

# ELECTROCHEMICAL SERIES

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There are three tables for this electrochemical series. Each table lists standard reduction potentials,  $E^\circ$  values, at 298.15 K (25°C), and at a pressure of 101.325 kPa (1 atm). Table 1 is an alphabetical listing of the elements, according to the symbol of the elements. Thus, data for silver (Ag) precedes those for aluminum (Al). Table 2 lists only those reduction reactions which have  $E^\circ$  values positive in respect to the standard hydrogen electrode. In Table 2, the reactions are listed in the order of increasing positive potential, and they range from 0.0000 V to + 3.4 V. Table 3 lists only those reduction potentials which have  $E^\circ$  negative with respect to the standard hydrogen electrode. In Table 3, the reactions are listed in the order of decreasing potential and range from 0.0000 V to -4.10 V. The reliability of the potentials is not the same for all the data. Typically, the values with fewer significant figures have lower

reliability. The values of reduction potentials, in particular those of less common reactions, are not definite; they are subject to occasional revisions.

*Abbreviations:* ac = acetate; bipy = 2,2'-dipyridine, or bipyridine; en = ethylenediamine; phen = 1,10-phenanthroline.

## References

1. Milazzo, G., Caroli, S., and Sharma, V. K. *Tables of Standard Electrode Potentials*, Wiley, Chichester, 1978.
2. Bard, A. J., Parsons, R., and Jordan, J. *Standard Potentials in Aqueous Solutions*, Marcel Dekker, New York, 1985.
3. Bratsch, S. G. *J. Phys. Chem. Ref. Data*, 18, 1-21, 1989.

TABLE 1. Alphabetical Listing

Reaction	$E^\circ/V$	Reaction	$E^\circ/V$
$\text{Ac}^{3+} + 3 e \rightleftharpoons \text{Ac}$	-2.20	$\text{As} + 3 \text{H}^+ + 3 e \rightleftharpoons \text{AsH}_3$	-0.608
$\text{Ag}^+ + e \rightleftharpoons \text{Ag}$	0.7996	$\text{As}_2\text{O}_3 + 6 \text{H}^+ + 6 e \rightleftharpoons 2 \text{As} + 3 \text{H}_2\text{O}$	0.234
$\text{Ag}^{2+} + e \rightleftharpoons \text{Ag}^+$	1.980	$\text{HAsO}_2 + 3 \text{H}^+ + 3 e \rightleftharpoons \text{As} + 2 \text{H}_2\text{O}$	0.248
$\text{Ag}(\text{ac}) + e \rightleftharpoons \text{Ag} + (\text{ac})^-$	0.643	$\text{AsO}_2^- + 2 \text{H}_2\text{O} + 3 e \rightleftharpoons \text{As} + 4 \text{OH}^-$	-0.68
$\text{AgBr} + e \rightleftharpoons \text{Ag} + \text{Br}^-$	0.07133	$\text{H}_3\text{AsO}_4 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{HAsO}_2 + 2 \text{H}_2\text{O}$	0.560
$\text{AgBrO}_3 + e \rightleftharpoons \text{Ag} + \text{BrO}_3^-$	0.546	$\text{AsO}_4^{3-} + 2 \text{H}_2\text{O} + 2 e \rightleftharpoons \text{AsO}_2^- + 4 \text{OH}^-$	-0.71
$\text{Ag}_2\text{C}_2\text{O}_4 + 2 e \rightleftharpoons 2 \text{Ag} + \text{C}_2\text{O}_4^{2-}$	0.4647	$\text{At}_2 + 2 e \rightleftharpoons 2 \text{At}^-$	0.3
$\text{AgCl} + e \rightleftharpoons \text{Ag} + \text{Cl}^-$	0.22233	$\text{Au}^+ + e \rightleftharpoons \text{Au}$	1.692
$\text{AgCN} + e \rightleftharpoons \text{Ag} + \text{CN}^-$	-0.017	$\text{Au}^{3+} + 2 e \rightleftharpoons \text{Au}^+$	1.401
$\text{Ag}_2\text{CO}_3 + 2 e \rightleftharpoons 2 \text{Ag} + \text{CO}_3^{2-}$	0.47	$\text{Au}^{3+} + 3 e \rightleftharpoons \text{Au}$	1.498
$\text{Ag}_2\text{CrO}_4 + 2 e \rightleftharpoons 2 \text{Ag} + \text{CrO}_4^{2-}$	0.4470	$\text{Au}^{2+} + e \rightleftharpoons \text{Au}^+$	1.8
$\text{AgF} + e \rightleftharpoons \text{Ag} + \text{F}^-$	0.779	$\text{AuOH}^{2+} + \text{H}^+ + 2 e \rightleftharpoons \text{Au}^+ + \text{H}_2\text{O}$	1.32
$\text{Ag}_3[\text{Fe}(\text{CN})_6] + 4 e \rightleftharpoons 4 \text{Ag} + [\text{Fe}(\text{CN})_6]^{4-}$	0.1478	$\text{AuBr}_2^- + e \rightleftharpoons \text{Au} + 2 \text{Br}^-$	0.959
$\text{AgI} + e \rightleftharpoons \text{Ag} + \text{I}^-$	-0.15224	$\text{AuBr}_4^- + 3 e \rightleftharpoons \text{Au} + 4 \text{Br}^-$	0.854
$\text{AgIO}_3 + e \rightleftharpoons \text{Ag} + \text{IO}_3^-$	0.354	$\text{AuCl}_4^- + 3 e \rightleftharpoons \text{Au} + 4 \text{Cl}^-$	1.002
$\text{Ag}_2\text{MoO}_4 + 2 e \rightleftharpoons 2 \text{Ag} + \text{MoO}_4^{2-}$	0.4573	$\text{Au}(\text{OH})_3 + 3 \text{H}^+ + 3 e \rightleftharpoons \text{Au} + 3 \text{H}_2\text{O}$	1.45
$\text{AgNO}_2 + e \rightleftharpoons \text{Ag} + 2 \text{NO}_2^-$	0.564	$\text{H}_2\text{BO}_3^- + 5 \text{H}_2\text{O} + 8 e \rightleftharpoons \text{BH}_4^- + 8 \text{OH}^-$	-1.24
$\text{Ag}_2\text{O} + \text{H}_2\text{O} + 2 e \rightleftharpoons 2 \text{Ag} + 2 \text{OH}^-$	0.342	$\text{H}_2\text{BO}_3^- + \text{H}_2\text{O} + 3 e \rightleftharpoons \text{B} + 4 \text{OH}^-$	-1.79
$\text{Ag}_2\text{O}_3 + \text{H}_2\text{O} + 2 e \rightleftharpoons 2 \text{AgO} + 2 \text{OH}^-$	0.739	$\text{H}_3\text{BO}_3 + 3 \text{H}^+ + 3 e \rightleftharpoons \text{B} + 3 \text{H}_2\text{O}$	-0.8698
$\text{Ag}^{3+} + 2 e \rightleftharpoons \text{Ag}^+$	1.9	$\text{B}(\text{OH})_3 + 7 \text{H}^+ + 8 e \rightleftharpoons \text{BH}_4^- + 3 \text{H}_2\text{O}$	-0.481
$\text{Ag}^{3+} + e \rightleftharpoons \text{Ag}^{2+}$	1.8	$\text{Ba}^{2+} + 2 e \rightleftharpoons \text{Ba}$	-2.912
$\text{Ag}_2\text{O}_2 + 4 \text{H}^+ + e \rightleftharpoons 2 \text{Ag} + 2 \text{H}_2\text{O}$	1.802	$\text{Ba}^{2+} + 2 e \rightleftharpoons \text{Ba}(\text{Hg})$	-1.570
$2 \text{AgO} + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{Ag}_2\text{O} + 2 \text{OH}^-$	0.607	$\text{Ba}(\text{OH})_2 + 2 e \rightleftharpoons \text{Ba} + 2 \text{OH}^-$	-2.99
$\text{AgOCN} + e \rightleftharpoons \text{Ag} + \text{OCN}^-$	0.41	$\text{Be}^{2+} + 2 e \rightleftharpoons \text{Be}$	-1.847
$\text{Ag}_2\text{S} + 2 e \rightleftharpoons 2 \text{Ag} + \text{S}^{2-}$	-0.691	$\text{Be}_2\text{O}_3^{2-} + 3 \text{H}_2\text{O} + 4 e \rightleftharpoons 2 \text{Be} + 6 \text{OH}^-$	-2.63
$\text{Ag}_2\text{S} + 2 \text{H}^+ + 2 e \rightleftharpoons 2 \text{Ag} + \text{H}_2\text{S}$	-0.0366	$p\text{-benzoquinone} + 2 \text{H}^+ + 2 e \rightleftharpoons$ hydroquinone	0.6992
$\text{AgSCN} + e \rightleftharpoons \text{Ag} + \text{SCN}^-$	0.08951	$\text{Bi}^+ + e \rightleftharpoons \text{Bi}$	0.5
$\text{Ag}_2\text{SeO}_3 + 2 e \rightleftharpoons 2 \text{Ag} + \text{SeO}_4^{2-}$	0.3629	$\text{Bi}^{3+} + 3 e \rightleftharpoons \text{Bi}$	0.308
$\text{Ag}_2\text{SO}_4 + 2 e \rightleftharpoons 2 \text{Ag} + \text{SO}_4^{2-}$	0.654	$\text{Bi}^{3+} + 2 e \rightleftharpoons \text{Bi}^+$	0.2
$\text{Ag}_2\text{WO}_4 + 2 e \rightleftharpoons 2 \text{Ag} + \text{WO}_4^{2-}$	0.4660	$\text{Bi} + 3 \text{H}^+ + 3 e \rightleftharpoons \text{BiH}_3$	-0.8
$\text{Al}^{3+} + 3 e \rightleftharpoons \text{Al}$	-1.662	$\text{BiCl}_4^- + 3 e \rightleftharpoons \text{Bi} + 4 \text{Cl}^-$	0.16
$\text{Al}(\text{OH})_3 + 3 e \rightleftharpoons \text{Al} + 3 \text{OH}^-$	-2.31	$\text{Bi}_2\text{O}_3 + 3 \text{H}_2\text{O} + 6 e \rightleftharpoons 2 \text{Bi} + 6 \text{OH}^-$	-0.46
$\text{Al}(\text{OH})_4^- + 3 e \rightleftharpoons \text{Al} + 4 \text{OH}^-$	-2.328	$\text{Bi}_2\text{O}_4 + 4 \text{H}^+ + 2 e \rightleftharpoons 2 \text{BiO}^+ + 2 \text{H}_2\text{O}$	1.593
$\text{H}_2\text{AlO}_3^- + \text{H}_2\text{O} + 3 e \rightleftharpoons \text{Al} + 4 \text{OH}^-$	-2.33	$\text{BiO}^+ + 2 \text{H}^+ + 3 e \rightleftharpoons \text{Bi} + \text{H}_2\text{O}$	0.320
$\text{AlF}_6^{3-} + 3 e \rightleftharpoons \text{Al} + 6 \text{F}^-$	-2.069	$\text{BiOCl} + 2 \text{H}^+ + 3 e \rightleftharpoons \text{Bi} + \text{Cl}^- + \text{H}_2\text{O}$	0.1583
$\text{Am}^{4+} + e \rightleftharpoons \text{Am}^{3+}$	2.60	$\text{Bk}^{4+} + e \rightleftharpoons \text{Bk}^{3+}$	1.67
$\text{Am}^{2+} + 2 e \rightleftharpoons \text{Am}$	-1.9	$\text{Bk}^{2+} + 2 e \rightleftharpoons \text{Bk}$	-1.6
$\text{Am}^{3+} + 3 e \rightleftharpoons \text{Am}$	-2.048	$\text{Bk}^{3+} + e \rightleftharpoons \text{Bk}^{2+}$	-2.8
$\text{Am}^{3+} + e \rightleftharpoons \text{Am}^{2+}$	-2.3		

