C_6H_5\dot{N}O_2^-$	4.5×10^9	12			
283.147	$\cdot CO_2^- + C_6H_5NO_2 \rightarrow$ $CO_2 + C_6H_5\dot{N}O_2^-$	$(1.0 \pm 0.2) \times 10^9$	6–7	p.r.	P.b.k. at 295 nm in N_2O-satd. soln. contg. 10^{-3} mol L^{-1} formate.	70G303
		$(5.6 \pm 1) \times 10^8$	~3			
		$(5.8 \pm 0.6) \times 10^8$	9.4	p.r.	P.b.k.	73G085
		$(7.5 \pm 0.7) \times 10^8$	2.5			
		$(4.6 \pm 0.5) \times 10^8$	0			
284.	***o*-Nitrobenzoate ion**					
284.078	$(CH_3)_2\dot{C}OH + NO_2C_6H_4CO_2^- \rightarrow$ $(CH_3)_2CO + H^+ + \dot{N}O_2^-C_6H_4CO_2^-$	5.4×10^8	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; at pH 0.8 k was the same ± 20–30%.	76A111
284.147	$\cdot CO_2^- + NO_2C_6H_4CO_2^- \rightarrow$ $CO_2 + \dot{N}O_2^-C_6H_4CO_2^-$	2.4×10^8	7	p.r.	P.b.k. in N_2O-satd. soln. contg. formate; at pH 0.8 k was the same ± 20–30%.	76A111
285.	***m*-Nitrobenzoate ion**					
285.078	$(CH_3)_2\dot{C}OH + NO_2C_6H_4CO_2^- \rightarrow$ $(CH_3)_2CO + H^+ + \dot{N}O_2^-C_6H_4CO_2^-$	9.0×10^8	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; at pH 0.8 k was the same ± 20–30%.	76A111
285.147	$\cdot CO_2^- + NO_2C_6H_4CO_2^- \rightarrow$ $CO_2 + \dot{N}O_2^-C_6H_4CO_2^-$	6.3×10^8	7	p.r.	P.b.k. in N_2O-satd. soln. contg. formate; at pH 0.8 k was the same ± 20–30%.	76A111
286.	***p*-Nitrobenzoate ion**					
286.078	$(CH_3)_2\dot{C}OH + NO_2C_6H_4CO_2^- \rightarrow$ $(CH_3)_2CO + H^+ + \dot{N}O_2^-C_6H_4CO_2^-$	2.1×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; at pH 0.8 k was the same ± 20–30%.	76A111
286.147	$\cdot CO_2^- + NO_2C_6H_4CO_2^- \rightarrow$ $CO_2 + \dot{N}O_2^-C_6H_4CO_2^-$	8.0×10^8	7	p.r.	P.b.k. in N_2O-satd. soln. contg. formate; at pH 0.8 k was the same ± 20–30%.	76A111
287.	***p*-Nitrobenzonitrile**					
287.111	$R + NO_2C_6H_4CN$ (R = Radicals from glucose)	1.0×10^9		p.r.		77R167
287a.	**Nitro blue tetrazolium**					
287a.147	$\cdot CO_2^- + NBT^{2+} \rightarrow CO_2 + NBT\cdot^+$	$(6.4 \pm 0.2) \times 10^9$	10	p.r.	P.b.k. at 405 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	80A085
	anti-5-Nitro-2-furaldoxime see Nifuroxime 278.					
288.	**5-Nitrofuroate ion**					
288.078	$(CH_3)_2\dot{C}OH + ...NO_2 \rightarrow$ $(CH_3)_2CO + H^+ + \dot{N}O_2^-$	1.5×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	73G114
289.	**2-Nitroimidazole**					
289.078	$(CH_3)_2\dot{C}OH + NX \rightarrow$ $(CH_3)_2CO + H^+ + NX^-$	3.5×10^9		p.r.	P.b.k.	76A075
290.	**4-Nitroimidazole**					
290.078	$(CH_3)_2\dot{C}OH + NX \rightarrow$ $(CH_3)_2CO + H^+ + NX^-$	3.5×10^9		p.r.	P.b.k.	76A075

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
291.	**2-Nitroisophthalate ion**					
291.078	$(CH_3)_2\dot{C}OH + (^-O_2C)_2C_6H_3NO_2 \rightarrow (CH_3)_2CO + H^+ + (^-O_2C)_2C_6H_3\dot{N}O_2^-$	1.5×10^8	7	p.r.	P.b.k. at 310 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	76A020
292.	**Nitromethane**					
292.047	$\cdot CF_3 + CH_2NO_2^- \rightarrow CF_3CH_2\dot{N}O_2^-$	5×10^8 (rel.)		γ-r.	C.k. in soln. contg. 1 mol L^{-1} 2-PrOH and CF_3Cl; rel. to $k(CF_3 +$ 2-PrOH$) = 10^5$; product radical identified by esr.	72G244
293.	***p*-Nitroperoxybenzoic acid**					
293.075	$\cdot CH_2OH + NO_2C_6H_4CO_2OH \rightarrow CH_2O + H^+ + \dot{N}O_2^-C_6H_4CO_2OH$ (+ adduct formn.)	2×10^8		p.r.	P.b.k. at 330 nm in N_2O-satd. soln. contg. MeOH; 20% *e*-transfer based on condy. change.	74A078
293.078	$(CH_3)_2\dot{C}OH + NO_2C_6H_4CO_2OH \rightarrow (CH_3)_2CO + H^+ + \dot{N}O_2^-C_6H_4CO_2OH$	3.3×10^9	5.0	p.r.	P.b.k. at 330 nm in N_2O-satd. soln. contg. 2-PrOH.	74A078
294.	***o*-Nitrophenol**					
294.078	$(CH_3)_2COH + HOC_6H_4NO_2 \rightarrow (CH_3)_2CO + H^+ + HOC_6H_4NO_2^-$	2.6×10^9	1	p.r.	P.b.k. in soln. contg. 2-PrOH.	69G270
	$(CH_3)_2CO^- + {}^-OC_6H_4NO_2 \rightarrow$	1.4×10^9	13	p.r.	P.b.k. in soln. contg. 2-PrOH.	69G270
295.	**2-Nitropyrrole**					
295.078	$(CH_3)_2\dot{C}OH + NX \rightarrow (CH_3)_2CO + H^+ + NX^-$	2.0×10^9		p.r.	P.b.k.	76A075
296.	**3-Nitropyrrole**					
296.078	$(CH_3)_2\dot{C}OH + NX \rightarrow (CH_3)_2CO + H^+ + NX^-$	2.0×10^9		p.r.	P.b.k.	76A075
	2-Nitroresorcinol See 1,3-Dihydroxy-2-nitrobenzene 178.					
297.	**Nitrosobenzene**					
297.075	$\cdot CH_2OH + C_6H_5NO \rightarrow CH_2O + C_6H_5\dot{N}OH$	3.2×10^9	7.0	p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} MeOH.	66G433
	$\cdot CH_2O^- + C_6H_5NO \rightarrow CH_2O + C_6H_5\dot{N}O^-$	6.8×10^9	13.0	p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} MeOH.	66G433
297.076	$CH_3\dot{C}HOH + C_6H_5NO \rightarrow CH_3CHO + C_6H_5\dot{N}OH$	3.9×10^9	7.0	p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} EtOH.	66G433
	$CH_3\dot{C}HO^- + C_6H_5NO \rightarrow CH_3CHO + C_6H_5\dot{N}O^-$	6.4×10^9	13.0	p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} EtOH.	66G433
297.077	$CH_3CH_2\dot{C}HOH + C_6H_5NO \rightarrow CH_3CH_2CHO + C_6H_5\dot{N}OH$	4.0×10^9	7.0	p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} 1-PrOH; includes β-alcohol radical reaction.	66G433
297.078	$(CH_3)_2\dot{C}OH + C_6H_5NO \rightarrow (CH_3)_2CO + C_6H_5\dot{N}OH$	5.0×10^9	7.0	p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} 2-PrOH.	66G433
	$(CH_3)_2\dot{C}O^- + C_6H_5NO \rightarrow (CH_3)_2CO + C_6H_5\dot{N}O^-$	7.0×10^9	13.0	p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} 2-PrOH.	66G433
297.079	$CH_3CH_2CH_2\dot{C}HOH + C_6H_5NO \rightarrow CH_3CH_2CH_2CHO + C_6H_5\dot{N}OH$	4.0×10^9	7.0	p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} 1-BuOH; includes β- and γ-alcohol radical reaction.	66G433
297.081	$(CH_3)_2CH\dot{C}HOH + C_6H_5NO \rightarrow (CH_3)_2CHCHO + C_6H_5\dot{N}OH$	4.0×10^9	7.0	p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} 2-methyl-1-propanol; includes β-alcohol radical reaction.	66G433
297.147	$\cdot CO_2^- + C_6H_5NO \rightarrow CO_2 + C_6H_5\dot{N}O^-$	4.0×10^9		p.r.	P.b.k. at 450 nm in soln. contg. formate ion.	66G433
	p-Nitroso-N,N-dimethylaniline See N,N-Dimethyl-4-nitrosoaniline, 186a.					
298.	**2-Nitrothiophene**					
298.078	$(CH_3)_2\dot{C}OH + NX \rightarrow (CH_3)_2CO + H^+ + NX^-$	3.0×10^9		p.r.	P.b.k.	76A075

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
299.	**3-Nitrothiophene**					
299.078	$(CH_3)_2\dot{C}OH + NX \rightarrow$ $(CH_3)_2CO + H^+ + NX^-$	2.0×10^9		p.r.	P.b.k.	76A075
300.	***o*-Nitrotoluene**					
300.078	$(CH_3)_2\dot{C}OH + CH_3C_6H_4NO_2 \rightarrow$ $(CH_3)_2CO + H^+ + CH_3C_6H_4\dot{N}O_2^-$	4.8×10^8	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	76A020
301.	**5-Nitrouracil**					
301.078	$(CH_3)_2\dot{C}OH + NX$	$(7 \pm 3.5) \times 10^8$		p.r.		73A150
302.	**Norpseudopelletierine-N-oxyl**					
302.016	$\cdot CH_2C(CH_3)_2OH + NPPN$	$(5.1 \pm 0.5) \times 10^8$		p.r.		71G061
302.078	$(CH_3)_2\dot{C}OH + NPPN$	$(8.1 \pm 0.8) \times 10^8$		p.r.		71G061
303.	**Orotate ion**					
303.078	$(CH_3)_2\dot{C}OH$ + orotate	$(1 \pm 0.5) \times 10^8$		p.r.		73A150
	Paraquat See 1,1′-Dimethyl-4,4′-bipyridinium ion 183.					
304.	**Penicillamine**					
304.075	$\cdot CH_2OH + RSH \rightarrow$ $CH_3OH + RS\cdot$ ($\rightarrow RSSR^-$)	$(1.1 \pm 0.1) \times 10^8$		p.r.	P.b.k. at 450 nm in soln. contg. 0.5 or 1 mol L^{-1} MeOH.	73A073
305.	**3-Pentanone**					
305.001	$\cdot CH_3 + C_2H_5COC_2H_5 \rightarrow$ $CH_4 + CH_3\dot{C}HCOC_2H_5$	1.4×10^4	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}-H_2O_2 soln.; est. from esr meas. and values for competing reactions.	75D188
306.	**1,10-Phenanthroline**					
306.075	$\cdot CH_2OH$ + phen	$<10^6$	7	p.r.	P.b.k. in soln. contg. 0.2 mol L^{-1} MeOH.	79A148
	$\cdot CH_2O^-$ + phen	$<10^6$	13			
		$<1 \times 10^7$	~13	p.r.	P.b.k. at 490 nm in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	80A115
306.076	$CH_3\dot{C}HO^-$ + phen $\rightarrow$ ·phenH	$(8 \pm 2) \times 10^8$	~13	p.r.	P.b.k. at 490 nm in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH.	80A115
306.078	$(CH_3)_2\dot{C}OH$ + phen $\rightarrow$ ·phenH	$(3.2 \pm 0.2) \times 10^9$	1	p.r.	P.b.k. at 520 nm in soln. contg. 1 mol L^{-1} 2-PrOH.	80A115
		1.9×10^9	3.0	p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	79A148
		1×10^8	5.5	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	80A115
		$<1 \times 10^7$	8			
		1.2×10^7	7		P.b.k. in soln. contg. 2-PrOH and acetone.	79A148
	$(CH_3)_2\dot{C}O^-$ + phen $\rightarrow$ ·phenH	6.0×10^8	13		P.b.k. in Ar-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	79A148
		5.7×10^8	13	p.r.	P.b.k.	79A305
		$(3.0 \pm 0.5) \times 10^9$	~13	p.r.	P.b.k. at 490 nm in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	80A115
307.	**Phenazine**					
307.078	$(CH_3)_2\dot{C}O^- + Pz \rightarrow (CH_3)_2CO + \cdot PzH$	3×10^9	13	p.r.	p.b.k.	79A305
308.	**Phenosafranine**					
308.056	$NH_2\dot{C}HCO_2^-$ + dye	1.9×10^9 (uncor.)	7	p.r.	D.k. at 520 nm in N_2O-satd. soln. contg. glycine; 66% *e*-transfer.	73A078
308.075	$\cdot CH_2OH$ + dye	1.2×10^9 (uncor.)	7	p.r.	D.k at 520 nm in N_2O-satd. soln. contg. MeOH; 22% *e*-transfer.	73A078
308.078	$(CH_3)_2\dot{C}OH$ + dye	3.2×10^9	7	p.r.	D.k. at 520 nm in N_2O-satd. soln. contg. 2-PrOH; 82% *e*-transfer.	73A078

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
309.	**Phenoxide ion**					
309.020	$\cdot CH_2CHO + C_6H_5O^- (+ H_2O) \rightarrow CH_3CHO + C_6H_5O\cdot + OH^-$	4.3×10^6	~11.5	p.r.	Soln. contg. N_2O and ethylene glycol.	79A051
310.	***o*-Phenylenediamine**					
310.020	$\cdot CH_2CHO + H_2NC_6H_4NH_2 \rightarrow CH_3CHO + H_2NC_6H_4\dot{N}H$	7.3×10^7	~11.5	p.r.	Soln. contg. N_2O and ethylene glycol.	79A051
311.	***p*-Phenylenediamine**					
311.020	$\cdot CH_2CHO + H_2NC_6H_4NH_2 \rightarrow CH_3CHO + H_2NC_6H_4\dot{N}H$	4.0×10^8	~11.5	p.r.	Soln. contg. N_2O and ethylene glycol.	79A051
312.	**Promethazine**					
312.048	$\cdot CCl_3 + PZ$	slow	12	p.r	Suggested that fast reaction is with $CCl_3\dot{O}_2$ and not $\cdot CCl_3$.	78B128 80A053
313.	**1-Propanol**					
313.047	$\cdot CF_3 + CH_3CH_2CH_2OH$	$(4.4 \pm 0.7) \times 10^4$ (rel.)	9–10	γ-r.	C.k. with addn. of CF_3 to propylene obs. $G(CF_3H)$; rel. to $k(CF_3 + HCO_2^-) = 3.4 \times 10^5$.	70G407
314.	**2-Propanol**					
314.001	$\cdot CH_3 + (CH_3)_2CHOH \rightarrow CH_4 + (CH_3)_2\dot{C}OH$	3.4×10^3 (rel.)		γ-r.	C.k. with O_2; radical from MeI; rel. to $k(CH_3 + O_2) = 4.7 \times 10^9$.	67G041
		$\geqslant(1.6 \pm 0.3) \times 10^3$ (rel.)	1	phot.	Est. from effect of addn. of 2-PrOH on CH_4 and C_2H_6 yields in photolysis of $Co(NH_3)_5O_2CCH_3^{2+}$.	71F579
314.015	$\cdot CH_2CHOHCH_3 + (CH_3)_2CHOH \rightarrow (CH_3)_2CHOH + (CH_3)_2\dot{C}OH$	$>53 \pm 10$		γ-r.	Est. from rel. rates and $G(-H_2O_2)$ in soln. contg. H_2O_2 and 2-PrOH.	70G104
314.047	$\cdot CF_3 + (CH_3)_2CHOH \rightarrow CHF_3 + (CH_3)_2\dot{C}OH$	$(9.2 \pm 0.9) \times 10^4$ (rel.)	9–10	γ-r.	C.k. with addn. of $\cdot CF_3$ to propylene; obs. $G(CHF_3)$; rel. to $k(\cdot CF_3 + HCO_2^-) = 3.4 \times 10^5$.	70G407
314.048	$\cdot CCl_3 + (CH_3)_2CHOH \rightarrow CCl_3^- + H^+ + (CH_3)_2\dot{C}OH$	$\sim 10^4$		p.r.	Reaction proposed to explain initial increase of abs. of $PNAP^-$ in soln. contg. CCl_4–PNAP–2-PrOH–acetone.	73A140
	$\cdot CCl_3 + (CH_3)_2CHOH \rightarrow CHCl_3 + (CH_3)_2\dot{C}OH$	79		γ-r.	Calcd. from dependence of $G(Cl^-)$ on dose rate in soln. contg. CCl_4 and 2-PrOH assuming $2k(\cdot CCl_3 + \cdot CCl_3) = 10^9$.	71G778
315.	**Propionic acid**					
315.001	$\cdot CH_3 + CH_3CH_2CO_2H \rightarrow CH_4 + CH_3\dot{C}HCO_2H$	3.0×10^3	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}–H_2O_2 soln.; est. from esr meas. and values for competing reactions.	75D188
316.	**Propionitrile**					
316.001	$\cdot CH_3 + CH_3CH_2CN \rightarrow CH_4 + CH_3\dot{C}HCN$	1.2×10^3	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}–H_2O_2 soln.; est. from esr meas. and values for competing reactions.	75D188
317.	**Propylene**					
317.001	$\cdot CH_3 + CH_3CH{=}CH_2 \rightarrow$ addn.	5.3×10^3 (rel.)		γ-r.	C.k. with 2-PrOH in soln. contg. MeI obs. $G(CH_4)$; rel. to $k(CH_3 + O_2) = 4.7 \times 10^9$.	67G041
317.047	$\cdot CF_3 + CH_3CH{=}CH_2 \rightarrow$ addn.	$(7.2 \pm 0.4) \times 10^7$ (rel.)	9–10	γ-r.	C.k. with 2-PrOH; radical from CF_3Cl; obs. $G(CF_3H)$ by H abstr. from formate rel. to $k(CF_3 + HCO_2^-) = 3.4 \times 10^5$.	70G407
	1,1′-Propylene-2,2′-bipyridinium ion See Trimethylene-2,2′-bipyridinium ion 354.					
318.	**Pteridine**					
318.075	$\cdot CH_2OH + P$	3.6×10^8	6.0	p.r.	P.b.k. in N_2O-satd. soln. contg. MeOH.	76A060

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
319.	**Pterin**					
319.075	$\cdot CH_2OH + PtH_2^+$	9.0×10^7 (uncor.)	0.8	p.r.	P.b.k. in N_2O–satd. soln.	76A060
	$\cdot CH_2OH + PtH$	$<10^7$	7.0		contg. MeOH; ~40% e–transfer	
	$\cdot CH_2O^- + Pt^-$	6.0×10^8	13.0		at pH 0.8, ~100% at pH 13.	
319.076	$CH_3\dot{C}HOH + PtH$	3.7×10^7 (uncor.)	7.0	p.r.	P.b.k. in N_2O–satd. soln.	76A060
	$CH_3\dot{C}HO^- + Pt^-$	1.2×10^9	13.0		contg. EtOH; ~40% e–transfer at pH 7, ~100% at pH 13.	
319.078	$(CH_3)_2\dot{C}OH + PtH_2^+$	2.0×10^9	0.8	p.r.	P.b.k. in N_2O–satd. soln.	76A060
	$(CH_3)_2\dot{C}OH + PtH$	4.5×10^8	7.0		contg. 2–PrOH; ~100% e–transfer.	
	$(CH_3)_2\dot{C}OH + Pt^-$	$<10^7$	9.4			
	$(CH_3)_2\dot{C}O^- + Pt^-$	1.5×10^9	13.0			
319.147	$\cdot CO_2^- + PtH$	4.6×10^8	7.0	p.r.	P.b.k. in N_2O–satd. soln.	76A060
	$\cdot CO_2^- + Pt^-$	$<10^7$	9.5–13.0		contg. formate ion; 100% e–transfer at pH 7.	
320.	**Purine**					
320.078	$(CH_3)_2\dot{C}OH + PH_2^+$	2.7×10^9	~0	p.r.	P.b.k. in N_2O–satd. soln. contg.	75A060
	$(CH_3)_2\dot{C}OH + PH$	$<10^7$	6.0		1–2 mol L^{-1} 2–PrOH.	
	$(CH_3)_2\dot{C}O^- + P^-$	$<10^7$	13.3			
320.147	$\cdot CO_2^- + PH$	$<10^7$	6.0	p.r.	P.b.k. in N_2O–satd. soln.	75A060
321.	**Pyrazine**					
321.078	$(CH_3)_2\dot{C}OH + PzH^+$	2.8×10^9	~0	p.r.	P.b.k. in N_2O–satd. soln. contg.	74A127
	$(CH_3)_2\dot{C}OH + Pz$	$<10^7$	5.0, 11.0		2–PrOH; $k \simeq 5 \times 10^9$ in 70% $HClO_4$ soln.	
	$(CH_3)_2\dot{C}O^- + Pz$	1.7×10^9	13.6			
321.147	$\cdot CO_2^- + Pz$	$<10^7$	5.0, 11.0	p.r.	P.b.k. in N_2O–satd. soln. contg. formate ion.	74A127
322.	**Pyrazinecarboxylic acid**					
322.078	$(CH_3)_2\dot{C}OH + PzCO_2H \rightarrow (CH_3)_2CO + \cdot Pz(H)CO_2H$	$\sim 8.5 \times 10^8$		p.r.	P.b.k.	78A222
323.	**Pyrene**					
323.075	$\cdot CH_2O^- + Py$	no reaction	13	p.r.	Buildup of Py^- in micellar soln. contg. 0.2 mol L^{-1} MeOH after phot. attributed to triplet pyrene; $k(\cdot CH_2O^- + {}^3Py) = 1.8 \times 10^{10}$.	76A062
323.076	$CH_3\dot{C}HO^- + Py \rightarrow CH_3CHO + Py^-$	1.7×10^8	13	p.r.	P.b.k. at 495 nm in soln. contg. 0.2 mol L^{-1} EtOH and 10^{-3} mol L^{-1} pyrene solubilized by 5×10^{-3} mol L^{-1} hexadecyl trimethylammonium bromide; after photolysis $k(R + {}^3Py) = 8 \times 10^9$.	76A062
323.078	$(CH_3)_2\dot{C}O^- + Py \rightarrow (CH_3)_2CO + Py^-$	2.3×10^9	13	p.r.	P.b.k. at 495 nm in soln. contg. 2×10^{-4} mol L^{-1} pyrene, 0.2 mol L^{-1} 2–PrOH, 0.1 mol L^{-1} acetone and 5×10^{-3} mol L^{-1} hexadecyl trimethyl–ammonium bromide; after photolysis $k(R + {}^3Py) = 2.3 \times 10^9$.	76A062
323.147	$\cdot CO_2^- + Py$	no reaction	13	p.r.	Buildup of 495 nm abs. in micellar soln. (CO_2–satd.) only after photolysis; $k(\cdot CO_2^- + {}^3Py) = 5 \times 10^9$; calcd. $k(\cdot CO_2^- + Py^-) = 1.8 \times 10^{10}$ from d.k. at 495 nm in micellar CO_2–free soln. contg. formate ion.	76A062
324.	**Pyridazine**					
324.078	$(CH_3)_2\dot{C}OH + PdH^+ \rightarrow (CH_3)_2CO + \cdot PdH_2^+$	2.6×10^9	~0	p.r.	P.b.k. in N_2O–satd. soln. contg. 2–PrOH.	74A127
	$(CH_3)_2\dot{C}OH + Pd$	$<10^7$	5.0, 11.0			74A127
	$(CH_3)_2\dot{C}O^- + Pd \rightarrow (CH_3)_2CO + \cdot PdH + OH^-$	2.1×10^9	13.6			74A127

