

Lead(II)

Equilibrium	Baes and Mesmer, 1976	NIST46	Powell et al., 2009	Brown and Ekberg, 2016	Cataldo et al., 2018
$\text{Pb}^{2+} + \text{H}_2\text{O} \rightleftharpoons \text{PbOH}^+ + \text{H}^+$	-7.71 ± 0.1	-7.6	-7.46 ± 0.06	-7.49 ± 0.13	-6.47 ± 0.03
$\text{Pb}^{2+} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Pb(OH)}_2 + 2 \text{H}^+$	-17.12 ± 0.1	-17.1	-16.94 ± 0.09	-16.99 ± 0.06	-16.12 ± 0.01
$\text{Pb}^{2+} + 3 \text{H}_2\text{O} \rightleftharpoons \text{Pb(OH)}_3^- + 3 \text{H}^+$	-28.06 ± 0.05	-28.1	-28.03 ± 0.06	-27.94 ± 0.21	-28.4 ± 0.1
$\text{Pb}^{2+} + 4 \text{H}_2\text{O} \rightleftharpoons \text{Pb(OH)}_4^{2-} + 4 \text{H}^+$			-40.8		
$2 \text{Pb}^{2+} + \text{H}_2\text{O} \rightleftharpoons \text{Pb}_2(\text{OH})^{3+} + \text{H}^+$	-6.36 ± 0.1	-6.4	-7.28 ± 0.09	-6.73 ± 0.31	
$3 \text{Pb}^{2+} + 4 \text{H}_2\text{O} \rightleftharpoons \text{Pb}_3(\text{OH})_4^{2+} + 4 \text{H}^+$	-23.88 ± 0.2	-23.9	-23.01 ± 0.07	-23.43 ± 0.10	

$3 \text{ Pb}^{2+} + 5 \text{ H}_2\text{O} \rightleftharpoons \text{Pb}_3(\text{OH})_5^+ + 5 \text{ H}^+$				-31.11 ± 0.10	
$4 \text{ Pb}^{2+} + 4 \text{ H}_2\text{O} \rightleftharpoons \text{Pb}_4(\text{OH})_4^{4+} + 4 \text{ H}^+$	-20.88 ± 0.1	-20.9	-20.57 ± 0.06	-20.71 ± 0.18	
$6 \text{ Pb}^{2+} + 8 \text{ H}_2\text{O} \rightleftharpoons \text{Pb}_6(\text{OH})_8^{4+} + 8 \text{ H}^+$	-43.61 ± 0.1	-43.6	-42.89 ± 0.07	-43.27 ± 0.47	
$\text{Pb}^{2+} + \text{H}_2\text{O} + \text{Cl}^- \rightleftharpoons \text{PbOHCl} + \text{H}^+$					-7.0 ± 0.3
$\text{PbO(s)} + 2 \text{ H}^+ \rightleftharpoons \text{Pb}^{2+} + \text{H}_2\text{O}$			12.62 (red) ^a 12.90 (yellow) ^b		
$\text{PbO(s)} + \text{H}_2\text{O} \rightleftharpoons \text{Pb}^{2+} + 2 \text{ OH}^-$	-15.28 ± 0.05 (red)	-15.3	-15.3 (red) ^a -15.1 (yellow) ^a	-15.37 ± 0.04 (red) -15.1 ± 0.08 (yellow)	
$\text{Pb}_2\text{O(OH)}_{2(\text{s})} + \text{H}_2\text{O} \rightleftharpoons 2 \text{ Pb}^{2+} + 4 \text{ OH}^-$			-14.9 ^a		
$\text{PbO(s)} + \text{H}_2\text{O} \rightleftharpoons \text{Pb(OH)}_2$			-4.4 (red) ^a -4.2 (yellow) ^a		
$\text{Pb}_2\text{O(OH)}_{2(\text{s})} + \text{H}_2\text{O} \rightleftharpoons 2 \text{ Pb(OH)}_2$			-4.0		

$\text{PbO}_{(s)} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Pb}(\text{OH})_3^- + \text{H}^+$			-1.4 (red) ^a -1.2 (yellow) ^a		
$\text{Pb}_2\text{O}(\text{OH})_2(s) + 2 \text{H}_2\text{O} \rightleftharpoons 2 \text{Pb}(\text{OH})_3^- + 2 \text{H}^+$			-1.0		

^aFeitknecht and Schindler (1963).

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Lead(IV)

Reaction	Powell et al., 2009
$\beta\text{-PbO}_2 + 2 \text{H}_2\text{O} \rightleftharpoons \text{Pb}^{4+} + 4 \text{OH}^-$	-64^a
$\beta\text{-PbO}_2 + 2 \text{H}_2\text{O} + 2 \text{OH}^- \rightleftharpoons \text{Pb}(\text{OH})_6^{2-}$	-4.5^a

^aFeitknecht and Schindler (1963).

W. Feitknecht and P. Schindler, Solubility constants of metal oxides, metal hydroxides and metal hydroxide salts in aqueous solution. Pure Appl. Chem., 6, 125–206 (1963).

K.J. Powell, P.L. Brown, R.H. Byrne, T. Gajda, G. Hefter, A.K. Leuz, S. Sjöberg, H. Wanner, Chemical speciation of environmentally significant metals with inorganic ligands. Part 3: The $\text{Pb}^{2+} + \text{OH}^-$, Cl^- , CO_3^{2-} , SO_4^{2-} , and PO_4^{3-} systems (IUPAC Technical Report). Pure Appl. Chem., 81, 2425–2476 (2009).