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A11102 466773

NAT'L INST OF STANDARDS & TECH R.I.C.



A1102466773

Ross, Alberta B/Rate constants for react
QC100 .U573 NO.70;1982 C.1 NBS-PUB-C 198



NSRDS-NBS 70

U.S. DEPARTMENT OF COMMERCE / National Bureau of Standards



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

QC
100
.U573
No. 70
1982

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QC100
.U573
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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. Chemical 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

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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

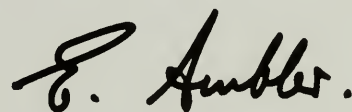
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Reliable data on the properties of matter and materials are a major foundation of scientific and technical progress. Such important activities as basic scientific research, industrial quality control, development of new materials for building and other 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.

A handwritten signature in black ink, reading "E. Ambler." The signature is fluid and cursive, with a large initial "E" and a trailing period.

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.

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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 $-\text{O}\dot{\text{C}}\text{HCH}_2\text{O}(\text{CH}_2)_2-$ 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 $\pm 25\%$. 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 $G(\text{R})$ or $k(\text{R} + \text{R})$, 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

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

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, $\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH}$, 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 $\cdot\text{CXYZ}$ are ordered as X, Y, and Z progressively represent H, C, halogens, N, and O.

001	Methyl	$\cdot\text{CH}_3$
002	Ethyl	$\cdot\text{CH}_2\text{CH}_3$
002a	1-Methylethyl	$(\text{CH}_3)_2\dot{\text{C}}\text{H}$
002b	1,1-Dimethylethyl	$(\text{CH}_3)_3\dot{\text{C}}$
003	Radicals from pentane	$\cdot\text{C}_5\text{H}_{11}$
004	Cyclopentyl	$c\text{-}\dot{\text{C}}_5\text{H}_9$
005	2-Chloroethyl	$\cdot\text{CH}_2\text{CH}_2\text{Cl}$
006	2-Carboxy-2,2-dimethylethyl	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2\text{H}$
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	$\cdot\text{CH}_2\text{CH}_2\text{NH}_2$
012	2-Amino-2,2-dimethylethyl	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{NH}_2$
013	2-Amino-2-carboxy-2-methylethyl	$\cdot\text{CH}_2\text{C}(\text{CH}_3)(\text{NH}_2)\text{CO}_2\text{H}$
014	2-Hydroxyethyl	$\cdot\text{CH}_2\text{CH}_2\text{OH}$
015	2-Hydroxypropyl	$\cdot\text{CH}_2\text{CHOHCH}_3$
016	2-Hydroxy-2,2-dimethylethyl	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH}$
016a	Radicals from cyclopentene + OH	R
017	2-Carboxy-2-hydroxy-2-methylethyl	$\cdot\text{CH}_2\text{C}(\text{CH}_3)(\text{OH})\text{CO}_2\text{H}$
018	Radicals from allyl alcohol + OH	R
019	Radicals from crotyl alcohol + OH	R
020	Formylmethyl	$\cdot\text{CH}_2\text{CHO}$
021	1-Formylethyl	$\text{CH}_3\dot{\text{C}}\text{HCHO}$
022	2-Hydroxyethenyl	$\cdot\text{CH}=\text{CHOH}$
023	2-Oxopropyl	$\cdot\text{CH}_2\text{COCH}_3$
024	1-Acetyethyl	$\text{CH}_3\text{CO}\dot{\text{C}}\text{HCH}_3$
025	2-Oxocyclohexyl	$-(\text{CH}_2)_4\dot{\text{C}}\text{HCO}-$
026	1-Formyl-2-hydroxyethyl	$\text{HOCH}_2\dot{\text{C}}\text{HCHO}$
027	4-Hydroxy-2-oxobutyl	$\text{HOCH}_2\text{CH}_2\text{CO}\dot{\text{C}}\text{H}_2$
028	1-Formyl-4-hydroxybutyl	$\text{HOCH}_2(\text{CH}_2)_2\dot{\text{C}}\text{HCHO}$
029	1-Formyl-5-hydroxypentyl	$\text{HOCH}_2(\text{CH}_2)_3\dot{\text{C}}\text{HCHO}$
030	Radicals from <i>meso</i> -erythritol	R
031	Radicals from xylitol	R
032	2-Oxo-3,4,5-trihydroxycyclohexyl	$-(\text{CHOH})_3\text{CH}_2\dot{\text{C}}\text{HCO}-$
033	Radicals from sorbitol	R
034	Carbamoylmethyl	$\cdot\text{CH}_2\text{CONH}_2$
035	Carboxymethyl	$\cdot\text{CH}_2\text{CO}_2\text{H}$
036	Methoxycarbonylmethyl	$\cdot\text{CH}_2\text{CO}_2\text{CH}_3$
037	1-Carboxyethyl	$\text{CH}_3\dot{\text{C}}\text{HCO}_2\text{H}$
038	1-Carboxypropyl	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCO}_2\text{H}$
039	1-Carboxy-2-hydroxyethyl	$\text{HOCH}_2\dot{\text{C}}\text{HCO}_2\text{H}$
040	1-Carboxy-2-hydroxypropyl	$\text{CH}_3\text{CHOH}\dot{\text{C}}\text{HCO}_2\text{H}$
040a	1,2-Dicarboxyethyl	$\text{HO}_2\dot{\text{C}}\text{HCH}_2\text{CO}_2\text{H}$
041	1,2-Dicarboxy-2-hydroxyethyl	$\text{HO}_2\text{CCHOH}\dot{\text{C}}\text{HCO}_2\text{H}$

042	Dicarboxymethyl	$\cdot\text{CH}(\text{CO}_2\text{H})_2$
043	Chloromethyl	$\cdot\text{CH}_2\text{Cl}$
044	Difluoromethyl	$\cdot\text{CHF}_2$
045	Dichloromethyl	$\cdot\text{CHCl}_2$
046	Dichlorofluoromethyl	$\cdot\text{CFCl}_2$
047	Trifluoromethyl	$\cdot\text{CF}_3$
048	Trichloromethyl	$\cdot\text{CCl}_3$
049	1-Aminoethyl	$\text{CH}_3\dot{\text{C}}\text{H}\text{NH}_2$
050	1-Amino-1-methylethyl	$(\text{CH}_3)_2\dot{\text{C}}\text{NH}_2$
051	1-(<i>N,N</i> -Diethylamino)ethyl	$\text{CH}_3\dot{\text{C}}\text{H}\text{N}(\text{C}_2\text{H}_5)_2$
052	Triethylammonioethyl	$\text{CH}_3\dot{\text{C}}\text{H}\text{N}^+(\text{C}_2\text{H}_5)_3$
053	(<i>N</i> -Acetylamino)methyl	$\text{CH}_3\text{CONH}\dot{\text{C}}\text{H}_2$
054	(<i>N</i> -Formyl- <i>N</i> -methylamino)methyl	$\text{HCON}(\text{CH}_3)\dot{\text{C}}\text{H}_2$
055	(<i>N</i> -Acetyl- <i>N</i> -methylamino)methyl	$\text{CH}_3\text{CON}(\text{CH}_3)\dot{\text{C}}\text{H}_2$
056	Amino(carboxy)methyl	$\text{NH}_2\dot{\text{C}}\text{HCO}_2\text{H}$
057	Amino(carbamoyl)methyl	$\text{NH}_2\dot{\text{C}}\text{HCONH}_2$
058	Radicals from glycylglycinamide + OH	R
059	Carboxy(<i>N</i> -methylamino)methyl	$\text{CH}_3\text{NH}\dot{\text{C}}\text{HCO}_2\text{H}$
060	<i>N</i> -Acetylamino(carboxy)methyl	$\text{CH}_3\text{CONH}\dot{\text{C}}\text{HCO}_2\text{H}$
061	<i>N</i> -Acetyl- <i>N</i> -methylamino(carboxy)methyl	$\text{CH}_3\text{CON}(\text{CH}_3)\dot{\text{C}}\text{HCO}_2\text{H}$
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 acetylaspargine + OH	R
074	Radical from 2-pyrrolidone-5-carboxylic acid	R
075	Hydroxymethyl	$\cdot\text{CH}_2\text{OH}$
076	1-Hydroxyethyl	$\text{CH}_3\dot{\text{C}}\text{HOH}$
077	1-Hydroxypropyl	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH}$
078	1-Hydroxy-1-methylethyl	$(\text{CH}_3)_2\dot{\text{C}}\text{OH}$
079	1-Hydroxybutyl	$\text{CH}_3(\text{CH}_2)_2\dot{\text{C}}\text{HOH}$
080	1-Hydroxy-1-methylpropyl	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{OHCH}_3$
081	1-Hydroxy-2-methylpropyl	$(\text{CH}_3)_2\text{CH}\dot{\text{C}}\text{HOH}$
082	1-Hydroxypentyl	$\text{CH}_3(\text{CH}_2)_3\dot{\text{C}}\text{HOH}$
083	(Cyclohexyl)hydroxymethyl	$c\text{-C}_6\text{H}_{11}\dot{\text{C}}\text{HOH}$
084	1-Hydroxycyclobutyl	$-\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_2-$
085	1-Hydroxycyclopentyl	$-\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_3-$
086	1-Hydroxycyclohexyl	$-\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_4-$
087	1-Hydroxycycloheptyl	$-\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_5-$
088	1-Hydroxycyclooctyl	$-\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_6-$
089	2,2,2-Trifluoro-1-hydroxyethyl	$\cdot\text{CHOHCF}_3$
090	Acetoxymethyl	$\text{CH}_3\text{CO}_2\dot{\text{C}}\text{H}_2$
091	1-Sulfatoethyl	$\text{CH}_3\dot{\text{C}}\text{HOSO}_3^-$
092	Radicals from sodium dodecylsulfate	R
092a	Methoxymethyl	$\cdot\text{CH}_2\text{OCH}_3$
093	1-Ethoxyethyl	$\text{CH}_3\dot{\text{C}}\text{HOC}_2\text{H}_5$
093a	1,1-Dimethylethoxymethyl	$\cdot\text{CH}_2\text{OC}(\text{CH}_3)_3$
094	2-Tetrahydrofuryl	$-\text{O}\dot{\text{C}}\text{H}(\text{CH}_2)_3-$
094a	(Methoxymethoxy)methyl	$\cdot\text{CH}_2\text{OCH}_2\text{OCH}_3$
095	1,4-Dihydroxybutyl	$\cdot\text{CHOHCH}_2\text{CH}_2\text{CH}_2\text{OH}$
096	1,3-Dihydroxy-2,2-di(hydroxymethyl)propyl	$\cdot\text{CHOHC}(\text{CH}_2\text{OH})_3$

097	2-Carboxy-1-hydroxy-1-methylethyl	$\text{CH}_3\dot{\text{C}}\text{OHCH}_2\text{CO}_2\text{H}$
098	2-Amino-1-hydroxyethyl	$\text{NH}_2\text{CH}_2\dot{\text{C}}\text{HOH}$
099	2-Amino-1-phosphoryloxyethyl	$\text{NH}_2\text{CH}_2\dot{\text{C}}\text{HOPO}_2\text{OH}$
100	2-Amino-2-carboxy-1-hydroxyethyl	$\cdot\text{CHOHCH}(\text{NH}_2)\text{CO}_2\text{H}$
101	1,2-Dihydroxyethyl	$\cdot\text{CHOHCH}_2\text{OH}$
102	1,2-Dihydroxypropyl	$\cdot\text{CHOHCHOHCH}_3$
103	1,2-Dihydroxy-1-methylpropyl	$\text{CH}_3\dot{\text{C}}\text{OHCHOHCH}_3$
104	2,5-Dioxacyclohexyl	$-\text{O}\dot{\text{C}}\text{HCH}_2\text{O}(\text{CH}_2)_2-$
105	Radicals from polyethyleneglycol	$-\text{O}\dot{\text{C}}\text{HCH}_2(\text{OCH}_2\text{CH}_2)_n-$
106	1,2,3-Trihydroxypropyl	$\cdot\text{CHOHCHOHCH}_2\text{OH}$ (+ $\text{CH}_2\text{OH}\dot{\text{C}}\text{OHCH}_2\text{OH}$)
107	1-Hydroxy-1-methyl-2-oxopropyl	$\text{CH}_3\text{CO}\dot{\text{C}}(\text{O}^-)\text{CH}_3$
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	$\cdot\text{A}^-$
114	(Carbamoyl)hydroxymethyl	$\cdot\text{CHOHCONH}_2$
115	(Carboxy)hydroxymethyl	$\cdot\text{CHOHCO}_2\text{H}$
116	1-Carbamoyl-1-hydroxyethyl	$\text{CH}_3\dot{\text{C}}\text{OHCONH}_2$
117	1-Carboxy-1-hydroxyethyl	$\text{CH}_3\dot{\text{C}}\text{OHCO}_2\text{H}$
118	1-Hydroxy-1-(methoxycarbonyl)ethyl	$\text{CH}_3\dot{\text{C}}\text{OHCO}_2\text{CH}_3$
119	(Dicarboxy)hydroxymethyl	$\text{HO}_2\text{C}\dot{\text{C}}\text{OHCO}_2\text{H}$
120	1,2-Dicarboxy-1-hydroxyethyl	$\text{HO}_2\text{C}\dot{\text{C}}\text{OHCH}_2\text{CO}_2\text{H}$
121	1,2-Dicarboxy-1,2-dihydroxyethyl	$\text{HO}_2\text{C}\dot{\text{C}}\text{OHCHOHCO}_2\text{H}$
122	1,3-Dicarboxy-1-hydroxypropyl	$\text{HO}_2\text{C}\dot{\text{C}}\text{OH}(\text{CH}_2)_2\text{CO}_2\text{H}$
123	Dihydroxymethyl	$\cdot\text{CH}(\text{OH})_2$
124	Dimethoxymethyl	$\cdot\text{CH}(\text{OCH}_3)_2$
125	2,5-Dioxacyclopentyl	$-\text{O}\dot{\text{C}}\text{HO}(\text{CH}_2)_2-$
126	2,2,2-Trichloro-1,1-dihydroxyethyl	$\text{CCl}_3\dot{\text{C}}(\text{OH})_2$
127	Carbamoyl	$\cdot\text{CONH}_2$
128	Electron adduct of acrylamide	$[\text{CH}_2\text{CHCONH}_2]\cdot^-$
129	Electron adduct of crotonamide	$[\text{CH}_3\text{CHCHCONH}_2]\cdot^-$
130	Electron adduct of methacrylamide	$[\text{CH}_2\text{C}(\text{CH}_3)\text{CONH}_2]\cdot^-$
131	Electron adduct of β,β -dimethylacrylamide	$[(\text{CH}_3)_2\text{CCHCONH}_2]\cdot^-$
132	Electron adduct of <i>N,N</i> -dimethylacrylamide	$[\text{CH}_2\text{CHCON}(\text{CH}_3)_2]\cdot^-$
133	Electron adduct of Diamide	R
134	Electron adduct of acrylate	$[\text{CH}_2\text{CHCO}_2\text{H}]\cdot^-$
135	Electron adduct of crotonate	$[\text{CH}_3\text{CHCHCO}_2\text{H}]\cdot^-$
136	Electron adduct of methacrylate	$[\text{CH}_2\text{C}(\text{CH}_3)\text{CO}_2\text{H}]\cdot^-$
137	Electron adduct of β,β -dimethylacrylate	$[(\text{CH}_3)_2\text{CCHCO}_2\text{H}]\cdot^-$
138	Electron adduct of methyl methacrylate	$[\text{CH}_2\text{C}(\text{CH}_3)\text{CO}_2\text{CH}_3]\cdot^-$
139	Electron adduct of sorbate	$[\text{CH}_3\text{CHCHCHCHCO}_2\text{H}]\cdot^-$
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	$\cdot\text{CO}_2^-/\cdot\text{CO}_2\text{H}$
148	Electron adduct of methyl acetate	$\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{OCH}_3$

