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Equilibrium constants for hydrolysis and associated equilibria in critical compilations

Cobalt(II)

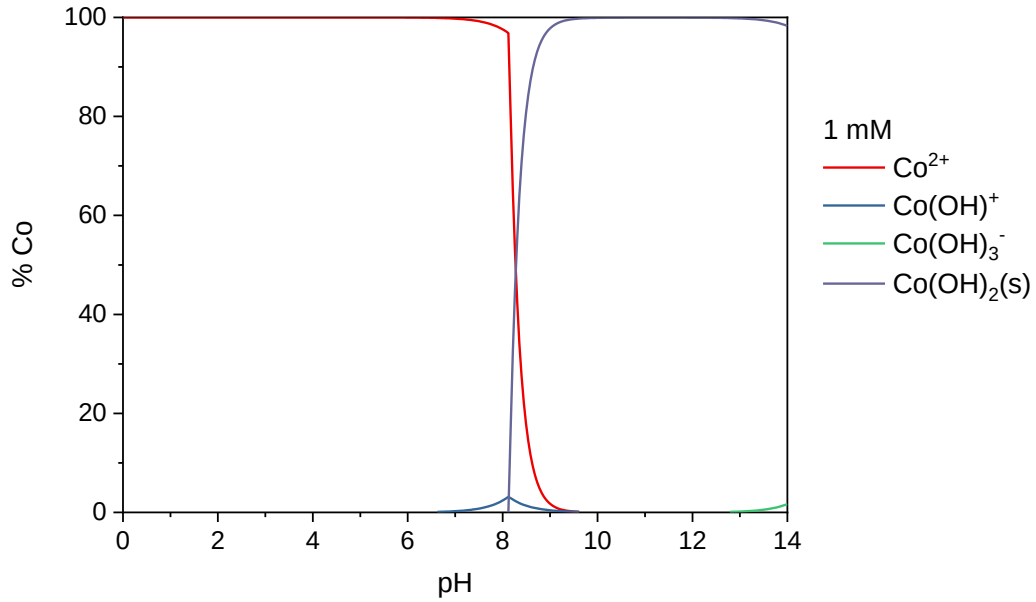
Equilibrium reactions	lg*K* at infinite dilution and *T* = 298 K	
	Baes and Mesmer, 1976	Brown and Ekberg, 2016
$Co^{2+} + H_2O \rightleftharpoons CoOH^+ + H^+$	–9.65	−9.61 ± 0.17
$Co^{2+} + 2\ H_2O \rightleftharpoons Co(OH)_2 + 2\ H^+$	–18.8	−19.77 ± 0.11
$Co^{2+} + 3\ H_2O \rightleftharpoons Co(OH)_3^- + 3\ H^+$	–31.5	−32.01 ± 0.33
$Co^{2+} + 4\ H_2O \rightleftharpoons Co(OH)_4^{2-} + 4\ H^+$	–46.3	
$2\ Co^{2+} + H_2O \rightleftharpoons Co_2(OH)^{3+} + H^+$	–11.2	
$4\ Co^{2+} + 4\ H_2O \rightleftharpoons Co_4(OH)_4^{4+} + 4H^+$	–30.53	
$Co(OH)_2(s) + 2\ H^+ \rightleftharpoons Co^{2+} + 2\ H_2O$	12.3	13.24 ± 0.12
$CoO(s) + 2\ H^+ \rightleftharpoons Co^{2+} + H_2O$		13.71 ± 0.10

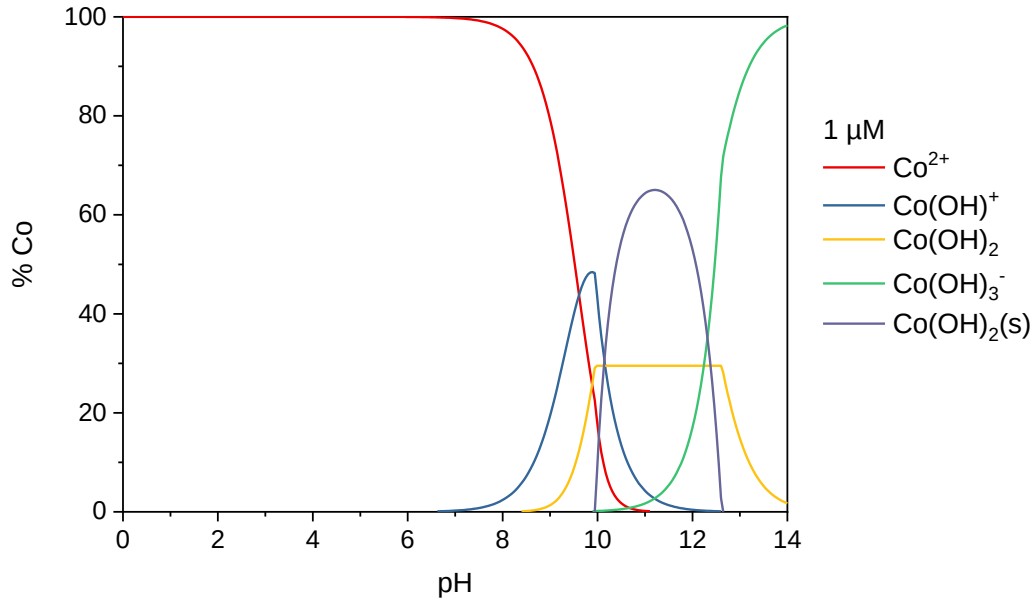
C.F. Baes and R.E. Mesmer, The Hydrolysis of Cations. Wiley, New York, 1976, p. 241.

P.L. Brown and C. Ekberg, Hydrolysis of Metal Ions. Wiley, 2016, pp. 620–628.

Distribution diagrams

These diagrams have been computed at two Co(II) concentrations (1 mM = $1x10^{-3}$ mol L^{-1} and 1 µM = $1x10^{-6}$ mol L^{-1}) 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).





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Equilibrium constants for hydrolysis and associated equilibria in critical compilations

Cobalt(III)

Equilibrium reaction	lg*K* at infinite dilution and *T* = 298 K
	Brown and Ekberg, 2016
$Co^{3+} + H_2O \rightleftharpoons CoOH^{2+} + H^+$	−1.07 ± 0.11

P.L. Brown and C. Ekberg, Hydrolysis of Metal Ions. Wiley, 2016, pp. 628−632.

Distribution diagrams

These diagrams have been computed at two Co(III) concentrations (1 mM = $1x10^{-3}$ mol L^{-1} and 1 µM = $1x10^{-6}$ mol L^{-1}) with the 'best' equilibrium constant above. Calculations assume T = 298 K for the limiting case of zero ionic strength (*i.e.*, even neglecting plotted ions).