

SC-Database

Software version = 5.81 Data version = 4.62

Experiment list contains 355 experiments for
(no ligands specified)

4 metals : Np⁺⁺⁺, Np⁺⁺⁺⁺, NpO₂⁺, NpO₂⁺⁺

(no references specified)

(no experimental details specified)

e- HL Electron (442)
Electron;

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

Np⁺⁺⁺ oth oth/un 25°C 1.0M U 1952LAb (721) 1
K(Np+3e=Np(s))=-94.1(-1860 mV)

From thermodynamic data

Br- HL Bromide CAS 10035-10-6 (19)
Bromide;

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

Np⁺⁺⁺ sp oth/un var U K1=-3.39 B2=-6.48 1966SMd (2156) 2
Medium:LiBr var

Cl- HL Chloride CAS 7647-01-0 (50)
Chloride;

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

Np⁺⁺⁺ ISE NaCl04 25°C 4.00M U 1974DCa (5300) 3
K(NpO₂+Cl)=-0.04

Np⁺⁺⁺ sp KCl ? var U K1=-2.42 B2=-4.96 1966SMd (5301) 4
Medium:LiCl var

OH- HL Hydroxide (57)
Hydroxide;

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

Np⁺⁺⁺ EMF none 25°C 0.0 U T H 1984LEa (11799) 5
*K1=-7.0
100 C: *K1=-5.3; 150 C: *K1=-4.5. Evaluated data

Np⁺⁺⁺ EMF oth/un 25°C 0.30M U 1974MKe (11800) 6
*K1=-7.43

PO₄--- H3L Phosphate CAS 7664-38-2 (176)

Phosphate;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np+++	EMF	none	25°C	0.0	U	T H			1984LEa (13269)	7
								K(Np+H2PO4)=2.4		
								K(Np+2H2PO4)=3.7		
								K(Np+3H2PO4)=5.6		

Evaluated data

Np+++	oth	none	?	0.0	U				1969M0c (13270)	8
								K(Np+H2L)=2.40		
								K(Np+2H2L)=3.73		
								K(Np+3H2L)=5.64		

Methods: solubility, ion exchange, distribution, EMF

C2H4O2 HL Acetic acid CAS 64-19-7 (36)
Ethanoic acid; CH3.COOH

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np+++	oth	none	?	0.00	U			K1=2.77 B2=5.04 B3=6.58	1969M0c (20082)	9

Data from survey of literature data

C2H4O3 HL Glycolic acid CAS 79-14-1 (33)
2-Hydroxyethanoic acid; HO.CH2.COOH

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np+++	oth	none	?	0.00	U			K1=3.60 B2=6.15 B3=7.30	1969M0c (20597)	10

Data from survey of literature data

C4H8O2 HL Isobutyric acid CAS 79-31-2 (573)
2-Methylpropanoic acid; CH3.CH(CH3).COOH

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np+++	oth	none	?	0.00	M			K1=3.60 B2=6.10 B3=7.30	1969M0c (33241)	11

Data from survey of literature data

C6H9NO6 H3L NTA CAS 139-13-9 (191)
Nitrilotriethanoic acid; N(CH2.COOH)3

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np+++	oth	none	?	0.00	M			K1=12.7	1969M0c (46953)	12

Constant obtained from survey of literature data

C10H16N2O8 H4L EDTA CAS 60-00-4 (120)
1,2-Diaminoethane-N,N,N',N'-tetraethanoic acid, Sequestric acid;

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

Np+++ sp oth/un 22°C 0.1M U K1=17.21 1974K Md (74026) 13

Np+++ oth oth/un ? 0.0 U K1=20.5 1969M Ib (74027) 14
From survey of literature data

C14H22N2O8 H4L CDTA CAS 482-54-2 (200)
trans-1,2-Diaminocyclohexane-N,N,N',N'-tetraethanoic acid;

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

Np+++ oth oth/un ? 0.0 U K1=21.2 1969M Oc (88741) 15

Method: from survey of literature data

C14H23N3O10 H5L DTPA CAS 67-43-6 (238)
Diethylenetriamine-pentaethanoic acid; HOOC.CH2.N(CH2.CH2.N(CH2.COOH)2)2

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

Np+++ sp oth/un 22°C 0.1M U K1=22.38 1974K Md (89339) 16

Np+++ oth oth/un ? 0.0 U K1=25.2 1969M Oc (89340) 17

From survey of literature data

e- HL Electron (442)
Electron;

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

Np++++ EMF KNO3 25°C 1.0M U I 1958S Pa (722) 18

K(Np+e=Np(III))=1.93(114 mV)

Medium: HNO3. In 0.5 M H2SO4: K=-0.78(-46 mV), 1 M HCl: K=2.45(145 mV),
1 M HClO4: K=2.37(140 mV)

Np++++ EMF NaClO4 25°C 1.03M U T 1952C Ha (723) 19

K(Np+e=Np(III))=2.62(155.1 mV)

Medium: HClO4. At 15.2 C: K=2.48(142.1 mV), 35.4 C: 2.77(169.4 mV)

Np++++ vlt KCl 25°C 1.0M U 1950H Kb (724) 20

K(Np+e=Np(III))=2.40(142 mV)

Np++++ EMF KCl 25°C 1.0M U 1949H Ma (725) 21

K(Np+e=Np(III))=2.32(137 mV)

Br- HL Bromide CAS 10035-10-6 (19)
Bromide;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg K values	Reference	ExptNo
Np++++	dis	oth/un	25°C	1.00M	U		K1=-0.21 B2=-0.78	1975RRa (2157)	22

				H2L	Carbonate		CAS 465-79-6	(268)	
Carbonate;									
Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg K values	Reference	ExptNo
Np++++	oth	none	25°C	0.0	M			1999KRa (3302)	23
							B4=ca. 35.1		
Evaluation of literature data.									
Np++++	sol	oth/un	25°C	0.05M	U		K1<22.5 B2<27.9	1985RRa (3303)	24
							B3 <33.2		
							B4 <38.5		
							B5 <41.6		
Np++++	EMF	none	25°C	0.0	U T H			1984LEa (3304)	25
							B5=38.3		
100 C: B5=42; 150 C: B5=46. Evaluated data									
Np++++	sol	oth/un	?	var	U I		B2=13.0	1971M0d (3305)	26
							B(Np(OH)4L)=53.08		
							B(NpO2(OH)L2)=4.84		
							B(NpO2(OH)2L)=23.32		
Medium: (NH4)2CO3. At I=0 (corr), B2=14.2									

				HL	Chloride		CAS 7647-01-0	(50)	
Chloride;									
Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg K values	Reference	ExptNo
Np++++	EMF	none	25°C	0.0	U T H		K1=0.2 B2=-0.1	1984LEa (5302)	27
At 100 C: K1=1.5, B2=3.5; 150 C: K1=3, B2=5. Evaluated data									
Np++++	dis	NaClO4	25°C	2.00M	U		K1=-0.046 B2=-0.15	1975PRb (5303)	28
By extraction from 2M HClO4/HCl with dinonylnaphthalene sulfonic acid									
Np++++	sp	NaClO4	?	9.0M	U		K1=2.12 B2=3.04	1973BMe (5304)	29
Medium: HClO4									
Np++++	dis	NaClO4	25°C	4.0M	U		K1=-0.11 B2=-0.10	1971DCb (5305)	30
Np++++	dis	NaClO4	20°C	2.0M	U I		K1=0.04 B2=-0.15	1966SNe (5306)	31
Medium: HClO4. When I=1: K1=-0.04, B2=-0.24, B3=-0.48; I=0.5: K1=0.15									
Np++++	sp	NaClO4	25°C	2.0M	U		K1=-0.28	1962STb (5307)	32

Np++++ EMF NaClO4 25°C 1.0M U K1=-0.3 1958SPa (5308) 33

CrO4-- H2L Chromate CAS 7738-94-5 (2382)
Chromate;

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

Np++++ sp NaClO4 10°C 0.20M U TIH 1972BTc (6499) 34

*K1=1.76
17 C; *K1=1.78. 25.0 C; *K1=1.80. DH(*K1)=4.3 kJ mol⁻¹

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

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

Np++++ ISE NaClO4 23°C 1.0M C K1=8.17 B2=14.52 1990SCa (7056) 35
B3=20.05
B4=25.95

Medium: 1.0 M HClO4/NaClO4. Method: F ion selective electrode.

Np++++ EMF none 25°C 0.0 U T H K1=8.7 B2=15.4 1984LEa (7057) 36
100 C: K1=8.8, B2=16.0; 150 C: K1=9.0, B2=16.6. Evaluated data

Np++++ dis NaClO4 25°C 2.00M U K1=4.70 B2=7.38 1976BRb (7058) 37

Np++++ dis NaClO4 25°C 2.00M U K1=4.72 1975PRb (7059) 38
By extraction from 2M HClO4/HCl with dinonylnaphthalene sulfonic acid

Np++++ ix NaClO4 25°C 1.0M U I K1(Np+HF=NpF+H)=4.56 1969KKc (7060) 39

Medium: HClO4. K=4.70(I=2)

Np++++ ix KNO3 ? 1.0M U I K(Np+HF=NpF+H)=4.23 1969KKd (7061) 40

Medium: HNO3. K=4.11(I=2)

Np++++ EMF NaClO4 20°C 4.0M U 1966ABa (7062) 41

K(NpF+HF=NpF2+H)=2.69
K(NpF2+HF=NpF3+H)=2.34
K(NpF3+HF=NpF4+H)=1.3

Medium: HClO4. By cation exchange: K(Np+HF=NpF+H)=4.82, K(NpF+HF=NpF2+H)=2.75

MoO4-- H2L Molybdate (443)
Molybdate;

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

Np++++ oth oth/un ? U 1974TGb (8744) 42

K2'=5.73

K3'=4.28
 K4'=3.64
 K5'=3.24

K6'=K7'=K8'=ca. 3. Kn: H+(H(n-1)A) (9-n)- where A = NpMo12042 8-

NO3- HL Nitrate CAS 7697-37-2 (288)

