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NSRDS—NBS 43, Supplement

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

NATIONAL STANDARD NSRDS REFERENCE DATA SYSTEM

MASTER

Selected Specific Rates of Reactions of Transients from Water in Aqueous Solution.

Hydrated Electron, Supplemental Data

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Selected Specific Rates of Reactions of Transients from Water in Aqueous Solution. Hydrated Electron, Supplemental Data

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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 is 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.

Richard W. Roberts

RICHARD W. ROBERTS, *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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Selected Specific Rates of Reactions of Transients from Water in Aqueous Solution. Hydrated Electron, Supplemental Data.

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A compilation of rates of reactions of hydrated electrons with other transients and with organic and inorganic solutes in aqueous solution appeared in NSRDS–NBS 43, and covered the literature up to early 1971. This supplement includes additional rates which have been published through July 1973.

Keywords: Aqueous solution; chemical kinetics; data compilation; hydrated electron; radiation chemistry; rates.

Introduction

When the preparation of NSRDS–NBS 43 (73–0030) was completed two and one half years ago, rates of nearly 700 reactions of the hydrated electron with various organic and inorganic ions and molecules in aqueous solution had been collected. Since that time rates of about 300 additional reactions have been reported in the literature bringing the total number of hydrated electron reactions which have been studied quantitatively to nearly one thousand. This supplement includes all of the data on reactions not previously reported as well as new rate determinations for reactions included in the earlier compilation.

The selection criteria and arrangement of the tables are similar to those used in the earlier work. Each reaction is numbered and the numbers in this supplement are prefixed by an S. A correlation between the reaction numbers in the main work and in the supplement is included at the end of this section. Reactions of the hydrated electron with transient ions and radicals derived from water are included in table 1. Reactions of e^-_{aq} with inorganic ions and molecules in table 2 are listed alphabetically by main element, and reactions of e^-_{aq} with organic ions and molecules in table 3 are listed alphabetically by name. A formula index follows the tables and refers to reactants listed in both this supplement and the main work, NSRDS–NBS 43.

The rates listed, in most cases, are observed values. In some cases, however, rates for the individual ionic forms of compounds which have acid–base equilibria have been calculated by the author of the original paper and are reported along with the observed rates at varying pH. Usually, however, the rates are listed under the uncharged parent compound, along with any available information on pH and pK. The equation for the reaction has been included only when evidence for product determination has been reported.

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In most of the studies cited the hydrated electron has been generated by pulse radiolysis and the specific rate, k, has been determined by measuring the rate of decay of the optical absorption of t' hydrated electron in a solution of 10^{-3} mol/dm^3 or less of reactant. When a correction was made for ion strength effect, the rate is marked (cor.). In some cases ratios of rates have been determined by competition kinetics and they are listed in the column under *Ratio* in the form k/k_X; $k_X = k(e^-_{aq} + X)$ where X is the competing reactant. The relative rate, k, obtained in this way using the assumed value of k_X given under *Comments*, is listed under the k column and marked (rel.). The assumed values of k_X are the same as those used in the main work, NSRDS–NBS 43, except where noted in these tables. Abbreviations used throughout the tables are listed at the end of this section.

It is expected that data will continue to appear and that further supplements to these tables will be prepared. If any data which have already been published have been omitted, the author would be very grateful to know of those omissions.

Abbreviations and Symbols

A	frequency factor	G	radiation yield (molecules or ions per 100 eV absorbed)
abs.	absorption		
alk.	alkaline	γ–r.	gamma–radiolysis
bipy	2,2′–bipyridine	k	specific rate
BrPhOH	bromophenol	μ	ionic strength
calcd.	calculated	M	mol/dm^3
chem.	chemical	mol. wt.	molecular weight
c.k.	competition kinetics	obs.	observed
concn.	concentration	opt.	optical spectroscopy
condy.	conductivity	oxy	oxygen
cor.	corrected	pol.	polarography
d.k.	decay kinetics	p.b.k.	product buildup kinetics
ϵ	extinction coefficient	p.r.	pulse radiolysis
E_a	activation energy	rel.	relative
estd.	estimated	satd.	saturated
formn.	formation	soln.	solution
f. phot.	flash photolysis	terpy	2,2′,6′,2″–terpyridine

Correlation of Reaction Numbers in NSRDS–NBS 43 and this Supplement

Consecutive numbers were assigned to the reactions listed in both NSRDS–NBS 43 and the Supplement. The reactions in the original work for which additional data are available in this supplement are listed below along with the corresponding reaction number in this supplement.

NSRDS–NBS 43	Supplement	NSRDS–NBS 43	Supplement	NSRDS–NBS 43	Supplement
1.3	S1.1	1.115	S1.25	1.188	S1.43
1.4	S1.2	1.127	S1.26	1.189	S1.44
1.5	S1.3	1.137	S1.30	1.193	S1.45
1.6	S1.4	1.143	S1.31	1.205	S1.47
1.9	S1.5	1.146	S1.32	1.211	S1.48
1.37	S1.9	1.156	S1.35	1.213	S1.50a
1.38	S1.10	1.165	S1.36	1.223	S1.51
1.54	S1.11	1.179	S1.38	1.225	S1.52
1.55	S1.13	1.180	S1.39	1.226	S1.53
1.59	S1.14	1.181	S1.40	1.231a	S1.55
1.76	S1.15	1.182	S1.41	1.233	S1.57
1.78	S1.19	1.186	S1.42	1.236	S1.61

Correlation of Reaction Numbers—Continued

SRDS–NBS 43	Supplement	NSRDS–NBS 43	Supplement	NSRDS–NBS 43	Supplement
1.237	S1.62	1.367a	S1.174	1.513	S1.301
1.238	S1.63	1.388	S1.192	1.514	S1.304
1.240	S1.65	1.389	S1.193	1.517	S1.365
1.242	S1.68	1.390–2	S1.194	1.518	S1.309
1.250	S1.71	1.393	S1.196	1.522	S1.314
1.265	S1.72	1.394	S1.197	1.523	S1.318
1.272	S1.73	1.395	S1.199	1.530	S1.323
1.274	S1.74	1.395a	S1.203	1.532	S1.327
1.286	S1.75	1.396	S1.204	1.551	S1.341
1.287	S1.77	1.403	S1.218	1.553	S1.348
1.288	S1.78	1.405	S1.227	1.554	S1.349
1.289	S1.80	1.409a	S1.231	1.559	S1.352
1.291	S1.81	1.409b	S1.232	1.568	S1.358
1.296	S1.87	1.417	S1.237	1.572	S1.359
1.298a	S1.98	1.421a	S1.239	1.573	S1.361
1.299	S1.99	1.422	S1.242	1.573a	S1.367
1.300	S1.105	1.425	S1.243	1.575	S1.369
1.301	S1.108	1.433	S1.245	1.576	S1.370
1.302	S1.109	1.435	S1.246	1.577	S1.372
1.303–4	S1.110	1.437a	S1.251	1.578	S1.374
1.305	S1.111	1.439a	S1.252	1.592	S1.385
1.310	S1.116	1.441	S1.254	1.593a	S1.388
1.313b	S1.121	1.442	S1.255	1.595	S1.389
1.314	S1.123	1.443	S1.256	1.596	S1.391
1.321–2	S1.128	1.444	S1.257	1.604	S1.393
1.323	S1.131	1.445	S1.258	1.613–4	S1.401
1.324	S1.132	1.451	S1.261	1.615	S1.403
1.325	S1.133	1.452	S1.262	1.615b	S1.405
1.327a	S1.135	1.454	S1.266	1.616	S1.406
1.329	S1.137	1.455	S1.267	1.616a	S1.407
1.330	S1.138	1.458	S1.270	1.621	S1.416
1.331	S1.144	1.465a	S1.278	1.627	S1.418
1.332	S1.146	1.465c	S1.279	1.632	S1.420
1.343	S1.157	1.481	S1.287	1.633b	S1.411
1.344	S1.158	1.483a	S1.382	1.643	S1.434
1.348	S1.159	1.487	S1.289	1.645–6	S1.436
1.354	S1.164	1.501	S1.296	1.647–8	S1.437
1.356	S1.166	1.507	S1.298	1.649	S1.438
1.366	S1.173	1.511–2	S1.299		

TABLE 1. *Reactions of hydrated electrons with transients from water*

No.	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.1	e^-_{aq} $e^-_{aq} + e^-_{aq} \rightarrow H_2 + 2OH^-$	alk.	$(5.8 \pm 0.2) \times 10^9$ [a]	—	f.phot.	opt.	d.k.; H_2-satd.; $\epsilon = 10{,}900$ $dm^3mol^{-1}cm^{-1}$ at 578 nm.	69-7106
		7-14	—	$k_H/k_D = 6.0 \pm 0.1$	p.r.	chem.	obs. H_2, D_2 and HD yields in $H_2O - D_2O$; dose rate $10^{26}-10^{28}$eV/g·s.	72-0013
		alk.	~(1.5 to 2) x 10^9	—	p.r.	opt.	d.k.; 6*M* NaOH; $\epsilon = 1.6 \times 10^4$ $dm^3mol^{-1}cm^{-1}$ at 600 nm.	72-0437
		~ 11	$(2.5 \pm 0.1) \times 10^9$	—	f.phot.	opt.	d.k.; H_2-satd.	72-7158
		See also 1.3.						
S1.2	e^-_d	*See* S1.1; *see also* 1.4.						
S1.3	H $e^-_{aq} + H \rightarrow H_2 + OH^-$	7-14	—	$k_H/k_D = 1.3 \pm 0.2$	p.r.	chem.	see comment under S1.1.	72-0013
		See also 1.5.						
S1.4	D $e^-_d + D \rightarrow D_2 + OD^-$	*See* S1.3; *See also* 1.6.						
S1.5	O^- $e^-_{aq} + O^- \rightarrow O^{2-}$	alk.	~ 1.2 x 10^{10}		p.r.	opt.	d.k.; 6*M* NaOH; assumed ratio of O^- to e^-_{aq} concn. = 0.8 - 0.9.	72-0437
		See also 1.9.						

[a] The rate law is $-d[e^-_{aq}]/dt = 2k[e^-_{aq}]^2$; values of k are given here (not $2k$).

TABLE 2. *Reactions of hydrated electrons with inorganic solutes*

	Solute and Reaction	pH	$k(dm^3 mol^{-1} s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.6	BrO_4^- $e^-_{aq} + BrO_4^- \rightarrow BrO_3^- + O^-$	~7	$(7.0 \pm 0.7) \times 10^9$	—	p.r.	opt.	d.k.; counter ion K^+.	73-0106
S1.7	HCN	—	2×10^8 (rel.)	$k/k_{nitrate} = 0.019$	γ-r.	chem.	c.k.; assume $k(e^-_{aq} + NO_3^-) = 1.1 \times 10^{10}$.	68-0593
		7.7–9.1	$(4.3 \pm 0.8) \times 10^8$	—	p.r.	opt.	d.k.; cor. for pK_a.	73-0071
S1.8	C_2N_2 $e^-_{aq} + (CN)_2 \rightarrow (CN)_2^-$	6	$(2.1 \pm 0.2) \times 10^{10}$	—	p.r.	opt.	d.k. (e^-_{aq}) as well as p.b.k. (adduct).	71-0038
S1.9	CNS^-	~5.7	7×10^6 (± 40%)	—	p.r.	opt.	d.k.; cor. for reaction of e^-_{aq} with matrix; k_{obs} decreases with concn.; no abs. by e^-_{aq} obs. ≥ 1 mol/dm³; counter ion K^+.	72-0475
		See also 1.37.						
S1.10	Cd^{2+} $e^-_{aq} + Cd^{2+} \rightarrow Cd^+$	acid	~2.5×10^{10} (rel.)	$k/k_{H^+} \cong 1.1$	p.r.	condy.	c.k.; assume $k_{H^+} = 2.3 \times 10^{10}$; counter ions ClO_4^-, SO_4^{2-}.	70-0512
		6.1	6.0×10^{10}	—	p.r.	opt.	d.k.; k also detd. at 6.4 kbar (6.4×10^8 N/m²); counter ion SO_4^{2-}.	72-0102
		See also 1.38.						
S1.11	ClO^- $e^-_{aq} + ClO^- \rightarrow Cl^- + O^-$	—	$(5.3 \pm 1.0) \times 10^{10}$	—	p.r.	opt.	d.k.; counter ion Na^+.	72-0301
		See also 1.54.						
S1.12	ClO_2^- $e^-_{aq} + ClO_2^- \rightarrow ClO^- + O^-$	—	$(4.5 \pm 0.5) \times 10^{10}$	—	p.r.	opt.	d.k.; counter ion Na^+.	72-0301
S1.13	ClO_3^-	—	$< 10^6$	—	p.r.	opt.	solute has no effect on d.k. of e^-_{aq}.	72-0301
		See also 1.55.						
S1.14	$Co(CN)_5^{3-}$ $e^-_{aq} + Co(CN)_5^{3-} \rightarrow Co(CN)_5^{4-}$	~ 13	$(1.2 \pm 0.2) \times 10^{10}$	—	p.r.	opt.	d.k.; $k_H/k_D \cong 1.2$.	71-0097
		See also 1.59.						
S1.15	$Co(CN)_6^{3-}$	7, 13	$(5.4 \pm 1.7) \times 10^9$	—	p.r.	opt.	d.k.; H_2-satd.; counter ion K^+.	71-0364
		See also 1.76.						
S1.16	$Co(CN)_5H^{3-}$	13	$(6.7 \pm 0.7) \times 10^9$	—	p.r.	opt.	d.k.; H_2-satd.; in D_2O $k = 5.6 \times 10^9$; counter ion K^+.	71-0364
S1.17	$Co(CN)_5NCS^{3-}$	7	$(1.6 \pm 0.2) \times 10^{10}$	—	p.r.	opt.	d.k.; H_2-satd.; contains formate ion; counter ion $(C_4H_9)_4N^+$.	71-0364
S1.18	$Co(CN)_5H_2O^{2-}$	7	1.2×10^{10}	—	p.r.	opt.	d.k.; counter ion K^+; $pK \cong 10$.	71-0364
S1.19	$Co(CN)_5OH^{3-}$	13	1.1×10^{10}	—	p.r.	opt.	d.k.; H_2-satd.; in D_2O $k = 1.07 \times 10^{10}$; counter ion K^+.	71-0364
		See also 1.78.						

TABLE 2. *Reactions of hydrated electrons with inorganic solutes* — Continued

No.	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref
S1.20	$Co(CN)_5I^{3-}$	7	$(2.1 \pm 0.2) \times 10^{10}$	—	p.r.	opt.	d.k. at 478 nm; H_2–satd.; contains formate ion; counter ion K^+.	71–0[illegible]
S1.21	$Co(CN)_5NO^{3-}$	—	$(9.7 \pm 0.5) \times 10^9$	$k/k_{nitrate}$ = 0.88	γ–r.	chem.	c.k.; assume $k_{nitrate} = 1.1 \times 10^{10}$; counter ion K^+.	71–0407
S1.22	$Co(terpy)_2^{3+}$	—	6.5×10^{10}	—	p.r.	opt.	p.b.k. (transient precursor to $Co(terpy)_2^{2+}$).	72–0381
S1.23	$Cr(CN)_5NO^{3-}$	—	$(3.6 \pm 0.4) \times 10^9$	$k/k_{nitrate}$ = 0.33	γ–r.	chem.	c.k.; assume $k_{nitrate} = 1.1 \times 10^{10}$; counter ion K^+.	71–0407
S1.24	$Cr(C_2O_4)_3^{3-}$	6.7	6.5×10^9	—	p.r.	opt.	d.k.; k also detd. at 6.4 kbar (6.4×10^8 N/m^2); counter ion K^+.	72–0102
S1.25	Cu^{2+}	acid	$\sim 4 \times 10^{10}$	—	p.r.	condy.	d.k.; counter ions ClO_4^-, SO_4^{2-}.	70–0512
	$e^-_{aq} + Cu^{2+} \rightarrow Cu^+$	—	3.0×10^{10}	—	p.r.	opt.	d.k.; $k = 4.4 \times 10^9$ in sodium dodecyl sulfate soln. and 1.6×10^{10} in hexadecyl–trimethylammonium bromide soln.	73–1004
		See also 1.102.						
S1.26	Eu^{3+}	~ 6	$(6.1 \pm 0.3) \times 10^{10}$ (cor.)	—	p.r.	opt.	d.k.	71–0311
		See also 1.127.						
S1.27	Fe^{3+}	1.8	$\sim 5 \times 10^{10}$ (rel.)	$k/k_{H^+} \cong 2$	γ–r.	chem.	c.k.; in H_2SO_4 or $HClO_4$; assume $k_{H^+} = 2.3 \times 10^{10}$.	71–0203
	$e^-_{aq} + Fe^{3+} \rightarrow Fe^{2+}$							
S1.28	$FeSO_4^+$	2.1–2.9	$\sim 2 \times 10^{10}$ (rel.)	$k/k_{H^+} = 0.95 \pm 0.1$	γ–r.	chem.	c.k.; soln. contains 0.5 mol/dm^3 Na_2SO_4 in H_2SO_4.	71–0203
	$e^-_{aq} + Fe(III) \rightarrow Fe(II)$							
S1.29	$HFe(CN)_6^{3-}$	~3	$(2 \pm 0.8) \times 10^9$ (rel.) (cor.)	$k/k_{N_2O} = 0.25 \pm 0.1$ (cor.)	phot.	chem.	c.k.; ratio = 0.75 at $\mu = 0.042$; assumed $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$.	66–7025
	$e^-_{aq} + HFe(CN)_6^{3-} \rightarrow H + Fe(CN)_6^{4-}$							
S1.30	$Fe(CN)_6^{3-}$	—	—	$k_1/k_2 \cong 0.1 - 0.2$	p.r.	condy.	estd.	70–0254
	$e^-_{aq} + Fe(CN)_6^{3-} \rightarrow Fe(CN)_5(H_2O)^{3-} + CN^-$ (1)	alk.	3×10^9 (rel.)	—	Al–NaOH	chem.	obs. effect of solute on H_2 evolution.	70–0465
	$e^-_{aq} + Fe(CN)_6^{3-} \rightarrow Fe(CN)_6^{4-}$ (2)	*See also* 1.137.						
S1.31	H^+	acid	3.0×10^{10}	—	p.r.	opt.	d.k.	71–0475
	$e^-_{aq} + H^+ \rightarrow H$	acid	2.2×10^{10}	—	p.r.	opt.	d.k.; $k(1.6$ to $2.2) \times 10^{10}$ and E_a (1.4 – 2.4 kcal/mol or 5.9 – 10.0 kJ/mol) vary with concn. of added ethanol, KI, and $MgCl_2$.	71–0580

TABLE 2. *Reactions of hydrated electrons with inorganic solutes* — Continued

	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.31	H^+ (contd.)	~3	1.3×10^{10} (rel.)	$k/k_{N_2O} = 1.54$	photo-effect	pol.	c.k.; assume $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$; 0.2 *M* KCl; indirect method.	71-7393
		—	2.2×10^{10}	—	p.r.	opt.	d.k.; *k* increases with pressure → 3.5 kbar, then remains constant → 6.4 kbar (6.4×10^8 N/m^2).	72-0298
		—	2.3×10^{10}	—	p.r.	opt.	d.k.; $k = 7.5 \times 10^9$ in sodium dodecyl sulfate soln.	73-1004
		—	2.4×10^{10} (cor.)	—	p.r.	opt.	d.k.; *k* unchanged in mixtures up to 99% ethanol.	73-1008
	See also 1.143; the value 2.3×10^{10} has been used to calculate specific rates from relative rates for the following reactions: S1.10, S1.27, S1.28, S1.45, S1.80, S1.157, S1.193, S1.194, S1.256, S1.294, S1.304, S1.306, S1.307, S1.365. The value 1.57×10^{10} has been used to calculate specific rates from relative rates at $\mu = 0.05$ for the following reactions: S1.78, S1.135, S1.246, S1.260, S1.273, S1.297, S1.303, S1.386, S1.402.							
S1.32	H_2O_2	alk.	7.0×10^9 (rel.)	—	Al-NaOH	chem.	obs. effect of solute on H_2 formation.	70-0465
		6.1	1.6×10^{10}	—	p.r.	opt.	d.k.; *k* also detd. at 6.4 kbar (6.4×10^8 N/m^2).	72-0102
	See also 1.146.							
S1.33	$HgCl_2$ $e^-_{aq} + HgCl_2 \rightarrow HgCl + Cl^-$	5.0	$(4.0 \pm 0.3) \times 10^{10}$	—	p.r.	opt.	d.k.	73-0043
S1.34	I^-	7	$< 2.4 \times 10^5$ (± 15%)	—	p.r.	opt.	d.k.	70-1226
S1.35	I_2	—	5.1×10^{10}	—	p.r.	opt.	d.k.; $k = 1.5 \times 10^{10}$ in sodium dodecyl sulfate soln.	73-1004
	See also 1.156.							
S1.36	K^+ $e^-_{aq} + K^+ \rightarrow (K^+ — e^-)$	>14	2.4×10^5	—	p.r.	opt.	d.k. and p.b.k. at 720 nm in 14.5 *M* KOH; *k* for decay of $(K^+ — e^-) = 2.6 \times 10^7 s^{-1}$.	72-0555
	See also 1.165.							
S1.37	Omitted							
S1.38	NH_2NH_2	10.5	2.3×10^6 (± 15%)	—	p.r.	opt.	d.k.	72-0003
	See also 1.179.							
S1.39	$NH_2NH_3^+$	6.0	2.2×10^8 (± 15%)	—	p.r.	opt.	d.k.	72-0003
	See also 1.180.							
S1.40	NH_2OH	9.0	9.2×10^8	—	p.r.	opt.	d.k.	71-0493
	See also 1.181.							
S1.41	NH_3OH^+	4.8	1.2×10^{10}	—	p.r.	opt.	d.k.	71-0493
	See also 1.182.							

