Thorium(IV)

Equilibrium reactions	lg*K* at infinite dilution and *T* = 298 K			
	Baes and Mesmer, 1976	Rand et al., 2008	Thoenen et al, 2014	Brown and Ekberg, 2016
$Th^{4+} + H_2O \rightleftharpoons ThOH^{3+} + H^+$	–3.20 ± 0.2	–2.5 ± 0.5	–2.5 ± 0.5	–2.5 ± 0.5
$Th^{4+} + 2H_2O \rightleftharpoons Th(OH)_2^{2+} + 2H^+$	–6.93 ± 0.2	–6.2 ± 0.5	–6.2 ± 0.5	–6.2 ± 0.5
$Th^{4+} + 3H_2O \rightleftharpoons Th(OH)_3^{+} + 3H^+$	< –11.7			
$Th^{4+} + 4H_2O \rightleftharpoons Th(OH)_4 + 4H^+$	–15.9	–17.4 ± 0.7	–17.4 ± 0.7	–17.4 ± 0.7
$2Th^{4+} + 2H_2O \rightleftharpoons Th_2(OH)_2^{6+} + 2H^+$	–6.14	–5.9 ± 0.5	–5.9 ± 0.5	–5.9 ± 0.5
$2Th^{4+} + 3H_2O \rightleftharpoons Th_2(OH)_3^{5+} + 3H^+$		–6.8 ± 0.2	–6.8 ± 0.2	–6.8 ± 0.2
$4Th^{4+} + 8H_2O \rightleftharpoons Th_4(OH)_8^{8+} + 8H^+$	–21.1	–20.4 ± 0.4	–20.4 ± 0.4	–20.4 ± 0.4
$4Th^{4+} + 12H_2O \rightleftharpoons Th_4(OH)_{12}^{4+} + 12H^+$		–26.6 ± 0.2	–26.6 ± 0.2	–26.6 ± 0.2
$6Th^{4+} + 15H_2O(l) \rightleftharpoons Th_6(OH)_{15}^{9+} + 15H^+$	–36.76	–36.8 ± 1.5	–36.8 ± 1.5	–36.8 ± 1.5
$6Th^{4+} + 14H_2O(l) \rightleftharpoons Th_6(OH)_{14}^{10+} + 14H^+$		–36.8 ± 1.2	–36.8 ± 1.2	–36.8 ± 1.2
$ThO_2(c) + 4H^+ \rightleftharpoons Th^{4+} + 2H_2O$	6.3 ± 0.5			
$ThO_2(am) + 4H^+ \rightleftharpoons Th^{4+} + 2H_2O$				
$ThO_2(am,hyd,fresh) + 4H^+ \rightleftharpoons Th^{4+} + 2H_2O$			9.3 ± 0.9	

Contributors: Clemente Bretti, Elvira Bura Nakić, Montserrat Filella, Josep Galceran, Sofia Gama, Elżbieta Gumienna- Kontecka, Lucija Knežević, Gabriele Lando, Přemysl Lubal, Demetrio Milea, Andrzej Mular, Bartosz Orzeł, Michaela Rendošová, Matteo Savastano, Vladimir Sladkov, Kamila Stokowa-Sołtys, Yuliya Toporivska, Zuzana Vargová, Emanuele Zanda, Veronika Zinovyeva

ThO_2(am,hyd,aged) + $4H^+ \rightleftharpoons Th^{4+} + 2H_2O$			8.5 ± 0.9	
$Th^{4+} + 4OH^- \rightleftharpoons ThO_2$(am,hyd,fresh) + $2H_2O$		46.7 ± 0.9		46.7 ± 0.9
$Th^{4+} + 4OH^- \rightleftharpoons ThO_2$(am,hyd,aged) + $2H_2O$		47.5 ± 0.9		47.5 ± 0.9

