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NSRDS-NBS 43

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

1. Hydrated Electron

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards

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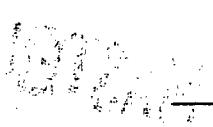

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Foreword

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.

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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, *Director*

Preface

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

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

Contents

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Rates of reactions of hydrated electrons with over 700 different organic and inorganic molecules, ions, and transients have been tabulated. Most of the data are derived from pulse radiolysis of aqueous solutions; results from photolysis and from steady-state radiolysis by competition kinetics are also included.

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

Introduction

The hydrated electron is unique not only by its nature and by its chemical properties, but also by the fact that its reactions have been quantitatively investigated with a larger number of different chemical species than any other reagent. A compilation of the rate constants of the reactions of the hydrated electron became a necessity as a result of the accumulation of data on the kinetic behavior of hundreds of different compounds. This was true already in 1965 when a compilation of rate data was first published (Anbar and Neta, 65–0245). Less than two years later two additional compilations were published (Hart, 66–0757, and Anbar and Neta, 67–0103). Three years later a new compilation appeared in Hart and Anbar's monograph, "The Hydrated Electron," 70–0482. The last compilation, which does not claim to be comprehensive, includes about 450 different compounds as compared with 410 in the 1967 compilation. The present tables, which are as comprehensive as possible, include close to 700 compounds and derive the information from about 180 references compared with 32, 59, and about 90 references in the 1966, 1967, and 1970 compilations, respectively. The rate of generation of new data has diminished in recent years, and the time has come for consolidation of the information which may now stimulate more systematic work on the chemistry of the hydrated electron.

Unlike the last two compilations, we have not limited ourselves to rate data obtained by pulse radiolysis, but have also included specific rates obtained by competition kinetics. This has been done primarily when no pulse radiolysis data were available and when a good agreement was found between pulse radiolysis and competition kinetic data. The latter type of data were included primarily in order to point out systems which are not complicated by secondary reactions. It may be stated in general that direct measurement of the decay of e^-_{aq} is by far the most reliable kinetic method whereas any rate constants derived by competition kinetics should be used with caution. Of the different reagents used in competition kinetics, one should avoid small molecules with high electron affinity such as O_2 or N_2O as specific competitors for e^-_{aq}. These reagents can easily abstract an electron from a long-lived electron adduct and thus lead to erroneous kinetic data. *p*-Bromophenol, nitrate ions and sulfur hexafluoride seem to be more reliable competitors,

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the latter having the advantage of enhanced analytical sensitivity by producing 6 fluoride ions per electron. Standard values have been chosen and used consistently throughout the tables for normalizing relative rates of the competitors, H^+, N_2O, O_2, SF_6, NO_3^-, acetone, *p*-bromophenol, chloroacetate ion and chloroacetic acid with other solutes.

In selecting the rate data from pulse radiolysis studies, we have included every rate constant reported except for some of those which have been superseded by more reliable measurements by the *same* author. We have avoided duplication of references in cases where it was obvious that two or more publications report one and the same experimental result.

In several cases unexplained discrepancies between reported values exist; if the solute concentration is greater then 10^{-1} *M*, the presence of reactive impurities could account for the variation in measured values. In most cases the specific rate included in the tables is the observed rate constant, k_{obs}, corrected only for the spontaneous decay of e^-_{aq} in the same solute-free matrix. Wherever a rate constant corrected for salt effects or for dissociation constant of an acid was reported, we introduced it into the specific rate column of the table, putting k_{obs} under *Comments*.

Wherever not specified, the reported rate constant is the value for ambient temperatures, 15–25°C. Since the activation energy of e^-_{aq} reactions is low, little uncertainty is introduced by the lack of information on the exact temperature of measurement. Unfortunately there are only a few studies in which the energy of activation was measured and even some of these are open to criticism (see for instance Anbar and Hart, 70–0482, Ch. VIIIA). Measured values of E_a have been included under *Comments*.

The ionic strength evidently has a pronounced effect on the reaction rates of e^-_{aq} with positive and negative ions, and moderate effects are expected even with neutral species. Many kinetic results were reported without specifying the ionic strengths, but wherever such data were available they have been included under *Comments*. No attempt was made, however, to calculate k_{cor} extrapolated to $\mu = 0$ because of the lack of exact information on the changes in activity coefficient of e^-_{aq} and of the other reagents with μ, especially in concentrated solutions. Wherever k_{cor} was calculated by an author, it was cited, leaving k_{obs} for *Comments*, otherwise k_{obs} was cited and any available information on the ionic strength was reported under *Comments*.

Arrangement of Tables

Solute and reaction. The reactions may involve electron attachment (e^-_{aq} + AB ⇒ AB^-) or dissociative electron attachment (e^-_{aq} + AB ⇒ A^- + B). If products have not been identified, no reaction has been included in the tables. In some cases the products of the electron attachment reaction have been identified and the reaction has been included. In some cases products have been identified after subsequent steps and an overall reaction has been included.

Table 2 contains the reactions of e^-_{aq} with transient species formed in water by irradiation. Arrangement in Table 3 (inorganic ions and molecules) is alphabetical by main element; in Table 4 arrangement of the organic ions and molecules is alphabetical by name. In most cases the IUPAC name has been used, however some complex materials are listed by a common name.

Solute concentrations were usually less than 10^{-3} *M*; if a higher concentration was reported it has been noted under *Comments*. Measurements were commonly made in the presence of a small concentration of an alcohol which acts as an OH scavenger. The absence of such a scavenger has been noted under *Comments* whenever that information was included in the reported experimental details.

Specific rate, k. In some cases the reported numerical values for *k* have been rounded off to two significant figures. Error limits have been given as reported; we have made no attempt to assess sources of error and assign limits. Values corrected to zero ionic strength have been marked (cor.). Values obtained indirectly from relative rates have been marked (rel.) and the reported rate ratios given under *Comments*. Values calculated for dissociated or undissociated acids using k_{obs}, the pH of the solutions and the p*K* of the acid have been marked (calcd.)

Method. Abbreviations used in the *Method* column include:

r.	radiolysis
γ-r.	gamma-radiolysis
X-r.	X-radiolysis
p.r.	pulse radiolysis
phot.	photoylsis
f. phot.	flash photolysis

Further details of the method used have been included in the *Comments* column with the aid of the following abbreviations.

c.k.	competition kinetics
d.k.	decay kinetics
p.b.k.	product buildup kinetics

ss otherwise noted, measurements by pulse radiolysis or flash photolysis were made by observation of the decay of e^-_{aq} absorption at 540–720 nm.

Activation energy, E_a. The temperature range studied and activation energies measured have been given under *Comments*. Entries in which E_a are included are: 1.1, 1.3, 1.30, 1.55, 1.61, 1.62, 1.143, 1.146, 1.173, 1.175, 1.188, 1.189, 1.240, 1.265, 1.286, 1.299, 1.313, 1.326, 1.327, 1.331, 1.343, 1.348, 1.358, 1.366, 1.376, 1.386, 1.433, 1.499, 1.551, 1.559, 1.577, 1.578, 1.596, 1.650

References. The serial number used in Radiation Chemistry Data Center files has been used for citing references; the first two digits of the number represent year. In the citation the number is preceded by the first four letters of the first author's name followed by a period for additional authors, *e.g.* Buxt.68–0153 and Bark...70–0243. Four periods denote four or more co–authors.

Indexes. Since alphabetical arrangements were chosen for listing the solutes in the tables, indexes have been included as an aid in locating entries for individual compounds or groups of compounds. The chemical structure index is an aid for locating classes of solutes related by structural features. The formula index is an aid for locating a specific compound or ion. The formulas contain the elements arranged in alphabetical order except for carbon compounds, in which C and H precede the alphabetical arrangement. The indexes refer to entry numbers in the tables.

Abbreviations, symbols and units. Formulas for complex ions contain the following ligand abbreviations: EDTA = ethylenediaminetetracetato; en = ethylenediamine; dien = diethylenetriamine; bipy =2,2′–bipyridine; phen = 1,10–phenanthroline; gly = glycine; et_4dien =tetraethyldiethylenetriamine; NTA = nitrilotriacetato; acac =acetylacetone. Abbreviations used in describing *Method* have been listed above. Other abbreviations and symbols include the following:

addn.	addition
anal.	analysis
aq	aqueous
atm.	atmospheres
calcd.	calculated
compd.	compound
concn.	concentration
cor.	corrected
detd.	determined
	hydrated electron in D_2O
E_a	activation energy
elec. condy.	electrical conductivity
equil.	equilibrium
estd.	estimated
g	primary radiation yield; (molecules or ions per 100 eV absorbed)
G	radiation yield; (molecules or ions per 100 eV absorbed)
k	specific rate
μ	ionic strength
mol. wt.	molecular weight
obs.	observed
rel.	relative
s	second
satd.	saturated
soln.	solution
$t_{1/2}$	half–life

The energy and pressure units in these tables do not conform to proposed international usage (SI units; Système International); therefore, conversion factors are listed below for the purpose of making these tables most generally useful. Concentration (mol/dm^3) has been designated by M for convenience and brevity.

1 kcal = 4.184 kJ
1 eV = 1.602 x 10^{-19} J
1 atm = 101 325 N/m^2
1 bar = 1 x 10^5 N/m^2

TABLE 1. *Properties of e^-_{aq} at 25 °C* [a]

Absorption maximum (nm)	715
Absorption maximum (eV)	1.73
Extinction coefficient, ϵ (715 nm) ($dm^3 \cdot mol^{-1} cm^{-1} 10^{-4}$)	1.85
$dh\nu/dT$ (0 to 100°C) ($eV \cdot deg^{-1} 10^3$)	−2.9
Half–width (eV)	0.93
Oscillator strength	0.71
ESR g–factor	2.0002
ESR line width (gauss)	< 0.5
Charge	−1
Radius of charge distribution (angstroms or $cm \cdot 10^8$)	2.5 to 3.0
Primary yield, $g(e^-_{aq})$, pH 7	2.65
Diffusion coefficient ($cm^2 s^{-1} 10^5$)	4.90
Equivalent conductivity ($mho \cdot cm^2$)	190
Mobility ($cm^2 V^{-1} s^{-1} 10^3$)	1.98
ΔF hyd ($kcal \cdot mol^{-1}$)	−37.4
ΔS hyd ($cal \cdot mol^{-1} deg^{-1}$)	−1.9
ΔH hyd ($kcal \cdot mol^{-1}$)	−38.1
$E°$ (e^-_{aq} + H ⇒ 1/2 H_2) (V)	2.77

[a] Hart, E. J. and Anbar, M., *The Hydrated Electron*, New York, Wiley, 1970, p. 225.

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TABLE 2. *Reactions of e_{aq}^- with water and transients from water*

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.1	H_2O $e_{aq}^- + H_2O \rightarrow H + OH^-$	8.3–9.0	$(1.6 \pm 0.1) \times 10^1$	p.r.	computer anal.; contains 7×10^{-4} *M* H_2.	Hart..66–0015
		8.3	–	p.r.	k detd. at 5–81°C to give $E_a = 4.5 \pm 1$ kcal mol^{-1}.	Fiel.67–0532
		11	$(2.2 \pm 0.6) \times 10^1$	p.r.	contains $Ba(OH)_2$ and 4×10^{-3} *M* formate ion; extrapolated to formate concn. = 0.	Swal68–0418
		> 7	2.7×10^1 (rel.)	γ–r.	c.k., assume $k(e_{aq}^- + NO_3^-) = 1.1 \times 10^{10}$, soln. contains 3×10^{-5} *M* $NaNO_3$ and 5×10^{-2} *M* glucose; pressures up to 8.85 kbar.	Hent.70–0056
1.2	D_2O $e_d^- + D_2O \rightarrow D + OD^-$	9.39	1.25 ± 0.5	p.r.	computer anal., D_2O soln. satd. with D_2.	Hart.68–0025
1.3	e_{aq}^-	–	$(6.5 \pm 1.0) \times 10^9$	p.r.	——	Dorf.63–0045
	$e_{aq}^- + e_{aq}^- \rightarrow H_2 + 2OH^-$	13	5×10^9	p.r.	——	Gord....63–0050
		10.9	$(4.3 \pm 0.8) \times 10^9$	p.r.	——	Gord....63–0073
		13.3	$(5.5 \pm 0.7) \times 10^9$	p.r.	soln. in equil. with 100 atm. H_2.	Math.65–0009
		12	$(6.3 \pm 1) \times 10^9$	γ–r.	steady–state method, soln. H_2–satd., method less reliable, k detd. at 10 – 93°C to give $E_a = 5.2 \pm 0.3$ kcal mol^{-1}.	Gott.67–0109
		11	6×10^9	f.phot.	soln. H_2–satd.	Schm.68–7143
		12.7	5.0×10^9 (cor.)	p.r.	apparent change in k with pH has been obs.	Brus70–0749
1.4	e_d^- $e_d^- + e_d^- \rightarrow D_2 + 2OD^-$	13.4	6.0×10^9	p.r.	computer anal., D_2O soln. contains 5.7×10^{-3} *M* D_2.	Hart.68–0025
1.5	H	10.9	$\sim 3 \times 10^{10}$	p.r.	——	Gord....63–0073
	$e_{aq}^- + H \rightarrow H_2 + OH^-$	10.5	$(2.5 \pm 0.6) \times 10^{10}$	p.r.	soln. is in equil. with 100 atm. H_2.	Math.65–0009
1.6	D $e_d^- + D \rightarrow D_2 + OD^-$	9.39	$(2.8 \pm 0.2) \times 10^{10}$	p.r.	soln. contains 4.5×10^{-3} *M* D_2 in D_2O.	Hart.68–0025
1.7	OH	10.5	$(3.0 \pm 0.7) \times 10^{10}$	p.r.	soln. contains only NaOH.	Math.65–0009
	$e_{aq}^- + OH \rightarrow OH^-$	11	3×10^{10}	p.r.	——	Gord....63–00730
1.8	OD $e_d^- + OD \rightarrow OD^-$	11.15	$(2.8 \pm 0.2) \times 10^{10}$	p.r.	computer anal., D_2O soln. of NaOD.	Hart.68–0025
1.9	O^- $e_{aq}^- + O^- \rightarrow 2\ OH^-$	13	$(2.2 \pm 0.6) \times 10^{10}$	p.r.	soln. in equil. with 50 atm. H_2, contains NaOH; not very reliable value.	Math.65–0009
1.10	O_2^- $e_{aq}^- + O_2^- \rightarrow O_2^{2-}$	11.1	1.3×10^{10}	p.r.	d.k. at 650 nm(e_{aq}^-); computer anal.	Grue...71–0171

TABLE 3. *Reactions of e^-_{aq} with inorganic solutes*

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.11	Ag^+	7	$(3.6 \pm 0.4) \times 10^{10}$	p.r.	——	Gord....63–0073
	$e^-_{aq} + Ag^+ \rightarrow Ag^\circ$	7	3.5×10^{10}	p.r.	d.k. at 720 nm as well as at 360 nm (Ag°), counter ion SO_4^{2-}.	Puki..68–0431
		7	$(4.3 \pm 0.2) \times 10^{10}$	p.r.	counter ion SO_4^{2-}.	Beva68–0436
		7	$(4.5 \pm 0.5) \times 10^{10}$	p.r.	p.b.k. at 365 nm (Ag°), counter ion SO_4^{2-}.	Beva68–0436
1.12	$Ag(NH_3)_2^+$ $e^-_{aq} + Ag(NH_3)_2^+ \rightarrow Ag^\circ + 2\ NH_3$	–	3.2×10^{10}	p.r.	d.k. at 720 nm as well as p.b.k. at 360 nm(Ag°), counter ion SO_4^{2-}; soln. contains 0.1 M NH_3.	Puki.68–0435
1.13	$Ag(CN)_2^-$	10	$(1.5 \pm 0.2) \times 10^9$	p.r.	contains 0.1 M CN^-, counter ion ClO_4^-.	Anba.65–0047
1.14	$Ag(NTA)^{2-}$	10.9	$(4.4 \pm 0.9) \times 10^9$	p.r	counter ion SO_4^{2-}; soln. contains 2×10^{-2} M nitrilotriacetic acid.	Meye.69–0277
1.15	$Ag(EDTA)^{3-}$	12	1.6×10^9	p.r.	$\mu = 0.2$.	Anba.69–0276
1.16	Al^{3+}_{aq}	6.8	$(2.0 \pm 0.3) \times 10^9$	p.r.	counter ion ClO_4^-.	Anba.65–0047
		11.2	$(4.0 \pm 1.0) \times 10^8$	p.r.	counter ions ClO_4^-, Na^+.	Anba.65–0047
1.17	$Al(OH)_4^-$	14	$(5.5 \pm 1.2) \times 10^6$	p.r.	counter ion ClO_4^-.	Anba.65–0047
1.18	$Al(gly)_3$	11.1	$\leq 1.8 \times 10^7$	p.r.	counter ion SO_4^{2-}; soln. contains 10^{-1} M glycine.	Meye.69–0277
1.19	Al(NTA)	10.9	$> 1 \times 10^8$	p.r.	soln. contains 2×10^{-2} M nitrilotriacetic acid, 10^{-2} M $Al_2(SO_4)_3$.	Meye69–0277
1.20	$Al(NTA)_2^{3-}$	10.9	$\leq 2 \times 10^7$	p.r.	soln. contains 2×10^{-2} M nitrilotriacetic acid, 10^{-3} M $Al_2(SO_4)_3$.	Meye.69–0277
1.21	$Al(EDTA)^-$	12	3.0×10^7	p.r.	$\mu = 0.2$.	Anba.69–0276
1.22	AsO_2^-	10.6	5.5×10^8 (cor.)	p.r.	counter ion Na^+; $\mu = 0.0075$ M; $k_{obs} = 5.9 \times 10^8$.	Anba.68–0295
1.23	$H_2AsO_4^- + HAsO_4^{2-}$	7.2	$(2.1 \pm 0.3) \times 10^8$	p.r.	$\sim$ 30% $H_2AsO_4^-$, thus $k(e^-_{aq} + H_2AsO_4^-) \cong (2.3 \pm 0.3) \times 10^8$ has been calcd.	Anba.65–0047
	$HAsO_4^{2-}$	11.0	1.9×10^8 (cor.)	p.r.	$\mu = 10^{-3}$ M; $k_{obs} = 2.0 \times 10^8$.	Anba.68–0295
1.24	AsF_6^-	7.0	$(9.0 \pm 0.9) \times 10^9$	p.r.	——	Anba.65–0047
1.25	$Au(CN)_2^-$ $e^-_{aq} + Au(I) \rightarrow (Au(I)e^-_{aq})^\circ$	11	$(8.0 \pm 0.5) \times 10^9$	p.r.	p.b.k. at 410 nm $KAu(CN)_2$, 10^{-3} M NaOH.	Ghos.68–0302
		10.6	3.5×10^9 (cor.)	p.r.	counter ion K^+; $\mu = 10^{-2}$ M; $k_{obs} = 4.2 \times 10^9$.	Anba.68–0295
1.26	BF_4^-	5.8	$< 2.3 \times 10^5$ (cor.)	p.r.	counter ion Na^+; $\mu = 0.2$; $k_{obs} = 4.0 \times 10^5$.	Anba.68–0295
1.27	Br_2^- $e^-_{aq} + Br_2^- \rightarrow 2Br^-$	7	1.3×10^{10}	p.r.	d.k. at 365 nm (Br_2^-), computer anal., soln. contains $10^{-4} - 10^{-2}$ M KBr; assumed for competing reactions $k(e^-_{aq} + Br_2) = k(e^-_{aq} + Br_3^-) = 1 \times 10^{10}$.	Math...65–0425
1.28	BrO^- $e^-_{aq} + BrO^- \rightarrow Br^- + O^-$	13	$(1.5 \pm 0.5) \times 10^{10}$ (cor.)	p.r.	counter ion Na^+; $\mu = 0.1$; $k_{obs} = (2.3 \pm 0.5) \times 10^{10}$; see also 68–0152 for c.k. with N_2O giving $k = (1.2–2.5) \times 10^{10}$ at pH 10–14.	Buxt..66–0184 Buxt.68–0153
1.29	BrO_2^- $e^-_{aq} + BrO_2^- \rightarrow BrO + O^{2-}$	13	$(1.1 \pm 0.2) \times 10^{10}$ (cor.)	p.r.	counter ions Na^+, BrO_3^-, Br^-; $\mu = 0.1$; $k_{obs} = (1.8 \pm 0.2) \times 10^{10}$.	Buxt.68–0153
	BrO_3^-	7	$(2.1 \pm 0.3) \times 10^9$	p.r.	counter ion K^+.	Anba.65–0047
	$e^-_{aq} + BrO_3^- \rightarrow BrO_3^{2-}$	11	$(3.7 \pm 0.5) \times 10^9$	p.r.	counter ion K^+; $k_{obs} =$	Anba.65–0047

TABLE 3. *Reactions of e^-_{aq} with inorganic solutes* —Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
	$\Rightarrow BrO_3H^- + OH^-$		(cor.)		$(3.8 \pm 0.5) \times 10^9$.	
	$\Rightarrow BrO_2 + OH^-$	14	$(2.4 \pm 0.7) \times 10^9$ (cor.)	p.r.	counter ion K^+; k_{obs} = $(5.8 \pm 0.7) \times 10^9$.	Anba.65–0047
		3 *M* OH^-	$(5.3 \pm 0.6) \times 10^9$	p.r.	counter ions K^+; Na^+.	Anba.65–0047
		13	$(2.3 \pm 0.2) \times 10^9$ (cor.)	p.r.	counter ion K^+; $\mu = 0.1$; $k_{obs} = (4.1 \pm 0.2) \times 10^9$.	Buxt.68–0153
		–	7.8×10^9	p.r.	k detd. at 15–80°C; $E_a = 4.5$ kcal mol^{-1}.	Cerc69–0567
		~ 7	3.4×10^9 (cor.)	p.r.	counter ion Na^+; in the presence of 0.01, 0.1 and 1 *M* $NaClO_4$, k = 4.1, 5 and 6.15×10^9, resp.	Pele.70–0242
1.31	CO	–	1.0×10^9	p.r.	——	Hart..64–0048
1.32	CO_2	7	$(7.7 \pm 1.1) \times 10^9$	p.r.	——	Gord....63–0073
1.33	HCO_3^-	–	$< 10^6$	p.r.	concn. 10^{-3}M , no OH scavenger added; see also 67–0218 for c.k. with CO_2 giving $k \cong 6 \times 10^5$.	Thom..64–0046
1.34	CO_3^{2-}	> 9	$< 10^6$	p.r.	concn. 10^{-3}M , no OH scavenger added.	Thom..64–0046
1.35	CN^-	11.0	$< 10^6$	p.r.	value inferred from data reported in this paper.	Anba.65–0047
1.36	CNO^-	11	$\leq 1.3 \times 10^6$	p.r.	concn. 2×10^{-2}M	Anba.64–0282
1.37	CNS^-	7	$< 10^6$	p.r.	——	Thom..64–0046
1.38	Cd^{2+}	7	5.8×10^{10}	p.r.	——	Baxe..63–0187
		3	4.8×10^{10} (rel.)	γ–r.	c.k., Cd^{2+} concn. 10^{-3}–10^{-1} *M*; counter ion ClO_4^-; $k_{1.38}/k(e^-_{aq} + H^+) = 2.1$; assumed $k(e^-_{aq} + H^+) = 2.3 \times 10^{10}$.	Baxe.64–0153
		7	$(6.1 \pm 1.8) \times 10^{10}$	n.r.	counter ion NO_3^-; indirect; less reliable method.	Roze.65–0008
		7	5.2×10^{10}	p.r.	——	Baxe..65–0044
		6.5	$(4.8 \pm 0.6) \times 10^{10}$	p.r.	counter ion SO_4^{2-}.	Anba.65–0047
		–	6.4×10^{10}(cor.)	p.r.	counter ion SO_4^{2-}; in the presence of 0.1 and 1 *M* Na_2SO_4, k = 1.9 and 0.96 x 10^{10}, resp.	Pele.70–0242
		–	$1.7–3.2 \times 10^{10}$	p.r.	k decreases with concn., 0.1–0.5 *M* $CdCl_2$, at high concn. soln. may contain $CdCl^+$ and $CdCl_3^-$ (see 1.40).	Aldr...71–0019
		–	$3.8–4.3 \times 10^{10}$	p.r.	k decreases with concn., 0.1–0.5 *M* $Cd(ClO_4)_2$, Cd_2OH^{3+} may be present at high concn.	Aldr...71–0019
1.39	$Cd(NH_3)_4^{2+}$	6.5	$(3.1 \pm 0.3) \times 10^{10}$	p.r.	contains 0.2 *M* NH_3, counter ion SO_4^{2-}.	Anba.65–0047
1.40	$CdCl(H_2O)_3^+$ + $CdCl_2(H_2O)_2$ + $CdCl_3(H_2O)^-$	6.8	$(1.1 \pm 0.1) \times 10^{10}$	p.r.	contains 1.0 *M* Cl^-, counter ion SO_4^{2-}.	Anba.65–0047
1.41	CdI_4^{2-}	7.2	$(1.6 \pm 0.2) \times 10^{10}$	p.r.	contains 0.2 *M* I^-, counter ion SO_4^{2-}.	Anba.65–0047
1.42	$Cd(CN)_4^{2-}$	10	$(1.4 \pm 0.2) \times 10^8$	p.r.	contains 0.1 *M* CN^-, counter ions SO_4^{2-}, K^+.	Anba.65–0047
1.43	$Cd(gly)^+$	~ 9	$(1.85 \pm 0.3) \times 10^{10}$	p.r.	counter ion SO_4^{2-}, $\mu \cong 10^{-4}$.	Meye.69–0277
1.44	$Cd(gly)_2$	~ 10	$(1.4 \pm 0.2) \times 10^{10}$	p.r.	counter ion SO_4^{2-}, $\mu \cong 10^{-3}$.	Meye.69–02
1.45	$Cd(gly)_3^-$	~ 11	4.8×10^9 (cor.)	p.r.	counter ion SO_4^{2-}, $\mu \cong 10^{-1}$.	Meye.69–02

TABLE 3. *Reactions of e^-_{aq} with inorganic solutes* —Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.46	$Cd(NTA)_2^{4-}$	10.9	$\leq 2.3 \times 10^7$	p.r.	counter ion SO_4^{2-}, soln. contains 2×10^{-2} *M* nitrilotriacetic acid.	Meye.69–0277
1.47	$Cd(EDTA)^{2-}$	12	3.9×10^8	p.r.	$\mu = 0.2$.	Anba.69–0276
1.48	$Cd(en)^{2+}$	~ 9	$(6.3 \pm 0.9) \times 10^{10}$ (cor.)	p.r.	$\mu \cong 10^{-4}$.	Meye.69–0277
1.49	$Cd(en)_2^{2+}$	~ 10	$(4.4 \pm 0.7) \times 10^{10}$ (cor.)	p.r.	$\mu \cong 10^{-3}$.	Meye.69–0277
1.50	$Cd(en)_3^{2+}$	~ 11	$(6.8 \pm 1.0) \times 10^{10}$ (cor.)	p.r.	$\mu \cong 10^{-1}$.	Meye.69–0277
1.51	Ce^{3+}	–	$< 10^9$	p.r.	——	Baxe....64–0132
1.52	$Ce(EDTA)^-$	11.5	$< 3.2 \times 10^7$	p.r.	$\mu = 0.2$.	Anba.69–0276
1.53	Cl^-	10	$< 10^5$	p.r.	values inferred from	Anba.64–0149
			$< 10^4$	p.r.	data reported in these papers.	Anba.65–0047
1.54	ClO^-	10.2	7.0×10^9 (cor.)	p.r.	counter ion Na^+; $\mu = 10^{-3}$ *M*; $k_{obs} = 7.2 \times 10^9$.	Anba.68–0295
1.55	ClO_3^-	~ 10	$< 4 \times 10^6$	p.r.	concn. 10^{-2} *M*.	Thom..64–0046
		–	3.5×10^8	p.r.	——	Baxe..65–0044
		9	$< 2 \times 10^6$	p.r.	——	Meye67–0750
		–	2.2×10^8	p.r.	k detd. at 15–80°C; $E_a = 3.2$ kcal mol^{-1}.	Cerc69–0567
			(Unexplained discrepancy in the above data)			
1.56	ClO_4^-	~ 10	$< 10^6$	p.r.	concn. 10^{-2} *M*.	Thom..64–0046
		–	$< 10^6$	p.r.	——	Baxe....64–0132
		–	$< 10^5$	p.r.	value inferred from data in this ref.	Anba.65–0001
1.57	Co^{2+}	–	1.35×10^{10}	p.r.	——	Baxe..63–0187
		–	1.2×10^{10}	p.r.	——	Baxe..65–0044
		–	1.2×10^{10}	p.r.	——	Baxe....64–0132
		–	9.5×10^9 (cor.)	p.r.	counter ion ClO_4^-; in the presence of 3 *M* $NaClO_4$, $k = 3.7 \times 10^9$.	Pele.70–0242
1.58	$Co(OH)_4^{2-} + Co(OH)_3^-$	14	1.6×10^9	p.r.	——	Anba.64–0282
1.59	$Co(CN)_5^{3-}$ $e^-_{aq} + Co(CN)_5^{3-} \Rightarrow Co(CN)_5^{4-}$	13	$(1.4 \pm 0.1) \times 10^{10}$	p.r.	k same in D_2O soln.	Vene..69–0443
1.59a	$Co(NTA)_2^{4-}$	10.9	$\leq 1.4 \times 10^8$	p.r.	counter ion SO_4^{2-}; contains 2×10^{-2} *M* nitrilotriacetic acid.	Meye.69–0277
1.60	$Co(EDTA)^{2-}$	12	$< 5.2 \times 10^8$	p.r.	$\mu = 0.2$.	Anba.69–0276
1.61	$Co(NH_3)_6^{3+}$	3	7.6×10^{10} (rel.)	γ–r.	c.k., k calcd. from $k_{1.61}/k(e^-_{aq} + H^+) = 3.3$ assuming $k(e^-_{aq} + H^+) = 2.3 \times 10^{10}$; counter ion ClO_4^-.	Baxe.64–0153
		–	9×10^{10}	p.r.	k detd. at 21–77.5°C to give $E_a = 4.2 \pm 0.5$ kcal mol^{-1}	Baxe.65–0044
		11.1	$(9.0 \pm 1.3) \times 10^{10}$	p.r.	counter ion ClO_4^-; soln. contains 0.2 *M* NH_3.	Anba.65–0047
		6.7	8.2×10^{10} (cor.)	p.r.	counter ion ClO_4^-; $\mu = 6 \times 10^{-5}$ *M*.	Anba.68–0295
		~ 7	$(8.8 \pm 0.4) \times 10^{10}$	p.r.	counter ion Cl^-; soln. contains $< 10^{-3}$ *M* H_2.	Walt.69–0186
		5–6	8.5×10^{10}	p.r.	counter ion ClO_4^-.	Meye.69–0428
1.62	$Co(NH_3)_5H_2O^{3+}$ +	–	6.2×10^{10}	p.r.	——	Baxe.65–0044
	$Co(NH_3)_5OH^{2+}$	5.5–6	4.6×10^{10} (rel.)	γ–r.	c.k., k calcd. assuming $k(e^-_{aq} + p\text{–}BrC_6H_4OH) = 1.2 \times 10^{10}$; p$K$ of $Co(NH_3)_5H_2O^{3+}$ is 5.4.	Anba.67–0098