Nitrate;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg K values	Reference	ExptNo
Np++++	sp	KNO3	?	var	U			1973RAa (9812)	43
							K(Np(H2O)8+6L=Pu6+8H2O)=6.11		
Np++++	sp	NaClO4	?	9.0M	U		K1=0.90 B2=2.06	1972BMD (9813)	44
Medium: HClO4									
Np++++	dis	NaClO4	25°C	4.0M	U		K1=-0.15 B2=-0.74	1971DCb (9814)	45
Np++++	dis	NaClO4	25°C	2.0M	U	I	K1=0.83 B2=1.30	1971MOf (9815)	46
							B3=1.55 B4=1.55		
Medium: 2 M LiClO4. In 4 M LiClO4, K1=0.72, B2=1.08, B3=1.23, B4=1.16									
Np++++	dis	NaClO4	20°C	8.0M	U		K1=-1.52 B2=-0.17	1970LKa (9816)	47
							B3=-0.82 B4=-0.89		
Np++++	sol	oth/un		2.0M	U		K1=0.83 B2=1.30	1969MOc (9817)	48
							B3=1.55 B4=1.55		
Np++++	sp	NaClO4	25°C	2.0M	U		K1=0.34 B2=0.18	1966RYa (9818)	49
Np++++	dis	NaClO4	20°C	2.0M	U	I	K1=0.30 B2=0.34	1966SNe (9819)	50
Medium: HClO4. K1=0.34(I=1),0.45(I=0.5); B2=0.08(I=1); B3=-0.26(I=1) I=0 corr: K1=1.68									
Np++++	sp	NaClO4	25°C	2.0M	U		K1=0.11	1962STb (9820)	51
Np++++	EMF	NaClO4	25°C	1.0M	U		K1=0.38	1958SPa (9821)	52

OH- HL Hydroxide (57)
 Hydroxide;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg K values	Reference	ExptNo
Np++++	sp	NaClO4	25°C	0.1M	C		K1=12.07	2003YFa (11801)	53
							K3=1.11		

in HClO4/NaClO4

For I=0.3 M K1=11.96; for I=1.0 M K1=11.76; for I=0 M K1=12.77; B2=24.3

Np++++ oth none 25°C 0.0 M 1999KRa (11802) 54
*B4=-10

Evaluation of literature data.

Np++++ oth KNO3 25°C 0.10M C 1988NTb (11803) 55
Kso(NpO2)=-55.4

Method: paper electrophoresis using 237Np(V). Medium: KNO3, 0.005-0.10 M

Np++++ sol oth/un 25°C 0.05M U 1985RRa (11804) 56
*B(1,5) < -24.7

Np++++ EMF none 25°C 0.0 U T H 1984LEa (11805) 57
*K1=-1.0

*B2=-2.8

*B3=-5.8

*B4=-9.6, *B5=-14

100 C, values: 0.7, 0, -2, -6, -11. Evaluated data

Np++++ oth NaClO4 25°C dil U 1980SGe (11806) 58
K(Np(OH)2+H=Np(OH))=4.5
K(Np(V)O2(OH)+H=NpO2(V))=8.7

Method: pulse irradiation

Np++++ sol oth/un 20°C U 1971M0d (11807) 59
Kso(Np(OH)4(s)=Np+4OH)=-55.2

Np++++ gl NaClO4 25°C 2.0M U I 1959HSc (11808) 60
*K1=-2.3

In D2O *K1=-2.5

O2-- H2L Peroxide CAS 7772-84-1 (2813)

Peroxide; -0.0-

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

Np++++ sp oth/un 25°C 1.0M U 1970BSe (12690) 61
K(2Np+H2L=complex(?))=4.5

P04--- H3L Phosphate CAS 7664-38-2 (176)

Phosphate;

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

Np++++ EMF none 25°C 0.0 U T H 1984LEa (13271) 62

K(Np+HPO4)=12.9

K(Np+2HPO4)=23.7

K(Np+3HPO4)=33.4

K(Np+4HPO4)=43.2

K(Np+5HPO4)=52.0. At 150 C: values are 24, 33, 45, and 55 respectively.

Evaluated data

 Np++++ oth none 25?°C 0.0 U 1967MEb (13272) 63
 K(Np(HL)2(s)=Np+2HL)=-28
 K(Np+HL)=12.4
 K(Np+2HL)=23.1
 K(Np+3HL)=32

Method: estimated from literature. K(Np+4HL)=41.0

P2W17O61----- Polytungstate (2102)
 alpha-Heterodiphospho-polytungstate (usually alpha1 isomer)

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

Np++++ sp oth/un 19°C 1.00M U B2=34 1980SHa (13730) 64

SCN- HL Thiocyanate CAS 463-56-9 (106)
 Thiocyanate;

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

Np++++ dis NaClO4 25°C 2.0M U K1=1.5 B2=2.06 1978RBb (15192) 65
 B3=2.53

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

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

Np++++ EMF none 25°C 0.0 U T H K1=5.5 B2=9.9 1984LEa (16407) 66
 100 C: K1=6.6, B2=11.8; 150 C: K1=7.5, B2=13.1. Evaluated data

 Np++++ dis NaClO4 25°C 2.00M U 1976BRb (16408) 67

K(Np+HL=NpL+H)=2.53
 K(Np+2HL=NpL2+2H)=4.00

 Np++++ kin NaClO4 25°C 1.0M U K1=2.56 B2=3.75 1976NMa (16409) 68

B(Np2L)=2.04
 B(Np2L2)=3.00

 Np++++ dis NaClO4 23°C 2.0M U 1973PRa (16410) 69

*K1=2.52
 *B2=4.01

Medium: HClO4

 Np++++ dis NaClO4 10°C 2.0M U T H 1973PRb (16411) 70

*K1=2.45
 *K2=1.5

Medium: HClO4. At 25 C: *K1=2.5, *K2=1.55; 40 C: *K1=2.54.

DH(*K1)=5.2 kJ mol-1

Np++++ dis NaClO4 10°C 2.0M U T 1973PRb (16412) 71

*K1=2.39

*K2=1.44

*K1=2.47, *K2=1.36(25.2 C). *K1=2.49, *K2=1.32(35.3 C)

Np++++ ix NaClO4 20°C 4.0M U 1966ABa (16413) 72

K(Np+HF=NpF+H)=2.70

K(NpF+HF=NpF2+H)=1.56

Medium: HClO4

Np++++ vlt NaClO4 25°C 3.0M U 1962Muc (16414) 73

*K1=2.49

*B2=3.58

Np++++ sp NaClO4 25°C 2.0M U K1=3.51 1962STb (16415) 74

Np++++ dis NaClO4 25°C 2.0M U T H K1=2.43 B2=3.47 1954SHa (16416) 75

At 10 C: K1=2.47, K2=0.91; 35.3 C: K1=2.40, K2=1.14. DH(K1)=16.8 kJ mol⁻¹,
DS=123 J K⁻¹ mol⁻¹; DH(K2)=25.9, DS=171

CH2O2 HL Formic acid CAS 64-18-6 (37)

Methanoic acid; H.COOH

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

Np++++ sp NaClO4 25°C 1.00M U K1=2.88 1984AKa (17627) 76

C2H2O4 H2L Oxalic acid CAS 144-62-7 (24)

Ethanedioic acid; (COOH)2

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

Np++++ dis NaClO4 25°C 1.00M U K1=9.22 B2=16.63 1976BRa (18991) 77

Np++++ sol oth/un 23°C ? U K1=8.64 B2=16.8 1967MEc (18992) 78

B3=23.2

B4=27.0

Np++++ sol NaClO4 26°C 1.0M U K1=9.63 B2=16.88 1964BSb (18993) 79

B3=23.69

Medium: HClO4. 24-28 C

Np++++ sol oth/un 20°C ? U 1958MGa (18994) 80

Kso=-22.07

C2H4O2 HL Acetic acid CAS 64-19-7 (36)

Ethanoic acid; CH3.COOH

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

 Np++++ oth oth/un ? 0.50M U K1=2.68 B2=4.76 1969M0c (20083) 81
 B3=7.49
 B4=9.67
 B5=12.0
 B6=14.7

Data from survey of literature data. B7=17.4, B8=20.2

Metal ion is NpO++

 C5H8O2 HL Acetylacetone CAS 123-54-6 (164)
 Pentane-2,4-dione; CH3.CO.CH2.CO.CH3

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np++++	dis	NaClO4	25°C	1.00M	U			K1=8.58 K3=6.71 K4=6.28	B2=17.23 1970LSc (38048)	82

 C5H9N3O4S H2L CAS 16907-58-7 (2106)
 Thiosemicarbazone-diethanoic acid; H2N.CS.NH.N(CH2.COOH)2

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np++++	sp	NaClO4	25°C	0.05M	U			B2=7.11	1988CDa (39571)	83

 C6H9NO6 H3L NTA CAS 139-13-9 (191)
 Nitrilotriethanoic acid; N(CH2.COOH)3

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np++++	sp	NaClO4	25°C	1.00M	U	T		K1=17.28 B2=32.06	1971EPb (46954)	84

 C6H12O6 HL a-ISA CAS 1518-54-3 (5925)
 a-Isosaccharinic acid;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np++++	sol	oth/un	25°C	0.11M	C				2003RHa (49623)	85

Ks(NpO2+H+L+H2O=Np(OH)3L)=2.57
 Ks(NpO2+H+2L=Np(OH)3L2)=4.68
 Ks(NpO2+L+2H2O=Np(OH)4L)=-4.76
 Ks(NpO2+2L=Np(OH)4L2)=-2.90

Solubility of NpO2(am) in 0.08 M NaI/ 0.01 M Na2S2O4, pH 5-12.
 Oxidation state determined by solvent extraction with dibenzoylmethane.

 C8H5O2F3S HL TTA CAS 326-91-0 (165)
 4,4,4-Trifluoro-1-(2-thienyl)butane-1,3-dione; F3C.CO.CH2.CO.C4H3S

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
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Np++++ dis NaClO4 25°C 2.00M U K1=1.68 1976BRb (58659) 86

Np++++ dis oth/un 25°C 0.45M C 1971CLb (58660) 87

B4=29.7

Extraction from edta solution, pH <0.35, I=0.45 M HNO3, into benzene using 239Np tracer. K(Np+4HL(org)=NpL4(org)+4H)=4.22.

C10H16N2O8 H4L EDTA CAS 60-00-4 (120)

1,2-Diaminoethane-N,N,N',N'-tetraethanoic acid, Sequestric acid;

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

Np++++ dis oth/un 25°C 0.45M C K1=22.9 1971CLb (74028) 88

K(Np+H4L=NpL+4H)=1.80

Extraction with tta from edta solution, pH <0.35, I=0.45 M HNO3, into benzene using 239Np tracer.

