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

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Foreword

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

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

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

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

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

E. Ambler.

ERNEST AMBLER, *Director*

Preface

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

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

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

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

Introduction

The radiolysis of water produces the short-lived intermediates, hydrated electrons, hydrogen atoms, and hydroxyl radicals, which react with a variety of aliphatic compounds to produce secondary radicals (73G030, 75G001, 75C002, 77C011).[1] In general, OH radicals and H atoms react with aliphatic compounds by hydrogen abstraction

$$\mathrm{OH} + \mathrm{RH} \rightarrow \mathrm{H_2O} + \mathring{\mathrm{R}}$$

$$\mathrm{H} + \mathrm{RH} \rightarrow \mathrm{H_2} + \mathring{\mathrm{R}}$$

or by addition

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

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

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

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

or to dissociate the molecule

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

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

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

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

$$\mathrm{HOCH_2CH_2OH} \rightarrow \mathrm{HOCH_2\mathring{C}HOH} \rightarrow \mathrm{\mathring{C}H_2CHO}$$

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

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

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[1] Literature references are cited following the tables.

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

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

Arrangement of the Tables

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

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

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

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

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

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

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List of Abbreviations and Symbols

A	frequency factor
Ac	acetyl
ala	alanine
abs.	absorption
abstr.	abstraction
addn.	addition
alk.	alkaline
bpy	2,2′–bipyridine
BuOH	butanol
calcd.	calculated
chem.	chemical
c.k.	competition kinetics
concn.	concentration
condy.	conductivity
contg.	containing
cor.	corrected
CTAB	hexadecyltrimethylammonium bromide
detd.	determined
dien	diethylenetriamine
d.k.	decay kinetics (decay of radical absorption and bleaching of substrate absorption)
e–r.	electron radiolysis
ϵ	extinction coefficient (molar absorptivity)
E_a	activation energy
en	ethylenediamine
esr	electron spin resonance
estd.	estimated
EtOH	ethanol
Et_2O	ethyl ether
f.p.	flash photolysis
formn.	formation
γ–r.	gamma radiolysis

G	radiation yield (molecules per 100 eV)
gly	glycine or glycinato
$\Delta H^\ddagger$	activation enthalpy
I	ionic strength
irradn.	irradiation
K	equilibrium constant
k	rate constant
k_f	specific rate of the forward reaction
k_r	specific rate of the reverse reaction
L	ligand
Me	methyl
meas.	measured
MeOH	methanol
NaLS	sodium dodecylsulfate
obs.	observed
o.d.	optical density
p.b.k.	product buildup kinetics
phot.	photolysis
pK_a	negative logarithm of the acid dissociation constant, e.g., where $AH + H_2O \rightleftharpoons A^- + H_3O^+$
PNAP	*p*–nitroacetophenone
PNBPA	*p*–nitrobenzoato(pentaammine)cobalt(III) ion
p.r.	pulse radiolysis
PrOH	propanol
R	radical
redn.	reduction
rel.	relative
RNO	*N,N*–dimethyl–*p*–nitrosoaniline
$\Delta S^\ddagger$	activation entropy
satd.	saturated
soln.	solution

List of Aliphatic Radicals

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

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

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

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

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

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
	Ag					
1.	**Silver(I) ion**					
1.016	$\cdot CH_2C(CH_3)_2OH + Ag^+ \rightarrow Ag^0$		nat	p.r.	No electron transfer to give Ag^0 in 0.1 mol L^{-1} *tert*-BuOH.	78A410
1.075	$\cdot CH_2OH + Ag^+ \rightarrow Ag^0$		nat	p.r.	No electron transfer to give Ag^0 in 0.1 mol L^{-1} MeOH.	78A410
1.078	$(CH_3)_2\dot{C}OH + Ag^+ \rightarrow Ag^0$		nat	p.r.	No electron transfer to give Ag^0 in 0.1 mol L^{-1} 2-PrOH.	78A410
1.128	$[CH_2CHCONH_2]\cdot^- + Ag^+ \rightarrow Ag^0 + H^+ + CH_2{=}CHCONH_2$	$(1.1 \pm 0.4) \times 10^8$	~6	p.r.	P.b.k. at 313 nm in soln. contg. acrylamide.	70G052
1.147	$\cdot CO_2^- + Ag^+ \rightarrow AgCO_2$ $(+ Ag^+) \rightarrow Ag_2CO_2^+$		nat	p.r.	Ag^+ was reduced in 10^{-2} mol L^{-1} formate soln. contg. CO_2 by a complex mechanism.	78A410
2.	**Silver(I) ion, complex with Ag(0)**					
2.016	$\cdot CH_2C(CH_3)_2OH + Ag_2^+ \rightarrow 2\,Ag^+ + OH^- + CH_2{=}C(CH_3)_2$	2.0×10^9	nat	p.r.	Calcd. from best fit for increase in condy. as function of time in 0.1 mol L^{-1} *tert*-BuOH-5 x 10^{-4} mol L^{-1} $AgClO_4$ soln.	78A410
2.075	$\cdot CH_2OH + Ag_2^+ \rightarrow Ag_2CH_2OH^+ \rightarrow CH_2O + H^+ + Ag_2$	5.0×10^9	nat	p.r.	Calcd. from increase in condy. as function of time in 0.1 mol L^{-1} MeOH-5 x 10^{-4} mol L^{-1} $AgClO_4$ soln. assuming values for $k(R + R)$, $[Ag_2^+]$, [R], and $[H_2O_2]$.	78A410
2.076	$CH_3\dot{C}HOH + Ag_2^+ \rightarrow CH_3CHO + H^+ + Ag_2$	1.0×10^9		p.r.	Calcd. from increase in condy. as function of time in EtOH-$AgClO_4$ soln. assuming values for $k(R + R)$, $[Ag_2^+]$, [R], and $[H_2O_2]$.	78A410
2.078	$(CH_3)_2\dot{C}OH + Ag_2^+ \rightarrow (CH_3)_2CO + H^+ + Ag_2$	2.5×10^9		p.r.	Calcd. from increase in condy. as function of time in 0.1 mol L^{-1} 2-PrOH-5 x 10^{-4} mol L^{-1} $AgClO_4$ soln. assuming values for $k(R + R)$, $[Ag_2^+]$, [R], and $[H_2O_2]$.	78A410
	Br					
3.	**Bromate ion**					
3.076	$CH_3\dot{C}HOH + BrO_3$	$< 5 \times 10^6$	6	p.r.	D.k.; radical from ethanol.	72A018
	$CH_3\dot{C}HO^- + BrO_3^-$	$(3.0 \pm 0.5) \times 10^7$	11.8			
	Cd					
4.	**Cadmium(I) ions**					
4.016	$\cdot CH_2C(CH_3)_2OH + Cd^+ \rightarrow Cd^{2+} + (CH_3)_2C{=}CH_2 + OH^-$	$\sim 1 \times 10^9$	nat	p.r.	Calcd. from opt. and condy. studies in *tert*-BuOH-Cd^{2+} soln. assuming values for competing reactions.	75A064
	$\cdot CH_2C(CH_3)_2OH + Cd_2^{2+} \rightarrow OH^- + Cd^+ + (CH_3)_2C{=}CH_2 + Cd^{2+}$	$\sim 1 \times 10^9$	nat	p.r.	See above.	75A064
4.075	$\cdot CH_2OH + Cd^+ \rightarrow CdCH_2OH^+$	2×10^8	nat	p.r.	D.k. at 300 nm (Cd^+) in soln. contg. MeOH and Cd^{2+}, as well as condy. and p.b.k. at 240 nm (Cd_2^{2+}); assumed $k(Cd^+ + H_2O_2) = 1.5 \times 10^9$, $k(R + R) = 1.2 \times 10^9$.	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	$CH_3\dot{C}HOH + Cd^+ \rightarrow CdCHOHCH_3{}^+$	$(1.3 \pm 0.6) \times 10^9$	nat	p.r.	D.k. at 300 nm (Cd^+) in soln. contg. EtOH and Cd^{2+}, as well as condy. and p.b.k. at 240 nm ($Cd_2{}^{2+}$); assumed $k(Cd^+ + H_2O_2) = 1.5 \times 10^9$, $k(R + R) = 1.15 \times 10^9$ and $2k(Cd^+ + Cd^+) = 3.0 \times 10^9$.	75A064
4.078	$(CH_3)_2\dot{C}OH + Cd^+ \rightarrow CdC(CH_3)_2OH^+$	$(2.4 \pm 1.2) \times 10^9$	nat	p.r.	D.k. at 300 nm (Cd^+) in soln. contg. 2-PrOH and Cd^{2+}, as well as condy. and p.b.k. at 240 nm ($Cd_2{}^{2+}$); assumed $k(Cd^+ + H_2O_2) = 1.5 \times 10^9$, $k(R + R) = 7 \times 10^8$ and $2k(Cd^+ + Cd^+) = 3.0 \times 10^9$.	75A064
4.105	$-O\dot{C}HCH_2(OCH_2CH_2O)_n- + Cd^+$	$<2 \times 10^8$	nat	p.r.	D.k. of Cd^+ in the presence of polyethylene glycol entirely by $Cd^+ + Cd^+$ ($2k = 5 \times 10^9$); $2k(R + R) = 2.2 \times 10^7$.	75A153
5.	**Cadmium(II) ion**					
5.016	$\cdot CH_2C(CH_3)_2OH + Cd^{2+}$	$<10^6$	nat	p.r.	Est. from lack of increase in Cd^+ in 0.1 mol L^{-1} Cd^{2+} soln. upon addn. of 0.1 mol L^{-1} *tert*-BuOH.	75A027
		$<2.5 \times 10^5$	nat	p.r.	No reaction.	75A153
5.075	$\cdot CH_2OH + Cd^{2+}$	$<10^2$	nat	p.r.	Est. from lack of increase in Cd^+ in 0.1 mol L^{-1} Cd^{2+} soln. upon addn. of 0.1 mol L^{-1} MeOH.	75A027
5.076	$CH_3\dot{C}HOH + Cd^{2+}$	$<2.5 \times 10^5$	nat	p.r.	No reaction.	75A153
5.078	$(CH_3)_2\dot{C}OH + Cd^{2+}$	$<10^6$		p.r.	Est. from lack of increase in Cd^+ in 0.1 mol L^{-1} Cd^{2+} soln. upon addn. of 0.1 mol L^{-1} 2-PrOH.	75A027
		$<2.5 \times 10^5$	nat	p.r.	No reaction	75A153
5.101	$\cdot CHOHCH_2OH + Cd^{2+}$	$<2.5 \times 10^5$	nat	p.r.	No reaction.	75A153
5.105	$-O\dot{C}HCH_2(OCH_2CH_2O)_n- + Cd^{2+}$	$<2.5 \times 10^5$	nat	p.r.	No reaction obs. in polyethylene glycol soln.	75A153
5.106	$\cdot CHOHCHOHCH_2OH + Cd^{2+}$	$<2.5 \times 10^5$	nat	p.r.	No reaction.	75A153
5.147	$\cdot CO_2{}^- + Cd^{2+} \rightarrow Cd^+ + CO_2$	$\sim 10^5$		p.r.	Est. from increase in Cd^+ in 0.1 mol L^{-1} Cd^{2+} soln. contg. 0.1 mol L^{-1} $HCO_2{}^-$, CO_2-satd.	75A027
		$(5.1 \pm 0.3) \times 10^6$	nat	p.r.	No details given.	75A153
	Co					
6.	**Cobalt(II) ions**					
6.016	$\cdot CH_2C(CH_3)_2OH + Co^{2+} \rightarrow Co^+$	$<10^6$	nat	p.r.	Est. from lack of increase in Co^+ in 0.1 mol L^{-1} Co^{2+} soln. upon addn. of 0.1 mol L^{-1} *tert*-BuOH.	75A027
6.075	$\cdot CH_2OH + Co^{2+} \rightarrow Co^+$	$<10^2$	nat	p.r.	Est. from lack of increase in Co^+ in 0.1 mol L^{-1} Co^{2+} soln. upon addn. of 0.1 mol L^{-1} MeOH.	75A027
6.078	$(CH_3)_2\dot{C}OH + Co^{2+} \rightarrow Co^+$	$<10^6$	nat	p.r.	Est. from lack of increase in Co^+ in 0.1 mol L^{-1} Co^{2+} soln. upon addn. of 0.1 mol L^{-1} 2-PrOH.	75A027
6.147	$\cdot CO_2{}^- + Co^{2+} \rightarrow CO_2 + Co^+$	$10^2 < k < 10^5$	nat	p.r.	Est. from lack of increase in Co^+ in 0.1 mol L^{-1} Co^{2+} soln. upon addn. of 0.1 mol L^{-1} formate, as well as γ-r. expts. (73G039).	75A027
7.	**Diaqua(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(II) ion**					
7.078	$(CH_3)_2\dot{C}OH + CoL(H_2O)_2{}^{2+} \rightarrow Co(I)$	5.5×10^9	1.25, 6.5	p.r.	P.b.k. in 2 mol L^{-1} 2-PrOH.	76A001
7.147	$\cdot CO_2{}^- + CoL(H_2O)_2{}^{2+} \rightarrow Co(I)$	4.7×10^9	6.5	p.r.	P.b.k. in 0.1 mol L^{-1} formate.	76A001

