

SC-Database

Software version = 5.81 Data version = 4.62

Experiment list contains 58 experiments for

(no ligands specified)

3 metals : Pa(IV), Pa(V), Pa++

(no references specified)

(no experimental details specified)

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e- HL Electron (442)  
Electron;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Pa(IV)	oth	none	rt	0.0	U				1956FEa (770)	1
K(PaF7+5e=Pa(s))=-85(-1000 mV)										

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

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Pa(IV)	dis	NaClO4	25°C	3.0M	U			B2=0 B3 < 0	1966GUb (5320)	2

Pa(IV)	dis	NaClO4		3.0M	U			*K1 < 0 *B2=0	1965GUc (5321)	3
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F- HL Fluoride CAS 7644-39-3 (201)  
Fluoride;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Pa(IV)	dis	NaClO4	?	3.0M	U T				1965GUc (7076)	4
K(PaO2+HF=PaO2F+H)=4.73										
K(PaO2+2HF=PaO2F2+2H)=8.26										

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

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Pa(IV)	ix	NaClO4	25°C	1.0M	U			K1=0.16 B2=-0.99	1967KR a (9830)	5

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OH- HL Hydroxide (57)  
Hydroxide;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
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Pa(IV) dis NaClO4 ? 3.00M U 1970LIa (11842) 6  
\*B(PaO+H2O=PaO2+2H)=0.96

Pa: Pa(V). Kw=-14.22

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Pa(IV) dis NaClO4 25°C 3.00M U 1968GUb (11843) 7  
\*K1=-0.14  
\*B2=-0.52  
\*B3=-1.6 to -2.0  
\*B4=-5.3

Medium: 3 M LiClO4

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

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Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo  
-----  
Pa(IV) dis NaClO4 25°C 3.0M U 1969STa (12694) 8  
K(PaOOH+H2L=PaOOH(HL)+H)=2.3  
K(PaOOH+2H2L)=3.25  
K(PaOOH+H2L=PaOHL+H2O)=2  
K(PaOOH+2H2L=PaO(HL)2+H)=3.2

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

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Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo  
-----  
Pa(IV) dis oth/un 10°C 0.50M U 19690Gb (16431) 9  
K(Pa(OH)2+HL=PaOHL+H2O)=2.50  
-----  
Pa(IV) dis oth/un 10°C 0.50M U 1968MIb (16432) 10  
K(Pa(OH)2+HL=PaLOH+H2O)=2.51

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Pa(IV) dis NaClO4 ? 3.0M U T 1965GUd (16433) 11  
\*K1=1.62  
\*B2=2.18

Medium: HClO4

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

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Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo  
-----  
Pa(IV) oth oth/un 25°C 0.0 U K1=10.7 B2=20.3 1967MEc (19005) 12  
B3=26.5  
B4=29.2

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

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Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Pa(IV)	dis	NaClO4	25°C	1.00M	C	T H		K1=6.1 B2=6.2 B(PaOL2=PaOL2(org))=2.07	1974LUa (38050)	13

M=PaO++; Organic phase: benzene. DH(Kd)=14 kJ mol<sup>-1</sup>.  
DH(Kd)=30 kJmol<sup>-1</sup>; Kd(PaO+2HL(org)=PaOL2(org)+2H)=-4.13

Pa(IV)	dis	NaClO4	25°C	1.00M	C	T H		B'2=12.3 B'3=18.34 K(Pa(OH)L3=Pa(OH)L3(org))=2.54	1974Lub (38051)	14
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Organic phase=benzene; B'n:Pa(OH)SO4+nL=Pa(OH)Ln+SO4

Kd: Pa(OH)SO4+3HL(org)=Pa(OH)L3(org)+3H+SO4

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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
Pa(IV)	dis	NaClO4	25°C	3.00M	U	M			1968GUa (46209)	15

K(MO(OH)+H3L=MO(OH)H2L+H)=1.30  
K(MO(OH)+2H3L=MO(H2L)2+H)=1.80  
K(MO(OH)+H3L=MO(OH)HL+2H)=0.0  
K(MO(OH)2+H3L=MO(OH)HL+H)=1.11

