

Equilibrium constants for hydrolysis and associated equilibria in critical compilations

Cerium(III)

Equilibrium reactions	lgK at infinite dilution and $T = 298\text{ K}$		
	Baes and Mesmer, 1976	NIST46	Brown and Ekberg, 2016
$\text{Ce}^{3+} + \text{H}_2\text{O} \rightleftharpoons \text{CeOH}^{2+} + \text{H}^+$	-8.3	-8.3	-8.31 ± 0.03
$2 \text{Ce}^{3+} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Ce}_2(\text{OH})_2^{4+} + 2 \text{H}^+$	< -15.5		-16.0 ± 0.2
$3 \text{Ce}^{3+} + 5 \text{H}_2\text{O} \rightleftharpoons \text{Ce}_3(\text{OH})_5^{4+} + 5 \text{H}^+$	-33.5		-34.6 ± 0.3
$\text{Ce}(\text{OH})_3(\text{s}) + 3 \text{H}^+ \rightleftharpoons \text{Ce}^{3+} + 3 \text{H}_2\text{O}$	19.9		18.5 ± 0.5
$\text{Ce}(\text{OH})_3(\text{s}) \rightleftharpoons \text{Ce}^{3+} + 3 \text{OH}^-$		-22.1 ± 0.9	

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.

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 Ce(III) 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).