TABLE 2. *Reactions of hydrated electrons with inorganic solutes* — Continued

No.	Solute and Reaction	pH	k(dm^{3}mol^{-1}s^{-1})	Ratio	Source	Method	Comment	Ref
S1.42	N_2O	—	8.0 x 10^9	—	p.r.	opt.	d.k.	71-0[illegible]
		—	4 x 10^9	—	photo-effect	pol.	indirect method; contains 1 *M* KCl.	71-7393
		See also 1.186; the value 8.7 x 10^9 has been used to calculate specific rates of the following reactions from relative rates: S1.29, S1.31, S1.43, S1.44, S1.47, S1.48, S1.62, S1.420.						
S1.43	NO_2^-	9	6 x 10^9 (rel.)	k/k_{N_2O} = 0.73	photo-effect	pol.	c.k.; assume $k(e^-_{aq} + N_2O)$ = 8.7 x 10^9; 0.2 *M* KCl; indirect method.	71-7393
		See also 1.188.						
S1.44	NO_3^- $e^-_{aq} + NO_3^- \rightarrow NO_2 + 2OH^-$	alk.	1.0 x 10^{10} (rel.)	—	Al-NaOH	chem.	obs. effect of solute on H_2 evolution.	70-0465
		—	9.5 x 10^9 (rel.)	k/k_{oxy} = 0.5	γ-r.	chem.	c.k.; assume $k(e^-_{aq} + O_2)$ = 1.9 x 10^{10}.	71-0166
		—	9.3 x 10^9	—	p.r.	opt.	d.k.; k(0.7 to 1.5 x 10^{10}) and E_a (2.5 – 3.5 kcal/mol or 10.5 – 14.6 kJ/mol) vary with concn. of added ethanol, KI, and $MgCl_2$.	71-0580
		—	2.5 x 10^{10} (rel.)	k/k_{N_2O} = 2.86	photo-effect	pol.	c.k.; assume $k(e^-_{aq} + N_2O)$ = 8.7 x 10^9; 0.2 *M* KCl; indirect method.	71-7393
		6.4	1.0 x 10^{10}	—	p.r.	opt.	d.k.; k also detd. at 6.4 kbar (6.4 x 10^8 N/m^2). counter ion Na^+.	72-0102
		11.5	1.1 x 10^{10}	—	f.phot.	opt.	d.k.	72-7158
		—	1.1 x 10^{10}	—	p.r.	opt.	d.k.; k unchanged in anionic or cationic surfactant soln.	73-1004
		—	8.6 x 10^9 (cor.)	—	p.r.	opt.	d.k.; k decreases with added ethanol to 3 x 10^7 at 99% ethanol.	73-1008
		See also 1.189; the value 1.1 x 10^{10} has been used to calculate specific rates of the following reactions from relative rates: S1.7, S1.21, S1.23, S1.43, S1.203.						
S1.45	Ni^{2+} $e^-_{aq} + Ni^{2+} \rightarrow Ni^+$	acid	1.2 x 10^{10} (rel.)	k/k_{H^+} = 0.54	p.r.	condy.	c.k.; assume k_{H^+} = 2.3 x 10^{10}; counter ions ClO_4^-, SO_4^{2-}.	70-0512
		See also 1.193.						
S1.46	$Ni(NH_3)_n^{2+}$	11.3	(8.4 ± 1.2) x 10^9	—	p.r.	opt.	d.k.; contains 0.67 mol/dm^3 NH_3.	72-0460
S1.47	O_2	6.4	2.2 x 10^{10}	—	p.r.	opt.	d.k.; k also detd. at 6.4 kbar (6.4 x 10^8 N/m^2).	72-0102

TABLE 2. *Reactions of hydrated electrons with inorganic solutes* — Continued

No.	Solute and Reaction	pH	$k(dm^3 mol^{-1} s^{-1})$	Ratio	Source	Method	Comment	Ref.
1.47	O_2 (contd.)	11	1.9×10^{10} (rel.)	$k/k_{N_2O} = (2.3 \pm 0.2)$	γ-r.	chem.	c.k.; assume $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$; preirradiated NaCl was added to the soln. to produce the e^-_{aq}; higher ratios are obtained at higher O_2 concn.	72-0430
		12	1.6×10^{10}		f.phot.	opt.	d.k.	72-7036
	See also 1.205; the value 1.9×10^{10} has been used to calculate specific rates of the following reactions from relative rates: S1.44, S1.393.							
S1.48	$H_2PO_4^-$ $e^-_{aq} + H_2PO_4^- \rightarrow H + HPO_4^{2-}$	7–9	2.2×10^7 (rel.) (cor.)	$k/k_{N_2O} = (8.8 \pm 0.7) \times 10^{-3}$	phot.	chem.	c.k. at $\mu = 1.45$; k calcd. assuming $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$ and cor. to $\mu = 0$.	66-7190
		6.8	1.0×10^7	—	p.r.	opt.	d.k.	72-0380
		4	$(6.6 \pm 0.8) \times 10^6$ (cor.)	—	p.r.	opt.	d.k.; $k_{obs} = (11.7 \pm 8) \times 10^5$ at $\mu = 0.1$.	73-1049
	See also 1.211.							
S1.49	HPO_4^{2-}	9–12.3	$(1.8 \pm 0.8) \times 10^4$ (cor.)	—	p.r.	opt.	d.k.; $k_{obs} = (1.4 \pm 0.6) \times 10^5$ at $\mu = 0.6$.	73-1049
S1.50	$HP_2O_7^{3-}$	9.7–10.3	$(1.1 \pm 0.3) \times 10^5$ (cor.)	—	p.r.	opt.	d.k.; $k_{obs} = (24 \pm 6) \times 10^5$ at $\mu = 0.8$.	73-1049
	See also 1.212.							
S1.50a	$P_2O_8^{4-}$	*See* 1.213. The rate listed is unpublished and did not appear in the reference cited.						
S1.51	Pr^{3+}	5.5	$(6 \pm 1) \times 10^6$	—	p.r.	opt.	d.k.; concn. 10^{-1} *M*.	72-0066
	See also 1.223.							
S1.52	$PtCl_4^{2-}$ e^-_{aq} + Pt(II) → Pt(I)	7	9.3×10^9	—	p.r.	opt.	p.b.k. at 310 nm.	69-0144
	See also 1.225.							
S1.53	$Pt(CN)_4^{2-}$ e^-_{aq} + Pt(II) → electron adduct	11	$(4.4 \pm 1.1) \times 10^9$	—	p.r.	opt.	p.b.k. at 360 nm.	69-0144
	See also 1.226.							
S1.54	$Ru(bipy)_3^{2+}$	—	8.2×10^{10}	—	p.r.	opt.	d.k.	72-0381
S1.55	$Ru(NH_3)_5N_2^{2+}$ $e^-_{aq} + Ru(NH_3)_5N_2^{2+} \rightarrow Ru(NH_3)_5N_2^+$	—	4.2×10^9	—	p.r.	opt.	d.k.	71-0234
	See also 1.231a.							
S1.56	$Ru(NH_3)_5Br^{2+}$	—	5.0×10^{10}	—	p.r.	opt.	d.k.	73-0107
S1.57	$Ru(NH_3)_5Cl^{2+}$	—	6.0×10^{10}	—	p.r.	opt.	d.k.	73-0107
	See also 1.231a.							
S1.58	$Ru(NH_3)_5I^{2+}$	—	$\sim 6 \times 10^{10}$	—	p.r.	opt.	d.k.	73-0107
S1.59	$Ru(NH_3)_5OH^{2+}$	6	5.9×10^{10}	—	p.r.	opt.	d.k.	73-0107
S1.60	$Ru(bipy)_3^{3+}$ $e^-_{aq} + Ru(bipy)_3^{3+} \rightarrow Ru(bipy)_3^{2+} + h\nu$	4.5	$\sim 6 \times 10^{10}$	—	p.r.	opt.	d.k.; the reaction produces chemiluminescence, $\phi = 0.015 \pm 0.004$.	72-0462
S1.61	HS^-	10.9–12.7	$(3.0 \pm 0.4) \times 10^7$	—	p.r.	opt.	d.k.	73-1012
	See also 1.236.							

TABLE 2. *Reactions of hydrated electrons with inorganic solutes* — Continued

No.	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.62	SF_6	—	1.7×10^{10} (rel.)	$k/k_{N_2O} = 2.0 \pm 0.2$	phot.	chem.	c.k.; I^- soln. ($\mu = 0.05$); ferrocyanide soln. ($\mu = 0.0035$); assume $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$.	71-7390
		See also 1.237.						
S1.63	SO_3^{2-} $e^-_{aq} + SO_3^{2-} \rightarrow$ prod. ($HSO_3^{2-} + OH^-$?)	—	$\leq 2 \times 10^6$ (rel.)	—	f.phot.	opt.	concn. 10^{-2} mol/dm^3; N_2-satd.; c.k. with NO_3^-.	68-7072
		alk.	$\leq 1.5 \times 10^6$	—	p.r.	opt.	d.k.; Ar-satd.; half-life of e^-_{aq} increases with sulfite concn.	71-0461
		> 9	no reaction	—	f.phot.	opt.	first order e^-_{aq} decay unchanged in sulfite concn. 10^{-4}-10^{-2} mol/dm^3.	72-7008
		See also 1.238.						
S1.64	HSO_3^- $e^-_{aq} + HSO_3^- \rightarrow H + SO_3^{2-}$	8.0-8.5	$(2 \pm 1) \times 10^7$ (cor.)	—	f.phot. and p.r.	opt.	d.k.; concn. $(3 - 8) \times 10^{-3}$ mol/dm^3 ($pK = 7.2$).	72-7008
S1.65	$S_2O_3^{2-}$ $e^-_{aq} + S_2O_3^{2-} \rightarrow \cdot S^- + SO_3^{2-}$ (72-5050)	—	3.8×10^7	—	p.r.	opt.	d.k.; single pulse to minimize colloidal S formn.	72-0611
		See also 1.240.						
S1.66	$S_2O_4^{2-}$	—	$(1.3 \pm 0.1) \times 10^9$	—	p.r.	opt.	d.k.	72-0611
S1.67	$S_2O_6^{2-}$	—	$(2.7 \pm 0.2) \times 10^6$	—	p.r.	opt.	d.k.	72-0611
S1.68	$S_2O_8^{2-}$	5.7	1.4×10^{10}	—	p.r.	opt.	d.k.; k also detd. at 6.4 kbar (6.4×10^8 N/m^2); counter ion K^+.	72-0102
		See also 1.242.						
S1.69	$S_3O_6^{2-}$	6.8	$(3.3 \pm 0.2) \times 10^9$	—	p.r.	opt.	d.k.	72-0611
S1.70	$S_4O_6^{2-}$	—	$(5.4 \pm 0.2) \times 10^9$	—	p.r.	opt.	d.k.	72-0611
		—	$(5.8 \pm 1) \times 10^9$	—	p.r.	opt.	d.k.	73-1027
S1.71	Sm^{3+}	~ 6	$(2.7 \pm 0.3) \times 10^{10}$ (cor.)	—	p.r.	opt.	d.k.	71-0311
		5.6	2.2×10^{10}	—	p.r.	opt.	d.k.; k also detd. at 6.4 kbar (6.4×10^8 N/m^2); counter ion SO_4^{2-}.	72-0102
		See also 1.250.						
S1.72	Tl^+	—	2.8×10^{10}	—	p.r.	opt.	d.k.; addn. of 0.1 - 0.3 mol/dm^3 ethanol gave k = (3.0 to 3.7) x 10^{10} and $E_a \cong 3 - 5$ kcal/mol (12 - 21 kJ/mol) detd. at 10 - 75°C.	71-0580
		6.1	5.4×10^{10}	—	p.r.	opt.	d.k.; k also detd. at 6.4 kbar (6.4×10^8 N/m^2); counter ion SO_4^{2-}.	72-0102
		See also 1.265.						
S1.73	Yb^{3+}	~ 6	$(4.7 \pm 0.3) \times 10^{10}$ (cor.)	—	p.r.	opt.	d.k.	71-0311
		See also 1.272.						
S1.74	Zn^{2+}	—	10^9 (cor.)	—	p.r.	opt.	d.k.; k increases in mixtures up to 60% ethanol.	73-1008
		See also 1.274.						

TABLE 3. *Reactions of hydrated electrons with organic solutes*

No.	Solute and Reaction	pH	k(dm^3/mol·s)	Ratio	Source	Method	Comment	Ref.
S1.75	acetamide	9.2	3.5×10^7	—	p.r.	opt.	d.k.	71–0414, 73–0091
	$e^-_{aq} + CH_3CONH_2 \rightarrow CH_3\dot{C}(O^-)NH_2$	5.2	4.5×10^7	—	p.r.	opt.	d.k.; k increases with pressure 0–6.4 kbar (6.4 x 10^8 N/m^2).	72–0298
	See also 1.286.							
S1.76	2–acetamido–2–deoxy–D–galactose	—	1.1×10^7	—	p.r.	opt.	d.k.	70–3081
S1.77	acetate ion	—	4.3×10^4	—	p.r.	opt.	d.k.; concn. 1.8 mol/dm^3 Na acetate.	71–0475
	See also 1.287.							
S1.78	acetic acid	2.0	5.8×10^8	—	p.r.	opt.	d.k.	72–0187
	$e^-_{aq} + CH_3COOH \rightarrow OH^- + CH_3CO$ (1)	3–4	1.72×10^7 (rel.)(1)	$k/k_{H^+} = 1.1 \times 10^{-3}$	γ–r.	chem.	c.k.; $\mu = 0.05$; assume $k_{H^+} = 1.57 \times 10^{10}$ at that μ.	72–0057
	$e^-_{aq} + CH_3COOH \rightarrow H + CH_3COO^-$ (2)		1.51×10^7 (rel.)(2)	$k_2/k_1 = 0.88$				
	See also 1.288.							
S1.79	acetoacetate ion	8.9	$(4.8 \pm 0.5) \times 10^9$	—	p.r.	opt.	d.k.	73–0073
S1.80	acetone	0–2	1×10^{10} (rel.)	$k/k_{H^+} = 0.42$	phot.	chem.	c.k.; I^- soln.; ratio increases to 1.02 with concn. 0.1 → 2 *M*; ratio is for lowest concn.	71–0462
		—	1×10^{10} (rel.)	$k/k_{H^+} = 0.48$	γ–r.	chem.	c.k.; ratio increases to 2.40 with concn. 0.02 – 2 *M*; ratio given is for lowest concn.	71–0462
		—	6.5×10^9	—	p.r.	opt.	d.k.; $\mu = 0$; k unchanged in water–ethanol mixtutes.	73–1008
	See also 1.289; the value 6 x 10^9 has been used to calculate a specific rate for S1.158 from a relative rate.							
S1.81	acetone oxime	7.0	3.5×10^8	—	p.r.	opt.	d.k.; k increases with pressure → 6.4 kbar (6.4 x 10^8 N/m^2).	72–0298
	See also 1.291.							
S1.82	acetophenone	~9.2	2.8×10^{10} (± 10%)	—	p.r.	opt.	d.k.	72–0171
S1.83	*N*–acetylalanyl–alanylalanine	9.2	6.8×10^8	—	p.r.	opt.	d.k.	74–1058
S1.84	*N*–acetylalanyl–alanylalanyl–alanylalanyl–alanine	9.2	8.2×10^8	—	p.r.	opt.	d.k.	74–1058
S1.85	*N*–acetylcysteamine	7.1	9.1×10^9 (± 10%)	—	p.r.	opt.	d.k.; p$K_a \cong 9.5$.	73–0090
		12.6	1.9×10^9 (± 10%)					
S1.86	*N*–acetylcysteine	7.1	5.6×10^9 (± 10%)	—	p.r.	opt.	d.k.; p$K_a \cong 2$, 9.5.	73–0090
		12.5	3.3×10^8 (± 10%)					
S1.87	*N*–acetylglycine	11.5	2.6×10^6	—	p.r.	opt.	d.k. at 700 nm.	71–3052
	See also 1.296.							
S1.88	*N*–acetylglycine amide	9.2	2.1×10^8	—	p.r.	opt.	d.k. at 700 nm.	71–3052
S1.89	*N*–acetylglycine methyl ester	8.7	3.3×10^8	—	p.r.	opt.	d.k. at 700 nm.	71–3052
S1.90	*N*–acetylglycyl–glycine	11.2	6.4×10^7	—	p.r.	opt.	d.k. at 700 nm.	71–3052
S1.91	*N*–acetylglycyl–glycine amide	9.2	4.2×10^8	—	p.r.	opt.	d.k. at 700 nm.	71–3052

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

No.	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.92	*N*-acetylglycyl-glycylglycine	9.2	4.4×10^8	—	p.r.	opt.	d.k.	74-1058
S1.93	*N*-acetylphenyl-alanine	9.2	5.3×10^7	—	p.r.	opt.	d.k.	73-0076
S1.94	*N*-acetylphenyl-alanine amide	9.3	2.5×10^8	—	p.r.	opt.	d.k.	73-0076
S1.95	*N*-acetylphenyl-glycine	9.2	1.7×10^8	—	p.r.	opt.	d.k.	73-0076
S1.96	*N*-acetylsarcosine	12.5	9×10^6	—	p.r.	opt.	d.k.	74-1058
S1.97	*N*-acetylsarcosyl-sarcosylsarcosine	9.0	3.9×10^8	—	p.r.	opt.	d.k.	74-1058
	4-(2-acetylsulfamoyl)phthalanilic acid *See* thalamyd (S1.413).							
S1.98	acriflavine	13	$(3.3 \pm 0.3) \times 10^{10}$	—	p.r.	opt.	d.k.	67-6053, 67-0239
		See also 1.298a.						
S1.99	acrylamide	11	9.7×10^9 (±15%)	—	f.phot.	opt.	d.k.; H_2-satd.	71-7345
		6.3	2.0×10^{10}	—	p.r.	opt.	d.k.; *k* also detd. at 6.4 kbar (6.4×10^8 N/m^2).	72-0102
		9.2	$(3.1 \pm 0.1) \times 10^{10}$	—	p.r.	opt.	d.k.	73-0072
		See also 1.299.						
S1.100	acrylate ion	9.2	$(5.3 \pm 0.5) \times 10^9$	—	p.r.	opt.	d.k.	73-0072
S1.101	acrylic acid	1.5-3.5	$(2.2 \pm 0.2) \times 10^{10}$	—	p.r.	opt.	d.k.; also c.k.	73-0072
S1.102	acrylonitrile	11	1×10^{10} (± 15%)	—	f.phot.	opt.	d.k.; H_2-satd.	71-7345
S1.103	ACTH, porcine	—	2.1×10^{10}	—	—	—	—	70-1056
S1.104	ACTH, synthetic	—	1.5×10^{10}	—	—	—	—	70-1056
S1.105	adenine	7	9.0×10^9	—	p.r.	opt.	d.k.; $\mu = 0.1$; $pK_a = 9.8$.	71-0375
		11	1.1×10^9					
		—	9×10^9	—	p.r.	opt.	d.k. (e^-_{aq}) or p.b.k. (radical anion).	73-3016
		See also 1.300.						
S1.106	adenine poly-nucleotides (poly A)	7	2.5×10^8	—	p.r.	opt.	d.k.; mol. wt. 2×10^5; *k* per base unit.	71-0375
S1.107	adenine + uracil polynucleotides (poly A + U)	7	1.3×10^8	—	p.r.	p.r.	d.k.; mol. wt. 5×10^5; *k* per base unit.	71-0375
S1.108	adenosine	6-11	9.2×10^9	—	p.r.	opt.	d.k.; $\mu = 0.1$; $pK_a = 12.5$.	71-0375
		See also 1.301.						
S1.109	adenosine 5'-phosphate ion	6-12	3.6×10^9	—	p.r.	opt.	d.k.; $\mu = 0.1$.	71-0375
		See also 1.302.						
S1.110	alanine	7.4	1.2×10^7	—	p.r.	opt.	d.k.	74-1058
		See also 1.303-4.						
S1.111	β-alanine	6.9	4.2×10^6	—	p.r.	opt.	d.k.	74-1058
		See also 1.305.						
S1.112	alanine anhydride	9.2	$(2.0 \pm 0.1) \times 10^9$	—	p.r.	opt.	d.k.	71-0554
S1.113	β-alanylglycylgly-cine	6.4	2.8×10^8	—	p.r.	opt.	d.k.	74-1058
		12.2	7.1×10^7	—	p.r.	opt.	d.k.	74-1058
S1.113a	albumin (bovine serum)	6.0	$(4.07 \pm 0.15) \times 10^{10}$	—	p.r.	opt.	d.k.	73-3020
S1.114	alcohol dehydro-genase	7	2.4×10^9 (± 15%)	—	p.r.	opt.	d.k.	70-1226
S1.115	2-aminoacetamide (glycine amide)	6.5	2.1×10^9	—	p.r.	opt.	d.k.; 90% deamination.	71-3052
	$e^-_{aq} + NH_3^+CH_2CONH_2 \rightarrow \cdot CH_2CONH_2 + NH_3$	11.4	2.8×10^8	—	p.r.	opt.	d.k.	71-3052
S1.116	*p*-aminobenzoate ion	11	$(1.8 \pm 0.3) \times 10^9$	—	f.phot.	opt.	d.k.	72-0423
		See also 1.310.						

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

No.	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.117	7-aminocephalosporanic acid	6.0	8.6×10^9	—	p.r.	opt.	d.k.	73-3020
S1.118	2-amino-2-deoxy-D-galactose	—	8.4×10^7	—	p.r.	opt.	d.k.	70-3081
S1.119	6-aminopenicillanic acid	6.0	3.6×10^9	—	p.r.	opt.	d.k.	73-3020
S1.120	ampicillin	6.0	5.7×10^9	—	p.r.	opt.	d.k.	73-3020
S1.121	amylamine	13	$(1.0 \pm 0.1) \times 10^6$	—	p.r.	opt.	d.k.	73-0016
		See also 1.313b.						
S1.122	amylammonium ion	8.5	$(2.7 \pm 0.1) \times 10^6$	—	p.r.	opt.	d.k.	73-0016
S1.123	aniline							
	$e^-_{aq} + C_6H_5NH_2 \rightarrow C_6H_6NH_2 + OH^-$	10	$(2.6 \pm 0.3) \times 10^7$	—	p.r.	opt.	d.k.	72-0289
		See also 1.314.						
S1.124	9,10-anthraquinone-1-sulfonate ion	—	2.3×10^{10}	—	p.r.	opt.	d.k.	72-0391
S1.125	9,10-anthraquinone-2-sulfonate ion	~9.2	2.2×10^{10} (± 10%)	—	p.r.	opt.	d.k.	72-0171
		—	2.8×10^{10}	—	p.r.	opt.	d.k.	72-0391
S1.126	anthrone	~9.2	3.3×10^{10} (± 10%)	—	p.r.	opt.	d.k.	72-0171
S1.127	ascorbate ion	7	4×10^8	—	p.r.	opt.	d.k.	72-0266
S1.128	aspartic acid	3.0		$k/k_{BrPhOH} = 0.147$	γ-r.	chem.	c.k.; assumed $k_{BrPhOH} = 6.0 \times 10^9$ to calculate k for various ionic forms; pK_a = 2.10, 3.86.	72-0027
		7.0		$k/k_{BrPhOH} = 2.5 \times 10^{-3}$				
	positive ion		5×10^9 (calcd.)					
	zwitterion		5×10^8 (calcd.)					
	negative ion		1.5×10^7 (calcd.)					
		See also 1.321-2.						
S1.129	azurin	7.0	$(1.0 \pm 0.3) \times 10^{11}$	—	p.r.	opt.	d.k. at 550 nm. (e^-_{aq}) as well as at 625 nm. (Cu-II ion); mol. wt. 16,000; *pseudomonas* azurin.	71-3064, 72-1003
S1.130	barbituric acid	2.6		$k/k_{BrPhOH} = 1.55$	γ-r.	chem.	c.k.; assume $k_{BrPhOH} = 6.0 \times 10^9$ to calculate k for ionic forms; pK_a = 4.01.	72-0027
		4.0		$k/k_{BrPhOH} = 0.733$				
		5.0		$k/k_{BrPhOH} = 0.167$				
		7.6		$k/k_{BrPhOH} = 0.0157$				
	e^-_{aq} + acid		9.5×10^9 (calcd.)					
	e^-_{aq} + anion		9.0×10^7 (calcd.)					
S1.131	benzamide	5.7	1.9×10^{10}	—	p.r.	opt.	d.k.; k also detd. at 6.4 kbar (6.4×10^8 N/m^2).	72-0102
		~9.2	1.9×10^{10} (± 10%)	—	p.r.	opt.	d.k.	72-0171
		See also 1.323.						
S1.132	benzene	—	1.46×10^7 (± 15%)	—	p.r.	opt.	d.k.	71-0475
		—	1.3×10^7	—	p.r.	opt.	d.k.; also reported k in solutions of surfactants.	71-0586
			1.1×10^8 (in hexadecyltrimethylammonium bromide)					
			4×10^6 (in dodecyl sodium sulfate)					
			6×10^6 (in Igepal CO-730)					
		See also 1.324.						
S1.133	benzenesulfonamide	—	9.8×10^9	—	p.r.	opt.	d.k.	73-0094
		See also 1.325.						
S1.134	benzil	~9.2	3.6×10^{10} (± 10%)	—	p.r.	opt.	d.k.	72-0171
S1.135	benzoic acid	3-4	7.08×10^9 (rel.)	$k_1/k_{H^+} = 0.451$	γ-r.	chem.	c.k.; $\mu = 0.05$; assume $k_{H^+} = 1.57 \times 10^{10}$ at that μ; cor. for e^-_{aq} + anion.	72-0057
	$e^-_{aq} + C_6H_5COOH \rightarrow OH^- + C_6H_5CO$ (1)			$k_2/k_1 \leq 0.1$				
	$e^-_{aq} + C_6H_5COOH \rightarrow H + C_6H_5COO^-$ (2)							
		—	3.0×10^9	—	p.r.	opt.	d.k.	73-0094
		See also 1.327a.						

