

Equilibrium constants for hydrolysis and associated equilibria in critical compilations

Neodymium

Equilibrium reactions	lgK at infinite dilution and $T = 298\text{ K}$			
	Baes and Mesmer, 1976	NIST46	Neck et al., 2009	Brown and Ekberg, 2016
$\text{Nd}^{3+} + \text{H}_2\text{O} \rightleftharpoons \text{Nd}(\text{OH})^{2+} + \text{H}^+$	-8.0	-8.0	-7.4 ± 0.4	-8.13 ± 0.05
$\text{Nd}^{3+} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Nd}(\text{OH})_2^+ + 2 \text{H}^+$	(-16.9)		-15.7 ± 0.7	
$\text{Nd}^{3+} + 3 \text{H}_2\text{O} \rightleftharpoons \text{Nd}(\text{OH})_{3(\text{aq})} + 3 \text{H}^+$	(-26.5)		-26.2 ± 0.5	
$\text{Nd}^{3+} + 4 \text{H}_2\text{O} \rightleftharpoons \text{Nd}(\text{OH})_4^- + 4 \text{H}^+$	(-37.1)	-37.4	-40.7 ± 0.7	
$2 \text{Nd}^{3+} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Nd}_2(\text{OH})_2^{4+} + 2 \text{H}^+$	-13.86	-13.9		-15.56 ± 0.20
$3 \text{Nd}^{3+} + 5 \text{H}_2\text{O} \rightleftharpoons \text{Nd}_3(\text{OH})_5^{4+} + 5 \text{H}^+$	< -28.5			-34.2 ± 0.3
$\text{Nd}(\text{OH})_3(\text{s}) + 3 \text{H}^+ \rightleftharpoons \text{Nd}^{3+} + 3 \text{H}_2\text{O}$	18.6		17.2 ± 0.4	17.89 ± 0.09
$\text{Nd}(\text{OH})_3(\text{s}) \rightleftharpoons \text{Nd}^{3+} + 3 \text{OH}^-$		-23.2 ± 0.9	-21.5 (act) -23.1 (inact)	

C.F. Baes and R.E. Mesmer, The Hydrolysis of Cations. Wiley, New York, 1976, p. 137.

P.L. Brown and C. Ekberg, Hydrolysis of Metal Ions. Wiley, 2016, pp. 135-145.

V. Neck, M. Altmaier, T. Rabung, J. Lützenkirchen and T. Fanghänel. Pure Appl. Chem., 81, 1555–1568 (2009).

NIST46, NIST Critically Selected Stability Constants of Metal Complexes: Version 8.0. Available at:
www.nist.gov/srd/nist46

Distribution diagrams

These diagrams have been computed at two Nd 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).