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

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

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

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

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

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

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

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

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

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

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

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

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

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
49.	**Dichloro(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(III) ion**					
49.078	$(CH_3)_2\dot{C}OH + Co^{III} \rightarrow Co^{II}$	7.0×10^8	1.0	p.r.	P.b.k.	76A203
49.147	$\cdot CO_2^- + Co^{III} \rightarrow Co^{II}$	1.1×10^9	2.5	p.r.	P.b.k.	76A203
50.	**Diaqua(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion**					
50.078	$(CH_3)_2\dot{C}OH + Co^{III} \rightarrow Co^{II}$	1.9×10^9	1.0	p.r.	P.b.k.	76A203
50.147	$\cdot CO_2^- + Co^{III} \rightarrow Co^{II}$	6.4×10^9	2.5	p.r.	P.b.k.	76A203
51.	**Aquahydroxy(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion**					
51.078	$(CH_3)_2\dot{C}OH + Co^{III} \rightarrow Co^{II}$	5.5×10^8	5.0	p.r.	P.b.k.	76A203
52.	**Dihydroxy(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion**					
52.078	$(CH_3)_2\dot{C}OH + Co^{III} \rightarrow Co^{II}$	3.3×10^6	9.0	p.r.	P.b.k.	76A203
53.	**Cyanocob(III)alamin(Vitamin B12)**					
53.147	$\cdot CO_2^- + B12 \rightarrow B12r$ (B12r *See* 10.)	1.2×10^9	6.0	p.r.	P.b.k. at 530 nm as well as d.k. at 390 nm in soln. contg. 0.1 mol L^{-1} *tert*-BuOH, satd. with CO_2.	73G116
		no reaction		p.r.	No change in o.d. in N_2O or CO_2-satd. soln. contg. 0.1 mol L^{-1} formate, or CO_2-satd. soln. contg. 0.1 mol L^{-1} *tert*-BuOH.	74A105
54.	**Hydroxocob(III)alamin(Vitamin B12a)**					
54.147	$\cdot CO_2^- + B12a \rightarrow B12r$ (B12r *See* 10.)	1.45×10^9	9.2	p.r.	D.k. at 350 nm as well as p.b.k. at 310 nm in CO_2-satd. soln. contg. *tert*-BuOH.	74A105
	Cr					
55.	**Chromium(II) ion**					
55.006	$\cdot CH_2C(CH_3)_2CO_2H + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH_2C(CH_3)_2CO_2H$	1.1×10^8	~1	p.r.	P.b.k. in Ar-satd. soln. contg. pivalic acid-$HClO_4$.	74A146
55.016	$\cdot CH_2C(CH_3)_2OH + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH_2C(CH_3)_2OH$	1.0×10^8	~1	p.r.	P.b.k. in Ar-satd. soln. contg. *tert*-BuOH-$HClO_4$.	74A146
55.020	$\cdot CH_2CHO + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH_2CH(OH)_2$	$(3.5 \pm 0.5) \times 10^8$	~1	p.r.	P.b.k. in Ar-satd. soln. contg. ethylene glycol-$HClO_4$; $\cdot CHOHCH_2OH$ loses water in acid soln.	74A146
55.035	$\cdot CH_2CO_2H + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH_2CO_2H$	2.5×10^8	~1	p.r.	P.b.k. in Ar-satd. soln. contg. acetic acid-$HClO_4$.	74A146
55.037	$CH_3\dot{C}HCO_2H + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH(CH_3)CO_2H$	1.1×10^8	~1	p.r.	P.b.k. in Ar-satd. soln. contg. propionic acid-$HClO_4$.	74A146
55.042	$\cdot CH(CO_2H)_2 + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH(CO_2H)_2$	6.0×10^7	~1	p.r.	P.b.k. in Ar-satd. soln. contg. malonic acid-$HClO_4$.	74A146
55.054	$HCON(CH_3)\dot{C}H_2 + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH_2N(CH_3)CHO$	$(1.1 \pm 0.1) \times 10^8$	~5	p.r.	P.b.k. in Ar or N_2O-satd. soln. contg. dimethylformamide.	74A146
55.075	$\cdot CH_2OH + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH_2OH$	1.6×10^8	~1	p.r.	P.b.k. in Ar-satd. soln. contg. MeOH-$HClO_4$.	74A146
55.076	$CH_3\dot{C}HOH + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CHOHCH_3$	7.9×10^7	~1	p.r.	P.b.k. in Ar-satd. soln. contg. EtOH-$HClO_4$.	74A146
55.078	$(CH_3)_2\dot{C}OH + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}C(CH_3)_2OH$	5.1×10^7	~1	p.r.	P.b.k. in Ar-satd. soln. contg. 2-PrOH-$HClO_4$.	74A146
55.093	$CH_3\dot{C}HOC_2H_5 + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH(CH_3)OC_2H_5$	3.4×10^7	~1	p.r.	P.b.k. in Ar-satd. soln. contg. Et_2O-$HClO_4$.	74A146
55.101	$\cdot CHOHCH_2OH + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CH_2CH(OH)_2$	$(1.5 \pm 0.2) \times 10^8$	3.0-4.5	p.r.	P.b.k. in Ar-satd. soln. contg. ethylene glycol-$HClO_4$; product same as in 55.020.	74A146
55.104	$-O\dot{C}HCH_2O(CH_2)_2- + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}R$	1.0×10^8	~1	p.r.	P.b.k. in Ar-satd. soln. contg. dioxane-$HClO_4$.	74A146
55.115	$\cdot CHOHCO_2H + Cr(H_2O)_6^{2+} \rightarrow (H_2O)_5Cr^{III}CHOHCO_2H$	1.4×10^8	~1	p.r.	P.b.k. in Ar-satd. soln. contg. glycolic acid-$HClO_4$.	74A146

