

SC-Database

Software version = 5.81 Data version = 4.62

Experiment list contains 41 experiments for
(no ligands specified)

Metal : Si++++

(no references specified)

(no experimental details specified)

e- HL Electron (442)
Electron;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Si++++	oth	none	25°C	0.0	U				1952LAb	(934) 1

K=-57.9(-860 mV)

K: SiO2(s)+4H+4e=Si(s)+2H2O. From thermodynamic data. K(SiF6+4e=Si(s)+6F)=-84(1200 mV). K(Si(s)+4H=4e=SiH4(g))=6.9(102 mV)

F- HL Fluoride CAS 7644-39-3 (201)
Fluoride;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Si++++	ISE	NaClO4	25°C	3.00M	C	M			1988CIa	(7156) 2

B(0,1)=2.40
B(-1,1)=1.66
B(0,4)=9.35
B(1,6)=13.88

B(2,6)=13.23. Medium: LiClO4. B(p,q)=Si(OH)4+qHF=Si(OH)4Fq+pH

Si++++	ISE	KCl	25°C	1.00M	U	T			1986CIa	(7157) 3
--------	-----	-----	------	-------	---	---	--	--	---------	----------

K(K2SiF6)=17.0
K: Si(OH)4 + 6HF + 2K = K2SiF6(s) + 2H + 4H2O

Si++++	ISE	NaCl	25°C	0.40M	U				1984GGb	(7158) 4
--------	-----	------	------	-------	---	--	--	--	---------	----------

K(Si(OH)4+4H+6F=SiF6+4aq)=29.5

Si++++	ISE	NaCl	25°C	0.20M	U	I			1984G0a	(7159) 5
--------	-----	------	------	-------	---	---	--	--	---------	----------

K(Si(OH)4+6F+4H=SiF6+4aq)=29.4

Si++++	ISE	NaNO3	25°C	1.00M	U				1982CLa	(7160) 6
--------	-----	-------	------	-------	---	--	--	--	---------	----------

K(Si(OH)4+HF=Si(OH)3F)=2.23
K(Si(OH)4+6HF=SiF6)=12.3

Si++++	ISE	NaCl	25°C	1.0M	C	T			1980BSa	(7161) 7
--------	-----	------	------	------	---	---	--	--	---------	----------

K=29.98

Quinhydrone+Felecrode. Reaction: Si(OH)4 + 4H + 6F = SiF6 + 4H2O

At 0 C: K=31.60; 60 C: K=28.23

Si++++	gl	oth/un	25°C	0.20M	U		1979MMc (7162)	8
						B(SiF6)=16.90		
Si++++	ISE	NaClO4	25°C	0.10M	C		1978RBd (7163)	9
						K(H4SiO4+6F+4H=SiF6+4H2O)=30.18		
						Method: F ion selective electrode. Medium: 0.10 M NaClO4 or NaCl or NaNO3.		
Si++++	gl	none	25°C	0.0	U		1978SKb (7164)	10
						K(HSiF6=H+SiF6)=1.83		
						K(H2SiF6=HSiF6+H)=0.13		
Si++++	kin	NaClO4	25°C	0.40M	U T		1974PLb (7165)	11
						K(SiF5+HF=SiF6+H)=1.89		
						Medium: LiClO4. K=2.10(0 C)		
Si++++	ix	oth/un	?	?	U		1972PAb (7166)	12
						K6=3.00		
Si++++	nmr	oth/un	25°C	var	U T H		1971BZd (7167)	13
						K5(SiF4+HF=SiF5+H)=2.40		
						K6(SiF5+HF=SiF6+H)=1.60		
						DH(K5)=-6.3 kJ mol ⁻¹ , DH(K6)=-32.6. K5=2.46, K6=1.92(10 C); K5=2.35, K6=1.33(40 C); K5=2.30, K6=1.10(54 C)		
Si++++	ix	NaClO4	?	0.20M	U I M		1971KKe (7168)	14
						K(UO2+HSiF6=UO2SiF6+H)=1.45		
						Medium: HClO4. K=1.49(I=0.5), 1.45(I=1), 1.40(I=2)		
Si++++	ix	NaClO4	?	1.0M	U I M		1971KKe (7169)	15
						K(NpO2+HSiF6=NpO2SiF6+H)=1.97		
						Medium: HClO4. K=1.77(I=2). K(PuO2+HSiF6=PuO2SiF6+H)=2.40(I=1); 2.21(I=2)		
Si++++	nmr	none	25°C	0.0	U M		1970HCa (7170)	16
						K(Fe(II)+SiF6)=-0.09		
						K(Co(II)+SiF6)=-0.12		
						K(Ni(II)+SiF6)=-0.22		
						K(Cu(II)+SiF6)=-0.59		
Si++++	sp	oth/un	?	var	U		1969KLd (7171)	17
						K(SiF4(H2O)OH+H)=5-5.6		
Si++++	sol	NaClO4	?	4.0M	U		1968KLa (7172)	18
						Ks(2SiO2(s)+4SiF6+8H)=-7.15		
						Ks(SiO2(s)+5SiF6+4H)=-1.05		
Si++++	ix	KCl	?	0.50M	U		1968PMF (7173)	19
						K6=3.96		
Si++++	kin	none	11°C	0.0	U		1946RYb (7174)	20
						K5K6=6.19		