Reaction	$E^\circ/V$	Reaction	$E^\circ/V$
$\text{Br}_2(\text{aq}) + 2 e \rightleftharpoons 2 \text{Br}^-$	1.0873	$[\text{Co}(\text{NH}_3)_6]^{3+} + e \rightleftharpoons [\text{Co}(\text{NH}_3)_6]^{2+}$	0.108
$\text{Br}_2(\text{l}) + 2 e \rightleftharpoons 2 \text{Br}^-$	1.066	$\text{Co}(\text{OH})_2 + 2 e \rightleftharpoons \text{Co} + 2 \text{OH}^-$	-0.73
$\text{HBrO} + \text{H}^+ + 2 e \rightleftharpoons \text{Br}^- + \text{H}_2\text{O}$	1.331	$\text{Co}(\text{OH})_3 + e \rightleftharpoons \text{Co}(\text{OH})_2 + \text{OH}^-$	0.17
$\text{HBrO} + \text{H}^+ + e \rightleftharpoons 1/2 \text{Br}_2(\text{aq}) + \text{H}_2\text{O}$	1.574	$\text{Cr}^{2+} + 2 e \rightleftharpoons \text{Cr}$	-0.913
$\text{HBrO} + \text{H}^+ + e \rightleftharpoons 1/2 \text{Br}_2(\text{l}) + \text{H}_2\text{O}$	1.596	$\text{Cr}^{3+} + e \rightleftharpoons \text{Cr}^{2+}$	-0.407
$\text{BrO}^- + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{Br}^- + 2 \text{OH}^-$	0.761	$\text{Cr}^{3+} + 3 e \rightleftharpoons \text{Cr}$	-0.744
$\text{BrO}_3^- + 6 \text{H}^+ + 5 e \rightleftharpoons 1/2 \text{Br}_2 + 3 \text{H}_2\text{O}$	1.482	$\text{Cr}_2\text{O}_7^{2-} + 14 \text{H}^+ + 6 e \rightleftharpoons 2 \text{Cr}^{3+} + 7 \text{H}_2\text{O}$	1.36
$\text{BrO}_3^- + 6 \text{H}^+ + 6 e \rightleftharpoons \text{Br}^- + 3 \text{H}_2\text{O}$	1.423	$\text{CrO}_2^- + 2 \text{H}_2\text{O} + 3 e \rightleftharpoons \text{Cr} + 4 \text{OH}^-$	-1.2
$\text{BrO}_3^- + 3 \text{H}_2\text{O} + 6 e \rightleftharpoons \text{Br}^- + 6 \text{OH}^-$	0.61	$\text{HCrO}_4^- + 7 \text{H}^+ + 3 e \rightleftharpoons \text{Cr}^{3+} + 4 \text{H}_2\text{O}$	1.350
$(\text{CN})_2 + 2 \text{H}^+ + 2 e \rightleftharpoons 2 \text{HCN}$	0.373	$\text{CrO}_2 + 4 \text{H}^+ + e \rightleftharpoons \text{Cr}^{3+} + 2 \text{H}_2\text{O}$	1.48
$2 \text{HCNO} + 2 \text{H}^+ + 2 e \rightleftharpoons (\text{CN})_2 + 2 \text{H}_2\text{O}$	0.330	$\text{Cr}(\text{V}) + e \rightleftharpoons \text{Cr}(\text{IV})$	1.34
$(\text{CNS})_2 + 2 e \rightleftharpoons 2 \text{CNS}^-$	0.77	$\text{CrO}_4^{2-} + 4 \text{H}_2\text{O} + 3 e \rightleftharpoons \text{Cr}(\text{OH})_3 + 5 \text{OH}^-$	-0.13
$\text{CO}_2 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{HCOOH}$	-0.199	$\text{Cr}(\text{OH})_3 + 3 e \rightleftharpoons \text{Cr} + 3 \text{OH}^-$	-1.48
$\text{Ca}^+ + e \rightleftharpoons \text{Ca}$	-3.80	$\text{Cs}^+ + e \rightleftharpoons \text{Cs}$	-3.026
$\text{Ca}^{2+} + 2 e \rightleftharpoons \text{Ca}$	-2.868	$\text{Cu}^+ + e \rightleftharpoons \text{Cu}$	0.521
$\text{Ca}(\text{OH})_2 + 2 e \rightleftharpoons \text{Ca} + 2 \text{OH}^-$	-3.02	$\text{Cu}^{2+} + e \rightleftharpoons \text{Cu}^+$	0.153
Calomel electrode, 1 molal KCl	0.2800	$\text{Cu}^{2+} + 2 e \rightleftharpoons \text{Cu}$	0.3419
Calomel electrode, 1 molar KCl (NCE)	0.2801	$\text{Cu}^{2+} + 2 e \rightleftharpoons \text{Cu}(\text{Hg})$	0.345
Calomel electrode, 0.1 molar KCl	0.3337	$\text{Cu}^{3+} + e \rightleftharpoons \text{Cu}^{2+}$	2.4
Calomel electrode, saturated KCl (SCE)	0.2412	$\text{Cu}_2\text{O}_3 + 6 \text{H}^+ + 2 e \rightleftharpoons 2 \text{Cu}^{2+} + 3 \text{H}_2\text{O}$	2.0
Calomel electrode, saturated NaCl (SSCE)	0.2360	$\text{Cu}^{2+} + 2 \text{CN}^- + e \rightleftharpoons [\text{Cu}(\text{CN})_2]^-$	1.103
$\text{Cd}^{2+} + 2 e \rightleftharpoons \text{Cd}$	-0.4030	$\text{CuI}_2^- + e \rightleftharpoons \text{Cu} + 2 \text{I}^-$	0.00
$\text{Cd}^{2+} + 2 e \rightleftharpoons \text{Cd}(\text{Hg})$	-0.3521	$\text{Cu}_2\text{O} + \text{H}_2\text{O} + 2 e \rightleftharpoons 2 \text{Cu} + 2 \text{OH}^-$	-0.360
$\text{Cd}(\text{OH})_2 + 2 e \rightleftharpoons \text{Cd}(\text{Hg}) + 2 \text{OH}^-$	-0.809	$\text{Cu}(\text{OH})_2 + 2 e \rightleftharpoons \text{Cu} + 2 \text{OH}^-$	-0.222
$\text{CdSO}_4 + 2 e \rightleftharpoons \text{Cd} + \text{SO}_4^{2-}$	-0.246	$2 \text{Cu}(\text{OH})_2 + 2 e \rightleftharpoons \text{Cu}_2\text{O} + 2 \text{OH}^- + \text{H}_2\text{O}$	-0.080
$\text{Cd}(\text{OH})_4^{2-} + 2 e \rightleftharpoons \text{Cd} + 4 \text{OH}^-$	-0.658	$2 \text{D}^+ + 2 e \rightleftharpoons \text{D}_2$	-0.013
$\text{CdO} + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{Cd} + 2 \text{OH}^-$	-0.783	$\text{Dy}^{2+} + 2 e \rightleftharpoons \text{Dy}$	-2.2
$\text{Ce}^{3+} + 3 e \rightleftharpoons \text{Ce}$	-2.336	$\text{Dy}^{3+} + 3 e \rightleftharpoons \text{Dy}$	-2.295
$\text{Ce}^{3+} + 3 e \rightleftharpoons \text{Ce}(\text{Hg})$	-1.4373	$\text{Dy}^{3+} + e \rightleftharpoons \text{Dy}^{2+}$	-2.6
$\text{Ce}^{4+} + e \rightleftharpoons \text{Ce}^{3+}$	1.72	$\text{Er}^{2+} + 2 e \rightleftharpoons \text{Er}$	-2.0
$\text{CeOH}^{3+} + \text{H}^+ + e \rightleftharpoons \text{Ce}^{3+} + \text{H}_2\text{O}$	1.715	$\text{Er}^{3+} + 3 e \rightleftharpoons \text{Er}$	-2.331
$\text{Cf}^{4+} + e \rightleftharpoons \text{Cf}^{3+}$	3.3	$\text{Er}^{3+} + e \rightleftharpoons \text{Er}^{2+}$	-3.0
$\text{Cf}^{3+} + e \rightleftharpoons \text{Cf}^{2+}$	-1.6	$\text{Es}^{3+} + e \rightleftharpoons \text{Es}^{2+}$	-1.3
$\text{Cf}^{3+} + 3 e \rightleftharpoons \text{Cf}$	-1.94	$\text{Es}^{3+} + 3 e \rightleftharpoons \text{Es}$	-1.91
$\text{Cf}^{2+} + 2 e \rightleftharpoons \text{Cf}$	-2.12	$\text{Es}^{2+} + 2 e \rightleftharpoons \text{Es}$	-2.23
$\text{Cl}_2(\text{g}) + 2 e \rightleftharpoons 2 \text{Cl}^-$	1.35827	$\text{Eu}^{2+} + 2 e \rightleftharpoons \text{Eu}$	-2.812
$\text{HClO} + \text{H}^+ + e \rightleftharpoons 1/2 \text{Cl}_2 + \text{H}_2\text{O}$	1.611	$\text{Eu}^{3+} + 3 e \rightleftharpoons \text{Eu}$	-1.991
$\text{HClO} + \text{H}^+ + 2 e \rightleftharpoons \text{Cl}^- + \text{H}_2\text{O}$	1.482	$\text{Eu}^{3+} + e \rightleftharpoons \text{Eu}^{2+}$	-0.36
$\text{ClO}^- + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{Cl}^- + 2 \text{OH}^-$	0.81	$\text{F}_2 + 2 \text{H}^+ + 2 e \rightleftharpoons 2 \text{HF}$	3.053
$\text{ClO}_2 + \text{H}^+ + e \rightleftharpoons \text{HClO}_2$	1.277	$\text{F}_2 + 2 e \rightleftharpoons 2 \text{F}^-$	2.866
$\text{HClO}_2 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{HClO} + \text{H}_2\text{O}$	1.645	$\text{F}_2\text{O} + 2 \text{H}^+ + 4 e \rightleftharpoons \text{H}_2\text{O} + 2 \text{F}^-$	2.153
$\text{HClO}_2 + 3 \text{H}^+ + 3 e \rightleftharpoons 1/2 \text{Cl}_2 + 2 \text{H}_2\text{O}$	1.628	$\text{Fe}^{2+} + 2 e \rightleftharpoons \text{Fe}$	-0.447
$\text{HClO}_2 + 3 \text{H}^+ + 4 e \rightleftharpoons \text{Cl}^- + 2 \text{H}_2\text{O}$	1.570	$\text{Fe}^{3+} + 3 e \rightleftharpoons \text{Fe}$	-0.037
$\text{ClO}_2^- + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{ClO}^- + 2 \text{OH}^-$	0.66	$\text{Fe}^{3+} + e \rightleftharpoons \text{Fe}^{2+}$	0.771
$\text{ClO}_2^- + 2 \text{H}_2\text{O} + 4 e \rightleftharpoons \text{Cl}^- + 4 \text{OH}^-$	0.76	$2 \text{HFeO}_4^- + 8 \text{H}^+ + 6 e \rightleftharpoons \text{Fe}_2\text{O}_3 + 5 \text{H}_2\text{O}$	2.09
$\text{ClO}_2(\text{aq}) + e \rightleftharpoons \text{ClO}_2^-$	0.954	$\text{HFeO}_4^- + 4 \text{H}^+ + 3 e \rightleftharpoons \text{FeOOH} + 2 \text{H}_2\text{O}$	2.08
$\text{ClO}_3^- + 2 \text{H}^+ + e \rightleftharpoons \text{ClO}_2 + \text{H}_2\text{O}$	1.152	$\text{HFeO}_4^- + 7 \text{H}^+ + 3 e \rightleftharpoons \text{Fe}^{3+} + 4 \text{H}_2\text{O}$	2.07
$\text{ClO}_3^- + 3 \text{H}^+ + 2 e \rightleftharpoons \text{HClO}_2 + \text{H}_2\text{O}$	1.214	$\text{Fe}_2\text{O}_3 + 4 \text{H}^+ + 2 e \rightleftharpoons 2 \text{FeOH}^+ + \text{H}_2\text{O}$	0.16
$\text{ClO}_3^- + 6 \text{H}^+ + 5 e \rightleftharpoons 1/2 \text{Cl}_2 + 3 \text{H}_2\text{O}$	1.47	$[\text{Fe}(\text{CN})_6]^{3-} + e \rightleftharpoons [\text{Fe}(\text{CN})_6]^{4-}$	0.358
$\text{ClO}_3^- + 6 \text{H}^+ + 6 e \rightleftharpoons \text{Cl}^- + 3 \text{H}_2\text{O}$	1.451	$\text{FeO}_4^{2-} + 8 \text{H}^+ + 3 e \rightleftharpoons \text{Fe}^{3+} + 4 \text{H}_2\text{O}$	2.20
$\text{ClO}_3^- + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{ClO}_2^- + 2 \text{OH}^-$	0.33	$[\text{Fe}(\text{bipy})_2]^{3+} + e \rightleftharpoons [\text{Fe}(\text{bipy})_2]^{2+}$	0.78
$\text{ClO}_3^- + 3 \text{H}_2\text{O} + 6 e \rightleftharpoons \text{Cl}^- + 6 \text{OH}^-$	0.62	$[\text{Fe}(\text{bipy})_3]^{3+} + e \rightleftharpoons [\text{Fe}(\text{bipy})_3]^{2+}$	1.03
$\text{ClO}_4^- + 2 \text{H}^+ + 2 e \rightleftharpoons \text{ClO}_3^- + \text{H}_2\text{O}$	1.189	$\text{Fe}(\text{OH})_3 + e \rightleftharpoons \text{Fe}(\text{OH})_2 + \text{OH}^-$	-0.56
$\text{ClO}_4^- + 8 \text{H}^+ + 7 e \rightleftharpoons 1/2 \text{Cl}_2 + 4 \text{H}_2\text{O}$	1.39	$[\text{Fe}(\text{phen})_3]^{3+} + e \rightleftharpoons [\text{Fe}(\text{phen})_3]^{2+}$	1.147
$\text{ClO}_4^- + 8 \text{H}^+ + 8 e \rightleftharpoons \text{Cl}^- + 4 \text{H}_2\text{O}$	1.389	$[\text{Fe}(\text{phen})_3]^{3+} + e \rightleftharpoons [\text{Fe}(\text{phen})_3]^{2+}$ (1 molar $\text{H}_2\text{SO}_4$ )	1.06
$\text{ClO}_4^- + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{ClO}_3^- + 2 \text{OH}^-$	0.36	$[\text{Ferricinium}]^+ + e \rightleftharpoons \text{ferrocene}$	0.400
$\text{Cm}^{4+} + e \rightleftharpoons \text{Cm}^{3+}$	3.0	$\text{Fm}^{3+} + e \rightleftharpoons \text{Fm}^{2+}$	-1.1
$\text{Cm}^{3+} + 3 e \rightleftharpoons \text{Cm}$	-2.04	$\text{Fm}^{3+} + 3 e \rightleftharpoons \text{Fm}$	-1.89
$\text{Co}^{2+} + 2 e \rightleftharpoons \text{Co}$	-0.28	$\text{Fm}^{2+} + 2 e \rightleftharpoons \text{Fm}$	-2.30
$\text{Co}^{3+} + e \rightleftharpoons \text{Co}^{2+}$	1.92		