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	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Ag}^+ \rightarrow \text{Ag}^0$		nat	p.r.	No electron transfer to give Ag^0 in 0.1 mol L ⁻¹ <i>tert</i> -BuOH.	78A410
1.075	$\cdot\text{CH}_2\text{OH} + \text{Ag}^+ \rightarrow \text{Ag}^0$		nat	p.r.	No electron transfer to give Ag^0 in 0.1 mol L ⁻¹ MeOH.	78A410
1.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ag}^+ \rightarrow \text{Ag}^0$		nat	p.r.	No electron transfer to give Ag^0 in 0.1 mol L ⁻¹ 2-PrOH.	78A410
1.128	$[\text{CH}_2\text{CHCONH}_2]^- + \text{Ag}^+ \rightarrow \text{Ag}^0$ + $\text{H}^+ + \text{CH}_2=\text{CHCONH}_2$	$(1.1 \pm 0.4) \times 10^8$	~6	p.r.	P.b.k. at 313 nm in soln. contg. acrylamide.	70G052
1.147	$\cdot\text{CO}_2^- + \text{Ag}^+ \rightarrow \text{AgCO}_2$ (+ Ag^+) $\rightarrow \text{Ag}_2\text{CO}_2^+$		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	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Ag}_2^+ \rightarrow$ $2 \text{Ag}^+ + \text{OH}^- + \text{CH}_2=\text{C}(\text{CH}_3)_2$	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 <i>tert</i> -BuOH-5 x 10 ⁻⁴ mol L ⁻¹ AgClO_4 soln.	78A410
2.075	$\cdot\text{CH}_2\text{OH} + \text{Ag}_2^+ \rightarrow \text{Ag}_2\text{CH}_2\text{OH}^+$ $\rightarrow \text{CH}_2\text{O} + \text{H}^+ + \text{Ag}_2$	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 $k(\text{R} + \text{R})$, $[\text{Ag}_2^+]$, $[\text{R}]$, and $[\text{H}_2\text{O}_2]$.	78A410
2.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Ag}_2^+ \rightarrow$ $\text{CH}_3\text{CHO} + \text{H}^+ + \text{Ag}_2$	1.0×10^9		p.r.	Calcd. from increase in condy. as function of time in EtOH- AgClO_4 soln. assuming values for $k(\text{R} + \text{R})$, $[\text{Ag}_2^+]$, $[\text{R}]$, and $[\text{H}_2\text{O}_2]$.	78A410
2.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ag}_2^+ \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{Ag}_2$	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 $k(\text{R} + \text{R})$, $[\text{Ag}_2^+]$, $[\text{R}]$, and $[\text{H}_2\text{O}_2]$.	78A410
Br						
3.	Bromate ion					
3.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{BrO}_3^-$ $\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{BrO}_3^-$	$< 5 \times 10^6$ $(3.0 \pm 0.5) \times 10^7$	6 11.8	p.r.	D.k.; radical from ethanol.	72A018
Cd						
4.	Cadmium(I) ions					
4.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cd}^+ \rightarrow$ $\text{Cd}^{2+} + (\text{CH}_3)_2\text{C}=\text{CH}_2 + \text{OH}^-$	$\sim 1 \times 10^9$	nat	p.r.	Calcd. from opt. and condy. studies in <i>tert</i> -BuOH- Cd^{2+} soln. assuming values for competing reactions.	75A064
	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cd}_2^{2+} \rightarrow \text{OH}^- +$ $\text{Cd}^+ + (\text{CH}_3)_2\text{C}=\text{CH}_2 + \text{Cd}^{2+}$	$\sim 1 \times 10^9$	nat	p.r.	See above.	75A064
4.075	$\cdot\text{CH}_2\text{OH} + \text{Cd}^+ \rightarrow \text{CdCH}_2\text{OH}^+$	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 $k(\text{Cd}^+ + \text{H}_2\text{O}_2) = 1.5 \times 10^9$, $k(\text{R} + \text{R}) = 1.2 \times 10^9$.	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	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Cd}^+ \rightarrow \text{CdCHOHCH}_3^+$	$(1.3 \pm 0.6) \times 10^9$	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 $k(\text{Cd}^+ + \text{H}_2\text{O}_2) = 1.5 \times 10^9$, $k(\text{R} + \text{R}) = 1.15 \times 10^9$ and $2k(\text{Cd}^+ + \text{Cd}^+) = 3.0 \times 10^9$.	75A064
4.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cd}^+ \rightarrow \text{CdC}(\text{CH}_3)_2\text{OH}^+$	$(2.4 \pm 1.2) \times 10^9$	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 $k(\text{Cd}^+ + \text{H}_2\text{O}_2) = 1.5 \times 10^9$, $k(\text{R} + \text{R}) = 7 \times 10^8$ and $2k(\text{Cd}^+ + \text{Cd}^+) = 3.0 \times 10^9$.	75A064
4.105	$-\text{O}\dot{\text{C}}\text{HCH}_2(\text{OCH}_2\text{CH}_2\text{O})_n^- + \text{Cd}^+$	$< 2 \times 10^8$	nat	p.r.	D.k. of Cd^+ in the presence of polyethylene glycol entirely by $\text{Cd}^+ + \text{Cd}^+$ ($2k = 5 \times 10^9$); $2k(\text{R} + \text{R}) = 2.2 \times 10^7$.	75A153
5. Cadmium(II) ion						
5.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cd}^{2+}$	$< 10^6$	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 <i>tert</i> -BuOH.	75A027
5.075	$\cdot\text{CH}_2\text{OH} + \text{Cd}^{2+}$	$< 2.5 \times 10^5$	nat	p.r.	No reaction.	75A153
		$< 10^2$	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	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Cd}^{2+}$	$< 2.5 \times 10^5$	nat	p.r.	No reaction.	75A153
5.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cd}^{2+}$	$< 10^6$		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
5.101	$\cdot\text{CHOHCH}_2\text{OH} + \text{Cd}^{2+}$	$< 2.5 \times 10^5$	nat	p.r.	No reaction.	75A153
5.105	$-\text{O}\dot{\text{C}}\text{HCH}_2(\text{OCH}_2\text{CH}_2\text{O})_n^- + \text{Cd}^{2+}$	$< 2.5 \times 10^5$	nat	p.r.	No reaction obs. in polyethylene glycol soln.	75A153
5.106	$\cdot\text{CHOHCHOHCH}_2\text{OH} + \text{Cd}^{2+}$	$< 2.5 \times 10^5$	nat	p.r.	No reaction.	75A153
5.147	$\cdot\text{CO}_2^- + \text{Cd}^{2+} \rightarrow \text{Cd}^+ + \text{CO}_2$	$\sim 10^5$		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	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Co}^{2+} \rightarrow \text{Co}^+$	$< 10^6$	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 <i>tert</i> -BuOH.	75A027
6.075	$\cdot\text{CH}_2\text{OH} + \text{Co}^{2+} \rightarrow \text{Co}^+$	$< 10^2$	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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}^{2+} \rightarrow \text{Co}^+$	$< 10^6$	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	$\cdot\text{CO}_2^- + \text{Co}^{2+} \rightarrow \text{CO}_2 + \text{Co}^+$	$10^2 < k < 10^5$	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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CoL}(\text{H}_2\text{O})_2^{2+} \rightarrow \text{Co(I)}$	5.5×10^9	1.25, 6.5	p.r.	P.b.k. in 2 mol L ⁻¹ 2-PrOH.	76A001
7.147	$\cdot\text{CO}_2^- + \text{CoL}(\text{H}_2\text{O})_2^{2+} \rightarrow \text{Co(I)}$	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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CoL}(\text{H}_2\text{O})_2^{2+} \rightarrow \text{Co(I)}$	$\leq 10^7$	6.5	p.r.	No reaction in 2 mol L ⁻¹ 2-PrOH.	76A001
8.147	$\cdot\text{CO}_2^- + \text{CoL}(\text{H}_2\text{O})_2^{2+} \rightarrow \text{Co(I)}$	$\leq 10^7$	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	$\cdot\text{CH}_3 + \text{CoL}(\text{OH}_2)_2^{2+} \rightarrow \text{CH}_3\text{Co}^{\text{III}}\text{L}(\text{OH}_2)_2^{2+}$	$\sim 7 \times 10^8$	1	f.p.	Radical from $\text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}_3^{2+}$ in HClO_4 soln.	74F644
		$(1 \text{ to } 2) \times 10^8$	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 <i>tert</i> -BuOH soln. contg. 5×10^{-3} mol L ⁻¹ CH_3I .	76A203
9.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{CoL}(\text{OH}_2)_2^{2+}$	$< 1 \times 10^7$		p.r.	No reaction obs.	78A200
9.020	$\cdot\text{CH}_2\text{CHO} + \text{CoL}(\text{OH}_2)_2^{2+} \rightarrow \text{Co}^{\text{III}}\text{LCH}_2\text{CHO}$	8×10^7	1-3, 7-10	p.r.	P.b.k. in N_2O -satd. soln. contg. 1 mol L ⁻¹ ethylene glycol.	78A200
9.035	$\cdot\text{CH}_2\text{CO}_2^- + \text{CoL}(\text{OH}_2)_2^{2+}$	$< 1 \times 10^7$		p.r.	No reaction obs.	78A200
9.075	$\cdot\text{CH}_2\text{OH} + \text{CoL}(\text{OH}_2)_2^{2+} \rightarrow \text{Co}^{\text{III}}\text{LCH}_2\text{OH}$	$(7 \pm 1) \times 10^7$	1-6	p.r.	P.b.k. in N_2O -satd. soln. contg. 1 mol L ⁻¹ MeOH.	78A200
9.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{CoL}(\text{OH}_2)_2^{2+} \rightarrow \text{Co}^{\text{III}}\text{LCHOHCH}_3$	$(3.0 \pm 0.4) \times 10^7$	1-6	p.r.	P.b.k. in N_2O -satd. soln. contg. 1 mol L ⁻¹ EtOH.	78A200
9.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CoL}(\text{OH}_2)_2^{2+}$	$\leq 10^7$	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	$\cdot\text{CHOHCF}_3 + \text{CoL}(\text{OH}_2)_2^{2+} \rightarrow \text{Co}^{\text{III}}\text{LCHOHCF}_3$	$(1 \pm 0.5) \times 10^7$	6	p.r.	P.b.k.	78A200
9.098	$\text{NH}_3^+ \cdot\text{CH}_2\dot{\text{C}}\text{HOH} + \text{CoL}(\text{OH}_2)_2^{2+}$	4.0×10^7	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	$\cdot\text{CHOHCH}_2\text{OH} + \text{CoL}(\text{OH}_2)_2^{2+} \rightarrow \text{Co}^{\text{III}}\text{LCHOHCH}_2\text{OH}$	$\sim 1 \times 10^7$	3-7	p.r.	P.b.k. in N_2O -satd. soln. contg. 1 mol L ⁻¹ ethylene glycol.	78A200
9.147	$\cdot\text{CO}_2^- + \text{CoL}(\text{OH}_2)_2^{2+}$	$\leq 10^7$	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	$\cdot\text{CH}_3 + \text{B12r} \rightarrow \text{methylcobalamin}$	$\sim 1.5 \times 10^9$		f.p.	D.k. following irradiation-induced $\text{Co}-\text{CH}_3$ homolysis of methylcobalamin; back reaction.	77F005
10.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{B12r} \rightarrow \text{B12a}$ (B12a See 54.)	2.4×10^8	5	p.r.	P.b.k. at 350-60 nm in N_2O -satd. soln. contg. 0.1 mol L ⁻¹ <i>tert</i> -BuOH.	75A169
10.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{B12r} \rightarrow \text{B12s} (\text{Co}^{\text{I}}) + (\text{CH}_3)_2\text{CO} + \text{H}^+$	$(4 \pm 2) \times 10^9$		f.p.	D.k. at 474 nm in 90% 2-PrOH soln. of adenosyl cobalamin after homolysis of the adenosyl group.	79A158
10.101	$\cdot\text{CHOHCH}_2\text{OH} + \text{B12r} \rightarrow \text{B12a}$ (B12a See 54.)	2.4×10^8		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	$\cdot\text{CO}_2^- + \text{B12r} \rightarrow \text{CO}_2 + \text{B12s} (\text{Co}^{\text{I}})$	8.2×10^8	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	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + (\text{Co}^{\text{II}}\text{pts})_2^{8-} \rightarrow$ addn.	2.2×10^8	9	p.r.	P.b.k. at 440 nm in N_2O -satd. soln. contg. 0.1-0.2 mol L ⁻¹ <i>tert</i> -BuOH; mechanism suggested to involve addn. followed by splitting to give $(\text{RCo}^{\text{III}}\text{pts})_2^{5-}$.	80A146
10a.075	$\cdot\text{CH}_2\text{OH} + (\text{Co}^{\text{II}}\text{pts})_2^{8-} \rightarrow$ electron transfer	2.2×10^8	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 $(\text{Co}^{\text{I}}\text{pts})_2^{7-}$.	80A146
10a.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + (\text{Co}^{\text{II}}\text{pts})_2^{8-} \rightarrow$ electron transfer	1.5×10^9	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.	Nitrilotriacetatocobalt(II) ion					
11.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Co}^{\text{II}}\text{NTA} \rightarrow$ $[\text{NTACoCH}_2\text{C}(\text{CH}_3)_2\text{OH}]^-$	$(1.1 \pm 0.2) \times 10^7$	7	p.r.	P.b.k. at 330 nm in N ₂ O-satd. soln. contg. 0.5 mol L ⁻¹ <i>tert</i> -BuOH.	79A255
11.147	$\cdot\text{CO}_2^- + \text{Co}^{\text{II}}\text{NTA} \rightarrow [\text{NTACo}(\text{CO}_2)]^{2-}$	$(7.3 \pm 0.7) \times 10^7$	7	p.r.	P.b.k. at 270 nm in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ formate.	79A255
	Cobalt(III) ions					
12.	Hexaamminecobalt(III) ion					
12.035	$\cdot\text{CH}_2\text{CO}_2^- + \text{Co}(\text{NH}_3)_6^{3+}$	$< 3.2 \times 10^6$	7.3	p.r.	D.k. in N ₂ O-satd. soln. contg. 0.01 mol L ⁻¹ acetate.	72A018
	$\cdot\text{CH}_2\text{CO}_2\text{H} + \text{Co}(\text{NH}_3)_6^{3+}$	$< 1.0 \times 10^7$	2.5	p.r.	D.k. in Ar-satd. soln. contg. 0.01 mol L ⁻¹ acetic acid.	72A018
12.042	$\cdot\text{CH}(\text{CO}_2\text{H})_2 + \text{Co}(\text{NH}_3)_6^{3+}$	$< 8.0 \times 10^6$	2.5	p.r.	D.k. in Ar-satd. soln. contg. 0.01 mol L ⁻¹ malonic acid.	72A018
12.054	$\text{HCON}(\text{CH}_3)\dot{\text{C}}\text{H}_2 + \text{Co}(\text{NH}_3)_6^{3+}$	$< 1.0 \times 10^7$	6.0	p.r.	D.k. in N ₂ O-satd. soln. contg. 0.01 mol L ⁻¹ dimethylformamide.	72A018
12.056	$\text{NH}_3^+\dot{\text{C}}\text{HCO}_2^- + \text{Co}(\text{NH}_3)_6^{3+}$	$< 1.2 \times 10^7$	5.7	p.r.	D.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ glycine.	72A018
12.075	$\cdot\text{CH}_2\text{O}^- + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow$ $\text{CH}_2\text{O} + \text{Co}(\text{NH}_3)_6^{2+}$	$(9.0 \pm 1.4) \times 10^9$	12	p.r.	D.k. in N ₂ O-satd. soln. contg. 0.01 mol L ⁻¹ MeOH.	72A018
	$\cdot\text{CH}_2\text{OH} + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow$ $\text{CH}_2\text{O} + \text{H}^+ + \text{Co}(\text{NH}_3)_6^{2+}$	$(1.4 \pm 0.2) \times 10^8$	5-6	p.r.	D.k. in N ₂ O-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 ₂ O-satd. soln. contg. 1 mol L ⁻¹ MeOH.	77A100
		$(6 \pm 0.9) \times 10^7$	4.9			
		$(4.5 \pm 0.7) \times 10^7$	4.5			
		$< 1 \times 10^7$	3.5			
12.076	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{Co}(\text{NH}_3)_6^{3+}$	$(8.5 \pm 1.3) \times 10^9$	12	p.r.	D.k. in N ₂ O-satd. soln. contg. 0.01 mol L ⁻¹ EtOH; <i>e</i> -transfer.	72A018
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Co}(\text{NH}_3)_6^{3+}$	$(5.2 \pm 0.8) \times 10^7$	5-6			
12.078	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Co}(\text{NH}_3)_6^{3+}$	$(5.0 \pm 0.8) \times 10^9$	12	p.r.	D.k. in N ₂ O-satd. soln. contg. 0.01 mol L ⁻¹ 2-PrOH; <i>e</i> -transfer.	72A018
	$(\text{CH}_3)_2\dot{\text{C}}\text{HOH} + \text{Co}(\text{NH}_3)_6^{3+}$	$(1.3 \pm 0.2) \times 10^7$	5-6			
12.093	$\text{CH}_3\dot{\text{C}}\text{HOC}_2\text{H}_5 + \text{Co}(\text{NH}_3)_6^{3+}$	$< 5 \times 10^6$	5.5-6	p.r.	D.k. in N ₂ O-satd. soln. contg. ethyl ether.	77A100
12.104	$-\text{O}\dot{\text{C}}\text{HCH}_2\text{O}(\text{CH}_2)_2- + \text{Co}(\text{NH}_3)_6^{3+}$	$< 2 \times 10^6$	3.5-4	p.r.	D.k. in N ₂ O-satd. soln. contg. dioxane.	77A100
12.107	$\text{CH}_3\text{CO}\dot{\text{C}}(\text{O}^-)\text{CH}_3 + \text{Co}(\text{NH}_3)_6^{3+}$	$< 1.8 \times 10^5$	5.5	p.r.	D.k. in N ₂ O-satd. soln. contg. 0.01 mol L ⁻¹ biacetyl.	72A018
	$\text{CH}_3\text{CO}\dot{\text{C}}(\text{OH})\text{CH}_3 + \text{Co}(\text{NH}_3)_6^{3+}$	$< 2.0 \times 10^5$	1.2			
12.117	$\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CO}_2^- + \text{Co}(\text{NH}_3)_6^{3+}$	2.4×10^{10}	12.0	p.r.	D.k. in N ₂ O-satd. soln. contg. 0.01 mol L ⁻¹ lactate; <i>e</i> -transfer.	72A018
	$\text{CH}_3\dot{\text{C}}(\text{OH})\text{CO}_2^- + \text{Co}(\text{NH}_3)_6^{3+}$	7.0×10^6	6.0			
12.127	$\cdot\text{CONH}_2 + \text{Co}(\text{NH}_3)_6^{3+}$	$< 3.6 \times 10^7$	6.2	p.r.	D.k. in N ₂ O-satd. soln. contg. 0.01 mol L ⁻¹ formamide.	72A018
12.147	$\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_6^{3+} \rightarrow$ $\text{CO}_2 + \text{Co}(\text{NH}_3)_6^{2+}$	4.0×10^7	4.8	p.r.	D.k. in N ₂ O-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 ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate rel. to $k(\cdot\text{CO}_2^- + \text{PNBPA}) = 1.9 \times 10^9$. [26.147]	73A075
13.	Pentaammineaquacobalt(III) ion					
13.075	$\cdot\text{CH}_2\text{OH} + \text{Co}(\text{NH}_3)_5\text{OH}_2^{3+} \rightarrow$ Co(II)	$(1.5 \pm 0.5) \times 10^6$ (rel.)	3.5-4	γ -r.	Calcd. from $G(\text{Co}^{2+})$, dose rate and $k(\text{R} + \text{R}) = 2.4 \times 10^9$.	77A100
13.147	$\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{OH}_2^{3+} \rightarrow$ Co(II)	$(1.7 \pm 0.3) \times 10^8$ (rel.)	5.2	p.r.	C.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate; rel. to $k(\cdot\text{CO}_2^- + \text{PNBPA}) = 1.9 \times 10^9$. [26.147]	73A075
14.	Pentaamminehydroxycobalt(III) ion					
14.147	$\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{OH}^{2+} \rightarrow$ Co(II)	$< (3 \pm 1.5) \times 10^7$ (rel.)	7.8	p.r.	C.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate; rel. to $k(\cdot\text{CO}_2^- + \text{PNBPA}) = 1.9 \times 10^9$. [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	$\cdot\text{CH}_2\text{OH} + \text{Co}(\text{NH}_3)_5\text{Br}^{2+}$	$(9.0 \pm 1.4) \times 10^7$ $(2.5 \pm 0.4) \times 10^7$ $(2.0 \pm 0.3) \times 10^7$ $(1.8 \pm 0.3) \times 10^7$ $(1.8 \pm 0.3) \times 10^7$ $(1.8 \pm 0.3) \times 10^7$	6.1 4.9 4.5 3.5 2.0 1.0	p.r.	D.k. in N ₂ O-satd. soln. contg. 1 mol L ⁻¹ MeOH.	77A100
15.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Co}(\text{NH}_3)_5\text{Br}^{2+}$	$(1.5 \pm 0.2) \times 10^8$	3.5–4	p.r.	D.k. in N ₂ O-satd. soln. contg. EtOH.	77A100
15.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{NH}_3)_5\text{Br}^{2+}$	$(3.0 \pm 0.45) \times 10^8$	3.5–4	p.r.	D.k. in N ₂ O-satd. soln. contg. 2-PrOH.	77A100
15.093	$\text{CH}_3\dot{\text{C}}\text{HOC}_2\text{H}_5 + \text{Co}(\text{NH}_3)_5\text{Br}^{2+}$	$(1.6 \pm 0.2) \times 10^8$	3.5–4	p.r.	D.k. in N ₂ O-satd. soln. contg. ethyl ether.	77A100
15.104	$-\text{O}\dot{\text{C}}\text{HCH}_2\text{O}(\text{CH}_2)_2- + \text{Co}(\text{NH}_3)_5\text{Br}^{2+}$	$\leq 2 \times 10^6$	3.5–4	p.r.	D.k. in N ₂ O-satd. soln. contg. dioxane.	77A100
16.	Pentaamminechlorocobalt(III) ion					
16.075	$\cdot\text{CH}_2\text{OH} + \text{Co}(\text{NH}_3)_5\text{Cl}^{2+}$	$(3 \pm 1) \times 10^6$ (rel.)	3.5–4	γ -r	Est. from effect of complex concn. on $G(\text{Co}^{2+})$ assuming $2k(\text{R} + \text{R}) = 2.4 \times 10^9$.	77A100
16.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Co}(\text{NH}_3)_5\text{Cl}^{2+}$	$(3.0 \pm 0.4) \times 10^6$	3.5–4	p.r.	D.k. in N ₂ O-satd. soln. contg. EtOH.	77A100
16.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{NH}_3)_5\text{Cl}^{2+}$	$(4.0 \pm 0.6) \times 10^7$	3.5–4	p.r.	D.k. in N ₂ O-satd. soln. contg. 2-PrOH.	77A100
16.093	$\text{CH}_3\dot{\text{C}}\text{HOC}_2\text{H}_5 + \text{Co}(\text{NH}_3)_5\text{Cl}^{2+}$	$(1.4 \pm 0.2) \times 10^7$	3.5–4	p.r.	D.k. in N ₂ O-satd. soln. contg. ethyl ether.	77A100
16.104	$-\text{O}\dot{\text{C}}\text{HCH}_2\text{O}(\text{CH}_2)_2- + \text{Co}(\text{NH}_3)_5\text{Cl}^{2+}$	$\leq 2 \times 10^6$	3.5–4	p.r.	D.k. in N ₂ O-satd. soln. contg. dioxane.	77A100
16.147	$\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{Cl}^{2+}$	$(1.5 \pm 0.3) \times 10^8$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(\text{CO}_2^- + \text{PNBPA}) = 1.9 \times 10^9$ in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate. [26.147]	73A075
17.	Pentaamminefluorocobalt(III) ion					
17.075	$\cdot\text{CH}_2\text{OH} + \text{Co}(\text{NH}_3)_5\text{F}^{2+}$	$(5.5 \pm 2) \times 10^5$ (rel.)	3.5–4	γ -r.	Est. from effect of complex concn. on $G(\text{Co}^{2+})$ assuming $2k(\text{R} + \text{R}) = 2.4 \times 10^9$.	77A100
18.	Pentaammine(nitrito-N)cobalt(III) ion					
18.147	$\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{NO}_2^{2+}$	$< (2 \pm 1) \times 10^7$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(\text{CO}_2^- + \text{PNBPA}) = 1.9 \times 10^9$ in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate. [26.147]	73A075
19.	Pentaammine(nitrato-O)cobalt(III) ion					
19.147	$\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{NO}_3^{2+}$	$(2.1 \pm 0.3) \times 10^8$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(\text{CO}_2^- + \text{PNBPA}) = 1.9 \times 10^9$ in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate. [26.147]	73A075
20.	(Acetato)pentaamminecobalt(III) ion					
20.001	$\cdot\text{CH}_3 + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}_3^{2+} \rightarrow$ $\text{CH}_4 + \text{Co}^{2+} + 4\text{NH}_4^+ + \text{NH}_2^+ +$ $\text{CH}_3\text{CO}_2\text{H}$	$(4 \pm 1) \times 10^3$ (rel.)		phot.	Est. from intensity dependence of CH ₄ and C ₂ H ₆ formn. assuming $k(\text{R} + \text{R}) = 2 \times 10^{10}$.	71F579
20.147	$\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}_3^{2+}$	$(1.1 \pm 0.3) \times 10^8$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(\text{CO}_2^- + \text{PNBPA}) = 1.9 \times 10^9$ in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate. [26.147]	73A075
21.	Pentaammine(phenylacetato)cobalt(III) ion					
21.147	$\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}_2\text{C}_6\text{H}_5^{2+}$	$(7.0 \pm 2) \times 10^7$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(\text{CO}_2^- + \text{PNBPA}) = 1.9 \times 10^9$ in N ₂ O-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. 22.147	Pentaammine(4-nitrophenylacetato)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}_2\text{C}_6\text{H}_4\text{NO}_2^{2+}$	$(1.2 \pm 0.1) \times 10^9$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(\text{CO}_2^- + \text{PNBPA}) = 1.9 \times 10^9$ in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate. [26.147]	73A075
23. 23.147	Pentaammine(benzoato)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_5^{2+}$	$(4.5 \pm 2) \times 10^7$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(\text{CO}_2^- + \text{PNBPA}) = 1.9 \times 10^9$ in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate. [26.147]	73A075
24. 24.078	Pentaammine(2-nitrobenzoato)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{NO}_2^{2+}$	1.7×10^9	7.0	p.r.	P.b.k.	77A027
24.147	$\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{NO}_2^{2+}$	2.0×10^9	7.0	p.r.	P.b.k.	77A027
25. 25.078	Pentaammine(3-nitrobenzoato)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{NO}_2^{2+}$	1.5×10^9	7.0	p.r.	P.b.k.	77A027
25.147	$\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{NO}_2^{2+}$	1.5×10^9	7.0	p.r.	P.b.k.	77A027
26. 26.078	Pentaammine(4-nitrobenzoato)cobalt(III) ion (PNBPA) $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{NO}_2^{2+} \rightarrow$ $(\text{CH}_3)_2\dot{\text{C}}\text{O} + \text{H}^+ + \text{Co}^{\text{III}}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\dot{\text{N}}\text{O}_2^-$	2.6×10^9 2.6×10^9	4.5 7.0	p.r. p.r.	Condy. in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ 2-PrOH. P.b.k.	74A002 77A027
26.147	$\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{NO}_2^{2+} \rightarrow$ $\text{CO}_2 + \text{Co}^{\text{III}}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\dot{\text{N}}\text{O}_2^-$	1.9×10^9	7.0	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate.	72G340 77A027
27. 27.078	Pentaammine(2,4-dinitrobenzoato)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2^{2+}$	4.3×10^9	7.0	p.r.	P.b.k.	77A027
27.147	$\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2^{2+}$	7.5×10^9	7.0	p.r.	P.b.k.	77A027
28. 28.078	Pentaammine(3,5-dinitrobenzoato)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2^{2+}$	2.9×10^9	7.0	p.r.	P.b.k.	77A027
28.147	$\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2^{2+}$	8.1×10^9	7.0	p.r.	P.b.k.	77A027
29. 29.078	Hexaamminebis(μ-hydroxy)[μ-(4-nitrobenzoato)]dicobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \dots\text{NO}_2 \rightarrow$ $(\text{CH}_3)_2\dot{\text{C}}\text{O} + \text{H}^+ + \dots\dot{\text{N}}\text{O}_2^-$	$(2 \pm 0.4) \times 10^9$ $(1.4 \pm 0.4) \times 10^9$	0.7– 6.0	p.r. p.r.	P.b.k. in N ₂ O-satd. soln. contg. 1 mol L ⁻¹ 2-PrOH. 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 ₂ O– 1% 2-PrOH.	78A108 80A066
29.101	$\cdot\text{CHOHCH}_2\text{OH} + \dots\text{NO}_2 \rightarrow \dots\dot{\text{N}}\text{O}_2$	$(8 \pm 2) \times 10^7$		p.r.	P.b.k. at 370 nm in soln. of 50% H ₂ O–50% ethylene glycol; $\Delta H^\ddagger =$ 5.4 ± 0.3 kcal mol ⁻¹ (21 kJ mol ⁻¹)	80A066
30. 30.147	Pentaammine(4-cyanobenzoato)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_6\text{H}_4\text{CN}^{2+}$	$(4.6 \pm 2) \times 10^7$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(\text{CO}_2^- + \text{PNBPA}) = 1.9 \times 10^9$ in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate. [26.147]	73A075
31. 31.078	Pentaammine(pyridine)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{NH}_3)_5\text{C}_5\text{H}_5\text{N}^{3+} \rightarrow$ $\text{Co}^{2+} + 5\text{NH}_3 + \text{C}_5\text{H}_5\text{N}$ $+ (\text{CH}_3)_2\dot{\text{C}}\text{O} + \text{H}^+$	$\sim 10^9$	1–7	γ -r.	Est. from $G(\text{Co}^{2+})$ in N ₂ O-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	$\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{C}_5\text{H}_5\text{N}^{3+}$	$(3.3 \pm 0.4) \times 10^8$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(\text{CO}_2^- + \text{PNBPA}) = 1.9 \times 10^9$ in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate. [26.147]	73A075
32. 32.147	Pentaammine(pyridinecarboxylato)cobalt(III) ion $\cdot\text{CO}_2^- + \text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_5\text{H}_4\text{N}^{2+}$	$(5.1 \pm 2) \times 10^7$ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(\text{CO}_2^- + \text{PNBPA}) = 1.9 \times 10^9$ in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate. [26.147]	73A075
33. 33.078	Pentaammine(pyrazinecarboxylato)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} +$ $\text{Co}(\text{NH}_3)_5\text{O}_2\text{CC}_4\text{H}_3\text{N}_2^{2+} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \dots\dot{\text{N}}\text{H}$	$(4.0 \pm 0.6) \times 10^8$	0-5	p.r.	P.b.k. in N ₂ O or Ar-satd. soln. contg. 1 mol L ⁻¹ 2-PrOH.	78A222
34. 34.078	Tetraammine(pyrazinecarboxylato-O,N)cobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} +$ $\text{Co}(\text{NH}_3)_4\text{O}_2\text{CC}_4\text{H}_3\text{N}_2^{2+} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{Co}^{\text{II}}$	$(9 \pm 2) \times 10^8$	5	p.r.	P.b.k. in N ₂ O or Ar-satd. soln. contg. 1 mol L ⁻¹ 2-PrOH.	78A222
35. 35.078	Hexaamminebis(μ-hydroxy)[μ-(pyrazinecarboxylato)](dicobalt(III) ion $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \dots\text{N} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \dots\dot{\text{N}}\text{H}$	$(4.2 \pm 0.4) \times 10^8$	0-6	p.r.	P.b.k. in N ₂ O or Ar-satd. soln. contg. 1 mol L ⁻¹ 2-PrOH.	78A222
36. 36.075 36.076 36.078	Tris(ethylenediamine)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{Co}(\text{en})_3^{3+}$ $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Co}(\text{en})_3^{3+}$ $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{en})_3^{3+}$	no reaction no reaction no reaction	3.5-4 3.5-4 3.5-4	p.r. p.r. p.r.	D.k. in N ₂ O-satd. soln. contg. MeOH. D.k. in N ₂ O-satd. soln. contg. EtOH. D.k. in N ₂ O-satd. soln. contg. 2-PrOH.	77A100 77A100 77A100
37. 37.075 37.076 37.078	cis-Amminechlorobis(ethylenediamine)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{Co}(\text{NH}_3\text{Cl}(\text{en})_2)^{2+}$ $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Co}(\text{NH}_3\text{Cl}(\text{en})_2)^{2+}$ $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{NH}_3\text{Cl}(\text{en})_2)^{2+}$	$<2 \times 10^6$ 4.2×10^6 2.2×10^7	3.5-4 3.5-4 3.5-4	p.r. p.r. p.r.	D.k. in N ₂ O-satd. soln. contg. MeOH. D.k. in N ₂ O-satd. soln. contg. EtOH. D.k. in N ₂ O-satd. soln. contg. 2-PrOH.	77A100 77A100 77A100
37.093	$\text{CH}_3\dot{\text{C}}\text{HOC}_2\text{H}_5 + \text{Co}(\text{NH}_3\text{Cl}(\text{en})_2)^{2+}$	4.6×10^6	3.5-4	p.r.	D.k. in N ₂ O-satd. soln. contg. Et ₂ O.	77A100
38. 38.075 38.076 38.078	cis-Aquachlorobis(ethylenediamine)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{Co}(\text{OH}_2\text{Cl}(\text{en})_2)^{2+}$ $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Co}(\text{OH}_2\text{Cl}(\text{en})_2)^{2+}$ $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{OH}_2\text{Cl}(\text{en})_2)^{2+}$	$(1.8 \pm 0.5) \times 10^6$ 2.0×10^7 8.2×10^7	3.5-4 3.5-4 3.5-4	p.r. p.r. p.r.	D.k. in N ₂ O-satd. soln. contg. MeOH. D.k. in N ₂ O-satd. soln. contg. EtOH. D.k. in N ₂ O-satd. soln. contg. 2-PrOH.	77A100 77A100 77A100
38.093	$\text{CH}_3\dot{\text{C}}\text{HOC}_2\text{H}_5 + \text{Co}(\text{OH}_2\text{Cl}(\text{en})_2)^{2+}$	3.5×10^7	3.5-4	p.r.	D.k. in N ₂ O-satd. soln. contg. Et ₂ O.	77A100
39. 39.075 39.076 39.078	trans-Dibromobis(ethylenediamine)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{Co}(\text{en})_2\text{Br}_2^+$ $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Co}(\text{en})_2\text{Br}_2^+$ $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Co}(\text{en})_2\text{Br}_2^+$	2.6×10^8 5.7×10^8 6.8×10^8	3.5-4 3.5-4 3.5-4	p.r. p.r. p.r.	D.k. in N ₂ O-satd. soln. contg. MeOH. D.k. in N ₂ O-satd. soln. contg. EtOH. D.k. in N ₂ O-satd. soln. contg. 2-PrOH.	77A100 77A100 77A100
39.093 39.104	$\text{CH}_3\dot{\text{C}}\text{HOC}_2\text{H}_5 + \text{Co}(\text{en})_2\text{Br}_2^+$ $-\text{O}\dot{\text{C}}\text{HCH}_2\text{O}(\text{CH}_2)_2- + \text{Co}(\text{en})_2\text{Br}_2^+$	6.5×10^8 4.4×10^8	3.5-4 3.5-4	p.r. p.r.	D.k. in N ₂ O-satd. soln. contg. Et ₂ O. D.k. in N ₂ O-satd. soln. contg. dioxane.	77A100 77A100
40. 40.075 40.076 40.078	cis-Bromobis(ethylenediamine)fluorocobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{CoBr}(\text{en})_2\text{F}^+$ $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{CoBr}(\text{en})_2\text{F}^+$ $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CoBr}(\text{en})_2\text{F}^+$	$<2 \times 10^6$ 2.8×10^7 1.1×10^8	3.5-4 3.5-4 3.5-4	p.r. p.r. p.r.	D.k. in N ₂ O-satd. soln. contg. MeOH. D.k. in N ₂ O-satd. soln. contg. EtOH. D.k. in N ₂ O-satd. soln. contg. 2-PrOH.	77A100 77A100 77A100
40.093	$\text{CH}_3\dot{\text{C}}\text{HOC}_2\text{H}_5 + \text{CoBr}(\text{en})_2\text{F}^+$	4.9×10^7	3.5-4	p.r.	D.k. in N ₂ O-satd. soln. contg. Et ₂ O.	77A100
41. 41.075	cis-Dichlorobis(ethylenediamine)cobalt(III) ion $\cdot\text{CH}_2\text{OH} + \text{CoCl}_2(\text{en})_2^+$	$<5 \times 10^6$	3.5-4	p.r.	D.k. in N ₂ O-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 $\dot{\text{C}}$ HOH + CoCl ₂ (en) ₂ ⁺	3.8 x 10 ⁷	3.5–4	p.r.	D.k. in N ₂ O–satd. soln. contg. EtOH.	77A100
41.078	(CH ₃) ₂ $\dot{\text{C}}$ OH + CoCl ₂ (en) ₂ ⁺	1.0 x 10 ⁸	3.5–4	p.r.	D.k. in N ₂ O–satd. soln. contg. 2-PrOH.	77A100
42.	trans-Dichlorobis(ethylenediamine)cobalt(III) ion					
42.075	·CH ₂ OH + CoCl ₂ (en) ₂ ⁺	(8 ± 2) x 10 ⁶	3.5–4	p.r.	D.k. in N ₂ O–satd. soln. contg. MeOH.	77A100
42.076	CH ₃ $\dot{\text{C}}$ HOH + CoCl ₂ (en) ₂ ⁺	1.5 x 10 ⁸	3.5–4	p.r.	D.k. in N ₂ O–satd. soln. contg. EtOH.	77A100
42.078	(CH ₃) ₂ $\dot{\text{C}}$ OH + CoCl ₂ (en) ₂ ⁺	3.8 x 10 ⁸	3.5–4	p.r.	D.k. in N ₂ O–satd. soln. contg. 2-PrOH.	77A100
42.093	CH ₃ $\dot{\text{C}}$ HOC ₂ H ₅ + CoCl ₂ (en) ₂ ⁺	1.5 x 10 ⁸	3.5–4	p.r.	D.k. in N ₂ O–satd. soln. contg. Et ₂ O.	77A100
42.104	–OCHCH ₂ O(CH ₂) ₂ – + CoCl ₂ (en) ₂ ⁺	3.5 x 10 ⁷	3.5–4	p.r.	D.k. in N ₂ O–satd. soln. contg. dioxane.	77A100
43.	trans-Bis(ethylenediamine)difluorocobalt(III) ion					
43.075	·CH ₂ OH + CoF ₂ (en) ₂ ⁺	no reaction	3.5–4	p.r.	D.k. in N ₂ O–satd. soln. contg. MeOH.	77A100
43.076	CH ₃ $\dot{\text{C}}$ HOH + CoF ₂ (en) ₂ ⁺	no reaction	3.5–4	p.r.	D.k. in N ₂ O–satd. soln. contg. EtOH.	77A100
43.078	(CH ₃) ₂ $\dot{\text{C}}$ OH + CoF ₂ (en) ₂ ⁺	no reaction	3.5–4	p.r.	D.k. in N ₂ O–satd. soln. contg. 2-PrOH.	77A100
44.	Tris(2,2'-bipyridine)cobalt(III) ion					
44.075	·CH ₂ OH + Co(bpy) ₃ ³⁺ → Co(bpy) ₃ ²⁺	2 x 10 ⁸	1,7	p.r.	P.b.k. at 326 nm in N ₂ O–satd. soln. contg. 0.25 mol L ⁻¹ MeOH.	79A034
44.078	(CH ₃) ₂ $\dot{\text{C}}$ OH + Co(bpy) ₃ ³⁺ → Co(bpy) ₃ ²⁺	(2.5 ± 0.3) x 10 ⁹	0.5, 7.8	p.r.	P.b.k. at 330 nm in N ₂ O–satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	79A034
44.147	·CO ₂ ⁻ + Co(bpy) ₃ ³⁺ → Co(bpy) ₃ ²⁺	(7.6 ± 0.2) x 10 ⁹ (rel.)	6.9	p.r.	C.k. with PNBPA assuming $k(\text{CO}_2^- + \text{PNBPA}) = 1.9 \times 10^9$ in N ₂ O–satd. soln. contg. 0.1 mol L ⁻¹ formate. [26.147]	73A075
		(7.8 ± 0.5) x 10 ⁹	6.9	p.r.	P.b.k. at 330 nm in N ₂ O–satd. soln. contg. 0.1 mol L ⁻¹ formate.	79A034
45.	Tris(1,10-phenanthroline)cobalt(III) ion					
45.075	·CH ₂ OH + Co(phen) ₃ ³⁺ → addn. to ligand	8 x 10 ⁸	1–7	p.r.	P.b.k. at 475 nm in N ₂ O–satd. soln. contg. 2.5 mol L ⁻¹ MeOH; c.k. with O ₂ gave (7 ± 1) x 10 ⁸ assuming $k(\text{R} + \text{O}_2) = 4.2 \times 10^9$.	80A227
45.076	CH ₃ $\dot{\text{C}}$ HOH + Co(phen) ₃ ³⁺ → addn. to ligand	3.8 x 10 ⁹	1–7	p.r.	P.b.k. at 475 nm in N ₂ O–satd. soln. contg. 0.25 mol L ⁻¹ EtOH.	80A227
45.078	(CH ₃) ₂ $\dot{\text{C}}$ OH + Co(phen) ₃ ³⁺ → Co(phen) ₃ ²⁺	4.6 x 10 ⁹	7.0	p.r.	P.b.k. at 360 nm in N ₂ O–satd. soln. contg. 0.5 mol L ⁻¹ 2-PrOH.	79A034
45a.	Tris(5,6-dimethyl-1,10-phenanthroline)cobalt(III) ion					
45a.075	·CH ₂ OH + Co(5,6-Me ₂ phen) ₃ ³⁺ → Co(5,6-Me ₂ phen) ₃ ²⁺	4.9 x 10 ⁸	~7	p.r.	P.b.k., as well as d.k. at 380 nm in N ₂ O–satd. soln. contg. 2.5 mol L ⁻¹ MeOH.	80A227
45a.076	CH ₃ $\dot{\text{C}}$ HOH + Co(5,6-Me ₂ phen) ₃ ³⁺ → Co(5,6-Me ₂ phen) ₃ ²⁺	3.1 x 10 ⁹	~7	p.r.	P.b.k., as well as d.k. at 380 nm in N ₂ O–satd. soln. contg. 0.25 mol L ⁻¹ EtOH.	80A227
45a.078	(CH ₃) ₂ $\dot{\text{C}}$ OH + Co(5,6-Me ₂ phen) ₃ ³⁺ → Co(5,6-Me ₂ phen) ₃ ²⁺	3.2 x 10 ⁹	~7	p.r.	P.b.k., as well as d.k. at 380 nm in N ₂ O–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 $\dot{\text{C}}$ OH + Co ^{III} → Co ^{II}	2.0 x 10 ⁸	2.0	p.r.	P.b.k.	76A203
46.147	·CO ₂ ⁻ + Co ^{III} → Co ^{II}	8.1 x 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 $\dot{\text{C}}$ OH + Co ^{III} → Co ^{II}	1.1 x 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 $\dot{\text{C}}$ OH + Co ^{III} → Co ^{II}	1.1 x 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 COH + Co ^{III} → Co ^{II}	7.0 × 10 ⁸	1.0	p.r.	P.b.k.	76A203
49.147	·CO ₂ ⁻ + Co ^{III} → 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 COH + Co ^{III} → Co ^{II}	1.9 × 10 ⁹	1.0	p.r.	P.b.k.	76A203
50.147	·CO ₂ ⁻ + Co ^{III} → 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 COH + Co ^{III} → 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 COH + Co ^{III} → Co ^{II}	3.3 × 10 ⁸	9.0	p.r.	P.b.k.	76A203
53.	Cyanocob(III)alamin(Vitamin B12)					
53.147	·CO ₂ ⁻ + B12 → 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 <i>tert</i> -BuOH, satd. with CO ₂ .	73G116
		no reaction		p.r.	No change in o.d. in N ₂ O or CO ₂ -satd. soln. contg. 0.1 mol L ⁻¹ formate, or CO ₂ -satd. soln. contg. 0.1 mol L ⁻¹ <i>tert</i> -BuOH.	74A105
54.	Hydroxocob(III)alamin(Vitamin B12a)					
54.147	·CO ₂ ⁻ + B12a → 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. <i>tert</i> -BuOH.	74A105
Cr						
55.	Chromium(II) ion					
55.006	·CH ₂ C(CH ₃) ₂ CO ₂ H + Cr(H ₂ O) ₆ ²⁺ → (H ₂ O) ₅ Cr ^{III} CH ₂ C(CH ₃) ₂ CO ₂ H	1.1 × 10 ⁸	~1	p.r.	P.b.k. in Ar-satd. soln. contg. pivalic acid-HClO ₄ .	74A146
55.016	·CH ₂ C(CH ₃) ₂ OH + Cr(H ₂ O) ₆ ²⁺ → (H ₂ O) ₅ Cr ^{III} CH ₂ C(CH ₃) ₂ OH	1.0 × 10 ⁸	~1	p.r.	P.b.k. in Ar-satd. soln. contg. <i>tert</i> -BuOH-HClO ₄ .	74A146
55.020	·CH ₂ CHO + Cr(H ₂ O) ₆ ²⁺ → (H ₂ O) ₅ Cr ^{III} CH ₂ CH(OH) ₂	(3.5 ± 0.5) × 10 ⁸	~1	p.r.	P.b.k. in Ar-satd. soln. contg. ethylene glycol-HClO ₄ ; ·CHOHCH ₂ OH loses water in acid soln.	74A146
55.035	·CH ₂ CO ₂ H + Cr(H ₂ O) ₆ ²⁺ → (H ₂ O) ₅ Cr ^{III} CH ₂ CO ₂ H	2.5 × 10 ⁸	~1	p.r.	P.b.k. in Ar-satd. soln. contg. acetic acid-HClO ₄ .	74A146
55.037	CH ₃ CHOHCO ₂ H + Cr(H ₂ O) ₆ ²⁺ → (H ₂ O) ₅ Cr ^{III} CH(CH ₃)CO ₂ H	1.1 × 10 ⁸	~1	p.r.	P.b.k. in Ar-satd. soln. contg. propionic acid-HClO ₄ .	74A146
55.042	·CH(CO ₂ H) ₂ + Cr(H ₂ O) ₆ ²⁺ → (H ₂ O) ₅ Cr ^{III} CH(CO ₂ H) 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)CH ₂ + Cr(H ₂ O) ₆ ²⁺ → (H ₂ O) ₅ Cr ^{III} CH ₂ N(CH ₃)CHO	(1.1 ± 0.1) × 10 ⁸	~5	p.r.	P.b.k. in Ar or N ₂ O-satd. soln. contg. dimethylformamide.	74A146
55.075	·CH ₂ OH + Cr(H ₂ O) ₆ ²⁺ → (H ₂ O) ₅ Cr ^{III} CH ₂ OH	1.6 × 10 ⁸	~1	p.r.	P.b.k. in Ar-satd. soln. contg. MeOH-HClO ₄ .	74A146
55.076	CH ₃ CHOH + Cr(H ₂ O) ₆ ²⁺ → (H ₂ O) ₅ Cr ^{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 COH + Cr(H ₂ O) ₆ ²⁺ → (H ₂ O) ₅ Cr ^{III} C(CH ₃) ₂ OH	5.1 × 10 ⁷	~1	p.r.	P.b.k. in Ar-satd. soln. contg. 2-PrOH-HClO ₄ .	74A146
55.093	CH ₃ CHOCH ₂ H ₃ + Cr(H ₂ O) ₆ ²⁺ → (H ₂ O) ₅ Cr ^{III} CH(CH ₃)OC ₂ H ₅	3.4 × 10 ⁷	~1	p.r.	P.b.k. in Ar-satd. soln. contg. Et ₂ O-HClO ₄ .	74A146
55.101	·CHOHCH ₂ OH + Cr(H ₂ O) ₆ ²⁺ → (H ₂ O) ₅ Cr ^{III} CH ₂ CH(OH) ₂	(1.5 ± 0.2) × 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	·OCHCH ₂ O(CH ₂) ₂ · + Cr(H ₂ O) ₆ ²⁺ → (H ₂ O) ₅ Cr ^{III} R	1.0 × 10 ⁸	~1	p.r.	P.b.k. in Ar-satd. soln. contg. dioxane-HClO ₄ .	74A146
55.115	·CHOHCO ₂ H + Cr(H ₂ O) ₆ ²⁺ → (H ₂ O) ₅ Cr ^{III} CHOHCO ₂ H	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	$\text{CH}_3\dot{\text{C}}\text{OHCO}_2\text{H} + \text{Cr}(\text{H}_2\text{O})_6^{2+} \rightarrow$ $(\text{H}_2\text{O})_5\text{Cr}^{\text{III}}\text{COH}(\text{CH}_3)\text{CO}_2\text{H}$	9.2×10^7	~ 1	p.r.	P.b.k. in Ar-satd. soln. contg. lactic acid-HClO ₄ .	74A146
55.127	$\cdot\text{CONH}_2 + \text{Cr}(\text{H}_2\text{O})_6^{2+} \rightarrow$ $(\text{H}_2\text{O})_5\text{Cr}^{\text{III}}\text{CONH}_2$	$(6.5 \pm 0.6) \times 10^8$	~ 5	p.r.	P.b.k. in Ar- or N ₂ O-satd. soln. contg. formamide.	74A146
55.147	$\cdot\text{CO}_2^-(\text{CO}_2\text{H}) + \text{Cr}^{\text{II}} \rightarrow \text{Cr}^{\text{III}}\text{CO}_2^-$	$(1.1 \pm 0.1) \times 10^9$	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	$\cdot\text{CO}_2^-(\text{CO}_2\text{H}) + \text{Cr}^{\text{III}}$	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	$\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{Cu}^+ \rightarrow \text{Cu}^{\text{II}}\text{CH}_2\text{CH}_2\text{OH}^+$ $\rightarrow \text{Cu}^{2+} + \text{C}_2\text{H}_4 + \text{OH}^-$	$(1.9 \pm 0.6) \times 10^{10}$	4.5	p.r.	Est. from p.b.k. in N ₂ O-satd. soln. contg. ethylene and Cu ²⁺ .	78A322
57.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cu}^+ \rightarrow$ $\text{Cu}^{\text{II}}\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH}^+ \rightarrow$ $\text{Cu}^{2+} + \text{OH}^- + \text{CH}_2=\text{C}(\text{CH}_3)_2$	$(2.6 \pm 0.9) \times 10^{10}$	4.5	p.r.	Est. from p.b.k. at 400 nm in N ₂ O-satd. soln. contg. <i>tert</i> -BuOH and Cu ²⁺ .	78A322
57.075	$\cdot\text{CH}_2\text{OH} + \text{Cu}^+ \rightleftharpoons \text{Cu}^{\text{II}}\text{CH}_2\text{OH}^+$	$\sim 10^{10}$	4.5	p.r.	Est. from growth and decay of absorption in soln. contg. MeOH and Cu ²⁺ ; $K \approx 10^4 \text{ dm}^3 \text{ mol}^{-1}$.	78A322
		$\sim 6 \times 10^9$	4.0	p.r.	Est. from growth and decay of absorption in soln. contg. MeOH and Cu ²⁺ ; $K \approx 5 \times 10^3 \text{ dm}^3 \text{ mol}^{-1}$.	80A278
57.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cu}^+$	$\sim 5 \times 10^9$	4.5	p.r.	Est. from growth and decay of absorption in soln. contg. 2-ProOH and Cu ²⁺ .	78A322
58.	Copper(I) ion, complex with ethylene					
58.014	$\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{CuC}_2\text{H}_4^+ \rightarrow$ $2\text{C}_2\text{H}_4 + \text{Cu}^{2+} + \text{OH}^-$	$(7.8 \pm 2.5) \times 10^7$	4.5	p.r.	Est. from effect of [C ₂ H ₄] on rate of formn. and decay of CuC ₂ H ₄ ⁺ at 227 nm; radical from OH + ethylene.	78A322
58.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{CuC}_2\text{H}_4^+ \rightarrow$ $\text{C}_2\text{H}_4 + \text{CH}_2=\text{C}(\text{CH}_3)_2 + \text{Cu}^{2+}$ $+ \text{OH}^-$	$(5.3 \pm 1.6) \times 10^7$	4.5	p.r.	Est. from effect of [C ₂ H ₄] on rate of formn. and decay of CuC ₂ H ₄ ⁺ at 227 nm in soln. contg. <i>tert</i> -BuOH.	78A322
58a.	Ethylenediaminetetraacetatocuprate(I) ion					
58a.079	$\text{CH}_3\text{CH}_2\text{CH}_2\dot{\text{C}}\text{HOH} + \text{CuEDTA}^{3-} \rightarrow$ RCuEDTA^{3-}	$(4 \text{ to } 5) \times 10^9$	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 $2k(\text{R} + \text{R}) = 10^9$.	80A153
59.	Copper(II) ions					
59.001	$\cdot\text{CH}_3 + \text{Cu}_{\text{aq}}^{2+} \rightarrow \text{CH}_3\text{Cu}^{2+}$	$(7.4 \pm 0.6) \times 10^5$	~ 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) ₅ O ₂ CCH ₃ ²⁺ .	78F301
59.014	$\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{Cu}_{\text{aq}}^{2+} \rightarrow$ $\text{Cu}^{\text{III}}-\text{CH}_2\text{CH}_2\text{OH}^+ \rightarrow$ $\text{Cu}^+ + \text{prod.}$	$(1.9 \pm 0.4) \times 10^7$ $(2.2 \pm 0.4) \times 10^7$	4.5 2	p.r.	P.b.k. at 270 nm (Cu ^I C ₂ H ₄) in N ₂ O-contg. ethylene (10 ⁻³ mol L ⁻¹) soln.; $\cdot\text{C}_2\text{H}_5$ is present at pH 4.5 ($\sim 10\%$) and pH 2 ($\sim 50\%$).	78A322
		$(3 \pm 1) \times 10^7$	6	p.r.	P.b.k. in soln. contg. (1–5) $\times 10^{-4}$ mol L ⁻¹ CuSO ₄ satd. with ethylene-N ₂ O (1:1).	80A277
59.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Cu}_{\text{aq}}^{2+} \rightarrow \text{Cu}^{\text{III}}-\text{R}$ $\rightarrow \text{Cu}^+ + \text{prod.}$	$(2.7 \pm 0.5) \times 10^6$ $(3.2 \pm 0.6) \times 10^6$	4.5 3	p.r.	P.b.k. at 320 nm (Cu ^I CH ₂ CHCONH ₂) in N ₂ O-satd. soln. contg. <i>tert</i> -BuOH and acrylamide.	78A322
		$(5 \pm 2) \times 10^6$	6	p.r.	P.b.k. in N ₂ O-satd. soln. contg. (1–5) $\times 10^{-4}$ mol L ⁻¹ CuSO ₄ and 0.1 mol L ⁻¹ <i>tert</i> -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	$\cdot\text{CH}_2\text{CO}_2^- + \text{Cu}^{2+} \rightarrow \text{Cu}^{\text{III}}\text{CH}_2\text{CO}_2^+ \rightarrow \text{Cu}^+ + \text{prod.}$	$(6.4 \pm 1.5) \times 10^8$	6.0	p.r.	D.k. in N ₂ O-satd. 10 ⁻² mol L ⁻¹ acetate soln.	77A025
59.037	$\text{CH}_3\dot{\text{C}}\text{HCO}_2^- + \text{Cu}_{\text{aq}}^{2+} \rightarrow \text{Cu}^{\text{III}}\text{-R} \rightarrow \text{Cu}^+ + \text{prod.}$	$(5 \pm 0.5) \times 10^8$	6	p.r.	P.b.k. in N ₂ O-satd. soln. contg. (2-10) $\times 10^{-5}$ mol L ⁻¹ CuSO ₄ and 10 ⁻² mol L ⁻¹ propionate.	80A277
59.041	$\cdot\text{O}_2\text{CCHOH}\dot{\text{C}}\text{HCO}_2^- + \text{Cu}_{\text{aq}}^{2+} \rightarrow \text{Cu}^{\text{III}}\text{-R} \rightarrow \text{Cu}^+ + \text{prod.}$	$(8 \pm 0.3) \times 10^8$	6	p.r.	P.b.k. in N ₂ O-satd. soln. contg. (5-10) $\times 10^{-5}$ mol L ⁻¹ CuSO ₄ and (2.5-10) $\times 10^{-4}$ mol L ⁻¹ fumarate; pH dependent, $k = 8.0 \times 10^8$, 1.8×10^8 , 1.2×10^8 , 6.4×10^7 , 3.1×10^7 , and $< 2 \times 10^7$ at pH 5.0, 3.5, 3.0, 2.6, 2.1, and 1.5, resp.	80A277
59.048	$\cdot\text{CCl}_3 (+ \cdot\text{CHCl}_2) + \text{Cu}_{\text{aq}}^{2+} \rightarrow \text{Cu}^{\text{III}}\text{-CCl}_3 \rightarrow \text{Cu}^+ + \text{prod.}$	$(3 \pm 1.5) \times 10^7$	6	p.r.	P.b.k. in Ar-satd. soln. contg. (2-10) $\times 10^{-5}$ mol L ⁻¹ CuSO ₄ and (1-10) $\times 10^{-2}$ mol L ⁻¹ CHCl ₃ ; $G(\cdot\text{CHCl}_2) = G(e_{\text{aq}}^-)$ and $G(\cdot\text{CCl}_3) = G(\text{OH})$.	80A277
59.075	$\cdot\text{CH}_2\text{OH} + \text{Cu}_{\text{aq}}^{2+} \rightarrow \text{Cu}^+ + \text{CH}_2\text{O} + \text{H}^+$	$(1.1 \pm 0.2) \times 10^8$	5-6	p.r.	D.k. in N ₂ O-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 ₂ CHCONH 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 ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ MeOH.	80A277
59.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Cu}_{\text{aq}}^{2+} \rightarrow \text{Cu}^+ + \text{CH}_3\text{CHO} + \text{H}^+$	$(7.4 \pm 1.1) \times 10^7$	5-6	p.r.	D.k. in N ₂ O-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 ₂ CHCONH 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 ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ EtOH.	80A277
59.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cu}_{\text{aq}}^{2+} \rightarrow \text{Cu}^+ +$	$(4.5 \pm 0.7) \times 10^7$	5-6	p.r.	D.k. in N ₂ O-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 ₂ CHCONH 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 ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	80A277
59.113	$\cdot\text{A}^- + \text{Cu}_{\text{aq}}^{2+}$ (A ⁻ = Radical from ascorbate)	$\leq 10^6$		phot.	Est.	78A394
59.147	$\cdot\text{CO}_2^- + \text{Cu}_{\text{aq}}^{2+} \rightarrow \text{CO}_2 + \text{Cu}^+$	$(1.5 \pm 0.3) \times 10^8$	6.8	p.r.	D.k. at 260 nm in N ₂ O-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	$\cdot\text{CH}_2\text{OH} + \text{Cu}^{\text{II}}\text{L} \rightarrow \text{Cu}^{\text{I}}\text{L}$	$\leq 2 \times 10^6$	3.5-10	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ MeOH; product ident. with that from e_{aq}^- .	80A189
	$\cdot\text{CH}_2\text{O}^- + \text{Cu}^{\text{II}}\text{L} \rightarrow \text{Cu}^{\text{I}}\text{L}$	9.0×10^8	12.0	p.r.	P.b.k. at 410 nm; no reduction obs. in neutral soln.; in methanolic soln. $k = 2.2 \times 10^4$ was detd. by f.phot. (p.b.k. at 415 nm)[77F639].	76A039
60.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Cu}^{\text{II}}\text{L} \rightarrow \text{Cu}^{\text{I}}\text{L}$	$\leq 2 \times 10^6$	3.5-10	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ EtOH; product ident. with that from e_{aq}^- .	80A189
60.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cu}^{\text{II}}\text{L} \rightarrow \text{Cu}^{\text{I}}\text{L}$	$\leq 2 \times 10^6$	3.5-10	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH; product ident. with that from e_{aq}^- .	80A189
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Cu}^{\text{II}}\text{L} \rightarrow \text{Cu}^{\text{I}}\text{L}$	9.0×10^8	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	$\cdot\text{CO}_2^- + \text{Cu}^{\text{II}}\text{L} \rightarrow \text{Cu}^{\text{I}}\text{L}$	2.3×10^9	7.0	p.r.	P.b.k. at 410 nm.	76A039
61.	Glycylglycylglycinatocopper(II) complex					
61.147	$\cdot\text{CO}_2^- + \text{Cu}^{\text{II}}(\text{gly}_3) \rightarrow \text{Cu}(\text{I}) + \text{CO}_2$	$(2.8 \pm 0.3) \times 10^8$	9.1	p.r.	D.k. at 550 nm (Cu^{II}) in N_2O -satd. formate (10^{-2} mol L ⁻¹) soln. contg. $\text{Cu}(\text{II})$ and gly_3 in 1:5, 1:3 and 1:2 ratio.	76A016
62.	(Oxidized glutathione)copper(II) complex					
62.147	$\cdot\text{CO}_2^- + \text{Cu}^{\text{II}}(\text{GSSG})_n \rightarrow \text{Cu}(\text{I}) + \text{CO}_2$	$(1.0 \pm 0.2) \times 10^8$	11	p.r.	D.k. at 595 nm (Cu^{II}) in N_2O -satd. soln. contg. formate ion; 10% of the $\cdot\text{CO}_2^-$ reacted with the disulfide $\rightarrow \text{GSSG}^-$ (p.b.k. at 410 nm).	76A016
63.	Histidinecopper(II) complex					
63.147	$\cdot\text{CO}_2^- + \text{Cu}(\text{II}) \rightarrow \text{Cu}(\text{I})$	$(4.1 \pm 0.4) \times 10^8$	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	$\cdot\text{CO}_2^- + \text{Cu}(\text{II})$	$(4.5 \pm 0.3) \times 10^8$ $(1.6 \pm 0.2) \times 10^7$	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	$\cdot\text{CO}_2^- + \text{Cu}(\text{II})$	$(3.5 \pm 0.4) \times 10^8$	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	$\text{CH}_3\text{CH}_2\text{CH}_2\dot{\text{C}}\text{HOH} + \text{CuEDTA}^{2-}$	$(0.5 \text{ to } 1) \times 10^6$	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	$\cdot\text{CO}_2\text{H}(\cdot\text{CO}_2^-) + \text{Eu}(\text{III}) \rightarrow \text{Eu}(\text{II})$	$\geq 7 \times 10^6$	1.4	p.r.	Est. from p.b.k. at 250 nm (Eu^{II}).	73A057
Fe						
67.	Iron(II) ion					
67.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Fe}(\text{H}_2\text{O})_6^{2+}$	2.9×10^6	~ 2	p.r.	Est. from change in abs. at 250 nm; product suggested to be $\text{Fe}(\text{H}_2\text{O})_5\text{R}^{2+}$.	75A166
<i>Deuteroheme See 223.</i>						
68.	Iron(III) ions					
68.075	$\cdot\text{CH}_2\text{OH} + \text{Fe}^{3+} \rightarrow \text{Fe}^{2+} + \text{CH}_2\text{O} + \text{H}^+$	1×10^8 (rel.) $(8 \pm 2) \times 10^7$	~ 1	γ -r.	C.k. rel. to $k(\text{R} + \text{C}(\text{NO}_2)_4) = 5 \times 10^9$; obs. $\text{C}(\text{NO}_2)_3^-$ and Fe^{2+} yields. Unpubl. data, C.N.Barnes and G.V.Buxton.	77G411 78A322
68.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Fe}^{3+} \rightarrow \text{Fe}^{2+} + \text{H}^+ + \text{CH}_3\text{CHO}$	2.7×10^8 (rel.) $(3.8 \pm 0.2) \times 10^8$	~ 1	γ -r.	C.k. rel. to $k(\text{R} + \text{C}(\text{NO}_2)_4) = 5 \times 10^9$; obs. $\text{C}(\text{NO}_2)_3^-$ and Fe^{2+} yields. Unpubl. data, C.N.Barnes and G.V.Buxton.	77G411 78A322
68.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Fe}^{3+} \rightarrow \text{Fe}^{2+} + \text{H}^+ + (\text{CH}_3)_2\text{CO}$	$(4.5 \pm 0.4) \times 10^8$ 1.8×10^8 (rel.) $(5.8 \pm 0.3) \times 10^8$	~ 1 ~ 1	p.r. γ -r.	D.k. at 270 nm in soln. contg. 1 mol L ⁻¹ 2-PrOH, 2×10^{-4} mol L ⁻¹ $\text{Fe}(\text{ClO}_4)_3$ and 0.5 mol L ⁻¹ HClO_4 ; $\mu = 1$ mol L ⁻¹ . C.k. rel. to $k(\text{R} + \text{C}(\text{NO}_2)_4) = 5 \times 10^9$; obs. $\text{C}(\text{NO}_2)_3^-$ and Fe^{2+} yields. Unpubl. data, C.N.Barnes and G.V.Buxton.	74A074 77G411 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	$\cdot\text{CH}_3 + \text{Fe}(\text{CN})_6^{3-}$	$(5 \pm 1) \times 10^6$	6–7	p.r.	D.k. at 420 nm in N ₂ O–satd. soln. contg. dimethyl sulfoxide.	81A003
69.002	$\cdot\text{CH}_2\text{CH}_3 + \text{Fe}(\text{CN})_6^{3-}$	$(5.0 \pm 0.5) \times 10^7$	6–7	p.r.	D.k. at 420 nm in N ₂ O–satd. soln. contg. diethyl sulfoxide.	81A003
69.002a	$(\text{CH}_3)_2\dot{\text{C}}\text{H} + \text{Fe}(\text{CN})_6^{3-}$	$(1.25 \pm 0.5) \times 10^9$	6–7	p.r.	D.k. at 420 nm in N ₂ O–satd. soln. contg. di-(1-methylethyl) sulfoxide.	81A003
69.002b	$(\text{CH}_3)_3\dot{\text{C}} + \text{Fe}(\text{CN})_6^{3-}$	$(3.6 \pm 1.5) \times 10^9$	6–7	p.r.	D.k. at 420 nm in N ₂ O–satd. soln. contg. di-(<i>tert</i> -butyl) sulfoxide.	81A003
69.014	$\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{Fe}(\text{CN})_6^{3-}$	$\sim 10^7$	7	p.r.	D.k. in soln. of 10 ⁻² mol L ⁻¹ ethylene contg. 10 ⁻² mol L ⁻¹ N ₂ O.	69G522
69.035	$\cdot\text{CH}_2\text{CO}_2\text{H} + \text{Fe}(\text{CN})_6^{3-}$	2×10^6	3.3	p.r.	D.k. at 420 nm in N ₂ O–satd. soln. contg. acetic acid.	81A003
69.043	$\cdot\text{CH}_2\text{Cl} + \text{Fe}(\text{CN})_6^{3-}$	$< 5 \times 10^5$	6–7	p.r.	D.k. at 420 nm in N ₂ O–satd. soln. contg. methylene chloride.	81A003
69.045	$\cdot\text{CHCl}_2 + \text{Fe}(\text{CN})_6^{3-}$	$< 5 \times 10^5$	6–7	p.r.	D.k. at 420 nm in N ₂ O–satd. soln. contg. chloroform.	81A003
69.056	$\text{NH}_2\dot{\text{C}}\text{HCO}_2^- + \text{Fe}(\text{CN})_6^{3-}$	1×10^9		p.r.	D.k. at 420 nm in soln. contg. glycine.	76A082
69.075	$\cdot\text{CH}_2\text{OH} + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{CH}_2\text{O} + \text{H}^+ + \text{Fe}(\text{CN})_6^{4-}$	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 ₂ O–satd. soln. contg. MeOH.	70G254
	$\cdot\text{CH}_2\text{O}^- + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{CH}_2\text{O} + \text{Fe}(\text{CN})_6^{4-}$	3.1×10^9	13	p.r.	D.k. at 410 nm (ferricyanide) in soln. contg. MeOH.	68G308
69.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Fe}(\text{CN})_6^{3-}$	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 ₂ O–satd. soln. contg. EtOH.	79N061
69.077	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{Fe}(\text{CN})_6^{3-}$	3.7×10^9	7	p.r.	D.k. at 410 nm in 0.1 mol L ⁻¹ 1-PrOH soln.	69G522
69.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Fe}(\text{CN})_6^{3-}$	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	$\text{CH}_3\dot{\text{C}}\text{OHCH}_2\text{CH}_3 + \text{Fe}(\text{CN})_6^{3-}$	4.8×10^9	7	p.r.	D.k. at 410 nm in 0.1 mol L ⁻¹ 2-BuOH soln.	69G522
69.081	$(\text{CH}_3)_2\text{CH}\dot{\text{C}}\text{HOH} + \text{Fe}(\text{CN})_6^{3-}$	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	$\text{CH}_3(\text{CH}_2)_3\dot{\text{C}}\text{HOH} + \text{Fe}(\text{CN})_6^{3-}$	$(9 \pm 2) \times 10^8$		p.r.	D.k. at 420 nm in N ₂ O–satd. soln. contg. 1-pentanol.	79N061
69.084	$-\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_2- + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{R}=\text{O} + \text{Fe}(\text{CN})_6^{4-} + \text{H}^+$	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 <i>tert</i> -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	$-\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_3- + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{R}=\text{O} + \text{Fe}(\text{CN})_6^{4-} + \text{H}^+$	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 <i>tert</i> -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	$-\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_4- + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{R}=\text{O} + \text{Fe}(\text{CN})_6^{4-} + \text{H}^+$	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 <i>tert</i> -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 ₂ O–satd. soln. contg. cyclohexanol.	79N061
69.087	$-\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_5- + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{R}=\text{O} + \text{Fe}(\text{CN})_6^{4-} + \text{H}^+$	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 <i>tert</i> -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	$-\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_6- + \text{Fe}(\text{CN})_6^{3-} \rightarrow \text{R}=\text{O} + \text{Fe}(\text{CN})_6^{4-} + \text{H}^+$	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 <i>tert</i> -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	$\text{CH}_3\dot{\text{C}}\text{HOSO}_3^- + \text{Fe}(\text{CN})_6^{3-}$	$\approx 2 \times 10^8$		p.r.	D.k. at 420 nm in N ₂ O-satd. soln. contg. ethylsulfate ion; values are given also for radicals produced from reaction of OH with higher alkyl sulfates.	79N061
69.092a	$\cdot\text{CH}_2\text{OCH}_3 + \text{Fe}(\text{CN})_6^{3-}$	$(4.3 \pm 0.23) \times 10^9$	6-7	p.r.	D.k. at 420 nm in N ₂ O-satd. soln. contg. dimethyl ether.	81A003
69.097	$\text{CH}_3(\dot{\text{C}}\text{O})\text{CH}_2\text{CO}_2^- + \text{Fe}(\text{CN})_6^{3-}$	$(7.3 \pm 0.7) \times 10^8$	7.0	p.r.	D.k. at 420 nm in soln. contg. acetoacetate ion (radical by reaction with e_{aq}^-).	73A104
69.100	$\cdot\text{CHOHCH}(\text{NH}_2)\text{CO}_2^- + \text{Fe}(\text{CN})_6^{3-}$	3.2×10^9	7	p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L ⁻¹ serine.	69G522
69.101	$\cdot\text{CHOHCH}_2\text{OH} + \text{Fe}(\text{CN})_6^{3-}$	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	$\text{R} + \text{Fe}(\text{CN})_6^{3-}$ (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	$\cdot\text{CHOHCHOHCH}_2\text{OH} + \text{Fe}(\text{CN})_6^{3-}$ (+ $\text{CH}_2\dot{\text{C}}\text{OHCH}_2\text{OH}$)	3.3×10^9	7	p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L ⁻¹ glycerol.	69G522
69.108	$\text{R} + \text{Fe}(\text{CN})_6^{3-}$ (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
69.111	$\text{R} + \text{Fe}(\text{CN})_6^{3-}$ (R = Radicals from glucose)	1.4×10^9 1.9×10^9	7	p.r. p.r.	Soln. contains 2-deoxy-D-ribose. D.k. at 410 nm in soln. contg. 0.3 mol L ⁻¹ glucose.	78A175 69G522
69.115	$\cdot\text{CHOHCO}_2^- + \text{Fe}(\text{CN})_6^{3-}$	5×10^8	7	p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L ⁻¹ glycolate ion.	69G522
	$\cdot\text{CHOHCO}_2\text{H} + \text{Fe}(\text{CN})_6^{3-}$	1.0×10^8	3.4	p.r.	D.k. at 420 nm in N ₂ O-satd. soln. contg. glycolate.	81A003
69.117	$\cdot\text{CH}(\text{O})\text{CO}_2^- + \text{Fe}(\text{CN})_6^{3-}$ $\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{Fe}(\text{CN})_6^{3-}$	7.5×10^8 1.5×10^9	11.5 7	p.r. p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L ⁻¹ lactate ion.	69G522
69.147	$\cdot\text{CO}_2^- + \text{Fe}(\text{CN})_6^{3-} \rightarrow$ $\text{CO}_2 + \text{Fe}(\text{CN})_6^{4-}$	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	$\cdot\text{CH}_2\text{OH} + \text{Fe}(\text{CN})_5\text{NO}^{2-} \rightarrow$ $\text{CH}_2\text{O} + \text{H}^+ + \text{Fe}(\text{CN})_5\dot{\text{N}}\text{O}^{3-}$	6.7×10^8	8.5	p.r.	P.b.k. in N ₂ O-satd. 0.5 mol L ⁻¹ MeOH soln.	77A120
70.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Fe}(\text{CN})_5\text{NO}^{2-}$	2.9×10^9	7.0	p.r.	P.b.k. in N ₂ O-satd. 0.5 mol L ⁻¹ 2-PrOH soln.	77A120
70.147	$\cdot\text{CO}_2^- + \text{Fe}(\text{CN})_5\dot{\text{N}}\text{O}^{2-} \rightarrow$ $\text{CO}_2 + \text{Fe}(\text{CN})_5\dot{\text{N}}\text{O}^{3-}$	3.7×10^8 4.0×10^8	7 7.0	p.r. p.r.	P.b.k. at 450 nm in N ₂ O-satd. 2×10^{-2} mol L ⁻¹ formate soln.; $I = 0.02$. P.b.k. in N ₂ O-satd. 0.1 mol L ⁻¹ formate soln.	69G052 77A120
71.	Pentacyanonitrosylferrate(III) radical ion (electron adduct)					
71.006	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2^- + \text{Fe}(\text{CN})_5\dot{\text{N}}\text{O}^{3-} \rightarrow$ $\text{Fe}(\text{CN})_5\text{N}(\text{O})\text{CH}_2\text{C}(\text{CH}_3)_2\text{CO}_2^{4-}$	$(2.0 \pm 0.3) \times 10^9$	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 $\text{Fe}(\text{CN})_5\text{NO}^{2-}$.	79A134
71.012	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{NH}_3^+ + \text{Fe}(\text{CN})_5\dot{\text{N}}\text{O}^{3-} \rightarrow$ $\text{Fe}(\text{CN})_5\text{N}(\text{O})\text{CH}_2\text{C}(\text{CH}_3)_2\text{NH}_3^{2-}$	$(1.2 \pm 0.2) \times 10^{10}$	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 <i>tert</i> -butylamine and 5×10^{-4} mol L ⁻¹ $\text{Fe}(\text{CN})_5\text{NO}^{2-}$.	79A134
71.013	$\cdot\text{CH}_2\text{C}(\text{CH}_3)(\text{NH}_3^+)\text{CO}_2^- +$ $\text{Fe}(\text{CN})_5\dot{\text{N}}\text{O}^{3-} \rightarrow$ $\text{Fe}(\text{CN})_5\text{N}(\text{O})\text{CH}_2\text{C}(\text{CH}_3)(\text{NH}_3)\text{CO}_2^{3-}$	$(1.6 \pm 0.2) \times 10^9$	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 $\text{Fe}(\text{CN})_5\text{NO}^{2-}$.	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	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Fe}(\text{CN})_5\text{NO}^{3-} \rightarrow \text{Fe}(\text{CN})_5\text{N}(\text{O})\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH}^{3-}$	$(2.5 \pm 0.4) \times 10^9$	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 <i>tert</i> -BuOH and 5×10^{-4} mol L ⁻¹ $\text{Fe}(\text{CN})_5\text{NO}^{2-}$.	79A134
71.017	$\cdot\text{CH}_2\text{COH}(\text{CH}_3)\text{CO}_2^- + \text{Fe}(\text{CN})_5\text{NO}^{3-} \rightarrow \text{Fe}(\text{CN})_5\text{N}(\text{O})\text{CH}_2\text{COH}(\text{CH}_3)\text{CO}_2^{4-}$	$(6.3 \pm 0.9) \times 10^8$	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 $\text{Fe}(\text{CN})_5\text{NO}^{2-}$.	79A134
71.055	$\text{CH}_3\text{CON}(\text{CH}_3)\dot{\text{C}}\text{H}_2 + \text{Fe}(\text{CN})_5\text{NO}^{3-} \rightarrow \text{Fe}(\text{CN})_5\text{N}(\text{O})\text{CH}_2\text{N}(\text{CH}_3)\text{C}(\text{O})\text{CH}_3^{3-}$	$(3.5 \pm 0.5) \times 10^{10}$	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 <i>N,N</i> -dimethylacetamide and 5×10^{-4} mol L ⁻¹ $\text{Fe}(\text{CN})_5\text{NO}^{2-}$.	79A134
72.	Tris(1,10-phenanthroline)iron(III) ion					
72.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Fe}(\text{phen})_3^{3+} \rightarrow \text{Fe}(\text{phen})_3^{2+}$	$\sim 10^7$	acid	p.r.	P.b.k. in soln. contg. <i>tert</i> -BuOH, H ₂ SO ₄ and HClO ₄ ; slower process follows fast H reaction.	79A174
	<i>Deuterohemin See 222.</i>					
	<i>Hemin See 224.</i>					
	<i>Hemin c See 225.</i>					
	<i>Methemerythrin See 256.</i>					
	Ga					
73.	Gallium(II) ions					
73.075	$\cdot\text{CH}_2\text{OH} + \text{Ga}^{2+} \rightarrow \text{CH}_2\text{O} + \text{H}^+ + \text{Ga}^+$	1.1×10^9	2.3	p.r.	D.k. in soln. contg. MeOH; Ga(II) formed from $e_{\text{aq}}^- + \text{Ga(III)}$; cor. to $I = 0$.	79A190
	$\cdot\text{CH}_2\text{OH} + \text{Ga}(\text{OH})^+ \rightarrow \text{CH}_2\text{O} + \text{H}_2\text{O} + \text{Ga}^+$	1.0×10^9	2.9			
	$\cdot\text{CH}_2\text{O}^- + \text{Ga}(\text{OH})_6^{4+} \rightarrow \text{prod.}$	7.8×10^8	12.0			
73.076	$\cdot\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{Ga}(\text{OH})_6^{4+} \rightarrow \text{prod.}$	1.2×10^9	12.0	p.r.	D.k. in soln. contg. EtOH; Ga(II) from $e_{\text{aq}}^- + \text{Ga(III)}$; cor. to $I = 0$.	79A190
73.078	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Ga}(\text{OH})_6^{4+} \rightarrow \text{prod.}$	1.7×10^9	12.0	p.r.	D.k. in soln. contg. 2-PrOH; Ga(II) from $e_{\text{aq}}^- + \text{Ga(III)}$; cor. to $I = 0$.	79A190
	Hg					
74.	Mercuric bromide					
74.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{HgBr}_2 \rightarrow \text{HgBr} + \text{Br}^- + \text{H}^+ + (\text{CH}_3)_2\text{CO}$	$(2.4 \pm 0.6) \times 10^9$		p.r.	P.b.k. in N ₂ O-satd. 0.1 mol L ⁻¹ 2-PrOH soln.	76A042
74.147	$\cdot\text{CO}_2^- + \text{HgBr}_2 \rightarrow \text{CO}_2 + \text{Hg(I)}$	$< 9 \times 10^9$		p.r.	P.b.k. at 360 nm in soln. contg. formate ion; based on max. optical density in various solns.; rel. rates are $\cdot\text{CO}_2^-$ 1.0, $(\text{CH}_3)_2\dot{\text{C}}\text{OH}$ 0.89, $\text{CH}_3\dot{\text{C}}\text{HOH}$ 0.87, and $\cdot\text{CH}_2\text{OH}$ 0.63.	76A087
75.	Mercuric chloride					
75.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{HgCl}_2 \rightarrow \text{HgCl} + \text{Cl}^- + \text{H}^+ + (\text{CH}_3)_2\text{CO}$	$(2.0 \pm 0.2) \times 10^9$		p.r.	P.b.k. in N ₂ O-satd. 0.1 mol L ⁻¹ 2-PrOH soln.	73G043 76A042
76.	Mercuric iodide					
76.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{HgI}_2$	$(7 \pm 2.5) \times 10^8$		p.r.	P.b.k. in N ₂ O-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 ĊOH + HgI ₂ → HgI + I ⁻ + H ⁺ + (CH ₃) ₂ CO	(2.0 ± 0.5) × 10 ⁹ (1.0 ± 0.5) × 10 ⁹		p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	76A042
76.147	·CO ₂ ⁻ + HgI ₂	(3.0 ± 1.0) × 10 ⁹		p.r.	P.b.k. in N ₂ O-satd. soln. contg. formate ion.	78A165
77.	Mercurous cyanide					
77.016	·CH ₂ C(CH ₃) ₂ OH + HgCN	1.6 × 10 ⁹		p.r.	Calcd. from increase in decay rate at 285 nm in soln. contg. <i>tert</i> -BuOH and Hg(CN) ₂ ; 2 <i>k</i> (HgCN + HgCN) = 3.4 × 10 ⁹ .	75A203
77.075	·CH ₂ OH + HgCN	4.0 × 10 ⁹		p.r.	Calcd. from increase in decay rate at 285 nm in soln. contg. MeOH and Hg(CN) ₂ ; 2 <i>k</i> (HgCN + HgCN) = 3.4 × 10 ⁹ .	75A203
77.076	CH ₃ ĊHOH + HgCN	3.9 × 10 ⁹		p.r.	Calcd. from increase in decay rate at 285 nm in soln. contg. EtOH and Hg(CN) ₂ ; 2 <i>k</i> (HgCN + HgCN) = 3.4 × 10 ⁹ .	75A203
77.078	(CH ₃) ₂ ĊOH + 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 ; 2 <i>k</i> (HgCN + HgCN) = 3.4 × 10 ⁹ .	75A203
78.	Mercuric cyanide					
78.147	·CO ₂ ⁻ + Hg(CN) ₂ → CO ₂ + Hg(I)	(3.4 ± 0.2) × 10 ⁹		p.r.	P.b.k. at 285 nm in N ₂ O-satd. soln. contg. formate.	75A203
79.	Mercuric thiocyanate					
79.078	(CH ₃) ₂ ĊOH + Hg(SCN) ₂ → HgSCN + SCN ⁻ + H ⁺ + (CH ₃) ₂ CO	(2.2 ± 0.5) × 10 ⁹		p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	76A042
I						
80.	Iodine					
80.001	·CH ₃ + I ₂ → ·[CH ₃ I ₂]	6.0 × 10 ⁹ (rel.)		p.r.	C.k. with O ₂ ; radical from MeI; rel. to <i>k</i> (CH ₃ + O ₂) = 4.7 × 10 ⁹ .	67G041
81.	Iodate ion					
81.076	CH ₃ ĊHOH + IO ₃ ⁻ CH ₃ ĊHO ⁻ + IO ₃ ⁻	< 5 × 10 ⁶ (7.5 ± 0.2) × 10 ⁸	6 11.8	p.r.	D.k. in N ₂ O-satd. soln. contg. EtOH.	72A018
Ir						
Iridium(IV) ions						
81a.	Hexachloroiridate(IV) ion					
81a.001	·CH ₃ + IrCl ₆ ²⁻	(1.15 ± 0.5) × 10 ⁹	6-7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln.; radical from dimethyl sulfoxide.	81A003
81a.002	·CH ₂ CH ₃ + IrCl ₆ ²⁻	(3.1 ± 0.8) × 10 ⁹	6-7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln.; radical from diethyl sulfoxide.	81A003
81a.002a	(CH ₃) ₂ ĊH + IrCl ₆ ²⁻	(3.6 ± 0.4) × 10 ⁹	6-7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln.; radical from di-(1-methylethyl) sulfoxide.	81A003
81a.002b	(CH ₃) ₃ Ċ + IrCl ₆ ²⁻	(3.8 ± 1.1) × 10 ⁹	6-7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln.; radical from di-(<i>tert</i> -butyl) sulfoxide.	81A003
81a.005	·CH ₂ CH ₂ Cl + IrCl ₆ ²⁻	~ 1 × 10 ⁹	6-7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln. contg. 1,2-dichloroethane.	81A003
81a.014	·CH ₂ CH ₂ OH + IrCl ₆ ²⁻	~ 2 × 10 ⁹	6-7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln. contg. ethylene.	81A003
81a.016	·CH ₂ C(CH ₃) ₂ OH + IrCl ₆ ²⁻	(1.2 ± 0.16) × 10 ⁹	6-7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln. contg. <i>tert</i> -BuOH.	81A003
81a.020	·CH ₂ CHO + 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	$\cdot\text{CH}_2\text{CO}_2^- + \text{IrCl}_6^{2-}$	4.2×10^8	7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln.	81A003
	$\cdot\text{CH}_2\text{CO}_2\text{H} + \text{IrCl}_6^{2-}$	1.4×10^9	3.3		contg. acetate.	
81a.040a	$\cdot\text{O}_2\dot{\text{C}}\text{CHCH}_2\text{CO}_2^- + \text{IrCl}_6^{2-}$	1.1×10^8	7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln.	81A003
	$\text{HO}_2\dot{\text{C}}\text{CHCH}_2\text{CO}_2\text{H} + \text{IrCl}_6^{2-}$	4.6×10^8	3.3		contg. succinate.	
81a.043	$\cdot\text{CH}_2\text{Cl} + \text{IrCl}_6^{2-}$	$\sim 1 \times 10^9$	6-7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln.	81A003
					contg. dichloromethane.	
81a.048	$\cdot\text{CCl}_3 + \text{IrCl}_6^{2-}$	2.8×10^7	6-7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln.	81A003
					contg. carbon tetrachloride.	
81a.075	$\cdot\text{CH}_2\text{OH} + \text{IrCl}_6^{2-}$	6.0×10^9	6-7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln.	81A003
					contg. MeOH.	
81a.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{IrCl}_6^{2-}$	4.5×10^9	6-7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln.	81A003
					contg. EtOH.	
81a.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{IrCl}_6^{2-}$	4.7×10^9	6-7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln.	81A003
					contg. 2-PrOH.	
81a.092	$\cdot\text{CH}_2\text{OCH}_3 + \text{IrCl}_6^{2-}$	6.5×10^9	6-7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln.	81A003
					contg. dimethyl ether.	
81a.093	$\text{CH}_3\dot{\text{C}}\text{HOC}_2\text{H}_5 + \text{IrCl}_6^{2-}$	5.7×10^9	6-7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln.	81A003
					contg. diethyl ether.	
81a.104	$-\text{CH}_2\dot{\text{C}}\text{HOCH}_2\text{CH}_2\text{O}- + \text{IrCl}_6^{2-}$	5.4×10^9	6-7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln.	81A003
					contg. dioxane.	
81a.115	$\cdot\text{CHOHCO}_2\text{H} + \text{IrCl}_6^{2-}$	2.3×10^9	3.3	p.r.	D.k. at 490 nm in N ₂ O-satd. soln.	81A003
	$\cdot\text{CHOHCO}_2^- + \text{IrCl}_6^{2-}$	2.0×10^9	6.9		contg. glycolate.	
	$\cdot\text{CH}(\text{O}^-)\text{CO}_2^- + \text{IrCl}_6^{2-}$	1.8×10^9	10.7			
81a.147	$\cdot\text{CO}_2^- + \text{IrCl}_6^{2-}$	1.7×10^9	6-7	p.r.	D.k. at 490 nm in N ₂ O-satd. soln.	81A003
					contg. formate.	
Mn						
82.	Manganese(II) ions					
82.147	$\cdot\text{CO}_2^- + \text{Mn}^{2+} \rightarrow \text{CO}_2 + \text{Mn}^+$	$< 2 \times 10^5$		p.r.	No effect of Mn ²⁺ on d.k. of $\cdot\text{CO}_2^-$ at 280 or 256 nm in N ₂ O-satd. soln. contg. 10 ⁻² mol L ⁻¹ formate.	76A109
83.	Permanganate ion					
83.001	$\cdot\text{CH}_3 + \text{MnO}_4^-$	1.05×10^9	6-7	p.r.	D.k. at 545 nm in N ₂ O-satd. soln.; radical from dimethyl sulfoxide.	81A003
83.002	$\cdot\text{CH}_2\text{CH}_3 + \text{MnO}_4^-$	$\sim 2 \times 10^9$	6-7	p.r.	D.k. at 545 nm in N ₂ O-satd. soln. radical from diethyl sulfoxide.	81A003
83.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{MnO}_4^-$	1.3×10^9	6-7	p.r.	D.k. at 545 nm in N ₂ O-satd. soln. contg. <i>tert</i> -BuOH.	81A003
83.043	$\cdot\text{CH}_2\text{Cl} + \text{MnO}_4^-$	$\sim 1 \times 10^9$	6-7	p.r.	D.k. at 545 nm in N ₂ O-satd. soln. contg. dichloromethane.	81A033
83.045	$\cdot\text{CHCl}_2 + \text{MnO}_4^-$	$\sim 1 \times 10^9$	6-7	p.r.	D.k. at 545 nm in N ₂ O-satd. soln. contg. chloroform.	81A003
83.048	$\cdot\text{CCl}_3 + \text{MnO}_4^-$	$\sim 4 \times 10^8$	6-7	p.r.	D.k. at 545 nm in N ₂ O-satd. soln. contg. carbon tetrachloride.	81A003
83.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{MnO}_4^-$	$(4.2 \pm 0.4) \times 10^9$	7.0	p.r.	D.k. at 545 nm in N ₂ O-satd. soln. contg. 2-PrOH.	73A104
83.097	$\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CH}_2\text{CO}_2^- + \text{MnO}_4^-$	$(4.8 \pm 0.5) \times 10^9$	9.2	p.r.	D.k. at 545 nm in Ar-satd. soln. contg. acetoacetate and <i>tert</i> -BuOH.	73A104
83.104	$-\text{CH}_2\dot{\text{C}}\text{HOCH}_2\text{CH}_2\text{O}- + \text{MnO}_4^-$	$(6.5 \pm 1.3) \times 10^9$	6-7	p.r.	D.k. at 545 nm in N ₂ O-satd. soln. contg. dioxane.	81A003
Nitrogen compounds						
84.	Hydroxylamine					
84.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NH}_2\text{OH} \rightarrow \cdot\text{NH}_2$	$\leq 3 \times 10^3$	< 2	chem.	Est. from esr in Ti(III)-NH ₂ OH 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	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{N}_2\text{O}$	$(3.8 \pm 0.4) \times 10^4$ (rel.)	13.5	γ -r.	Est. from $G(\text{acetone})$ based on an assumed mechanism and values for competing reactions.	72G167
86.	Nitrite ion					
86.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{NO}_2^-$	$< 5 \times 10^6$	6	p.r.	D.k. in N_2O -satd. EtOH soln.	72A018
87.	Nitrate ion					
87.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{NO}_3^-$	$< 5 \times 10^6$	6	p.r.	D.k. in N_2O -satd. EtOH soln.	72A018
87.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NO}_3^-$	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 $G(\text{R}) = 5.8$ and $2k(\text{R} + \text{R}) = 1.4 \times 10^9$.	80N062
	Ni					
88.	Nickel(I) ion					
88.004	$c\text{-}\dot{\text{C}}_5\text{H}_9 + \text{Ni}^+ \rightarrow \text{C}_5\text{H}_9\text{Ni}^+$	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	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Ni}^+ \rightarrow \text{Ni}^{2+} + \text{CH}_2=\text{C}(\text{CH}_3)_2 + \text{OH}^-$	3×10^9		p.r.	D.k. at 300 nm (Ni^+) in soln. contg. NiSO_4 and <i>tert</i> -BuOH; assume $G(\text{Ni}^+) = G(\text{R}) = 2.7$.	74A037
88.075	$\cdot\text{CH}_2\text{OH} + \text{Ni}^+ \rightarrow \text{NiCH}_2\text{OH}^+$	4.2×10^9		p.r.	D.k. at 300 nm (as well as p.b.k. at 250 nm); assume $G(\text{Ni}^+) = G(\text{R}) = 3.2$; soln. contains NiSO_4 and MeOH.	74A037
88.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Ni}^+ \rightarrow \text{NiCHOHCH}_3^+$	2.3×10^9		p.r.	D.k. at 300 nm (as well as p.b.k.) in soln. contg. NiSO_4 and EtOH.	74A037
88.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ni}^+ \rightarrow \text{NiC}(\text{OH})(\text{CH}_3)_2^+$	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	$\cdot\text{CO}_2^- + \text{Ni}^+ \rightarrow \text{NiCO}_2$	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	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Ni}^{2+}$	$< 10^6$		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 <i>tert</i> -BuOH.	75A027
89.075	$\cdot\text{CH}_2\text{OH} + \text{Ni}^{2+}$	$< 10^2$		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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Ni}^{2+}$	$< 10^6$		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	$\cdot\text{CO}_2^- + \text{Ni}^{2+} \rightarrow \text{CO}_2 + \text{Ni}^+$	$10^2 < k < 10^5$		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	$\cdot\text{CO}_2^- + \text{Ni}(\text{CN})_4^{2-} \rightarrow \text{CO}_2 + \text{Ni}(\text{CN})_4^{3-}$	$(1.2 \pm 0.1) \times 10^9$		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	$\cdot\text{CO}_2^- + \text{Ni}^{\text{II}}\text{L} \rightarrow \text{Ni}^{\text{I}}\text{L} + \text{CO}_2$	5.7×10^9	7.0	p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L ⁻¹ formate; $\text{Ni}(\text{I})$ 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	$\cdot\text{CO}_2^- + \text{Ni}^{\text{II}}\text{L} \rightarrow \text{Ni}^{\text{I}}\text{L} + \text{CO}_2$	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	$\cdot\text{CH}_3 + \text{O}_2 \rightarrow \text{CH}_3\text{O}_2\cdot$	$(4.7 \pm 0.7) \times 10^9$	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	$\cdot\text{CH}_2\text{CH}_3 + \text{O}_2 \rightarrow \text{C}_2\text{H}_5\text{O}_2\cdot$	$(2.9 \pm 0.8) \times 10^9$	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	$c\text{-}\dot{\text{C}}_5\text{H}_9 + \text{O}_2 \rightarrow \text{RO}_2\cdot$	$(4.9 \pm 0.6) \times 10^9$	7	p.r.	P.b.k. at 270 nm in N_2O -satd. soln. contg. cyclopentane.	74A051
93.007	$\text{R} + \text{O}_2 \rightarrow \text{RO}_2\cdot$ (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	$\text{R} + \text{O}_2 \rightarrow \text{RO}_2\cdot$ (R = Radicals from linoleate)	3×10^8	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	$\text{R} + \text{O}_2 \rightarrow \text{RO}_2\cdot$ (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 - 0.8×10^{-3} mol L ⁻¹ soap.	78A365
93.010	$\text{R} + \text{O}_2 \rightarrow \text{RO}_2\cdot$ (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	$\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{O}_2 \rightarrow \cdot\text{O}_2\text{CH}_2\text{CH}_2\text{OH}$	$(6.6 \pm 1.3) \times 10^9$	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 $\cdot\text{C}_2\text{H}_5$ from H addn.	67G269
93.035	$\cdot\text{CH}_2\text{CO}_2^- + \text{O}_2 \rightarrow \cdot\text{O}_2\text{CH}_2\text{CO}_2^-$	$(5.0 \pm 0.8) \times 10^8$	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 $k(\text{R} + \text{R}) = 5.5 \times 10^8$.	76A082
93.036	$\cdot\text{CH}_2\text{CO}_2\text{CH}_3 + \text{O}_2 \rightarrow \cdot\text{O}_2\text{CH}_2\text{CO}_2\text{CH}_3$	$(1.8 \pm 0.2) \times 10^9$	4	p.r.	D.k. at 340 nm in soln. contg. methyl chloroacetate and formate ion.	78A402
93.052	$\text{CH}_3\dot{\text{C}}\text{HN}^+(\text{C}_2\text{H}_5)_3 + \text{O}_2 \rightarrow \text{addn.}$		13	p.r.	Est. that $k(\text{R} + \text{R})/k(\text{R} + \text{O}_2) \approx 10$.	78A095
93.057	$\text{NH}_2\dot{\text{C}}\text{HCO}_2^- + \text{O}_2$	$\sim 1 \times 10^9$	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 $2k(\text{R} + \text{ferricyanide}) = 1 \times 10^9$.	76A082
93.062	$\text{R} + \text{O}_2 \rightarrow \text{RO}_2\cdot$ (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	$\text{R} + \text{O}_2 \rightarrow \text{RO}_2\cdot$ (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	$\text{R} + \text{O}_2 \rightarrow \text{RO}_2\cdot$ (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	$\text{R} + \text{O}_2 \rightarrow \text{RO}_2\cdot$ (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	$\cdot\text{CH}_2\text{OH} + \text{O}_2 \rightarrow \cdot\text{O}_2\text{CH}_2\text{OH}$	4.9×10^9 (rel.)	7	p.r.	C.k. in 0.1 mol L ⁻¹ MeOH soln. contg. ferricyanide; $k(\text{R} + \text{ferricyanide}) = 4.0 \times 10^9$.	69G522
		$(4.2 \pm 0.5) \times 10^9$	10.7	p.r.	Calcd. from abs. at 248 nm assuming $k[\text{O}_2] = \text{rate of } \text{O}_2^- \text{ formn. from peroxy radical.}$	74A099
93.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{O}_2 \rightarrow \cdot\text{O}_2\text{CHOHCH}_3$	3.6×10^8 (rel.)	7	p.r.	C.k. with RNO [$k(\text{R} + \text{RNO}) = 2.4 \times 10^9$].	69G156
		4.6×10^9 (rel.)	7	p.r.	C.k. in 0.1 mol L ⁻¹ EtOH soln. contg. ferricyanide; $k(\text{R} + \text{ferricyanide}) = 5.3 \times 10^9$.	69G522
93.077	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{O}_2$	4.7×10^9 (rel.)	7	p.r.	C.k. in 0.1 mol L ⁻¹ 1-PrOH soln. contg. ferricyanide; $k(\text{R} + \text{ferricyanide}) = 5.3 \times 10^9$.	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 ĊOH + O ₂ → (CH ₃) ₂ C(OH)O ₂ ·	6.2 x 10 ⁸ (rel.) 4.2 x 10 ⁹ (rel.) 3.5 x 10 ⁹ (rel.) (4.5 ± 0.5) x 10 ⁹	7 7 5-6 ~1	p.r. p.r. p.r. p.r.	C.k. with RNO [$k(R + RNO) = 3.2 \times 10^9$]. C.k. in 0.1 mol L ⁻¹ 2-PrOH soln. contg. ferricyanide; $k(R + ferricyanide) = 4.7 \times 10^9$. C.k. in N ₂ O-satd. 0.1 mol L ⁻¹ 2-PrOH soln. with <i>p</i> -nitroacetophenone; $k(R + PNAP) = 3.8 \times 10^9$. 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 .	69G156 69G522 71G618 74A074
93.080	CH ₃ CH ₂ ĊOHCH ₃ + O ₂	4.0 x 10 ⁹ (rel.)	7	p.r.	C.k. in soln. contg. 0.3 mol L ⁻¹ 2-BuOH with ferricyanide; $k(R + ferricyanide) = 4.8 \times 10^9$.	69G522
93.081	(CH ₃) ₂ CHĊHOH + O ₂	3.4 x 10 ⁹ (rel.)	7	p.r.	C.k. in soln. contg. 0.3 mol L ⁻¹ 2-methyl-1-propanol with ferricyanide; $k(R + ferricyanide) = 3.0 \times 10^9$.	69G522
93.090	CH ₃ CO ₂ ĊH ₂ + O ₂ → CH ₃ CO ₂ CH ₂ O ₂ ·	(1.35 ± 0.15) x 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 ₂ O.	78A402
93.100	·CHOHCH(NH ₂)CO ₂ ⁻ + O ₂	2.4 x 10 ⁹ (rel.)	7	p.r.	C.k. in 0.3 mol L ⁻¹ serine soln. contg. ferricyanide; $k(R + ferricyanide) = 3.2 \times 10^9$.	69G522
93.101	·CHOHCH ₂ OH + O ₂	3.2 x 10 ⁹ (rel.)	7	p.r.	C.k. in soln. contg. 0.3 mol L ⁻¹ ethylene glycol with ferricyanide; $k(R + ferricyanide) = 3.6 \times 10^9$.	69G522
93.105	R + O ₂ (R = Radicals from polyethylene oxide)	(1.9 - 2.9) x 10 ⁹	7	p.r.	C.k. in soln. contg. ~2% polyethylene oxide with ferricyanide; $k(R + ferricyanide) = 2.1 \times 10^9$.	69G522
93.106	·CHOHCHOHCH ₂ OH + O ₂ (+ CH ₂ OHĊOHCH ₂ OH)	3.3 x 10 ⁹ (rel.)	7	p.r.	C.k. in soln. contg. 0.4 mol L ⁻¹ glycerol with ferricyanide; $k(R + ferricyanide) = 3.3 \times 10^9$.	69G522
93.108	R + O ₂ (R = Radicals from deoxyribose)	2.0 x 10 ⁹ (rel.)	5-6	p.r.	C.k. with ferricyanide in N ₂ O-satd. soln. contg. deoxyribose; rel. to $k(R + ferricyanide) = 2.8 \times 10^9$.	71G618
93.111	R + O ₂ (R = Radicals from glucose)	1.6 x 10 ⁹ (rel.)	7	p.r.	C.k. in soln. contg. 0.3 mol L ⁻¹ glucose and ferricyanide; $k(R + ferricyanide) = 1.9 \times 10^9$.	69G522
93.113	·A ⁻ + O ₂ (A = Radical from ascorbate)	< 5 x 10 ² ~ 6 x 10 ²	8.6	p.r.	D.k. at 360 nm in N ₂ O-satd. soln. contg. ascorbate ion.	75A240
93.115	·CHOHCO ₂ ⁻ + O ₂	1.8 x 10 ⁹ (rel.)	7	γ-r. p.r.	Obs. rate of consumption of O ₂ . C.k. in 0.3 mol L ⁻¹ glycolate soln. contg. ferricyanide; $k(R + ferricyanide) = 5 \times 10^8$.	78A417 69G522
93.117	CH ₃ ĊOHCO ₂ ⁻ + O ₂ → CH ₃ C(ĊO ₂)(OH)CO ₂ ⁻	2.6 x 10 ⁹ (rel.) (3.5 ± 0.5) x 10 ⁸	7 7.3	p.r. p.r.	C.k. in 0.3 mol L ⁻¹ lactate soln. contg. ferricyanide; $k(R + ferricyanide) = 1.5 \times 10^9$. D.k. at 270 nm in N ₂ O-satd. soln. contg. lactate ion.	69G522 73A052
93.123	·CH(OH) ₂ + O ₂ → ·O ₂ CH(OH) ₂ ⇌ ·O ₂ CH(OH)O ⁻ + H ⁺	7.7 x 10 ⁸ (4.5 ± 0.7) x 10 ⁹	5.7 3.5-6.5	p.r. p.r.	D.k. at 250 nm in N ₂ O-satd. soln. contg. formaldehyde, as well as condy. increase. Condy. increase in oxygenated soln. contg. 5 x 10 ⁻³ mol L ⁻¹ formaldehyde; products are formate and H ₂ O ₂ .	71G424 80A282
93.126	CCl ₃ Ċ(OH) ₂ + O ₂ → ·O ₂ C(OH) ₂ CCl ₃	(1.0 ± 0.2) x 10 ⁸	5.9	p.r.	D.k. at 250 nm in N ₂ O-satd. soln. contg. chloral.	73G062
93.141	R + O ₂ (R = Electron adduct of dimethyl fumarate)	5.3 x 10 ⁹ 2.2 x 10 ⁹	11	p.r. p.r.	D.k. D.k.	67G729 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	$\cdot\text{CO}_2^- + \text{O}_2 \rightarrow \text{CO}_2 + \text{O}_2^-$	7.7×10^8 (rel.)	7	p.r.	C.k. with RNO in N ₂ O-std. soln. contg. formate; $k(\text{R} + \text{RNO}) = 1.84 \times 10^9$.	69G156
		2.4×10^9 (rel.)	7	p.r.	C.k. with ferricyanide in 0.3 mol L ⁻¹ formate soln.; $k(\text{R} + \text{ferricyanide}) = 1.06 \times 10^9$.	69G522
		$(2.0 \pm 0.4) \times 10^9$	8.0	p.r.	P.b.k. at 260 nm in 0.1 mol L ⁻¹ formate soln. satd. with oxygen.	76A072
		$(4.2 \pm 0.4) \times 10^9$	6.8	p.r.	D.k. at 270 nm and 300 nm in 0.18 mol L ⁻¹ formate ion.	76A132
		1×10^9 (rel.)	1-4	p.r.	Est. from buildup of C(NO ₂) ₃ ⁻ in O ₂ -satd. 0.01 mol L ⁻¹ HCO ₂ H contg. C(NO ₂) ₄ ; rel. to $k(\text{R} + \text{TNM}) = 4 \times 10^9$.(336.147)	78A177
94.	Hydrogen peroxide					
94.001	$\cdot\text{CH}_3 + \text{H}_2\text{O}_2$	$<10^6$	nat	p.r.	Addn. of 10 ⁻³ and 10 ⁻² mol L ⁻¹ H ₂ O ₂ had no effect on second order d.k. of $\cdot\text{CH}_3$. Suggested that reaction is slow compared to $\text{R} + \text{R}$ and may form HO ₂ .	75A055
94.003	$\cdot\text{C}_5\text{H}_{11} + \text{H}_2\text{O}_2$	3.4×10^4 (rel.)		γ -r.	Est. from dose rate effect on G(H ₂ O ₂), assuming $2k(\text{R} + \text{R}) = 2 \times 10^9$ in soln. contg. 5×10^{-3} mol L ⁻¹ pentane and 10 ⁻² mol L ⁻¹ N ₂ O.	76A254
94.004	$c\text{-}\dot{\text{C}}_5\text{H}_9 + \text{H}_2\text{O}_2$	4.6×10^4 (rel.)		γ -r.	Est. from dose rate effect on G(H ₂ O ₂), assuming $2k(\text{R} + \text{R}) = 1.5 \times 10^9$ in soln. contg. 2.5×10^{-3} mol L ⁻¹ cyclopentane and 10 ⁻² mol L ⁻¹ N ₂ O.	76A254
94.016a	$\text{R} + \text{H}_2\text{O}_2$ (R = Radicals from cyclopentene + OH, 73% addn., 23% abstraction)	3.7×10^4 (rel.)		γ -r.	Est. from dose rate effect on G(H ₂ O ₂), assuming $2k(\text{R} + \text{R}) = 1.5 \times 10^9$ in soln. contg. 8.2×10^{-3} mol L ⁻¹ cyclopentene and 10 ⁻² mol L ⁻¹ N ₂ O.	76A254
94.075	$\cdot\text{CH}_2\text{OH} + \text{H}_2\text{O}_2 \rightarrow \text{CH}_2\text{O} + \text{H}_2\text{O} + \text{OH}$	$(4.0 \pm 0.4) \times 10^4$ (rel.)		γ -r.	Calcd. from dose rate effect on H ₂ O ₂ redn. in 0.99 mol L ⁻¹ MeOH soln. assuming $2k(\text{R} + \text{R}) = 2.4 \times 10^9$.	70G338
		$(2.3 \pm 0.8) \times 10^4$ (rel.)		chem.	Calcd. from esr of Ti(III)-H ₂ O ₂ soln. contg. MeOH and <i>tert</i> -BuOH; $2k(\text{R} + \text{R}) = 2 \times 10^9$.	74D144
94.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{H}_2\text{O}_2 \rightarrow \text{CH}_3\text{CHO} + \text{H}_2\text{O} + \text{OH}$	1.5×10^5 (rel.)		γ -r.	Calcd. from dose rate effect on G(H ₂ O ₂) in soln. contg. EtOH assuming $2k(\text{R} + \text{R}) = 2.0 \times 10^9$.	67G094
94.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{H}_2\text{O}_2 \rightarrow \text{CH}_3\text{COCH}_3 + \text{H}_2\text{O} + \text{OH}$	5×10^5 (rel.)	1,7	phot.	Esr; effect of [H ₂ O ₂] on [R] in soln. contg. 2-PrOH and acetone; $2k(\text{R} + \text{R}) = 1.4 \times 10^9$.	71D227
94.093	$\text{CH}_3\dot{\text{C}}\text{HOC}_2\text{H}_5 + \text{H}_2\text{O}_2$	$(5.5 \pm 1.1) \times 10^4$ (rel.)		chem.	Calcd. from esr in Ti(III)-H ₂ O ₂ soln. contg. Et ₂ O; assumed $2k(\text{R} + \text{R}) = 3 \times 10^9$.	74D144
94.094	$-\text{O}\dot{\text{C}}\text{H}(\text{CH}_2)_3- + \text{H}_2\text{O}_2$	3.0×10^4 (rel.)		chem.	Calcd. from esr in Ti(III)-H ₂ O ₂ soln. contg. tetrahydrofuran; assumed $2k(\text{R} + \text{R}) = 3 \times 10^9$.	74D144
94.104	$-\text{O}\dot{\text{C}}\text{HCH}_2\text{O}(\text{CH}_2)_2- + \text{H}_2\text{O}_2$	$(3.0 \pm 0.6) \times 10^4$ (rel.)		chem.	Calcd. from esr in Ti(III)-H ₂ O ₂ soln. contg. dioxane and <i>tert</i> -BuOH; assumed $2k(\text{R} + \text{R}) = 2 \times 10^9$.	74D144
94.124	$\cdot\text{CH}(\text{OCH}_3)_2 + \text{H}_2\text{O}_2$	$(1.1 \pm 0.3) \times 10^6$ (rel.)		chem.	Calcd. from esr in Ti(III)-H ₂ O ₂ soln. contg. dimethoxymethane; assumed $2k(\text{R} + \text{R}) = 2 \times 10^9$.	74D144
94.125	$-\text{O}\dot{\text{C}}\text{HO}(\text{CH}_2)_2- + \text{H}_2\text{O}_2$	$>6 \times 10^4$ (rel.)		chem.	Calcd. from esr in Ti(III)-H ₂ O ₂ soln. contg. dioxolane; assumed $2k(\text{R} + \text{R}) = 3 \times 10^9$.	74D144
94.147	$\cdot\text{CO}_2^- + \text{H}_2\text{O}_2$	$<7 \times 10^5$ (rel.)	7	phot.	Calcd. from assumed chain mechanism in CO-H ₂ O ₂ soln.; $k < 2.2 \times 10^6$ assuming $2k(\text{R} + \text{R}) < 10^{10}$, recalcd. in 74D144 assuming $2k(\text{R} + \text{R}) = 3 \times 10^9$.	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	$\cdot\text{CH}_2\text{OH} + \text{Pb}^+ \rightarrow \text{PbCH}_2\text{OH}^+$	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	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Pb}^+ \rightarrow \text{PbCHOHCH}_3^+$	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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Pb}^+ \rightarrow \text{PbC}(\text{CH}_3)_2\text{OH}^+$	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	$\cdot\text{CHOHC}(\text{CH}_2\text{OH})_3 + \text{Pb}^+ \rightarrow \text{PbCHOHC}(\text{CH}_2\text{OH})_3^+$	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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Pb}^{2+} \rightarrow (\text{CH}_3)_2\text{CO} + \text{Pb}^+ + \text{H}^+$	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 μ s after pulse; Pb ⁺ formed initially by $e_{\text{aq}}^- + \text{Pb}^{2+}$.	76A170
Pt						
97.	trans-Dichlorobis(ethylenediamine)platinum(IV) ion					
97.075	$\cdot\text{CH}_2\text{OH} + \text{Pt}(\text{en})_2\text{Cl}_2^{2+} \rightarrow \text{Pt(III)}$	$(6.9 \pm 1.0) \times 10^8$	7	p.r.	P.b.k. at 240–340 nm in N ₂ O-satd. soln. contg. 1–4 mol L ⁻¹ MeOH.	75A188
97.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Pt}(\text{en})_2\text{Cl}_2^{2+} \rightarrow \text{Pt(III)}$	$(8.1 \pm 1.1) \times 10^8$	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	$\cdot\text{CH}_2\text{OH} + \text{Rh}(\text{bpy})_3^{3+}$	$(2.2 \pm 0.2) \times 10^8$	7	p.r.	P.b.k.	74A167
98.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Rh}(\text{bpy})_3^{3+}$	$(2.9 \pm 0.3) \times 10^9$	7	p.r.	P.b.k.; same product as from e_{aq}^- .	74A167
98.147	$\cdot\text{CO}_2^- + \text{Rh}(\text{bpy})_3^{3+}$	$(6.2 \pm 0.6) \times 10^9$	7	p.r.	P.b.k.; same product as from e_{aq}^- .	74A167
98a.	Tris(1,10-phenanthroline)rhodium(III) ion					
98a.075	$\cdot\text{CH}_2\text{OH} + \text{Rh}(\text{phen})_3^{3+} \rightarrow$ addn. to ligand	4×10^8		p.r.	P.b.k. at 475 nm in N ₂ O-satd. soln. contg. 2.5 mol L ⁻¹ MeOH.	80A227
98a.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Rh}(\text{phen})_3^{3+} \rightarrow$ addn. to ligand	2.5×10^9		p.r.	P.b.k. at 475 nm in N ₂ O-satd. soln. contg. 0.25 mol L ⁻¹ EtOH.	80A227
98a.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Rh}(\text{phen})_3^{3+} \rightarrow \text{Rh}(\text{phen})_3^{2+}$	3.2×10^9	~7	p.r.	P.b.k. at 365 nm in N ₂ O-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	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Ru}(\text{bpy})_3^{2+}$	$< 10^6$	7	p.r.	P.b.k.; no reduction.	78A068
99.075	$\cdot\text{CH}_2\text{O}^- + \text{Ru}(\text{bpy})_3^{2+} \rightarrow \text{Ru}(\text{bpy})_3^+$	2.9×10^9	11–13	p.r.	Same product as from e_{aq}^- reaction; suggested to be $[\text{Ru}(\text{bpy})_2(\text{bpy}^-)]^+$ [72G381].	78A068
99.076	$\cdot\text{CH}_2\text{OH} + \text{Ru}(\text{bpy})_3^{2+}$	$< 10^6$	7	p.r.	No reduction.	78A068
	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{Ru}(\text{bpy})_3^{2+}$	7.0×10^9	11–13	p.r.	Same product as from e_{aq}^- reaction.	78A068
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Ru}(\text{bpy})_3^{2+}$	$< 10^6$	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 ĊO ⁻ + Ru(bpy) ₃ ²⁺ → Ru(bpy) ₃ ⁺	4.9 x 10 ⁹	11–13	p.r.	Same product as from e _{aq} ⁻ reaction.	78A068
	(CH ₃) ₂ ĊOH + Ru(bpy) ₃ ²⁺	<10 ⁶	7	p.r.	No reduction	78A068
		~1.5 x 10 ⁸	1	p.r.	Radical addn. to ligand.	80A227
99.147	·CO ₂ ⁻ + Ru(bpy) ₃ ²⁺	<10 ⁶	7	p.r.	No reduction.	78A068
99a.	Tris(1,10-phenanthroline)ruthenium(II) ion					
99a.075	·CH ₂ O ⁻ + Ru(phen) ₃ ²⁺ → Ru(phen) ₃ ⁺	5.2 x 10 ⁹	11	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2.5 mol L ⁻¹ MeOH.	80A227
99a.076	CH ₃ ĊHO ⁻ + Ru(phen) ₃ ²⁺ → Ru(phen) ₃ ⁺	5.9 x 10 ⁹	12	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.25 mol L ⁻¹ EtOH; $k \approx 10^8$ at pH 1.	80A227
99a.078	(CH ₃) ₂ ĊO ⁻ + Ru(phen) ₃ ²⁺ → Ru(phen) ₃ ⁺	3.7 x 10 ⁹	13	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.25 mol L ⁻¹ 2-PrOH.	80A227
	(CH ₃) ₂ ĊOH + Ru(phen) ₃ ²⁺	8 x 10 ⁸	1	p.r.	P.b.k. in Ar-satd. soln.	80A227
	Ruthenium(III) ions					
100.	Hexaammineruthenium(III) ion					
100.035	·CH ₂ CO ₂ H + Ru(NH ₃) ₆ ³⁺	<3.0 x 10 ⁷	2.5	p.r.	D.k. in Ar-satd. 0.01 mol L ⁻¹ acetic acid soln.	72A018
		<5 x 10 ⁶	3.9	p.r.	D.k. in N ₂ O-satd. 0.5–1 mol L ⁻¹ acetic acid soln.	77A100
	·CH ₂ CO ₂ ⁻ + Ru(NH ₃) ₆ ³⁺	<1 x 10 ⁷	7.3	p.r.	D.k. in N ₂ O-satd. 0.01 mol L ⁻¹ acetate soln.	72A018
100.042	·CH(CO ₂ H) ₂ + Ru(NH ₃) ₆ ³⁺	<1.1 x 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)ĊH ₂ + Ru(NH ₃) ₆ ³⁺	<3.0 x 10 ⁷	6.0	p.r.	D.k. in N ₂ O-satd. 10 ⁻² mol L ⁻¹ dimethylformamide soln.; e ⁻ -transfer.	72A018
100.056	NH ₂ ĊHCO ₂ ⁻ + Ru(NH ₃) ₆ ³⁺	(4.0 ± 0.6) x 10 ⁸	5.7	p.r.	D.k. in N ₂ O-satd. 0.01 mol L ⁻¹ glycine soln.; e ⁻ -transfer.	72A018
100.075	·CH ₂ OH + Ru(NH ₃) ₆ ³⁺ → CH ₂ O + H ⁺ + Ru(NH ₃) ₆ ²⁺	(4.1 ± 0.6) x 10 ⁷	5–6	p.r.	D.k. in N ₂ O-satd. 0.01 mol L ⁻¹ MeOH soln.	72A018
100.076	CH ₃ ĊHOH + Ru(NH ₃) ₆ ³⁺	(5.5 ± 1.6) x 10 ⁸	5–6	p.r.	D.k. in N ₂ O-satd. 0.01 mol L ⁻¹ EtOH soln.; e ⁻ -transfer.	72A018
100.078	(CH ₃) ₂ ĊOH + Ru(NH ₃) ₆ ³⁺	(9.2 ± 1.4) x 10 ⁸	5–6	p.r.	D.k. in N ₂ O-satd. 0.01 mol L ⁻¹ 2-PrOH soln.; e ⁻ -transfer.	72A018
100.093	CH ₃ ĊHOC ₂ H ₅ + Ru(NH ₃) ₆ ³⁺	(1.0 ± 0.15) x 10 ⁸	3.5–4	p.r.	D.k. in N ₂ O-satd. 0.5–1 mol L ⁻¹ ethyl ether soln.	77A100
100.104	·OĊHCH ₂ O(CH ₂) ₂ · + Ru(NH ₃) ₆ ³⁺	(5.0 ± 0.75) x 10 ⁶	3.5–4	p.r.	D.k. in N ₂ O-satd. 0.5–1 mol L ⁻¹ dioxane soln.	77A100
100.107	CH ₃ COĊ(OH)CH ₃ + Ru(NH ₃) ₆ ³⁺	<3.8 x 10 ⁶	1.2	p.r.	D.k. in Ar-satd. 10 ⁻³ mol L ⁻¹ biacetyl soln.	72A018
		2.0 x 10 ⁹	5.5	p.r.	D.k. in N ₂ O-satd. 10 ⁻² mol L ⁻¹ biacetyl soln.	72A018
100.117	CH ₃ ĊOHCO ₂ ⁻ + Ru(NH ₃) ₆ ³⁺	(2.5 ± 0.4) x 10 ⁹	6.0	p.r.	D.k. in N ₂ O-satd. 10 ⁻² mol L ⁻¹ lactate ion; e ⁻ -transfer.	72A018
100.127	·CONH ₂ + Ru(NH ₃) ₆ ³⁺	<7.0 x 10 ⁷	6.2	p.r.	D.k. in N ₂ O-satd. 10 ⁻² mol L ⁻¹ formamide soln.; e ⁻ -transfer.	72A018
100.147	·CO ₂ ⁻ + Ru(NH ₃) ₆ ³⁺ → CO ₂ + Ru(NH ₃) ₆ ²⁺	(2.0 ± 0.6) x 10 ⁹	4.8	p.r.	D.k. in N ₂ O-satd. 10 ⁻² mol L ⁻¹ formate soln.; e ⁻ -transfer.	72A018
101.	Bromopentaammineruthenium(III) ion					
101.035	·CH ₂ CO ₂ H + Ru(NH ₃) ₅ Br ²⁺	(4.6 ± 0.7) x 10 ⁸	3.9	p.r.	D.k. in N ₂ O-satd. 0.5–1 mol L ⁻¹ acetic acid.	77A100
101.093	CH ₃ ĊHOC ₂ H ₅ + Ru(NH ₃) ₅ Br ²⁺	(5.8 ± 0.9) x 10 ⁸	3.5–4	p.r.	D.k. in N ₂ O-satd. 0.5–1 mol L ⁻¹ ethyl ether soln.	77A100
101.104	·OĊHCH ₂ O(CH ₂) ₂ · + Ru(NH ₃) ₅ Br ²⁺	(2.7 ± 0.4) x 10 ⁸	3.5–4	p.r.	D.k. in N ₂ O-satd. 0.5–1 mol L ⁻¹ dioxane soln.	77A100
102.	Chloropentaammineruthenium(III) ion					
102.035	·CH ₂ CO ₂ H + Ru(NH ₃) ₅ Cl ²⁺	(4.0 ± 0.6) x 10 ⁷	3.9	p.r.	D.k. in N ₂ O-satd. soln. contg. 0.5–1 mol L ⁻¹ acetic acid.	77A100
102.075	·CH ₂ OH + Ru(NH ₃) ₅ Cl ²⁺	(1.2 ± 0.2) x 10 ⁸	3.4–5	p.r.	D.k. in N ₂ O-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 ĊHOH + Ru(NH ₃) ₅ Cl ²⁺	(8.0 ± 1.2) × 10 ⁸	3.5–4	p.r.	D.k. in N ₂ O–satd. soln. contg. 0.5–1 mol L ⁻¹ ethanol.	77A100
102.078	(CH ₃) ₂ ĊOH + Ru(NH ₃) ₅ Cl ²⁺	(1.3 ± 0.2) × 10 ⁹	3.5–4	p.r.	D.k. in N ₂ O–satd. soln. contg. 0.5–1 mol L ⁻¹ 2-propanol.	77A100
102.093	CH ₃ ĊHOC ₂ H ₅ + Ru(NH ₃) ₅ Cl ²⁺	(2.6 ± 0.4) × 10 ⁸	3.5–4	p.r.	D.k. in N ₂ O–satd. soln. contg. 0.5–1 mol L ⁻¹ ethyl ether.	77A100
102.104	–OĊHCH ₂ O(CH ₂) ₂ – + Ru(NH ₃) ₅ Cl ²⁺	(8.3 ± 1.2) × 10 ⁷	3.5–4	p.r.	D.k. in N ₂ O–satd. soln. contg. 0.5–1 mol L ⁻¹ dioxane.	77A100
103.	Nitrosopentaammineruthenium(III) ion					
103.078	(CH ₃) ₂ ĊOH + Ru(NH ₃) ₅ NO ³⁺ → Ru(NH ₃) ₅ NO ²⁺ + (CH ₃) ₂ CO + H ⁺	5.5 × 10 ⁸	5.0	p.r.	P.b.k. at 280 nm in N ₂ O–satd. soln. contg. 0.5 mol L ⁻¹ 2-PrOH.	75A049
103.147	·CO ₂ ⁻ + Ru(NH ₃) ₅ NO ³⁺ → Ru(NH ₃) ₅ NO ²⁺ + CO ₂	3.1 × 10 ⁹	6.6	p.r.	P.b.k. at 280 nm in N ₂ O–satd. soln. contg. 0.5 mol L ⁻¹ formate ion.	75A049
104.	Nitrosopentaammineruthenium(III) radical ion (electron adduct)					
104.006	·CH ₂ C(CH ₃) ₂ CO ₂ ⁻ + Ru(NH ₃) ₅ NO ²⁺ → [Ru(NH ₃) ₅ N(O)CH ₂ C(CH ₃) ₂ CO ₂] ⁺	(2.9 ± 0.4) × 10 ⁹	6.0– 7.5	p.r.	D.k. at 280 nm (nitrosyl radical, ε = 3.8 × 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) ₅ NO ³⁺ .	79A134
104.012	·CH ₂ C(CH ₃) ₂ NH ₃ ⁺ + Ru(NH ₃) ₅ NO ²⁺ → [Ru(NH ₃) ₅ N(O)CH ₂ C(CH ₃) ₂ NH ₃] ³⁺	(2.0 ± 0.3) × 10 ⁹	6.0– 7.5	p.r.	D.k. at 280 nm (nitrosyl radical, ε = 3.8 × 10 ³ L mol ⁻¹ cm ⁻¹), as well as p.b.k. in soln. contg. 0.3 mol L ⁻¹ <i>tert</i> -BuNH ₂ and 5 × 10 ⁻⁴ mol L ⁻¹ Ru(NH ₃) ₅ NO ³⁺ .	79A134
104.013	·CH ₂ C(CH ₃)(NH ₃ ⁺)CO ₂ ⁻ + Ru(NH ₃) ₅ NO ²⁺ → [Ru(NH ₃) ₅ N(O)CH ₂ C(CH ₃)(NH ₃)CO ₂] ²⁺	(3.1 ± 0.5) × 10 ⁹	6.0– 7.5	p.r.	D.k. at 280 nm (nitrosyl radical, ε = 3.8 × 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) ₅ NO ³⁺ .	79A134
104.016	·CH ₂ C(CH ₃) ₂ OH + Ru(NH ₃) ₅ NO ²⁺ → [Ru(NH ₃) ₅ N(O)CH ₂ C(CH ₃) ₂ OH] ²⁺	(3.7 ± 0.6) × 10 ⁹	6.0– 7.5	p.r.	D.k. at 280 nm (nitrosyl radical, ε = 3.8 × 10 ³ L mol ⁻¹ cm ⁻¹), as well as p.b.k. in soln. contg. 0.3 mol L ⁻¹ <i>tert</i> -BuOH and 5 × 10 ⁻⁴ mol L ⁻¹ Ru(NH ₃) ₅ NO ³⁺ .	79A134
104.017	·CH ₂ C(CH ₃)(OH)CO ₂ ⁻ + Ru(NH ₃) ₅ NO ²⁺ → [Ru(NH ₃) ₅ N(O)CH ₂ C(CH ₃)(OH)CO ₂] ⁺	(3.0 ± 0.4) × 10 ⁹	6.0– 7.5	p.r.	D.k. at 280 nm (nitrosyl radical, ε = 3.8 × 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) ₅ NO ³⁺ .	79A134
104.055	CH ₃ CON(CH ₃)ĊH ₂ + Ru(NH ₃) ₅ NO ²⁺ → [Ru(NH ₃) ₅ N(O)CH ₂ N(CH ₃)C(O)CH ₃] ²⁺	(2.9 ± 0.4) × 10 ⁹	6.0– 7.5	p.r.	D.k. at 280 nm (nitrosyl radical, ε = 3.8 × 10 ³ L mol ⁻¹ cm ⁻¹), as well as p.b.k. in soln. contg. 0.3 mol L ⁻¹ <i>N,N</i> -dimethylacetamide and 5 × 10 ⁻⁴ mol L ⁻¹ Ru(NH ₃) ₅ NO ³⁺ .	79A134
105.	Tris(2,2'-bipyridine)ruthenium(III) ion					
105.016	·CH ₂ C(CH ₃) ₂ OH + Ru(bpy) ₃ ³⁺ → Ru(bpy) ₃ ²⁺	1.3 × 10 ⁸ (1.9 ± 0.2) × 10 ⁸	acid 4.6	p.r. p.r.	P.b.k. in N ₂ O–satd. soln. contg. <i>tert</i> -BuOH.	72G462 78A070
Sulfur compounds						
106.	Hydrogen sulfide					
106.016	·CH ₂ C(CH ₃) ₂ OH + H ₂ S ⇌ H ₂ ŜCH ₂ C(CH ₃) ₂ OH → (CH ₃) ₃ COH + ·SH		6	p.r.	Effect of [H ₂ S] on p.b.k. at 380 nm (complex) gave $K = 1 \times 10^{-3}$ mol L ⁻¹ ; $k(\text{complex} \rightarrow \text{tert-BuOH} + \cdot\text{SH}) = 1.3 \times 10^5 \text{ s}^{-1}$.	67G262
106.075	·CH ₂ OH + H ₂ S ⇌ H ₂ ŜCH ₂ OH → CH ₃ OH + ·SH		6	p.r.	Effect of [H ₂ S] on p.b.k. at 360 nm (complex) gave $K = 5.3 \times 10^{-4}$ mol L ⁻¹ ; $k(\text{complex} \rightarrow \text{MeOH} + \cdot\text{SH}) = 2.3 \times 10^5 \text{ s}^{-1}$.	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	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{H}_2\text{S} \rightleftharpoons \text{H}_2\dot{\text{S}}\text{CHOHCH}_3$ $\rightarrow \text{CH}_3\text{CH}_2\text{OH} + \cdot\text{SH}$		6	p.r.	Effect of $[\text{H}_2\text{S}]$ on p.b.k. at 380 nm (complex) gave $K = 6.4 \times 10^{-4}$ mol L ⁻¹ ; $k(\text{complex} \rightarrow \text{EtOH} + \cdot\text{SH}) = 4.6 \times 10^5 \text{ s}^{-1}$.	67G262
106.077	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{H}_2\text{S} \rightleftharpoons$ $\text{H}_2\dot{\text{S}}\text{CHOHCH}_2\text{CH}_3$ $\rightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{OH} + \cdot\text{SH}$		6	p.r.	Effect of $[\text{H}_2\text{S}]$ on p.b.k. at 380 nm (complex) gave $K = 5.7 \times 10^{-4}$ mol L ⁻¹ ; $k(\text{complex} \rightarrow 1\text{-PrOH} + \cdot\text{SH}) = 3.8 \times 10^5 \text{ s}^{-1}$.	67G262
106.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{H}_2\text{S} \rightleftharpoons$ $\text{H}_2\dot{\text{S}}\text{COH}(\text{CH}_3)_2 \rightarrow$ $(\text{CH}_3)_2\text{CHOH} + \cdot\text{SH}$		6	p.r.	Effect of $[\text{H}_2\text{S}]$ on p.b.k. at 380 nm (complex) gave $K = 1.1 \times 10^{-3}$ mol L ⁻¹ ; $k(\text{complex} \rightarrow 2\text{-PrOH} + \cdot\text{SH}) = 8.6 \times 10^5 \text{ s}^{-1}$.	67G262
107.	Sulfur dioxide					
107.147	$\cdot\text{CO}_2^- + \text{SO}_2 \rightarrow \text{SO}_2^- + \text{CO}_2$	$(7.6 \pm 1) \times 10^8$	3.1	p.r.	P.b.k. at 320 nm in soln. contg. 1 mol L ⁻¹ formate; $2k(\text{R} + \text{R}) = 7.6 \times 10^8$.	75A118
108.	Tetrathionate ion					
108.147	$\cdot\text{CO}_2^- + \text{S}_4\text{O}_6^{2-} \rightarrow \text{CO}_2 + \text{S}_4\text{O}_6^{3-}$	5.8×10^7		p.r.	P.b.k. at 370 nm in N ₂ O-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	$\cdot\text{CO}_2^-(\cdot\text{CO}_2\text{H}) + \text{Sc(III)}$		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	$\cdot\text{CH}_2\text{CO}_2\text{H} + \text{Ti}^{3+} \rightarrow \text{Ti}^{3+}\text{-CH}_2\text{CO}_2\text{H}$ $\rightarrow \text{Ti(IV)}$	$(4 \pm 1) \times 10^6$	0.5	p.r.	Complex formn. deduced from transient spectra.	79A341
110.042	$\cdot\text{CH}(\text{CO}_2\text{H})_2 + \text{Ti(III)} \rightarrow \text{Ti(IV)}$	8×10^6	~0	e-r.	Calcd. from effect of $[\text{Ti}^{\text{III}}]$ on on esr signal intensity; $2k(\text{R} + \text{R}) \approx 10^9$.	73G249
110.075	$\cdot\text{CH}_2\text{OH} + \text{Ti(III)}$			p.r.	No reaction in soln. contg. 1 mol L ⁻¹ MeOH and 10^{-2} mol L ⁻¹ Ti(III).	73A057
110.147	$\cdot\text{CO}_2^- + \text{Ti(III)} \rightarrow \text{Ti(II)}$	$\sim 5 \times 10^6$	1.4	p.r.	D.k. in 1 mol L ⁻¹ formic acid soln.; $\text{p}K_a(\cdot\text{CO}_2\text{H}) = 1.4$.	73A057
	$\cdot\text{CO}_2\text{H}(\cdot\text{CO}_2^-) + \text{Ti}^{3+} \rightarrow \text{Ti}^{3+}\text{-CO}_2\text{H}$ $\rightarrow \text{Ti(II)}$	$(4 \pm 1) \times 10^6$	0.5	p.r.	Complex formn. deduced from transient spectra.	79A341
	Tl					
111.	Thallium(I) ion					
111.076	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{Tl}^+ \rightarrow \text{Tl}_2^+$	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	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Tl}^+ \rightarrow \text{Tl}_2^+$	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	$\cdot\text{CO}_2^- + \text{Tl}^+ \rightarrow \text{Tl}_2^+$	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(O)					
111a.075	$\cdot\text{CH}_2\text{OH} + \text{Tl}_2^+ + \text{H}^+ \rightarrow \text{CH}_3\text{OH} + 2 \text{Tl}^+$	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 $2k(\text{Tl}_2^+ + \text{Tl}_2^+)$, $k(\text{Tl}_2^+ + \text{H}_2\text{O}_2)$ and $2k(\text{R} + \text{R})$.	80A123
111a.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Tl}_2^+ + \text{H}^+ \rightarrow \text{CH}_3\text{CH}_2\text{OH} + 2 \text{Tl}^+$	3.0×10^9	6	p.r.	See above.	80A123
111a.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Tl}_2^+ + \text{H}^+ \rightarrow (\text{CH}_3)_2\text{CHOH} + 2 \text{Tl}^+$	3.0×10^9	6	p.r.	See above.	80A123
	Yb					
112.	Ytterbium(III) ions					
112.147	$\cdot\text{CO}_2^- + (\text{CO}_2\text{H}) + \text{Yb(III)}$		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	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Zn}^+ (+ \text{H}^+) \rightarrow \text{Zn}^{2+} + (\text{CH}_3)_3\text{COH}$	$(1.0 \pm 0.3) \times 10^9$	7	p.r.	Calcd. from d.k. at 310 nm (Zn^+) in <i>tert</i> -BuOH-ZnSO ₄ soln. assuming $k(\text{H} + \text{H}) = 1.3 \times 10^{10}$, $k(\text{Zn}^+ + \text{Zn}^+) = 4 \times 10^8$, $k(\text{R} + \text{R}) = 6.5 \times 10^8$ and $k(\text{Zn}^+ + \text{H}) = 2.8 \times 10^9$.	77A011
113.075	$\cdot\text{CH}_2\text{OH} + \text{Zn}^+ (+ \text{H}^+) \rightarrow \text{Zn}^{2+} + \text{CH}_3\text{OH}$	$(2.5 \pm 0.3) \times 10^9$	7	p.r.	Calcd. from d.k. at 310 nm (Zn^+) in N ₂ O-MeOH-ZnSO ₄ soln. taking $k(\text{Zn}^+ + \text{Zn}^+) = 4.5 \times 10^8$, $k(\text{Zn}^+ + \text{H}_2\text{O}_2) = 2.4 \times 10^9$, $k(\text{Zn}^+ + \text{N}_2\text{O}) = 1.6 \times 10^7$ and $k(\text{R} + \text{R}) = 1.5 \times 10^9$.	77A011
113.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Zn}^+ (+ \text{H}^+) \rightarrow \text{Zn}^{2+} + (\text{CH}_3)_2\text{CHOH}$	$(1.3 \pm 0.25) \times 10^9$	~3,7	p.r.	Calcd. from d.k. at 310 nm (Zn^+) in 2-PrOH-ZnSO ₄ soln. taking $k(\text{Zn}^+ + \text{Zn}^+) = 4.5 \times 10^8$.	77A011
113.147	$\cdot\text{CO}_2^- + \text{Zn}^+ (+ \text{H}^+) \rightarrow \text{Zn}^{2+} + \text{HCO}_2^-$	$\sim 4 \times 10^9$		p.r.	Est. from first-order decay at 310 nm (Zn^+) in formate-ZnSO ₄ soln.	77A011
114.	Zinc(II) ion					
114.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Zn}^{2+}$	$< 10^6$		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 <i>tert</i> -BuOH.	75A027
114.075	$\cdot\text{CH}_2\text{OH} + \text{Zn}^{2+}$	$< 10^2$		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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Zn}^{2+}$	$< 10^6$		p.r.	Est. from lack of increase in Zn^+ in 2-PrOH.	75A027
114.147	$\cdot\text{CO}_2^- + \text{Zn}^{2+}$	$< 10^2$		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
<i>Zinc hematoporphyrin See 221.</i>						
<i>Zinc(II)-Insulin See 233a.</i>						