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

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

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

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
59.035	$\cdot CH_2CO_2^- + Cu^{2+} \rightarrow Cu^{III}CH_2CO_2^{+} \rightarrow Cu^+ +$ prod.	$(6.4 \pm 1.5) \times 10^6$	6.0	p.r.	D.k. in N_2O–satd. 10^{-2} mol L^{-1} acetate soln.	77A025
59.037	$CH_3\dot{C}HCO_2^- + Cu_{aq}^{2+} \rightarrow Cu^{III}$–R $\rightarrow Cu^+ +$ prod.	$(5 \pm 0.5) \times 10^8$	6	p.r.	P.b.k. in N_2O–satd. soln. contg. (2–10) x 10^{-5} mol L^{-1} $CuSO_4$ and 10^{-2} mol L^{-1} propionate.	80A277
59.041	$^-O_2CCHOH\dot{C}HCO_2^- + Cu_{aq}^{2+} \rightarrow Cu^{III}$–R $\rightarrow Cu^+ +$ prod.	$(8 \pm 0.3) \times 10^8$	6	p.r.	P.b.k. in N_2O–satd. soln. contg. (5–10) x 10^{-5} mol L^{-1} $CuSO_4$ and (2.5–10) x 10^{-4} mol L^{-1} fumarate; pH dependent, $k = 8.0 \times 10^8$, 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	$\cdot CCl_3$ (+ $\cdot CHCl_2$) + $Cu_{aq}^{2+} \rightarrow Cu^{III}$–$CCl_3 \rightarrow Cu^+ +$ prod.	$(3 \pm 1.5) \times 10^7$	6	p.r.	P.b.k. in Ar–satd. soln. contg. (2–10) x 10^{-5} mol L^{-1} $CuSO_4$ and (1–10) x 10^{-2} mol L^{-1} $CHCl_3$; $G(\cdot CHCl_2) = G(e_{aq}^-)$ and $G(\cdot CCl_3) = G(OH)$.	80A277
59.075	$\cdot CH_2OH + Cu_{aq}^{2+} \rightarrow Cu^+ + CH_2O + H^+$	$(1.1 \pm 0.2) \times 10^8$	5–6	p.r.	D.k. in N_2O–satd. 10^{-2} mol L^{-1} MeOH soln.	72A018
		$(1.6 \pm 0.3) \times 10^8$	2–5	p.r.	P.b.k. at 320 nm ($Cu^ICH_2CHCONH_2$) in soln. contg. MeOH and acrylamide (10^{-2} mol L^{-1}).	78A322
		$(1.9 \pm 0.4) \times 10^8$	$\leqslant 3$	p.r.	D.k.	78A322
		$(1.6 \pm 0.2) \times 10^8$	6	p.r.	D.k. at ~300 nm (radical) in N_2O–satd. soln. contg. 0.1 mol L^{-1} MeOH.	80A277
59.076	$CH_3\dot{C}HOH + Cu_{aq}^{2+} \rightarrow Cu^+ + CH_3CHO + H^+$	$(7.4 \pm 1.1) \times 10^7$	5–6	p.r.	D.k. in N_2O–satd. 10^{-2} mol L^{-1} EtOH soln.	72A018
		$(9.4 \pm 1.9) \times 10^7$	2–5	p.r.	P.b.k. at 320 nm ($Cu^ICH_2CHCONH_2$) in soln. contg. EtOH and acrylamide (10^{-2} mol L^{-1}).	78A322
		$(9 \pm 2) \times 10^7$	6	p.r.	D.k. at ~300 nm (radical) in N_2O–satd. soln. contg. 0.1 mol L^{-1} EtOH.	80A277
59.078	$(CH_3)_2\dot{C}OH + Cu_{aq}^{2+} \rightarrow Cu^+ +$	$(4.5 \pm 0.7) \times 10^7$	5–6	p.r.	D.k. in N_2O–satd. 10^{-2} mol L^{-1} 2–PrOH soln.	72A018
		$(5.2 \pm 1.0) \times 10^7$	2–5	p.r.	P.b.k. at 320 nm ($Cu^ICH_2CHCONH_2$) in soln. contg. 2–PrOH and acrylamide (10^{-2} mol L^{-1}).	78A322
		$(5.0 \pm 1.0) \times 10^7$	$\leqslant 3$	p.r.	D.k.	78A322
		$(5.0 \pm 1.5) \times 10^7$	6	p.r.	D.k. at ~300 nm (radical) in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH.	80A277
59.113	$\cdot A^- + Cu_{aq}^{2+}$ ($A\cdot^-$ = Radical from ascorbate)	$\leqslant 10^6$		phot.	Est.	78A394
59.147	$\cdot CO_2^- + Cu_{aq}^{2+} \rightarrow CO_2 + Cu^+$	$(1.5 \pm 0.3) \times 10^8$	6.8	p.r.	D.k. at 260 nm in N_2O–satd. formate (0.1 mol L^{-1}) soln.	78A176
60.	**(5,7,7,12,14,14–Hexamethyl–1,4,8,11–tetraazacyclotetradeca–4,11–diene)copper(II) ion**					
60.075	$\cdot CH_2OH + Cu^{II}L \rightarrow Cu^IL$	$\leqslant 2 \times 10^6$	3.5–10	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} MeOH; product ident. with that from e_{aq}^-.	80A189
	$\cdot CH_2O^- + Cu^{II}L \rightarrow Cu^IL$	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	$CH_3\dot{C}HOH + Cu^{II}L \rightarrow Cu^IL$	$\leqslant 2 \times 10^6$	3.5–10	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} EtOH; product ident. with that from e_{aq}^-.	80A189
60.078	$(CH_3)_2\dot{C}OH + Cu^{II}L \rightarrow Cu^IL$	$\leqslant 2 \times 10^6$	3.5–10	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH; product ident. with that from e_{aq}^-.	80A189
	$(CH_3)_2\dot{C}O^- + Cu^{II}L \rightarrow Cu^IL$	9.0×10^8	12.5	p.r.	P.b.k. at 410 nm; no redn. obs. in neutral soln.	76A039

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Zinc hematoporphyrin See 221.

Zinc(II)-Insulin See 233a.

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

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
115.	**Acetic acid**					
115.001	$\cdot CH_3 + CH_3CO_2H \rightarrow CH_4 + \cdot CH_2CO_2H$	2×10^2	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}–H$_2$O$_2$ soln.; est. from esr meas. and values for competing reactions.	75D188
116.	**Acetone**					
116.001	$\cdot CH_3 + CH_3COCH_3 \rightarrow CH_4 + \cdot CH_2COCH_3$	$0.99[k(R + R]^{0.5}$	nat	phot.	Est. from quantum yields of CH$_4$, CO, and C$_2$H$_6$.	60F004
		$1.00[k(R + R)]^{0.5}$	nat	phot.	Obs. yields of CH$_4$ and C$_2$H$_6$; log k (in cm^3 mol^{-1}s^{-1}) = [(4.47 ± 0.05)–(1335 ± 18)/T] – 0.5 log k(R + R).	69F176
117.	**Acetonitrile**					
117.001	$\cdot CH_3 + CH_3CN \rightarrow CH_4 + \cdot CH_2CN$	$<3 \times 10^2$	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}–H$_2$O$_2$ soln.; est. from esr.	75D188
118.	**Acetophenone**					
118.076	$CH_3\dot{C}HO^- + C_6H_5COCH_3 \rightarrow CH_3CHO + (C_6H_5COCH_3)\cdot^-$	1.1×10^9	13	p.r.	P.b.k. at 440 nm in N$_2$O–satd. soln. contg. 1 mol L^{-1} EtOH; pH dependent, k extrapolated to pH 14.	73G122
118.078	$(CH_3)_2\dot{C}O^- + C_6H_5COCH_3 \rightarrow CH_3COCH_3 + (C_6H_5COCH_3)\cdot^-$	7.8×10^8	13	p.r.	P.b.k. at 440 nm in acetone soln.	67G729
		9×10^8	13	p.r.	P.b.k. at 440 nm in N$_2$O–satd. soln. contg. 1 mol L^{-1} 2–PrOH; pH dependent, k extrapolated to pH 14.	73G122
118.142	$R + C_6H_5COCH_3 \rightarrow (C_6H_5COCH_3)\cdot^-$ (R = Electron adduct of glycine anhydride)	$(2.3 \pm 0.3) \times 10^9$	5.2	p.r.	P.b.k. at 280 nm (320 at pH 12.3) in soln. contg. 1 mol L^{-1} *tert*–BuOH.	71G554
		$(2.0 \pm 0.3) \times 10^9$	12.3			
118.143	$R + C_6H_5COCH_3 \rightarrow (C_6H_5COCH_3)\cdot^-$ (R = Electron adduct of alanine anhydride)	$(2.0 \pm 0.3) \times 10^9$	5.2	p.r.	P.b.k. at 280 nm (320 at pH 12.2) in soln. contg. 1 mol L^{-1} *tert*–BuOH.	71G554
		$(1.5 \pm 0.4) \times 10^9$	12.2			
118.144	$R + C_6H_5COCH_3 \rightarrow (C_6H_5COCH_3)\cdot^-$ (R = Electron adduct of sarcosine anhydride)	$(2.0 \pm 0.2) \times 10^9$	5.2	p.r.	P.b.k. at 280 nm (320 at pH 12.4) in soln. contg. 1 mol L^{-1} *tert*–BuOH.	71G554
		$(2.1 \pm 0.2) \times 10^9$	12.4			
118.147	$\cdot CO_2^- + C_6H_5COCH_3 \rightarrow CO_2 + (C_6H_5COCH_3)\cdot^-$	1×10^7	12	p.r.	P.b.k. at 440 nm.	68G308
119.	**Acetylene**					
119.022	$\cdot CH{=}CHOH + CH{=}CH$	$(8.8 \pm 0.9) \times 10^6$	4.0, 6.0	p.r.	Radical from OH + C$_2$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	$(CH_3)_2\dot{C}OH + CH_3COC_5H_4NH^+ \rightarrow$ *e*–transfer	$(8.6 \pm 1.7) \times 10^9$	0.6	p.r.	P.b.k.; no *e*–transfer in neutral soln.; pK_a = 4.9.	74A089
121.	**Acridine**					
121.075	$\cdot CH_2OH + C_{13}H_9NH^+$	5.0×10^8	2.0	p.r.	P.b.k. in N$_2$O–satd. soln. contg. MeOH; ~30% *e*–transfer; no reaction at pH 7.6; pK_a = 5.6.	74A127
121.078	$(CH_3)_2\dot{C}O^- + C_{13}H_9N \rightarrow (CH_3)_2CO + \cdot A^-$	3×10^9	13	p.r.	P.b.k. in N$_2$O–satd. soln. contg. 2–PrOH.	79A305
	$(CH_3)_2\dot{C}OH + C_{13}H_9N \rightarrow \cdot AR + \cdot A$ (50% redn., 50% addn.)	3.0×10^8	7.6	p.r.	P.b.k. in N$_2$O–satd. soln. contg. 2–PrOH; ~40% *e*–transfer.	74A127
		$\sim 3 \times 10^8$	7–9	p.r.	P.b.k.	79A305
	$(CH_3)_2\dot{C}OH + C_{13}H_9NH^+ \rightarrow (CH_3)_2CO + H^+ + \cdot AH$	3.7×10^9	2.0	p.r.	P.b.k. in N$_2$O–satd. soln. contg. 2–PrOH; ~90% *e*–transfer.	74A127
		3.3×10^9	4	p.r.	P.b.k.	79A305