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
324.147	$\cdot CO_2^- + Pd$	$<10^7$	5.0, 11.0	p.r.	<10% e-transfer.	74A127
325.	**4-Pyridinecarboxaldoxime**					
325.078	$(CH_3)_2\dot{C}OH + HN^+C_5H_4CH{=}NOH$	1.7×10^9	acid	p.r.	P.b.k. (pyridinyl radical) in N_2O-satd. soln. contg. 2-PrOH; e-transfer in strong acid or base.	76A182
		$<10^7$	7			
	$(CH_3)_2\dot{C}O^- + NC_5H_4CH{=}NO^-$	1.7×10^8	13.3			
326.	**2-Pyridinecarboxaldoxime methochloride**					
326.078	$(CH_3)_2\dot{C}OH + CH_3N^+C_5H_4CH{=}NOH$	6×10^8	3,7, 11	p.r.	P.b.k.; e-transfer.	76A182
	3-Pyridinecarboxamide See Nicotinamide 275.					
	4-Pyridinecarboxamide See Isonicotinamide 244.					
	3-Pyridinecarboxylic acid See Nicotinic acid 277.					
	4-Pyridinecarboxylic acid See Isonicotinic acid 245.					
327.	**Pyridoxal-5-phosphate**					
327.078	$(CH_3)_2\dot{C}OH + P \rightarrow \cdot P$	5.8×10^8	1.0	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	75A024
	$(CH_3)_2\dot{C}OH + P \rightarrow \cdot P$	1.3×10^8	5.6			
	$(CH_3)_2\dot{C}O^- + P \rightarrow \cdot P$	2.9×10^8	10.0, 13.3			
328.	**Pyridoxine**					
328.078	$(CH_3)_2\dot{C}OH + PH$	$<10^7$	1,7, 13.5	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	75A024
329.	**Pyrimidine**					
329.078	$(CH_3)_2\dot{C}OH + PmH^+ \rightarrow (CH_3)_2CO + \cdot PmH_2^+$	2.2×10^9	~0	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	74A127
	$(CH_3)_2\dot{C}OH + Pm$	$<10^7$	5.0, 11.0	p.r.	P.b.k. in N_2O-satd.soln. contg. 2-PrOH.	74A127
	$(CH_3)_2\dot{C}O^- + Pm$	$<10^7$	13.6	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	74A127
329.147	$\cdot CO_2^- + Pm$	$<10^7$	5.0, 11.0	p.r.	P.b.k. in N_2O-satd. soln. contg. formate ion; <10% e-transfer.	74A127
330.	**Pyruvate ion**					
330.113	$\cdot A^- + CH_3COCO_2^-$ ($\cdot A^-$ = ascorbate radical)	<10	8.6	p.r.	D.k. at 360 nm in N_2O-satd. soln. contg. ascorbate ion.	75A240
331.	**Quinoxaline**					
331.076	$CH_3\dot{C}HOH + Qx \rightarrow CH_3CHO + \cdot QxH$	6.5×10^7 (uncor.)	6.5	p.r.	P.b.k. in N_2O-satd. soln. contg. EtOH; 70% e-transfer.	74A127
331.078	$(CH_3)_2\dot{C}OH + QxH^+ \rightarrow (CH_3)_2CO + \cdot QxH_2^+$	3.7×10^9	~0	p.r.	P.b.k. in N_2O-satd. soln. contg. 2 mol L^{-1} $HClO_4$ and 2 mol L^{-1} 2-PrOH; $k \simeq 7.0 \times 10^8$ at 70% $HClO_4$.	74A127
	$(CH_3)_2\dot{C}OH + Qx \rightarrow (CH_3)_2CO + \cdot QxH$	1.6×10^8	6.5	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	74A127
	Resorcinol See 1,3-Dihydroxybenzene 177.					
332.	**Rhodamine B**					
332.147	$\cdot CO_2^- + RhB \rightarrow CO_2 + RhB_{red}$	$(1.8 \pm 0.5) \times 10^8$		p.r.	D.k. at 510 nm as well as p.b.k. at 410 nm in soln. contg. 0.1 mol L^{-1} formate ion.	67E053
333.	**Riboflavin**					
333.056	$NH_2\dot{C}HCO_2^- + RF$	$(2.7 \pm 0.3) \times 10^9$	8.0	p.r.	P.b.k. at 560 nm in N_2O-satd. soln. contg. glycine; e-transfer.	73A104

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
333.078	$(CH_3)_2\dot{C}OH$ + RF	(2.3 ± 0.2) x 10^9	7.0	p.r.	P.b.k. at 560 nm in N_2O–satd. soln. contg. 2–PrOH; e–transfer.	73A104
333.115	$\dot{C}HOHCO_2^-$ + RF	(9.3 ± 0.9) x 10^8	7.0	p.r.	P.b.k. at 560 nm in N_2O–satd. soln. contg. glycolate ion; e–transfer.	73A104
333.147	$\cdot CO_2^-$ + RF	1.4 x 10^9 3.6 x 10^9	alk 5.9	p.r.	D.k. at 460 nm as well as p.b.k. at 560 nm (semiquinone) in N_2O–satd. soln. contg. formate ion.	69G238
		3.6 x 10^9 3.0 x 10^9	3 H_o=–2	p.r.	D.k. at 420 nm in N_2O–satd. soln. contg. formate ion.	69G238
		(1.7 ± 0.2) x 10^9	7.0	p.r.	P.b.k. at 560 nm in N_2O–satd. soln. contg. formate ion; e–transfer.	73A104
334.	**Riboflavine 5′-phosphate *(Flavine mononucleotide)***					
334.078	$(CH_3)_2\dot{C}OH$ + FMN	(1 ± 0.5) x 10^9		p.r.		73A150
335.	**Ribonuclease**					
335.045	$\cdot CHCl_2$ + RNase	6 x 10^8	11	p.r.	P.b.k. in soln. contg. $CHCl_3$ and *tert*–BuOH.	73A140
336.	**Safranine T**					
336.056	$NH_2\dot{C}HCO_2^-$ + Dye	1.6 x 10^9 (uncor.)	7	p.r.	D.k. at 520 nm in N_2O–satd. soln. contg. glycine; 60% e–transfer.	73A078
336.078	$(CH_3)_2\dot{C}OH$ + Dye	2.8 x 10^9	7	p.r.	D.k. at 520 nm in N_2O–satd. soln. contg. 2–PrOH; 86% e–transfer.	73A078
337.	***meso*–Tetra(4–carboxyphenyl)porphyrin**					
337.078	$(CH_3)_2\dot{C}OH$ + $H_2TCPP \rightarrow H_2TCPP\cdot^-$	(9 ± 1) x 10^8	7–11	p.r.	P.b.k. at 460 and 700 nm in N_2O–satd. soln. contg. 0.2 mol L^{-1} 2–PrOH.	79A143
338.	**Tetrachlorobenzoquinone *(Chloranil)***					
338.076	$CH_3\dot{C}HOH$ + $O{=}C_6Cl_4{=}O \rightarrow$ e–transfer	(2.9 to 3.4) x 10^9		p.r.	P.b.k. in CTAB or NaLS micelles; soln. contains 0.1 mol L^{-1} EtOH; cor. for e_{aq}^- reaction.	76A104
339.	**1,2,4,5–Tetracyanobenzene**					
339.076	$CH_3\dot{C}HOH$ + $C_6H_2(CN)_4 \rightarrow$ e–transfer	(3.3 to 4.1) x 10^9		p.r.	P.b.k. in CTAB or NaLS micelles; soln. contains 0.1 mol L^{-1} EtOH; cor. for e_{aq}^- reaction.	76A104
340.	**Tetrahydrofuran**					
340.048	$\cdot CCl_3$ + C_4H_8O	57			Calcd. from dependence of $G(Cl^-)$ on dose rate in soln. contg. CCl_4 and tetrahydrofuran.	71G778
	Tetramethyl–p–benzoquinone See Duroquinone 198.					
	N,N,N′,N′–Tetramethyldiazenedicarboxamide See Diamide 170.					
341.	**1,1′–Tetramethylene–2,2′–bipyridinium ion**					
341.147	$\cdot CO_2^-$ + $BP^{2+} \rightarrow CO_2$ + $\cdot BP^-$	9.0 x 10^9	7.0	p.r.	P.b.k. at 680 nm in N_2O–satd. soln. contg. 0.2 mol L^{-1} formate.	76A169
		7 x 10^9	6.8	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} formate ion.	78A321
342.	**2,2,6,6–Tetramethyl–4–oxo–1–piperidinyloxy *(TAN)***					
342.004	c–$\dot{C}_5H_9$ + TAN	(4.0 ± 0.4) x 10^8	acid	p.r.	Condy. changes in N_2O–satd. soln. contg. 10^{-2} mol L^{-1} cyclopentane; addn. reaction.	76A067
342.016	$\cdot CH_2C(CH_3)_2OH$ + TAN	(2.8 ± 0.3) x 10^8	2.4	p.r.	Condy. changes in N_2O–satd. soln. contg. 0.1 mol L^{-1} *tert*–BuOH; addn. reaction.	76A067

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
342.075	$\cdot CH_2OH$ + TAN	7.2 x 10^8 (rel.)	5–6	p.r.	C.k. in N_2O–satd. soln. contg. 1 mol L^{-1} MeOH; k($\cdot CH_2OH$ + ferricyanide) = 4.0 x 10^9.	71G618
		(7.2 ± 0.7) x 10^8	acid	p.r.	Condy. changes in N_2O–satd. soln. contg. 0.1 mol L^{-1} MeOH; addn. reaction.	76A067
342.076	$CH_3\dot{C}HOH$ + TAN	6.4 x 10^8 (rel.)	5–6	p.r.	C.k. in N_2O–satd. soln. contg. EtOH assuming k(R + ferricyanide) = 5.3 x 10^9.	71G618
		(4.0 ± 0.4) x 10^8	acid	p.r.	Condy. changes in N_2O–satd. soln. contg. 0.1 mol L^{-1} EtOH; e–transfer.	76A067
342.078	$(CH_3)_2\dot{C}OH$ + TAN	3.9 x 10^8 (rel.)	5–6	p.r.	C.k. in N_2O–satd. soln. contg. 2–PrOH, rel. to k(R + ferricyanide) = 4.7 x 10^9; k = 4.7 x 10^8 rel. to k(R + PNAP) = 3.8 x 10^9.	71G618
		(4.3 ± 0.4) x 10^8	acid	p.r.	Condy. change in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH; addn. reaction.	76A067
342.105	R + TAN (R = Radicals from polyethylene oxide)	1.9 x 10^8 (rel.)	5–6	p.r.	C.k. in N_2O–satd. soln. contg. PEO(20000), rel. to k(R + ferricyanide) = 2.1 x 10^9; similar values were obtained for PEO(600) and PEO(200).	71G618
342.108	R + TAN (R = Radicals from deoxyribose)	3.9 x 10^8 (rel.)	5–6	p.r.	C.k. in N_2O–satd. soln. contg. deoxyribose, rel. to k(R + ferricyanide) = 2.8 x 10^9.	71G618
342.111	R + TAN (R = Radicals from glucose)	<1 x 10^8 (rel.)	5–6	p.r.	C.k. in N_2O–satd. soln. contg. glucose, rel. to k(R + ferricyanide) = 1.9 x 10^9.	71G618
		(5.9 ± 0.6) x 10^7	acid	p.r.	Condy. change in N_2O–satd. soln. contg. 0.1 mol L^{-1} glucose.	76A067
342.147	$\cdot CO_2^-$ + TAN	7.0 x 10^8	7–8	p.r.	P.b.k. at 310 nm in N_2O–satd. soln. contg. formate.	71G618
		5.4 x 10^8 (rel.)	7–8	p.r.	C.k. in N_2O–satd. soln. contg. formate, rel. to k($\cdot CO_2^-$ + ferricyanide) = 1.06 x 10^9.	71G618
343.	**2,2,6,6–Tetramethyl–4–hydroxy–1–piperidinyloxy *(TMPN)***					
343.004	c–$\dot{C}_5H_9$ + TMPN	(4.3 ± 0.4) x 10^8	acid	p.r.	Condy. change in N_2O–satd. soln. contg. 10^{-2} mol L^{-1} cyclopentane; addn. reaction.	76A067
343.016	$\cdot CH_2C(CH_3)_2OH$ + TMPN	(1.5 ± 0.2) x 10^8	2.6	p.r.	Condy. change in N_2O–satd. soln. contg. 0.1 mol L^{-1} *tert*–BuOH; addn. reaction.	76A067
343.075	$\cdot CH_2OH$ + TMPN	(4.4 ± 0.4) x 10^8	acid	p.r.	Condy. change in N_2O–satd. soln. contg. 0.1 mol L^{-1} MeOH; addn. reaction.	76A067
343.076	$CH_3\dot{C}HOH$ + TMPN	(4.9 ± 0.5) x 10^8	acid	p.r.	Condy change in N_2O–satd. soln. contg. 0.1 mol L^{-1} EtOH; e–transfer.	76A067
343.078	$(CH_3)_2\dot{C}OH$ + TMPN	(3.6 ± 0.4) x 10^8	acid	p.r.	Condy. change in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH; e–transfer.	76A067
343.111	R + TMPN (R = Radicals from glucose)	(4.9 ± 0.5) x 10^7	acid	p.r.	Condy. change in N_2O–satd. soln. contg. 0.1 mol L^{-1} glucose; addn. reaction.	76A067
344.	***N,N,N',N'*–Tetramethyl–p–phenylenediamine**					
344.020	$\cdot CH_2CHO$ + TMPD (+ H_2O) → CH_3CHO + TMPD$\cdot$ + OH^-	2.0 x 10^9	~11.5	p.r.	Soln. contg. N_2O and ethylene glycol; radical cation ident. by abs. spectra.	70A051
345.	**2,2,5,5–Tetramethyl–1–pyrrolidinyloxy–3–carboxamide *(NX–s)***					
345.001	$\cdot CH_3$ + NX–s	(7.5 ± 0.8) x 10^8	3.0	p.r.	Condy. change in N_2O–satd. soln. contg. 10^{-2}–10^{-1} mol L^{-1} dimethyl sulfoxide; addn. reaction.	76A152

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
345.004	c-$\dot{C}_5H_9$ + NX-s	(3.5 ± 0.4) x 10^8	acid	p.r.	Condy. change in N_2O-satd. soln. contg. 10^{-2}–10^{-1} mol L^{-1} cyclopentane; addn. reaction.	76A152
345.014	$\cdot CH_2CH_2OH$ + NX-s	(4.7 ± 0.5) x 10^8	acid	p.r.	Condy. change in N_2O-satd. soln. contg. 10^{-2}–10^{-1} mol L^{-1} ethylene; addn. reaction.	76A152
345.016	$\cdot CH_2C(CH_3)_2OH$ + NX-s	(1.8 ± 0.2) x 10^8	acid	p.r.	Condy. change in N_2O-satd. soln. contg. 10^{-2}–10^{-1} mol L^{-1} *tert*-BuOH; addn. reaction.	76A152
345.075	$\cdot CH_2OH$ + NX-s	(4.6 ± 0.5) x 10^8	acid	p.r.	Condy. change in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH; addn. reaction.	76A152
345.076	$CH_3\dot{C}HOH$ + NX-s	(4.3 ± 0.4) x 10^8	acid	p.r.	Condy. change in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH; *e*-transfer.	76A152
345.078	$(CH_3)_2\dot{C}OH$ + NX-s	(3.3 ± 0.3) x 10^8	acid	p.r.	Condy. change in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH; *e*-transfer.	76A152
345.111	R + NX-s (R = Radicals from glucose)	(5.1 ± 0.5) x 10^7	acid	p.r.	Condy. change in N_2O-satd. soln. contg. 0.1 mol L^{-1} glucose; *e*-transfer.	76A152
346.	**2,2,5,5-Tetramethyl-3-pyrrolin-1-yloxy-3-carboxamide *(NX-u)***					
346.001	$\cdot CH_3$ + NX-u	(7.8 ± 0.8) x 10^8	acid.	p.r.	Condy. change in N_2O-satd. soln. contg. 10^{-2}–10^{-1} mol L^{-1} dimethyl sulfoxide; addn. reaction.	76A152
346.004	c-C_5H_9 + NX-u	(3.6 ± 0.4) x 10^8	acid	p.r.	Condy. change in N_2O-satd. soln. contg. 10^{-2}–10^{-1} mol L^{-1} cyclopentane; addn. reaction.	76A152
346.014	$\cdot CH_2CH_2OH$ + NX-u	(4.8 ± 0.5) x 10^8	acid	p.r.	Condy. change in N_2O-satd. soln. contg. 10^{-2}–10^{-1} mol L^{-1} ethylene; addn. reaction.	76A152
346.016	$\cdot CH_2C(CH_3)_2OH$ + NX-u	(2.0 ± 0.2) x 10^8	acid	p.r.	Condy. change in N_2O-satd. soln. contg. 10^{-2}–10^{-1} mol L^{-1} *tert*-BuOH; addn. reaction.	76A152
346.075	$\cdot CH_2OH$ + NX-u	(3.5 ± 0.4) x 10^8	acid	p.r.	Condy. change in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH; addn. reaction.	76A152
346.076	$CH_3\dot{C}HOH$ + NX-u	(6.2 ± 0.6) x 10^8	acid	p.r.	Condy. change in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH; *e*-transfer.	76A152
346.078	$(CH_3)_2\dot{C}OH$ + NX-u	(3.6 ± 0.4) x 10^8	acid	p.r.	Condy. change in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH; *e*-transfer.	76A152
346.111	R + NX-u (R = Radicals from glucose)	(4.3 ± 0.4) x 10^7	acid	p.r.	Condy. chnge in N_2O-satd. soln. contg. 0.1 mol L^{-1} glucose; *e*-transfer.	76A152
347.	**Tetranitromethane**					
347.075	$\cdot CH_2OH + C(NO_2)_4 \rightarrow CH_2O + NO_2 + H^+ + C(NO_2)_3^-$	(5.0 ± 1) x 10^9		p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	64G133
347.076	$CH_3\dot{C}HOH + C(NO_2)_4 \rightarrow CH_3CHO + NO_2 + H^+ + C(NO_2)_3^-$	5.6 x 10^9	~1	p.r.	P.b.k. at 366 nm in soln. contg. 0.5 mol L^{-1} EtOH.	65G183
		~3.5 x 10^9		p.r.	P.b.k. in solns. contg. 0.1 mol L^{-1} EtOH and either 0.1 mol L^{-1} Na dodecyl sulfate or 0.02 mol L^{-1} dodecyltrimethylammonium chloride.	76A104
347.077	$CH_3CH_2\dot{C}HOH + C(NO_2)_4 \rightarrow CH_3CH_2CHO + NO_2 + H^+ + C(NO_2)_3^-$	(4.7 ± 1) x 10^9		p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1-PrOH.	64G133
347.078	$(CH_3)_2\dot{C}OH + C(NO_2)_4 \rightarrow (CH_3)_2CO + H^+ + NO_2 + C(NO_2)_3^-$	(5.0 ± 1) x 10^9		p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	64G133
347.092a	$\cdot CH_2OCH_3 + C(NO_2)_4 \rightarrow CH_3OCH_2O\dot{N}^+(O^-)C(NO_2)_3 \longleftrightarrow CH_3OCH_2ON(\dot{O})C(NO_2)_3$	6 x 10^9		p.r.	P.b.k. at 300 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} methyl ether; adduct decomposes to nitroform anion, k = 1.1 x 10^4 s^{-1}.	80A071
347.093	$CH_3CH_2O\dot{C}HCH_3 + C(NO_2)_4 \rightarrow C(NO_2)_3^-$	~4 x 10^9		p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. ethyl ether.	80A071
347.093a	$\cdot CH_2OC(CH_3)_3 + C(NO_2)_4 \rightarrow C(NO_2)_3^-$	~3 x 10^9		p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. methyl *tert*-butyl ether.	80A071

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
347.094a	$\cdot CH_2OCH_2OCH_3 + C(NO_2)_4 \rightarrow CH_3OCH_2OCH_2ON(\dot{O})C(NO_2)_3$	5×10^9	4–13	p.r.	P.b.k. at 300 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} dimethoxymethane; adduct decomposes to nitroform anion (λ 350 nm), $k = 8.2 \times 10^2$ s^{-1}.	80A071
347.101	$CH_2OH\dot{C}HOH + C(NO_2)_4$	1.7×10^9		p.r.	P.b.k. in soln. contg. 0.2 mol L^{-1} ethylene glycol.	73G126
347.102	$CH_3CHOH\dot{C}HOH + C(NO_2)_4$	3.2×10^9		p.r.	P.b.k. in soln. contg. 0.2 mol L^{-1} 1,2-propanediol.	73G126
347.103	$CH_3CHOH\dot{C}OHCH_3 + C(NO_2)_4$	3.3×10^9		p.r.	P.b.k. in soln. contg. 0.2 mol L^{-1} 2,3-butanediol.	73G126
347.106	$CH_2OHCHOH\dot{C}HOH + C(NO_2)_4$ (+ $CH_2OH\dot{C}OHCH_2OH$)	$(2.4 \pm 0.3) \times 10^9$		p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} glycerol.	64G133
347.111	$R + C(NO_2)_4$ (R = Radicals from glucose)	2.6×10^9		p.r.	P.b.k. at 366 nm in N_2O-satd. soln. 0.25 mol L^{-1} glucose.	65G183
347.112	$R + C(NO_2)_4$ (R = Radicals from sucrose)	$(7.0 \pm 1) \times 10^8$		p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} sucrose.	64G133
		$(8.5 \pm 1) \times 10^8$		p.r.	P.b.k. in soln. contg. 0.1 or 0.01 mol L^{-1} sucrose.	65G183
347.147	$\cdot CO_2^- + C(NO_2)_4$	$(4 \pm 1) \times 10^9$		p.r.	P.b.k.; independent of pH between 3 and 7.	70G303
348.	**Thiamine**					
348.078	$(CH_3)_2\dot{C}OH + TmH^+ \rightarrow (CH_3)_2CO + \cdot TmH_2^+$	2.2×10^8	0.5	p.r.	P.b.k. in soln. contg. 2-PrOH.	77A034
	$(CH_2)_2\dot{C}OH + Tm \rightarrow (CH_3)_2CO + \cdot TmH^+$	1.9×10^8	6.6	p.r.	P.b.k. in soln. contg. 2-PrOH.	77A034
349.	**Thiazole**					
349.078	$(CH_3)_2\dot{C}OH + C_3H_3SNH^+ \rightarrow (CH_3)_2CO + \cdot C_3H_3SNH_2^+$	6.2×10^8	0.8	p.r.	P.b.k. in soln. contg. 2-PrOH.	77A034
	$(CH_3)_2\dot{C}O^- + C_3H_3SN$		13.3	p.r.	No electron transfer.	77A034
350.	**Thionine**					
350.056	$NH_2\dot{C}HCO_2^- + Dye$	3.2×10^9	8	p.r.	D.k. at 600 nm in N_2O-satd. soln. contg. glycine; 85% e-transfer.	73A078
350.075	$\cdot CH_2OH + Dye$	2.6×10^9	8	p.r.	D.k. at 600 nm in N_2O-satd. soln. contg. MeOH; 86% e-transfer.	73A078
350.078	$(CH_3)_2\dot{C}OH + Dye$	4.2×10^9	8	p.r.	D.k. at 600 nm in N_2O-satd. soln. contg. 2-PrOH; 88% e-transfer.	73A078
351.	**Trichloroacetate ion**					
351.078	$(CH_3)_2\dot{C}OH + CCl_3CO_2^-$	5×10^6 (rel.)		p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to k(R + PNAP) = 3.8×10^9.	73A140
	$(CH_3)_2\dot{C}O^- + CCl_3CO_2^-$	3×10^8 (rel.)	13	p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to k(R + PNAP) = 3.8×10^9.	73A140
352.	**Trifluoroacetate ion**					
352.078	$(CH_3)_2\dot{C}OH + CF_3CO_2^-$	$<1 \times 10^5$ (rel.)		p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to k(R + PNAP) = 3.8×10^9.	73A140
353.	**2,3,5-Trimethylbenzoquinone**					
353.078	$(CH_3)_2\dot{C}OH + Q \rightarrow (CH_3)_2CO + H^+ + \cdot Q^+$	3.6×10^9	7	p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	73G125
354.	**1,1′-Trimethylene-2,2′-bipyridinium ion**					
354.147	$\cdot CO_2^- + BP^{2+} \rightarrow CO_2 + \cdot BP^+$	7.5×10^9	7.0	p.r.	P.b.k. at 680 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} formate ion.	76A169
		1.1×10^{10}	6.8	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	78A321

TABLE 2. Rate constants for reactions of aliphatic radicals with organic solutes in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
355.	**Trinitrobenzenesulfonate ion**					
355.111	R + $(NO_2)_3C_6H_2SO_3^-$ (R = Radicals from glucose)	1.1 x 10^9		p.r.		77R167
356.	**2,4,6-Trinitrobenzoate ion**					
356.078	$(CH_3)_2\dot{C}OH + (NO_2)_3C_6H_2CO_2^- \rightarrow (CH_3)_2CO + H^+ + (\dot{N}O_2^-)(NO_2)_2C_6H_2CO_2^-$	3.9 x 10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20-30%.	76A111
356.147	$\cdot CO_2^- + (NO_2)_3C_6H_2CO_2^-$	3.4 x 10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. formate; k at pH 0.8 within 20-30%.	76A111
357.	**Trypan blue**					
357.078	$(CH_3)_2\dot{C}OH$ + Dye	(3 ± 1.5) x 10^9		p.r.		73A150
358.	**Tyrosine**					
358.048	$\cdot CCl_3 + ArO^-$	slow	12	p.r.	Suggested that fast reaction is $CCl_3\dot{O}_2 + ArO^- \rightarrow ArO\cdot$ (k = 1.6 x 10^8) and $\cdot CCl_3$ is less reactive.	78B128 80A053
359.	**Ubiquinone**					
359.078	$(CH_3)_2\dot{C}OH + Q \rightarrow (CH_3)_2CO + \cdot Q^- + H^+$	1.9 x 10^9	7	p.r.	P.b.k. in soln. contg. 7 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	73G125
	Vitamin B_5 See Nicotinamide 275.					
	Vitamin B_{12} See Cyanocobalamin (under Cobalt(III) ions) 53.					
	Vitamin B_{12a} See Hydroxocobalamin (under Cobalt(III) ions) 54.					
	Vitamin B_{12r} See Cobalamin (under Cobalt(II) ions) 10.					
360.	**Vitamin K_1**					
360.078	$(CH_3)_2\dot{C}OH + Q \rightarrow (CH_3)_2CO + \cdot Q^- + H^+$	1.7 x 10^9	7	p.r.	P.b.k. in soln. contg. 5 mol L^{-1} 2-PrOH and 2 mol L^{-1} acetone.	73G125
	Vitamin K_3 See 2-Methyl-1,4-naphthoquinone 262.					