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	$\cdot\text{CH}_3 + \text{CH}_3\text{CO}_2\text{H} \rightarrow$ $\text{CH}_4 + \cdot\text{CH}_2\text{CO}_2\text{H}$	2×10^2	~ 1	chem.	Radical from dimethyl sulfoxide in Ti ^{III} -H ₂ O ₂ soln.; est. from esr meas. and values for competing reactions.	75D188
116.	Acetone					
116.001	$\cdot\text{CH}_3 + \text{CH}_3\text{COCH}_3 \rightarrow$ $\text{CH}_4 + \cdot\text{CH}_2\text{COCH}_3$	$0.99[k(\text{R} + \text{R})]^{0.5}$ $1.00[k(\text{R} + \text{R})]^{0.5}$	nat nat	phot. phot.	Est. from quantum yields of CH ₄ , CO, and C ₂ H ₆ . Obs. yields of CH ₄ and C ₂ H ₆ ; $\log k$ (in cm ³ mol ⁻¹ s ⁻¹) = [(4.47 $\pm$ 0.05) - (1335 $\pm$ 18)/T] - 0.5 $\log k(\text{R} + \text{R})$.	60F004 69F176
117.	Acetonitrile					
117.001	$\cdot\text{CH}_3 + \text{CH}_3\text{CN} \rightarrow$ $\text{CH}_4 + \cdot\text{CH}_2\text{CN}$	$< 3 \times 10^2$	~ 1	chem.	Radical from dimethyl sulfoxide in Ti ^{III} -H ₂ O ₂ soln.; est. from esr.	75D188
118.	Acetophenone					
118.076	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{C}_6\text{H}_5\text{COCH}_3 \rightarrow$ $\text{CH}_3\text{CHO} + (\text{C}_6\text{H}_5\text{COCH}_3)^{\cdot-}$	1.1×10^9	13	p.r.	P.b.k. at 440 nm in N ₂ O-satd. soln. contg. 1 mol L ⁻¹ EtOH; pH dependent, k extrapolated to pH 14.	73G122
118.078	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{C}_6\text{H}_5\text{COCH}_3 \rightarrow$ $\text{CH}_3\text{COCH}_3 + (\text{C}_6\text{H}_5\text{COCH}_3)^{\cdot-}$	7.8×10^8 9×10^8	13 13	p.r. p.r.	P.b.k. at 440 nm in acetone soln. P.b.k. at 440 nm in N ₂ O-satd. soln. contg. 1 mol L ⁻¹ 2-PrOH; pH dependent, k extrapolated to pH 14.	67G729 73G122
118.142	$\text{R} + \text{C}_6\text{H}_5\text{COCH}_3 \rightarrow (\text{C}_6\text{H}_5\text{COCH}_3)^{\cdot-}$ (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 <i>tert</i> -BuOH.	71G554
118.143	$\text{R} + \text{C}_6\text{H}_5\text{COCH}_3 \rightarrow (\text{C}_6\text{H}_5\text{COCH}_3)^{\cdot-}$ (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 <i>tert</i> -BuOH.	71G554
118.144	$\text{R} + \text{C}_6\text{H}_5\text{COCH}_3 \rightarrow (\text{C}_6\text{H}_5\text{COCH}_3)^{\cdot-}$ (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 <i>tert</i> -BuOH.	71G554
118.147	$\cdot\text{CO}_2^- + \text{C}_6\text{H}_5\text{COCH}_3 \rightarrow$ $\text{CO}_2 + (\text{C}_6\text{H}_5\text{COCH}_3)^{\cdot-}$	1×10^7	12	p.r.	P.b.k. at 440 nm.	68G308
119.	Acetylene					
119.022	$\cdot\text{CH}=\text{CHOH} + \text{CH}=\text{CH}$	$(8.8 \pm 0.9) \times 10^6$	4.0, 6.0	p.r.	Radical from OH + C ₂ H 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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CH}_3\text{COC}_5\text{H}_4\text{NH}^+ \rightarrow$ 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	$\cdot\text{CH}_2\text{OH} + \text{C}_{13}\text{H}_9\text{NH}^+$	5.0×10^8	2.0	p.r.	P.b.k. in N ₂ O-satd. soln. contg. MeOH; $\sim 30\%$ e^- -transfer; no reaction at pH 7.6; $pK_a = 5.6$.	74A127
121.078	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{C}_{13}\text{H}_9\text{N} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \cdot\text{A}^-$	3×10^9	13	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2-PrOH.	79A305
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_{13}\text{H}_9\text{N} \rightarrow$ $\cdot\text{AR} + \cdot\text{A}$ (50% redn., 50% addn.)	3.0×10^8 $\sim 3 \times 10^8$	7.6 7-9	p.r. p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2-PrOH; $\sim 40\%$ e^- -transfer.	74A127 79A305
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_{13}\text{H}_9\text{NH}^+ \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \cdot\text{AH}$	3.7×10^9 3.3×10^9	2.0 4	p.r. p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2-PrOH; $\sim 90\%$ e^- -transfer.	74A127 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	$\cdot\text{CO}_2^- + \text{AH}^+ \rightarrow \cdot\text{AH}$	$\sim 3 \times 10^8$	7	p.r.	P.b.k.; at pH 13 adduct is formed ($\cdot\text{CO}_2^- + \text{A} \rightarrow \cdot\text{ACO}_2^-$).	79A305
122.	Acriflavin (3,10-Diamino-10-methylacridinium chloride)					
122.147	$\cdot\text{CO}_2^- + \text{A}$	$(3.7 \pm 0.4) \times 10^8$		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	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{CH}_2=\text{CHCONH}_2 \rightarrow$ $\text{HOC}(\text{CH}_3)_2\text{CH}_2\text{CH}_2\dot{\text{C}}\text{HCONH}_2$	$(4.5 \pm 1.4) \times 10^7$ $(6.8 \pm 2) \times 10^7$ (rel.)	4.5 3	p.r.	C.k. in N ₂ O-satd. soln. contg. <i>tert</i> -BuOH and Cu ²⁺ ; rel. to $k(\text{R} + \text{Cu}^{2+}) = 2.7 \times 10^6$ at pH 4.5 and 3.2×10^6 at pH 3.	78A322
123.075	$\cdot\text{CH}_2\text{OH} + \text{CH}_2=\text{CHCONH}_2 \rightarrow$ $\text{HOCH}_2\text{CH}_2\dot{\text{C}}\text{HCONH}_2$	$(2.6 \pm 0.8) \times 10^7$ (rel.)	2-5	p.r.	C.k. in N ₂ O-satd. soln. contg. MeOH and Cu ²⁺ ; rel. to $k(\text{R} + \text{Cu}^{2+}) = 1.6 \times 10^8$.	78A322
123.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{CH}_2=\text{CHCONH}_2 \rightarrow$ $\text{CH}_3\text{CHOHCH}_2\dot{\text{C}}\text{HCONH}_2$	$(2.6 \pm 0.8) \times 10^7$ (rel.)	2-5	p.r.	C.k. in N ₂ O-satd. soln. contg. EtOH and Cu ²⁺ ; rel. to $k(\text{R} + \text{Cu}^{2+}) = 9.4 \times 10^7$.	78A322
123.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CH}_2=\text{CHCONH}_2 \rightarrow$ $(\text{CH}_3)_2\text{C}(\text{OH})\text{CH}_2\dot{\text{C}}\text{HCONH}_2$	$(4.1 \pm 1.2) \times 10^7$ (rel.)	2-5	p.r.	C.k. in N ₂ O-satd. soln. contg. 2-PrOH and Cu ²⁺ ; rel. to $k(\text{R} + \text{Cu}^{2+}) = 5.2 \times 10^7$.	78A322
123.128	$[\text{CH}_2\text{CHCONH}_2]^- + \text{CH}_2=\text{CHCONH}_2 \rightarrow$ $\text{HOC}(\text{NH}_2)=\text{CH}(\text{CH}_2)_2\dot{\text{C}}\text{HCONH}_2$	$(2.5 \pm 0.4) \times 10^5$	~ 6	p.r.	D.k. at 275 nm.	70G052
123.147	$\cdot\text{CO}_2^- + \text{CH}_2=\text{CHCONH}_2 \rightarrow \text{addn.}$	$\sim (4 \pm 1) \times 10^7$	~ 5	p.r.	Electron transfer not obs.	70G052
124.	Adenosine					
124.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{A} \rightarrow$ e^- -transfer $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{A}$	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	$\cdot\text{CO}_2^- + \text{A}$	$< 10^6$	8.3	p.r.	P.b.k. at 550 nm (A ⁻) in N ₂ O-satd. 0.1 mol L ⁻¹ formate.	68G441
126.	Alloxan					
126.147	$\cdot\text{CO}_2^- + \text{A} (+ \text{H}^+) \rightarrow$ $\text{CO}_2 + \cdot\text{AH}$	$(3.7 \pm 1.1) \times 10^7$	4.8	p.r.	P.b.k. at 310 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate; cor. for decay of $\cdot\text{CO}_2^-$.	79A327 80A197
127.	2-Amino-5-nitrothiazole					
127.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NX} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{NX}^- + \text{H}^+$	2.0×10^9		p.r.	P.b.k.	76A075
128.	4-Aminophenoxide ion					
128.020	$\cdot\text{CH}_2\text{CHO} + \text{NH}_2\text{C}_6\text{H}_4\text{O}^- \rightarrow$ $\text{CH}_3\text{CHO} + \text{NH}_2\text{C}_6\text{H}_4\text{O}\cdot$	2.1×10^9	~ 11.5	p.r.	Soln. contg. N ₂ O and ethylene glycol.	79A051
129.	4-Aminopyrimidine					
129.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{A}$ $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{A}$		0.8- 13.0	p.r.	No e^- -transfer.	77A034
130.	Aniline					
130.036	$\cdot\text{CF}_3 + \text{C}_6\text{H}_5\text{NH}_2 \rightarrow \text{addn.}$	$(4.7 \pm 0.9) \times 10^6$	9-10	p.r.	P.b.k. at 330 nm in N ₂ O-satd. soln. contg. CF ₃ Cl; c.k. rel. to $k(\text{CF}_3 + \text{HCO}_2^-) = 3.4 \times 10^5$ gave $k = 5.6 \times 10^6$.	70G407
131.	9,10-Anthraquinone					
131.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{A} \rightarrow$ semiquinone	$(1.6 \pm 0.1) \times 10^9$	7.0	p.r.	P.b.k. at 400 nm in N ₂ O-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	$\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CH}_2\text{CO}_2^- + \text{A} \rightarrow$ 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 <i>tert</i> -BuOH.	73A104
132.	9,10-Anthraquinone-1-sulfonate ion					
132.147	$\cdot\text{CO}_2^- + \text{A} \rightarrow$ semiquinone	1.0×10^9 3.3×10^9	3 7	p.r.	P.b.k.	72G391
133.	9,10-Anthraquinone-2-sulfonate ion					
133.056	$\text{NH}_2\dot{\text{C}}\text{HCO}_2^- + \text{A} \rightarrow$ semiquinone	$(2.2 \pm 0.2) \times 10^9$	8.0	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. glycine.	73A104
133.068	$\text{R} + \text{A} \rightarrow$ semiquinone (R = Radicals from triglycine)	$(1.4 \pm 0.1) \times 10^9$	10	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. triglycine.	73A104
133.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{A} \rightarrow$ semiquinone	$(3.0 \pm 0.3) \times 10^9$ $(5.6 \pm 0.6) \times 10^9$	7.0	p.r. p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. 2-PrOH. P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	73A104 76A070
133.097	$\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CH}_2\text{CO}_2^- + \text{A} \rightarrow$ 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 <i>tert</i> -BuOH.	73A104
133.115	$\cdot\text{CHOHCO}_2^- + \text{A} \rightarrow$ semiquinone	$(7.1 \pm 0.7) \times 10^8$	7.0	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. glycolate.	73A104
133.147	$\cdot\text{CO}_2^- + \text{A} \rightarrow$ semiquinone	2.8×10^9 3.1×10^9 $(1.6 \pm 0.2) \times 10^9$	3 7 7	p.r. p.r.	P.b.k. in soln. contg. formate. P.b.k. at 400 nm in N ₂ O-satd. soln. contg. formate.	72G391 73A104
134.	9,10-Anthraquinone-2,6-disulfonate ion					
134.056	$\text{NH}_2\dot{\text{C}}\text{HCO}_2^- + \text{A} \rightarrow$ semiquinone	$(2.6 \pm 0.3) \times 10^9$	8.0	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. glycine.	73A104
134.068	$\text{R} + \text{A} \rightarrow$ semiquinone (R = Radicals from triglycine)	$(1.8 \pm 0.2) \times 10^9$	10	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. triglycine.	73A104
134.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{A} \rightarrow$ semiquinone	$(4.6 \pm 0.5) \times 10^9$	7.0	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. 2-PrOH.	73A104
134.097	$\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CH}_2\text{CO}_2^- + \text{A} \rightarrow$ 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 <i>tert</i> -BuOH.	73A104
134.117	$\text{CH}_3\dot{\text{C}}\text{OHCO}_2\text{H} + \text{A}$	3.0×10^9	7.0	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 5×10^{-3} mol L ⁻¹ lactate; 58% <i>e</i> - transfer.	75A051
134.147	$\cdot\text{CO}_2^- + \text{A} \rightarrow$ semiquinone	$(2.4 \pm 0.2) \times 10^9$	7.0	p.r.	P.b.k. in N ₂ O-satd. soln. contg. formate.	73A104
135.	Ascorbate ion					
135.020	$\cdot\text{CH}_2\text{CHO} + \text{A}^- (+ \text{H}_2\text{O}) \rightarrow$ $\text{CH}_3\text{CHO} + \cdot\text{A}^- + \text{OH}^-$	8.8×10^7	7	p.r.	Radical from ClCH ₂ CH ₂ OH by reaction with OH and HCl elimination.	79A051
135.042	$\cdot\text{CH}(\text{CO}_2^-)_2 + \text{AH}^- \rightarrow$ $\text{CH}_2(\text{CO}_2^-)_2 + \cdot\text{A}^-$	$(1.3 \pm 0.1) \times 10^7$	7.5	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.8 mol L ⁻¹ malonate.	73R006
135.075	$\cdot\text{CH}_2\text{OH} + \text{AH}^-$	$< 10^6$		p.r.		77A036
135.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{AH}^- \rightarrow$ $(\text{CH}_3)_2\text{CHOH} + \cdot\text{A}^-$	$(1.2 \pm 0.1) \times 10^6$	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	$\cdot\text{CH}_2\text{O}^- + \text{C}_6\text{H}_5\text{N}=\text{NC}_6\text{H}_5 \rightarrow$ $\text{CH}_2\text{O} + [\text{C}_6\text{H}_5\text{N}=\text{NC}_6\text{H}_5]^-$	1×10^9	14	p.r.	P.b.k. at 380 nm in soln. contg. MeOH; k same for <i>syn</i> - and <i>anti</i> - isomers.	77A169
136.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_6\text{H}_5\text{N}=\text{NC}_6\text{H}_5 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + [\text{C}_6\text{H}_5\text{N}=\text{NC}_6\text{H}_5]^-$ $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{C}_6\text{H}_5\text{N}=\text{NC}_6\text{H}_5 \rightarrow$ $(\text{CH}_3)_2\text{CO} + [\text{C}_6\text{H}_5\text{N}=\text{NC}_6\text{H}_5]^-$	4×10^8 2×10^9	~ 7 14	p.r. p.r.	P.b.k. at 380 nm in soln. contg. 2-PrOH; <i>anti</i> - isomer. P.b.k. at 380 nm in soln. contg. 2-PrOH; <i>anti</i> -isomer.	77A169 77A169
137.	Benzophenone					
137.075	$\cdot\text{CH}_2\text{O}^- + (\text{C}_6\text{H}_5)_2\text{CO} \rightarrow$ $\text{CH}_2\text{O} + (\text{C}_6\text{H}_5)_2\dot{\text{C}}\text{O}^-$	1.2×10^8	13	p.r.	P.b.k. at 610 nm in N ₂ O-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	$\text{CH}_3\dot{\text{C}}\text{HO}^- + (\text{C}_6\text{H}_5)_2\text{CO} \rightarrow$ $\text{CH}_3\text{CHO} + (\text{C}_6\text{H}_5)_2\dot{\text{C}}\text{O}^-$	1×10^9	13	p.r.	P.b.k. at 610 nm in N ₂ O-satd. soln. contg. EtOH; $E_a \approx 3.1$ kcal mol ⁻¹ (13 kJ mol ⁻¹).	74A010
137.078	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + (\text{C}_6\text{H}_5)_2\text{CO} \rightarrow$ $(\text{CH}_3)_2\text{CO} + (\text{C}_6\text{H}_5)_2\dot{\text{C}}\text{O}^- \rightarrow$	2.6×10^8	13	p.r.	P.b.k. at 610 nm in N ₂ O-satd. soln.	75A125
		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 ₂ O-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 ₂ O-satd. soln. contg. 2-PrOH.	75A125
137.142	$\text{R} + (\text{C}_6\text{H}_5)_2\text{CO} \rightarrow (\text{C}_6\text{H}_5)_2\dot{\text{C}}\text{O}^-$ (R = Electron adduct of glycine anhydride)	$(2.2 \pm 0.3) \times 10^9$	5.5	p.r.	P.b.k. at 330 nm (320 at pH 12.3) in soln. contg. 1 mol L ⁻¹ <i>tert</i> -BuOH.	71G554
		$(2.5 \pm 0.4) \times 10^9$	12.3			
137.143	$\text{R} + (\text{C}_6\text{H}_5)_2\text{CO} \rightarrow (\text{C}_6\text{H}_5)_2\dot{\text{C}}\text{O}^-$ (R = Electron adduct of alanine anhydride)	$(1.6 \pm 0.2) \times 10^9$	5.2	p.r.	P.b.k. at 330 nm (320 at pH 12.2) in soln. contg. 1 mol L ⁻¹ <i>tert</i> -BuOH.	71G554
		$(1.9 \pm 0.3) \times 10^9$	12.2			
137.144	$\text{R} + (\text{C}_6\text{H}_5)_2\text{CO} \rightarrow (\text{C}_6\text{H}_5)_2\dot{\text{C}}\text{O}^-$ (R = Electron adduct of sarcosine anhydride)	$(2.3 \pm 0.2) \times 10^9$	5.2	p.r.	P.b.k. at 330 nm (320 at pH 12.2) in soln. contg. 1 mol L ⁻¹ <i>tert</i> -BuOH.	71G554
		$(2.4 \pm 0.2) \times 10^9$	12.2			
138.	Benzoquinone					
138.056	$\text{NH}_2\dot{\text{C}}\text{HCO}_2^- + \text{Q} \rightarrow \text{semiquinone}$	$(3.9 \pm 0.4) \times 10^9$	8.0	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. glycine.	73A104
138.062	$\text{R} + \text{Q} \rightarrow \text{semiquinone}$ (R = Radical from glycine anhydride)	2.2×10^9	10.5	p.r.	P.b.k. in N ₂ O-satd. soln. contg. glycine anhydride; 87% <i>e</i> -transfer.	73A052
138.068	$\text{R} + \text{Q} \rightarrow \text{semiquinone}$ (R = Radicals from triglycine)	$(2.5 \pm 0.2) \times 10^9$	10	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. triglycine	73A104
138.075	$\cdot\text{CH}_2\text{OH} + \text{Q} \rightarrow \text{CH}_2\text{O} + \text{H}^+ + \cdot\text{Q}^-$	6.1×10^9	nat	p.r.	P.b.k. at 430 nm in N ₂ O-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 ₂ O-satd. soln. contg. 1 mol L ⁻¹ MeOH.	73G049
138.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Q} \rightarrow$ $\text{CH}_3\text{CHO} + \text{H}^+ + \cdot\text{Q}^-$	4.5×10^9	nat	p.r.	P.b.k. at 430 nm in N ₂ O-satd. soln. contg. 1 mol L ⁻¹ EtOH.	71G619
138.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Q} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \cdot\text{Q}^-$	5.0×10^9	nat	p.r.	P.b.k. at 430 nm in N ₂ O-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 ₂ O-satd. soln. contg. 2-PrOH.	73A104
		5×10^9	6.9	p.r.	P.b.k. at 430 nm in N ₂ O-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.	73G125
				p.r.	P.b.k. at 430 nm in soln. contg. 0.1 mol L ⁻¹ sodium dodecylsulfate $k(\text{R} + \text{micelle}) = 9.9 \times 10^8$.	78A261
138.092	$\text{R} + \text{Q} \rightarrow \cdot\text{Q}^-$ (R = Radicals from sodium dodecylsulfate)	1.2×10^9		p.r.		78A261
138.108	$\text{R} + \text{Q} \rightarrow \text{semiquinone}$ (R = Radicals from deoxyribose)	2.7×10^9	5.6	p.r.	P.b.k. at 430 nm in N ₂ O-satd. soln. contg. deoxyribose.	73G049
138.115	$\cdot\text{CHOHCO}_2^- + \text{Q} \rightarrow \cdot\text{Q}^-$	2.2×10^9	7.0	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. glycolate 72% <i>e</i> -transfer.	73A052 73A104
138.116	$\text{CH}_3\dot{\text{C}}\text{OHCONH}_2 + \text{Q} \rightarrow \cdot\text{Q}^-$	2.0×10^9 3.6×10^9	5.0 7.3	p.r.	P.b.k. in N ₂ O-satd. soln. contg. lactamide.	73A052
138.117	$\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{Q} \rightarrow \cdot\text{Q}^-$	6.5×10^9 $\sim 7.0 \times 10^9$	7.3 10.8	p.r.	P.b.k. in N ₂ O-satd. soln. contg. lactate; 97% <i>e</i> -transfer.	73A052
138.147	$\cdot\text{CO}_2^- + \text{Q} \rightarrow \text{CO}_2 + \cdot\text{Q}^-$	6.6×10^9	~ 7	p.r.	P.b.k. in N ₂ O-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 ₂ O-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 ₂ O-satd. soln. contg. formate.	73A104
139.	3-Benzoyl-1-methylpyridinium ion					
139.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_6\text{H}_5\text{COC}_5\text{H}_4\text{N}^+\text{CH}_3 \rightarrow$ $(\text{CH}_3)_2\text{CO} + (\text{C}_6\text{H}_5\text{COHC}_5\text{H}_4\text{NCH}_3)^+$	$(2.3 \pm 0.3) \times 10^9$	5.0, 1.0	p.r.	P.b.k. at 530 nm in N ₂ O-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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_6\text{H}_5\text{COC}_5\text{H}_4\text{NH}^+ \rightarrow (\text{CH}_3)_2\text{CO} + (\text{C}_6\text{H}_5\text{COHC}_5\text{H}_4\text{NH})^+$	$(3.0 \pm 0.3) \times 10^9$	1.0	p.r.	P.b.k. at 500 nm, as well as at 330 nm, in N ₂ O-satd. soln. contg. 2 mol L ⁻¹ 2-PrOH.	72G359
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_6\text{H}_5\text{COC}_5\text{H}_4\text{N} \rightarrow (\text{CH}_3)_2\text{CO} + (\text{C}_6\text{H}_5\text{COC}_5\text{H}_4\text{NH})\cdot$	$(1.5 \pm 0.2) \times 10^8$	5.9	p.r.	P.b.k. at 500 nm, as well as at 330 nm, in N ₂ O-satd. soln. contg. 2 mol L ⁻¹ 2-PrOH.	72G359
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{C}_6\text{H}_5\text{COC}_5\text{H}_4\text{N} \rightarrow (\text{CH}_3)_2\text{CO} + (\text{C}_6\text{H}_5\text{COC}_5\text{H}_4\text{N})\cdot^-$	$(2.3 \pm 0.2) \times 10^9$	13.2	p.r.	P.b.k. at 550 nm, as well as at 330 nm, in N ₂ O-satd. soln. contg. 2 mol L ⁻¹ 2-PrOH.	72G359
141.	3-Benzoylpyridine					
141.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_6\text{H}_5\text{COC}_5\text{H}_4\text{NH}^+ \rightarrow (\text{CH}_3)_2\text{CO} + (\text{C}_6\text{H}_5\text{COHC}_5\text{H}_4\text{NH})^+$	$(1.7 \pm 0.2) \times 10^9$	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 ₂ O-satd. soln. contg. 2 mol L ⁻¹ 2-PrOH.	72G359
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_6\text{H}_5\text{COC}_5\text{H}_4\text{N} \rightarrow (\text{CH}_3)_2\text{CO} + (\text{C}_6\text{H}_5\text{COC}_5\text{H}_4\text{NH})\cdot$	$(1.0 \pm 0.2) \times 10^8$	5.1	p.r.	P.b.k. at 530 nm, as well as at 330 nm in N ₂ O-satd. soln. contg. 2 mol L ⁻¹ 2-PrOH.	72G359
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{C}_6\text{H}_5\text{COC}_5\text{H}_4\text{N} \rightarrow (\text{CH}_3)_2\text{CO} + (\text{C}_6\text{H}_5\text{COC}_5\text{H}_4\text{N})\cdot^-$	$(2.0 \pm 0.2) \times 10^9$	13.0	p.r.	P.b.k. at 605 nm, as well as at 341 nm, in N ₂ O-satd. soln. contg. 2 mol L ⁻¹ 2-PrOH.	72G359
142.	4-Benzoylpyridine					
142.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_6\text{H}_5\text{COC}_5\text{H}_4\text{NH}^+ \rightarrow (\text{CH}_3)_2\text{CO} + (\text{C}_6\text{H}_5\text{COHC}_5\text{H}_4\text{NH})^+$	$(2.5 \pm 0.2) \times 10^9$	0.7	p.r.	P.b.k. at 510 nm in N ₂ O-satd. soln. contg. 2 mol L ⁻¹ 2-PrOH.	72G359
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_6\text{H}_5\text{COC}_5\text{H}_4\text{N} \rightarrow (\text{CH}_3)_2\text{CO} + (\text{C}_6\text{H}_5\text{COC}_5\text{H}_4\text{NH})\cdot$	$(2.4 \pm 0.4) \times 10^8$	7.7	p.r.	P.b.k. at 500 nm in N ₂ O-satd. soln. contg. 2 mol L ⁻¹ 2-PrOH.	72G359
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{C}_6\text{H}_5\text{COC}_5\text{H}_4\text{N} \rightarrow (\text{CH}_3)_2\text{CO} + (\text{C}_6\text{H}_5\text{COC}_5\text{H}_4\text{N})\cdot^-$	$(2.5 \pm 0.2) \times 10^9$	13.2	p.r.	P.b.k. at 575 nm in N ₂ O-satd. soln. contg. 2 mol L ⁻¹ 2-PrOH.	72G359
<i>Benzyl viologen See 1,1'-Dibenzyl-4,4'-bipyridinium ion 171.</i>						
<i>Biacetyl See 2,3-Butanedione 148.</i>						
143.	2,2'-Bipyridine					
143.075	$\cdot\text{CH}_2\text{OH} + \text{bpy}$	$<10^6$	7	p.r.	P.b.k.	79A148
	$\cdot\text{CH}_2\text{O}^- + \text{bpy}$	$<10^6$	alk.	p.r.	P.b.k.	79A148
143.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{bpy}$	$<10^6$	7	p.r.	P.b.k.	79A148
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{bpyH}^+ \rightarrow (\text{CH}_3)_2\text{CO} + \text{bpyH}_2^{+ \cdot}$	3.5×10^8	1.4, 3.7	p.r.	P.b.k. at 375 nm in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ 2-PrOH.	79A148
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{bpy} \rightarrow (\text{CH}_3)_2\text{CO} + \text{bpy}\cdot^-$	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	$\cdot\text{CO}_2^- + \text{bpy}$	$<10^6$	7	p.r.	P.b.k.	79A148
	$\cdot\text{CO}_2^- + \text{bpyH}^+$	5.0×10^8	4.4	p.r.	P.b.k. at 375 nm in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ formate.	79A148
144.	1,1'-Bis(2-hydroxyethyl)-4,4'-bipyridinium ion					
144.147	$\cdot\text{CO}_2^- + \text{BP}^{2+} \rightarrow \text{CO}_2 + \cdot\text{BP}^+$	1.9×10^{10}	6.8	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate.	78A321
145.	2-Bromo-5-nitrothiazole					
145.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NX} \rightarrow (\text{CH}_3)_2\text{CO} + \text{H}^+ + \cdot\text{NX}^-$	3.0×10^9		p.r.	P.b.k.	76A075
146.	5-Bromouracil					
146.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{BrU}$	2×10^7 (rel.)		p.r.	C.k. rel. to $k(\text{R} + \text{PNAP}) = 3.8 \times 10^9$.	73A140
146.147	$\cdot\text{CO}_2^- + \text{BrU} \rightarrow \text{CO}_2 + \text{Br}^- + \text{U}\cdot$	$>1.0 \times 10^8$		p.r.	P.b.k. at 440 nm (BrUCO ₂ ⁻) in N ₂ O-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	$\cdot\text{CH}_3 + \text{C}_4\text{H}_6 \rightarrow \text{addn.}$	1.25×10^6 (rel.)		γ -r.	C.k. with MeOH in soln. contg. MeI; obs. $G(\text{CH}_4)$; rel. to $k(\text{CH}_3 + \text{O}_2) = 4.7 \times 10^9$.	67G041
147.047	$\cdot\text{CF}_3 + \text{C}_4\text{H}_6 \rightarrow \text{addn.}$	$(5.8 \pm 1.0) \times 10^8$ (rel.)	9-10	γ -r.	C.k. with 2-PrOH in soln. contg. CF_3Cl ; rel. to $k(\text{CF}_3 + \text{HCO}_2^-) = 3.4 \times 10^5$.	70G407
148.	2,3-Butanedione					
148.075	$\cdot\text{CH}_2\text{OH} + \text{CH}_3\text{COCOCH}_3 (\text{B}) \rightarrow \text{CH}_2\text{O} + \text{H}^+ + \cdot\text{B}^-$	1.1×10^8 $(6.5 \pm 1) \times 10^7$		p.r.	P.b.k. at 300 nm in N_2O -satd. soln. contg. 10^{-2} mol L ⁻¹ MeOH.	68G249
			5-6	p.r.	D.k. in N_2O -satd. soln. contg. 10^{-2} mol L ⁻¹ MeOH.	72A018
148.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{B} \rightarrow \text{CH}_3\text{CHO} + \text{H}^+ + \cdot\text{B}^-$	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	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{B} \rightarrow \text{CH}_3\text{CH}_2\text{CHO} + \text{H}^+ + \cdot\text{B}^-$	6.8×10^8		p.r.	P.b.k. at 300 nm in N_2O -satd. soln. contg. 1-PrOH.	68G249
148.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{B} \rightarrow (\text{CH}_3)_2\text{CO} + \text{H}^+ + \cdot\text{B}^-$	8.6×10^8 6.0×10^8		p.r.	P.b.k. at 300 nm in N_2O -satd. soln. contg. 10^{-2} mol L ⁻¹ 2-PrOH.	68G249
			5-6	p.r.	D.k. in N_2O -satd. soln. contg. 10^{-2} mol L ⁻¹ 2-PrOH.	72A018
148.080	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{OHCH}_3 + \text{B} \rightarrow \text{CH}_3\text{COCH}_2\text{CH}_3 + \text{H}^+ + \cdot\text{B}^-$	7.2×10^8		p.r.	P.b.k. at 300 nm in N_2O -satd. soln. contg. 2-BuOH.	68G249
148.083	$c\text{-C}_6\text{H}_{11}\dot{\text{C}}\text{HOH} + \text{B} \rightarrow \text{C}_6\text{H}_{11}\text{CHO} + \text{H}^+ + \cdot\text{B}^-$	2.6×10^8		p.r.	P.b.k. at 300 nm in N_2O -satd. soln. contg. cyclohexanemethanol.	68G249
148.117	$\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{B}$	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	$\cdot\text{CH}_3 + \text{C}_4\text{H}_8 \rightarrow \text{addn.}$	3.0×10^4 (rel.)		γ -r.	C.k. with MeOH in soln. contg. MeI; obs. $G(\text{CH}_4)$; rel. to $k(\text{CH}_3 + \text{O}_2) = 4.7 \times 10^9$.	67G041
149.047	$\cdot\text{CF}_3 + \text{C}_4\text{H}_8 \rightarrow \text{addn.}$	$(5.3 \pm 0.7) \times 10^7$ (rel.)	9-10	γ -r.	C.k. with 2-PrOH; rel. to $k(\text{CF}_3 + \text{HCO}_2^-) = 3.4 \times 10^5$.	70G407
<i>1,1'-Butylene-2,2'-bipyridinium ion See Tetramethylene-2,2'-bipyridinium ion 341.</i>						
150.	Camphor					
150.147	$\cdot\text{CO}_2^- + \text{RC}=\text{O}$	$\leq 10^6$	13	p.r.	D.k. of $\cdot\text{CO}_2^-$ 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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CH}_3\text{N}^+\text{C}_5\text{H}_4\text{CONH}_2$	$(3.6 \pm 0.7) \times 10^8$	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	$\cdot\text{CO}_2^- + \text{CH}_3\text{N}^+\text{C}_5\text{H}_4\text{CONH}_2$	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	$\cdot\text{CH}_2\text{OH} + \text{CCl}_4 \rightarrow \cdot\text{CCl}_3 + \text{Cl}^- + \text{CH}_2\text{O} + \text{H}^+$	$\leq 10^6$		p.r.	Condy.; $G(\text{Cl}^-) \approx 0.3G(\cdot\text{CH}_2\text{OH})$.	71G778
152.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CCl}_4 \rightarrow \cdot\text{CCl}_3 + \text{Cl}^- + (\text{CH}_3)_2\text{CO} + \text{H}^+$	1.0×10^8 7×10^8 (rel.)		p.r.	Condy.; build-up of HCl in N_2O -satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	71G778
				p.r.	C.k. with <i>p</i> -nitroacetophenone in soln. contg. 2-PrOH and acetone; rel. to $k(\text{R} + \text{PNAP}) = 3.8 \times 10^9$.	73A140 73A150
152.093	$\text{CH}_3\dot{\text{C}}\text{HOC}_2\text{H}_5 + \text{CCl}_4 \rightarrow \text{Cl}^-$	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	$\text{-O}\dot{\text{C}}\text{H}(\text{CH}_2)_3\text{-} + \text{CCl}_4 \rightarrow \text{Cl}^-$	2.0×10^7		p.r.	Condy.; buildup of HCl in N ₂ O-satd. soln. contg. tetrahydrofuran.	71G778
152.147	$\cdot\text{CO}_2^- + \text{CCl}_4$	no reaction		p.r.	Condy.	71G778
153.	3-Carboxy-1-methylpyridinium ion					
153.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CH}_3\text{N}^+\text{C}_5\text{H}_4\text{CO}_2^-$	1.0×10^8	9.2	p.r.	P.b.k. (pyridinyl radical) at 400 nm in N ₂ O-satd. soln. contg. 0.5 mol L ⁻¹ 2-PrOH.	74A106
154.	4-Carboxy-1-methylpyridinium ion					
154.075	$\cdot\text{CH}_2\text{O}^- + \text{CH}_3\text{N}^+\text{C}_5\text{H}_4\text{CO}_2^-$	3.8×10^9	12.7	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ MeOH.	79A051
154.076	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{CH}_3\text{N}^+\text{C}_5\text{H}_4\text{CO}_2^-$	3.8×10^9	12.7	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ EtOH.	79A051
154.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CH}_3\text{N}^+\text{C}_5\text{H}_4\text{CO}_2^-$	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
<i>Catechol See 1,2-Dihydroxybenzene 176.</i>						
155.	Chloral hydrate					
155.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Cl}_3\text{CH}(\text{OH})_2$	1×10^6 (rel.)		p.r.	C.k. with <i>p</i> -nitroacetophenone in soln. contg. 2-PrOH and acetone; rel. to $k(\text{R} + \text{PNAP}) = 3.8 \times 10^9$.	73A140 73A150
<i>Chloranil See Tetrachlorobenzoquinone 338.</i>						
156.	Chloroacetic acid					
156.001	$\cdot\text{CH}_3 + \text{ClCH}_2\text{CO}_2\text{H} \rightarrow \text{CH}_4 + \text{Cl}\dot{\text{C}}\text{HCO}_2\text{H}$	3.0×10^3	~1	chem.	Radical from dimethyl sulfoxide in Ti ^{III} -H ₂ O ₂ soln.; est. from esr meas. and values for competing reactions.	75D188
156a.	<i>m</i>-Chlorobenzonitrile					
156a.078	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{ClC}_6\text{H}_4\text{CN} \rightarrow (\text{CH}_3)_2\dot{\text{C}}\text{O} + (\text{ClC}_6\text{H}_4\text{CN})\cdot^-$	$(2 \pm 0.5) \times 10^8$	13	p.r.	P.b.k. at 310 nm (radical anion); $k < 10^7$ at pH 7.	81A001
157.	Chloroform					
157.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CHCl}_3$	$< 1 \times 10^7$ (rel.)		p.r.	C.k. with <i>p</i> -nitroacetophenone in soln. contg. 2-PrOH and acetone; rel. to $k(\text{R} + \text{PNAP}) = 3.8 \times 10^9$.	73A140
158.	<i>p</i>-Chloronitrobenzene					
158.111	$\text{R} + \text{ClC}_6\text{H}_4\text{NO}_2$ (R = Radicals from glucose)	4.0×10^8		p.r.		77R167
158.147	$\cdot\text{CO}_2^- + \text{ClC}_6\text{H}_4\text{NO}_2$	3×10^8		p.r.		77R167
159.	Crystal Violet					
159.056	$\text{NH}_2\dot{\text{C}}\text{HCO}_2^- + \text{dye}$	1.2×10^9	7	p.r.	D.k. at 525 nm in N ₂ O-satd. soln. contg. glycine; 56% <i>e</i> -transfer.	73A078
159.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{dye}$	2.3×10^9	7	p.r.	D.k. at 525 nm in N ₂ O-satd. soln. contg. 2-PrOH; 84% <i>e</i> -transfer.	73A078
159.147	$\cdot\text{CO}_2^- + \text{dye} \rightarrow \text{CO}_2 + \text{dye}^-$	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	$\cdot\text{CH}_3 + \text{CNCH}_2\text{CO}_2\text{H} \rightarrow \text{CH}_4 + \text{CN}\dot{\text{C}}\text{HCO}_2\text{H}$	$> 6.6 \times 10^3$	~1	chem.	Radical from dimethyl sulfoxide in Ti ^{III} -H ₂ O 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 → <i>e</i> -transfer (R = Electron adduct of glycine anhydride)	$(1.2 \pm 0.3) \times 10^8$	5.7, 11.0	p.r.	D.k. at 265 nm (R) in soln. contg. 1 mol L ⁻¹ <i>tert</i> -BuOH.	71G554
160a.143	R + Cys → <i>e</i> -transfer (R = Electron adduct of alanine anhydride)	$(1.1 \pm 0.2) \times 10^8$	5.1, 11.4	p.r.	D.k. at 265 nm (R) in soln. contg. 1 mol L ⁻¹ <i>tert</i> -BuOH.	71G554
161.	Cysteamine					
161.016	·CH ₂ C(CH ₃) ₂ OH + RSH → (CH ₃) ₃ COH + RS·	1.8×10^7		p.r.	P.b.k. at 410 nm (RSSR ⁻) in N ₂ O-satd. soln. contg. <i>tert</i> -BuOH.	68G132
161.018	R' + RSH (R' = Radicals from allyl alcohol)	$< 1 \times 10^7$		p.r.	P.b.k. at 410 nm (RSSR ⁻) in N ₂ O-satd. soln. contg. allyl alcohol.	68G132
161.033	·CH ₂ COCH ₃ + RSH → CH ₃ COCH ₃ + RS·	$\sim 4 \times 10^8$		p.r.	P.b.k. at 410 nm (RSSR ⁻) in N ₂ O-satd. soln. contg. acetone.	68G132
161.075	·CH ₂ OH + RSH → CH ₃ OH + RS·	6.8×10^7	7.6	p.r.	P.b.k. at 410 nm (RSSR ⁻) in N ₂ O-satd. soln. contg. MeOH; $k \simeq 1 \times 10^7$ at pH 12.	68G132
161.076	CH ₃ ·CHOH + RSH → CH ₃ CH ₂ OH + RS·	2.9×10^7 1.4×10^8	7	p.r. p.r.	D.k. in N ₂ O-satd. soln. contg. MeOH. P.b.k. at 410 nm (RSSR ⁻) in N ₂ O-satd. soln. contg. EtOH.	72R003 68G132
161.078	(CH ₃) ₂ ·CHOH + RSH → (CH ₃) ₂ CHOH + RS·	4.2×10^8 2.0×10^8	7	p.r. p.r.	P.b.k. at 410 nm (RSSR ⁻) in N ₂ O-satd. soln. contg. 2-PrOH. D.k. in N ₂ O-satd. soln. contg. 2-PrOH.	68G132 72R003
161.079	CH ₃ CH ₂ CH ₂ ·CHOH + RSH → CH ₃ CH ₂ CH ₂ CH ₂ OH + RS·	8.2×10^7		p.r.	P.b.k. at 410 nm (RSSR ⁻) in N ₂ O-satd. soln. contg. 1-BuOH.	68G132
161.081	(CH ₃) ₂ CH·CHOH + RSH → (CH ₃) ₂ CHCH ₂ OH + RS·	1.4×10^8		p.r.	P.b.k. at 410 nm (RSSR ⁻) in N ₂ O-satd. soln. contg. 2-methyl-1-propanol.	68G132
161.095	·CHOHCH ₂ CH ₂ CH ₂ OH + RSH → (CH ₂ CH ₂ OH) ₂ + RS·	1.1×10^8		p.r.	P.b.k. at 410 nm (RSSR ⁻) in N ₂ O-satd. soln. contg. 1,4-butanediol.	68G132
161.111	R' + RSH → R'H + RS· (R' = Radicals from glucose)	3.2×10^7		p.r.	P.b.k. at 410 nm (RSSR ⁻) in N ₂ O-satd. soln. contg. glucose.	68A132
162.	Cysteine					
162.075	·CH ₂ OH + RSH → CH ₃ OH + RS·	$0.5[k(\text{CH}_2\text{OH} + \text{O}_2)]$ 4.2×10^7		γ-r. 7	C.k. with O ₂ ; obs. CH ₂ O and glycol yields. D.k. in N ₂ O-satd. soln. contg. MeOH.	69G524 72R003
162.062	R + Cys → no <i>e</i> -transfer (R = Radicals from glycine anhydride + OH)	$< 10^7$	6,10, 12	p.r. p.r.	No change in d.k. at 265 nm on addn. of cysteine in N ₂ O-satd. soln.	71G554
162.142	R + Cys → <i>e</i> -transfer (R = Electron adduct of glycine anhydride)	$(2.1 \pm 0.4) \times 10^8$	6.4	p.r.	D.k. at 265 nm in soln. contg. 1 mol L ⁻¹ <i>tert</i> -BuOH.	71G554
162.143	R + Cys → <i>e</i> -transfer (R = Electron adduct of alanine anhydride)	$(1.4 \pm 0.3) \times 10^8$	7.4	p.r.	D.k. at 265 nm in soln. contg. 1 mol L ⁻¹ <i>tert</i> -BuOH.	71G554
162.144	R + Cys → <i>e</i> -transfer (R = Electron adduct of sarcosine anhydride)	$(1.5 \pm 0.3) \times 10^8$	7.0	p.r.	D.k. at 265 nm in soln. contg. 1 mol L ⁻¹ <i>tert</i> -BuOH.	71G554
163.	Cytochrome c					
163.016	·CH ₂ C(CH ₃) ₂ OH + Fe ³⁺ cyt c			p.r.	No reaction; p.b.k. at 550 nm in N ₂ O-satd. soln. contg. 10 ⁻² mol L ⁻¹ <i>tert</i> -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 ₂ O-satd. soln. contg. glycine anhydride.	78A288
163.075	·CH ₂ OH + Fe ³⁺ cyt c → Fe ²⁺ cyt c	$(3.0 \pm 0.5) \times 10^7$	7	p.r.	Abs. change at 550 and 435 nm in N ₂ O-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	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Fe}^{3+}\text{cyt c} \rightarrow \text{Fe}^{2+}\text{cyt c}$	2.4×10^8 $(1.4 \pm 0.2) \times 10^8$ 1.8×10^8	2.0 7 ~ 7	p.r. p.r. p.r.	Abs. change at 550 and 435 nm in N ₂ O-satd. soln. contg. EtOH; 100% redn. Abs. change at 550 and 450 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ EtOH; see also 74A007 and 77A128.	77A128 79A153 79A312
163.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Fe}^{3+}\text{cyt c} \rightarrow \text{Fe}^{2+}\text{cyt c}$	3.8×10^8 1.6×10^8	7 9.3	p.r.	P.b.k. at 550 nm; radical from 2-PrOH.	75A012
163.096	$\cdot\text{CHOHC}(\text{CH}_2\text{OH})_3 + \text{Fe}^{3+}\text{cyt c} \rightarrow \text{Fe}^{2+}\text{cyt c}$	$<10^6$ 1.4×10^8 1.6×10^8	5.6 9.1 9.8	p.r.	P.b.k. at 550 nm; radical from pentaerythritol.	75A012
163.106	$\cdot\text{CHOHCHOHCH}_2\text{OH} + \text{Fe}^{3+}\text{cyt c} \rightarrow (+\text{CH}_2\text{OHCHOHCH}_2\text{OH})$	2.5×10^6	7	p.r.	P.b.k. at 550 nm; radicals from glycerol.	75A012
163.113	$\cdot\text{A}^- + \text{Fe}^{3+}\text{cyt c} \rightarrow \text{A} + \text{Fe}^{2+}\text{cyt c}$ ($\cdot\text{A}^-$ = radical from ascorbate ion)	6.6×10^3	7.4	p.r.	D.k. at 360 nm in N ₂ O-satd. soln. contg. ascorbate	75A240
163.117	$\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{Fe}^{3+}\text{cyt c} \rightarrow \text{Fe}^{2+}\text{cyt c}$	$(2.4 \pm 0.2) \times 10^8$ 2.3×10^8 2.5×10^8	 7 11	p.r. p.r.	P.b.k. at 550 nm in soln. contg. lactate. P.b.k. at 550 nm in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ lactate.	74A007 75A012
163.120	$\cdot\text{O}_2\dot{\text{C}}\text{OHCH}_2\text{CO}_2^- + \text{Fe}^{3+}\text{cyt c} \rightarrow \text{Fe}^{2+}\text{cyt c}$	$(8.5 \pm 0.8) \times 10^7$	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	$\cdot\text{O}_2\dot{\text{C}}\text{OHCHOHCO}_2^- + \text{Fe}^{3+}\text{cyt c}$	1.7×10^8	7	p.r.	P.b.k. at 550 nm in tartrate soln.	75A012
163.142	$\text{R} + \text{Fe}^{3+}\text{cyt c}$ (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	$\cdot\text{CO}_2^- + \text{Fe}^{3+}\text{cyt c} \rightarrow \text{CO}_2 + \text{Fe}^{2+}\text{cyt c}$	$\sim 5 \times 10^8$ $\sim 3 \times 10^9$ 6.9×10^8 2.5×10^8 1.0×10^9 6.3×10^8	>4 <4 7 10.8 6.2 8.7	p.r. p.r. p.r.	P.b.k. at 550 nm in soln. contg. 0.03–1 mol L ⁻¹ formate; concn. effect. P.b.k. at 550 nm in N ₂ O-satd. soln. contg. formate. Abs. change at 450 and 550 nm 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 $A = 1.0 \times 10^{11}$.	71G327 75A012 76A127
		$(7 \pm 0.5) \times 10^8$	7.4	p.r.	P.b.k. in N ₂ O-satd. 0.1 mol L ⁻¹ formate; $k = (5.0 \pm 0.6) \times 10^8$ in basic soln.	77A096
		7.4×10^8 9.4×10^8 1.3×10^9	6.7 2.0 7.0	p.r. p.r.		77A128 78A288
		1.0×10^8	~ 7	p.r.	P.b.k. at 550 nm in 1 atm N ₂ O, and 0.01 mol L ⁻¹ formate. D.k. in formate soln.; $I = 0.1$.	79A312
164.	Cytochrome c, acetylated					
164.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Ac-cyt c}$	2.5×10^8	~ 7	p.r.	Abs. change at 550 and 450 nm in N ₂ O-satd. 0.1 mol L ⁻¹ EtOH soln.; $I = 0.005$.	79A312
164.147	$\cdot\text{CO}_2^- + \text{Ac-cyt c}$	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	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Cxm-cyt c}$	3.5×10^8	~ 7	p.r.	Abs. change at 550 nm and 450 nm in N ₂ O-satd. 0.1 mol L ⁻¹ EtOH soln.	79A312
165.121	$\cdot\text{O}_2\dot{\text{C}}\text{OHCHOHCO}_2^- + \text{Cxm-cyt c}$	2.8×10^7	7	p.r.	Radical from tartrate ion	78A288
165.147	$\cdot\text{CO}_2^- + \text{Cxm-cyt c}$	1.4×10^8 1.3×10^8	7 ~ 7	p.r. p.r.	Radical from formate ion. D.k. at 550 nm in formate soln.; $I = 0.1$.	78A288 79A312
167.	Cytochrome c, succinylated					
167.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Suc-cyt c}$	1.8×10^9	~ 7	p.r.	Abs. change at 550 and 450 nm in N ₂ O-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	$\cdot\text{CO}_2^- + \text{Suc-cyt c}$	4.0×10^9	~ 7	p.r.	D.k. at 550 nm in formate soln.; $I = 0.1$.	79A312
168.	Cytochrome c₃					
168.147	$\cdot\text{CO}_2^- + \text{cyt c}_3$	2.1×10^8	8.1	p.r.	D.k. in N ₂ O-satd. formate soln.	78A232
169.	Cytochrome P450					
169.147	$\cdot\text{CO}_2^- + \text{cyt P450}$				No redn. obs. in N ₂ O-satd. soln. contg. formate.	79A036
<i>Deuteroheme See 223.</i>						
<i>Deuterohemin See 222.</i>						
<i>Deuteroporphyrin dimethyl ester See 221a.</i>						
170.	Diamide (Tetramethyldiazenedicarboxamide)					
170.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{D} \rightarrow$ $\text{D}^- + \text{H}^+ + (\text{CH}_3)_2\text{CO}$	$\sim 2.5 \times 10^9$		p.r.	P.b.k. at 400 nm.	75A194
170.147	$\cdot\text{CO}_2^- + \text{D} \rightarrow \text{D}^- + \text{CO}_2$ $\text{D} = (\text{CH}_3)_2\text{NCON}=\text{NCON}(\text{CH}_3)_2$	$\sim 2.5 \times 10^9$		p.r.	P.b.k. at 400 nm.	75A194
171.	1,1'-Dibenzyl-4,4'-bipyridinium ion (Benzyl viologen)					
171.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{BV}^{2+} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{BV}^{\cdot+}$	$(3.0 \pm 0.1) 10^9$		p.r.	P.b.k. at 400 or 600 nm in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ 2-PrOH.	76A070
171.147	$\cdot\text{CO}_2^- + \text{BV}^{2+} \rightarrow \text{CO}_2 + \text{BV}^{\cdot+}$	6.7×10^9	7.0	p.r.	P.b.k. at 680 nm in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ formate.	76A169
		1.7×10^{10}	6.8	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate.	78A321
172.	1,1'-Di(carboxyethyl)-4,4'-bipyridinium ion					
172.147	$\cdot\text{CO}_2^- + \text{BP}^{2+} \rightarrow \text{CO}_2 + \text{BP}^{\cdot+}$	2.0×10^9	7.0	p.r.	P.b.k. at 680 nm in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ formate.	76A169
173.	Dichloroindophenol					
173.056	$\text{NH}_2\dot{\text{C}}\text{HCO}_2^- + \text{dye}$	3.6×10^9	7	p.r.	D.k. at 600 nm in N ₂ O-satd. soln. contg. glycine; 87% <i>e</i> -transfer.	73A078
173.075	$\cdot\text{CH}_2\text{OH} + \text{dye}$	3.2×10^9	7	p.r.	D.k. at 600 nm in N ₂ O-satd. soln. contg. MeOH; 99% <i>e</i> -transfer.	73A078
173.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{dye}$	4.4×10^9	7	p.r.	D.k. at 600 nm in N ₂ O-satd. soln. contg. 2-PrOH; 88% <i>e</i> -transfer.	73A078
173.147	$\cdot\text{CO}_2^- + \text{dye}$	3.5×10^9	7	p.r.	D.k. at 600 nm in N ₂ O-satd. soln. contg. formate, as well as p.b.k. at ~ 400 nm; 100% <i>e</i> -transfer.	73A078
174.	Dichloromethane					
174.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CH}_2\text{Cl}_2 \rightarrow$ $\cdot\text{CH}_2\text{Cl} + (\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{Cl}^-$			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	$\cdot\text{CO}_2^- + \text{BP}^{2+} \rightarrow \text{CO}_2 + \text{BP}^{\cdot+}$	1.4×10^{10}	6.8	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate.	78A321
<i>Diethyl ketone See 3-Pentanone 305.</i>						
176.	1,2-Dihydroxybenzene (Catechol)					
176.020	$\cdot\text{CH}_2\text{CHO} + \text{HOC}_6\text{H}_4\text{O}^- \rightarrow$ $\text{CH}_3\text{CHO} + \cdot\text{OC}_6\text{H}_4\text{O} \cdot$	7.4×10^8	~ 11.5	p.r.	Soln. contg. N ₂ O 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	$\cdot\text{CH}_2\text{CHO} + \text{HOC}_6\text{H}_4\text{O}^- \rightarrow \text{CH}_3\text{CHO} + \cdot\text{C}_6\text{H}_4\text{O}\cdot$	1.6×10^9	~ 11.5	p.r.	Soln. contg. N ₂ O and ethylene glycol.	79A051
<i>1,4-Dihydroxybenzene See Hydroquinone 227.</i>						
178.	1,3-Dihydroxy-2-nitrobenzene					
178.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + (\text{OH})_2\text{C}_6\text{H}_3\text{NO}_2 \rightarrow (\text{CH}_3)_2\text{CO} + \text{H}^+ + (\text{OH})_2\text{C}_6\text{H}_3\dot{\text{N}}\text{O}_2^-$	6.8×10^8	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	76A020
179.	2-(3,4-Dihydroxyphenyl)ethylamine (Dopamine)					
179.113	$\cdot\text{A}^- + (\text{OH})_2\text{C}_6\text{H}_3\text{CH}_2\text{CH}_2\text{NH}_2 \rightarrow (\cdot\text{A}^- = \text{Radical from ascorbate})$	$(3.6 \pm 0.4) \times 10^2$	8.4	p.r.	D.k. at 360 nm in N ₂ O-satd. soln. contg. ascorbate.	75A240
180.	2,3-Dimethylbenzoquinone					
180.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Q} \rightarrow (\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{Q}\cdot^-$	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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Q} \rightarrow (\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{Q}\cdot^-$	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	$\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CH}_2\text{CO}_2^- + \text{Q} \rightarrow \text{Q}\cdot^-$	3.3×10^9	9.2	p.r.	P.b.k. at 400 nm in Ar-satd. soln. contg. <i>tert</i> -BuOH + acetoacetate ion.	73A104
182.	2,6-Dimethylbenzoquinone					
182.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Q} \rightarrow (\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{Q}\cdot^-$	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	$\cdot\text{CH}_2\text{OH} + \text{MV}^{2+} \rightarrow \text{CH}_2\text{O} + \text{H}^+ + \text{MV}\cdot^+$	3×10^8		p.r.	N ₂ O-satd. 3% MeOH soln.	77A177
183.147	$\cdot\text{CO}_2^- + \text{MV}^{2+} \rightarrow \text{CO}_2 + \text{MV}\cdot^+$	1.5×10^{10}		p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate.	73A074
184.	Dimethyl fumarate					
184.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CH}_3\text{O}_2\text{CCH}=\text{CHCO}_2\text{CH}_3$	4.0×10^9 (uncor.)	7.0	p.r.	12% <i>e</i> -transfer.	73G097
184.147	$\cdot\text{CO}_2^- + \text{CH}_3\text{O}_2\text{CCH}=\text{CHCO}_2\text{CH}_3$	9×10^8 (uncor.)	7.0	p.r.	>80% <i>e</i> -transfer.	73G097
185.	2,3-Dimethylnaphthoquinone					
185.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Q} \rightarrow (\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{Q}\cdot^-$	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	$\cdot\text{CH}_2\text{OH} + \text{RNO}$	$(7.9 \pm 0.3) \times 10^8$	7	p.r.	D.k. at 440 nm in N ₂ O-satd. soln., contg. MeOH.	69G156
185a.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{RNO}$	$(2.4 \pm 0.04) \times 10^9$	7	p.r.	D.k. at 440 nm in N ₂ O-satd. soln. contg. 0.5 mol L ⁻¹ EtOH.	69G156
185a.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{RNO}$	$(3.2 \pm 0.05) \times 10^9$	7	p.r.	D.k. at 440 nm in N ₂ O-satd. soln. contg. 0.5 mol L ⁻¹ 2-PrOH.	69G156
185a.147	$\cdot\text{CO}_2^- + \text{RNO}$	$(1.8 \pm 0.01) \times 10^9$	7	p.r.	D.k. at 440 nm in N ₂ O-satd. soln. contg. 0.25 mol L ⁻¹ formate.	69G156
186.	3,5-Dinitroanisole					
186.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{dNA} \rightarrow (\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{dNA}\cdot^-$	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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_6\text{H}_4(\text{NO}_2)_2 \rightarrow (\text{CH}_3)_2\text{CO} + \text{H}^+ + [\text{C}_6\text{H}_4(\text{NO}_2)_2]\cdot^-$	2.9×10^9	7	p.r.	P.b.k. in N ₂ O-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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_6\text{H}_4(\text{NO}_2)_2 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + [\text{C}_6\text{H}_4(\text{NO}_2)_2]^-$	3.6×10^9	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20–30%.	76A111
189.	1,4-Dinitrobenzene					
189.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_6\text{H}_4(\text{NO}_2)_2 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + [\text{C}_6\text{H}_4(\text{NO}_2)_2]^-$	3.2×10^9	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20–30%.	76A111
190.	2,4-Dinitrobenzoate ion					
190.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + {}^-\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ +$ $[{}^-\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2]^-$	2.9×10^9	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20–30%.	76A111
190.147	$\cdot\text{CO}_2^- + {}^-\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2 \rightarrow$ $\text{CO}_2 + [{}^-\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2]^-$	1.8×10^9	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. formate.	76A111
191.	2,5-Dinitrobenzoate ion					
191.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + {}^-\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ +$ $[{}^-\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2]^-$	3.3×10^9	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20–30%.	76A111
191.147	$\cdot\text{CO}_2^- + {}^-\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2 \rightarrow$ $\text{CO}_2 + [{}^-\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2]^-$	1.9×10^9	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. formate.	76A111
192.	3,4-Dinitrobenzoate ion					
192.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + {}^-\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ +$ $[{}^-\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2]^-$	3.2×10^9	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20–30%.	76A111
192.147	$\cdot\text{CO}_2^- + {}^-\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2 \rightarrow$ $\text{CO}_2 + [{}^-\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2]^-$	1.8×10^9	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. formate.	76A111
193.	3,5-Dinitrobenzoate ion					
193.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + {}^-\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ +$ $[{}^-\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2]^-$	3.1×10^9	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20–30%.	76A111
193.147	$\cdot\text{CO}_2^- + {}^-\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2 \rightarrow$ $\text{CO}_2 + [{}^-\text{O}_2\text{CC}_6\text{H}_3(\text{NO}_2)_2]^-$	2.5×10^9	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. formate.	76A111
194.	3,5-Dinitrobenzonitrile					
194.111	$\text{R} + (\text{NO}_2)_2\text{C}_6\text{H}_3\text{CN} \rightarrow$ $[(\text{NO}_2)_2\text{C}_6\text{H}_3\text{CN}]^-$ (R = Radicals from glucose)	1.0×10^9		p.r.		77R167
195.	1-(2,4-Dinitrophenyl)pyridinium ion					
195.100	$\text{R} + (\text{NO}_2)_2\text{C}_6\text{H}_4\text{N}^+\text{C}_5\text{H}_5 \rightarrow$ $[(\text{NO}_2)_2\text{C}_6\text{H}_4\text{N}^+\text{C}_5\text{H}_5]^-$ (R = Radicals from glucose)	1.0×10^9		p.r.		77R167
195.147	$\cdot\text{CO}_2^- + (\text{NO}_2)_2\text{C}_6\text{H}_4\text{N}^+\text{C}_5\text{H}_5 \rightarrow$ $[(\text{NO}_2)_2\text{C}_6\text{H}_4\text{N}^+\text{C}_5\text{H}_5]^-$	4×10^8		p.r.		77R167
196.	1,1'-Diphenyl-4,4'-bipyridinium ion					
196.147	$\cdot\text{CO}_2^- + \text{BP}^{2+} \rightarrow \text{CO}_2 + \text{BP}^{\cdot+}$	1.3×10^{10}	6.8	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate ion.	78A321
197.	Dithiothreitol					
197.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} +$ $\text{HSCH}_2\text{CHOHCHOHCH}_2\text{SH} \rightarrow$ $(\text{CH}_3)_3\text{COH} + \text{RS}\cdot (\rightarrow \text{RSSR}^-)$	$(6.8 \pm 0.6) \times 10^7$	7	p.r.	P.b.k. at 390 nm in N ₂ O-satd. soln. contg. 1 mol L ⁻¹ <i>tert</i> -BuOH.	73A020
197.075	$\cdot\text{CH}_2\text{OH} + \text{RSH} \rightarrow$ $\text{CH}_3\text{OH} + \text{RS}\cdot$	$(6.8 \pm 0.6) \times 10^7$	7	p.r.	P.b.k. at 390 nm in N ₂ O-satd. soln. contg. 1 mol L ⁻¹ MeOH.	73A020
197.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{RSH} \rightarrow$ $(\text{CH}_3)_2\text{CHOH} + \text{RS}\cdot$	$(2.1 \pm 0.2) \times 10^8$	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. 198.078	Duroquinone $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Q} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \cdot\text{Q}^-$	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. 199.076	Eosin $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{S} \rightarrow$ $\text{CH}_3\text{CHO} + \cdot\text{S}^- + \text{H}^+$	$(1.1 \pm 0.2) \times 10^9$	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 ₂ O ₂ .	67G038
199.147	$\cdot\text{CO}_2^- + \text{S} \rightarrow \text{CO}_2 + \cdot\text{S}^- + \text{H}^+$	$(2.5 \pm 0.5) \times 10^8$	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 ₂ O ₂ .	67G038
200. 200.001	Ethanol $\cdot\text{CH}_3 + \text{CH}_3\text{CH}_2\text{OH} \rightarrow$ $\text{CH}_4 + \text{CH}_3\dot{\text{C}}\text{HOH}$	5.9×10^2 (rel.)		γ-r.	C.k. with O ₂ ; radical from MeI; rel. to $k(\text{CH}_3 + \text{O}_2) = 4.7 \times 10^9$.	67G041
200.014	$\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{C}_2\text{H}_5\text{OH} \rightarrow$ $\text{C}_2\text{H}_5\text{OH} + \text{CH}_3\dot{\text{C}}\text{HOH}$	16 ± 3		γ-r.	Calcd. from obs. yields and assumed mechanism in oxid. of EtOH by H ₂ O ₂ .	70G338
200.047	$\cdot\text{CF}_3 + \text{C}_2\text{H}_5\text{OH} \rightarrow$ $\text{CF}_3\text{H} + \text{C}_2\text{H}_4\text{OH}$	$(4.6 \pm 0.5) \times 10^4$ (rel.)	9–10	γ-r.	C.k. with $\cdot\text{CF}_3$ addn. to propylene; obs. CF ₃ H yield; rel. to $k(\text{CF}_3 +$ $\text{HCO}_2^-) = 3.4 \times 10^5$.	70G407
201. 201.001	Ethyl acetate $\cdot\text{CH}_3 + \text{CH}_3\text{CO}_2\text{Et} \rightarrow$ $\text{CH}_4 + \text{CH}_3\text{CO}_2\dot{\text{C}}\text{HCH}_3$	$<1.7 \times 10^3$	~1	chem.	Radical from dimethyl sulfoxide in Ti ^{III} -H ₂ O ₂ soln.; est. from esr meas. and values for competing reactions.	75D188
202. 202.001	Ethylene $\cdot\text{CH}_3 + \text{CH}_2=\text{CH}_2 \rightarrow \cdot\text{CH}_2\text{CH}_2\text{CH}_3$	4.9×10^3 (rel.)		γ-r.	C.k. with 2-PrOH in soln. contg. MeI; obs. $G(\text{CH}_4)$; rel. to $k(\cdot\text{CH}_3 + \text{O}_2) = 4.7 \times 10^9$.	67G041
202.014	$\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{CH}_2=\text{CH}_2 \rightarrow$ $\cdot\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$	$(1.6 \pm 0.5) \times 10^6$ (rel.) $(4.1 \pm 1.2) \times 10^6$ (rel.) $(3 \pm 2) \times 10^4$ (rel.)	4.5 2	p.r. γ-r.	Radical from OH + ethylene; contains ~10% (pH 4.5) and ~50% (pH 2) $\cdot\text{C}_2\text{H}_5$; obs. rate of addn. of Cu ⁺ to ethylene (Cu ⁺ from OH + Cu ²⁺ in N ₂ O-satd. soln.); rel. to $k(\text{R} + \text{Cu}^{2+}) = 1.9 \times 10^7$ (pH 4.5) and 2.2×10^7 (pH 2). Calcd. from dose rate effect on yields of α,ω-diols in N ₂ O-satd. soln. contg. ethylene assuming termination rate constant of chain reaction is 5×10^8 .	78A322 80A054
202.046	$\cdot\text{CFCl}_2 + \text{CH}_2=\text{CH}_2 \rightarrow \text{CFCl}_2\text{CH}_2\dot{\text{C}}\text{H}_2$	$\sim 4 \times 10^7$	5.9	p.r.	Est. from condy meas. in soln. contg. CFCl ₃ .	71G026
202.047	$\cdot\text{CF}_3 + \text{CH}_2=\text{CH}_2 \rightarrow \cdot\text{CH}_2\text{CH}_2\text{CF}_3$	$(4.0 \pm 0.6) \times 10^7$ (rel.) $\sim 7 \times 10^8$	9–10 5.9	γ-r. p.r.	C.k. with 2-PrOH (H abstr. by CF ₃); obs. CF ₃ H yield; rel. to $k(\cdot\text{CF}_3 + \text{HCO}_2^-) = 3.4 \times 10^5$. Est. from condy. meas. in soln. contg. CF ₃ Cl.	70G407 71G026
203. 203.147	1,1'-Ethylene-2,2'-bipyridinium ion $\cdot\text{CO}_2^- + \text{BP}^{2+} \rightarrow \text{CO}_2 + \cdot\text{BP}^+$	4.0×10^9 1.2×10^{10}	7.0 6.8	p.r. p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ formate ion. P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate ion.	76A169 78A321
204. 204.075	Ethylene glycol $\cdot\text{CH}_2\text{OH} + \text{HOCH}_2\text{CH}_2\text{OH} \rightarrow$ $\text{CH}_3\text{OH} + \text{HO}\dot{\text{C}}\text{HCH}_2\text{OH}$	$\sim 10^3$ – 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	$\cdot\text{CCl}_3 + \text{CH}_3\text{CH}_2\text{OEt} \rightarrow \text{CHCl}_3 + \text{CH}_3\dot{\text{C}}\text{HOEt}$	35		γ -r.	Calcd. from dependence of $G(\text{Cl}^-)$ on dose rate in soln. contg. 2×10^{-3} mol L ⁻¹ CCl_4 and 0.5 mol L ⁻¹ ethyl ether; assume $2k(\text{R} + \text{R}) = 10^9$.	71G778
206.	N-Ethylmaleimide (NEM)					
206.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{NEM} \rightarrow \cdot\text{NEM-R}$			p.r.	No e -transfer; very low addn. rate; radical from <i>tert</i> -BuOH.	72G144
206.053	$\text{CH}_3\text{CONH}\dot{\text{C}}\text{H}_2 + \text{NEM} \rightarrow \cdot\text{NEM-R}$	$\sim 10^8$	6-7	p.r.	100% addn. based on abs. spectra; radical from <i>N</i> -methylacetamide.	72G144
206.075	$\cdot\text{CH}_2\text{OH} + \text{NEM} \rightarrow \cdot\text{NEM}^- + \cdot\text{NEM-CH}_2\text{OH}$	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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NEM} \rightarrow \cdot\text{NEM}^- + \cdot\text{NEM-R}$	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	$\text{R} + \text{NEM}$ (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	$\text{R} + \text{NEM} \rightarrow \cdot\text{NEM}^-$ (R = Electron adduct of dimethyl fumarate)	2.2×10^9		p.r.	D.k.	73G097
206.147	$\cdot\text{CO}_2^- + \text{NEM} \rightarrow \text{CO}_2 + \cdot\text{NEM}^-$	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	$\cdot\text{CH}_2\text{CHO} + \text{C}_2\text{H}_5\text{C}_6\text{H}_4\text{O}^- (+ \text{H}_2\text{O}) \rightarrow \text{CH}_3\text{CHO} + \text{OH}^- + \text{C}_2\text{H}_5\text{C}_6\text{H}_4\text{O}\cdot$	7.0×10^7	~ 11.5	p.r.	Soln. contg. N_2O and ethylene glycol.	79A051
208.	Ferredoxin					
208.147	$\cdot\text{CO}_2^- + \text{ferredoxin}$	$(8.0 \pm 0.7) \times 10^7$	7.5	p.r.	D.k. at 420 nm in N_2O -satd. soln. contg. 0.1 mol L ⁻¹ formate.	73A064
<i>Flagyl See Metronidazole 271.</i>						
<i>Flavin mononucleotide (FMN) See Riboflavin 5'-phosphate 334.</i>						
209.	Fluorescein					
209.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Dye} \rightarrow \text{semiquinone}$	4.5×10^8	10.8	p.r.	D.k. at 500 nm in N_2O -satd. soln. contg. EtOH.	73A078
209.147	$\cdot\text{CO}_2^- + \text{Dye} \rightarrow \text{semiquinone}$	$(2.6 \pm 0.9) \times 10^7$	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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{FH}_2^+$ $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{FH} \rightarrow (\text{CH}_3)_2\text{CO} + \text{H}^+ + \cdot\text{FH}^-$	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	$\cdot\text{CH}_2\text{OH} + \text{CH}_2(\text{OH})_2 \rightarrow \text{CH}_3\text{OH} + \cdot\text{CH}(\text{OH})_2$	$\sim 10^4$ - 10^5		γ -r.	Est. from dose effects on yields in soln. contg. MeOH.	71G929
212.	Formate ion					
212.047	$\cdot\text{CF}_3 + \text{HCO}_2^- \rightarrow \text{CF}_3\text{H} + \cdot\text{CO}_2^-$	$(3.4 \pm 0.7) \times 10^5$	9-10	p.r.	P.b.k. at 270 nm (CO_2^-); radical from $\text{CF}_3\text{Cl} + e_{\text{aq}}^-$.	70G407
213.	N-Formylkynurenine					
213.147	$\cdot\text{CO}_2^- + \text{FK} (+ \text{H}^+) \rightarrow \text{CO}_2 + \cdot\text{FKH}$	$> 3 \times 10^7$	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	$\cdot\text{CF}_3 + \cdot\text{O}_2\text{CCH}=\text{CHCO}_2^- \rightarrow$ $\cdot\text{O}_2\dot{\text{C}}\text{CHCH}(\text{CF}_3)\text{CO}_2^-$	$\sim 10^8$		<i>e-r.</i>	Est. from esr.	71G284
214.075	$\cdot\text{CH}_2\text{OH} + \cdot\text{O}_2\text{CCH}=\text{CHCO}_2^- \rightarrow$ $\cdot\text{O}_2\dot{\text{C}}\text{CHCH}(\text{CH}_2\text{OH})\text{CO}_2^-$	$\sim 10^7$		<i>e-r.</i>	Est. by esr from dose rate effect on $\cdot\text{CH}_2\text{OH}$ and adduct radical (in 1 mol L ⁻¹ MeOH and 0.01 mol L ⁻¹ fumarate) assuming $2k(\text{R} + \text{R}) = 2.4 \times 10^9$; other radicals adding to fumarate ion were $\cdot\text{CH}_3$, $\cdot\text{CHOHCH}_3$, $(\text{CH}_3)_2\dot{\text{C}}\text{OH}$, $\cdot\text{CHOHCH}_2\text{OH}$, $\cdot\text{CH}_2\text{NH}_2$, $\cdot\text{CH}_2\text{Cl}$, $\cdot\text{CHClCO}_2^-$, $\cdot\text{CO}_2^-$, $\cdot\text{CF}_3$, and $\cdot\text{CH}(\text{CO}_2^-)\text{CH}_2\text{CO}_2^-$.	71G284
214.113	$\cdot\text{A}^- + \cdot\text{O}_2\text{CCH}=\text{CHCO}_2^-$ ($\cdot\text{A}^-$ = ascorbate radical)	< 10	8.7	<i>p.r.</i>	D.k. at 360 nm in N ₂ O-satd. soln. contg. ascorbate ion.	75A240
214.147	$\cdot\text{CO}_2^- + \cdot\text{O}_2\text{CCH}=\text{CHCO}_2\text{H}$	2.0×10^7 (uncor.)	4.0	<i>p.r.</i>	$> 30\%$ <i>e</i> -transfer; no <i>e</i> -transfer at pH 10.0.	73G097
215.	Fumaric acid					
215.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{HO}_2\text{CCH}=\text{CHCO}_2\text{H}$	9.0×10^8 (uncor.)	0.5	<i>p.r.</i>	14% <i>e</i> -transfer.	73G097
215a.	Glutathione					
215a.142	$\text{R} + \text{GSH} \rightarrow e\text{-transfer}$ (R = Electron adduct of glycine anhydride)	$(1.8 \pm 0.3) \times 10^8$	6.4, 7.4	<i>p.r.</i>	D.k. at 265 nm in soln. contg. 1 mol L ⁻¹ <i>tert</i> -BuOH.	71G554
216.	Glutathione disulfide					
216.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{GSSG}$	$\leq 10^7$	7	<i>p.r.</i>	No 420 nm abs. (RSSR^-) obs. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	72G388
216.142	$\text{R} + \text{GSSG} \rightarrow (\text{GSSG})^-$ (R = Electron adduct of glycine anhydride)	$(4.0 \pm 0.4) \times 10^7$	6.2	<i>p.r.</i>	D.k. at 265 nm in soln. contg. 1 mol L ⁻¹ <i>tert</i> -BuOH.	71G554
216.147	$\cdot\text{CO}_2^- + \text{GSSG}$	$\leq 10^7$		<i>p.r.</i>	No 420 nm abs. (RSSR^-) obs. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate.	72G388
217.	Glycine					
217.001	$\cdot\text{CH}_3 + \text{H}_2\text{NCH}_2\text{CO}_2^- \rightarrow$ $\text{CH}_4 + \text{H}_2\text{N}\dot{\text{C}}\text{HCO}_2^-$ $\cdot\text{CH}_3 + \text{H}_3\text{N}^+\text{CH}_2\text{CO}_2^- \rightarrow$ ~ 4 (rel.)	$\sim 1.2 \times 10^2$ (rel.) ~ 4 (rel.)	~ 10	phot.	$\cdot\text{CH}_3$ from cumene hydroperoxide; obs. formn. of CH ₄ and C ₂ H ₆ ; assume $2k(\text{R} + \text{R}) = 2 \times 10^9$; $k_{\text{H}}/k_{\text{D}} = 10.5$ at pH 11.5 [74F528].	70F280
218.	Glycine anhydride					
218.147	$\cdot\text{CO}_2^- + \cdot\text{NHCH}_2\text{CONHCH}_2\text{C}(\text{O})-$	$< 10^7$	6.2	<i>p.r.</i>	No <i>e</i> -transfer obs. in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ formate.	71G554
219.	Glycolic acid					
219.001	$\cdot\text{CH}_3 + \text{HOCH}_2\text{CO}_2\text{H} \rightarrow$ $\text{CH}_4 + \text{HO}\dot{\text{C}}\text{HCO}_2\text{H}$	3.6×10^3	~ 1	chem.	Radical from dimethylsulfoxide in Ti ^{III} -H ₂ O ₂ soln.; est. from esr meas. and values for competing reactions.	75D188
220.	Hematoporphyrin					
220.075	$\cdot\text{CH}_2\text{OH} + \text{PH}_2 \rightarrow \cdot\text{PH}_2^-$ $\cdot\text{CH}_2\text{O}^- + \text{PH}_2 \rightarrow \cdot\text{PH}_2^-$	$< 1 \times 10^7$ $(3.3 \pm 0.5) \times 10^8$	7.0 13.0	<i>p.r.</i>	P.b.k. at 600–650 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ MeOH.	74A040
220.076	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{PH}_2 \rightarrow \cdot\text{PH}_2^-$	$(7.0 \pm 1.0) \times 10^8$	13	<i>p.r.</i>	P.b.k. at 600–650 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ EtOH.	74A040
220.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PH}_2 \rightarrow \cdot\text{PH}_2^-$ $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{PH}_2 \rightarrow \cdot\text{PH}_2^-$	$(2.4 \pm 0.4) \times 10^8$ $(1.1 \pm 0.2) \times 10^9$	7.0 13.0	<i>p.r.</i>	P.b.k. at 600–650 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	74A040
220.147	$\cdot\text{CO}_2^- + \text{PH}_2 \rightarrow \cdot\text{PH}_2^-$	$(4 \pm 1) \times 10^7$	13.0	<i>p.r.</i>	P.b.k. at 600–650 nm in N ₂ O-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	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{ZnP} \rightarrow (\text{CH}_3)_2\text{CO} + \text{ZnP}^-$	$(1.0 \pm 0.1) \times 10^9$	13.0	p.r.	P.b.k. at 600–650 nm in N ₂ O–satd. soln. contg. 1 mol L ⁻¹ 2-PrOH.	74A040
221a.	Deuteroporphyrin dimethyl ester					
221a.001	$\cdot\text{CH}_3 + \text{DP}$	$(1 \text{ to } 2) \times 10^7$	~13	p.r.	Est. from abs. change in soln. contg. 6.5 mol L ⁻¹ 2-PrOH, 0.7 mol L ⁻¹ acetone and 2.3×10^{-2} mol L ⁻¹ CH ₃ I; cor. for $\cdot\text{CH}_3 + \cdot\text{CH}_3$.	81A002
221a.078	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{DP} \rightarrow \text{DP}^-$	$(6 \pm 1) \times 10^8$	~13	p.r.	Abs. change in soln. contg. 6.5 mol L ⁻¹ 2-PrOH and 0.7 mol L ⁻¹ acetone.	81A002
	<i>Deuteroporphyrin (ferri) See Deuterohemim 222.</i>					
	<i>Deuteroporphyrin (ferro) See Deuteroheme 223.</i>					
222.	Deuterohemim					
222.001	$\cdot\text{CH}_3 + \text{DH}(\text{Fe}^{\text{III}}) \rightarrow \text{addn.}$	$(2.3 \pm 0.5) \times 10^9$ $\sim 1.3 \times 10^9$	~13 7	p.r.	Abs. change in soln. contg. 6.5 mol L ⁻¹ 2-PrOH and 4.1×10^{-3} mol L ⁻¹ methyl iodide.	81A002
222.050	$\cdot\text{CCl}_3 + \text{DH}(\text{Fe}^{\text{III}})$	$\leq 10^6$	7.2	p.r.	No spectral change in soln. contg. 6.5 mol L ⁻¹ 2-PrOH, 5×10^{-3} mol L ⁻¹ CCl ₄ and 10^{-4} mol L ⁻¹ deuterohemim.	80A011
222.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{DH}(\text{Fe}^{\text{III}}) \rightarrow \text{DH}(\text{Fe}^{\text{II}})$	3.7×10^8	7.2	p.r.	D.k. in Ar–satd. soln. contg. 6.5 mol L ⁻¹ 2-PrOH and 3.4×10^{-2} mol L ⁻¹ acetone.	80A011
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{DH}(\text{Fe}^{\text{III}}) \rightarrow \text{DH}(\text{Fe}^{\text{II}})$	$(9 \pm 1) \times 10^8$	~13	p.r.	D.k. in soln. contg. 6.5 mol L ⁻¹ 2-PrOH.	81A002
223.	Deuteroheme					
223.001	$\cdot\text{CH}_3 + \text{DH}(\text{Fe}^{\text{II}}) \rightarrow \text{addn.}$	$(3.9 \pm 0.5) \times 10^9$	7	p.r.	Abs. change in 6.5 mol L ⁻¹ 2-PrOH soln. of deuterohemim chemically reduced by dithionite to which methyl chloride was added.	81A002
223.043	$\cdot\text{CH}_2\text{Cl} + \text{DH}(\text{Fe}^{\text{II}})$	2×10^9	7.2	p.r.	Abs. change in soln. of deuterohemim chemically reduced by dithionite to which 4×10^{-2} mol L ⁻¹ CH ₂ Cl ₂ was added.	80A011
223.048	$\cdot\text{CCl}_3 + \text{DH}(\text{Fe}^{\text{II}})$	$(2 \pm 1) \times 10^9$	7.2	p.r.	Abs. change in soln. contg. 6.5 mol L ⁻¹ 2-PrOH, 3.2×10^{-2} mol L ⁻¹ acetone, CCl ₄ , and deuterohemim, the latter reduced by (CH ₃) ₂ COH.	80A011
223.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{DH}(\text{Fe}^{\text{II}})$	$(6.3 \pm 0.5) \times 10^8$	7	p.r.	Abs. change in 6.5 mol L ⁻¹ 2-PrOH soln. of deuterohemim chemically reduced by dithionite to which 0.7 mol L ⁻¹ acetone was added.	81A002
224.	Hemin (Protoferriheme IX)					
224.076	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{H}(\text{Fe}^{\text{III}}) \rightarrow \text{H}(\text{Fe}^{\text{II}})$	$(9.0 \pm 1.0) \times 10^8$	13	p.r.	Soln. 30% EtOH, N ₂ O–satd.	74A040
	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{H}(\text{Fe}^{\text{III}}) \rightarrow \text{H}(\text{Fe}^{\text{II}})$	7.7×10^8	7	p.r.	Redn. obs. at 560 nm in N ₂ O–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 ₂ O–satd. soln. contg. 1 mol L ⁻¹ EtOH and 0.2 mol L ⁻¹ Na dodecylsulfate (micelles).	78A033
225.	Hemin c					
225.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{H}(\text{Fe}^{\text{III}}) \rightarrow \text{H}(\text{Fe}^{\text{II}})$	$(2.8 \pm 0.6) \times 10^9$	7.0	p.r.	P.b.k. at 413 nm in N ₂ O–satd. soln. contg. 0.04 mol L ⁻¹ 2-PrOH.	75A241
225.096	$\cdot\text{CHOHC}(\text{CH}_2\text{OH})_3 + \text{H}(\text{Fe}^{\text{III}}) \rightarrow \text{H}(\text{Fe}^{\text{II}})$	$(3.0 \pm 0.6) \times 10^8$ $(2.8 \pm 0.6) \times 10^8$	7.0 11.8	p.r.	P.b.k. at 413 nm in N ₂ O–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 ₂ OH $\dot{\text{C}}$ OHCH ₂ OH + H(Fe ^{III}) $\rightarrow$ H(Fe ^{II}) (+ CH ₂ OHCHOH $\dot{\text{C}}$ OH)	(1.3 $\pm$ 0.3) $\times 10^9$	7.0	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 10 ⁻² mol L ⁻¹ glycerol.	75A241
225.117	CH ₃ $\dot{\text{C}}$ 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 ₂ O-satd. soln. contg. 0.025 mol L ⁻¹ lactate.	75A241
225.121	O ₂ CCHOH $\dot{\text{C}}$ 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 ₂ O-satd. soln. contg. 0.02 mol L ⁻¹ tartrate.	75A241
225.147	$\cdot\text{CO}_2^-$ + H(Fe ^{III}) $\rightarrow$ H(Fe ^{II})	(1.3 $\pm$ 0.3) $\times 10^9$	7.0	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.02 mol L ⁻¹ formate.	75A241
226.	Hemoglobin					
226.075	$\cdot\text{CH}_2\text{OH}$ + 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 ₂ O-satd. soln. contg. MeOH; 100% redn.	79A153
226.076	CH ₃ $\dot{\text{C}}$ 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 ₂ O-satd. soln. contg. EtOH; 100% redn.	79A153
227.	Hydroquinone					
227.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH}$ + HOC ₆ H ₄ OH $\rightarrow$ (CH ₃) ₃ COH + $\cdot\text{OC}_6\text{H}_4\cdot$	$\leq 2 \times 10^6$	11.5	p.r.	Semiquinone not formed in <i>tert</i> -BuOH soln.	79A051
227.020	$\cdot\text{CH}_2\text{CHO}$ + HOC ₆ H ₄ O ⁻ $\rightarrow$ CH ₃ CHO + $\cdot\text{OC}_6\text{H}_4\cdot$	(2.2 $\pm$ 0.1) $\times 10^9$	~ 11.5	p.r.	Soln. contg. N ₂ O and ethylene glycol or 2-methoxy- or 2-ethoxy-ethanol.	79A051
227.021	$\cdot\text{CH}_2\text{CHO}$ + HOC ₆ H ₄ OH	$\leq 2 \times 10^6$	7.2	p.r.	Radical from 2-chloroethanol.	79A051
227.023	CH ₃ $\dot{\text{C}}$ HCHO + HOC ₆ H ₄ O ⁻	(1.2 $\pm$ 0.1) $\times 10^9$	~ 11.5	p.r.	P.b.k. at 430 nm (semiquinone) in N ₂ O-satd. soln. contg. 1,2-propanediol; radical mixture.	79A051
227.024	CH ₃ CO $\dot{\text{C}}$ HCH ₃ + HOC ₆ H ₄ O ⁻	(5.6 $\pm$ 0.5) $\times 10^8$	~ 11.5	p.r.	P.b.k. at 430 nm in N ₂ O-satd. soln. contg. 2,3-butanediol.	79A051
227.025	-(CH ₂) ₄ $\dot{\text{C}}$ HCO- + HOC ₆ H ₄ O ⁻	(5.5 $\pm$ 1.9) $\times 10^8$	~ 11.5	p.r.	P.b.k. at 430 nm in N ₂ O-satd. soln. contg. 1,2-cyclohexanediol.	79A051
227.026	HOCH ₂ $\dot{\text{C}}$ HCHO + HOC ₆ H ₄ O ⁻ (and HOCH ₂ CO $\dot{\text{C}}$ H ₂)	(1.3 $\pm$ 0.1) $\times 10^9$	~ 11.5	p.r.	P.b.k. at 430 nm in N ₂ O-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 ₂ CH ₂ CO $\dot{\text{C}}$ H ₂ + HOC ₆ H ₄ O ⁻	(6.2 $\pm$ 0.8) $\times 10^8$	~ 11.5	p.r.	P.b.k. at 430 nm in N ₂ O-satd. soln. contg. 2-hydroxyfuran.	79A051
227.028	HO(CH ₂) ₃ $\dot{\text{C}}$ HCHO + HOC ₆ H ₄ O ⁻	(8.6 $\pm$ 1.2) $\times 10^8$	~ 11.5	p.r.	P.b.k. at 430 nm in N ₂ O-satd. soln. contg. 2-(hydroxymethyl)furan.	79A051
227.029	HO(CH ₂) ₄ $\dot{\text{C}}$ HCHO + HOC ₆ H ₄ O ⁻	(5.2 $\pm$ 0.9) $\times 10^8$	~ 11.5	p.r.	P.b.k. at 430 nm in N ₂ O-satd. soln. contg. 2-(hydroxymethyl)pyran.	79A051
227.030	R + HOC ₆ H ₄ O ⁻ (R = Radicals from erythritol)	(1.3 $\pm$ 0.3) $\times 10^9$	~ 11.5	p.r.	P.b.k. at 430 nm in N ₂ O-satd. soln. contg. <i>meso</i> -erythritol.	79A051
227.031	R + HOC ₆ H ₄ O ⁻ (R = Radicals from xylitol)	(1.2 $\pm$ 0.1) $\times 10^9$	~ 11.5	p.r.	P.b.k. at 430 nm in N ₂ O-satd. soln. contg. xylitol.	79A051
227.032	-(CHOH) ₃ CH ₂ $\dot{\text{C}}$ HCO- + HOC ₆ H ₄ O ⁻	(6.4 $\pm$ 1.1) $\times 10^8$	~ 11.5	p.r.	P.b.k. at 430 nm in N ₂ O-satd. soln. contg. <i>meso</i> -inositol.	79A051
227.033	R + HOC ₆ H ₄ O ⁻ (R = Radicals from sorbitol)	(9.8 $\pm$ 1.3) $\times 10^8$	~ 11.5	p.r.	P.b.k. at 430 nm in N ₂ O-satd. soln. contg. sorbitol.	79A051
227.109	R + HOC ₆ H ₄ O ⁻ (R = Radicals from ribose)	(9.6 $\pm$ 1) $\times 10^8$	~ 11.5	p.r.	P.b.k. at 430 nm in N ₂ O-satd. soln. contg. ribose.	79A051
227.111	R + HOC ₆ H ₄ O ⁻ (R = Radicals from glucose)	(7.1 $\pm$ 0.9) $\times 10^8$	~ 11.5	p.r.	P.b.k. at 430 nm in N ₂ O-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	$R + Q \rightarrow \cdot Q^-$ (R = Radicals from triglycine)	1.9×10^9	10	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. triglycine.	73A104
228.056	$NH_2\dot{C}HCO_2^- + Q \rightarrow \cdot Q^-$	$(3.1 \pm 0.3) \times 10^9$	8.0	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. glycine.	73A104
228.078	$(CH_3)_2\dot{C}OH + Q \rightarrow \cdot Q^-$	$(3.4 \pm 0.3) \times 10^9$	7.0	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. 2-PrOH.	73A104
228.097	$CH_3\dot{C}(O^-)CH_2CO_2^- + Q \rightarrow \cdot Q^-$	$(1.5 \pm 0.2) \times 10^9$	9.2	p.r.	P.b.k. at 400 nm in Ar-satd. soln. contg. acetate ion and <i>tert</i> -BuOH.	73A104
228.115	$\cdot CHOHCO_2^- + Q \rightarrow \cdot Q^-$	$(9.1 \pm 0.9) \times 10^8$	7.0	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. glycolate.	73A104
228.147	$\cdot CO_2^- + Q \rightarrow \cdot Q^-$	$(1.95 \pm 0.2) \times 10^9$	7.0	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. formate.	73A104
229.	3-Hydroxy-2-nitrobenzoate ion					
229.078	$(CH_3)_2\dot{C}OH + ^-O_2CC_6H_3(OH)NO_2 \rightarrow$ $(CH_3)_2\dot{C}O + H^+ + ^-O_2CC_6H_3(OH)\dot{N}O_2^-$	3.3×10^8	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	76A020
230.	3-Hydroxypropionitrile					
230.001	$\cdot CH_3 + CNCH_2CH_2OH \rightarrow$ $CH_4 + CNCH_2\dot{C}HOH$	$< 1.6 \times 10^3$	~1	chem.	Radical from dimethyl sulfoxide in Ti ^{III} -H ₂ O ₂ soln.; est from esr meas. and values for competing reactions.	75D188
<i>4-Hydroxy-2,2,6,6-tetramethyl-1-piperidinyloxy See Tetramethylhydroxypiperidinyloxy (TMPN) 343.</i>						
231.	Indigo disulfonate					
231.056	$NH_2\dot{C}HCO_2^- + Dye$	2.8×10^9	9	p.r.	D.k. at 610 nm in N ₂ O-satd. soln. contg. glycine; 71% <i>e</i> -transfer.	73A078
231.075	$\cdot CH_2OH + Dye$	2.0×10^9 1.9×10^9	7 9	p.r.	D.k. at 610 nm in N ₂ O-satd. soln. contg. MeOH; <i>e</i> -transfer 75% at pH 7 and 62% at pH 9.	73A078
231.078	$(CH_3)_2\dot{C}OH + Dye$	4.0×10^9	7.9	p.r.	D.k. at 610 nm in N ₂ O-satd. soln. contg. 2-PrOH; 88% <i>e</i> -transfer.	73A078
231.147	$\cdot CO_2^- + Dye \rightarrow$ $CO_2 + Dye^-$	2.0×10^9 2.1×10^9	7.0 7.0	p.r. p.r.	D.k. at 610 nm in N ₂ O-satd. soln. contg. formate. P.b.k. at 400 nm.	73A078 73A078
232.	Indigo tetrasulfonate					
232.056	$NH_2\dot{C}HCO_2^- + Dye$	2.6×10^9	7.0	p.r.	D.k. at 610 nm in N ₂ O-satd. soln. contg. glycine; 78% <i>e</i> -transfer.	73A078
232.075	$\cdot CH_2OH + Dye$	3.0×10^9	7	p.r.	D.k. at 610 nm in N ₂ O-satd. ssoln. contg. MeOH; 80% <i>e</i> -transfer.	73A078
232.078	$(CH_3)_2\dot{C}OH + Dye$	4.2×10^9	7	p.r.	D.k. at 610 nm in N ₂ O-satd. soln. contg. 2-PrOH; 89% <i>e</i> -transfer.	73A078
233.	Indophenol					
233.075	$\cdot CH_2OH + Dye$	3.1×10^9	9	p.r.	D.k. at 610 nm in N ₂ O-satd. soln. contg. MeOH; 92% <i>e</i> -transfer.	73A078
233.078	$(CH_3)_2\dot{C}OH + Dye$	4.0×10^9	9	p.r.	D.k. at 610 nm in N ₂ O-satd. soln. contg. 2-PrOH; 86% <i>e</i> -transfer.	73A078
233.147	$\cdot CO_2^- + Dye \rightarrow$ $CO_2 + Dye^-$	2.8×10^9 2.7×10^9	9.0 9.0	p.r. p.r.	D.k. at 610 nm in N ₂ O-satd. soln. contg. formate. P.b.k. at ~400 nm.	73A078 73A078
233a.	Zinc(II) Insulin					
233a.147	$\cdot CO_2^- + Zn(II)Insulin$	6×10^8	9.0	p.r.	P.b.k. at 420 nm in N ₂ O-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. 234.078	Iodoacetamide (CH ₃) ₂ ĊOH + ICH ₂ CONH ₂	4 × 10 ⁸ (rel.)		p.r.	C.k. with <i>p</i> -nitroacetophenone in soln. contg. 2-PrOH and acetone; rel. to $k(R + \text{PNAP}) = 3.8 \times 10^9$.	73A140
235. 235.078	Iodoacetate ion (CH ₃) ₂ ĊOH + ICH ₂ CO ₂ ⁻	7 × 10 ⁷ (rel.)		p.r.	C.k. with <i>p</i> -nitroacetophenone in soln. contg. 2-PrOH and acetone; rel. to $k(R + \text{PNAP}) = 3.8 \times 10^9$.	73A140
236. 236.016	Iodoacetic acid ·CH ₂ C(CH ₃) ₂ OH + ICH ₂ CO ₂ H → ICH ₂ C(CH ₃) ₂ OH + ·CH ₂ CO ₂ H	(1.3 ± 0.3) × 10 ⁷ (rel.)	1	chem.	Est. from esr meas. in Ti ^{III} -H ₂ O ₂ soln. contg. <i>tert</i> -BuOH; rel. to $2k(\cdot\text{CH}_2\text{CO}_2\text{H} + \cdot\text{CH}_2\text{CO}_2\text{H}) = 1.8 \times 10^9$.	74D286
236.075	·CH ₂ OH + ICH ₂ CO ₂ H → ·CH ₂ CO ₂ H + prod.	(2.1 ± 0.7) × 10 ⁸ (rel.)	1	chem.	Est. from esr meas. in Ti ^{III} -H ₂ O ₂ soln. contg. MeOH; rel. to $2k(\cdot\text{CH}_2\text{CO}_2\text{H} + \cdot\text{CH}_2\text{CO}_2\text{H}) = 1.8 \times 10^9$.	74D286
		< 3.5 × 10 ⁸		p.r.	P.b.k. at 330 nm.	74D286
237. 237.016	Iodoacetonitrile ·CH ₂ C(CH ₃) ₂ OH + ICH ₂ CN → ICH ₂ C(CH ₃) ₂ OH + ·CH ₂ CN	2.0 × 10 ⁷ (rel.)	1	chem.	Est. from esr meas. in Ti ^{III} -H ₂ O ₂ soln. contg. <i>tert</i> -BuOH; rel. to $2k(\cdot\text{CH}_2\text{CN} + \cdot\text{CH}_2\text{CN}) = 2 \times 10^9$.	74D286
238. 238.016	Iodoethanol ·CH ₂ C(CH ₃) ₂ OH + ICH ₂ CH ₂ OH → ICH ₂ C(CH ₃) ₂ OH + ·CH ₂ CH ₂ OH	1.5 × 10 ⁵ (rel.)	1	chem.	Est. from esr meas in Ti ^{III} -H ₂ O ₂ soln. contg. <i>tert</i> -BuOH; rel. to $2k(\cdot\text{CH}_2\text{CH}_2\text{OH} + \cdot\text{CH}_2\text{CH}_2\text{OH}) = 1.9 \times 10^9$.	74D286
238a. 238a.078	Iodomethane (CH ₃) ₂ ĊO ⁻ + CH ₃ I → ·CH ₃ (CH ₃) ₂ ĊOH + CH ₃ I	(1.1 ± 0.1) × 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. 239.016	3-Iodopropionic acid ·CH ₂ C(CH ₃) ₂ OH + ICH ₂ CH ₂ CO ₂ H → ICH ₂ C(CH ₃) ₂ OH + ·CH ₂ CH ₂ CO ₂ H	1.8 × 10 ⁵ (rel.)	1	chem.	Est. from esr meas. in Ti ^{III} -H ₂ O ₂ soln. contg. <i>tert</i> -BuOH; rel. to $2k(\cdot\text{CH}_2\text{CH}_2\text{CO}_2\text{H} + \cdot\text{CH}_2\text{CH}_2\text{CO}_2\text{H}) = 2.4 \times 10^9$.	74D286
239.075	·CH ₂ OH + ICH ₂ CH ₂ CO ₂ H → ·CH ₂ CH ₂ CO ₂ H + prod.	1.0 × 10 ⁵ (rel.)	1	chem.	Est. from esr meas. in Ti ^{III} -H ₂ O ₂ soln. contg. MeOH; rel. to $2k(\cdot\text{CH}_2\text{CH}_2\text{CO}_2\text{H} + \cdot\text{CH}_2\text{CH}_2\text{CO}_2\text{H}) = 2.4 \times 10^9$.	74D286
240. 240.147	3-Iodotyrosine ·CO ₂ ⁻ + IC ₆ H ₃ (OH)CH ₂ CH(·NH ₃)CO ₂ H → CO ₂ + I ⁻ + ·Ar	(1.3 ± 0.1) × 10 ⁵	3.0	X-r.	Est. from dependence of tyrosine yields on irradiation time in soln. contg. 10 ⁻² mol L ⁻¹ formate assuming $2k(R + R) = 5.0 \times 10^8$.	72G610
241. 241.001	Isobutylene ·CH ₃ + (CH ₃) ₂ C=CH ₂ → addn.	3.9 × 10 ⁴ (rel.)		γ-r.	C.k. with MeOH in soln. contg. MeI obs. $G(\text{CH}_3)$; rel. to $k(\cdot\text{CH}_3 + \text{O}_2) = 4.7 \times 10^9$.	67G041
242. 242.001	Isobutyric acid ·CH ₃ + (CH ₃) ₂ CHCO ₂ H → CH ₄ + (CH ₃) ₂ ĊCO ₂ H	9.0 × 10 ³ (rel.)	~1	chem.	Radical from dimethyl sulfoxide in Ti ^{III} -H ₂ O 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	$\cdot\text{CH}_3 + (\text{CH}_3)_2\text{CHCN} \rightarrow$ $\text{CH}_4 + (\text{CH}_3)_2\dot{\text{C}}\text{CN}$	4.5×10^3 (rel.)	~ 1	chem.	Radical from dimethyl sulfoxide in Ti ^{III} -H ₂ O ₂ -soln.; est. from esr meas. and values for competing reactions.	75D188
244.	Isonicotinamide					
244.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NH}^+ \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \cdot\text{NH}$	$(3.1 \pm 0.6) \times 10^9$	0.7	p.r.	P.b.k. (pyridinyl radical) in N ₂ O-satd. soln. contg. 2-PrOH.	74A089
245.	Isonicotinic acid					
245.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{H}^+\text{NC}_5\text{H}_4\text{CO}_2\text{H}$ $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{H}^+\text{NC}_5\text{H}_4\text{CO}_2^-$ $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NC}_5\text{H}_4\text{CO}_2^-$ $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{NC}_5\text{H}_4\text{CO}_2^-$	2.0×10^9 8.5×10^8 $< 1 \times 10^6$ 2×10^8	0.4 3.2 9.0 13.3	p.r.	P.b.k. at ~ 400 nm (pyridinyl radical) in N ₂ O-satd. soln. contg. 0.5 mol L ⁻¹ 2-PrOH.	74A106
<i>Isopropanol See 2-Propanol 314.</i>						
246.	α-Ketoglutarate ion					
246.113	$\cdot\text{A}^- + \cdot\text{O}_2\text{CCH}_2\text{CH}_2\text{COCO}_2^-$ ($\cdot\text{A}^-$ = ascorbate radical)	< 10	9.7	p.r.	D.k. at 360 nm in N ₂ O-satd. soln. contg. ascorbate ion.	75A240
247.	Lactate ion					
247.113	$\cdot\text{A}^- + \text{CH}_3\text{CHOHCO}_2^-$ ($\cdot\text{A}^-$ = ascorbate radical)	< 10	8.6	p.r.	D.k. at 360 nm in N ₂ O-satd. soln. contg. ascorbate ion	75A240
248.	Lactic acid					
248.001	$\cdot\text{CH}_3 + \text{CH}_3\text{CHOHCO}_2\text{H} \rightarrow$ $\text{CH}_4 + \text{CH}_3\dot{\text{C}}\text{OHCO}_2\text{H}$	1.2×10^4	~ 1	chem.	Radical from dimethyl sulfoxide in Ti ^{III} -H ₂ O ₂ soln.; est. from esr meas. and values for competing reactions.	75D188
249.	Lipoate ion					
249.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{RSSR} \rightarrow$ $(\text{RSSR})^- + \text{CH}_3\text{CHO} + \text{H}^+$	1.0×10^8	7	p.r.	P.b.k. at 410 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ EtOH.	70G560
249.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{RSSR} \rightarrow$ $(\text{RSSR})^- + (\text{CH}_3)_2\text{CO} + \text{H}^+$	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	$\cdot\text{CO}_2^- + \text{RSSR} \rightarrow$ $(\text{RSSR})^- + \text{CO}_2$	5.5×10^8 5.6×10^8	7 6.1–9.2	p.r. p.r.	P.b.k. at 410 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate ion. P.b.k. at 410 nm; $k = 9 \times 10^8$ at pH 3.	70G560 75A195
$\text{RSSR} = -\text{SCH}_2\text{CH}_2\text{CH}[(\text{CH}_2)_4\text{CO}_2^-]\text{S}-$						
250.	Lumazine					
250.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{LH}_2 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{LH}_3\cdot$ $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{LH}^- \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{LH}_2\cdot^-$ $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{L}^{2-} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{LH}\cdot^{2-}$	$(1.3 \pm 0.1) \times 10^9$ $(1.7 \pm 0.2) \times 10^8$ (uncor.) $(1.0 \pm 0.2) \times 10^9$ (uncor.)	0.8, 5.1 9.5 14.0	p.r.	P.b.k. in N ₂ O-satd. solns. of 1–2 mol L ⁻¹ 2-PrOH; 100%, 70% and 85% <i>e</i> -transfer at acid pH and pH 9.5 and 14.0, resp.	75A056
251.	Lysozyme					
251.147	$\cdot\text{CO}_2^- + \text{lys} \rightarrow$ $\text{CO}_2 + (-\text{SS})^-$	$\sim 5 \times 10^8$	~ 6	p.r.	P.b.k. at 420 nm in N ₂ O-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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{HO}_2\text{CCH}=\text{CHCO}_2\text{H}$	2.2×10^8 (uncor.)	0.5	p.r.	18% <i>e</i> -transfer; no <i>e</i> -transfer at pH 10.0 (dianion).	73G097
252.147	$\cdot\text{CO}_2^- + \text{HO}_2\text{CCH}=\text{CHCO}_2^-$	1.1×10^8 (uncor.)	5.2	p.r.	$\geq 65\%$ <i>e</i> -transfer; no <i>e</i> -transfer 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	$\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{HO}(\text{CH}_2)_2\text{SH} \rightarrow$ $\text{CH}_3\text{CH}_2\text{OH} + \text{HO}(\text{CH}_2)_2\text{S}\cdot$	$(4.7 \pm 0.7) \times 10^7$	10	p.r.	P.b.k. (RSSR ⁻) in Ar-satd. soln.; radical from $e_{\text{aq}}^- + \text{HO}(\text{CH}_2)_2\text{SH}$.	69G553
253.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{HO}(\text{CH}_2)_2\text{SH} \rightarrow$ $(\text{CH}_3)_3\text{COH} + \text{HO}(\text{CH}_2)_2\text{S}\cdot$	$(8.2 \pm 1.2) \times 10^7$	10	p.r.	P.b.k. at 420 nm (RSSR ⁻) in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ <i>tert</i> -BuOH.	69G553
253.075	$\cdot\text{CH}_2\text{OH} + \text{HO}(\text{CH}_2)_2\text{SH} \rightarrow$ $\text{CH}_3\text{OH} + \text{HO}(\text{CH}_2)_2\text{S}\cdot$	$(1.3 \pm 0.2) \times 10^8$	10	p.r.	P.b.k. (RSSR ⁻) in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ MeOH.	69G553
253.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{HO}(\text{CH}_2)_2\text{SH} \rightarrow$ $\text{CH}_3\text{CH}_2\text{OH} + \text{HO}(\text{CH}_2)_2\text{S}\cdot$	$(2.3 \pm 0.3) \times 10^8$	10	p.r.	P.b.k. (RSSR ⁻) in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ EtOH.	69G553
253.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{HO}(\text{CH}_2)_2\text{SH} \rightarrow$ $(\text{CH}_3)_2\text{CHOH} + \text{HO}(\text{CH}_2)_2\text{S}\cdot$	$(5.1 \pm 0.8) \times 10^8$	10	p.r.	P.b.k. (RSSR ⁻) in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	69G553
253a.	3-Mercaptopropionate ion					
253a.142	$\text{R} + \text{HSCH}_2\text{CH}_2\text{CO}_2^- \rightarrow e^-$ -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 <i>tert</i> -BuOH.	71G554
254.	Methanethiol					
254.001	$\cdot\text{CH}_3 + \text{CH}_3\text{SH} \rightarrow \text{CH}_4 + \text{CH}_3\text{S}\cdot$	$(7.4 \pm 1) \times 10^7$	11	p.r.	P.b.k. (RSSR ⁻) in Ar-satd. soln.; radical from e_{aq}^- reaction with CH ₃ SH.	69G553
255.	Methanol					
255.001	$\cdot\text{CH}_3 + \text{CH}_3\text{OH} \rightarrow \text{CH}_4 + \cdot\text{CH}_2\text{OH}$	2.2×10^2 (rel.) $\geq 1 \times 10^2$		γ -r. 1 phot.	C.k. with O ₂ ; radical from MeI; rel. to $k(\text{CH}_3 + \text{O}_2) = 4.7 \times 10^9$. Radical from $\text{Co}(\text{NH}_3)_5\text{O}_2\text{CCH}_3^{2+}$; est. from effect of addn. of MeOH on CH ₄ and C ₂ H ₆ yields.	67G041 71F579
255.047	$\cdot\text{CF}_3 + \text{CH}_3\text{OH} \rightarrow \text{CF}_3\text{H} + \cdot\text{CH}_2\text{OH}$	$(8.1 \pm 1.2) \times 10^3$ (rel.)	9–10	γ -r.	C.k. with addn. of $\cdot\text{CF}_3$ to propylene; obs. $G(\text{CF}_3\text{H})$; rel. to $k(\text{CF}_3 + \text{HCO}_2^-) = 3.4 \times 10^5$.	70G407
255.113	$\cdot\text{A}^- + \text{CH}_3\text{OH}$ ($\cdot\text{A}^-$ = ascorbate radical)	< 0.1	8.8	p.r.	D.k. at 360 nm in N ₂ O-satd. soln. contg. ascorbate ion.	75A240
256.	Methemerythrin					
256.147	$\cdot\text{CO}_2^- + \text{MFe}^{3+}$	6.8×10^7	8.2	p.r.	D.k. at 360 nm in N ₂ O-satd. soln. contg. 10 ⁻² mol L ⁻¹ formate; $I = 0.03$.	79A204
257.	3-Methoxy-2-nitrotoluene					
257.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{ArNO}_2 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{Ar}\dot{\text{N}}\text{O}_2^-$	2.3×10^8	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	76A020
258.	4-Methoxyphenoxide ion					
258.020	$\cdot\text{CH}_2\text{CHO} + \text{CH}_3\text{OC}_6\text{H}_4\text{O}^- (+ \text{H}_2\text{O}) \rightarrow$ $\text{CH}_3\text{CHO} + \text{CH}_3\text{C}_6\text{H}_4\text{O}\cdot + \text{OH}^-$	9.8×10^8	~ 11.5	p.r.	Soln. contg. N ₂ O and ethylene glycol.	79A051
259.	2-Methylbenzoquinone					
259.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Q} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \cdot\text{Q}^-$	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	$\text{NH}_2\dot{\text{C}}\text{HCO}_2^- + \text{MB}^+$	3.7×10^9	7	p.r.	D.k. at 580 nm in N ₂ O-satd. soln. contg. glycine; 86% <i>e</i> -transfer.	73A078
260.075	$\cdot\text{CH}_2\text{OH} + \text{MB}^+$	3.4×10^9	7	p.r.	D.k. at 580 nm in N ₂ O-satd. soln. contg. MeOH; 91% <i>e</i> -transfer.	73A078
260.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{MB}^+$	$(4 \pm 2) \times 10^9$ 4.4×10^9	7	p.r. p.r.	D.k. at 580 nm in N ₂ O-satd. soln. contg. 2-PrOH; 91% <i>e</i> -transfer.	73A150 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	$\cdot\text{CO}_2^- + \text{MB}^+ \rightarrow$ $\text{CO}_2 + \text{MB}\cdot$	5.6×10^9	~ 9	p.r.	D.k. at 580 nm in soln. contg. 0.1 mol L ⁻¹ formate.	65G396
	$\cdot\text{CO}_2\text{H} + \text{MB}^+ \rightarrow$ $\text{CO}_2 + \text{H}^+ + \text{MB}\cdot$	$\sim 2 \times 10^9$	1.75	p.r.	D.k. at 580 nm.	65G396
	$\cdot\text{CO}_2\text{H} + \text{MBH}_2^{2+} \rightarrow$ $\text{CO}_2 + \cdot\text{MBH}_2^+ + \text{H}^+$	$\sim 10^9$	$\text{H}_0 = -0.8$	p.r.	D.k. at 660 nm.	65G396
	$\cdot\text{CO}_2\text{H} + \text{MBH}_2^{3+} \rightarrow$ $\text{CO}_2 + \cdot\text{MBH}_2^{2+} + \text{H}^+$	$\sim 7 \times 10^8$	$\text{H}_0 = -5.7$	p.r.	D.k. at 420 nm.	65G396
261.	1-Methylguanosine					
261.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{MG}^+ \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{MG}\cdot + \text{H}^+$	8.0×10^7	0.5	p.r.	P.b.k.	75A060
<i>Methyl iodide See Iodomethane 238a.</i>						
<i>1-Methylisonicotinic acid See 4-Carboxy-1-methylpyridinium ion 154.</i>						
<i>Methyl mercaptan See Methanethiol 254.</i>						
262.	2-Methyl-1,4-naphthoquinone					
262.011	$\cdot\text{CH}_2\text{CH}_2\text{NH}_2 + \text{Q}$		7.5	p.r.	P.b.k. in soln. contg. ethylamine; 10% <i>e</i> -transfer; see 262.049.	73A047
262.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{Q}$		7.0, 12.4	p.r.	P.b.k. in soln. contg. 0.05 mol L ⁻¹ <i>tert</i> -BuOH; $\leq 5\%$ <i>e</i> -transfer.	73A047
262.034	$\cdot\text{CH}_2\text{CONH}_2$ (or $\text{CH}_3\text{CONH}\cdot$) $+ \text{Q} \rightarrow \cdot\text{Q}^-$	$(1.1 \pm 0.1) \times 10^9$ (uncor.)	6.0, 10.9	p.r.	P.b.k. at 395 nm in soln. contg. acetamide; $\sim 17\%$ <i>e</i> -transfer.	73A047
262.049	$\text{CH}_3\dot{\text{C}}\text{HNH}_2 + \text{Q} \rightarrow \cdot\text{Q}^-$	$(3.3 \pm 0.3) \times 10^9$ (uncor.)	11.6	p.r.	P.b.k. at 395 nm in soln. contg. ethylamine; 34% <i>e</i> -transfer.	73A047
262.050	$(\text{CH}_3)_2\dot{\text{C}}\text{NH}_2 + \text{Q} \rightarrow \cdot\text{Q}^-$	$(3.6 \pm 0.4) \times 10^9$ (uncor.)	11.4	p.r.	P.b.k. at 395 nm in soln. contg. isopropylamine; 41% <i>e</i> -transfer; 14% <i>e</i> -transfer at pH 9.0.	73A047
262.051	$\text{CH}_3\dot{\text{C}}\text{HN}(\text{C}_2\text{H}_5)_2 + \text{Q} \rightarrow \cdot\text{Q}^-$	$(4.6 \pm 0.5) \times 10^9$ (uncor.)	11.6	p.r.	P.b.k. at 395 nm in soln. contg. triethylamine; 37% <i>e</i> -transfer; $\sim 10\%$ <i>e</i> -transfer at pH 6.	73A047
262.053	$\text{CH}_3\text{CONH}\dot{\text{C}}\text{H}_2 + \text{Q} \rightarrow \cdot\text{Q}^-$	$(2.0 \pm 0.2) \times 10^9$ (uncor.)	6.0, 10.9	p.r.	P.b.k. at 395 nm in soln. contg. <i>N</i> -methylacetamide; 19% <i>e</i> -transfer.	73A047
262.055	$\text{CH}_3\text{CON}(\text{CH}_3)\dot{\text{C}}\text{H}_2 + \text{Q}$		6.0, 10.9	p.r.	11% <i>e</i> -transfer in soln. contg. <i>N,N</i> -dimethylacetamide.	73A047
262.056	$\text{NH}_2\dot{\text{C}}\text{HCO}_2^- + \text{Q} \rightarrow \cdot\text{Q}^-$	3.8×10^9 (uncor.)	6.2	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. glycine; 78% <i>e</i> -transfer.	72R057
		$(5.5 \pm 0.6) \times 10^9$ (uncor.)	5.4	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. glycine; 71% <i>e</i> -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% <i>e</i> -transfer.	73A047 73A104
262.057	$\text{NH}_3^+\dot{\text{C}}\text{HCONH}_2 + \text{Q} \rightarrow \cdot\text{Q}^-$	$(3.6 \pm 0.4) \times 10^9$ (uncor.)	3.2	p.r.	P.b.k. at 395 nm in soln. contg. glycine; 24% <i>e</i> -transfer.	73A047
	$\text{NH}_2\dot{\text{C}}\text{HCONH}_2 + \text{Q}$	5×10^9 (uncor.)	8.0	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. glycine; 38% <i>e</i> -transfer.	72R057
		$(5.4 \pm 0.5) \times 10^9$ (uncor.)	10.4	p.r.	P.b.k. at 395 nm in soln. contg. glycine; 41% <i>e</i> -transfer.	73A047
262.058	$\text{R} + \text{Q} \rightarrow \cdot\text{Q}^-$ (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 ₂ O-satd. soln. contg. glycylglycinamide; 25% <i>e</i> -transfer at pH 6.8 (16% <i>e</i> -transfer at pH 5.5 and 45% at pH 11.0).	73A047
262.059	$\text{CH}_3\text{NH}\dot{\text{C}}\text{HCO}_2^- + \text{Q} \rightarrow \cdot\text{Q}^-$	$(1.1 \pm 0.1) \times 10^9$ (uncor.)	6.0	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. sarcosine; 33% <i>e</i> -transfer.	73A047
		$(1.7 \pm 0.2) \times 10^9$ (uncor.)	12.5	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. sarcosine; 64% <i>e</i> -transfer.	73A047
262.061	$\text{CH}_3\text{CON}(\text{CH}_3)\dot{\text{C}}\text{HCO}_2^- + \text{Q} \rightarrow \cdot\text{Q}^-$	$(1.3 \pm 0.1) \times 10^9$ $(1.0 \pm 0.1) \times 10^9$ (uncor.)	7.0 12.5	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. acetylsarcosine; 39% <i>e</i> -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) × 10 ⁹ (uncor.)	10.9	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. glycine anhydride; 88% <i>e</i> -transfer; no <i>e</i> -transfer at pH 6.7.	73A047
		5.0 × 10 ⁹ (uncor.)	10.9	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. glycine anhydride; 85% <i>e</i> -transfer; no <i>e</i> -transfer at pH 7.0.	72R057
262.063	R + Q → ·Q ⁻ (R = Radical from alanine anhydride)	(3.1 ± 0.3) × 10 ⁹ (uncor.)	10.9	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. alanine anhydride, 75% <i>e</i> -transfer.	73A047
262.065	R + Q → ·Q ⁻ (R = Radicals from diglycine)	(1.2 ± 0.1) × 10 ⁹ (uncor.)	6.6 11.0	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. diglycine; 19% <i>e</i> -transfer at pH 6.6 and 47% at pH 11.	73A047
262.066	R + Q → ·Q ⁻ (R = Radicals from glycylsarcosine)	(1.0 ± 0.1) × 10 ⁹ (uncor.)	10.9	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. glycylsarcosine; 46% <i>e</i> -transfer (20% at pH 6.8).	73A047
262.067	R + Q → ·Q ⁻ (R = Radicals from acetyldiglycine)	(3.8 ± 0.4) × 10 ⁹ (uncor.)	12.3	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. acetyldiglycine; 55% <i>e</i> -transfer.	73A047
262.068	R + Q → ·Q ⁻ (R = Radicals from triglycine)	(1.8 ± 0.2) × 10 ⁹ (uncor.)	7.0	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. triglycine; 11% <i>e</i> -transfer.	73A047
		(1.9 ± 0.2) × 10 ⁹ (uncor.)	10	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. triglycine.	73A104
		(1.8 ± 0.2) × 10 ⁹ (uncor.)	12.0	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. triglycine; 77% <i>e</i> -transfer.	73A047
262.069	R + Q → ·Q ⁻ (R = Radicals from acetyltriglycine)	(3.7 ± 0.4) × 10 ⁹ (uncor.)	12.5	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. acetyltriglycine; 50% <i>e</i> -transfer.	73A047
262.070	R + Q → ·Q ⁻ (R = Radicals from acetyltrialanine)	(2.1 ± 0.2) × 10 ⁹ (uncor.)	6.9	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. acetyltrialanine; 18% <i>e</i> -transfer.	73A047
		(2.6 ± 0.3) × 10 ⁹ (uncor.)	12.3	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. acetyltrialanine; 47% <i>e</i> -transfer.	73A047
262.071	R + Q → ·Q ⁻ (R = Radicals from acetyltrisarcosine)	(1.3 ± 0.1) × 10 ⁹ (uncor.)	12.5	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. acetyltrisarcosine; 39% <i>e</i> -transfer at pH 12.5 and 7.0.	73A047
262.072	R + Q → ·Q ⁻ (R = Radicals from acetylserineamide)	(1.5 ± 0.2) × 10 ⁹ (1.9 ± 0.2) × 10 ⁹ (uncor.)	6, 9, 11.0	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. acetylserineamide; 52%, 57%, and 68% <i>e</i> -transfer, resp., at pH 6, 9, and 11.	73A047
262.073	R + Q → ·Q ⁻ (R = Radicals from acetylaspargine)	(1.5 ± 0.2) × 10 ⁹ (uncor.)	12.5	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. acetylaspargine; 39% <i>e</i> -transfer; ~12% <i>e</i> -transfer at pH 3.2 and 6.0.	73A047
262.075	·CH ₂ OH + Q → ·Q ⁻	(3.7 ± 0.4) × 10 ⁹	7.0	p.r.	P.b.k. at 395 nm in 0.5 mol L ⁻¹ MeOH; 88% <i>e</i> -transfer.	73A047
	·CH ₂ O ⁻ + Q → ·Q ⁻	(4.4 ± 0.4) × 10 ⁹	12.4	p.r.	P.b.k. at 395 nm in soln. contg. 0.5 mol L ⁻¹ MeOH; 92% <i>e</i> -transfer.	73A047
262.076	CH ₃ ĊHOH + Q → ·Q ⁻	(3.8 ± 0.4) × 10 ⁹	7.0	p.r.	P.b.k. at 395 nm in soln. contg. 0.5 mol L ⁻¹ EtOH; 90% <i>e</i> -transfer.	73A047
	CH ₃ ĊHO ⁻ + Q → ·Q ⁻	(4.2 ± 0.4) × 10 ⁹	12.5	p.r.	P.b.k. at 395 nm in soln. contg. 0.5 mol L ⁻¹ EtOH; 92% <i>e</i> -transfer.	73A047
262.078	(CH ₃) ₂ ĊOH + Q → ·Q ⁻	6.2 × 10 ⁹	6.9	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. 2-PrOH; 80% <i>e</i> -transfer.	72R057
		(4.2 ± 0.4) × 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) × 10 ⁹	7.0	p.r.	P.b.k. in soln. contg. 0.5 mol L ⁻¹ 2-PrOH; 91% <i>e</i> -transfer.	73A047
		(4.8 ± 0.5) × 10 ⁹	7.0	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. 2-PrOH.	73A104
		(4.2 ± 0.4) × 10 ⁹	12.4	p.r.	P.b.k. in soln. contg. 0.5 mol L ⁻¹ EtOH; 91% <i>e</i> -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	$\text{CH}_3\text{CH}_2\text{CH}_2\dot{\text{C}}\text{HOH} + \text{Q} \rightarrow \cdot\text{Q}^-$	$(4.1 \pm 0.4) \times 10^9$ $(4.2 \pm 0.4) \times 10^9$ (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) <i>e</i> -transfer.	73A047
262.097	$\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CH}_2\text{CO}_2^- + \text{Q} \rightarrow \cdot\text{Q}^-$	$(3.7 \pm 0.4) \times 10^9$	9.2	p.r.	P.b.k. at 395 nm in soln. contg. acetoacetate and 1 mol L ⁻¹ <i>tert</i> -BuOH; 95% <i>e</i> -transfer.	73A047 73A104
262.108	$\text{R} + \text{Q} \rightarrow \cdot\text{Q}^-$ (R = Radicals from deoxyribose)	4×10^9 (uncor.) $(2.1 \pm 0.2) \times 10^9$ (uncor.)	6.8 6.8	p.r. p.r.	P.b.k. at 400 nm in soln. contg. deoxyribose; 74% <i>e</i> -transfer. P.b.k. in soln. contg. 0.05 mol L ⁻¹ deoxyribose; 81% <i>e</i> -transfer.	72R057 73A047
262.109	$\text{R} + \text{Q} \rightarrow \cdot\text{Q}^-$ (R = Radicals from ribose)	2.6×10^9 (uncor.) $(1.4 \pm 0.1) \times 10^9$ (uncor.)	6.9 6.9	p.r. p.r.	P.b.k. in N ₂ O-satd. soln. contg. ribose; 44% <i>e</i> -transfer. P.b.k. in N ₂ O-satd. soln. contg. 0.5 mol L ⁻¹ ribose; 60% <i>e</i> -transfer.	72R057 73A047
262.110	$\text{R} + \text{Q} \rightarrow \text{Q}^-$ (R = Radicals from ribose phosphate)	4.0×10^9 (uncor.)	6.8	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. ribose-5-phosphate; 25% <i>e</i> -transfer.	72R057
262.113	$\cdot\text{A}^- + \text{Q} \rightarrow \cdot\text{Q}^-$ ($\cdot\text{A}^-$ = 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 ₂ O-satd. soln. contg. 0.05 mol L ⁻¹ ascorbic acid; 43 and 38% <i>e</i> -transfer, resp., at pH 3.3 and 9.0.	73A047
262.114	$\dot{\text{C}}\text{HO}^-\text{CONH}_2 + \text{Q} \rightarrow \cdot\text{Q}^-$	$(2.3 \pm 0.2) \times 10^9$ (uncor.)	7.1	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. glycolamide; 48% <i>e</i> -transfer.	73A047
262.115	$\dot{\text{C}}\text{HOHCO}_2\text{H} + \text{Q} \rightarrow \cdot\text{Q}^-$ $\dot{\text{C}}\text{HOHCO}_2^- + \text{Q} \rightarrow \cdot\text{Q}^-$ $\dot{\text{C}}\text{HO}^-\text{CO}_2^- + \text{Q} \rightarrow \cdot\text{Q}^-$	$(9.2 \pm 0.9) \times 10^8$ (uncor.) $(1.5 \pm 0.2) \times 10^9$ (uncor.) $(1.6 \pm 0.2) \times 10^9$ (uncor.)	3.2 6.5 10.6	p.r. p.r. p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. glycolic acid; 13% <i>e</i> -transfer. P.b.k. at 395 nm in N ₂ O-satd. soln. contg. glycolate ion; 69% <i>e</i> -transfer P.b.k. at 395 nm in N ₂ O-satd. soln. contg. glycolate ion; 77% <i>e</i> -transfer.	73A047 73A047 73A104
262.117	$\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{Q} \rightarrow \cdot\text{Q}^-$ $\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CO}_2^- + \text{Q} \rightarrow \cdot\text{Q}^-$	$(1.4 \pm 0.1) \times 10^9$ (uncor.) $(1.9 \pm 0.2) \times 10^9$ (uncor.)	6.5 10.6	p.r. p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. lactate ion; 55% <i>e</i> -transfer. P.b.k. at 395 nm in N ₂ O-satd. soln. contg. lactate ion; 72% <i>e</i> -transfer (15% at pH 3.2).	73A047 73A047
262.118	$\text{CH}_3\dot{\text{C}}(\text{O}^-)\text{CO}_2\text{CH}_3 + \text{Q} \rightarrow \cdot\text{Q}^-$	$(2.3 \pm 0.2) \times 10^9$ (uncor.)	10.4	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. methyl lactate; 74% <i>e</i> -transfer (20% at pH 3.2).	73A047
262.119	$\dot{\text{C}}\text{O}^-(\text{CO}_2^-)_2 + \text{Q} \rightarrow \cdot\text{Q}^-$	$(2.5 \pm 0.3) \times 10^9$	9.2	p.r.	P.b.k. at 395 nm in soln. contg. ketomalonate and 1 mol L ⁻¹ <i>tert</i> -BuOH; 94% <i>e</i> -transfer.	73A047
262.120	$^-\text{O}_2\text{C}\dot{\text{C}}(\text{OH})\text{CH}_2\text{CO}_2^- + \text{Q} \rightarrow \cdot\text{Q}^-$	$(1.1 \pm 0.1) \times 10^9$ (uncor.) $(3.1 \pm 0.3) \times 10^9$	7.0 6.2	p.r. p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. malate; 47% <i>e</i> -transfer. P.b.k. at 395 nm in soln. contg. oxaloacetate and 1 mol L ⁻¹ <i>tert</i> -BuOH; 92% <i>e</i> -transfer.	73A047 73A047
262.121	$\text{HO}_2\text{C}\dot{\text{C}}\text{HOH}\dot{\text{C}}(\text{OH})\text{CO}_2\text{H} + \text{Q} \rightarrow \cdot\text{Q}^-$ $^-\text{O}_2\text{C}\dot{\text{C}}\text{HOH}\dot{\text{C}}(\text{OH})\text{CO}_2^- + \text{Q} \rightarrow \cdot\text{Q}^-$	$(7.0 \pm 0.7) \times 10^8$ (uncor.) $(7.0 \pm 0.7) \times 10^8$ (uncor.)	3.2 11.0	p.r. p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. tartaric acid; 14% <i>e</i> -transfer. P.b.k. at 395 nm in N ₂ O-satd. soln. contg. tartrate ion; 69% <i>e</i> -transfer.	73A047 73A047
262.122	$^-\text{O}_2\text{C}(\text{CH}_2)_2\dot{\text{C}}(\text{O}^-)\text{CO}_2^- + \text{Q} \rightarrow \cdot\text{Q}^-$	$(3.8 \pm 0.4) \times 10^9$	10.2	p.r.	P.b.k. at 395 nm in soln. contg. α -ketoglutarate and 1 mol L ⁻¹ <i>tert</i> -BuOH; 94% <i>e</i> -transfer.	73A047
262.142	$\text{R} + \text{Q} \rightarrow \cdot\text{Q}^-$ (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% <i>e</i> -transfer.	73A047
262.143	$\text{R} + \text{Q} \rightarrow \cdot\text{Q}^-$ (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% <i>e</i> -transfer.	73A047
262.144	$\text{R} + \text{Q} \rightarrow \cdot\text{Q}^-$ (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% <i>e</i> -transfer.	73A047
262.146	$\text{R} + \text{Q} \rightarrow \cdot\text{Q}^-$ (R = Electron adduct of acetylglycylglycinamide)	$(2.7 \pm 0.3) \times 10^9$	7.0	p.r.	P.b.k. at 395 nm; 99% <i>e</i> -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	$\cdot\text{CO}_2^- + \text{Q} \rightarrow \cdot\text{Q}^-$	5.4×10^9	6.9	p.r.	P.b.k. at 400 nm in N ₂ O-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 ₂ O-satd. soln. contg. formate.	73A047 73A104
<i>1-Methylnicotinamide See 3-Carbamoyl-1-methylpyridinium ion 151.</i>						
<i>1-Methylnicotinate ion See 3-Carboxy-1-methylpyridinium ion 153.</i>						
<i>3-Methyl-2-nitroanisole See 3-Methoxy-2-nitrotoluene 257.</i>						
263.	3-Methyl-2-nitrobenzoate ion					
263.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NO}_2\text{B}^- \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \cdot\text{NO}_2\text{B}^{2-}$	1.9×10^8	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	76A020
264.	2-Methyl-5-nitroimidazole					
264.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NX} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{NX}^-$	2.5×10^9		p.r.	P.b.k.	76A075
265.	3-Methyl-2-nitrophenol					
265.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CH}_3(\text{OH})\text{C}_6\text{H}_3\text{NO}_2 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{CH}_3(\text{OH})\text{C}_6\text{H}_3\dot{\text{N}}\text{O}_2^-$	2.9×10^8		p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	76A020
266.	4-Methylphenoxide ion					
266.020	$\cdot\text{CH}_2\text{CHO} + \text{CH}_3\text{C}_6\text{H}_4\text{O}^- (+ \text{H}_2\text{O}) \rightarrow$ $\text{CH}_3\text{CHO} + \text{CH}_3\text{C}_6\text{H}_4\text{O} \cdot + \text{OH}^-$	9.0×10^7	~11.5	p.r.	Soln. contg. N ₂ O and ethylene glycol.	79A051
267.	Methyl propionate					
267.001	$\cdot\text{CH}_3 + \text{C}_2\text{H}_5\text{CO}_2\text{CH}_3 \rightarrow$ $\text{CH}_4 + \text{CH}_3\dot{\text{C}}\text{HCO}_2\text{CH}_3$	2.9×10^3 (rel.)	~1	chem.	Radical from dimethyl sulfoxide in Ti ^{III} -H ₂ O ₂ -soln.; est. from esr meas. and values of competing reactions.	75D188
268.	3-Methylpterin					
268.075	$\cdot\text{CH}_2\text{OH} + \text{PtH}^+$	6×10^7 (uncor.)	0.8	p.r.	P.b.k. in N ₂ O-satd. soln. contg. MeOH; ~45% e -transfer.	76A060
268.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Pt}$	3.2×10^7 (uncor.)	6.3	p.r.	P.b.k. in N ₂ O-satd. soln. contg. EtOH; 55% e -transfer.	76A060
268.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PtH}^+$ $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Pt}$	1.9×10^9 2.9×10^8	0.8 7.0	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2-PrOH; 100% e -transfer.	76A060
269.	9-Methylpurine					
269.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{MP} \rightarrow \text{MPH} \cdot$ $\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{MP} \rightarrow \text{MP}^-$	$<2 \times 10^7$ 5.1×10^8	8.2 13.6	p.r.	P.b.k.; N ₂ O-satd. soln. contg. EtOH.	76A060
269.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{MPH}^+ \rightarrow \text{MPH}_3^{2+}$ $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{MP} \rightarrow \text{MPH} \cdot$ $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{MP} \rightarrow \text{MP}^-$	1.9×10^9 1.7×10^8 8.7×10^8	~0 8.6 13.6	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2-PrOH.	76A060
<i>1-Methyl-3-pyridinecarboxylate ion See 3-Carboxy-1-methylpyridinium ion 153.</i>						
<i>1-Methyl-4-pyridinecarboxylate ion See 4-Carboxy-1-methylpyridinium ion 154.</i>						
<i>Methylviologen See 1,1'-Dimethyl-4,4'-bipyridinium ion 183.</i>						
270.	Metmyoglobin					
270.075	$\cdot\text{CH}_2\text{OH} + \text{M(Fe}^{\text{III}}) \rightarrow$ $\text{CH}_2\text{O} + \text{H}^+ + \text{M(Fe}^{\text{II}})$	$(2.4 \pm 0.5) \times 10^7$	7	p.r.	95% redn. of hemoprotein in N ₂ O-satd. soln. contg. MeOH; obs. abs. change at 550 and 435 nm.	79A153
270.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{M(Fe}^{\text{III}})$	$(5.5 \pm 0.5) \times 10^7$	7	p.r.	95% redn. of hemoprotein in N ₂ O-satd. soln. contg. EtOH.	79A153
270.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{M(Fe}^{\text{III}}) \rightarrow \text{M(Fe}^{\text{II}})$	$\sim 1 \times 10^8$	7.5	p.r.	$G = 2.2$.	79A371
270.121	$\cdot\text{O}_2\text{CCHOHCHOHCO}_2^- + \text{M(Fe}^{\text{III}})$	$(3.5 \pm 0.7) \times 10^7$	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	$\cdot\text{CO}_2^- + \text{M}(\text{Fe}^{\text{III}})$	$(2.0 \pm 0.4) \times 10^9$	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 ₂ O-satd. soln. contg. 10^{-2} mol L ⁻¹ formate; $I = 0.03$.	79A204
271.	Metronidazole [1-(2-Hydroxyethyl)-2-methyl-5-nitroimidazole]					
271.075	$\cdot\text{CH}_2\text{OH} + \text{RNO}_2$	10^8		p.r.	D.k. at 320 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ MeOH.	74A135
271.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{RNO}_2$	2×10^8		p.r.	D.k. at 320 nm in N ₂ O-satd. soln. contg. EtOH.	74A135
271.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{RNO}_2$	7×10^8		p.r.	D.k. at 320 nm in N ₂ O-satd. soln. contg. 2-PrOH.	74A135
271.147	$\cdot\text{CO}_2^- + \text{RNO}_2$	8×10^8		p.r.	D.k. at 320 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate ion; also c.k. gave 8×10^8 rel. to $k(\cdot\text{CO}_2^- + \text{TAN}) = 6 \times 10^8$ [342.147].	74A135
272.	Misonidazole [1-(2-Hydroxy-3-methoxypropyl)-2-nitroimidazole]					
272.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{RNO}_2 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{RNO}_2^-$	$(2.8 \pm 0.4) \times 10^9$		p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	76A070
273.	1,4-Naphthoquinone					
273.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Q} \rightarrow \cdot\text{Q}^-$	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	$\text{NH}_2\dot{\text{C}}\text{HCO}_2^- + \text{Q} \rightarrow \cdot\text{Q}^-$	$(3.3 \pm 0.3) \times 10^9$	8.0	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. glycine.	73A104
274.068	$\text{R} + \text{Q} \rightarrow \cdot\text{Q}^-$ (R = Radicals from triglycine)	$(2.0 \pm 0.2) \times 10^9$	10	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. triglycine.	73A104
274.115	$\cdot\text{CHOHCO}_2^- + \text{Q} \rightarrow \cdot\text{Q}^-$	$(1.7 \pm 0.2) \times 10^9$	7.0	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. glycolate ion.	73A104
275.	Nicotinamide					
275.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NH}^+ \rightarrow$ $(\text{CH}_3)_2\text{CO} + \cdot\text{NH} + \text{H}^+$	$(2.1 \pm 0.4) \times 10^8$	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 ₂ O-satd. soln. contg. 0.5 mol L ⁻¹ 2-PrOH.	74A106
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{N}$	$< 1 \times 10^6$	9.2	p.r.	P.b.k. at ~400 nm in N ₂ O-satd. soln. contg. 0.5 mol L ⁻¹ 2-PrOH.	74A106
276.	Nicotinamide-adenine dinucleotide					
276.056	$\text{NH}_2\dot{\text{C}}\text{HCO}_2^- + \text{NAD}^+$	1.5×10^9	6.0	p.r.		73A104
276.075	$\cdot\text{CH}_2\text{OH} + \text{NAD}^+$	1.0×10^9	6.0	p.r.		73A104
276.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NAD}^+ \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \cdot\text{NAD}$	1.0×10^9		p.r.	Est. from buildup and decay of $\cdot\text{NAD}$ 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	$\cdot\text{CO}_2^- + \text{NAD}^+ \rightarrow \text{CO}_2 + \cdot\text{NAD}$	1.6×10^9	6.4	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate.	68G441
277.	Nicotinic acid					
277.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{H}^+\text{NC}_5\text{H}_4\text{CO}_2\text{H}$	3.5×10^8	0.0	p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N ₂ O-satd. soln.	74A106
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{H}^+\text{NC}_5\text{H}_4\text{CO}_2^-$	1.8×10^8	3.4			
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NC}_5\text{H}_4\text{CO}_2^-$	$< 1 \times 10^6$	8.2			
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{NC}_5\text{H}_4\text{CO}_2^-$	$> 1 \times 10^8$	13.1		contg. 0.5 mol L ⁻¹ 2-PrOH.	