Reaction	$E^\circ/V$	Reaction	$E^\circ/V$
$\text{Fr}^+ + e \rightleftharpoons \text{Fr}$	-2.9	$\text{La}(\text{OH})_3 + 3 e \rightleftharpoons \text{La} + 3 \text{OH}^-$	-2.90
$\text{Ga}^{3+} + 3 e \rightleftharpoons \text{Ga}$	-0.549	$\text{Li}^+ + e \rightleftharpoons \text{Li}$	-3.0401
$\text{Ga}^+ + e \rightleftharpoons \text{Ga}$	-0.2	$\text{Lu}^{3+} + 3 e \rightleftharpoons \text{Lu}$	-1.96
$\text{GaOH}^{2+} + \text{H}^+ + 3 e \rightleftharpoons \text{Ga} + \text{H}_2\text{O}$	-0.498	$\text{Lu}^{3+} + 3 e \rightleftharpoons \text{Lu}$	-2.28
$\text{H}_2\text{GaO}_3 + \text{H}_2\text{O} + 3 e \rightleftharpoons \text{Ga} + 4 \text{OH}^-$	-1.219	$\text{Md}^{3+} + e \rightleftharpoons \text{Md}^{2+}$	-0.1
$\text{Gd}^{3+} + 3 e \rightleftharpoons \text{Gd}$	-2.279	$\text{Md}^{3+} + 3 e \rightleftharpoons \text{Md}$	-1.65
$\text{Ge}^{2+} + 2 e \rightleftharpoons \text{Ge}$	0.24	$\text{Md}^{2+} + 2 e \rightleftharpoons \text{Md}$	-2.40
$\text{Ge}^{4+} + 4 e \rightleftharpoons \text{Ge}$	0.124	$\text{Mg}^+ + e \rightleftharpoons \text{Mg}$	-2.70
$\text{Ge}^{4+} + 2 e \rightleftharpoons \text{Ge}^{2+}$	0.00	$\text{Mg}^{2+} + 2 e \rightleftharpoons \text{Mg}$	-2.372
$\text{GeO}_2 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{GeO} + \text{H}_2\text{O}$	-0.118	$\text{Mg}(\text{OH})_2 + 2 e \rightleftharpoons \text{Mg} + 2 \text{OH}^-$	-2.690
$\text{H}_2\text{GeO}_3 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{Ge} + 3 \text{H}_2\text{O}$	-0.182	$\text{Mn}^{2+} + 2 e \rightleftharpoons \text{Mn}$	-1.185
$2 \text{H}^+ + 2 e \rightleftharpoons \text{H}_2$	0.00000	$\text{Mn}^{3+} + e \rightleftharpoons \text{Mn}^{2+}$	1.5415
$\text{H}_2 + 2 e \rightleftharpoons 2 \text{H}^-$	-2.23	$\text{MnO}_2 + 4 \text{H}^+ + 2 e \rightleftharpoons \text{Mn}^{2+} + 2 \text{H}_2\text{O}$	1.224
$\text{HO}_2 + \text{H}^+ + e \rightleftharpoons \text{H}_2\text{O}_2$	1.495	$\text{MnO}_4^- + e \rightleftharpoons \text{MnO}_4^{2-}$	0.558
$2 \text{H}_2\text{O} + 2 e \rightleftharpoons \text{H}_2 + 2 \text{OH}^-$	-0.8277	$\text{MnO}_4^- + 4 \text{H}^+ + 3 e \rightleftharpoons \text{MnO}_2 + 2 \text{H}_2\text{O}$	1.679
$\text{H}_2\text{O}_2 + 2 \text{H}^+ + 2 e \rightleftharpoons 2 \text{H}_2\text{O}$	1.776	$\text{MnO}_4^- + 8 \text{H}^+ + 5 e \rightleftharpoons \text{Mn}^{2+} + 4 \text{H}_2\text{O}$	1.507
$\text{Hf}^{4+} + 4 e \rightleftharpoons \text{Hf}$	-1.55	$\text{MnO}_4^- + 2 \text{H}_2\text{O} + 3 e \rightleftharpoons \text{MnO}_2 + 4 \text{OH}^-$	0.595
$\text{HfO}^{2+} + 2 \text{H}^+ + 4 e \rightleftharpoons \text{Hf} + \text{H}_2\text{O}$	-1.724	$\text{MnO}_4^{2-} + 2 \text{H}_2\text{O} + 2 e \rightleftharpoons \text{MnO}_2 + 4 \text{OH}^-$	0.60
$\text{HfO}_2 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{Hf} + 2 \text{H}_2\text{O}$	-1.505	$\text{Mn}(\text{OH})_2 + 2 e \rightleftharpoons \text{Mn} + 2 \text{OH}^-$	-1.56
$\text{HfO}(\text{OH})_2 + \text{H}_2\text{O} + 4 e \rightleftharpoons \text{Hf} + 4 \text{OH}^-$	-2.50	$\text{Mn}(\text{OH})_3 + e \rightleftharpoons \text{Mn}(\text{OH})_2 + \text{OH}^-$	0.15
$\text{Hg}^{2+} + 2 e \rightleftharpoons \text{Hg}$	0.851	$\text{Mn}_2\text{O}_3 + 6 \text{H}^+ + e \rightleftharpoons 2 \text{Mn}^{2+} + 3 \text{H}_2\text{O}$	1.485
$2 \text{Hg}^{2+} + 2 e \rightleftharpoons \text{Hg}_2^{2+}$	0.920	$\text{Mo}^{3+} + 3 e \rightleftharpoons \text{Mo}$	-0.200
$\text{Hg}_2^{2+} + 2 e \rightleftharpoons 2 \text{Hg}$	0.7973	$\text{MoO}_2 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{Mo} + 4 \text{H}_2\text{O}$	-0.152
$\text{Hg}_2(\text{ac})_2 + 2 e \rightleftharpoons 2 \text{Hg} + 2(\text{ac})^-$	0.51163	$\text{H}_3\text{Mo}_7\text{O}_{24}^{3-} + 45 \text{H}^+ + 42 e \rightleftharpoons 7 \text{Mo} + 24 \text{H}_2\text{O}$	0.082
$\text{Hg}_2\text{Br}_2 + 2 e \rightleftharpoons 2 \text{Hg} + 2 \text{Br}^-$	0.13923	$\text{MoO}_3 + 6 \text{H}^+ + 6 e \rightleftharpoons \text{Mo} + 3 \text{H}_2\text{O}$	0.075
$\text{Hg}_2\text{Cl}_2 + 2 e \rightleftharpoons 2 \text{Hg} + 2 \text{Cl}^-$	0.26808	$\text{N}_2 + 2 \text{H}_2\text{O} + 6 \text{H}^+ + 6 e \rightleftharpoons 2 \text{NH}_4\text{OH}$	0.092
$\text{Hg}_2\text{HPO}_4 + 2 e \rightleftharpoons 2 \text{Hg} + \text{HPO}_4^{2-}$	0.6359	$3 \text{N}_2 + 2 \text{H}^+ + 2 e \rightleftharpoons 2 \text{HN}_3$	-3.09
$\text{Hg}_2\text{I}_2 + 2 e \rightleftharpoons 2 \text{Hg} + 2 \text{I}^-$	-0.0405	$\text{N}_5^+ + 3 \text{H}^+ + 2 e \rightleftharpoons 2 \text{NH}_4^+$	1.275
$\text{Hg}_2\text{O} + \text{H}_2\text{O} + 2 e \rightleftharpoons 2 \text{Hg} + 2 \text{OH}^-$	0.123	$\text{N}_2\text{O} + 2 \text{H}^+ + 2 e \rightleftharpoons \text{N}_2 + \text{H}_2\text{O}$	1.766
$\text{HgO} + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{Hg} + 2 \text{OH}^-$	0.0977	$\text{H}_2\text{N}_2\text{O}_2 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{N}_2 + 2 \text{H}_2\text{O}$	2.65
$\text{Hg}(\text{OH})_2 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{Hg} + 2 \text{H}_2\text{O}$	1.034	$\text{N}_2\text{O}_4 + 2 e \rightleftharpoons 2 \text{NO}_2^-$	0.867
