

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

# Dysprosium

Equilibrium reactions	lgK at infinite dilution and $T = 298\text{ K}$	
	Baes and Mesmer, 1976	Brown and Ekberg, 2016
$\text{Dy}^{3+} + \text{H}_2\text{O} \rightleftharpoons \text{DyOH}^{2+} + \text{H}^+$	-8.0	$-7.53 \pm 0.14$
$\text{Dy}^{3+} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Dy}(\text{OH})_2^+ + 2 \text{H}^+$	(-16.2)	
$\text{Dy}^{3+} + 3 \text{H}_2\text{O} \rightleftharpoons \text{Dy}(\text{OH})_3 + 3 \text{H}^+$	(-24.7)	
$\text{Dy}^{3+} + 4 \text{H}_2\text{O} \rightleftharpoons \text{Dy}(\text{OH})_4^- + 4 \text{H}^+$	-33.5	
$2 \text{Dy}^{3+} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Dy}_2(\text{OH})_2^{4+} + 2 \text{H}^+$		$-13.76 \pm 0.20$
$3 \text{Dy}^{3+} + 5 \text{H}_2\text{O} \rightleftharpoons \text{Dy}_3(\text{OH})_5^{4+} + 5 \text{H}^+$		$-30.6 \pm 0.3$
$\text{Dy}(\text{OH})_3(\text{s}) + 3 \text{H}^+ \rightleftharpoons \text{Dy}^{3+} + 3 \text{H}_2\text{O}$	15.9	$16.26 \pm 0.30$
$\text{Dy}(\text{OH})_3(\text{c}) + \text{OH}^- \rightleftharpoons \text{Dy}(\text{OH})_4^-$	$-3.6 \pm 0.3$	
$\text{Dy}(\text{OH})_3(\text{c}) \rightleftharpoons \text{Dy}(\text{OH})_3$	-8.8	

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. 247, 250–251 and 290–292.

# Distribution diagrams

These diagrams have been computed at two Dy 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).