Np++++ sp NaClO4 25°C 1.0M U T K1=24.55 1971EPb (74029) 89

C10H18N2O7 H3L HEDTA CAS 150-39-0 (392)

N-(Hydroxyethyl)diaminoethane-N,N',N'-triethanoic acid;

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

Np++++ sp NaClO4 25°C 1.0M U K1=12.97 B2=23.72 1971EPb (75463) 90

C14H23N3O10 H5L DTPA CAS 67-43-6 (238)

Diethylenetriamine-pentaethanoic acid; HOOC.CH2.N(CH2.CH2.N(CH2.COOH)2)2

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

Np++++ ix oth/un 25°C 0.10M U K1=30.96 1973CCc (89341) 91

K(Np+HL)=21.5

K(Np+H2L)=12.3

Medium 0.5-1.0 M HCl

Np++++ ix oth/un 25°C var C K1=30.96 1973CCd (89342) 92

K(Np+HL)=21.5

K(Np+H2L)=12.3

Medium: 0.58-1.04 M HClO4.

Np++++ EMF oth/un 20°C 0.50M U K1=29.29 1972PRc (89343) 93

Np++++ sp NaClO4 25°C 1.0M U K1=30.33 1971EPb (89344) 94

Np++++ ix R4N.X ? 1.0M U K1=29.80 1971M0c (89345) 95

Medium: NH4Cl

Np++++ oth oth/un ? 1.0M U K1=29.8 1969M0c (89346) 96

From survey of literature data

e- HL Electron (442)
Electron;

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

NpO2+ oth none 25°C 0.0 M 1999KRa (726) 97
K(NpO2+e)=10.07(596 mV)

Evaluation of literature data. K: NpO2+e=Np(IV)

NpO2+ EMF none 25°C 0.0 U T H 1984LEa (727) 98

*K'=-0.4
*K"=-39.5
*K"'=-56.3

*K': 4NpO2+4H+O2=4Np(VI)O2+2H2O. *K'': 4NpO2+12H=4Np(IV)+O2+6H2O.

*K''': 2NpO2+4H=2Np(IV)+O2+2H2O. At 150 C, values: -6. -41, -40

NpO2+ sp KCl 450°C 100% U T H 1974LLa (728) 99

K=-5.03

Medium:(Li,K)Cl. K: NpO2+ +4HCl(g)=Np(IV)+2H2O(g)+1/2Cl2(g)+3Cl-;
DH-40.00 kJ mol-1; K=-5.29(500 C), -5.38(550 C), -5.57(600 C)

NpO2+ EMF NaClO4 25°C 1.0M U T 1952CHa (729) 100

K=12.49(738.8 mV)

Medium: HClO4. K: NpO2+4H+e=Np(IV)+2H2O. At 35.4 C: K=11.62(711.5 mV),
47.4 C: K=10.67(678.6 mV)

NpO2+ EMF oth/un 25°C 1.0M U 1949HMa (730) 101

K=12.5(740 mV)

Medium: HCl. K: NpO2+4H+e=Np(IV)+2H2O

CO3-- H2L Carbonate CAS 465-79-6 (268)

Carbonate;

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

NpO2+ sol oth/un 25°C 0.0 C I 1997NAa (3306) 102

Medium: 0.01-6.38 m K2CO3. Kso(KNpO2CO3(s))=K+NpO2+CO3)=-13.6.

Kso(K3NpO2CO3(s))=3K+NpO2+2CO3)=-15.9.

NpO2+ sp NaClO4 25°C 3.0M C M K1=5.09 B2= 8.15 1986GRb (3307) 103

B3=10.46

K(3(NpO2)(CO3)3=(NpO2)3(CO3)6+3(CO3))=-10.1

K(2(UO2)(CO3)3+(NpO2)(CO3)3=(NpO2)(UO2)2(CO3)6+3(CO3))=-10.0

NpO2+ dis NaClO4 25°C 1.0M C K1=4.14 B2= 6.78 1985ITb (3308) 104

Method: extraction of 339Np from buffered 1.0 M NaClO4 into
CH2Cl2/2-thenoyltrifluoroacetone/phen.

NpO2+ EMF none 25°C 0.0 U T H K1=4.6 B2=7.0 1984LEa (3309) 105

B3=8.5
 100 C: K1=7, B2=9, B3=10.9; 150 C: K1=8, B2=10, B3=13.4. Evaluated data

 NpO2+ gl NaClO4 25°C 1.0M U K1=1.49 B2= 7.11 1983MAc (3310) 106
 B3=8.53

Ks=-10.14. K(NpO2+H2O=NpO2OH+H)=-9.12

 NpO2+ oth R4N.X 20°C 0.25M U 1978MPa (3311) 107
 K(NpO2+HL)=2.15
 K(NpO2+2HL)=3.66

Method: Coprecipitation.
 Medium: NH4Cl.

 NpO2+ oth oth/un ? 0.15M U I 1963MMb (3312) 108
 K(NpO2+HL)=2.17

K=2.43(I=0 corr.)

 Cl- HL Chloride CAS 7647-01-0 (50)
 Chloride;

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

 NpO2+ EMF none 25°C 0.0 U T H K1=-0.4 1984LEa (5309) 109
 At 100 C: K1=0; 150 C: K1=0. Evaluated data

 NpO2+ dis NaClO4 25°C 2.00M U K1=-0.42 1979RGa (5310) 110

 NpO2+ EMF NaClO4 25°C 4.0M U K1=-2.5 B2=-1.55 1971DCb (5311) 111

 NpO2+ ix NaClO4 25°C 2.0M U K1=-0.29 1964GSb (5312) 112

Method:cation exchange. Medium: HClO4

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

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

 NpO2+ dis NaClO4 25°C 1.0M C K1=1.39 B2= 2.07 1985ITa (7063) 113

Method: extraction of 339Np from buffered 1.0 M NaClO4 into
 CH2Cl2/2-thenoyltrifluoroactone/phen.

 NpO2+ EMF none 25°C 0.0 U T H K1=1.0 1984LEa (7064) 114

100 C: K1=2.2; 150 C: K1=2.8. Evaluated data

 NpO2+ dis NaClO4 25°C 2.00M U K1=0.99 1979RGa (7065) 115

 IO3- HL Iodate CAS 7782-68-5 (1257)
 Iodate;

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

NpO2+ dis NaClO4 25°C 2.00M U K1=0.32 1979RGa (8539) 116

NpO2+ sol none 25°C 0.0 U 1972BBg (8540) 117
Kso(NpO2L(H2O)2)=-4.91

N02- HL Nitrite CAS 7782-77-6 (635)
Nitrite;

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

NpO2+ dis NaClO4 25°C 2.00M U K1=0.05 1979RGa (9392) 118

N03- HL Nitrate CAS 7697-37-2 (288)
Nitrate;

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

NpO2+ dis NaClO4 25°C 4.0M U K1=-1.6 B2=-1.4 1971DCb (9822) 119

NpO2+ dis NaClO4 20°C 8.0M U K1=-0.28 1970LKa (9823) 120
Medium: HClO4

NpO2+ ix NaClO4 25°C 2.0M U K1=-0.25 1964GSb (9824) 121

N3- HL Azide CAS 7782-79-8 (441)
Azide;

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

NpO2+ sp oth/un 25°C 5.00M U K1=1.08 B2=1.85 1978MMd (10249) 122
B3=2.23

OH- HL Hydroxide (57)
Hydroxide;

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

NpO2+ gl R4N.X 25°C 1.12M C T H 2004RSa (11809) 123

*K1=-9.01
*B2=-18.95
*K1=-8.98 (I=0)
*B2=-19.22 (I=0)

In 1.12 m Me4NCl. By spectrometry, *K1=-9.0, *B2=-18.85. Data for 10-85 C
Calorimetry: DH(*K1)=31.6 kJ m-1, DH(*B2)=84.1. Values at I=0 from SIT.

NpO2+ sol NaCl 23°C 3.0M M K1=4.3 B2= 7.10 1996GSc (11810) 124
B3=9.2
Kso(Na(NpO2)CO3)=-9.4

Method: solubility of Na(NpO2)CO3 in NaCl, NaClO4 and Na2CO3 solutions.

Pitzer parameters used. At I=0.1 M, $K_{so}(Na(NpO_2)CO_3)=-10.4$.

NpO₂⁺ oth KNO₃ 25°C 0.10M C I K₁=6.92 1988NTb (11811) 125
K(NpO₂+OH=NpO₂(OH))=6.0
K(NpO₂+2OH=NpO₂(OH)₂)=9.9

Method: paper electrophoresis using ²³⁷Np(V). Medium: KNO₃, 0.005-0.10 M
At I=0.005, K(NpO₂+OH=NpO₂OH)=5.7; K(NpO₂+2OH=NpO₂(OH)₂)=9.2.

NpO₂⁺ oth NaClO₄ 25°C 0.1M U 1987RMb (11812) 126
K[NpO₂(OH)+H]=10.45
K[NpO₂(OH)₂+2H]=21.95

Method: electromigration

NpO₂⁺ gl NaClO₄ 25°C 1.0M U 1985LRa (11813) 127
K(NpO₂+OH)=2.33
K(NpO₂+2OH)=4.89

NpO₂⁺ EMF none 25°C 0.0 U T H 1984LEa (11814) 128
*K(NpO₂+H₂O=NpO₂(OH)+H)=-8.9
100 C: *K=-7.6; 150 C: *K=-7.2. Evaluated data

NpO₂⁺ con oth/un 23°C .02M U 1976SKa (11815) 129
*K(NpO₂=NpO₂(OH)+H)=-8.91
By spectroscopy, *K(NpO₂=NpO₂(OH)+H)=-8.89

NpO₂⁺ sol oth/un 20°C U 1971M0d (11816) 130
K_s(NpO₂(OH)_s=NpO₂(OH))=-5.1
K_{so}(NpO₂(OH)_s=NpO₂+OH)=-9.0

NpO₂⁺ sp oth/un 25°C 8.00M U T H 1967MSf (11817) 131
K(NpO₂+Rh(III))=0.52
Medium: 8M MgClO₄. K=0.37(35 C), 0.33(50 C). DH=-15.0 kJ mol⁻¹, DS=-42

NpO₂⁺ sp oth/un 50°C 5.00M U TIH 1964SUc (11818) 132
K(NpO₂ + Cr⁺⁺⁺)=0.33
Medium: (Y,H)ClO₄. In (Mg,H)ClO₄: K=0.4(25 C), 0.43(35 C), 0.30(50 C).
DH=-13.8 kJ mol⁻¹, DS=-38 J K⁻¹ mol⁻¹

NpO₂⁺ EMF NaClO₄ 25°C 3.0M U 1961SHb (11819) 133
K(NpO₂+UO₂=NpO₂UO₂)=-0.16

NpO₂⁺ gl oth/un 25°C 0.10M U 1949KNa (11820) 134
*K₁ ca.-8.9
K_{so}(NpO₂(OH)₂(s)) < -9.2

O₂-- H₂L Peroxide CAS 7772-84-1 (2813)
Peroxide; -0.0-

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
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NpO2+ gl oth/un 1°C var U 1974MUb (12691) 135
 $K(NpO2L+2HL=NpO2L3+2H)=21.8$

$K(2NpO2+H2L=(NpO2)2L(s)+2H)=5.8$; $K((NpO2)2L(s)+H2L=2NpO2L+2H)=20.9$

P04--- H3L Phosphate CAS 7664-38-2 (176)
 Phosphate;

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

NpO2+ dis NaClO4 25°C 1.0M C 1985ITa (13273) 136
 $K(NpO2+H2PO4)=1.04$
 $K(NpO2+2H2PO4)=1.87$
 $K(NpO2+HPO4)=2.11$
 $K(NpO2+2HPO4)=3.43$

Method: extraction of 339Np from buffered 1.0 M NaClO4 into
 CH2Cl2/2-thenoyltrifluoroactone/phen.