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

No.	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.136	benzoin	~9.2	1.7×10^{10} (±10%)	—	p.r.	opt.	d.k.	72–0171
S1.137	benzophenone	~9.2	2.8×10^{10} (± 10%)	—	p.r.	opt.	d.k.	72–0171
		See also 1.329.						
S1.138	benzoquinone	11	$(4.2 \pm 0.7) \times 10^9$	—	f.phot.	opt.	d.k.	71–0437
		~7	4.2×10^{10}	—	p.r.	opt.	d.k.	71–0619
		See also 1.330.						
S1.139	3–benzoyl–*N*–methylpyridinium ion	9.0	$(5.5 \pm 0.7) \times 10^{10}$	—	p.r.	opt.	d.k.	72–0359
S1.140	2–benzoylpyridine	9.0	$(2.5 \pm 0.3) \times 10^{10}$	—	p.r.	opt.	d.k.	72–0359
S1.141	3–benzoylpyridine	9.0	$(3.0 \pm 0.3) \times 10^{10}$	—	p.r.	opt.	d.k.	72–0359
S1.142	4–benzoylpyridine	9.0	$(2.8 \pm 0.3) \times 10^{10}$	—	p.r.	opt.	d.k.	72–0359
S1.143	benzyl acetate $e^-_{aq} + C_6H_5CH_2OOCCH_3 \rightarrow C_6H_5CH_2 + CH_3COO^-$	—	1.1×10^9	—	p.r.	opt.	p.b.k. (benzyl radical).	73–0089
S1.144	benzyl alcohol	6.5	2×10^8	—	p.r.	opt.	d.k.; *k* increases with pressure → 6.4 kbar.	72–0298
		See also 1.331.						
S1.145	benzyl bromide $e^-_{aq} + C_6H_5CH_2Br \rightarrow C_6H_5CH_2 + Br^-$	—	1.5×10^9	—	p.r.	opt.	p.b.k. (benzyl radical).	73–0089
S1.146	benzyl chloride $e^-_{aq} + C_6H_5CH_2Cl \rightarrow C_6H_5CH_2 + Cl^-$	—	1.6×10^9	—	p.r.	opt.	p.b.k. (benzyl radical).	73–0089
		6–7	5×10^9	—	p.r.	opt.	d.k.	73–1041
		See also 1.332.						
S1.147	benzyl formate $e^-_{aq} + C_6H_5CH_2OOCH \rightarrow C_6H_5CH_2 + HCOO^-$	—	1.5×10^9	—	p.r.	opt.	p.b.k. (benzyl radical).	73–0089
S1.148	β–benzylglucoside	~7	$(7 \pm 1.5) \times 10^7$	—	p.r.	opt.	d.k.	71–0480
S1.149	benzyl mercaptan $e^-_{aq} + C_6H_5CH_2SH \rightarrow C_6H_5CH_2 + HS^-$	7.0	8.7×10^9 (± 10%)	—	p.r.	opt.	d.k.	73–0090
S1.150	benzylpenicillin	6.0	$(2.76 \pm 0.08) \times 10^9$	—	p.r.	opt.	d.k.	73–0134, 73–3020
S1.151	benzylpenicillin, methyl ester	6.0	7.0×10^9	—	p.r.	opt.	d.k.	73–3020
S1.152	benzylpenicilloic acid	—	1.4×10^9	—	p.r.	opt.	d.k.	73–0134
S1.153	benzyl thiocyanate $e^-_{aq} + C_6H_5CH_2SCN \rightarrow C_6H_5CH_2 + SCN^-$	—	2.0×10^9	—	p.r.	opt.	p.b.k. (benzyl radical).	73–0089
S1.154	biuret $e^-_{aq} + NH_2CONHCONH_2 \rightarrow NH_2C(O^-)NHCONH_2$	10.3	2.5×10^8	—	p.r.	opt.	d.k.	73–0091
S1.155	5–bromoorotate ion	11	3×10^9	—	p.r.	opt.	d.k.	73–0002
S1.156	5–bromoorotic acid	7	1×10^{10}	—	p.r.	opt.	d.k.	73–0002
S1.157	*p*–bromophenol	5–6	7×10^9	—	p.r.	opt.	d.k.	72–0027
		4	5.5×10^9 (rel.)	$k/k_{H^+} = 0.24$	γ–r.	chem.	c.k.; assume $k_{H^+} = 2.3 \times 10^{10}$; also see S1.158.	72–0027
		The value 6.0×10^9 has been used to calculate specific rates of the following reactions from relative rates: S1.128, S1.130, S1.256, S1.257, S1.296, S1.297, S1.401, S1.402. *See also* 1.343, in which 1.2×10^{10} was the standard value used.						
S1.158	*p*–bromophenoxide ion	7	6×10^9 (rel.)	$k/k_{acetone} = 1$	γ–r.	chem.	c.k.; assume $k_{acetone} = 6 \times 10^9$.	72–0027
		7	6.2×10^9 (rel.)	$k/k_{orotate\ ion} = 0.41$	γ–r.	chem.	c.k.; assume $k_{orotate\ ion} = 1.5 \times 10^{10}$.	72–0027
		11	3.4×10^9	—	p.r.	opt.	d.k.	72–00[illegible]
		See also 1.344.						

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

No.	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
..159	5-bromouracil	7	1.6×10^{10}	—	p.r.	opt.	d.k.; $\mu = 0.05$.	72-0049
		9	8.2×10^{9}	—	p.r.	opt.	d.k.; $\mu = 0.05$.	72-0049
		11	7.0×10^{9}	—	p.r.	opt.	d.k.; $\mu = 0.05$.	72-0049
		See also 1.348.						
S1.160	*N-tert*-butyl-acetamide	9.2	1.2×10^{7}	—	p.r.	opt.	d.k.	71-0414
S1.161	butylamine	13	$(1.1 \pm 0.1) \times 10^{6}$	—	p.r.	opt.	d.k.	73-0016
S1.162	butylammonium ion	8.5	$(2.6 \pm 0.1) \times 10^{6}$	—	p.r.	opt.	d.k.	73-0016
S1.163	carbenicillin	6.0	1.1×10^{9}	—	p.r.	opt.	d.k.	73-3020
S1.164	carbon disulfide	—	3.1×10^{10}	—	p.r.	—	—	73-1015
	$e^-_{aq} + CS_2 \rightarrow SCS^-$	*See also* 1.354.						
S1.165	carboxymethyl-cellulose ion	—	1.8×10^{7}	—	p.r.	opt.	d.k.	68-0352
S1.166	catalase	6.0	$(2.0 \pm 0.2) \times 10^{11}$	—	p.r.	opt.	d.k. (e^-_{aq}); first-order d.k. (protein) or p.b.k., $k = 18 \pm 1\ s^{-1}$.	72-1003
		See also 1.356.						
S1.167	cephaloridine	6.0	2.8×10^{10}	—	p.r.	opt.	d.k.	73-3020
S1.168	cephalosporin C	6.0	8.9×10^{9}	—	p.r.	opt.	d.k.	73-3020
S1.169	cephalothin	6.0	1.1×10^{10}	—	p.r.	opt.	d.k.	73-3020
S1.170	ceruloplasmin	6.0	$(9 \pm 1) \times 10^{10}$	—	p.r.	opt.	d.k. (e^-_{aq}); first-order $k = (8.8 \pm 0.6) \times 10^2\ s^{-1}$ for d.k. (protein).	72-1003
S1.171	chloral hydrate	—	$(1.2 \pm 0.2) \times 10^{10}$	—	p.r.	opt.	d.k.	73-0062
S1.172	*N*-(2-chloro-acetyl)-phenylalanine	9.2	2.3×10^{9}	—	p.r.	opt.	d.k.	73-0076
S1.173	2-chloroethanol	6.2	6.4×10^{8}	—	p.r.	opt.	d.k.; k increases with pressure → 6.4 kbar ($6.4 \times 10^8\ N/m^2$).	72-0298
		See also 1.366.						
S1.174	chloromethane	—	5×10^{8}	—	p.r.	opt.	d.k.	71-0587
		See also 1.367a.						
S1.175	2-chloro-2-phenyl-acetate ion	9.2	2.7×10^{9}	—	p.r.	opt.	d.k.	73-0076
S1.176	1-chloro-2-phenyl-ethane	9.2	6.0×10^{8}	—	p.r.	opt.	d.k.	73-0076
S1.177	*p*-chlorophenyl-β-D-glucopyranoside	—	2.57×10^{9}	—	p.r.	opt.	d.k.	71-0056
S1.178	5-chlorouracil	7	1.5×10^{10}	—	p.r.	opt.	d.k.; $\mu = 0.05$	72-0049
		9	6.3×10^{9}	—	p.r.	opt.	d.k.	72-0049
		11	5.5×10^{9}	—	p.r.	opt.	d.k.	72-0049
S1.179	chondroitin 4-sulfate I	—	2.6×10^{7}	—	p.r.	opt.	d.k.; rate per hexose unit.	70-3081
S1.180	chondroitin 4-sulfate II	—	1.3×10^{7}	—	p.r.	opt.	d.k.; rate per hexose unit.	70-3081
S1.181	chondroitin 6-sulfate I	—	4.2×10^{7}	—	p.r.	opt.	d.k.; rate per hexose unit.	70-3081
S1.182	chondroitin 6-sulfate II	—	1.1×10^{7}	—	p.r.	opt.	d.k.; rate per hexose unit.	70-3081
S1.183	cinnamamide	9.2	$(3.0 \pm 0.1) \times 10^{10}$	—	p.r.	opt.	d.k.	73-0072
S1.184	cloxacillin	6.0	7.5×10^{9}	—	p.r.	opt.	d.k.	73-3020
S1.185	copper oxidase (fungal laccase)	6	8.5×10^{10}	—	p.r.	opt.	d.k. at 550 nm (e^-_{aq}); contains 4 Cu(II) ions; d.k. of Cu(II) at 610 nm gave $k = 1.5 \times 10^8$.	71-3073 72-1003

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

No.	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.186	*p*-cresol	7.9	$(4.2 \pm 0.5) \times 10^7$	—	p.r.	opt.	d.k.	73-0003
S1.187	cresol red	11	$(8.5 \pm 0.7) \times 10^9$	—	f.phot.	opt.	d.k.	71-0437
S1.188	*trans*-crotonate ion	9.2	$(1.3 \pm 0.1) \times 10^9$	—	p.r.	opt.	d.k.	73-0072
S1.189	*trans*-crotonic acid	1.5-3.5	$(2.9 \pm 0.4) \times 10^{10}$	—	p.r.	opt.	d.k.; also c.k.	73-0072
S1.190	cyanocobalamin (Vitamin B_{12})	6.1	$(5.2 \pm 0.1) \times 10^{10}$	—	p.r.	opt.	d.k. at 600 nm; also d.k. at other wavelengths 310-520 nm.	73-0116
		11.1	$(3.5 \pm 0.2) \times 10^{10}$					
S1.191	cycloheptatriene	—	$(6 \pm 2) \times 10^9$	—	p.r.	opt.	d.k.	71-0710
S1.192	cystamine, di-positive ion	6.7	$(4.2 \pm 0.4) \times 10^{10}$	—	p.r.	opt.	d.k.	72-0388
	free amine	11.1	$(1.8 \pm 0.2) \times 10^{10}$	—	p.r.	opt.	d.k.	72-0388
		See also 1.388.						
S1.193	cysteamine, positive ion	5.5	3.0×10^{10} (± 10%)	—	p.r.	opt.	d.k.; pK_a = 8.6, 10.7.	73-0090
		2.4-2.65	2.4×10^{10} (cor.) (rel.)	—	γ-r.	chem.	c.k. with H^+; assume $k_{H^+} = 2.3 \times 10^{10}$.	73-0286
	negative ion	12.5	1.5×10^9 (± 10%)	—	p.r.	opt.	d.k.	73-0090
		See also 1.389.						
S1.194	cysteine, positive ion	1	6.1×10^{10} (cor.) (rel.)	—	γ-r.	chem.	c.k. with H^+; assume $k_{H^+} = 2.3 \times 10^{10}$.	73-0286
	zwitterion	5.8	1.3×10^{10} (± 10%)	—	p.r.	opt.	d.k.; pK_a = 1.8, 8.3, 10.8.	73-0090
		3	1.0×10^{10} (rel.)	—	p.r.	opt.	c.k. with H^+; assume $k_{H^+} = 2.3 \times 10^{10}$	73-0286
	negative ion	11.0	$(3.5 - 3.7) \times 10^8$	—	f.phot.	opt.	d.k.	71-7525
		12.5	2.0×10^8 (± 10%)	—	p.r.	opt.	d.k.	73-0090
		See also 1.390 - 1.392.						
S1.195	cysteine, methyl ester	5.1	1.8×10^{10} (± 10%)	—	p.r.	opt.	d.k.; pK_a = 6.5, 9.0.	73-0090
		10.1	6.9×10^9 (± 10%)					
	cysteine, *S*-methyl ether *See* *S*-methylcysteine (S1.319)							
S1.196	cystine, zwitterion	5.6	1.6×10^{10}	—	p.r.	opt.	d.k.	72-0187
		6.2	$(1.5 \pm 0.2) \times 10^{10}$	—	p.r.	opt.	d.k.	72-0388
		See also 1.393.						
S1.197	cystine, dianion	11.0	$(2.46 \pm 0.3) \times 10^9$	—	f.phot.	opt.	d.k.	71-7525
		12.1	$(5.0 \pm 0.5) \times 10^9$	—	p.r.	opt.	d.k.	72-0388
		See also 1.394.						
S1.198	cystine, dimethyl ester	6.3	$(5.1 \pm 0.5) \times 10^{10}$	—	p.r.	opt.	d.k.; pK_a 6.9.	72-0388
		9.2	$(2.1 \pm 0.2) \times 10^{10}$	—	p.r.	opt.	d.k.	72-0388
S1.199	cytidine	7	1.32×10^{10}	—	p.r.	opt.	d.k.; μ = 0.1; pK_a = 12.3.	71-0375
		14	9.5×10^9					
		See also 1.395.						
S1.200	cytidine 5′-phosphate ion	7-14	6.8×10^9	—	p.r.	opt.	d.k.; μ = 0.1.	71-0375
S1.201	cytidine 2′,3′-cyclic phosphate ion	7	1.0×10^{10}	—	p.r.	opt.	d.k.; μ = 0.1; pK_a = 12.3.	71-0375
		14	7.5×10^9					
S1.202	cytochrome-C, ferro-	7	$(1-2) \times 10^{10}$	—	p.r.	opt.	deduced that rate is similar to rate with ferri-cytochrome C; see below.	71-0327

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.203	cytochrome-C, ferri- $e^-_{aq} + Fe^{3+}$cyt C → Fe^{2+} cyt C	—	5.0×10^{10} (rel.)	$k/k_{nitrate} = 4.5$	γ-r.	opt.	c.k.; assume $k_{nitrate} = 1.1 \times 10^{10}$.	67-3020
		6	$\sim 2 \times 10^{10}$	—	p.r.	opt.	d.k.; soln. contains 0.1 *M* formate ion.	71-0327
		13	$\sim 1 \times 10^{10}$	—				
		6-11	~ (2-200) x 10^9 (cor.)	—	p.r.	opt.	d.k.; decreases with pH.	71-3049
		8.5	< 1.1×10^{11} (calcd.)	—	p.r.	opt.	d.k. as well as p.b.k.; $k_{obs.}$ = 3.3×10^{10} and 2.6×10^{10}.	72-1002, 71-0930
		6.0	(1.2 – 1.7) (± 0.3) x 10^{11}	—	p.r.	opt.	d.k.; similar values for d.k. (protein) and p.b.k.; *k* given for cyt C from several sources and several cyt C derivatives.	72-3010, 72-1003
		11	(1.0 ± 0.4) x 10^{10}	—	p.r.	opt.	d.k.	72-3010, 72-1003
		6.8	(5.5 ± 1.5) x 10^{10}	—	p.r.	opt.	d.k.; *k* is for e^- attachment; $k = 10^5 s^{-1}$ detd. for Fe(II) cyt C formn.	73-0022
		See also 1.395a.						
S1.204	cytosine	7	1.3×10^{10}	—	p.r.	opt.	d.k.; $\mu = 0.1$; $pK_a = 12.2$.	71-0375
		14	3.6×10^9					
		See also 1.396.						
S1.205	deoxyribose	7	(1 ± 0.5) x 10^7	—	p.r.	opt.	d.k.; H_2-satd.	71-0256
S1.206	2-deoxy-2-sulfonamido-D-glucose	—	1.7×10^7	—	p.r.	opt.	d.k.	70-3081
S1.207	dextran sulfate	—	≤ 7×10^6	—	p.r.	opt.	d.k.; *k* calcd. per hexose unit.	70-3081
S1.208	diacetamide	6.5	1.1×10^{10}	—	p.r.	opt.	d.k.	73-0091
	dibenzyl ketone *See* 1,3-diphenylacetone (S1.228)							
S1.209	1,4-dicyanobenzene	—	(2.4 ± 0.1) x 10^{10}	—	p.r.	opt.	d.k.	73-0121
S1.210	*N,N*-diethylacetamide	9.2	8.0×10^6	—	p.r.	opt.	d.k.	71-0414
S1.211	*N,N*-diethylhydroxylammonium ion	4.7	≥ 1.2×10^{10}	—	p.r.	opt.	d.k.; could be 30% higher.	71-0493
S1.212	*N,N*-diethylhydroxylamine	9.1	2.4×10^8	—	p.r.	opt.	d.k.; could be 30% higher.	71-0493
S1.213	*o*-difluorobenzene $e^-_{aq} + C_6H_4F_2 \rightarrow C_6H_4F + F^-$ and $\cdot C_6H_5F_2$	~6.5	1.2×10^9	—	p.r.	opt.	d.k.	73-0054
S1.214	*p*-difluorobenzene $e^-_{aq} + C_6H_4F_2 \rightarrow \cdot C_6H_4F + F^-$ and $\cdot C_6H_5F_2$	~6.5	2.0×10^9	—	p.r.	opt.	d.k.	73-0054
S1.215	*N,N*-dimethylacetamide	9.2	2.1×10^7	—	p.r.	opt.	d.k.	71-0414
S1.216	5,6-dimethylbenzimidazole	6.5	5.1×10^{10}	—	p.r.	opt.	d.k.	73-0116

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

No.	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.217	4,4-dimethyl-1,1-bipyridylium ion	—	8.4×10^{10}	—	p.r.	opt.	d.k.	73-1074
S1.218	*N,N*-dimethylformamide	9.2	4.6×10^{8}	—	p.r.	opt.	d.k.; impurities might account for high *k*.	71-0414
		See also 1.403.						
S1.219	dimethyl fumarate	9.2	3.3×10^{10}	—	p.r.	opt.	d.k.	73-0097
S1.220	1,1-dimethylhydrazinium ion	5.6	5.8×10^{9} (± 15%)	—	p.r.	opt.	d.k.	72-0003
S1.221	1,2-dimethylhydrazinium ion	5.6	2.3×10^{9} (± 15%)	—	p.r.	opt.	d.k.	72-0003
S1.222	1,1-dimethylhydrazine	12.0	2.4×10^{7} (± 15%)	—	p.r.	opt.	d.k.	72-0003
S1.223	1,2-dimethylhydrazine	12.4	6.1×10^{6} (± 15%)	—	p.r.	opt.	d.k.	72-0003
S1.224	dimethyl maleate	9.2	3.2×10^{10}	—	p.r.	opt.	d.k.	73-0097
S1.225	2,4-dimethylphenyl-β-D-glucopyranoside	—	5.0×10^{7}	—	p.r.	opt.	d.k.	71-0056
S1.226	*N,N*-dimethylpivalamide	9.2	1.2×10^{7}	—	p.r.	opt.	d.k.	71-0414
S1.227	dimethylsulfoxide	—	1.6×10^{6}	—	p.r.	opt.	d.k.; cor. for $e^-_{aq} + H_2O$.	71-0587
		See also 1.405.						
S1.228	1,3-diphenylacetone (dibenzyl ketone)	~9.2	1.1×10^{10} (± 10%)	—	p.r.	opt.	d.k.	72-0171
S1.229	2,2′-dithiobisacetate ion	10.8	$(4.3 \pm 0.2) \times 10^{9}$	—	p.r.	opt.	d.k.	72-0388
S1.230	2,2′-dithiobispropionate ion	6.4	$(4.4 \pm 0.3) \times 10^{9}$	—	p.r.	opt.	d.k.	72-0388
		10.8	$(4.3 \pm 0.3) \times 10^{9}$	—	p.r.	opt.	d.k.	72-0388
S1.231	DNA	7	1.4×10^{8}	—	p.r.	opt.	d.k.; *k* per base unit.	71-0375
		—	4.0×10^{9}	—	p.r.	opt.	d.k. (e^-_{aq}) or p.b.k. (radical anion); *k* per base unit.	73-3016
		See also 1.409a.						
S1.232	dodecyl sodium sulfate	—	$\leq 2 \times 10^{5}$	—	p.r.	opt.	d.k.	71-0586
		7	$< 10^{7}$	—	p.r.	opt.	d.k.	73-3013
		See also 1.409b.						
S1.233	erythrosin (tetraiodofluorescein)	8.0	$\geq 8 \times 10^{9}$ (rel.)	—	X-r.	opt.	c.k. with O_2; contains Br^- as OH scavenger; obs. *G*(−dye); assume $k(e^-_{aq} + O_2) = 1.9 \times 10^{10}$.	71-0295, 71-0354
S1.234	ethanesulfonate ion	—	3.5×10^{7}	—	p.r.	opt.	d.k.	68-0352
S1.235	ethyl acrylate	11	8.7×10^{9} (± 15%)	—	f.phot.	opt.	d.k.; H_2-satd.	71-7345
S1.236	ethylamine	13	$(1.0 \pm 0.1) \times 10^{6}$	—	p.r.	opt.	d.k.	73-0016
S1.237	ethylammonium ion	8.5	$(2.5 \pm 0.1) \times 10^{6}$	—	p.r.	opt.	d.k.	73-0016
		See also 1.417.						
S1.238	*N*-ethylmaleamate ion	7.9	8.5×10^{9}	—	p.r.	opt.	d.k.	72-0144
S1.239	*N*-ethylmaleimide	6.0	3.8×10^{10}	—	p.r.	opt.	d.k.	72-0144
		See also 1.421a.						
S1.240	fluocinolone acetonide	—	3.0×10^{10}	—	p.r.	—	—	70-1056
S1.241	fluorenone	~9.2	3.3×10^{10} (± 10%)	—	p.r.	opt.	d.k.	72-