TABLE 3. Rate constants for acid- and base-catalyzed proton transfer reactions of aliphatic radicals in aqueous solution

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
361.	**Hydronium ion**					
361.075	$\cdot CH_2OH + H_3O^+ \rightleftharpoons \cdot CH_2OH_2^+ + H_2O$	$k_f = 1.76 \times 10^8$		chem.	Esr; radicals from Ti(III)–H_2O_2–MeOH.	65D040
		$k_f = 3.6 \times 10^7$		phot.	Esr; soln. contg. 10% acetone and 5% MeOH.	66D162
		$k_f = (3.19 \pm 0.04) \times 10^7$		chem.	Esr; radicals from Ti(III)–H_2O_2–MeOH at 30.4°C; $E_a = 2.8 \pm 5$ kcal mol^{-1} (11.7 kJ mol^{-1}) at 5.7–41°C; $A = 9.5$ s^{-1}.	68M058
361.078	$(CH_3)_2\dot{C}OH + H_3O^+ \rightleftharpoons (CH_3)_2\dot{C}OH_2^+ + H_2O$	$k_f = 7.2 \times 10^7$		phot.	Esr; soln. contg. 10% acetone and 5% 2–PrOH.	66D162
		$k_f = (6.44 \pm 0.30) \times 10^7$		chem.	Esr; radicals from Ti(III)–H_2O_2–2–PrOH.	68M058
361.148	$CH_3\dot{C}(O^-)OCH_3 + H_3O^+ \rightarrow CH_3\dot{C}(OH)OCH_3 + H_2O$	1.4×10^{10}		p.r.	D.k. at 360 nm in soln. contg. methyl acetate and $HClO_4$ (1–5 x 10^{-5} mol L^{-1}).	78A402
362.	**Hydroxide ion**					
362.022	$\cdot CH{=}CHOH + OH^- \rightleftharpoons [\cdot CH{=}CHO^-] + H_2O$	$k_f = (1.5 \pm 0.3) \times 10^{10}$	9.4–10	p.r.	D.k. at 260 nm in 10^{-3} mol L^{-1} acetylene soln.; hydrolysis product is formylmethyl radical.	78A007
362.060	$CH_3CONH\dot{C}HCOO^- + OH^- \rightleftharpoons CH_3CON^-\dot{C}HCOO^- + H_2O$	$k_f = (8 \pm 2) \times 10^8$	>13	e–r.	Est. by esr from pH dependence of line width in N_2O–satd. soln. contg. acetylglycine; $k_r = 1.6 \times 10^7$; ($pK_a = 14.0$).	76D198
362.062	$R(NH) + OH^- \rightleftharpoons R(N^-) + H_2O$ (R = Radicals from glycine anhydride)	$\sim(8 \pm 2) \times 10^9$	~9.2–10.5	p.r.	P.b.k. at 300 nm in N_2O–satd. soln. contg. 4 x 10^{-3} mol L^{-1} glycine anhydride.	71G554
362.063	$R(NH) + OH^- \rightleftharpoons R(N^-) + H_2O$ (R = Radicals from alanine anhydride)	$\sim(1.1 \pm 0.2) \times 10^{10}$	~9.2–10.5	p.r.	P.b.k. at 300 nm in N_2O–satd. soln. contg. 4 x 10^{-3} mol L^{-1} alanine anhydride.	71G554
362.074	$-(CH_2)_2CONH\dot{C}(COO^-)- + OH^- \rightleftharpoons -(CH_2)_2CO\dot{N}^-\dot{C}(COO^-)- + H_2O$	$k_f = 1 \times 10^9$		e–r.	Est. by esr from pH depencence of line width in N_2O–satd. soln. contg. 2–pyrrolidone–5–carboxylic acid; ($pK_a = 12.7$).	77D087
362.076	$CH_3\dot{C}HOH + OH^- \rightleftharpoons CH_3\dot{C}HO^- + H_2O$	$k_f = 7 \times 10^9$	11–12	e–r.	Esr line broadening in N_2O–satd. soln. contg. 0.1 mol L^{-1} EtOH; $k_r = 4.1 \times 10^5$ ($pK_a = 11.51$).	73D065
362.078	$(CH_3)_2\dot{C}OH + OH^- \rightleftharpoons (CH_3)_2\dot{C}O^- + H_2O$	$k_f = 9 \times 10^9$	11–12	e–r.	Esr line broadening in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH; $k_r = 1.8 \times 10^6$ ($pK_a = 12.03$).	73D065
		$k_f = 7.5 \times 10^9$	10.4–11.0	p.r.	Condy. in soln. contg. 1 mol L^{-1} acetone gave $k_r = (1.4 \pm 0.1) \times 10^6$; k_f calcd. from $pK_a = 12.00$.	80A323
362.101	$\cdot CHOHCH_2OH + OH^- \rightarrow [\cdot CHO^-CH_2OH] + H_2O \rightarrow \cdot CH_2CHO + OH^-$	$\sim 10^{10}$	10	p.r.	Absorption spectrum immediately after pulse in N_2O–satd. soln. contg. ethylene glycol decays in < 10 μs to formylmethyl spectrum.	73G004
362.114	$\cdot CHOHCONH_2 + OH^- \rightleftharpoons \cdot CHO^-CONH_2 + H_2O$	$k_f = 1.1 \times 10^{10}$	8.3–9.9	p.r.	Calcd. from effect of [OH$^-$] in buffer soln. on d.k. at 290 nm in N_2O–satd. soln. contg. glycolamide; cor. to $I = 0$.	75A053
362.115	$\cdot CHOHCO_2^- + OH^- \rightleftharpoons \cdot CHO^-CO_2^- + H_2O$	$k_f = 3.9 \times 10^9$	9.5–10.5	p.r.	Calcd. from effect of [OH$^-$] in buffer soln. on d.k. at 270 nm in N_2O–satd. glycolate soln.; cor. to $I = 0$; $k = (3.1 \pm 0.4) \times 10^9$ in unbuffered soln.	75A053
362.116	$\cdot COH(CH_3)CONH_2 + OH^- \rightleftharpoons \cdot CO^-(CH_3)CONH_2 + H_2O$	$k_f = 1.1 \times 10^{10}$	8.0–10.2	p.r.	Calcd. from effect of [OH$^-$] in buffer soln. on d.k. at 300 nm in N_2O–satd. lactamide soln.; cor. to $I = 0$.	75A053

TABLE 3. Rate constants for acid- and base-catalyzed proton transfer reactions of aliphatic radicals in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
362.134	$[CH_2CHCO_2H]\cdot^- + OH^-$	7.7×10^8	>7	p.r.	Calcd. from effect of $[OH^-]$ on d.k. in acrylate soln.; cor. to $I = 0$; for mechanism and evidence for protonation at the β position see 74G033.	76A113
362.135	$[CH_3CHCHCO_2H]\cdot^- + OH^- \rightarrow CH_3CH_2\dot{C}HCO_2^- + OH^-$	$\sim 1.2 \times 10^8$	>7.5	p.r.	Calcd. from effect of $[OH^-]$ on d.k. in *trans*-crotonate soln.; cor. to $I = 0$.	76A113
362.136	$[CH_2C(CH_3)CO_2H]\cdot^- + OH^- \rightarrow (CH_3)_2\dot{C}CO_2^- + OH^-$	8×10^8	>5.3	p.r.	Calcd. from effect of $[OH^-]$ on d.k. in soln. contg. methacrylate; cor to $I = 0$.	76A113
362.137	$[(CH_3)_2CCHCO_2H]\cdot^- + OH^- \rightarrow (CH_3)_2CH\dot{C}CO_2^- + OH^-$	3×10^6	>8.0	p.r.	Calcd. from effect of $[OH^-]$ on d.k. in β,β-dimethylacrylate soln.; cor. to $I = 0$.	76A113
362.139	$[CH_3CHCHCHCHCO_2H]\cdot^- + OH^-$	$\sim 2 \times 10^7$	>6.4	p.r.	Calcd. from effect of $[OH^-]$ on d.k. in soln. contg. sorbate; cor. to $I = 0$.	76A113
363.	**Water**					
363.128	$[CH_2CHCONH_2]\cdot^- + H_2O \rightarrow CH_3\dot{C}HCONH_2 + OH^-$	1.4×10^5 s^{-1}	9.3–13	p.r.	D.k. in acrylamide soln contg. 10^{-3} mol L^{-1} borate buffer; general acid catalysis by buffer components, e.g. $B(OH)_3$, NH_4^+, $(CH_3)_3NH^+$, HCO_3^-, HPO_4^{2-}, etc.	75A052
363.129	$[CH_3CHCHCONH_2]\cdot^- + H_2O \rightarrow CH_3CH_2\dot{C}HCONH_2 + OH^-$	2×10^4 s^{-1}	10.2	p.r.	D.k. in *trans*-crotonamide soln. contg. borate buffer, as above.	75A052
363.130	$[CH_2C(CH_3)CONH_2]\cdot^- + H_2O \rightarrow CH_3\dot{C}(CH_3)CONH_2 + OH^-$	1.3×10^6 s^{-1}	10–13	p.r.	D.k. in methacrylamide soln. contg. borate buffer, as above.	75A052
363.131	$[(CH_3)_2CCHCONH_2]\cdot^- + H_2O \rightarrow (CH_3)_2CH\dot{C}HCONH_2 + OH^-$	2×10^4 s^{-1}	10.2	p.r.	D.k. in β,β-dimethylacrylamide soln. cor. to $I = 0$.	75A052
363.132	$[CH_2CHCON(CH_3)_2]\cdot^- + H_2O \rightarrow CH_3\dot{C}HCON(CH_3)_2 + OH^-$	3.7×10^5 s^{-1}	10	p.r.	D.k. in *N,N*-dimethylacrylamide soln. contg. borate buffer, as above.	75A052
363.134	$[CH_2CHCO_2H]\cdot^- + H_2O$	4.0×10^4 s^{-1} 3.0×10^4 s^{-1}	6.0 9.5	p.r.	D.k. in acrylate soln.; extrapolated to zero concn. of buffer.	76A113
363.135	$[CH_3CHCHCO_2H]\cdot^- + H_2O \rightarrow CH_3CH_2\dot{C}HCO_2^- + H_2O$	1.0×10^4 s^{-1}	10.4	p.r.	D.k. in crotonate soln.; extrapolated to zero concn. of buffer.	76A113
363.136	$[CH_2C(CH_3)CO_2H]\cdot^- + H_2O \rightarrow CH_3\dot{C}(CH_3)CO_2^- + H_2O$	2.0×10^5 s^{-1}	9.0	p.r.	D.k. in methacrylate soln.; extrapolated to zero concn. of buffer.	76A113
363.137	$[(CH_3)_2CCHCO_2H]\cdot^- + H_2O \rightarrow (CH_3)_2CH\dot{C}HCO_2^- + H_2O$	9×10^3 s^{-1}	11.0	p.r.	D.k. in β,β-dimethylacrylate soln.; extrapolated to zero concn. of buffer.	76A113
363.138	$[CH_2C(CH_3)CO_2CH_3)\cdot^- + H_2O \rightarrow CH_3\dot{C}(CH_3)CO_2CH_3 + OH^-$	4.5×10^5 s^{-1}	9.8–12.8	p.r.	D.k. in methyl methacrylate soln. contg. borate buffer; see 363.128.	75A052
363.139	$[CH_3CHCHCHCHCO_2H]\cdot^- + H_2O$	5.0×10^4 s^{-1}	11.1	p.r.	D.k. in sorbate soln.; extrapolated to zero concn. of buffer.	76A113
364.	**Ammonium ion**					
364.128	$[CH_2CHCONH_2]\cdot^- + NH_4^+ \rightarrow CH_3\dot{C}HCONH_2 + NH_3$	9.5×10^6		p.r.	D.k. in soln. contg. acrylamide; cor. to $I = 0$.	75A052 74A182
364.134	$[CH_2CHCO_2H]\cdot^- + NH_4^+ \rightarrow CH_3\dot{C}HCO_2^- + NH_4^+$	1.8×10^6	>7	p.r.	Calcd. from effect of $[NH_4^+]$ on d.k. in acrylate soln.; cor. to $I = 0$.	76A113
365.	**Ammonia**					
365.114	$\cdot CHOHCONH_2 + NH_3 \rightleftharpoons \cdot CHO^-CONH_2 + NH_4^+$	$k_f = 1.2 \times 10^9$	8.05, 8.25	p.r.	Calcd. from effect of $[NH_3]$ in buffer soln. on d.k. at 290 nm in N_2O-satd. glycolamide soln.; cor. to $I = 0$.	75A053
365.115	$\cdot CHOHCO_2^- + NH_3 \rightleftharpoons \cdot CHO^-CO_2^- + NH_4^+$	$k_f = 7.5 \times 10^8$	9.26, 9.75	p.r.	Calcd. from effect of $[NH_3]$ in buffer soln. on d.k. at 270 nm in N_2O-satd. glycolate soln.; cor. to $I = 0$.	75A053

TABLE 3. Rate constants for acid- and base-catalyzed proton transfer reactions of aliphatic radicals in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
365.116	$\cdot COH(CH_3)CONH_2 + NH_3 \rightleftharpoons \cdot CO^-(CH_3)CONH_2 + NH_4^+$	$k_f = 9.7 \times 10^8$	8.05	p.r.	Calcd. from effect of [NH_3] in buffer soln. on d.k. at 300 nm in N_2O–satd. lactamide soln.; cor. to $I = 0$.	75A053
365.134	$[CH_2CHCO_2H]\cdot^- + NH_3 \rightarrow CH_3\dot{C}HCO_2^- + NH_3$	$(2.8 \pm 1.0) \times 10^6$	>7	p.r.	Calcd. from effect of [NH_3] on d.k. in acrylate soln.; cor. to $I = 0$.	76A113
366.	**Tetrahydroborate ion**					
366.114	$\cdot CHOHCONH_2 + B(OH)_4^- \rightleftharpoons \cdot CHO^-CONH_2 + B(OH)_3 + H_2O$	9.1×10^8	8.25	p.r.	Calcd. from effect of borate on d.k. at 290 nm in N_2O–satd. soln. contg. glycolamide; cor. to $I = 0$.	75A053
366.115	$\cdot CHOHCOO^- + B(OH)_4^- \rightleftharpoons \cdot CHO^-COO^- + B(OH)_3 + H_2O$	1.4×10^7	9.16, 9.75	p.r.	Calcd. from effect of borate on d.k. at 270 nm in N_2O–satd. soln. contg. glycolate; cor. to $I = 0$.	75A053
366.116	$\cdot COH(CH_3)CONH_2 + B(OH)_4^- \rightleftharpoons \cdot CO^-(CH_3)CONH_2 + B(OH)_3 + H_2O$	3.1×10^8	8.30	p.r.	Calcd. from effect of borate on d.k. at 300 nm in N_2O–satd. soln. contg. lactamide; cor. to $I = 0$.	75A053
366.134	$[CH_2CHCO_2H]\cdot^- + B(OH)_4^- \rightarrow CH_3\dot{C}HCO_2^- + B(OH)_4^-$	2.3×10^5	>7	p.r.	Calcd. from effect of borate on d.k. in acrylate soln.; cor. to $I = 0$.	76A113
367.	**Boric acid**					
367.128	$[CH_2CHCONH_2]\cdot^- + B(OH)_3 + H_2O \rightarrow CH_3\dot{C}HCONH_2 + B(OH)_4^-$	1.6×10^6	9.8	p.r.	D.k. in soln. contg. acrylamide; cor. to $I = 0$.	75A052 74A182
367.134	$[CH_3CHCO_2H]\cdot^- + B(OH)_3 \rightarrow CH_3\dot{C}HCO_2^- + B(OH)_3$	2.8×10^5	>7	p.r.	Calcd. from effect of borate on d.k. in acrylate soln.	76A113
368.	**Phosphate ion**					
368.114	$\cdot CHOHCONH_2 + HPO_4^{2-} \rightleftharpoons \cdot CHO^-CONH_2 + H_2PO_4$	$k_f = 1.8 \times 10^9$	8.3	p.r.	Calcd. from effects of [HPO_4^{2-}] on d.k. at 290 nm in N_2O–satd. glycolamide soln.; cor. to $I = 0$.	75A053
368.116	$\cdot COH(CH_3)CONH_2 + HPO_4^{2-} \rightleftharpoons \cdot CO^-(CH_3)CONH_2 + H_2PO_4^-$	$k_f = 8.5 \times 10^8$	6.2	p.r.	Calcd. from effect of [HPO_4^{2-}] on d.k. at 300 nm in N_2O–satd. lactamide soln.; cor. to $I = 0$.	75A053
368.128	$[CH_2CHCONH_2]\cdot^- + H_2PO_4^- \rightarrow CH_3\dot{C}HCONH_2 + HPO_4^{2-}$	3.8×10^6		p.r.	D.k. in soln. contg. acrylamide; cor. to $I = 0$.	75A052 74A182
	$[CH_2CHCONH_2]\cdot^- + HPO_4^{2-} \rightarrow CH_3\dot{C}HCONH_2 + PO_4^{3-}$	8.6×10^4		p.r.	D.k. in soln. contg. acrylamide; cor. to $I = 0$.	75A052 74A182
368.133	$[(CH_3)_2NCONNCON(CH_3)_2]\cdot^- + H_2PO_4^{2-} \rightarrow (CH_3)_2NCONH\dot{N}CON(CH_3)_2 + HPO_4^{2-}$	$(7 \pm 1) \times 10^7$	6–9	p.r.	Effect of [$H_2PO_4^-$] on d.k. at 300 nm in soln. contg. 10^{-4} mol L^{-1} Diamide and 0.2 mol L^{-1} *tert*–BuOH.	75A194
368.134	$[CH_2CHCOOH]\cdot^- + HPO_4^{2-} \rightarrow CH_3\dot{C}HCO_2^- + HPO_4^{2-}$	7×10^3	>7	p.r.	Calcd. from effect of [HPO_4^{2-}] on d.k. in acrylate soln.; cor. to $I = 0$.	76A113
	$[CH_2CHCOOH]\cdot^- + H_2PO_4^- \rightarrow CH_3\dot{C}HCO_2^- + H_2PO_4^-$	5.7×10^6	>7	p.r.	Calcd. from effect of [$H_2PO_4^-$] on d.k. in acrylate soln.; cor. to $I = 0$.	76A113
369.	**Pyrophosphate ion**					
369.114	$\cdot CHOHCONH_2 + HP_2O_7^{3-} \rightarrow \cdot CHO^-CONH_2 + H_2P_2O_7^{2-}$	1.1×10^9	6.10, 6.40	p.r.	Calcd. from effect of [$HP_2O_7^{3-}$] on d.k. at 290 nm in N_2O–satd. glycolamide soln.; cor. to $I = 0$.	75A053
369.115	$\cdot CHOHCOO^- + P_2O_7^{4-} \rightarrow \cdot CHO^-COO^- + HP_2O_7^{3-}$	5.8×10^6	9.26, 9.75	p.r.	Calcd. from effect of [$P_2O_7^{4-}$] on d.k. at 270 nm in N_2O–satd. glycolate soln.; cor. to $I = 0$.	75A053
369.116	$\cdot COH(CH_3)CONH_2 + HP_2O_7^{3-} \rightarrow \cdot CO^-(CH_3)CONH_2 + H_2P_2O_7^{2-}$	3.7×10^8	8.1, 9.3	p.r.	Calcd. from effect of [$HP_2O_7^{3-}$] on d.k. at 300 nm in N_2O–satd. soln. contg. lactamide; $k = 8.5 \times 10^8$ for $P_2O_7^{4-}$.	75A053
369.134	$[CH_3CHCOOH]\cdot^- + HP_2O_7^{3-} \rightarrow CH_3\dot{C}HCO_2^- + HP_2O_7^{3-}$	9.1×10^4	>7	p.r.	Calcd. from effect of [$HP_2O_7^{3-}$] on d.k. in acrylate soln.; cor. to $I = 0$.	76A113

TABLE 3. Rate constants for acid- and base-catalyzed proton transfer reactions of aliphatic radicals in aqueous solution—Continued

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
370.	**Bicarbonate ion**					
370.128	$[CH_2CHCONH_2]\cdot^- + HCO_3^- \rightarrow CH_3\dot{C}HCONH_2 + CO_3^{2-}$	8.6×10^5		p.r.	D.k. in soln. contg. acrylamide; cor. to $I = 0$.	75A052 74A182
371.	**Trimethylammonium ion**					
371.128	$[CH_2CHCONH_2]\cdot^- + (CH_3)_3NH^+ \rightarrow CH_3\dot{C}HCONH_2 + (CH_3)_3N$	2.1×10^9		p.r.	D.k. in soln. contg. acrylamide; cor. to $I = 0$.	75A052 74A182
372.	**Ethylammonium ion**					
372.128	$[CH_2CHCONH_2]\cdot^- + C_2H_5NH_3^+ \rightarrow CH_3\dot{C}HCONH_2 + C_2H_5NH_2$	1.5×10^7		p.r.	D.k. in soln. contg. acrylamide.	75A052 74A182
373.	**Diethylammonium ion**					
373.128	$[CH_2CHCONH_2]\cdot^- + (C_2H_5)_2NH_2^+ \rightarrow CH_3\dot{C}HCONH_2 + (C_2H_5)_2NH$	7.2×10^7		p.r.	D.k. in soln. contg. acrylamide.	75A052 74A182
374.	**Triethylammonium ion**					
374.128	$[CH_2CHCONH_2]\cdot^- + (C_2H_5)_3NH^+ \rightarrow CH_3\dot{C}HCONH_2 + (C_2H_5)_3N$	1.3×10^8	10.3–11.8	p.r.	D.k. in soln. contg. acrylamide; cor. to $I = 0$.	75A052 74A182
375.	**Cyclohexylammonium ion**					
375.128	$[CH_2CHCONH_2]\cdot^- + c\text{-}C_6H_{11}NH_3^+ \rightarrow CH_3\dot{C}HCONH_2 + c\text{-}C_6H_{11}NH_2$	1.4×10^7		p.r.	D.k. in soln. contg. acrylamide.	75A052 74A182
376.	**Pyrrolidinium ion**					
376.128	$[CH_2CHCONH_2]\cdot^- + c\text{-}C_4H_8NH_2^+ \rightarrow CH_3\dot{C}HCONH_2 + c\text{-}C_4H_8NH$	2.0×10^8		p.r.	D.k. in soln. contg. acrylamide.	75A052 74A182
377.	**Piperidinium ion**					
377.128	$[CH_2CHCONH_2]\cdot^- + c\text{-}C_5H_{10}NH_2^+ \rightarrow CH_3\dot{C}HCONH_2 + c\text{-}C_5H_{10}NH$	6.3×10^7		p.r.	D.k. in soln. contg. acrylamide.	75A052 74A182
378.	**Glycine**					
378.128	$[CH_2CHCONH_2]\cdot^- + H_3N^+CH_2CO_2^- \rightarrow CH_3\dot{C}HCONH_2 + H_2NCH_2CO_2^-$	2.5×10^7		p.r.	D.k. in soln. contg. acrylamide.	75A052 74A182