TABLE 3. *Reactions of e^-_{aq} with inorganic solutes* —Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
		5.5–6	5.8×10^{10} (rel.)	γ–r.	c.k., k calcd. assuming $k(e^-_{aq} + NO_3^-) = 1.1 \times 10^{10}$; k detd. by both methods at 20, 45 and 70°C. to give $E_a = 3.2$ kcal mol^{-1}.	Anba.67–0098
		4.9	8.1×10^{10}	p.r.	counter ion ClO_4^-; $\mu = 6 \times 10^{-5}$ M.	Anba.68–0295
		–	8.0×10^{10}	p.r.	unpubl. data cited.	Meye.69–0428
1.63	$Co(NH_3)_4(H_2O)_2^{3+}$	–	4.4×10^{10}	p.r.	——	Baxe..65–0044
1.64	$Co(NH_3)_5OH^{2+}$	10.0	$(6.0 \pm 0.9) \times 10^{10}$	p.r.	counter ion ClO_4^-.	Meye.69–0428
1.65	$Co(NH_3)_5F^{2+}$	5–6	$(6.6 \pm 1) \times 10^{10}$	p.r.	counter ion ClO_4^-.	Meye.69–0428
1.66	$Co(NH_3)_5Cl^{2+}$	–	5.4×10^{10}	p.r.	——	Baxe..65–0044
		7.3	6.1×10^{10}	p.r.	counter ion ClO_4^-; $\mu = 4 \times 10^{-5}$ M.	Anba.68–0295
		5–6	$(7.8 \pm 1.1) \times 10^{10}$	p.r.	counter ion ClO_4^-.	Meye.69–0428
1.67	$Co(NH_3)_5Br^{2+}$	7.7	6.2×10^{10}	p.r.	counter ion ClO_4^-; $\mu = 4 \times 10^{-5}$ M.	Anba.68–0295
		5–6	$(8.0 \pm 1.2) \times 10^{10}$	p.r.	counter ion ClO_4^-.	Meye.69–0428
1.68	$Co(NH_3)_5CN^{2+}$	6.1	6.3×10^{10}	p.r.	counter ion ClO_4^-; $\mu = 4 \times 10^{-5}$ M.	Anba.68–0295
		5–6	$(7.4 \pm 1.1) \times 10^{10}$	p.r.	counter ion ClO_4^-.	Meye.69–0428
1.69	$Co(NH_3)_5NCS^{2+}$	5–6	$(7.3 \pm 1.1) \times 10^{10}$	p.r.	counter ion SO_4^{2-}.	Meye.69–0428
1.70	$Co(NH_3)_5N_3^{2+}$	6.3–8.2	6.3×10^{10}	p.r.	counter ion ClO_4^-; $\mu = 4 \times 10^{-5}$ M.	Anba.68–0295
1.71	$Co(NH_3)_4(CN)H_2O^{2+}$	6.1	5.6×10^{10}	p.r.	counter ion ClO_4^-; $\mu = 4 \times 10^{-5}$ M.	Anba.68–0295
1.72	$Co(NH_3)_5$acetate^{2+}	5–6	$(7.3 \pm 1.1) \times 10^{10}$	p.r.	counter ion ClO_4^-.	Meye.69–0428
1.73	$Co(NH_3)_5$fumarate$^+$	5–6	$(6.5 \pm 0.9) \times 10^{10}$	p.r.	counter ion ClO_4^-.	Meye.69–0428
1.74	$Co(NH_3)_5$terephthalate$^+$	–	6×10^{10}	p.r.	——	Brow...64–0045
1.75	$(NH_3)_5CoO_2Co(NH_3)_5^{5+}$	5.9	8.2×10^{10}	p.r.	counter ion Br^-; $\mu = 5 \times 10^{-5}$ M.	Anba.68–0295
1.76	$Co(CN)_6^{3-}$	–	2.7×10^9	p.r.	——	Baxe..65–0044
		10	$(1.0 \pm 0.2) \times 10^9$ (cor.)	p.r.	contains 0.1 M CN^-; $k_{obs} = (3.6 \pm 0.4) \times 10^9$.	Anba.65–0047
		13	$(5.0 \pm 0.5) \times 10^9$	p.r.	contains ~ 0.1 M H_2.	Vene..69–0443
1.77	$Co(CN)_5Cl^{3-}$	–	1.8×10^{10}	p.r.	——	Baxe..65–0044
1.78	$Co(CN)_5OH^{3-}$	–	1.1×10^{10}	p.r.	——	Baxe..65–0044
1.79	$Co(CN)_5N_3^{3-}$	–	1.3×10^{10}	p.r.	——	Baxe..65–0044
1.80	$Co(CN)_5NO_2^{3-}$	–	8.0×10^9	p.r.	——	Baxe..65–0044
1.81	$Co(NO_2)_6^{3-}$	–	5.8×10^{10}	p.r.	——	Baxe..65–0044
1.82	$Co(C_2O_4)_3^{3-}$	–	1.3×10^{10}	p.r.	——	Baxe..65–0044
1.83	omitted					
1.84	$Co(EDTA)^-$	–	2.9×10^{10}	p.r.	——	Baxe..65–0044
		11–12	2.9×10^{10}	p.r.	$\mu = 0.2$.	Anba.69–0276
1.85	$Co(en)_3^{3+}$	6.55	7.3×10^{10}	p.r.	counter ion Cl^-.	Szut.....65–0018
		–	8.2×10^{10}	p.r.	——	Baxe..65–0044
		5–6	$(8.5 \pm 1.3) \times 10^{10}$	p.r.	counter ion Cl^-.	Meye.69–0428
1.86	*cis* $-Co(en)_2F_2^+$	5–6	$(4.9 \pm 0.7) \times 10^{10}$	p.r.	——	Meye.69–0428
1.87	$Co(en)_2Cl_2^+$	–	3.2×10^{10}	p.r.	——	Baxe..65–0044
	cis $-Co(en)_2Cl_2^+$	5–6	$(7.3 \pm 1.1) \times 10^{10}$	p.r.	counter ion ClO_4^-.	Meye.69–0428
	trans $-Co(en)_2Cl_2^+$	5.55	7.1×10^{10}	p.r.	counter ion NO_3^-; k cor. for NO_3^-.	Szut.....65–0018
		5–6	$(7.7 \pm 1.1) \times 10^{10}$	p.r.	counter ion Cl^-.	Meye.69–0428
1.88	$Co(en)_2CO_3^+$	7.2	4.9×10^{10}	p.r.	counter ion ClO_4^-; $\mu = 2 \times 10^{-5}$ M.	Anba.68–0295
		5–6	$(4.8 \pm 0.7) \times 10^{10}$	p.r.	——	Meye.69–0428
1.89	*cis* $-Co(en)_2NH_3Cl^{2+}$	5–6	$(6.6 \pm 1) \times 10^{10}$	p.r.	——	Meye.69–0428
1.90	*cis* $-Co(en)_2NH_3NO_2^{2+}$	5–6	$(6.6 \pm 1) \times 10^{10}$	p.r.	——	Meye.69–0428

TABLE 3. *Reactions of e^-_{aq} with inorganic solutes* — Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.91	$Co(en)_2FH_2O^{2+}$	5–6	$(6.3 \pm 0.9) \times 10^{10}$	p.r.	——	Meye.69–0428
1.92	*cis* $-Co(en)_2(CNS)_2^+$	6.00	6.9×10^{10}	p.r.	counter ion CNS^-.	Szut.65–0018
	trans $-Co(en)_2(CNS)_2^+$	6.50	5.4×10^{10}	p.r.	counter ion Cl^-.	Szut.65–0018
1.93	$Co(dien)_2^{3+}$	~ 7	$(7.6 \pm 0.4) \times 10^{10}$	p.r.	counter ion Cl^-; soln. contains $< 10^{-3}$ *M* H_2.	Walt.69–0186
1.94	$(en)_2CoO_2(NH_2)Co(en)_2^{4+}$	6.2	9.6×10^{10}	p.r.	counter ion Br^-; $\mu = 10^{-4}$ *M*.	Anba.68–0295
1.95	$(CN)_5CoO_2Co(CN)_5^{5-}$	7.0	2.9×10^{10}	p.r.	counter ion K^+; $\mu = 10^{-4}$ *M*.	Anba.68–0295
1.96	$Co(bipy)_3^{3+}$	~ 7	$(8.3 \pm 0.7) \times 10^{10}$	p.r.	counter ion ClO_4^-; soln. contains $< 10^{-3}$ *M* H_2.	Walt.69–0186
1.97	$Co(phen)_3^{3+}$	~ 7	$(7.5 \pm 0.5) \times 10^{10}$	p.r.	counter ion ClO_4^-; soln. contains $< 10^{-3}$ *M* H_2.	Walt.69–0186
1.98	$Co(acac)_3^{3+}$	1.8–3.0	4.6×10^{10} (rel.)	r.	c.k., k calcd. from $k_{1.98}/k(e^-_{aq} + H^+) = 2.0$ assuming $k(e^-_{aq} + H^+) = 2.3 \times 10^{10}$; $k(H + Co(acac)_3^{3+})/k(H +$ *iso* $-C_3H_7OH) = 17$, $g(H) = 0.56$, $g(e^-_{aq}) = 2.85$.	Rao..70–0094
		6–7	4.3×10^{10} (rel.)	r.	c.k., k calcd. from $k(e^-_{aq} + O_2)/k_{1.98} = 0.44$ assuming $k(e^-_{aq} + O_2) = 1.9 \times 10^{10}$; $g(OH) = 2.2$, $g(H) = 0.56$.	Rao..70–0094
1.99	Cr^{2+}	6.9	$(4.2 \pm 0.8) \times 10^{10}$	p.r.	Cr^{2+} soln. produced by electrolytic redn. of $Cr(ClO_4)_3$.	Anba.65–0047
		11.2	$(1.9 \pm 0.5) \times 10^{10}$			
1.100	$Cr(CN)_6^{4-}$	10.0	3.3×10^9 (cor.)	p.r.	counter ion K^+; $\mu = 5 \times 10^{-2}$ *M*; $k_{obs} = 1.4 \times 10^{10}$.	Anba.68–0295
1.101	CrF_6^{4-}	8.5	4.1×10^9	p.r.	——	Anba.65–0780
1.102	Cr^{3+}					
	$Cr(H_2O)_5OH^{2+}$	7.1	$(6.0 \pm 0.5) \times 10^{10}$	p.r.	counter ion ClO_4^-; pK of $Cr(H_2O)_6^{3+}$ is 3.75.	Anba.65–0047
	$CrO_2(H_2O)_n^-$	10.9	$(4.6 \pm 0.5) \times 10^{10}$	p.r.	counter ion ClO_4^-;	Anba.65–0047
		14	$(2.0 \pm 0.2) \times 10^8$	p.r.	counter ion ClO_4^-; soln. contains 1 *M* NaOH.	Anba.65–0047
1.103	$Cr(NH_3)_5Cl^{2+}$	6.7	6.2×10^{10}	p.r.	counter ion Cl^-; $\mu = 10^{-4}$ *M*.	Anba.68–0295
1.104	CrF_6^{3-}	10	$(1.4 \pm 0.2) \times 10^{10}$	p.r.	soln. contains 0.2 *M* F^-.	Anba.65–0047
1.105	$Cr(CN)_6^{3-}$	10	4.2×10^9 (cor.)	p.r.	soln. contains 0.1 *M* CN^-; $k_{obs} = (1.5 \pm 0.2) \times 10^{10}$.	Anba.65–0047
1.106	$Cr(en)_3^{3+}$	6.83	5.3×10^{10}	p.r.	counter ion Cl^-.	Szut...65–0018
		–	7.5×10^{10}	p.r.	——	Baxe..65–0044
1.107	*cis* $-Cr(en)_2Cl_2^+$	5.55	7.1×10^{10}	p.r.	counter ion Cl^-.	Szut...65–0018
1.108	*cis* $-Cr(en)_2(CNS)_2^+$	5.65	4.2×10^{10}	p.r.	counter ion CNS^-.	Szut...65–0018
1.109	$Cr(EDTA)^-$	4.9–5.0	2.6×10^{10}	p.r.	k cor. for H^+ content.	Szut...65–0018
		11–12	2.6×10^{10}	p.r.	$\mu = 0.2$.	Anba.69–0276
1.110	$Cr(C_2O_4)_3^{3-}$	4.76–6.13	1.8×10^{10}	p.r.	counter ion K^+.	Szut...65–0018
1.111	*cis* $-Cr(C_2O_4)_2(H_2O)_2^-$	6.4	1.3×10^{10}	p.r.	counter ion K^+.	Szut...65–0018
	trans $-Cr(C_2O_4)_2(H_2O)_2^-$	6.18	1.5×10^{10}	p.r.	counter ion K^+.	Szut...65–0018
1.112	CrO_4^{2-}	–	1.8×10^{10}	p.r.	——	Baxe..65–0044
		–	1.8×10^{10} (cor.)	p.r.	counter ion Na^+; in the presence of 0.1 and 1 *M* Na_2SO_4, $k = 2.7$ and 2.6×10^{10}, resp.	Pele.70–02423
1.113	$Cr_2O_7^{2-}$	7.0	3.3×10^{10}	p.r.	contains no methanol.	Thom..64–0046
		–	6.0×10^{10} (cor.)	p.r.	counter ion Na^+; in the presence of 0.3 *M* $NaClO_4$, 0.1 and 1 *M* Na_2SO_4. k=7.5, 7 and 5.0×10^{10}, resp.	Pele. 70–02423
14	$Cr(CrO_4)_3^{3-}$	7	2.1×10^{10}	p.r.	There is an error in the reported charge on the ion.	Hart...66–0144

TABLE 3. *Reactions of e^-_{aq} with inorganic solutes* —Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.115	Cu^{2+}					
	$Cu(H_2O)_4^{2+}$	6	4.0×10^{10} (rel.)	γ-r.	c.k., k calcd. from $k_{1.115}/k(e^-_{aq} + N_2O) = 4.7 \pm 0.4$ assuming $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$.	Scho..63-0057 Scho.64-0095
	$e^-_{aq} + Cu^{2+} \rightarrow Cu^+$	7	$(3.3 \pm 0.3) \times 10^{10}$	p.r.	counter ion SO_4^{2-}.	Gord....63-0073
		–	3.0×10^{10}	p.r.	——	Baxe..63-0187
		–	2.9×10^{10}	p.r.	——	Baxe..65-0044
		6.8	$(3.0 \pm 0.3) \times 10^{10}$	p.r.	counter ion ClO_4^-.	Anba.65-0047
		1.5–4.5	3.8×10^{10} (rel.)	γ-r.	c.k., $\mu = 0.15$; k calcd. from $k_{1.115}/k(e^-_{aq} + H^+) = 1.64 \pm 0.03$ assuming $k(e^-_{aq} + H^+) = 2.3 \times 10^{10}$ and $g(H) = 0.55$.	Mici.66-0138
		–	4.5×10^{10} (cor.)	p.r.	counter ion ClO_4^- or SO_4^{2-}; in the presence of 0.03 and 0.3 M $NaClO_4$ and 1 M Na_2SO_4, k = 2.7, 1.7 and 0.91×10^{10}, resp.	Pele.70-0242
1.116	$Cu(OH)_4^{2-}$	14	$(5.8 \pm 0.6) \times 10^9$	p.r.	counter ions ClO_4^-, Na^+.	Anba.65-0047
		3 M OH^-	$(4.5 \pm 0.5) \times 10^9$	p.r.	counter ions ClO_4^-, Na^+.	Anba.65-0047
		5 M OH^-	$(3.4 \pm 0.5) \times 10^9$	p.r.	counter ions ClO_4^-, Na^+.	Anba.65-0047
1.116a	glycine, Cu (II) salt	6.7	3.5×10^8 (rel.)	γ-r.	c.k., assume $k(e^-_{aq} + ClCH_2COO^-) = 1.2 \times 10^9$.	Will.67-0310
1.117	$Cu(gly)_3^-$	11.1	$(1.4 \pm 0.2) \times 10^{10}$	p.r.	counter ion SO_4^{2-}; soln. contains 10^{-1} M glycine.	Meye.69-0277
1.118	$Cu(NTA)_2^{4-}$	10.9	$(1.0 \pm 0.2) \times 10^{10}$	p.r.	counter ion SO_4^{2-}; soln. contains 2×10^{-2} M nitrilotriacetic acid.	Meye.69-0277
1.119	$Cu(EDTA)^{2-}$	12	1.0×10^{10}	p.r.	$\mu = 0.2$.	Anba.69-0276
1.120	$Cu(NH_3)_4^{2+}$	11.1	$(1.8 \pm 0.3) \times 10^{10}$	p.r.	soln. contains 0.2 M NH_3.	Anba.65-0047
1.121	$Cu(en)_3^{2+}$	11.2	$(2.0 \pm 0.3) \times 10^{10}$	p.r.	counter ion SO_4^{2-}; soln. contains 10^{-1} M ethylene-diamine-diHCl.	Meye.69-0277
1.122	$Cu(CN)_4^{2-}$	10	3.0×10^8	p.r.	soln. contains 0.1 M CN^-.	Anba.65-0047
1.123	Dy^{3+}	5.90	4.6×10^8	p.r.	——	Thom..64-0046
1.124	$Dy(EDTA)^-$	12	9.3×10^6	p.r.	$\mu = 0.2$.	Anba.69-0276
1.125	Er^{3+}	–	7×10^7	p.r.	——	Baxe..65-0044
1.126	$Er(EDTA)^-$	12	1.1×10^7	p.r.	$\mu = 0.2$.	Anba.69-0276
1.127	Eu^{3+}	5.55	6.1×10^{10}	p.r.	——	Thom..64-0046
1.128	$Eu(EDTA)^-$	11.5	5.6×10^9	p.r.	$\mu = 0.2$.	Anba.69-0276
1.129	F^-	7.2	$< 2 \times 10^4$	p.r.	k calcd. from exptl. data in this ref.	Anba.65-0001
1.130	HF $e^-_{aq} + HF \rightarrow HF^- \rightarrow H + F^-$	5.02	6×10^7 (calcd.)	X-r.	calcd. from $k = 3 \times 10^7$ (65-0493), where HF_2^- is 95% of the acid present, and the pK of HF and HF_2^- differ by 0.6.	Anba.67-0099
1.131	HF_2^- $e^-_{aq} + HF_2^- \rightleftharpoons H + F_2^-$	5.03	4.3×10^7 (cor.)		c.k., soln. contains 9.6×10^{-3} M HF, 1.6×10^{-2} M HF_2^-, and $0 - 10^{-4}$ M acetone; $\mu = 0.46$; k calcd. from $k(e^-_{aq} + \text{acetone})/k_{1.131} = 80 \pm 20$; assuming $k(e^-_{aq} + \text{acetone}) = 6 \times 10^9$.	Jort...62-0021 Raba65-049
		5.03	1.8×10^7 (cor.)	phot.	c.k., soln. contains 9×10^{-3} M HF, 4.4×10^{-1} M F^-, 1.6×10^{-2} M HF_2^-, 1.5×10^{-1} M I^-; $\mu = 0.6$; k calcd. from	Jort...62-0021, Raba65-0493

TABLE 3. *Reactions of e^-_{aq} with inorganic solutes* —Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
					$k(e^-_{aq} + H^+)/k_{1.131} = 250$ assuming $k(e^-_{aq} + H^+) = 2.3 \times 10^{10}$.	
1.132	Fe^{2+}	–	$\sim 3.5 \times 10^8$	p.r.	——	Baxe....64–0132
		5.0	1.2×10^8	p.r.	——	Anba.64–0282
		–	$\sim 1.6 \times 10^8$	p.r.	——	Baxe..65–0044
1.133	$Fe(EDTA)^{2-}$	12	$< 1.0 \times 10^9$	p.r.	$\mu = 0.2$; value probably high due to partial oxidation.	Anba.69–0276
1.134	$Fe(CN)_6^{4-}$	–	$< 10^5$	p.r.	——	Anba.66–0435
1.135	$Fe(CN)_5NH_3^{3-}$	8.6	$< 1.0 \times 10^7$	p.r.	counter ion Na^+; $\mu = 0.005$ M.	Anba.68–0295
1.136	FeF_6^{3-}	6.6	2.2×10^9 (cor.)	p.r.	counter ion K^+; $\mu = 10^{-1}$ M; $k_{obs} = 1.1 \times 10^{10}$.	Anba.68–0295
1.137	$Fe(CN)_6^{3-}$	7, 10.3	$(3.0 \pm 0.4) \times 10^9$ (cor.)	p.r.	counter ion K^+; k detd. at various ionic strengths and extrapolated to $\mu = 0$.	Gord....63–0073 Gord....63–0050
1.138	$Fe(CN)_5NO^{2-}$	10.5	2.4×10^{10}	p.r.	counter ion Na^+; $\mu = 10^{-4}$ M.	Anba.68–0295
		–	2.2×10^{10}	p.r.	——	Buxt..69–0052
1.139	$Fe(EDTA)^-$	12	2.3×10^{10}	p.r.	$\mu = 0.2$.	Anba.69–0276
1.140	$Ga(EDTA)^-$	11	7.8×10^7	p.r.	$\mu = 0.2$.	Anba.69–0276
1.141	Gd^{3+}	6.05	5.5×10^8	p.r.	——	Thom..64–0046
1.142	$Gd(EDTA)^-$	12	6.0×10^6	p.r.	$\mu = 0.2$.	Anba.69–0276
1.143	H^+_{aq} $e^-_{aq} + H^+_{aq} \gg H$		*$2.3–2.4 \times 10^{10}$*	The values listed have been used to calculate specific rates of the following reactions from relative rates: 1.38, 1.61, 1.98, 1.115, 1.131, 1.156, 1.178, 1.295, 1.333, 1.359, 1.390, 1.399a, 1.520, 1.552, 1.553, 1.562, 1.570, 1.571, 1.635.		
		4.1–4.7	$(2.3 \pm 0.2) \times 10^{10}$	p.r.	soln. contains H_2SO_4 or $HClO_4$.	Dorf.63–0045
		4–5	$(2.4 \pm 0.2) \times 10^{10}$	p.r.	——	Gord....63–0073
		2.1–4.3	$(2.0 \pm 0.2) \times 10^{10}$	p.r.	k cor. to $\mu = 0$.	Keen64–0091
		–	2.1×10^{10}	p.r.	——	Baxe....64–0132
		–	2.2×10^{10}	p.r.	k detd. at 26–57°C; E_a = 3.8 ± 0.5 kcal mol^{-1}.	Baxe.65–0044
		–	2.2×10^{10}	p.r.	k detd. at 15–80°C; $E_a = 2.5_5$ kcal mol^{-1}.	Cerc69–0567, 68–0010
		–	2.0×10^{10} (rel.)	γ–r.	c.k., k calcd. assuming $k(e^-_{aq} + NO_3^-) = 1.1 \times 10^{10}$; soln. contains 10^{-3} M $NaNO_3$, 5×10^{-2} M glucose and 2.3×10^{-4} M $HClO_4$; pressures up to 8.15 kbar.	Hent.70–0056
		5–6	$(2.8 \pm 0.2) \times 10^{10}$	p.r.	elec. condy., k detd. at 25–50°C to give $E_a = 2.44 \pm 0.20$ kcal mol^{-1}.	Bark...70–0243
		< 2	$(1.2 \pm 0.2) \times 10^{10}$	p.r.	concn. 0.5 – 5 M.	Bron..70–0605
1.144	D^+_{aq} $e^-_d + D^+_{aq} \gg D$	acid	$(1.7 \pm 0.1) \times 10^{10}$	p.r.	D_2O soln. contains H_2SO_4, HCl or $HClO_4$.	Fiel.68–0061
1.145	H_2	–	$< 10^7$	p.r.	——	Hart..64–0048
1.146	H_2O_2 $e^-_{aq} + H_2O_2 \gg OH + OH^-$		*1.2×10^{10}*	The value listed has been used to calculate specific rates of the following reactions from relative rates: 1.156, 1.180.		
		7	$(1.2 \pm 0.1) \times 10^{10}$	p.r.	——	Gord....63–0050, Gord....63–0073
		–	1.4×10^{10}	p.r.	——	Baxe....64–0132 Keen64–0091
		11	1.3×10^{10}	p.r.	soln. H_2–satd.	Hart.65–0494
		–	1.1×10^{10}	p.r.	k detd. at 15–80°C; $E_a = 3.6$ kcal mol^{-1}.	Cerc69–0567
		~ 11	1.35×10^{10}	f. phot.	soln. H_2– satd., $\sim 10^{-3}$ M	Hick.70–7116

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TABLE 3. *Reactions of e^-_{aq} with inorganic solutes* —Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
					NaOH; pK (H_2O_2) = 11.75.	
		–	1.7×10^{10}	p.r.	concn. > 0.1 M.	Aldr...71–0019
1.147	D_2O_2	7	$(1.2 \pm 0.1) \times 10^{10}$	p.r.	D_2O soln.	Fiel.68–0061
	$e^-_d + D_2O_2 \rightarrow OD + OD^-$					
1.148	HO_2^-	13.0	$(3.5 \pm 0.4) \times 10^9$	p.r.	soln. contains (4–13) x 10^{-4} M H_2O_2; pK (H_2O_2) = 11.8; $H_2O_2 \rightleftharpoons H^+ + HO_2^-$.	Feli..67–0132
1.149	$Hg(en)_3^{2+}$	11.2	$(1.6 \pm 0.2) \times 10^{10}$	p.r.	counter ion Cl^-; soln. contains 2 x 10^{-2} M ethylenediamine–diHCl.	Meye.69–0277
1.150	$Hg(CN)_4^{2-}$	10	1.9×10^8	p.r.	——	Anba.65–0780
1.151	$Hg(gly)_3^-$	11.1	$(1.5 \pm 0.2) \times 10^{10}$	p.r.	counter ion Cl^-; soln. contains 10^{-1} M glycine.	Meye.69–0277
1.152	$Hg(NTA)_2^{4-}$	10.9	$(3.9 \pm 0.6) \times 10^9$	p.r.	counter ion Cl^-; soln. contains 2 x 10^{-2} M nitrilotriacetic acid.	Meye.69–0277
1.153	$Hg(EDTA)^{2-}$	12	5.1×10^9	p.r.	μ = 0.2.	Anba.69–0276
1.154	Ho^{3+}	5.88	2.4×10^9	p.r.	We have no explanation	Thom..64–0046
	$e^-_{aq} + Ho^{3+} \rightarrow Ho^{2+}$	–	6.6×10^7	p.r.	for this large discrepancy	Baxe..65–0044
1.155	$Ho(EDTA)^-$	12	9.8×10^6	p.r.	μ = 0.2.	Anba.69–0276
1.156	I_2	7	$(5.1 \pm 0.3) \times 10^{10}$	p.r.	d.k.(e^-_{aq}) as well as p.b.k. (I_2^-).	Thom..64–0046
	$e^-_{aq} + I_2 \rightarrow I_2^-$					
		5.3	5.9×10^{10} (rel.)	γ–r.	c.k., soln. contains 5 x 10^{-4} M KI; k calcd. from eq. based on H_2O_2 yield assuming $k(e^-_{aq} + H^+) = 2.36 \times 10^{10}$, $k(e^-_{aq} + H_2O_2) = 1.2 \times 10^{10}$, and $g(e^-_{aq}) = 2.8$.	Sawa..66–0113
		–	5.1×10^{10} (rel.)	γ–r.	c.k., k calcd. from $k_{1.156}/k$ (e^-_{aq} + SF_6) = 3.08, assuming $k(e^-_{aq} + SF_6) = 1.65 \times 10^{10}$.	Asmu.68–0159
1.157	I_3^-	7	2×10^{10} (rel., cor.)	phot.	c.k., soln. contains 0.23 M KI, (4–48) x 10^{-4} M I_3^-, and (8–64) x 10^{-4} M N_2O; k calcd. assuming $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$.	Dain.65–7017
	$e^-_{aq} + I_3^- \rightarrow I^- + I_2^-$					
1.158	IO_3^-	7	$(7.7 \pm 0.9) \times 10^9$	p.r.	counter ion K^+.	Anba.65–0047
		11	$(8.3 \pm 1.0) \times 10^9$	p.r.	counter ion K^+.	Anba.65–0047
		14	$(9.6 \pm 1.2) \times 10^9$	p.r.	counter ion K^+.	Anba.65–0047
		3 M OH^-	$(8.1 \pm 0.8) \times 10^9$	p.r.	counter ion K^+.	Anba.65–0047
		–	8.5×10^9 (cor.)	p.r.	counter ion K^+; in the presence of 0.1 M $NaClO_4$, $k = 1.2 \times 10^{10}$.	Pele.70–0242
1.159	IO_4^-	7	$(1.1 \pm 0.2) \times 10^{10}$	p.r.	counter ion Na^+.	Anba.65–0047
		11	$(1.9 \pm 0.2) \times 10^{10}$	p.r.	counter ion Na^+.	Anba.65–0047
		14	$(2.1 \pm 0.3) \times 10^{10}$	p.r.	counter ion Na^+.	Anba.65–0047
		3 M OH^-	$(1.6 \pm 0.2) \times 10^{10}$	p.r.	counter ion Na^+.	Anba.65–0047
1.160	In^{3+}	1	$(5.6 \pm 1.0) \times 10^{10}$	p.r.	counter ion SO_4^{2-}.	Brow.66–0062
	$e^-_{aq} + In^{3+} \rightarrow In^{2+}$					
1.161	$In(EDTA)^-$	12	4.1×10^8	p.r.	μ = 0.2.	Anba.69–0276
1.162	$IrCl_6^{3-}$	–	4.7×10^9	p.r.	——	Dain.67–0063
		10.6	3.0×10^9 (cor.)	p.r.	counter ion K^+; $\mu = 5 \times 10^{-2}$ M, $k_{obs} = 9.4 \times 10^9$.	Anba.68–0295
1.163	$Ir(NH_3)_6^{3+}$	~ 7	$(1.3 \pm 0.1) \times 10^{10}$	p.r.	counter ion Cl^-.	Walt67–0560
1.164	$IrCl_6^{2-}$	–	2.6×10^{10} (rel.)	γ–r.	c.k., $k_{1.164}/k(e^-_{aq} + N_2O)$ = (2.96 ± 0.03), assume k (e^-_{aq} + N_2O) = 8.7×10^9.	Dain.67–0063
		–	2.5×10^{10}	p.r.	——	Dain.67–0063
		10.2	9.3×10^9 (cor.)	p.r.	counter ion K^+; $\mu = 5 \times 10^{-2}$	Anba.68–0295