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.242	fluorescein	13	$(2.0 \pm 0.2) \times 10^{10}$	—	p.r.	opt.	d.k.	67-6053
		See also 1.422.						
S1.243	fluorobenzene	~6.5	7×10^7	—	p.r.	opt.	d.k.	73-0054
	$e^-_{aq} + C_6H_5F \rightarrow (C_6H_5F)^- \rightarrow \cdot C_6H_6F$ or $C_6H_5F^- \rightarrow \cdot C_6H_5 + F^-$	*See also* 1.425.						
S1.244	5-fluorouracil	7	1.2×10^{10}	—	p.r.	opt.	d.k.; $\mu = 0.05$.	72-0049
		9	5.7×10^9					
		11	5.0×10^9					
S1.245	formamide	9.2	6.3×10^7	—	p.r.	opt.	d.k.	71-0414
		—	$(1.8 \pm 0.2) \times 10^7$	—	laser	opt.	d.k.; concn. 2.5 – 12.6 mol/dm^3.	71-0442
		6.3	1.8×10^7	—	p.r.	opt.	d.k.; k increases with pressure → 6.4 kbar (6.4×10^8 N/m^2).	72-0298
		See also 1.433.						
S1.246	formic acid	3–4	1.88×10^8 (rel.)(1)	$k/k_{H^+} = 1.20 \times 10^{-2}$	γ-r.	chem.	c.k.; $\mu = 0.05$; assume $k_{H^+} = 1.57 \times 10^{10}$ at that μ.	72-0057
	$e^-_{aq} + HCOOH \rightarrow OH^- + HCO$ (1)		1.52×10^8 (rel.)(2)	$k_2/k_1 = 0.80$				
	$e^-_{aq} + HCOOH \rightarrow H + HCOO^-$ (2)	*See also* 1.435.						
S1.247	*N*-formylglycine	10.5	2.9×10^7	—	p.r.	opt.	d.k.	71-3052
S1.249	furadantin	7	3.35×10^{10}	—	p.r.	opt.	—	73-1018
S1.250	furamazone	7	3.25×10^{10}	—	p.r.	opt.	—	73-1018
S1.251	gelatin	6.18	—	—	p.r.	opt.	d.k.; k increases by 100% at 16 → 40°C.	67-0776
		See also 1.437a.						
S1.252	D-glucuronate ion	—	2×10^6	—	p.r.	opt.	d.k.	70-3081
		See also 1.439a.						
S1.253	glutamylglutamyl-glutamic acid	6.3	2.3×10^9	—	p.r.	opt.	d.k.	74-1058
		9.6	5.8×10^8	—	p.r.	opt.	d.k.	74-1058
S1.254	glutathione, reduced (GuSH)	11.0	1.5×10^8	—	f.phot.	opt.	d.k.	71-7525
		7.2	4.5×10^9 (± 10%)	—	p.r.	opt.	d.k.; $pK_a = 2.1$, 3.6, 8.8, 9.7.	73-0090
		12.7	4.7×10^8 (± 10%)					
		See also 1.441.						
S1.255	glutathione, oxidized	11.0	$(1.15 \pm 0.1) \times 10^9$	—	f.phot.	opt.	d.k.	71-7525
	$e^-_{aq} + (GuS)_2 \rightarrow (GuS)_2^-$	4.5–7.9	$(2.7 \pm 0.3) \times 10^9$	—	p.r.	opt.	d.k.	72-0380
		6.8	$(3.4 \pm 0.3) \times 10^9$	—	p.r.	opt.	d.k.; $pK = 3.15$, 4.03, 8.57, 9.54.	72-0388
		12.6	$(2.1 \pm 0.2) \times 10^9$					
		See also 1.442.						
S1.256	glycine, positive ion	3.0	5.4×10^8 (rel.)	$k/k_{BrPhOH} = 9 \times 10^{-2}$	γ-r.	chem.	c.k.; assume $k_{BrPhOH} = 6 \times 10^9$; $pK_a = 2.35$; calcd. $k = 4 \times 10^9$ for positive ion.	72-0027
	$e^-_{aq} + {}^+NH_3CH_2COOH \rightarrow NH_3 + CH_2COOH$ + other products	4.0	4.6×10^7 (rel.)	$k/k_{BrPhOH} = 7.6 \times 10^{-3}$				
		1.0	6.0×10^9	—	p.r.	opt.	d.k.	72-0187
		2.3	4.1×10^9 (rel.)	$k/k_{H^+} = 0.18$	p.r.	opt.	c.k.; assume $k_{H^+} = 2.3 \times 10^{10}$; obs. CH_2COOH at 320 nm.	72-1012
		See also 1.443.						

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

No.	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.257	glycine, zwitterion	6.2	8.3×10^6	—	p.r.	opt.	d.k.	71-0[illegible]
		7.0	9×10^6 (rel.)	$k/k_{BrPhOH} = 1.5 \times 10^{-3}$	γ-r.	chem.	d.k.; assume $k_{BrPhOH} = 6 \times 10^9$; obs. $G(Br^-)$.	72-0027
		See also 1.444.						
S1.258	glycine, negative ion	11.8	1.7×10^6	—	p.r.	opt.	d.k.	71-0782
		See also 1.445.						
	glycine amide *See* 2-aminoacetamide (S1.115).							
S1.259	glycine anhydride	9.2	$(1.7 \pm 0.1) \times 10^9$	—	p.r.	opt.	d.k.	71-0554
	glycine methyl ester *See* methyl 2-aminoacetate (1.523, S1.318).							
	glycolamide *See* hydroxyacetamide (S1.284).							
S1.260	glycolic acid $e^-_{aq} + CH_2OHCOOH \rightarrow OH^- + CH_2OHCO$ (1) $e^-_{aq} + CH_2OHCOOH \rightarrow H + CH_2OHCOO^-$ (2)	3-4	4.27×10^8 (rel.)	$k_1/k_{H^+} = 2.72 \times 10^{-2}$ $k_2/k_1 << 0.1$	γ-r.	chem.	c.k.; $\mu = 0.05$; assume $k_{H^+} = 1.57 \times 10^{10}$ at that μ.	72-0057
S1.261	glycylglycine, zwitterion	6.4	3.7×10^8	—	p.r.	opt.	d.k.	71-3052
		See also 1.451.						
S1.262	glycylglycine, negative ion	13.1	4.9×10^7	—	p.r.	opt.	d.k.	71-3052
		See also 1.452.						
S1.263	glycylglycine amide	5.7	4.2×10^9	—	p.r.	opt.	d.k.	71-3052
		11.4	1.7×10^9	—	p.r.	opt.	d.k.	71-3052
S1.264	glycylglycine, ethyl ester	5.9	4.0×10^9	—	p.r.	opt.	d.k.	71-3052
		11.4	1.7×10^9	—	p.r.	opt.	d.k.	71-3052
S1.265	glycylglycyl-β-alanine	5.0	1.4×10^9	—	p.r.	opt.	d.k.	74-1058
		12.2	2.3×10^8	—	p.r.	opt.	d.k.	74-1058
S1.266	glycylglycyl-glycine, zwitterion	6.1	1.8×10^9	—	p.r.	opt.	d.k.	71-3052
		See also 1.454.						
S1.267	glycylglycyl-glycine, negative ion	10.9	3.4×10^8	—	p.r.	opt.	d.k.	71-3052
		See also 1.455.						
S1.268	glycylglycyl-glycine amide	5.0	7.4×10^9	—	p.r.	opt.	d.k.	71-3052
		11.2	1.5×10^9	—	p.r.	opt.	d.k.	71-3052
S1.269	glycylglycyl-glycylglycine amide	6.3	8.8×10^9	—	p.r.	opt.	d.k.	71-3052
		9.7	3.7×10^9	—	p.r.	opt.	d.k.	71-3052
S1.270	glycylphenyl-alanine	5.9	6.1×10^8	—	p.r.	opt.	d.k.	73-0076
		9.4	1.3×10^8	—	p.r.	opt.	d.k.	73-0076
		See also 1.458.						
S1.271	glycylphenyl-alanylglycine	5.5	1.6×10^9	—	p.r.	opt.	d.k.	73-0076
		11.6	5.4×10^8	—	p.r.	opt.	d.k.	73-0076
S1.272	glycylsarcosine	6.4	6.9×10^8	—	p.r.	opt.	d.k.	74-1058
		11.3	1.0×10^8	—	p.r.	opt.	d.k.	74-1058
S1.273	glyoxylic acid $e^-_{aq} + CHOCOOH \rightarrow OH^- + CHOCO$ (1) $e^-_{aq} + CHOCOOH \rightarrow H + CHOCOO^-$ (2)	3-4	1.26×10^9 (rel.)	$k/k_{H^+} = 8.03 \times 10^{-2}$ $k_2/k_1 << 0.1$	γ-r.	chem.	c.k.; $\mu = 0.05$; assume $k_{H^+} = 1.57 \times 10^{10}$ at that μ.	72-0057
	N-(2-guanidinyl)sulfanilamide *See* sulfaguanidine (S1.404)							
S1.274	guanine	7	1.35×10^{10}	—	p.r.	opt.	d.k.; little change in k on addition of surfactants.	73-3013
		11	2.0×10^9					
S1.275	heme - peptide	6.0	$(1.5 \pm 0.2) \times 10^{11}$	—	p.r.	opt.	d.k.; cytochrome C deriv.	72-1003
S1.276	heparin	—	2.2×10^7	—	p.r.	opt.	d.k.; rate calcd. per hexose unit.	68-0352, 70-3081

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

No.	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.277	heparin, *N*-desulfated	—	1.0×10^7	—	p.r.	opt.	d.k.; rate calcd. per hexose unit.	70-3081
S1.278	hexadecyltrimethylammonium bromide	—	$\leq 9 \times 10^5$	—	p.r.	opt.	d.k.	71-0586
		7	$< 10^7$	—	p.r.	opt.	d.k.	73-3013
		See also 1.465a.						
S1.279	hexafluorobenzene $e^-_{aq} + C_6F_6 \rightarrow \cdot C_6F_5 + F^-$	~6.5	2.0×10^{10}	—	p.r.	opt.	d.k.	73-0054
		See also 1.465c.						
S1.280	hyaluronic acid	5.2	3×10^8	—	p.r.	opt.	d.k.; per disaccharide unit (mol. wt. 400).	67-0730
		11.2	8×10^8					
		—	1.4×10^8	—	p.r.	opt.	d.k.; rate calcd. per hexose unit.	68-0352, 70-3081
		—	$(2.1 \text{ to } 6.4) \times 10^7$	—	p.r.	—	solns. contain ~ 0.07 – 0.5% protein.	72-3119
S1.281	hyaluronic acid, sulfated	—	1.7×10^7	—	p.r.	opt.	d.k.; rate calcd. per hexose unit.	70-3081
S1.282	hydrocortisone	—	3.5×10^{10}	—	p.r.	—	—	70-1056
S1.283	hydrocortisone acetate	—	3.2×10^{10}	—	p.r.	—	—	70-1056
S1.284	hydroxyacetamide	7.5	2.7×10^8	—	p.r.	opt.	d.k.	73-0071
S1.285	hydroxycyclo-heptatriene $e^-_{aq} + C_7H_8OH \rightarrow \cdot C_7H_9OH + OH^-$	—	$(6 \pm 2) \times 10^9$	—	p.r.	opt.	d.k.	71-0710
S1.286	β-*p*-hydroxy-phenylglucoside	~7	$\sim 1 \times 10^7$	—	p.r.	opt.	d.k.	71-0480
S1.287	*p*-hydroxyphenyl-propionate ion (dianion)	7.0	$(4.6 \pm 0.5) \times 10^7$	—	p.r.	opt.	d.k.; $pK_a = 4.6$, 10.1.	73-0003
		12.5	$(2.1 \pm 0.2) \times 10^7$	—	p.r.	opt.	d.k.	73-0003
		See also 1.481.						
S1.288	2-hydroxypropion-amide	9.3	1.9×10^8	—	p.r.	opt.	d.k.	73-0071
	Igepal CO-730 *See* polyoxyethylene (15) nonylphenol (S1.382).							
S1.289	indole	11	2.6×10^8	—	f.phot.	opt.	d.k.	72-0541
		See also 1.487.						
S1.290	indole-3-acetate ion	11	1.7×10^8	—	f.phot.	opt.	d.k.	72-0541
S1.291	indole-3-propion-ate ion	11	2.6×10^8	—	f.phot.	opt.	d.k.	72-0541
S1.292	iodoacetamide $e^-_{aq} + ICH_2CONH_2 \rightarrow I^- + CH_2CONH_2$	—	5×10^{10}	—	p.r.	—	estd.	69-3030
S1.293	3-iodopropionate ion	7	5.8×10^9	—	f.phot.	opt.	d.k.	70-1226
S1.294	iodotyrosine	3.0-6.0	8.2×10^9	$k/k_{H^+} = 0.355$	X-r.	opt.	c.k.; assume $k_{H^+} = 2.3 \times 10^{10}$.	72-0610
S1.295	keratan sulfate	—	3.3×10^7	—	p.r.	opt.	d.k.; rate calcd. per hexose unit.	70-3081
		—	3.0×10^7	—	p.r.	opt.	d.k.	71-0067
	laccase *See* copper oxidase (S1.186).							
	lactamide *See* 2-hydroxypropionamide (S1.288).							
S1.296	lactate ion	7.0	5.0×10^7 (rel.)	$k/k_{BrPhOH} = 8.33 \times 10^{-3}$	γ-r.	chem.	c.k.; obs. $G(Br^-)$; assume $k_{BrPhOH} = 6.0 \times 10^9$	72-0027
		See also 1.501.						

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

No.	Solute and Reaction	pH	k(dm^{3}mol^{-1}s^{-1})	Ratio	Source	Method	Comment	Ref.
S1.297	lactic acid e^-_{aq} + $CH_3CHOHCOOH$ → OH^- + $CH_3CHOHCO$ (1)	3.0	7 x 10^8 (rel.)	k/k_{BrPhOH} = 9.67 x 10^{-2}	γ-r.	chem.	c.k.; obs. $G(Br^-)$; assume k_{BrPhOH} = 6.0 x 10^9 and pK_a = 3.82 to calc. k.	72-0027
	e^-_{aq} + $CH_3CHOHCOOH$ → H + $CH_3CHOHCOO^-$ (2)	3-4	6.31 x 10^8 (rel.)	k_1/k_{H^+} = 4.02 x 10^{-2} k_2/k_1 <<0.1	γ-r.	chem.	c.k.; μ = 0.05; assume k_{H^+} = 1.57 x 10^{10} at that μ.	72-0057
S1.298	lipoate ion	7.0	(1.5 ± 0.2) x 10^{10}	—	p.r.	opt.	d.k.	72-0388
	See also 1.507.							
S1.299	maleate ion (monoanion)	—	1.8 x 10^{10}	—	p.r.	opt.	d.k.; calcd. from $k_{obs.}$ = 1.45 x 10^{10} at pH 5.77.	73-0097
	(dianion)	10.5	1.6 x 10^9	—	p.r.	opt.	d.k.	73-0097
	See also 1.511 - 1.512.							
S1.300	malonamide	7.0	1.1 x 10^9	—	p.r.	opt.	d.k.	73-0091
S1.301	malonate ion (monoanion) e^-_{aq} + $HOOCCH_2COO^-$ → OH^- + $OCCH_2COO^-$ (1) e^-_{aq} + $HOOCCH_2COO^-$ → H + $^-OOCCH_2COO^-$ (2)	—	6 x 10^8 (rel.)	—	γ-r.	chem.	c.k.; obs. $G(Br^-)$; assume k_{BrPhOH} = 6.0 x 10^9; value calcd. from ratios at pH 2.1, 3.5, 5.1, 6.2, and 7.2 of k/k_{BrPhOH} = 0.175, 0.12, 0.065, 0.0183, and 0.002, resp.; pK_a = 2.86, 5.5.	72-0027
		3-4	6.11 x 10^8 (rel.)	k/k_{H^+} = 3.89 x 10^{-2} $k_2/k_1 \leq 0.1$	γ-r.	chem.	c.k.; μ = 0.05; assumed k_{H^+} = 1.57 x 10^{10} at that μ.	72-0057
	See also 1.513.							
S1.302	malonate ion (dianion)	—	3 x 10^6 (rel.)	—	γ-r.	chem.	c.k.; see S1.301 above.	72-0027
S1.303	malonic acid e^-_{aq} + $HOOCCH_2COOH$ → OH^- + $OCCH_2COOH$	—	1.3 x 10^9 (rel.)	—	γ-r.	chem.	c.k.; see S1.301 above.	72-0027
		3-4	1.45 x 10^9 (rel.)	k/k_{H^+} = 9.22 x 10^{-2}	γ-r.	chem.	c.k.; μ = 0.05; assumed k_{H^+} = 1.57 x 10^{10} at that μ, cor. for e^-_{aq} + anions.	72-0057
	menaquinone *See* 2-methyl-1,4-naphthoquinone (S1.333).							
	2-mercaptoacetate ion *See* thioglycolate ion (1.621, S1.416).							
S1.304	2-mercaptoethanol	1.6-3.0	5.8 x 10^{10} (rel.)	—	γ-r.	chem.	c.k. with H^+; assume k_{H^+} = 2.3 x 10^{10}.	73-0286
	See also 1.514.							
S1.304a	2-mercaptopropionate ion	7.2 12.2	5.0 x 10^9 (± 10%) 7.7 x 10^8 (± 10%)	—	p.r.	opt.	d.k.; pK_a ≅ 4, 10.7.	73-0090
S1.305	3-mercaptopropionate ion	7.4 13.0	5.0 x 10^9 (± 10%) ~ 2.8 x 10^8 (± 10%)	—	p.r.	opt.	d.k.; pK_a = 4.3, 10.3.	73-0090
S1.306	2-mercaptopropionic acid	1.6-3.0	(3.4 to 17.5) x 10^9 (rel.)	—	p.r.	opt.	c.k.; assume k_{H^+} = 2.3 x 10^{10}; k increases with pH.	73-0286
S1.307	3-mercaptopropionic acid	1.6-3.0	5.4 x 10^9 (rel.)	—	p.r.	opt.	c.k. with H^+; assume k_{H^+} = 2.3 x 10^{10}.	73-0286
	3-mercaptovaline *See* penicillamine (1.517, S1.365).							

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.308	methacrylamide	9.2	$(2.4 \pm 0.3) \times 10^{10}$	—	p.r.	opt.	d.k.	73-0072
S1.309	methacrylate ion	11	3×10^9 (± 15%)	—	f.phot.	opt.	d.k.; H_2-satd.	71-7345
		9.2	$(4.5 \pm 0.2) \times 10^9$	—	p.r.	opt.	d.k.	73-0072
		See also 1.518.						
S1.310	methacrylic acid	1.5-3.5	$(2.8 \pm 0.3) \times 10^{10}$	—	p.r.	opt.	d.k.; also c.k.	73-0072
S1.311	β-methazone valerate	—	3.7×10^{10}	—	p.r.	opt.	d.k.	70-1056
S1.312	methemoglobin	6-9	~ 6×10^9 to ~ 3×10^{11} (cor.)	—	p.r.	opt.	d.k.; decreases with pH.	71-3049
		6	3.0×10^{11}	—	p.r.	opt.	d.k. (e^-_{aq}); d.k. (protein) or p.b.k., $k = (2.2 \pm 0.3) \times 10^{11}$.	72-1003
S1.313	methicillin	6.0	2.8×10^9	—	p.r.	opt.	d.k.	73-3020
S1.314	methionine	7.3	4.5×10^7 (± 10%)	—	p.r.	opt.	d.k.; pK_a = 2.3, 9.2.	73-0090
		See also 1.522.						
S1.315	methyl acrylate	11	9.4×10^9 (± 15%)	—	f.phot.	opt.	d.k.; H_2-satd.	71-7345
S1.316	2-methyladenine	7	8.4×10^9	—	p.r.	opt.	d.k.; $\mu = 0.1$; $pK_a \sim 10$.	71-0375
		11	1.0×10^9					
S1.317	7-methyladenine	6-12	1.3×10^{10}	—	p.r.	opt.	d.k.; $\mu = 0.1$.	71-0375
S1.318	methyl 2-aminoacetate (glycine methyl ester) positive ion	11.2	3.3×10^8	—	p.r.	opt.	d.k.	71-3052
		5.3	6.8×10^9	—	p.r.	opt.	d.k.	71-3052
		See also 1.523.						
S1.319	*S*-methylcysteine	5.4	7.2×10^8 (± 10%)	—	p.r.	opt.	d.k.; $pK_a \cong$ 2, 8.8.	73-0090
		12.2	1.5×10^8 (± 10%)					
S1.320	1-methylcytosine	7-14	1.4×10^{10}	—	p.r.	opt.	d.k.; $\mu = 0.1$.	71-0375
S1.321	methylene chloride $e^-_{aq} + CH_2Cl_2 \rightarrow CH_2Cl + Cl^-$	10	$(6.3 \pm 0.5) \times 10^9$	—	p.r.	opt.	d.k.	72-0159
S1.322	methylene iodide	6-7	3.4×10^{10}	—	p.r.	opt.	d.k.	73-1041
S1.323	*N*-methylformamide	9.2	7.1×10^7	—	p.r.	opt.	d.k.	71-0414
		See also 1.530.						
S1.324	methyl fumarate (monoanion)	—	1.3×10^{10}	—	p.r.	opt.	d.k.	73-0097
	methyl glycolate *See* methyl hydroxyacetate							
S1.325	methylhydrazine	12.0	6.5×10^6 (± 15%)	—	p.r.	opt.	d.k.	72-0003
S1.326	methylhydrazinium ion	5.5	1.4×10^9 (± 15%)	—	p.r.	opt.	d.k.	72-0003
S1.327	methyl hydroxyacetate	9.0	1.4×10^9	—	p.r.	opt.	d.k.	73-0071
		See also 1.532.						
S1.328	*N*-methylhydroxylamine	9.0	2.4×10^8	—	p.r.	opt.	d.k.	71-0493
S1.329	*O*-methylhydroxylamine	9.1	4.4×10^8	—	p.r.	opt.	d.k.	71-0493
S1.330	*N*-methylhydroxylammonium ion	4.8	1.3×10^{10}	—	p.r.	opt.	d.k.	71-0493
S1.331	*O*-methylhydroxylammonium ion	4.5	$\geq 1.9 \times 10^{10}$	—	p.r.	opt.	d.k.; could be ~ 30% higher.	71-0493
S1.332	methyl methacrylate	11	6.3×10^9 (± 15%)	—	f.phot.	opt.	d.k.; H_2-satd.	71-7345
		9.2	$(1.3 \pm 0.1) \times 10^{10}$	—	p.r.	opt.	d.k.	73-0072
S1.333	2-methyl-1,4-naphthoquinone (menaquinone, Vitamin K_3) $e^-_{aq} + MQ \rightarrow MQ^-$ (semiquinone)	—	5.4×10^{10}	—	p.r.	opt.	—	72-3057, 73-0026
334	methylpenicillin	6.0	2.0×10^9	—	p.r.	opt.	d.k.	73-3020