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 [<i>anti</i>-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 ₂ O-satd. soln. contg. allyl alcohol; 3% <i>e</i> -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 ₂ O-satd. soln. contg. crotyl alcohol; 24% <i>e</i> -transfer.	73A099
		2.4 x 10 ⁹ (uncor.)	7	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. crotyl alcohol; 10% <i>e</i> -transfer.	73A052
278.037	CH ₃ ĊHCO ₂ ⁻ + NF	4.0 x 10 ⁹ (uncor.)	7	p.r.	P.b.k. at 390 nm (NF ⁻) in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ propionate ion; 2% <i>e</i> -transfer based on abs. spectra.	73A099
278.038	CH ₃ CH ₂ ĊHCO ₂ ⁻ + NF	4.9 x 10 ⁹ (uncor.)	7	p.r.	P.b.k. at 390 nm (NF ⁻) in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ butyrate ion; 2% <i>e</i> -transfer.	73A099
278.039	HOCH ₂ ĊHCO 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% <i>e</i> -transfer.	73A099
278.040	CH ₃ CHOHĊHCO ₂ ⁻ + NF	5.5 x 10 ⁹ (uncor.)	7	p.r.	P.b.k. at 390 nm in soln. contg. crotonate ion; 25% <i>e</i> -transfer.	73A099
278.041	·O ₂ CĊHCHOHCO ₂ ⁻ + NF	2.4 x 10 ⁹ (uncor.)	7	p.r.	P.b.k. at 390 nm in soln. contg. maleate ion; 3% <i>e</i> -transfer.	73A099
278.042	·CH(CO ₂ ⁻) ₂ + NF	1.3 x 10 ⁹ (uncor.)	7	p.r.	P.b.k. at 390 nm in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ malonate ion; 3% <i>e</i> -transfer.	73A099
278.075	·CH ₂ OH + NF → NF ⁻	8 x 10 ⁸	7	p.r.	P.b.k. at 390 nm in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ MeOH; 90% <i>e</i> -transfer.	73A099
278.076	CH ₃ ĊHOH + NF → NF ⁻	> 1.5 x 10 ⁹ (uncor.)	7	p.r.	P.b.k. at 390 nm in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ EtOH; > 75% <i>e</i> -transfer.	73A099
278.077	CH ₃ CH ₂ ĊHOH + NF → NF ⁻	3.2 x 10 ⁹ (uncor.)	7	p.r.	P.b.k. at 390 nm in N ₂ O-satd. soln. contg. 1-PrOH; 52% <i>e</i> -transfer.	73A062
		3.2 x 10 ⁹	7	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. 1-PrOH; 95% <i>e</i> -transfer.	73A099
278.078	(CH ₃) ₂ ĊOH + NF → NF ⁻	3.3 x 10 ⁹	7	p.r.	P.b.k. at 390 nm in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ 2-PrOH; 100% <i>e</i> -transfer.	73A099
		3.5 x 10 ⁹		p.r.	P.b.k.	76A075
278.079	CH ₃ CH ₂ CH ₂ ĊHOH + NF → NF ⁻	5.1 x 10 ⁹ (uncor.)	7	p.r.	P.b.k. at 390 nm in N ₂ O-satd. soln. contg. 1-BuOH; 75% <i>e</i> -transfer.	73A099
		3.4 x 10 ⁹ (uncor.)	7	p.r.	P.b.k. at 395 nm in N ₂ O-satd. soln. contg. 1-BuOH; 32% <i>e</i> -transfer.	73A062
278.099	NH ₃ ⁺ CH ₂ ĊHOPO ₃ ²⁻ + NF	3.0 x 10 ⁹ (uncor.)	7	p.r.	P.b.k. at 390 nm in N ₂ O-satd. soln. contg. 10 ⁻² mol L ⁻¹ <i>o</i> -phosphoryl-ethanolamine; 1% <i>e</i> -transfer.	73A099
278.106	CH ₂ OHCHOHĊHOH + NF (+ CH ₂ OHĊOHCH ₂ OH)	1.3 x 10 ⁹ (uncor.)	7	p.r.	P.b.k. at 390 nm in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ glycerol; 20% <i>e</i> -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 ₂ O-satd. soln. contg. 10 ⁻² mol L ⁻¹ deoxyribose; 70% <i>e</i> -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 ₂ O-satd. soln. contg. 10 ⁻² mol L ⁻¹ ribose; 50% <i>e</i> -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 ₂ O-satd. soln. contg. 10 ⁻³ mol L ⁻¹ ribose phosphate; 10% <i>e</i> -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	$\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{NF} \rightarrow \text{NF}^-$	1.5×10^9	7	p.r.	P.b.k. at 390 nm in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ lactate ion; 100% <i>e</i> -transfer.	73A099
278.120	$^-\text{O}_2\text{CCH}_2\dot{\text{C}}\text{OHCO}_2^- + \text{NF}$	1.2×10^8 (uncor.)	7	p.r.	P.b.k. at 390 nm in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ malate ion; 30% <i>e</i> -transfer.	73A099
278.147	$^-\text{CO}_2 + \text{NF} \rightarrow \text{NF}^-$	2.7×10^9		p.r.	P.b.k. at 390 nm in CO ₂ -satd. soln. contg. <i>tert</i> -BuOH or 0.2 mol L ⁻¹ formate; 100% <i>e</i> -transfer.	73A099
279.	<i>p</i>-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 ₂ O-satd. soln. contg. allyl alcohol; 3% <i>e</i> -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 ₂ O-satd. soln. contg. crotyl alcohol; 9% <i>e</i> -transfer.	73A062
279.075	$^-\text{CH}_2\text{OH} + \text{PNAP} \rightarrow \text{addn.}$	1×10^8	7	p.r.	P.b.k. at 330 nm in N ₂ O-satd. soln. contg. MeOH.	73G122
	$^-\text{CH}_2\text{OH} + \text{PNAP} \rightarrow \text{PNAP}^-$	1×10^7	7	p.r.	P.b.k. at 550 nm in N ₂ O-satd. soln. contg. MeOH.	73G122
	$^-\text{CH}_2\text{O} + \text{PNAP} \rightarrow \text{PNAP}^-$	$(4.7 \pm 0.5) \times 10^9$	13	p.r.	P.b.k. at 550 nm in N ₂ O-satd. soln. contg. MeOH.	73G122
279.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{PNAP} \rightarrow \text{PNAP}^-$	$(8 \pm 2) \times 10^8$	11	p.r.	P.b.k. at 550 nm in N ₂ O-satd. soln. contg. EtOH.	73G122
279.077	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{PNAP}$	2.4×10^9 (uncor.)	7	p.r.	P.b.k. at 360 and 550 nm in N ₂ O-satd. soln. contg. 1-PrOH; 45% <i>e</i> -transfer.	73A062
279.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PNAP} \rightarrow \text{PNAP}^-$	$(3.8 \pm 0.4) \times 10^9$	11	p.r.	P.b.k. at 550 nm in N ₂ O-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	$\text{CH}_3\text{CH}_2\text{CH}_2\dot{\text{C}}\text{HOH} + \text{PNAP}$	2.2×10^9 (uncor.)	7	p.r.	P.b.k. at 360 and 550 nm in N ₂ O-satd. soln. contg. 1-BuOH; 24% <i>e</i> -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% <i>e</i> -transfer.	75A207
279.111	R + PNAP $\rightarrow$ PNAP ⁻ (R = Radicals from glucose)	9×10^8		p.r.		77R167
279.147	$^-\text{CO}_2 + \text{PNAP} \rightarrow \text{PNAP}^-$	$(1.0 \pm 0.1) \times 10^9$	10	p.r.	P.b.k. at 550 nm in N ₂ O-satd. soln. contg. formate ion.	73G122
		7×10^8		p.r.	Radical from formate.	77R167
280.	<i>o</i>-Nitroaniline					
280.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NH}_2\text{C}_6\text{H}_4\text{NO}_2 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{NH}_2\text{C}_6\text{H}_4\dot{\text{N}}\text{O}_2^-$	9.2×10^8	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	76A020
281.	<i>m</i>-Nitroaniline					
281.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NH}_2\text{C}_6\text{H}_4\text{NO}_2 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{NH}_2\text{C}_6\text{H}_4\dot{\text{N}}\text{O}_2^-$	1.5×10^9	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	76A020
282.	<i>p</i>-Nitroaniline					
282.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NH}_2\text{C}_6\text{H}_4\text{NO}_2 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{NH}_2\text{C}_6\text{H}_4\dot{\text{N}}\text{O}_2^-$	7.2×10^8	7	p.r.	P.b.k. in N ₂ O-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 ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	77A118
283.	Nitrobenzene					
283.018	R + C ₆ H ₅ NO ₂ (R = Radicals from allyl alcohol)	$\sim 1.5 \times 10^9$ (uncor.)	7	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. allyl alcohol; 5% <i>e</i> -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 ₆ H ₅ NO ₂ (R = Radicals from crotyl alcohol)	~1 x 10 ⁹ (uncor.)	7	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. crotyl alcohol; 8% <i>e</i> -transfer.	73A062
283.075	·CH ₂ OH + C ₆ H ₅ NO ₂ → CH ₂ O + C ₆ H ₅ NO ₂ ⁻	<10 ⁷	7	p.r.	P.b.k. at 285 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ MeOH.	66G432
		(6.0 ± 0.9) x 10 ⁷	5-6	p.r.	N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ MeOH.	72A018
	·CH ₂ O ⁻ + C ₆ H ₅ NO ₂ → CH ₂ O + C ₆ H ₅ NO ₂ ⁻	2.7 x 10 ⁹	13	p.r.	P.b.k. at 285 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ MeOH.	66G432
283.076	CH ₃ CHOH + C ₆ H ₅ NO ₂ → CH ₃ CHO + H ⁺ + C ₆ H ₅ NO ₂ ⁻	3.3 x 10 ⁸	7	p.r.	P.b.k. at 285 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ EtOH.	66G432
		(2.4 ± 0.7) x 10 ⁸	5-6	p.r.	N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ EtOH.	72A018
	CH ₃ CHO ⁻ + C ₆ H ₅ NO ₂ → CH ₃ CHO + C ₆ H ₅ NO ₂ ⁻	3.1 x 10 ⁹	13	p.r.	P.b.k. at 285 nm in N ₂ O-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 ₂ O-satd. soln. contg. EtOH; <i>E</i> _a ≈ 3.3 kcal mol ⁻¹ (14 kJ mol ⁻¹).	74A010
283.077	CH ₃ CH ₂ CHOH + C ₆ H ₅ NO ₂ → CH ₃ CH ₂ CHO + H ⁺ + C ₆ H ₅ NO ₂ ⁻	3.5 x 10 ⁸	7	p.r.	P.b.k. at 285 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 1-PrOH; 68% <i>e</i> - transfer.	66G432
		1.0 x 10 ⁹ (uncor.)	7	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. 1-PrOH; 60% <i>e</i> -transfer.	73A062
	CH ₃ CH ₂ CHO ⁻ + C ₆ H ₅ NO ₂ → CH ₃ CH ₂ CHO + C ₆ H ₅ NO ₂ ⁻	3.1 x 10 ⁹	13	p.r.	P.b.k. at 285 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 1-PrOH.	66G432
283.078	(CH ₃) ₂ CHOH + C ₆ H ₅ NO ₂ → (CH ₃) ₂ CO + H ⁺ + C ₆ H ₅ NO ₂ ⁻	1.6 x 10 ⁹	7	p.r.	P.b.k. at 285 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	66G432
	(CH ₃) ₂ CHO ⁻ + C ₆ H ₅ NO ₂ → (CH ₃) ₂ CO + C ₆ H ₅ NO ₂ ⁻	3.0 x 10 ⁹	13	p.r.	P.b.k. at 285 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	66G432
283.079	CH ₃ CH ₂ CH ₂ CHOH + C ₆ H ₅ NO ₂ → CH ₃ CH ₂ CH ₂ CHO + H ⁺ + C ₆ H ₅ NO ₂ ⁻	4.0 x 10 ⁸	7	p.r.	P.b.k. at 285 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 1-BuOH; 35% <i>e</i> - transfer.	66G432
		1.1 x 10 ⁹ (uncor.)	7	p.r.	P.b.k. at 400 nm in N ₂ O-satd. soln. contg. 1-BuOH; 31% <i>e</i> -transfer;	73A062
	CH ₃ CH ₂ CH ₂ CHO ⁻ + C ₆ H ₅ NO ₂ → CH ₃ CH ₂ CH ₂ CHO + C ₆ H ₅ NO ₂ ⁻	3.1 x 10 ⁹	13	p.r.	P.b.k. at 285 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 1-BuOH.	66G432
283.081	(CH ₃) ₂ CHCHOH + C ₆ H ₅ NO ₂ → (CH ₃) ₂ CHCHO + H ⁺ + C ₆ H ₅ NO ₂ ⁻	3.9 x 10 ⁸	7	p.r.	P.b.k. at 285 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-methyl-1-propanol; 39% <i>e</i> -transfer.	66G432
	(CH ₃) ₂ CHCHO ⁻ + C ₆ H ₅ NO → (CH ₃) ₂ CHCHO + C ₆ H ₅ NO ₂ ⁻	2.9 x 10 ⁹	13	p.r.	P.b.k. at 285 nm in N ₂ O-satd. soln. contg. 2-methyl-1-propanol.	66G432
283.084	-CH ₂ CHOH(CH ₂) ₂ - + C ₆ H ₅ NO ₂ → R=O + H ⁺ + C ₆ H ₅ NO 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 <i>tert</i> -BuOH at 2°C; <i>k</i> = 3.2 x 10 ⁹ at 64°C; <i>E</i> _a = 2.3 kcal mol ⁻¹ (9.6 kJ mol ⁻¹).	76A103
283.085	-CH ₂ CHOH(CH ₂) ₃ - + C ₆ H ₅ NO ₂ → R=O + C ₆ H ₅ NO 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 <i>tert</i> -BuOH at 2°C; <i>k</i> = 5.2 x 10 ⁹ at 64°C; <i>E</i> _a = 4.0 kcal mol ⁻¹ (17 kJ mol ⁻¹).	76A103
283.086	-CH ₂ CHOH(CH ₂) ₄ - + C ₆ H ₅ NO ₂ → R=O + C ₆ H ₅ NO 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 <i>tert</i> -BuOH at 2°C; <i>k</i> = 2.0 x 10 ⁹ at 64°C <i>E</i> _a = 3.1 kcal mol ⁻¹ (13 kJ mol ⁻¹).	76A103
283.087	-CH ₂ CHOH(CH ₂) ₅ - + C ₆ H ₅ NO ₂ → R=O + C ₆ H ₅ NO 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 <i>tert</i> -BuOH at 2°C; <i>k</i> = 4.9 x 10 ⁹ at 64°C; <i>E</i> _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	$-\text{CH}_2\dot{\text{C}}\text{OH}(\text{CH}_2)_6^- + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$ $\text{R}=\text{O} + \text{C}_6\text{H}_5\dot{\text{N}}\text{O}_2^-$	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 <i>tert</i> -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	$\text{CH}_3\dot{\text{C}}\text{HOC}_2\text{H}_5 + \text{C}_6\text{H}_5\text{NO}_2$	2.5×10^8		p.r.	D.k.; radical from ethyl ether.	77A100
283.104	$-\text{O}\dot{\text{C}}\text{HCH}_2\text{O}(\text{CH}_2)_2^- + \text{C}_6\text{H}_5\text{NO}_2$	2.5×10^7		p.r.	D.k.; radical from dioxane.	77A100
283.117	$\text{CH}_3\dot{\text{C}}\text{OHCO}_2^- + \text{C}_6\text{H}_5\text{NO}_2$	$(6.5 \pm 2) \times 10^7$	6.0	p.r.	N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ lactate ion.	72A018
283.123	$\cdot\text{CH}(\text{OH})_2 + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$ $\text{HCO}_2^- + 2 \text{H}^+ + \text{C}_6\text{H}_5\dot{\text{N}}\text{O}_2^-$	1.9×10^9	5.8	p.r.	P.b.k. at 290 nm in N ₂ O-satd. soln. contg. 10^{-2} mol L ⁻¹ formaldehyde; also condy.	71G424
	$\cdot\text{CH}(\text{OH})\text{O}^- + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$ $\text{HCO}_2^- + \text{H}^+ + \text{C}_6\text{H}_5\dot{\text{N}}\text{O}_2^-$	4.5×10^9	12			
283.147	$\cdot\text{CO}_2^- + \text{C}_6\text{H}_5\text{NO}_2 \rightarrow$ $\text{CO}_2 + \text{C}_6\text{H}_5\dot{\text{N}}\text{O}_2^-$	$(1.0 \pm 0.2) \times 10^9$ $(5.6 \pm 1) \times 10^8$ $(5.8 \pm 0.6) \times 10^8$ $(7.5 \pm 0.7) \times 10^8$ $(4.6 \pm 0.5) \times 10^8$	6-7 ~3 9.4 2.5 0	p.r. p.r.	P.b.k. at 295 nm in N ₂ O-satd. soln. contg. 10^{-3} mol L ⁻¹ formate. P.b.k.	70G303 73G085
284.	<i>o</i>-Nitrobenzoate ion					
284.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NO}_2\text{C}_6\text{H}_4\text{CO}_2^- \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \dot{\text{N}}\text{O}_2^-\text{C}_6\text{H}_4\text{CO}_2^-$	5.4×10^8	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2-PrOH; at pH 0.8 k was the same ± 20 -30%.	76A111
284.147	$\cdot\text{CO}_2^- + \text{NO}_2\text{C}_6\text{H}_4\text{CO}_2^- \rightarrow$ $\text{CO}_2 + \dot{\text{N}}\text{O}_2^-\text{C}_6\text{H}_4\text{CO}_2^-$	2.4×10^8	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. formate; at pH 0.8 k was the same ± 20 -30%.	76A111
285.	<i>m</i>-Nitrobenzoate ion					
285.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NO}_2\text{C}_6\text{H}_4\text{CO}_2^- \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \dot{\text{N}}\text{O}_2^-\text{C}_6\text{H}_4\text{CO}_2^-$	9.0×10^8	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2-PrOH; at pH 0.8 k was the same ± 20 -30%.	76A111
285.147	$\cdot\text{CO}_2^- + \text{NO}_2\text{C}_6\text{H}_4\text{CO}_2^- \rightarrow$ $\text{CO}_2 + \dot{\text{N}}\text{O}_2^-\text{C}_6\text{H}_4\text{CO}_2^-$	6.3×10^8	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. formate; at pH 0.8 k was the same ± 20 -30%.	76A111
286.	<i>p</i>-Nitrobenzoate ion					
286.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NO}_2\text{C}_6\text{H}_4\text{CO}_2^- \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \dot{\text{N}}\text{O}_2^-\text{C}_6\text{H}_4\text{CO}_2^-$	2.1×10^9	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2-PrOH; at pH 0.8 k was the same ± 20 -30%.	76A111
286.147	$\cdot\text{CO}_2^- + \text{NO}_2\text{C}_6\text{H}_4\text{CO}_2^- \rightarrow$ $\text{CO}_2 + \dot{\text{N}}\text{O}_2^-\text{C}_6\text{H}_4\text{CO}_2^-$	8.0×10^8	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. formate; at pH 0.8 k was the same ± 20 -30%.	76A111
287.	<i>p</i>-Nitrobenzonitrile					
287.111	$\text{R} + \text{NO}_2\text{C}_6\text{H}_4\text{CN}$ (R = Radicals from glucose)	1.0×10^9		p.r.		77R167
287a.	Nitro blue tetrazolium					
287a.147	$\cdot\text{CO}_2^- + \text{NBT}^{2+} \rightarrow \text{CO}_2 + \text{NBT}^{\cdot+}$	$(6.4 \pm 0.2) \times 10^9$	10	p.r.	P.b.k. at 405 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate.	80A085
<i>anti</i> -5-Nitro-2-furaldoxime see Nifuroxime 278.						
288.	5-Nitrofuroate ion					
288.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \dots\text{NO}_2 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \dot{\text{N}}\text{O}_2^-$	1.5×10^9	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	73G114
289.	2-Nitroimidazole					
289.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NX} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{NX}^-$	3.5×10^9		p.r.	P.b.k.	76A075
290.	4-Nitroimidazole					
290.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NX} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{NX}^-$	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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + (\text{O}_2\text{C})_2\text{C}_6\text{H}_3\text{NO}_2 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + (\text{O}_2\text{C})_2\text{C}_6\text{H}_3\dot{\text{N}}\text{O}_2^-$	1.5×10^8	7	p.r.	P.b.k. at 310 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	76A020
292.	Nitromethane					
292.047	$\cdot\text{CF}_3 + \text{CH}_2\text{NO}_2^- \rightarrow$ $\text{CF}_3\text{CH}_2\dot{\text{N}}\text{O}_2^-$	5×10^8 (rel.)		γ -r.	C.k. in soln. contg. 1 mol L ⁻¹ 2-PrOH and CF ₃ Cl; rel. to $k(\text{CF}_3 + 2\text{-PrOH}) = 10^5$; product radical identified by esr.	72G244
293.	<i>p</i>-Nitroperoxybenzoic acid					
293.075	$\cdot\text{CH}_2\text{OH} + \text{NO}_2\text{C}_6\text{H}_4\text{CO}_2\text{OH} \rightarrow$ $\text{CH}_2\text{O} + \text{H}^+ + \dot{\text{N}}\text{O}_2\text{C}_6\text{H}_4\text{CO}_2\text{OH}$ (+ adduct formn.)	2×10^8		p.r.	P.b.k. at 330 nm in N ₂ O-satd. soln. contg. MeOH; 20% <i>e</i> -transfer based on condy. change.	74A078
293.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NO}_2\text{C}_6\text{H}_4\text{CO}_2\text{OH} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \dot{\text{N}}\text{O}_2\text{C}_6\text{H}_4\text{CO}_2\text{OH}$	3.3×10^9	5.0	p.r.	P.b.k. at 330 nm in N ₂ O-satd. soln. contg. 2-PrOH.	74A078
294.	<i>o</i>-Nitrophenol					
294.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{HOC}_6\text{H}_4\text{NO}_2 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{HOC}_6\text{H}_4\dot{\text{N}}\text{O}_2^-$	2.6×10^9	1	p.r.	P.b.k. in soln. contg. 2-PrOH.	69G270
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{OC}_6\text{H}_4\text{NO}_2 \rightarrow$	1.4×10^9	13	p.r.	P.b.k. in soln. contg. 2-PrOH.	69G270
295.	2-Nitropyrrole					
295.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NX} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{NX}^-$	2.0×10^9		p.r.	P.b.k.	76A075
296.	3-Nitropyrrole					
296.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NX} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{NX}^-$	2.0×10^9		p.r.	P.b.k.	76A075
<i>2-Nitroresorcinol See 1,3-Dihydroxy-2-nitrobenzene 178.</i>						
297.	Nitrosobenzene					
297.075	$\cdot\text{CH}_2\text{OH} + \text{C}_6\text{H}_5\text{NO} \rightarrow$ $\text{CH}_2\text{O} + \text{C}_6\text{H}_5\dot{\text{N}}\text{OH}$	3.2×10^9	7.0	p.r.	P.b.k. at 450 nm in N ₂ O-satd. soln. contg. 0.05 mol L ⁻¹ MeOH.	66G433
	$\cdot\text{CH}_2\text{O}^- + \text{C}_6\text{H}_5\text{NO} \rightarrow$ $\text{CH}_2\text{O} + \text{C}_6\text{H}_5\dot{\text{N}}\text{O}^-$	6.8×10^9	13.0	p.r.	P.b.k. at 450 nm in N ₂ O-satd. soln. contg. 0.05 mol L ⁻¹ MeOH.	66G433
297.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{C}_6\text{H}_5\text{NO} \rightarrow$ $\text{CH}_3\text{CHO} + \text{C}_6\text{H}_5\dot{\text{N}}\text{OH}$	3.9×10^9	7.0	p.r.	P.b.k. at 450 nm in N ₂ O-satd. soln. contg. 0.05 mol L ⁻¹ EtOH.	66G433
	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{C}_6\text{H}_5\text{NO} \rightarrow$ $\text{CH}_3\text{CHO} + \text{C}_6\text{H}_5\dot{\text{N}}\text{O}^-$	6.4×10^9	13.0	p.r.	P.b.k. at 450 nm in N ₂ O-satd. soln. contg. 0.05 mol L ⁻¹ EtOH.	66G433
297.077	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{C}_6\text{H}_5\text{NO} \rightarrow$ $\text{CH}_3\text{CH}_2\text{CHO} + \text{C}_6\text{H}_5\dot{\text{N}}\text{OH}$	4.0×10^9	7.0	p.r.	P.b.k. at 450 nm in N ₂ O-satd. soln. contg. 0.05 mol L ⁻¹ 1-PrOH; includes β -alcohol radical reaction.	66G433
297.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_6\text{H}_5\text{NO} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{C}_6\text{H}_5\dot{\text{N}}\text{OH}$	5.0×10^9	7.0	p.r.	P.b.k. at 450 nm in N ₂ O-satd. soln. contg. 0.05 mol L ⁻¹ 2-PrOH.	66G433
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{C}_6\text{H}_5\text{NO} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{C}_6\text{H}_5\dot{\text{N}}\text{O}^-$	7.0×10^9	13.0	p.r.	P.b.k. at 450 nm in N ₂ O-satd. soln. contg. 0.05 mol L ⁻¹ 2-PrOH.	66G433
297.079	$\text{CH}_3\text{CH}_2\text{CH}_2\dot{\text{C}}\text{HOH} + \text{C}_6\text{H}_5\text{NO} \rightarrow$ $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO} + \text{C}_6\text{H}_5\dot{\text{N}}\text{OH}$	4.0×10^9	7.0	p.r.	P.b.k. at 450 nm in N ₂ O-satd. soln. contg. 0.05 mol L ⁻¹ 1-BuOH; includes β - and γ -alcohol radical reaction.	66G433
297.081	$(\text{CH}_3)_2\text{CH}\dot{\text{C}}\text{HOH} + \text{C}_6\text{H}_5\text{NO} \rightarrow$ $(\text{CH}_3)_2\text{CHCHO} + \text{C}_6\text{H}_5\dot{\text{N}}\text{OH}$	4.0×10^9	7.0	p.r.	P.b.k. at 450 nm in N ₂ O-satd. soln. contg. 0.05 mol L ⁻¹ 2-methyl-1-propanol; includes β -alcohol radical reaction.	66G433
297.147	$\cdot\text{CO}_2^- + \text{C}_6\text{H}_5\text{NO} \rightarrow$ $\text{CO}_2 + \text{C}_6\text{H}_5\dot{\text{N}}\text{O}^-$	4.0×10^9		p.r.	P.b.k. at 450 nm in soln. contg. formate ion.	66G433
<i>p-Nitroso-N,N-dimethylaniline See N,N-Dimethyl-4-nitrosoaniline, 186a.</i>						
298.	2-Nitrothiophene					
298.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NX} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{NX}^-$	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. 299.078	3-Nitrothiophene (CH ₃) ₂ ĊOH + NX → (CH ₃) ₂ CO + H ⁺ + NX ⁻	2.0 × 10 ⁹		p.r.	P.b.k.	76A075
300. 300.078	o-Nitrotoluene (CH ₃) ₂ ĊOH + CH ₃ C ₆ H ₄ NO ₂ → (CH ₃) ₂ CO + H ⁺ + CH ₃ C ₆ H ₄ ĊO ₂ ⁻	4.8 × 10 ⁸	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	76A020
301. 301.078	5-Nitrouracil (CH ₃) ₂ ĊOH + NX	(7 ± 3.5) × 10 ⁸		p.r.		73A150
302. 302.016 302.078	Norpseudopelletierine-N-oxy ·CH ₂ C(CH ₃) ₂ OH + NPPN (CH ₃) ₂ ĊOH + NPPN	(5.1 ± 0.5) × 10 ⁸ (8.1 ± 0.8) × 10 ⁸		p.r. p.r.		71G061 71G061
303. 303.078	Orotate ion (CH ₃) ₂ ĊOH + orotate	(1 ± 0.5) × 10 ⁸		p.r.		73A150
<i>Paraquat See 1,1'-Dimethyl-4,4'-bipyridinium ion 183.</i>						
304. 304.075	Penicillamine ·CH ₂ OH + RSH → CH ₃ OH + RS· (→ RSSR ⁻)	(1.1 ± 0.1) × 10 ⁸		p.r.	P.b.k. at 450 nm in soln. contg. 0.5 or 1 mol L ⁻¹ MeOH.	73A073
305. 305.001	3-Pentanone ·CH ₃ + C ₂ H ₅ COC ₂ H ₅ → CH ₄ + CH ₃ ĊHCOC ₂ H ₅	1.4 × 10 ⁴	~1	chem.	Radical from dimethyl sulfoxide in Ti ^{III} -H ₂ O ₂ soln.; est. from esr meas. and values for competing reactions.	75D188
306. 306.075	1,10-Phenanthroline ·CH ₂ OH + phen ·CH ₂ O ⁻ + phen	<10 ⁶ <10 ⁶ <1 × 10 ⁷	7 13 ~13	p.r. p.r.	P.b.k. in soln. contg. 0.2 mol L ⁻¹ MeOH. P.b.k. at 490 nm in N ₂ O-satd. soln. contg. 1 mol L ⁻¹ MeOH.	79A148 80A115
306.076	CH ₃ ĊHO ⁻ + phen → ·phenH	(8 ± 2) × 10 ⁸	~13	p.r.	P.b.k. at 490 nm in N ₂ O-satd. soln. contg. 1 mol L ⁻¹ EtOH.	80A115
306.078	(CH ₃) ₂ ĊOH + phen → ·phenH	(3.2 ± 0.2) × 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 ₂ O-satd. soln. contg. 2-PrOH.	80A115
		<1 × 10 ⁷	8			
		1.2 × 10 ⁷	7		P.b.k. in soln. contg. 2-PrOH and acetone.	79A148
	(CH ₃) ₂ ĊO ⁻ + phen → ·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 ± 0.5) × 10 ⁹	~13	p.r.	P.b.k. at 490 nm in N ₂ O-satd. soln. contg. 1 mol L ⁻¹ 2-PrOH.	80A115
307. 307.078	Phenazine (CH ₃) ₂ ĊO ⁻ + Pz → (CH ₃) ₂ CO + ·PzH	3 × 10 ⁹	13	p.r.	p.b.k.	79A305
308. 308.056	Phenosafarine NH ₂ ĊHCO ₂ ⁻ + dye	1.9 × 10 ⁹ (uncor.)	7	p.r.	D.k. at 520 nm in N ₂ O-satd. soln. contg. glycine; 66% e-transfer.	73A078
308.075	·CH ₂ OH + dye	1.2 × 10 ⁹ (uncor.)	7	p.r.	D.k. at 520 nm in N ₂ O-satd. soln. contg. MeOH; 22% e-transfer.	73A078
308.078	(CH ₃) ₂ ĊOH + dye	3.2 × 10 ⁹	7	p.r.	D.k. at 520 nm in N ₂ O-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	$\cdot\text{CH}_2\text{CHO} + \text{C}_6\text{H}_5\text{O}^- (+ \text{H}_2\text{O}) \rightarrow$ $\text{CH}_3\text{CHO} + \text{C}_6\text{H}_5\text{O}\cdot + \text{OH}^-$	4.3×10^6	~ 11.5	p.r.	Soln. contg. N ₂ O and ethylene glycol.	79A051
310.	<i>o</i>-Phenylenediamine					
310.020	$\cdot\text{CH}_2\text{CHO} + \text{H}_2\text{NC}_6\text{H}_4\text{NH}_2 \rightarrow$ $\text{CH}_3\text{CHO} + \text{H}_2\text{NC}_6\text{H}_4\dot{\text{N}}\text{H}$	7.3×10^7	~ 11.5	p.r.	Soln. contg. N ₂ O and ethylene glycol.	79A051
311.	<i>p</i>-Phenylenediamine					
311.020	$\cdot\text{CH}_2\text{CHO} + \text{H}_2\text{NC}_6\text{H}_4\text{NH}_2 \rightarrow$ $\text{CH}_3\text{CHO} + \text{H}_2\text{NC}_6\text{H}_4\dot{\text{N}}\text{H}$	4.0×10^8	~ 11.5	p.r.	Soln. contg. N ₂ O and ethylene glycol.	79A051
312.	Promethazine					
312.048	$\cdot\text{CCl}_3 + \text{PZ}$	slow	12	p.r.	Suggested that fast reaction is with $\text{CCl}_3\dot{\text{O}}_2$ and not $\cdot\text{CCl}_3$.	78B128 80A053
313.	1-Propanol					
313.047	$\cdot\text{CF}_3 + \text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$	$(4.4 \pm 0.7) \times 10^4$ (rel.)	9–10	γ -r.	C.k. with addn. of CF ₃ to propylene obs. $G(\text{CF}_3\text{H})$; rel. to $k(\text{CF}_3 + \text{HCO}_2^-)$ $= 3.4 \times 10^5$.	70G407
314.	2-Propanol					
314.001	$\cdot\text{CH}_3 + (\text{CH}_3)_2\text{CHOH} \rightarrow$ $\text{CH}_4 + (\text{CH}_3)_2\dot{\text{C}}\text{OH}$	3.4×10^3 (rel.)		γ -r.	C.k. with O ₂ ; radical from MeI; rel. to $k(\text{CH}_3 + \text{O}_2) = 4.7 \times 10^9$.	67G041
		$\geq (1.6 \pm 0.3) \times 10^3$ (rel.)	1	phot.	Est. from effect of addn. of 2-PrOH on CH ₄ and C ₂ H ₆ yields in photolysis of Co(NH ₃) ₅ O ₂ CCH ₃ ²⁺ .	71F579
314.015	$\cdot\text{CH}_2\text{CHOHCH}_3 + (\text{CH}_3)_2\text{CHOH} \rightarrow$ $(\text{CH}_3)_2\text{CHOH} + (\text{CH}_3)_2\dot{\text{C}}\text{OH}$	$> 53 \pm 10$		γ -r.	Est. from rel. rates and $G(-\text{H}_2\text{O}_2)$ in soln. contg. H ₂ O ₂ and 2-PrOH.	70G104
314.047	$\cdot\text{CF}_3 + (\text{CH}_3)_2\text{CHOH} \rightarrow$ $\text{CHF}_3 + (\text{CH}_3)_2\dot{\text{C}}\text{OH}$	$(9.2 \pm 0.9) \times 10^4$ (rel.)	9–10	γ -r.	C.k. with addn. of $\cdot\text{CF}_3$ to propylene; obs. $G(\text{CHF}_3)$; rel. to $k(\cdot\text{CF}_3 + \text{HCO}_2^-)$ $= 3.4 \times 10^5$.	70G407
314.048	$\cdot\text{CCl}_3 + (\text{CH}_3)_2\text{CHOH} \rightarrow$ $\text{CCl}_3^- + \text{H}^+ + (\text{CH}_3)_2\dot{\text{C}}\text{OH}$	$\sim 10^4$		p.r.	Reaction proposed to explain initial increase of abs. of PNAP ⁻ in soln. contg. CCl ₄ -PNAP-2-PrOH-acetone.	73A140
	$\cdot\text{CCl}_3 + (\text{CH}_3)_2\text{CHOH} \rightarrow$ $\text{CHCl}_3 + (\text{CH}_3)_2\dot{\text{C}}\text{OH}$	79		γ -r.	Calcd. from dependence of $G(\text{Cl}^-)$ on dose rate in soln. contg. CCl ₄ and 2-PrOH assuming $2k(\cdot\text{CCl}_3 + \cdot\text{CCl}_3) = 10^9$.	71G778
315.	Propionic acid					
315.001	$\cdot\text{CH}_3 + \text{CH}_3\text{CH}_2\text{CO}_2\text{H} \rightarrow$ $\text{CH}_4 + \text{CH}_3\dot{\text{C}}\text{HCO}_2\text{H}$	3.0×10^3	~ 1	chem.	Radical from dimethyl sulfoxide in Ti ^{III} -H ₂ O ₂ soln.; est. from esr meas. and values for competing reactions.	75D188
316.	Propionitrile					
316.001	$\cdot\text{CH}_3 + \text{CH}_3\text{CH}_2\text{CN} \rightarrow$ $\text{CH}_4 + \text{CH}_3\dot{\text{C}}\text{HCN}$	1.2×10^3	~ 1	chem.	Radical from dimethyl sulfoxide in Ti ^{III} -H ₂ O ₂ soln.; est. from esr meas. and values for competing reactions.	75D188
317.	Propylene					
317.001	$\cdot\text{CH}_3 + \text{CH}_3\text{CH}=\text{CH}_2 \rightarrow \text{addn.}$	5.3×10^3 (rel.)		γ -r.	C.k. with 2-PrOH in soln. contg. MeI obs. $G(\text{CH}_4)$; rel. to $k(\text{CH}_3 + \text{O}_2) = 4.7 \times 10^9$.	67G041
317.047	$\cdot\text{CF}_3 + \text{CH}_3\text{CH}=\text{CH}_2 \rightarrow \text{addn.}$	$(7.2 \pm 0.4) \times 10^7$ (rel.)	9–10	γ -r.	C.k. with 2-PrOH; radical from CF ₃ Cl; obs. $G(\text{CF}_3\text{H})$ by H abstr. from formate rel. to $k(\text{CF}_3 + \text{HCO}_2^-) = 3.4 \times 10^5$.	70G407
<i>1,1'-Propylene-2,2'-bipyridinium ion See Trimethylene-2,2'-bipyridinium ion 354.</i>						
318.	Pteridine					
318.075	$\cdot\text{CH}_2\text{OH} + \text{P}$	3.6×10^8	6.0	p.r.	P.b.k. in N ₂ O-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	$\cdot\text{CH}_2\text{OH} + \text{PtH}_2^+$	9.0×10^7 (uncor.)	0.8	p.r.	P.b.k. in N ₂ O-satd. soln.	76A060
	$\cdot\text{CH}_2\text{OH} + \text{PtH}$	$\leq 10^7$	7.0		contg. MeOH; ~40% e -transfer	
	$\cdot\text{CH}_2\text{O}^- + \text{Pt}^-$	6.0×10^8	13.0		at pH 0.8, ~100% at pH 13.	
319.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{PtH}$	3.7×10^7 (uncor.)	7.0	p.r.	P.b.k. in N ₂ O-satd. soln.	76A060
	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{Pt}^-$	1.2×10^9	13.0		contg. EtOH; ~40% e -transfer at pH 7, ~100% at pH 13.	
319.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PtH}_2^+$	2.0×10^9	0.8	p.r.	P.b.k. in N ₂ O-satd. soln.	76A060
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PtH}$	4.5×10^8	7.0		contg. 2-PrOH; ~100% e -transfer.	
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Pt}^-$	$\leq 10^7$	9.4			
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Pt}^-$	1.5×10^9	13.0			
319.147	$\cdot\text{CO}_2^- + \text{PtH}$	4.6×10^8	7.0	p.r.	P.b.k. in N ₂ O-satd. soln.	76A060
	$\cdot\text{CO}_2^- + \text{Pt}^-$	$\leq 10^7$	9.5–13.0		contg. formate ion; 100% e -transfer at pH 7.	
320.	Purine					
320.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PH}_2^+$	2.7×10^9	~0	p.r.	P.b.k. in N ₂ O-satd. soln. contg.	75A060
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PH}$	$< 10^7$	6.0		1–2 mol L ⁻¹ 2-PrOH.	
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{P}^-$	$< 10^7$	13.3			
320.147	$\cdot\text{CO}_2^- + \text{PH}$	$< 10^7$	6.0	p.r.	P.b.k. in N ₂ O-satd. soln.	75A060
321.	Pyrazine					
321.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PzH}^+$	2.8×10^9	~0	p.r.	P.b.k. in N ₂ O-satd. soln. contg.	74A127
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Pz}$	$\leq 10^7$	5.0, 11.0		2-PrOH; $k \approx 5 \times 10^9$ in 70% HClO ₄ soln.	
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Pz}$	1.7×10^9	13.6			
321.147	$\cdot\text{CO}_2^- + \text{Pz}$	$\leq 10^7$	5.0, 11.0	p.r.	P.b.k. in N ₂ O-satd. soln. contg. formate ion.	74A127
322.	Pyrazinecarboxylic acid					
322.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PzCO}_2\text{H} \rightarrow (\text{CH}_3)_2\dot{\text{C}}\text{O} + \cdot\text{Pz(H)CO}_2\text{H}$	$\sim 8.5 \times 10^8$		p.r.	P.b.k.	78A222
323.	Pyrene					
323.075	$\cdot\text{CH}_2\text{O}^- + \text{Py}$	no reaction	13	p.r.	Buildup of Py ⁻ in micellar soln. contg. 0.2 mol L ⁻¹ MeOH after phot. attributed to triplet pyrene; $k(\cdot\text{CH}_2\text{O}^- + {}^3\text{Py}) = 1.8 \times 10^{10}$.	76A062
323.076	$\text{CH}_3\dot{\text{C}}\text{HO}^- + \text{Py} \rightarrow \text{CH}_3\dot{\text{C}}\text{HO} + \text{Py}^-$	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 x 10 ⁻³ mol L ⁻¹ hexadecyl trimethylammonium bromide; after photolysis $k(\text{R} + {}^3\text{Py}) = 8 \times 10^9$.	76A062
323.078	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Py} \rightarrow (\text{CH}_3)_2\dot{\text{C}}\text{O} + \text{Py}^-$	2.3×10^9	13	p.r.	P.b.k. at 495 nm in soln. contg. 2 x 10 ⁻⁴ mol L ⁻¹ pyrene, 0.2 mol L ⁻¹ 2-PrOH, 0.1 mol L ⁻¹ acetone and 5 x 10 ⁻³ mol L ⁻¹ hexadecyl trimethyl-ammonium bromide; after photolysis $k(\text{R} + {}^3\text{Py}) = 2.3 \times 10^9$.	76A062
323.147	$\cdot\text{CO}_2^- + \text{Py}$	no reaction	13	p.r.	Buildup of 495 nm abs. in micellar soln. (CO ₂ -satd.) only after photolysis; $k(\cdot\text{CO}_2^- + {}^3\text{Py}) = 5 \times 10^9$; calcd. $k(\cdot\text{CO}_2^- + \text{Py}^-) = 1.8 \times 10^{10}$ from d.k. at 495 nm in micellar CO ₂ -free soln. contg. formate ion.	76A062
324.	Pyridazine					
324.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PdH}^+ \rightarrow (\text{CH}_3)_2\dot{\text{C}}\text{O} + \cdot\text{PdH}_2^+$	2.6×10^9	~0	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2-PrOH.	74A127
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Pd}$	$\leq 10^7$	5.0, 11.0			74A127
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Pd} \rightarrow (\text{CH}_3)_2\dot{\text{C}}\text{O} + \cdot\text{PdH} + \text{OH}^-$	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	$\cdot\text{CO}_2^- + \text{Pd}$	$<10^7$	5.0, 11.0	p.r.	$<10\%$ e -transfer.	74A127
325. 325.078	4-Pyridinecarboxaldoxime $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{HN}^+\text{C}_5\text{H}_4\text{CH}=\text{NOH}$ $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{NC}_5\text{H}_4\text{CH}=\text{NO}^-$	1.7×10^9 $<10^7$ 1.7×10^8	acid 7 13.3	p.r.	P.b.k. (pyridinyl radical) in N_2O -satd. soln. contg. 2-PrOH; e -transfer in strong acid or base.	76A182
326. 326.078	2-Pyridinecarboxaldoxime methochloride $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CH}_3\text{N}^+\text{C}_5\text{H}_4\text{CH}=\text{NOH}$	6×10^8	3,7, 11	p.r.	P.b.k.; e -transfer.	76A182
<i>3-Pyridinecarboxamide See Nicotinamide 275.</i>						
<i>4-Pyridinecarboxamide See Isonicotinamide 244.</i>						
<i>3-Pyridinecarboxylic acid See Nicotinic acid 277.</i>						
<i>4-Pyridinecarboxylic acid See Isonicotinic acid 245.</i>						
327. 327.078	Pyridoxal-5-phosphate $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{P} \rightarrow \cdot\text{P}$ $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{P} \rightarrow \cdot\text{P}$ $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{P} \rightarrow \cdot\text{P}$	5.8×10^8 1.3×10^8 2.9×10^8	1.0 5.6 10.0, 13.3	p.r.	P.b.k. in N_2O -satd. soln. contg. 1 mol L ⁻¹ 2-PrOH.	75A024
328. 328.078	Pyridoxine $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PH}$	$<10^7$	1,7, 13.5	p.r.	P.b.k. in N_2O -satd. soln. contg. 1 mol L ⁻¹ 2-PrOH.	75A024
329. 329.078	Pyrimidine $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{PmH}^+ \rightarrow$ $(\text{CH}_3)_2\dot{\text{C}}\text{O} + \cdot\text{PmH}_2^+$ $(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Pm}$ $(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{Pm}$	2.2×10^9 $<10^7$ $<10^7$	~ 0 5.0, 11.0 13.6	p.r. p.r. p.r.	P.b.k. in N_2O -satd. soln. contg. 2-PrOH. P.b.k. in N_2O -satd. soln. contg. 2-PrOH. P.b.k. in N_2O -satd. soln. contg. 2-PrOH.	74A127 74A127 74A127
329.147	$\cdot\text{CO}_2^- + \text{Pm}$	$<10^7$	5.0, 11.0	p.r.	P.b.k. in N_2O -satd. soln. contg. formate ion; $<10\%$ e -transfer.	74A127
330. 330.113	Pyruvate ion $\cdot\text{A}^- + \text{CH}_3\text{COCO}_2^-$ ($\cdot\text{A}^-$ = ascorbate radical)	<10	8.6	p.r.	D.k. at 360 nm in N_2O -satd. soln. contg. ascorbate ion.	75A240
331. 331.076	Quinoxaline $\text{CH}_3\dot{\text{C}}\text{HOH} + \text{Qx} \rightarrow$ $\text{CH}_3\text{CHO} + \cdot\text{QxH}$	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	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{QxH}^+ \rightarrow$ $(\text{CH}_3)_2\dot{\text{C}}\text{O} + \cdot\text{QxH}_2^+$	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; $k \approx$ 7.0×10^8 at 70% HClO_4 .	74A127
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Qx} \rightarrow$ $(\text{CH}_3)_2\dot{\text{C}}\text{O} + \cdot\text{QxH}$	1.6×10^8	6.5	p.r.	P.b.k. in N_2O -satd. soln. contg. 2-PrOH.	74A127
<i>Resorcinol See 1,3-Dihydroxybenzene 177.</i>						
332. 332.147	Rhodamine B $\cdot\text{CO}_2^- + \text{RhB} \rightarrow \text{CO}_2 + \text{RhB}_{\text{red}}$	$(1.8 \pm 0.5) \times 10^8$		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. 333.056	Riboflavin $\text{NH}_2\dot{\text{C}}\text{HCO}_2^- + \text{RF}$	$(2.7 \pm 0.3) \times 10^9$	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 ĊOH + RF	(2.3 ± 0.2) × 10 ⁹	7.0	p.r.	P.b.k. at 560 nm in N ₂ O-satd. soln. contg. 2-PrOH; <i>e</i> -transfer.	73A104
333.115	ĊHOHCO ₂ ⁻ + RF	(9.3 ± 0.9) × 10 ⁸	7.0	p.r.	P.b.k. at 560 nm in N ₂ O-satd. soln. contg. glycolate ion; <i>e</i> -transfer.	73A104
333.147	·CO ₂ ⁻ + RF	1.4 × 10 ⁹	alk	p.r.	D.k. at 460 nm as well as p.b.k. at 560 nm (semiquinone) in N ₂ O-satd. soln. contg. formate ion.	69G238
		3.6 × 10 ⁹	5.9			
		3.6 × 10 ⁹	3	p.r.	D.k. at 420 nm in N ₂ O-satd. soln. contg. formate ion.	69G238
		3.0 × 10 ⁹	H _a = -2			
		(1.7 ± 0.2) × 10 ⁹	7.0	p.r.	P.b.k. at 560 nm in N ₂ O-satd. soln. contg. formate ion; <i>e</i> -transfer.	73A104
334.	Riboflavine 5'-phosphate (Flavine mononucleotide)					
334.078	(CH ₃) ₂ ĊOH + FMN	(1 ± 0.5) × 10 ⁹		p.r.		73A150
335.	Ribonuclease					
335.045	·CHCl ₂ + RNase	6 × 10 ⁸	11	p.r.	P.b.k. in soln. contg. CHCl ₃ and <i>tert</i> -BuOH.	73A140
336.	Safranin T					
336.056	NH ₂ ĊHCO ₂ ⁻ + Dye	1.6 × 10 ⁹ (uncor.)	7	p.r.	D.k. at 520 nm in N ₂ O-satd. soln. contg. glycine; 60% <i>e</i> -transfer.	73A078
336.078	(CH ₃) ₂ ĊOH + Dye	2.8 × 10 ⁹	7	p.r.	D.k. at 520 nm in N ₂ O-satd. soln. contg. 2-PrOH; 86% <i>e</i> -transfer.	73A078
337.	meso-Tetra(4-carboxyphenyl)porphyrin					
337.078	(CH ₃) ₂ ĊOH + H ₂ TCPP → H ₂ TCPP ⁻	(9 ± 1) × 10 ⁸	7-11	p.r.	P.b.k. at 460 and 700 nm in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ 2-PrOH.	79A143
338.	Tetrachlorobenzoquinone (Chloranil)					
338.076	CH ₃ ĊHOH + O=C ₆ Cl ₄ =O → <i>e</i> -transfer	(2.9 to 3.4) × 10 ⁹		p.r.	P.b.k. in CTAB or NaLS micelles; soln. contains 0.1 mol L ⁻¹ EtOH; cor. for <i>e</i> _{aq} ⁻ reaction.	76A104
339.	1,2,4,5-Tetracyanobenzene					
339.076	CH ₃ ĊHOH + C ₆ H ₂ (CN) ₄ → <i>e</i> -transfer	(3.3 to 4.1) × 10 ⁹		p.r.	P.b.k. in CTAB or NaLS micelles; soln. contains 0.1 mol L ⁻¹ EtOH; cor. for <i>e</i> _{aq} ⁻ reaction.	76A104
340.	Tetrahydrofuran					
340.048	·CCl ₃ + C ₄ H ₈ O	57			Calcd. from dependence of <i>G</i> (Cl ⁻) on dose rate in soln. contg. CCl ₄ and tetrahydrofuran.	71G778
<i>Tetramethyl-p-benzoquinone See Duroquinone 198.</i>						
<i>N,N,N',N'-Tetramethyldiazenedicarboxamide See Diamide 170.</i>						
341.	1,1'-Tetramethylene-2,2'-bipyridinium ion					
341.147	·CO ₂ ⁻ + BP ²⁺ → CO ₂ + ·BP ⁻	9.0 × 10 ⁹	7.0	p.r.	P.b.k. at 680 nm in N ₂ O-satd. soln. contg. 0.2 mol L ⁻¹ formate.	76A169
		7 × 10 ⁹	6.8	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ formate ion.	78A321
342.	2,2,6,6-Tetramethyl-4-oxo-1-piperidinyloxy (TAN)					
342.004	<i>c</i> -Ċ ₃ H ₉ + TAN	(4.0 ± 0.4) × 10 ⁸	acid	p.r.	Condy. changes in N ₂ O-satd. soln. contg. 10 ⁻² mol L ⁻¹ cyclopentane; addn. reaction.	76A067
342.016	·CH ₂ C(CH ₃) ₂ OH + TAN	(2.8 ± 0.3) × 10 ⁸	2.4	p.r.	Condy. changes in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ <i>tert</i> -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	$\cdot\text{CH}_2\text{OH} + \text{TAN}$	7.2×10^8 (rel.)	5-6	p.r.	C.k. in N ₂ O-satd. soln. contg. 1 mol L ⁻¹ MeOH; $k(\cdot\text{CH}_2\text{OH} + \text{ferricyanide}) = 4.0 \times 10^9$.	71G618
		$(7.2 \pm 0.7) \times 10^8$	acid	p.r.	Condy. changes in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ MeOH; addn. reaction.	76A067
342.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{TAN}$	6.4×10^8 (rel.)	5-6	p.r.	C.k. in N ₂ O-satd. soln. contg. EtOH assuming $k(\text{R} + \text{ferricyanide}) = 5.3 \times 10^9$.	71G618
		$(4.0 \pm 0.4) \times 10^8$	acid	p.r.	Condy. changes in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ EtOH; e -transfer.	76A067
342.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{TAN}$	3.9×10^8 (rel.)	5-6	p.r.	C.k. in N ₂ O-satd. soln. contg. 2-PrOH, rel. to $k(\text{R} + \text{ferricyanide}) = 4.7 \times 10^9$; $k = 4.7 \times 10^8$ rel. to $k(\text{R} + \text{PNAP}) = 3.8 \times 10^9$.	71G618
		$(4.3 \pm 0.4) \times 10^8$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH; addn. reaction.	76A067
342.105	$\text{R} + \text{TAN}$ (R = Radicals from polyethylene oxide)	1.9×10^8 (rel.)	5-6	p.r.	C.k. in N ₂ O-satd. soln. contg. PEO(20000), rel. to $k(\text{R} + \text{ferricyanide}) = 2.1 \times 10^9$; similar values were obtained for PEO(600) and PEO(200).	71G618
342.108	$\text{R} + \text{TAN}$ (R = Radicals from deoxy-ribose)	3.9×10^8 (rel.)	5-6	p.r.	C.k. in N ₂ O-satd. soln. contg. deoxyribose, rel. to $k(\text{R} + \text{ferricyanide}) = 2.8 \times 10^9$.	71G618
342.111	$\text{R} + \text{TAN}$ (R = Radicals from glucose)	$<1 \times 10^8$ (rel.)	5-6	p.r.	C.k. in N ₂ O-satd. soln. contg. glucose, rel. to $k(\text{R} + \text{ferricyanide}) = 1.9 \times 10^9$.	71G618
		$(5.9 \pm 0.6) \times 10^7$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ glucose.	76A067
342.147	$\cdot\text{CO}_2^- + \text{TAN}$	7.0×10^8	7-8	p.r.	P.b.k. at 310 nm in N ₂ O-satd. soln. contg. formate.	71G618
		5.4×10^8 (rel.)	7-8	p.r.	C.k. in N ₂ O-satd. soln. contg. formate, rel. to $k(\cdot\text{CO}_2^- + \text{ferricyanide}) = 1.06 \times 10^9$.	71G618
343.	2,2,6,6-Tetramethyl-4-hydroxy-1-piperidinyloxy (TMPN)					
343.004	$c\text{-}\dot{\text{C}}_5\text{H}_9 + \text{TMPN}$	$(4.3 \pm 0.4) \times 10^8$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 10 ⁻² mol L ⁻¹ cyclopentane; addn. reaction.	76A067
343.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{TMPN}$	$(1.5 \pm 0.2) \times 10^8$	2.6	p.r.	Condy. change in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ <i>tert</i> -BuOH; addn. reaction.	76A067
343.075	$\cdot\text{CH}_2\text{OH} + \text{TMPN}$	$(4.4 \pm 0.4) \times 10^8$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ MeOH; addn. reaction.	76A067
343.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{TMPN}$	$(4.9 \pm 0.5) \times 10^8$	acid	p.r.	Condy change in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ EtOH; e -transfer.	76A067
343.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{TMPN}$	$(3.6 \pm 0.4) \times 10^8$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH; e -transfer.	76A067
343.111	$\text{R} + \text{TMPN}$ (R = Radicals from glucose)	$(4.9 \pm 0.5) \times 10^7$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ glucose; addn. reaction.	76A067
344.	N,N,N',N'-Tetramethyl-p-phenylenediamine					
344.020	$\cdot\text{CH}_2\text{CHO} + \text{TMPD} (+ \text{H}_2\text{O}) \rightarrow \text{CH}_3\text{CHO} + \text{TMPD}\cdot + \text{OH}^-$	2.0×10^9	~11.5	p.r.	Soln. contg. N ₂ O and ethylene glycol; radical cation ident. by abs. spectra.	70A051
345.	2,2,5,5-Tetramethyl-1-pyrrolidinyloxy-3-carboxamide (NX-s)					
345.001	$\cdot\text{CH}_3 + \text{NX-s}$	$(7.5 \pm 0.8) \times 10^8$	3.0	p.r.	Condy. change in N ₂ O-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	$c\text{-}\dot{\text{C}}_5\text{H}_9 + \text{NX-s}$	$(3.5 \pm 0.4) \times 10^8$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 10 ⁻² –10 ⁻¹ mol L ⁻¹ cyclopentane; addn. reaction.	76A152
345.014	$\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{NX-s}$	$(4.7 \pm 0.5) \times 10^8$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 10 ⁻² –10 ⁻¹ mol L ⁻¹ ethylene; addn. reaction.	76A152
345.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{NX-s}$	$(1.8 \pm 0.2) \times 10^8$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 10 ⁻² –10 ⁻¹ mol L ⁻¹ <i>tert</i> -BuOH; addn. reaction.	76A152
345.075	$\cdot\text{CH}_2\text{OH} + \text{NX-s}$	$(4.6 \pm 0.5) \times 10^8$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ MeOH; addn. reaction.	76A152
345.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{NX-s}$	$(4.3 \pm 0.4) \times 10^8$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ EtOH; <i>e</i> -transfer.	76A152
345.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NX-s}$	$(3.3 \pm 0.3) \times 10^8$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH; <i>e</i> -transfer.	76A152
345.111	$\text{R} + \text{NX-s}$ (R = Radicals from glucose)	$(5.1 \pm 0.5) \times 10^7$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ glucose; <i>e</i> -transfer.	76A152
346.	2,2,5,5-Tetramethyl-3-pyrrolin-1-yloxy-3-carboxamide (NX-u)					
346.001	$\cdot\text{CH}_3 + \text{NX-u}$	$(7.8 \pm 0.8) \times 10^8$	acid.	p.r.	Condy. change in N ₂ O-satd. soln. contg. 10 ⁻² –10 ⁻¹ mol L ⁻¹ dimethyl sulfoxide; addn. reaction.	76A152
346.004	$c\text{-}\dot{\text{C}}_5\text{H}_9 + \text{NX-u}$	$(3.6 \pm 0.4) \times 10^8$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 10 ⁻² –10 ⁻¹ mol L ⁻¹ cyclopentane; addn. reaction.	76A152
346.014	$\cdot\text{CH}_2\text{CH}_2\text{OH} + \text{NX-u}$	$(4.8 \pm 0.5) \times 10^8$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 10 ⁻² –10 ⁻¹ mol L ⁻¹ ethylene; addn. reaction.	76A152
346.016	$\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \text{NX-u}$	$(2.0 \pm 0.2) \times 10^8$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 10 ⁻² –10 ⁻¹ mol L ⁻¹ <i>tert</i> -BuOH; addn. reaction.	76A152
346.075	$\cdot\text{CH}_2\text{OH} + \text{NX-u}$	$(3.5 \pm 0.4) \times 10^8$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ MeOH; addn. reaction.	76A152
346.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{NX-u}$	$(6.2 \pm 0.6) \times 10^8$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ EtOH; <i>e</i> -transfer.	76A152
346.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{NX-u}$	$(3.6 \pm 0.4) \times 10^8$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH; <i>e</i> -transfer.	76A152
346.111	$\text{R} + \text{NX-u}$ (R = Radicals from glucose)	$(4.3 \pm 0.4) \times 10^7$	acid	p.r.	Condy. change in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ glucose; <i>e</i> -transfer.	76A152
347.	Tetranitromethane					
347.075	$\cdot\text{CH}_2\text{OH} + \text{C}(\text{NO}_2)_4 \rightarrow$ $\text{CH}_2\text{O} + \text{NO}_2 + \text{H}^+ + \text{C}(\text{NO}_2)_3^-$	$(5.0 \pm 1) \times 10^9$		p.r.	P.b.k. at 350 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ MeOH.	64G133
347.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{C}(\text{NO}_2)_4 \rightarrow$ $\text{CH}_3\text{CHO} + \text{NO}_2 + \text{H}^+ + \text{C}(\text{NO}_2)_3^-$	5.6×10^9	~1	p.r.	P.b.k. at 366 nm in soln. contg. 0.5 mol L ⁻¹ EtOH.	65G183
		$\sim 3.5 \times 10^9$		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	$\text{CH}_3\text{CH}_2\dot{\text{C}}\text{HOH} + \text{C}(\text{NO}_2)_4 \rightarrow$ $\text{CH}_3\text{CH}_2\text{CHO} + \text{NO}_2 + \text{H}^+ + \text{C}(\text{NO}_2)_3^-$	$(4.7 \pm 1) \times 10^9$		p.r.	P.b.k. at 350 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 1-PrOH.	64G133
347.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}(\text{NO}_2)_4 \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \text{NO}_2 + \text{C}(\text{NO}_2)_3^-$	$(5.0 \pm 1) \times 10^9$		p.r.	P.b.k. at 350 nm in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH.	64G133
347.092a	$\cdot\text{CH}_2\text{OCH}_3 + \text{C}(\text{NO}_2)_4 \rightarrow$ $\text{CH}_3\text{OCH}_2\text{O}\dot{\text{N}}^+(\text{O}^-)\text{C}(\text{NO}_2)_3 \longleftrightarrow$ $\text{CH}_3\text{OCH}_2\text{ON}(\dot{\text{O}})\text{C}(\text{NO}_2)_3$	6×10^9		p.r.	P.b.k. at 300 nm in N ₂ O-satd. soln. contg. 0.05 mol L ⁻¹ methyl ether; adduct decomposes to nitroform anion, $k = 1.1 \times 10^4 \text{ s}^{-1}$.	80A071
347.093	$\text{CH}_3\text{CH}_2\text{O}\dot{\text{C}}\text{HCH}_3 + \text{C}(\text{NO}_2)_4 \rightarrow$ $\text{C}(\text{NO}_2)_3^-$	$\sim 4 \times 10^9$		p.r.	P.b.k. at 350 nm in N ₂ O-satd. soln. contg. ethyl ether.	80A071
347.093a	$\cdot\text{CH}_2\text{OC}(\text{CH}_3)_3 + \text{C}(\text{NO}_2)_4 \rightarrow$ $\text{C}(\text{NO}_2)_3^-$	$\sim 3 \times 10^9$		p.r.	P.b.k. at 350 nm in N ₂ O-satd. soln. contg. methyl <i>tert</i> -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	$\cdot\text{CH}_2\text{OCH}_2\text{OCH}_3 + \text{C}(\text{NO}_2)_4 \rightarrow$ $\text{CH}_3\text{OCH}_2\text{OCH}_2\text{ON}(\dot{\text{O}})\text{C}(\text{NO}_2)_3$	5×10^9	4–13	p.r.	P.b.k. at 300 nm in N ₂ O–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	$\text{CH}_2\text{OH}\dot{\text{C}}\text{HOH} + \text{C}(\text{NO}_2)_4$	1.7×10^9		p.r.	P.b.k. in soln. contg. 0.2 mol L ⁻¹ ethylene glycol.	73G126
347.102	$\text{CH}_3\text{CHOH}\dot{\text{C}}\text{HOH} + \text{C}(\text{NO}_2)_4$	3.2×10^9		p.r.	P.b.k. in soln. contg. 0.2 mol L ⁻¹ 1,2–propanediol.	73G126
347.103	$\text{CH}_3\text{CHOH}\dot{\text{C}}\text{OHCH}_3 + \text{C}(\text{NO}_2)_4$	3.3×10^9		p.r.	P.b.k. in soln. contg. 0.2 mol L ⁻¹ 2,3–butanediol.	73G126
347.106	$\text{CH}_2\text{OHCHOH}\dot{\text{C}}\text{HOH} + \text{C}(\text{NO}_2)_4$ (+ $\text{CH}_2\text{OH}\dot{\text{C}}\text{OHCH}_2\text{OH}$)	$(2.4 \pm 0.3) \times 10^9$		p.r.	P.b.k. at 350 nm in N ₂ O–satd. soln. contg. 0.1 mol L ⁻¹ glycerol.	64G133
347.111	$\text{R} + \text{C}(\text{NO}_2)_4$ (R = Radicals from glucose)	2.6×10^9		p.r.	P.b.k. at 366 nm in N ₂ O–satd. soln. 0.25 mol L ⁻¹ glucose.	65G183
347.112	$\text{R} + \text{C}(\text{NO}_2)_4$ (R = Radicals from sucrose)	$(7.0 \pm 1) \times 10^8$		p.r.	P.b.k. at 350 nm in N ₂ O–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	$\cdot\text{CO}_2^- + \text{C}(\text{NO}_2)_4$	$(4 \pm 1) \times 10^9$		p.r.	P.b.k.; independent of pH between 3 and 7.	70G303
348.	Thiamine					
348.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{TmH}^+ \rightarrow$ $(\text{CH}_3)_2\text{CO} + \cdot\text{TmH}_2^+$	2.2×10^8	0.5	p.r.	P.b.k. in soln. contg. 2–PrOH.	77A034
	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Tm} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \cdot\text{TmH}^+$	1.9×10^8	6.6	p.r.	P.b.k. in soln. contg. 2–PrOH.	77A034
349.	Thiazole					
349.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{C}_3\text{H}_3\text{SNH}^+ \rightarrow$ $(\text{CH}_3)_2\text{CO} + \cdot\text{C}_3\text{H}_3\text{SNH}_2^+$	6.2×10^8	0.8	p.r.	P.b.k. in soln. contg. 2–PrOH.	77A034
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{C}_3\text{H}_3\text{SN}$		13.3	p.r.	No electron transfer.	77A034
350.	Thionine					
350.056	$\text{NH}_2\dot{\text{C}}\text{HCO}_2^- + \text{Dye}$	3.2×10^9	8	p.r.	D.k. at 600 nm in N ₂ O–satd. soln. contg. glycine; 85% <i>e</i> –transfer.	73A078
350.075	$\cdot\text{CH}_2\text{OH} + \text{Dye}$	2.6×10^9	8	p.r.	D.k. at 600 nm in N ₂ O–satd. soln. contg. MeOH; 86% <i>e</i> –transfer.	73A078
350.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Dye}$	4.2×10^9	8	p.r.	D.k. at 600 nm in N ₂ O–satd. soln. contg. 2–PrOH; 88% <i>e</i> –transfer.	73A078
351.	Trichloroacetate ion					
351.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CCl}_3\text{CO}_2^-$	5×10^6 (rel.)		p.r.	C.k. in soln. contg. 2–PrOH and acetone; rel. to $k(\text{R} + \text{PNAP}) = 3.8 \times 10^9$.	73A140
	$(\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{CCl}_3\text{CO}_2^-$	3×10^8 (rel.)	13	p.r.	C.k. in soln. contg. 2–PrOH and acetone; rel. to $k(\text{R} + \text{PNAP}) = 3.8 \times 10^9$.	73A140
352.	Trifluoroacetate ion					
352.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{CF}_3\text{CO}_2^-$	$<1 \times 10^5$ (rel.)		p.r.	C.k. in soln. contg. 2–PrOH and acetone; rel. to $k(\text{R} + \text{PNAP}) = 3.8 \times 10^9$.	73A140
353.	2,3,5–Trimethylbenzoquinone					
353.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Q} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ + \cdot\text{Q}^+$	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	$\cdot\text{CO}_2^- + \text{BP}^{2+} \rightarrow \text{CO}_2 + \cdot\text{BP}^+$	7.5×10^9	7.0	p.r.	P.b.k. at 680 nm in N ₂ O–satd. soln. contg. 0.2 mol L ⁻¹ formate ion.	76A169
		1.1×10^{10}	6.8	p.r.	P.b.k. in N ₂ O–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	$R + (\text{NO}_2)_3\text{C}_6\text{H}_2\text{SO}_3^-$ (R = Radicals from glucose)	1.1×10^9		p.r.		77R167
356.	2,4,6-Trinitrobenzoate ion					
356.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + (\text{NO}_2)_3\text{C}_6\text{H}_2\text{CO}_2^- \rightarrow$ $(\text{CH}_3)_2\text{CO} + \text{H}^+ +$ $(\dot{\text{N}}\text{O}_2)(\text{NO}_2)_2\text{C}_6\text{H}_2\text{CO}_2^-$	3.9×10^9	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20–30%.	76A111
356.147	$\cdot\text{CO}_2^- + (\text{NO}_2)_3\text{C}_6\text{H}_2\text{CO}_2^-$	3.4×10^9	7	p.r.	P.b.k. in N ₂ O-satd. soln. contg. formate; k at pH 0.8 within 20–30%.	76A111
357.	Trypan blue					
357.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Dye}$	$(3 \pm 1.5) \times 10^9$		p.r.		73A150
358.	Tyrosine					
358.048	$\cdot\text{CCl}_3 + \text{ArO}^-$	slow	12	p.r.	Suggested that fast reaction is $\text{CCl}_3\dot{\text{O}}_2 + \text{ArO}^- \rightarrow \text{ArO}\cdot$ ($k = 1.6 \times 10^8$) and $\cdot\text{CCl}_3$ is less reactive.	78B128 80A053
359.	Ubiquinone					
359.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Q} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \cdot\text{Q}^- + \text{H}^+$	1.9×10^9	7	p.r.	P.b.k. in soln. contg. 7 mol L ⁻¹ 2-PrOH and 1 mol L ⁻¹ acetone.	73G125
	<i>Vitamin B₅ See Nicotinamide 275.</i>					
	<i>Vitamin B₁₂ See Cyanocobalamin (under Cobalt(III) ions) 53.</i>					
	<i>Vitamin B_{12a} See Hydroxocobalamin (under Cobalt(III) ions) 54.</i>					
	<i>Vitamin B_{12r} See Cobalamin (under Cobalt(II) ions) 10.</i>					
360.	Vitamin K₁					
360.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{Q} \rightarrow$ $(\text{CH}_3)_2\text{CO} + \cdot\text{Q}^- + \text{H}^+$	1.7×10^9	7	p.r.	P.b.k. in soln. contg. 5 mol L ⁻¹ 2-PrOH and 2 mol L ⁻¹ acetone.	73G125
	<i>Vitamin K₃ See 2-Methyl-1,4-naphthoquinone 262.</i>					