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

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

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

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

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

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

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

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
140.	**2-Benzoylpyridine**					
140.078	$(CH_3)_2\dot{C}OH + C_6H_5COC_5H_4NH^+ \rightarrow (CH_3)_2CO + (C_6H_5COHC_5H_4NH)\cdot^+$	$(3.0 \pm 0.3) \times 10^9$	1.0	p.r.	P.b.k. at 500 nm, as well as at 330 nm, in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
	$(CH_3)_2\dot{C}OH + C_6H_5COC_5H_4N \rightarrow (CH_3)_2CO + (C_6H_5COC_5H_4NH)\cdot$	$(1.5 \pm 0.2) \times 10^8$	5.9	p.r.	P.b.k. at 500 nm, as well as at 330 nm, in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
	$(CH_3)_2\dot{C}O^- + C_6H_5COC_5H_4N \rightarrow (CH_3)_2CO + (C_6H_5COC_5H_4N)\cdot^-$	$(2.3 \pm 0.2) \times 10^9$	13.2	p.r.	P.b.k. at 550 nm, as well as at 330 nm, in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
141.	**3-Benzoylpyridine**					
141.078	$(CII_3)_2\dot{C}OH + C_6H_5COC_5H_4NH^+ \rightarrow (CH_3)_2CO + (C_6H_5COHC_5H_4NH)\cdot^+$	$(1.7 \pm 0.2) \times 10^9$	0.9	p.r.	P.b.k. at 500 nm, as well as at 330 nm (at pH 0.5 giving $k = 2.3 \times 10^9$) in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
	$(CH_3)_2\dot{C}OH + C_6H_5COC_5II_4N \rightarrow (CH_3)_2CO + (C_6H_5COC_5H_4NH)\cdot$	$(1.0 \pm 0.2) \times 10^8$	5.1	p.r.	P.b.k. at 530 nm, as well as at 330 nm in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
	$(CH_3)_2\dot{C}O^- + C_6H_5COC_5H_4N \rightarrow (CH_3)_2CO + (C_6H_5COC_5H_4N)\cdot^-$	$(2.0 \pm 0.2) \times 10^9$	13.0	p.r.	P.b.k. at 605 nm, as well as at 341 nm, in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
142.	**4-Benzoylpyridine**					
142.078	$(CH_3)_2\dot{C}OH + C_6H_5COC_5H_4NH^+ \rightarrow (CH_3)_2CO + (C_6H_5COHC_5H_4NH)\cdot^+$	$(2.5 \pm 0.2) \times 10^9$	0.7	p.r.	P.b.k. at 510 nm in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
	$(CH_3)_2\dot{C}OH + C_6H_5COC_5H_4N \rightarrow (CH_3)_2CO + (C_6H_5COC_5H_4NH)\cdot$	$(2.4 \pm 0.4) \times 10^8$	7.7	p.r.	P.b.k. at 500 nm in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
	$(CH_2)_2\dot{C}O^- + C_6H_5COC_5H_4N \rightarrow (CH_3)_2CO + (C_6H_5COC_5H_4N)\cdot^-$	$(2.5 \pm 0.2) \times 10^9$	13.2	p.r.	P.b.k. at 575 nm in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	72G359
	Benzyl viologen See 1,1′-Dibenzyl-4,4′-bipyridinium ion 171.					
	Biacetyl See 2,3-Butanedione 148.					
143.	**2,2′-Bipyridine**					
143.075	$\cdot CH_2OH + bpy$	$<10^6$	7	p.r.	P.b.k.	79A148
	$\cdot CH_2O^- + bpy$	$<10^6$	alk.	p.r.	P.b.k.	79A148
143.078	$(CH_3)_2\dot{C}OH + bpy$	$<10^6$	7	p.r.	P.b.k.	79A148
	$(CH_3)_2\dot{C}OH + bpyH^+ \rightarrow (CH_3)_2CO + bpyH_2\cdot^+$	3.5×10^8	1.4, 3.7	p.r.	P.b.k. at 375 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH.	79A148
	$(CH_3)_2\dot{C}O^- + bpy \rightarrow (CH_3)_2CO + bpy\cdot^-$	1.3×10^8	13.0	p.r.	P.b.k. at 365 nm in soln. contg. 0.1 mol L^{-1} 2-PrOH and 0.1 mol L^{-1} acetone.	79A148
143.147	$\cdot CO_2^- + bpy$	$<10^6$	7	p.r.	P.b.k.	79A148
	$\cdot CO_2^- + bpyH^+$	5.0×10^8	4.4	p.r.	P.b.k. at 375 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} formate.	79A148
144.	**1,1′-Bis(2-hydroxyethyl)-4,4′-bipyridinium ion**					
144.147	$\cdot CO_2^- + BP^{2+} \rightarrow CO_2 + \cdot BP^+$	1.9×10^{10}	6.8	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	78A321
145.	**2-Bromo-5-nitrothiazole**					
145.078	$(CH_3)_2\dot{C}OH + NX \rightarrow (CH_3)_2CO + H^+ + \cdot NX^-$	3.0×10^9		p.r.	P.b.k.	76A075
146.	**5-Bromouracil**					
146.078	$(CH_3)_2\dot{C}OH + BrU$	2×10^7 (rel.)		p.r.	C.k. rel. to k(R + PNAP) = 3.8×10^9.	73A140
146.147	$\cdot CO_2^- + BrU \rightarrow CO_2 + Br^- + U\cdot$	$>1.0 \times 10^8$		p.r.	P.b.k. at 440 nm ($BrUCO_2^-$) in N_2O-satd. soln. contg. formate.	69G826

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

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

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

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

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

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

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

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

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

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

No.	Reaction	*k* (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
188.	**1,3-Dinitrobenzene**					
188.078	$(CH_3)_2\dot{C}OH + C_6H_4(NO_2)_2 \rightarrow (CH_3)_2CO + H^+ + [C_6H_4(NO_2)_2]^{\cdot -}$	3.6×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; *k* at pH 0.8 within 20–30%.	76A111
189.	**1,4-Dinitrobenzene**					
189.078	$(CH_3)_2\dot{C}OH + C_6H_4(NO_2)_2 \rightarrow (CH_3)_2CO + H^+ + [C_6H_4(NO_2)_2]^{\cdot -}$	3.2×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; *k* at pH 0.8 within 20–30%.	76A111
190.	**2,4-Dinitrobenzoate ion**					
190.078	$(CH_3)_2\dot{C}OH + {}^-O_2CC_6H_3(NO_2)_2 \rightarrow (CH_3)_2CO + H^+ + [{}^-O_2CC_6H_3(NO_2)_2]^{\cdot -}$	2.9×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; *k* at pH 0.8 within 20–30%.	76A111
190.147	$\cdot CO_2^- + {}^-O_2CC_6H_3(NO_2)_2 \rightarrow CO_2 + [{}^-O_2CC_6H_3(NO_2)_2]^{\cdot -}$	1.8×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	76A111
191.	**2,5-Dinitrobenzoate ion**					
191.078	$(CH_3)_2\dot{C}OH + {}^-O_2CC_6H_3(NO_2)_2 \rightarrow (CH_3)_2CO + H^+ + [{}^-O_2CC_6H_3(NO_2)_2]^{\cdot -}$	3.3×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; *k* at pH 0.8 within 20–30%.	76A111
191.147	$\cdot CO_2^- + {}^-O_2CC_6H_3(NO_2)_2 \rightarrow CO_2 + [{}^-O_2CC_6H_3(NO_2)_2]^{\cdot -}$	1.9×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	76A111
192.	**3,4-Dinitrobenzoate ion**					
192.078	$(CH_3)_2\dot{C}OH + {}^-O_2CC_6H_3(NO_2)_2 \rightarrow (CH_3)_2CO + H^+ + [{}^-O_2CC_6H_3(NO_2)_2]^{\cdot -}$	3.2×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; *k* at pH 0.8 within 20–30%.	76A111
192.147	$\cdot CO_2^- + {}^-O_2CC_6H_3(NO_2)_2 \rightarrow CO_2 + [{}^-O_2CC_6H_3(NO_2)_2]^{\cdot -}$	1.8×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	76A111
193.	**3,5-Dinitrobenzoate ion**					
193.078	$(CH_3)_2\dot{C}OH + {}^-O_2CC_6H_3(NO_2)_2 \rightarrow (CH_3)_2CO + H^+ + [{}^-O_2CC_6H_3(NO_2)_2]^{\cdot -}$	3.1×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; *k* at pH 0.8 within 20–30%.	76A111
193.147	$\cdot CO_2^- + {}^-O_2CC_6H_3(NO_2)_2 \rightarrow CO_2 + [{}^-O_2CC_6H_3(NO_2)_2]^{\cdot -}$	2.5×10^9	7	p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	76A111
194.	**3,5-Dinitrobenzonitrile**					
194.111	$R + (NO_2)_2C_6H_3CN \rightarrow [(NO_2)_2C_6H_3CN]^{\cdot -}$ (R = Radicals from glucose)	1.0×10^9		p.r.		77R167
195.	**1-(2,4-Dinitrophenyl)pyridinium ion**					
195.100	$R + (NO_2)_2C_6H_4N^+C_5H_5 \rightarrow [(NO_2)_2C_6II_4N^+C_5II_5]^{\cdot -}$ (R = Radicals from glucose)	1.0×10^9		p.r.		77R167
195.147	$\cdot CO_2^- + (NO_2)_2C_6H_4N^+C_5H_5 \rightarrow [(NO_2)_2C_6H_4N^+C_5H_5]^{\cdot -}$	4×10^8		p.r.		77R167
196.	**1,1′-Diphenyl-4,4′-bipyridinium ion**					
196.147	$\cdot CO_2^- + BP^{2+} \rightarrow CO_2 + BP\cdot^+$	1.3×10^{10}	6.8	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	78A321
197.	**Dithiothreitol**					
197.016	$\cdot CH_2C(CH_3)_2OH + HSCH_2CHOHCHOHCH_2SH \rightarrow (CH_3)_3COH + RS\cdot (\rightarrow RSSR^-)$	$(6.8 \pm 0.6) \times 10^7$	7	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH.	73A020
197.075	$\cdot CH_2OH + RSH \rightarrow CH_3OH + RS\cdot$	$(6.8 \pm 0.6) \times 10^7$	7	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	73A020
197.078	$(CH_3)_2\dot{C}OH + RSH \rightarrow (CH_3)_2CHOH + RS\cdot$	$(2.1 \pm 0.2) \times 10^8$	7	p.r.	P.b.k. at 390 nm in soln. of 2 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	73A020