$K(\text{Si}(\text{OH})_4+4\text{HF}=\text{SiF}_4+4\text{H}_2\text{O})=7.98$. $K(\text{Si}(\text{OH})_4+6\text{HF}=\text{SiF}_6+2\text{H}+4\text{H}_2\text{O})=26.27$

Si++++ kin none 20°C 0.0 U 1926RHa (7175) 21
K5.K6=6.0

MoO4-- H2L Molybdate (443)
Molybdate;

Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo

Si++++ vlt oth/un ? ? U 1959GHa (8754) 22
K=10.82

pH 2.5. K: $\text{Si}(\text{OH})_4+2\text{H}_6\text{Mo6O21}=6\text{H}_2\text{O}+\text{H}_4\text{SiMo12O40}$

Si++++ sp oth/un rt ? U 1959KRc (8755) 23
 $K(\text{SiO}_2(\text{aq})+4\text{H}_2\text{Mo2O7}=\text{H}_4\text{SiMo8O28}(\text{alpha or beta})+2\text{H}_2\text{O})=11.8$? (pH 2-4)
 $K(\text{SiO}_2(\text{aq})+4\text{H}_2\text{Mo3O10}=\text{H}_4\text{SiMo12O40}(\text{gamma})+2\text{H}_2\text{O})=13.7$? (pH 1.5)

Si++++ gl none 30°C 0.0 U 1959TEa (8756) 24
K(H14SiMo12O46+H)=2.17
K(H13SiMo12O46+H)=2.58 ?

OH- HL Hydroxide (57)
Hydroxide;

Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo

Si++++ sol NaCl 25°C 0.10M C 1998PSc (12123) 25
Ks($\text{SiO}_2+2\text{H}_2\text{O}=\text{Si}(\text{OH})_4$)=-2.74

Method: solubility of $\text{SiO}_2(\text{am})$ in NaCl.

S04-- H2L Sulfate CAS 7664-93-9 (15)
Sulfate;

Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo

Si++++ sol none 25°C 0.0 C 1982Mcc (16536) 26
K($\text{Si}(\text{OH})_4+\text{S04}$)=-0.544

Method: solubility of $\text{SiO}_2(\text{am})$ in $\text{Na}_2\text{S04}$ media. Data for 0-35 C.

At 200 C, K=-0.412

V04--- H3L CAS 15457-75-7 (1586)
Vanadate; $\text{V02}(\text{OH})_3$ -- or polymers

Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo

Si++++ nmr NaCl 25°C 0.60M U I 1996HHa (17390) 27
K(H3SiO4+H+HV04=H3VSiO7)=12.66
K(H3SiO4+HV04=H2VSiO7)=1.12
*K(H3VSiO7)=-11.54

In 3 M NaCl: $K(H_3SiO_4+H+H_2O=H_3SiO_7+H_2O)=12.83$, $K(H_3SiO_4+H_2O=H_2SiO_7)=1.20$
 $*K(H_3SiO_7)=-11.63$. 51V and 170 NMR used. All values approximate.

CH4O L Methyl alcohol CAS 67-56-1 (597)
 Methanol; CH3.OH

 Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo

Si++++ EMF alc/w 20°C 100% U 1971GSa (17900) 28
 $K(Si+4L=Si(H-1L)_4+4H) > 1$

Medium: MeOH, 1 M Li tosylate

C5H5N L Pyridine CAS 110-86-1 (31)
 Pyridine, Azine;

 Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo

Si++++ cal non-aq 25°C 100% U HM 1967MOB (36678) 29
 Medium: n-hexane. $DH(SiF_4(l)+2L(l)=SiF_4L_2(c))=-121.2$ kJ mol⁻¹, $DH(SiF_4(g)+2L(l)=SiF_4L_2(c))=-138.4$, $DH(SiCl_4(l)+2L(l)=SiCl_4L_2(c))=-216.1$ plus others

C6H6O2 H2L Catechol CAS 120-80-9 (534)
 1,2-Dihydroxybenzene, pyrocatechol; HO.C6H4.OH

 Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo

Si++++ gl NaCl 25°C 0.10M M 1998PSc (43820) 30
 $K(Si(OH)_4+2H_2L=SiL_3+2H+4H_2O)=-12.0$
 Method: solubility of SiO2(am) in 0.1 m NaCl/0.1 m H2L.