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C10H10O2 HL Benzoylacetone CAS 93-91-4 (197)  
1-Phenylbutane-1,3-dione; C6H5.CO.CH2.CO.CH3

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Pa(IV)	dis	NaClO4	25°C	1.00M	C			Kd(Pa)=-0.7	1975LUa (70760)	16

Organic phase=benzene

Kd(Pa): PaO+4HL(org)=PaL4(org)+2H+H2O

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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
Pa(IV)	dis	NaClO4	25°C	1.00M	C			K(PaO+L)=19.0 K(PaO+H+L)=20.5	1974LUc (74036)	17

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e- HL Electron (442)  
Electron;

Metal	Mtd	Medium	Temp	Conc	Cal	Flags	Lg	K values	Reference	ExptNo
Pa(V)	oth	oth/un	25°C	6.0M	U				1962HPb (771)	18

K(Pa+e=Pa(IV))=-4.9(-290 mV)

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AsO4--- H3L Arsenate CAS 7778-39-4 (1557)  
Arsenate;

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Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo  
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Pa(V) oth oth/un ? 6.0M U 1966DMg (1155) 19  
K(Pa+H3L)=1.65  
K(Pa+2H3L)=2.75

Method:sorption on silica gel. Medium:HNO3

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

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Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo  
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Pa(V) dis NaClO4 25°C 1.0M U K1=0.21 B2=-0.68 1967KRa (5322) 20  
Medium:HClO4

-----  
Pa(V) dis oth/un 20°C 0.0 U 1966SNd (5323) 21  
K(Pa(OH)3+L)=0.0  
K(Pa(OH)3+2H+6L=PaCl6)=-11.26  
K(Pa(OH)3+3H+6L=PaCl6)=-13.70

Kd values into benzene also given

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Pa(V) dis NaClO4 ? 3.0M U 1965GUc (5324) 22  
K(Pa(OH)3+L)=0.08

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

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Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo  
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Pa(V) dis NaClO4 25°C 1.0M U 1967KRa (7077) 23  
\*K1=3.95  
\*K2=3.48  
\*K3=3.04

\*Kn: K(PaF(n-1)+HL=PaFn+H)

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Pa(V) EMF NaClO4 25°C 1.0M U K1=5.4 B2=10.40 1966BFb (7078) 24  
K3=4.9  
K4=4.8  
K5=4.5  
K6=4.4

K7=3.7, K8=1.7. Method:quinhydrone electrode.

-----  
Pa(V) dis NaClO4 25°C 3.0M U 1966GUb (7079) 25  
K(PaOOH+HF=PaOF+H2O)=3.56  
K(PaOOH+2HF-H)=7.65

K(PaOOH+3HF-2H)=10.91

-----  
Pa(V) dis NaClO4 ? 3.0M U 1965GUc (7080) 26  
K(Pa(OH)3+HF)=3.56  
K(Pa(OH)3+2HF-H)=7.65  
K(Pa(OH)3+3HF-2H)=10.90

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

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

Pa(V) dis NaClO4 25°C 1.0M U 1967KRa (8542) 27  
\*K1=2.11  
\*K2=1.54

\*\*\*\*\*  
NO3- HL Nitrate CAS 7697-37-2 (288)  
Nitrate;

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

Pa(V) dis NaClO4 ? 5.0M U K1=1.23 B2=2.10 1966KDa (9831) 28  
B3=2.73  
B4=3.14

Medium: HClO4. Probably Pa(OH)2+++. Kd(Pa(OH)2+2H+5L+2TPB(in C6H6)=  
PaL5(TBP)2(in C6H6)+2H2O)=3.73

-----  
Pa(V) ix NaClO4 20°C 4.0M U I K1=-0.20 B2=-0.68 1963NPa (9832) 29  
Medium: HClO4. I=2.0: K1=-0.10, B2=-0.13; I=1.0: K1=-0.17, B2=0.48, B4=1.08

-----  
Pa(V) dis NaClO4 20°C 6.0M U 1963SIa (9833) 30  
K6=-0.85  
K7=0.04

Medium: HClO4. Kd(PaL5+2TBP(C6H6)=PaL5(TBP)2(C6H6))=0.7

\*\*\*\*\*  
OH- HL Hydroxide (57)  
Hydroxide;

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

Pa(V) dis NaClO4 25°C 0.10M C I 2002TLa (11844) 31  
K(PaOOH+H2O=PaO(OH)2+H)=-2.0

Extraction of 233Pa with thenoyltrifluoroacetone from HClO4/NaClO4 into  
toluene. K(PaO(OH)2+2H2O=PaO(OH)5+H)=-7.0. Data for 1.05 and 3.52 m.