$\text{Hg}_2\text{SO}_4 + 2 e \rightleftharpoons 2 \text{Hg} + \text{SO}_4^{2-}$	0.6125	$\text{N}_2\text{O}_4 + 2 \text{H}^+ + 2 e \rightleftharpoons 2 \text{NHO}_2$	1.065
$\text{Ho}^{2+} + 2 e \rightleftharpoons \text{Ho}$	-2.1	$\text{N}_2\text{O}_4 + 4 \text{H}^+ + 4 e \rightleftharpoons 2 \text{NO} + 2 \text{H}_2\text{O}$	1.035
$\text{Ho}^{3+} + 3 e \rightleftharpoons \text{Ho}$	-2.33	$2 \text{NH}_3\text{OH}^+ + \text{H}^+ + 2 e \rightleftharpoons \text{N}_2\text{H}_5^+ + 2 \text{H}_2\text{O}$	1.42
$\text{Ho}^{3+} + e \rightleftharpoons \text{Ho}^{2+}$	-2.8	$2 \text{NO} + 2 \text{H}^+ + 2 e \rightleftharpoons \text{N}_2\text{O} + \text{H}_2\text{O}$	1.591
$\text{I}_2 + 2 e \rightleftharpoons 2 \text{I}^-$	0.5355	$2 \text{NO} + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{N}_2\text{O} + 2 \text{OH}^-$	0.76
$\text{I}_3^- + 2 e \rightleftharpoons 3 \text{I}^-$	0.536	$\text{HNO}_2 + \text{H}^+ + e \rightleftharpoons \text{NO} + \text{H}_2\text{O}$	0.983
$\text{H}_3\text{IO}_6^{2-} + 2 e \rightleftharpoons \text{IO}_3^- + 3 \text{OH}^-$	0.7	$2 \text{HNO}_2 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{H}_2\text{N}_2\text{O}_2 + 2 \text{H}_2\text{O}$	0.86
$\text{H}_5\text{IO}_6 + \text{H}^+ + 2 e \rightleftharpoons \text{IO}_3^- + 3 \text{H}_2\text{O}$	1.601	$2 \text{HNO}_2 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{N}_2\text{O} + 3 \text{H}_2\text{O}$	1.297
$2 \text{HIO} + 2 \text{H}^+ + 2 e \rightleftharpoons \text{I}_2 + 2 \text{H}_2\text{O}$	1.439	$\text{NO}_2^- + \text{H}_2\text{O} + e \rightleftharpoons \text{NO} + 2 \text{OH}^-$	-0.46
$\text{HIO} + \text{H}^+ + 2 e \rightleftharpoons \text{I}^- + \text{H}_2\text{O}$	0.987	$2 \text{NO}_2^- + 2 \text{H}_2\text{O} + 4 e \rightleftharpoons \text{N}_2\text{O}_4^{2-} + 4 \text{OH}^-$	-0.18
$\text{IO}^- + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{I}^- + 2 \text{OH}^-$	0.485	$2 \text{NO}_2^- + 3 \text{H}_2\text{O} + 4 e \rightleftharpoons \text{N}_2\text{O} + 6 \text{OH}^-$	0.15
$2 \text{IO}_3^- + 12 \text{H}^+ + 10 e \rightleftharpoons \text{I}_2 + 6 \text{H}_2\text{O}$	1.195	$\text{NO}_3^- + 3 \text{H}^+ + 2 e \rightleftharpoons \text{HNO}_2 + \text{H}_2\text{O}$	0.934
$\text{IO}_3^- + 6 \text{H}^+ + 6 e \rightleftharpoons \text{I}^- + 3 \text{H}_2\text{O}$	1.085	$\text{NO}_3^- + 4 \text{H}^+ + 3 e \rightleftharpoons \text{NO} + 2 \text{H}_2\text{O}$	0.957
$\text{IO}_3^- + 2 \text{H}_2\text{O} + 4 e \rightleftharpoons \text{IO}^- + 4 \text{OH}^-$	0.15	$2 \text{NO}_3^- + 4 \text{H}^+ + 2 e \rightleftharpoons \text{N}_2\text{O}_4 + 2 \text{H}_2\text{O}$	0.803
$\text{IO}_3^- + 3 \text{H}_2\text{O} + 6 e \rightleftharpoons \text{IO}^- + 6 \text{OH}^-$	0.26	$\text{NO}_3^- + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{NO}_2^- + 2 \text{OH}^-$	0.01
$\text{In}^+ + e \rightleftharpoons \text{In}$	-0.14	$2 \text{NO}_3^- + 2 \text{H}_2\text{O} + 2 e \rightleftharpoons \text{N}_2\text{O}_4 + 4 \text{OH}^-$	-0.85
$\text{In}^{2+} + e \rightleftharpoons \text{In}^+$	-0.40	$\text{Na}^+ + e \rightleftharpoons \text{Na}$	-2.71
$\text{In}^{3+} + e \rightleftharpoons \text{In}^{2+}$	-0.49	$\text{Nb}^{3+} + 3 e \rightleftharpoons \text{Nb}$	-1.099
$\text{In}^{3+} + 2 e \rightleftharpoons \text{In}^+$	-0.443	$\text{NbO}_2 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{NbO} + \text{H}_2\text{O}$	-0.646
$\text{In}^{3+} + 3 e \rightleftharpoons \text{In}$	-0.3382	$\text{NbO}_2 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{Nb} + 2 \text{H}_2\text{O}$	-0.690
$\text{In}(\text{OH})_3 + 3 e \rightleftharpoons \text{In} + 3 \text{OH}^-$	-0.99	$\text{NbO} + 2 \text{H}^+ + 2 e \rightleftharpoons \text{Nb} + \text{H}_2\text{O}$	-0.733
$\text{In}(\text{OH})_4^- + 3 e \rightleftharpoons \text{In} + 4 \text{OH}^-$	-1.007	$\text{Nb}_2\text{O}_5 + 10 \text{H}^+ + 10 e \rightleftharpoons 2 \text{Nb} + 5 \text{H}_2\text{O}$	-0.644
$\text{In}_2\text{O}_3 + 3 \text{H}_2\text{O} + 6 e \rightleftharpoons 2 \text{In} + 6 \text{OH}^-$	-1.034	$\text{Nd}^{3+} + 3 e \rightleftharpoons \text{Nd}$	-2.323
$\text{Ir}^{3+} + 3 e \rightleftharpoons \text{Ir}$	1.156	$\text{Nd}^{2+} + 2 e \rightleftharpoons \text{Nd}$	-2.1
$[\text{IrCl}_6]^{2-} + e \rightleftharpoons [\text{IrCl}_6]^{3-}$	0.8665	$\text{Nd}^{3+} + e \rightleftharpoons \text{Nd}^{2+}$	-2.7
$[\text{IrCl}_6]^{3-} + 3 e \rightleftharpoons \text{Ir} + 6 \text{Cl}^-$	0.77	$\text{Ni}^{2+} + 2 e \rightleftharpoons \text{Ni}$	-0.257
$\text{Ir}_2\text{O}_3 + 3 \text{H}_2\text{O} + 6 e \rightleftharpoons 2 \text{Ir} + 6 \text{OH}^-$	0.098	$\text{Ni}(\text{OH})_2 + 2 e \rightleftharpoons \text{Ni} + 2 \text{OH}^-$	-0.72
$\text{K}^+ + e \rightleftharpoons \text{K}$	-2.931	$\text{NiO}_2 + 4 \text{H}^+ + 2 e \rightleftharpoons \text{Ni}^{2+} + 2 \text{H}_2\text{O}$	1.678
$\text{La}^{3+} + 3 e \rightleftharpoons \text{La}$	-2.379	$\text{NiO}_2 + 2 \text{H}_2\text{O} + 2 e \rightleftharpoons \text{Ni}(\text{OH})_2 + 2 \text{OH}^-$	-0.490