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

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

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

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

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

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

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

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

No.	Reaction	k (L $mol^{-1}s^{-1}$)	pH	Method	Comment	Ref.
221.	**Zinc hematoporphyrin**					
221.078	$(CH_3)_2\dot{C}O^- + ZnP \rightarrow (CH_3)_2CO + ZnP\cdot^-$	$(1.0 \pm 0.1) \times 10^9$	13.0	p.r.	P.b.k. at 600–650 nm in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	74A040
221a.	**Deuteroporphyrin dimethyl ester**					
221a.001	$\cdot CH_3 + DP$	$(1 \text{ to } 2) \times 10^7$	~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_3I; cor. for $\cdot CH_3 + \cdot CH_3$.	81A002
221a.078	$(CH_3)_2\dot{C}O^- + DP \rightarrow DP^-$	$(6 \pm 1) \times 10^8$	~13	p.r.	Abs. change in soln. contg. 6.5 mol L^{-1} 2-PrOH and 0.7 mol L^{-1} acetone.	81A002
	Deuteroporphyrin (ferri) See Deuterohemin 222.					
	Deuteroporphyrin (ferro) See Deuteroheme 223.					
222.	**Deuterohemin**					
222.001	$\cdot CH_3 + DH(Fe^{III}) \rightarrow$ addn.	$(2.3 \pm 0.5) \times 10^9$ $\sim 1.3 \times 10^9$	~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	$\cdot CCl_3 + DH(Fe^{III})$	$\leqslant 10^6$	7.2	p.r.	No spectral change in soln. contg. 6.5 mol L^{-1} 2-PrOH, 5×10^{-3} mol L^{-1} CCl_4 and 10^{-4} mol L^{-1} deuterohemin.	80A011
222.078	$(CH_3)_2\dot{C}OH + DH(Fe^{III}) \rightarrow DH(Fe^{II})$	3.7×10^8	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
	$(CH_3)_2\dot{C}O^- + DH(Fe^{III}) \rightarrow DH(Fe^{II})$	$(9 \pm 1) \times 10^8$	~13	p.r.	D.k. in soln. contg. 6.5 mol L^{-1} 2-PrOH.	81A002
223.	**Deuteroheme**					
223.001	$\cdot CH_3 + DH(Fe^{II}) \rightarrow$ addn.	$(3.9 \pm 0.5) \times 10^9$	7	p.r.	Abs. change in 6.5 mol L^{-1} 2-PrOH soln. of deuterohemin chemically reduced by dithionite to which methyl chloride was added.	81A002
223.043	$\cdot CH_2Cl + DH(Fe^{II})$	2×10^9	7.2	p.r.	Abs. change in soln. of deuterohemin chemically reduced by dithionite to which 4×10^{-2} mol L^{-1} CH_2Cl_2 was added.	80A011
223.048	$\cdot CCl_3 + DH(Fe^{II})$	$(2 \pm 1) \times 10^9$	7.2	p.r.	Abs. change in soln. contg. 6.5 mol L^{-1} 2-PrOH, 3.2×10^{-2} mol L^{-1} acetone, CCl_4, and deuterohemin, the latter reduced by $(CH_3)_2\dot{C}OH$.	80A011
223.078	$(CH_3)_2\dot{C}OH + DH(Fe^{II})$	$(6.3 \pm 0.5) \times 10^8$	7	p.r.	Abs. change in 6.5 mol L^{-1} 2-PrOH soln. of deuterohemin chemically reduced by dithionite to which 0.7 mol L^{-1} acetone was added.	81A002
224.	**Hemin *(Protoferriheme IX)***					
224.076	$CH_3\dot{C}HO^- + H(Fe^{III}) \rightarrow H(Fe^{II})$	$(9.0 \pm 1.0) \times 10^8$	13	p.r.	Soln. 30% EtOH, N_2O-satd.	74A040
	$CH_3\dot{C}HOH + H(Fe^{III}) \rightarrow H(Fe^{II})$	7.7×10^8	7	p.r.	Redn. obs. at 560 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	77A128
		$(5.6 \pm 0.6) \times 10^8$ $(1.6 \pm 0.6) \times 10^9$	9.2 4.0	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH and 0.2 mol L^{-1} Na dodecylsulfate (micelles).	78A033
225.	**Hemin c**					
225.078	$(CH_3)_2\dot{C}OH + H(Fe^{III}) \rightarrow H(Fe^{II})$	$(2.8 \pm 0.6) \times 10^9$	7.0	p.r.	P.b.k. at 413 nm in N_2O-satd. soln. contg. 0.04 mol L^{-1} 2-PrOH.	75A241
225.096	$\cdot CHOHC(CH_2OH)_3 + H(Fe^{III}) \rightarrow H(Fe^{II})$	$(3.0 \pm 0.6) \times 10^8$ $(2.8 \pm 0.6) \times 10^8$	7.0 11.8	p.r.	P.b.k. at 413 nm in N_2O-satd. soln. contg. 0.25 mol L^{-1} pentaerythritol.	75A241

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

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
225.106	$CH_2OH\dot{C}OHCH_2OH + H(Fe^{III}) \rightarrow H(Fe^{II})$ $(+ CH_2OHCHOH\dot{C}HOH)$	$(1.3 \pm 0.3) \times 10^9$	7.0	p.r.	P.b.k. in N_2O–satd. soln. contg. 10^{-2} mol L^{-1} glycerol.	75A241
225.117	$CH_3\dot{C}OHCO_2^- + H(Fe^{III}) \rightarrow H(Fe^{II})$	$(5.6 \pm 1.1) \times 10^8$	7.0	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.025 mol L^{-1} lactate.	75A241
225.121	$O_2CCHOH\dot{C}OHCO_2^- + H(Fe^{III}) \rightarrow H(Fe^{II})$	$(8.1 \pm 1.6) \times 10^7$	7.0	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.02 mol L^{-1} tartrate.	75A241
225.147	$\cdot CO_2^- + H(Fe^{III}) \rightarrow H(Fe^{II})$	$(1.3 \pm 0.3) \times 10^9$	7.0	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.02 mol L^{-1} formate.	75A241
226.	**Hemoglobin**					
226.075	$\cdot CH_2OH + H(Fe^{III}) \rightarrow H(Fe^{II})$	$(9.5 \pm 1.5) \times 10^6$	7	p.r.	Abs. change at 550 and 435 nm in N_2O–satd. soln. contg. MeOH; 100% redn.	79A153
226.076	$CH_3\dot{C}HOH + H(Fe^{III}) \rightarrow H(Fe^{II})$	$(4.0 \pm 0.4) \times 10^7$	7	p.r.	Abs. change at 550 and 435 nm in N_2O–satd. soln. contg. EtOH; 100% redn.	79A153
227.	**Hydroquinone**					
227.016	$\cdot CH_2C(CH_3)_2OH + HOC_6H_4OH \rightarrow (CH_3)_3COH + OC_6H_4O\cdot$	$\leqslant 2 \times 10^6$	11.5	p.r.	Semiquinone not formed in *tert*–BuOH soln.	79A051
227.020	$\cdot CH_2CHO + HOC_6H_4O^- \rightarrow CH_3CHO + {}^-OC_6H_4O\cdot$	$(2.2 \pm 0.1) \times 10^9$	~11.5	p.r.	Soln. contg. N_2O and ethylene glycol or 2–methoxy– or 2–ethoxy–ethanol.	79A051
	$\cdot CH_2CHO + HOC_6H_4OH$	$\leqslant 2 \times 10^6$	7.2	p.r.	Radical from 2–chloroethanol.	79A051
227.021	$CH_3\dot{C}HCHO + HOC_6H_4O^-$	$(1.2 \pm 0.1) \times 10^9$	~11.5	p.r.	P.b.k. at 430 nm (semiquinone) in N_2O–satd. soln. contg. 1,2–propanediol; radical mixture.	79A051
227.023	$CH_3CO\dot{C}H_2 + HOC_6H_4O^-$					
227.024	$CH_3CO\dot{C}HCH_3 + HOC_6H_4O^-$	$(5.6 \pm 0.5) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 2,3–butanediol.	79A051
227.025	$-(CH_2)_4\dot{C}HCO- + HOC_6H_4O^-$	$(5.5 \pm 1.9) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 1,2–cyclohexanediol.	79A051
227.026	$HOCH_2\dot{C}HCHO + HOC_6H_4O^-$ (and $HOCH_2CO\dot{C}H_2$)	$(1.3 \pm 0.1) \times 10^9$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 2,3–epoxypropanol; radical also obtained from glycerol, $k = (1.5 \pm 0.1) \times 10^9$ and glycerol 2–phosphate, $k = (1.7 \pm 0.2) \times 10^9$.	79A051
227.027	$HOCH_2CH_2CO\dot{C}H_2 + HOC_6H_4O^-$	$(6.2 \pm 0.8) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 2–hydroxyfuran.	79A051
227.028	$HO(CH_2)_3\dot{C}HCHO + HOC_6H_4O^-$	$(8.6 \pm 1.2) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 2–(hydroxymethyl)furan.	79A051
227.029	$HO(CH_2)_4\dot{C}HCHO + HOC_6H_4O^-$	$(5.2 \pm 0.9) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. 2–(hydroxymethyl)pyran.	79A051
227.030	$R + HOC_6H_4O^-$ (R = Radicals from erythritol)	$(1.3 \pm 0.3) \times 10^9$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. *meso*–erythritol.	79A051
227.031	$R + HOC_6H_4O^-$ (R = Radicals from xylitol)	$(1.2 \pm 0.1) \times 10^9$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. xylitol.	79A051
227.032	$-(CHOH)_3CH_2\dot{C}HCO- + HOC_6H_4O^-$	$(6.4 \pm 1.1) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. *meso*–inositol.	79A051
227.033	$R + HOC_6H_4O^-$ (R = Radicals from sorbitol)	$(9.8 \pm 1.3) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. sorbitol.	79A051
227.109	$R + HOC_6H_4O^-$ (R = Radicals from ribose)	$(9.6 \pm 1) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. ribose.	79A051
227.111	$R + HOC_6H_4O^-$ (R = Radicals from glucose)	$(7.1 \pm 0.9) \times 10^8$	~11.5	p.r.	P.b.k. at 430 nm in N_2O–satd. soln. contg. glucose.	79A051

