

Thorium(IV)

Reaction	Baes and Mesmer, 1976	Thoenen et al., 2002	Rand et al., 2008	Brown and Ekberg, 2016
$\text{Th}^{4+} + \text{H}_2\text{O} \rightleftharpoons \text{ThOH}^{3+} + \text{H}^+$	-3.20	-2.5 ± 0.5	-2.5 ± 0.9	-2.55 ± 0.50
$\text{Th}^{4+} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Th}(\text{OH})_2^{2+} + 2 \text{H}^+$	-6.93	-6.2 ± 0.5	-6.2 ± 0.5	-6.05 ± 0.09
$\text{Th}^{4+} + 3 \text{H}_2\text{O} \rightleftharpoons \text{Th}(\text{OH})_3^+ + 3 \text{H}^+$	< -11.7			-11.0 ± 1.0
$\text{Th}^{4+} + 4 \text{H}_2\text{O} \rightleftharpoons \text{Th}(\text{OH})_4 + 4 \text{H}^+$	-15.9	-17.4 ± 0.7	-17.4 ± 0.7	-17.2 ± 0.3
$2 \text{Th}^{4+} + 2 \text{H}_2\text{O} \rightleftharpoons \text{Th}_2(\text{OH})_2^{6+} + 2 \text{H}^+$	-6.14	-5.9 ± 0.5	-5.9 ± 0.5	-5.79 ± 0.12
$2 \text{Th}^{4+} + 3 \text{H}_2\text{O} \rightleftharpoons \text{Th}_2(\text{OH})_3^{5+} + 3 \text{H}^+$		-6.8 ± 0.2	-6.8 ± 0.2	-6.64 ± 0.13
$4 \text{Th}^{4+} + 8 \text{H}_2\text{O} \rightleftharpoons \text{Th}_4(\text{OH})_8^{8+} + 8 \text{H}^+$	-21.1	-20.4 ± 0.4	-20.4 ± 0.4	-20.41 ± 0.08

$4 \text{ Th}^{4+} + 12 \text{ H}_2\text{O} \rightleftharpoons \text{Th}_4(\text{OH})_{12}^{4+} + 12 \text{ H}^+$		-26.6 ± 0.2	-26.6 ± 0.2	-26.6 ± 0.2
$6 \text{ Th}^{4+} + 14 \text{ H}_2\text{O} \rightleftharpoons \text{Th}_6(\text{OH})_{14}^{10+} + 14 \text{ H}^+$		-36.8 ± 1.2	-36.8 ± 1.2	-36.8 ± 0.5
$6 \text{ Th}^{4+} + 15 \text{ H}_2\text{O} \rightleftharpoons \text{Th}_6(\text{OH})_{15}^{9+} + 15 \text{ H}^+$	-36.76	-36.8 ± 1.5	-36.8 ± 1.2	-37.5 ± 0.2
$\text{ThO}_2(\text{c}) + 4 \text{ H}^+ \rightleftharpoons \text{Th}^{4+} + 2 \text{ H}_2\text{O}$	6.3 ± 0.5			
$\text{ThO}_2(\text{am}) + 4 \text{ H}^+ \rightleftharpoons \text{Th}^{4+} + 2 \text{ H}_2\text{O}$				8.8 ± 1.0
$\text{ThO}_2(\text{am,hyd,fresh}) + 4 \text{ H}^+ \rightleftharpoons \text{Th}^{4+} + 2 \text{ H}_2\text{O}$		9.3 ± 0.9		
$\text{ThO}_2(\text{am,hyd,aged}) + 4 \text{ H}^+ \rightleftharpoons \text{Th}^{4+} + 2 \text{ H}_2\text{O}$		8.5 ± 0.9		
$\text{Th}^{4+} + 4 \text{ OH}^- \rightleftharpoons \text{ThO}_2(\text{am,hyd,fresh}) + 2 \text{ H}_2\text{O}$			46.7 ± 0.9	
$\text{Th}^{4+} + 4 \text{ OH}^- \rightleftharpoons \text{ThO}_2(\text{am,hyd,aged}) + 2 \text{ H}_2\text{O}$			47.5 ± 0.9	

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

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Log file

28/06/2021 Zanda. First compilation of values

12/07/2021 Filella Formatting and adding references

28/11/2021 Zanda Formatting and adding references

06/12/2021 1 Filella Minor formatting and checking

07/12/2021 Zanda Revision

08/12/2021 Filella Final revision