TABLE 3. *Reactions of e^-_{aq} with inorganic solutes* — Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
					M; k_{obs} = 2.0 x 10^{10}.	
1.165	K^+	–	< 5 x 10^5	p.r.	——	Baxe....64-0132
		–	< 3 x 10^4	p.r.	k calcd. from the exptl. data in this ref.	Anba.65-0001
1.166	La^{3+}	6.98	3.4 x 10^8	p.r.	——	Thom..64-0046
		–	6.9 x 10^8	p.r.	——	Baxe..65-0044
1.167	La(EDTA)$^-$	12	< 1.2 x 10^6	p.r.	μ = 0.2.	Anba.69-0276
1.168	Lu^{3+}	6.20	2.5 x 10^8	p.r.	——	Thom..64-0046
1.169	Lu(EDTA)$^-$	12	1.5 x 10^7	p.r.	μ = 0.2.	Anba.69-0276
1.170	Mn^{2+}	–	7.7 x 10^7	p.r.	——	Baxe....64-0132
		–	3.8 x 10^7	p.r.	——	Baxe..65-0044
1.171	$Mn(gly)_3^-$	11.1	≤ 1.7 x 10^7	p.r.	counter ion SO_4^{2-}; soln. contains 10^{-1} M glycine.	Meye.69-0277
1.172	$Mn(NTA)_2^{4-}$	10.9	≤ 5 x 10^6	p.r.	counter ion SO_4^{2-}; soln. contains 2 x 10^{-2} M nitrilotriacetic acid.	Meye.69-0277
1.173	$Mn(EDTA)^{2-}$	11.3	1.5 x 10^6	p.r.	soln. contains 0.05 M EDTA; k detd. at 2–62°, E_a = 4.0 ± 0.6 kcal mol^{-1}.	Anba.67-0299
		12	< 2.2 x 10^6	p.r.	μ = 0.2.	Anba.69-0276
1.174	$Mn(CN)_6^{4-}$	–	(2.5 ± 0.2) x 10^{10}	p.r.	——	Anba.66-0435
		9.0	5.9 x 10^9 (cor.)	p.r.	counter ion K^+; μ = 5 x 10^{-2}; k_{obs} = 2.5 x 10^{10}.	Anba.68-0295
1.175	MnO_4^-	7.0	2.2 x 10^{10}	p.r.	——	Thom..64-0046
		13	3.7 x 10^{10}	p.r.	——	Thom..64-0046
		–	3 x 10^{10}	p.r.	——	Baxe..65-0044
		–	4.4 x 10^{10}	p.r.	k detd. at 15–80°C; E_a = 3.1 kcal mol^{-1}.	Cerc69-0567
1.176	$Mo(CN)_8^{4-}$	–	7.1 x 10^9	p.r.	——	Vene..69-0443
1.177	N_3^-	–	2.9 x 10^6 (rel.)	X–r.	c.k., assume $k(e^-_{aq}$ + acetone) = 5.9 x 10^9.	Kell.61-0019
		11	< 5.6 x 10^6	p.r.	——	Anba.64-0282
		–	< 5 x 10^6	f. phot.	e^-_{aq} decay not influenced by N_3^- concn. 10^{-4}–10^{-3} M.	Bura..70-7004
		~ 7	≤ 1.5 x 10^6	p.r.	concn. 1 M.	Pele..71-0007
1.178	NH_4^+ $e^-_{aq} + NH_4^+ \rightarrow H + NH_3$	7.8	2 x 10^6 (rel.)	phot.	c.k., soln. contains 0.15 M I^-, 5 x 10^{-3} – 4.0 M NH_4Cl; k calcd. from $k(e^-_{aq} + H^+)$/ $k_{1.178}$ = 1.2 x 10^4 assuming $k(e^-_{aq} + H^+)$ = 2.3 x 10^{10}.	Jort...62-0021
		5.3	1.3 x 10^6	p.r.	——	Anba.64-0282
1.179	N_2H_4	–	< 10^8	p.r.	——	Baxe....64-0132
1.180	$N_2H_5^+$	–	< 3.5 x 10^8	p.r.	——	Baxe....64-0132
	$e^-_{aq} + N_2H_5^+ \rightarrow (N_2H_4 + H) \rightarrow N_2H_3 + H_2$	6	1.5 x 10^7 (rel.)	γ–r.	c.k., k calcd. assuming $k(e^-_{aq} + H_2O_2)$ = 1.2 x 10^{10}.	Bell.69-0598
1.181	NH_2OH	–	< 2 x 10^7	p.r.	——	Baxe....64-0132
		~ 5–7	(6.6 ± 0.7) x 10^8 (calcd.)	p.r.	k calcd. from detns. at pH 5.37, 6.70 and 7.77 assuming pK = 5.83 for $NH_3OH^+ \rightleftharpoons NH_2OH + H^+$.	Beha..70-0197
			(Unexplained discrepancy in the above data)			
1.182	NH_3OH^+	~ 5–7	(1 ± 0.1) x 10^{10} (calcd.)	p.r.	see 1.181.	Beha..70-0197
1.183	$NH_2SO_3^-$	11.7	< 1.3 x 10^6 (cor.)	p.r.	counter ion Na^+; μ = 0.02; k_{obs} = < 1.7 x 10^6.	Anba.68-0295
1.184	$NO(SO_3)_2^{2-}$ (Fremy's salt)	6.25	4 x 10^9 (rel.)	γ–r.	c.k., k calcd. from $k_{1.184}/k$ $(e^-_{aq} + H_2PO_4^-)$ = (5.2 ± 0.3) x 10^2 assuming $k(e^-_{aq} + H_2PO_4^-)$ = 7.7 x 10^6.	More..69-0649

TABLE 3. *Reactions of e^-_{aq} with inorganic solutes* —Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.185	$HON(SO_3)_2^{2-}$	12	$(4 \pm 0.8) \times 10^8$	p.r.	counter ion K^+.	Fel'..68–0460
1.186	N_2O $e^-_{aq} + N_2O \rightarrow$ $N_2 + O^-$ or $\rightarrow$ $N_2 + OH^- + OH$		*8.7 x 10^9*	The value listed has been used to calculate specific rates of the following reactions from relative rates: 1.115, 1.157, 1.164, 1.188, 1.225, 1.234, 1.260, 1.301, 1.302, 1.333, 1.396, 1.399a(8.9), 1.409a, 1.486, 1.606, 1.635(8.9).		
		7	$(8.7 \pm 0.6) \times 10^9$	p.r.	——	Gord....63–0073
		–	$(5.6 \pm 2) \times 10^9$	p.r.	——	Keen64–0091
		–	$(2.4 \pm 0.3) \times 10^9$	p.r.	soln. contains 12.4 *M* KF.	Anba.65–0001
		11	5.6×10^9	p.r.	soln. H_2–satd.	Hart.65–0494
		~ 7	9.4×10^9 (rel.)	γ–r.	c.k., soln. contains 1–2 x 10^{-3}M SF_6 and 10^{-4} –10^{-3} *M* N_2O; k calcd. from $k_{1.186}/k(e^-_{aq} + SF_6)$ = 0.57 assuming $k(e^-_{aq} + SF_6) = 1.65 \times 10^{10}$.	Asmu.68–0159
		> 11	9.1×10^9	f. phot.	soln. H_2–satd., 10^{-3}–10^{-1} *M* NaOH.	Hick.70–7116
1.187	NO	7	$(3.1 \pm 0.2) \times 10^{10}$	p.r.	——	Gord.63–0073
	$e^-_{aq} + NO \rightarrow NO^- \rightarrow HNO$	7	2.8×10^{10} (rel.)	γ–r.	c.k., soln. contains ~ 10^{-3} *M* NO in phosphate buffer with added NO_2^- ~ 10^{-3} – 10^{-1} *M*; $k_{1.187}/k(e^-_{aq} + NO_2^-) \cong 7$ (μ = 0), assumed $k(e^-_{aq} + NO_2^-) = 4 \times 10^9$.	Knig.67–0231
		7	$(2.3 \pm 0.4) \times 10^{10}$	p.r.	——	Sedd.70–0014
1.188	NO_2^-	7.0	4.3×10^9 (rel.)	γ–r.	c.k., $k_{1.188}/k(e^-_{aq} + N_2O)$ = 0.49 ± 0.05, assumed $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$.	Appl..63–0041
		~ 7.0	4.6×10^9	p.r.	——	Thom..64–0046
		–	3.5×10^9	p.r.	——	Baxe..65–0044
		5.5–6	3.4×10^9 (rel.)	γ–r.	c.k., assumed $k(e^-_{aq} + p$–$BrC_6H_4OH) = 1.2 \times 10^{10}$, k detd. at 20, 45, and 70°C, to give E_a = 3.4 kcal mol^{-1}.	Anba..67–0098
		–	3.4×10^9	p.r.	k detd. at 15–80°C; $E_a = 1.6_5$ kcal mol^{-1}.	Cerc69–0567
		–	4.5×10^9	p.r.	counter ion K^+; H_2–satd.	Fel'70–0417
		–	8.0×10^9	p.r.	concn. 0.1–1.8 *M*.	Aldr...71–0019
			(see also 1.187 and 1.569 for relative rates).			
1.189	NO_3^- $e^-_{aq} + NO_3^- \rightarrow NO_3^{2-}$ $NO_3^{2-} + H_2O \rightarrow$ $NO_2 + 2OH^-$ $2NO_2 + H_2O \rightarrow$ $NO_2^- + NO_3^- + 2H^+$		*1.1 x 10^{10}*	The value listed has been used to calculate specific rates of the following reactions from relative rates: 1.1, 1.62, 1.143, 1.286, 1.313, 1.326, 1.327, 1.331, 1.343, 1.386, 1.391, 1.401, 1.433, 1.577, 1.578, 1.596, 1.650.		
		7	$(1.1 \pm 0.1) \times 10^{10}$	p.r.	——	Gord....63–0073 Thom..64–0046
		–	$(1.9 \pm 0.3) \times 10^9$	p.r.	soln. contains 12.4 *M* KF.	Anba.65–0001
		–	8.2×10^9	p.r.	——	Baxe..65–0044
		7.0	7.5×10^9 (rel.)	γ–r.	c.k., counter ion Na^+; $k_{1.189}/k(e^-_{aq} + O_2) = 2.5$ ± 0.2, assumed $k(e^-_{aq} + O_2) = 1.9 \times 10^{10}$.	Dani.67–0032
		5.5–6	1.1×10^{10} (rel.)	γ–r.	c.k., assumed $k(e^-_{aq} + p$–$BrC_6H_4OH) = 1.2 \times 10^{10}$; k detd. at 20, 45 and 70°C, E_a = 3.9 kcal mol^{-1}.	Anba.67–0098
		–	9.3×10^9	p.r.	k detd. at 15–80°C;	Cerc69–0567

TABLE 3. *Reactions of e^-_{aq} with inorganic solutes* — Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
					E_a = 2.3 kcal mol^{-1}.	
		–	9 x 10^9	p.r.	counter ion K^+; H_2–satd.	Fel'70–0417
		–	1.05 x 10^{10} (cor.)	p.r.	counter ion Na^+; in the presence of 0.1 and 1 *M* $NaClO_4$, k = 1.3 and 1.6 x 10^{10}, resp.	Pele.70–0242
		–	2.0 x 10^{10}	p.r.	concn. 0.1–0.7 *M*.	Aldr...71–0019
1.190	Na^+	–	< 10^6	p.r.	——	Baxe....64–0132
		–	< 10^5	p.r.	k calcd. from exptl. data in this ref.	Anba.65–0001
1.191	Nd^{3+}	4.66	5.9 x 10^8	p.r.	——	Thom..64–0046
1.192	$Nd(EDTA)^-$	12	2.8 x 10^6	p.r.	μ = 0.2.	Anba.69–0276
1.193	Ni^{2+}	–	2.3 x 10^{10}	p.r.	——	Baxe..63–0187
		–	2.2 x 10^{10} (cor.)	p.r.	counter ion SO_4^{2-}; in the presence of 1 *M* Na_2SO_4, k = 1.9 x 10^9.	Pele.70–0242
1.194	$NiF(H_2O)_3^+$	8.5	< 1.2 x 10^{10} (cor.)	p.r.	counter ion F^-, μ = 10^{-1} *M*, k_{obs} = 7.2 x 10^9. The real value for NiF^+_{aq} is lower as the soln. contained 12% Ni^{2+}_{aq}.	Anba.68–0295
1.195	$Ni(CN)_4^{2-}$	11.0	4.1 x 10^9 (cor.)	p.r.	counter ion K^+; μ = 5 x 10^{-3} *M*, k_{obs} = 5.5 x 10^9.	Anba.68–0295
1.196	Ni(gly)	> 8	(1.6 ± 0.2) x 10^{10}	p.r.	counter ion SO_4^{2-}, $\mu \cong 10^{-4}$.	Meye.69–0277
1.197	$Ni(gly)_2$	~ 9	(2.7 ± 0.4) x 10^9	p.r.	counter ion SO_4^{2-}, $\mu \cong 10^{-3}$.	Meye.69–0277
1.198	$Ni(gly)_3^-$	~ 10	≤ 2.5 x 10^7 (cor.)	p.r.	counter ion SO_4^{2-}, $\mu \cong 10^{-1}$.	Meye.69–0277
1.199	$Ni(NTA)^-$	~ 8	(6 ± 0.9) x 10^8	p.r.	counter ion SO_4^{2-}; concn. ~ 10^{-4} *M*.	Meye.69–0277
1.200	$Ni(NTA)_2^{4-}$	~ 11	≤ 1.8 x 10^7	p.r.	counter ion SO_4^{2-}; concn. ~ 10^{-2} *M*.	Meye.69–0277
1.201	$Ni(EDTA)^{2-}$	12	1.0 x 10^8	p.r.	μ = 0.2.	Anba.69–0276
1.202	$Ni(en)^{2+}$	~ 8	(2.2 ± 0.3) x 10^{10} (cor.)	p.r.	counter ion SO_4^{2-}; $\mu \cong 10^{-4}$.	Meye.69–0277
1.203	$Ni(en)_2^{2+}$	~ 9	(1.95 ± 0.3) x 10^{10} (cor.)	p.r.	counter ion SO_4^{2-}; μ ~ 10^{-4}.	Meye.69–0277
		11	7.5 x 10^9	p.r.	counter ion SO_4^{2-}; μ = 10^{-3}. contained some $Ni(en)_3^{2+}$.	Anba.68–0295
1.204	$Ni(en)_3^{2+}$	~ 11	≤ 2 x 10^7	p.r.	counter ion SO_4^{2}, $\mu \cong 0.2$.	Meye.69–0277
1.205	O_2 $e^-_{aq} + O_2 \gg O_2^-$		*1.9 x 10^{10}*	The value listed has been used to calculate specific rates of the following reactions from relative rates: 1.98, 1.189, 1.310, 1.391, 1.549, 1.618.		
		7	(1.9 ± 0.2) x 10^{10}	p.r.	——	Gord....63–0073
		–	(2.2 ± 0.2) x 10^{10}	p.r.	——	Keen64–0091
		11	1.9 x 10^{10}	p.r.	——	Hart.65–0494
		13	(1.7 ± 0.2) x 10^{10}	p.r.	observed rate depends on O_2 concn. (2 x 10^{-6} – 2 x 10^{-4} *M*), H_2 concn. 7 x 10^{-4} *M*.	Kaba..69–0582
1.206	O_2(in D_2O) $e^-_d + O_2 \gg O_2^-$	7	(1.5 ± 0.1) x 10^{10}	p.r.	——	Fiel.68–0061
1.207	$Os(CN)_6^{4-}$	10.5	< 1.0 x 10^6	p.r.	counter ion K^+; μ = 10^{-3} *M*.	Anba.68–0295
1.208	$Os(NH_3)_6^{3+}$	~ 7	(7.2 ± 0.2) x 10^{10}	p.r.	counter ion Br^-.	Walt67–0560
1.209	$H_2PO_2^-$	6.8	< 1.0 x 10^5 (cor.)	p.r.	counter ion Na^+; μ = 10^{-2} *M*; k_{obs} = 1.1 x 10^5.	Anba.68–0295
1.210	$H_2PO_3^-$	6.7	5.5 x 10^6 (cor.)	p.r.	counter ion K^+; μ = 2 x 10^{-2} *M*; k_{obs} = 7.2 x 10^6.	Anba.68–0295
1.211	$H_2PO_4^-$ $e^-_{aq} + H_2PO_4^- \gg H + HPO_4^{2-}$	7.1	4.2 x 10^6 (cor.)	p.r.	counter ion K^+; μ = 0.1; k_{obs} = 7.7 x 10^6; see also 1.184 for relative rate.	Anba.68–0295

TABLE 3. *Reactions of e^-_{aq} with inorganic solutes* —Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.212	$P_2O_7^{2-}$	7.7	$< 3 \times 10^6$	p.r.	counter ions Na^+, Cl^-; $P_2O_7^{2-}$ concn. 10^{-2} *M*.	Land.68–0441
1.213	$P_2O_8^{4-}$	–	1.9×10^{10}	p.r.	counter ion Na^+; soln. contains 0.1 *M* H_2O_2, 10^{-2} *M* $P_4O_8^{4-}$.	Roeb..69–0158
1.214	Pb^{2+}	–	3.9×10^{10}	p.r.	——	Baxe..65–0044
		7	$(3.9 \pm 0.5) \times 10^{10}$	p.r.	counter ion ClO_4^-.	Anba.65–0047
		11.2	$(1.3 \pm 0.1) \times 10^{10}$	p.r.	counter ions ClO_4^-, Na^+.	Anba.65–0047
1.215	PbO_2^{2-}	14	$(1.0 \pm 0.1) \times 10^{10}$	p.r.	counter ion ClO_4^-; soln. contains 1 *M* NaOH.	Anba.65–0047
		3 *M* OH^-	$(9.2 \pm 0.1) \times 10^9$	p.r.	counter ion ClO_4^-.	Anba.65–0047
1.216	$Pb(gly)_3^-$	11.1	$(1.6 \pm 0.2) \times 10^{10}$	p.r.	counter ion Cl^-; soln. contains 10^{-1} *M* glycine.	Meye.69–0277
1.217	$Pb(NTA)_2^{4-}$	10.9	$(3.2 \pm 0.5) \times 10^9$	p.r.	counter ion Cl^-; soln. contains 2×10^{-2} *M* nitrilotriacetic acid.	Meye.69–0277
1.218	$Pb(EDTA)^-$	12	3.8×10^9	p.r.	$\mu = 0.2$.	Anba.69–0276
1.219	$Pb(en)_3^{2+}$	11.2	$(2.3 \pm 0.3) \times 10^{10}$	p.r.	counter ion Cl^-; soln. contains 10^{-1} *M* ethylene–diamine – diHCl.	Meye.69–0277
1.220	$PdCl_4^{2-}$	7.1	$(1.2 \pm 0.15) \times 10^{10}$	p.r.	counter ion K^+; soln. contains 0.1 *M* Cl^-.	Anba.65–0047
1.221	$Pd(CN)_4^{2-}$	10.6	1.9×10^9 (cor.)	p.r.	counter ion K^+; $\mu = 10^{-2}$ *M*; $k_{obs} = 2.8 \times 10^9$.	Anba.68–0295
		10	$(1.0 \pm 0.3) \times 10^9$ (cor.)	p.r.	counter ion K^+; soln. contains 0.1 *M* CN^-, $k_{obs} = (2.0 \pm 0.3) \times 10^9$.	Anba.65–0047
1.222	$Pd(et_4dien)Cl^+$	~ 7	$(4.4 \pm 0.5) \times 10^{10}$	p.r.	counter ion Cl^-.	Walt67–0560
1.223	Pr^{3+}	6	2.9×10^8	p.r.	——	Thom..64–0046
		–	1×10^7	p.r.	——	Baxe..65–0044
			(Unexplained discrepancy in the above data)			
1.224	$Pr(EDTA)^-$	11.5	3.6×10^6	p.r.	$\mu = 0.2$.	Anba.69–0276
1.225	$PtCl_4^{2-}$	7–11	1.5×10^{10} (rel.)	γ–r.	c.k., k calcd. from $k_{1.225}/k(e^-_{aq} + N_2O) =$ 1.76 (cor. to $\mu = 0$) assuming $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$.	Dain.67–0063
		–	9.0×10^9	p.r.	——	Baxe..65–0044
		11	$(6.7 \pm 0.9) \times 10^9$	p.r.	counter ion K^+; contains 0.1 *M* NaOH.	Dain.67–0063
		6.8	$(1.2 \pm 0.15) \times 10^{10}$	p.r.	counter ion K^+; soln. contains 0.1 *M* Cl^-.	Anba.65–0047
1.226	$Pt(CN)_4^{2-}$	10	$(1.3 \pm 0.3) \times 10^9$ (cor.)	p.r.	counter ion K^+; soln. contains 0.1 *M* CN^-; $k_{obs} = (3.2 \pm 0.4) \times 10^9$.	Anba.65–0047
		10.6	2.9×10^9 (cor.)	p.r.	counter ion K^+; $\mu = 10^{-2}$ *M*, $k_{obs} = 3.9 \times 10^9$.	Anba.68–0295
1.227	$Pt(et_4dien)Cl^+$	~ 7	$(1.2 \pm 0.1) \times 10^{10}$	p.r.	counter ion Cl^-.	Walt67–0560
1.228	$PtCl_6^{2-}$	11	$(3.6 \pm 0.4) \times 10^{10}$	p.r.	counter ions K^+, Na^+.	Dain.67–0063
		10	1.4×10^{10} (cor.)	p.r.	counter ion K^+; $\mu = 10^{-2}$ *M*; $k_{obs} = 2.0 \times 10^{10}$.	Anba.68–0295
1.229	$Rh(NH_3)_6^{3+}$	7	$(7.9 \pm 0.2) \times 10^{10}$	p.r.	counter ion Cl^-.	Walt67–0560
1.230	$Rh(bipy)_3^{3+}$	7	$(8.4 \pm 0.1) \times 10^{10}$	p.r.	counter ion ClO_4^-.	Walt67–0560
1.231	$Ru(CN)_6^{4-}$	10.6	$< 1.0 \times 10^6$	p.r.	counter ion K^+; $\mu = 0.01$ *M*.	Anba.68–0295
1.231a	$Ru(NH_3)_5N_2^{2+}$	~ 7	4.3×10^9	p.r.	——	Baxe70–0263
	$e^-_{aq} + Ru(NH_3)_5N_2^{2+} \Rightarrow Ru(NH_3)_5N_2^+$					
1.232	$Ru(NH_3)_6^{3+}$	~ 7	$(7.4 \pm 0.5) \times 10^{10}$	p.r.	counter ion Cl^-.	Walt67–0560
	$e^-_{aq} + Ru(NH_3)_6^{3+} \Rightarrow Ru(NH_3)_6^{2+}$	–	$(6.8 \pm 0.1) \times 10^{10}$	p.r.	——	Baxe..70–017

TABLE 3. *Reactions of e^-_{aq} with inorganic solutes* —Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.233	$Ru(NH_3)_5Cl^{2+}$ $e^-_{aq} + Ru(NH_3)_5Cl^{2+} \rightarrow Ru(NH_3)_5Cl^+$	–	$(6.2 \pm 0.4) \times 10^{10}$	p.r.	——	Baxe..70-0178
1.234	H_2S $e^-_{aq} + H_2S \rightarrow H + HS^-$ and $\rightarrow H_2 + S^-$	5.5–6	1.6×10^{10} (rel.)	γ–r.	c.k., k calcd. from $k_{1.234}/k$ $(e^-_{aq} + N_2O) = (1.80 \pm 0.1)$ assuming $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$.	Meis.65-0013
		5.5–6	$(1.35 \pm 0.1) \times 10^{10}$	p.r.	——	Meis.65-0013
		–	1.1×10^{10}	p.r.	——	Karm..67-0273
1.235	D_2S $e^-_d + D_2S \rightarrow D + DS^-$ and $\rightarrow D_2 + S^-$	–	1.35×10^{10}	p.r.	——	Meis.65-0013
1.236	HS^- $e^-_{aq} + SH^- \rightarrow S^{2-} + H$	11	$< 6 \times 10^5$	p.r.	——	Karm67-0684
1.237	SF_6 $e^-_{aq} + SF_6 \rightarrow 6F^- + SO_4^{2-} + 7H_3O^+$ (overall)		*1.65 x 10*^{10}	The value listed has been used to calculate specific rates of the following reactions from relative rates: 1.143, 1.156, 1.186, 1.289, 1.367a.		
		–	$(1.65 \pm 0.1) \times 10^{10}$	p.r.	soln. air–satd.; overall reaction consists of fast steps $\rightarrow SF_5 + F^-$, $SF_5 + 2H_2O \rightarrow OH + SF_4 + F^- + H_3O^+$, followed by slow hydrolysis: $SF_4 + 9H_2O \rightarrow SO_3^{2-} + 4F^- + 6H_3O^+$ (70–0107).	Asmu.68-0159
1.238	SO_3^{2-}	10.0	$\leq 1.3 \times 10^6$	p.r.	counter ion Na^+; $\mu = 10^{-3}$ M.	Anba.68-0295
1.239	SO_4^{2-}	~ 7	$< 10^6$	p.r.	——	Baxe....64-0132 Thom..64-0046
1.240	$S_2O_3^{2-}$	11.9	$< 10^8$	p.r.	——	Thom..64-0046
		–	7.6×10^9	p.r.	——	Baxe....64-0132
		–	6.0×10^8	p.r.	k detd. at 15–80°C; $E_a = 3.8$ kcal mol^{-1}.	Cerc69-0567
		–	9×10^8 (cor.)	p.r.	counter ion Na^+; in the presence of 1 M Na_2SO_4, $k = 1.35 \times 10^9$.	Pele.70-0242
			(Unexplained discrepancy in the above data)			
1.241	HSO_5^- $e^-_{aq} + HSO_5^- \rightarrow SO_4^{2-} + OH$ or $\rightarrow SO_4^- + OH^-$	–	8.4×10^9	p.r.	——	Roeb..69-0158
1.242	$S_2O_8^{2-}$	~ 7	1.1×10^{10}	p.r.	——	Thom..64-0046
	$e^-_{aq} + S_2O_8^{2-} \rightarrow SO_4^{2-} + SO_4^-$	–	7.6×10^9	p.r.	——	Baxe..65-0044
		–	1.1×10^{10}	p.r.	——	Roeb..69-0158
1.243	SbO_3^-	11.0	1.3×10^{10}	p.r.	counter ion K^+.	Anba.68-0295
		11.0	$(1.2 \pm 0.2) \times 10^{10}$	p.r.	——	Anba.65-0047
1.244	$Sc(EDTA)^-$	11.5	3.5×10^7	p.r.	$\mu = 0.2$.	Anba.69-0276
1.245	H_2Se $e^-_{aq} + H_2Se \rightarrow HSe^- + H$	6.0	$(1.1 \pm 0.2) \times 10^{10}$	p.r.	cor. for $e^-_{aq} + H^+$.	Scho..69-0564
1.246	HSe^- $e^-_{aq} + HSe^- \rightarrow Se^- + H_2 + OH$	9–12.6	$(4.8 \pm 0.2) \times 10^7$	p.r.	concn. 10^{-3}–10^{-2} M.	Scho..69-0564
1.247	SeO_3^{2-}	10.8	2.3×10^6 (cor.)	p.r.	counter ion Na^+; $\mu = 0.25$ M, $k_{obs} = 1.2 \times 10^7$.	Anba.68-0295
1.248	SeO_4^{2-}	11.0	1.1×10^9	p.r.	counter ion Na^+; $\mu = 10^{-3}$ M.	Anba.68-0295
1.249	SiF_6^{2-}	5.9	$< 5.5 \times 10^5$ (cor.)	p.r.	counter ion Li^+; $\mu = 0.15$ M, $k_{obs} = 1.5 \times 10^6$.	Anba.68-0295
1.250	Sm^{3+}	5.96	2.5×10^{10}	p.r.	——	Thom..64-0046
1	$Sm(EDTA)^-$	11.5	2.6×10^7	p.r.	$\mu = 0.2$.	Anba.69-0276
2	SnO_2^{2-}	11	$(3.4 \pm 0.3) \times 10^9$	p.r.	counter ions Cl^-, Na^+.	Anba.65-0047
1.253	SnF_3^-	10	9.3×10^9	p.r.	counter ion K^+.	Anba.64-0282