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

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

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_2O-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_2O-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_2O-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. acetoacetate ion and *tert*-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_2O-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_2O-satd. soln. contg. formate.	73A104
229.	**3-Hydroxy-2-nitrobenzoate ion**					
229.078	$(CH_3)_2\dot{C}OH + {}^-O_2CC_6H_3(OH)NO_2 \rightarrow$ $(CH_3)_2CO + H^+ + {}^-O_2CC_6H_3(OH)\dot{N}O_2^-$	3.3×10^8	7	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	76A020
230.	**3-Hydroxypropionitrile**					
230.001	$\cdot CH_3 + CNCH_2CH_2OH \rightarrow$ $CH_4 + CNCH_2\dot{C}HOH$	$<1.6 \times 10^3$	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}-H_2O_2 soln.; est from esr meas. and values for competing reactions.	75D188
	4-Hydroxy-2,2,6,6-tetramethyl-1-piperidinyloxy See Tetramethylhydroxypiperidinyloxy(TMPN) 343.					
231.	**Indigo disulfonate**					
231.056	$NH_2\dot{C}HCO_2^- +$ Dye	2.8×10^9	9	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. glycine; 71% *e*-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_2O-satd. soln. contg. MeOH; *e*-transfer 75% at pH 7 and 62% at pH 9.	73A078
231.078	$(CH_3)_2\dot{C}OH +$ Dye	4.0×10^9	7,9	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. 2-PrOH; 88% *e*-transfer.	73A078
231.147	$\cdot CO_2^- +$ Dye $\rightarrow$ $CO_2 +$ Dye$^-$	2.0×10^9	7.0	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. formate.	73A078
		2.1×10^9	7.0	p.r.	P.b.k. at 400 nm.	73A078
232.	**Indigo tetrasulfonate**					
232.056	$NH_2\dot{C}HCO_2^- +$ Dye	2.6×10^9	7.0	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. glycine; 78% *e*-transfer.	73A078
232.075	$\cdot CH_2OH +$ Dye	3.0×10^9	7	p.r.	D.k. at 610 nm in N_2O-satd. ssoln. contg. MeOH; 80% *e*-transfer.	73A078
232.078	$(CH_3)_2\dot{C}OH +$ Dye	4.2×10^9	7	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. 2-PrOH; 89% *e*-transfer.	73A078
233.	**Indophenol**					
233.075	$\cdot CH_2OH +$ Dye	3.1×10^9	9	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. MeOH; 92% *e*-transfer.	73A078
233.078	$(CH_3)_2\dot{C}OH +$ Dye	4.0×10^9	9	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. 2-PrOH; 86% *e*-transfer.	73A078
233.147	$\cdot CO_2^- +$ Dye $\rightarrow$ $CO_2 +$ Dye$^-$	2.8×10^9	9.0	p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. formate.	73A078
		2.7×10^9	9.0	p.r.	P.b.k. at ~400 nm.	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_2O-satd. soln. contg. 10^{-2} mol L^{-1} formate; based on monomer concn.	80A204

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

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

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

Menaquinone See 2-Methylnaphthoquinone 262.

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

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
253.	**2-Mercaptoethanol**					
253.014	$\cdot CH_2CH_2OH + HO(CH_2)_2SH \rightarrow CH_3CH_2OH + HO(CH_2)_2\cdot S$	$(4.7 \pm 0.7) \times 10^7$	10	p.r.	P.b.k. (RSSR$^-$) in Ar-satd. soln.; radical from e_{aq}^- + HO(CH$_2$)$_2$SH.	69G553
253.016	$\cdot CH_2C(CH_3)_2OH + HO(CH_2)_2SH \rightarrow (CH_3)_3COH + HO(CH_2)_2S\cdot$	$(8.2 \pm 1.2) \times 10^7$	10	p.r.	P.b.k. at 420 nm (RSSR$^-$) in N$_2$O-satd. soln. contg. 0.1 mol L^{-1} *tert*-BuOH.	69G553
253.075	$\cdot CH_2OH + HO(CH_2)_2SH \rightarrow CH_3OH + HO(CH_2)_2S\cdot$	$(1.3 \pm 0.2) \times 10^8$	10	p.r.	P.b.k. (RSSR$^-$) in N$_2$O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	69G553
253.076	$CH_3\dot{C}HOH + HO(CH_2)_2SH \rightarrow CH_3CH_2OH + HO(CH_2)_2S\cdot$	$(2.3 \pm 0.3) \times 10^8$	10	p.r.	P.b.k. (RSSR$^-$) in N$_2$O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	69G553
253.078	$(CH_3)_2\dot{C}OH + HO(CH_2)_2SH \rightarrow (CH_3)_2CHOH + HO(CH_2)_2S\cdot$	$(5.1 \pm 0.8) \times 10^8$	10	p.r.	P.b.k. (RSSR$^-$) in N$_2$O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	69G553
253a.	**3-Mercaptopropionate ion**					
253a.142	$R + HSCH_2CH_2CO_2^- \rightarrow$ *e*-transfer (R = Electron adduct of glycine anhydride)	$(3.0 \pm 0.3) \times 10^8$	5.3,	p.r.	D.k. at 265 nm in soln. contg. 1 mol L^{-1} *tert*-BuOH.	71G554
254.	**Methanethiol**					
254.001	$\cdot CH_3 + CH_3SH \rightarrow CH_4 + CH_3S\cdot$	$(7.4 \pm 1) \times 10^7$	11	p.r.	P.b.k. (RSSR$^-$) in Ar-satd. soln.; radical from e_{aq}^- reaction with CH$_3$SH.	69G553
255.	**Methanol**					
255.001	$\cdot CH_3 + CH_3OH \rightarrow CH_4 + \cdot CH_2OH$	2.2×10^2 (rel.)		γ-r.	C.k. with O$_2$; radical from MeI; rel. to k(CH$_3$ + O$_2$) = 4.7×10^9.	67G041
		$\geqslant 1 \times 10^2$	1	phot.	Radical from Co(NH$_3$)$_5$O$_2$CCH$_3$$^{2+}$; est. from effect of addn. of MeOH on CH$_4$ and C$_2$H$_6$ yields.	71F579
255.047	$\cdot CF_3 + CH_3OH \rightarrow CF_3H + \cdot CH_2OH$	$(8.1 \pm 1.2) \times 10^3$ (rel.)	9–10	γ-r.	C.k. with addn. of ·CF$_3$ to propylene; obs. G(CF$_3$H); rel. to k(CF$_3$ + HCO$_2^-$) = 3.4×10^5.	70G407
255.113	$\cdot A^- + CH_3OH$ (·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	$\cdot CO_2^- + MFe^{3+}$	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	$(CH_3)_2\dot{C}OH + ArNO_2 \rightarrow (CH_3)_2CO + Ar\dot{N}O_2^-$	2.3×10^8	7	p.r.	P.b.k. in N$_2$O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	76A020
258.	**4-Methoxyphenoxide ion**					
258.020	$\cdot CH_2CHO + CH_3OC_6H_4O^- (+ H_2O) \rightarrow CH_3CHO + CH_3C_6H_4O\cdot + OH^-$	9.8×10^8	~11.5	p.r.	Soln. contg. N$_2$O and ethylene glycol.	79A051
259.	**2-Methylbenzoquinone**					
259.078	$(CH_3)_2\dot{C}OH + Q \rightarrow (CH_3)_2CO + H^+ + \cdot Q^-$	3.5×10^9	7	p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	73G125
260.	**Methylene blue**					
260.056	$NH_2\dot{C}HCO_2^- + MB^+$	3.7×10^9	7	p.r.	D.k. at 580 nm in N$_2$O-satd. soln. contg. glycine; 86% *e*-transfer.	73A078
260.075	$\cdot CH_2OH + MB^+$	3.4×10^9	7	p.r.	D.k. at 580 nm in N$_2$O-satd. soln. contg. MeOH; 91% *e*-transfer.	73A078
260.078	$(CH_3)_2\dot{C}OH + MB^+$	$(4 \pm 2) \times 10^9$		p.r.		73A150
		4.4×10^9	7	p.r.	D.k. at 580 nm in N$_2$O-satd. soln. contg. 2-PrOH; 91% *e*-transfer.	73A078