Reaction	$E^\circ/V$	Reaction	$E^\circ/V$
$\text{No}^{3+} + e \rightleftharpoons \text{No}^{2+}$	1.4	$\text{Pr}^{3+} + e \rightleftharpoons \text{Pr}^{2+}$	-3.1
$\text{No}^{3+} + 3 e \rightleftharpoons \text{No}$	-1.20	$\text{Pt}^{2+} + 2 e \rightleftharpoons \text{Pt}$	1.18
$\text{No}^{2+} + 2 e \rightleftharpoons \text{No}$	-2.50	$[\text{PtCl}_4]^{2-} + 2 e \rightleftharpoons \text{Pt} + 4 \text{Cl}^-$	0.755
$\text{Np}^{3+} + 3 e \rightleftharpoons \text{Np}$	-1.856	$[\text{PtCl}_6]^{2-} + 2 e \rightleftharpoons [\text{PtCl}_4]^{2-} + 2 \text{Cl}^-$	0.68
$\text{Np}^{4+} + e \rightleftharpoons \text{Np}^{3+}$	0.147	$\text{Pt}(\text{OH})_2 + 2 e \rightleftharpoons \text{Pt} + 2 \text{OH}^-$	0.14
$\text{NpO}_2 + \text{H}_2\text{O} + \text{H}^+ + e \rightleftharpoons \text{Np}(\text{OH})_3$	-0.962	$\text{PtO}_3 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{PtO}_2 + \text{H}_2\text{O}$	1.7
$\text{O}_2 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{H}_2\text{O}_2$	0.695	$\text{PtO}_3 + 4 \text{H}^+ + 2 e \rightleftharpoons \text{Pt}(\text{OH})_2^{2+} + \text{H}_2\text{O}$	1.5
$\text{O}_2 + 4 \text{H}^+ + 4 e \rightleftharpoons 2 \text{H}_2\text{O}$	1.229	$\text{PtOH}^+ + \text{H}^+ + 2 e \rightleftharpoons \text{Pt} + \text{H}_2\text{O}$	1.2
$\text{O}_2 + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{HO}_2^- + \text{OH}^-$	-0.076	$\text{PtO}_2 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{PtO} + \text{H}_2\text{O}$	1.01
$\text{O}_2 + 2 \text{H}_2\text{O} + 2 e \rightleftharpoons \text{H}_2\text{O}_2 + 2 \text{OH}^-$	-0.146	$\text{PtO}_2 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{Pt} + 2 \text{H}_2\text{O}$	1.00
$\text{O}_2 + 2 \text{H}_2\text{O} + 4 e \rightleftharpoons 4 \text{OH}^-$	0.401	$\text{Pu}^{3+} + 3 e \rightleftharpoons \text{Pu}$	-2.031
$\text{O}_3 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{O}_2 + \text{H}_2\text{O}$	2.076	$\text{Pu}^{4+} + e \rightleftharpoons \text{Pu}^{3+}$	1.006
$\text{O}_3 + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{O}_2 + 2 \text{OH}^-$	1.24	$\text{Pu}^{5+} + e \rightleftharpoons \text{Pu}^{4+}$	1.099
$\text{O}(\text{g}) + 2 \text{H}^+ + 2 e \rightleftharpoons \text{H}_2\text{O}$	2.421	$\text{PuO}_2(\text{OH})_2 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{Pu}(\text{OH})_4$	1.325
$\text{OH} + e \rightleftharpoons \text{OH}^-$	2.02	$\text{PuO}_2(\text{OH})_2 + \text{H}^+ + e \rightleftharpoons \text{PuO}_2\text{OH} + \text{H}_2\text{O}$	1.062
$\text{HO}_2^- + \text{H}_2\text{O} + 2 e \rightleftharpoons 3 \text{OH}^-$	0.878	$\text{Ra}^{2+} + 2 e \rightleftharpoons \text{Ra}$	-2.8
$\text{OsO}_4 + 8 \text{H}^+ + 8 e \rightleftharpoons \text{Os} + 4 \text{H}_2\text{O}$	0.838	$\text{Rb}^+ + e \rightleftharpoons \text{Rb}$	-2.98
$\text{OsO}_4 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{OsO}_2 + 2 \text{H}_2\text{O}$	1.02	$\text{Re}^{3+} + 3 e \rightleftharpoons \text{Re}$	0.300
$[\text{Os}(\text{bipy})_2]^{3+} + e \rightleftharpoons [\text{Os}(\text{bipy})_2]^{2+}$	0.81	$\text{ReO}_4^- + 4 \text{H}^+ + 3 e \rightleftharpoons \text{ReO}_2 + 2 \text{H}_2\text{O}$	0.510
$[\text{Os}(\text{bipy})_3]^{3+} + e \rightleftharpoons [\text{Os}(\text{bipy})_3]^{2+}$	0.80	$\text{ReO}_2 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{Re} + 2 \text{H}_2\text{O}$	0.2513
$\text{P}(\text{red}) + 3 \text{H}^+ + 3 e \rightleftharpoons \text{PH}_3(\text{g})$	-0.111	$\text{ReO}_4^- + 2 \text{H}^+ + e \rightleftharpoons \text{ReO}_3 + \text{H}_2\text{O}$	0.768
$\text{P}(\text{white}) + 3 \text{H}^+ + 3 e \rightleftharpoons \text{PH}_3(\text{g})$	-0.063	$\text{ReO}_4^- + 4 \text{H}_2\text{O} + 7 e \rightleftharpoons \text{Re} + 8 \text{OH}^-$	-0.584
$\text{P} + 3 \text{H}_2\text{O} + 3 e \rightleftharpoons \text{PH}_3(\text{g}) + 3 \text{OH}^-$	-0.87	$\text{ReO}_4^- + 8 \text{H}^+ + 7 e \rightleftharpoons \text{Re} + 4 \text{H}_2\text{O}$	0.368
$\text{H}_2\text{P}_2^- + e \rightleftharpoons \text{P} + 2 \text{OH}^-$	-1.82	$\text{Rh}^+ + e \rightleftharpoons \text{Rh}$	0.600
$\text{H}_3\text{PO}_2 + \text{H}^+ + e \rightleftharpoons \text{P} + 2 \text{H}_2\text{O}$	-0.508	$\text{Rh}^{3+} + 3 e \rightleftharpoons \text{Rh}$	0.758
$\text{H}_3\text{PO}_3 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{H}_3\text{PO}_2 + \text{H}_2\text{O}$	-0.499	$[\text{RhCl}_6]^{3-} + 3 e \rightleftharpoons \text{Rh} + 6 \text{Cl}^-$	0.431
$\text{H}_3\text{PO}_3 + 3 \text{H}^+ + 3 e \rightleftharpoons \text{P} + 3 \text{H}_2\text{O}$	-0.454	$\text{RhOH}^{2+} + \text{H}^+ + 3 e \rightleftharpoons \text{Rh} + \text{H}_2\text{O}$	0.83
$\text{HPO}_3^{2-} + 2 \text{H}_2\text{O} + 2 e \rightleftharpoons \text{H}_2\text{PO}_2^- + 3 \text{OH}^-$	-1.65	$\text{Ru}^{2+} + 2 e \rightleftharpoons \text{Ru}$	0.455
$\text{HPO}_3^{2-} + 2 \text{H}_2\text{O} + 3 e \rightleftharpoons \text{P} + 5 \text{OH}^-$	-1.71	$\text{Ru}^{3+} + e \rightleftharpoons \text{Ru}^{2+}$	0.2487
$\text{H}_3\text{PO}_4 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{H}_3\text{PO}_3 + \text{H}_2\text{O}$	-0.276	$\text{RuO}_2 + 4 \text{H}^+ + 2 e \rightleftharpoons \text{Ru}^{2+} + 2 \text{H}_2\text{O}$	1.120
$\text{PO}_4^{3-} + 2 \text{H}_2\text{O} + 2 e \rightleftharpoons \text{HPO}_3^{2-} + 3 \text{OH}^-$	-1.05	$\text{RuO}_4^- + e \rightleftharpoons \text{RuO}_4^{2-}$	0.59
$\text{Pa}^{3+} + 3 e \rightleftharpoons \text{Pa}$	-1.34	$\text{RuO}_4 + e \rightleftharpoons \text{RuO}_4^-$	1.00
$\text{Pa}^{4+} + 4 e \rightleftharpoons \text{Pa}$	-1.49	$\text{RuO}_4 + 6 \text{H}^+ + 4 e \rightleftharpoons \text{Ru}(\text{OH})_2^{2+} + 2 \text{H}_2\text{O}$	1.40
$\text{Pa}^{4+} + e \rightleftharpoons \text{Pa}^{3+}$	-1.9	$\text{RuO}_4 + 8 \text{H}^+ + 8 e \rightleftharpoons \text{Ru} + 4 \text{H}_2\text{O}$	1.038
$\text{Pb}^{2+} + 2 e \rightleftharpoons \text{Pb}$	-0.1262	$[\text{Ru}(\text{bipy})_3]^{3+} + e^- \rightleftharpoons [\text{Ru}(\text{bipy})_3]^{2+}$	1.24
$\text{Pb}^{2+} + 2 e \rightleftharpoons \text{Pb}(\text{Hg})$	-0.1205	$[\text{Ru}(\text{H}_2\text{O})_6]^{3+} + e^- \rightleftharpoons [\text{Ru}(\text{H}_2\text{O})_6]^{2+}$	0.23
$\text{PbBr}_2 + 2 e \rightleftharpoons \text{Pb} + 2 \text{Br}^-$	-0.284	$[\text{Ru}(\text{NH}_3)_6]^{3+} + e^- \rightleftharpoons [\text{Ru}(\text{NH}_3)_6]^{2+}$	0.10
$\text{PbCl}_2 + 2 e \rightleftharpoons \text{Pb} + 2 \text{Cl}^-$	-0.2675	$[\text{Ru}(\text{en})_3]^{3+} + e^- \rightleftharpoons [\text{Ru}(\text{en})_3]^{2+}$	0.210
$\text{PbF}_2 + 2 e \rightleftharpoons \text{Pb} + 2 \text{F}^-$	-0.3444	$[\text{Ru}(\text{CN})_6]^{3-} + e^- \rightleftharpoons [\text{Ru}(\text{CN})_6]^{4-}$	0.86
$\text{PbHPO}_4 + 2 e \rightleftharpoons \text{Pb} + \text{HPO}_4^{2-}$	-0.465	$\text{S} + 2 e \rightleftharpoons \text{S}^{2-}$	-0.47627
$\text{PbI}_2 + 2 e \rightleftharpoons \text{Pb} + 2 \text{I}^-$	-0.365	$\text{S} + 2 \text{H}^+ + 2 e \rightleftharpoons \text{H}_2\text{S}(\text{aq})$	0.142
$\text{PbO} + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{Pb} + 2 \text{OH}^-$	-0.580	$\text{S} + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{SH}^- + \text{OH}^-$	-0.478
$\text{PbO}_2 + 4 \text{H}^+ + 2 e \rightleftharpoons \text{Pb}^{2+} + 2 \text{H}_2\text{O}$	1.455	$2 \text{S} + 2 e \rightleftharpoons \text{S}_2^{2-}$	-0.42836
$\text{HPbO}_2^- + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{Pb} + 3 \text{OH}^-$	-0.537	$\text{S}_2\text{O}_6^{2-} + 4 \text{H}^+ + 2 e \rightleftharpoons 2 \text{H}_2\text{SO}_3$	0.564
$\text{PbO}_2 + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{PbO} + 2 \text{OH}^-$	0.247	$\text{S}_2\text{O}_8^{2-} + 2 e \rightleftharpoons 2 \text{SO}_4^{2-}$	2.010
$\text{PbO}_2 + \text{SO}_4^{2-} + 4 \text{H}^+ + 2 e \rightleftharpoons \text{PbSO}_4 + 2 \text{H}_2\text{O}$	1.6913	$\text{S}_2\text{O}_8^{2-} + 2 \text{H}^+ + 2 e \rightleftharpoons 2 \text{HSO}_4^-$	2.123
$\text{PbSO}_4 + 2 e \rightleftharpoons \text{Pb} + \text{SO}_4^{2-}$	-0.3588	$\text{S}_4\text{O}_6^{2-} + 2 e \rightleftharpoons 2 \text{S}_2\text{O}_3^{2-}$	0.08
$\text{PbSO}_4 + 2 e \rightleftharpoons \text{Pb}(\text{Hg}) + \text{SO}_4^{2-}$	-0.3505	$2 \text{H}_2\text{SO}_3 + \text{H}^+ + 2 e \rightleftharpoons \text{HS}_2\text{O}_4^- + 2 \text{H}_2\text{O}$	-0.056
$\text{Pd}^{2+} + 2 e \rightleftharpoons \text{Pd}$	0.951	$\text{H}_2\text{SO}_3 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{S} + 3 \text{H}_2\text{O}$	0.449
$[\text{PdCl}_4]^{2-} + 2 e \rightleftharpoons \text{Pd} + 4 \text{Cl}^-$	0.591	$2 \text{SO}_3^{2-} + 2 \text{H}_2\text{O} + 2 e \rightleftharpoons \text{S}_2\text{O}_4^{2-} + 4 \text{OH}^-$	-1.12
$[\text{PdCl}_6]^{2-} + 2 e \rightleftharpoons [\text{PdCl}_4]^{2-} + 2 \text{Cl}^-$	1.288	$2 \text{SO}_3^{2-} + 3 \text{H}_2\text{O} + 4 e \rightleftharpoons \text{S}_2\text{O}_3^{2-} + 6 \text{OH}^-$	-0.571
$\text{Pd}(\text{OH})_2 + 2 e \rightleftharpoons \text{Pd} + 2 \text{OH}^-$	0.07	$\text{SO}_4^{2-} + 4 \text{H}^+ + 2 e \rightleftharpoons \text{H}_2\text{SO}_3 + \text{H}_2\text{O}$	0.172
$\text{Pm}^{2+} + 2 e \rightleftharpoons \text{Pm}$	-2.2	$2 \text{SO}_4^{2-} + 4 \text{H}^+ + 2 e \rightleftharpoons \text{S}_2\text{O}_6^{2-} + \text{H}_2\text{O}$	-0.22
$\text{Pm}^{3+} + 3 e \rightleftharpoons \text{Pm}$	-2.30	$\text{SO}_4^{2-} + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{SO}_3^{2-} + 2 \text{OH}^-$	-0.93
$\text{Pm}^{3+} + e \rightleftharpoons \text{Pm}^{2+}$	-2.6	$\text{Sb} + 3 \text{H}^+ + 3 e \rightleftharpoons \text{SbH}_3$	-0.510
$\text{Po}^{4+} + 2 e \rightleftharpoons \text{Po}^{2+}$	0.9	$\text{Sb}_2\text{O}_3 + 6 \text{H}^+ + 6 e \rightleftharpoons 2 \text{Sb} + 3 \text{H}_2\text{O}$	0.152
$\text{Po}^{4+} + 4 e \rightleftharpoons \text{Po}$	0.76	$\text{Sb}_2\text{O}_5$ (senarmontite) + $4 \text{H}^+ + 4 e \rightleftharpoons \text{Sb}_2\text{O}_3 + 2 \text{H}_2\text{O}$	0.671
$\text{Pr}^{4+} + e \rightleftharpoons \text{Pr}^{3+}$	3.2	$\text{Sb}_2\text{O}_5$ (valentinite) + $4 \text{H}^+ + 4 e \rightleftharpoons \text{Sb}_2\text{O}_3 + 2 \text{H}_2\text{O}$	0.649
$\text{Pr}^{2+} + 2 e \rightleftharpoons \text{Pr}$	-2.0		
$\text{Pr}^{3+} + 3 e \rightleftharpoons \text{Pr}$	-2.353		