 NpO2+ EMF none 25°C 0.0 U T H 1984LEa (13274) 137
 $K(NpO2+H2PO4)=0.6$
 $K(NpO2+HPO4)=3.5$

At 150 C: $K(NpO2+H2PO4)=0$, $K(NpO2+HPO4)=7$. Evaluated data

 NpO2+ ix NaClO4 25°C 0.10M U 1984RDa (13275) 138
 $K_{eff}(NpO2+HL)=3.11$ (pH 7)

 NpO2+ sol oth/un 20°C 1.00M U $K1=5.78$ 1979MPc (13276) 139

 NpO2+ oth R4N.X 20°C 1.00M U $K1=5.78$ 1978MPa (13277) 140
 $K(NpO2+HPO4)=2.90$, 0.1M NH4Cl

Medium: NH4Cl. Method: Coprecipitation

 NpO2+ ix R4N.X 20°C 0.20M U I 1964MPc (13278) 141
 $K(NpO2+HL)=2.85$
 $K(NpO2+H2L)=0.81$

Medium: NH4ClO4. At I=0 corr: $K(NpO2+HL)=3.38$

 NpO2+ oth oth/un ? 0.20M U I 1964PCa (13279) 142
 $K(NpO2+HL)=2.85$

$K(NpO2+HL)=3.38(I=0 \text{ corr})$

SCN- HL Thiocyanate CAS 463-56-9 (106)
 Thiocyanate;

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

NpO2+ dis NaClO4 25°C 2.00M U $K1=0.32$ 1979RGa (15193) 143

 NpO2+ sp oth/un 25°C 5.00M U $K1=0.86$ $B2=1.05$ 1978MMd (15194) 144
 $B3=0.89$

S03-- H2L Sulfite CAS 7782-99-2 (801)
Sulfite;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np02+	sol	oth/un	20°C	1.00M	U			K1=1.50 B2=3.01	1979MPc (15469)	145
Np02+	oth	R4N.X	20°C	1.00M	U			K1=1.50 B2=3.01	1978MPa (15470)	146
Method: Coprecipitation. Medium: NH4Cl.										
Np02+	sp	oth/un	25°C	1.0M	U			K1=2.6 B2=3.60	1972BBe (15471)	147
Medium:NaNO2										
Np02+	ix	oth/un	?	0.0	U			K1=2.15 B2=3.00	1965MMc (15472)	148

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

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np02+	sp	NaClO4	25°C	2.00M	U			K1=0.61	1990RNb (16417)	149
Np02+	dis	NaClO4	25°C	1.0M	C			K1=0.76	1985ITa (16418)	150
Method: extraction of 339Np from buffered 1.0 M NaClO4 into CH2Cl2/2-thenoyltrifluoroactone/phen.										
Np02+	EMF	none	25°C	0.0	U	T H		K1=0.4	1984LEa (16419)	151
100 C: K1=0.9; 150 C: K1=0.9. Evaluated data										
Np02+	sol	oth/un	20°C	1.50M	U			K1=1.04	1979MPc (16420)	152
Np02+	dis	NaClO4	25°C	2.00M	U			K1=0.45	1979RGa (16421)	153
Np02+	oth	R4N.X	20°C	1.55M	U			K1=1.04	1978MPa (16422)	154
Medium: NH4Cl. Method: Coprecipitation (Fe(OH)3)										

C2H2O2Cl2 HL CAS 79-43-6 (1282)
Dichloroethanoic acid; Cl2CH.COOH

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np02+	sp	NaClO4	25°C	2.00M	U			K1=-0.48	1990RNb (18398)	155

C2H2O4		H2L		Oxalic acid				CAS 144-62-7 (24)		
Ethanedioic acid; (COOH)2										

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np02+	sp	NaClO4	23°C	1.00M	U			K1=3.52 B2=6.09	1987CNa (18995)	156

NpO2+ dis NaClO4 25°C 1.00M U K1=3.44 B2=5.83 1983ITa (18996) 157

NpO2+ dis NaClO4 25°C 1.0M U K1=3.42 B2= 5.66 1982ITa (18997) 158

NpO2+ EMF NaClO4 20°C 1.00M U K1=3.74 B2=6.31 1972MBg (18998) 159

NpO2+ ix oth/un 20°C 0.05M C K1=7.36 B2=11.40 1963ZAa (18999) 160
K3=2.70

Medium: 0.05 M NH4ClO4. Method: cation exchange using 239Np.

NpO2+ ix R4N.X 20°C 0.05M U K1=4.04 B2=11.40 1961ZMa (19000) 161
K(NpO2+HL)=2.70

Medium: NH4ClO4. 18-22 C

NpO2+ sp oth/un 25°C 0.50M U K1=3.30 B2=7.07 1953GKa (19001) 162

C2H3O2Br HL Bromoacetic acid CAS 79-08-3 (1309)
Bromoethanoic acid; Br.CH2.COOH

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

NpO2+ sp NaClO4 25°C 2.00M U K1=0.11 1990RNb (19280) 163

C2H3O2Cl HL Chloroacetic CAS 79-11-8 (34)
Chloroethanoic acid; ClCH2.COOH

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

NpO2+ sp NaClO4 25°C 2.00M U K1=0.00 1990RNb (19372) 164

C2H3O2I HL Iodoacetic acid CAS 64-69-7 (1312)
Iodoethanoic acid; ICH2.COOH

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

NpO2+ sp NaClO4 25°C 2.00M U K1=0.14 1990RNb (19417) 165

C2H4O2 HL Acetic acid CAS 64-19-7 (36)
Ethanoic acid; CH3.COOH

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

NpO2+ dis NaCl 25°C 0.30M C I K1=1.05 1999MBb (20084) 166

Method: Solvent extraction into n-heptane, 0.05 M di-(2-ethylhexyl)-
phosphoric acid. Data for 0.3-5.0 m NaCl.

NpO2+ oth NaClO4 25°C 0.30M U K1=0.96 B2=1.57 1990RDa (20085) 167

Method: electromigration

Np02+ sp NaClO4 25°C 2.00M U K1=0.87 1990RNb (20086) 168

Np02+ sol oth/un 25°C 1.00M U K1=1.07 B2=2.20 1979MPb (20087) 169
Medium: ammonium oxalate

C2H4O3 HL Glycolic acid CAS 79-14-1 (33)
2-Hydroxyethanoic acid; HO.CH2.COOH

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

Np02+ sp NaClO4 25°C 2.00M U K1=1.43 B2=1.90 1990RNb (20598) 170

Np02+ dis NaClO4 25°C 1.00M U K1=1.21 B2=1.70 1983ITa (20599) 171

Np02+ sp NaClO4 25°C 0.10M U K1=1.51 1969ESc (20600) 172

C2H5NO2 HL Glycine CAS 56-40-6 (85)
2-Aminoethanoic acid; H2N.CH2.COOH

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

Np02+ dis NaClO4 25°C 1.0M U K1=3.59 B2= 5.71 1994TSa (21652) 173
K(Np02+HL)=1.02

Np02+ dis NaClO4 25°C 1.00M U K1=3.17 B2=5.47 1983ITa (21653) 174

Np02+ sp NaClO4 25°C 0.10M C K1=3.31 B2= 5.44 1968EWa (21654) 175

C3H4O4 H2L Malonic acid CAS 141-82-2 (79)
Propanedioic acid; CH2(COOH)2

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

Np02+ sp NaClO4 23°C 1.00M U K1=2.53 B2=6.73 1987CNa (24519) 176

Np02+ dis NaClO4 25°C 1.00M U K1=2.25 B2=3.61 1983ITa (24520) 177

Np02+ dis NaClO4 25°C 1.0M U K1=2.26 B2= 3.26 1982ITa (24521) 178
K(Np02+HL)=1.22
K(Np02+2HL)=1.91

Np02+ EMF NaClO4 20°C 1.00M U K1=2.75 1972MBg (24522) 179

C3H6O3 HL L-Lactic acid CAS 79-33-4 (82)
L-2-Hydroxypropanoic acid; CH3.CH(OH).COOH

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

Np02+ dis NaCl 25°C 0.30M C I K1=1.78 1999MBb (25495) 180
Method: Solvent extraction into n-heptane, 0.05 M di-(2-ethylhexyl)-

phosphoric acid. Data for 0.3-5.0 m NaCl. At I=0.0, K1=1.70.