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

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

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

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

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

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

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
262.147	$\cdot CO_2^- + Q \rightarrow \cdot Q^-$	5.4×10^9	6.9	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. formate; 100% *e*–transfer.	72R057
		$(4.8 \pm 0.5) \times 10^9$	7	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. formate.	73A047 73A104
	1–Methylnicotinamide See 3–Carbamoyl–1–methylpyridinium ion 151.					
	1–Methylnicotinate ion See 3–Carboxy–1–methylpyridinium ion 153.					
	3–Methyl–2–nitroanisole See 3–Methoxy–2–nitrotoluene 257.					
263.	**3–Methyl–2–nitrobenzoate ion**					
263.078	$(CH_3)_2\dot{C}OH + NO_2B \rightarrow (CH_3)_2CO + H^+ + \cdot NO_2B^{2-}$	1.9×10^8	7	p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH.	76A020
264.	**2–Methyl–5–nitroimidazole**					
264.078	$(CH_2)_2\dot{C}OH + NX \rightarrow (CH_3)_2CO + H^+ + NX^-$	2.5×10^9		p.r.	P.b.k.	76A075
265.	**3–Methyl–2–nitrophenol**					
265.078	$(CH_3)_2\dot{C}OH + CH_3(OH)C_6H_3NO_2 \rightarrow (CH_3)_2CO + H^+ + CH_3(OH)C_6H_3\dot{N}O_2^-$	2.9×10^8		p.r.	P.b.k. in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH.	76A020
266.	**4–Methylphenoxide ion**					
266.020	$\cdot CH_2CHO + CH_3C_6H_4O^- (+ H_2O) \rightarrow CH_3CHO + CH_3C_6H_4O\cdot + OH^-$	9.0×10^7	~11.5	p.r.	Soln. contg. N_2O and ethylene glycol.	79A051
267.	**Methyl propionate**					
267.001	$\cdot CH_3 + C_2H_5CO_2CH_3 \rightarrow CH_4 + CH_3\dot{C}HCO_2CH_3$	2.9×10^3 (rel.)	~1	chem.	Radical from dimethyl sulfoxide in Ti^{III}–H_2O_2–soln.; est. from esr meas. and values of competing reactions.	75D188
268.	**3–Methylpterin**					
268.075	$\cdot CH_2OH + PtH^+$	6×10^7 (uncor.)	0.8	p.r.	P.b.k. in N_2O–satd. soln. contg. MeOH; ~45% *e*–transfer.	76A060
268.076	$CH_3\dot{C}HOH + Pt$	3.2×10^7 (uncor.)	6.3	p.r.	P.b.k. in N_2O–satd. soln. contg. EtOH; 55% *e*–transfer.	76A060
268.078	$(CH_3)_2\dot{C}OH + PtH^+$	1.9×10^9	0.8	p.r.	P.b.k. in N_2O–satd. soln. contg. 2–PrOH; 100% *e*–transfer.	76A060
	$(CH_3)_2\dot{C}OH + Pt$	2.9×10^8	7.0			
269.	**9–Methylpurine**					
269.076	$CH_3\dot{C}HOH + MP \rightarrow MPH\cdot$	$<2 \times 10^7$	8.2	p.r.	P.b.k.; N_2O–satd. soln. contg. EtOH.	76A060
	$CH_3\dot{C}HO^- + MP \rightarrow MP^-$	5.1×10^8	13.6			
269.078	$(CH_3)_2\dot{C}OH + MPH^+ \rightarrow MPH_3\cdot^{2+}$	1.9×10^9	~0	p.r.	P.b.k. in N_2O–satd. soln. contg. 2–PrOH.	76A060
	$(CH_3)_2\dot{C}OH + MP \rightarrow MPH\cdot$	1.7×10^8	8.6			
	$(CH_3)_2\dot{C}O^- + MP \rightarrow MP^-$	8.7×10^8	13.6			
	1–Methyl–3–pyridinecarboxylate ion See 3–Carboxy–1–methylpyridinium ion 153.					
	1–Methyl–4–pyridinecarboxylate ion See 4–Carboxy–1–methylpyridinium ion 154.					
	Methylviologen See 1,1′–Dimethyl–4,4′–bipyridinium ion 183.					
270.	**Metmyoglobin**					
270.075	$\cdot CH_2OH + M(Fe^{III}) \rightarrow CH_2O + H^+ + M(Fe^{II})$	$(2.4 \pm 0.5) \times 10^7$	7	p.r.	95% redn. of hemoprotein in N_2O–satd. soln. contg. MeOH; obs. abs. change at 550 and 435 nm.	79A153
270.076	$CH_3\dot{C}HOH + M(Fe^{III})$	$(5.5 \pm 0.5) \times 10^7$	7	p.r.	95% redn. of hemoprotein in N_2O–satd. soln. contg. EtOH.	79A153
270.078	$(CH_3)_2\dot{C}OH + M(Fe^{III}) \rightarrow M(Fe^{II})$	$\sim 1 \times 10^8$	7.5	p.r.	$G = 2.2$.	79A371
270.121	$^-O_2CCHOH\dot{C}OHCO_2^- + M(Fe^{III})$	$(3.5 \pm 0.7) \times 10^7$	7	p.r.	Redn. in soln. contg. 10^{-2} mol L^{-1} tartrate.	78A288

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

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

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

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

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

No.	Reaction	k (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
283.019	R + $C_6H_5NO_2$ (R = Radicals from crotyl alcohol)	~1 x 10^0 (uncor.)	7	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. crotyl alcohol; 8% e–transfer.	73A062
283.075	$\cdot CH_2OH + C_6H_5NO_2 \rightarrow CH_2O + C_6H_5\dot{N}O_2^-$	$<10^7$	7	p.r.	P.b.k. at 285 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} MeOH.	66G432
		$(6.0 \pm 0.9) \times 10^7$	5–6	p.r.	N_2O–satd. soln. contg. 0.1 mol L^{-1} MeOH.	72A018
	$\cdot CH_2O^- + C_6H_5NO_2 \rightarrow CH_2O + C_6H_5\dot{N}O_2^-$	2.7 x 10^9	13	p.r.	P.b.k. at 285 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} MeOH.	66G432
283.076	$CH_3\dot{C}HOH + C_6H_5NO_2 \rightarrow CH_3CHO + H^+ + C_6H_5\dot{N}O_2^-$	3.3 x 10^8	7	p.r.	P.b.k. at 285 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} EtOH.	66G432
		$(2.4 \pm 0.7) \times 10^8$	5–6	p.r.	N_2O–satd. soln. contg. 0.1 mol L^{-1} EtOH.	72A018
	$CH_3\dot{C}HO^- + C_6H_5NO_2 \rightarrow CH_3CHO + C_6H_5\dot{N}O_2^-$	3.1 x 10^9	13	p.r.	P.b.k. at 285 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} EtOH.	66G432
		3 x 10^9	13	p.r.	P.b.k. at 285 nm in N_2O–satd. soln. contg. EtOH; $E_a \simeq 3.3$ kcal mol^{-1} (14 kJ mol^{-1}).	74A010
283.077	$CH_3CH_2\dot{C}HOH + C_6H_5NO_2 \rightarrow CH_3CH_2CHO + H^+ + C_6H_5\dot{N}O_2^-$	3.5 x 10^8	7	p.r.	P.b.k. at 285 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} 1–PrOH; 68% e–transfer.	66G432
		1.0 x 10^9 (uncor.)	7	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. 1–PrOH; 60% e–transfer.	73A062
	$CH_3CH_2\dot{C}HO^- + C_6H_5NO_2 \rightarrow CH_3CH_2CHO + C_6H_5\dot{N}O_2^-$	3.1 x 10^9	13	p.r.	P.b.k. at 285 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} 1–PrOH.	66G432
283.078	$(CH_3)_2\dot{C}OH + C_6H_5NO_2 \rightarrow (CH_3)_2CO + H^+ + C_6H_5\dot{N}O_2^-$	1.6 x 10^9	7	p.r.	P.b.k. at 285 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH.	66G432
	$(CH_3)_2\dot{C}O^- + C_6H_5NO_2 \rightarrow (CH_3)_2CO + C_6H_5\dot{N}O_2^-$	3.0 x 10^9	13	p.r.	P.b.k. at 285 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–PrOH.	66G432
283.079	$CH_3CH_2CH_2\dot{C}HOH + C_6H_5NO_2 \rightarrow CH_3CH_2CH_2CHO + H^+ + C_6H_5\dot{N}O_2^-$	4.0 x 10^8	7	p.r.	P.b.k. at 285 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} 1–BuOH; 35% e–transfer.	66G432
		1.1 x 10^9 (uncor.)	7	p.r.	P.b.k. at 400 nm in N_2O–satd. soln. contg. 1–BuOH; 31% e–transfer;	73A062
	$CH_3CH_2CH_2\dot{C}HO^- + C_6H_5NO_2 \rightarrow CH_3CH_2CH_2CHO + C_6H_5\dot{N}O_2^-$	3.1 x 10^9	13	p.r.	P.b.k. at 285 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} 1–BuOH.	66G432
283.081	$(CH_3)_2CH\dot{C}HOH + C_6H_5NO_2 \rightarrow (CH_3)_2CHCHO + H^+ + C_6H_5\dot{N}O_2^-$	3.9 x 10^8	7	p.r.	P.b.k. at 285 nm in N_2O–satd. soln. contg. 0.1 mol L^{-1} 2–methyl–1–propanol; 39% e–transfer.	66G432
	$(CH_3)_2CH\dot{C}HO^- + C_6H_5NO \rightarrow (CH_3)_2CHCHO + C_6H_5\dot{N}O_2^-$	2.9 x 10^9	13	p.r.	P.b.k. at 285 nm in N_2O–satd. soln. contg. 2–methyl–1–propanol.	66G432
283.084	$-CH_2\dot{C}OH(CH_2)_2- + C_6H_5NO_2 \rightarrow R{=}O + H^+ + C_6H_5\dot{N}O_2^-$	1.5 x 10^9		p.r.	P.b.k. at 280 nm in soln. contg. 10^{-3} mol L^{-1} cyclobutanone and 0.1 mol L^{-1} *tert*–BuOH at 2°C; k = 3.2 x 10^9 at 64°C; E_a = 2.3 kcal mol^{-1} (9.6 kJ mol^{-1}).	76A103
283.085	$-CH_2\dot{C}OH(CH_2)_3- + C_6H_5NO_2 \rightarrow R{=}O + C_6H_5\dot{N}O_2^-$	1.4 x 10^9		p.r.	P.b.k. at 280 nm in soln. contg. 10^{-3} mol L^{-1} cyclopentanone and 0.1 mol L^{-1} *tert*–BuOH at 2°C; k = 5.2 x 10^9 at 64°C; E_a = 4.0 kcal mol^{-1} (17 kJ mol^{-1}).	76A103
283.086	$-CH_2\dot{C}OH(CH_2)_4- + C_6H_5NO_2 \rightarrow R{=}O + C_6H_5\dot{N}O_2^-$	7 x 10^8		p.r.	P.b.k. at 280 nm in soln. contg. 10^{-3} mol L^{-1} cyclohexanone and 0.1 mol L^{-1} *tert*–BuOH at 2°C; k = 2.0 x 10^9 at 64°C E_a = 3.1 kcal mol^{-1} (13 kJ mol^{-1}).	76A103
283.087	$-CH_2\dot{C}OH(CH_2)_5- + C_6H_5NO_2 \rightarrow R{=}O + C_6H_5\dot{N}O_2^-$	1.4 x 10^9		p.r.	P.b.k. at 280 nm in soln. contg. 10^{-3} mol L^{-1} cycloheptanone and 0.1 mol L^{-1} *tert*–BuOH at 2°C; k = 4.9 x 10^0 at 64°C; E_a = 3.8 kcal mol^{-1} (16 kJ mol^{-1}).	76A103

