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Equilibrium constants for hydrolysis and associated equilibria in critical compilations

Manganese(II)

Equilibrium reactions	lg*K* at infinite dilution and *T* = 298 K				
	Perrin et al., 1969	Baes and Mesmer, 1976	Nordstrom et al., 1990	Hummel et al., 2002	Brown and Ekberg, 2016
$Mn^{2+} + H_2O \rightleftharpoons MnOH^+ + H^+$	–10.59	–10.59	–10.59	–10.59	−10.58 ± 0.04
$Mn^{2+} + 2\ H_2O \rightleftharpoons Mn(OH)_2 + 2\ H^+$		–22.2			−22.18 ± 0.20
$Mn^{2+} + 3\ H_2O \rightleftharpoons Mn(OH)_3^- + 3\ H^+$		–34.8			−34.34 ± 0.45
$Mn^{2+} + 4\ H_2O \rightleftharpoons Mn(OH)_4^{2-} + 4\ H^+$		–48.3			−48.28 ± 0.40
$2\ Mn^{2+} + H_2O \rightleftharpoons Mn_2OH^{3+} + H^+$		–10.56			
$2\ Mn^{2+} + 3\ H_2O \rightleftharpoons Mn_2(OH)_3^+ + 6\ H^+$		–23.90			

$Mn(OH)_2(s) + 2 H^+ \rightleftharpoons Mn^{2+} + 2 H_2O$	15.2	15.2	15.2		15.19 ± 0.10
$MnO(s) + 2 H^+ \rightleftharpoons Mn^{2+} + H_2O$					17.94 ± 0.12

C.F. Baes and R.E. Mesmer, The Hydrolysis of Cations. Wiley, New York, 1976, p. 226.

P.L. Brown and C. Ekberg, Hydrolysis of Metal Ions. Wiley, 2016, pp. 557−561.

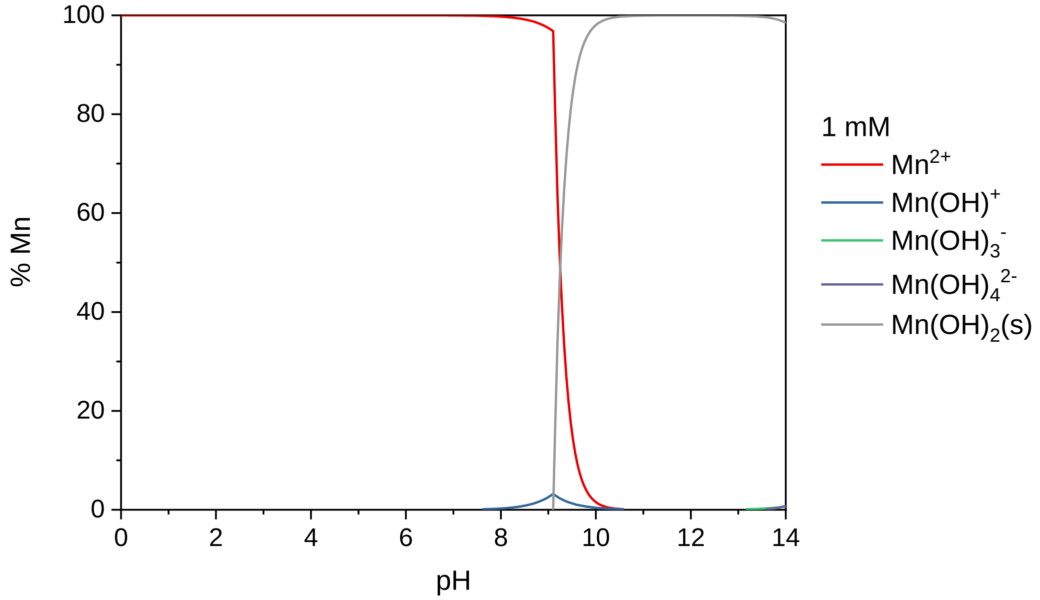
W. Hummel, U. Berner, E. Curti, F.J. Pearson and T. Thoenen, TECHNICAL REPORT 02-16, Nagra/ PSI Chemical Thermodynamic Data Base 01/01, 2002.

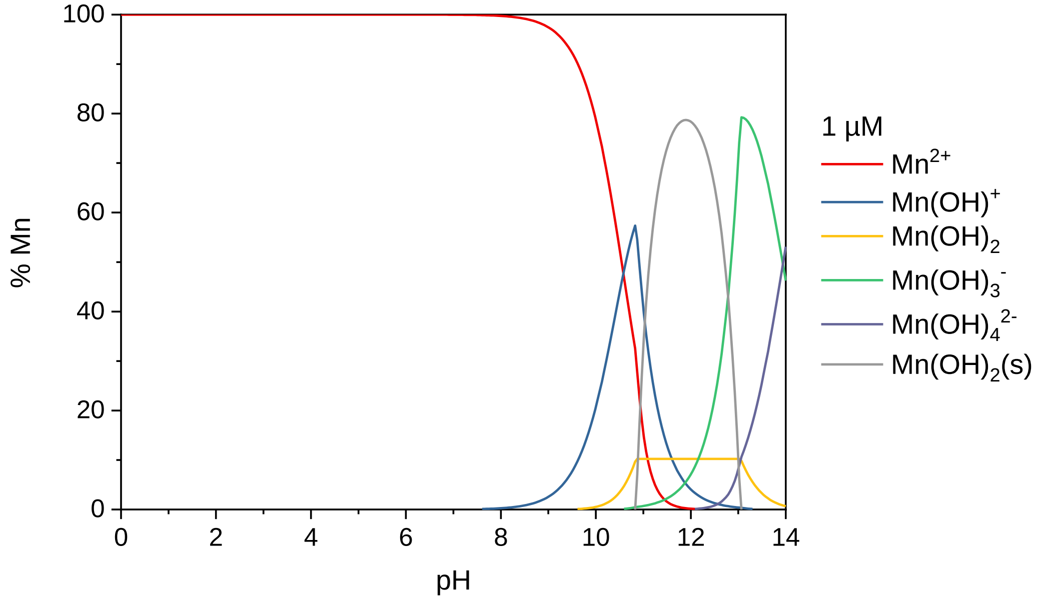
D.K. Nordstrom, L.N. Plummer, D. Langmuir, E. Busenberg, H.M. May, B.F. Jones and D.L. Parkhurst, Revised chemical equilibrium data for major water-mineral reactions and their limitations. In: Chemical Modeling of Aqueous Systems II. D.C. Melchior and R.L. Bassett (eds.). ACS Symposium Series 416. ACS, Washington DC, 1990, pp. 398–446.

D.D. Perrin, International Union of Pure and Applied Chemistry. Commission on Electroanalytical Chemistry, Dissociation constants of inorganic acids and bases in aqueous solutions. Butterworths, 1969, p. 181.

Distribution diagrams

These diagrams have been computed at two Mn(II) 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).





Manganese(III)

Equilibrium reaction	lg*K* at infinite dilution and *T* = 298 K
	Brown and Ekberg, 2016
$Mn^{3+} + H_2O \rightleftharpoons MnOH^{2+} + H^+$	0.75 ± 0.18

P.L. Brown and C. Ekberg, Hydrolysis of Metal Ions. Wiley, 2016, pp. 568−570.

Distribution diagrams

These diagrams have been computed at two Mn(III) concentrations (1 mM = 1×10^{-3} mol L^{-1} and 1 μM = 1×10^{-6} mol L^{-1}) with the 'best' equilibrium constant above. Calculations assume T = 298 K for the limiting case of zero ionic strength (*i.e.*, even neglecting plotted ions).