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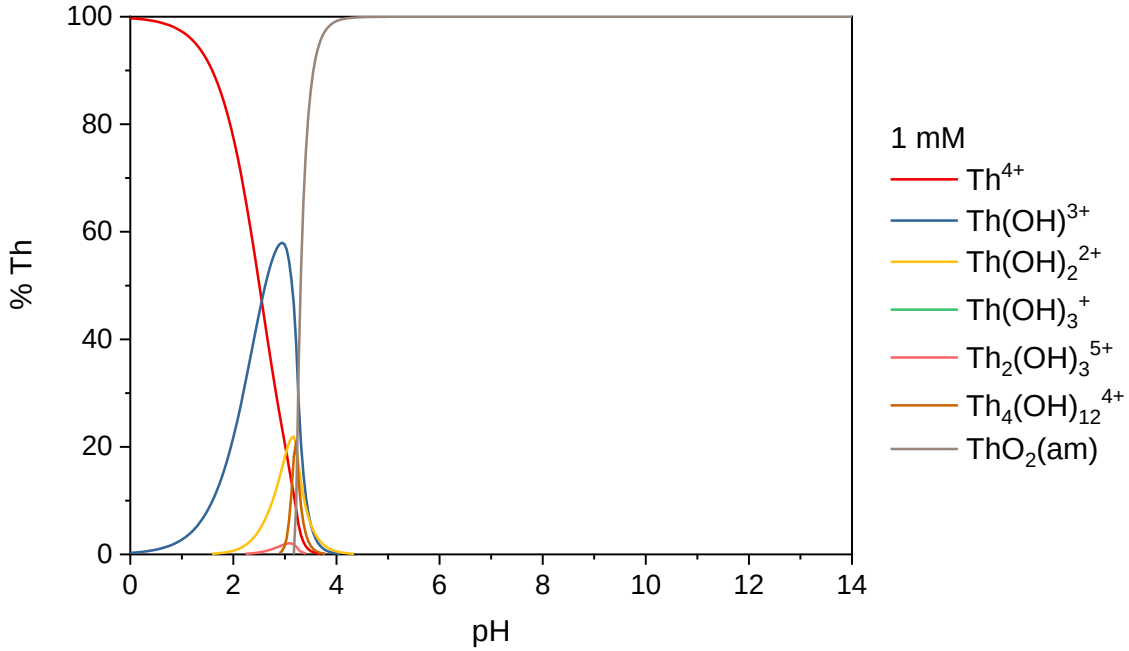
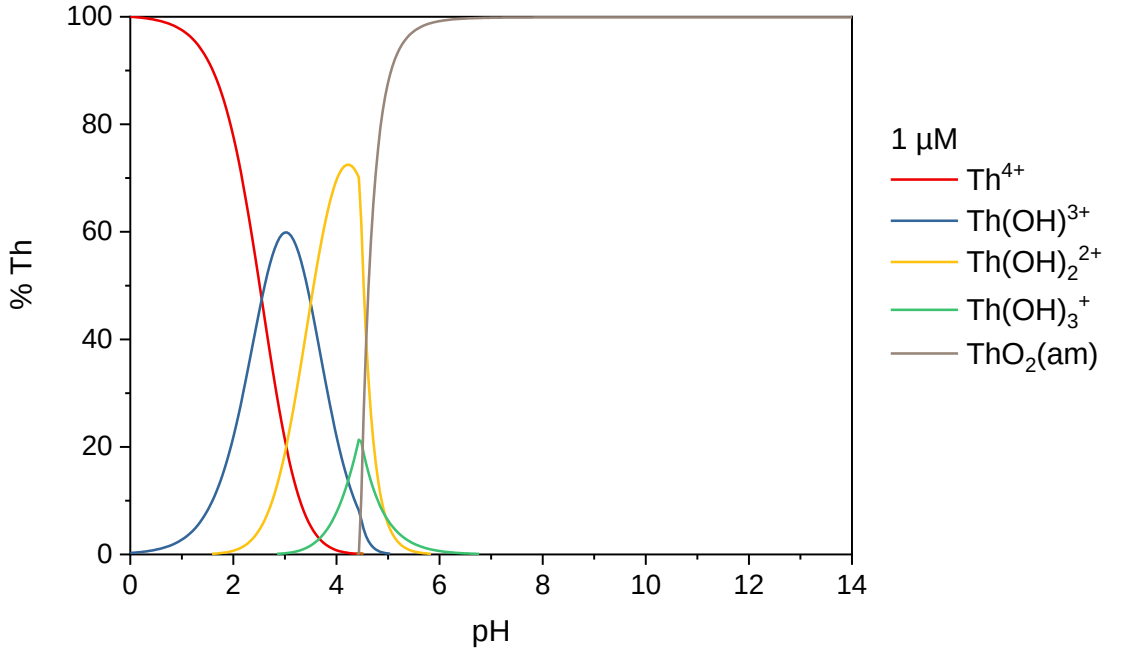
Distribution diagrams

These diagrams have been computed at two Th(IV) 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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