TABLE 4. Rate constants for second order decay of selected aliphatic radicals in aqueous solution—Continued

No.	Reaction	k^a (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
.001	**Methyl**					
	$\cdot CH_3 + \cdot CH_3 \rightarrow C_2H_6$	$(1.24 \pm 0.2) \times 10^9$	5.5	p.r.	D.k. in soln. contg. 10^{-2} mol L^{-1} CH_4 and 0.25 mol L^{-1} N_2O; ϵ = 850 L mol^{-1}cm^{-1} at 220 nm.	72G445
		$(1.6 \pm 0.2) \times 10^9$	4.4	p.r.	D.k. in soln. contg. 0.4 mol L^{-1} CH_4 (30 atm) and 2.5×10^{-3} mol L^{-1} N_2O; ϵ = 1600 and 975 L mol^{-1}cm^{-1} at 213 and 220 nm., resp.; $E_a = 3.9 \pm 0.4$ kcal mol^{-1} (16 kJ mol^{-1}).	75A055
.002	**Ethyl**					
	$\cdot CH_2CH_3 + \cdot CH_2CH_3$	$(9.6 \pm 2) \times 10^8$	5.5	p.r.	D.k. in soln. contg. 10^{-2} mol L^{-1} ethane and 0.25 mol L^{-1} N_2O; ϵ = 520 and 330 L mol^{-1}cm^{-1} at 220 and 250 nm, resp.	72G445
		$(1.2 \pm 0.2) \times 10^9$	4.4	p.r.	D.k. in soln. contg. 5×10^{-2} mol L^{-1} ethane (30 atm) and 2.5×10^{-3} mol L^{-1} N_2O; ϵ = 790, 750, 700, 545 and 375 L mol^{-1}cm^{-1} at 210, 215, 220, 230 and 250 nm, resp.; $E_a = 3.9 \pm 0.4$ kcal mol^{-1} (16 kJ mol^{-1}).	75A055
.004	**Cyclopentyl**					
	$c\text{-}\dot{C}_5H_9 + c\text{-}\dot{C}_5H_9 \rightarrow C_{10}H_{18}$ and $C_5H_{10} + C_5H_8$	$(1.0 \pm 0.2) \times 10^9$	7	p.r.	D.k. in soln. contg. N_2O and 1.3×10^{-5} mol L^{-1} cyclopentane; ϵ = 480 L mol^{-1}cm^{-1} at 248 nm.	74A051
.016	**2-Hydroxy-2,2-dimethylethyl**					
	$\cdot CH_2C(CH_3)_2OH + \cdot CH_2C(CH_3)_2OH$	7×10^8 6×10^8	6 13.5	p.r.	D.k. in N_2O-satd. soln. contg. *tert*-BuOH; ϵ = 900, 200 and 30 L mol^{-1} cm^{-1} at 225, 250 and 280 nm, resp. $2k/\epsilon = 1.3 \times 10^7$ and 1.1×10^7 at pH 6 and 13.5, resp.	69G419
.020	**Formylmethyl**					
	$\cdot CH_2CHO + \cdot CH_2CHO$	4.5×10^8	10	p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} ethylene glycol; ϵ = 260 L mol^{-1}cm^{-1} at 300 nm.	73G004
		4.5×10^8	9.8	p.r.	D.k. in N_2O-satd. soln. contg. 10^{-3} mol L^{-1} acetylene; $2k/\epsilon = 3.4 \times 10^6$ cm s^{-1}.	78A007
.021	**2-Hydroxyethenyl**					
	$\cdot CH{=}CHOH + \cdot CH{=}CHOH \rightarrow HOCH{=}CHCH{=}CHOH$	3.2×10^9	<7	p.r.	P.b.k. in N_2O-satd. soln. contg. 10^{-3} mol L^{-1} acetylene at 240 nm ($\epsilon = 8.1 \times 10^3$ L mol^{-1}cm^{-1}); $2k/\epsilon = 2.0 \times 10^5$ cm s^{-1}; prod. rearranges to succinaldehyde.	78A007
.035	**Carboxymethyl**					
	$\cdot CH_2CO_2^- + \cdot CH_2CO_2^-$	$(5.5 \pm 1) \times 10^8$	6.5	p.r.	D.k. at 366 nm in N_2O-satd. soln. contg. Na acetate; ϵ = 780 L mol^{-1} cm^{-1}.	76A082
		5×10^8	10	p.r.	D.k. in N_2O-satd. soln. contg. acetate ion; ϵ = 800 L mol^{-1} cm^{-1} at 350 nm.	69G446
	$\cdot CH_2CO_2H + \cdot CH_2CO_2H$	9×10^8	3	p.r.	D.k. in N_2O-satd. soln. contg. acetic acid; ϵ = 650 L mol^{-1} cm^{-1} at 320 nm; $pK_a = 4.5$.	69G446
.048	**Trichloromethyl**					
	$\cdot CCl_3 + \cdot CCl_3 \rightarrow C_2Cl_6$	$(3.7 \pm 0.9) \times 10^8$	5.5–12.4	p.r.	D.k. at 230 nm in 10^{-4} mol L^{-1} CCl_4 soln.; $\epsilon = 2300 \pm 450$ L mol^{-1} cm^{-1}.	74A043

TABLE 4. Rate constants for second order decay of selected aliphatic radicals in aqueous solution—Continued

No.	Reaction	k^a (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
.075	**Hydroxymethyl**					
	$\cdot CH_2OH + \cdot CH_2OH$	1.2×10^9	6	p.r.	D.k. at 280 and 350 nm, resp., at pH 6 and 12 in N_2O–satd. soln. contg. MeOH; $2k/\epsilon = 6.2 \times 10^6$ and 1.5×10^6 at pH 6 and 12, resp. (ϵ = 390 and 600); pK_a = 10.7 [66G074].	69G419
	$\cdot CH_2O^- + \cdot CH_2O^-$	4.5×10^8	12			
	$\cdot CH_2OH + \cdot CH_2OH$	$(1.5 \pm 1) \times 10^9$		p.r.	D.k. in N_2O–satd. soln. contg. MeOH; $\epsilon = 270 \pm 15$ L mol^{-1} cm^{-1} at 310 nm.	77A011
.076	**1-Hydroxyethyl**					
	$CH_3\dot{C}HOH + CH_3\dot{C}HOH$	$(5.5 \pm 1.5) \times 10^8$	~7	p.r.	D.k. at 289.4 nm in deaerated soln. contg. EtOH; $\epsilon = 260 \pm 65$ L mol^{-1} cm^{-1}; relative disproportionation and combination est. from product yields.	62G140
	$\rightarrow CH_3CHOHCHOHCH_3$ (I)	$k_I = (4.4 \pm 1) \times 10^8$				
	$\rightarrow CH_3CHO + CH_3CH_2OH$ (II)	$k_{II} = (1.1 \pm 0.3) \times 10^8$				
		$(7 \pm 2) \times 10^8$	~1	p.r.	D.k. at 296.7 nm in deaerated soln. contg. EtOH and 0.8 N H_2SO_4; $\epsilon = 240 \pm 45$ L mol^{-1} cm^{-1}.	63G045
		$(1.2 \pm 0.3) \times 10^9$	6	p.r.	D.k. at 280 and 300 nm, resp., at pH 6 and 13 in N_2O–satd. soln. contg. EtOH; pK_a = 11.6 [66G074]; $2k/\epsilon = 4.7 \times 10^6$ and 5.7×10^6 resp., at pH 6 and 13.	69G419
	$CH_3\dot{C}HO^- + CH_3\dot{C}HO^-$	$(2.5 \pm 0.5) \times 10^8$	13			
.078	**1-Hydroxy-1-methylethyl**					
	$(CH_3)_2\dot{C}OH + (CH_3)_2\dot{C}OH$	$(7 \pm 1.5) \times 10^8$	6	p.r.	D.k. at 280 and 300 nm, resp. at pH 6 and 13.3 in N_2O–satd. soln. contg. 2-PrOH; $2k/\epsilon = 2.1 \times 10^6$ and 2.7×10^5 at pH 6 and 13.3, resp.; pK_a = 12.2 [66G074].	69G419
	$(CH_3)_2\dot{C}O^- + (CH_3)_2\dot{C}O^-$	$(2 \pm 0.4) \times 10^8$	13.3			
		$(6.5 \pm 0.5) \times 10^8$		p.r.	D.k. at 310 nm in N_2O–satd. soln. contg. 0.02 mol L^{-1} 2-PrOH; $\epsilon = 353 \pm 15$ L mol^{-1} cm^{-1}.	77A011
.101	**1,2-Dihydroxyethyl**					
	$\cdot CHOHCH_2OH + \cdot CHOHCH_2OH$	3.4×10^8	6.0	p.r.	D.k. at 250 nm in N_2O–satd. soln. contg. ethylene glycol; $2k/\epsilon = 1.1 \times 10^6$ (ϵ = 610 L mol^{-1} cm^{-1}).	73G004
.113	**Ascorbate radical**					
	$\cdot A^- + \cdot A^- (+ H^+) \rightarrow A + HA^-$	$(1.9 \pm 0.2) \times 10^5$	8.7	p.r.	D.k. at 360 nm in N_2O–satd. soln. contg. ascorbate; ϵ = 3300 L mol^{-1} cm^{-1} [77A036]; pK_a = –0.45 [72D181].	75A240
.115	**(Carboxy)hydroxymethyl**					
	$\cdot CHOHCO_2H + \cdot CHOHCO_2H$	$(6.5 \pm 1) \times 10^8$	1	p.r.	D.k. in N_2O–satd. soln. contg. 0.05 mol L^{-1} glycolic acid (ϵ 6000 L mol^{-1}cm^{-1}); pK_a = 4.6, 8.8.	69G447
	$\cdot CHOHCO_2^- + \cdot CHOHCO_2^-$	$(4.3 \pm 0.7) \times 10^8$	7.2			
	$\cdot CHO^-CO_2^- + \cdot CHO^-CO_2^-$	$(7.5 \pm 1) \times 10^6$	12			
.123	**Dihydroxymethyl**					
	$\cdot CH(OH)_2 + \cdot CH(OH)_2 \rightarrow CH_2(OH)_2 + HCO_2^- + H^+$	3.6×10^8	6.3	p.r.	D.k. at 250 nm, as well as condy. change, in N_2O–satd. soln. contg. formaldehyde, as well as in soln. contg. *tert*–BuOH and CO; $\epsilon \cong 850$ and 1500 L mol^{-1} cm^{-1} at pH 6 and 11.8, resp.; pK_a = 9.5.	71G424
		2.3×10^8	12			

TABLE 4. Rate constants for second order decay of selected aliphatic radicals in aqueous solution—Continued

No.	Reaction	k^a (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
.147	**Carboxyl**					
	$\cdot CO_2^- + \cdot CO_2^- \rightarrow C_2O_4^{2-}$	5 x 10^8	5	p.r.	D.k. at 250 nm in CO_2–satd. soln. contg. 10^{-2} mol L^{-1} formate; ϵ = 2250 L mol^{-1} cm^{-1}; k cor. to I = 0.	65G384
		7.5 x 10^8 8.5 x 10^8	3.1,9 13	p.r.	D.k. at 255 nm in N_2O–satd. soln. contg. formate, as well as in CO_2–satd. soln. contg. formate; ϵ_{max} = 3000 L mol^{-1} cm^{-1} at 235 nm.	69G446
		(4.5 ± 0.15) x 10^8	2.8–7	p.r.	D.k. in CO–satd. soln. at 260 nm (ϵ = 2200 L mol^{-1} cm^{-1}) as well as condy. change; same result in N_2O–satd. formate soln.	70G303
		(3.8 ± 0.35) x 10^8 (8.5 ± 1) x 10^8	2.7 13 0	p.r.	D.k. at 250 nm in N_2O–satd. 0.1 mol L^{-1} formate soln.; ϵ = 2050 L mol^{-1} cm^{-1} (1100 at pH 0); k cor. to I = 0; pK_a($\cdot CO_2H$) = 1.4.	73G085

[a] k is defined by the expression $-d[R]/dt = 2k[R]^2$.

Index to Radical Reactions

Radicals are listed in number order. Following the name of the radical are the entry numbers for the substrates for which reactions of that radical are included in tables 1–3. For example, the first reaction in the tables for methyl radical is under entry 9 and the reaction is numbered 9.001.

001 Methyl 9, 10, 20, 59, 69, 80, 81a, 83, 93, 94, 115, 116, 117, 147, 149, 156, 160, 200, 201, 202, 217, 219, 221a, 222, 223, 230, 241, 242, 243, 248, 254, 255, 267, 305, 314, 315, 316, 317, 345, 346.

002 Ethyl 69, 81a, 83, 93.

002a 1-Methylethyl 69, 81a.

002b 1,1-Dimethylethyl 69, 81a.

003 Radicals from pentane 94.

004 Cyclopentyl 88, 93, 94, 342, 343, 345, 346.

005 2-Chloroethyl 81a.

006 2-Carboxy-2,2-dimethylethyl 55, 71, 104.

007 Radicals from oleate + OH 93.

008 Radicals from linoleate + OH 93.

009 Radicals from linolenate + OH 93.

010 Radicals from arachidonate + OH 93.

011 2-Aminoethyl 262.

012 2-Amino-2,2-dimethylethyl 71, 104.

013 2-Amino-2-carboxy-2-methylethyl 71, 104.

014 2-Hydroxyethyl 57, 58, 59, 69, 81a, 93, 200, 202, 253, 345, 346.

015 2-Hydroxypropyl 314.

016 2-Hydroxy-2,2-dimethylethyl 1, 2, 4, 5, 6, 9, 10, 10a, 11, 55, 57, 58, 59, 71, 72, 77, 81a, 83, 88, 89, 99, 104, 105, 106, 113, 114, 123, 161, 163, 197, 206, 227, 236, 237, 238, 239, 253, 262, 302, 342, 343, 345, 346.

016a Radicals from cyclopentene + OH 94.

017 2-Carboxy-2-hydroxy-2-methylethyl 71, 104.

018 Radicals from allyl alcohol + OH 161, 278, 279, 283.

019 Radicals from crotyl alcohol + OH 278, 279, 283.

020 Formylmethyl 9, 55, 81a, 128, 135, 176, 177, 207, 227, 258, 266, 309, 310, 311, 344.

021 1-Formylethyl 227.

022 2-Hydroxyethenyl 119, 362.

023 2-Oxopropyl 227.

024 1-Acetylethyl 227.

025 2-Oxocyclohexyl 227.

026 1-Formyl-2-hydroxyethyl 227.

027 4-Hydroxy-2-oxobutyl 227,

028 1-Formyl-4-hydroxybutyl 227.

029 1-Formyl-5-hydroxypentyl 227.

030 Radicals from *meso*-erythritol 227.

031 Radicals from xylitol 227.

032 2-Oxo-3.4.5-trihydroxycyclohexyl 227.

033 Radicals from sorbitol 161, 227.

034 Carbamoylmethyl 262.

035 Carboxymethyl 9, 12, 55, 59, 81a, 93, 100, 101, 102, 110.

036 Methoxycarbonylmethyl 93.

037 1-Carboxyethyl 55, 59, 278.

038 1-Carboxypropyl 278.

039 1-Carboxy-2-hydroxyethyl 278.

040 1-Carboxy-2-hydroxypropyl 278.

040a 1,2-Dicarboxyethyl 81a.

041 1,2-Dicarboxy-2-hydroxyethyl 59, 278.

042 Dicarboxymethyl 12, 55, 100, 110, 135, 228, 278.

043 Chloromethyl 69, 81a, 83, 223.

044 Difluoromethyl

045 Dichloromethyl 69, 83, 335.

046 Dichlorofluoromethyl 202.

047 Trifluoromethyl 130, 147, 149, 200, 202, 212, 214, 255, 292, 313, 314, 317.

048 Trichloromethyl 59, 81a, 83, 205, 223, 312, 314, 340, 358.

049 1-Aminoethyl 262.

050 1-Amino-1-methylethyl 222, 262.

051 1-(*N*,*N*-Diethylamino)ethyl 262.

052 Triethylammonioethyl 93.

053 (*N*-Acetylamino)methyl 206, 262.

054 (*N*-Formyl-*N*-methylamino)methyl 12, 55, 100.

055 (*N*-Acetyl-*N*-methylamino)methyl 71, 104, 262.

056 Amino(carboxy)methyl 12, 69, 100, 133, 134, 138, 159, 173, 228, 231, 232, 260, 262, 274, 276, 308, 333, 336, 350.

057 Amino(carbamoyl)methyl 93, 262.

058 Radicals from glycylglycinamide + OH 262.

059 Carboxy(*N*-methylamino)methyl 262.

060 *N*-Acetylamino(carboxy)methyl 362.

061 *N*-Acetyl-*N*-methylamino(carboxy)methyl 262.

062 Radical from glycine anhydride + OH 93, 138, 162, 163, 262, 273, 362.

063 Radical from alanine anhydride + OH 93, 262, 362.

064 Radical from sarcosine anhydride + OH 93.

065 Radicals from diglycine + OH 262.

066 Radicals from glycylsarcosine + OH 262.

067 Radicals from acetyldiglycine + OH 93, 262.

068 Radicals from triglycine + OH 133, 134, 138, 262, 274.

069 Radicals from acetyltriglycine + OH 262.

070 Radicals from acetyltrialanine + OH 262.

071 Radicals from acetyltrisarcosine + OH 262.

072 Radicals from acetylserineamide + OH 262.

073 Radicals from acetylasparagine + OH 262.

074 Radical from 2-pyrrolidone-5-carboxylic acid 362.

075 Hydroxymethyl 1, 2, 4, 5, 6, 9, 10a, 12, 13, 15, 16, 17, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 45a, 55, 57, 59, 60, 68, 69, 70, 73, 77, 81a, 88, 89, 92, 94, 95, 97, 98, 98a, 99, 99a, 100, 102, 106, 110, 111a, 113, 114, 121, 123, 135, 136, 137, 138, 143, 148, 152, 154, 161, 162, 163, 173, 183, 185a, 197, 204, 206, 211, 214, 220, 226, 231, 232, 233, 236, 239, 253, 260, 262, 268, 270, 271, 276, 278, 279, 283, 293, 297, 304, 306, 308, 318, 319, 323, 342, 343, 345, 346, 347, 350, 361.

076 1-Hydroxyethyl 2, 3, 4, 5, 9, 12, 15, 16, 36, 37, 38, 39, 40, 41, 42, 43, 45, 45a, 55, 59, 60, 68, 69, 73, 76, 77, 81, 81a, 86, 87, 88, 93, 94, 95, 98a, 99, 99a, 100, 102, 106, 111, 111a, 118, 123, 137, 138, 148, 154, 161, 163, 164, 165, 185a, 199, 209, 220, 224, 226, 249, 253, 262, 268, 269, 270, 271, 278, 279, 283, 297, 306, 319, 323, 331, 338, 339, 342, 343, 345, 346, 347, 362.

077 1-Hydroxypropyl 69, 93, 106, 148, 278, 279, 283, 297, 347.

078 1-Hydroxy-1-methylethyl 1, 2, 4, 5, 6, 7, 8, 9, 10, 10a, 12, 15, 16, 24, 25, 26, 27, 28, 29, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 45a, 46, 47, 48, 49, 50, 51, 52, 55, 57, 59, 60, 67, 68, 69, 70, 73, 74, 75, 76, 77, 79, 81a, 83, 84, 85, 87, 88, 89, 93, 94, 95, 96, 97, 98, 98a, 99, 99a, 100, 102, 103, 106, 111, 111a, 113, 114, 118, 120, 121, 123, 124, 127, 129, 131, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 145, 146, 148, 151, 152, 153, 154, 155, 156a, 157, 159, 161, 163, 170, 171, 173, 174, 178, 180, 181, 182, 184, 185, 185a, 186, 187, 188, 189, 190, 191, 192, 193, 197, 198, 206, 210, 215, 216, 220, 221, 221a, 222, 223, 225, 228, 229, 231, 232, 233, 234, 235, 238a, 244, 245, 249, 250, 252, 253, 257, 259, 260, 261, 262, 263, 264, 265, 268, 269, 270, 271, 272, 273, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 288, 289, 290, 291, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 306, 307, 308, 319, 320, 321, 322, 323, 324, 325, 326, 327, 329, 329, 331, 333, 334, 336, 337, 342, 343, 345, 346, 347, 348, 349, 350, 351, 352, 353, 356, 357, 359, 360, 361, 362.

079 1-Hydroxybutyl 58a, 65a, 161, 262, 278, 279, 283, 297.

080 1-Hydroxy-1-methylpropyl 60, 93, 148.

081 1-Hydroxy-2-methylpropyl 69, 93, 161, 283, 297.

082 1-Hydroxypentyl 69.

083 (Cyclohexyl)hydroxymethyl 148.

084 1-Hydroxycyclobutyl 69, 283.

085 1-Hydroxycyclopentyl 69, 283.

086 1-Hydroxycyclohexyl 69, 283.

087 1-Hydroxycycloheptyl 69, 283.

088 1-Hydroxycyclooctyl 69, 283.

089 2,2,2-Trifluoro-1-hydroxyethyl 9.

090 Acetoxymethyl 93.

091 1-Sulfatoethyl 69.

092 Radicals from sodium dodecylsulfate 138.

092a Methoxymethyl 69, 81a, 347.

093 1-Ethoxyethyl 12, 15, 16, 37, 38, 39, 39, 40, 42, 55, 81a, 94, 100, 101, 102, 152, 283, 347.

093a 1,1-Dimethylethoxymethyl 347.

094 2-Tetrahydrofuryl 94, 152.

094a (Methoxymethoxy)methyl 347.

095 1,4-Dihydroxybutyl 161.

096 1,3-Dihydroxy-2,2-di(hydroxymethyl)propyl 95, 163, 225.

097 2-Carboxy-1-hydroxy-1-methylethyl 69, 83, 131, 133, 134, 181, 228, 262.

098 2-Amino-1-hydroxyethyl 9.

099 2-Amino-1-phosphoryloxyethyl 278.

100 2-Amino-2-carboxy-1-hydroxyethyl 60, 93.

101 1,2-Dihydroxyethyl 5, 9, 10, 29, 55, 69, 93, 347, 362.

102 1,2-Dihydroxypropyl 347.

103 1,2-Dihydroxy-1-methylpropyl 347.

104 2,5-Dioxacyclohexyl 12, 15, 16, 42, 55, 81a, 83, 94, 100, 101, 102, 283.

105 Radicals from polyethyleneglycol 4, 5, 69, 93.

106 1,2,3-Trihydroxypropyl 5, 69, 93, 163, 225, 278, 347.

107 1-Hydroxy-1-methyl-2-oxopropyl 12, 100.

108 Radicals from deoxyribose + OH 69, 93, 138, 262, 278, 279, 342.

109 Radicals from ribose + OH 206, 227, 262, 278.

110 Radicals from ribose phosphate + OH 262, 278.

111 Radicals from glucose + OH 69, 93, 158, 161, 194, 195, 227, 279, 287, 342, 343, 345, 346, 347, 355.

112 Radicals from sucrose + OH 347.

113 Radical from ascorbate + OH 59, 93, 163, 179, 214, 246, 247, 255, 262, 330.

114 (Carbamoyl)hydroxymethyl 262, 362, 365, 366, 368, 369.

