Vanadium(IV)

Equilibrium reactions	lg*K* at infinite dilution and *T* = 298 K
	Brown and Ekberg, 2016
$VO^{2+} + H_2O \rightleftharpoons VO(OH)^{+} + H^{+}$	–5.30 ± 0.13
$2\ VO^{2+} + 2\ H_2O \rightleftharpoons (VO)_2(OH)_2^{2+} + 2\ H^{+}$	–6.71 ± 0.10

P.L. Brown and C. Ekberg, Hydrolysis of Metal Ions. Wiley, 2016, pp. 568–570.

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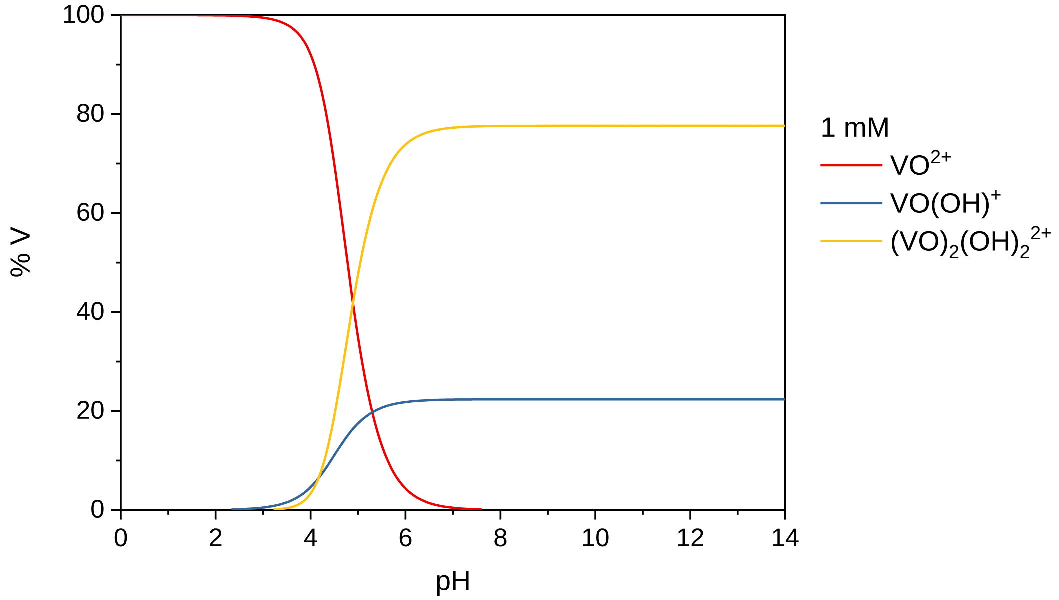
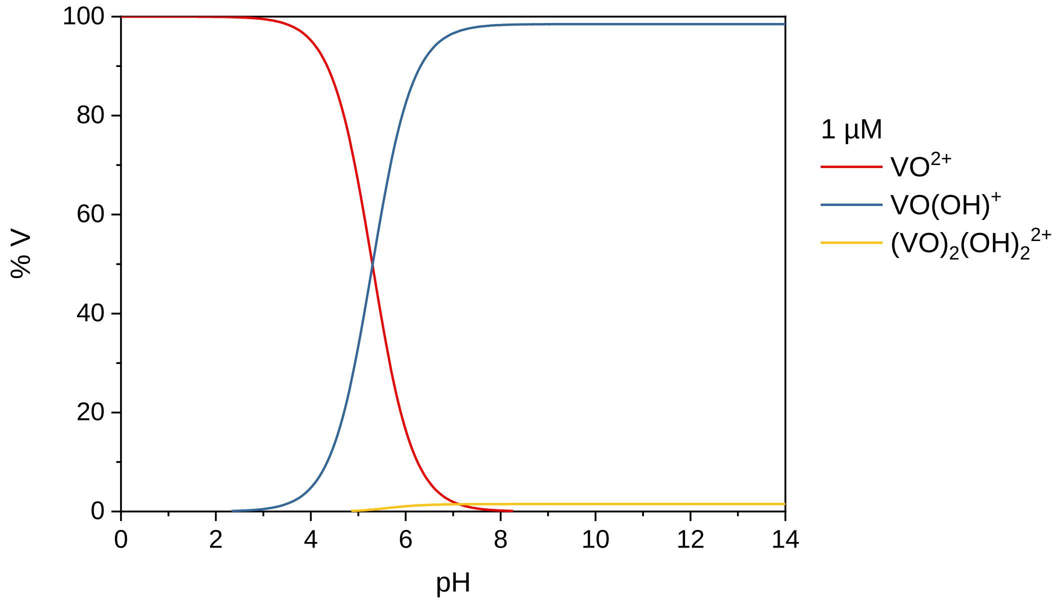
Distribution diagrams

These diagrams have been computed at two V(IV) concentrations (1 mM = 1×10^{-3} mol L^{-1} and 1 μM = 1×10^{-6} mol L^{-1}) with the 'best' equilibrium constants above. Calculations assume T = 298 K for the limiting case of zero ionic strength (*i.e.*, even neglecting plotted ions).