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	$\cdot\text{CH}_2\text{OH} + \text{H}_3\text{O}^+ \rightleftharpoons \cdot\text{CH}_2\text{OH}_2^+ + \text{H}_2\text{O}$	$k_f = 1.76 \times 10^8$ $k_r = 3.6 \times 10^7$ $k_f = (3.19 \pm 0.04) \times 10^7$		chem. phot. chem.	Esr; radicals from Ti(III)-H ₂ O ₂ -MeOH. Esr; soln. contg. 10% acetone and 5% MeOH. Esr; radicals from Ti(III)-H ₂ O 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 .	65D040 66D162 68M058
361.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{H}_3\text{O}^+ \rightleftharpoons (\text{CH}_3)_2\dot{\text{C}}\text{OH}_2^+ + \text{H}_2\text{O}$	$k_f = 7.2 \times 10^7$ $k_f = (6.44 \pm 0.30) \times 10^7$		phot. chem.	Esr; soln. contg. 10% acetone and 5% 2-PrOH. Esr; radicals from Ti(III)-H ₂ O ₂ -2-PrOH.	66D162 68M058
361.148	$\text{CH}_3\dot{\text{C}}(\text{O})\text{OCH}_3 + \text{H}_3\text{O}^+ \rightarrow \text{CH}_3\dot{\text{C}}(\text{OH})\text{OCH}_3 + \text{H}_2\text{O}$	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	$\cdot\text{CH}=\text{CHOH} + \text{OH}^- \rightleftharpoons [\cdot\text{CH}=\text{CHO}^-] + \text{H}_2\text{O}$	$k_f = (1.5 \pm 0.3) \times 10^{10}$	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	$\text{CH}_3\text{CONH}\dot{\text{C}}\text{HCOO}^- + \text{OH}^- \rightleftharpoons \text{CH}_3\text{CON}^-\dot{\text{C}}\text{HCOO}^- + \text{H}_2\text{O}$	$k_f = (8 \pm 2) \times 10^8$	>13	e-r.	Est. by esr from pH dependence of line width in N ₂ O-satd. soln. contg. acetylglycine; $k_f = 1.6 \times 10^7$; ($pK_a = 14.0$).	76D198
362.062	$\text{R}(\text{NH}) + \text{OH}^- \rightleftharpoons \text{R}(\text{N}^-) + \text{H}_2\text{O}$ (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 ₂ O-satd. soln. contg. 4 x 10 ⁻³ mol L ⁻¹ glycine anhydride.	71G554
362.063	$\text{R}(\text{NH}) + \text{OH}^- \rightleftharpoons \text{R}(\text{N}^-) + \text{H}_2\text{O}$ (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 ₂ O-satd. soln. contg. 4 x 10 ⁻³ mol L ⁻¹ alanine anhydride.	71G554
362.074	$-(\text{CH}_2)_2\text{CONH}\dot{\text{C}}(\text{COO})^- + \text{OH}^- \rightleftharpoons -(\text{CH}_2)_2\text{CON}^-\dot{\text{C}}(\text{COO})^- + \text{H}_2\text{O}$	$k_f = 1 \times 10^9$		e-r.	Est. by esr from pH dependence of line width in N ₂ O-satd. soln. contg. 2-pyrrolidone-5-carboxylic acid; ($pK_a = 12.7$).	77D087
362.076	$\text{CH}_3\dot{\text{C}}\text{HOH} + \text{OH}^- \rightleftharpoons \text{CH}_3\dot{\text{C}}\text{HO}^- + \text{H}_2\text{O}$	$k_f = 7 \times 10^9$	11-12	e-r.	Esr line broadening in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ EtOH; $k_f = 4.1 \times 10^5$ ($pK_a = 11.51$).	73D065
362.078	$(\text{CH}_3)_2\dot{\text{C}}\text{OH} + \text{OH}^- \rightleftharpoons (\text{CH}_3)_2\dot{\text{C}}\text{O}^- + \text{H}_2\text{O}$	$k_f = 9 \times 10^9$ $k_f = 7.5 \times 10^9$	11-12 10.4- 11.0	e-r. p.r.	Esr line broadening in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ 2-PrOH; $k_f = 1.8 \times 10^6$ ($pK_a = 12.03$). Condy. in soln. contg. 1 mol L ⁻¹ acetone gave $k_f = (1.4 \pm 0.1) \times 10^6$; k_f calcd. from $pK_a = 12.00$.	73D065 80A323
362.101	$\cdot\text{CHOHCH}_2\text{OH} + \text{OH}^- \rightarrow [\cdot\text{CHO}\cdot\text{CH}_2\text{OH}] + \text{H}_2\text{O} \rightarrow \cdot\text{CH}_2\text{CHO} + \text{OH}^-$	$\sim 10^{10}$	10	p.r.	Absorption spectrum immediately after pulse in N ₂ O-satd. soln. contg. ethylene glycol decays in < 10 μs to formylmethyl spectrum.	73G004
362.114	$\cdot\text{CHOHCONH}_2 + \text{OH}^- \rightleftharpoons \cdot\text{CHO}^-\text{CONH}_2 + \text{H}_2\text{O}$	$k_f = 1.1 \times 10^{10}$	8.3- 9.9	p.r.	Calcd. from effect of [OH ⁻] in buffer soln. on d.k. at 290 nm in N ₂ O-satd. soln. contg. glycolamide; cor. to $I = 0$.	75A053
362.115	$\cdot\text{CHOHCO}_2^- + \text{OH}^- \rightleftharpoons \cdot\text{CHO}^-\text{CO}_2^- + \text{H}_2\text{O}$	$k_f = 3.9 \times 10^9$	9.5- 10.5	p.r.	Calcd. from effect of [OH ⁻] in buffer soln. on d.k. at 270 nm in N ₂ O-satd. glycolate soln.; cor. to $I = 0$; $k = (3.1 \pm 0.4) \times 10^9$ in unbuffered soln.	75A053
362.116	$\cdot\text{COH}(\text{CH}_3)\text{CONH}_2 + \text{OH}^- \rightleftharpoons \cdot\text{CO}^-(\text{CH}_3)\text{CONH}_2 + \text{H}_2\text{O}$	$k_f = 1.1 \times 10^{10}$	8.0- 10.2	p.r.	Calcd. from effect of [OH ⁻] in buffer soln. on d.k. at 300 nm in N ₂ O-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	$[\text{CH}_2\text{CHCO}_2\text{H}]^- + \text{OH}^-$	7.7×10^8	>7	p.r.	Calcd. from effect of $[\text{OH}^-]$ 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	$[\text{CH}_3\text{CHCHCO}_2\text{H}]^- + \text{OH}^- \rightarrow \text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCO}_2^- + \text{OH}^-$	$\sim 1.2 \times 10^8$	>7.5	p.r.	Calcd. from effect of $[\text{OH}^-]$ on d.k. in <i>trans</i> -crotonate soln.; cor. to $I = 0$.	76A113
362.136	$[\text{CH}_2\text{C}(\text{CH}_3)\text{CO}_2\text{H}]^- + \text{OH}^- \rightarrow (\text{CH}_3)_2\dot{\text{C}}\text{CO}_2^- + \text{OH}^-$	8×10^8	>5.3	p.r.	Calcd. from effect of $[\text{OH}^-]$ on d.k. in soln. contg. methacrylate; cor. to $I = 0$.	76A113
362.137	$[(\text{CH}_3)_2\text{CCHCO}_2\text{H}]^- + \text{OH}^- \rightarrow (\text{CH}_3)_2\text{CH}\dot{\text{C}}\text{CO}_2^- + \text{OH}^-$	3×10^6	>8.0	p.r.	Calcd. from effect of $[\text{OH}^-]$ on d.k. in β,β -dimethylacrylate soln.; cor. to $I = 0$.	76A113
362.139	$[\text{CH}_3\text{CHCHCHCHCO}_2\text{H}]^- + \text{OH}^-$	$\sim 2 \times 10^7$	>6.4	p.r.	Calcd. from effect of $[\text{OH}^-]$ on d.k. in soln. contg. sorbate; cor. to $I = 0$.	76A113
363.	Water					
363.128	$[\text{CH}_2\text{CHCONH}_2]^- + \text{H}_2\text{O} \rightarrow \text{CH}_3\dot{\text{C}}\text{HCONH}_2 + \text{OH}^-$	$1.4 \times 10^5 \text{ s}^{-1}$	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. $\text{B}(\text{OH})_3$, NH_4^+ , $(\text{CH}_3)_3\text{NH}^+$, HCO_3^- , HPO_4^{2-} , etc.	75A052
363.129	$[\text{CH}_3\text{CHCHCONH}_2]^- + \text{H}_2\text{O} \rightarrow \text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCONH}_2 + \text{OH}^-$	$2 \times 10^4 \text{ s}^{-1}$	10.2	p.r.	D.k. in <i>trans</i> -crotonamide soln. contg. borate buffer, as above.	75A052
363.130	$[\text{CH}_2\text{C}(\text{CH}_3)\text{CONH}_2]^- + \text{H}_2\text{O} \rightarrow \text{CH}_3\dot{\text{C}}(\text{CH}_3)\text{CONH}_2 + \text{OH}^-$	$1.3 \times 10^6 \text{ s}^{-1}$	10–13	p.r.	D.k. in methacrylamide soln. contg. borate buffer, as above.	75A052
363.131	$[(\text{CH}_3)_2\text{CCHCONH}_2]^- + \text{H}_2\text{O} \rightarrow (\text{CH}_3)_2\text{CH}\dot{\text{C}}\text{HCONH}_2 + \text{OH}^-$	$2 \times 10^4 \text{ s}^{-1}$	10.2	p.r.	D.k. in β,β -dimethylacrylamide soln. cor. to $I = 0$.	75A052
363.132	$[\text{CH}_2\text{CHCON}(\text{CH}_3)_2]^- + \text{H}_2\text{O} \rightarrow \text{CH}_3\dot{\text{C}}\text{HCON}(\text{CH}_3)_2 + \text{OH}^-$	$3.7 \times 10^5 \text{ s}^{-1}$	10	p.r.	D.k. in <i>N,N</i> -dimethylacrylamide soln. contg. borate buffer, as above.	75A052
363.134	$[\text{CH}_2\text{CHCO}_2\text{H}]^- + \text{H}_2\text{O}$	$4.0 \times 10^4 \text{ s}^{-1}$ $3.0 \times 10^4 \text{ s}^{-1}$	6.0 9.5	p.r.	D.k. in acrylate soln.; extrapolated to zero concn. of buffer.	76A113
363.135	$[\text{CH}_3\text{CHCHCO}_2\text{H}]^- + \text{H}_2\text{O} \rightarrow \text{CH}_3\text{CH}_2\dot{\text{C}}\text{HCO}_2^- + \text{H}_2\text{O}$	$1.0 \times 10^4 \text{ s}^{-1}$	10.4	p.r.	D.k. in crotonate soln.; extrapolated to zero concn. of buffer.	76A113
363.136	$[\text{CH}_2\text{C}(\text{CH}_3)\text{CO}_2\text{H}]^- + \text{H}_2\text{O} \rightarrow \text{CH}_3\dot{\text{C}}(\text{CH}_3)\text{CO}_2^- + \text{H}_2\text{O}$	$2.0 \times 10^5 \text{ s}^{-1}$	9.0	p.r.	D.k. in methacrylate soln.; extrapolated to zero concn. of buffer.	76A113
363.137	$[(\text{CH}_3)_2\text{CCHCO}_2\text{H}]^- + \text{H}_2\text{O} \rightarrow (\text{CH}_3)_2\text{CH}\dot{\text{C}}\text{HCO}_2^- + \text{H}_2\text{O}$	$9 \times 10^3 \text{ s}^{-1}$	11.0	p.r.	D.k. in β,β -dimethylacrylate soln.; extrapolated to zero concn. of buffer.	76A113
363.138	$[\text{CH}_2\text{C}(\text{CH}_3)\text{CO}_2\text{CH}_3]^- + \text{H}_2\text{O} \rightarrow \text{CH}_3\dot{\text{C}}(\text{CH}_3)\text{CO}_2\text{CH}_3 + \text{OH}^-$	$4.5 \times 10^5 \text{ s}^{-1}$	9.8–12.8	p.r.	D.k. in methyl methacrylate soln. contg. borate buffer; see 363.128.	75A052
363.139	$[\text{CH}_3\text{CHCHCHCHCO}_2\text{H}]^- + \text{H}_2\text{O}$	$5.0 \times 10^4 \text{ s}^{-1}$	11.1	p.r.	D.k. in sorbate soln.; extrapolated to zero concn. of buffer.	76A113
364.	Ammonium ion					
364.128	$[\text{CH}_2\text{CHCONH}_2]^- + \text{NH}_4^+ \rightarrow \text{CH}_3\dot{\text{C}}\text{HCONH}_2 + \text{NH}_3$	9.5×10^6		p.r.	D.k. in soln. contg. acrylamide; cor. to $I = 0$.	75A052 74A182
364.134	$[\text{CH}_2\text{CHCO}_2\text{H}]^- + \text{NH}_4^+ \rightarrow \text{CH}_3\dot{\text{C}}\text{HCO}_2^- + \text{NH}_4^+$	1.8×10^6	>7	p.r.	Calcd. from effect of $[\text{NH}_4^+]$ on d.k. in acrylate soln.; cor. to $I = 0$.	76A113
365.	Ammonia					
365.114	$\cdot\text{CHOHCONH}_2 + \text{NH}_3 \rightleftharpoons \cdot\text{CHO}\cdot\text{CONH}_2 + \text{NH}_4^+$	$k_f = 1.2 \times 10^9$	8.05, 8.25	p.r.	Calcd. from effect of $[\text{NH}_3]$ in buffer soln. on d.k. at 290 nm in N_2O -satd. glycolamide soln.; cor. to $I = 0$.	75A053
365.115	$\cdot\text{CHOHCO}_2^- + \text{NH}_3 \rightleftharpoons \cdot\text{CHO}\cdot\text{CO}_2^- + \text{NH}_4^+$	$k_f = 7.5 \times 10^8$	9.26, 9.75	p.r.	Calcd. from effect of $[\text{NH}_3]$ 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	$\cdot\text{COH}(\text{CH}_3)\text{CONH}_2 + \text{NH}_3 \rightleftharpoons \cdot\text{CO}^-(\text{CH}_3)\text{CONH}_2 + \text{NH}_4^+$	$k_f = 9.7 \times 10^8$	8.05	p.r.	Calcd. from effect of $[\text{NH}_3]$ in buffer soln. on d.k. at 300 nm in N_2O -satd. lactamide soln.; cor. to $I = 0$.	75A053
365.134	$[\text{CH}_2\text{CHCO}_2\text{H}]^- + \text{NH}_3 \rightarrow \text{CH}_3\dot{\text{C}}\text{HCO}_2^- + \text{NH}_3$	$(2.8 \pm 1.0) \times 10^6$	>7	p.r.	Calcd. from effect of $[\text{NH}_3]$ on d.k. in acrylate soln.; cor. to $I = 0$.	76A113
366.	Tetrahydroborate ion					
366.114	$\cdot\text{CHOHCONH}_2 + \text{B}(\text{OH})_4^- \rightleftharpoons \cdot\text{CHO}^-\text{CONH}_2 + \text{B}(\text{OH})_3 + \text{H}_2\text{O}$	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	$\cdot\text{CHOHCOO}^- + \text{B}(\text{OH})_4^- \rightleftharpoons \cdot\text{CHO}^-\text{COO}^- + \text{B}(\text{OH})_3 + \text{H}_2\text{O}$	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	$\cdot\text{COH}(\text{CH}_3)\text{CONH}_2 + \text{B}(\text{OH})_4^- \rightleftharpoons \cdot\text{CO}^-(\text{CH}_3)\text{CONH}_2 + \text{B}(\text{OH})_3 + \text{H}_2\text{O}$	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	$[\text{CH}_2\text{CHCO}_2\text{H}]^- + \text{B}(\text{OH})_4^- \rightarrow \text{CH}_3\dot{\text{C}}\text{HCO}_2^- + \text{B}(\text{OH})_4^-$	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	$[\text{CH}_2\text{CHCONH}_2]^- + \text{B}(\text{OH})_3 + \text{H}_2\text{O} \rightarrow \text{CH}_3\dot{\text{C}}\text{HCONH}_2 + \text{B}(\text{OH})_4^-$	1.6×10^6	9.8	p.r.	D.k. in soln. contg. acrylamide; cor. to $I = 0$.	75A052 74A182
367.134	$[\text{CH}_2\text{CHCO}_2\text{H}]^- + \text{B}(\text{OH})_3 \rightarrow \text{CH}_3\dot{\text{C}}\text{HCO}_2^- + \text{B}(\text{OH})_3$	2.8×10^5	>7	p.r.	Calcd. from effect of borate on d.k. in acrylate soln.	76A113
368.	Phosphate ion					
368.114	$\cdot\text{CHOHCONH}_2 + \text{HPO}_4^{2-} \rightleftharpoons \cdot\text{CHO}^-\text{CONH}_2 + \text{H}_2\text{PO}_4^-$	$k_f = 1.8 \times 10^9$	8.3	p.r.	Calcd. from effects of $[\text{HPO}_4^{2-}]$ on d.k. at 290 nm in N_2O -satd. glycolamide soln.; cor. to $I = 0$.	75A053
368.116	$\cdot\text{COH}(\text{CH}_3)\text{CONH}_2 + \text{HPO}_4^{2-} \rightleftharpoons \cdot\text{CO}^-(\text{CH}_3)\text{CONH}_2 + \text{H}_2\text{PO}_4^-$	$k_f = 8.5 \times 10^8$	6.2	p.r.	Calcd. from effect of $[\text{HPO}_4^{2-}]$ on d.k. at 300 nm in N_2O -satd. lactamide soln.; cor. to $I = 0$.	75A053
368.128	$[\text{CH}_2\text{CHCONH}_2]^- + \text{H}_2\text{PO}_4^- \rightarrow \text{CH}_3\dot{\text{C}}\text{HCONH}_2 + \text{HPO}_4^{2-}$	3.8×10^6		p.r.	D.k. in soln. contg. acrylamide; cor. to $I = 0$.	75A052 74A182
	$[\text{CH}_2\text{CHCONH}_2]^- + \text{HPO}_4^{2-} \rightarrow \text{CH}_3\dot{\text{C}}\text{HCONH}_2 + \text{PO}_4^{3-}$	8.6×10^4		p.r.	D.k. in soln. contg. acrylamide; cor. to $I = 0$.	75A052 74A182
368.133	$[(\text{CH}_3)_2\text{NCONNCON}(\text{CH}_3)_2]^- + \text{H}_2\text{PO}_4^{2-} \rightarrow (\text{CH}_3)_2\text{NCONHNCON}(\text{CH}_3)_2 + \text{HPO}_4^{2-}$	$(7 \pm 1) \times 10^7$	6-9	p.r.	Effect of $[\text{H}_2\text{PO}_4^-]$ on d.k. at 300 nm in soln. contg. 10^{-4} mol L ⁻¹ Diamide and 0.2 mol L ⁻¹ <i>tert</i> -BuOH.	75A194
368.134	$[\text{CH}_2\text{CHCOOH}]^- + \text{HPO}_4^{2-} \rightarrow \text{CH}_3\dot{\text{C}}\text{HCO}_2^- + \text{HPO}_4^{2-}$	7×10^3	>7	p.r.	Calcd. from effect of $[\text{HPO}_4^{2-}]$ on d.k. in acrylate soln.; cor. to $I = 0$.	76A113
	$[\text{CH}_2\text{CHCOOH}]^- + \text{H}_2\text{PO}_4^- \rightarrow \text{CH}_3\dot{\text{C}}\text{HCO}_2^- + \text{H}_2\text{PO}_4^-$	5.7×10^6	>7	p.r.	Calcd. from effect of $[\text{H}_2\text{PO}_4^-]$ on d.k. in acrylate soln.; cor. to $I = 0$.	76A113
369.	Pyrophosphate ion					
369.114	$\cdot\text{CHOHCONH}_2 + \text{HP}_2\text{O}_7^{3-} \rightarrow \cdot\text{CHO}^-\text{CONH}_2 + \text{H}_2\text{P}_2\text{O}_7^{2-}$	1.1×10^9	6.10, 6.40	p.r.	Calcd. from effect of $[\text{HP}_2\text{O}_7^{3-}]$ on d.k. at 290 nm in N_2O -satd. glycolamide soln.; cor. to $I = 0$.	75A053
369.115	$\cdot\text{CHOHCOO}^- + \text{P}_2\text{O}_7^{4-} \rightarrow \cdot\text{CHO}^-\text{COO}^- + \text{HP}_2\text{O}_7^{3-}$	5.8×10^6	9.26, 9.75	p.r.	Calcd. from effect of $[\text{P}_2\text{O}_7^{4-}]$ on d.k. at 270 nm in N_2O -satd. glycolate soln.; cor. to $I = 0$.	75A053
369.116	$\cdot\text{COH}(\text{CH}_3)\text{CONH}_2 + \text{HP}_2\text{O}_7^{3-} \rightarrow \cdot\text{CO}^-(\text{CH}_3)\text{CONH}_2 + \text{H}_2\text{P}_2\text{O}_7^{2-}$	3.7×10^8	8.1, 9.3	p.r.	Calcd. from effect of $[\text{HP}_2\text{O}_7^{3-}]$ on d.k. at 300 nm in N_2O -satd. soln. contg. lactamide; $k = 8.5 \times 10^8$ for $\text{P}_2\text{O}_7^{4-}$.	75A053
369.134	$[\text{CH}_2\text{CHCOOH}]^- + \text{HP}_2\text{O}_7^{3-} \rightarrow \text{CH}_3\dot{\text{C}}\text{HCO}_2^- + \text{HP}_2\text{O}_7^{3-}$	9.1×10^4	>7	p.r.	Calcd. from effect of $[\text{HP}_2\text{O}_7^{3-}]$ 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	$[\text{CH}_2\text{CHCONH}_2]^- + \text{HCO}_3^- \rightarrow$ $\text{CH}_3\dot{\text{C}}\text{HCONH}_2 + \text{CO}_3^{2-}$	8.6×10^5		p.r.	D.k. in soln. contg. acrylamide; cor. to $I = 0$.	75A052 74A182
371.	Trimethylammonium ion					
371.128	$[\text{CH}_2\text{CHCONH}_2]^- + (\text{CH}_3)_3\text{NH}^+ \rightarrow$ $\text{CH}_3\dot{\text{C}}\text{HCONH}_2 + (\text{CH}_3)_3\text{N}$	2.1×10^9		p.r.	D.k. in soln. contg. acrylamide; cor. to $I = 0$.	75A052 74A182
372.	Ethylammonium ion					
372.128	$[\text{CH}_2\text{CHCONH}_2]^- + \text{C}_2\text{H}_5\text{NH}_3^+ \rightarrow$ $\text{CH}_3\dot{\text{C}}\text{HCONH}_2 + \text{C}_2\text{H}_5\text{NH}_2$	1.5×10^7		p.r.	D.k. in soln. contg. acrylamide.	75A052 74A182
373.	Diethylammonium ion					
373.128	$[\text{CH}_2\text{CHCONH}_2]^- + (\text{C}_2\text{H}_5)_2\text{NH}_2^+ \rightarrow$ $\text{CH}_3\dot{\text{C}}\text{HCONH}_2 + (\text{C}_2\text{H}_5)_2\text{NH}$	7.2×10^7		p.r.	D.k. in soln. contg. acrylamide.	75A052 74A182
374.	Triethylammonium ion					
374.128	$[\text{CH}_2\text{CHCONH}_2]^- + (\text{C}_2\text{H}_5)_3\text{NH}^+ \rightarrow$ $\text{CH}_3\dot{\text{C}}\text{HCONH}_2 + (\text{C}_2\text{H}_5)_3\text{N}$	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	$[\text{CH}_2\text{CHCONH}_2]^- + c\text{-C}_6\text{H}_{11}\text{NH}_3^+ \rightarrow$ $\text{CH}_3\dot{\text{C}}\text{HCONH}_2 + c\text{-C}_6\text{H}_{11}\text{NH}_2$	1.4×10^7		p.r.	D.k. in soln. contg. acrylamide.	75A052 74A182
376.	Pyrrolidinium ion					
376.128	$[\text{CH}_2\text{CHCONH}_2]^- + c\text{-C}_4\text{H}_8\text{NH}_2^+ \rightarrow$ $\text{CH}_3\dot{\text{C}}\text{HCONH}_2 + c\text{-C}_4\text{H}_8\text{NH}$	2.0×10^8		p.r.	D.k. in soln. contg. acrylamide.	75A052 74A182
377.	Piperidinium ion					
377.128	$[\text{CH}_2\text{CHCONH}_2]^- + c\text{-C}_5\text{H}_{10}\text{NH}_2^+ \rightarrow$ $\text{CH}_3\dot{\text{C}}\text{HCONH}_2 + c\text{-C}_5\text{H}_{10}\text{NH}$	6.3×10^7		p.r.	D.k. in soln. contg. acrylamide.	75A052 74A182
378.	Glycine					
378.128	$[\text{CH}_2\text{CHCONH}_2]^- + \text{H}_3\text{N}^+\text{CH}_2\text{CO}_2^- \rightarrow$ $\text{CH}_3\dot{\text{C}}\text{HCONH}_2 + \text{H}_2\text{NCH}_2\text{CO}_2^-$	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^* (L mol ⁻¹ s ⁻¹)	pH	Method	Comment	Ref.
.001	Methyl $\cdot\text{CH}_3 + \cdot\text{CH}_3 \rightarrow \text{C}_2\text{H}_6$	$(1.24 \pm 0.2) \times 10^9$	5.5	p.r.	D.k. in soln. contg. 10^{-2} mol L ⁻¹ CH ₄ and 0.25 mol L ⁻¹ N ₂ O; $\epsilon = 850$ 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 ₂ O; $\epsilon = 1600$ 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 $\cdot\text{CH}_2\text{CH}_3 + \cdot\text{CH}_2\text{CH}_3$	$(9.6 \pm 2) \times 10^8$	5.5	p.r.	D.k. in soln. contg. 10^{-2} mol L ⁻¹ ethane and 0.25 mol L ⁻¹ N ₂ O; $\epsilon = 520$ 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 ₂ O; $\epsilon = 790, 750, 700, 545$ 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 $c\text{-}\dot{\text{C}}_5\text{H}_9 + c\text{-}\dot{\text{C}}_5\text{H}_9 \rightarrow$ $\text{C}_{10}\text{H}_{18}$ and $\text{C}_5\text{H}_{10} + \text{C}_5\text{H}_8$	$(1.0 \pm 0.2) \times 10^9$	7	p.r.	D.k. in soln. contg. N ₂ O and 1.3×10^{-5} mol L ⁻¹ cyclopentane; $\epsilon = 480$ L mol ⁻¹ cm ⁻¹ at 248 nm.	74A051
.016	2-Hydroxy-2,2-dimethylethyl $\cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH} + \cdot\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH}$	7×10^8 6×10^8	6 13.5	p.r.	D.k. in N ₂ O-satd. soln. contg. <i>tert</i> -BuOH; $\epsilon = 900, 200$ 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 $\cdot\text{CH}_2\text{CHO} + \cdot\text{CH}_2\text{CHO}$	4.5×10^8	10	p.r.	D.k. in N ₂ O-satd. soln. contg. 0.1 mol L ⁻¹ ethylene glycol; $\epsilon = 260$ L mol ⁻¹ cm ⁻¹ at 300 nm.	73G004
		4.5×10^8	9.8	p.r.	D.k. in N ₂ O-satd. soln. contg. 10^{-3} mol L ⁻¹ acetylene; $2k/\epsilon = 3.4 \times 10^6$ cm s ⁻¹ .	78A007
.021	2-Hydroxyethenyl $\cdot\text{CH}=\text{CHOH} + \cdot\text{CH}=\text{CHOH} \rightarrow$ $\text{HOCH}=\text{CHCH}=\text{CHOH}$	3.2×10^9	<7	p.r.	P.b.k. in N ₂ O-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 $\cdot\text{CH}_2\text{CO}_2^- + \cdot\text{CH}_2\text{CO}_2^-$	$(5.5 \pm 1) \times 10^8$	6.5	p.r.	D.k. at 366 nm in N ₂ O-satd. soln. contg. Na acetate; $\epsilon = 780$ L mol ⁻¹ cm ⁻¹ .	76A082
		5×10^8	10	p.r.	D.k. in N ₂ O-satd. soln. contg. acetate ion; $\epsilon = 800$ L mol ⁻¹ cm ⁻¹ at 350 nm.	69G446
		9×10^8	3	p.r.	D.k. in N ₂ O-satd. soln. contg. acetic acid; $\epsilon = 650$ L mol ⁻¹ cm ⁻¹ at 320 nm; $pK_a = 4.5$.	69G446
.048	Trichloromethyl $\cdot\text{CCl}_3 + \cdot\text{CCl}_3 \rightarrow \text{C}_2\text{Cl}_6$	$(3.7 \pm 0.9) \times 10^8$	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 ·CH ₂ OH + ·CH ₂ OH ·CH ₂ O ⁻ + ·CH ₂ O ⁻	1.2 × 10 ⁹ 4.5 × 10 ⁸	6 12	p.r.	D.k. at 280 and 350 nm, resp., at pH 6 and 12 in N ₂ O-satd. soln. contg. MeOH; $2k/\epsilon = 6.2 \times 10^6$ and 1.5×10^6 at pH 6 and 12, resp. ($\epsilon = 390$ and 600); $pK_a = 10.7$ [66G074].	69G419
	·CH ₂ OH + ·CH ₂ OH	(1.5 ± 1) × 10 ⁹		p.r.	D.k. in N ₂ O-satd. soln. contg. MeOH; $\epsilon = 270 \pm 15$ L mol ⁻¹ cm ⁻¹ at 310 nm.	77A011
.076	1-Hydroxyethyl CH ₃ ·CHOH + CH ₃ ·CHOH → CH ₃ CHOHCHOHCH ₃ (I)	(5.5 ± 1.5) × 10 ⁸ $k_I = (4.4 \pm 1) \times 10^8$	~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
	→ CH ₃ CHO + CH ₃ CH ₂ OH (II)	$k_{II} = (1.1 \pm 0.3) \times 10^8$ (7 ± 2) × 10 ⁸	~1	p.r.	D.k. at 296.7 nm in deaerated soln. contg. EtOH and 0.8 N H ₂ SO ₄ ; $\epsilon = 240 \pm 45$ L mol ⁻¹ cm ⁻¹ .	63G045
		(1.2 ± 0.3) × 10 ⁹	6	p.r.	D.k. at 280 and 300 nm, resp., at pH 6 and 13 in N ₂ O-satd. soln. contg. EtOH; $pK_a = 11.6$ [66G074];	69G419
	CH ₃ ·CHO ⁻ + CH ₃ ·CHO ⁻	(2.5 ± 0.5) × 10 ⁸	13		$2k/\epsilon = 4.7 \times 10^6$ and 5.7×10^6 resp., at pH 6 and 13.	
.078	1-Hydroxy-1-methylethyl (CH ₃) ₂ ·CHOH + (CH ₃) ₂ ·CHOH (CH ₃) ₂ ·C·O ⁻ + (CH ₃) ₂ ·C·O ⁻	(7 ± 1.5) × 10 ⁸ (2 ± 0.4) × 10 ⁸	6 13.3	p.r.	D.k. at 280 and 300 nm, resp. at pH 6 and 13.3 in N ₂ O-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
		(6.5 ± 0.5) × 10 ⁸		p.r.	D.k. at 310 nm in N ₂ O-satd. soln. contg. 0.02 mol L ⁻¹ 2-PrOH; $\epsilon = 353 \pm 15$ L mol ⁻¹ cm ⁻¹ .	77A011
.101	1,2-Dihydroxyethyl ·CHOHCH ₂ OH + ·CHOHCH ₂ OH	3.4 × 10 ⁸	6.0	p.r.	D.k. at 250 nm in N ₂ O-satd. soln. contg. ethylene glycol; $2k/\epsilon = 1.1 \times 10^6$ ($\epsilon = 610$ L mol ⁻¹ cm ⁻¹).	73G004
.113	Ascorbate radical ·A ⁻ + ·A ⁻ (+ H ⁺) → A + HA ⁻	(1.9 ± 0.2) × 10 ⁵	8.7	p.r.	D.k. at 360 nm in N ₂ O-satd. soln. contg. ascorbate; $\epsilon = 3300$ L mol ⁻¹ cm ⁻¹ [77A036]; $pK_a = -0.45$ [72D181].	75A240
.115	(Carboxy)hydroxymethyl ·CHOHCO ₂ H + ·CHOHCO ₂ H ·CHOHCO ₂ ⁻ + ·CHOHCO ₂ ⁻ ·CHO ⁻ CO ₂ ⁻ + ·CHO ⁻ CO ₂ ⁻	(6.5 ± 1) × 10 ⁸ (4.3 ± 0.7) × 10 ⁸ (7.5 ± 1) × 10 ⁶	1 7.2 12	p.r.	D.k. in N ₂ O-satd. soln. contg. 0.05 mol L ⁻¹ glycolic acid ($\epsilon = 6000$ L mol ⁻¹ cm ⁻¹); $pK_a = 4.6, 8.8$.	69G447
.123	Dihydroxymethyl ·CH(OH) ₂ + ·CH(OH) ₂ → CH ₂ (OH) ₂ + HCO ₂ ⁻ + H ⁺	3.6 × 10 ⁸ 2.3 × 10 ⁸	6.3 12	p.r.	D.k. at 250 nm, as well as condy. change, in N ₂ O-satd. soln. contg. formaldehyde, as well as in soln. contg. <i>tert</i> -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

