Author: montserrat.filella@unige.ch
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Equilibrium constants for hydrolysis and associated equilibria in critical compilations

Cadmium

Equilibrium reactions	lg*K* at infinite dilution and *T* = 298 K		
	Baes and Mesmer, 1976	Powell et al., 2011	Brown and Ekberg, 2016
$Cd^{2+} + H_2O \rightleftharpoons CdOH^+ + H^+$	−10.08	–9.80 ± 0.10	−9.81 ± 0.10
$Cd^{2+} + 2\ H_2O \rightleftharpoons Cd(OH)_2 + 2\ H^+$	–20.35	–20.19 ± 0.13	−20.6 ± 0.4
$Cd^{2+} + 3\ H_2O \rightleftharpoons Cd(OH)_3^- + 3\ H^+$	<–33.3	–33.5 ± 0.5	−33.5 ± 0.5
$Cd^{2+} + 4\ H_2O \rightleftharpoons Cd(OH)_4^{2-} + 4\ H^+$	–47.35	–47.28 ± 0.15	−47.25 ± 0.15
$2\ Cd^{2+} + H_2O \rightleftharpoons Cd_2OH^{3+} + H^+$	–9.390	–8.73 ± 0.01	−8.74 ± 0.10
$4\ Cd^{2+} + 4\ H_2O \rightleftharpoons Cd_4(OH)_4^{4+} + H^+$	–32.85		
$Cd(OH)_2(s) \rightleftharpoons Cd^{2+} + 2\ OH^-$		–14.28 ± 0.12	
$Cd(OH)_2(s) + 2\ H^+ \rightleftharpoons Cd^{2+} + 2\ H_2O$	13.65	13.72 ± 0.12	13.71 ± 0.12

C.F. Baes and R.E. Mesmer, The Hydrolysis of Cations. Wiley, New York, 1976, p. 301.

P.L. Brown and C. Ekberg, Hydrolysis of Metal Ions. Wiley, 2016, pp. 730–738.

K. J. Powell, P. L. Brown, R. H. Byrne, T. Gajda, G. Hefter, A.-K. Leuz, S. Sjöberg, and H. Wanner, Chemical speciation of environmentally significant metals with inorganic ligands. Part 4: The $Cd^{2+} + OH^-$, Cl^-, CO_3^{2-}, SO_4^{2-}, and PO_4^{3-} systems (IUPAC Technical Report). Pure Appl. Chem., 83, 1163–1214 (2011).

Distribution diagrams

These diagrams have been computed at two Cd concentrations (1 mM = $1x10^{-3}$ mol L^{-1} and 1 μM = $1x10^{-6}$ mol L^{-1}) with the 'best' equilibrium constants above (in green). Calculations assume T = 298 K for the limiting case of zero ionic strength (*i.e.*, even neglecting plotted ions).