

Equilibrium constants for hydrolysis and associated equilibria in critical compilations

Zinc

Equilibrium reactions	lgK at infinite dilution and $T = 298\text{ K}$		
	Baes and Mesmer, 1976	Powell and Brown, 2013	Brown and Ekberg, 2016
$\text{Zn}^{2+} + \text{H}_2\text{O} \rightleftharpoons \text{ZnOH}^+ + \text{H}^+$	-8.96	-8.96 ± 0.05	8.94 ± 0.06
$\text{Zn}^{2+} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Zn(OH)}_2 + 2 \text{H}^+$	-16.9	-17.82 ± 0.08	-17.89 ± 0.15
$\text{Zn}^{2+} + 3 \text{H}_2\text{O} \rightleftharpoons \text{Zn(OH)}_3^- + 3 \text{H}^+$	-28.4	-28.05 ± 0.05	-27.98 ± 0.10
$\text{Zn}^{2+} + 4 \text{H}_2\text{O} \rightleftharpoons \text{Zn(OH)}_4^{2-} + 4 \text{H}^+$	-41.2	-40.41 ± 0.12	-40.35 ± 0.22
$2 \text{Zn}^{2+} + \text{H}_2\text{O} \rightleftharpoons \text{Zn}_2\text{OH}^{3+} + \text{H}^+$	-9.0	-7.9 ± 0.2	-7.89 ± 0.31
$2 \text{Zn}^{2+} + 6 \text{H}_2\text{O} \rightleftharpoons \text{Zn}_2(\text{OH})_6^{2-} + 6 \text{H}^+$	-57.8		
$\text{ZnO(s)} + 2 \text{H}^+ \rightleftharpoons \text{Zn}^{2+} + \text{H}_2\text{O}$	11.14	11.12 ± 0.05	11.11 ± 0.10
$\epsilon\text{-Zn(OH)}_2(\text{s}) + 2 \text{H}^+ \rightleftharpoons \text{Zn}^{2+} + 2 \text{H}_2\text{O}$		11.38 ± 0.20	11.38 ± 0.20
$\beta_1\text{-Zn(OH)}_2(\text{s}) + 2 \text{H}^+ \rightleftharpoons \text{Zn}^{2+} + 2 \text{H}_2\text{O}$		11.72 ± 0.04	
$\beta_2\text{-Zn(OH)}_2(\text{s}) + 2 \text{H}^+ \rightleftharpoons \text{Zn}^{2+} + 2 \text{H}_2\text{O}$		11.76 ± 0.04	
$\gamma\text{-Zn(OH)}_2(\text{s}) + 2 \text{H}^+ \rightleftharpoons \text{Zn}^{2+} + 2 \text{H}_2\text{O}$		11.70 ± 0.04	
$\delta\text{-Zn(OH)}_2(\text{s}) + 2 \text{H}^+ \rightleftharpoons \text{Zn}^{2+} + 2 \text{H}_2\text{O}$		11.81 ± 0.04	

C.F. Baes and R.E. Mesmer, The Hydrolysis of Cations. Wiley, New York, 1976, p. 293.

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P.L. Brown and C. Ekberg, *Hydrolysis of Metal Ions*. Wiley, 2016, pp. 676–700.

K. J. Powell, P. L. Brown, R. H. Byrne, T. Gajda, G. Hefter, A.-K. Leuz, S. Sjöberg, and H. Wanner, *Pure and Applied Chemistry*, 85, 2249–2311 (2013).

Distribution diagrams

These diagrams have been computed at two Zn concentrations ($1 \text{ mM} = 1 \times 10^{-3} \text{ mol L}^{-1}$ and $1 \text{ }\mu\text{M} = 1 \times 10^{-6} \text{ mol L}^{-1}$) with the 'best' equilibrium constants above (in green). Calculations assume $T = 298 \text{ K}$ for the limiting case of zero ionic strength (*i.e.*, even neglecting plotted ions).

