

## Equilibrium constants for hydrolysis and associated equilibria in critical compilations

# Europium

Equilibrium reactions	lgK at infinite dilution and $T = 298$ K			
	Baes and Mesmer, 1976	NIST46	Hummel et al., 2002	Brown and Ekberg, 2016
$\text{Eu}^{3+} + \text{H}_2\text{O} \rightleftharpoons \text{EuOH}^{2+} + \text{H}^+$	-7.8		$-7.64 \pm 0.04$	$-7.66 \pm 0.05$
$\text{Eu}^{3+} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Eu}(\text{OH})_2^+ + 2 \text{H}^+$			$-15.1 \pm 0.2$	
$\text{Eu}^{3+} + 3 \text{H}_2\text{O} \rightleftharpoons \text{Eu}(\text{OH})_3 + 3 \text{H}^+$			$-23.7 \pm 0.1$	
$\text{Eu}^{3+} + 4 \text{H}_2\text{O} \rightleftharpoons \text{Eu}(\text{OH})_4^- + 4 \text{H}^+$			$-36.2 \pm 0.5$	
$2 \text{Eu}^{3+} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Eu}_2(\text{OH})_2^{4+} + 2 \text{H}^+$			-	$-14.1 \pm 0.2$
$3 \text{Eu}^{3+} + 5 \text{H}_2\text{O} \rightleftharpoons \text{Eu}_3(\text{OH})_5^{4+} + 5 \text{H}^+$			-	$-32.0 \pm 0.3$
$\text{Eu}(\text{OH})_3(\text{s}) + 3 \text{H}^+ \rightleftharpoons \text{Eu}^{3+} + 3 \text{H}_2\text{O}$	17.5		$17.6 \pm 0.8$ (am) $14.9 \pm 0.3$ (cr)	$16.48 \pm 0.30$
$\text{Eu}(\text{OH})_3(\text{s}) \rightleftharpoons \text{Eu}^{3+} + 3 \text{OH}^-$		$-24.5 \pm 0.7$ (am) $-26.5$ (cr)		

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.

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

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

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# Distribution diagrams

These diagrams have been computed at two Eu concentrations (1 mM =  $1 \times 10^{-3}$  mol L<sup>-1</sup> and 1  $\mu$ M =  $1 \times 10^{-6}$  mol L<sup>-1</sup>) 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).

