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Manganese(II)

Reaction	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.

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Manganese(III)

Reaction	Brown and Ekberg, 2016
$Mn^{3+} + H_2O \rightleftharpoons MnOH^{2+} + H^+$	0.75 ± 0.18
$MnOOH(s) + 2\ H^+ \rightleftharpoons Mn^{2+} + 1\frac{1}{2}H_2O + \frac{1}{4}O_2$	−0.08 ± 0.30
$\frac{1}{3}\ Mn_3O_4(s) + 2\ H^+ + \frac{1}{3}\ H_2 \rightleftharpoons Mn^{2+} + 1\frac{1}{3}\ H_2O$	−6.6 ± 0.3

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

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Manganese(IV)

Reaction	Parc et al., 1989	Brown and Ekberg, 2016
$MnO_2(s) + 2\ H^+ \rightleftharpoons Mn^{2+} + H_2O + 0.5\ O_2$	0.02	0.05 ± 0.15

P.L. Brown and C. Ekberg, Hydrolysis of Metal Ions. Wiley, 2016, pp. 573.

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