NpO2+	dis	NaClO4	25°C	1.00M	U			K1=1.11	B2=1.78	1983ITa (25496)	181
NpO2+	dis	NaClO4	25°C	1.0M	U			K1=1.09	B2= 1.60	1982ITa (25497)	182
NpO2+	sp	NaClO4	25°C	0.10M	U			K1=1.75		1969ESd (25498)	183

C3H7NO2			HL	DL-Alanine				CAS 302-72-7		(189)	
DL-2-Aminopropanoic acid; H2N.CH(CH3).COOH											

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values		Reference	ExptNo
NpO2+	dis	NaClO4	25°C	1.0M	U			K1=3.37		1994TSa (26540)	184
K(NpO2+HL)=1.30											
NpO2+	dis	NaClO4	25°C	1.00M	U			K1=3.30	B2=5.67	1983ITa (26541)	185

C4H4O4			H2L	Maleic acid				CAS 110-16-7		(111)	
cis-Butenedioic acid; HOOC.CH:CH.COOH											

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values		Reference	ExptNo
NpO2+	sp	NaClO4	23°C	1.00M	U			K1=1.89	B2=3.12	1987CNa (29113)	186
NpO2+	EMF	NaClO4	20°C	1.00M	U			K1=2.20		1972MBg (29114)	187

C4H6O4			H2L	Succinic acid				CAS 110-15-6		(112)	
1,4-Butanedioic acid; HOOC.CH2.CH2.COOH											

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values		Reference	ExptNo
NpO2+	sp	NaClO4	23°C	1.00M	U			K1=1.51	B2=2.42	1987CNa (30012)	188
NpO2+	dis	NaClO4	25°C	1.00M	U			K1=1.13	B2=1.50	1983ITa (30013)	189
B3=2.35											
NpO2+	dis	NaClO4	25°C	1.0M	U			K1=1.29	B2= 1.89	1982ITa (30014)	190
K(NpO2+HL)=1.03											
K(NpO2+2HL)=1.63											
NpO2+	EMF	NaClO4	20°C	1.00M	U			K1=1.72		1972MBg (30015)	191

C4H6O4S			H2L	Thiodiacetic				CAS 123-93-3		(140)	
2,2'-Thiodiglycolic acid, Thiodiethanoic acid; HOOC.CH2.S.CH2.COOH											

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values		Reference	ExptNo
NpO2+	gl	NaClO4	25°C	0.50M	U			K1=1.18		1990Rnc (30225)	192

C4H6O5 H2L Diglycolic acid CAS 110-99-6 (243)
Di(carboxy)methyl ether, 2,2'-Oxydiethanoic acid; HOOC.CH2.O.CH2.COOH

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

NpO2+ gl NaClO4 25°C 0.50M U K1=3.72 1990Rnc (30907) 193

C4H6O6 H2L L-Tartaric acid CAS 87-69-4 (92)
L-Tartaric acid, L-2,3-Dihydroxybutanedioic acid; HOOC.CH(OH).CH(OH).COOH

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

NpO2+ ix R4N.X 20°C 0.50M U K1=2.32 B2=4.30 1961MMb (31323) 194
B3=6.18
K(NpO2+HL)=2.36

Medium: NH4ClO4

C4H6O6 H2L meso-Tartaric CAS 147-73-9 (91)
meso-2,3-Dihydroxybutanedioic acid; HOOC.CH(OH).CH(OH).COOH

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

NpO2+ ix oth/un 20°C 0.05M C K1=6.18 B2=10.48 1963ZAa (31430) 195
K3=2.32
K4=2.36

Medium: 0.05 M NH4ClO4. Method: cation exchange using 239Np.

C4H7N04 H2L Aspartic acid CAS 56-84-8 (21)
Aminobutanedioic acid; H2N.CH(CH2.COOH).COOH

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

NpO2+ dis NaClO4 25°C 1.00M U K1=2.63 B2=5.32 1983ITa (31908) 196
K(NpO2+HL)=0.70
K(NpO2+2HL)=1.32

C4H7N04 H2L IDA CAS 142-73-4 (118)
Iminodiethanoic acid; HN(CH2.COOH)2

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

NpO2+ dis NaClO4 25°C 1.0M U K1=6.42 1994TSa (32323) 197

NpO2+ gl NaClO4 25°C 0.50M U K1=5.81 1990Rnc (32324) 198

NpO2+ dis NaClO4 25°C 1.00M U K1=5.64 1983ITa (32325) 199

NpO2+ gl NaClO4 20°C 1.00M U K1=8.72 1973CBc (32326) 200

NpO2+ sp R4N.X 25°C 0.10M U K1=6.27 1970EWa (32327) 201

K(NpO2+HL)=1.35

Medium: NH4ClO4

C4H8O3 HL CAS 594-61-6 (81)

2-Hydroxy-2-methylpropanoic acid; (CH3)2C(OH).COOH

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2+	sp	NaClO4	25°C	2.00M	U			K1=1.80	1990RNb (33496)	202
NpO2+	dis	NaClO4	25°C	1.00M	U			K1=1.48 B2=2.19	1983ITa (33497)	203
NpO2+	dis	NaClO4	25°C	1.0M	U			K1=1.35 B2= 1.88	1982ITa (33498)	204
NpO2+	ix	NaClO4	?	0.05M	U			K1=1.99 B2=2.90 B3=3.53	1971MOc (33499)	205

C4H8O3 HL CAS 965-70-8 (423)

2-Hydroxybutanoic acid; CH3.CH2.CH(OH).COOH

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2+	dis	NaClO4	25°C	1.00M	U			K1=1.13	1983ITa (33579)	206
NpO2+	dis	NaClO4	25°C	1.0M	U			K1=1.10 B2= 1.50	1982ITa (33580)	207
NpO2+	sp	NaClO4	25°C	0.10M	U			K1=1.62	1969ESc (33581)	208

C4H8O3 HL CAS 300-85-6 (30)

3-Hydroxybutanoic acid; CH3.CH(OH).CH2.COOH

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2+	dis	NaClO4	25°C	1.00M	U			K1=0.55 B2=0.98	1983ITa (33624)	209
NpO2+	dis	NaClO4	25°C	1.0M	U			K1=0.67 B2= 0.90	1982ITa (33625)	210

C5H2O2F6 HL HFA CAS 1522-22-1 (195)

1,1,1,5,5,5-Hexafluoropentane-2,4-dione; F3C.CO.CH2.CO.CF3

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2+	sp	NaClO4	25°C	0.10M	U			K1=1.94	1972GKb (35928)	211

C5H5O2F3 HL CAS 367-57-7 (163)

1,1,1-Trifluoropentane-2,4-dione; CF3.CO.CH2.CO.CH3

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2+	sp	NaClO4	25°C	0.10M	U			K1=2.57	1972GKb (37059)	212

C5H8O2 HL Acetylacetone CAS 123-54-6 (164)
Pentane-2,4-dione; CH3.CO.CH2.CO.CH3

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2+	sp	NaClO4	25°C	0.10M	U	T		K1=4.08 B2=7.00	1972GKb (38049)	213
K1(18 C)=4.33, K1(32 C)=4.01, B2(18 C)=7.56, B2(32 C)=6.96										

C5H8O4 H2L Glutaric acid CAS 110-94-1 (420)
Pentanedioic acid; HOO.C.H2.C.H2.C.OOH

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2+	dis	NaClO4	25°C	1.00M	U			K1=1.27 B2=1.44 B3=2.45	1983ITa (38338)	214
NpO2+	dis	NaClO4	25°C	1.0M	U			K1=1.18 B2= 1.42 K(NpO2+HL)=0.88 K(NpO2+2HL)=1.23	1982ITa (38339)	215

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2+	oth	oth/un	25°C	0.10M	U			K1=1.43 K(NpO2+HL)=0.87	1969EWa (38340)	216

C5H9NO4 H2L Glutamic acid CAS 56-86-0 (22)
2-Aminopentanedioic acid; H2N.CH(CH2.C.H2.C.OOH)COOH

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2+	dis	NaClO4	25°C	1.00M	U			K1=2.72 B2=5.13 K(NpO2+HL)=0.76 K(NpO2+2HL)=1.41	1983ITa (39107)	217

C5H9NO4 H2L MIDA CAS 4408-64-4 (190)
N-Methyliminodiethanoic acid; CH3.N(CH2.C.OOH)2

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2+	gl	NaClO4	25°C	0.50M	U			K1=6.75	1990Rnc (39270)	218
NpO2+	sp	R4N.X	25°C	0.10M	U			K1=7.37 K(NpO2+HL)=1.28	1970EWa (39271)	219

Medium: NH4ClO4

C5H9N3O4S H2L CAS 16907-58-7 (2106)
Thiosemicarbazone-diethanoic acid; H2N.CS.NH.N(CH2.C.OOH)2

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2+	sp	NaClO4	25°C	0.05M	U				1988CDa (39572)	220

$$K(\text{NpO}_2\text{+H-1L}=\text{NpO}_2\text{H-1L})=3.36$$

C5H10O3 HL CAS 3739-30-8 (3612)
 2-Hydroxy-2-methylbutanoic acid, Methylene glycolic acid; CH3.CH2.C(OH)(CH3)COOH

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

NpO2+ dis NaClO4 25°C 1.0M U K1=1.38 B2= 1.99 1982ITa (40260) 221

C5H10O3 HL CAS 4026-18-0 (422)
 2-Hydroxy-3-methylbutanoic acid; CH3.CH2.C(OH)(CH3).COOH

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

NpO2+ dis NaClO4 25°C 1.00M U K1=1.60 B2=2.12 1983ITa (40271) 222

C5H10O3 HL CAS 617-31-2 (474)
 2-Hydroxypentanoic acid; CH3.CH2.CH2.CH(OH).COOH

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

NpO2+ sp NaClO4 25°C 0.10M U K1=1.59 1969ESc (40284) 223

C6H5NO2 HL Picolinic acid CAS 98-98-6 (391)
 2-Pyridine-carboxylic acid; C5H4N.COOH

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

NpO2+ gl NaClO4 25°C 0.50M U K1=3.04 1990Rnc (42576) 224

NpO2+ dis NaClO4 25°C 1.00M U K1=3.45 B2=6.03 1983ITa (42577) 225

NpO2+ dis NaClO4 25°C 1.0M U K1=3.23 B2= 5.58 1982ITa (42578) 226

C6H5NO2 HL Nicotinic acid CAS 59-67-6 (419)
 3-Pyridine-carboxylic acid; C5H4N.COOH

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

NpO2+ dis NaClO4 25°C 1.00M U K1=0.57 1983ITa (42679) 227

C6H8O7 H3L Citric acid CAS 77-92-9 (95)
 2-Hydroxypropane-1,2,3-tricarboxylic acid; HOOCCH2.CH(OH)(COOH).CH2COOH

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

NpO2+ sp NaClO4 25°C 2.00M U K1=2.49 1990RNb (46203) 228

NpO2+ sp oth/un 25°C 0.05M U K1=2.87 1985SEa (46204) 229

Np02+ ix NaCl04 25°C 0.10M U 1984RDa (46205) 230
K1eff=4.84 (pH 7)

Np02+ dis NaCl04 25°C 1.0M U K1=3.94 B2= 6.91 1982ITa (46206) 231
K(Np02+HL)=2.37
K(Np02+2HL)=3.41

Np02+ ix oth/un 20°C 0.05M C K1=3.67 B2= 6.36 1963ZAa (46207) 232
Medium: 0.05 M NH4Cl04. Method: cation exchange using 239Np.