Reaction	$E^\circ/V$
$\text{Sb}_2\text{O}_5 + 6 \text{H}^+ + 4 \text{e} \rightleftharpoons 2 \text{SbO}^+ + 3 \text{H}_2\text{O}$	0.581
$\text{SbO}^+ + 2 \text{H}^+ + 3 \text{e} \rightleftharpoons \text{Sb} + 2 \text{H}_2\text{O}$	0.212
$\text{SbO}_2^- + 2 \text{H}_2\text{O} + 3 \text{e} \rightleftharpoons \text{Sb} + 4 \text{OH}^-$	-0.66
$\text{SbO}_3^- + \text{H}_2\text{O} + 2 \text{e} \rightleftharpoons \text{SbO}_2^- + 2 \text{OH}^-$	-0.59
$\text{Sc}^{3+} + 3 \text{e} \rightleftharpoons \text{Sc}$	-2.077
$\text{Se} + 2 \text{e} \rightleftharpoons \text{Se}^{2-}$	-0.924
$\text{Se} + 2 \text{H}^+ + 2 \text{e} \rightleftharpoons \text{H}_2\text{Se}(\text{aq})$	-0.399
$\text{H}_2\text{SeO}_3 + 4 \text{H}^+ + 4 \text{e} \rightleftharpoons \text{Se} + 3 \text{H}_2\text{O}$	0.74
$\text{Se} + 2 \text{H}^+ + 2 \text{e} \rightleftharpoons \text{H}_2\text{Se}$	-0.082
$\text{SeO}_3^{2-} + 3 \text{H}_2\text{O} + 4 \text{e} \rightleftharpoons \text{Se} + 6 \text{OH}^-$	-0.366
$\text{SeO}_4^{2-} + 4 \text{H}^+ + 2 \text{e} \rightleftharpoons \text{H}_2\text{SeO}_3 + \text{H}_2\text{O}$	1.151
$\text{SeO}_4^{2-} + \text{H}_2\text{O} + 2 \text{e} \rightleftharpoons \text{SeO}_3^{2-} + 2 \text{OH}^-$	0.05
$\text{SiF}_6^{2-} + 4 \text{e} \rightleftharpoons \text{Si} + 6 \text{F}^-$	-1.24
$\text{SiO} + 2 \text{H}^+ + 2 \text{e} \rightleftharpoons \text{Si} + \text{H}_2\text{O}$	-0.8
$\text{SiO}_2$ (quartz) + 4 $\text{H}^+$ + 4 $\text{e} \rightleftharpoons \text{Si} + 2 \text{H}_2\text{O}$	0.857
$\text{SiO}_3^{2-} + 3 \text{H}_2\text{O} + 4 \text{e} \rightleftharpoons \text{Si} + 6 \text{OH}^-$	-1.697
$\text{Sm}^{3+} + \text{e} \rightleftharpoons \text{Sm}^{2+}$	-1.55
$\text{Sm}^{3+} + 3 \text{e} \rightleftharpoons \text{Sm}$	-2.304
$\text{Sm}^{2+} + 2 \text{e} \rightleftharpoons \text{Sm}$	-2.68
$\text{Sn}^{2+} + 2 \text{e} \rightleftharpoons \text{Sn}$	-0.1375
$\text{Sn}^{4+} + 2 \text{e} \rightleftharpoons \text{Sn}^{2+}$	0.151
$\text{Sn}(\text{OH})_3^+ + 3 \text{H}^+ + 2 \text{e} \rightleftharpoons \text{Sn}^{2+} + 3 \text{H}_2\text{O}$	0.142
$\text{SnO}_2 + 4 \text{H}^+ + 2 \text{e} \rightleftharpoons \text{Sn}^{2+} + 2 \text{H}_2\text{O}$	-0.094
$\text{SnO}_2 + 4 \text{H}^+ + 4 \text{e} \rightleftharpoons \text{Sn} + 2 \text{H}_2\text{O}$	-0.117
$\text{SnO}_2 + 3 \text{H}^+ + 2 \text{e} \rightleftharpoons \text{SnOH}^+ + \text{H}_2\text{O}$	-0.194
$\text{SnO}_2 + 2 \text{H}_2\text{O} + 4 \text{e} \rightleftharpoons \text{Sn} + 4 \text{OH}^-$	-0.945
$\text{HSnO}_2^- + \text{H}_2\text{O} + 2 \text{e} \rightleftharpoons \text{Sn} + 3 \text{OH}^-$	-0.909
$\text{Sn}(\text{OH})_6^{2-} + 2 \text{e} \rightleftharpoons \text{HSnO}_2^- + 3 \text{OH}^- + \text{H}_2\text{O}$	-0.93
$\text{Sr}^+ + \text{e} \rightleftharpoons \text{Sr}$	-4.10
$\text{Sr}^{2+} + 2 \text{e} \rightleftharpoons \text{Sr}$	-2.899
$\text{Sr}^{2+} + 2 \text{e} \rightleftharpoons \text{Sr}(\text{Hg})$	-1.793
$\text{Sr}(\text{OH})_2 + 2 \text{e} \rightleftharpoons \text{Sr} + 2 \text{OH}^-$	-2.88
$\text{Ta}_2\text{O}_5 + 10 \text{H}^+ + 10 \text{e} \rightleftharpoons 2 \text{Ta} + 5 \text{H}_2\text{O}$	-0.750
$\text{Ta}^{3+} + 3 \text{e} \rightleftharpoons \text{Ta}$	-0.6
$\text{Tc}^{2+} + 2 \text{e} \rightleftharpoons \text{Tc}$	0.400
$\text{TcO}_4^- + 4 \text{H}^+ + 3 \text{e} \rightleftharpoons \text{TcO}_2 + 2 \text{H}_2\text{O}$	0.782
$\text{Tc}^{3+} + \text{e} \rightleftharpoons \text{Tc}^{2+}$	0.3
$\text{TcO}_4^- + 8 \text{H}^+ + 7 \text{e} \rightleftharpoons \text{Tc} + 4 \text{H}_2\text{O}$	0.472
$\text{Tb}^{4+} + \text{e} \rightleftharpoons \text{Tb}^{3+}$	3.1
$\text{Tb}^{3+} + 3 \text{e} \rightleftharpoons \text{Tb}$	-2.28
$\text{Te} + 2 \text{e} \rightleftharpoons \text{Te}^{2-}$	-1.143
$\text{Te} + 2 \text{H}^+ + 2 \text{e} \rightleftharpoons \text{H}_2\text{Te}$	-0.793
$\text{Te}^{4+} + 4 \text{e} \rightleftharpoons \text{Te}$	0.568
$\text{TeO}_2 + 4 \text{H}^+ + 4 \text{e} \rightleftharpoons \text{Te} + 2 \text{H}_2\text{O}$	0.593
$\text{TeO}_3^{2-} + 3 \text{H}_2\text{O} + 4 \text{e} \rightleftharpoons \text{Te} + 6 \text{OH}^-$	-0.57
$\text{TeO}_4^- + 8 \text{H}^+ + 7 \text{e} \rightleftharpoons \text{Te} + 4 \text{H}_2\text{O}$	0.472
$\text{H}_6\text{TeO}_6 + 2 \text{H}^+ + 2 \text{e} \rightleftharpoons \text{TeO}_2 + 4 \text{H}_2\text{O}$	1.02
$\text{Th}^{4+} + 4 \text{e} \rightleftharpoons \text{Th}$	-1.899
$\text{ThO}_2 + 4 \text{H}^+ + 4 \text{e} \rightleftharpoons \text{Th} + 2 \text{H}_2\text{O}$	-1.789
$\text{Th}(\text{OH})_4 + 4 \text{e} \rightleftharpoons \text{Th} + 4 \text{OH}^-$	-2.48
$\text{Ti}^{2+} + 2 \text{e} \rightleftharpoons \text{Ti}$	-1.630
$\text{Ti}^{3+} + \text{e} \rightleftharpoons \text{Ti}^{2+}$	-0.9
$\text{TiO}_2 + 4 \text{H}^+ + 2 \text{e} \rightleftharpoons \text{Ti}^{2+} + 2 \text{H}_2\text{O}$	-0.502
$\text{Ti}^{3+} + 3 \text{e} \rightleftharpoons \text{Ti}$	-1.37
$\text{TiOH}^{3+} + \text{H}^+ + \text{e} \rightleftharpoons \text{Ti}^{3+} + \text{H}_2\text{O}$	-0.055