-----  
Pa(V) dis NaClO4 25°C 0.0 C I 2002TLa (11845) 32  
K(PaOOH+H2O=PaO(OH)2+H)=-1.26

Extraction of 233Pa with TTA from HClO4/NaClO4 into toluene.  
K(PaO(OH)2+2H2O=PaO(OH)5+H)=-7.15. SIT analysis of data for 0.1-3.52 m.

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Pa(V) dis NaClO4 25°C 3.00M U 1968GUb (11846) 33  
K(PaO3(OH)+H)=5.55  
K(PaO2+H)=1.05

Medium: 3 M LiClO4

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Pa(V) dis NaClO4 25°C 3.00M U 1965GUa (11847) 34  
K(PaO(OH)3+H)=1.05

Medium: 3 M LiClO4

-----  
Pa(V) dis NaNO3 20°C 6.0M U 1959MIb (11848) 35  
\*K1(PaA(H2O)3)=2.1  
\*K2(PaA(OH))=1.46  
\*K3(PaA(OH)2)=1.32

Medium: LiNO3. HA=(CHMeEtO)2PO2H

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Pa(V) oth oth/un ? var U 1959SSc (11849) 36  
Kso(Pa(OH)5)=-55(?)

Method: adsorption studies

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

Phosphate;

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

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Pa(V) dis NaClO4 25°C 1.00M U 1973CGd (13283) 37  
K(PaOOH+H3L=PaOOHH2L+H)=1.75  
K(PaOOH+2H3L=PaOH3LH2L)=3.04  
K(PaOOH+2H3L=PaO(H2L)2+H)=1.91  
K(PaOOH+H2O=PaO(OH)2+H)=-1.05

Medium: LiClO4, K(PaOOH+3H3L+HSO4=PaO(H2L)3HSO4+2H)=5.11

K(PaOOH+3H3L=PaO(H2L)3+2H)=4.07

-----  
Pa(V) oth KNO3 ? 6.0M U 1966DMg (13284) 38  
K(Pa+H3L)=1.54  
K(Pa+2H3L)=2.20

Method:sorption on silica gel. Medium: HNO3

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

Sulfate;

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

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Pa(V) dis NaClO4 25°C 1.0M U 1973CGd (16434) 39  
K(PaOOH+HL)=1.49  
K(PaOOH+2HL+H=PaO(HL)2)=2.40

Medium: LiClO4

-----  
Pa(V) dis NaClO4 25°C 1.0M U 1967KRa (16435) 40  
K(Pa+HL=PaL+H)=2.08  
K(PaHL+HL=PaL2+H)=0.23

-----  
Pa(V) dis NaClO4 17°C 1.38M U 1967MSa (16436) 41  
K(Pa(OH)4+2H+L=Pa(OH)2L)=0.81  
-----

Pa(V) dis NaClO4 25°C 3.0M U 1966GUb (16437) 42  
K(PaOOH+HL=PaOL+H2O)=1.29  
K(PaOOH+2HL=PaOL2+H+H2O)=2.51  
-----

Pa(V) dis NaClO4 ? 3.0M U 1965GUd (16438) 43  
K(Pa(OH)3+HL)=1.3  
K(Pa(OH)3+2HL+H)=2.5  
-----

Pa(V) ix oth/un 20°C 2.0M U I 1963NPa (16439) 44  
K1eff=0.06  
B2eff=1.17  
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\*\*\*\*\*  
C2H2O4 H2L Oxalic acid CAS 144-62-7 (24)  
Ethanedioic acid; (COOH)2  
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Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo  
-----  
Pa(V) ix KNO3 ? 1.00M U K1=1.81 B2=2.51 1966DMb (19006) 45  
B3=4.34  
Medium : 1-6 M HNO3  
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Pa(V) ix oth/un 25°C 0.25M U 1966GAa (19007) 46  
K(Pa2O(OH)3+HL)=2.60(?)  
K(Pa2O(OH)2+2HL)=3.95(?)  
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\*\*\*\*\*  
C3H6O3 HL L-Lactic acid CAS 79-33-4 (82)  
L-2-Hydroxypropanoic acid; CH3.CH(OH).COOH  
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Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo  
-----  
Pa(V) ix oth/un ? 0.25M U 1962GLa (25499) 47  
K(PaO(OH)+L)=2.24(?)  
-----