Np02+ ix R4N.X 20°C 0.05M U K1=3.67 1961MMb (46208) 233
K(Np02+HL)=2.69

Medium: NH4Cl04. 18-22 C

C6H9NO6 H3L NTA CAS 139-13-9 (191)
Nitrilotriethanoic acid; N(CH2.COOH)3

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

Np02+ dis NaCl04 25°C 1.0M U K1=6.48 1994TSa (46955) 234

Np02+ gl NaCl04 25°C 0.50M U K1=7.51 1990Rnc (46956) 235

Np02+ dis NaCl04 25°C 1.00M U K1=6.08 1983ITa (46957) 236

Np02+ ix R4N.X 25°C 0.10M U M T K1=6.81 1970EWa (46958) 237
K(Np02+HL)=1.77
K(Np02L+H2O=Np02LOH+H)=-11.46

Medium: NH4Cl04

C6H11NO5 H2L HIMDA CAS 93-62-9 (192)
N-(2-Hydroxyethyl)iminodiethanoic acid; HO.CH2.CH2.N(CH2.COOH)2

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

Np02+ sp oth/un ? 0.10M U K1=20.82 B2=33.59 1971EPb (48771) 238

Np02+ sp oth/un 25°C 0.10M U K1=6.08 1969EWa (48772) 239
K(Np02+HL)=1.45
K(Np02L+H2O=Np02OHL+H)=-11.42

C6H12N2O4 H2L N,N-EDDA CAS 5835-29-0 (2333)
1,2-Diaminoethane-N,N-diethanoic acid; H2N.CH2.CH2.N(CH2.COOH)2

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

Np02+ gl NaCl04 25°C 0.50M U K1=8.26 1990Rnc (49305) 240

C6H12O3 HL DiEtGlycolic CAS 3639-21-2 (421)
2-Ethyl-2-hydroxybutanoic acid; (C2H5)2.C(OH).COOH

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np02+	dis	NaCl04	25°C	1.00M	U			K1=1.57	1983ITa (49463)	241
Np02+	dis	NaCl04	25°C	1.0M	U			K1=1.59 B2= 2.07	1982ITa (49464)	242

C6H12O3		HL						CAS 6064-63-7	(475)	
2-Hydroxyhexanoic acid; CH3.CH2.CH2.CH2.CH(OH).COOH										
Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np02+	sp	NaCl04	25°C	0.10M	U			K1=1.63	1969ESc (49488)	243

C7H5N04		H2L						Dipicolinic aci CAS 449-83-2	(418)	
2,6-Pyridinedicarboxylic acid; C5H3N.(COOH)2										
Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np02+	gl	NaCl04	25°C	0.50M	U			K1=4.82	1990RNc (52791)	244
Np02+	dis	NaCl04	25°C	1.00M	U			K1=7.07	1983ITa (52792)	245

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
Np02+	gl	NaCl04	20°C	1.00M	U			K1=5.45 B2=9.81	1973MBb (53684)	246

C7H6O2		HL						Benzoic Acid CAS 65-85-0	(462)	
Benzenecarboxylic acid; C6H5.COOH										
Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np02+	sp	NaCl04	25°C	2.00M	U			K1=0.82	1990RNb (53847)	247

C7H6O3		H2L						Salicylic acid CAS 69-72-7	(14)	
2-Hydroxybenzoic acid, Salicylic acid; HO.C6H4.COOH										
Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np02+	dis	NaCl04	25°C	1.0M	U	T		K1=0.84	1992TIb (54277)	248
Np02+	sp	NaCl04	25°C	2.0M	U	T		K1=0.28	1990RNa (54278)	249

C7H6O6S		H3L						CAS 5965-83-3	(399)	
5-Sulfosalicylic acid, 2-Hydroxy-5-sulfobenzoic; H03S.C6H3(OH).COOH										
Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo

 NpO2+ sp NaClO4 25°C 2.0M U K1=0.17 1990RNa (55034) 250

 C7H11NO6 H3L CAS 40199-58-4 (3165)
 N-(2'-Carboxyethyl)iminodiethanoic acid; HOOC.CH2.CH2.N(CH2.COOH)2

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2+	ix	R4N.X	25°C	0.10M	U			K1=7.00 K(NpO2+HL)=2.35 K(NpO2L+H2O=NpO2LOH+H)=-11.57	1970EWa (56883)	251

Medium: NH4ClO4

 C8H5O2F3S HL TTA CAS 326-91-0 (165)
 4,4,4-Trifluoro-1-(2-thienyl)butane-1,3-dione; F3C.CO.CH2.CO.C4H3S

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2+	sp	NaClO4	25°C	0.10M	U			K1=2.89 B2=5.48	1972GKb (58661)	252
NpO2+	dis	oth/un	RT	0.10M	C			K1=1.99 K(NpO2+HL=NpO2L+H)=-4.29 K(NpO2+2HL=NpO2HL2+H)=-3.48	1971CLa (58662)	253

Extraction from edta solution, pH 5.3, I=0.1 M, into isoamyl alcohol.

 C8H5O3F3 HL CAS 15788-03-1 (3215)
 1,1,1-Trifluoro-3-2'-furoylacetone; F3C.CO.CH2.CO.C4H3O

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2+	sp	NaClO4	25°C	0.10M	U			K1=2.23 B2=4.64	1972GKb (58716)	254

 C8H6O4 H2L Phthalic acid CAS 88-99-3 (113)
 Benzene-1,2-dicarboxylic acid; C6H4(COOH)2

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2+	sp	NaClO4	25°C	2.00M	U			K1=1.68	1990RNb (58999)	255
NpO2+	EMF	NaClO4	20°C	1.0M	U			K1=2.22	1972MBg (59000)	256

 C8H8O2S HL 2-Thenoylacetone CAS 3151-27-2 (3224)
 2-Thenoylacetone, 1-(2'-Thienyl)butane-1,3-dione; C4H3S.CO.CH2.CO.CH3

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2+	sp	NaClO4	25°C	0.10M	U			K1=4.23 B2=7.41	1972GKb (59639)	257

 C8H8O3 HL Furoylacetone CAS 67748-89-4 (3192)
 Furoylacetone; C4H3O.CO.CH2.CO.CH3

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Metal      Mtd Medium Temp Conc Cal Flags Lg K values      Reference ExptNo
-----
Np02+     sp  NaCl04 25°C 0.10M U      K1=4.40  B2=7.85  1972GKb (60008) 258
*****
C8H9N3OS          H2L          CAS 5351-90-6 (2103)
Salicylidenethiosemicarbazone; HO.C6H4.CH:N.NH.CS.NH2
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Metal      Mtd Medium Temp Conc Cal Flags Lg K values      Reference ExptNo
-----
Np02+     sp  NaCl04 25°C 0.05M U      K1=11.85          1987CDb (60558) 259
                    K(Np02+HL=Np02HL)=5.14
*****
C9H7N04S          H2L  Sulfoxine          CAS 84-88-8 (448)
8-Hydroxyquinoline-5-sulfonic acid;
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Metal      Mtd Medium Temp Conc Cal Flags Lg K values      Reference ExptNo
-----
Np02+     dis NaCl04 25°C 1.0M U      K1=5.67  B2=10.11  1994TSa (64569) 260
-----
Np02+     dis NaCl04 25°C 1.00M U      K1=5.42  B2=10.21  1983ITa (64570) 261
*****
C9H11N3OS          H2L          (2104)
S-Methyl-(salicylidene)isothiosemicarbazone; HO(C6H4)CH:N.N:C(NH2)SCH3
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Metal      Mtd Medium Temp Conc Cal Flags Lg K values      Reference ExptNo
-----
Np02+     sp  NaCl04 25°C 0.05M U      K1=13.33          1987CDb (66475) 262
                    K(Np02+HL=Np02HL)=8.42
*****
C10H7O2F3          HL          CAS 326-06-7 (196)
3-Benzoyl-1,1,1-trifluoroacetone; CF3.CO.CH2.CO.C6H5
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Metal      Mtd Medium Temp Conc Cal Flags Lg K values      Reference ExptNo
-----
Np02+     sp  NaCl04 25°C 0.10M U      K1=4.11  B2=7.86  1972GKb (69159) 263
*****
C10H10O2          HL  Benzoylacetone  CAS 93-91-4 (197)
1-Phenylbutane-1,3-dione; C6H5.CO.CH2.CO.CH3
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Metal      Mtd Medium Temp Conc Cal Flags Lg K values      Reference ExptNo
-----
Np02+     sp  NaCl04 25°C 0.10M U      K1=4.99  B2=8.86  1972GKb (70759) 264
*****
C10H14N5O7P        H2L  AMP-3          CAS 84-21-9 (2438)
Adenosine-3'-monophosphoric acid, 3-Adenylic acid;
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Metal      Mtd Medium Temp Conc Cal Flags Lg K values      Reference ExptNo
-----
Np02+     gl  NaCl04 25°C 0.10M U      K1=2.51          1993RNa (72246) 265
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 C10H15N5O10P2 H3L ADP CAS 20398-34-9 (2181)
 Adenosine-5'-diphosphoric acid;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg K values	Reference	ExptNo
NpO2+	gl	NaClO4	25°C	0.10M	U		K1=2.97 B((NpO2)HL)=7.48 K(NpO2+HL)=1.07	1993RNa (73010)	266

 C10H16N2O8 H4L EDTA CAS 60-00-4 (120)
 1,2-Diaminoethane-N,N,N',N'-tetraethanoic acid, Sequestic acid;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg K values	Reference	ExptNo
NpO2+	dis	NaClO4	25°C	1.0M	U		K(NpO2+HL)=4.89	1994Tsa (74030)	267
NpO2+	dis	NaClO4	25°C	1.00M	U		K(NpO2+HL)=4.46	1983ITa (74031)	268
NpO2+	dis	oth/un	RT	0.10M	C		K1=9.05	1971CLa (74032)	269

Extraction with tta from edta solution, pH 5.3, I=0.1 M, into isoamyl alcohol.