115 (Carboxy)hydroxymethyl 55, 69, 81a, 93, 133, 138, 228, 262, 274, 333, 362, 365, 366, 368, 369.

116 1-Carbamoyl-1-hydroxyethyl 138, 362, 365, 366, 368, 369.

117 1-Carboxy-1-hydroxyethyl 12, 55, 69, 93, 100, 134, 138, 148, 163, 225, 262, 278, 283.

118 1-Hydroxy-1-(methoxycarbonyl)ethyl 262.

119 (Dicarboxy)hydroxymethyl 262.

120 1,2-Dicarboxy-1-hydroxyethyl 163, 262, 278.

121 1,2-Dicarboxy-1,2-dihydroxyethyl 163, 165, 225, 262, 270.

122 1,3-Dicarboxy-1-hydroxypropyl 262.

123 Dihydroxymethyl 93, 283.

124 Dimethoxymethyl 94, 347.

125 2,5-Dioxacyclopentyl 94.

126 2,2,2-Trichloro-1,1-dihydroxyethyl 93.

127 Carbamoyl 12, 55, 100.

128 Electron adduct of acrylamide 1, 123, 363, 364, 367, 368, 370, 371, 373, 374, 375, 376, 377, 378.

129 Electron adduct of crotonamide 363.

130 Electron adduct of methacrylamide 363.

131 Electron adduct of β,β-dimethylacrylamide 363.

132 Electron adduct of *N,N*-dimethylacrylamide 363.

133 Electron adduct of Diamide 368.

134 Electron adduct of acrylate 362, 364, 365, 366, 367, 368, 369.

135 Electron adduct of crotonate 362, 363.

136 Electron adduct of methacrylate 362, 363.

137 Electron adduct of β,β-dimethylacrylate 362, 363.

138 Electron adduct of methyl methacrylate 363.

139 Electron adduct of sorbate 362, 363.

141 Electron adduct of dimethyl fumarate 93, 206.

142 Electron adduct of glycine anhydride 118, 137, 160a, 162, 163, 215a, 216, 253a, 262.

143 Electron adduct of alanine anhydride 118, 137, 160a, 162, 262.

144 Electron adduct of sarcosine anhydride 118, 137, 162, 262.

146 Electron adduct of acetylglycylglycinamide 262.

147 Carboxyl 1, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 31, 32, 44, 46, 49, 50, 53, 54, 55, 56, 59, 60, 61, 62, 63, 64, 65, 66, 69, 70, 74, 76, 78, 81a, 82, 88, 89, 90, 91, 92, 93, 94, 98, 99, 100, 103, 107, 108, 109, 110, 111, 112, 113, 114, 118, 121, 122, 123, 125, 126, 132, 133, 134, 138, 143, 144, 146, 150, 151, 152, 158, 159, 163, 164, 165, 167, 168, 169, 170, 171, 172, 173, 175, 183, 184, 185a, 190, 191, 192, 193, 195, 196, 199, 203, 206, 208, 209, 213, 214, 216, 218, 220, 225, 228, 231, 233, 233a, 240, 249, 251, 252, 256, 260, 262, 270, 271, 276, 278, 279, 283, 284, 285, 286, 287a, 297, 319, 320, 321, 323, 324, 329, 332, 333, 341, 342, 347, 354, 356.

148 Electron adduct of methyl acetate 361.

Radical Formula Index

The radical numbers following the name are contained in the *List of Aliphatic Radicals* preceding table 1 and in the *Index to Radicals* just preceding this index.

CCl_2F	Dichlorofluoromethyl, 046
CCl_3	Trichloromethyl, 048
CF_3	Trifluoromethyl, 047
$CHCl_2$	Dichloromethyl, 045
CHF_2	Difluoromethyl, 044
CH_2Cl	Chloromethyl, 043
CH_2NO	Carbamoyl, 127
CH_3	Methyl, 001
CH_3O	Hydroxymethyl, 075
CH_3O_2	Dihydroxymethyl, 123
CO_2^-	Carboxyl, 147
$C_2H_2Cl_3O_2$	2,2,2-Trichloro-1,1-dihydroxyethyl, 126
$C_2H_2F_3O$	2,2,2-Trifluoro-1-hydroxyethyl, 089
C_2H_3O	Formylmethyl, 020
	2-Hydroxyethenyl, 022
$C_2H_3O_2$	Carboxymethyl, 035
$C_2H_3O_3$	(Carboxy)hydroxymethyl, 115
C_2H_4Cl	2-Chloroethyl, 005
C_2H_4NO	Carbamoylmethyl, 034
$C_2H_4NO_2$	Amino(carboxy)methyl, 056
	(Carbamoyl)hydroxymethyl, 114
$C_2H_4O_4S^-$	1-Sulfatoethyl, 091
C_2H_5	Ethyl, 002
$C_2H_5N_2O$	Amino(carbamoyl)methyl, 057
C_2H_5O	1-Hydroxyethyl, 076
	2-Hydroxyethyl, 014
	Methoxymethyl, 092a
$C_2H_5O_2$	1,2-Dihydroxyethyl, 101
C_2H_6N	1-Aminoethyl, 049
	2-Aminoethyl, 011
C_2H_6NO	2-Amino-1-hydroxyethyl, 098
$C_2H_7NO_4P$	2-Amino-1-phosphoryloxyethyl, 099
$C_3H_3O_4$	Dicarboxymethyl, 042
$C_3H_3O_5$	(Dicarboxy)hydroxymethyl, 119
$C_3H_4O_2^-$	Electron adduct of acrylate, 134
$C_3H_5NO^-$	Electron adduct of acrylamide, 128
C_3H_5O	1-Formylethyl, 021
	2-Oxopropyl, 023
	Radicals from allyl alcohol + OH, 018
$C_3H_5O_2$	Acetoxymethyl, 090
	1-Carboxyethyl, 037
	2,5-Dioxacyclopentyl, 125
	1-Formyl-2-hydroxyethyl, 026
	Methoxycarbonylmethyl, 036
$C_3H_5O_3$	1-Carboxy-1-hydroxyethyl, 117
	1-Carboxy-2-hydroxyethyl, 039
C_3H_6NO	(*N*-Acetylamino)methyl, 053
	(*N*-Formyl-*N*-methylamino)methyl, 054
$C_3H_6NO_2$	1-Carbamoyl-1-hydroxyethyl, 116
	Carboxy(*N*-methylamino)methyl, 059
$C_3H_6NO_3$	2-Amino-2-carboxy-1-hydroxyethyl, 100
$C_3H_6O_2^-$	Electron adduct of methyl acetate, 148
C_3H_7	1-Methylethyl, 002a
C_3H_7O	1-Hydroxy-1-methylethyl, 078
	1-Hydroxypropyl, 077
	2-Hydroxypropyl, 015
$C_3H_7O_2$	1,2-Dihydroxypropyl, 102
	Dimethoxymethyl, 124
	(Methoxymethoxy)methyl, 094a
$C_3H_7O_2$	Radicals from allyl alcohol + OH, 018
$C_3H_7O_3$	1,2,3-Trihydroxypropyl, 106
C_3H_8N	1-Amino-1-methylethyl, 050
$C_4H_4O_4^-$	Electron adduct of maleate, 140
$C_4H_5N_2O_2$	Radical from glycine anhydride + OH, 062
$C_4H_5O_4$	1,2-Dicarboxyethyl, 040a
$C_4H_5O_5$	1,2-Dicarboxy-1-hydroxyethyl,120
	1,2-Dicarboxy-2-hydroxyethyl, 041
$C_4H_5O_6$	1,2-Dicarboxy-1,2-dihydroxyethyl, 121
$C_4H_6NO_3$	*N*-Acetylamino(carboxy)methyl, 060
$C_4H_6O_2^-$	Electron adduct of crotonate, 135
	Electron adduct of methacrylate, 136
$C_4H_7NO^-$	Electron adduct of crotonamide, 129
	Electron adduct of methacrylamide, 130
$C_4H_7N_2O_2^-$	Electron adduct of glycine anhydride, 142
	Radicals from glycylglycinamide + OH, 058
$C_4H_7N_2O_3$	Radicals from diglycine + OH, 065
C_4H_7O	1-Acetylethyl, 024
	1-Hydroxycyclobutyl, 084
	Radicals from crotyl alcohol + OH, 019
	2-Tetrahydrofuryl, 094
$C_4H_7O_2$	1-Carboxypropyl, 038
	2,5-Dioxacyclohexyl, 104
	1-Hydroxy-1-methyl-2-oxopropyl, 107
	4-Hydroxy-2-oxobutyl, 027
$C_4H_7O_3$	2-Carboxy-1-hydroxy-1-methylethyl, 097
	2-Carboxy-2-hydroxy-2-methylethyl, 017
	1-Carboxy-2-hydroxypropyl, 040
	1-Hydroxy-1-(methoxycarbonyl)ethyl, 118
	Radicals from *meso*-erythritol, 030
C_4H_8NO	(*N*-Acetyl-*N*-methylamino)methyl, 055
$C_4H_8NO_2$	2-Amino-2-carboxy-2-methylethyl, 013
C_4H_9	1,1-Dimethylethyl, 002b
C_4H_9O	1-Ethoxyethyl, 093
	1-Hydroxybutyl, 079
	2-Hydroxy-2,2-dimethylethyl, 016
	1-Hydroxy-1-methylpropyl, 080
	1-Hydroxy-2-methylpropyl, 081
$C_4H_9O_2$	1,4-Dihydroxybutyl, 095
	1,2-Dihydroxy-1-methylpropyl, 103
$C_4H_9O_2$	Radicals from crotyl alcohol + OH, 019
$C_4H_{10}N$	2-Amino-2,2-dimethylethyl, 012
$C_5H_7NO_3$	Radical from 2-pyrrolidone-5-carboxylic acid, 074
$C_5H_7O_4$	2-Oxocyclopentyl, 032
$C_5H_7O_5$	1,3-Dicarboxy-1-hydroxypropyl, 122
$C_5H_8NO_3$	*N*-Acetyl-*N*-methylamino(carboxy)methyl, 061
$C_5H_8O_2^-$	Electron adduct of β,β-dimethylacrylate, 137
	Electron adduct of methyl methacrylate, 138
C_5H_9	Cyclopentyl, 004
$C_5H_9NO^-$	Electron adduct of *N*,*N*-dimethylacrylamide, 132
	Electron adduct of β,β-dimethylacrylamide, 131
$C_5H_9N_2O_3$	Radicals from acetylserineamide, 072
C_5H_9O	1-Hydroxycyclopentyl, 085
	Radicals from cyclopentene + OH, 016a
$C_5H_9O_2$	2-Carboxy-2,2-dimethylethyl, 006
	1-Formyl-4-hydroxybutyl, 028
	Radicals from ribose + OH, 109
$C_5H_9O_4$	Radicals from deoxyribose + OH, 108
	Radicals from xylitol, 031
$C_5H_9O_8P$	Radicals from ribose phosphate + OH, 110
C_5H_{11}	Radicals from pentane, 003
$C_5H_{11}N_2O_3$	Radicals from glycylsarcosine + OH, 066
$C_5H_{11}O$	1,1-Dimethylethoxymethyl, 093a
	1-Hydroxypentyl, 082
$C_5H_{11}O_4$	1,3-Dihydroxy-2,2-di(hydroxymethyl)propyl, 096
$C_6H_6O_6^-$	Radical from ascorbate + OH, 113
$C_6H_8O_2^-$	Electron adduct of sorbate, 139

$C_6H_8O_4^-$ Electron adduct of dimethyl fumarate, 141
$C_6H_9N_2O_2$ Radical from alanine anhydride + OH, 063
Radical from sarcosine anhydride + OH, 064
$C_6H_9N_2O_4$ Radicals from acetyldiglycine + $\overline{O}H$, 067
C_6H_9O 2-Oxocyclohexyl, 025
$C_6H_{10}N_2O_4$ Radicals from acetylasparagine + OH, 073
$C_6H_{10}N_3O_4$ Radicals from triglycine + OH, 068
$C_6H_{11}N_2O_2^-$ Electron adduct of alanine anhydride, 143
Electron adduct of sarcosine anhydride, 144
$C_6H_{11}O$ 1-Hydroxycyclohexyl, 086
$C_6H_{11}O_2$ 1-Formyl-5-hydroxypentyl, 029
$C_6H_{11}O_5$ Radicals from sorbitol, 033
$C_6H_{11}O_6$ Radicals from glucose + OH, 111
$C_6H_{12}N_2O_3^-$ Electron adduct of acetylglycylglycinamide, 146
$C_6H_{12}N_4O_2^-$ Electron adduct of Diamide, 133
$C_6H_{14}N$ 1-(*N,N*-Diethylamino)ethyl, 051
$C_7H_{13}O$ (Cyclohexyl)hydroxymethyl, 083
1-Hydroxycycloheptyl, 087
$C_8H_{12}N_3O_5$ Radicals from acetyltriglycine + OH, 069
$C_8H_{14}N_3O_5^-$ Electron adduct of acetyltriglycine, 145
$C_8H_{15}O$ 1-Hydroxycyclooctyl, 088
$C_8H_{19}N^+$ Triethylammonioethyl, 052
$C_{11}H_{18}N_3O_5$ Radicals from acetyltrialanine + OH, 070
Radicals from acetyltrisarcosine + OH, 071
$C_{12}H_{21}O_{12}$ Radicals from sucrose + OH, 112
$C_{12}H_{24}O_4S^-$ Radicals from sodium dodecylsulfate, 092
$C_{18}H_{28}O_2^-$ Radicals from linolenate + OH, 009
$C_{18}H_{30}O_2^-$ Radicals from linoleate + OH, 008
$C_{18}H_{32}O_2^-$ Radicals from oleate + OH, 007
$C_{20}H_{30}O_2^-$ Radicals from arachidonate + OH, 010

Substrate Formula Index

Substrates for radical reactions are indexed by molecular formula. Entry numbers for the reactions in tables 1–3 are listed following the name.

Ag^+	Silver(I) ion, 1
Ag_2^+	Silver(I) ion, complex with Ag(0), 2
BH_3O_3	Boric acid, 367
$BH_4O_4^-$	Tetrahydroborate ion, 366
$BrCoH_{15}N_5^{2+}$	Pentaamminebromocobalt(III) ion, 15
$BrH_{15}N_5Ru^{2+}$	Bromopentaammineruthenium(III) ion, 101
BrO_3^-	Bromate ion, 3
Br_2Hg	Mercuric bromide, 74
CCl_4	Carbon tetrachloride, 152
$CHCl_3$	Chloroform, 157
CHO_2^-	Formate ion, 212
CHO_3^-	Bicarbonate ion, 370
CH_2Cl_2	Dichloromethane, 174
CH_2O	Formaldehyde, 211
CH_3NO_2	Nitromethane, 292
CH_4O	Methanol, 255
CH_4S	Methanethiol, 254
CHgN	Mercurous cyanide, 77
CN_4O_8	Tetranitromethane, 347
$C_2Cl_3O_2^-$	Trichloroacetate ion, 351
$C_2F_3O_2^-$	Trifluoroacetate ion, 352
C_2H_2	Acetylene, 119
C_2H_2IN	Iodoacetonitrile, 237
$C_2H_2IO_2^-$	Iodoacetate ion, 235
$C_2H_3ClO_2$	Chloroacetic acid, 156
$C_2H_3Cl_3O_2$	Chloral hydrate, 155
$C_2H_3IO_2$	Iodoacetic acid, 236
C_2H_3N	Acetonitrile, 117
C_2H_4	Ethylene, 202
$C_2H_4Cu^+$	Copper(I) ion, complex with ethylene, 58
C_2H_4INO	Iodoacetamide, 234
$C_2H_4O_2$	Acetic acid, 115
$C_2H_4O_3$	Glycolic acid, 219
C_2H_5IO	Iodoethanol, 238
$C_2H_5NO_2$	Glycine, 217, 378
C_2H_6O	Ethanol, 200
C_2H_6OS	2-Mercaptoethanol, 253
$C_2H_6O_2$	Ethylene glycol, 204
C_2H_7NS	Cysteamine, 161
$C_2H_8N^+$	Ethylammonium ion, 372
$C_2H_{19}CoN_5O_2^+$	(Acetato)pentaamminecobalt(III) ion, 20
C_2HgN_2	Mercuric cyanide, 78
$C_2HgN_2S_2$	Mercuric thiocyanate, 79
C_3HBrNO_2S	2-Bromo-5-nitrothiazole, 145
$C_3H_3NO_2$	Cyanoacetic acid, 160
C_3H_3NS	Thiazole, 349
$C_3H_3N_3O_2$	2-Nitroimidazole, 289
	4-Nitroimidazole, 290
$C_3H_3N_3O_2S$	2-Amino-5-nitrothiazole, 127
$C_3H_3O_3^-$	Pyruvate ion, 330
$C_3H_5IO_2$	3-Iodopropionic acid, 239
C_3H_5N	Propionitrile, 316
C_3H_5NO	Acrylamide, 123
	3-Hydroxypropionitrile, 230
$C_3H_5O_2S^-$	3-Mercaptopropionate ion, 253a
$C_3H_5O_3^-$	Lactate ion, 247
C_3H_6	Propylene, 317
C_3H_6O	Acetone, 116
$C_3H_6O_2$	Propionic acid, 315
$C_3H_6O_3$	Lactic acid, 248
$C_3H_7NO_2S$	Cysteine, 162
C_3H_8O	1-Propanol, 313
	2-Propanol, 314
$C_3H_{10}N^+$	Trimethylammonium ion, 371
$C_4H_2N_2O_4$	Alloxan, 126
$C_4H_3BrN_2O_2$	5-Bromouracil, 146
$C_4H_3NO_2S$	2-Nitrothiophene, 298
	3-Nitrothiophene, 299
$C_4H_3N_3O_4$	5-Nitrouracil, 301
$C_4H_3O_4^-$	Fumarate ion, 214
$C_4H_4N_2$	Pyrazine, 321
	Pyridazine, 324
	Pyrimidine, 329
$C_4H_4N_2O_2$	2-Nitropyrrole, 295
	3-Nitropyrrole, 296
$C_4H_4O_4$	Fumaric acid, 215
	Maleic acid, 252
$C_4H_5N_3$	4-Aminopyrimidine, 129
$C_4H_5N_3O_2$	2-Methyl-5-nitroimidazole, 264
C_4H_6	Butadiene, 147
$C_4H_6N_2O_2$	Glycine anhydride, 218
$C_4H_6O_2$	2,3-Butanedione, 148
C_4H_7N	Isobutyronitrile, 243
C_4H_8	1-Butene, 149
	Isobutylene, 241
C_4H_8O	Tetrahydrofuran, 340
$C_4H_8O_2$	Ethyl acetate, 201
	Isobutyric acid, 242
	Methyl propionate, 267
$C_4H_{10}N^+$	Pyrrolidinium ion, 376
$C_4H_{10}O$	Ethyl ether, 205
$C_4H_{10}O_2S_2$	Dithiothreitol, 197
$C_4H_{12}N^+$	Diethylammonium ion, 373
$C_4H_{12}N_2S_2$	Cystamine, 160a
$C_4H_{16}BrCoFN_4^+$	*cis*-Bromobis(ethylenediamine) fluorocobalt(III) ion, 40
$C_4H_{16}Br_2CoN_4^+$	*trans*-Dibromobis(ethylenediamine) cobalt(III) ion, 39
$C_4H_{16}Cl_2CoN_4^+$	*cis*-Dichlorobis(ethylenediamine) cobalt(III) ion, 41
	trans-Dichlorobis(ethylenediamine) cobalt(III) ion, 42
$C_4H_{16}Cl_2N_4Pt^{2+}$	*trans*-Dichlorobis(ethylenediamine)-platinum(IV) ion, 97
$C_4H_{16}CoF_2N_4^+$	*trans*-Bis(ethylenediamine) difluorocobalt(III) ion, 43
$C_4H_{18}ClCoN_4O^{2+}$	*cis*-Aquachlorobis(ethylene-diamine)cobalt(III) ion, 38
$C_4H_{19}ClCoN_5^{2+}$	*cis*-Amminechlorobis(ethylene-diamine)cobalt(III) ion, 37
$C_4N_4Ni^{2-}$	Tetracyanonickelate(II) ion, 90
$C_5FeN_6O^{3-}$	Pentacyanonitrosylferrate(III) ion, 70
$C_5FeN_6O^{4-}$	Pentacyanonitrosylferrate(III) radical ion (electron adduct), 71
$C_5H_2NO_5^-$	5-Nitrofuroate ion, 288
$C_5H_3N_2O_4^-$	Orotate ion, 303
$C_5H_4N_2O_2$	Pyrazinecarboxylic acid, 322
$C_5H_4N_2O_4$	Nifuroxime , 278
$C_5H_4N_4$	Purine, 320
$C_5H_4O_5^{2-}$	α-Ketoglutarate ion, 246
$C_5H_{10}O$	3-Pentanone, 305
$C_5H_{11}NO_2S$	Penicillamine, 304
$C_5H_{12}N^+$	Piperidinium ion, 377
$C_5H_{15}CoN_6O_2^{2+}$	Tetraammine(pyrazinecarboxylato-*O,N*) cobalt(III) ion, 34
$C_5H_{18}CoN_7O_2^{2+}$	Pentaammine(pyrazinecarboxylato)-