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

No.	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.335	*N*-methylsuccin-imide	6.9	1.3×10^{10}	—	p.r.	opt.	d.k.	73-0094
S1.336	methyl thioglyco-late	5.2 10.3	1.4×10^{10} (± 10%) 1.4×10^{9} (± 10%)	—	p.r.	opt.	d.k.; pK_a = 7.8.	73-0090
S1.337	metmyoglobin	6-9	~ 7×10^{9} to ~4×10^{10} (cor.)	—	p.r.	opt.	d.k.; decreases with pH.	71-3049
		6	(5.3 to 6.0)(± 0.6) x 10^{10}	—	p.r.	opt.	d.k. (e^-_{aq} or protein) or p.b.k.	72-1003
S1.338	1,2-naphthoqui-none-4-sulfonate ion	~9.2	1.7×10^{10} (± 10%)	—	p.r.	opt.	d.k.	72-0171
S1.339	1,4-naphthoqui-none-2-sulfonate ion	~9.2	2.6×10^{10} (± 10%)	—	p.r.	opt.	d.k.	72-0171
S1.340	5-nitrobarbituric acid	5.9	1.82×10^{10}	—	p.r.	opt.	d.k.	73-1003
S1.341	nitrobenzene $e^-_{aq} + C_6H_5NO_2 \rightarrow C_6H_5NO_2^-$	—	2.8×10^{10}	—	p.r.	opt.	d.k.; k = (3.0 to 4.1) x 10^{10} and $E_a \cong 2 - 4.8$ kcal/mol (10 – 20 kJ/mol) vary with concn. of added ethanol, $MgCl_2$, KI, methanol, propanol, and butanol.	71-0580
		—	4.2×10^{10}	—	p.r.	opt.	d.k.; $\mu = 0$; k decreased in H_2O-ethanol mixtures.	73-1008
		See also 1.551.						
S1.342	nitrobenzene anion $e^-_{aq} + C_6H_5NO_2^- \rightarrow C_6H_5NO_2^{2-}$	10	2.5×10^{10}	—	p.r.	opt., condy.	p.b.k. during train of pulses (train length ~ 100 μs); com-puter analysis.	71-0171
S1.343	5-nitrofuraldehyde	7	3.4×10^{10}	—	p.r.	opt.	—	73-1018
S1.344	5-nitrofuraldehyde diacetate	7	3.0×10^{10}	—	p.r.	opt.	—	73-1018
S1.345	5-nitro-2-fural-dehyde semicar-bazone (nitrofur-azone)	—	2.8×10^{10}	—	p.r.	opt.	d.k. (e^-_{aq}) or p.b.k. (radical anion).	73-3016
S1.346	*anti*-5-nitro-2-furaldoxime (NF) $e^-_{aq} + NF \rightarrow NF^-$	6.8	3.8×10^{10}	—	p.r.	opt.	d.k. at 550 nm (e^-_{aq}) or at 360 nm (NF) as well as p.b.k. at 395 nm; slight de-crease in k with increase in pH (4 – 12).	73-1018
S1.347	5-nitrofuroate ion $e^-_{aq} + {}^-OOC(C_4H_2O)NO_2 \rightarrow {}^-OOC(C_4H_2O)NO_2^-$	3.3-7	2.2×10^{10}	—	p.r.	opt.	d.k.	73-0114
S1.348	nitromethane	—	2.2×10^{10}	—	p.r.	opt.	d.k.; k unchanged in sodium dodecyl sulfate soln.	73-1004
		6-7	2.9×10^{10}	—	p.r.	opt.	d.k.	73-1041
		See also 1.553.						
S1.349	nitromethane anion $e^-_{aq} + CH_3NO_2^- \rightarrow CH_3NO_2^{2-}$	10	—	—	p.r.	opt.	k has same order of magnitude as for $e^-_{aq} + CH_3NO_2 \rightarrow CH_3NO_2^-$.	71-0171
		See also 1.554.						

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.350	5-nitro-6-methyl-uracil	5.9	1.94×10^{10}	—	p.r.	opt.	d.k.	73-1003
S1.351	5-nitroorotic acid	5.9	1.75×10^{10}	—	p.r.	opt.	d.k.	73-1003
S1.352	*p*-nitrophenol	5.5	4.4×10^{10}	—	p.r.	opt.	d.k.; *k* also detd. at 6.4 kbar.	72-0102
		See also 1.559.						
S1.353	*o*-nitrophenyl-β-D-glucopyranoside	—	2.54×10^{10}	—	p.r.	opt.	d.k.	71-0056
S1.354	*p*-nitrophenyl-β-D-glucopyranoside	—	3.89×10^{10}	—	p.r.	opt.	d.k.	71-0056
		~7	$(1 - 5) \times 10^9$	—	p.r.	opt.	d.k.	71-0480
S1.355	5-nitrouracil	5.9	2.1×10^{10}	—	p.r.	opt.	d.k.	73-1003
S1.356	norpseudopelletierine *N*-oxyl	—	$(2.4 \pm 0.2) \times 10^{10}$	—	p.r.	opt.	d.k.	71-0061
S1.357	oleate ion	7,11	$< 10^7$	—	p.r.	opt.	d.k.	73-3013
S1.358	oxaloacetate ion	9.5	$(4.8 \pm 0.6) \times 10^9$	—	p.r.	opt.	d.k.	73-0073
		See also 1.568.						
S1.359	oxamate ion	9.2	5.7×10^9	—	p.r.	opt.	d.k.	73-0091
		See also 1.572.						
S1.360	oxamide	9.2	2.7×10^{10}	—	p.r.	opt.	d.k.	71-0782
		9.0	3.3×10^{10}	—	p.r.	opt.	d.k.	73-0091
S1.361	2-oxoglutarate ion	9.2	$(5.5 \pm 0.8) \times 10^9$	—	p.r.	opt.	d.k.	73-0073
		See also 1.573.						
S1.362	oxomalonate ion	9.3	$(1.3 \pm 0.1) \times 10^9$	—	p.r.	opt.	d.k.	73-0073
S1.363	papain	6.4	4.1×10^{10}	—	p.r.	opt.	d.k.	72-3042
S1.364	penamecillin	6.0	4.5×10^{10}	—	p.r.	opt.	d.k.	73-3020
S1.365	penicillamine (3-mercaptovaline)	5.3	1.0×10^{10} (± 10%)	—	p.r.	opt.	d.k.; $pK_a \cong 2$, 7.9, 10.4.	73-0090
		12.0	5.6×10^8 (± 10%)					
	positive ion	1.6-3.0	1.6×10^{10} (cor.) (rel.)	—	γ-r.	chem.	c.k. with H^+; assumed $k_{H^+} = 2.3 \times 10^{10}$.	73-0286
	zwitterion	1.6-3.0	5.2×10^9 (rel.)	—	γ-r.	chem.	c.k. with H^+; assumed $k_{H^+} = 2.3 \times 10^{10}$.	73-0286
		See also 1.517.						
S1.366	penicillamine disulfide	7.0	$(1.2 \pm 0.1) \times 10^{10}$	—	p.r.	opt.	d.k.	72-0388
		12.4	$(3.5 \pm 0.4) \times 10^9$					
		7.0	7.3×10^9	—	p.r.	opt.	d.k.; obs. values are 4.5, 2.3, and 1.4 x 10^9 for pH = 8, 9, and 10, resp.; net charge changes from 0 to −2 at pH 7 → 10.	73-1073
		8.0	3.7×10^9 (cor.)					
		9.0	1.6×10^9 (cor.)					
		10.0	8×10^8 (cor.)					
S1.367	pentafluorobenzene $e^-_{aq} + C_6HF_5 \rightarrow \cdot C_6HF_4 + F^-$	~6.5	1.6×10^{10}	—	p.r.	opt.	d.k.	73-0054
		See also 1.573a.						
S1.368	phenethicillin	6.0	2.7×10^9	—	p.r.	opt.	d.k.	73-3020
S1.369	phenol	—	1.6×10^7	—	p.r.	opt.	d.k.; concn. 0.2 mol/dm³.	71-0475
		See also 1.575.						
S1.370	phenoxide ion	—	3.7×10^5	—	p.r.	opt.	d.k.; concn. 0.19 mol/dm³, $k = 4.0 \times 10^5$ at 2.13 mol/dm³; contains 0.2 mol/dm³ NaOH.	71-0475
		See also 1.576.						

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

No.	Solute and Reaction	pH	$k(dm^3 mol^{-1} s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.371	phenoxymethyl-penicillin	6.0	2.7×10^9	—	p.r.	opt.	d.k.	73-3020
S1.372	phenylacetate ion	9.0	2.0×10^7	—	p.r.	opt.	d.k.	73-0076
		See also 1.577.						
S1.373	phenyl acetone	~9.2	1.2×10^{10} (± 10%)	—	p.r.	opt.	d.k.	72-0171
S1.374	phenylalanine	6.0-6.6	1.0×10^8	—	f.phot.	opt.	d.k.	71-7350
		6.9	1.6×10^8	—	p.r.	opt.	d.k.	73-0076
		See also 1.578.						
S1.375	phenylalanine amide	5.4	1.4×10^9	—	p.r.	opt.	d.k.	73-0076
		9.2	1.4×10^8	—	p.r.	opt.	d.k.	73-0076
S1.376	phenylalanyl-glycylglycine	6.6	1.1×10^9	—	p.r.	opt.	d.k.	73-0076
		11.3	3.7×10^8	—	p.r.	opt.	d.k.	73-0076
S1.377	phenylglycine	9.2	3.0×10^8	—	p.r.	opt.	d.k.	73-0076
S1.378	phenyl-β-D-glucopyranoside	—	7×10^7	—	p.r.	opt.	d.k.	71-0055
		—	6.5×10^7	—	p.r.	opt.	d.k.	71-0056
		~7	$< 5 \times 10^6$	—	p.r.	opt.	d.k.	71-0480
S1.379	phthalic acid	—	4.8×10^9	—	p.r.	opt.	d.k.	73-0094
S1.380	pivalamide	9.2	1.5×10^7	—	p.r.	opt.	d.k.	71-0414
	polyadenylic acid *See* adenine polynucleotides (S1.106).							
S1.381	poly(ethylene-sulfonate ion)	—	4.3×10^7	—	p.r.	opt.	d.k.	68-0352
S1.382	polyoxyethylene-(15)-nonylphenol (Igepal CO-730)	—	$\leq 1 \times 10^6$	—	p.r.	opt.	d.k.	71-0586
		See also 1.483a.						
S1.383	polyoxyethylene sorbitan mono-laurate (Tween 20)	7	$< 10^7$	—	p.r.	opt.	d.k.	73-3013
S1.384	poly(styrene-sulfonate) ion	—	3.6×10^7	—	p.r.	opt.	d.k.	68-0352
	polyuridylic acid *See* uracil polynucleotides (1.649, S1.438).							
S1.385	propionamide	9.2	5.4×10^7	—	p.r.	opt.	d.k.	71-0414
		See also 1.592.						
S1.386	propionic acid $e^-_{aq} + CH_3CH_2COOH \rightarrow OH^- + CH_3CH_2CO$ (1)	3-4	2.2×10^7 (rel.)(1)	$k_1/k_{H^+} = 1.4 \times 10^{-3}$	γ-r.	chem.	c.k.; $\mu = 0.05$; assume $k_{H^+} = 1.57 \times 10^{10}$ at that μ.	72-0057
	$e^-_{aq} + CH_3CH_2COOH \rightarrow H + CH_3CH_2COO^-$ (2)		1.3×10^7 (rel.)(2)	$k_2/k_1 = 0.60$				
S1.387	propylamine	13	$(1.1 \pm 0.1) \times 10^6$	—	p.r.	opt.	d.k.	73-0016
S1.388	propylammonium ion	8.5	$(2.8 \pm 0.1) \times 10^6$	—	p.r.	opt.	d.k.	73-0016
		See also 1.593a.						
S1.389	purine	7	1.6×10^{10}	—	p.r.	opt.	d.k.; $\mu = 0.1$;	71-0375
		11	8.2×10^9				$pK_a = 8.75$.	71-0375
		See also 1.595.						
S1.390	pyrene	—	1.1×10^{10}	—	p.r.	opt.	d.k. in polyoxy-ethylene (23) dodecanol soln.; $k = 3.3 \times 10^{10}$ in hexadecyl-trimethyl-ammonium bromide soln.; $k < 5.0 \times 10^7$ in sodium dodecyl sulfate soln.	73-1004
S1.391	pyridine $e^-_{aq} + C_5H_5N \rightarrow C_5H_5NH + OH^-$ (72-5208)	7	1.0×10^9	—	p.r.	opt.	d.k.; $k = 3.7 \times 10^9$ is also re-ported with no explanation for the two values.	71-0582
		See also 1.596.						

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.392	Rhodamine B	13	~ 3 x 10^{10}	—	p.r.	opt.	d.k.	67–6053
S1.393	ribonuclease	6.8	4 x 10^9	—	p.r.	opt.	d.k.; value from graph; at 65°C $k \cong 2.5 \times 10^{10}$.	67–0776
		5.9	(1.7 ± 0.2) x 10^{10}	—	p.r.	opt.	d.k.	72–3079
		7.1	(1.0 ± 0.15) x 10^{10}	—	p.r.	opt.	d.k.	72–3079
		7.6	1.0 x 10^{10} (rel.)	k/k_{oxy} = 0.53	p.r.	opt.	c.k.; assumed $k(e^-_{aq} + O_2)$ = 1.9 x 10^{10}.	72–3079
		See also 1.604.						
S1.394	sarcosine anhydride	9.2	(2.0 ± 0.2) x 10^9	—	p.r.	opt.	d.k.	71–0554
S1.395	sarcosylglycine	5.8	8.8 x 10^8	—	p.r.	opt.	d.k.	74–1058
		12.2	7.7 x 10^7	—	p.r.	opt.	d.k.	74–1058
S1.396	selenocystine	6.0	7.6 x 10^9	—	p.r.	opt.	d.k.	73–1010
		11.5	3.9 x 10^9					
	sodium dodecyl sulfate *See* dodecyl sodium sulfate (1.409b, S1.232).							
S1.397	sorbate ion	8.9	(5.6 ± 0.3) x 10^9	—	p.r.	opt.	d.k.	73–0072
S1.398	sorbic acid	1.5–4.0	(1.9 ± 0.1) x 10^{10}	—	p.r.	opt.	d.k.; also c.k.	73–0072
S1.399	stearate ion	11	< 10^7	—	p.r.	opt.	d.k.	73–3013
S1.400	succinamide	7.1	2.0 x 10^8	—	p.r.	opt.	d.k.	73–0091
S1.401	succinate ion (monoanion) (dianion)	—	7 x 10^7 (± 20%) 7 x 10^5 (± 50%) (rel., calcd.)	—	γ–r.	chem.	c.k. with *p*–bromophenol assuming k_{BrPhOH} = 6.0 x 10^9; obs. $G(Br^-)$ at pH 3.0, 4.0, 5.0, 6.0 and 7.5, 100 k/k_{BrPhOH} = 5.67, 4.5, 1.6, 0.25 and 0.025, resp.; pK_a = 4.16, 5.64.	72–0027
		See also 1.613, 1.614.						
S1.402	succinic acid	—	3.7 x 10^8 (± 20%) (rel., calcd.)	—	γ–r.	chem.	c.k.; see S1.401 above.	72–0027
	$e^-_{aq} + (CH_2COOH)_2 \rightarrow OH^- + HOOCCH_2CH_2CO$ (1)	3–4	8.56 x 10^7 (rel.)	k_1/k_{H^+} = 5.45 x 10^{-3} $k_2/k_1 \leq 0.1$	γ–r.	chem.	c.k.; μ = 0.05; assume k_{H^+} = 1.57 x 10^{10} at that μ.	72–0057
	$e^-_{aq} + (CH_2COOH)_2 \rightarrow H + HOOCCH_2CHCO_2^-$ (2)							
S1.403	succinimide	6.5	1.1 x 10^{10}	—	p.r.	opt.	d.k.	73–0091
		11.4	9.2 x 10^8	—	p.r.	opt.	d.k.	73–0091
		See also 1.615.						
S1.404	sulfaguanidine	—	8.6 x 10^9	—	p.r.	opt.	d.k.	73–0094
S1.405	sulfanilamide	11	(3.5 ± 0.5) x 10^9	—	f.phot.	opt.	d.k.	72–0423, 73–0015
		—	7.4 x 10^9	—	p.r.	opt.	d.k.	73–0094
		See also 1.615b.						
S1.406	sulfanilate ion	11	2.54 x 10^8	—	f.phot.	opt.	d.k.	73–0270
		See also 1.616.						
S1.407	sulfanilic acid	—	5.9 x 10^9	—	p.r.	opt.	d.k.	73–0094
		See also 1.616a.						
S1.408	sulfasuccidine	—	14.2 x 10^9	—	p.r.	opt.	d.k.	73–0094
S1.409	sulfathiazole	—	11.7 x 10^9	—	p.r.	opt.	d.k.	73–0094
S1.410	*p*–sulfodiphenyl–picryl hydrazyl (SDPPH)	—	5.7 x 10^{10} (rel.)	k/k_{N_2O} = 6.6	γ–r.	chem.	c.k.; assume $k(e^-_{aq} + N_2O)$ = 8.6 x 10^9; p.r. gave 6.9 x 10^{10}.	72–0688
S1.411	1,2,3,4–tetra–fluorobenzene $e^-_{aq} + C_6H_2F_4 \rightarrow \cdot C_6H_2F_3 + F^-$	~6.5	2.6 x 10^{10}	—	p.r.	opt.	d.k.	73–0054
		See also 1.633b.						

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

No.	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.412	2,2,6,6-tetra-methyl-4-piperidone *N*-oxyl (TAN)	7.8	$(2.2 \pm 0.2) \times 10^{10}$	—	p.r.	opt.	d.k.	71-0010
S1.413	thalamyd	—	7.4×10^9	—	p.r.	opt.	d.k.	73-0094
	4-(2-thiazolylsulfamoyl)succinanilic acid *See* sulfasuccidine (S1.408).							
	N-(2-thiazolyl)sulfanilamide *See* sulfathiazole (S1.409).							
S1.414	thiodiacetate ion	10.8	8.3×10^7 (± 10%)	—	p.r.	opt.	d.k.; pK_a = 3.3, 4.5.	73-0090
S1.415	3,3'-thiodipro-pionate ion	10.8	5.8×10^7 (± 10%)	—	p.r.	opt.	d.k.; $pK_a \cong 4$.	73-0090
	thioglycol *See* 2-mercaptoethanol (1.514, S1.304).							
S1.416	thioglycolate ion	6.5 12.0	5.5×10^9 (± 10%) 5.6×10^8 (± 10%)	—	p.r.	opt.	d.k.; pK_a = 3.7, 10.3.	73-0090
		See also 1.621.						
S1.417	thiolactate ion *See* 2-mercaptopropionate ion (S1.304a).							
S1.418	thymine, negative ion	12	3.0×10^9	—	p.r.	opt.	d.k.	72-7036
		See also 1.627.						
S1.419	thymine dimer $e^-_{aq} + T_2 \rightarrow T^- + T$	8.01	$(1.5 \pm 0.2) \times 10^{10}$	—	p.r.	opt.	d.k.	72-0309
S1.420	*p*-toluenesulfon-ate ion $e^-_{aq} + CH_3C_6H_4SO_3^- \rightarrow SO_4^{2-}$	6	1.3×10^9 (rel.)	$k/k_{N_2O} = 0.15$	γ-r.	opt.	c.k. with N_2O assuming $k(e^-_{aq} + N_2O) = 8.67 \times 10^9$; obs. buildup of sulfate ion.	71-0932
		See also 1.632.						
S1.421	toluidine	11	$(2.0 \pm 0.5) \times 10^7$	—	f.phot.	opt.	d.k.	72-0423
S1.422	*o*-tolyl-β-D-glucopyranoside	—	4.1×10^7	—	p.r.	opt.	d.k.	71-0056
S1.423	*m*-tolyl-β-D-glucopyranoside	—	1.4×10^8	—	p.r.	opt.	d.k.	71-0056
S1.424	*p*-tolyl-β-D-glucopyranoside	—	6.1×10^7	—	p.r.	opt.	d.k.	71-0056
S1.425	*p*-tolyl-*S*-β-D-thioglucopyranoside	—	3.9×10^9	—	p.r.	—	—	70-1056
S1.426	triamcinolone	—	3.5×10^{10}	—	p.r.	—	—	70-1056
S1.427	triamcinolone acetonide	—	3.5×10^{10}	—	p.r.	—	—	70-1056
S1.428	trimethylhydrazine	10.4	$\sim 10^8$	—	p.r.	opt.	d.k.	72-0003
S1.429	trimethylhydra-zinium ion	5.4	1.3×10^{10} (± 15%)	—	p.r.	opt.	d.k.	72-0003
S1.430	trimethylphos-phate $e^-_{aq} + (CH_3O)_3PO \rightarrow \cdot CH_3 + (CH_3O)_2PO_2^-$	—	2×10^5	—	p.r.	—	—	72-3008
S1.431	1,3,5-trioxane	11	$\sim 10^6$	—	f.phot.	opt.	d.k.; H_2 - satd.	71-7345
	tropylcarbinol *See* hydroxycycloheptatriene (S1.285).							
	trypaflavin *See* acriflavine (1.298a, S1.98).							
S1.432	trypsin	~7	$(3.5 \pm 0.8) \times 10^{10}$	—	p.r.	opt.	d.k. at 600 nm as well as p.b.k. at 430 nm.	71-3069
S1.433	trypsinogen	~7	$(2.5 \pm 0.5) \times 10^{10}$	—	p.r.	opt.	d.k. at 600 nm as well as p.b.k. at 430 nm.	71-3069
S1.434	tryptophan	6.0-6.6	4.3×10^8	—	f.phot.	opt.	d.k.	71-7350
		See also 1.643.						
S1.435	tyramine, positive ion negative ion	6.9 11.2	$(3.5 \pm 0.2) \times 10^8$ $(5.8 \pm 0.5) \times 10^7$	—	p.r.	opt.	d.k.; pK_a = 9.5, 10.8.	73-0003

