

Standard and Formal Electrode Potentials

Half-Reaction	E°, V^*	Formal Potential, V^\dagger
Aluminum		
$\text{Al}^{3+} + 3e^- \rightleftharpoons \text{Al}(s)$	-1.662	
Antimony		
$\text{Sb}_2\text{O}_5(s) + 6\text{H}^+ + 4e^- \rightleftharpoons 2\text{SbO}^+ + 3\text{H}_2\text{O}$	+0.581	
Arsenic		
$\text{H}_3\text{AsO}_4 + 2\text{H}^+ + 2e^- \rightleftharpoons \text{H}_3\text{AsO}_3 + \text{H}_2\text{O}$	+0.559	0.577 in 1 M HCl, HClO_4
Barium		
$\text{Ba}^{2+} + 2e^- \rightleftharpoons \text{Ba}(s)$	-2.906	
Bismuth		
$\text{BiO}^+ + 2\text{H}^+ + 3e^- \rightleftharpoons \text{Bi}(s) + \text{H}_2\text{O}$	+0.320	
$\text{BiCl}_4^- + 3e^- \rightleftharpoons \text{Bi}(s) + 4\text{Cl}^-$	+0.16	
Bromine		
$\text{Br}_2(l) + 2e^- \rightleftharpoons 2\text{Br}^-$	+1.065	1.05 in 4 M HCl
$\text{Br}_2(aq) + 2e^- \rightleftharpoons 2\text{Br}^-$	+1.087 [†]	
$\text{BrO}_3^- + 6\text{H}^+ + 5e^- \rightleftharpoons \frac{1}{2}\text{Br}_2(l) + 3\text{H}_2\text{O}$	+1.52	
$\text{BrO}_3^- + 6\text{H}^+ + 6e^- \rightleftharpoons \text{Br}^- + 3\text{H}_2\text{O}$	+1.44	
Cadmium		
$\text{Cd}^{2+} + 2e^- \rightleftharpoons \text{Cd}(s)$	-0.403	
Calcium		
$\text{Ca}^{2+} + 2e^- \rightleftharpoons \text{Ca}(s)$	-2.866	
Carbon		
$\text{C}_6\text{H}_4\text{O}_2$ (quinone) + $2\text{H}^+ + 2e^- \rightleftharpoons \text{C}_6\text{H}_4(\text{OH})_2$	+0.699	0.696 in 1 M HCl, HClO_4 , H_2SO_4
$2\text{CO}_2(g) + 2\text{H}^+ + 2e^- \rightleftharpoons \text{H}_2\text{C}_2\text{O}_4$	-0.49	
Cerium		
$\text{Ce}^{4+} + e^- \rightleftharpoons \text{Ce}^{3+}$		+1.70 in 1 M HClO_4 ; +1.61 in 1 M HNO_3 ; 1.44 in 1 M H_2SO_4
Chlorine		
$\text{Cl}_2(g) + 2e^- \rightleftharpoons 2\text{Cl}^-$	+1.359	
$\text{HClO} + \text{H}^+ + e^- \rightleftharpoons \frac{1}{2}\text{Cl}_2(g) + \text{H}_2\text{O}$	+1.63	
$\text{ClO}_3^- + 6\text{H}^+ + 5e^- \rightleftharpoons \frac{1}{2}\text{Cl}_2(g) + 3\text{H}_2\text{O}$	+1.47	
Chromium		
$\text{Cr}^{3+} + e^- \rightleftharpoons \text{Cr}^{2+}$	-0.408	
$\text{Cr}^{3+} + 3e^- \rightleftharpoons \text{Cr}(s)$	-0.744	
$\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + 6e^- \rightleftharpoons 2\text{Cr}^{3+} + 7\text{H}_2\text{O}$	+1.33	
Cobalt		
$\text{Co}^{2+} + 2e^- \rightleftharpoons \text{Co}(s)$	-0.277	
$\text{Co}^{3+} + e^- \rightleftharpoons \text{Co}^{2+}$	+1.808	
Copper		
$\text{Cu}^{2+} + 2e^- \rightleftharpoons \text{Cu}(s)$	+0.337	
$\text{Cu}^{2+} + e^- \rightleftharpoons \text{Cu}^+$	+0.153	
$\text{Cu}^+ + e^- \rightleftharpoons \text{Cu}(s)$	+0.521	
$\text{Cu}^{2+} + \text{I}^- + e^- \rightleftharpoons \text{CuI}(s)$	+0.86	
$\text{CuI}(s) + e^- \rightleftharpoons \text{Cu}(s) + \text{I}^-$	-0.185	