	cobalt(III) ion, 33
$C_5H_{20}CoN_6^{3+}$	Pentaammine(pyridine)cobalt(III) ion, 31
$C_5H_{23}Co_2N_8O_4^{3+}$	Hexaamminebis(μ-hydroxy)[μ-(pyrazine-carboxylato)]dicobalt(III) ion, 35
$C_6Cl_4O_2$	Tetrachlorobenzoquinone, 338
$C_6FeN_6^{3-}$	Ferricyanide ion, 69
$C_6H_2N_3O_9S^-$	Trinitrobenzenesulfonate ion, 355
$C_6H_4ClNO_2$	*p*-Chloronitrobenzene, 158
$C_6H_4N_2O_4$	1,2-Dinitrobenzene, 187
	1,3-Dinitrobenzene, 188
	1,4-Dinitrobenzene, 189
$C_6H_4N_4$	Pteridine, 318
$C_6H_4N_4O_2$	Lumazine, 250
$C_6H_4O_2$	Benzoquinone, 138
C_6H_5NO	Nitrosobenzene, 297
$C_6H_5NO_2$	Isonicotinic acid, 245
	Nicotinic acid, 277
	Nitrobenzene, 283
$C_6H_5NO_3$	*o*-Nitrophenol, 294
$C_6H_5NO_4$	1,3-Dihydroxy-2-nitrobenzene, 178
$C_6H_5N_5O$	Pterin, 319
$C_6H_5O^-$	Phenoxide ion, 309
$C_6H_6CoN_3O_6^-$	Nitrilotriacetatocobalt(II) ion, 11
$C_6H_6NO^-$	4-Aminophenoxide ion, 128
$C_6H_6N_2O$	Isonicotinamide, 244
	Nicotinamide, 275
	4-Pyridinecarboxaldoxime, 325
$C_6H_6N_2O_2$	*o*-Nitroaniline, 280
	m-Nitroaniline, 281
	p-Nitroaniline, 282
$C_6H_6N_4$	9-Methylpurine, 269
$C_6H_6O_2$	1,2-Dihydroxybenzene, 176
	1,3-Dihydroxybenzene, 177
	Hydroquinone, 227
C_6H_7N	Aniline, 130
$C_6H_7NO_2$	*N*-Ethylmaleimide, 206
$C_6H_7O_6^-$	Ascorbate ion, 135
$C_6H_8N_2$	*o*-Phenylenediamine, 310
	p-Phenylenediamine, 311
$C_6H_8O_4$	Dimethyl fumarate, 184
$C_6H_9N_3O_3$	Metronidazole, 271
$C_6H_{11}CuN_3O_4^{2+}$	Glycylglycylglycinatocopper(II) complex, 61
$C_6H_{12}N_4O_2$	Diamide, 170
$C_6H_{14}N^+$	Cyclohexylammonium ion, 375
$C_6H_{16}N^+$	Triethylammonium ion, 374
$C_6H_{19}CoN_6O_2^{2+}$	Pentaammine(pyridinecarboxylato) cobalt(III) ion, 32
$C_6H_{24}CoN_6^{3+}$	Tris(ethylenediamine)cobalt(III) ion, 36
$C_7H_2N_3O_8^-$	2,4,6-Trinitrobenzoate ion, 356
$C_7H_3N_2O_6^-$	2,4-Dinitrobenzoate ion, 190
	2,5-Dinitrobenzoate ion, 191
	3,4-Dinitrobenzoate ion, 192
	3,5-Dinitrobenzoate ion, 193
$C_7H_3N_3O_4$	3,5-Dinitrobenzonitrile, 194
C_7H_4ClN	*m*-Chlorobenzonitrile, 156a
$C_7H_4NO_4^-$	*o*-Nitrobenzoate ion, 284
	m-Nitrobenzoate ion, 285
	p-Nitrobenzoate ion, 286
$C_7H_4NO_5^-$	3-Hydroxy-2-nitrobenzoate ion, 229
$C_7H_4N_2O_2$	*p*-Nitrobenzonitrile, 287
$C_7H_5NO_5$	*p*-Nitroperoxybenzoic acid, 293
$C_7H_6N_2O_5$	3,5-Dinitroanisole, 186
$C_7H_6O_2$	2-Methylbenzoquinone, 259
C_7H_7NO	3-Acetylpyridine, 120
$C_7H_7NO_2$	*o*-Nitrotoluene, 300
$C_7H_7NO_3$	3-Methyl-2-nitrophenol, 265
$C_7H_7N_5O$	3-Methylpterin, 268
$C_7H_7O^-$	4-Methylphenoxide ion, 266
$C_7H_7O_2^-$	4-Methoxyphenoxide ion, 258
$C_7H_8NO^+$	3-Carboxy-1-methylpyridinium ion, 153
	4-Carboxy-1-methylpyridinium ion, 154
$C_7H_9ClN_2O$	2-Pyridinecarboxaldoxime methochloride, 326
$C_7H_9N_2O^+$	3-Carbamoyl-1-methylpyridinium ion, 151
$C_7H_{11}N_3O_3$	Misonidazole , 272
$C_7H_{18}CoN_7O_6^{2+}$	Pentaammine(2,4-dinitrobenzoato)cobalt (III) ion, 27
	Pentaammine(3,5-dinitrobenzoato)cobalt (III) ion, 28
$C_7H_{19}CoN_6O_4^{2+}$	Pentaammine(4-nitrobenzoato)cobalt (III) ion, 26
	Pentaammine(2-nitrobenzoato)cobalt (III) ion, 24
	Pentaammine(3-nitrobenzoato)cobalt (III) ion, 25
$C_7H_{20}CoN_5O_2^{2+}$	Pentaammine(benzoato)cobalt(III) ion, 23
$C_7H_{24}Co_2N_7O_6^{3+}$	Hexaamminebis(μ-hydroxy)[μ-(4-nitro-benzoato)]dicobalt(III) ion, 29
$C_8H_3NO_6^{2-}$	2-Nitroisophthalate ion, 291
$C_8H_6NO_4^-$	3-Methyl-2-nitrobenzoate ion, 263
$C_8H_6N_2$	Quinoxaline, 331
$C_8H_7NO_3$	*p*-Nitroacetophenone, 279
C_8H_8O	Acetophenone, 118
$C_8H_8O_2$	2,3-Dimethylbenzoquinone, 180
	2,5-Dimethylbenzoquinone, 181
	2,6-Dimethylbenzoquinone, 182
$C_8H_9NO_3$	3-Methoxy-2-nitrotoluene, 257
$C_8H_9O^-$	4-Ethylphenoxide ion, 207
$C_8H_{10}NO_6P$	Pyridoxal-5-phosphate, 327
$C_8H_{10}N_2O$	*N,N*-Dimethyl-4-nitrosoaniline, 185a
$C_8H_{11}NO_2$	2-(3,4-Dihydroxyphenyl)ethylamine, 179
$C_8H_{11}NO_3$	Pyridoxine, 328
$C_8H_{12}CuN_4O_3$	Glycylhistidinecopper(II) complex, 64
$C_8H_{12}NO_2$	Norpseudopelletierine-*N*-oxyl, 302
$C_8H_{13}O_2S_2^-$	Lipoate ion, 249
$C_8H_{19}N_6O_2^{2+}$	Pentaammine(4-cyanobenzoato)cobalt(III) ion, 30
$C_8H_{21}CoN_6O_4^{2+}$	Pentaammine(4-nitrophenylacetato) cobalt(III) ion, 22
$C_8H_{22}CoN_5O_2^{2+}$	Pentaammine(phenylacetato)cobalt(III) ion, 21
$C_9H_{10}INO_3$	3-Iodotyrosine, 240
$C_9H_{10}O_2$	2,3,5-Trimethylbenzoquinone, 353
$C_9H_{11}NO_3$	Tyrosine, 358
$C_9H_{15}N_2O_2$	2,2,5,5-Tetramethyl-3-pyrrolin-1-yloxy-3-carboxamide, 346
$C_9H_{16}NO_2$	2,2,6,6-Tetramethyl-4-oxo-1-piperidinyl-oxy, 342
$C_9H_{17}N_2O_2$	2,2,5,5-Tetramethyl-1-pyrrolidinyloxy-3-carboxamide, 345
$C_9H_{18}NO_2$	2,2,6,6-Tetramethyl-4-hydroxy-1-piperi-dinyloxy, 343
$C_{10}H_2N_4$	1,2,4,5-Tetracyanobenzene, 339
$C_{10}H_5O_5S^-$	1,4-Naphthoquinone-2-sulfonate ion, 274
$C_{10}H_6O_2$	1,4-Naphthoquinone, 273
$C_{10}H_6O_3$	2-Hydroxy-1,4-naphthoquinone, 228
$C_{10}H_8N_2$	2,2′-Bipyridine, 143
$C_{10}H_{12}CuN_2O_8^{3}$	Ethylenediaminetetraacetatocuprate(I) ion, 58a
$C_{10}H_{12}CuN_2O_8^{2-}$	Ethylenediaminetetraacetatocuprate(II) ion, 65a
$C_{10}H_{12}O_2$	Duroquinone, 198
$C_{10}H_{13}N_5O_4$	Adenosine, 124
$C_{10}H_{14}CuN_4O_3$	β-Alanylhistidinecopper(II) complex, 65
$C_{10}H_{14}N_5O_7P$	Adenosine monophosphate, 125
$C_{10}H_{16}N_2$	*N,N,N′,N′*-Tetramethyl-*p*-phenylenedi-amine, 344
$C_{10}H_{16}O$	Camphor, 150
$C_{10}H_{17}N_3O_6S$	Glutathione, 215a
$C_{11}H_8N_3O_4^+$	1-(2,4-Dinitrophenyl)pyridinium ion, 195
$C_{11}H_8O_2$	2-Methyl-1,4-naphthoquinone, 262
$C_{11}H_{12}N_2O_4$	*N*-Formylkynurenine, 213
$C_{11}H_{15}N_5O_5$	1-Methylguanosine, 261
$C_{12}H_7ClNO$	Dichloroindophenol, 173

$C_{12}H_8N_2$	1,10-Phenanthroline, 306
	Phenazine, 307
$C_{12}H_9NO$	3-Benzoylpyridine, 141
	4-Benzoylpyridine, 142
	Indophenol, 233
$C_{12}H_9N_3S$	Thionine, 350
$C_{12}H_{10}N_2$	Azobenzene, 136
$C_{12}H_{10}O_2$	2,3-Dimethylnaphthoquinone, 185
$C_{12}H_{12}N_2^{2+}$	1,1′-Ethylene-2,2′-bipyridinium ion, 203
$C_{12}H_{14}N_2^{2+}$	1,1′-Dimethyl-4,4′-bipyridinium ion, 183
$C_{12}H_{17}ClN_4OS$	Thiamine, 348
$C_{12}H_{18}CuN_6O_4$	Histidinecopper(II) complex, 63
$C_{12}N_9NO$	2-Benzoylpyridine, 140
$C_{13}H_9N$	Acridine, 121
$C_{13}H_{10}O$	Benzophenone, 137
$C_{13}H_{12}NO^+$	3-Benzoyl-1-methylpyridinium ion, 139
$C_{13}H_{14}N_2^{2+}$	1,1-Trimethylene-2,2′-bipyridinium ion, 354
$C_{14}H_6O_7S_2^{2-}$	9,10-Anthraquinone-2,6-disulfonate ion, 134
$C_{14}H_7O_5S^-$	9,10-Anthraquinone-1-sulfonate ion, 132
	9,10-Anthraquinone-2-sulfonate ion, 133
$C_{14}H_8O_2$	9,10-Anthraquinone, 131
$C_{14}H_{14}ClN_3$	Acriflavin, 122
$C_{14}H_{16}N_2^{2+}$	1,1′-Tetramethylene-2,2′-bipyridinium ion, 341
$C_{14}H_{18}N_2O_2^{2+}$	1,1′-Bis(2-hydroxyethyl)-4,4′-bipyridinium ion, 144
$C_{14}H_{26}CoN_4O_2^+$	Dihydroxy(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion, 52
$C_{14}H_{27}CoN_4O_2^{2+}$	Aquahydroxy(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion, 51
$C_{14}H_{28}CoN_4O_2^{2+}$	Diaqua(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(II) ion, 7
$C_{14}H_{28}CoN_4O_2^{3+}$	Diaqua(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion, 50
$C_{16}H_6N_2O_{14}S_4^{4-}$	Indigo tetrasulfonate, 232
$C_{16}H_8N_2O_8S_2^{2-}$	Indigo disulfonate, 231
$C_{16}H_{10}$	Pyrene, 323
$C_{16}H_{16}N_2O_4$	1,1′-Dicarboxyethyl-4,4′-bipyridinium, 172
$C_{16}H_{18}N_3S^+$	Methylene blue, 260
$C_{16}H_{32}Cl_2CoN_4^+$	Dichloro(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(III) ion, 49
$C_{16}H_{32}CuN_4^{2+}$	(5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(II) ion, 60
$C_{16}H_{32}N_4Ni^{2+}$	(5,7,7,12,12,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)nickel(II) ion, 92
$C_{16}H_{34}CoN_4O_2^+$	(5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)dihydroxycobalt(III) ion, 48
$C_{16}H_{35}CoN_4O_2^{2+}$	Aqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)hydroxycobalt(III) ion, 47
$C_{16}H_{36}CoN_4O_2^{2+}$	Diaqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(II) ion, 9
$C_{16}H_{36}CoN_4O_2^{3+}$	Diaqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(III) ion, 46
$C_{16}H_{36}N_4Ni^{2+}$	(5,7,7,12,12,14-Hexamethyl-1,4,8,11-tetraazacyclotetradecane)nickel(II) ion, 91
$C_{17}H_{20}N_2S$	Promethazine, 312
$C_{17}H_{20}N_4O_6$	Riboflavine, 333
$C_{17}H_{20}N_4O_9P^-$	Riboflavine 5′-phosphate , 334
$C_{18}H_{15}N_4^+$	Phenosafranine, 308
$C_{19}H_{19}N_7O_6$	Folic acid, 210
$C_{20}H_6Br_4O_5^{2-}$	Eosin, 199
$C_{20}H_{10}O_5^{2-}$	Fluorescein, 209
$C_{20}H_{19}N_4^+$	Safranine T, 336
$C_{21}H_{28}N_7O_{10}P_2$	Nicotinamide-adenine dinucleotide, 276
$C_{22}H_{18}N_2^{2+}$	1,1′-Diphenyl-4,4′-bipyridinium ion, 196
$C_{24}H_{16}N_4^{2+}$	1,1′-Di(4-cyanophenyl)-4,4′-bipyridinium ion, 175
$C_{24}H_{22}N_2^{2+}$	1,1′-Dibenzyl-4,4′-bipyridinium ion, 171
$C_{25}H_{30}ClN_3$	Crystal Violet, 159
$C_{28}H_{31}N_2O_3^+$	Rhodamine B, 332
$C_{30}H_{24}CoN_6^{3+}$	Tris(2,2′-bipyridine)cobalt(III) ion, 44
$C_{30}H_{24}N_6Rh^{3+}$	Tris(2,2′-bipyridine)rhodium(III) ion, 98
$C_{30}H_{24}N_6Ru^{2+}$	Tris(2,2′-bipyridine)ruthenium(II) ion, 99
$C_{30}H_{24}N_6Ru^{3+}$	Tris(2,2′-bipyridine)ruthenium(III) ion, 105
$C_{30}H_{28}FeN_4O_6$	Deuteroheme, 223
$C_{30}H_{28}FeN_4O_6^+$	Deuterohemin, 222
$C_{31}H_{46}O_2$	Vitamin K_1, 360
$C_{32}H_{34}N_4O_6$	Deuteroporphyrin dimethyl ester, 221a
$C_{34}H_{24}N_6Na_4O_{14}S_4$	Trypan blue, 357
$C_{34}H_{32}ClFeN_4O_4$	Hemin, 224
$C_{34}H_{38}N_4O_6$	Hematoporphyrin, 220
$C_{36}H_{24}CoN_6^{3+}$	Tris(1,10-phenanthroline)cobalt(III) ion, 45
$C_{36}H_{24}FeN_6^{3+}$	Tris(1,10-phenanthroline)iron(III) ion, 72
$C_{36}H_{24}N_6Rh^{3+}$	Tris(1,10-phenanthroline)rhodium(III) ion, 98a
$C_{36}H_{24}N_6Ru^{2+}$	Tris(1,10-phenanthroline)ruthenium(II) ion, 99a
$C_{40}H_{30}N_{10}O_6^{2+}$	Nitro blue tetrazolium, 287a
$C_{40}H_{46}ClFeN_6O_8S_2$	Hemin c, 225
$C_{42}H_{58}CoN_6^{3+}$	Tris(5,6-dimethyl-1,10-phenanthroline)cobalt(III) ion, 45a
$C_{48}H_{30}N_4O_8$	*meso*-5-Tetra(4-carboxyphenyl)porphyrin, 337
$C_{62}H_{90}CoN_{13}O_{14}P$	Cobal(II)amin, 10
$C_{62}H_{91}CoN_{13}O_{15}P$	Hydroxocob(III)alamin(Vitamin B12a), 54
$C_{63}H_{90}CoN_{14}O_{14}P$	Cyanocob(III)alamin(Vitamin B12), 53
$C_{64}H_{24}CoN_{16}O_{24}S_8^{8-}$	3,10,17,24-Tetrasulfophthalocyaninecobalt(II) ion dimer, 10a
Cd^+	Cadmium(I) ions, 4
Cd^{2+}	Cadmium(II) ion, 5
$ClCoH_{15}N_5^{2+}$	Pentaamminechlorocobalt(III) ion, 16
$ClH_{15}N_5Ru^{2+}$	Chloropentaammineruthenium(III) ion, 102
Cl_2Hg	Mercuric chloride, 75
Cl_6Ir^{2-}	Hexachloroiridate(II) ion, 81a
Co^{2+}	Cobalt(II) ions, 6
$CoFH_{15}N_5^{2+}$	Pentaammine fluorocobalt(III) ion, 17
$CoH_{15}N_6O_2^{2+}$	Pentaammine(nitrito-*N*)cobalt(III) ion, 18
$CoH_{15}N_6O_2^{2+}$	Pentaammine(nitrato-*O*)cobalt(III) ion, 19
$CoH_{16}N_5O^{2+}$	Pentaamminehydroxycobalt(III) ion, 14
$CoH_{17}N_5O^{3+}$	Pentaammineaquacobalt(III) ion, 13
$CoH_{18}N_6^{3+}$	Hexaamminecobalt(III) ion, 12
Cr^{2+}	Chromium(II) ion, 55
Cr^{3+}	Chromium(III) ion, 56
Cu^+	Copper(I) ions, 57
Cu^{2+}	Copper(II) ions, 59
Eu^{3+}	Europium(III) ion, 66
Fe^{2+}	Iron(II) ion, 67
Fe^{3+}	Iron(III) ions, 68
Ga^{2+}	Gallium(II) ions, 73
HO^-	Hydroxide ion, 362
$HO_7P_2^{3-}$	Pyrophosphate ion, 369
H_2O	Water, 363
H_2O_2	Hydrogen peroxide, 94
$H_2O_4P^-$	Phosphate ion, 368
H_2S	Hydrogen sulfide, 106
H_3N	Ammonia, 365
H_3NO	Hydroxylamine, 84
H_3O^+	Hydronium ion, 361
H_4N^+	Ammonium ion, 364
$H_{15}N_6ORu^{3+}$	Nitrosopentaammineruthenium(III) ion, 103

$H_{15}N_6ORu^{2+}$	Nitrosopentaammineruthenium(III) radical ion (electron adduct), 104
$H_{18}N_6Ru^{3+}$	Hexaammineruthenium(III) ion, 100
HgI_2	Mercuric iodide, 76
IO_3^-	Iodate ion, 81
I_2	Iodine, 80
Mn^{2+}	Manganese(II) ions, 82
MnO_4^-	Permanganate ion, 83
NO_2^-	Nitrite ion, 86
NO_3^-	Nitrate ion, 87
N_2O	Nitrous oxide, 85
Ni^+	Nickel(I) ion, 88
Ni^{2+}	Nickel(II) ions, 89
O_2	Oxygen, 93
O_2S	Sulfur dioxide, 107
$O_6S_4^{2-}$	Tetrathionate ion, 108
Pb^+	Lead(I) ions, 95
Pb^{2+}	Lead(II) ions, 96
Sc^{2+}	Scandium(II) ions, 109
Ti^{3+}	Titanium(III) ions, 110
Tl^+	Thallium(I) ion, 111
Tl_2^+	Thallium(I) ion, complex with Tl(0), 111a
Yb^{3+}	Ytterbium(III) ions, 112
Zn^+	Zinc(I) ion, 113
Zn^{2+}	Zinc(II) ion, 114

References

61G019 Kelly, P., Smith, M., The radiation chemistry of azide solutions. Part II. The action of x-rays (200 kv) on deaerated aqueous solutions of sodium azide in the presence of different organic solutes, J. Chem. Soc. 1487–94 (1961).

62G140 Taub, I.A., Dorfman, L.M., Pulse radiolysis studies. II. Transient spectra and rate processes in irradiated ethanol and aqueous ethanol solution, J. Am. Chem. Soc. **84**: 4053–9 (1962).

63F005 Buxton, G., Wilmarth, W.K., Aqueous chemistry of inorganic free radicals. V. The use of carbon monoxide as a scavenger for hydroxyl radicals generated by the photolysis of hydrogen peroxide, J. Phys. Chem. **67**: 2835–41 (1963).

63G045 Dorfman, L.M., Taub, I.A., Pulse radiolysis studies. III. Elementary reactions in aqueous ethanol solution, J. Am. Chem. Soc. **85**: 2370–4 (1963).

64G133 Asmus, K.-D., Henglein, A., Ebert, M., Keene, J.P., Pulsradiolytische Untersuchung schneller Reaktionen von hydratisierten Elektronen, freien Radikalen und Ionen mit Tetranitromethan in Waessriger Loesung, Ber. Bunsenges. Phys. Chem. **68**: 657–63 (1964).

65D040 Fischer, H., Rapid proton exchange of the free radical $\cdot CH_2OH$ as studied by E.S.R, Mol. Phys. **9**: 149–52 (1965).

65F006 Dainton, F.S., Fowles, P., The photolysis of aqueous systems at 1849 A. I. Solutions containing nitrous oxide, Proc. Roy. Soc. (London) Ser. A **287**: 295–311 (1965).

65G183 Rabani, J., Mulac, W.A., Matheson, M.S., The pulse radiolysis of aqueous tetranitromethane. I. Rate constants and the extinction coefficient of e_{aq}^-. II. Oxygenated solutions, J. Phys. Chem. **69**: 53–70 (1965).

65G375 Guetlbauer, F., Getoff, N., Kinetic studies on the radiation-chemistry carboxylation of methanol, Z. Phys. Chem. (Frankfurt Am Main) **47**: 299–305 (1965).

65G384 Keene, J.P., Raef, Y., Swallow, A.J., Pulse radiolysis studies of carboxyl and related radicals, Pulse Radiolysis, Ebert, M.; Keene, J.P.; Swallow, A.J.; Baxendale, J.H. (eds.), Academic Press, New York, 1965, p.99–106.

65G396 Keene, J.P., Land, E.J., Swallow, A.J., A pulse radiolysis study of methylene blue, Pulse Radiolysis, Ebert, M.; Keene, J.P.; Swallow, A.J.; Baxendale, J.H. (eds.), Academic Press, New York, 1965, p.227–45.

66D162 Zeldes, H., Livingston, R., Paramagnetic resonance study of liquids during photolysis. II. Acetone and solutions containing acetone, J. Chem. Phys. **45**(6): 1946–54: (1966).

66G074 Asmus, K.-D., Henglein, A., Wigger, A., Beck, G., Pulsradiolytische Versuche zur elektrolytischen Dissoziation von aliphatischen Alkoholradikalen, Ber. Bunsenges. Phys. Chem. **70**(7): 756–8 (1966).

66G316 Guetlbauer, F., Getoff, N., Bestimmung des $g(e^-_{aq})$-Wertes und der Dissoziationskonstante des COOH-Radikals in waesseriger Methanolloesung, Z. Phys. Chem. (Frankfurt Am Main) **51**(5–6): 255–63 (1966).

66G432 Asmus, K.-D., Wigger, A., Henglein, A., Pulsradiolytische Untersuchung einiger Elementarprozesse der Nitrobenzol reduktion, Ber. Bunsenges. Phys. Chem. **70**(6): 862–8 (1966).

66G433 Asmus, K.-D., Beck, G., Henglein, A., Wigger, A., Pulsradiolytische Untersuchung der Oxydation und Reduktion des Nitrosobenzols in wassriger Loesung, Ber. Bunsenges. Phys. Chem. **70**(6): 869–74 (1966).

67E053 Pruetz, W., Land, E.J., Lichtemission von waessrigen Farbstoffloesungen nach Bestrahlung mit Elektronenimpulsen, Biophysik **3**: 349–60 (1967).

67G038 Chrysochoos, J., Ovadia, J., Grossweiner, L.I., Pulse radiolysis of aqueous eosin, J. Phys. Chem. **71**(6): 1629–36 (1967).

67G041 Thomas, J. K., Pulse radiolysis of aqueous solutions of methyl iodide and methyl bromide. The reactions of iodine atoms and methyl radicals in water, J. Phys. Chem. **71**(6): 1919–1925 (1967).

67G094 Seddon, W.A., Allen, A.O., Radiation chemistry of aqueous solutions of ethanol, J. Phys. Chem. **71**: 1914–8 (1967).

67G102 Basson, R.A., van der Linde, H.J., Radical yield of propionaldehyde in the radiolysis of n-propanol, Chem. Commun. (2): 91–2 (1967).

67G262 Karmann, W., Henglein, A., Pulse-radiolytic investigations of the reactions of organic radicals with hydrogen sulfide, Ber. Bunsenges. Phys. Chem. **71**(4): 421–4 (1967).

67G269 Cullis, C.F., Francis, J.M., Raef, Y., Swallow, A.J., Studies of radiation-induced reactions of ethylene in aqueous solution. II. Reactions in the presence of oxygen as studied by pulse radiolysis and γ-irradiation techniques, Proc. Roy. Soc. (London) Ser. A **300**: 443–54 (1967).

67G333 Sibirskaya, G.K., Pikaev, A.K., The radiolysis of aqueous sulfuric acid solutions of methyl alcohol, Bull. Acad. Sci. USSR, Div. Chem. Sci. (Engl. Transl.) (1): 183–5 (1967), Transl. from Izv. Akad. Nauk SSSR, Ser. Khim, (1): 190–2 (1967).

67G729 Adams, G.E., Michael, B.D., Richards, J.T., Three stage electron transfer in aqueous and alcoholic solutions, Nature (London) **215**: 1248–50 (1967).

68G132 Adams, G.E., McNaughton, G.S., Michael, B.D., Pulse radiolysis of sulphur compounds. Part 2.– Free radical repair by hydrogen transfer from sulphydryl compounds, Trans. Faraday Soc. **64**(4): 902–10 (1968).

68G172 Cordier, P., Grossweiner, L.I., Pulse radiolysis of aqueous fluorescein, J. Phys. Chem. **72**(6): 2018–26 (1968).

