TABLE SI-1

A Summary of Equilibrium Constants at 25° C and Zero Ionic Strength Investigated in Lead Solubility Modeling Computations

Reaction	*LEADSOL log K	**SASIAS log K	***MINEQL+ v 4.5 log K	****Powell et. al. (2009) log K
$Pb^{2+} + H_2O \rightleftarrows PbOH^+$	-7.23	-7.25	-7.697	-7.46
$Pb^{2+} + 2H_2O \rightleftarrows Pb(OH)_2^0 + 2H^+$	-16.93	-16.91	-17.094	-16.94
$Pb^{2+} + 3H_2O \rightleftarrows Pb(OH)_3^- + 3H^+$	-28.1	-28.1	-28.091	-28.03
$Pb^{2+} + 4H_2O \rightleftarrows Pb(OH)_4^{2-} + 4H^+$	-39.7	+	-39.699	-
$2Pb^{2+} + H_2O \rightleftarrows Pb_2OH^{3+} + H^+$	-6.36	-6.4	-6.397	-7.28
$3Pb^{2+} + 4H_2O \rightleftarrows Pb_3(OH)_4^{2+} + 4H^+$	-23.88	-23.9	-23.888	-23.01
$4Pb^{2+} + 4H_2O \rightleftarrows Pb_4(OH)_4^{4+} + 4H^+$	-20.88	+	-19.988	-20.57
$6Pb^{2+} + 8H_2O \rightleftarrows Pb_6(OH)_8^{4+} + 8H^+$	-43.61	-43.6	-	-42.89
$Pb^{2+} + CO_3^{2-} \rightleftarrows PbCO_3$	7.1	7.09	6.478	6.45
$Pb^{2+} + 2CO_3^{2-} \rightleftarrows Pb(CO_3)_2^{2-}$	10.4	10.29	9.938	10.13
$Pb^{2+} + H^+ + CO_3^{2-} \rightleftarrows PbHCO_3^+$	13.2	+	13.2	12.196
$Pb^{2+} + H^+ + PO_4^{3-} \rightleftarrows PbHPO_4$	15.45	15.45	-	-
$Pb^{2+} + 2H^+ + PO_4^{3-} \rightleftarrows PbH_2PO_4^+$	21.1	21.049	-	-
$Pb^{2+} + SO_4^{2-} \rightleftarrows PbSO_4^0$	2.75	2.75	2.69	2.72
$Pb^{2+} + 2SO_4^{2-} \rightleftarrows Pb(SO_4)_2^{2-}$	3.47	+	3.47	-
$Pb^{2+} + Cl^- \rightleftarrows PbCl^+$	1.6	1.59	1.55	1.50
$Pb^{2+} + 2Cl^- \rightleftarrows PbCl_2^0$	1.8	1.8	2.2	2.10
$Pb^{2+} + 3Cl^- \rightleftarrows PbCl_3^-$	1.7	1.7	1.8	2.00
$Pb^{2+} + 4Cl^- \rightleftarrows PbCl_4^{2-}$	1.4	1.4	1.46	-
$Pb^{2+} + NO_3^- \rightleftarrows PbNO_3^+$	‡	1.17 §	1.17	-
$Pb^{2+} + 2NO_3^- \rightleftarrows Pb(NO_3)_2^0$	‡	1.4 §	1.4	-

$PbCO_3(s) \rightleftarrows Pb^{2+} + CO_3^{2-}$	-13.13	-13.88	-13.13	-13.18
$Pb_3(CO_3)_2OH)_2(s) + 2H^+ \rightleftarrows 3Pb^{2+} + 2CO_3^{2-} + 2H_2O$	-18.8	-19.14	-18.77	-
$Pb(OH)_2(s) + 2H^+ \rightleftarrows Pb^{2+} + 2H_2O$	13.06	12.69	8.15	-
$Pb_5(PO_4)_3OH(s) + H^+ \rightleftarrows 5Pb^{2+} + 3PO_4^{3-} + H_2O$	-62.79	-62.8	-62.79	-

*Derived from Table 4-13, AWWARF-TZW Internal Corrosion of Water Distribution Systems, 2nd Edition (1996) Gibbs Free Energy values (LEADSOL)

**Reported in Hunt, D.T.E. & Creasey, J.D WRc Technical Report TR-151 (SASIAS)

***Schecher, W. (2001) Thermochemical Data Used in MINEQL+ version 4.5, Environmental Research Software

****Powell, K.J., Brown, P.L., Byrne, R.H., Gajda, T., Hefter, G., Leuz, A.-K., Sjöberg, S., and Wanner, H., 2009. Chemical speciation of environmentally significant metals with inorganic ligands. Part 3: The Pb^{2+} + OH^-, Cl^-, CO_3^{2-}, SO_4^{2-}, and PO_4^{3-} systems (IUPAC Technical Report). *Pure and Applied Chemistry,* 81:12. https: 10.1351/pac-rep-09-03-05.

+ Not included in the SASIAS program

‡ Not included in the LEADSOL program

§ Not included in the SASIAS computations in WRc TR-151

- Not included in the database