continues

Half-Reaction	E°, V^*	Formal Potential, V^\dagger
Fluorine		
$F_2(g) + 2H^+ + 2e^- \rightleftharpoons 2HF(aq)$	+3.06	
Hydrogen		
$2H^+ + 2e^- \rightleftharpoons H_2(g)$	0.000	-0.005 in 1 M HCl, HClO ₄
Iodine		
$I_2(s) + 2e^- \rightleftharpoons 2I^-$	+0.5355	
$I_2(aq) + 2e^- \rightleftharpoons 2I^-$	+0.615 [†]	
$I_3^- + 2e^- \rightleftharpoons 3I^-$	+0.536	
$ICl_2^- + e^- \rightleftharpoons \frac{1}{2}I_2(s) + 2Cl^-$	+1.056	
$IO_3^- + 6H^+ + 5e^- \rightleftharpoons \frac{1}{2}I_2(s) + 3H_2O$	+1.196	
$IO_3^- + 6H^+ + 5e^- \rightleftharpoons \frac{1}{2}I_2(aq) + 3H_2O$	+1.178 [†]	
$IO_3^- + 2Cl^- + 6H^+ + 4e^- \rightleftharpoons ICl_2^- + 3H_2O$	+1.24	
$H_5IO_6 + H^+ + 2e^- \rightleftharpoons IO_3^- + 3H_2O$	+1.601	
Iron		
$Fe^{2+} + 2e^- \rightleftharpoons Fe(s)$	-0.440	
$Fe^{3+} + e^- \rightleftharpoons Fe^{2+}$	+0.771	0.700 in 1 M HCl; 0.732 in 1 M HClO ₄ ; 0.68 in 1 M H ₂ SO ₄
$Fe(CN)_6^{3-} + e^- \rightleftharpoons Fe(CN)_6^{4-}$	+0.36	0.71 in 1 M HCl; 0.72 in 1 M HClO ₄ , H ₂ SO ₄
Lead		
$Pb^{2+} + 2e^- \rightleftharpoons Pb(s)$	-0.126	-0.14 in 1 M HClO ₄ ; -0.29 in 1 M H ₂ SO ₄
$PbO_2(s) + 4H^+ + 2e^- \rightleftharpoons Pb^{2+} + 2H_2O$	+1.455	
$PbSO_4(s) + 2e^- \rightleftharpoons Pb(s) + SO_4^{2-}$	-0.350	
Lithium		
$Li^+ + e^- \rightleftharpoons Li(s)$	-3.045	
Magnesium		
$Mg^{2+} + 2e^- \rightleftharpoons Mg(s)$	-2.363	
Manganese		
$Mn^{2+} + 2e^- \rightleftharpoons Mn(s)$	-1.180	
$Mn^{3+} + e^- \rightleftharpoons Mn^{2+}$		1.51 in 7.5 M H ₂ SO ₄
$MnO_2(s) + 4H^+ + 2e^- \rightleftharpoons Mn^{2+} + 2H_2O$	+1.23	
$MnO_4^- + 8H^+ + 5e^- \rightleftharpoons Mn^{2+} + 4H_2O$	+1.51	
$MnO_4^- + 4H^+ + 3e^- \rightleftharpoons MnO_2(s) + 2H_2O$	+1.695	
$MnO_4^- + e^- \rightleftharpoons MnO_4^{2-}$	+0.564	
Mercury		
$Hg_2^{2+} + 2e^- \rightleftharpoons 2Hg(l)$	+0.788	0.274 in 1 M HCl; 0.776 in 1 M HClO ₄ ; 0.674 in 1 M H ₂ SO ₄
$2Hg^{2+} + 2e^- \rightleftharpoons Hg_2^{2+}$	+0.920	0.907 in 1 M HClO ₄
$Hg^{2+} + 2e^- \rightleftharpoons Hg(l)$	+0.854	
$Hg_2Cl_2(s) + 2e^- \rightleftharpoons 2Hg(l) + 2Cl^-$	+0.268	0.244 in sat'd KCl; 0.282 in 1 M KCl; 0.334 in 0.1 M KCl
$Hg_2SO_4(s) + 2e^- \rightleftharpoons 2Hg(l) + SO_4^{2-}$	+0.615	
Nickel		
$Ni^{2+} + 2e^- \rightleftharpoons Ni(s)$	-0.250	
Nitrogen		
$N_2(g) + 5H^+ + 4e^- \rightleftharpoons N_2H_5^+$	-0.23	
$HNO_2 + H^+ + e^- \rightleftharpoons NO(g) + H_2O$	+1.00	
$NO_3^- + 3H^+ + 2e^- \rightleftharpoons HNO_2 + H_2O$	+0.94	0.92 in 1 M HNO ₃
Oxygen		
$H_2O_2 + 2H^+ + 2e^- \rightleftharpoons 2H_2O$	+1.776	
$HO_2^- + H_2O + 2e^- \rightleftharpoons 3OH^-$	+0.88	
$O_2(g) + 4H^+ + 4e^- \rightleftharpoons 2H_2O$	+1.229	
$O_2(g) + 2H^+ + 2e^- \rightleftharpoons H_2O_2$	+0.682	
$O_3(g) + 2H^+ + 2e^- \rightleftharpoons O_2(g) + H_2O$	+2.07	

