

Equilibrium constants for hydrolysis and associated equilibria in critical compilations

Manganese(II)

Equilibrium reactions	lgK 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
$\text{Mn}^{2+} + \text{H}_2\text{O} \rightleftharpoons \text{MnOH}^+ + \text{H}^+$	-10.59	-10.59	-10.59	-10.59	-10.58 ± 0.04
$\text{Mn}^{2+} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Mn}(\text{OH})_2 + 2 \text{H}^+$		-22.2			-22.18 ± 0.20
$\text{Mn}^{2+} + 3 \text{H}_2\text{O} \rightleftharpoons \text{Mn}(\text{OH})_3^- + 3 \text{H}^+$		-34.8			-34.34 ± 0.45
$\text{Mn}^{2+} + 4 \text{H}_2\text{O} \rightleftharpoons \text{Mn}(\text{OH})_4^{2-} + 4 \text{H}^+$		-48.3			-48.28 ± 0.40
$2 \text{Mn}^{2+} + \text{H}_2\text{O} \rightleftharpoons \text{Mn}_2\text{OH}^{3+} + \text{H}^+$		-10.56			
$2 \text{Mn}^{2+} + 3 \text{H}_2\text{O} \rightleftharpoons \text{Mn}_2(\text{OH})_3^+ + 6 \text{H}^+$		-23.90			

$\text{Mn(OH)}_2(\text{s}) + 2 \text{H}^+ \rightleftharpoons \text{Mn}^{2+} + 2 \text{H}_2\text{O}$	15.2	15.2	15.2		15.19 ± 0.10
$\text{MnO}(\text{s}) + 2 \text{H}^+ \rightleftharpoons \text{Mn}^{2+} + \text{H}_2\text{O}$					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.

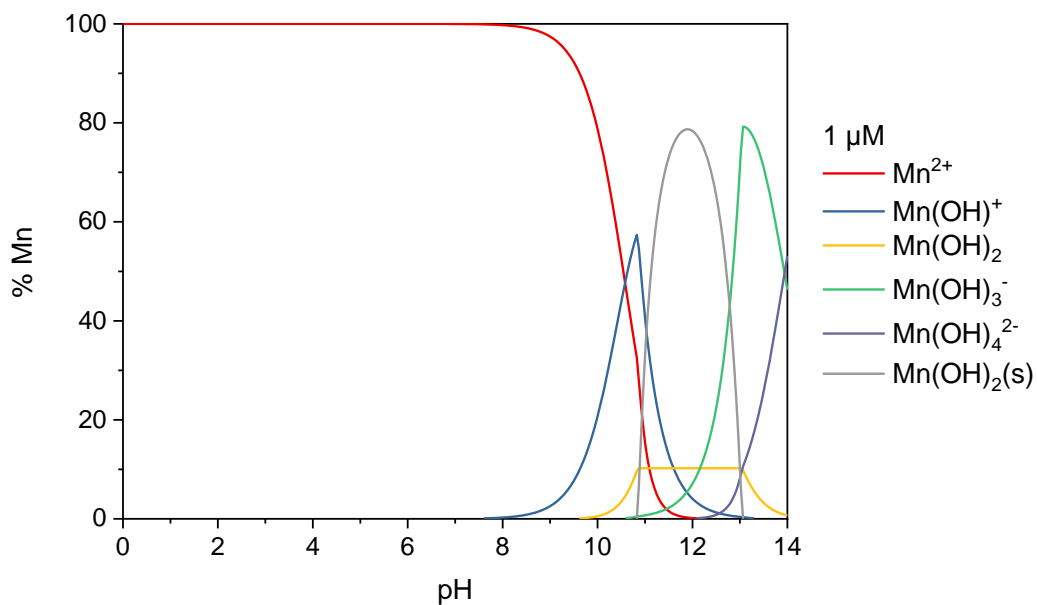
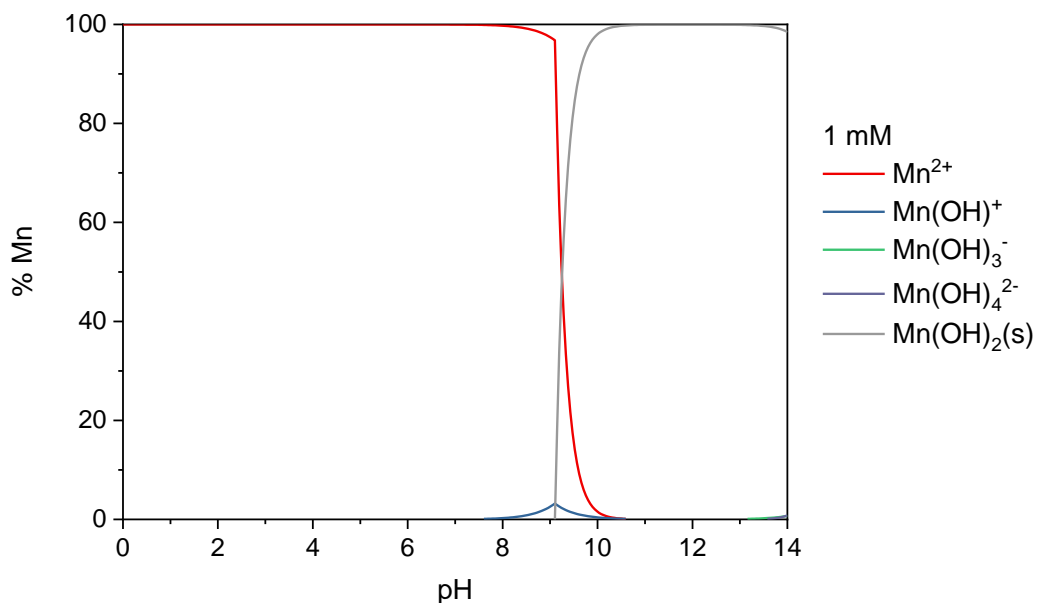
W. Hummel, U. Berner, E. Curti, F.J. Pearson and T. Thoenen, TECHNICAL REPORT 02-16, Nagra/ PSI Chemical Thermodynamic Data Base 01/01, 2002.

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 = 1×10^{-3} mol L⁻¹ and 1 μ M = 1×10^{-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	lgK at infinite dilution and $T = 298 \text{ K}$
	Brown and Ekberg, 2016
$\text{Mn}^{3+} + \text{H}_2\text{O} \rightleftharpoons \text{MnOH}^{2+} + \text{H}^+$	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 μ M = 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).