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

No.	Reaction	k^a (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
.001	**Methyl**					
	$\cdot CH_3 + \cdot CH_3 \rightarrow C_2H_6$	$(1.24 \pm 0.2) \times 10^9$	5.5	p.r.	D.k. in soln. contg. 10^{-2} mol L^{-1} CH_4 and 0.25 mol L^{-1} N_2O; $\epsilon = 850$ 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_2O; $\epsilon = 1600$ 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**					
	$\cdot CH_2CH_3 + \cdot CH_2CH_3$	$(9.6 \pm 2) \times 10^8$	5.5	p.r.	D.k. in soln. contg. 10^{-2} mol L^{-1} ethane and 0.25 mol L^{-1} N_2O; $\epsilon =$ 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_2O; $\epsilon =$ 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**					
	$c\text{-}\dot{C}_5H_9 + c\text{-}\dot{C}_5H_9 \rightarrow$ $C_{10}H_{18}$ and $C_5H_{10} + C_5H_8$	$(1.0 \pm 0.2) \times 10^9$	7	p.r.	D.k. in soln. contg. N_2O and 1.3×10^{-5} mol L^{-1} cyclopentane; $\epsilon = 480$ L mol^{-1}cm^{-1} at 248 nm.	74A051
.016	**2-Hydroxy-2,2-dimethylethyl**					
	$\cdot CH_2C(CH_3)_2OH + \cdot CH_2C(CH_3)_2OH$	7×10^8 6×10^8	6 13.5	p.r.	D.k. in N_2O-satd. soln. contg. *tert*-BuOH; $\epsilon =$ 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**					
	$\cdot CH_2CHO + \cdot CH_2CHO$	4.5×10^8	10	p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} ethylene glycol; $\epsilon = 260$ L mol^{-1}cm^{-1} at 300 nm.	73G004
		4.5×10^8	9.8	p.r.	D.k. in N_2O-satd. soln. contg. 10^{-3} mol L^{-1} acetylene; $2k/\epsilon = 3.4 \times 10^6$ cm s^{-1}.	78A007
.021	**2-Hydroxyethenyl**					
	$\cdot CH{=}CHOH + \cdot CH{=}CHOH \rightarrow$ $HOCH{=}CHCH{=}CHOH$	3.2×10^9	<7	p.r.	P.b.k. in N_2O-satd. soln. contg. 10^{-3} mol L^{-1} acetylene at 240 nm ($\epsilon = 8.1 \times 10^3$ L mol^{-1}cm^{-1}); $2k/\epsilon = 2.0 \times 10^5$ cm s^{-1}; prod. rearranges to succinaldehyde.	78A007
.035	**Carboxymethyl**					
	$\cdot CH_2CO_2^- + \cdot CH_2CO_2^-$	$(5.5 \pm 1) \times 10^8$	6.5	p.r.	D.k. at 366 nm in N_2O-satd. soln. contg. Na acetate; $\epsilon = 780$ L mol^{-1} cm^{-1}.	76A082
		5×10^8	10	p.r.	D.k. in N_2O-satd. soln. contg. acetate ion; $\epsilon = 800$ L mol^{-1} cm^{-1} at 350 nm.	69G446
	$\cdot CH_2CO_2H + \cdot CH_2CO_2H$	9×10^8	3	p.r.	D.k. in N_2O-satd. soln. contg. acetic acid; $\epsilon = 650$ L mol^{-1} cm^{-1} at 320 nm; p$K_a = 4.5$.	69G446
.048	**Trichloromethyl**					
	$\cdot CCl_3 + \cdot CCl_3 \rightarrow C_2Cl_6$	$(3.7 \pm 0.9) \times 10^8$	5.5–12.4	p.r.	D.k. at 230 nm in 10^{-4} mol L^{-1} CCl_4 soln.; $\epsilon = 2300 \pm 450$ L mol^{-1} cm^{-1}.	74A043

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

No.	Reaction	k^a (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
.075	**Hydroxymethyl**					
	$\cdot CH_2OH + \cdot CH_2OH$ $\cdot CH_2O^- + \cdot CH_2O^-$	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_2O-satd. soln. contg. MeOH; $2k/\epsilon = 6.2 \times 10^6$ and 1.5×10^6 at pH 6 and 12, resp. (ϵ = 390 and 600); pK_a = 10.7 [66G074].	69G419
	$\cdot CH_2OH + \cdot CH_2OH$	$(1.5 \pm 1) \times 10^9$		p.r.	D.k. in N_2O-satd. soln. contg. MeOH; $\epsilon = 270 \pm 15$ L mol^{-1} cm^{-1} at 310 nm.	77A011
.076	**1-Hydroxyethyl**					
	$CH_3\dot{C}HOH + CH_3\dot{C}HOH$ $\rightarrow CH_3CHOHCHOHCH_3$ (I) $\rightarrow CH_3CHO + CH_3CH_2OH$ (II)	$(5.5 \pm 1.5) \times 10^8$ $k_I = (4.4 \pm 1) \times 10^8$ $k_{II} = (1.1 \pm 0.3) \times 10^8$	~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
		$(7 \pm 2) \times 10^8$	~1	p.r.	D.k. at 296.7 nm in deaerated soln. contg. EtOH and 0.8 *N* H_2SO_4; $\epsilon = 240 \pm 45$ L mol^{-1} cm^{-1}.	63G045
	 $CH_3\dot{C}HO^- + CH_3\dot{C}HO^-$	$(1.2 \pm 0.3) \times 10^9$ $(2.5 \pm 0.5) \times 10^8$	6 13	p.r.	D.k. at 280 and 300 nm, resp., at pH 6 and 13 in N_2O-satd. soln. contg. EtOH; pK_a = 11.6 [66G074]; $2k/\epsilon = 4.7 \times 10^6$ and 5.7×10^6 resp., at pH 6 and 13.	69G419
.078	**1-Hydroxy-1-methylethyl**					
	$(CH_3)_2\dot{C}OH + (CH_3)_2\dot{C}OH$ $(CH_3)_2\dot{C}O^- + (CH_3)_2\dot{C}O^-$	$(7 \pm 1.5) \times 10^8$ $(2 \pm 0.4) \times 10^8$	6 13.3	p.r.	D.k. at 280 and 300 nm, resp. at pH 6 and 13.3 in N_2O-satd. soln. contg. 2-PrOH; $2k/\epsilon = 2.1 \times 10^6$ and 2.7×10^5 at pH 6 and 13.3, resp.; pK_a = 12.2 [66G074].	69G419
		$(6.5 \pm 0.5) \times 10^8$		p.r.	D.k. at 310 nm in N_2O-satd. soln. contg. 0.02 mol L^{-1} 2-PrOH; $\epsilon = 353 \pm 15$ L mol^{-1} cm^{-1}.	77A011
.101	**1,2-Dihydroxyethyl**					
	$\cdot CHOHCH_2OH + \cdot CHOHCH_2OH$	3.4×10^8	6.0	p.r.	D.k. at 250 nm in N_2O-satd. soln. contg. ethylene glycol; $2k/\epsilon = 1.1 \times 10^6$ (ϵ = 610 L mol^{-1} cm^{-1}).	73G004
.113	**Ascorbate radical**					
	$\cdot A^- + \cdot A^- (+ H^+) \rightarrow A + HA^-$	$(1.9 \pm 0.2) \times 10^5$	8.7	p.r.	D.k. at 360 nm in N_2O-satd. soln. contg. ascorbate; ϵ = 3300 L mol^{-1} cm^{-1} [77A036]; pK_a = -0.45 [72D181].	75A240
.115	**(Carboxy)hydroxymethyl**					
	$\cdot CHOHCO_2H + \cdot CHOHCO_2H$ $\cdot CHOHCO_2^- + \cdot CHOHCO_2^-$ $\cdot CHO^-CO_2^- + \cdot CHO^-CO_2^-$	$(6.5 \pm 1) \times 10^8$ $(4.3 \pm 0.7) \times 10^8$ $(7.5 \pm 1) \times 10^6$	1 7.2 12	p.r.	D.k. in N_2O-satd. soln. contg. 0.05 mol L^{-1} glycolic acid (ϵ 6000 L mol^{-1}cm^{-1}); pK_a = 4.6, 8.8.	69G447
.123	**Dihydroxymethyl**					
	$\cdot CH(OH)_2 + \cdot CH(OH)_2 \rightarrow CH_2(OH)_2 + HCO_2^- + H^+$	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_2O-satd. soln. contg. formaldehyde, as well as in soln. contg. *tert*-BuOH and CO; $\epsilon \cong 850$ and 1500 L mol^{-1} cm^{-1} at pH 6 and 11.8, resp.; pK_a = 9.5.	71G424

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

No.	Reaction	k^a (L mol^{-1}s^{-1})	pH	Method	Comment	Ref.
.147	**Carboxyl** $\cdot CO_2^- + \cdot CO_2^- \rightarrow C_2O_4^{2-}$	5×10^8	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 8.5×10^8	3.1,9 13	p.r.	D.k. at 255 nm in N_2O–satd. soln. contg. formate, as well as in CO_2–satd. soln. contg. formate; $\epsilon_{max} = 3000$ L mol^{-1} cm^{-1} at 235 nm.	69G446
		$(4.5 \pm 0.15) \times 10^8$	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_2O–satd. formate soln.	70G303
		$(3.8 \pm 0.35) \times 10^8$	2.7 13	p.r.	D.k. at 250 nm in N_2O–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($\cdot CO_2H$) = 1.4.	73G085
		$(8.5 \pm 1) \times 10^8$	0			

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[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.

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.

$C_6H_8O_4^-$	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 + OH, 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.

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