Half-Reaction	E°, V^*	Formal Potential, V^\dagger
Platinum		
$\text{PtCl}_4^{2-} + 2e^- \rightleftharpoons \text{Pt}(s) + 4\text{Cl}^-$	+0.755	
$\text{PtCl}_6^{2-} + 2e^- \rightleftharpoons \text{PtCl}_4^{2-} + 2\text{Cl}^-$	+0.68	
Potassium		
$\text{K}^+ + e^- \rightleftharpoons \text{K}(s)$	-2.925	
Selenium		
$\text{H}_2\text{SeO}_3 + 4\text{H}^+ + 4e^- \rightleftharpoons \text{Se}(s) + 3\text{H}_2\text{O}$	+0.740	
$\text{SeO}_4^{2-} + 4\text{H}^+ + 2e^- \rightleftharpoons \text{H}_2\text{SeO}_3 + \text{H}_2\text{O}$	+1.15	
Silver		
$\text{Ag}^+ + e^- \rightleftharpoons \text{Ag}(s)$	+0.799	0.228 in 1 M HCl; 0.792 in 1 M HClO ₄ ; 0.77 in 1 M H ₂ SO ₄
$\text{AgBr}(s) + e^- \rightleftharpoons \text{Ag}(s) + \text{Br}^-$	+0.073	
$\text{AgCl}(s) + e^- \rightleftharpoons \text{Ag}(s) + \text{Cl}^-$	+0.222	0.228 in 1 M KCl
$\text{Ag}(\text{CN})_2^- + e^- \rightleftharpoons \text{Ag}(s) + 2\text{CN}^-$	-0.31	
$\text{Ag}_2\text{CrO}_4(s) + 2e^- \rightleftharpoons 2\text{Ag}(s) + \text{CrO}_4^{2-}$	+0.446	
$\text{AgI}(s) + e^- \rightleftharpoons \text{Ag}(s) + \text{I}^-$	-0.151	
$\text{Ag}(\text{S}_2\text{O}_3)_2^{3-} + e^- \rightleftharpoons \text{Ag}(s) + 2\text{S}_2\text{O}_3^{2-}$	+0.017	
Sodium		
$\text{Na}^+ + e^- \rightleftharpoons \text{Na}(s)$	-2.714	
Sulfur		
$\text{S}(s) + 2\text{H}^+ + 2e^- \rightleftharpoons \text{H}_2\text{S}(g)$	+0.141	
$\text{H}_2\text{SO}_3 + 4\text{H}^+ + 4e^- \rightleftharpoons \text{S}(s) + 3\text{H}_2\text{O}$	+0.450	
$\text{SO}_4^{2-} + 4\text{H}^+ + 2e^- \rightleftharpoons \text{H}_2\text{SO}_3 + \text{H}_2\text{O}$	+0.172	
$\text{S}_4\text{O}_6^{2-} + 2e^- \rightleftharpoons 2\text{S}_2\text{O}_3^{2-}$	+0.08	
$\text{S}_2\text{O}_8^{2-} + 2e^- \rightleftharpoons 2\text{SO}_4^{2-}$	+2.01	
Thallium		
$\text{Tl}^+ + e^- \rightleftharpoons \text{Tl}(s)$	-0.336	-0.551 in 1 M HCl; -0.33 in 1 M HClO ₄ , H ₂ SO ₄
$\text{Tl}^{3+} + 2e^- \rightleftharpoons \text{Tl}^+$	+1.25	0.77 in 1 M HCl
Tin		
$\text{Sn}^{2+} + 2e^- \rightleftharpoons \text{Sn}(s)$	-0.136	-0.16 in 1 M HClO ₄
$\text{Sn}^{4+} + 2e^- \rightleftharpoons \text{Sn}^{2+}$	+0.154	0.14 in 1 M HCl
Titanium		
$\text{Ti}^{3+} + e^- \rightleftharpoons \text{Ti}^{2+}$	-0.369	
$\text{TiO}^{2+} + 2\text{H}^+ + e^- \rightleftharpoons \text{Ti}^{3+} + \text{H}_2\text{O}$	+0.099	0.04 in 1 M H ₂ SO ₄
Uranium		
$\text{UO}_2^{2+} + 4\text{H}^+ + 2e^- \rightleftharpoons \text{U}^{4+} + 2\text{H}_2\text{O}$	+0.334	
Vanadium		
$\text{V}^{3+} + e^- \rightleftharpoons \text{V}^{2+}$	-0.255	
$\text{VO}^{2+} + 2\text{H}^+ + e^- \rightleftharpoons \text{V}^{3+} + \text{H}_2\text{O}$	+0.337	
$\text{V}(\text{OH})_4^+ + 2\text{H}^+ + e^- \rightleftharpoons \text{VO}^{2+} + 3\text{H}_2\text{O}$	+1.00	1.02 in 1 M HCl, HClO ₄
Zinc		
$\text{Zn}^{2+} + 2e^- \rightleftharpoons \text{Zn}(s)$	-0.763	