68G249 Lilie, J., Beck, G., Henglein, A., Pulsradiolytische Untersuchung des Acetoinradikals und des Diacetylanions in waessriger Loesung, Ber. Bunsenges. Phys. Chem. **72**(4): 529–33 (1968).

68G308 Adams, G.E., Michael, B.D., Willson, R.L., Electron transfer studies by pulse radiolysis, Adv. Chem. Ser. **81**: 289–308 (1968).

68G441 Land, E.J., Swallow, A.J., One-electron reactions in biochemical systems as studied by pulse radiolysis I. Nicotinamide-adenine dinucleotide and related compounds, Biochim. Biophys. Acta **162**: 327–37 (1968).

68G539 Volkert, W.A., Some radical reactions with amino acids in aqueous solutions, Ph.D. Thesis, Univ. of Missouri, 1968, 164p.

68M058 Poupko, R., Loewenstein, A., Kinetic study of proton exchange in radicals derived from simple alcohols, J. Chem. Soc. B 949–51 (1968).

69F176 Taha, I.A.I., Kuntz, R.R., Methyl radical reactions in aqueous solutions. I. Hydrogen abstraction from acetone, J. Phys. Chem. **73**(12): 4406–9 (1969).

69G019 Shankar, J., Rama Rao, K.V.S., Shastri, L.V., Peroxide formation in the γ radiolysis of aerated aqueous solutions of methyl iodide, J. Phys. Chem. **73**(1): 52–7 (1969).

69G052 Buxton, G.V., Dainton, F.S., Kalecinski, J., The radiation chemistry of aqueous solutions of sodium nitroprusside, Int. J. Radiat. Phys. Chem. **1**: 87–98 (1969).

69G156 Baxendale, J.H., Khan, A.A., The pulse radiolysis of p-nitrosodimethylaniline in aqueous solution, Int. J. Radiat. Phys. Chem. **1**(1): 11–24 (1969).

69G238 Land, E.J., Swallow, A.J., One-electron reactions in biochemical systems as studied by pulse radiolysis. II. Riboflavin, Biochemistry **8**: 2117–25 (1969).

69G270 Gruenbein, W., Henglein, A., Pulsradiolytische Untersuchung zweibasischer Radikale der Reduktion von Nitrophenolen in waessriger Loesung, Ber. Bunsenges. Phys. Chem. **73**(4): 376–82 (1969).

69G419 Simic, M., Neta, P., Hayon, E., Pulse radiolysis of alcohols in aqueous solution, J. Phys. Chem. **73**(11): 3794–800 (1969).

69G446 Neta, P., Simic, M., Hayon, E., Pulse radiolysis of aliphatic acids in aqueous solutions. I. Simple monocarboxylic acids, J. Phys. Chem. **73**(12): 4207–13 (1969).

69G447 Simic, M., Neta, P., Hayon, E., Pulse radiolysis of aliphatic acids in aqueous solutions. II. Hydroxy and polycarboxylic acids, J. Phys. Chem. **73**(12): 4214–9 (1969).

69G522 Adams, G.E., Willson, R.L., Pulse radiolysis studies on the oxidation of organic radicals in aqueous solution, Trans. Faraday Soc. **65**: 2981–7 (1969).

69G524 Morita, M., Tajima, M., Fujimaki, M., Radiation chemistry of foods. Part II. Reactivity of some food constituents with a model secondary radical, CH_2OH, Agric. Biol. Chem. **33**(2): 250–5 (1969).

69G553 Karmann, W., Granzow, A., Meissner, G., Henglein, A., Die Pulsradiolyse einfacher Merkaptane in Luft freier waessriger Loesung, Int. J. Radiat. Phys. Chem. **1**: 395–405 (1969).

69G826 Zimbrick, J.D., Ward, J.F., Myers, L.S.Jr., Studies on the chemical bases of cellular radiosensitization by 5-bromouracil substitution in DNA. I. Pulse and steady-state radiolysis of 5-bromouracil and thymine, Int. J. Radiat. Biol. Relat. Stud. Phys., Chem. Med. **16**(6): 505–23 (1969).

70G052 Chambers, K.W., Collinson, E., Dainton, F.S., Addition of e^-_{aq}, H· and ·OH to acrylamide in aqueous solution and reactions of the adducts, Trans. Faraday Soc. **66**: 142–62 (1970).

70G080 Wander, R., Gall, B.L., Dorfman, L.M., The absolute reactivity of the oxide radical ion with methanol and ethanol in water, J. Phys. Chem. **74**(8): 1819–21 (1970).

70G104 Burchill, C.E., Ginns, I.S., Radiation-induced oxidation of 2-propanol by hydrogen peroxide in aqueous solutions, Can. J. Chem. **48**: 1232–8 (1970).

70G241 Pruetz, W.A., Land, E.J., Chemiluminescent reactions after pulse radiolysis of aqueous solutions of acriflavin. Effects of halides and pseudo halides, J. Phys. Chem. **74**(10): 2107–14 (1970).

70G254 Barker, G.C., Fowles, P., Stringer, B., Pulse radiolytic induced transient electrical conductance in liquid solutions. Part 2. Radiolysis of aqueous solutions of NO_3^-, NO_2^- and $Fe(CN)_6^{3-}$, Trans. Faraday Soc. **66**(6): 1509–19 (1970).

70G303 Fojtik, A., Czapski, G., Henglein, A., Pulse radiolytic investigation of the carboxyl radical in aqueous solution. J. Phys. Chem. **74**(17): 3204–8 (1970).

70G338 Burchill, C.E., Ginns, I.S., The radiation-induced oxidation of ethanol and methanol by hydrogen peroxide in aqueous solution, Can. J. Chem. **48**(16): 2628–32 (1970).

70G407 Bullock, G., Cooper, R., Reactions of aqueous trifluoromethyl radicals, Trans. Faraday Soc. **66**: 2055–64 (1970).

70G560 Willson, R.L., Pulse radiolysis studies of electron transfer in aqueous disulphide solutions, Chem. Commun. (21): 1425–6 (1970).

70R013 Willson, R.L., Pulse radiolysis studies of electron transfer reactions in aerobic solution, Chem. Commun. (16): 1005 (1970).

71D227 Burchill, C.E., Jones, P.W., Electron spin resonance studies of reactions of photo-generated organic radicals with hydrogen peroxide in aqueous solution, Can. J. Chem. **49**(24): 4005–16 (1971).

71F579 Kantrowitz, E.R., Hoffman, M.Z., Endicott, J.F., Ultraviolet photochemistry of acetatopentaammine cobalt(III) in aqueous solution, J. Phys. Chem. **75**(12): 1914–20 (1971).

71G026 Balkas, T.I., Fendler, J.H., Schuler, R.H., The radiation chemistry of aqueous solutions of $CFCl_3$, CF_2Cl_2, and CF_3Cl, J. Phys. Chem. **75**(4): 455–66 (1971).

71G041 Getoff, N., Schwoerer, F., Markovic, V.M., Sehested, K., Nielsen, S.O., Pulse radiolysis of oxalic acid and oxalates, J. Phys. Chem. **75**(6): 749–55 (1971).

71G061 Fielden, E.M., Roberts, P.B., Pulse radiolysis studies of the radiosensitizer nor-pseudo-pelletierine-N-oxyl (NPPN). I. Radiation chemistry, Int. J. Radiat. Biol. Relat. Stud. Phys., Chem. Med. **20**(4): 355–62 (1971).

71G284 Neta, P., Electron spin resonance study of irradiated aqueous solutions of fumarate ion. The use of fumarate for radical trapping, J. Phys. Chem. **75**(17): 2570–4 (1971).

71G327 Land, E.J., Swallow, A.J., One-electron reactions in biochemical systems as studied by pulse radiolysis. V. Cytochrome c, Arch. Biochem. Biophys. **145**: 365–72 (1971).

71G424 Stockhausen, K., Henglein, A., Pulsradiolytische Untersuchung des Mechanismus der Oxidation und Autoxidation von Formaldehyd in waessriger Loesung, Ber. Bunsenges. Phys. Chem. **75**(8): 833–40 (1971).

71G554 Hayon, E., Simic, M., Pulse radiolysis study of cyclic peptides in aqueous solution. Absorption spectrum of the peptide radical -NHCHCO-, J. Am. Chem. Soc. **93**(25): 6781–6 (1971).

71G618 Willson, R.L., Pulse radiolysis studies on reaction of triacetoneamine-N-oxyl with radiation-induced free radicals, Trans. Faraday Soc. **67**(10): 3008–19 (1971).

71G619 Willson, R.L., Pulse radiolysis studies of electron transfer in aqueous quinone solutions, Trans. Faraday Soc. **67**(10): 3020–9 (1971).

71G778 Koester, R., Asmus, K.-D., Die Reduktion von Tetrachlorkohlenstoff durch hydratisierte Elektronen, H-Atome und reduzierende Radikale, Z. Naturforsch. Teil B **26**(11): 1104–8 (1971).

71G929 Byakov, V.M., Zhiltsova, L.V., Kalyazin, E.P., Kovalyova, E.P., Petryaev, E.P., On the mechanism of radiolysis of aqueous methanol solutions, Proc. of the Third Tihany Symposium on Radiation Chemistry, Vol. 2, J. Dobo and P. Hedvig (eds.), Akademiai Kiado, Budapest, Hungary, 1972, p.1301–9.

72A002 Nilsson, K., The reduction of ferricytochrome c studied by pulse radiolysis, Isr. J. Chem. **10**(6): 1011–9 (1972).

72A006 Adams, G.E., Redpath, J.L., Bisby, R.H., Cundall, R.B., The use of free radical probes in the study of mechanisms of enzyme inactivation, Isr. J. Chem. **10**(6): 1079–93 (1972).

72A018 Cohen, H., Meyerstein, D., On the mechanism of reduction of cobalt(III) and ruthenium(III) hexaammine complexes by several aliphatic radicals, J. Am. Chem. Soc. **94**(20): 6944–8 (1972).

72D181 Laroff, G.P., Fessenden, R.W., Schuler, R.H., The electron spin resonance spectra of radical intermediates in the oxidation of ascorbic acid and related substances, J. Am. Chem. Soc. **94**(26): 9062–73 (1972).

72G070 Cohen, H., Meyerstein, D., Formation of chromium-carbon bonds in aqueous solution: A pulse radiolytic study, J. Chem. Soc., Chem. Commun. (6): 320–1 (1972).

72G144 Hayon, E., Simic, M., Radiation sensitization reactions of N-ethylmaleimide with model compounds, Radiat. Res. **50**(3): 464–78 (1972).

72G167 Burchill, C.E., Wollner, G.P., Radiation-induced oxidation of 2-propanol by nitrous oxide in alkaline aqueous solution, Can. J. Chem. **50**(11): 1751–6 (1972).

72G244 Lilie, J., Behar, D., Sujdak, R.J., Schuler, R.H., On the lifetime of trifluoromethyl radical in aqueous solution, J. Phys. Chem. **76**(18): 2517–20 (1972).

72G340 Hoffman, M.Z., Simic, M., Ligand-to-metal intramolecular electron transfer in the reduction of p-nitrobenzoato pentaamminecobalt(III) ion, J. Am. Chem. Soc. **94**(5): 1757–9 (1972).

72G359 Nelson, D.A., Hayon, E., Ketyl radicals of benzoylpyridines, J. Phys. Chem. **76**(22): 3200–7 (1972).

72G388 Hoffman, M.Z., Hayon, E., One-electron reduction of the disulfide linkage in aqueous solution. Formation, protonation, and decay kinetics of the $RSSR^-$ radical, J. Am. Chem. Soc. **94**(23): 7950–7 (1972).

72G391 Hulme, B.E., Land, E.J., Phillips, G.O., Pulse radiolysis of 9,10-anthraquinones. Part 1. Radicals, J. Chem. Soc., Faraday Trans. 1 **68**(10): 1992–2002 (1972).

72G445 Stevens, G.C., Clarke, R.M., Hart, E.J., Radiolysis of aqueous methane solutions, J. Phys. Chem. **76**(25): 3863–7 (1972).

72G462 Martin, J.E., Hart, E.J., Adamson, A.W., Gafney, H., Halpern, Jack, Chemiluminescence from the reaction of the hydrated electron with tris(bipyridyl)ruthenium(III), J. Am. Chem. Soc. **94**(26): 9238–40 (1972).

72G610 Stelter, L.H., Chemical effects of direct and indirect interactions of X-radiation with iodine containing amino acids, Ph.D., Thesis, Univ. of Toledo, Ohio, 1972, 115p.

72R003 Nucifora, G., Smaller, B., Remko, R., Avery, E.C., Transient radicals of DNA bases by pulse radiolysis. Effects of cysteine and cysteamine as radioprotectors, Radiat. Res. **49**: 96–111 (1972).

72R046 Blackburn, R., Cox, D.L., Phillips, G.O., Effects of gamma radiation on vitamin B12 systems, J. Chem. Soc., Faraday Trans. 1 **68**(9): 1687–96 (1972).

72R057 Simic, M., Hayon, E., A model of radiation sensitization by quinones, Int. J. Radiat. Biol. Relat. Stud. Phys., Chem. Med. **22**(5): 507–11 (1972).

73A020 Redpath, J.L., Pulse radiolysis of dithiothreitol, Radiat. Res. **54**(3): 364–74 (1973).

73A027 Schoeneshoefer, M., Pulsradiolytische Untersuchung ueber das $S_4O_6^{3-}$–Radikal als Zwischenprodukt der Thiosulfatoxidation und Tetrathionatreduktion, Int. J. Radiat. Phys. Chem. **5**(4): 375–86 (1973).

73A047 Rao, P.S., Hayon, E., One-electron redox reactions of free radicals in solution. Rate of electron transfer processes to quinones, Biochim. Biophys. Acta **292**: 516–33 (1973).

73A052 Hayon, E., Simic, M., Acid-base properties of organic peroxy radicals, ·OORH, in aqueous solution, J. Am. Chem. Soc. **95**(20): 6681–4 (1973).

73A057 Ellis, J.D., Green, M., Sykes, A.G., Buxton, G.V., Sellers, R.M., Pulse radiolysis of titanium(III) and other metal(III) ions in the presence of formic acid, J. Chem. Soc., Dalton Trans. (16): 1724–8 (1973).

73A062 Greenstock, C.L., Dunlop, I., Kinetics of competing free radical reactions with nitroaromatic compounds, J. Am. Chem. Soc. **95**(21): 6917–9 (1973).

73A064 Pecht, I., Pulse radiolysis study of the reduction of spinach ferredoxin, FEBS (Fed. Eur. Biochem. Soc.) Lett. **33**(2): 259–61 (1973).

73A070 Simic, M., Neta, P., Hayon, E., Reactions of hydroxyl radicals with unsaturated aliphatic alcohols in aqueous solution. A spectroscopic and electron spin resonance radiolysis study, J. Phys. Chem. **77**(22): 2662–7 (1973).

73A073 Purdie, J.W., Gillis, H.A., Klassen, N.V., The pulse radiolysis of penicillamine and penicillamine disulfide in aqueous solution, Can. J. Chem. **51**(18): 3132–42 (1973).

73A074 Farrington, J.A., Ebert, M., Land, E.J., Fletcher, K., Bipyridylium quaternary salts and related compounds. V. Pulse radiolysis studies of the reaction of paraquat radical with oxygen. Implications for the mode of action of bipyridyl herbicides, Biochim. Biophys. Acta **314**(22): 372–81 (1973).

73A075 Hoffman, M.Z., Simic, M., Rate of reduction of cobalt(III) complexes by $CO_2\cdot^-$ radicals in aqueous solution, Inorg. Chem. **12**(10): 2471–2 (1973).

73A078 Rao, P.S., Hayon, E., Reduction of dyes by free radicals in solution. Correlation between reaction rate constants and redox potentials, J. Phys. Chem. **77**(23): 2753–6 (1973).

73A099 Greenstock, C.L., Dunlop, I., Pulse radiolysis studies of nitrofurans: Chemical radiosensitization, Radiat. Res. **56**(3): 428–40 (1973).

73A102 Bansal, K.M., Henglein, A., Janata, E., Sellers, R.M., Pulse radiolysis and polarography. Influence of the double layer capacity on electrode reactions of short lived radicals in aqueous solutions, Ber. Bunsenges. Phys. Chem. **77**(12): 1139–44 (1973).

73A104 Rao, P.S., Hayon, E., Rate constants of electron transfer processes in solution: Dependence on the redox potential of the acceptor, Nature (London) **243**: 344–6 (1973).

73A140 Willson, R.L., Slater, T.F., Carbon tetrachloride and biological damage: pulse radiolysis studies of associated free radical reactions, Fast Processes in Radiation Chemistry and Biology, G.E. Adams, E.M. Fielden and B.D. Michael (eds.), John Wiley & Sons, 1975, p.147–61 (Proceedings of the Fifth L.H. Gray Conference, University of Sussex, Sept. 10–14, 1973).

73A146 Faraggi, M., Electron transfer reactions in structural units of copper proteins, Ibid., p.285–308 .

73A150 Willson, R.L., Free radical chain oxidation by carbon tetrachloride and related compounds: Model pulse radiolysis studies, Trans. Biochem. Soc. **1**: 929–31 (1973).

73D065 Laroff, G.P., Fessenden, R.W., Equilibrium and kinetics of the acid dissociation of several hydroxyalkyl radicals, J. Phys. Chem. **77**(10): 1283–8 (1973).

73F161 Mittal, L.J., Mittal, J.P., Hayon, E., Photo-induced decarboxylation of aliphatic acids and esters in solution. Dependence upon state of protonation of the carboxyl group, J. Phys. Chem. **77**(12): 1482–7 (1973).

73F285 Mittal, L.J., Mittal, J.P., Hayon, E., Primary processes in the photochemistry of phenylalanine and derivatives in aqueous solution. Biphotonic photoionization and photodissociation reactions, J. Am. Chem. Soc. **95**(19): 6203–10 (1973).

73G004 Bansal, K.M., Graetzel, M., Henglein, A., Janata, E., Polarographic and optical absorption studies of radicals produced in the pulse radiolysis of aqueous solutions of ethylene glycol, J. Phys. Chem. **77**(1): 16–9 (1973).

73G026 Hayon, E., Simic, M., Addition of hydroxyl radicals to pyrimidine bases and electron transfer reactions of intermediates to quinones, J. Am. Chem. Soc. **95**(4): 1029–35 (1973).

73G030 Anbar, M., Bambenek, M., Ross, A.B., Selected specific rates of reactions of transients from water in aqueous solution. I. Hydrated electron, NSRDS-NBS 43, 1973, 67 p.

73G039 Buxton, G.V., Dainton, F., McCracken, D.R., Radiation chemical study of the reaction of Ni^+, Co^+ and Cd^+ with N_2O. Evidence for the formation of a hyperoxidised state by oxygen atom transfer, J. Chem. Soc., Faraday Trans. 1 **69**(1): 243–54 (1973).

73G043 Nazhat, N.B., Asmus, K.-D., Reduction of mercuric chloride by hydrated electrons and reducing radicals in aqueous solutions. Formation and reactions of HgCl, J. Phys. Chem. **77**(5): 614–20 (1973).

73G049 Simic, M., Hayon, E., Comparison between the electron transfer reactions from free radicals and their corresponding peroxy radicals to quinones, Biochem. Biophys. Res. Commun. **50**(2): 364–9 (1973).

73G062 Eriksen, T., Henglein, A., Stockhausen, K., Pulse radiolytic oxidation of chloral hydrate in oxygenated and deoxygenated aqueous solutions, J. Chem. Soc., Faraday Trans. 1 **69**(2): 337–45 (1973).

73G068 Rao, P.S., Hayon, E., Experimental determination of the redox potential of the superoxide radical $\cdot O_2^-$, Biochem. Biophys. Res. Commun. **51**(2): 468–73 (1973).

73G085 Buxton, G.V., Sellers, R.M., Acid dissociation constant of the carboxyl radical. Pulse radiolysis studies of aqueous solutions of formic acid and sodium formate, J. Chem. Soc., Faraday Trans. 1 **69**(3): 555–9 (1973).

73G097 Hayon, E., Simic, M., Acid-base properties of radical anions of cis and trans isomers. I. Fumarates and maleates, J. Am. Chem. Soc. **95**(8): 2433–9 (1973).

73G112 Rabani, J., Klug-Roth, D., Lilie, J., Pulse radiolytic investigations of the catalyzed disproportionation of peroxy radicals. Aqueous cupric ions, J. Phys. Chem. **77**(9): 1169–75 (1973).

73G114 Greenstock, C.L., Dunlop, I., Neta, P., Radiation chemical studies of the oxidation and reduction of nitrofurans. Oxidative denitration by OH radicals, J. Phys. Chem. **77**(9): 1187–90 (1973).

73G116 Faraggi, M., Leopold, J.G., The reduction of cobalamin. A pulse radiolysis study, Biochem. Biophys. Res. Commun. **50**(2): 413–20 (1973).

73G122 Adams, G.E., Willson, R.L., Ketyl radicals in aqueous solution. Pulse radiolysis study, J. Chem. Soc., Faraday Trans. 1 **69**(4): 719–29 (1973).

73G125 Patel, K.B., Willson, R.L., Semiquinone free radicals and oxygen. Pulse radiolysis study of one electron transfer equilibria, J. Chem. Soc., Faraday Trans. 1 **69**(4): 814–25 (1973).

73G126 Asmus, K.-D., Moeckel, H., Henglein, A., Pulse radiolytic study of the site of OH· radical attack on aliphatic alcohols in aqueous solution, J. Phys. Chem. **77**(10): 1218–21 (1973).

73G249 Behar, D., Samuni, A., Fessenden, R.W., Reactions of iron(II) and titanium(III) with organic radicals, J. Phys. Chem. **77**(17): 2055–9 (1973).

73R150 Bensasson, R., Land, E.J., Optical and kinetic properties of semireduced plastoquinone and ubiquinone: Electron acceptors in photosynthesis, Biochim. Biophys. Acta **325**: 175–81 (1973).

74A002 Simic, M., Lilie, J., Kinetics of ammonia detachment from reduced cobalt(III) complexes based on conductometric pulse radiolysis, J. Am. Chem. Soc. **96**(1): 291–2 (1974).

74A007 Shafferman, A., Stein, G., Reduction of ferricytochrome c by some free radical agents, Science **183**: 428–30 (1974).

74A010 Micic, O.I., Cercek, B., Solvent participation in electron transfer reactions, J. Phys. Chem. **78**(3): 285–9 (1974).

74A037 Kelm, M., Lilie, J., Henglein, A., Janata, E., Pulse radiolytic study of Ni^+. Nickel–carbon bond formation, J. Phys. Chem. **78**(9): 882–7 (1974).

74A040 Harel, Y., Meyerstein, D., On the mechanism of reduction of porphyrins. A pulse radiolytic study, J. Am. Chem. Soc. **96**(9): 2720–7 (1974).

74A043 Lesigne, B., Gilles, L., Woods, R.J., Spectra and decay of trichloromethyl radicals in aqueous solution, Can. J. Chem. **52**(7): 1135–9 (1974).

74A051 Rabani, J., Pick, M., Simic, M., Pulse radiolysis of cyclopentane in aqueous solutions, J. Phys. Chem. **78**(11): 1049–51 (1974).

74A072 Mulazzani, Q.G., Ward, M.D., Semerano, G., Emmi, S.S., Giordani, P., Gamma and pulse radiolysis of tetracyanonickelate(II) anion in aqueous solution, Int. J. Radiat. Phys. Chem. **6**(3): 187–201 (1974).

74A074 Butler, J., Jayson, G.G., Swallow, A.J., Oxidation of ferrous ions by an aliphatic dioxyl radical, J. Chem. Soc., Faraday Trans. 1 **70**(7): 1394–401 (1974).

74A078 Lilie, J., Heckel, E., Lamb, R.C., The pulse radiolytic decomposition of p-nitroperoxybenzoic acid, J. Am. Chem. Soc. **96**(17): 5543–7 (1974).

74A089 Bruehlmann, U., Hayon, E., One-electron redox reactions of water-soluble vitamins. I. Nicotinamide (vitamin B_5) and related compounds, J. Am. Chem. Soc. **96**(19): 6169–74 (1974).

74A099 Rabani, J., Klug-Roth, D., Henglein, A., Pulse radiolytic investigations of $OHCH_2O_2$ radicals, J. Phys. Chem. **78**(21): 2089–3 (1974).

