
Equilibrium constants for hydrolysis and associated equilibria in critical compilations

Gadolinium

Equilibrium reaction	lgK at infinite dilution and $T = 298\text{ K}$	
	Baes and Mesmer, 1976	Brown and Ekberg, 2016
$\text{Gd}^{3+} + \text{H}_2\text{O} \rightleftharpoons \text{GdOH}^{2+} + \text{H}^+$	-8.0	-7.87 ± 0.05
$\text{Gd}^{3+} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Gd}(\text{OH})_2^+ + 2 \text{H}^+$	(-16.4)	
$\text{Gd}^{3+} + 3 \text{H}_2\text{O} \rightleftharpoons \text{Gd}(\text{OH})_3 + 3 \text{H}^+$	(-25.2)	
$\text{Gd}^{3+} + 4 \text{H}_2\text{O} \rightleftharpoons \text{Gd}(\text{OH})_4^- + 4 \text{H}^+$	-34.4	
$2 \text{Gd}^{3+} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Gd}_2(\text{OH})_2^{4+} + 2 \text{H}^+$		-14.16 ± 0.20
$3 \text{Gd}^{3+} + 5 \text{H}_2\text{O} \rightleftharpoons \text{Gd}_3(\text{OH})_5^{4+} + 5 \text{H}^+$		-33.0 ± 0.3
$\text{Gd}(\text{OH})_3(\text{s}) + 3 \text{H}^+ \rightleftharpoons \text{Gd}^{3+} + 3 \text{H}_2\text{O}$	15.6	17.20 ± 0.48

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. 284–287.

Distribution diagrams

These diagrams have been computed at two Gd 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).