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 $\cdot\text{CO}_2^- + \cdot\text{CO}_2^- \rightarrow \text{C}_2\text{O}_4^{2-}$	5×10^8	5	p.r.	D.k. at 250 nm in CO ₂ -satd. soln. contg. 10 ⁻² mol L ⁻¹ formate; $\epsilon = 2250$ L mol ⁻¹ cm ⁻¹ ; k cor. to $I = 0$.	65G384
		7.5×10^8	3.1,9	p.r.	D.k. at 255 nm in N ₂ O-satd. soln. contg. formate, as well as in CO ₂ -satd. soln. contg. formate; $\epsilon_{\text{max}} = 3000$ L mol ⁻¹ cm ⁻¹ at 235 nm.	69G446
		8.5×10^8	13			
		$(4.5 \pm 0.15) \times 10^8$	2.8-7	p.r.	D.k. in CO-satd. soln. at 260 nm ($\epsilon = 2200$ L mol ⁻¹ cm ⁻¹) as well as condy. change; same result in N ₂ O-satd. formate soln.	70G303
		$(3.8 \pm 0.35) \times 10^8$	2.7-13	p.r.	D.k. at 250 nm in N ₂ O-satd. 0.1 mol L ⁻¹ formate soln.; $\epsilon = 2050$ L mol ⁻¹ cm ⁻¹ (1100 at pH 0); k cor. to $I = 0$; $pK_a(\cdot\text{CO}_2\text{H}) = 1.4$.	73G085
		$(8.5 \pm 1) \times 10^8$	0			