Reaction	$E^\circ/V$
$\text{Tl}^+ + \text{e} \rightleftharpoons \text{Tl}$	-0.336
$\text{Tl}^+ + \text{e} \rightleftharpoons \text{Tl}(\text{Hg})$	-0.3338
$\text{Tl}^{3+} + 2 \text{e} \rightleftharpoons \text{Tl}^+$	1.252
$\text{Tl}^{3+} + 3 \text{e} \rightleftharpoons \text{Tl}$	0.741
$\text{TlBr} + \text{e} \rightleftharpoons \text{Tl} + \text{Br}^-$	-0.658
$\text{TlCl} + \text{e} \rightleftharpoons \text{Tl} + \text{Cl}^-$	-0.5568
$\text{TlI} + \text{e} \rightleftharpoons \text{Tl} + \text{I}^-$	-0.752
$\text{Tl}_2\text{O}_3 + 3 \text{H}_2\text{O} + 4 \text{e} \rightleftharpoons 2 \text{Tl}^+ + 6 \text{OH}^-$	0.02
$\text{TlOH} + \text{e} \rightleftharpoons \text{Tl} + \text{OH}^-$	-0.34
$\text{Tl}(\text{OH})_3 + 2 \text{e} \rightleftharpoons \text{TlOH} + 2 \text{OH}^-$	-0.05
$\text{Tl}_2\text{SO}_4 + 2 \text{e} \rightleftharpoons \text{Tl} + \text{SO}_4^{2-}$	-0.4360
$\text{Tm}^{3+} + \text{e} \rightleftharpoons \text{Tm}^{2+}$	-2.2
$\text{Tm}^{3+} + 3 \text{e} \rightleftharpoons \text{Tm}$	-2.319
$\text{Tm}^{2+} + 2 \text{e} \rightleftharpoons \text{Tm}$	-2.4
$\text{U}^{3+} + 3 \text{e} \rightleftharpoons \text{U}$	-1.798
$\text{U}^{4+} + \text{e} \rightleftharpoons \text{U}^{3+}$	-0.607
$\text{UO}_2^+ + 4 \text{H}^+ + \text{e} \rightleftharpoons \text{U}^{4+} + 2 \text{H}_2\text{O}$	0.612
$\text{UO}_2^{2+} + \text{e} \rightleftharpoons \text{UO}_2^+$	0.062
$\text{UO}_2^{2+} + 4 \text{H}^+ + 2 \text{e} \rightleftharpoons \text{U}^{4+} + 2 \text{H}_2\text{O}$	0.327
$\text{UO}_2^{2+} + 4 \text{H}^+ + 6 \text{e} \rightleftharpoons \text{U} + 2 \text{H}_2\text{O}$	-1.444
$\text{V}^{2+} + 2 \text{e} \rightleftharpoons \text{V}$	-1.175
$\text{V}^{3+} + \text{e} \rightleftharpoons \text{V}^{2+}$	-0.255
$\text{VO}^{2+} + 2 \text{H}^+ + \text{e} \rightleftharpoons \text{V}^{3+} + \text{H}_2\text{O}$	0.337
$\text{VO}_2^+ + 2 \text{H}^+ + \text{e} \rightleftharpoons \text{VO}^{2+} + \text{H}_2\text{O}$	0.991
$\text{V}_2\text{O}_5 + 6 \text{H}^+ + 2 \text{e} \rightleftharpoons 2 \text{VO}^{2+} + 3 \text{H}_2\text{O}$	0.957
$\text{V}_2\text{O}_5 + 10 \text{H}^+ + 10 \text{e} \rightleftharpoons 2 \text{V} + 5 \text{H}_2\text{O}$	-0.242
$\text{V}(\text{OH})_4^+ + 2 \text{H}^+ + \text{e} \rightleftharpoons \text{VO}^{2+} + 3 \text{H}_2\text{O}$	1.00
$\text{V}(\text{OH})_4^+ + 4 \text{H}^+ + 5 \text{e} \rightleftharpoons \text{V} + 4 \text{H}_2\text{O}$	-0.254
$[\text{V}(\text{phen})_3]^{3+} + \text{e} \rightleftharpoons [\text{V}(\text{phen})_3]^{2+}$	0.14
$\text{W}^{3+} + 3 \text{e} \rightleftharpoons \text{W}$	0.1
$\text{W}_2\text{O}_5 + 2 \text{H}^+ + 2 \text{e} \rightleftharpoons 2 \text{WO}_2 + \text{H}_2\text{O}$	-0.031
$\text{WO}_2 + 4 \text{H}^+ + 4 \text{e} \rightleftharpoons \text{W} + 2 \text{H}_2\text{O}$	-0.119
$\text{WO}_3 + 6 \text{H}^+ + 6 \text{e} \rightleftharpoons \text{W} + 3 \text{H}_2\text{O}$	-0.090
$\text{WO}_3 + 2 \text{H}^+ + 2 \text{e} \rightleftharpoons \text{WO}_2 + \text{H}_2\text{O}$	0.036
$2 \text{WO}_3 + 2 \text{H}^+ + 2 \text{e} \rightleftharpoons \text{W}_2\text{O}_5 + \text{H}_2\text{O}$	-0.029
$\text{H}_4\text{XeO}_6 + 2 \text{H}^+ + 2 \text{e} \rightleftharpoons \text{XeO}_3 + 3 \text{H}_2\text{O}$	2.42
$\text{XeO}_3 + 6 \text{H}^+ + 6 \text{e} \rightleftharpoons \text{Xe} + 3 \text{H}_2\text{O}$	2.10
$\text{XeF} + \text{e} \rightleftharpoons \text{Xe} + \text{F}^-$	3.4
$\text{Y}^{3+} + 3 \text{e} \rightleftharpoons \text{Y}$	-2.372
$\text{Yb}^{3+} + \text{e} \rightleftharpoons \text{Yb}^{2+}$	-1.05
$\text{Yb}^{3+} + 3 \text{e} \rightleftharpoons \text{Yb}$	-2.19
$\text{Yb}^{2+} + 2 \text{e} \rightleftharpoons \text{Yb}$	-2.76
$\text{Zn}^{2+} + 2 \text{e} \rightleftharpoons \text{Zn}$	-0.7618
$\text{Zn}^{2+} + 2 \text{e} \rightleftharpoons \text{Zn}(\text{Hg})$	-0.7628
$\text{ZnO}_2^{2-} + 2 \text{H}_2\text{O} + 2 \text{e} \rightleftharpoons \text{Zn} + 4 \text{OH}^-$	-1.215
$\text{ZnSO}_4 \cdot 7 \text{H}_2\text{O} + 2 \text{e} \rightleftharpoons \text{Zn}(\text{Hg}) + \text{SO}_4^{2-} + 7 \text{H}_2\text{O}$ (Saturated $\text{ZnSO}_4$ )	-0.7993
$\text{ZnOH}^+ + \text{H}^+ + 2 \text{e} \rightleftharpoons \text{Zn} + \text{H}_2\text{O}$	-0.497
$\text{Zn}(\text{OH})_4^{2-} + 2 \text{e} \rightleftharpoons \text{Zn} + 4 \text{OH}^-$	-1.199
$\text{Zn}(\text{OH})_2 + 2 \text{e} \rightleftharpoons \text{Zn} + 2 \text{OH}^-$	-1.249
$\text{ZnO} + \text{H}_2\text{O} + 2 \text{e} \rightleftharpoons \text{Zn} + 2 \text{OH}^-$	-1.260
$\text{ZrO}_2 + 4 \text{H}^+ + 4 \text{e} \rightleftharpoons \text{Zr} + 2 \text{H}_2\text{O}$	-1.553
$\text{ZrO}(\text{OH})_2 + \text{H}_2\text{O} + 4 \text{e} \rightleftharpoons \text{Zr} + 4 \text{OH}^-$	-2.36
$\text{Zr}^{4+} + 4 \text{e} \rightleftharpoons \text{Zr}$	-1.45

