

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

### Yttrium

Equilibrium reactions	lgK at infinite dilution and $T = 298 \text{ K}$	
	Baes and Mesmer, 1976	Brown and Ekberg, 2016
$\text{Y}^{3+} + \text{H}_2\text{O} \rightleftharpoons \text{YOH}^{2+} + \text{H}^+$	-7.7	$-7.77 \pm 0.06$
$\text{Y}^{3+} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Y}(\text{OH})_2^+ + 2 \text{H}^+$	$(-16.4)^*$	
$\text{Y}^{3+} + 3 \text{H}_2\text{O} \rightleftharpoons \text{Y}(\text{OH})_3 + 3 \text{H}^+$	$(-26.0)^*$	
$\text{Y}^{3+} + 4 \text{H}_2\text{O} \rightleftharpoons \text{Y}(\text{OH})_4^- + 4 \text{H}^+$	-36.5	
$2 \text{Y}^{3+} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Y}_2(\text{OH})_2^{4+} + 2 \text{H}^+$	-14.23	$-14.1 \pm 0.2$
$3 \text{Y}^{3+} + 5 \text{H}_2\text{O} \rightleftharpoons \text{Y}_3(\text{OH})_5^{4+} + 5 \text{H}^+$	-31.6	$-32.7 \pm 0.3$
$\text{Y}(\text{OH})_3(\text{s}) + 3 \text{H}^+ \rightleftharpoons \text{Y}^{3+} + 3 \text{H}_2\text{O}$	17.5	$17.32 \pm 0.30$

\*Estimation.

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.

# Distribution diagrams

These diagrams have been computed at two Y 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).