TABLE 3. *Reactions of hydrated electrons with organic solutes* — Continued

	Solute and Reaction	pH	$k(dm^3mol^{-1}s^{-1})$	Ratio	Source	Method	Comment	Ref.
S1.436	tyrosine,	~ 6	1.8×10^8	—	f.phot.	opt.	d.k.	71-7350
	zwitterion	6.6	$(2.8 \pm 0.5) \times 10^8$	—	p.r.	opt.	d.k.; $pK_a = 2.2$, 9.1, 10.1.	73-0003
	negative ion	12.5	$(9.6 \pm 1.0) \times 10^7$					
		See also 1.645-6.						
S1.437	uracil	—	1.5×10^{10}	—	p.r.	opt.	d.k. (e^-_{aq}) or p.b.k. (radical anion).	73-3016
		7	1.5×10^{10}	—	p.r.	opt.	d.k.; little change in k on addition of surfactants.	73-3013
		11	3.0×10^9					
		See also 1.647-8.						
S1.438	uracil poly-nucleotides (poly U)	7	7.5×10^8	—	p.r.	opt.	d.k.; mol. wt. 2×10^5; k per base unit.	71-0375
		See also 1.649.						
S1.439	vinyl acetate	11	1.7×10^9 (± 15%)	—	f.phot.	opt.	d.k.; H_2-satd.	71-7345
S1.440	vinyl benzoate	11	7.3×10^9 (± 15%)	—	f.phot.	opt.	d.k.; H_2-satd.	71-7345
S1.441	vinyl isobutyl ether	11	$\sim 10^7$	—	f.phot.	opt.	d.k.; H_2-satd.	71-7345
S1.442	*N*-vinylpyrrolidone	11	2×10^9 (± 15%)	—	f.phot.	opt.	d.k.; H_2-satd.	71-7345
	Vitamin B_{12} *See* cyanocobalamin (S1.190).							
	Vitamin K_3 *See* 2-methyl-1,4-naphthoquinone (S1.333).							
S1.443	xylenol orange	11	$(5.2 \pm 0.4) \times 10^9$	—	f.phot.	opt.	d.k.	71-0437

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Ag^+, 1.11
$AgH_6N_2^+$ Diamminesilver(I) ion, 1.12
Al^{3+}, 1.16
$AlH_4O_4^-$ Aluminate ion, 1.17
AsF_6^- Hexafluoroarsenate(V) ion, 1.24
$AsHO_4^{2-}$ Arsenate ion, 1.23
AsO_2^- Arsenite ion, 1.22
BF_4^- Tetrafluoroborate ion, 1.26
$BrCoH_{15}N_5^{2+}$ Bromopentaamminecobalt(III) ion, 1.67
$BrH_{15}N_5Ru^{2+}$ Bromopentaammineruthenium(III) ion, S1.56
BrO^- Hypobromite ion, 1.28
BrO_2^- Bromite ion, 1.29
BrO_3^- Bromate ion, 1.30
BrO_4^- Perbromate ion, S1.6
Br_2^- Bromine molecule ion, 1.27
$CBrF_3$ Bromotrifluoromethane, 1.347a
$CClF_3$ Chlorotrifluoromethane, 1.378
CCl_2F_2 Dichlorodifluoromethane, 1.399a
CCl_3F Trichlorofluoromethane, 1.635
CCl_4 Carbon tetrachloride, 1.355
CF_3I Trifluoroiodomethane, 1.638a
$CHCl_3$ Chloroform, 1.367
CHN Hydrogen cyanide, S1.7
CHO_2^- Formate ion, 1.434
CHO_3^- Bicarbonate ion, 1.33
CH_2Cl_2 Methylene chloride, S1.321
CH_2I_2 Methylene iodide, S1.322
CH_2O Formaldehyde, 1.432
CH_2O_2 Formic acid, 1.435, S1.246
CH_3Cl Chloromethane, 1.367a, S1.174
CH_3I Iodomethane, 1.495
CH_3NO Formamide, 1.433, S1.245
CH_3NO_2 Nitromethane, 1.553, 1.554, S1.348
$CH_3NO_2^-$ Nitromethane anion, S1.349
CH_4 Methane, 1.519
CH_4N_2O Urea, 1.650
CH_4N_2S Thiourea, 1.624
CH_4N_2Se Selenourea, 1.609
CH_4O Methanol, 1.521
CH_4S Methanethiol, 1.520
CH_5NO *N*-Methylhydroxylamine, S1.328;
O-Methylhydroxylamine, S1.329
CH_5N_3 Guanidine, 1.463, 1.464
CH_6N^+ Methylammonium ion, 1.524
CH_6NO^+ *N*-Methylhydroxylammonium ion, S1.330;
O-Methylhydroxylammonium ion, S1.331
CH_6N_2 Methylhydrazine, S1.325
$CH_7N_2^+$ Methylhydrazinium ion, S1.326
$CH_{14}CoN_5O^{2+}$ Cyanoaquotetraamminecobalt(III) ion, 1.71
$CH_{15}CoN_6^{2+}$ Cyanopentaamminecobalt(III) ion, 1.68
$CH_{15}CoN_6S^{2+}$ Thiocyanatopentaamminecobalt(III) ion, 1.69
CN^- Cyanide ion, 1.35
CNO^- Cyanate ion, 1.36
CNS^- Thiocyanate ion, 1.37, S1.9
$CN_3O_6^-$ Trinitromethyl ion, 1.642
CN_4O_8 Tetranitromethane, 1.618
CO Carbon monoxide, 1.31
CO_2 Carbon dioxide, 1.32
CO_3^{2-} Carbonate ion, 1.34
CS_2 Carbon disulfide, 1.354, S1.164
$C_2AgN_2^-$ Dicyanoargentate(I) ion, 1.13
$C_2AuN_2^-$ Dicyanoaurate(I) ion, 1.25
$C_2Cl_3O_2^-$ Trichloroacetate ion, 1.634
C_2Cl_4 Tetrachloroethylene, 1.633a
$C_2F_3O_2^-$ Trifluoroacetate ion, 1.637
$C_2HCl_2O_2^-$ Dichloroacetate ion, 1.396a
C_2HCl_3 1,1,2-Trichloroethylene 1.634a
$C_2HO_4^-$ Oxalate ion, 1.570
C_2H_2 Acetylene, 1.295
$C_2H_2BrO_2^-$ Bromoacetate ion, 1.335
$C_2H_2ClO_2^-$ Chloroacetate ion, 1.358
$C_2H_2Cl_2$ 1,1-Dichloroethylene, 1.399b;
1,2-Dichloroethylene, 1.399c
$C_2H_2FO_2^-$ Fluoroacetate ion, 1.423
$C_2H_2IO_2^-$ Iodoacetate ion, 1.488
$C_2H_2NO_3^-$ Oxamate ion, 1.572, S1.359
$C_2H_2O_3$ Glyoxylic acid, S1.273
$C_2H_2O_4$ Oxalic acid, 1.571
C_2H_3Cl Vinyl chloride, 1.658a
$C_2H_3ClO_2$ Chloroacetic acid, 1.359
$C_2H_3Cl_3O_2$ Chloral hydrate, S1.171
C_2H_3N Acetonitrile, 1.292
$C_2H_3O_2^-$ Acetate ion, 1.287, S1.77
$C_2H_3O_2S^-$ Thioglycolate ion, 1.621, S1.416
C_2H_4 Ethylene, 1.419
$C_2H_4CdNO_2^+$ Glycinatocadmium(II) ion, 1.43
C_2H_4INO Iodoacetamide, S1.292
$C_2H_4NNiO_2^+$ Glycinatonickel(II) ion, 1.196
$C_2H_4N_2O_2$ Oxamide, S1.360
C_2H_4O Acetaldehyde, 1.284
$C_2H_4O_2$ Acetic acid, 1.288, S1.78
$C_2H_4O_3$ Glycolic acid, S1.260
C_2H_5Br 1-Bromoethane, 1.339
C_2H_5BrO 2-Bromoethanol, 1.340
C_2H_5ClO 2-Chloroethanol, 1.366, S1.173
C_2H_5I Iodoethane, 1.494
C_2H_5NO Acetaldoxime, 1.285; Acetamide, 1.286, S1.75;
N-Methylformamide, 1.530, S1.323
$C_2H_5NO_2$ Glycine, 1.443–1.445, S1.256–S1.258;
Glycine, copper salt, 1.116a;
Hydroxyacetamide, S1.284
$C_2H_5N_3O_2$ Biuret, S1.154
$C_2H_5O_3S^-$ Ethanesulfonate ion, S1.234
$C_2H_6N_2O$ 2-Aminoacetamide(glycine amide), S1.115
C_2H_6O Ethanol, 1.411
C_2H_6OS Dimethylsulfoxide, 1.405, S1.227;
2-Mercaptoethanol, 1.514, S1.304
C_2H_6S Dimethylsulfide, 1.404
C_2H_7N Ethylamine, S1.236
C_2H_7NS Cysteamine(2-aminoethanethiol), 1.389, S1.193
$C_2H_8CdN_2^{2+}$ Ethylenediaminecadmium(II) ion, 1.48
$C_2H_8N^+$ Ethylammonium ion, 1.417, S1.237
$C_2H_8N_2$ 1,1-Dimethylhydrazine, S1.222;
1,2-Dimethylhydrazine, S1.223
$C_2H_8N_2Ni^{2+}$ Ethylenediaminenickel(II) ion, 1.202
$C_2H_9N_2^+$ 1,1-Dimethylhydrazinium ion, S1.220;
1,2-Dimethylhydrazinium ion, S1.221
$C_2H_{10}Tl^+$ Diethylthallium ion, 1.401
$C_2H_{18}CoN_5O_2^{2+}$ Acetatopentaamminecobalt(III) ion, 1.72
C_2N_2 Cyanogen, S1.8
$C_2O_4^{2-}$ Oxalate ion, 1.569
$C_3H_2NO_2^-$ Cyanoacetate ion, 1.382

$C_3H_2O_4^{2-}$ Malonate ion, S1.302
$C_3H_3F_3O$ α,α,α–Trifluoroacetone, 1.638
$C_3H_3F_3O_2$ Methyl trifluoroacetate, 1.537
N Acrylonitrile, S1.102
C_3H_3NS Thiazole, 1.619
$C_3H_3O_2^-$ Acrylate ion, S1.100
$C_3H_3O_3^-$ Pyruvate ion, 1.601
$C_3H_3O_4^-$ Hydrogen malonate ion, 1.513, S1.301
$C_3H_4BrO_2^-$ 2–Bromopropionate ion, 1.346;
3–Bromopropionate ion, 1.347
$C_3H_4ClO_2^-$ 2–Chloropropionate ion, 1.375;
3–Chloropropionate ion, 1.376
$C_3H_4IO_2^-$ 2–Iodopropionate ion, 1.497;
3–Iodopropionate ion, S1.293
$C_3H_4N_2$ Imidazole, 1.484
$C_3H_4N_2O_3$ Barbituric acid, S1.130
$C_3H_4O_2$ Acrylic acid, S1.101
$C_3H_4O_4$ Malonic acid, S1.303
C_3H_5FO Fluoroacetone, 1.424
$C_3H_5FO_2$ Methyl fluoroacetate, 1.529
C_3H_5N Propionitrile, 1.593
C_3H_5NO Acrylamide, 1.299, S1.99
$C_3H_5NO_3$ *N*–Formyglycine, S1.247
$C_3H_5O_2S^-$ 2–Mercaptopropionate ion, S1.304a;
3–Mercaptopropionate ion, S1.305
$C_3H_5O_3^-$ Lactate ion, 1.501, S1.296
C_3H_6ClNO 2–Chloropropionamide, 1.373;
3–Chloropropionamide, 1.374
$C_3H_6N_2O_2$ Malonamide, S1.300
C_3H_6O Acetone, 1.289, S1.80; Allyl alcohol, 1.309
$C_3H_6O_2$ Propionic acid, S1.386
$C_3H_6O_2S$ 2–Mercaptopropionic acid, S1.306;
3–Mercaptopropionic acid, S1.307;
Methyl thioglycolate, S1.336
$C_3H_6O_3$ Lactic acid, S1.297; Methyl 2–hydroxyacetate, 1.532, S1.327; 1,3,5–Trioxane, S1.431
C_3H_7Br 1–Bromopropane, 1.345
C_3H_7Cl 1–Chloropropane, 1.372
C_3H_7I 1–Iodopropane, 1.496
C_3H_7NO Acetone oxime, 1.291, S1.81;
N, *N*–Dimethylformamide, 1.403, S1.218;
Propionamide, 1.592, S1.385
$C_3H_7NO_2$ Alanine, 1.303–1.304, S1.110;
β–Alanine, 1.305, S1.111;
2–Hydroxypropionamide, S1.288;
Methyl 2–aminoacetate, 1.523, S1.318
Sarcosine, 1.608
$C_3H_7NO_2S$ Cysteine, 1.390–1.392, S1.194
$C_3H_7NO_3$ Serine, 1.610
C_3H_9N Isopropylamine, 1.500a; Propylamine, S1.387
$C_3H_9N_3S$ Mercaptoethylguanidine, 1.515
$C_3H_9O_4P$ Trimethylphosphate, S1.430
$C_3H_{10}N^+$ Propylammonium ion, 1.593a, S1.388
$C_3H_{10}N_2$ Trimethylhydrazine, S1.428
$C_3H_{11}N_2^+$ Trimethylhydrazinium ion, S1.429
$C_3O_5^{2-}$ Oxomalonate ion, S1.362
$C_4CdN_4^{2-}$ Tetracyanocadmate(II) ion, 1.42
$C_4H_2O_4^{2-}$ Fumarate ion, 1.436; Maleate ion, 1.512, S1.299
$C_4H_3BrN_2O_2$ 5–Bromouracil, 1.348, S1.159
$C_4H_3ClN_2O_2$ 5–Chlorouracil, S1.178
$C_4H_3FN_2O_2$ 5–Fluorouracil, S1.244
$C_4H_3IN_2O_2$ Iodouracil, 1.499
$C_4H_3N_3O_4$ 5–Nitrouracil, S1.355
$C_4H_3N_3O_5$ 5–Nitrobarbituric acid, S1.340
$C_4H_3O_4^-$ Hydrogen maleate ion, 1.511, S1.299
$C_4H_3O_5^-$ Oxalacetate ion, 1.568, S1.358
$C_4H_4CrO_{10}^-$ Dioxalatodiaquochromate(III) ion, 1.111
$C_4H_4N_2O_2$ Uracil, 1.647, 1.648, S1.437
$C_4H_4N_2O_2S$ Thiobarbituric acid, 1.620
C_4H_4O Furan, 1.437
$C_4H_4O_4^{2-}$ Succinate ion, 1.614, S1.401
$C_4H_4O_4S^{2-}$ Thiodiacetate ion, S1.414
$C_4H_4O_4S_2^{2-}$ 2,2′–Dithiobisacetate ion, S1:229
$C_4H_4O_5^{2-}$ Malate ion, 1.510
C_4H_4S Thiophene, 1.622
C_4H_5N 3–Butenenitrile, 1.351; Pyrrole, 1.597
$C_4H_5NO_2$ Methyl cyanoacetate, 1.526;
Succinimide, 1.615, S1.403
$C_4H_5NO_4^{2-}$ Aspartate ion, 1.322
$C_4H_5N_3$ 2–Aminopyrimidine, 1.313
$C_4H_5N_3O$ Cytosine, 1.396, S1.204
$C_4H_5O_2^-$ *trans*–Crotonate ion, S1.188;
Methacrylate ion, 1.518, S1.309
$C_4H_5O_3^-$ Acetoacetate ion, S1.79
$C_4H_5O_4^-$ Succinate ion, 1.613, S1.401
C_4H_6 Butadiene, 1.349
$C_4H_6NO_4^-$ Aspartate ion, 1.321
$C_4H_6N_2O_2$ Glycine anhydride, S1.259;
Hydrouracil, 1.474
$C_4H_6O_2$ 2,3–Butanedione, 1.350; *trans*–Crotonic acid, S1.189; Methacrylic acid, S1.310; Methyl acrylate, S1.315; Vinyl acetate, S1.439
$C_4H_6O_4$ Succinic acid, S1.402
C_4H_7NO 2–Pyrrolidone, 1.600; Methacrylamide, S1.308
$C_4H_7NO_2$ Diacetamide, S1.208
$C_4H_7NO_3$ *N*–Acetylglycine, 1.296, S1.87
$C_4H_7NO_4$ Aspartic acid, S1.128
$C_4H_8CdN_2O_4$ Bis(glycinato)cadmium(II), 1.44
$C_4H_8NO_2^-$ 4–Aminobutyrate ion, 1.312
$C_4H_8N_2NiO_4$ Bis(glycinato)nickel(II), 1.197
$C_4H_8N_2O_2$ *N*–Acetylglycine amide, S1.88;
Succinamide, S1.400
$C_4H_8N_2O_3$ Asparagine, 1.319, 1.320;
Glycylglycine, 1.450–1.452, S1.261, S1.262
$C_4H_8O_2$ Ethyl acetate, 1.415; 3–Hydroxy–2–butanone, 1.480;
Methyl propionate, 1.536
C_4H_9Br 1–Bromobutane, 1.338
C_4H_9Cl 1–Chlorobutane, 1.364; 2–Chlorobutane, 1.365;
1–Chloro–2–methylpropane, 1.368
C_4H_9I 1–Iodobutane, 1.493
C_4H_9N Pyrrolidine, 1.598, 1.599
C_4H_9NO *N*–Ethylacetamide, 1.414;
N,*N*–Dimethylacetamide, S1.215
C_4H_9NOS *N*–Acetylcysteamine, S1.85
$C_4H_9NO_2$ Ethyl 2–aminoacetate, 1.416; Threonine, 1.625
$C_4H_9NO_2S$ Cysteine, methyl ester, S1.195;
Homocystine, 1.470; *S*–Methylcysteine, S1.319
$C_4H_9NO_3$ 2–Methyl–2–nitro–1–propanol, 1.556
$C_4H_9NO_4$ 2–Methyl–2–nitro–1,3–propanediol, 1.555
$C_4H_9N_3O$ Acetone semicarbazone, 1.290
$C_4H_9N_3O_2$ Creatine, 1.381; Glycylglycine amide, S1.263
$C_4H_{10}N^+$ Pyrrolidinium ion, 1.599
$C_4H_{10}O$ *tert*–Butyl alcohol, 1.352; Ethyl ether, 1.421
$C_4H_{10}S$ *tert*–Butyl mercaptan, 1.353
$C_4H_{11}N$ Butylamine, S1.161
$C_4H_{11}NO$ *N*,*N*–Diethylhydroxylamine, S1.212
$C_4H_{12}N^+$ Butylammonium ion, S1.162;
tert–Butylammonium ion, 1.352a

$C_4H_{12}NO^+$ *N,N*-Diethylhydroxylammonium ion, S1.211
$C_4H_{12}N_2S_2$ Cystamine, 1.388, S1.192
$C_4H_{16}CdN_4^{2+}$ Bis(ethylenediamine)cadmium(II) ion 1.49
$C_4H_{16}Cl_2CoN_4^+$ Dichlorobis(ethylenediamine)cobalt(III) ion, 1.87
$C_4H_{16}Cl_2CrN_4^+$ Dichlorobis(ethylenediamine)chromium(III) ion, 1.107
$C_4H_{16}CoF_2N_4^+$ Difluorobis(ethylenediamine)cobalt(III) ion, 1.86
$C_4H_{16}N_4Ni^{2+}$ Bis(ethylenediamine)nickel(II) ion, 1.203
$C_4H_{18}ClCoN_5^{2+}$ Chloroamminebis(ethylenediamine)cobalt(III) ion, 1.89
$C_4H_{18}CoFN_4O^{2+}$ Fluoroaquobis(ethylenediamine)cobalt(III) ion, 1.91
$C_4H_{18}CoN_5O_4^+$ Fumaratopentamminecobalt(III) ion, 1.73
$C_4H_{18}CoN_6O_2^{2+}$ Nitroamminebis(ethylenediamine)cobalt(III) ion, 1.90
$C_4HgN_4^{2-}$ Tetracyanomercurate(II) ion, 1.150
$C_4N_4Ni^{2-}$ Tetracyanonickelate(II) ion, 1.195
$C_4N_4Pd^{2-}$ Tetracyanopalladate(II) ion, 1.221
$C_4N_4Pt^{2-}$ Tetracyanoplatinate(II) ion, 1.226, S1.53
$C_4N_4Zn^{2-}$ Tetracyanozincate(II) ion, 1.279
$C_5ClCoN_5^{3-}$ Chloropentacyanocobaltate(III) ion, 1.77
$C_5CoIN_5^{3-}$ Iodopentacyanocobaltate(III) ion, S1.20
$C_5CoN_5^{3-}$ Pentacyanocobaltate(II) ion, 1.59, S1.14
$C_5CoN_6O^{3-}$ Pentacyanonitrosylcobaltate(III) ion, S1.21
$C_5CoN_6O_2^{3-}$ Nitropentacyanocobaltate(III) ion, 1.80
$C_5CoN_8^{3-}$ Azidopentacyanocobaltate(III) ion, 1.79
$C_5CrN_6O^{3-}$ Pentacyanonitrosylchromate(III) ion, S1.23
$C_5FeN_6O^{2-}$ Pentacyanonitrosylferrate(III) ion, 1.138
$C_5HCoN_5^{3-}$ Hydridopentacyanocobaltate(III) ion, S1.16
$C_5HCoN_5O^{3-}$ Hydroxypentacyanocobaltate(III) ion, 1.78, S1.19
$C_5H_2BrN_2O_4^-$ 5-Bromoorotate ion, S1.155
$C_5H_2CoN_5O^{2-}$ Aquopentacyanocobaltate(III) ion, S1.18
$C_5H_2NO_5^-$ 5-Nitrofuroate ion, S1.347
$C_5H_3BrN_2O_4$ 5-Bromoorotic acid, S1.156
$C_5H_3FeN_6^{3-}$ Pentacyanoammineferrate(II) ion, 1.35
$C_5H_3NO_4$ 5-Nitro-2-furaldehyde, S1.343
$C_5H_3N_2O_4^-$ Isoorotate ion, 1.500c; Orotate ion, 1.567
$C_5H_3N_3O_6$ 5-Nitroorotic acid, S1.351
$C_5H_4N_2O_4$ *anti*-5-Nitro-2-furaldoxime, S1.346
$C_5H_4N_4$ Purine, 1.595, S1.389
$C_5H_4N_4O$ Hypoxanthine, 1.483
$C_5H_4N_4O_3$ Uric acid, 1.651
$C_5H_4O_5^{2-}$ 2-Oxoglutarate ion, 1.573, S1.361
C_5H_5N Pyridine, 1.596, S1.391
$C_5H_5N_2O_4^-$ Hydroorotate ion, 1.472a
$C_5H_5N_3O_4$ 5-Nitro-6-methyluracil, S1.350
$C_5H_5N_5$ Adenine, 1.300, S1.105
$C_5H_5N_5O$ Guanine, S1.274
$C_5H_5O_4^-$ Methyl fumarate ion, S1.324
$C_5H_6N_2O_2$ 6-Methyluracil, 1.539; Thymine, 1.627, S1.418
$C_5H_7NO_2$ Ethylcyanoacetate, 1.418; *N*-Methylsuccinimide, S1.335
$C_5H_7N_3O$ 1-Methylcytosine, S1.320; 5-Methylcytosine, 1.527
$C_5H_8NO_4^-$ Glutamate ion, 1.440
$C_5H_8N_2O_2$ Hydrothymine, 1.473a
$C_5H_8O_2$ Ethyl acrylate, S1.235; Methyl methacrylate, S1.332
$C_5H_9NO_2$ Proline, 1.590, 1.591
$C_5H_9NO_3$ *N*-Acetylalanine, 1.293, 1.294; *N*-Acetylglycine, methyl ester, S1.89; *N*-Acetylsarcosine, S1.96; Hydroxyproline, 1.482
$C_5H_9NO_3S$ *N*-Acetylcysteine, S1.86
$C_5H_{10}N_2O_3$ Alanylglycine, 1.307; Glycylalanine, 1.447; Glycylsarcosine, S1.272; Sarcosylglycine, S1.395
$C_5H_{10}O_2$ Pivalic acid, 1.588
$C_5H_{10}O_4$ Deoxyribose, S1.205
$C_5H_{10}O_5$ Arabinose, 1.315; Ribose, 1.605; Xylose, 1.661
$C_5H_{11}NO$ Pivalamide, S1.380
$C_5H_{11}NO_2$ Valine, 1.657, 1.658
$C_5H_{11}NO_2S$ 3-Mercaptovaline (Penicillamine), 1.517, S1.365; Methionine, 1.522, S1.314
$C_5H_{13}N$ Amylamine, 1.313b, S1.121; Isoamylamine, 1.499a
$C_5H_{14}N^+$ Amylammonium ion, S1.122
$C_5H_{16}CoN_4O_3^+$ Carbonatobis(ethylenediamine)cobalt(III) ion, 1.88
$C_6CoN_6^{3-}$ Hexacyanocobaltate(III) ion, 1.76, S1.15
$C_6CoN_6S^{3-}$ Pentacyanothiocyanotocobaltate(III) ion, S1.17
$C_6CoO_{12}^{3-}$ Trioxalatocobaltate(III) ion, 1.82
$C_6CrN_6^{3-}$ Hexacyanochromate(III) ion, 1.105
$C_6CrN_6^{4-}$ Hexacyanochromate(II) ion, 1.100
$C_6CrO_{12}^{3-}$ Trioxalatochromate(III) ion, S1.24
C_6F_6 Hexafluorobenzene, 1.465c, S1.279
$C_6FeN_6^{3-}$ Hexacyanoferrate(III) ion, 1.137, S1.30
$C_6FeN_6^{4-}$ Hexacyanoferrate(II) ion, 1.134
C_6HF_5 Pentafluorobenzene, 1.573a, S1.367
$C_6HFeN_6^{3-}$ Hydrogen hexacyanoferrate(II) ion, S1.29
$C_6H_2F_4$ 1,2,3,4-Tetrafluorobenzene, 1.633b, S1.411
$C_6H_2N_3O_7^-$ Picrate ion, 1.587
$C_6H_3O_6^{3-}$ *cis*-Aconitate ion, 1.297
$C_6H_4BrO^-$ *o*-Bromophenoxide ion, 1.341; *m*-Bromophenoxide ion, 1.342; *p*-Bromophenoxide, 1.344, S1.158
$C_6H_4ClO^-$ *o*-Chlorophenoxide ion, 1.369; *m*-Chlorophenoxide ion, 1.370; *p*-Chlorophenoxide ion, 1.371
$C_6H_4Cl_2$ *o*-Dichlorobenzene, 1.397; *m*-Dichlorobenzene, 1.398; *p*-Dichlorobenzene, 1.399
$C_6H_4FO^-$ *o*-Fluorophenoxide ion, 1.429; *m*-Fluorophenoxide ion, 1.430; *p*-Fluorophenoxide ion, 1.431
$C_6H_4F_2$ *o*-Difluorobenzene, S1.213; *p*-Difluorobenzene, S1.214
$C_6H_4NO_2^-$ Isonicotinate ion, 1.500b; Nicotinate ion, 1.549; Picolinate ion, 1.586a
$C_6H_4NO_3^-$ *o*-Nitrophenoxide ion, 1.557; *m*-Nitrophenoxide ion, 1.558; *p*-Nitrophenoxide ion, 1.560
$C_6H_4O_2$ *p*-Benzoquinone, 1.330, S1.138
C_6H_5Br Bromobenzene, 1.336
C_6H_5BrO *p*-Bromophenol, 1.343, S1.157
C_6H_5Cl Chlorobenzene, 1.360
C_6H_5F Fluorobenzene, 1.425, S1.243
C_6H_5I Iodobenzene, 1.489
C_6H_5NO Nitrosobenzene, 1.563
$C_6H_5NO_2$ Nitrobenzene, 1.551, S1.341
$C_6H_5NO_2^-$ Nitrobenzene anion, S1.342
$C_6H_5NO_3$ *p*-Nitrophenol, 1.559, S1.352
$C_6H_5O^-$ Phenoxide ion, 1.576, S1.370
$C_6H_5O_2^-$ *p*-Hydroxyphenoxide ion, 1.473
$C_6H_5O_3S^-$ Benzenesulfonate ion, 1.326
$C_6H_5S^-$ Thiophenoxide ion, 1.623

