

# Niobium

Reaction	Baes and Mesmer, 1976	Filella and May, 2020
$\text{Nb}(\text{OH})_5 + \text{H}^+ \rightleftharpoons \text{Nb}(\text{OH})_4^+ + \text{H}_2\text{O}$	$\sim -0.6$	1.603
$\text{Nb}(\text{OH})_5 + \text{H}_2\text{O} \rightleftharpoons \text{Nb}(\text{OH})_6^- + \text{H}^+$	$\sim -4.8$	-4.951
$\text{Nb}_6\text{O}_{19}^{8-} + \text{H}^+ \rightleftharpoons \text{HNb}_6\text{O}_{19}^{7-}$		14.95
$\text{HNb}_6\text{O}_{19}^{7-} + \text{H}^+ \rightleftharpoons \text{H}_2\text{Nb}_6\text{O}_{19}^{6-}$		13.23
$\text{H}_2\text{Nb}_6\text{O}_{19}^{6-} + \text{H}^+ \rightleftharpoons \text{H}_3\text{Nb}_6\text{O}_{19}^{5-}$		11.73
$1/2 \text{Nb}_2\text{O}_5(\text{act}) + 5/2 \text{H}_2\text{O} \rightleftharpoons \text{Nb}(\text{OH})_5$	$\sim -7.4$	
$\text{Nb}(\text{OH})_5(\text{am},\text{s}) \rightleftharpoons \text{Nb}(\text{OH})_5$		-7.510
$\text{Nb}_2\text{O}_5(\text{s}) + 5 \text{H}_2\text{O} \rightleftharpoons 2 \text{Nb}(\text{OH})_5$		-18.31

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

M. Filella and P.M. May, The aqueous solution thermodynamics of niobium under conditions of environmental and biological interest. Applied Geochemistry, 122, 104729 (2020). doi:10.1016/j.apgeochem.2020.104729