^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-Acetyethyl 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 ₂ F	Dichlorofluoromethyl, 046	C ₃ H ₈ N	1-Amino-1-methylethyl, 050
CCl ₃	Trichloromethyl, 048	C ₄ H ₄ O ₄ ⁻	Electron adduct of maleate, 140
CF ₃	Trifluoromethyl, 047	C ₄ H ₅ N ₂ O ₂	Radical from glycine anhydride + OH, 062
CHCl ₂	Dichloromethyl, 045	C ₄ H ₅ O ₄	1,2-Dicarboxyethyl, 040a
CHF ₂	Difluoromethyl, 044	C ₄ H ₅ O ₅	1,2-Dicarboxy-1-hydroxyethyl, 120
CH ₂ Cl	Chloromethyl, 043		1,2-Dicarboxy-2-hydroxyethyl, 041
CH ₂ NO	Carbamoyl, 127	C ₄ H ₅ O ₆	1,2-Dicarboxy-1,2-dihydroxyethyl, 121
CH ₃	Methyl, 001	C ₄ H ₆ NO ₃	<i>N</i> -Acetylamino(carboxy)methyl, 060
CH ₃ O	Hydroxymethyl, 075	C ₄ H ₆ O ₂ ⁻	Electron adduct of crotonate, 135
CH ₃ O ₂	Dihydroxymethyl, 123		Electron adduct of methacrylate, 136
CO ₂ ⁻	Carboxyl, 147	C ₄ H ₇ NO ⁻	Electron adduct of crotonamide, 129
C ₂ H ₂ Cl ₃ O ₂	2,2,2-Trichloro-1,1-dihydroxyethyl, 126		Electron adduct of methacrylamide, 130
C ₂ H ₂ F ₃ O	2,2,2-Trifluoro-1-hydroxyethyl, 089	C ₄ H ₇ N ₂ O ₂ ⁻	Electron adduct of glycine anhydride, 142
C ₂ H ₃ O	Formylmethyl, 020		Radicals from glycyglycinamide + OH, 058
	2-Hydroxyethenyl, 022	C ₄ H ₇ N ₂ O ₃	Radicals from diglycine + OH, 065
C ₂ H ₃ O ₂	Carboxymethyl, 035	C ₄ H ₇ O	1-Acetyethyl, 024
C ₂ H ₃ O ₃	(Carboxy)hydroxymethyl, 115		1-Hydroxycyclobutyl, 084
C ₂ H ₄ Cl	2-Chloroethyl, 005	C ₄ H ₇ O ₂	Radicals from crotyl alcohol + OH, 019
C ₂ H ₄ NO	Carbamoylmethyl, 034		2-Tetrahydrofuryl, 094
C ₂ H ₄ NO ₂	Amino(carboxy)methyl, 056		1-Carboxypropyl, 038
	(Carbamoyl)hydroxymethyl, 114	C ₄ H ₇ O ₃	2,5-Dioxacyclohexyl, 104
C ₂ H ₄ O ₄ S ⁻	1-Sulfatoethyl, 091		1-Hydroxy-1-methyl-2-oxopropyl, 107
C ₂ H ₅	Ethyl, 002		4-Hydroxy-2-oxobutyl, 027
C ₂ H ₅ N ₂ O	Amino(carbamoyl)methyl, 057		2-Carboxy-1-hydroxy-1-methylethyl, 097
C ₂ H ₅ O	1-Hydroxyethyl, 076		2-Carboxy-2-hydroxy-2-methylethyl, 017
	2-Hydroxyethyl, 014		1-Carboxy-2-hydroxypropyl, 040
	Methoxymethyl, 092a		1-Hydroxy-1-(methoxycarbonyl)ethyl, 118
C ₂ H ₅ O ₂	1,2-Dihydroxyethyl, 101	C ₄ H ₈ NO	Radicals from <i>meso</i> -erythritol, 030
C ₂ H ₆ N	1-Aminoethyl, 049	C ₄ H ₈ NO ₂	(<i>N</i> -Acetyl- <i>N</i> -methylamino)methyl, 055
	2-Aminoethyl, 011	C ₄ H ₉	2-Amino-2-carboxy-2-methylethyl, 013
C ₂ H ₆ NO	2-Amino-1-hydroxyethyl, 098	C ₄ H ₉ O	1,1-Dimethylethyl, 002b
C ₂ H ₇ NO ₄ P	2-Amino-1-phosphoryloxyethyl, 099		1-Ethoxyethyl, 093
C ₃ H ₃ O ₄	Dicarboxymethyl, 042		1-Hydroxybutyl, 079
C ₃ H ₃ O ₅	(Dicarboxy)hydroxymethyl, 119	C ₄ H ₉ O ₂	2-Hydroxy-2,2-dimethylethyl, 016
C ₃ H ₄ O ₂ ⁻	Electron adduct of acrylate, 134		1-Hydroxy-1-methylpropyl, 080
C ₃ H ₅ NO ⁻	Electron adduct of acrylamide, 128	C ₄ H ₉ O ₃	1-Hydroxy-2-methylpropyl, 081
C ₃ H ₅ O	1-Formylethyl, 021		1,4-Dihydroxybutyl, 095
	2-Oxopropyl, 023		1,2-Dihydroxy-1-methylpropyl, 103
	Radicals from allyl alcohol + OH, 018	C ₄ H ₉ O ₂	Radicals from crotyl alcohol + OH, 019
C ₃ H ₅ O ₂	Acetoxymethyl, 090	C ₄ H ₁₀ N	2-Amino-2,2-dimethylethyl, 012
	1-Carboxyethyl, 037	C ₅ H ₇ NO ₃	Radical from 2-pyrrolidone-5-carboxylic acid, 074
	2,5-Dioxacyclopentyl, 125		2-Oxocyclopentyl, 032
	1-Formyl-2-hydroxyethyl, 026	C ₅ H ₇ O ₄	1,3-Dicarboxy-1-hydroxypropyl, 122
	Methoxycarbonylmethyl, 036	C ₅ H ₇ O ₅	<i>N</i> -Acetyl- <i>N</i> -methylamino(carboxy)methyl, 061
C ₃ H ₅ O ₃	1-Carboxy-1-hydroxyethyl, 117	C ₅ H ₈ NO ₃	Electron adduct of β,β-dimethylacrylate, 137
	1-Carboxy-2-hydroxyethyl, 039	C ₅ H ₈ O ₂ ⁻	Electron adduct of methyl methacrylate, 138
C ₃ H ₆ NO	(<i>N</i> -Acetylamino)methyl, 053		Cyclopentyl, 004
	(<i>N</i> -Formyl- <i>N</i> -methylamino)methyl, 054	C ₅ H ₉	Electron adduct of <i>N,N</i> -dimethylacrylamide, 132
C ₃ H ₆ NO ₂	1-Carbamoyl-1-hydroxyethyl, 116	C ₅ H ₉ NO ⁻	Electron adduct of β,β-dimethylacrylamide, 131
	Carboxy(<i>N</i> -methylamino)methyl, 059		Radicals from acetylserineamide, 072
C ₃ H ₆ NO ₃	2-Amino-2-carboxy-1-hydroxyethyl, 100	C ₅ H ₉ N ₂ O ₃	1-Hydroxycyclopentyl, 085
C ₃ H ₆ O ₂ ⁻	Electron adduct of methyl acetate, 148	C ₅ H ₉ O	Radicals from cyclopentene + OH, 016a
C ₃ H ₇	1-Methylethyl, 002a		2-Carboxy-2,2-dimethylethyl, 006
C ₃ H ₇ O	1-Hydroxy-1-methylethyl, 078		1-Formyl-4-hydroxybutyl, 028
	1-Hydroxypropyl, 077	C ₅ H ₉ O ₂	Radicals from ribose + OH, 109
	2-Hydroxypropyl, 015		Radicals from deoxyribose + OH, 108
C ₃ H ₇ O ₂	1,2-Dihydroxypropyl, 102		Radicals from xylitol, 031
	Dimethoxymethyl, 124	C ₅ H ₉ O ₄	Radicals from ribose phosphate + OH, 110
	(Methoxymethoxy)methyl, 094a		Radicals from pentane, 003
C ₃ H ₇ O ₂	Radicals from allyl alcohol + OH, 018	C ₅ H ₁₁ N ₂ O ₃	Radicals from glycy sarcosine + OH, 066
C ₃ H ₇ O ₃	1,2,3-Trihydroxypropyl, 106	C ₅ H ₁₁ O	1,1-Dimethylethoxymethyl, 093a
			1-Hydroxypentyl, 082
		C ₅ H ₁₁ O ₄	1,3-Dihydroxy-2,2-di(hydroxymethyl)propyl, 096
		C ₆ H ₆ O ₆ ⁻	Radical from ascorbate + OH, 113
		C ₆ H ₈ O 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 + $\bar{O}H$, 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	C ₃ H ₇ NO ₂ S	Cysteine, 162
Ag ₂ ⁺	Silver(I) ion, complex with Ag(0), 2	C ₃ H ₈ O	1-Propanol, 313
BH ₃ O ₃	Boric acid, 367	C ₃ H ₁₀ N ⁺	2-Propanol, 314
BH ₄ O ₄ ⁻	Tetrahydroborate ion, 366	C ₄ H ₂ N ₂ O ₄	Trimethylammonium ion, 371
BrCoH ₁₅ N ₅ ²⁺	Pentaamminebromocobalt(III) ion, 15	C ₄ H ₃ BrN ₂ O ₂	Alloxan, 126
BrH ₁₅ N ₅ Ru ²⁺	Bromopentaammineruthenium(III) ion, 101	C ₄ H ₃ NO ₂ S	5-Bromouracil, 146
BrO ₃ ⁻	Bromate ion, 3	C ₄ H ₃ N ₃ O ₄	2-Nitrothiophene, 298
Br ₂ Hg	Mercuric bromide, 74	C ₄ H ₃ O ₄ ⁻	3-Nitrothiophene, 299
CCl ₄	Carbon tetrachloride, 152	C ₄ H ₄ N ₂	5-Nitouracil, 301
CHCl ₃	Chloroform, 157	C ₄ H ₄ N ₂ O ₂	Fumarate ion, 214
CHO ₂ ⁻	Formate ion, 212	C ₄ H ₄ O ₄	Pyrazine, 321
CHO ₃ ⁻	Bicarbonate ion, 370	C ₄ H ₅ N ₃	Pyridazine, 324
CH ₂ Cl ₂	Dichloromethane, 174	C ₄ H ₅ N ₃ O ₂	Pyrimidine, 329
CH ₂ O	Formaldehyde, 211	C ₄ H ₆	2-Nitropyrrole, 295
CH ₃ NO ₂	Nitromethane, 292	C ₄ H ₆ N ₂ O ₂	3-Nitropyrrole, 296
CH ₄ O	Methanol, 255	C ₄ H ₆ O ₂	Fumaric acid, 215
CH ₄ S	Methanethiol, 254	C ₄ H ₇ N	Maleic acid, 252
CH ₅ N	Mercurous cyanide, 77	C ₄ H ₈	4-Aminopyrimidine, 129
CN ₄ O ₈	Tetranitromethane, 347	C ₄ H ₈ O	2-Methyl-5-nitroimidazole, 264
C ₂ Cl ₃ O ₂ ⁻	Trichloroacetate ion, 351	C ₄ H ₈ O ₂	Butadiene, 147
C ₂ F ₃ O ₂ ⁻	Trifluoroacetate ion, 352	C ₄ H ₁₀ N ⁺	Glycine anhydride, 218
C ₂ H ₂	Acetylene, 119	C ₄ H ₁₀ O	2,3-Butanedione, 148
C ₂ H ₂ IN	Iodoacetonitrile, 237	C ₄ H ₁₀ O ₂ S ₂	Isobutyronitrile, 243
C ₂ H ₂ IO ₂ ⁻	Iodoacetate ion, 235	C ₄ H ₁₂ N ⁺	1-Butene, 149
C ₂ H ₃ ClO ₂	Chloroacetic acid, 156	C ₄ H ₁₂ N ₂ S ₂	Isobutylene, 241
C ₂ H ₃ Cl ₃ O ₂	Chloral hydrate, 155	C ₄ H ₁₆ BrCoFN ₄ ⁺	Tetrahydrofuran, 340
C ₂ H ₃ IO ₂	Iodoacetic acid, 236	C ₄ H ₁₆ Br ₂ CoN ₄ ⁺	Ethyl acetate, 201
C ₂ H ₃ N	Acetonitrile, 117	C ₄ H ₁₆ Cl ₂ CoN ₄ ⁺	Isobutyric acid, 242
C ₂ H ₄	Ethylene, 202	C ₄ H ₁₆ Cl ₂ N ₄ Pt ²⁺	Methyl propionate, 267
C ₂ H ₄ Cu ⁺	Copper(I) ion, complex with ethylene, 58	C ₄ H ₁₆ CoF ₂ N ₄ ⁺	Pyrrrolidinium ion, 376
C ₂ H ₄ INO	Iodoacetamide, 234	C ₄ H ₁₈ ClCoN ₄ O ²⁺	Ethyl ether, 205
C ₂ H ₄ O ₂	Acetic acid, 115	C ₄ H ₁₉ ClCoN ₅ ²⁺	Dithiothreitol, 197
C ₂ H ₄ O ₃	Glycolic acid, 219	C ₄ N ₄ Ni ²⁺	Diethylammonium ion, 373
C ₂ H ₅ IO	Iodoethanol, 238	C ₅ FeN ₆ O ³⁻	Cystamine, 160a
C ₂ H ₅ NO ₂	Glycine, 217, 378	C ₅ FeN ₆ O ⁴⁻	<i>cis</i> -Bromobis(ethylenediamine)
C ₂ H ₆ O	Ethanol, 200	C ₅ H ₂ NO ₅ ⁻	fluorocobalt(III) ion, 40
C ₂ H ₆ OS	2-Mercaptoethanol, 253	C ₅ H ₃ N ₂ O ₄ ⁻	<i>trans</i> -Dibromobis(ethylenediamine)
C ₂ H ₆ O ₂	Ethylene glycol, 204	C ₅ H ₄ N ₂ O ₂	cobalt(III) ion, 39
C ₂ H ₇ NS	Cysteamine, 161	C ₅ H ₄ N ₂ O ₄	<i>cis</i> -Dichlorobis(ethylenediamine)
C ₂ H ₈ N ⁺	Ethylammonium ion, 372	C ₅ H ₄ N ₄	cobalt(III) ion, 41
C ₂ H ₁₅ CoN ₅ O ₂ ⁺	(Acetato)pentaamminecobalt(III) ion, 20	C ₅ H ₄ O ₅ ²⁻	<i>trans</i> -Dichlorobis(ethylenediamine)
C ₂ HgN ₂	Mercuric cyanide, 78	C ₅ H ₁₀ O	cobalt(III) ion, 42
C ₂ HgN ₂ S ₂	Mercuric thiocyanate, 79	C ₅ H ₁₁ NO ₂ S	<i>trans</i> -Dichlorobis(ethylenediamine)-
C ₃ HBrNO ₂ S	2-Bromo-5-nitrothiazole, 145	C ₅ H ₁₂ N ⁺	platinum(IV) ion, 97
C ₃ H ₃ NO ₂	Cyanoacetic acid, 160	C ₅ H ₁₅ CoN ₆ O ₂ ²⁺	<i>trans</i> -Bis(ethylenediamine)
C ₃ H ₃ NS	Thiazole, 349	C ₅ H ₁₈ CoN ₇ O ₂ ²⁺	difluorocobalt(III) ion, 43
C ₃ H ₃ N ₃ O ₂	2-Nitroimidazole, 289		<i>cis</i> -Aqua chlorobis(ethylene-
C ₃ H ₃ N ₃ O ₂ S	4-Nitroimidazole, 290		diamine)cobalt(III) ion, 38
C ₃ H ₃ O ₃ ⁻	2-Amino-5-nitrothiazole, 127		<i>cis</i> -Amminechlorobis(ethylene-
C ₃ H ₃ IO ₂	Pyruvate ion, 330		diamine)cobalt(III) ion, 37
C ₃ H ₅ N	3-Iodopropionic acid, 239		Tetracyanonickelate(II) ion, 90
C ₃ H ₅ NO	Propionitrile, 316		Pentacyanonitrosylferrate(III) ion, 70
C ₃ H ₅ O ₂ ⁻	Acrylamide, 123		Pentacyanonitrosylferrate(III) radical ion
C ₃ H ₅ O ₃ ⁻	3-Hydroxypropionitrile, 230		(electron adduct), 71
C ₃ H ₆	3-Mercaptopropionate ion, 253a		5-Nitrofuroate ion, 288
C ₃ H ₆ O	Lactate ion, 247		Orotate ion, 303
C ₃ H ₆ O ₂	Propylene, 317		Pyrazinecarboxylic acid, 322
C ₃ H ₆ O ₃	Acetone, 116		Nifuroxime, 278
	Propionic acid, 315		Purine, 320
	Lactic acid, 248		α-Ketoglutarate ion, 246
			3-Pentanone, 305
			Penicillamine, 304
			Piperidinium ion, 377
			Tetraammine(pyrazinecarboxylato-O,N)
			cobalt(III) ion, 34
			Pentaammine(pyrazinecarboxylato)-