C_6H_6 Benzene, 1.324, S1.132
$C_6H_6AlNO_6$ Nitrilotriacetatoaluminum (III), 1.19
$C_6H_6AsO_3^-$ Phenylarsonate(V) ion, 1.581
$H_6NNiO_6^-$ Nitrilotriacetatonickelate (II) ion, 1.199
$H_6NO_3S^-$ Sulfanilate ion, 1.616, S1.406
$C_6H_6NO_6^{3-}$ Nitrilotriacetate ion, 1.550
$C_6H_6NO_6Zn^-$ Nitrilotriacetatozincate (II) ion, 1.281
$C_6H_6N_2O$ Isonicotinamide, 1.500a; Nicotinamide, 1.546a
$C_6H_6N_4O_4$ 5-Nitro-2-furaldehyde semicarbazone, S1.345
C_6H_6O Phenol, 1.575, S1.369
C_6H_7N Aniline, 1.314, S1.123
C_6H_7NO Phenylhydroxylamine, 1.582
$C_6H_7NO_2$ *N*-Ethylmaleimide, 1.421a, S1.239
$C_6H_7NO_2S$ Benzenesulfonamide, 1.325, S1.133
$C_6H_7NO_3S$ Sulfanilic acid, 1.616a, S1.407
$C_6H_7N_5$ 2-Methyladenine, S1.316; 7-Methyladenine, S1.317
$C_6H_7O_2^-$ Sorbate ion, S1.397
$C_6H_7O_6^-$ Ascorbate ion, S1.127
$C_6H_7O_7^-$ Citrate ion, 1.380; Isocitrate ion, 1.500
C_6H_8 1,3-Cyclohexadiene, 1.384;
1,4-Cyclohexadiene, 1.385
$C_6H_8NO_3^-$ *N*-Ethylmaleamate ion, S1.238
$C_6H_8N_2O_2$ 1,3-Dimethyluracil, 1.406;
1,6-Dimethyluracil, 1.407;
3,6-Dimethyluracil, 1.408;
4-Ethoxyuracil, 1.413
$C_6H_8N_2O_2S$ Sulfanilamide, 1.615b, S1.405
$C_6H_8O_2$ Sorbic acid, S1.398
$C_6H_8O_4$ Dimethyl fumarate, S1.219;
Dimethyl maleate, S1.224
$C_6H_8O_4S^{2-}$ 3,3′-Thiodipropionate ion, S1.415
$C_6H_8O_4S_2^{2-}$ 2,2′-Dithiobispropionate ion, S1.230
C_6H_9NO *N*-Vinylpyrrolidone, S1.442
$C_6H_9N_2O_4$ *N*-Acetylglycylglycine, S1.90
$C_6H_9N_3O_2$ Histidine, 1.466-1.468
$C_6H_9O_7^-$ D-Glucuronate ion, 1.439a, S1.252
C_6H_{10} Cyclohexene, 1.387
$C_6H_{10}N_2O_2$ Alanine anhydride, S1.112;
Sarcosine anhydride, S1.394
$C_6H_{10}N_3O_6$ Glycylasparagine, 1.448, 1.449
$C_6H_{10}O$ Cyclohexanone, 1.386
$C_6H_{11}N_3O_3$ *N*-Acetylglycylglycine amide, S1.91
$C_6H_{11}N_3O_4$ Glycylglycylglycine, 1.453-1.455,
S1.266, S1.267
$C_6H_{12}AlN_3O_6$ Tris(glycinato)aluminum(III), 1.18
$C_6H_{12}CdN_3O_6^-$ Tris(glycinato)cadmate(II) ion, 1.45
$C_6H_{12}CuN_3O_6^-$ Tris(glycinato)cuprate(II) ion, 1.117
$C_6H_{12}HgN_3O_6^-$ Tris(glycinato)mercurate(II) ion, 1.151
$C_6H_{12}MnN_3O_6^-$ Tris(glycinato)manganate(II) ion, 1.171
$C_6H_{12}N_2O_3$ Alanylalanine, 1.306; Glycylglycine, ethyl
ester, S1.264
$C_6H_{12}N_2O_4S_2$ Cystine, 1.393, 1.394, S1.196, S1.197
$C_6H_{12}N_2O_4Se_2$ Selenocystine, S1.396
$C_6H_{12}N_3NiO_6^-$ Tris(glycinato)nickelate(II) ion, 1.198
$C_6H_{12}N_3O_6Pb^-$ Tris(glycinato)plumbate(II) ion, 1.216
$C_6H_{12}N_3O_6Zn^-$ Tris(glycinato)zincate(II) ion, 1.283
$C_6H_{12}N_4O_3$ Glycylglycylglycine amide, S1.268
$C_6H_{12}O$ Vinyl isobutyl ether, S1.441
$C_6H_{12}O_2$ Methyl trimethylacetate, 1.538
$C_6H_{12}O_6$ Glucose, 1.439
$C_6H_{13}N$ Cyclohexylamine, 1.387a
$C_6H_{13}NO$ *N*-*tert*-Butylacetamide, S1.160;
N,*N*-Diethylacetamide, S1.210
$C_6H_{13}NO_2$ Leucine, 1.502; Norleucine, 1.566
$C_6H_{13}NO_5$ 2-Amino-2-deoxy-D-galactose, S1.118;
Glucosamine, 1.438
$C_6H_{13}NO_8S$ 2-Deoxy-2-sulfoamino-D-glucose, S1.206
$C_6H_{14}N_2O_2$ Lysine, 1.508
$C_6H_{14}N_4O_2$ Arginine, 1.316-1.318
$C_6H_{14}O_6$ Sorbitol, 1.611
$C_6H_{16}CoN_6S_2^+$ Dithiocyanatobis(ethylenediamine)cobalt(III)
ion, 1.92
$C_6H_{16}CrN_6S_2^+$ Dithiocyanatobis(ethylenediamine)-
chromium(III) ion, 1.108
$C_6H_{16}N_6S_2$ Bis(2-guanidinoethyl)disulfide, 1.516
$C_6H_{24}CdN_6^{2+}$ Tris(ethylenediamine)cadmium(II) ion, 1.50
$C_6H_{24}CoN_6^{3+}$ Tris(ethylenediamine)cobalt(III) ion, 1.85
$C_6H_{24}CrN_6^{3+}$ Tris(ethylenediamine)chromium(III) ion, 1.106
$C_6H_{24}CuN_6^{2+}$ Tris(ethylenediamine)copper(II) ion, 1.121
$C_6H_{24}HgN_6^{2+}$ Tris(ethylenediamine)mercury(II) ion, 1.149
$C_6H_{24}N_6Ni^{2+}$ Tris(ethylenediamine)nickel(II) ion, 1.204
$C_6H_{24}N_6Pb^{2+}$ Tris(ethylenediamine)lead(II) ion, 1.219
$C_6H_{24}N_6Zn^{2+}$ Tris(ethylenediamine)zinc(II) ion, 1.278
$C_6MnN_6^{4-}$ Hexacyanomanganate(II) ion, 1.174
C_6N_4 Tetracyanoethylene, 1.617
$C_6N_6Os^{4-}$ Hexacyanoosmate(II) ion, 1.207
$C_6N_6Ru^{4-}$ Hexacyanoruthenate(II) ion, 1.231
$C_7H_4BrO_2^-$ *p*-Bromobenzoate ion, 1.337
$C_7H_4ClO_2^-$ *o*-Chlorobenzoate ion, 1.361;
m-Chlorobenzoate ion, 1.362;
p-Chlorobenzoate ion, 1.363
$C_7H_4FO_2^-$ *o*-Fluorobenzoate ion, 1.426;
m-Fluorobenzoate ion, 1.427;
p-Fluorobenzoate ion, 1.428
$C_7H_4IO_2^-$ *o*-Iodobenzoate ion, 1.490;
m-Iodobenzoate ion, 1.491;
p-Iodobenzoate ion, 1.492
$C_7H_5Cl_3$ α,α,α-Trichlorotoluene, 1.636
$C_7H_5F_3$ α,α,α-Trifluorotoluene, 1.639
C_7H_5N Benzonitrile, 1.328
C_7H_5NO *o*-Hydroxybenzonitrile, 1.477;
m-Hydroxybenzonitrile, 1.478;
p-Hydroxybenzonitrile, 1.479
$C_7H_5N_4O_5$ Furamazone, S1.250
$C_7H_5O_2^-$ Benzoate ion, 1.327
$C_7H_5O_3^-$ *m*-Hydroxybenzoate ion, 1.475;
p-Hydroxybenzoate ion, 1.476;
Salicylate ion, 1.607
$C_7H_6NO_2^-$ *p*-Aminobenzoate ion, 1.310, S1.116
$C_7H_6N_2$ *o*-Aminobenzonitrile, 1.311
$C_7H_6O_2$ Benzoic acid, 1.327a, S1.135
C_7H_7Br Benzyl bromide, S1.145
C_7H_7Cl Benzyl chloride, 1.332, S1.146;
p-Chlorotoluene, 1.377
C_7H_7I *p*-Iodotoluene, 1.498
C_7H_7N Vinylpyridine, 1.659
C_7H_7NO Benzamide, 1.323, S1.131
$C_7H_7NO_2$ *p*-Nitrotoluene, 1.565
$C_7H_7O_3S^-$ *p*-Toluensulfonate ion, 1.632, S1.420
C_7H_8 Cycloheptatriene, S1.191; Toluene, 1.631
$C_7H_8N^+$ Vinylpyridinium ion, 1.660
C_7H_8O Benzyl alcohol, 1.331, S1.144; *p*-Cresol, S1.186;
Hydroxycycloheptatriene, S1.285
C_7H_8S Benzyl mercaptan, S1.149
C_7H_9N Benzylamine, 1.331a; *p*-Toluidine, S1.421
$C_7H_9N_2O$ 1-Methylnicotinamide, 1.535
$C_7H_{10}N_2O_2$ 4-Ethoxy-1-methyluracil, 1.412;
1,3,5-Trimethyluracil, 1.641

$C_7H_{10}N_4O_2S$ Sulfaguanidine, S1.404
$C_7H_{12}N_2O_3$ Glycylproline, 1.459
$C_7H_{13}N_3O_4$ β-Alanylglycylglycine, S1.113;
Glycylglycyl-β-alanine, S1.265
$C_7H_{14}N_2O_3$ Glycylvaline, 1.462
$C_7H_{14}N_2O_4S_2$ Djenkolic acid, 1.409
$C_7H_{15}NO$ *N,N*-Dimethylpivalamide, S1.226
$C_8H_4NO_2^-$ *p*-Cyanobenzoate ion, 1.383
$C_8H_4N_2$ 1,4-Dicyanobenzene, S1.209
$C_8H_4O_4^{2-}$ *o*-Phthalate ion, 1.583, 1.584;
m-Phthalate ion, 1.585;
p-Phthalate ion, 1.586
$C_8H_6ClO_2^-$ 2-Chloro-2-phenylacetate ion, S1.175
$C_8H_6NO_4^-$ *p*-Nitrophenylacetate ion, 1.561
$C_8H_6N_4O_5$ Furadantin, S1.249
$C_8H_6O_4$ Phthalic acid, S1.379
C_8H_7N Indole, 1.487, S1.289; *p*-Tolunitrile, 1.633
C_8H_7NS Benzyl thiocyanate, S1.153
$C_8H_7O_2^-$ Phenylacetate ion, 1.577, S1.372
$C_8H_7O_2^-$ *o*-Toluate ion, 1.628; *m*-Toluate ion, 1.629;
p-Toluate ion, 1.630
C_8H_8 Styrene, 1.612
$C_8H_8INO_3$ Iodotyrosine, S1.294
$C_8H_8N_2O_3$ Nicotinuric acid, 1.549a
C_8H_8O Acetophenone, S1.82
$C_8H_8O_2$ Benzyl formate, S1.147
C_8H_9Cl 1-Chloro-2-phenylethane, S1.176
$C_8H_9NO_2$ Phenylglycine, S1.377
$C_8H_{10}N_2O$ *p*-Nitrosodimethylaniline, 1.564
$C_8H_{10}N_2O_3S$ Sulfacetamide, 1.615a
$C_8H_{11}N$ Phenethylamine, 1.574a
$C_8H_{11}NO$ Tyramine, S1.435
$C_8H_{12}NO_2$ Norpseudopelletierine *N*-oxyl, S1.356
$C_8H_{12}N_2O_2$ 2,4-Diethoxypyrimidine, 1.400
$C_8H_{12}N_2O_3S$ 6-Aminopenicillanic acid, S1.119
$C_8H_{13}N_3O_5$ *N*-Acetylglycylglycylglycine, S1.92
$C_8H_{13}O_2S_2^-$ Lipoate ion, 1.507, S1.298
$C_8H_{15}NO_6$ 2-Acetamido-2-deoxy-D-galactose, S1.76
$C_8H_{15}N_5O_4$ Glycylglycylglycylglycine amide, S1.269
$C_8H_{16}N_2O_3$ Glycylleucine, 1.456, 1.457;
Leucylglycine, 1.504
$C_8H_{16}N_2O_4S_2$ Cystine, dimethyl ester, S1.198
$C_8H_{19}CoN_5O_4^+$ Terephthalatopentaamminecobalt(III)
ion, 1.74
$C_8H_{26}CoN_6^{3+}$ Bis(diethylenetriamine)cobalt(III) ion, 1.93
$C_8H_{34}Co_2N_9O_2^{4+}$ Tetrakis(ethylenediamine)-μ-
amidoperoxodicobalt(III) ion, 1.94
$C_8MoN_8^{4-}$ Octacyanomolybdate(IV) ion, 1.176
$C_9H_3O_6^{3-}$ Trimesate ion, 1.640
$C_9H_6NO_2^-$ Indole-2-carboxylate ion, 1.487a;
Indole-3-carboxylate ion, 1.487b;
Indole-5-carboxylate ion, 1.487c
$C_9H_7N_2O_{10}P^{3-}$ Uridine monophosphate(UMP^{3-}), 1.655
$C_9H_7O_2^-$ Cinnamate ion, 1.379
$C_9H_8N_2O_{10}P^{2-}$ Uridine monophosphate(UMP^{2-}), 1.654; Uridine
monophosphate(2′,3′-cyclic UMP^{2-}), 1.656
$C_9H_8O_2$ Vinyl benzoate, S1.440
C_9H_9N 2-Methylindole, 1.533; 3-Methylindole, 1.534
C_9H_9NO Cinnamamide, S1.183
$C_9H_9NO_7$ 5-Nitro-2-furaldehyde, diacetate, S1.344
$C_9H_9N_3O_2S_2$ Sulfathiazole, S1.409
$C_9H_9O_2^-$ Hydrocinnamate ion, 1.471
$C_9H_9O_3^-$ *p*-Hydroxyphenylpropionate ion, 1.481, S1.287
$C_9H_{10}N_2$ 5,6-Dimethylbenzimidazole, S1.216
$C_9H_{10}O$ Phenylacetone, S1.373
$C_9H_{10}O_2$ Benzyl acetate, S1.143; Hydrocinnamic acid, 1.472
$C_9H_{11}NO_2$ Phenylalanine, 1.578, 1.579, S1.374
$C_9H_{11}NO_3$ Tyrosine, 1.645, 1.646, S1.436
$C_9H_{11}NO_4$ 3-(3,4-Dihydroxyphenyl)alanine, 1.402
$C_9H_{11}N_3O_7P^-$ Cytidine 2′,3′-cyclicphosphate ion, S1.201
$C_9H_{12}N_2O$ Phenylalanine amide, S1.375
$C_9H_{12}N_2O_7$ Uridine, 1.620, 1.621
$C_9H_{12}N_3O_8P^-$ Cytidine 5′-phosphate ion, S1.200
$C_9H_{13}N_3O_5$ Cytidine, 1.395, S1.199
$C_9H_{16}NO_2$ 2,2,6,6-Tetramethyl-4-piperidone *N*-oxyl, S1.412
$C_9H_{18}N_2O_3$ Alanylleucine, 1.308; Leucylalanine, 1.503
$C_{10}Co_2N_{10}O_2^{5-}$ Decacyano-μ-peroxodicobaltate(III)
ion, 1.95
$C_{10}H_5O_5S^-$ 1,2-Naphthoquinone-4-sulfonate ion, S1.338;
1,4-Naphthoquinone-2-sulfonate ion, S1.339
$C_{10}H_6NO_2^-$ Quinoline-2-carboxylate ion, 1.602a
$C_{10}H_7O^-$ 1-Naphthyloxide ion, 1.543;
2-Naphthyloxide ion, 1.544
$C_{10}H_8$ Naphthalene, 1.540
$C_{10}H_8NO_2^-$ Indole-3-acetate ion, S1.290
$C_{10}H_8N_2$ 2,2′-Bipyridine, 1.334; 4,4′-Bipyridine, 1.334a
$C_{10}H_9N_3$ Dipyridylamine, 1.408c
$C_{10}H_{11}NO_3$ *N*-Acetylphenylglycine, S1.95
$C_{10}H_{11}N_2O_8^-$ Orotidine, 1.567b
$C_{10}H_{12}AgN_2O_8^{3-}$ Ethylenediaminetetraacetatoargentate(I)
ion, 1.15
$C_{10}H_{12}AlN_2O_8^-$ Ethylenediaminetetraacetatoaluminate(III)
ion, 1.21
$C_{10}H_{12}CdN_2O_8^{2-}$ Ethylenediaminetetraacetatocadmate(II)
ion, 1.47
$C_{10}H_{12}CeN_2O_8^-$ Ethylenediaminetetraacetatocerate(III)
ion, 1.52
$C_{10}H_{12}CoN_2O_8^-$ Ethylenediaminetetraacetatocobaltate(III)
ion, 1.84
$C_{10}H_{12}CoN_2O_8^{2-}$ Ethylenediaminetetraacetatocobaltate(II)
ion, 1.60
$C_{10}H_{12}CrN_2O_8^-$ Ethylenediaminetetraacetatochromate(III)
ion, 1.109
$C_{10}H_{12}CuN_2O_8^{2-}$ Ethylenediaminetetraacetatocuprate(II)
ion, 1.119
$C_{10}H_{12}DyN_2O_8^-$ Ethylenediaminetetraacetatodysprosate(III)
ion, 1.124
$C_{10}H_{12}ErN_2O_8^-$ Ethylenediaminetetraacetatoerbate(III)
ion, 1.126
$C_{10}H_{12}EuN_2O_8^-$ Ethylenediaminetetraacetatoeuropate(III)
ion, 1.128
$C_{10}H_{12}FeN_2O_8^{2-}$ Ethylenediaminetetraacetatoferrate(II)
ion, 1.133
$C_{10}H_{12}FeN_2O_8^-$ Ethylenediaminetetraacetatoferrate(III)
ion, 1.139
$C_{10}H_{12}GaN_2O_8^-$ Ethylenediaminetetraacetatogallate(III)
ion, 1.140
$C_{10}H_{12}GdN_2O_8^-$ Ethylenediaminetetraacetatogadolinate(III)
ion, 1.142
$C_{10}H_{12}HgN_2O_8^{2-}$ Ethylenediaminetetraacetatomercurate(II)
ion, 1.153
$C_{10}H_{12}HoN_2O_8^-$ Ethylenediaminetetraacetatoholmate(III)
ion, 1.155
$C_{10}H_{12}InN_2O_8^-$ Ethylenediaminetetraacetatoindate(III)
ion, 1.161
$C_{10}H_{12}LaN_2O_8^-$ Ethylenediaminetetraacetatolanthanate(III)
ion, 1.167