TABLE 3. *Reactions of e^-_{aq} with inorganic solutes* —Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.254	$Sn(NTA)_2^{4-}$	10.9	$(1.7 \pm 0.3) \times 10^9$	p.r.	counter ion Cl^-; soln. 2×10^{-2} *M* nitrilotriacetic acid.	Meye.69–0277
1.255	$Sn(EDTA)^{2-}$	12	1.4×10^9	p.r.	$\mu = 0.2$.	Anba.69–0276
1.256	SnO_3^{2-}	11.0	6.3×10^8	p.r.	counter ion Na^+; $\mu = 10^{-3}$ *M*.	Anba.68–0295
1.257	SnF_6^{2-}	6.5	2.9×10^9 (cor.)	p.r.	counter ion K^+; $\mu = 10^{-2}$ *M*; $k_{obs} = 4.1 \times 10^9$.	Anba.68–0295
1.258	Tb^{3+}	6.15	3.7×10^8	p.r.	——	Thom..64–0046
		–	1.7×10^7	p.r.	——	Baxe..65–0044
			(Unexplained discrepancy in the above data)			
1.259	$Tb(EDTA)^-$	12	5.3×10^6	p.r.	$\mu = 0.2$.	Anba.69–0276
1.260	TeO_3^{2-}	7	6×10^8	p.r.	counter ion Na^+.	Brow...64–0045
		10.9	1.1×10^9	p.r.	counter ion Na^+; $\mu = 10^{-3}$ *M*.	Anba.68–0295
		12.6	8.7×10^8 (rel.)	γ–r.	c.k., $k_{1.260}/k(e^-_{aq} + N_2O) =$ 0.10 at pH 12.6 and 0.53 at	Dain.65–0073
		14	4.6×10^9 (rel.)		pH 14, assumed $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$.	
1.261	TeO_4^{2-}	11.0	1.6×10^{10}	p.r.	counter ion Na^+, $\mu = 10^{-3}$ *M*.	Anba.68–0295
1.262	$Ti(EDTA)^-$	11.2	$< 4 \times 10^8$	p.r.	——	Anba.66–0825
1.263	TiO_3^{2-}	11.5	$< 5 \times 10^6$	p.r.	——	Anba.64–0282
1.264	TiF_6^{2-}	6.6	3.5×10^9 (cor.)	p.r.	counter ion Na^+; $\mu = 0.1$ *M*; $k_{obs} = 5.8 \times 10^9$.	Anba.68–0295
1.265	Tl^+_{aq}	–	$\sim 1.1 \times 10^{10}$	p.r.	——	Baxe....64–0132
		7	3.0×10^{10}	p.r.	——	Baxe..65–0044
		8.5	4.0×10^{10} (cor.)	p.r.	counter ion SO_4^{2-}; $\mu = 10^{-3}$ *M*; $k_{obs} = 3.7 \times 10^{10}$.	Anba.68–0295
		–	2.8×10^{10}	p.r.	k detd. at 15–80°C; $E_a = 2.6$ kcal mol^{-1}.	Cerc69–0567
1.266	Tm^{3+}	6.05	3×10^9	p.r.	——	Thom..64–0046
1.267	$Tm(EDTA)^-$	12	1.4×10^7	p.r.	$\mu = 0.2$.	Anba.69–0276
1.268	UO_2^{2+}	–	7.4×10^{10}	p.r.	——	Baxe..65–0044
1.269	VO_3^-	11.0	4.9×10^9	p.r.	counter ion NH_4^+, $\mu = 10^{-4}$ *M*.	Anba.68–0295
1.270	Y^{3+}	–	2×10^8	p.r.	——	Baxe..65–0044
1.271	$Y(EDTA)^-$	12	1.1×10^7	p.r.	$\mu = 0.2$.	Anba.69–0276
1.272	Yb^{3+}	6.03	4.3×10^{10}	p.r.	——	Thom..64–0046
		–	3.7×10^{10}	p.r.	——	Baxe..65–0044
1.273	$Yb(EDTA)^-$	12	2.0×10^9	p.r.	$\mu = 0.2$.	Anba.69–0276
1.274	Zn^{2+}_{aq}	–	1.7×10^9	p.r.	——	Baxe..63–0187
		–	1.5×10^9	p.r.	——	Baxe..65–0044
		6.8	$(1.0 \pm 0.3) \times 10^9$	p.r.	counter ion SO_4^{2-}.	Anba.65–0047
		9.7	$(5.6 \pm 0.7) \times 10^8$	p.r.	counter ions SO_4^{2-}, Na^+, soln. contains Zn^{2+} and $Zn(OH)^+_{aq}$ 1:1.	Anba.65–0047
1.275	$Zn(OH)^+_{aq}$	12	$(2.0 \pm 0.3) \times 10^8$	p.r.	counter ions SO_4^{2-}, Na^+.	Anba.65–0047
1.276	$Zn(OH)_4^{2-}$	14	$(1.6 \pm 0.3) \times 10^7$	p.r.	counter ions SO_4^{2-}, Na^+.	Anba.65–0047
		3 *M* OH^-	1.7×10^6 (cor.)	p.r.	counter ions SO_4^{2-}, Na^+; $k_{obs} = (7.5 \pm 1.5) \times 10^6$.	Anba.65–0047
1.277	$Zn(NH_3)_4^{2+}$	11.1	$(6.5 \pm 0.6) \times 10^8$	p.r.	soln. contains 0.2 *M* NH_3.	Anba.65–0047
1.278	$Zn(en)_3^{2+}$	11.2	$(5.2 \pm 0.8) \times 10^8$	p.r.	counter ion SO_4^{2-}; soln. contains 10^{-1} *M* ethylene–diamine di–HCl.	Meye.69–0277
1.279	$Zn(CN)_4^{2-}$	10	$(7.2 \pm 1.0)\ 10^7$ (cor.)	p.r.	soln. contains 0.1 *M* CN^-; $k_{obs} = (1.8 \pm 0.2) \times 10^8$.	Anba.65–0047
1.280	$Zn(EDTA)^{2-}$	12	$< 1.8 \times 10^6$	p.r.	$\mu = 0.2$.	Anba.69–0276
1.281	$Zn(NTA)^-$	~ 10	$(7.5 \pm 1.1) \times 10^7$	p.r.	counter ion SO_4^{2-}; concn. $\sim 10^{-4}$ *M*.	Meye.69–0277
1.282	$Zn(NTA)_2^{4-}$	~ 11	$\leq 1 \times 10^7$	p.r.	counter ion SO_4^{2-}, concn. $\sim 10^{-2}$ *M*.	Meye.69–0277
1.283	$Zn(gly)_3^-$	11.1	$(4.8 \pm 0.7) \times 10^7$	p.r.	counter ion SO_4^{2-}; soln. contains 10^{-1} *M* glycine.	Meye.69–0277

TABLE 4. *Reactions of e^-_{aq} with organic solutes*

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.284	acetaldehyde	6.55, 11	3.5×10^9	p.r.	——	Gord....63–0073,
1.285	acetaldoxime	10.82	7.2×10^7	p.r.	——	Hart..67–0298
1.286	acetamide	5.5–6	4×10^7 (rel.)	γ–r.	c.k., assumed $k(e^-_{aq} + NO_3^-) = 1.1 \times 10^{10}$.	Anba.67–0098
			3×10^7 (rel.)	γ–r.	c.k., assumed $k(e^-_{aq} + p\text{-}BrC_6H_5OH) = 1.2 \times 10^{10}$; k detd. at 20, 45 and 70°C to give $E_a = 3.5 \pm 0.5$ kcal mol^{-1}.	
		10.9	1.7×10^7	p.r.	——	Hart..67–0298
1.287	acetate ion	~ 10	$< 10^6$	p.r.	solute concn. 1 M.	Gord....63–0073
		9.5–10.5	$\leq (1.2 \pm 0.4) \times 10^6$ (cor.)	p.r.	solute concn. 10^{-1} M, $k_{obs} = < (2.0 \pm 0.5) \times 10^6$.	Anba.65–0015
1.288	acetic acid $e^-_{aq} + CH_3COOH \rightarrow CH_3COO^- + H$	5.4	$(1.8 \pm 0.3) \times 10^8$	p.r.	——	Gord....63–0073
1.289	acetone		*5.9×10^9*	The value listed has been used to calculate specific rates of the following reactions from relative rates: 1.131, 1.177, 1.391		
		7	$(5.9 \pm 0.2) \times 10^9$	p.r.	——	Gord....63–0073
		–	$(1.6 \pm 0.2) \times 10^9$	p.r.	soln. contains 12.4 M KF.	Anba.65–0001
		7	$(5.9 \pm 0.2) \times 10^9$	p.r.	——	Anba.65–0047
		11	$(5.6 \pm 0.6) \times 10^9$	p.r.	soln. H_2–satd.	Anba.65–0047
		14	$(5.2 \pm 0.6) \times 10^9$	p.r.	——	Anba.65–0047
		3 M OH^-	$(4.2 \pm 0.5) \times 10^9$	p.r.	——	Anba.65–0047
		11	6.9×10^9	p.r.	soln. H_2–satd.	Hart.65–0494
		7	6.4×10^9 (rel.)	γ–r.	c.k., $k_{1.289}/k(e^-_{aq} + SF_6) = 0.39$, assumed $k(e^-_{aq} + SF_6) = 1.65 \times 10^{10}$.	Asmu.68–0159
		–	6.4×10^9 (rel.)	γ–r.	c.k., D_2O soln. $k_{1.289}/k(e^-_d + SF_6) = 0.39$, assumed $k(e^-_d + SF_6) = 1.65 \times 10^{10}$.	Asmu.69–0242
		–	7.6×10^9	p.r.	in concd. soln. (0.1–1.8 M), $k = 9.5 \times 10^9$.	Aldr...71–0019
1.290	acetone semicarbazone	10.7	3.4×10^8	p.r.	——	Hart64–0287
1.291	acetone oxime	7.75	3.0×10^8	p.r.	——	Hart..67–0298
1.292	acetonitrile	7.2	3.0×10^7	p.r.	——	Anba.64–0282
1.293	*N*–acetylalanine	3	1.3×10^8 (rel.)	γ–r.	c.k., assumed $k(e^-_{aq} + ClCH_2COOH) = 6.9 \times 10^9$.	Will.67–0310
1.294	*N*–acetylalanine (negative ion)	8.6–9.0	1.0×10^7	p.r.	——	Braa65–0390
		6.7	1.1×10^7 (rel.)	γ–r.	c.k., assumed $k(e^-_{aq} + ClCH_2COO^-) = 1.2 \times 10^9$.	Will.67–0310
		7	6.3×10^6 (rel.)	γ–r.	c.k., k calcd. from $k(e^-_{aq} + ClCH_2COO^-)/k_{1.294} = 1.9 \times 10^2$, assuming $k(e^-_{aq} + ClCH_2COO^-) = 1.2 \times 10^9$.	Rodg..68–0006
1.295	acetylene	3.3	$(3.5 \pm 0.45) \times 10^{10}$ (rel.)	γ–r.	c.k., assumed $k(e^-_{aq} + H^+) = 2.3 \times 10^{10}$	Fiti.68–0502
1.296	*N*–acetylglycine (negative ion)	5.95	2×10^7	p.r.	——	Braa65–0390
1.297	*cis*–aconitate ion	11	$(2.1 \pm 0.5) \times 10^8$ (rel.)	γ–r.	c.k., k calcd. from $k_{1.297}/k(e^-_{aq} + ClCH_2COO^-) = 0.18 \pm 0.04$ assuming $k(e^-_{aq} + ClCH_2COO^-) = 1.2 \times 10^9$.	Stoc.66–0160
1.298	acridine orange	–	3.2×10^{10}	p.r.	Also studied effect of various polyanions on rate.	Bala...68–2104
98a	acriflavine	–	$(3.7 \pm 0.4) \times 10^{10}$	p.r.	——	Prue.70–0241
9	acrylamide	7	1.8×10^{10}	p.r.	——	Gord....63–0073

TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
		7	$(2.1 \pm 0.4) \times 10^{10}$	p.r.	one detn. from growth of absorption at 275 nm gave $k = (1.8 \pm 0.7) \times 10^{10}$.	Cham....67–0171 Cham...66–2058
		–	3.3×10^{10}	p.r.	k detd. at 15–80°C; $E_a = 3.9$ kcal mol^{-1}.	Cerc69–0567
1.300	adenine	6	3×10^{10}	p.r.	soln. buffered with KH_2PO_4 + Na_2SO_4; $\mu = 0.1$.	Gree..68–0316
1.301	adenosine	12	1.0×10^{10}	p.r.	——	Hart..64–0044
		–	1.3×10^{10} (rel.)	γ–r.	c.k., k calcd. from $k_{1.301}/k(e^-_{aq} + N_2O) = 1.54 \pm 0.15$ assuming $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$.	Scho.64–0094
		5.5	3.1×10^{10}	p.r.	——	Scho...65–0388
1.302	adenosine-5′-phosphate	–	4.4×10^9 (rel.)	γ–r.	c.k., k calcd. from $k_{1.302}/k(e^-_{aq} + N_2O) = 0.52 \pm 0.05$ assuming $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$.	Scho.64–0094
		7	3.8×10^9	p.r.	——	Scho...65–0388
		5.8	5.2×10^9	p.r.	phosphate may be at 3′ – or 5′–position.	Braa65–0778
		8.3	4.0×10^9	p.r.	soln. contains 10^{-1} *M* sodium formate.	Land.68–0441
1.303	DL-alanine (positive ion)	3	8.4×10^8 (rel.)	γ–r.	c.k., assumed $k(e^-_{aq} + ClCH_2COOH) = 6.9 \times 10^9$.	Will.67–0310
1.304	DL-alanine (negative ion)	6.4	5.9×10^6	p.r.	pH is above the isoelectric point.	Davi..65–0389
		6.8	$\leq 5 \times 10^6$	p.r.		Braa66–0011
1.305	β-alanine	6.85	$\leq 4 \times 10^6$	p.r.	——	Braa66–0011
1.306	DL-alanyl-DL-alanine (negative ion)	6.27	1.3×10^8	p.r.	——	Braa67–3005
1.307	DL-alanylgylcine (negative ion)	6.22	2.1×10^8	p.r.	——	Braa65–0390
1.308	DL-alanyl-DL-leucine (negative ion)	6.46	1.3×10^8	p.r.	——	Braa67–3005
1.308a	albumin (egg)	11.53	1.3×10^{10}	p.r.	——	Braa67–3005
1.308b	albumin (human serum)	9.0	$(8.2 \pm 0.1) \times 10^9$	p.r.	contains 10^{-2} *M* formate ion, 10^{-3} *M* $Na_2B_4O_7$; also studied complex with eosin.	Husa..70–0253
		12.0	$(3.3 \pm 0.3) \times 10^9$	p.r.	contains 10^{-2} *M* formate ion, 10^{-2} *M* NaOH.	Husa..70–0253
1.309	allyl alcohol	–	$< 10^6$ (rel.)	γ–r.	solute did not compete with N_2O.	Scho.64–0094
1.309a	allylamine	11.3	1.2×10^7	p.r.	——	Geto.70–0371
1.310	*p*-aminobenzoate ion	~ 11	2.1×10^9	p.r.	——	Anba.64–0138
		–	4.2×10^9 (rel.)	r.	c.k., k calcd. from $k_{1.310}/k(e^-_{aq} + O_2) = 0.22$ assuming $k(e^-_{aq} + O_2) = 1.9 \times 10^{10}$.	Nakk65–0739
1.311	*o*-aminobenzonitrile	10	1.1×10^{10}	p.r.	——	Anba.64–0282
1.312	4-aminobutyrate ion	6.65	$\leq 9 \times 10^6$	p.r.	——	Braa66–0011
1.313	2-aminopyrimidine	5.5–6	1.4×10^{10} (rel.)	γ–r.	c.k., assume $k(e^-_{aq} + NO_3^-) = 1.1 \times 10^{10}$.	Anba..67–0098
			1.3×10^{10} (rel.)	γ–r.	c.k., assume $k(e^-_{aq} + p\text{-}BrC_6H_4OH) = 1.2 \times 10^{10}$; k detd. at 20, 45 and 70°C to give $E_a = 3.7 \pm 0.5$ kcal mol^{-1} (ave. of both methods).	
1.313a	4-aminopyrimidine	6.5–7	$(5.2 \pm 0.4) \times 10^9$	p.r.	no OH scavenger added.	Fiel.70–0226
1.313b	amylamine	11.8	$< 4 \times 10^5$	p.r.	——	Geto.70–0371
1.314	aniline	11.94	$< 2 \times 10^7$	p.r.	——	Hart..64–0044
1.315	arabinose	–	$< 10^7$	p.r.	——	Hart..64–0048

TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.316	L-arginine	6.10	1.5×10^8	p.r.	—	Braa66-0011
	(positive ion)	8.0	1.2×10^8	p.r.	value of k from graph.	Braa66-0011
		8.7	1.2×10^8	p.r.	value of k from graph.	Braa66-0011
		8.9	1.1×10^8	p.r.	value of k from graph.	Braa66-0011
1.317	L-arginine (zwitterion)	9.9	6.0×10^7	p.r.	value of k from graph.	Braa66-0011
1.318	L-arginine (negative ion)	11.5	6.3×10^7	p.r.	isoelectric point of arginine is 10.76.	Braa66-0011
1.319	L-asparagine	4.7	2×10^8	p.r.	—	Braa65-0778
	(zwitterion)	7.3	1.5×10^8	p.r.	—	Braa66-0011
1.320	L-asparagine (negative ion)	11.7	2.4×10^7	p.r.	—	Braa66-0011
1.321	aspartate ion (monoanion)	7.3	$< 10^7$	p.r.	$k < 10^7$ was also reported in 64-0048; pH not specified.	Braa66-0011
1.322	aspartate ion (dianion)	10.5	$< 5 \times 10^6$	p.r.	—	Braa66-0011
1.323	benzamide	~ 11	1.7×10^{10}	p.r.	—	Anba.64-0138
1.324	benzene	7	$< 7 \times 10^6$	p.r.	—	Hart..64-0044
		~ 11	1.4×10^7	p.r.	—	Anba.64-0138
		11	1.2×10^7	p.r.	—	Mich.70-0211
1.325	benzenesulfonamide	~ 11	1.6×10^{10}	p.r.	—	Anba.64-0138
1.326	benzenesulfonate ion	7	1.2×10^9 (rel.)	γ-r.	c.k., assume $k(e^-_{aq} + NO_3^-) = 1.1 \times 10^{10}$. k detd. at 20, 45 and 70°C by c.k. with NO_3^- and also p-bromophenol gives $E_a = 3.5 \pm 0.5$ kcal mol^{-1}.	Anba..67-0098
		~ 11	4.0×10^9	p.r.	—	Anba.64-0138
1.327	benzoate ion	~ 11	3.1×10^9	p.r.	—	Anba.64-0138
		–	$(1.7 \pm 0.15) \times 10^9$	p.r.	soln. contains 12.4 M KF.	Anba.65-0001
		5.35-5.45	5.4×10^9	p.r.	—	Szut...65-0018
		7.19-7.74	3.1×10^9	p.r.	—	Szut...65-0018
		12.3	2.8×10^9 (cor.)	p.r.	$k_{obs} = 3.6 \times 10^9$.	Szut...65-0018
		7	$(3.5 \pm 0.4) \times 10^9$	p.r.	—	Anba.65-0047
		11	$(3.1 \pm 0.3) \times 10^9$	p.r.	—	Anba.65-0047
		14	$(2.9 \pm 0.3) \times 10^9$	p.r.	—	Anba.65-0047
		3 M OH^-	$(2.4 \pm 0.3) \times 10^9$	p.r.	—	Anba.65-0047
		11	2.6×10^9 (rel.)	γ-r.	c.k., k calcd. from $k_{1.327}/k(e^-_{aq} + ClCH_2COO^-) = 2.2 \pm 0.4$ assuming $k(e^-_{aq} + ClCH_2COO^-) = 1.2 \times 10^9$.	Stoc.66-0160
		7	3.6×10^9 (rel.)	γ-r.	c.k., with NO_3^- or p-bromophenol, k detd. by both methods at 20, 45, and 70°C to give $E_a = 3.6 \pm 0.5$ kcal mol^{-1}.	Anba..67-0098
1.327a	benzoic acid	5.4	3.3×10^{10} (calcd.)	p.r.	calcd. from $k_{obs} = 5.4 \times 10^9$ and pK (benzoic acid) = 4.19.	Szut...65-0018
1.328	benzonitrile	~ 11	1.6×10^{10}	p.r.	—	Anba.64-0138
		7.16	1.9×10^{10}	p.r.	soln. contains 5×10^{-2} M formate; d.k. at 600 nm; p.b.k. at 315 nm gave $k = 1.7 \times 10^{10}$.	Chut.70-0657
1.329	benzophenone	7 ± 1	$(3.0 \pm 0.5) \times 10^{10}$	p.r.	—	Land68-0727
1.330	p-benzoquinone	6.6	1.25×10^9	p.r.	—	Hart..64-0044
		–	2.7×10^{10}	p.r.	—	Land.70-0198
1.331	benzyl alcohol	~ 11	1.3×10^8	p.r.	—	Anba.64-0138

TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
		5.5–6	1.9×10^8 (rel.)	γ–r.	c.k., assume $k(e^-_{aq} + NO_3^-) = 1.1 \times 10^{10}$.	Anba..67–0098
			1.8×10^8 (rel.)	γ–r.	c.k., assume $k(e^-_{aq} + p\text{-}BrC_6H_4OH) = 1.2 \times 10^{10}$; k detd. at 20, 45 and 70°C by both methods to give $E_a = 3.7 \pm 0.5$ kcal mol^{-1}.	
1.331a	benzylamine	11.4	3.4×10^7	p.r.	——	Geto.70–0371
1.331b	benzylammonium ion	8.8	1.45×10^9 (calcd.)	p.r.	——	Geto.70–0371
1.332	benzyl chloride	~ 10	$(5.5 \pm 0.5) \times 10^9$	p.r.	——	Anba.65–0015
		~ 11	5.1×10^9	p.r.	——	Anba.64–0138
1.333	benzyltrimethyl–ammonium ion $e^-_{aq} + C_6H_5CH_2N(CH_3)_3^+ \rightarrow C_6H_5CH_2 + (CH_3)_3N$	–	1.2×10^{10} (rel.)	γ–r.	c.k., assume $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$ or $k(e^-_{aq} + H^+) = 2.3 \times 10^{10}$.	Kabi.68–0205
1.333a	biphenyl–4–carboxylate ion	9.1	9.6×10^9	p.r.	——	Eber.70–0411
1.334	2,2′–bipyridine	6.25–7.2	$(1.8 \pm 0.2) \times 10^{10}$	p.r.	——	Walt67–0560
		9.2	2.5×10^{10}	p.r.	——	Eber.70–0411
1.334a	4,4′–bipyridine	9.3	3.3×10^{10}	p.r.	——	Eber.70–0411
1.335	bromoacetate ion	~ 10	$(6.2 \pm 0.7) \times 10^9$	p.r.	——	Anba.65–0015
1.336	bromobenzene	~ 11	4.3×10^9	p.r.	——	Anba.64–0138
1.337	*p*–bromobenzoate ion	~ 11	7.7×10^9	p.r.	——	Anba.64–0138
1.338	1–bromobutane	6.57	1.0×10^{10}	p.r.	——	Szut...65–0018
	$e^-_{aq} + C_4H_9Br \rightarrow C_4H_9 + Br^-$	–	1.0×10^{10}	p.r.	——	Bull.70–0407
1.339	bromoethane	7.12	1.2×10^{10}	p.r.	——	Szut...65–0018
	$e^-_{aq} + C_2H_5Br \rightarrow C_2H_5 + Br^-$	–	1.2×10^{10}	p.r.	——	Bull.70–0407
1.340	2–bromoethanol	~ 10	$(1.6 \pm 0.2) \times 10^9$	p.r.	——	Anba.65–0015
1.341	*o*–bromophenoxide ion	~ 11	1.9×10^9	p.r.	——	Anba.64–0138
1.342	*m*–bromophenoxide ion	~ 11	2.7×10^9	p.r.	——	Anba.64–0138
1.343	*p*–bromophenol		*1.2×10^{10}*	The value listed has been used to calculate specific rates of the following reactions from relative rates: 1.62, 1.188, 1.189, 1.286, 1.313, 1.326, 1.327, 1.331, 1.358, 1.386, 1.577, 1.578.		
		5.5–6	1.2×10^{10} (rel.)	γ–r.	c.k., k calcd. assuming $k(e^-_{aq} + NO_3^-) = 1.1 \times 10^{10}$; k detd. at 20, 45, and 70°C to give $E_a = 3.0 \pm 0.5$ kcal mol^{-1}.	Anba..67–0098
		–	1.2×10^{10}	p.r.	k detd. at 15–80°C; $E_a = 3.0_8$ kcal mol^{-1}	Cerc69–0567
1.344	*p*–bromophenoxide ion	~ 11	2.9×10^9	p.r.	——	Anba.64–0138
1.345	1–bromopropane	6.15	8.5×10^9	p.r.	——	Szut...65–0018
1.346	2–bromopropionate ion	~ 10	$(5.3 \pm 0.8) \times 10^9$	p.r.	——	Anba.65–0015
1.347	3–bromopropionate ion	~ 10	$(2.7 \pm 0.3) \times 10^9$	p.r.	——	Anba.65–0015
1.347a	bromotrifluoromethane $e^-_{aq} + CF_3Br \rightarrow CF_3 + Br^-$	9–10	$(2.35 \pm 0.15) \times 10^{10}$	p.r.	——	Bull.70–0407
1.348	5–bromouracil	–	1.9×10^{10}	p.r.	k detd. at 15–80°C; $E_a = 3.9$ kcal mol^{-1}.	Cerc69–0567
		7.0	2.6×10^{10}	p.r.	——	Zimb..69–0826
1.349	butadiene	7	8×10^9	p.r.	see also 1.378 for relative rate.	Hart..64–0044
1.350	2,3–butanedione	–	1.0×10^{10}	p.r.	——	Lili..68–0249
1.351	3–butenenitrile	7.0	9.1×10^8	p.r.	——	Anba.64–0282

TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.352	*tert*-butyl alcohol	6–12	~ 10^8 (rel.)	γ-r.	c.k., with metal ions, estimated from inhibition of tritium exchange, involves a number of assumptions.	Gold.70–0034
1.352a	*tert*-butylammonium ion	7.9	1.1 x 10^6	p.r.	——	Geto.70–0371
1.353	*tert*-butyl mercaptan $e^-_{aq} + (CH_3)_3CSH \rightarrow (CH_3)_3C\cdot + SH^-$	7	(3.0 ± 0.45) x 10^9	p.r.	——	Karm...69–0553
1.354	carbon disulfide	7	(3.1 ± 0.15) x 10^{10}	p.r.	——	Gord....63–0073
		7.7	3.1 x 10^{10}	p.r.	——	Hart..64–0044
1.355	carbon tetrachloride	7	3.1 x 10^{10}	p.r.	——	Gord....63–0073
		7	3.0 x 10^{10}	p.r.	——	Hart..64–0044
1.356	catalase	> 7	3.7 x 10^9	p.r.	mol. wt. 2.5 x 10^5	Heng...66–0499
1.357	Omitted					
1.358	chloroacetate ion		*1.2 x 10^9*	The value listed has been used to calculate specific rates of the following reactions from relative rates: 1.116a, 1.294, 1.297, 1.327, 1.416, 1.476, 1.500, 1.510, 1.558, 1.568, 1.573, 1.584, 1.607, 1.614.		
		~ 10	(1.2 ± 0.15) x 10^9	p.r.	——	Anba.65–0015
		7	1.1 x 10^9 (rel.)	γ-r.	c.k., k calcd. assuming $k(e^-_{aq} + p\text{-}BrC_6H_4OH)$ = 1.2 x 10^{10}; k detd. at 20, 45, and 70°C. to give E_a = 3.8 ± 0.5 kcal mol^{-1}.	Anba..67–0098
		11	8.9 x 10^8	p.r.	k detd. at 2–62°C to give E_a = 3.2 ± 0.4.	Anba.67–0299
		8.5	2.5 x 10^9	p.r.	concn. > 0.1 M.	Aldr...71–0019
1.359	chloroacetic acid $e^-_{aq} + ClCH_2COOH \rightarrow Cl^- + \cdot CH_2COOH$		*6.9 x 10^9*	The value listed has been used to calculate specific rates of the following reactions from relative rates: 1.293, 1.303, 1.414, 1.417, 1.443, 1.450, 1.453.		
		1.0–1.5	6.9 x 10^9 (rel.)	γ-r.	c.k., k calcd. from $k_{1.359}/k(e^-_{aq} + H^+)$ = 3.34–3.49 assuming $k(e^-_{aq} + H^+)$ = 2.3 x 10^{10}.	Hayo.61–0025
1.360	chlorobenzene	~ 11	5.0 x 10^8	p.r.	——	Anba.64–0138
1.361	*o*-chlorobenzoate ion	~ 11	1.2 x 10^9	p.r.	——	Anba.64–0138
1.362	*m*-chlorobenzoate ion	~ 11	5.5 x 10^9	p.r.	——	Anba.64–0138
1.363	*p*-chlorobenzoate ion	~ 11	6.0 x 10^9	p.r.	——	Anba.64–0138
1.364	1-chlorobutane	7.28	4.5 x 10^8	p.r.	——	Szut...65–0018
	$e^-_{aq} + C_4H_9Cl \rightarrow C_4H_9 + Cl^-$	~ 10	(3.2 ± 0.4)x 10^8	p.r.	——	Anba.65–0015
		–	4.5 x 10^8	p.r.	——	Bull.70–0407
1.365	2-chlorobutane	6.64	5.1 x 10^8	p.r.	——	Szut...65–0918
		~ 10	(5.1 ± 0.8) x 10^8	p.r.	——	Anba.65–0015
1.366	2-chloroethanol	~ 10	(4.1 ± 0.6) x 10^8	p.r.	——	Anba.65–0015
		11	3.3 x 10^8	p.r.	k detd. at 2–62°C to give E_a = 3.1 ± 0.6 kcal mol^{-1}.	Anba.67–0299
1.367	chloroform	7	3.0 x 10^{10}	p.r.	——	Hart..64–0044
1.367a	chloromethane $e^-_{aq} + CH_3Cl \rightarrow \cdot CH_3 + Cl^-$	–	1.1 x 10^9 (rel.)	γ-r.	c.k., CH_3Cl concn. 1.2 x 10^{-2} M; k calcd. assuming $k(e^-_{aq} + SF_6)$ = 1.65 x 10^{10}.	Balk..70–0225
		10	~ 8 x 10^8	p.r.	lower limit only because of volatility losses.	Balk..70–0225
1.368	1-chloro-2-methyl-propane (isobutyl chloride)	5.82	5.1 x 10^8	p.r.	——	Szut...65–0018
.369	*o*-chlorophenoxide ion	~ 11	2.0 x 10^8	p.r.	——	Anba.64–0138
.370	*m*-chlorophenoxide ion	~ 11	5.0 x 10^8	p.r.	——	Anba.64–0138

TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.371	*p*-chlorophenoxide ion	~ 11	6.4×10^8	p.r.	—	Anba.64-0138
1.372	1-chloropropane	6.27	6.9×10^8	p.r.	—	Szut...65-0018
	$e^-_{aq} + C_3H_7Cl \Rightarrow C_3H_7 + Cl^-$	–	6.9×10^8	p.r.	—	Bull.70-0407
1.373	2-chloropropionamide	–	$(5.8 \pm 0.5) \times 10^9$	p.r.	soln. satd. with ethylene.	Cham..70-0052
1.374	3-chloropropionamide	–	$(1.8 \pm 0.2) \times 10^9$	p.r.	soln. satd. with ethylene.	Cham..70-0052
1.375	2-chloropropionate ion	~ 10	$(1.4 \pm 0.2) \times 10^9$	p.r.	—	Anba.65-0015
1.376	3-chloropropionate ion	~ 10	$(4.0 \pm 0.4) \times 10^8$	p.r.	—	Anba.65-0015
		11	4.4×10^8	p.r.	k detd. at 2–62°C to give $E_a = 3.6 \pm 0.4$ kcal mol^{-1}.	Anba.67-0299
1.377	*p*-chlorotoluene	~ 11	4.5×10^8	p.r.	—	Anba.64-0138
1.378	chlorotrifluoro-methane	11	$(1.0 \pm 0.2) \times 10^{10}$	p.r.	—	Anba.64-0282
		9–10	$(4.4 \pm 0.4) \times 10^9$	p.r.	—	Bull.70-0407
	$e^-_{aq} + CF_3Cl \Rightarrow CF_3 + Cl^-$	9–10	$(4.6 \pm 0.7) \times 10^9$ (rel.)	γ-r.	c.k., $k(e^-_{aq}$ + butadiene)/$k_{1.378} = 1.75 \pm 0.3$, assume $k(e^-_{aq}$ + butadiene) = 8×10^9.	Bull.70-0407
1.379	cinnamate ion	7.22	6.8×10^9	p.r.	—	Szut...65-0018
		12.45	7.2×10^9(cor.)	p.r.	$k_{obs.} = 9.7 \times 10^9$.	Szut...65-0018
1.380	citrate ion	–	$< 10^5$	p.r.	10^{-1} *M* soln. unreactive.	Thom..64-0046
1.381	creatine (*N*-amidinosarcosine)	7.0	2.7×10^7	p.r.	—	Davi..65-0389
1.382	cyanoacetate ion	~ 11	4×10^7	p.r.	—	Anba.65-0047
1.383	*p*-cyanobenzoate ion	~ 11	1.0×10^{10}	p.r.	—	Anba.64-0138
1.384	1,3-cyclohexadiene	11	1×10^9	p.r.	—	Mich.70-0211
1.385	1,4-cyclohexadiene	11	$< 6.5 \times 10^5$	p.r.	—	Mich.70-0211
1.386	cyclohexanone	5.5–6	8×10^9 (rel.)	γ-r.	c.k., assume $k(e^-_{aq} + NO_3^-) = 1.1 \times 10^{10}$.	Anba..67-0098
			7.8×10^9 (rel.)	γ-r.	c.k., assume $k(e^-_{aq}$ + *p*-$BrC_6H_4OH) = 1.2 \times 10^{10}$; k detd. at 20, 45, and 70°C by both methods. $E_a = 3.6 \pm 0.5$ kcal mol^{-1}.	
1.387	cyclohexene	11	$< 2 \times 10^6$	p.r.	—	Mich.70-0211
1.387a	cyclohexylamine	11.8	1.7×10^6	p.r.	—	Geto.70-0371
1.388	cystamine	7.3	4×10^{10}	p.r.	—	Braa66-0011
	$e^-_{aq} + (NH_2CH_2CH_2S)_2 \Rightarrow RSSR^- \leftrightarrows NH_2CH_2CH_2S^- + NH_2CH_2CH_2S\cdot$	4–9	~ 4×10^{10}	p.r.	p.b.k. at 410 nm, estimated value.	Adam..67-0554
1.389	cysteamine (2-amino-ethanethiol)	6.9	2×10^{10}	p.r.	—	Braa66-0011
1.390	cysteine (positive ion)	1	3×10^{10} (rel.)	γ-r.	c.k., assume $k(e^-_{aq} + H^+) = 2.3 \times 10^{10}$.	Al-T68-0540
1.391	cysteine (zwitterion)	6.3	8.7×10^9	p.r.	—	Braa66-0011
	$e^-_{aq} + SHCH_2CH(NH_3^+)COO^- \Rightarrow \cdot CH_2CH(NH_3^+)COO^- + SH^-$	5.5	1.1×10^{10} (rel.)	γ-r.	c.k., $k_{1.391}/k(e^-_{aq} + acetone) = 1.95$, assume $k(e^-_{aq}$ + acetone) = 5.9×10^9 or $k_{1.391}/k(e^-_{aq} + NO_3^-) = 1.03$ assuming $k(e^-_{aq} + NO_3^-) = 1.1 \times 10^{10}$.	Wilk...68-0002
		7	~ 8×10^9 (rel.)	γ-r.	c.k., exptl. details not given.	Al-T68-0540, Trum67-0477
		7	4.9×10^9 (rel.)	γ-r.	c.k., $k(e^-_{aq} + O_2)/k_{1.391} = 3.8$, assume $k(e^-_{aq} + O_2) = 1.9 \times 10^{10}$ and $g(e^-_{aq}) = 2.8$.	Pack.70-0015
1.392	cysteine (negative ion)	11.6	7.5×10^7	p.r.	—	Braa66-0011
1.393	cystine (zwitterion)	6.1	1.3×10^{10}	p.r.	—	Braa66-0011

TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.394	cystine (negative ion)	10.7	2.5×10^9	p.r.	——	Braa66-0011
		12.0	3.4×10^9	p.r.	——	Hart..64-0044
1.395	cytidine	12.0	1.2×10^{10}	p.r.	——	Hart..64-0044
1.395a	cytochrome-C (ferri)	7.0	$(1.3 \pm 0.1) \times 10^{11}$	p.r.	d.k. at 550 nm (e^-_{aq}) or 370 nm (ferricytochrome-C) as well as p.b.k. at 425 nm (ferrocytochrome-C); concn. $1-3 \times 10^{-6}$ *M*, contains 5×10^{-4} *M* NaCl.	Pech.71-0018
1.396	cytosine	6	$\sim 7-8 \times 10^9$	p.r.	——	Hart..64-0048
		–	$\sim 1 \times 10^{10}$ (rel.)	γ-r.	c.k., $k_{1.396}/k(e^-_{aq} + N_2O) = 1.26 \pm 0.15$, assume $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$.	Scho.64-0094
1.396a	dichloroacetate ion	11	4.2×10^9	p.r.	——	Aldr...71-0019
		7.5	1.0×10^{10}	p.r.	concn. > 0.1 *M*.	Aldr...71-0019
1.397	*o*-dichlorobenzene	~ 11	4.7×10^9	p.r.	——	Anba.64-0138
1.398	*m*-dichlorobenzene	~ 11	5.2×10^9	p.r.	——	Anba.64-0138
1.399	*p*-dichlorobenzene	~ 11	5.0×10^9	p.r.	——	Anba.64-0138
1.399a	dichlorodifluoromethane $e^-_{aq} + CF_2Cl_2 \rightarrow CF_2Cl + Cl^-$	~ 6	1.4×10^{10} (rel.)	γ-r.	c.k., assume $k(e^-_{aq} + N_2O) = 8.9 \times 10^9$ or $k(e^-_{aq} + H^+) = 2.4 \times 10^{10}$.	Balk..71-0026
1.399b	1,1-dichloroethylene	–	2.3×10^{10}	p.r.	——	Koes.71-0030
1.399c	1,2-dichloroethylene	–	7.5×10^9	p.r.	——	Koes.71-0030
1.400	2,4-diethoxypyrimidine	7-11	3.0×10^9	p.r.	$\mu = 0.1$.	Gree..68-0316
1.401	diethylthallium ion $e^-_{aq} + (C_2H_5)_2Tl^+ \rightarrow Tl^+$ + organic prod.	–	3.5×10^{10} (rel.)	γ-r.	c.k., $k_{1.401}/k(e^-_{aq} + NO_3^-) = 3.19$, assume $k(e^-_{aq} + NO_3^-) = 1.1 \times 10^{10}$.	Sarr66-0629
1.402	3-(3,4-dihydroxyphenyl)-L-alanine	6.95	1.6×10^8	p.r.	——	Braa66-0011
1.403	*N*, *N*-dimethylformamide	–	$(5.2 \pm 1.3) \times 10^7$	p.r.	concn. 10^{-2}M.	Fel'..67-0054
1.404	dimethylsulfide	–	2.0×10^7	p.r.	——	Meis..67-0186
1.405	dimethylsulfoxide	–	1.7×10^6	p.r.	——	Meis..67-0186
1.406	1,3-dimethyluracil	7	1.65×10^{10}	p.r.	$\mu = 0.1$.	Gree..68-0316
1.407	1,6-dimethyluracil	6.5-7	$(7.9 \pm 0.7) \times 10^9$	p.r.	no OH scavenger added.	Fiel.70-0226
1.408	3,6-dimethyluracil	6.5-7	$(6.0 \pm 0.7) \times 10^9$	p.r.	no OH scavenger added.	Fiel.70-0226
1.408a	*o*,*o*'-diphenate ion	9.1	3.2×10^9	p.r.	——	Eber.70-0411
1.408b	*p*,*p*'-diphenate ion	9.1	1.2×10^{10}	p.r.	——	Eber.70-0411
1.408c	dipyridylamine	9.1	1.4×10^{10}	p.r.	——	Eber.70-0411
1.409	djenkolate ion 3,3'-methylenedithiobis(2-aminopropionate ion)	11	10^8	p.r.	——	Braa66-0011
1.409a	DNA	8	$> 10^{12}$	p.r.	mol. wt. 5×10^6.	Scho...65-0388
		–	10^{13} (rel.)	γ-r.	c.k., assume $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$.	Scho...65-0038
1.409b	dodecyl sodium sulfate	–	$< 2.3 \times 10^5$	p.r.	concn. 5×10^{-2} *M*.	Fend.70-0271
1.410	eosin(dianion)	11	1.5×10^{10}	p.r.	——	Hart.66-0818
		9.0	$(2.2 \pm 0.4) \times 10^{10}$	p.r.	contains formate ion.	Gros68-0309
		12.0	$(1.9 \pm 0.1) \times 10^{10}$	p.r.	contains 10^{-2}*M* formate ion.	Husa..70-0253
		12.0	$(1.0 \pm 0.2) \times 10^{10}$	p.r.	p.b.k. at 405 nm, also studied complex with human serum albumin.	Husa..70-0253

TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.411	ethanol $e^-_{aq} + C_2H_5OH \rightarrow C_2H_5O^- + H$	12 –	$< 10^5$ ≤ 400	p.r. f. phot.	solute concn. 0.2–1.0 M. concn. ~1–9 M, H_2– satd., ~ 10^{-3} M NaOH; assumed $k(e^-_{aq} + H_2O) = 16$ and cor. for $k(H + OH^-)$ and $k(H + C_2H_5OH)$.	Dorf.63–0045 Hick.70–7116
1.412	4–ethoxy–1–methyl–uracil	6.5–7	$(1.4 \pm 0.2) \times 10^{10}$	p.r.	no OH scavenger added.	Fiel.70–0226
1.413	4–ethoxyuracil	6.5–7	$(1.7 \pm 0.2) \times 10^{10}$	p.r.	no OH scavenger added.	Fiel.70–0226
1.414	*N*–ethylacetamide	3–6.7	1.6×10^7 (rel.)	γ–r.	c.k., assume $k(e^-_{aq} + ClCH_2COOH) = 6.9 \times 10^9$.	Will.67–0310
1.415	ethyl acetate	6.53	5.9×10^7	p.r.	——	Hart..67–0298
1.416	ethyl 2–aminoacetate (glycine, ethyl ester)	6.7	1.0×10^9 (rel.)	γ–r.	c.k., assume $k(e^-_{aq} + ClCH_2COO^-) = 1.2 \times 10^9$.	Will.67–0310
1.417	ethylammonium ion	3	~ 10^6 (rel.)	γ–r.	c.k., assume $k(e^-_{aq} + ClCH_2COOH) = 6.9 \times 10^9$, cor. for $e^-_{aq} + H^+$.	Will.67–0310
		7.8	2.4×10^6 (calcd.)	p.r.	$k_{obs} = 2.7 \times 10^6$.	Geto.70–0371
1.418	ethyl cyanoacetate	10.92	3.2×10^8	p.r.	——	Hart..67–0298
1.419	ethylene	7	$< 2.5 \times 10^6$	p.r.	——	Cull..65.0053
1.420	ethylenediamine–tetraacetate ion	8–11	$< 1.5 \times 10^6$	p.r.	——	Anba.64–0282
1.421	ethyl ether	–	$< 10^7$	p.r.	——	Hart..64–0048
1.421a	*N*–ethylmaleimide	–	3.2×10^{10}	p.r.	——	Ward69–0562
1.422	fluorescein (anion)	9.2	$(1.4 \pm 0.2) \times 10^{10}$	p.r.	soln. contains 10^{-2} M formate ion.	Cord.68–0172
1.423	fluoroacetate ion	~ 10	$< (1.2 \pm 0.5) \times 10^6$ (cor.)	p.r.	$k_{obs} < (2.0 \pm 0.5) \times 10^6$.	Anba.65–0015
1.424	fluoroacetone	6.7–10.9	9.8×10^8	p.r.	——	Hart..67–0298
1.425	fluorobenzene	~ 11	6.0×10^7	p.r.	——	Anba.64–0138
		–	7.0×10^7	p.r.	——	Koes.71–0030
1.426	*o*–fluorobenzoate ion	~ 11	3.1×10^9	p.r.	——	Anba.64–0138
1.427	*m*–fluorobenzoate ion	~ 11	6.7×10^9	p.r.	——	Anba.64–0138
1.428	*p*–fluorobenzoate ion	~ 11	3.8×10^9	p.r.	——	Anba.64–0138
1.429	*o*–fluorophenoxide ion	~ 11	3.4×10^8	p.r.	——	Anba.64–0138
1.430	*m*–fluorophenoxide ion	~ 11	2.0×10^8	p.r.	——	Anba.64–0138
1.431	*p*–fluorophenoxide ion	~ 11	1.2×10^8	p.r.	——	Anba.64–0138
1.432	formaldehyde	7	$< 10^7$	p.r.	——	Gord....63–0073
1.433	formamide	–	$< 10^6$	p.r.	solute concn. 10^{-2} M.	Fel'..67–0054
		11	4.2×10^7	p.r.	solute concn. 10^{-3} M.	Hart..67–0298
		5.5–6	3.8×10^7 (rel.)	γ–r.	c.k., assume $k(e^-_{aq} + NO_3^-) = 1.1 \times 10^{10}$; k detd. at 20, 45 and 70° C, $E_a = 3.2 \pm 0.5$ kcal mol^{-1}.	Anba..67–0098
1.434	formate ion	~ 9	$\leq 1.4 \times 10^4$ (cor.)	p.r.	concn. 10^{-1} M; counter ion Na^+; $k_{obs} = \leq 2.5 \times 10^4$.	Keen..65–0396
		~ 11	$\leq 1 \times 10^4$ (cor.)	p.r.	solute concn. ≤ 0.2 M; $k_{obs} = 2.4 \times 10^4$; counter ions Na^+, Ba^{2+}.	Swal68–0418
1.435	formic acid	5.0	$(1.4 \pm 0.1) \times 10^8$	p.r.	——	Gord....63–0073
1.436	fumarate ion	13	7.5×10^9	p.r.	——	Hart..64–0044
1.437	furan	7.94	3.0×10^6	p.r.	——	Szut...65–0018
1.437a	gelatin	5.85	6.1×10^{10}	p.r.	——	Braa67–3005
		6.2	5.0×10^{10}	p.r.	——	Braa67–3005
		6.22	4.9×10^{10}	p.r.	——	Braa67–3005
		5.97	6.4×10^{10}	p.r.	——	Braa67–3005

TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
		10.39	3.0×10^{10}	p.r.	——	Braa67-3005
		11.12	2.6×10^{10}	p.r.	——	Braa67-3005
1.438	glucosamine	7.7	3.5×10^{7}	p.r.	——	Braa66-0011
1.439	D-glucose	–	$\sim 3 \times 10^{5}$	p.r.	solute concn. 5×10^{-4}–5×10^{-2} M.	Davi..65-0391, Phil..66-0211
1.439a	D-glucuronate ion	–	$\leq 10^{6}$	p.r.	concn. 10^{-1} M.	Phil.70-0509
1.440	L-glutamate ion (monoanion)	7	$< 10^{7}$	p.r.	——	Hart..64-0048
		10.2	5×10^{6}	p.r.	at this pH solute is mixture of monoanion and dianion; estd. value for the dianion: $k < 1 \times 10^{6}$.	Braa65-0778
		5.7	$\cong 2 \times 10^{7}$	p.r.	——	Braa66-0011
1.441	glutathione(reduced form)	6.4	3.2×10^{9}	p.r.	——	Braa66-0011
1.442	glutathione (oxidized form; disulfide)	8.25	4.6×10^{9}	p.r.	——	Braa66-0011
1.443	glycine (positive ion)	3	4.7×10^{8} (rel.)	γ-r.	c.k., assume $k(e^-_{aq} + ClCH_2COOH) = 6.9 \times 10^{9}$.	Will.67-0310
1.444	glycine (zwitterion)	6.4	8.3×10^{6}	p.r.	solute concn. 5×10^{-2} M.	Davi..65-0389
		8.5	5.5×10^{6}	p.r.	solute concn. 3×10^{-2} M.	Davi..65-0389
1.445	glycine (negative ion)	11	1.8×10^{6}	p.r.	solute concn. 3×10^{-2} M.	Davi.65-0389
1.446	omitted					
1.447	glycyl-DL-alanine (negative ion)	6.22	2.9×10^{8}	p.r.	——	Braa65-0390, 67-3005
1.448	glycyl-L-asparagine	5.33	5.4×10^{8}	p.r.	——	Braa67-3005
1.449	glycyl-L-asparagine (negative ion)	11.41	8×10^{7}	p.r.	——	Braa67-3005
1.450	glycylglycine (positive ion)	3	9.3×10^{8} (rel.)	γ-r.	c.k., assume $k(e^-_{aq} + ClCH_2COOH) = 6.9 \times 10^{9}$.	Will.67-0310
1.451	glycylglycine (zwitterion)	6.38	2.5×10^{8}	p.r.	——	Braa65-0390, 67-3005
1.452	glycylglycine (negative ion)	11.75	5×10^{7}	p.r.	——	Braa65-0390, 67-3005
1.453	glycylglycylglycine (positive ion)	3	3.1×10^{9} (rel.)	γ-r.	c.k., assume $k(e^-_{aq} + ClCH_2COOH) = 6.9 \times 10^{9}$.	Will.67-0310
1.454	glycylglycylclycine (zwitterion)	6.0	9.0×10^{8}	p.r.	——	Braa65-0390, 67-3005
1.455	glycylglycylglycine (negative ion)	11.1	9×10^{7}	p.r.	——	Braa65-0390, 67-3005
1.456	glycyl-L-leucine (zwitterion)	5.9	1.5×10^{8}	p.r.	——	Davi..65-0389
		6.46	2.8×10^{8}	p.r.	——	Braa67-3005
		8.74	7×10^{7}	p.r.	——	Braa67-3005
1.457	glycyl-L-leucine (negative ion)	8.94	6.5×10^{7}	p.r.	——	Braa67-3005
1.458	glycyl-L-phenyl-alanine	6.7	1.6×10^{8}	p.r.	——	Davi..65-0389
1.459	glycyl-L-proline	6.66	1.1×10^{9}	p.r.	——	Braa65-0390, 67-3005
1.460	glycyl-L-tryptophan	6.37	4.5×10^{8}	p.r.	——	Braa65-0390, 67-3005
1.461	glycyl-L-tyrosine	6.13	4.1×10^{8}	p.r.	——	Braa65-0390, 67-3005
1.462	glycyl-DL-valine	5.97	2.6×10^{8}	p.r.	——	Braa65-0390, 67-3005
1.463	guanidine (positive ion)	6.1	2.5×10^{8}	p.r.	values for k from graph.	Braa66-0011

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TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.464	guanidine	11.1	1.9×10^8	p.r.	values for k from graph.	Braa66–0011
		11.9	1.6×10^8	p.r.	values for k from graph.	Braa66–0011
1.464a	hemin	–	6.0×10^9	p.r.	——	Davi..65–0781
1.465	hemoglobin	–	2.6×10^{10}	p.r.	——	Davi..65–0781
1.465a	hexadecyltrimethyl-ammonium bromide	–	$< 9.2 \times 10^5$	p.r.	concn. 5×10^{-2} M.	Fend.70–0271
1.465b	hexadecylpyridinium chloride	–	2.6×10^{10}	p.r.	also studied effect of heparin on rate.	Bala...68–2104
		–	5×10^{10}	p.r.	also studied effect of chondroitin 4–sulfate on rate.	Moor...67–0742
1.465c	hexafluorobenzene	–	2.0×10^{10}	p.r.	——	Koes.71–0030
1.466	DL–histidine (positive ion)	< 5	7×10^9	p.r.	at pH 5.96 $k_{obs} = 3.87 \times 10^9$; at pH 6.70 $k_{obs} = 1.41 \times 10^9$.	Braa66–0011
1.467	DL–histidine (zwitterion)	~ 7	6×10^7	p.r.	at pH 8.58, $k_{obs} = 4.5 \times 10^7$.	Braa66–0011
1.468	DL–histidine (negative ion)	< 11	$\sim 10^7$	p.r.	at pH 11.14 $k_{obs} = 1.2 \times 10^7$.	Braa66–0011
1.469	histidylhistidine	5.51	7.9×10^9	p.r.	——	Braa65–0390, 67–3005
		6.83	2.4×10^9	p.r.	——	
		7.3	1.3×10^9	p.r.	——	
		8.37	2.85×10^8	p.r.	——	
		11.0	5.1×10^7	p.r.	——	
1.470	homocystine	6.90	9×10^9	p.r.	——	Braa66–0011
1.471	hydrocinnamate ion	5.43	4.9×10^7	p.r.	At pH 5.4 the solute is ~ 10% in the acid form.	Szut...65–0018
		12.14	1.1×10^7	p.r.	——	Szut...65–0018
1.472	hydrocinnamic acid	5.43	4×10^8 (calcd.)	p.r.	calcd. from k_{obs} for mixture with hydrocinnamate ion, see above.	Szut...65–0018
1.472a	hydroorotate ion	7	1.6×10^{10}	p.r.	——	Gree70–0567
1.473	hydroquinone ion (p–hydroxyphenoxide ion)	13	$< 10^7$	p.r.	——	Hart..64–0044
1.473a	hydrothymine	7	5×10^9	p.r.	——	Phil..69–0012
1.474	hydrouracil	7	4.5×10^9	p.r.	μ= 0.1.	Gree..68–0316
		7	1.0×10^{10}	p.r.	——	Phil..69–0012
1.475	m–hydroxybenzoate ion	~ 11	1.1×10^9	p.r.	——	Anba.64–0138
1.476	p–hydroxybenzoate ion	~ 11	4.0×10^8	p.r.	——	Anba.64–0138
		11	2.5×10^8 (rel.)	γ–r.	c.k., k calcd. from $k_{1.476}/k(e^-_{aq} + ClCH_2COO^-) = 0.21 \pm 20\%$ assuming $k(e^-_{aq} + ClCH_2COO^-) = 1.2 \times 10^9$.	Stoc.66–0160
1.477	o–hydroxybenzonitrile	~ 11	8.2×10^9	p.r.	——	Anba.64–0138
1.478	m–hydroxybenzonitrile	~ 11	4.8×10^9	p.r.	——	Anba.64–0138
1.479	p–hydroxybenzonitrile	~ 11	2.0×10^9	p.r.	——	Anba.64–0138
1.480	3–hydroxy–2–butanone (acetoin)	–	6.0×10^9	p.r.	——	Lili..68–0249
1.481	p–hydroxyphenylpropionate ion	11.0	$\leq (1.7 \pm 0.4) \times 10^7$	p.r.	——	Chry68–0062
1.482	L–hydroxyproline	10.8	1.1×10^7	p.r.	——	Braa66–0011
1.483	hypoxanthine	6.6	1.7×10^{10}	p.r.	——	Hart..64–0044
1.483a	Igepal CO–730 (nonylphenylpolyoxyethylene: 15)	–	$< 1.3 \times 10^6$	p.r.	concn. 5×10^{-2} M.	Fend.70–0271
1.484	imidazolium ion	6.3	4.3×10^9	p.r.	——	Braa66–0011
		6	3.4×10^9	p.r.	μ = 0.1.	Gree..68–0316
1.485	imidazole	9.16	3.7×10^7	p.r.	——	Szut...65–0018

TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
		11.5	2.4×10^7	p.r.	—	Braa66–0011
1.486	indigotetrasulfonate ion	6	6.8×10^9 (rel.)	γ–r.	c.k., assume $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$; counter ion K^+.	Raki68–0059
1.487	indole	–	$\sim 7 \times 10^8$	p.r.	—	Baxe....64–0132
		7.7	$(1.9 \pm 0.2) \times 10^8$	p.r.	—	Arms.69–0459
1.487a	indole–2–carboxylate ion	10.5	3.8×10^9	p.r.	—	Eber.70–0411
1.487b	indole–3–carboxylate ion	10.5	1.6×10^9	p.r.	—	Eber.70–0411
1.487c	indole–5–carboxylate ion	9.2	2.0×10^9	p.r.	—	Eber.70–0411
1.488	iodoacetate ion	~ 10	$(1.2 \pm 0.1) \times 10^{10}$	p.r.	—	Anba.65–0015
1.489	iodobenzene	~ 11	1.2×10^{10}	p.r.	—	Anba.64–0138
1.490	*o*–iodobenzoate ion	~ 11	4.6×10^9	p.r.	—	Anba.64–0138
1.491	*m*–iodobenzoate ion	~ 11	1.3×10^{10}	p.r.	—	Anba.64–0138
1.492	*p*–iodobenzoate ion	~ 11	9.1×10^9	p.r.	—	Anba.64–0138
1.493	1–iodobutane	7.60	1.2×10^{10}	p.r.	—	Szut...65–0018
1.494	iodoethane	6.04–6.75	1.5×10^{10}	p.r.	—	Szut...65–0018
	$e^-_{aq} + C_2H_5I \rightarrow C_2H_5 + I^-$	–	1.5×10^{10}	p.r.	—	Bull.70–0407
1.495	iodomethane	6.85	1.7×10^{10}	p.r.	—	Szut...65–0018
	$e^-_{aq} + CH_3I \rightarrow CH_3 + I^-$	–	$(1.7 \pm 0.3) \times 10^{10}$	p.r.	d.k. at 600 nm as well as p.b.k. at 230 nm (I^-), soln. contains 10^{-3} *M* ethylene.	Thom67–0041
		–	1.65×10^{10}	p.r.	—	Bull.70–0407
1.496	1–iodopropane	6.21	1.3×10^{10}	p.r.	—	Szut...65–0018
1.497	2–iodopropionate ion	~ 10	$(6.6 \pm 0.9) \times 10^9$	p.r.	—	Anba.65–0015
1.498	*p*–iodotoluene	~ 11	1.3×10^{10}	p.r.	—	Anba.64–0138
1.499	iodouracil	–	1.7×10^{10}	p.r.	k detd. at 15–80°C; $E_a = 2.3$ kcal mol^{-1}.	Cerc69–0567
1.499a	isoamylamine	11.8	$< 1.0 \times 10^6$	p.r.	—	Geto.70–0371
1.500	isocitrate ion	11	$(2.4 \pm 0.5) \times 10^7$ (rel.)	γ–r.	c.k., k calcd. from $k_{1.500}/k(e^-_{aq} + ClCH_2COO^-) = (2 \pm 0.4) \times 10^2$ assuming $k(e^-_{aq} + ClCH_2COO^-) = 1.2 \times 10^9$.	Stoc.66–0160
1.500a	isonicotinamide	9.0	3.2×10^{10}	p.r.	—	Eber.70–0411
1.500b	isonicotinate ion	10.5	2.4×10^{10}	p.r.	—	Eber.70–0411
1.500c	isoorotate ion	7	1.1×10^{10}	p.r.	—	Gree70–0567
1.500d	isopropylamine	12.3	$< 1.5 \times 10^6$	p.r.	—	Geto.70–0371
1.501	lactate ion	9	$< 10^7$	p.r.	—	Hart..64–0048
		11	$\leq 2 \times 10^6$	p.r.	—	Anba.64–0282
1.502	L–leucine	6.5	$< 10^7$	p.r.	solute concn. 10^{-2} *M*.	Braa66–0011
1.503	L–leucyl–L–alanine	6.1	1.65×10^8	p.r.	—	Braa67–3005
1.504	DL–leucylglycine	6.09	1.1×10^8	p.r.	—	Braa67–3005
1.505	leucylglycylglycine	6.0	2.0×10^8	p.r.	—	Davi..65–0389
		6.93	2.8×10^8	p.r.	—	Braa67–3005
		9.5	5×10^7	p.r.	—	Braa67–3005
1.506	L–leucyl–L–leucine	5.97	9×10^7	p.r.	—	Braa67–3005
1.507	lipoate ion	7	1.5×10^{10}	p.r.	—	Will70–0560
1.508	lysine (positive ion)	7, 7.8	$\sim 2 \times 10^7$	p.r.	—	Braa65–0390, 66–0011
1.509	lysozyme	6.2	7.5×10^{10}	p.r.	—	Eber.65–3013
		6.2	7.5×10^{10}	p.r.	mol. wt. 15,000.	Braa67–3005
		10.1	2.7×10^{10}	p.r.	—	Braa67–3005
		10.7	1.8×10^{10}	p.r.	—	Braa67–3005
		11.8	8.3×10^9	p.r.	—	Braa67–3005
		5.6	5.2×10^{10}	p.r.	mol. wt. 15,000.	Davi..68–0683

TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
		7.4	3.1×10^{10}	p.r.	concn. 0.8 mg/ml.	Adam...69–3039
1.510	malate ion	11	6×10^7 (rel.)	γ–r.	c.k., k calcd. from $k_{1.510}$/ $k(e^-_{aq} + ClCH_2COO^-) = (5 \pm 1) \times 10^{-2}$ assuming $k(e^-_{aq} + ClCH_2COO^-) = 1.2 \times 10^9$.	Stoc.66–0160
1.511	maleate ion (monoanion)	6.5	3.9×10^{10} (calcd.)	p.r.	k calcd. from $k_{obs} = 1.2 \times 10^{10}$ assuming that $k(e^-_{aq}$ + dianion $= 1.7 \times 10^9$ and that soln. contains 28% monanion.	Hart..64–0044
1.512	maleate ion (dianion)	8.45	1.7×10^9	p.r.	—	Hart..64–0044
		12.7	1.7×10^9 (cor.)	p.r.	$k_{obs} = 2.2 \times 10^9$.	Hart..64–0044
1.513	malonate ion (monoanion)	6.0	2.4×10^8	p.r.	—	Hart..66–0819
1.514	2–mercaptoethanol $e^-_{aq} + SHCH_2CH_2OH \rightarrow \cdot CH_2CH_2OH + SH^-$ (I)	10	$(1.0 \pm 0.15) \times 10^{10}$	p.r.	—	Karm...69–0553
		5.7–9.0	1.2×10^{10}	p.r.	—	Jays..71–0175
	or $\rightarrow \cdot SCH_2CH_2OH + H_2 + OH^-$ (II)	5.5	–	X–r.	$k_I/k_{II} \equiv 1$ from H_2S yields; concn. 10^{-2} *M*.	Jays..71–0175
1.515	mercaptoethylguanidine	6.74	2×10^{10}	p.r.	—	Braa66–0011
1.516	mercaptoethylguanidine (oxidized); bis–(2–guanidinoethyl)–disulfide)	7.4	2×10^{10}	p.r.	—	Braa66–0011
1.517	3–mercaptovaline (penincillamine)	6.5	5.1×10^9	p.r.	—	Braa66–0011
1.518	methacrylate ion	10.1	8.4×10^9	p.r.	counter ion Na^+.	Hart..64–0044
1.519	methane		$< 10^7$	p.r.	—	Hart..64–0048
1.520	methanethiol $e^-_{aq} + CH_3SH \rightarrow \cdot CH_3 + SH^-$	0–6	$(1.8 \pm 0.2) \times 10^{10}$ (rel.)	γ–r.	c.k., k calcd. from $k_{1.520}$/ $(e^-_{aq} + H^+) = 0.8 \pm 0.3$ assuming $k(e^-_{aq} + H^+) = 2.3 \times 10^{10}$.	Arms.64–0151
		7	$(7.5 \pm 1.1) \times 10^9$	p.r.	—	Karm...69–0553
1.521	methanol $e^-_{aq} + CH_3OH \rightarrow CH_3O^- + H$	–	$< 10^4$	p.r.	addn. of 10–20% methanol did not alter the half–life of e^-_{aq} in aq. solns. of aromatic compds.	Anba.64–0138, Anba.64–0282
		–	≤ 400	f. phot.	concn. ~ 1–8 *M*, H_2–satd., 10^{-3} *M* NaOH; assumed $k(e^-_{aq} + H_2O) = 16$ and cor. for impurities.	Hick.70–7116
1.522	DL–methionine	6.0	3.5×10^7	p.r.	—	Braa66–0011
1.523	methyl 2–aminoacetate (glycine, methyl ester)	10.66	2.9×10^8	p.r.	—	Hart..67–0298
1.524	methylammonium ion	4.9	~ 2×10^6	p.r.	—	Ries.65–0188
	$e^-_{aq} + CH_3NH_3^+ \rightarrow$	7.6	1.8×10^6	p.r.	—	Braa66–0011
	$H + CH_3NH_2$	7.8	1.9×10^6	p.r.	—	Geto.70–0371
1.525	Omitted					
1.526	methyl cyanoacetate	10.9	3.2×10^8	p.r.	—	Hart..66–0819
1.527	5–methylcytosine	7.72	1.0×10^{10}	p.r.	—	Hart..64–0044
1.528	methylene blue	7.8	$(2.5 \pm 0.3) \times 10^{10}$	p.r.	d.k. at 520 nm (e^-_{aq}) as well as d.k. at 580 nm (dye) and p.b.k. at 425 nm (semiquinone), soln. contains 10^{-1} *M* formate ion.	Keen..65–0396
		–	2.5×10^{10}	p.r.	—	Eber.65–3013
		–	2.4×10^{10}	p.r.	counter ion Cl^-.	Moor...67–0742

TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
		–	2.4×10^{10}	p.r.	soln. contains 10^{-2} *M* glucose; also studied effect of various polyanions on rate.	Bala...68–0238, 68–2104
1.529	methyl fluoroacetate	6.7	$(1.0 \pm 0.1) \times 10^9$	p.r.	——	Hart..67–0298
		10.86	$(8.8 \pm 0.9) \times 10^8$	p.r.	——	Hart..67–0298
1.530	*N*–methylformamide	–	$(1.5 \pm 1.0) \times 10^7$	p.r.	solute concn. 10^{-2} *M*.	Fel'..67–0054
1.531	methyl green	–	4.3×10^{10}	p.r.	also studied effect of heparin on rate.	Bala...68–2104
1.532	methyl 2–hydroxy–acetate	10.65	4.8×10^8	p.r.	——	Hart..67–0298
1.533	2–methylindole	7.1	$(6 \pm 3) \times 10^7$	p.r.	——	Arms.69–0459
1.534	3–methylindole	8.2	$(2.6 \pm 0.3) \times 10^8$	p.r	——	Arms.69–0459
1.535	1–methylnicotinamide	8.5	4.1×10^{10}	p.r.	soln. contains 10^{-1} *M* sodium formate.	Land.68–0441
1.536	methyl propionate	6.81	9.0×10^7	p.r.	——	Hart..67–0298
1.537	methyl trifluoro–acetate	10.62	1.9×10^9	p.r.	——	Hart..67–0298
1.538	methyl trimethyl–acetate	5.91	2.3×10^7	p.r.	——	Hart..67–0298
1.539	6–methyluracil	6.5–7	$(1.3 \pm 0.3) \times 10^{10}$	p.r.	no OH scavenger added.	Fiel.70–0226
1.540	naphthalene	~ 11	5.4×10^9	p.r.	——	Anba.64–0138
1.541	1–naphthoate ion	~ 11	6.1×10^9	p.r.	——	Anba.64–0138
		9.1	1.0×10^{10}	p.r.	——	Eber.70–0411
1.542	2–naphthoate ion	~ 11	9.5×10^9	p.r.	——	Anba.64–0138
1.543	1–naphthyloxide ion	~ 11	9.6×10^8	p.r.	——	Anba.64–0138
1.544	2–naphthyloxide ion	11	1.8×10^9	p.r.	——	Hart..64–0044
		~ 11	1.2×10^9	p.r.	——	Anba.64–0138
1.545	1–naphthonitrile	~ 11	2.1×10^{10}	p.r.	——	Anba.64–0138
1.546	2–naphthonitrile	~ 11	2.1×10^{10}	p.r.	——	Anba.64–0138
1.546a	nicotinamide	7.5	2.4×10^{10}	p.r.	——	Eber.70–0411
1.547	nicotinamide–adenine dinucleotide (NAD^+)	6.4	2.5×10^{10}	p.r.	soln. contains 10^{-1} *M* sodium formate.	Land.68–0441
1.548	nicotinamide–adenine dinucleotide (enzymatically reduced) (NADH)	7 ± 1	5.2×10^9	p.r.	soln. N_2O–satd.	Land.68–0441
1.549	nicotinate ion	–	1.9×10^9 (rel.)	r.	c.k., $k_{1.549}/k(e^-_{aq} + O_2) = 10^{-1}$, assume $k(e^-_{aq} + O_2) = 1.9 \times 10^{10}$.	Nakk65–0739
		10.5	1.0×10^{10}	p.r.	——	Eber.70–0411
1.549a	nicotinuric acid	9.2	2.1×10^{10}	p.r.	——	Eber.70–0411
1.550	nitrilotriacetate ion	10	4×10^6	p.r.	——	Anba.64–0282
1.551	nitrobenzene	7	3.0×10^{10}	p.r.	——	Hart..64–0044
	$e^-_{aq} + C_6H_5NO_2 \rightleftharpoons$	~ 11	3.0×10^{10}	p.r.	——	Anba.64–0138
	$C_6H_5NO_2^-(+H^+) \rightleftharpoons$ $C_6H_5NO_2H$	7	2.9×10^{10}	p.r.	d.k. at 720 nm as well as p.b.k. at 290 nm (nitrobenzene anion).	Wigg67–0688
		–	2.8×10^{10}	p.r.	k detd. at 15–80°C; $E_a = 2.1_8$ kcal mol^{-1}.	Cerc69–0567
1.552	nitroethane	0–6	$(2.7 \pm 0.1) \times 10^{10}$ (rel.)	γ–r.	c.k., $k_{1.552}/k(e^-_{aq} + H_3O^+) = 1.17 \pm 0.02$, assume $k(e^-_{aq} + H_3O^+) = 2.3 \times 10^{10}$.	Sutt.67–0180
1.553	nitromethane	–	2.1×10^{10}	p.r.	——	Asmu..66–0800
		0–6	$(2.9 \pm 0.1) \times 10^{10}$ (rel.)	γ–r.	c.k., $k_{1.553}/k(e^-_{aq} + H_3O^+) = 1.22 \pm 0.02$, assume $k(e^-_{aq} + H_3O^+) = 2.3 \times 10^{10}$.	Sutt.67–0180

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TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.554	*aci*-nitromethane (negative ion) $e^-_{aq} + CH_2NO_2^- \rightarrow CH_3NO_2^- + OH^-$	12	6.6×10^9	p.r.	——	Asmu..66-0080
1.555	2-nitro-2-methyl-1,3-propanediol	10	1.3×10^{10}	p.r.	——	Anba.64-0282
1.556	2-nitro-2-methyl-1-propanol	10	2.1×10^{10}	p.r.	——	Anba.64-0282
1.557	*o*-nitrophenoxide ion	~ 11	2.0×10^{10}	p.r.	——	Anba.64-0138
1.558	*m*-nitrophenoxide ion	~ 11	2.5×10^{10}	p.r.	——	Anba.64-0138
		11	1.7×10^{10} (rel.)	γ-r.	c.k., $k_{1.558}/k(e^-_{aq} + ClCH_2COO^-) = 14 \pm 2.8$, assume $k(e^-_{aq} + ClCH_2COO^-) = 1.2 \times 10^9$.	Stoc.66-0160
1.559	*p*-nitrophenol	7	$(3.5 \pm 0.6) \times 10^{10}$	p.r.	d.k. at 650 nm or p.b.k. at 290 nm (radical anion), pK of solute is 7.15.	Cerc.68-0303
		–	3.6×10^{10}	p.r.	k detd. at 15-80 °C; $E_a = 2.5_4$ kcal mol^{-1}.	Cerc69-0567
1.560	*p*-nitrophenoxide ion	~ 11	2.5×10^{10}	p.r.	——	Anba.64-0138
1.561	*p*-nitrophenylacetate ion	7-11	$(1.85 \pm 0.2) \times 10^{10}$	p.r.	——	Anba.65-0047
		3 *M* OH^-	$(1.7 \pm 0.2) \times 10^{10}$	p.r.	——	Anba.65-0047
1.562	1-nitropropane	0-6	$(2.7 \pm 0.1) \times 10^{10}$ (rel.)	γ-r.	c.k., $k_{1.562}/k(e^-_{aq} + H_3O^+) = 1.18 \pm 0.04$, assume $k(e^-_{aq} + H_3O^+) = 2.3 \times 10^{10}$.	Sutt.67-0180
1.563	nitrosobenzene	7	4.3×10^{10}	p.r.	——	Asmu...66-0433
1.564	*p*-nitrosodimethyl-aniline	–	$(3.4 \pm 0.2) \times 10^{10}$	p.r.	——	Dain.68-0066
		–	$(2.6 \pm 0.4) \times 10^{10}$ (rel.)	γ-r.	c.k., with N_2O, assumed values not given.	Dain..68-0066
1.565	*p*-nitrotoluene	~ 11	1.9×10^{10}	p.r.	——	Anba.64-0138
1.566	norleucine	–	3.3×10^6	p.r.	——	Davi..65-0389
1.567	orotate ion	6.56	1.5×10^{10}	p.r.	——	Hart..64-0044
		7.7	1.4×10^{10}	p.r.	d.k. at 600 nm as well as p.b.k. at 320 nm (e^- adduct).	Gree70-0567
1.567a	orotate ion (dianion)	~ 12	~ 8×10^9	p.r.	d.k. at 600 nm as well as p.b.k. at 320 nm (e^- adduct).	Gree70-0567
1.567b	orotidine	7	9×10^9	p.r.	d.k. at 600 nm as well as p.b.k. at 320 nm (e^- adduct).	Gree70-0567
1.568	oxalacetate ion	11	4.3×10^9 (rel.)	γ-r.	c.k., $k_{1.568}/k(e^-_{aq} + ClCH_2COO^-) = 3.6 \pm 0.7$, assume $k(e^-_{aq} + ClCH_2COO^-) = 1.2 \times 10^9$.	Stoc.66-0160
1.569	oxalate ion (dianion)	10	$< 10^7$	p.r.	——	Hart..64-0048
		–	$< 10^8$	p.r.	——	Baxe....64-0132
		7.0-7.7	4.8×10^7 (rel.)	γ-r.	c.k., assume $k(e^-_{aq} + NO_2^-) = 4.58 \times 10^9$, soln. air-satd.; counter ion K^+.	Mici.69-0646
		–	$(1.7 \pm 0.5) \times 10^7$	p.r.	k detd. at pH 5 and 9; assumed p$K_1 = 1.25$ and p$K_2 = 4.28$ for oxalic acid dissoc. and cor. for $e^-_{aq} + H_3O^+$; see 1.570.	Geto....71-0041
1.570	oxalate ion (monanion)	2.8-4.0	$(3.4 \pm 0.7) \times 10^9$ (rel., cor.)	γ-r.	c.k., assume $k(e^-_{aq} + H^+) = 2.36 \times 10^{10}$, counter ions Na^+, ClO_4^-; k cor. to $\mu = 0$.	Mici.69-0646
		–	$(3.2 \pm 0.6) \times 10^9$	p.r.	see 1.569.	Geto....71-0041

TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.571	oxalic acid	1.3	$(2.5 \pm 0.9) \times 10^{10}$ (rel., cor.)	γ–r.	c.k., assume $k(e^-_{aq} + H^+) = 2.36 \times 10^{10}$; counter ions Na^+, ClO_4^-; k cor. to $\mu = 0$.	Mici.69–0646
1.572	oxamate ion	~ 11	$(4.0 \pm 0.4) \times 10^9$	p.r.	counter ion Na^+.	Hart..67–0298
1.573	2–oxoglutarate ion	13	$(7 \pm 2) \times 10^9$ (rel.)	γ–r.	c.k., $k_{1.573}/k(e^-_{aq} + ClCH_2COO^-) = 6.1 \pm 1.2$, assume $k(e^-_{aq} + ClCH_2COO^-) = 1.2 \times 10^9$; counter ion Na^+.	Stoc.66–0160
1.573a	pentafluorobenzene	–	2.6×10^{10}		——	Koes.71–0030
1.574	1,10–phenanthroline	7.2	$(2.1 \pm 0.1) \times 10^{10}$	p.r.	——	Walt67–0560
1.574a	phenethylamine	11.8	2.0×10^7	p.r.	——	Geto.70–0371
1.575	phenol	6.3–6.8	$(1.8 \pm 0.2) \times 10^7$	p.r.	——	Land.67–0122
1.576	phenoxide ion	~ 11	4.0×10^6	p.r.	——	Anba.64–0138
1.577	phenylacetate ion	5.43	5.1×10^7	p.r.	——	Szut...65–0018
		7	$3.1–3.3 \times 10^7$ (rel.)	γ–r.	c.k., k calcd. assuming $k(e^-_{aq} + NO_3^-) = 1.1 \times 10^{10}$ or $k(e^-_{aq} + p\text{–}BrC_6H_4OH) = 1.2 \times 10^{10}$; k detd. at 20, 45, and 70°C to give $E_a = 3.4$ kcal mol^{-1}.	Anba..67–0098
1.578	DL–phenylalanine (zwitterion)	6.7	1.5×10^8	p.r.	——	Davi..65–0389
		6.28	1.1×10^8	p.r.	——	Braa66–0011
		7.0	1.5×10^8	p.r.	——	Braa66–0011
		8.65	8.8×10^7	p.r.	——	Braa66–0011
		7	1.6×10^8 (rel.)	γ–r.	c.k., assume $k(e^-_{aq} + NO_3^-) = 1.1 \times 10^{10}$.	Anba..67–0098
			1.35×10^8 (rel.)	γ–r.	c.k., assume $k(e^-_{aq} + BrC_6H_4OH) = 1.2 \times 10^{10}$; k detd. at 20, 45, and 70 °C to give $E_a = 3.4$ kcal mol^{-1} as ave. of both methods.	
1.579	DL–phenylalanine (negative ion)	11	$< 10^7$	p.r.	——	Hart..64–0044
		11.2	1.35×10^7 (cor.)	p.r.	$k_{obs} = 1.7 \times 10^7$.	Braa66–0011
		11	$\leq (1.6 \pm 0.3) \times 10^7$	p.r.	——	Chry68–0062
1.580	L–phenylalanyl–L–phenylalanine	5.66	4.5×10^8	p.r.	——	Braa67–3005
1.581	phenylarsonate ion	10	1.5×10^8	p.r.	——	Anba.64–0282
1.582	phenylhydroxylamine	–	1.8×10^9	p.r.	——	Wigg..67–0191
		13.5	1.4×10^9	p.r.	reactant is $C_6H_5NHO^-$.	Wigg..67–0191
1.583	*o*–phthalate ion (monoanion)	5.6	1.1×10^{10} (calcd.)	p.r.	k calcd. from $k_{obs} = 6.2 \times 10^9$ assuming solute is 1:1 mixture of mono– and dianion.	Szut...65–0018
1.584	*o*–phthalate ion (dianion)	13	1.8×10^9	p.r.	——	Gord..64–0043
		12.8	2.0×10^9	p.r.	——	Hart..64–0044
		6.78	1.2×10^9	p.r.	——	Szut...65–0018
		12.7	1.9×10^9	p.r.	——	Szut...65–0018
		11–13	1.7×10^9 (rel.)	γ–r.	c.k., $k_{1.584}/k(e^-_{aq} + ClCH_2COO^-) = 1.4 \pm 0.3$, assume $k(e^-_{aq} + ClCH_2COO^-) = 1.2 \times 10^9$.	Stoc.66–0160
1.585	*m*–phthalate ion	13	3.0×10^9	p.r.	——	Gord..64–0043
1.586	*p*–phthalate ion	13	7.3×10^9	p.r.	——	Gord..64–0043
1.586a	picolinate ion	9.1	1.1×10^{10}	p.r.	——	Eber.70–0411
1.587	picrate ion	5.36	3.9×10^{10}	p.r.	——	Hart..64–0044
		13	3.5×10^{10}	p.r.	——	Hart..64–0044
.588	pivalic acid	5.0	9.7×10^7	p.r.	——	Hart..67–0298

TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.589	polylysine hydrobromide	–	5.0×10^9	p.r.	also studied effect of heparin and DNA on rate.	Bala...68–2104
1.590	L-proline (zwitterion)	6.7	2×10^7	p.r.	isoelectric point of proline is 6.3	Braa66–0011
1.591	L-proline (negative ion)	7–8	$< 10^7$	p.r.	——	Hart..64–0048
		10.1	$< 10^6$ (calcd.)	p.r.	k calcd. from $k_{obs} \cong 5 \times 10^6$ assuming solute contains 22% negative ion at this pH.	Braa66–0011
1.592	propionamide	–	$(3.9 \pm 0.5) \times 10^7$	p.r.	soln. satd. with ethylene.	Cham..70–0052
1.593	propionitrile	10.9	1.5×10^8	p.r.	——	Anba.64–0282
1.593a	propylammonium ion	7.8	3.2×10^6 (calcd.)	p.r.	$k_{obs} = 3.7 \times 10^6$.	Geto.70–0371
1.594	protamine sulfate	–	5.5×10^9	p.r.	also studied effect of heparin and DNA on rate.	Bala...68–2104
1.595	purine	7.2	1.7×10^{10}	p.r.	——	Hart..64–0044
1.596	pyridine	6.9–7.3	1.0×10^9	p.r.	——	Hart..64–0044
		5.5–6	3.0×10^9 (rel.)	γ-r.	c.k., assume $k(e^-_{aq} + NO_3^-) = 1.1 \times 10^{10}$; k detd. at 20, 45 and 70 °C to give $E_a = 3.9$ kcal mol^{-1}.	Anba..67–0098
		–	3.7×10^9	p.r.	k detd at 15–80°C; $E_a = 4.5$ kcal mol^{-1}.	Cerc69–0567
1.597	pyrrole	10.29	6.0×10^5	p.r.	——	Szut...65–0018
1.598	pyrrolidine	12.08	4.2×10^6	p.r.	——	Szut...65–0018
	$e^-_{aq} + C_4H_8NH \rightarrow C_4H_8N\cdot + H_2 + OH^-_{aq}$	12.3	$(1.1 \pm 0.5) \times 10^6$ (calcd.)	p.r.	k calcd. from $k_{obs} = (2.4 \pm 0.3) \times 10^6$ assuming pyrrolidine is 20% protonated; concn. 10^{-1} M.	Geto.70–0006
1.599	pyrrolidine (positive ion) $e^-_{aq} + C_4H_8NH_2^+ \rightarrow C_4H_8N\cdot + H_2$	< 8	$(7.5 \pm 1.5) \times 10^6$	p.r.	concn. 10^{-1} M; counter ion SO_4^{2-}.	Geto.70–0006
1.600	2-pyrrolidone	7.82	1.3×10^7	p.r.	——	Szut...65–0018
1.601	pyruvate ion	12.7	6.8×10^9	p.r.	——	Hart..64–0044, 67–0298
1.602	pyruvonitrile	7.15	3.0×10^7	p.r.	——	Hart..67–0298
1.602a	quinoline-2-carboxylate ion	9.1	1.4×10^{10}	p.r.	——	Eber.70–0411
1.603	riboflavin	5.9	2.3×10^{10}	p.r.	soln. contains 10^{-1} M Na formate.	Land.69–0283
		basic	1.7×10^{10}	p.r.	soln. contains 10^{-1} M Na formate and 3×10^{-3} M NaOH.	Land.69–0283
1.604	ribonuclease	5.5	2.9×10^{10} (cor.)	p.r.	——	Braa67–3005
		6.8	1.3×10^{10} (cor.)	p.r.	——	Braa67–3005, Eber.65–3013
		8.4	6×10^9 (cor.)	p.r.	——	Braa67–3005
		10.7	1.7×10^9 (cor.)	p.r.	——	Braa67–3005
		6.2	6×10^9	p.r.	soln. contains phosphate buffer and 10^{-2} M KCl.	Braa.68–3007
1.605	ribose	–	$< 10^7$	p.r.	——	Hart..64–0048
1.606	safranine T	6	4.7×10^{10} (rel.)	γ-r.	c.k., assume $k(e^-_{aq} + N_2O) = 8.7 \times 10^9$.	Raki68–0059
1.607	salicylate ion	~ 11	3.2×10^9	p.r.	solute consists of ~ 33% dianion at this pH.	Anba.64–0138
		11	3.4×10^9 (rel.)	γ-r.	c.k., $k_{1.607}/k(e^-_{aq} + ClCH_2COO^-) = 2.8 \pm 0.6$, assume $k(e^-_{aq} + ClCH_2COO^-) = 1.2 \times 10^9$.	Stoc.66–0160

TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
		7	$\sim 1 \times 10^{10}$	p.r.	——	Amph..68–0305
1.608	sarcosine	6.5	1.9×10^7	p.r.	solute concn. 10^{-2} *M*.	Davi..65–0389
		7.6	1.4×10^7	p.r.	——	Braa66–0011
1.609	selenourea	6.5	4.0×10^9	p.r.	k independent of pH 6–11.	Badi.70–0240
1.610	DL–serine	7.1	1.5×10^7	p.r.	solute concn. 10^{-2} *M*.	Davi..65–0389
		6.1	$< 3 \times 10^7$	p.r.	——	Braa66–0011
1.611	sorbitol	–	$< 10^5$	p.r.	——	Davi..65–0391
1.612	styrene	7	1.5×10^{10}	p.r.	——	Hart..64–0044
		12.7	1.1×10^{10}	p.r.	——	Hart..64–0044
1.613	succinate ion (monoanion)	6.0	$(3.4 \pm 1.0) \times 10^8$ (calcd.)	p.r.	k calcd. from $k_{obs} = 1.2 \times 10^8$ at this pH.	Hart..67–0298
1.614	succinate ion (dianion)	11	2.4×10^7 (rel.)	γ–r.	c.k., $k_{1.614}/k(e^-_{aq} + ClCH_2COO^-) = (2 \pm 0.4) \times 10^{-2}$, assume $k(e^-_{aq} + ClCH_2COO^-) = 1.2 \times 10^9$.	Stoc.66–0160
		10.0	3.1×10^7	p.r.	——	Hart..67–0298
1.615	succinimide	8.04	7.2×10^9	p.r.	——	Szut...65–0018
1.615a	sulfacetamide (Na)	–	4.1×10^{10}	p.r.	——	Phil..71–0128
1.615b	sulfanilamide	–	1.5×10^{10}	p.r.	——	Phil..71–0128
1.616	sulfanilate ion	~ 11	4.6×10^8	p.r.	——	Anba.64–0138
1.616a	sulfanilic acid	–	5.9×10^9	p.r.	——	Phil..71–0128
1.617	tetracyanoethylene	7	1.5×10^{10}	p.r.	——	Hart..64–0044
1.618	tetranitromethane $e^-_{aq} + C(NO_2)_4 \rightarrow C(NO_2)_3^- + NO_2$	7	$(6.0 \pm 0.5) \times 10^{10}$	p.r.	——	Asmu...64–0133, Asmu.64–0136
		6	4.6×10^{10}	p.r.	d.k. at 578 nm as well as p.b.k. at 360 nm (nitroform anion).	Raba..65–0183
		5.5–6.0	4.4×10^{10} (rel.)	p.r.	c.k., p.b.k. at 366 nm (nitroform anion), $k_{1.618}/k(e^-_{aq} + O_2) = 2.3 \pm 0.7$, assume $k(e^-_{aq} + O_2) = 1.9 \times 10^{10}$.	Raba..65–0183
1.619	thiazole	6.59	2.5×10^9	p.r.	——	Szut...65–0018
1.620	thiobarbituric acid	–	$\sim 6 \times 10^7$	p.r.	——	Hart..64–0048
1.621	thioglycolate ion	10	8.2×10^7	p.r.	——	Anba.64–0282
1.622	thiophene	6.73	6.5×10^7	p.r.	——	Szut...65–0018
1.623	thiophenoxide ion	~ 11	4.7×10^7	p.r.	——	Anba.64–0138
1.624	thiourea	6.41	2.9×10^9	p.r.	——	Hart..64–0044
		7.6–9.0	3.1×10^9 (ave.)	p.r.	——	Char....65–0392
1.625	DL–threonine	7	2.0×10^7	p.r.	——	Davi..65–0389
	(negative ion)	6.2	$\leq 10^7$	p.r.	——	Braa66–0011
		9.5	$\leq 5 \times 10^6$	p.r.	——	Braa66–0011
1.626	thymidylic acid	6.7	1.5×10^9	p.r.	——	Scho...65–0388
1.627	thymine	6.0	1.7×10^{10}	p.r.	——	Hart..64–0044
		12	2.7×10^9	p.r.	——	Hart..64–0044
		5.5	1.8×10^{10}	p.r.	——	Scho...65–0388
		11	4.0×10^9	p.r.	soln. H_2–satd.	Hart.65–0494
1.628	*o*–toluate ion	~ 11	2.7×10^8	p.r.	——	Anba.64–0138
1.629	*m*–toluate ion	~ 11	2.6×10^9	p.r.	——	Anba.64–0138
1.630	*p*–toluate ion	~ 11	3.6×10^9	p.r.	——	Anba.64–0138
1.631	toluene	~ 11	1.2×10^7	p.r.	——	Anba.64–0138
1.632	*p*–toluenesulfonate ion	~ 11	1.7×10^9	p.r.	——	Anba.64–0138
1.633	*p*–tolunitrile	~ 11	1.4×10^{10}	p.r.	——	Anba.64–0138
1.633a	tetrachloroethylene	–	1.3×10^{10}	p.r.	——	Koes.71–0030
1.633b	tetrafluorobenzene	–	2.6×10^{10}	p.r.	——	Koes.71–0030

TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.634	trichloroacetate ion	~ 10	6.2×10^9	p.r.	——	Hart..64–0044
		~ 10	$(8.5 \pm 1.0) \times 10^9$	p.r.	——	Anba.65–0015
		6.6	2.1×10^{10}	p.r.	concn. > 0.1 *M*.	Aldr...71–0019
1.634a	1,1,2–trichloroethylene	–	1.9×10^{10}	p.r.	——	Koes.71–0030
1.635	trichlorofluoromethane	~ 6	1.6×10^{10} (rel.)	γ–r.	c.k., elec. condy., assume $k(e^-_{aq} + N_2O) = 8.9 \times 10^9$ or $k(e^-_{aq} + H^+) = 2.4 \times 10^{10}$.	Balk..71–0026
1.636	α,α,α–trichlorotoluene	~ 10	$(8.3 \pm 0.9) \times 10^9$	p.r.	——	Anba.65–0015
1.637	trifluoroacetate ion	~ 10	$\leq (1.4 \pm 0.4) \times 10^6$ (cor.)	p.r.	$k_{obs} \leq (2.6 \pm 0.6) \times 10^6$.	Anba.65–0015
1.638	1,1,1–trifluoro–acetone	5.19	6.6×10^7	p.r.	——	Hart..67–0298
1.638a	trifluoroiodo–methane $e^-_{aq} + CF_3I \gg CF_3 + I^-$	9–10	$(1.3 \pm 0.1) \times 10^{10}$	p.r.	——	Bull.70–0407
1.639	α,α,α–trifluorotoluene	~ 11	1.8×10^9	p.r.	——	Anba.64–0138
1.640	trimesate ion (trianion)	5.74	3.5×10^9	p.r.	k calcd. for the dianion is $(1.0 \pm 0.15) \times 10^{10}$.	Szut...65–0018
		6.96	2.5×10^9	p.r.	——	Szut...65–0018
		8.84	3.0×10^9	p.r.	——	Szut...65–0018
		12.39	2.8×10^9 (cor.)	p.r.	$k_{obs} = 4.2 \times 10^9$.	Szut...65–0018
1.641	1,3,5–trimethyluracil	6.5–7	$(4.8 \pm 0.6) \times 10^9$	p.r.	no OH scavenger added.	Fiel.70–0226
1.642	trinitromethyl ion (nitroform anion)	7	3.0×10^{10}	p.r.	counter ion K^+.	Raba..65–0183
1.643	tryptophan	7.3	2.6×10^8	p.r.	——	Davi..65–0389
		6.76	4.0×10^8	p.r.	——	Braa66–0011
		6.9	4.6×10^8	p.r.	solute is L–tryptophan.	Braa66–0011
		8.92	3.1×10^8	p.r.	——	Braa66–0011
		7.8	$(3.0 \pm 0.3) \times 10^8$	p.r.	solute is L–tryptophan.	Arms.69–0459
1.644	tryptophan (negative ion)	11.5	1.3×10^8	p.r.	——	Braa66–0011
1.645	tyrosine (zwitterion)	5.8	1.6×10^8	p.r.	solute is L–tyrosine.	Braa66–0011
		7.8	4.0×10^8	p.r.	——	Davi..65–0389
1.646	tyrosine (negative ion)	11.0	$\leq (1.7 \pm 0.4) \times 10^7$	p.r.	solute is L–tyrosine; 20% monoanion.	Chry68–0062
1.647	uracil	6.4	7.7×10^9	p.r.	——	Hart..64–0044
		7	9.3×10^9 (cor.)	p.r.	$\mu = 0.1$, $k_{obs} = 1.5 \times 10^{10}$.	Gree..68–0316
		6.5–7	$(1.6 \pm 0.3) \times 10^{10}$	p.r.	no OH scavenger added.	Fiel.70–0226
1.648	uracil (monoanion)	12.2	2.3×10^9	p.r.	——	Hart..64–0044
		11	1.9×10^9 (cor.)	p.r.	$\mu = 0.1$, $k_{obs} = 3 \times 10^9$.	Gree..68–0316
		13	1.6×10^9 (cor.)	p.r.	$\mu = 0.1$, $k_{obs} = 2.5 \times 10^9$.	Gree..68–0316
1.649	uracil polynucleotides	7	2.5×10^9	p.r.	$\mu = 0.1$.	Gree..68–0316
		12	8×10^8	p.r.	$\mu = 0.1$.	Gree..68–0316
1.650	urea	5.5–6	2.7×10^5 (rel.)	γ–r.	c.k., assume $k(e^-_{aq} + NO_3^-) = 1.1 \times 10^{10}$; k detd. at 20, 45 and 70 °C to give $E_a = 3.4$ kcal mol^{-1}.	Anba..67–0098
		7	3.0×10^5	p.r.	——	Hart..67–0298
1.651	uric acid	5	$\sim 6 \times 10^9$	p.r.	——	Hart..64–0048
1.652	uridine	6	1.4×10^{10}	p.r.	$\mu = 0.1$.	Gree..68–0316
1.653	uridine (monoanion)	11.8	2×10^9 (cor.)	p.r.	$\mu = 0.1$, $k_{obs} = 3 \times 10^9$.	Gree..68–0316
1.654	uridine monophosphate (dianion) (UMP^{2-})	7	2.2×10^9 (cor.)	p.r.	$\mu = 0.1$, $k_{obs} = 5 \times 10^9$.	Gree..68–0316
1.655	uridine monophosphate (trianion) (UMP^{3-})	13	1.9×10^8 (cor.)	p.r.	$\mu = 0.1$, $k_{obs} = 6.5 \times 10^8$.	Gree..68–0316

TABLE 4. *Reactions of e^-_{aq} with organic solutes*—Continued

No.	Solute and Reaction	pH	k(dm^3 mol^{-1}s^{-1})	Method	Comments	Ref.
1.656	uridine monophosphate (2′,3′-cyclic, dianion)	6	4.5×10^9 (cor.)	p.r.	$\mu = 0.1$, $k_{obs} = 1 \times 10^{10}$.	Gree..68–0316
1.657	valine (zwitterion)	6.4	5.2×10^6	p.r.	solute concn. 10^{-1} M.	Davi..65–0389
			$\leq 5 \times 10^6$	p.r.	——	Braa66–0011
1.658	DL-valine (negative ion)	9.5	$< 2 \times 10^6$ (calcd.)	p.r.	k calcd. from $k_{obs} = < 5 \times 10^6$ at pH 9.5 assuming solute is 50% negative ion, 50% zwitterion.	Braa66–0011
1.658a	vinyl chloride	–	2.5×10^8	p.r.	——	Koes.71–0030
1.659	vinylpyridine	–	1.4×10^{10}	–	unpubl. data cited.	Swal68–0678
1.660	vinylpyridinium ion	–	3×10^{10}	–	unpubl. data cited.	Swal68–0678
1.661	xylose	–	$\leq 10^6$	p.r.	——	Davi..65–0391

$C_7H_4IO_2^-$ *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
$C_7H_5O_2^-$ Benzoate ion, 1.327
$C_7H_5O_3^-$ *m*-Hydroxybenzoate ion, 1.475; *p*-Hydroxybenzoate ion, 1.476; Salicylate ion, 1.607
$C_7H_6AlNO_6$ Nitrilotriacetatoaluminum(III), 1.19
$C_7H_6NNiO_6^-$ Nitrilotriacetatonickelate(II) ion, 1.199
$C_7H_6NO_2^-$ *p*-Aminobenzoate ion, 1.310
$C_7H_6NO_6Zn^-$ Nitrilotriacetatozincate(II) ion, 1.281
$C_7H_6N_2$ *o*-Aminobenzonitrile, 1.311
C_7H_7Cl Benzyl chloride, 1.332; *p*-Chlorotoluene, 1.377
C_7H_7I *p*-Iodotoluene, 1.498
C_7H_7N Vinylpyridine, 1.659
C_7H_7NO Benzamide, 1.323
$C_7H_7NO_2$ *p*-Nitrotoluene, 1.565
C_7H_8 Toluene, 1.631
$C_7H_8N^+$ Vinylpyridinium ion, 1.660
C_7H_8O Benzyl alcohol, 1.330
$C_7H_7O_3S^-$ *p*-Toluenesulfonate ion, 1.632
C_7H_9N Benzylamine, 1.331a
$C_7H_9N_2O$ 1-Methylnicotinamide, 1.535
$C_7H_{10}N_2O_2$ 4-Ethoxy-1-methyluracil, 1.412; 1,3,5-Trimethyluracil, 1.641
$C_7H_{12}N_2O_3$ Glycylproline, 1.459
$C_7H_{14}N_2O_3$ Glycylvaline, 1.462
$C_7H_{14}N_2O_4S_2$ Djenkolic acid, 1.409
$C_8H_4NO_2^-$ *p*-Cyanobenzoate ion, 1.383
$C_8H_4O_4^{2-}$ *o*-Phthalate ion, 1.583, 1.584; *m*-Phthalate ion, 1.585; *p*-Phthalate ion, 1.586
$C_8H_6NO_4^-$ *p*-Nitrophenylacetate ion, 1.561
C_8H_7N Indole, 1.487; *p*-Tolunitrile, 1.633
$C_8H_7O_2^-$ Phenylacetate ion, 1.577
C_8H_8 Styrene, 1.612
$C_8H_7O_2^-$ *o*-Toluate ion, 1.628; *m*-Toluate ion, 1.629; *p*-Toluate ion, 1.630
$C_8H_8N_2O_3$ Nicotinuric acid, 1.549a
$C_8H_{10}N_2O$ *p*-Nitrosodimethylaniline, 1.564
$C_8H_{10}N_2O_3S$ Sulfacetamide, 1.615a
$C_8H_{11}N$ Phenethylamine, 1.574a
$C_8H_{12}N_2O_2$ 2,4-Diethoxypyrimidine, 1.400
$C_8H_{13}O_2S_2^-$ Lipoate ion, 1.507
$C_8H_{16}N_2O_3$ Glycylleucine, 1.456, 1.457; Leucylglycine, 1.504
$C_8H_{19}CoN_5O_4^+$ 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
$C_8N_{10}N_8^{4-}$ 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_9N 2-Methylindole, 1.533; 3-Methylindole, 1.534
$C_9H_9O_2^-$ Hydrocinnamate ion, 1.471
$C_9H_9O_3^-$ *p*-Hydroxyphenylpropionate ion, 1.481
$C_9H_{10}O_2$ Hydrocinnamic acid, 1.472
$C_9H_{11}NO_2$ Phenylalanine, 1.578, 1.579
$C_9H_{11}NO_3$ Tyrosine, 1.645, 1.646
$C_9H_{11}NO_4$ 3-(3,4-Dihydroxyphenyl)alanine, 1.402
$C_9H_{12}N_2O_7$ Uridine, 1.620, 1.621
$C_9H_{13}N_3O_5$ Cytidine, 1.395
$C_9H_{18}N_2O_3$ Alanylleucine, 1.308; Leucylalanine, 1.503
$C_{10}Co_2N_{10}O_2^{5-}$ Decacyano-μ-peroxodicobaltate(III) ion, 1.95
$C_{10}H_6NO_2^-$ 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
$C_{10}H_8N_2$ 2,2′-Bipyridine, 1.334; 4,4′-Bipyridine, 1.334a
$C_{10}H_9N_3$ Dipyridylamine, 1.408c
$C_{10}H_{11}N_2O_8^-$ 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
$C_{10}H_{12}N_2O_8^{4-}$ 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(III) ion, 1.224
$C_{10}H_{12}N_2O_8Sc^-$ Ethylenediametetraacetatoscandate(III) ion, 1.244

$_{12}N_2O_8Sm^-$ 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
$C_{10}H_8N_2O_8Tm^-$ 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
$C_{10}H_{13}N_5O_4$ Adenosine, 1.301
$C_{10}H_4N_5O_7P$ Adenosine-5′-phosphate, 1.302
$C_{10}H_{15}N_2O_8P$ Thymidylic acid, 1.626
$C_{10}H_{16}N^+$ Benzyltrimethylammonium ion, 1.333
$C_{10}H_{17}N_3O_6S$ Glutathione, 1.441
$C_{10}H_{19}N_3O_4$ Leucylglycylglycine, 1.505, 1.506
$C_{11}H_7N$ Naphthonitrile, 1.520, 1.521
$C_{11}H_7O_2^-$ 1-Naphthoate ion, 1.541; 2-Naphthoate ion, 1.542
$C_{11}H_{12}N_2O_2$ Tryptophan, 1.643, 1.644
$C_{11}H_{14}N_2O_3$ Glycylphenylalanine, 1.458
$C_{11}H_{14}N_2O_4$ Glycyltyrosine, 1.461
$C_{12}H_8N_2$ 1,10-Phenanthroline, 1.574
$C_{12}H_{12}N_2O_2S$ Sulfanilamide, 1.615b
$C_{12}H_{16}N_6O_3$ Histidylhistidine, 1.469
$C_{12}H_{24}N_2O_3$ Leucylleucine, 1.506
$C_{12}H_{25}NaO_4S$ Dodecyl sodium sulfate, 1.409a
$C_{12}H_{33}ClN_3Pd^+$ 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
$C_{13}H_9O_2^-$ Biphenyl-4-carboxylate ion, 1.333a
$C_{13}H_{10}O$ Benzophenone, 1.329
$C_{13}H_{15}N_3O_3$ Glycyltryptophan, 1.460
$C_{14}H_8O_4^{2-}$ *o*,*o*′-Diphenate ion, 1.408a; *p*,*p*′-Diphenate ion, 1.408b
$C_{14}H_{12}AgN_2O_{12}^{5-}$ Bis(nitrilotriacetato)argentate(I) ion, 1.14
$C_{14}H_{12}AlN_2O_{12}^{3-}$ Bis(nitrilotriacetato)aluminate(III) ion, 1.20
$C_{14}H_{12}CdN_2O_{12}^{4-}$ Bis(nitrilotriacetato)cadmate(II) ion, 1.46
$C_{14}H_{12}CoN_2O_{12}^{4-}$ Bis(nitrilotriacetato)cobalt(II) ion, 1.83
$C_{14}H_{12}CuN_2O_{12}^{4-}$ Bis(nitrilotriacetato)cuprate(II) ion, 1.118
$C_{14}H_{12}HgN_2O_{12}^{4-}$ Bis(nitrilotriacetato)mercurate(II) ion, 1.152
$C_{14}H_{12}MnN_2O_{12}^{4-}$ Bis(nitrilotriacetato)manganate(II) ion, 1.172
$C_{14}H_{12}N_2NiO_{12}^{4-}$ Bis(nitrilotriacetato)nickelate(II) ion, 1.200
$C_{14}H_{12}N_2O_{12}Pb^{4-}$ Bis(nitrilotriacetato)plumbate(II) ion, 1.217
$C_{14}H_{12}N_2O_{12}Zn^{4-}$ Bis(nitrilotriacetato)zincate(II) ion, 1.282
$C_{14}H_{14}ClN_3$ Acriflavin, 1.298a
$C_{15}H_{20}N_4O_6$ Riboflavin, 1.603
$C_{15}H_{24}CoO_6^{3+}$ Tris(acetylacetonato)cobalt(III) ion, 1.98
$C_{16}H_6N_2O_{14}S_4^{4-}$ Indigotetrasulfonate ion, 1.486
$C_{16}H_{18}ClN_3S$ Methylene blue, 1.528
$C_{17}H_{20}ClN_3$ Acridine orange, 1.298
$C_{18}H_{20}N_2O_3$ Phenylalanylphenylalanine, 1.580
$C_{19}H_{42}BrN$ Hexadecyltrimethylammonium bromide, 1.465a
$C_{20}H_6Br_4O_5^{2-}$ Eosin(dianion), 1.410
$C_{20}H_{11}O_5^-$ Fluoroscein(anion), 1.422
$C_{20}H_{19}ClN_4$ Safranine T, 1.577
$C_{20}H_{32}N_6O_{12}S_2$ Glutathione, oxidized(disulfide), 1.442
$C_{21}H_{28}N_7O_{10}P_2$ Nicotinamide-adenine dinucleotide, 1.547, 1.548
$C_{21}H_{38}ClN$ Hexadecylpyridinium chloride, 1.465b
$C_{30}H_{24}CoN_6^{3+}$ 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
$C_{36}H_{24}CoN_6^{3+}$ Tris(1,10-phenanthroline)cobalt(III) ion 1.97
Cd^{2+}, 1.38
$CdH_6IO_3^+$ 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
ClO^- Hypochlorite ion, 1.54
ClO_3^- Chlorate ion, 1.55
ClO_4^- Perchlorate ion, 1.56
Cl_4Pd^{2-} Tetrachloropalladate(II) ion, 1.220
Cl_4Pt^{2-} Tetrachloroplatinate(II) ion, 1.225
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
$CuH_4O_4^{2-}$ Tetrahydroxocuprate(II) ion, 1.116
$CuH_{12}N_4^{2+}$ Tetraamminecopper(II) ion, 1.120
D, 1.6
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

REFERENCES

61-0019 Kelly, P.; Smith, M.
The radiation chemistry of azide solutions. Part II. The action of x-rays (200 kv) on deaerated aqueous solutions of sodium azide in the presence of different organic solutes.
J. CHEM. SOC: 1487-94 (1961)

61-0025 Hayon, E.; Allen, A.O.
Evidence for two kinds of "H atoms" in the radiation chemistry of water.
J. PHYS. CHEM. 65: 2181-5 (1961)

62-0021 Jortner, J.; Ottolenghi, M.; Rabani, J.; Stein, G.
Conversion of solvated electrons into hydrogen atoms in the photo- and radiation chemistry of aqueous solutions.
J. CHEM. PHYS. 37(10): 2488-95 (1962)

63-0041 Appleby, A.; Scholes, G.; Simic, M.
Reactivities of the primary reducing species formed in the radiolysis of aqueous solutions.
J. AM. CHEM. SOC. 85: 3891-2 (1963)

63-0045 Dorfman, L.M.; Taub, I.A.
Pulse radiolysis studies. III. Elementary reactions in aqueous ethanol solution.
J. AM. CHEM. SOC. 85: 2370-4 (1963)

63-0050 Gordon, S.; Hart, E.J.; Matheson, M.S.; Rabani, J.; Thomas, J.K.
Reaction constants of the hydrated electron.
J. AM. CHEM. SOC. 85: 1375-7 (1963)

63-0057 Scholes, G.; Simic, M.; Weiss, J.J.
Nature and reactivity of the primary reducing species in the radiolysis of aqueous solutions.
DISCUSSIONS FARADAY SOC. 36: 214-22 (1963)

63-0073 Gordon, S.; Hart, E.J.; Matheson, M.S.; Rabani, J.; Thomas, J.K.
Reactions of the hydrated electron.
DISCUSSIONS FARADAY SOC. 36: 193-205 (1963)

63-0187 Baxendale, J.H.; Fielden, E.M.; Keene, J.P.
Absolute rate constants for the reactions of some metal ions with the hydrated electron.
PROC. CHEM. SOC. 242-3 (1963)

64-0043 Gordon, S.; Hart, E.J.; Thomas, J.K.
The ultraviolet spectra of transients produced in the radiolysis of aqueous solutions.
J. PHYS. CHEM. 68: 1262-4 (1964)

64-0044 Hart, E.J.; Gordon, S.; Thomas, J.K.
Rate constants of hydrated electron reactions with organic compounds.
J. PHYS. CHEM. 68: 1271-4 (1964)

64-0045 Brown, D.M.; Dainton, F.S.; Keene, J.P.; Walker, D.C.
Solute isotope and pH effects on the primary species produced in the pulse radiolysis of water.
PROC. CHEM. SOC.: 266-7 (1964)

64-0046 Thomas, J.K.; Gordon, S,; Hart, E.J.
The rates of reaction of the hydrated electron in aqueous inorganic solutions.
J. PHYS. CHEM. 68: 1524-7 (1964)

64-0048 Hart, E.J.; Thomas, J.K.; Gordon, S.
A review of the radiation chemistry of single-carbon compounds and some reactions of the hydrated electron in aqueous solution.
RADIATION RES. SUPPL. 4: 74-88 (1964)

64-0091 Keene, J.P.
The absorption spectrum and some reaction constants of the hydrated electron.
RADIATION RES. 22: 1-13 (1964)

64-0094 Scholes, G.; Simic, M.
Action of γ-rays on aqueous solutions of nitrous oxide and the effects of added solutes.
J. PHYS. CHEM. 68: 1731-7 (1964)

64-0095 Scholes, G.; Simic, M.
Reactivity of the hydrogen atoms produced in the radiolysis of aqueous systems.
J. PHYS. CHEM. 68: 1738-43 (1964)

64-0132 Baxendale, J.H.; Fielden, E.M.; Capellos, C.; Francis, J.M.; Davies, J.V.; Ebert, M.; Gilbert, C.W.; Keene, J.P.; Land, E.J.; Swallow, A.J.; Nosworthy, J.M.
NATURE 201: 468-70 (1964)

64-0133 Asmus, K.-D.; Henglein, A.; Ebert, M.; Keene, J.P.
Pulsradiolytische Untersuchung schneller Reaktionen von hydratisierten Elektronen, freien Radikalen und Ionen mit Tetranitromethan in waessriger Loesung.
BER. BUNSENGES. PHYSIK. CHEM. 68: 657-63 (1964)

64-0136 Asmus, K.-D.; Henglein, A.
Die Reaktion des Tetranitromethans mit hydratisierten Elektronen aus der γ-Radiolyse des Wassers.
BER. BUNSENGES. PHYSIK. CHEM. 68: 348-52 (1964)

64-0138 Anbar, M.; Hart, E.J.
The reactivity of aromatic compounds toward hydrated electrons.
J. AM. CHEM. SOC. 86: 5633-7 (1964)

64-0149 Anbar, M.; Thomas, J.K.
Pulse radiolysis studies of aqueous sodium chloride solutions.
J. PHYS. CHEM. 68: 3829-35 (1964)

64-0151 Armstrong, D.A.; Wilkening, V.G.
Effects of pH in the γ-radiolysis of aqueous solutions of cysteine and methyl mercaptan.
CAN. J. CHEM. 42: 2631-5 (1964)

64-0153 Baxendale, J.H.; Dixon, R.S.
Reactions of the reducing species in the radiolysis of aqueous methanol solutions.
Z. PHYSIK. CHEM. (FRANKFURT) 43: 161-76 (1964)

64-0282 Anbar, M.; Hart, E.J.
UNPUBLISHED DATA (quoted in 67-0103)

64-0287 Hart, E.J.
UNPUBLISHED DATA (quoted in 67-0103)

65-0001 Anbar, M.; Hart, E.J.
The effect of solvent and of solutes on the absorption spectrum of solvated electrons.
J. PHYS. CHEM. 69: 1244-7 (1965)

65-0008 Rozenberg, J.; Dolle, L.
Influence de certains sels chimiquement inertes sur la radiolyse de l'eau.
J. CHIM. PHYS. 62: 217-8 (1965)

65-0009 Matheson, M.S.; Rabani, J.
Pulse radiolysis of aqueous hydrogen solutions. I. Rate constants for reaction of e_{aq}^- with itself and other transients. II. The interconvertibility of e_{aq}^- and H.
J. PHYS. CHEM. 69: 1324-35 (1965)

65-0013 Meissner, G.; Henglein, A.
Die Reaktionen des Schwefelwasserstoffs mit hydratisierten Elektronen und freien Wasserstoffatomen und die Solvatationsenergie des Elektrons im Wasser.
BER. BUNSENGES. PHYSIK. CHEM. 69: 3-7 (1965)

65-0015 Anbar, M.; Hart, E.J.
The reaction of haloaliphatic compounds with hydrated electrons.
J. PHYS. CHEM. 69: 271-4 (1965)

65-0018 Szutka, A.; Thomas, J.K.; Gordon, S.; Hart, E.J.
Rate constants of hydrated electron reactions with some aromatic acids, alkyl halides, heterocyclic compounds, and Werner complexes.
J. PHYS. CHEM. 69: 289-92 (1965)

65-0044 Baxendale, J.H.; Fielden, E.M.; Keene, J.P.
The pulse radiolysis of aqueous solutions of some inorganic compounds.
PROC. ROY. SOC. (LONDON) SER. A 286: 320-36 (1965)

65-0047 Anbar, M.; Hart, E.J.
The reactivity of metal ions and some oxy anions toward hydrated electrons.
J. PHYS. CHEM. 69: 973-7 (1965)

65-0053 Cullis, C.F.; Francis, J.M.; Swallow, A.J.
Studies of radiation-induced reactions of ethylene in aqueous solution. I. Reactions in the absence of oxygen.
PROC. ROY. SOC. (LONDON) SER. A 287: 15-26 (1965)

65-0073 Dainton, F.S.; Rumfeldt, R.
Radical and molecular yields in the γ-radiolysis of water. III. The nitrous oxide-sodium tellurite system.
PROC. ROY. SOC. (LONDON) SER. A 287: 444-56 (1965)

65-0183 Rabani, J.; Mulac, W.A.; Matheson, M.S.
The pulse radiolysis of aqueous tetranitromethane. I. Rate constants and the extinction coefficient of e_{aq}^-. II. Oxygenated solutions.
J. PHYS. CHEM. 69: 53-70 (1965)

65-0188 Riesz, P.; Morris, T.
The radiolysis of aqueous methylammonium ion.
RADIATION RES. 26: 1-11 (1965)

65-0245 Anbar, M.; Neta, P.
Tables of bimolecular rate constants of hydrated electrons, hydrogen atoms and hydroxyl radicals with inorganic and organic compounds.
INTERN. J. APPL. RADIATION ISOTOPES 16: 227-42 (1965)

65-0388 Scholes, G.; Shaw, P.; Willson, R.L.; Ebert, M.
Pulse radiolysis studies of aqueous solutions of nucleic acid and related substances.
Pulse Radiolysis, Ebert, M.; Keene, J.P.; Swallow, A.J.; Baxendale, J.H. (eds.), Academic Press, New York, 1965, p.151-64. (Proc of the Internat. Symposium on Pulse Radiolysis, Manchester, Eng., April 21-3, 1965)

65-0389 Davies, J.V.; Ebert, M.; Swallow, A.J.
Reactions of the hydrated electron with glycine and other amino acids and peptides.
Ibid., p.165-70

65-0390 Braams, R.
Reactions of the hydrated electron with amino acids, peptides and proteins.
Ibid., p.171-80

65-0391 Davies, J.V.; Griffiths, W.; Phillips, G.O.
Pulse radiolysis of aqueous carbohydrate solutions.
Ibid., p.181-91

65-0392 Charlesby, A.; Fydelor, P.J.; Kopp, P.M.; Keene, J.P.; Swallow, A.J.
Pulse radiolysis studies of aqueous polymer-thiourea systems.
Ibid., p.193-201

65-0396 Keene, J.P.; Land, E.J.; Swallow, A.J.
A pulse radiolysis study of methylene blue.
Ibid., p.227-45

65-0493 Rabani, J.
The interconvertibility of e_{aq}^- and H.
ADVAN. CHEM. SER. 50: 242-52 (1965)

65-0494 Hart, E.J.; Fielden, E.M.
Submicromolar analysis of hydrated electron scavengers.
ADVAN. CHEM. SER. 50: 253-62 (1965)

65-0739 Nakken, K.F.
Radical scavengers and radioprotection.
CURR. TOPICS RADIATION RES. 1: 49-92 (1965)

65-0778 Braams, R.
UNPUBLISHED DATA (quoted in 67-0103)

65-0780 Anbar, M.; Hart, E.J.
UNPUBLISHED DATA (quoted in 67-0103)

65-0781 Davies, J.V.; Ebert, M.; Swallow, A.J.
UNPUBLISHED DATA (quoted in 67-0103)

65-3013 Ebert, M.; Swallow, A.J.
Reactions of the hydrated electron with substances of biological importance.
ADVAN. CHEM. SER. 50: 289-96 (1965)

J17 Dainton, F.S.; Logan, S.R.
Primary processes in the photolysis of the iodide ion in aqueous solution.
PROC. ROY. SOC. (LONDON) SER. A 287: 281–94 (1965)

66–0011 Braams, R.
Rate constants of hydrated electron reactions with amino acids.
RADIATION RES. 27: 319–29 (1966)

66–0015 Hart, E.J.; Gordon, S.; Fielden, E.M.
Reaction of the hydrated electron with water.
J. PHYS. CHEM. 70: 150–6 (1966)

66–0062 Brown, D.M.; Dainton, F.S.
Matrix isolation of unstable lower valency states of metal cations.
TRANS. FARADAY SOC. 62(5): 1139–50 (1966)

66–0113 Sawai, T.; Shinozaki, Y.; Meshitsuka, G.
The radiolysis of aqueous solutions of potassium iodide.
BULL. CHEM. SOC. JAPAN 39(5): 951–5 (1966)

66–0138 Micic, O.; Draganic, I.
A study of some free–radical reactions in aqueous γ radiolysis by direct measurements of Cu^{+} intermediates during irradiation
J. PHYS. CHEM. 70(7): 2212–19 (1966)

66–0144 Hart, E.J.
The significance of the hydrated electron in radiation chemistry.
HEALTH PHYS. 12(3): 641–51 (1966)

66–0160 Stockdale, J.A.D.; Sangster, D.F.
Relative reaction rates of hydrated electrons with Krebs cycle and other anions.
J. AM. CHEM. SOC. 88(13): 2907–10 (1966)

66–0184 Buxton, G.V.; Dainton, F.S.; Wilkinson, F.
The BrO radical in aqueous solution.
CHEM. COMMUN. (11): 320–1 (1966)

66–0211 Phillips, G.O.; Griffiths, W.; Davies, J.V.
Radiation Chemistry of carbohydrates. XVI.
The contribution of OH radicals to the radiolysis of aqueous solutions.
J. CHEM. SOC. PT. B 194–200 (1966)

66–0425 Matheson, M.S.; Mulac, W.A.; Weeks, J.L.; Rabani, J.
The pulse radiolysis of deaerated aqueous bromide solutions.
J. PHYS. CHEM. 70(7): 2092–9 (1966)

66–0433 Asmus, K.–D.; Beck, G.; Henglein, A.; Wigger, A.
Pulsradiolytische Untersuchung der Oxydation und Reduktion des Nitrosobenzols in waessriger Loesung.
BER. BUNSENGES. PHYSIK. CHEM. 70(6): 869–74 (1966)

66–0435 Anbar, M.
On the reactivity of transition–metal complex ions toward hydrated electrons.
CHEM. COMMUN.: 416 (1966)

66–0499 Henglein, A.; Karmann, W.; Roebke, W.; Beck, G.
Pulsradiolytische Untersuchungen ueber die Reaktivitaet der Katalase gegenueber hydratisierten Elektronen und freien OH–Radikalen.
MAKROMOL. CHEM. 92: 105–113 (1966)

66–0629 Sarrach, D.
On the reactivity of diethyl thallium ions with hydrated electrons.
Proc. of the Second Tihany Symposium on Radiation Chemistry, Dobo, J., Hedvig, P. (eds.), Publishing House of the Hungarian Acad. of Sci., Budapest, 1967, p.197–201