Si++++ gl NaCl 25°C 0.60M C 1991ONa (43821) 31
 $B(-2,1,3)=-10.44$
 $B(p,q,r); pH+qSi(OH)_4+rH_2L=Hp(Si(OH)_4)q(H_2L)r$

Si++++ nmr oth/un 25°C 0.20M U 1990EPa (43822) 32
 $K=-12.42$

K: $Si(OH)_4+3H_2L=SiL_3+4H_2O+2H$. Medium: Various buffers. With 1,2-dihydroxy-4,5-dichlorobenzene, K=-8.49; -4-nitrobenzene, K=-7.74; -3,4-dinitro-, -4.37

Si++++ EMF R4N.X 20°C 1.00M U M 1971GSa (43823) 33
 $K(SiA_4+3H_2L+2A=SiL_3+6HA)=18.1$

Medium: MeOH, 1.0 Me4NCl. HA=MeOH

C6H6O3 H3L Pyrogallol CAS 87-66-1 (696)
 1,2,3-Trihydroxybenzene; C6H3(OH)3

 Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo

Si++++ gl NaCl 25°C 0.60M C 1992FOa (43978) 34
 $B(-2,1,3)=-10.02$

B(p,q,r) pH+q(Si(OH)4)+r(H3L)=Hp(Si(OH)4)q(H3L)r

C7H6O2 HL Tropolone CAS 533-75-5 (3129)
2-Hydroxycyclohepta-2,4,6-trien-1-one;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Si++++	gl	NaCl	25°C	0.60M	C				1985SIa (53690)	35
									B(H4SiO4+3HL+H=SiL3+4H2O)=7.08	
									K(2H4SiO4=(H4SiO4)2)=1.2	

Additional method: 29Si-NMR

C7H6O4 H3L Protocatechuic CAS 99-50-3 (875)
3,4-Dihydroxybenzoic acid; C6H3(OH)2.COOH

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Si++++	gl	NaCl	25°C	0.60M	C				1992FOa (54697)	36
									B(-5,1,3)=-21.95	

B(p,q,r); pH+r(Si(OH)4)+q(H3L)=Hp(Si(OH)4)q(H3L)r

C7H6O5 H4L Gallic acid CAS 149-91-7 (446)
3,4,5-Trihydroxybenzoic acid; C6H2(OH)3.COOH

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Si++++	gl	NaCl	25°C	0.60M	C				1992FOa (54763)	37
									B(-5,1,3)=-21.26	

B(p,q,r); pH+q(Si(OH)4)+r(H4L)=Hp(Si(OH)4)q(H4L)r

C8H11NO2 H2L Dopamine CAS 579-59-9 (251)
2-(3',4'-Dihydroxyphenyl)ethylamine; (HO)2.C6H3.CH2.CH2.NH2

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Si++++	gl	NaCl	25°C	0.60M	U				1993SSa (61085)	38
									B(-2,1,3)=9.70	
									B(-3,1,3)=19.33	

B(p,q,r): pH+qSi(OH)4+rH3L=Hp(Si(OH)4)q(H3L)r

C9H7N L CAS 119-65-3 (487)
Isoquinoline;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Si++++	cal	non-aq	25°C	100%	U	H			1967MOB (64027)	39
Medium: n-hexane. Many data; DH(SiF4(l)+2L(l)=SiF4L2(c))=-116.2 kJ mol ⁻¹										
DH(SiF4(g)+2L(l)=SiF4L2(c))=-133.3, DH(SiCl4(l)+2L(l)=SiCl4L2(c))=-72.7										

C9H11NO4 H3L DOPA CAS 59-92-7 (5)

2-Amino-3-(3,4-dihydroxyphenyl)propanoic acid;H₂NCH(CH₂C₆H₃(OH)₂)COOH

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Si++++	gl	NaCl	25°C	0.60M	U				1993SSa (66402)	40
								B(-2,1,3)=-10.08		
								B(-3,1,3)=-19.35		

B(p,q,r): pH+qSi(OH)₄+rH₃L=Hp(Si(OH)₄)q(H₃L)r

C12H8N₂ L Phenanthroline CAS 66-71-7 (144)

1,10-Phenanthroline;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Si++++	gl	NaCl	25°C	0.10M	C	H			2000KEa (80513)	41
								Kout(SiL ₃ +L)=1.50		
								K(SiL ₃ =Si(OH)L ₂ +L+H)=-8.05		

By calorimetry: DH(SiL₃+L)=-16 kJ mol⁻¹, DS=-20 J K⁻¹ mol⁻¹.