\*\*\*\*\*  
C4H6O5 H2L Malic acid CAS 617-48-1 (393)  
2-Hydroxybutane-1,4-dioic acid, Hydroxy-succinic acid; HOOC.CH2.CH(OH).COOH  
-----

Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo  
-----  
Pa(V) ix oth/un 25°C 0.25M U 1966GAa (30697) 48  
K(Pa2O(OH)1.5+HL)=2.42(?)  
K(Pa2O(OH)1.5+2HL)=4.80(?)  
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\*\*\*\*\*  
C4H6O6 H2L L-Tartaric acid CAS 87-69-4 (92)  
L-Tartaric acid, L-2,3-Dihydroxybutanedioic acid; HOOC.CH(OH).CH(OH).COOH  
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Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo

-----  
Pa(V) ix oth/un 25°C 0.25M U 1966GAa (31324) 49  
K(Pa2O(OH)3.5+HL)=2.34 ?  
K(Pa2O(OH)4.5+2HL)=4.96 ?  
\*\*\*\*\*

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  
-----

Pa(V) ix oth/un ? 0.25M U 1962GLa (33501) 50  
K(?)=3.47  
K(?)=7.00  
\*\*\*\*\*

C5H8O7 H2L CAS 40120-71-6 (3022)  
2,3,4-Trihydroxypentanedioic acid, Trihydroxyglutaric acid; HOOC.(CH(OH))3.COOH  
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Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo  
-----

Pa(V) ix oth/un 25°C 0.25M U 1966GAa (38433) 51  
K(Pa2O(OH)3+HL)=2.80 ?  
\*\*\*\*\*

C6H6O6 H3L Aconitic acid CAS 449-12-7 (3647)  
1,2,3-Propenetricarboxylic acid;  
-----

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

Pa(V) ix oth/un 25°C 0.25M U 1966GAa (44291) 52  
K(?)=2.39  
\*\*\*\*\*

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  
-----

Pa(V) ix oth/un 25°C 0.25M U 1966GAa (46210) 53  
K(?)=3.43  
K(?)=5.92  
\*\*\*\*\*

C8H5O2F3S HL TTA CAS 326-91-0 (165)  
4,4,4-Trifluoro-1-(2-thienyl)butane-1,3-dione; F3C.CO.CH2.CO.C4H3S  
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Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo  
-----

Pa(V) dis NaClO4 25°C 3.0M U 1965GUa (58663) 54  
K(Pa(OH)3+L)=2.26  
K(Pa(OH)3+2L)=2.2  
K(Pa(OH)3+OH+L)=-0.9  
K(Pa(OH)3+OH+L+2HL)=6.2  
Medium: LiClO4. K(Pa(OH)3+2L+2HL=Pa(OH)3L2(HL)2) < 9.6



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 C8H8O3 HL Mandelic Acid CAS 611-72-3 (80)  
 2-Phenyl-2-hydroxyethanoic acid; C6H5.CH(OH).COOH

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 Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo  
 -----  
 Pa(V) ix oth/un ? 0.25M U 1962GLa (59860) 55  
 K(?)=2.85

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

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 Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo  
 -----  
 Pa(V) dis oth/un 20°C 1.0M U 1969SKa (74037) 56  
 K(Pa(OH)2+L)=22.1 pH 0-2

-----  
 Pa(V) ix oth/un 25°C 0.25M U 1966GAa (74038) 57  
 K(?)=8.19  
 K(?)=11.96

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

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 Metal Mtd Medium Temp Conc Cal Flags Lg K values Reference ExptNo  
 -----  
 Pa++ dis NaClO4 20°C 1.0M U K1=8.3 B2=15.44 1968DKb (58664) 58

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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

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END