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

$C_{12}H_8N_2$	1,10-Phenanthroline, 306 Phenazine, 307	$C_{19}H_{19}N_7O_6$	Folic acid, 210
$C_{12}H_9NO$	3-Benzoylpyridine, 141 4-Benzoylpyridine, 142 Indophenol, 233 Thionine, 350	$C_{20}H_6Br_4O_5^{2-}$	Eosin, 199
$C_{12}H_9N_3S$	Azobenzene, 136	$C_{20}H_{10}O_5^{2-}$	Fluorescein, 209
$C_{12}H_{10}N_2$	2,3-Dimethylnaphthoquinone, 185	$C_{20}H_{19}N_4^+$	Safranine T, 336
$C_{12}H_{10}O_2$	1,1'-Ethylene-2,2'-bipyridinium ion, 203	$C_{21}H_{28}N_7O_{10}P_2$	Nicotinamide-adenine dinucleotide, 276
$C_{12}H_{12}N_2^{2+}$	1,1'-Dimethyl-4,4'-bipyridinium ion, 183	$C_{22}H_{18}N_2^{2+}$	1,1'-Diphenyl-4,4'-bipyridinium ion, 196
$C_{12}H_{14}N_2^{2+}$	Thiamine, 348	$C_{24}H_{16}N_4^{2+}$	1,1'-Di(4-cyanophenyl)-4,4'-bipyridinium ion, 175
$C_{12}H_{17}ClN_4OS$	Histidinecopper(II) complex, 63	$C_{24}H_{22}N_2^{2+}$	1,1'-Dibenzyl-4,4'-bipyridinium ion, 171
$C_{12}H_{18}CuN_6O_4$	2-Benzoylpyridine, 140	$C_{25}H_{30}ClN_3^+$	Crystal Violet, 159
$C_{12}N_9NO$	Acridine, 121	$C_{28}H_{31}N_2O_3^+$	Rhodamine B, 332
$C_{13}H_9N$	Benzophenone, 137	$C_{30}H_{24}CoN_6^{3+}$	Tris(2,2'-bipyridine)cobalt(III) ion, 44
$C_{13}H_{10}O$	3-Benzoyl-1-methylpyridinium ion, 139	$C_{30}H_{24}N_6Rh^{3+}$	Tris(2,2'-bipyridine)rhodium(III) ion, 98
$C_{13}H_{12}NO^+$	1,1-Trimethylene-2,2'-bipyridinium ion, 354	$C_{30}H_{24}N_6Ru^{2+}$	Tris(2,2'-bipyridine)ruthenium(II) ion, 99
$C_{13}H_{14}N_2^{2+}$	9,10-Antraquinone-2,6-disulfonate ion, 134	$C_{30}H_{24}N_6Ru^{3+}$	Tris(2,2'-bipyridine)ruthenium(III) ion, 105
$C_{14}H_6O_7S_2^{2-}$	9,10-Antraquinone-1-sulfonate ion, 132	$C_{30}H_{28}FeN_4O_6$	Deuteroheme, 223
$C_{14}H_7O_5S^-$	9,10-Antraquinone-2-sulfonate ion, 133	$C_{30}H_{28}FeN_4O_6^+$	Deuterohemin, 222
$C_{14}H_8O_2$	9,10-Antraquinone, 131	$C_{31}H_{46}O_2$	Vitamin K ₁ , 360
$C_{14}H_{14}ClN_3$	Acridine, 122	$C_{32}H_{34}N_4O_6$	Deuteroporphyrin dimethyl ester, 221a
$C_{14}H_{16}N_2^{2+}$	1,1'-Tetramethylene-2,2'-bipyridinium ion, 341	$C_{34}H_{24}N_6Na_4O_{14}S_4$	Trypan blue, 357
$C_{14}H_{18}N_2O_2^{2+}$	1,1'-Bis(2-hydroxyethyl)-4,4'-bipyridinium ion, 144	$C_{34}H_{32}ClFeN_4O_4$	Hemin, 224
$C_{14}H_{26}CoN_4O_2^+$	Dihydroxy(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion, 52	$C_{34}H_{38}N_4O_6$	Hematoporphyrin, 220
$C_{14}H_{27}CoN_4O_2^{2+}$	Aquahydroxy(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion, 51	$C_{36}H_{24}CoN_6^{3+}$	Tris(1,10-phenanthroline)cobalt(III) ion, 45
$C_{14}H_{28}CoN_4O_2^{2+}$	Diaqua(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(II) ion, 7	$C_{36}H_{24}N_6Rh^{3+}$	Tris(1,10-phenanthroline)iron(III) ion, 72
$C_{14}H_{28}CoN_4O_2^{3+}$	Diaqua(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion, 50	$C_{36}H_{24}N_6Ru^{2+}$	Tris(1,10-phenanthroline)rhodium(III) ion, 98a
$C_{16}H_6N_2O_{14}S_4^{4-}$	Indigo tetrasulfonate, 232	$C_{40}H_{30}N_{10}O_6^{2+}$	Tris(1,10-phenanthroline)ruthenium(II) ion, 99a
$C_{16}H_8N_2O_8S_2^{2-}$	Indigo disulfonate, 231	$C_{40}H_{46}ClFeN_6O_8S_2$	Nitro blue tetrazolium, 287a
$C_{16}H_{10}$	Pyrene, 323	$C_{42}H_{58}CoN_6^{3+}$	Hemin c, 225
$C_{16}H_{16}N_2O_4$	1,1'-Dicarboxyethyl-4,4'-bipyridinium, 172	$C_{48}H_{30}N_4O_8$	Tris(5,6-dimethyl-1,10-phenanthroline)cobalt(III) ion, 45a
$C_{16}H_{18}N_3S^+$	Methylene blue, 260	$C_{62}H_{90}CoN_{13}O_{14}P$	<i>meso</i> -5-Tetra(4-carboxyphenyl)porphyrin, 337
$C_{16}H_{32}Cl_2CoN_4^+$	Dichloro(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(III) ion, 49	$C_{62}H_{91}CoN_{13}O_{15}P$	Cobal(II)amin, 10
$C_{16}H_{32}CuN_4^{2+}$	(5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(II) ion, 60	$C_{63}H_{90}CoN_{14}O_{14}P$	Hydroxocob(III)alamin(Vitamin B12a), 54
$C_{16}H_{32}N_4Ni^{2+}$	(5,7,7,12,12,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)nickel(II) ion, 92	$C_{64}H_{24}CoN_{16}O_{24}S_8^{8-}$	Cyanocob(III)alamin(Vitamin B12), 53
$C_{16}H_{34}CoN_4O_2^+$	(5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)dihydroxycobalt(III) ion, 48	Cd^+	3,10,17,24-Tetrasulfophthalocyaninecobalt(II) ion dimer, 10a
$C_{16}H_{35}CoN_4O_2^{2+}$	Aqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)hydroxycobalt(III) ion, 47	Cd^{2+}	Cadmium(I) ions, 4
$C_{16}H_{36}CoN_4O_2^{2+}$	Diaqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(II) ion, 9	$ClCoH_{15}N_5S^{2+}$	Cadmium(II) ion, 5
$C_{16}H_{36}CoN_4O_2^{3+}$	Diaqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(III) ion, 46	$ClH_{15}N_5Ru^{2+}$	Pentaamminechlorocobalt(III) ion, 16
$C_{16}H_{36}N_4Ni^{2+}$	(5,7,7,12,12,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)nickel(II) ion, 91	Cl_2Hg	Chloropentaammineruthenium(III) ion, 102
$C_{17}H_{20}N_2S$	Promethazine, 312	Cl_2Ir^{2-}	Mercuric chloride, 75
$C_{17}H_{20}N_4O_6$	Riboflavin, 333	Co^{2+}	Hexachloroiridate(II) ion, 81a
$C_{17}H_{20}N_4O_9P^-$	Riboflavin 5'-phosphate, 334	$CoFH_{15}N_5S^{2+}$	Cobalt(II) ions, 6
$C_{18}H_{15}N_4^+$	Phenosafarine, 308	$CoH_{15}N_6O_2^{2+}$	Pentaamminefluorocobalt(III) ion, 17
		$CoH_{15}N_6O_3^{2+}$	Pentaammine(nitrito- <i>N</i>)cobalt(III) ion, 18
		$CoH_{16}N_5O^{2+}$	Pentaammine(nitrato- <i>O</i>)cobalt(III) ion, 19
		$CoH_{17}N_5O^{3+}$	Pentaamminehydroxycobalt(III) ion, 14
		Cr^{2+}	Pentaammineaquacobalt(III) ion, 13
		Cr^{3+}	Hexaamminecobalt(III) ion, 12
		Cu^+	Chromium(II) ion, 55
		Cu^{2+}	Chromium(III) ion, 56
		Eu^{3+}	Copper(I) ions, 57
		Fe^{2+}	Copper(II) ions, 59
		Fe^{3+}	Europium(III) ion, 66
		Ga^{2+}	Iron(II) ion, 67
		HO^-	Iron(III) ions, 68
		$HO_2P_2^{3-}$	Gallium(II) ions, 73
		H_2O	Hydroxide ion, 362
		H_2O_2	Pyrophosphate ion, 369
		$H_2O_4P^-$	Water, 363
		H_2S	Hydrogen peroxide, 94
		H_3N	Phosphate ion, 368
		H_3NO	Hydrogen sulfide, 106
		H_3O^+	Ammonia, 365
		H_4N^+	Hydroxylamine, 84
		$H_{15}N_6ORu^{3+}$	Hydronium ion, 361
			Ammonium ion, 364
			Nitrosopentaammineruthenium(III) ion, 103

$\text{H}_{15}\text{N}_6\text{ORu}^{2+}$	Nitrosopentaammineruthenium(III) radical ion (electron adduct), 104
$\text{H}_{18}\text{N}_6\text{Ru}^{3+}$	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
$\text{O}_6\text{S}_4^{2-}$	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
Ti^+	Thallium(I) ion, 111
Ti_2^+	Thallium(I) ion, complex with $\text{Tl}(0)$, 111a
Yb^{3+}	Ytterbium(III) ions, 112
Zn^+	Zinc(I) ion, 113
Zn^{2+}	Zinc(II) ion, 114

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4. TITLE AND SUBTITLE Rate Constants for Reactions of Aliphatic Carbon-Centered Radicals in Aqueous Solution			
5. AUTHOR(S) Alberta B. Ross and Pedatsur Neta			
6. PERFORMING ORGANIZATION (If joint or other than NBS, see instructions) Radiation Chemistry Data Center Radiation Laboratory University of Notre Dame Notre Dame, Indiana 46556			7. Contract/Grant No. 8. Type of Report & Period Covered N/A
9. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS (Street, City, State, ZIP) National Bureau of Standards Department of Commerce Washington, D. C. 20234			
10. SUPPLEMENTARY NOTES Library of Congress Catalog Card Number: 82-2096 ☐ Document describes a computer program; SF-185, FIPS Software Summary, is attached.			
11. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here) 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.			
12. KEY WORDS (Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons) alkyl radicals; aminoalkyl radicals; aqueous solution; carboxyalkyl radicals; chemical kinetics; electron transfer; haloalkyl radicals; hydroxyalkyl radicals; photolysis; radical anions; radiolysis; rates.			
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