74A105 Blackburn, R., Erkol, A.Y., Phillips, G.O., One-electron reactions in some cobalamins, J. Chem. Soc., Faraday Trans. 1 (9): 1693–1701 (1974).

74A106 Neta, P., Patterson, L.K., Substituted pyridinyl radicals in aqueous solutions. Formation, reactivity, and acid-base equilibria, J. Phys. Chem. **78**(22): 2211–7 (1974).

74A127 Moorthy, P.N., Hayon, E., Intermediates produced from the one-electron reduction of nitrogen heterocyclic compounds in solution, J. Phys. Chem. **78**(25): 2615–20 (1974).

74A135 Willson, R.L., Gilbert, B.C., Marshall, P.D.R., Norman, R.O.C., Metronidazole ('Flagyl'): A pulse radiolysis and e.s.r. study, Int. J. Radiat. Biol. Relat. Stud. Phys., Chem. Med. **26**(5): 427–34 (1974).

74A146 Cohen, H., Meyerstein, D., Chromium-carbon bonds in aqueous solutions. A pulse radiolytic study, Inorg. Chem. **13**(10): 2434–43 (1974).

74A167 Mulazzani, Q.G., Emmi, S., Roffi, G., Hoffman, M.Z., Radiation chemically induced reduction of $Rh(dipyr)_3^{3+}$ in aqueous solution, Quaderni dell'Area di Ricerca dell'Emilia-Romagna, C.N.R., Vol. 5, Lab. di Fotochimica e Radiazioni d'Alta Energia, Rapporto annuale 1973, Bologna, Consiglio Nazionale delle Ricerche, 1974, p.111–3.

74A182 Madhavan, V., Spectra and dynamics of transients formed by the action of pulse radiolytically generated hydrated electrons and hydroxyl radicals on acrylic acid derivatives, Ph.D. Thesis, Boston University, 1974, p. 156.

74D144 Gilbert, B.C., Norman, R.O.C., Sealy, R.C., Electron spin resonance studies. Part XL. A kinetic investigation of the oxidation of oxygen-substituted carbon radicals by hydrogen peroxide, J. Chem. Soc., Perkin Trans. 2 (7): 824–9 (1974).

74D286 Gilbert, B.C., Norman, R.O.C., Sealy, R.C., Electron spin resonance studies. Part XLII. The reactions of iodine-containing compounds with hydroxyl and carbon radicals in aqueous solution, J. Chem. Soc., Perkin Trans. 2 (12): 1435–41 (1974).

74F246 Rowan, N.S., Hoffman, M.Z., Milburn, R.M., Intermediates in the photochemistry of tris(oxalato)cobaltate(III) ion in aqueous solution. Free and coordinated radicals, J. Am. Chem. Soc. **96**(19): 6060–7 (1974).

74F528 Moger, G., Mink, Gy., Nemes, I., Cserhegyi, A., Moger, D., Kinetic isotope study of the reaction of methyl radicals with amino acids and aliphatic acids in aqueous solutions. I. Kinetic isotope effect of deuterium in the abstraction of hydrogen from an α-C–H bond, Kinetics Catalysis 15(3): 512–7 (1974), Transl. from Kinet. Katal. **15**(3): 573–80 (1974).

74F529 Moger, G., Nemesh, I., Cherkhedii, A., Kinetic-isotope study of the reactions of amino acids and aliphatic acids with methyl radicals in aqueous solutions. II. Relative rate constants for hydrogen abstraction from methine and methylene groups, Kinetics Catalysis 15(4): 762–6 (1974), Transl. from Kinet. Katal. **15**(4):851–6 (1974).

74F644 Roche, T.S., Endicott, J.F., Saturated macrocyclic (N_4) complexes of cobalt(III) containing cobalt-alkyl bonds. Preparation and properties, Inorg. Chem. **13**(7): 1575–80 (1974).

74G033 Fessenden, R.W., Chawla, O.P., A proposed mechanism for the base catalyzed protonation of the e_{aq}^- adduct to acrylate, J. Am. Chem. Soc. **96**: 2262–3 (1974).

74G207 Pribush, A.G., Brusentseva, S.A., Shubin, V.N., Dolin, P.I., Gamma-radiolysis of air-saturated aqueous solutions of propyl alcohols, High Energy Chem. 8(2): 137–9 (1974), Transl. from Khim. Vys. Energ. **8**(2): 167–70 (1974).

74G275 Olson, K.R., Hoffman, M.Z., One-electron reduction of cobalt(III) hexa-ammine ion by hydroxymethyl radicals in aqueous solution, J. Chem. Soc., Chem. Commun. (22): 938–9 (1974).

74M382 Kimura, M., Kinetics and mechanism of the reaction between formate and peroxodisulfate in aqueous solution, Inorg. Chem. **13**(4): 841–6 (1974).

75A012 Simic, M.G., Taub, I.A., Tocci, J., Hurwitz, P.A., Free radical reduction of ferricytochrome-C, Biochem. Biophys. Res. Commun. **62**(2): 161–7 (1975).

75A017 Graetzel, M., Kozak, J.J., Thomas, J.K., Electron reactions and electron transfer reactions catalyzed by micellar systems, J. Chem. Phys. **62**(5): 1632–40 (1975).

75A024 Moorthy, P.N., Hayon, E., One-electron redox reactions of water-soluble vitamins. III. Pyridoxine and pyridoxal phosphate (vitamin B_6), J. Am. Chem. Soc. **97**(8): 2048–52 (1975).

75A027 Buxton, G.V., Sellers, R.M., Pulse radiolysis study of monovalent cadmium, cobalt, nickel and zinc in aqueous solution. Pt. 1. Formation and decay of the monovalent ions, J. Chem. Soc., Faraday Trans. 1 **71**(3): 558–68 (1975).

75A049 Armor, J.N., Hoffman, M.Z., Reactivity of coordinated nitrosyls. IV. One-electron reduction of ruthenium nitrosylpentaammine(3+) ion in aqueous solution, Inorg. Chem. **14**(2): 444–6 (1975).

75A051 Rao, P.S., Hayon, E., Redox potentials of free radicals. III. Reevaluation of the method, J. Am. Chem. Soc. **97**(11): 2986–9 (1975).

75A052 Madhavan, V., Lichtin, N.N., Hayon, E., Protonation reactions of electron adducts of acrylamide derivatives. A pulse radiolytic-kinetic spectrophotometric study, J. Am. Chem. Soc. **97**(11): 2989–95 (1975).

75A053 Bell, J.A., Grunwald, E., Hayon, E., Kinetics of deprotonation of organic free radicals in water. Reaction of $HOCHCO_2^-$, $HOCHCONH_2$, and $HOCCH_3CONH_2$ with various bases, J. Am. Chem. Soc. **97**(11): 2995–3000 (1975).

75A055 Hickel, B., Absorption spectra and kinetics of methyl and ethyl radicals in water, J. Phys. Chem. **79**(11): 1054–9 (1975).

75A056 Moorthy, P.N., Hayon, E., Radical intermediates produced from the one-electron reduction of lumazine in water, J. Phys. Chem. **79**(11): 1059–62 (1975).

75A060 Moorthy, P.N., Hayon, E., Free radical intermediates produced from the one-electron reduction of purine, adenine, and guanine derivatives in water, J. Am. Chem. Soc. **97**(12): 3345–50 (1975).

75A064 Kelm, M., Lilie, J., Henglein, A., Pulse radiolytic investigation of the reduction of cadmium(II) ions, J. Chem. Soc., Faraday Trans. 1 **5**(9): 1132–42 (1975).

75A079 Barkatt, A., Rabani, J., Metal precipitation from pulse irradiated solutions of cadmium(II) and similar cations, J. Phys. Chem. **79**(14): 1359–62 (1975).

75A080 Hoffman, M.Z., Hayon, E., Solute environmental effects in the one-electron reduction of lysozyme in aqueous solution, J. Phys. Chem. **79**(14): 1362–9 (1975).

75A099 Semerano, G., Flash photolysis and pulse radiolysis in coordination chemistry, Coord. Chem. Rev. **16**(1/2): 185–94 (1975).

75A113 Wilting, J., Van Buuren, K.J.H., Braams, R., Van Gelder, B.F., The mechanism of reduction of cytochrome c as studied by pulse radiolysis, Biochim. Biophys. Acta **376**(2): 285–97 (1975).

75A118 Eriksen, T.E., Pulse radiolytic investigation of the $SO_2^{\cdot-}$ radical ion, Radiochem. Radioanal. Lett. **22**(1): 33–40 (1975).

75A125 Brede, O., Helmstreit, W., Mehnert, R., Pulradiolyse von Benzophenon in Waessriger Loesung, Z. Phys. Chem. (Leipzig) **256**(3): 513–21 (1975).

75A153 Barkatt, A., Rabani, J., Kinetics of spur reactions of electrons in ethylene glycol-water glassy ice. A pulse radiolytic study, J. Phys. Chem. **79**(24): 2592–7 (1975).

75A166 Pribush, A.G., Brusentseva, S.A., Shubin, V.N., Dolin, P.I., Mechanism of the reaction of α-hydroxyisopropyl radicals with ferrous ions, High Energy Chem. 9(3): 206–8 (1975), Trans. from Khim. Vys. Energ. **9**(3): 235–7 (1975).

75A169 Blackburn, R., Kyaw, M., Phillips, G.O., Swallow, A.J., Free radical reactions in the coenzyme B12 system, J. Chem. Soc., Faraday Trans. 1 **71**(11): 2277–87 (1975).

75A188 Storer, D.K., Waltz, W.L., Brodovitch, J.C, Eager, R.L., A pulse radiolysis study of some platinum(II) and platinum(IV) complex ions in aqueous solutions. The formation and characterization of platinum(I) and platinum(III) transients, Int. J. Radiat. Phys. Chem. **7**(6): 693–704 (1975).

75A194 Whillans, D.W., Neta, P., Radiation chemical studies of the sensitizer Diamide, Radiat. Res. **64**(3): 416–30 (1975).

75A195 Faraggi, M., Redpath, J.L., Tal, Y., Pulse radiolysis studies of electron transfer reaction in molecules of biological interest. I. The reduction of a disulfide bridge by peptide radicals, Radiat. Res. **64**(3): 452–66 (1975).

75A203 Fujita, S., Horii, H., Mori, T., Taniguchi, S., Pulse radiolysis of $Hg(CN)_2$ in aqueous solutions, Bull. Chem. Soc. Jpn. **48**(11): 3067–72 (1975).

75A207 Whillans, D.W., Adams, G.E., Electron transfer oxidation of DNA radicals by paranitroacetophenone, Int. J. Radiat. Biol. Relat. Stud. Phys., Chem. Med. **28**(6): 501–10 (1975).

75A240 Bielski, B.H.J., Richter, H.W., Chan, P.C., Some properties of the ascorbate free radical, Ann. N.Y. Acad. Sci. **258**: 231–7 (1975).

75A241 Goff, H., Simic, M.G., Free radical reduction of hemin c, Biochim. Biophys. Acta **392**: 201–6 (1975).

75D188 Gilbert, B.C., Norman, R.O.C., Placucci, G., Sealy, R.C., Electron spin resonance studies. Part XLV. Reactions of the methyl radical with some aliphatic compounds in aqueous solution, J. Chem. Soc., Perkin Trans. 2 (9): 885–91 (1975).

75F361 Walrant, P., Santus, R., Grossweiner, L.I., Photosensitizing properties of N-formylkynurenine, Photochem. Photobiol. **22**(1/2): 63–5 (1975).

75G001 Anbar, M., Farhataziz, Ross, A.B., Selected specific rates of reactions of transients from water in aqueous solution. II. Hydrogen atom, NSRDS-NBS 51, 1975, 56 p.

75G002 Ross, A.B., Selected specific rates of reactions of transients from water in aqueous solution. I. Hydrated electron, supplemental data, NSRDS-NBS 43-Supp, 1975, 43 p.

75G106 Packer, J.E., Richardson, R.K., Free-radical reductions of arenediazonium ions in aqueous solution. Part III. Kinetics of reactions of toluene-p-diazonium ions with ethanol, propan-2-ol, and acetaldehyde, J. Chem. Soc., Perkin Trans. 2 (7): 751–5 (1975).

75M087 Gilbert, B.C., Norman, R.O.C., Sealy, R.C., Electron spin resonance studies. Part XLIII. Reaction of dimethyl sulphoxide with the hydroxyl radical, J. Chem. Soc., Perkin Trans. 2 (4): 303–8 (1975).

75M297 Brooks, H.B., Sicillo, F., Electron spin resonance study of the TiF_2^+-H_2O_2 reaction system, J. Phys. Chem. **79**(23): 2544–7 (1975).

75M298 Brooks, H.B., Sicillo, F., Electron spin resonance study of effects of sulfate and chloride ions on kinetics of the titanium(III)-hydrogen peroxide reaction system, J. Phys. Chem. **79**(23): 2547–50 (1975).

76A001 Tait, A.M., Hoffman, M.Z., Hayon, E., The reactivity of cobalt(I) complexes containing unsaturated macrocyclic ligands in aqueous solution, J. Am. Chem. Soc. **98**(1): 86–93 (1976).

76A016 Faraggi, M., Leopold, J.G., Pulse radiolysis studies of electron-transfer reaction in molecules of biological interest. II. The reduction of Cu(II)-peptide complexes, Radiat. Res. **65**(2): 238–49 (1976).

76A020 Neta, P., Meisel, D., Substituent effects on nitroaromatic radical anions in aqueous solution, J. Phys. Chem. **80**(5): 519–24 (1976).

76A039 Tait, A.M., Hoffman, M.Z., Hayon, E., Reactivity of nickel(I) and copper(I) complexes containing 14-membered macrocyclic ligands in aqueous solution, Inorg. Chem. **15**(4): 934–9 (1976).

76A042 Jungbluth, H., Beyrich, J., Asmus, K.-D., Reduction of mercuric halides and pseudohalides in aqueous solution. Formation and some physicochemical properties of HgCl, HgBr, HgI, HgSCN, and HgCN radical molecules, J. Phys. Chem. **80**(10): 1049–53 (1976).

76A060 Moorthy, P.N., Hayon, E., One-electron redox reactions of water-soluble vitamins. II. Pterin and folic acid, J. Org. Chem. **41**(9): 1607–13 (1976).

76A062 Frank, A.J., Graetzel, M., Henglein, A., Janata, E., Electron transfer reactions of singlet and triplet pyrene in micelles with various radical anions in aqueous solution, Ber. Bunsenges. Phys. Chem. **80**(4): 294–300 (1976).

76A067 Asmus, K.-D., Nigam, S., Willson, R.L., Kinetics of nitroxyl radical reactions. A pulse-radiolysis conductivity study, Int. J. Radiat. Biol. Relat. Stud. Phys., Chem. Med. **29**(3): 211–9 (1976).

76A068 Schuler, R.H., Neta, P., Zemel, H., Fessenden, R.W., Conversion of hydroxyphenyl to phenoxyl radicals. A radiolytic study of the reduction of bromophenols in aqueous solution, J. Am. Chem. Soc. **98**(13): 3825–31 (1976).

76A070 Wardman, P., Clarke, E.D., One-electron reduction potentials of substituted nitroimidazoles measured by pulse radiolysis, J. Chem. Soc., Faraday Trans. 1 **72**(6): 1377–90 (1976).

76A072 Buxton, G.V., Sellers, R.M., McCracken, D.R., Pulse radiolysis study of monovalent cadmium, cobalt, nickel and zinc in aqueous solution. Part 2. Reactions of the monovalent ions, J. Chem. Soc. Faraday Trans 1 **72**(6): 1464–76 (1976).

76A075 Greenstock, C.L., Ruddock, G.W., Neta, P., Pulse radiolysis and ESR studies of the electron-affinic properties of nitroheterocyclic radiosensitizers, Radiat. Res. **66**(3): 472–84 (1976).

76A082 Abramovitch, S., Rabani, J., Pulse radiolytic investigations of peroxy radicals in aqueous solutions of acetate and glycine, J. Phys. Chem. **8**(5): 609–11 (1976).

76A087 Fujita, S., Horii, H., Mori, T., Taniguchi, S., Pulse radiolysis of $HgBr_2$ in aqueous solutions, Bull. Chem. Soc. Jpn. **49**(5): 1250–3 (1976).

76A103 Toffel, P., Henglein, A., The temperature dependence of the electrolytic dissociation of some 1-hydroxy-alkyl radicals in aqueous solution (a pulse radiolysis study), Ber. Bunsenges. Phys. Chem. **80**(6): 525–8 (1976).

76A104 Frank, A.J., Graetzel, M., Henglein, A., Janata, E., The influence of the interface potential on the reactions of hydrated electrons and neutral radicals with acceptors in micelles, Ber. Bunsenges. Phys. Chem. **80**(6): 547–51 (1976).

76A109 Pick-Kaplan, M., Rabani, J., Pulse radiolytic studies of aqueous $Mn(ClO_4)_2$ solutions, J. Phys. Chem. **80**(17): 1840–3 (1976).

79A312 Ilan, Y., Shafferman, A., Feinberg, B.A., Lau, Y.-K., Partitioning of electrostatic and conformational contributions in the redox reactions of modified cytochromes c, Biochim. Biophys. Acta **548**(3): 565–78 (1979).

79A327 Houee-Levin, C., Gardes-Albert, M., Ferradini, C., Pucheault, J., Pulse radiolytic investigatins of the redox system alloxan-dialuric acid: Evidence for a radical intermediate, Biochem. Biophys. Res. Commun. **91**(3): 1196–200 (1979).

79A341 Micic, O.I., Nenadovic, M.T., Pulse-radiolytic investigation of the reduction of titanium(III) ions in aqueous solutions, J. Chem. Soc., Dalton Trans. (12): 2011–4 (1979).

79A371 Shieh, J.J., Sellers, R.M., Hoffman, M.Z., Taub, I.A., Radiation chemistry of myoglobin, its derivatives, and model compounds in aqueous solution, Radiation Biology and Chemistry. Research Developments, H.E. Edwards, S. Navaratnam, B.J. Parsons and G.O. Phillips (eds.), Elsevier, N.Y., 1979, p. 179–88.

79E282 Land, E.J., Truscott, T.G., Triplet excited state of coumarin and 4′,5′ dihydropsoralen: Reaction with nucleic acid bases and amino acids, Photochem. Photobiol. **29**(5): 861–6 (1979).

79G191 Henglein, A., Catalysis of the reduction of Tl^+ and of CH_2Cl_2 by colloidal silver in aqueous solution, J. Phys. Chem. **83**(22): 2858–62 (1979).

79N061 Almgren, M., Grieser, F., Thomas, J.K., Rate of exchange of surfactant monomer radicals and long chain alcohols between micelles and aqueous solutions. A pulse radiolysis study, J. Chem. Soc., Faraday Trans. 1 **75**: 1674–87 (1979).

80A011 Brault, D., Bizet, C., Morliere, P., Rougee, M., Land, E.J., Santus, R., Swallow, A.J., One-electron reduction of ferrideuteroporphyrin IX and reaction of the oxidized and reduced forms with chlorinated methyl radicals, J. Am. Chem. Soc. **102**(3): 1015–20 (1980).

80A053 Packer, J.E., Willson, R.L., Bahnemann, D., Asmus, K.-D., Electron transfer reactions of halogenated aliphatic peroxyl radicals: measurement of absolute rate constants by pulse radiolysis, J. Chem. Soc., Perkin Trans. 2 (2): 296–9 (1980).

80A054 Soylemez, T., von Sonntag, C., Hydroxyl radical-induced oligomerization of ethylene in deoxygenated aqueous solution, J. Chem. Soc., Perkin Trans. 2 (2): 391–4 (1980).

80A066 Beitz, J.V., Miller, J.R., Cohen, H, Wieghardt, K., Meyerstein, D., Activation energies for an intramolecular electron transfer reaction, Inorg. Chem. **19**(4): 966–8 (1980).

80A071 Eibenberger, J., Schulte-Frohlinde, D., Steenken, S, One-electron oxidation of α-monoalkoxyalkyl radicals by tetranitromethane via an intermediate adduct. Influence of radical structure on rate of decomposition of the adduct, J. Phys. Chem. **84**(7):704–10 (1980).

80A085 Bielski, B.H.J., Shiue, G.G., Bajuk, S., Reduction of nitro blue tetrazolium by CO_2^- and O_2^- radicals, J. Phys. Chem. **84**(8): 830–33 (1980).

80A115 Teply, J., Janovsky, I., Mehnert, R., Brede, O., Pulse radiolytic study of unstable intermediates in the radiolysis of aqueous solutions of 1,10-phenanthroline, Radiat. Phys. Chem. **15**(2–3): 169–75 (1980).

80A123 Butler, J., Henglein, A., Elementary reactions of the reduction of Tl^+ in aqueous solution, Radiat. Phys. Chem. **15**(5): 603–12 (1980).

80A146 Ferraudi, G., Patterson, L.K., Free radical reactions with dimeric cobalt(II) sulphophthalocyanine. A pulse radiolytic study, J. Chem. Soc., Dalton Trans 476–80 (1980).

80A153 Buitenhuis, R., Bakker, C.N.N., Stock, F.R., Louwrier, P.W.F., Pulse radiolysis study of $Cu(EDTA)^{2-}$ in aqueous solution in the presence of alcohols, Radiat. Phys. Chem. **16**(1): 6–10 (1980).

80A189 Freiberg, M., Lilie, J., Meyerstein, D., Nature and mechanism of decomposition of the complex of copper(I) with 5,7,7,12,14,14-hexamethyl 1,4,8,11-tetraazacyclotetradeca-4,11-diene in aqueous solutions. A pulse radiolysis study. Inorg. Chem. **19**(7): 1908–12 (1980).

80A197 Houee-Levin, C., Gardes-Albert, M., Ferradini, C., Pucheault, J., Radiolysis study of the alloxan-dialuric acid couple, Radiat. Res. **83**: 270–8 (1980).

80A204 Elliot, A.J., Wilkinson, F., Armstrong, D.A., A pulse radiolysis study of zinc(II)-insulin, Int. J. Radiat. Biol. Relat. Stud. Phys., Chem. Med. **38**(1): 1–10 (1980).

80A227 Venturi, M., Emmi, S., Fuochi, P.G., Mulazzani, Q.G., Nucleophilic addition of α-hydroxyalkyl radicals to polypyridyl complexes of chromium(III), cobalt(III), rhodium(III), and ruthenium(II) in aqueous solution, J. Phys. Chem. **84**(17): 2160–6 (1980).

80A277 Freiberg, M., Meyerstein, D., Reactions of aliphatic free radicals with copper cations in aqueous solution. Part 2. Reactions with cupric ions: A pulse radiolysis study, J. Chem. Soc. Faraday Trans. 1 **76**: 1825–37 (1980).

80A278 Freiberg, M., Mulac, W.A., Schmidt, K.H., Meyerstein, D., Reactions of aliphatic free radicals with copper cations in aqueous solutions. Part 3. Reactions with cuprous ions: A pulse radiolysis study, J. Chem. Soc. Faraday Trans 1 **76**: 1838–48 (1980).

80A282 Bothe, E., Schulte-Frohlinde, D., Reaction of dihydroxymethyl radical with molecular oxygen in aqueous solution, Z. Naturforsch. Teil B **35B**: 1035–9 (1980).

80A323 Janata, E., Schuler, R.H., Direct observation of the protonation of acetone ketyl radical by conductometric pulse radiolysis, J. Phys. Chem. **84**(25): 3351-3 (1980).

80N062 Henglein, A., Colloidal silver catalyzed multi-electron transfer processes in aqueous solution, Ber. Bunsenges. Phys. Chem. **84**: 253–9 (1980).

81A001 Neta, P., Behar, D., Intramolecular electron transfer and dehalogenation of anion radicals. 3. Halobenzonitriles and cyano-benzyl halides, J. Am. Chem. Soc. **103**: 103-6 (1981).

81A002 Brault, D., Neta, P., Reactions of iron porphyrins with methyl radicals, J. Am. Chem. Soc. **103**(10): 2705-10 (1981).

81A003 Steenken, S., Neta, P., Oxidation of substituted alkyl radicals by $IrCl_6^{2-}$, $Fe(CN)_6^{3-}$ and MnO_4^- in aqueous solution. Electron transfer versus chlorine transfer from $IrCl_6^{2-}$, J. Am. Chem. Soc. **104**(5): 1244-8 (1982).