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Vanadium(V)

Equilibrium reaction	lg*K* at infinite dilution and *T* = 298 K	
	Baes and Mesmer, 1976	Brown and Ekberg, 2016
$VO_2^+ + 2\ H_2O \rightleftharpoons VO(OH)_3 + H^+$	–3.3	
$VO_2^+ + 2\ H_2O \rightleftharpoons VO_2(OH)_2^- + 2H^+$	–7.3	–7.18 ± 0.12
$10\ VO_2^+ + 8\ H_2O \rightleftharpoons V_{10}O_{26}(OH)_2^{4-} + 14\ H^+$	–10.7	
$VO_2(OH)_2^- \rightleftharpoons VO_3(OH)^{2-} + H^+$	–8.55	
$2\ VO_2(OH)_2^- \rightleftharpoons V_2O_6(OH)_2^{3-} + H^+ + H_2O$	–6.53	
$VO_3(OH)^{2-} \rightleftharpoons VO_4^{3-} + H^+$	–14.26	
$2\ VO_3(OH)^{2-} \rightleftharpoons V_2O_7^{4-} + H_2O$	0.56	
$3\ VO_3(OH)^{2-} + 3\ H^+ \rightleftharpoons V_3O_9^{3-} + 3\ H_2O$	31.81	
$V_{10}O_{26}(OH)_2^{4-} \rightleftharpoons V_{10}O_{27}(OH)^{5-} + 3\ H^+$	–3.6	
$V_{10}O_{27}(OH)^{5-} \rightleftharpoons V_{10}O_{28}^{6-} + H^+$	–6.15	
$VO_2^+ + H_2O \rightleftharpoons VO_2OH + H^+$		–3.25 ± 0.11
$VO_2^+ + 3\ H_2O \rightleftharpoons VO_2(OH)_3^{2-} + 3\ H^+$		–15.74 ± 0.19

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$VO_2^+ + 4\ H_2O \rightleftharpoons VO_2(OH)_4^{3-} + 4\ H^+$		–30.03 ± 0.24
$2\ VO_2^+ + 4\ H_2O \rightleftharpoons (VO_2)_2(OH)_4^{2-} + 4\ H^+$		–11.66 ± 0.53
$2\ VO_2^+ + 5\ H_2O \rightleftharpoons (VO_2)_2(OH)_5^{3-} + 5\ H^+$		–20.91 ± 0.22
$2\ VO_2^+ + 6\ H_2O \rightleftharpoons (VO_2)_2(OH)_6^{4-} + 6\ H^+$		–32.43 ± 0.30
$4\ VO_2^+ + 8\ H_2O \rightleftharpoons (VO_2)_4(OH)_8^{4-} + 8\ H^+$		–20.78 ± 0.33
$4\ VO_2^+ + 9\ H_2O \rightleftharpoons (VO_2)_4(OH)_9^{5-} + 9\ H^+$		–31.85 ± 0.26
$4\ VO_2^+ + 10\ H_2O \rightleftharpoons (VO_2)_4(OH)_{10}^{6-} + 10\ H^+$		–45.85 ± 0.26
$5\ VO_2^+ + 10\ H_2O \rightleftharpoons (VO_2)_5(OH)_{10}^{5-} + 10\ H^+$		–27.02 ± 0.34
$10\ VO_2^+ + 14\ H_2O \rightleftharpoons (VO_2)_{10}(OH)_{14}^{4-} + 14\ H^+$		–10.5 ± 0.3
$10\ VO_2^+ + 15\ H_2O \rightleftharpoons (VO_2)_{10}(OH)_{15}^{5-} + 15\ H^+$		–15.73 ± 0.33
$10\ VO_2^+ + 16\ H_2O \rightleftharpoons (VO_2)_{10}(OH)_{16}^{6-} + 16\ H^+$		–23.90 ± 0.35
$½\ V_2O_5(c) + H^+ \rightleftharpoons VO_2^+ + ½\ H_2O$	–0.66	
$V_2O_5(s) + 2\ H^+ \rightleftharpoons 2\ VO_2^+ + H_2O$		–0.64 ± 0.09

C.F. Baes and R.E. Mesmer, The Hydrolysis of Cations. Wiley, New York, 1976, p. 209.