NpO2+	ix	R4N.X	25°C	0.10M	U		K1=7.33 K(NpO2+HL)=5.30 K(NpO2L+H2O=NpO2LOH+H)=-11.51	1970EWa (74033)	270
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Medium: NH4ClO4

NpO2+	ix	oth/un	20°C	0.05M	C		K1=9.69	1963ZAa (74034)	271
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Medium: 0.05 M NH4ClO4. Method: cation exchange using 239Np.

NpO2+	ix	R4N.X	20°C	0.05M	U		K1=9.7	1961ZMa (74035)	272
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Medium: NH4ClO4

 C10H16N5O13P3 H4L ATP CAS 56-65-5 (403)
 Adenosine-5'-triphosphoric acid;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg K values	Reference	ExptNo
NpO2+	gl	NaClO4	25°C	0.10M	U		K1=3.73 B((NpO2)HL)=8.87 K(NpO2+HL)=2.36	1993RNa (74807)	273

 C10H18N2O7 H3L HEDTA CAS 150-39-0 (392)
 N-(Hydroxyethyl)diaminoethane-N,N',N'-triethanoic acid;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg K values	Reference	ExptNo
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NpO2+ ix R4N.X 25°C 0.10M U K1=6.87 1970EWa (75464) 274
K(NpO2+HL)=4.06
K(NpO2L+H2O=NpO2LOH+H)=-11.37

Medium: NH4ClO4

NpO2+ sp NaClO4 25°C 0.10M U K1=6.08 1969EWa (75465) 275
K(NpO2+HL)=1.45
K(NpO2L+H2O=NpO2LOH+H)=-11.42

C11H8O4 HL CAS 94147-09-8 (3348)
Difuroylmethane; C4H3O.CO.CH2.CO.C4H3O

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

NpO2+ sp NaClO4 25°C 0.10M U K1=4.03 B2=7.06 1972GKb (77213) 276

C12H12N2O2 HL CAS 4173-74-4 (4915)
1-Phenyl-3-methyl-4-acetylpyrazol-5-one;

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

NpO2+ sp oth/un 25°C 0.10M U K1=2.42 B2=4.69 1973BKc (81043) 277

C14H23N3O10 H5L DTPA CAS 67-43-6 (238)
Diethylenetriamine-pentaethanoic acid; HOOC.CH2.N(CH2.CH2.N(CH2.COOH)2)2

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

NpO2+ ix R4N.X ? 0.05M U K1=10.83 1971MOc (89347) 278

Medium: NH4Cl

C16H16N2O2 H2L CAS 94-93-9 (2101)
N,N'-Bis(salicylidene)ethylenediamine;(HO(C6H4)CH:NCH2-)2

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

NpO2+ sp alc/w 25°C 50% U K1=7.5 1987CHa (93684) 279

C16H35O4P HL CAS 298-07-7 (1625)
Di-(2-ethylhexyl)-phosphoric acid; (C2H5C6H12O)2P(O)OH

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

NpO2+ dis oth/un 25°C 2.0M U K1=-0.09 B2=-0.68 1989BFe (95512) 280

In 2.0 M HCl; for 15 C K1=-0.11; K2=-0.62;
for 35 C K1=-0.004; K2=-0.59

e- HL Electron (442)

Electron;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
NpO2++	oth	none	25°C	0.0	M				1999KRa	(731) 281
K(NpO2+e)=19.62(1161 mV) Evaluation of literature data. K: NpO2+e=Np(V)										
NpO2++	sp	KCl	400°C	100%	U				1974LLa	(732) 282
K=1.64 Medium:(Li,K)Cl; K: NpO2++ + Cl=NpO2+ + 1/2Cl2(g)										
NpO2++	sp	none	40°C	0.00	U T				1972SNe	(733) 283
K=3.4 K: NpO2++ +1/2HNO2+1/2H2O=NpO2+ +3/2H+ +1/2NO3-. K=3.2(65 C)										
NpO2++	sp	oth/un	22°C	5.50M	U I				1971EGd	(734) 284
K(Np(VI)+Np(IV)=2Np(V))=-0.41 Medium:C M HNO3 at C=5.5; K=-0.85(C=6.0), -1.25(C=6.5), -1.70(C=7.0), -2.11(C=7.5), -2.54(C=8.0)										
NpO2++	sp	oth/un	22°C	5.50M	U I				1971EGd	(735) 285
K(Np(VI)+Np(IV)=Np(V))=1.70 Medium:C M HClO4. At C=5.5. K=1.05(C=6.0), 0.40(C=6.5), 0.10(C=7.0), -0.90(C=7.5), -1.54(C=8.0)										
NpO2++	dis	oth/un	25°C	1.00M	U IH				1971G0a	(736) 286
K=3.50(C=1.00) Medium:C M HNO3 at C=1.00; K: NpO2++ +1/2HNO2+1/2H2O=NpO2+ +3/2H+ + 1/2NO3-; K=3.37(C=1.95). Also data at 35 C and 50 C as well as DH and DS at 35 C										
NpO2++	dis	oth/un	25°C	2.95M	U IH				1971G0a	(737) 287
K=3.18(C=2.95) Medium: C M HNO3 at C=2.95; K:NpO2++ +1/2HNO2+1/2H2O=NpO2+ +3/2H+ +1/2NO3-; K=3.03(C=3.85. Also data at 35 C and 50 C as well as DH and DS at 35 C										
NpO2++	EMF	none	25°C	0.00	U				1970BCc	(738) 288
K=20.89(1.236V) K: NpO2++ + e. Method:emf and from survey of literature data										
NpO2++	sp	oth/un	23°C	13.6M	U				1970KMb	(739) 289
B(Np(VII)+Np(V)=2Np(VI))=1.6 Medium: NaOH										
NpO2++	EMF	oth/un	25°C	0.97M	U I				1970PKa	(740) 290
K=9.99(0.591V) Medium: C M NaOH. At C=0.97; K: Np(VII) + e=Np(VI). K=8.38(0.496V,C=3.1), 7.40(0.438V,C=4.6), 5.75(0.340V,C=7.3)										
NpO2++	EMF	oth/un	25°C	10.2M	U I				1970PKa	(741) 291
K=3.89(0.230V) Medium: C M NaOH. At C=10.2; K: Np(VII) + e=Np(VI). K=3.06(0.181V,C=12.0),										

2.25(0.133V,C=14.0)

NpO2++ EMF oth/un 25°C 1.00M U 1970SKc (742) 292
K=9.93(587.5mV)

Medium:NaOH; K: Np(VII) + e=Np(VI); (suggest:NpO5--- + 3H2O + e=NpO2(OH)4-- + 2OH-)

NpO2++ EMF oth/un 25°C 1.00M U 1970ZCa (743) 293
K=9.84(582.1mV)

Medium:NaOH; K: NpO5--- + H2O + e=NpO4-- + 2OH-

NpO2++ EMF oth/un 25°C 1.00M U 1969SGe (744) 294
K=10.3(0.61V)

Medium:KOH; K: NpO5--- + H2O + e=NpO4-- + 2OH-

NpO2++ sol oth/un 20°C 0.50M U I 1969SGe (745) 295
Ks(Co(NH3)6+++ .NpO5---)=-7.8

Medium:C M NaOH at C=0.5;Ks(Co(NH3)6.NpO5(s)=Co(NH3)6+++ + NpO5---)=-7.3 (C=1);data also for Ks((Ba++)3(NpO5---)2(s)=3Ba++ + 2NpO5---)=-17.7(C=1)

NpO2++ oth none 25°C 0.0 U 1969SGe (746) 296
K(NpO2(VII)+e=NpO2) > 35.0

Method:Estimated data

NpO2++ EMF oth/un 25°C 0.20M U I 1969SMk (747) 297
K=11.8(0.70V)

Medium: C M NaOH at C=0.2; K: Np(VII) + e=Np(VI). K=11.2(0.66V,C=0.5), 10.1 (0.60V,C=1.0), 8.1(0.48V,C=5.0), 6.4(0.38V,C=10)

NpO2++ EMF NaClO4 25°C 2.0M U I 1962ZSa (748) 298
K(NpO2+e)=19.20(1136.0 mV)

K: NpO2+e=NpO2(V). In HClO4: K=19.04(1126.4 mV), LiClO4: K=19.09(1129.4 mV)

NpO2++ EMF NaClO4 25°C 1.0M U 1961SHb (749) 299
K(NpO2+e)=19.21(1136.4 mV)

NpO2++ EMF KNO3 25°C 0.25M U I 1958SPa (750) 300
K(NpO2+e)=19.58(1158 mV)

Medium: HNO3. I=1: K=19.49(1153 mV), I=8: K=19.27(1140 mV) plus others
In 0.5 M H2SO4: K=18.16(1074 mV), 1 M HClO4: K=19.31(1142 mV)

NpO2++ EMF NaClO4 25°C 1.03M U T 1952CHa (751) 301
K(NpO2+e)=19.22(1137.3 mV)

Medium: HClO4. 15.2 C: K=19.93(1140.3 mV), 35.4 C: K=18.54(1134.9 mV)

NpO2++ EMF KCl 25°C 1.0M U 1949HMa (752) 302
K(NpO2+e)=19.3(1.14 V)

CO3-- H2L Carbonate CAS 465-79-6 (268)

Carbonate;

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

NpO2++ oth none 25°C 0.0 M 1999KRa (3313) 303
K(NpO2+OH+2CO3)=6.0
K(NpO2+2OH+CO3)=7.1

Evaluation of literature data.

NpO2++ cal oth/un 25°C U 1988USa (3314) 304
DH(NpO2+3L)=-41.9 kJ mol-1

Ionic strength is variable within 0.27-1.08

NpO2++ EMF NaClO4 22°C 3.0M C 1986GRa (3315) 305
K(3NpO2L3=(NpO2)3+3L)=-10.1

K(2UO2L3 + NpO2L3=(UO2)2(NpO2)L6+3L)=-10.0

NpO2++ cal oth/un 25°C 1.6M C H 1985SFa (3316) 306
Medium: 1.6 M (Na2CO3 + Na2SO4). DH(B3)=-50 kJ mol-1.

