

Equilibrium constants for hydrolysis and associated equilibria in critical compilations

Molybdenum(VI)

Equilibrium reactions	lgK at infinite dilution and $T = 298\text{ K}$			
	Baes and Mesmer, 1976	Jolivet, 2000	NIST46	Crea et al., 2017
$\text{MoO}_4^{2-} + \text{H}^+ \rightleftharpoons \text{HMoO}_4^-$	3.89 ^a		4.24	4.47 ± 0.02
$\text{MoO}_4^{2-} + 2\text{H}^+ \rightleftharpoons \text{H}_2\text{MoO}_4$	7.50 ^a			8.12 ± 0.03
$\text{HMoO}_4^- + \text{H}^+ \rightleftharpoons \text{H}_2\text{MoO}_4$			4.0	
$\text{Mo}_7\text{O}_{24}^{6-} + \text{H}^+ \rightleftharpoons \text{HMo}_7\text{O}_{24}^{5-}$		4.4		
$\text{HMo}_7\text{O}_{24}^{5-} + \text{H}^+ \rightleftharpoons \text{H}_2\text{Mo}_7\text{O}_{24}^{4-}$		3.5		
$\text{H}_2\text{Mo}_7\text{O}_{24}^{4-} + \text{H}^+ \rightleftharpoons \text{H}_3\text{Mo}_7\text{O}_{24}^{3-}$		2.5		
$7\text{MoO}_4^{2-} + 8\text{H}^+ \rightleftharpoons \text{Mo}_7\text{O}_{24}^{6-} + 4\text{H}_2\text{O}$	57.74 ^a		52.99 ^b	51.93 ± 0.04
$7\text{MoO}_4^{2-} + 9\text{H}^+ \rightleftharpoons \text{Mo}_7\text{O}_{23}(\text{OH})^{5-} + 4\text{H}_2\text{O}$	62.14 ^a			58.90 ± 0.02
$7\text{MoO}_4^{2-} + 10\text{H}^+ \rightleftharpoons \text{Mo}_7\text{O}_{22}(\text{OH})_2^{4-} + 4\text{H}_2\text{O}$	65.68 ^a			64.63 ± 0.05
$7\text{MoO}_4^{2-} + 11\text{H}^+ \rightleftharpoons \text{Mo}_7\text{O}_{21}(\text{OH})_3^{3-} + 4\text{H}_2\text{O}$	68.21 ^a			68.68 ± 0.06
$19\text{MoO}_4^{2-} + 34\text{H}^+ \rightleftharpoons \text{Mo}_{19}\text{O}_{59}^{4-} + 17\text{H}_2\text{O}$	196.3 ^a		196 ^a	
$\text{MoO}_3(\text{s}) + \text{H}_2\text{O} \rightleftharpoons \text{MoO}_4^{2-} + 2\text{H}^+$	-12.06 ^a			

^a at $I = 3\text{ M NaClO}_4$

^b at $I = 0.1\text{ M Na}^+$ medium, Data at $I = 0$ are not available

C.F. Baes and R.E. Mesmer, The Hydrolysis of Cations. Wiley, New York, 1976, p. 256.

F. Crea, C. De Stefano, A. Irto, D. Milea, A. Pettignano and S. Sammartano, Modeling the acid-base properties of molybdate(VI) in different ionic media, ionic strengths and temperatures, by EDH, SIT and Pitzer equations. Journal of Molecular Liquids, 229, 15-26 (2017).

J.-P. Jolivet, Metal Oxide Chemistry and Synthesis. From Solution to Solid State. Wiley, 2000.

NIST46, NIST Critically Selected Stability Constants of Metal Complexes: Version 8.0. Available at: www.nist.gov/srd/nist46

Distribution diagrams

These diagrams have been computed at two Mo(VI) concentrations (1 mM = 1×10^{-3} mol L⁻¹ and 1 μ M = 1×10^{-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).