P.L. Brown and C. Ekberg, Hydrolysis of Metal Ions. Wiley, 2016, pp. 517–541.

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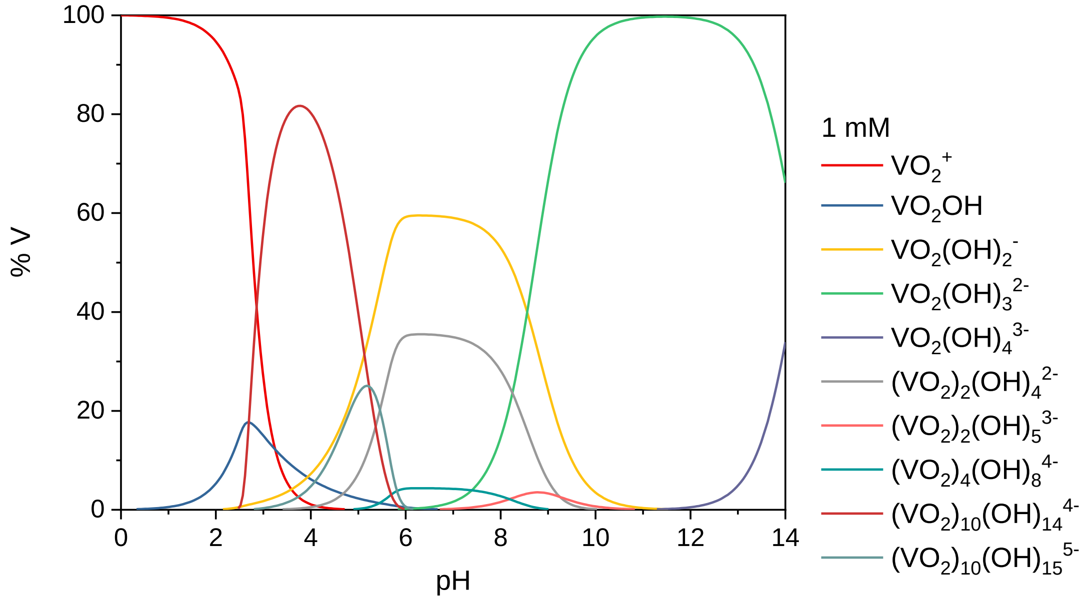
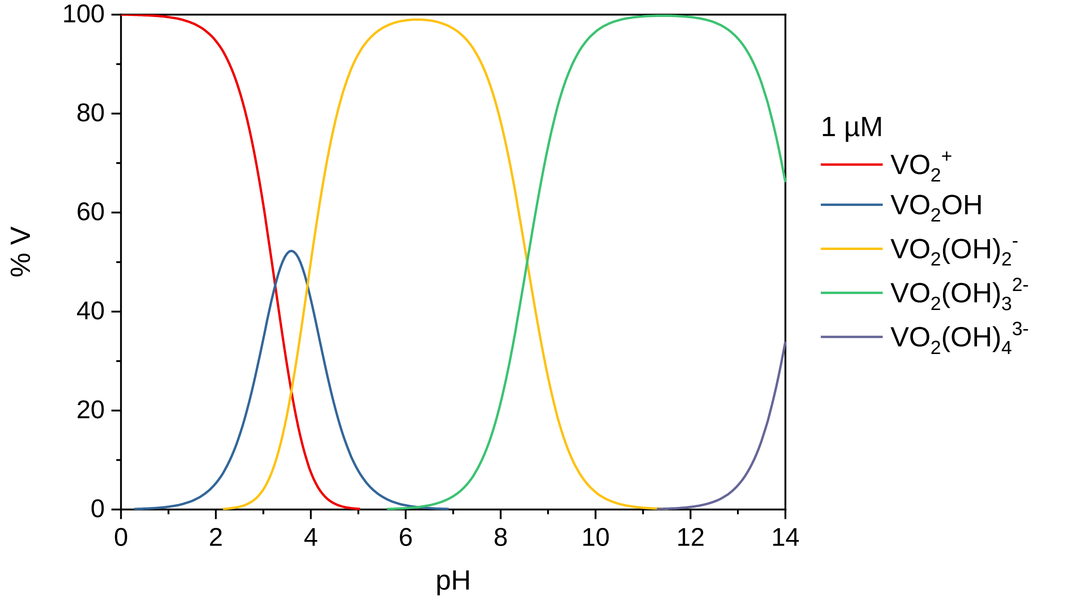
Distribution diagrams

These diagrams have been computed at two V(V) 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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