DH(SiL₃=Si(OH)L₂+L+H)=-15, DS=100.

REFERENCES

- 2000KEa R Kanzaki,T Egashira,T Nakazoto; Phys.Chem.Chem.Phys.,2,3825 (2000)
 1998PSc G Povrovski,J Schott; Geochim.Cosmo.Acta,63,3413 (1998)
 1996HHa O Howarth,J Hastings; J.Chem.Soc.,Dalton Trans.,4189 (1996)
 1993SSa I Fattapour Sedeh,S Sjoberg,L Ohman; J.Inorg.Biochem.,50,119 (1993)
 1992FOa I Fattapour Sedeh,L Ohman,S Sjoberg; Acta Chem.Scand.,46,933 (1992)
 1991ONa L Ohman,A Nordin,I Fattapour Sedeh et al; Acta Chem.Scand.,45,335 (1991)
 1990EPa D Evans,J Parr,E Coker; Polyhedron,9,813 (1990)
 1988CIa L Ciavatta,M Iuliano,R Porto; Polyhedron,7,1773 (1988)
 1986CIa l Ciavatta; Ann.Chim.(Rome),76,133 (1986)
 1985Sia J Siepak; Pol.J.Chem.,59,651 (1985)
 1984GGb N Golovnev,I Golovneva; Zh.Neorg.Khim.,29,1173(673) (1984)
 1984GOa N Golovnev; Zh.Neorg.Khim.,29,2526(1442) (1984)
 1982CLa Chen Rongsan,Liu Haicheng,Wang Jinxi etc; Chem.J.of Chin.Univ.,19 (1982)
 1982MCC W Marshall,C Chen; Geochim.Cosmo.Acta,46,367 (1982)
 1980BSa R Busey,E Schwartz,R Mesmer; Inorg.Chem.,19,758 (1980)
 1979MMC V Masalovich,G Moshkareva et al; Zh.Neorg.Khim.,24,353(196) (1979)
 1978RBd C Roberson,R Barnes; Chem.Geol.,21,239 (1978)
 1978SKb T Sudakova,V Krasnoshchekov et al; Zh.Neorg.Khim.,23,2092(1150) (1978)
 1974PLb V Plakhotnik; Zh.Fiz.Khim.,48,2809(E:1651) (1974)
 1972PAb N Parpiev; Uzbeksk.Khim.Zh.,6,17 (1972)
 1971BZd P Borodin,N Zao; Zh.Neorg.Khim.,16,3248(E:1720) (1971)
 1971GSa R Gut,E Schmid,J Serrallach; Helv.Chim.Acta,54,593;609 (1971)
 1971KKe V Krylov,E Komarov,M Pushlenkov; Radiokhim.,13,430(E:445) (1971)
 1970HCa R Haque,N Cyr; Trans.Faraday Soc.,66,1848 (1970)
 1969KLd K Kleboth; Monatsh.Chem.,100,1057 (1969)
 1968KLa K Kleboth; Monatsh.Chem.,99,1177 (1968)
 1968PMF N Parpiev,I Maslennikov; Uzbeksk.Khim.Zh.,2,6 (1968)
 1967MOB J Miller,M Onyszchuk; J.Chem.Soc.(A),1132 (1967)

1959GHa K Grasshoff,H Hahn; Zh.Anal.Khim.,168,247 (1959)
1959KRc W Kemula,S Rosolowski; Bull.Acad.Polon.Sci.Chim.,7,351 (1959)
1959TEa A Tourky,H El-Shamy,I Issa; Egypt.J.Chem.,2,13 (1959)
1952LAB W Latimer; "Oxidation Potentials",Prentice Hall,NY (1952)
1946RYb I Ryss; Zh.Obshch.Khim.,16,331 (1946)
1926RHa A Rees,L Hudleston; J.Chem.Soc.,1334 (1926)

EXPLANATORY NOTES

DATA Flags are :-

T Data at other TEMPERATURES
I Data with various BACKGROUNDS
H Data for THERMOCHEMICAL quantities
M Data for TERNARY Complexes

END Experiments recorded for Dr. M. Filella, University of Geneva
from SC-Database on Sunday, 25 September, 2022 at 12:03:35