NpO2++ EMF none 25°C 0.0 U T H B2=14.0 1984LEa (3317) 307
B3=20.4

100 C: B2=16, B3=20; 150 C: B2=16, B3=21. Evaluated data

NpO2++ gl NaClO4 25°C 1.00M U 1984MAa (3318) 308

B(2,1,3)=18.60

B(1,2,0)=17.71

B(1,3,0)=30.18

B(p.q.r): pNpO2+qCO2(g)+rH2O=(NpO2)p(CO2)q(OH)r-q+(q+r)H

Cl- HL Chloride CAS 7647-01-0 (50)

Chloride;

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

NpO2++ EMF none 25°C 0.0 U T H K1=-0.2 1984LEa (5313) 309
At 100 C: K1=1; 150 C: K1=2. Evaluated data

NpO2++ dis NaClO4 25°C 4.0M U K1=-0.05 1974DCa (5314) 310

NpO2++ dis NaClO4 25°C 4.0M U K1=-0.16 1971DCb (5315) 311

NpO2++ EMF NaClO4 25°C 0.40M U K1=-0.34 1970AWb (5316) 312
Medium: HClO4, I=0.3 to 0.5 M

NpO2++ sp NaClO4 25°C 2.0M U K1=-0.21 1962STb (5317) 313

NpO2++ kin NaClO4 0°C 3.0M U T H K1=0.21 1955CSb (5318) 314
Medium: HClO4. Or: K1=0.10, K2=-0.80. DH(K1)=-36 kJ mol-1 (or -29, DH(K2)=15)
At 4.78 C: K1=0.06(or 0.00, K2=-0.74) 9.84 C: K1=-0.06 (or -0.09, K2=-0.70)

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

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

 NpO2++ ISE NaClO4 21°C 1.0M C I K1=3.94 B2= 6.82 1985SCe (7066) 315
 B3=8.49
 At I=0.10 M NaClO4, K1=4.18, B2=6.96, B3=9.64.

NpO2++ EMF none 25°C 0.0 U T H K1=4.6 B2=7.8 1984LEa (7067) 316
 100 C: K1=4.8, B2=8.1; 150 C: K1=5.2, B2=8.5. Evaluated data

NpO2++ dis NaClO4 25°C 2.00M U K1=1.12 1976PRa (7068) 317

NpO2++ EMF none 25°C 0.0 U 1970AWa (7069) 318
 K(NpO2+HF=NpO2F+H)=1.41
 K(NpO2F+HF=NpO2F2+H)=0.04

NpO2++ dis NaClO4 21°C 1.0M U 1968ABc (7070) 319
 K(NpO2+HF=NpO2F+H)=0.93
 K(NpO2+2HF=NpO2F2+2H)=1.11

NpO2++ ix NaClO4 25°C 2.11M U I K1=5.92 1968KKd (7071) 320
 K(NpO2+HF=NpO2F+H)=2.11

Method:cation exchange. Medium: HClO4. At I=1.04: K(NpO2+HF=NpO2F+H)=2.20,
 K1=5.37

I03- Iodate; HL Iodate CAS 7782-68-5 (1257)

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

 NpO2++ sp NaClO4 25°C 0.30M U K1=0.61 1972BBg (8541) 321
 Medium: HClO4

N03- Nitrate; HL Nitrate CAS 7697-37-2 (288)

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

 NpO2++ sp oth/un 25°C 1.00M U B2=4.74 1976VAb (9825) 322

NpO2++ dis NaClO4 25°C 4.0M U K1=-0.7 1971DCb (9826) 323

NpO2++ EMF NaClO4 25°C 0.40M U I K1=-0.98 1970AWb (9827) 324
 Medium: HClO4. K1=-0.89(I=0.6)

NpO2++ dis NaClO4 20°C 8.0M U K1=-0.24 B2=0.20 1970LKa (9828) 325
 Medium: HClO4

NpO2++ sp NaClO4 25°C 2.0M U K1=-0.4 1966RYa (9829) 326

OH- HL Hydroxide (57)
Hydroxide;

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

NpO2++ EMF none 25°C 0.0 U T H 1984LEa (11821) 327
*K(NpO2+H2O=NpO2(OH)+H)=-5.2
*B(2,2)=-6.4
*B(3,5)=-17.5

100 C, values are: -3.7, -5.0, -14.0; 150 C: -3.0, -4.6, -12.8. Evaluated data

NpO2++ con none 23°C 0.0 C 1983SGe (11822) 328
*K1=-5.45

NpO2++ EMF NaClO4 20°C 1.00M U 1974Mca (11823) 329
Kso=-14

Np: NpO3+. Kso: NpO3(OH)(s)=NpO3 + OH

NpO2++ gl NaClO4 25°C 1.00M U 1972Cma (11824) 330
*K1(NpO2+H2O=NpO2OH+H)=-5.17
*B(2,2)=-6.68
*B(3,5)=-18.25

*B(m,n)(mNpO2 + nH2O=(NpO2)m(OH)n + nH)

NpO2++ sol none 20°C 0.00 U K1=10.63 B2=19.20 1971M0d (11825) 331
B3=23.49

NpO2++ sol oth/un ? U B2=21.4 1971M0d (11826) 332

NpO2++ gl oth/un 25°C ? U 1948KNa (11827) 333
Kso(NpO2(OH)2)=-21.6?

PO4--- H3L Phosphate CAS 7664-38-2 (176)
Phosphate;

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

NpO2++ EMF none 25°C 0.0 U T H 1984LEa (13280) 334
K(NpO2+H2PO4)=2.3
K(NpO2+HPO4)=8.2

At 150 C: K(NpO2+H2PO4)=1, K(NpO2+HPO4)=9. Evaluated data

NpO2++ oth none ? 0.0 U 1969M0c (13281) 335
K(NpO2+H2L)=2.33
K(NpO2+HL)=8.18

Methods: solubility, ion exchange, distribution, EMF.
I=0.5, by distribution: K(NpO2+HL)=7.18, K(NpO2+H2L)=1.70

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

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np02++	EMF	none	25°C	0.0	U T H			K1=3.3	1984LEa (16423)	336
100 C: K1=4.6; 150 C: K1=5.8. Evaluated data										
Np02++	dis	NaCl04	25°C	2.00M	U			K1=1.07 B2=0.6	1976PRa (16424)	337
Np02++	EMF	oth/un	20°C	var	U			K1=0.7 B2=1.8	1974Mca (16425)	338
Metal: Np03+ (Np(VII))										
Np02++	EMF	none	25°C	0.0	U I				1970AWa (16426)	339
*K1=1.28										
Np02++	sp	NaCl04	6°C	ca.1	U			K1=2.20 B2=4.04	1970MKf (16427)	340
Metal: Np02+++ (Np(VII))										
Np02++	dis	NaCl04	21°C	1.0M	U				1968ABd (16428)	341
*K1=0.79										
*B2=0.56										
Np02++	sp	NaCl04	25°C	2.0M	U			K1=1.64	1962STb (16429)	342
Np02++	EMF	NaCl04	25°C	1.0M	U			K1=1.11	1958SPa (16430)	343

SiW11039----- H8L (2464)
alpha-Heterosilicon-polytungstate;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np02++	sp	NaCl04	RT	0.10M	C				2000PMb (17240)	344
K(Np02+SiW11039)=11.6										

Medium: 0.1 M HCl04.

C2H2O4 H2L Oxalic acid CAS 144-62-7 (24)
Ethanedioic acid; (COOH)2

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np02++	sol	oth/un	25°C	0.50M	U			K1=3.38 B2=5.65	1979MPb (19002)	345
Medium: ammonium oxalate										
Np02++	sol	oth/un	20°C	1.00M	U			K1=3.38 B2=5.65	1979MPc (19003)	346
Np02++	sp	NaCl04	20°C	1.00M	U			K1=6.0 B2=10.10	1969MKh (19004)	347

C2H3O2Cl HL Chloroacetic CAS 79-11-8 (34)
Chloroethanoic acid; ClCH2.COOH

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Metal      Mtd Medium Temp Conc Cal Flags Lg K values      Reference ExptNo
-----
Np02++    gl  NaCl04 20°C 1.00M U      K1=1.33  B2=2.10  1969CMa (19373) 348
                                     B3=2.78

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*****
C2H4O2          HL  Acetic acid      CAS 64-19-7 (36)
Ethanoic acid; CH3.COOH
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Metal      Mtd Medium Temp Conc Cal Flags Lg K values      Reference ExptNo
-----
Np02++    oth none  ?  0.00 U      K1=2.98  B2=5.51  1969M0c (20088) 349
                                     B3=7.41

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Data from survey of literature data

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*****
C2H4O3          HL  Glycolic acid   CAS 79-14-1 (33)
2-Hydroxyethanoic acid; HO.CH2.COOH
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Metal      Mtd Medium Temp Conc Cal Flags Lg K values      Reference ExptNo
-----
Np02++    gl  NaCl04 20°C 1.00M C      T K1=2.37  B2=3.95  1974MTa (20601) 350
                                     B3=5.00

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Np02++    EMF NaCl04 20°C 1.00M U      K1=2.37  B2=3.95  1972PTc (20602) 351
                                     B3=5.00

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*****
C3H5O2Cl        HL          CAS 107-94-8 (1436)
3-Chloropropanoic acid; Cl.CH2.CH2.COOH
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Metal      Mtd Medium Temp Conc Cal Flags Lg K values      Reference ExptNo
-----
Np02++    gl  NaCl04 20°C 1.00M U      K1=1.88  B2=3.30  1969CMa (24731) 352
                                     B3=3.60

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*****
C3H6O2          HL  Propionic acid  CAS 79-09-4 (35)
Propanoic acid; CH3.CH2.COOH
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Metal      Mtd Medium Temp Conc Cal Flags Lg K values      Reference ExptNo
-----
Np02++    gl  NaCl04 20°C 1.00M U      K1=2.44  B2=4.45  1969CMa (25027) 353
                                     B3=6.49

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*****
C4H6O5          H2L  Diglycolic acid CAS 110-99-6 (243)
Di(carboxy)methyl ether, 2,2'-Oxydiethanoic acid; HOOC.CH2.O.CH2.COOH
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Metal      Mtd Medium Temp Conc Cal Flags Lg K values      Reference ExptNo
-----
Np02++    gl  NaCl04 20°C 1.00M U      K1=5.16          1973CBc (30908) 354

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C4H8O3          HL          CAS 594-61-6 (81)

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2-Hydroxy-2-methylpropanoic acid; (CH₃)₂C(OH).COOH

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Np02++	gl	NaCl04	20°C	1.00M	C		T	K1=3.15 B2=5.25	1974MTa	(33500) 355

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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

EVALUATION Flags are :-

T or IUP=T signifies EVALUATION RATING = Tentative by IUPAC

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