$C_{10}H_{12}LuN_2O_8^-$ Ethylenediaminetetraacetatolutetate(III) ion, 1.169
$C_{10}H_{12}MnN_2O_8^{2-}$ Ethylenediaminetetraacetatomanganate(II) ion, 1.173
$C_{10}H_{12}N_2NdO_8^-$ Ethylenediaminetetraacetatoneodymate(III) ion, 1.192
$C_{10}H_{12}N_2NiO_8^{2-}$ Ethylenediaminetetraacetatonickelate(II) ion, 1.201
$C_{10}H_{12}N_2O_4$ Thymine dimer, S1.419
$C_{10}H_{12}N_2O_5S$ 7-Aminocephalosporanic acid, S1.117
$C_{10}H_{12}N_2O_8^{4-}$ Ethylenediaminetetraacetate ion, 1.420
$C_{10}H_{12}N_2O_8Pb^{2-}$ Ethylenediaminetetraacetatoplumbate(II) ion, 1.218
$C_{10}H_{12}N_2O_8Pr^-$ Ethylenediaminetetraacetatopraseodymate(II) ion, 1.224
$C_{10}H_{12}N_2O_8Sc^-$ Ethylenediametetraacetatoscandate(III) ion, 1.244
$C_{10}H_{12}N_2O_8Sm^-$ Ethylenediaminetetraacetatosamarate(III) ion, 1.251
$C_{10}H_{12}N_2O_8Sn^{2-}$ Ethylenediaminetetraacetatostannate(II) ion, 1.255
$C_{10}H_{12}N_2O_8Tb^-$ Ethylenediaminetetraacetatoterbate(III) ion, 1.259
$C_{10}H_{12}N_2O_8Ti^-$ Ethylenediaminetetraacetatotitanate(III) ion, 1.262
$C_{10}H_{12}N_2O_8Tm^-$ Ethylenediaminetetraacetatothulate(III) ion, 1.267
$C_{10}H_{12}N_2O_8Y^-$ Ethylenediaminetetraacetatoyttrate(III) ion, 1.271
$C_{10}H_{12}N_2O_8Yb^-$ Ethylenediaminetetraacetatoytterbate(III) ion, 1.273
$C_{10}H_{12}N_2O_8Zn^{2-}$ Ethylenediaminetetraacetatozincate(II) ion, 1.280
$C_{10}H_{12}N_5O_7P^-$ Adenosine 5′-phosphate ion, 1.302, S1.109
$C_{10}H_{13}N_5O_4$ Adenosine, 1.301, S1.108
$C_{10}H_{14}N_2O_4S$ Methylpenicillin, S1.334
$C_{10}H_{15}N_2O_8P$ Thymidylic acid, 1.626
$C_{10}H_{16}N^+$ Benzyltrimethylammonium ion, 1.333
$C_{10}H_{17}N_3O_6S$ Glutathione, reduced, 1.441, S1.254
$C_{10}H_{19}N_3O_4$ Leucylglycylglycine, 1.505, 1.506
$C_{10}H_{20}N_2O_4S_2$ Penicillamine disulfide, S1.366
$C_{11}H_7N$ Naphthonitrile, 1.520, 1.521
$C_{11}H_7O_2^-$ 1-Naphthoate ion, 1.541; 2-Naphthoate ion, 1.542
$C_{11}H_8O_2$ 2-Methyl-1,4-naphthoquinone, S1.333
$C_{11}H_{10}NO_2^-$ Indole-3-propionate ion, S1.291
$C_{11}H_{12}ClNO_3$ *N*-(2-Chloroacetyl)phenylalanine, S1.172
$C_{11}H_{12}N_2O_2$ Tryptophan, 1.643, 1.644, S1.434
$C_{11}H_{13}NO_3$ *N*-Acetylphenylalanine, S1.93
$C_{11}H_{14}N_2O_2$ *N*-Acetylphenylalanine amide, S1.94
$C_{11}H_{14}N_2O_3$ Glycylphenylalanine, 1.458, S1.270
$C_{11}H_{14}N_2O_4$ Glycyltyrosine, 1.461
$C_{11}H_{19}N_3O_5$ *N*-Acetylalanylalanylalanine, S1.83; *N*-Acetylsarcosylsarcosylsarcosine, S1.97
$C_{12}H_8N_2$ 1,10-Phenanthroline, 1.574
$C_{12}H_9NO$ 2-Benzoylpyridine, S1.140; 3-Benzoylpyridine, S1.141; 4-Benzoylpyridine, S1.142
$C_{12}H_{12}AgN_2O_{12}^{5-}$ Bis (nitrilotriacetato)argentate(I) ion, 1.14
$C_{12}H_{12}AlN_2O_{12}^{3-}$ Bis(nitrilotriacetato)aluminate(III) ion, 1.20
$C_{12}H_{12}CdN_2O_{12}^{4-}$ Bis(nitrilotriacetato)cadmate(II) ion, 1.46
$C_{12}H_{12}Cl_2N_2$ 4,4-Dimethyl-1,1-bipyridylium chloride, S1.217
$C_{12}H_{12}CoN_2O_{12}^{4-}$ Bis(nitrilotriacetato)cobalt(II) ion, 1.83
$C_{12}H_{12}CuN_2O_{12}^{4-}$ Bis(nitrilotriacetato)cuprate(II) ion, 1.118
$C_{12}H_{12}HgN_2O_{12}^{4-}$ Bis(nitrilotriacetato)mercurate(II) ion, 1.152
$C_{12}H_{12}MnN_2O_{12}^{4-}$ Bis(nitrilotriacetato)manganate(II) ion, 1.172
$C_{12}H_{12}N_2NiO_{12}^{4-}$ Bis(nitrilotriacetato)nickelate(II) ion, 1.200
$C_{12}H_{12}N_2O_2S$ Sulfanilamide, 1.615b
$C_{12}H_{12}N_2O_{12}Pb^{4-}$ Bis(nitrilotriacetato)plumbate(II) ion, 1.217
$C_{12}H_{12}N_2O_{12}Zn^{4-}$ Bis(nitrilotriacetato)zincate(II) ion, 1.282
$C_{12}H_{15}ClO_6$ *p*-Chlorophenyl-β-D-glucopyranoside, S1.177
$C_{12}H_{15}NO_8$ *o*-Nitrophenyl-β-D-glucopyranoside, S1.353; *p*-Nitrophenyl-β-D-glucopyranoside, S1.354
$C_{12}H_{16}N_6O_3$ Histidylhistidine, 1.469
$C_{12}H_{16}O_6$ Phenyl-β-D-glucopyranoside, S1.378
$C_{12}H_{16}O_7$ β-*p*-Hydroxyphenylglucoside, S1.286
$C_{12}H_{24}N_2O_3$ Leucylleucine, 1.506
$C_{12}H_{25}NaO_4S$ Dodecyl sodium sulfate, 1.409b, S1.232
$C_{12}H_{33}ClN_3Pd^+$ Chloro-1,1,7,7-tetraethyldiethylenetriaminepalladium(II) ion, 1.222
$C_{12}H_{33}ClN_3Pt^+$ Chloro-1,1,7,7-tetraethyldiethylenetriamineplatinum(II) ion, 1.227
$C_{13}H_8O$ Fluorenone, S1.241
$C_{13}H_9O_2^-$ Biphenyl-4-carboxylate ion, 1.333a
$C_{13}H_{10}O$ Benzophenone, 1.329, S1.137
$C_{13}H_{12}NO^+$ 3-Benzoyl-*N*-methylpyridinium ion, S1.139
$C_{13}H_{13}N_3O_5S_2$ Sulfasuccidine, S1.408
$C_{13}H_{15}N_3O_3$ Glycyltryptophan, 1.460
$C_{13}H_{17}N_3O_4$ Glycylphenylalanylglycine, S1.271; Phenylalanylglycylglycine, S1.376
$C_{13}H_{18}O_5S$ *p*-Tolyl-*S*-β-D-thioglucopyranoside, S1.425
$C_{13}H_{18}O_6$ β-Benzylglucoside, S1.148; *o*-Tolyl-β-D-glucopyranoside, S1.422; *m*-Tolyl-β-D-glucopyranoside, S1.423; *p*-Tolyl-β-D-glucopyranoside, S1.424
$C_{14}H_7O_5S^-$ 9,10-Anthraquinone-1-sulfonate ion, S1.124; 9,10-Anthraquinone-2-sulfonate ion, S1.125
$C_{14}H_8O_4^{2-}$ *o,o′*-Diphenate ion, 1.408a; *p,p′*-Diphenate ion, 1.408b
$C_{14}H_{10}O$ Anthrone, S1.126
$C_{14}H_{10}O_2$ Benzil, S1.134
$C_{14}H_{12}O_2$ Benzoin, S1.136
$C_{14}H_{14}ClN_3$ Acriflavin, 1.298a, S1.98
$C_{14}H_{20}O_6$ 2,4-dimethylphenyl-β-D-glucopyranoside, S1.225
$C_{15}H_{14}N_2O_6S_2$ Cephalothin, S1.169
$C_{15}H_{14}O$ 1,3-Diphenylacetone, S1.228
$C_{15}H_{20}N_4O_6$ Riboflavin, 1.603
$C_{15}H_{23}N_3O_{10}$ Glutamylglutamylglutamic acid, S1.253
$C_{15}H_{24}CoO_6^{3+}$ Tris(acetylacetonato)cobalt(III) ion, 1.98
$C_{16}H_6N_2O_{14}S_4^{4-}$ Indigotetrasulfonate ion, 1.486
$C_{16}H_{10}$ Pyrene, S1.390
$C_{16}H_{14}N_2O_6S$ Thalamyd, S1.413
$C_{16}H_{18}ClN_3S$ Methylene blue, 1.528
$C_{16}H_{18}N_2O_4S$ Benzylpenicillin, S1.150
$C_{16}H_{18}N_2O_5S$ Phenoxymethylpenicillin, S1.371
$C_{16}H_{19}N_3O_4S$ Ampicillin, S1.120

$C_{16}H_{20}N_2O_5S$ Benzylpenicilloic acid, S1.152
$C_{16}H_{21}N_3O_8S$ Cephalosporin C, S1.168
$C_{17}H_{18}N_2O_6S$ Carbenicillin, S1.163
$C_{17}H_{20}ClN_3$ Acridine orange, 1.298
$C_{17}H_{20}N_2O_4S$ Benzylpenicillin, methyl ester, S1.151
$C_{17}H_{20}N_2O_6S$ Methecillin, S1.313
$C_{18}H_{11}N_5O_9S$ *p*-Sulfodiphenylpicrylhydrazyl, S1.410
$C_{18}H_{16}N_3O_4S_2$ Cephaloridine, S1.167
$C_{18}H_{20}N_2O_3$ Phenylalanylphenylalanine, 1.580
$C_{18}H_{22}N_2O_4S$ Phenethicillin, S1.368
$C_{18}H_{31}O_2^-$ Oleate ion, S1.357
$C_{18}H_{35}O_2^-$ Stearate ion, S1.399
$C_{19}H_{18}ClN_3O_5S$ Cloxacillin, S1.184
$C_{19}H_{22}N_2O_6S$ Penamecillin, S1.364
$C_{19}H_{42}BrN$ Hexadecyltrimethylammonium bromide, 1.465a, S1.278
$C_{20}H_6Br_4O_5^{2-}$ Eosin(dianion), 1.410
$C_{20}H_8I_4O_5$ Erythrosin (tetraiodofluorescein), S1.233
$C_{20}H_{11}O_5^-$ Fluoroscein(anion), 1.422
$C_{20}H_{12}O_5$ Fluorescein, S1.242
$C_{20}H_{19}ClN_4$ Safranine T, 1.577
$C_{20}H_{32}N_6O_{12}S_2$ Glutathione, oxidized, 1.442, S1.255
$C_{20}H_{34}N_6O_8$ *N*-Acetylalanylalanylalanylalanylalanylalanylalanine, S1.84
$C_{21}H_{18}O_5S$ Cresol red, S1.187
$C_{21}H_{27}FO_6$ Triamcinolone, S1.426
$C_{21}H_{28}N_7O_{10}P_2$ Nicotinamide-adenine dinucleotide, 1.547, 1.548
$C_{21}H_{30}O_5$ Hydrocortisone, S1.282
$C_{21}H_{38}ClN$ Hexadecylpyridinium chloride, 1.465b
$C_{23}H_{32}O_6$ Hydrocortisone acetate, S1.283
$C_{24}H_{30}F_2O_6$ Fluocinolone acetonide, S1.240
$C_{24}H_{31}FO_6$ Triamcinolone acetonide, S1.427
$C_{26}H_{35}FO_6$ β-Methazone valerate, S1.311
$C_{28}H_{31}ClN_2O_3$ Rhodamine B, S1.392
$C_{30}H_{24}CoN_6^{3+}$ Tris(2,2′-bipyridine)cobalt(III) ion, 1.96
$C_{30}H_{24}N_6Rh^{3+}$ Tris(2,2′-bipyridine)rhodium(III) ion, 1.230
$C_{30}H_{24}N_6Ru^{2+}$ Tris(2,2′-bipyridine)ruthenium(II) ion, S1.54
$C_{30}H_{24}N_6Ru^{3+}$ Tris(2,2′-bipyridine)ruthenium(III) ion, S1.60
$C_{30}H_{32}N_2O_{10}S$ Xylenol orange, S1.443
$C_{36}H_{24}CoN_6^{3+}$ Tris(1,10-phenanthroline)cobalt(III) ion 1.97
$C_{45}H_{33}CoN_9^{3+}$ Tris(2,2′,6′,2″-terpyridine)cobalt(III) ion, S1.22
$C_{63}H_{90}CoN_{14}O_{14}P$ Cyanocobalamin(Vitamin B_{12}), S1.190
Cd^{2+}, 1.38, S1.10
$CdH_6IO_3^+$ Iodotriaquocadmium(II) ion, 1.41
$CdH_{12}N_4^{2+}$ Tetraamminecadmium(II) ion, 1.39
Ce^{3+}, 1.51
Cl^-, 1.53
$ClCoH_{15}N_5^{2+}$ Chloropentaamminecobalt(III) ion, 1.66
$ClCrH_{15}N_5^{2+}$ Chloropentaamminechromium(III) ion, 1.103
$ClH_{15}N_5Ru^{2+}$ Chlorapentaammineruthenium(III) ion, 1.233, S1.57
ClO^- Hypochlorite ion, 1.54, S1.11
ClO_2^- Chlorite ion, S1.12
ClO_3^- Chlorate ion, 1.55, S1.13
ClO_4^- Perchlorate ion, 1.56
Cl_2Hg Mercury(II) chloride, S1.33
Cl_4Pd^{2-} Tetrachloropalladate(II) ion, 1.220
Cl_4Pt^{2-} Tetrachloroplatinate(II) ion, 1.225, S1.52
Cl_6Ir^{2-} Hexachloroiridate(IV) ion, 1.164
Cl_6Ir^{3-} Hexachloroiridate(III) ion, 1.162
Cl_6Pt^{2-} Hexachloroplatinate(IV) ion, 1.228
Co^{2+}, 1.57
$CoFH_{15}N_5^{2+}$ Fluoropentaamminecobalt(III) ion, 1.65
$CoH_{15}N_8^{2+}$ Azidopentaamminecobalt(III) ion, 1.70
$CoH_{16}N_4O_2^{3+}$ Diaquotetraamminecobalt(III) ion, 1.63
$CoH_{16}N_5O^{2+}$ Hydroxopentaamminecobalt(III) ion, 1.64
$CoH_{17}N_5O^{3+}$ Aquopentaamminecobalt(III) ion, 1.62
$CoH_{18}N_6^{3+}$ Hexaamminecobalt(III) ion, 1.61
$CoN_6O_{12}^{3-}$ Hexanitrocobaltate(III) ion, 1.81
CoO_2^{2-} Cobaltate(II) ion, 1.58
$Co_2H_{30}N_{10}O_2^{5+}$ Decaammine-μ-dioxodicobalt(III) ion, 1.75
Cr^{2+}, 1.99
Cr^{3+}, 1.102
CrF_6^{3-} Hexafluorochromate(III) ion, 1.104
CrF_6^{4-} Hexafluorochromate(II) ion, 1.101
CrO_4^{2-} Chromate(VI) ion, 1.112
$Cr_2O_7^{2-}$ Dichromate(VI) ion, 1.113
$Cr_4O_{12}^{3-}$ Trichromatochromate(III) ion, 1.114
Cu^{2+}, 1.115, S1.25
$CuH_4O_4^{2-}$ Tetrahydroxocuprate(II) ion, 1.116
$CuH_{12}N_4^{2+}$ Tetraamminecopper(II) ion, 1.120
D, 1.6, S1.4
D^+, 1.144
DO, 1.8
D_2O Deuterium oxide, 1.2
D_2O_2 Deuterium peroxide, 1.147
D_2S Deuterium sulfide, 1.235
Dy^{3+}, 1.123
Er^{3+}, 1.125
Eu^{3+}, 1.127, S1.26
F^-, 1.129
FH Hydrofluoric acid, 1.130
$FH_6NiO_3^+$ Fluorotriaquonickel(II) ion, 1.194
F_2H^-, 1.131
F_3Sn^- Trifluorostannate(II) ion, 1.253
F_6Fe^{3-} Hexafluoroferrate(III) ion, 1.136
F_6S Sulfur hexafluoride, 1.237, S1.62
F_6Si^{2-} Hexafluorosilicate(IV) ion, 1.249
F_6Sn^{2-} Hexafluorostannate(IV) ion, 1.257
F_6Ti^{2-} Hexafluorotitanate(IV) ion, 1.264
Fe^{2+}, 1.132
Fe^{3+}, S1.27
FeO_4S^+ Sulfatoiron(III) ion, S1.28
Gd^{3+}, 1.141
H, 1.5, S1.3
H^+, 1.143, S1.31
$HNO_7S_2^{2-}$ Hydroxylaminedisulfonate ion, 1.185
HO Hydroxyl radical, 1.7
$HOZn^+$ Hydroxozinc(II) ion, 1.275
HO_2^- Hydroperoxide ion, 1.148
HO_3S^- Bisulfite ion, S1.64
HO_4P^{2-} Hydrogen phosphate ion, S1.49
HO_5S^- Peroxysulfate ion, 1.241
$HO_7P_2^{3-}$ Pyrophosphate ion, S1.50
HS^- Hydrosulfide ion, 1.236, S1.61
HSe^- Hydroselenide ion, 1.246
H_2, 1.145
$H_2NO_3S^-$ Sulfamate ion, 1.183
H_2O Water, 1.1
H_2O_2 Hydrogen peroxide, 1.146, S1.32
$H_2O_2P^-$ Hypophosphite(III) ion, 1.209
$H_2O_3P^-$ Phosphite ion, 1.210
$H_2O_4P^-$ Phosphate ion, 1.211, S1.48

H_2S Hydrogen sulfide, 1.234
H_2Se Hydrogen selenide, 1.245
H_3NO Hydroxylamine, 1.181, S1.40
H_4N^+ Ammonium ion, 1.178
H_4NO^+ Hydroxylammonium ion, 1.182, S1.41
H_4N_2 Hydrazine, 1.179, S1.38
$H_4O_4Zn^{2-}$ Tetrahydroxozincate(II) ion, 1.276
$H_5N_2^+$ Hydrazinium ion, 1.180, S1.39
$H_{12}N_4Zn^{2+}$ Tetraamminezinc(II) ion, 1.277
$H_{15}IN_5Ru^{2+}$ Iodopentaammineruthenium(III) ion, S1.58
$H_{15}N_7Ru^{2+}$ Pentaamminenitrogenruthenium(II) ion, 1.231a, S1.55
$H_{16}N_5ORu^{2+}$ Hydroxopentaammineruthenium(III) ion, S1.59
$H_{18}IrN_6^{3+}$ Hexaammineiridium(III) ion, 1.163
$H_{18}N_6Os^{3+}$ Hexammineosmium(III) ion, 1.208
$H_{18}N_6Rh^{3+}$ Hexamminerhodium(III) ion, 1.229
$H_{18}N_6Ru^{3+}$ Hexaammineruthenium(III) ion, 1.232
Ho^{2+}, 1.154
I^-, S1.34
IO_3^- Iodate ion, 1.158
IO_4^- Periodate ion, 1.159
I_2, 1.156, S1.35
I_3^-, 1.157
In^{3+}, 1.160
K^+, 1.165, S1.36
La^{3+}, 1.166
Lu^{3+}, 1.168
Mn^{2+}, 1.170
MnO_4^- Permanganate ion, 1.175
NO Nitric oxide, 1.187
NO_2^- Nitrite ion, 1.188, S1.43
NO_3^- Nitrate ion, 1.189, S1.44
$NO_7S_2^{2-}$ Nitrosyldisulfonate ion, 1.184
N_2O Nitrous oxide, 1.186, S1.42
N_3^- Azide ion, 1.177
Na^+, 1.190
Nd^{3+}, 1.191
Ni^{2+}, 1.193, S1.45
O^-, 1.9, S1.5
O_2, 1.205, 1.206, S1.47
O_2^-, 1.10
O_2Pb^{2-} Plumbate(II) ion, 1.215
O_2Sn^{2-} Stannate(II) ion, 1.252
O_2U^{2+} Uranyl(VI) ion, 1.268
O_3S^{2-} Sulfite ion, 1.238, S1.63
$O_3S_2^{2-}$ Thiosulfate ion, 1.240, S1.65
O_3Sb^- Antimonate(V) ion, 1,243
O_3Se^{2-} Selenite(IV) ion, 1.247
O_3Sn^{2-} Stannate(IV) ion, 1.256
O_3Te^{2-} Tellurate(IV) ion, 1.260
O_3Ti^{2-} Titanate(IV) ion, 1.263
O_3V^- Vanadate(V) ion, 1.269
O_4S^{2-} Sulfate ion, 1.239
$O_4S_2^{2-}$ Dithionite ion, S1.66
O_4Se^{2-} Selenate(VI) ion, 1.248
O_4Te^{2-} Tellurate(VI) ion, 1.261
$O_6S_2^{2-}$ Dithionate ion, S1.67
$O_6S_3^{2-}$ Trithionate ion, S1.69
$O_6S_4^{2-}$ Tetrathionate ion, S1.70
$O_7P_2^{2-}$ Pyrophosphate ion, 1.212
$O_8P_2^{4-}$ Peroxyphosphate ion, 1.213, S1.50a
$O_8S_2^{2-}$ Peroxydisulfate ion, 1.242, S1.68
Pb^{2+}, 1.214
Pr^{3+}, 1.223, S1.51
Sm^{3+}, 1.250, S1.71
Tb^{3+}, 1.258
Tl^+, 1.265, S1.72
Tm^{3+}, 1.266
Y^{3+}, 1.270
Yb^{3+}, 1.272, S1.73
Zn^{2+}, 1.274, S1.74

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