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Equilibrium constants for hydrolysis and associated equilibria in critical compilations

Silicon

Equilibrium reaction	lg*K* at infinite dilution and *T* = 298 K	
	Baes and Mesmer, 1976	Thoenen et al., 2014
$Si(OH)_4 \rightleftharpoons SiO(OH)_3^- + H^+$	−9.86	−9.81 ± 0.02
$Si(OH)_4 \rightleftharpoons SiO_2(OH)_2^{2-} + 2\ H^+$	−22.92	−23.14 ± 0.09
$4\ Si(OH)_4 \rightleftharpoons Si_4O_6(OH)_6^{2-} + 2\ H^+ + 4\ H_2O$	−13.44	
$4\ Si(OH)_4 \rightleftharpoons Si_4O_8(OH)_4^{4-} + 4\ H^+ + 4\ H_2O$	−35.80	−36.3 ± 0.2
$SiO_2(quartz) + 2\ H_2O \rightleftharpoons Si(OH)_4$	−4.0	−3.739 ± 0.087
$SiO_2(am) + 2\ H_2O \rightleftharpoons Si(OH)_4$		−2.714

C.F. Baes and R.E. Mesmer, The Hydrolysis of Cations. Wiley, New York, 1976; p. 342.

T. Thoenen, W. Hummel, U. Berner and E. Curti, The PSI/Nagra Chemical Thermodynamic Database 12/07, Paul Scherrer Institut, Villigen PSI, Switzerland, 2014, pp. 205−212.

Distribution diagrams

These diagrams have been computed at two Si 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).