66–0757 Hart, E.J.
The hydrated electron.
Actions Chimiques et Biologiques des Radiations. Dixieme Serie., Haissinsky, M. (ed.), Masson et C^{ie} Editeurs, p.1–88, 1966

66–0800 Asmus, K.–D.; Henglein, A.; Beck, G.
Pulsradiolytische Untersuchung der Reaktion des hydratisierten Elektrons mit Nitromethan.
BER. BUNSENGES. PHYSIK. CHEM. 70(4): 459–66 (1966)

66–0818 Hart, E.J.; Fielden, E.M.
UNPUBLISHED DATA (quoted in 67–0103)

66–0819 Hart, E.J.; Fielden, E.M.; Anbar, M.
UNPUBLISHED DATA (quoted in 67–0103)

66–0825 Anbar, M.; Meyerstein, D.
UNPUBLISHED DATA (quoted in 67–0103)

66–2058 Chambers, K.; Collinson, E.; Dainton, F.S.; Seddon, W.
Radicals and radical anions in addition polymerization, their
CHEM. COMMUN. (15): 498–9 (1967)

67–0032 Daniels, M.; Wigg, E.E.
Radiation chemistry of the aqueous nitrate system.
I. γ Radiolysis of dilute solutions.
J. PHYS. CHEM. 71(4): 1024–33 (1967)

67–0041 Thomas, J.K.
Pulse radiolysis of aqueous solutions of methyl iodide and methyl bromide. The reactions of iodine atoms and methyl radicals in water.
J. PHYS. CHEM. 71(6): 1919–1925 (1967)

67–0054 Fel', N.S.; Dolin, P.I.; Zolotarevskii, V.I.
Pulsed radiolysis of formamides.
HIGH ENERGY CHEM. 1(2): 132–8 (1967)
Translated from: Khim. Vys. Energ. 1(2): 154–60 (1967)

67–0063 Dainton, F.S.; Rumfeldt, R.
Radical and molecular yields in the radiolysis of aqueous solution. IV. Nitrous oxide solutions containing hexachloro–anions of iridium and platinum.
PROC. ROY. SOC. (LONDON) SER. A 298: 239–54 (1967)

67–0098 Anbar, M.; Alfassi, Z.B.; Bregman–Reisler, H.
Hydrated electron reactions in view of their temperature dependence.
J. AM. CHEM. SOC. 89: 1263–4 (1967)

67-0099 Anbar, M.; Neta, P.
Reaction of fluoride ions with hydrogen atoms in aqueous solution.
TRANS. FARADAY SOC. 63(529): 141-6 (1967)

67-0103 Anbar, M.; Neta, P.
A compilation of specific bimolecular rate constants for the reactions of hydrated electrons, hydrogen atoms and hydroxyl radicals with inorganic and organic compounds in aqueous solution.
INTERN. J. APPL. RADIATION ISOTOPES 18: 493-523 (1967)

67-0109 Gottschall, W.C.; Hart, E.J.
The effect of temperature on the absorption spectrum of the hydrated electron and on its bimolecular recombination reaction.
J. PHYS. CHEM. 71(7): 2102-6 (1967)

67-0122 Land, E.J.; Ebert, M.
Pulse radiolysis studies of aqueous phenol. Water elimination from dihydroxycyclohexadienyl radicals to form phenoxyl.
TRANS. FARADAY SOC. 63: 1181-90 (1967)

67-0132 Felix, W.D.; Gall, B.L.; Dorfman, L.M.
Pulse radiolysis studies. IX. Reactions of the ozonide ion in aqueous solution.
J. PHYS. CHEM. 71(2): 384-92 (1967)

67-0171 Chambers, K.W.; Collinson, E.; Dainton, F.S.; Seddon, W.A.; Wilkinson, F.
Pulse radiolysis: Adducts of vinyl compounds and simple free radicals.
TRANS. FARADAY SOC. 63: 1699-1711 (1967)

67-0180 Sutton, J.; Tran Dinh Son
Vitesses de reaction de trois nitroparaffines avec les atomes d'hydrogene et les electrons solvates en milieu aqueux.
J. CHIM. PHYS. 64(4): 688-90 (1967)

67-0186 Meissner, G.; Henglein, A.; Beck, G.
Pulsradiolytische Untersuchung von Dimethylthioaether und Dimethylsulfoxyd in waessriger Loesung.
Z. NATURFORSCH. PT. B 22(1): 13-9 (1967)

67-0191 Wigger, A.; Henglein, A.; Asmus, K.-D.
Pulsradiolytische Untersuchung der Oxydation des Phenylhydroxylamins in waessriger Loesung.
BER. BUNSENGES. PHYSIK. CHEM. 71(5): 513-6 (1967)

67-0218 Hentz, R.R.; Farhataziz; Milner, D.J.; Burton, M.
γ Radiolysis of liquids at high pressures. III. Aqueous solutions of sodium bicarbonate.
J. CHEM. PHYS. 47: 374-7 (1967)

67-0231 Knight, R.J.; Sutton, H.C.
Radiolysis of aqueous solutions of nitric oxide.
TRANS. FARADAY SOC. 63: 2628-39 (1967)

67-0273 Karmann, W.; Meissner, G.; Henglein, A.
Pulsradiolyse des Schwefelwasserstoffs in waessriger Loesung.
Z. NATURFORSCH. PT. B 22: 273-82 (1967)

67-0298 Hart, E.J.; Fielden, E.M.; Anbar, M.
Reactions of carbonylic compounds with hydrated electrons.
J. PHYS. CHEM. 71(12): 3993-8 (1967)

67-0299 Anbar, M.; Hart, E.J.
The activation energy of hydrated electron reactions.
J. PHYS. CHEM. 71(11): 3700-2 (1967)

67-0310 Willix, R.L.S.; Garrison, W.M.
Chemistry of the hydrated electron in oxygen-free solutions of amino acids, peptides, and related compounds.
RADIATION RES. 32: 452-62 (1967)

67-0477 Trumbore, C.N.
Studies in chemical radiation protection agents.
NYO-3383-06, 13p., Feb. 14, 1967
NUC. SCI. ABSTR 21: 25873

67-0532 Fielden, E.M.; Hart, E.J.
Activation energy of the hydrated electron water reaction and the ultra-violet absorption spectrum of the hydrated electron.
TRANS. FARADAY SOC. 63(12): 2975-82 (1967)
Also see corrigendum TRANS. FARADAY SOC. 64: 3158 (1968)

67-0554 Adams, G.E.; McNaughton, G.S.; Michael, B.D.
The pulse radiolysis of sulphur compounds. Part I. Cysteamine and cystamine.
The Chemistry of Ionization and Excitation, Johnson, G.R.A. and Scholes, G. (eds.), Taylor and Francis Ltd, London, 1967, p.281-93

67-0560 Waltz, W.L.
A pulse radiolysis study of some transition metal complexes.
Ph.D. Thesis, Northwestern Univ., 1967, 206p.
DISS. ABSTR. 28(6): 2383 (1967)

67-0684 Karmann, W.
Pulsradiolyse des Schwefelwasserstoffs in Wasser, waessrigen alkoholischen Loesungen und in Methanol.
Ph.D., Thesis, Technische Univ., Berlin, 1967, 85p.

67-0688 Wigger, A.
Die pulsradiolytische Untersuchung der Reduktion von Nitrobenzol zu Phenylhydroxylamin in waessriger Loesung.
Ph.D., Thesis, Technische Univ., Berlin, 1967, 81p.

67-0742 Moore, J.S.; Phillips, G.O.; Dodgson, K.S.; Davies, J.V.
Interactions of connective tissue and other polyanions with cationic counter ions.
BIOCHEM. J. 104(2): 18P (1967)

67-0750 Meyerstein, D.
UNPUBLISHED DATA (quoted in 67-0103)

67-3005 Braams, R.
Rate constants of hydrated electron reactions with peptides and proteins.
RADIATION RES. 31: 8-26 (1967)

68-0002 Wilkening, V.G.; Lal, M.; Arends, M.; Armstrong, D.A.
The cobalt-60 γ radiolysis of cysteine in deaerated aqueous solutions at pH values between 5 and 6.
J. PHYS. CHEM. 72(1): 185-90 (1968)

68-0006 Rodgers, M.A.J.; Sokol, H.A.; Garrison, W.M.
The radiation-induced hydrolysis of the peptide bond.
J. AM. CHEM. SOC. 90(3): 795-6 (1968)

68-0010 Cercek, B.; Ebert, M.
Activation energies for reactions of the hydrated electron.
J. PHYS. CHEM. 72(2): 766 (1968)

68-0025 Hart, E.J.; Fielden, E.M.
Reaction of the deuterated electron, e_d^-, with e_d^-, D, OD, and D_2O.
J. PHYS. CHEM. 72(2): 577-83 (1968)

68-0059 Rakintzis, N.Th.
Geschwindigkeitskonstanten der Reaktion einiger Farbstoffe mit HO_2-Radikalen und hydratisierten Elektronen, gebildet durch ^{60}Co-γ-Radiolyse von waessrigen Loesungen.
Z. PHYSIK. CHEM. (FRANKFURT) 57: 99-102 (1968)

68-0061 Fielden, E.M.; Hart, E.J.
Primary radical yields and some rate constants in heavy water.
RADIATION RES. 33: 426-36 (1968)

68-0062 Chrysochoos, J.
Pulse radiolysis of phenylalanine and tyrosine.
RADIATION RES. 33: 465-79 (1968)

68-0066 Dainton, F.S.; Wiseall, B.
Reactions of nitrosodimethylaniline with free radicals.
TRANS. FARADAY SOC. 64(3): 694-705 (1968)

68-0152 Buxton, G.V.; Dainton, F.S.
Radical and molecular yields in the γ-radiolysis of water.
V. The sodium hypobromite system.
PROC. ROY. SOC. (LONDON) SER. A 304: 441-7 (1968)

68-0153 Buxton, G.V.; Dainton, F.S.
The radiolysis of aqueous solutions of oxybromine compounds; the spectra and reactions of BrO and BrO_2.
PROC. ROY. SOC. (LONDON) SER. A 304: 427-39 (1968)

68-0159 Asmus, K.-D.; Fendler, J.H.
The reaction of sulfur hexafluoride with hydrated electrons.
J. PHYS. CHEM. 72(12): 4285-9 (1968)

68-0172 Cordier, P.; Grossweiner, L.I.
Pulse radiolysis of aqueous fluorescein.
J. PHYS. CHEM. 72(6): 2018-26 (1968)

68-0205 Kabi, A.; Clay, P.G.
Gamma radiolysis of aqueous solutions of aryl alkyl amines.
RADIATION RES. 34: 680-88 (1968)

68-0238 Balazs, E.A.; Davies, J.V.; Phillips, G.O.; Scheufele, D.S.
Polyanions and their complexes. Part IV. A pulse radiolysis study of the interaction between methylene blue and heparin in aqueous solution.
J. CHEM. SOC. PT. C (12): 1424-9 (1968)

68-0249 Lilie, J.; Beck, G.; Henglein, A.
Pulsradiolytische Untersuchung des Acetoinradikals und des Diacetylanions in waessriger Loesung.
BER. BUNSENGES. PHYSIK. CHEM. 72(4): 529-33 (1968)

68-0295 Anbar, M.; Hart, E.J.
On the reactivity of hydrated electrons toward inorganic compounds.
ADVAN. CHEM. SER. 81: 79-94 (1968)

68-0302 Ghosh-Mazumdar, A.S.; Hart, E.J.
A pulse radiolysis study of bivalent and zerovalent gold in aqueous solutions.
ADVAN. CHEM. SER. 81: 193-209 (1968)

68-0303 Cercek, B.; Ebert, M.
Radiolytic transients from p-nitrophenol and their inter- and intramolecular reactions.
ADVAN. CHEM. SER. 81: 210-21 (1968)

68-0305 Amphlett, C.B.; Adams, G.E.; Michael, B.D.
Pulse radiolysis studies of deaerated aqueous salicylate solutions.
ADVAN. CHEM. SER. 81: 231-50 (1968)

68-0309 Grossweiner, L.I.
The application of pulse radiolysis to the radiation chemistry of organic dyes.
ADVAN. CHEM. SER. 81: 309-20 (1968)

68-0316 Greenstock, C.L.; Ng,M.; Hunt, J.W.
Pulse radiolysis studies of reactions of primary species in water with nucleic acid derivatives.
ADVAN. CHEM. SER. 81: 397-417 (1968)

68-0418 Swallow, A.J.
Recent studies from pulse radiolysis.
PHOTOCHEM. PHOTOBIOL. 7: 683-94 (1968)

68-0431 Pukies, J.; Roebke, W.; Henglein, A.
Pulsradiolytische Untersuchung einiger Elementarprozesse der Silberreduktion.
BER. BUNSENGES. PHYSIK. CHEM. 72(7): 842-7 (1968)

68-0435 Pukies, J.; Roebke, W.
Pulsradiolytische Untersuchung der Reduktion des Ag^+-Ions in ammoniakalischer Loesung.
BER. BUNSENGES. PHYSIK. CHEM. 72(9/10): 1101-5 (1968)

68-0436 Bevan, P.L.T.
Radiolysis studies in aqueous solution.
Ph.D., Thesis, Univ. of Manchester, Sept., 1968, 172p.

68-0441 Land, E.J.; Swallow, A.J.
One-electron reactions in biochemical systems as studied by pulse radiolysis I. Nicotinamide-adenine dinucleotide and related compounds.
BIOCHIM. BIOPHYS. ACTA 162: 327-37 (1968)

68-0460 Fel', N.S.; Zolotarevskii, V.I.; Zakatova, N.V.; Sharpatyi, V.A.
On the interaction of $HON(SO_3K)_2$ with e_{aq}^-.
KHIM. VYS. ENERG. 2(4): 376-7 (1968)
(for translation see High Energy Chemistry)

68-0502 Fiti, M.; Sutton, J.
UNPUBLISHED DATA

68-0540 Al-Thannon, A.A-M.
Kinetics of the gamma radiolytic decomposition of aqueous cysteine solutions.
Ph.D., Thesis, Univ. of Del., 1968, 147p.

68-0678 Swallow, A.J.
Pulse radiolysis of monomers and polymers.
ADVAN. CHEM. SER. 82: 499-512 (1968)

68-0683 Davies, J.V.; Ebert, M.; Shalek, R.J.
The radiolysis of dilute solutions of lysozyme. II. Pulse radiolysis studies with cysteine and oxygen.
INTERN. J. RADIATION BIOL. 14(1): 19-27 (1968)

68-0727 Land, E.J.
Extinction coefficients of triplet-triplet transitions.
PROC. ROY. SOC. (LONDON) SER. A 305: 457-71 (1968)

68-2104 Balazs, E.A.; Davies, J.V.; Phillips, G.O.; Scheufele, D.S.
Polyanions and their complexes. Part V. Examination of polyanion-cation interaction using pulse radiolysis.
J. CHEM. SOC. PT. C (12): 1429-33 (1968)

68-3007 Braams, R.; Ebert, M.
The influence of changes in conformation of a macromolecule on reaction rates.
ADVAN. CHEM. SER. 81: 464-71 (1968)

68-7143 Schmidt, K.; Hart, E.J.
A compact apparatus for photogeneration of hydrated electrons.
ADVAN. CHEM. SER. 81: 267-79 (1968)

69-0012 Phillips, J.; Scholes, G.; Willson, R.L.
Brit. Empire Cancer Campaign, Ann. Report 1969. (cited in 70-0567)

69-0052 Buxton, G.V.; Dainton, F.S.; Kalecinski, J.
The radiation chemistry of aqueous solutions of sodium nitroprusside.
INTERN. J. RADIATION PHYS. CHEM. 1: 87-98 (1969)

69-0158 Roebke, W.; Renz, M.; Henglein, A.
Pulseradiolyse der Anionen $S_2O_8^{2-}$ und HSO_5^- in Waessriger Loesung.
INTERN. J. RADIATION PHYS. CHEM. 1(1): 39-44 (1969)

69-0186 Waltz, W.L.; Pearson, R.G.
A pulse radiolysis study of some cobalt(III) complexes. Occurrence of electronically excited cobalt(II) products.
J. PHYS. CHEM. 73(6): 1941-52 (1969)

69-0242 Asmus, K.-D.; Fendler, J.H.
The use of sulfur hexafluoride to determine $G(e_d^-)$ and relative reaction rate constants in D_2O.
J. PHYS. CHEM. 73(5): 1583-4 (1969)

69-0276 Anbar, M.; Meyerstein, D.
Effect of ligands on reactivity of metal cations towards the hydrated electron. Part I. The effect of ethylenediaminetetracetic acid.
TRANS. FARADAY SOC. 65: 1812-7 (1969)

69-0277 Meyerstein, D.; Mulac, W.A.
Effect of ligands on reactivity of metal cations towards the hydrated electron. Part 2.-Effect of glycine, ethylenediamine and nitrilotriacetic acid.
TRANS. FARADAY SOC. 65: 1818-26 (1969)

69-0283 Land, E.J.; Swallow, A.J.
One-electron reactions in biochemical systems as studied by pulse radiolysis. II. Riboflavin.
BIOCHEMISTRY 8: 2117-25 (1969)

69-0428 Meyerstein, D.; Mulac, W.A.
Reduction of cobalt(III) complexes by monovalent zinc, cadmium, and nickel ions in aqueous solutions.
J. PHYS. CHEM. 73(4): 1091-5 (1969)

69-0443 Venerable, G.D.II.; Hart, E.J.; Halpern, J.
Pulse radiolysis of aqueous solutions of cobalt cyanide complexes. The detection of pentacyanocobaltate(I) and other transients.
J. AM. CHEM. SOC. 91(26): 7538-9 (1969)

69-0459 Armstrong, R.C.; Swallow, A.J.
Pulse- and gamma-radiolysis of aqueous solutions of tryptophan.
RADIATION RES. 40(3): 563-79 (1969)

69-0553 Karmann, W.; Granzow, A.; Meissner, G.; Henglein, A.
Die Pulsradiolyse einfacher Merkaptane in Luft freier waessriger Loesung.
INTERN. J. RADIAT. PHYS. CHEM. 1: 395-405 (1969)

69-0562 Ward, J.F.; Johansen, I.; Aasen, J.
Radiosensitization by N-ethyl maleimide - a model chemical system.
INTERN. J. RADIAT. BIOL. 15: 163-70 (1969)

69-0564 Schoeneshoefer, M.; Karmann, W.; Henglein, A.
Die Pulsradiolyse des Selenwasserstoffes in waessriger Loesung.
INTERN. J. RADIAT. PHYS. CHEM. 1: 407-23 (1969)

69-0567 Cercek, B.
Activation energies for reactions of the hydrated electron.
NATURE 223: 491-2 (1969)

69-0582 Kabakchi, S.A.; Shubin, V.N.; Dolin, P.I.
On the kinetics of hydrated electron and oxygen interaction.
DOKL. AKAD. NAUK SSSR. 189(4): 800-3 (1969)
Translation in: Dokl. Phys. Chem. 189(4): 761-4 (1969).

69-0598 Belloni, J.; Haissinsky, M.
Radiolyse γ de solutions aqueuses d'hydrazine.
INTERN. J. RADIAT. PHYS. CHEM. 1: 519-27 (1969)

69-0646 Micic, O.; Draganic, I.
Some reactions of hydrated electron in acid medium (pH 0.6-4.0).
INTERN. J. RADIAT. PHYS. CHEM. 1(3): 287-95 (1969)

69-0649 Moreau, M.; Schmidt, M.; Sutton, J.
The radiolysis of aqueous solutions of Fremy's salt: Rate constants for the reactions with solvated electrons and hydrogen atoms.
INTERN. J. RADIAT. PHYS. CHEM. 1(4): 433-40 (1969)

69-0826 Zimbrick, J.D.; Ward, J.F.; Myers, L.S.Jr.
Studies on the chemical basis of cellular radiosensitization by 5-bromouracil substitution in DNA. I. Pulse- and steady-state radiolysis of 5-bromouracil and thymine.
INTERN. J. RADIAT. BIOL. 16: 505-23 (1969)

69-3039 Adams, G.E.; Willson, R.L.; Aldrich, J.E.; Cundall, R.B.
On the mechanism of the radiation-induced inactivation of lysozyme in dilute aqueous solution.
INTERN. J. RADIAT. BIOL. 16(4): 333-42 (1969)

70-0006 Getoff, N.; Schwoerer, F.
Pulse radiolysis of pyrrolidine.
RADIATION RES. 41: 1-14 (1970)

70-0014 Seddon, W.A.; Young, M.J.
Pulse radiolysis of nitric oxide in aqueous solution.
CAN. J. CHEM. 48(2): 393-4 (1970)

70-0015 Packer, J.E.; Winchester, R.V.
^{60}Co γ-radiolysis of oxygenated aqueous solutions of cysteine at pH 7.
CAN. J. CHEM. 48(3): 417-21 (1970)

70-0034 Gold, V.; Rolston, J.H.
Radiation-induced aliphatic hydrogen isotope exchange between t-butyl alcohol and solvent water.
CHEM. COMMUN. (4): 208-9 (1970)

70-0052 Chambers, K.W.; Collinson, E.; Dainton, F.S.
Addition of e_{aq}^-, H· and ·OH to acrylamide in aqueous solution and reactions of the adducts.
TRANS. FARADAY SOC. 66: 142-62 (1970)

70-0056 Hentz, R.R.; Knight, R.J.
γ Radiolysis of liquids at high pressures. VIII. Primary yields at 8.7 kbar and reactions of the hydrated electron with H_2O and H_2O^+.
J. CHEM. PHYS. 52(5): 2456-9 (1970)

70-0094 Rama Rao, K.V.S.; Shastri, L.V.; Shankar, J.
Radiation chemistry of tris(acetylacetonato) cobalt(III) in aqueous solutions.
RADIATION EFFECTS 2(3): 193-200 (1970)

70-0107 Asmus, K.-D.; Gruenbein, W.; Fendler, J.H.
Conductometric pulse radiolysis of sulfur hexafluoride in aqueous solutions. Rate of hydrolysis of sulfur tetrafluoride.
J. AM. CHEM. SOC. 92(9): 2625-8 (1970)

70-0178 Baxendale, J.H.; Rodgers, M.A.J.; Ward, M.D.
Radiolysis of aqueous solutions of ruthenium(III) hexa-ammine and chloropenta-ammine.
J. CHEM. SOC. PT. A. (8): 1246-50 (1970)

70-0197 Behar, D.; Shapira, D.; Treinin, A.
UNPUBLISHED DATA

70-0198 Land, E.J.; Swallow, A.J.
One-electron reactions in biochemical systems as studied by pulse radiolysis. III. Ubiquinone.
J. BIOL. CHEM. 245(8): 1890-4 (1970)

70-0211 Michael, B.D.; Hart, E.J.
The rate constants of hydrated electron, hydrogen atom, and hydroxyl radical reactions with benzene, 1,3-cyclohexadiene, 1,4-cyclohexadiene, and cyclohexene.
J. PHYS. CHEM. 74(15): 2878-84 (1970)

70-0225 Balkas, T.I.; Fendler, J.H.; Schuler, R.H.
Radiolysis of aqueous solutions of methyl chloride. The concentration dependence for scavenging electrons within spurs.
J. PHYS. CHEM. 74(26): 4497-505 (1970)

70-0226 Fielden, E.M.; Stevens, G.C.
UNPUBLISHED DATA

70-0240 Badiello, R.; Fielden, E.M.
Pulse radiolysis of selenium containing radioprotectors. I. Selenourea.
INTERN. J. RADIAT. BIOL. 17(1): 1-14 (1970)

70-0241 Pruetz, W.A.; Land, E.J.
Chemiluminescent reactions after pulse radiolysis of aqueous solutions of acriflavin. Effects of halides and pseudo halides.
J. PHYS. CHEM. 74(10): 2107-14 (1970)

70-0242 Peled, E.; Czapski, G.
Studies on the molecular hydrogen formation in the radiation chemistry of aqueous solutions.
J. PHYS. CHEM. 74(15): 2903-11 (1970)

70-0243 Barker, G.C.; Fowles, F.;Sammon, D.C.; Stringer, B.
Pulse radiolytic induced transient electrical conductance in liquid solutions. Part 1. Technique and the radiolysis of water.
TRANS. FARADAY SOC. 66(6): 1498-508 (1970)

70-0253 Husain, A.; Ovadia, J.; Grossweiner, L.I.
Pulse radiolysis of the eosin-human serum albumin complex.
TRANS. FARADAY SOC. 66(6): 1472-84 (1970)

70-0263 Baxendale, J.H.
The pulse radiolysis of coordination complexes in aqueous solution.
QUAD. RIC. SCI. 68: 43-61 (1970)

70-0271 Fendler, J.H.; Patterson, L.K.
Micellar effects on the reactivity of the hydrated electron with benzene.
J. PHYS. CHEM. 74(26): 4608-9 (1970)

70-0371 Getoff, N.; Schwoerer, F.
Pulsradiolytische Bestimmung von Geschwindigkeitskonstanten der Reaktionen einiger Amine mit OH und e_{aq}^-.
INTERN. J. RADIAT. PHYS. CHEM. 2(2): 81-9 (1970)

70-0407 Bullock, G.; Cooper, R.
Reactions of aqueous trifluoromethyl radicals.
TRANS. FARADAY SOC. 66(572): 2055-64 (1970)

70-0411 Ebert, M.; Simic, M.
UNPUBLISHED DATA

70-0417 Fel', N.S.
Determination of the rate constant of the reaction of e_{aq}^- with an acceptor in neutral water by a pulsed method.
HIGH ENERGY CHEM. 4(2): 155-6 (1970) (translated from KHIM. VYS. ENERG.)

70-0482 Hart, E.J.; Anbar, M.
The Hydrated Electron.
Wiley-Interscience, New York, 1970, 267p.

70-0509 Phillips, G.O.; Worthington, N.W.
Effects of ionizing radiations on glucuronic acid.
RADIATION RES. 43: 34-44 (1970)

70-0560 Willson, R.L.
Pulse radiolysis studies of electron transfer in aqueous disulphide solutions.
CHEM. COMMUN. (21): 1425-6 (1970)

70-0567 Greenstock, C.L.
Radiation chemistry of orotic acid as studied by pulse radiolysis.
TRANS. FARADAY SOC. 66: 2541-50 (1970)

70-0605 Bronskill, M.J.; Wolff, R.K.; Hunt, J.W.
Picosecond pulse radiolysis studies. I. The solvated electron in aqueous and alcohol solutions.
J. CHEM. PHYS. 53(11): 4201-10 (1970)

70-0657 Chutny, B.; Swallow, A.J.
Aromatic anions and free radicals in the pulse radiolysis of aqueous solutions of benzonitrile.
TRANS. FARADAY SOC. 66: 2847-54 (1970)

70-0749 Brusentseva, S.A.
The salt effect during pulsed radiolysis of neutral water and alkaline solutions.
HIGH ENERGY CHEM. 4(4): 339-40 (1970) (translated from KHIM. VYS. ENERG.)

70-7004 Burak, I.; Shapira, D.; Treinin, A.
The photochemistry of N_3^- in aqueous solution at 2288 and 2139 A.
J. PHYS. CHEM. 74(3): 568-73 (1970)

70-7116 Hickel, B.; Schmidt, K.H.
Kinetic studies with photogenerated hydrated electrons in aqueous systems containing nitrous oxide, hydrogen peroxide, methanol, or ethanol.
J. PHYS. CHEM. 74(12): 2470-4 (1970)

71-0007 Peled, E.; Mirski, U.; Czapski, G.
On the contribution of H atoms to $G(H_2)$ in the radiation chemistry of aqueous solutions.
J. PHYS. CHEM. 75(1): 31-5 (1971)

71-0018 Pecht, I.; Faraggi, M.
The reduction of cytochrome-C by hydrated electrons.
FEBS (FED. EUR. BIOCHEM. SOC.) LETT. 13(4): 221-4 (1971)

71-0026 Balkas, T.I.; Fendler, J.H.; Schuler, R.H.
The radiation chemistry of aqueous solutions of $CFCl_3$, CF_2Cl_2 and CF_3Cl.
J. PHYS. CHEM. 75(4): 455-66 (1971)

71-0030 Koester, R.; Asmus, K.-D.
UNPUBLISHED DATA (published in part as 71-0709).

71-0041 Getoff, N.; Schwoerer, F.; Markovic, V.M.; Sehested, K.; Nielsen, S.O.
Pulse radiolysis of oxalic acid and oxalates.
J. PHYS. CHEM. 75(6): 749-55 (1971)

71-0128 Phillips, G.O.; Power, D.M.; Sewart, M.
Effects of γ-irradiation on sodium sulphacetamide.
RADIATION RES. 46(2): 236-50 (1971)

71-0171 Gruenbein, W.; Henglein, A.; Stevens, G.; Beck, G.
Vielfachpuls-Radiolyse: Sukzessive Anlagerung zweier hydratisierter Elektronen an Sauerstoff, Nitrobenzol und Nitromethan.
BER. BUNSENGES. PHYSIK. CHEM. 75(2): 126-34 (1971)

71-0175 Jayson, G.G.; Stirling, D.A.; Swallow, A.J.
Pulse- and X-radiolysis of 2-mercaptoethanol in aqueous solution.
INT. J. RADIAT. BIOL. 19(2): 143-56 (1971)

71-0247 Aldrich, J.E.; Bronskill, M.J.; Wolff, R.K.; Hunt, J.W.
Picosecond pulse radiolysis. III. Reaction rates and reduction in yields of hydrated electrons.
J. CHEM. PHYS. 55(2); 530-9 (1970)

71-0709 Koester, R.; Asmus, K.-D.
Die Reaktionen chlorierter Aethylene mit hydratisierten Elektronen und OH-Radikalen in waessriger Loesung.
Z. NATURFORSCH. B 26(11): 1108-16 (1971)

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16. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.)

Rates of reactions of hydrated electrons with over 700 different organic and inorganic molecules, ions, and transients have been tabulated. Most of the data are derived from pulse radiolysis of aqueous solutions; results from photolysis and from steady-state radiolysis by competition kinetics are also included.

17. KEY WORDS (Alphabetical order, separated by semicolons)
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