TABLE 2. Reduction Reactions Having  $E^\circ$  Values More Positive than That of the Standard Hydrogen Electrode

Reaction	$E^\circ/V$	Reaction	$E^\circ/V$
$2\text{H}^+ + 2\text{e} \rightleftharpoons \text{H}_2$	0.00000	$\text{Hg}_2\text{Cl}_2 + 2\text{e} \rightleftharpoons 2\text{Hg} + 2\text{Cl}^-$	0.26808
$\text{CuI}_2^- + \text{e} \rightleftharpoons \text{Cu} + 2\text{I}^-$	0.00	Calomel electrode, 1 molal KCl	0.2800
$\text{Ge}^{4+} + 2\text{e} \rightleftharpoons \text{Ge}^{2+}$	0.00	Calomel electrode, 1 molar KCl (NCE)	0.2801
$\text{NO}_3^- + \text{H}_2\text{O} + 2\text{e} \rightleftharpoons \text{NO}_2^- + 2\text{OH}^-$	0.01	$\text{At}_2 + 2\text{e} \rightleftharpoons 2\text{At}^-$	0.3
$\text{Tl}_2\text{O}_3 + 3\text{H}_2\text{O} + 4\text{e} \rightleftharpoons 2\text{Tl}^+ + 6\text{OH}^-$	0.02	$\text{Re}^{3+} + 3\text{e} \rightleftharpoons \text{Re}$	0.300
$\text{SeO}_4^{2-} + \text{H}_2\text{O} + 2\text{e} \rightleftharpoons \text{SeO}_3^{2-} + 2\text{OH}^-$	0.05	$\text{Tc}^{3+} + \text{e} \rightleftharpoons \text{Tc}^{2+}$	0.3
$\text{WO}_3 + 2\text{H}^+ + 2\text{e} \rightleftharpoons \text{WO}_2 + \text{H}_2\text{O}$	0.036	$\text{Bi}^{3+} + 3\text{e} \rightleftharpoons \text{Bi}$	0.308
$\text{UO}_2^{2+} + \text{e} \rightleftharpoons \text{UO}_2^+$	0.062	$\text{BiO}^+ + 2\text{H}^+ + 3\text{e} \rightleftharpoons \text{Bi} + \text{H}_2\text{O}$	0.320
$\text{Pd}(\text{OH})_2 + 2\text{e} \rightleftharpoons \text{Pd} + 2\text{OH}^-$	0.07	$\text{UO}_2^{2+} + 4\text{H}^+ + 2\text{e} \rightleftharpoons \text{U}^{4+} + 2\text{H}_2\text{O}$	0.327
$\text{AgBr} + \text{e} \rightleftharpoons \text{Ag} + \text{Br}^-$	0.07133	$\text{ClO}_3^- + \text{H}_2\text{O} + 2\text{e} \rightleftharpoons \text{ClO}_2^- + 2\text{OH}^-$	0.33
$\text{MoO}_3 + 6\text{H}^+ + 6\text{e} \rightleftharpoons \text{Mo} + 3\text{H}_2\text{O}$	0.075	$2\text{HCNO} + 2\text{H}^+ + 2\text{e} \rightleftharpoons (\text{CN})_2 + 2\text{H}_2\text{O}$	0.330
$\text{S}_4\text{O}_6^{2-} + 2\text{e} \rightleftharpoons 2\text{S}_2\text{O}_3^{2-}$	0.08	Calomel electrode, 0.1 molar KCl	0.3337
$\text{H}_3\text{Mo}_7\text{O}_{24}^{3-} + 45\text{H}^+ + 42\text{e} \rightleftharpoons 7\text{Mo} + 24\text{H}_2\text{O}$	0.082	$\text{VO}^{2+} + 2\text{H}^+ + \text{e} \rightleftharpoons \text{V}^{3+} + \text{H}_2\text{O}$	0.337
$\text{AgSCN} + \text{e} \rightleftharpoons \text{Ag} + \text{SCN}^-$	0.8951	$\text{Cu}^{2+} + 2\text{e} \rightleftharpoons \text{Cu}$	0.3419
$\text{N}_2 + 2\text{H}_2\text{O} + 6\text{H}^+ + 6\text{e} \rightleftharpoons 2\text{NH}_4\text{OH}$	0.092	$\text{Ag}_2\text{O} + \text{H}_2\text{O} + 2\text{e} \rightleftharpoons 2\text{Ag} + 2\text{OH}^-$	0.342
$\text{HgO} + \text{H}_2\text{O} + 2\text{e} \rightleftharpoons \text{Hg} + 2\text{OH}^-$	0.0977	$\text{Cu}^{2+} + 2\text{e} \rightleftharpoons \text{Cu}(\text{Hg})$	0.345
$\text{Ir}_2\text{O}_3 + 3\text{H}_2\text{O} + 6\text{e} \rightleftharpoons 2\text{Ir} + 6\text{OH}^-$	0.098	$\text{AgIO}_3 + \text{e} \rightleftharpoons \text{Ag} + \text{IO}_3^-$	0.354
$2\text{NO} + 2\text{e} \rightleftharpoons \text{N}_2\text{O}_2^{2-}$	0.10	$[\text{Fe}(\text{CN})_6]^{3-} + \text{e} \rightleftharpoons [\text{Fe}(\text{CN})_6]^{4-}$	0.358
$[\text{Ru}(\text{NH}_3)_6]^{3+} + \text{e} \rightleftharpoons [\text{Ru}(\text{NH}_3)_6]^{2+}$	0.10	$\text{ClO}_4^- + \text{H}_2\text{O} + 2\text{e} \rightleftharpoons \text{ClO}_3^- + 2\text{OH}^-$	0.36
$\text{W}^{3+} + 3\text{e} \rightleftharpoons \text{W}$	0.1	$\text{Ag}_2\text{SeO}_3 + 2\text{e} \rightleftharpoons 2\text{Ag} + \text{SeO}_3^{2-}$	0.3629
$[\text{Co}(\text{NH}_3)_6]^{3+} + \text{e} \rightleftharpoons [\text{Co}(\text{NH}_3)_6]^{2+}$	0.108	$\text{ReO}_4^- + 8\text{H}^+ + 7\text{e} \rightleftharpoons \text{Re} + 4\text{H}_2\text{O}$	0.368
$\text{Hg}_2\text{O} + \text{H}_2\text{O} + 2\text{e} \rightleftharpoons 2\text{Hg} + 2\text{OH}^-$	0.123	$(\text{CN})_2 + 2\text{H}^+ + 2\text{e} \rightleftharpoons 2\text{HCN}$	0.373
$\text{Ge}^{4+} + 4\text{e} \rightleftharpoons \text{Ge}$	0.124	$[\text{Ferraricinium}]^+ + \text{e} \rightleftharpoons \text{ferrocene}$	0.400
$\text{Hg}_2\text{Br}_2 + 2\text{e} \rightleftharpoons 2\text{Hg} + 2\text{Br}^-$	0.13923	$\text{Tc}^{2+} + 2\text{e} \rightleftharpoons \text{Tc}$	0.400
$\text{Pt}(\text{OH})_2 + 2\text{e} \rightleftharpoons \text{Pt} + 2\text{OH}^-$	0.14	$\text{O}_2 + 2\text{H}_2\text{O} + 4\text{e} \rightleftharpoons 4\text{OH}^-$	0.401
$[\text{V}(\text{phen})_3]^{3+} + \text{e} \rightleftharpoons [\text{V}(\text{phen})_3]^{2+}$	0.14	$\text{AgOCN} + \text{e} \rightleftharpoons \text{Ag} + \text{OCN}^-$	0.41
$\text{S} + 2\text{H}^+ + 2\text{e} \rightleftharpoons \text{H}_2\text{S}(\text{aq})$	0.142	$[\text{RhCl}_6]^{3-} + 3\text{e} \rightleftharpoons \text{Rh} + 6\text{Cl}^-$	0.431
$\text{Sn}(\text{OH})_3^+ + 3\text{H}^+ + 2\text{e} \rightleftharpoons \text{Sn}^{2+} + 3\text{H}_2\text{O}$	0.142	$\text{Ag}_2\text{CrO}_4 + 2\text{e} \rightleftharpoons 2\text{Ag} + \text{CrO}_4^{2-}$	0.4470
$\text{Np}^{4+} + \text{e} \rightleftharpoons \text{Np}^{3+}$	0.147	$\text{H}_2\text{SO}_3 + 4\text{H}^+ + 4\text{e} \rightleftharpoons \text{S} + 3\text{H}_2\text{O}$	0.449
$\text{Ag}_4[\text{Fe}(\text{CN})_6] + 4\text{e} \rightleftharpoons 4\text{Ag} + [\text{Fe}(\text{CN})_6]^{4-}$	0.1478	$\text{Ru}^{2+} + 2\text{e} \rightleftharpoons \text{Ru}$	0.455
$\text{IO}_3^- + 2\text{H}_2\text{O} + 4\text{e} \rightleftharpoons \text{IO}^- + 4\text{OH}^-$	0.15	$\text{Ag}_2\text{MoO}_4 + 2\text{e} \rightleftharpoons 2\text{Ag} + \text{MoO}_4^{2-}$	0.4573
$\text{Mn}(\text{OH})_3 + \text{e} \rightleftharpoons \text{Mn}(\text{OH})_2 + \text{OH}^-$	0.15	$\text{Ag}_2\text{C}_2\text{O}_4 + 2\text{e} \rightleftharpoons 2\text{Ag} + \text{C}_2\text{O}_4^{2-}$	0.4647
$2\text{NO}_2^- + 3\text{H}_2\text{O} + 4\text{e} \rightleftharpoons \text{N}_2\text{O} + 6\text{OH}^-$	0.15	$\text{Ag}_2\text{WO}_4 + 2\text{e} \rightleftharpoons 2\text{Ag} + \text{WO}_4^{2-}$	0.4660
$\text{Sn}^{4+} + 2\text{e} \rightleftharpoons \text{Sn}^{2+}$	0.151	$\text{Ag}_2\text{CO}_3 + 2\text{e} \rightleftharpoons 2\text{Ag} + \text{CO}_3^{2-}$	0.47
$\text{Sb}_2\text{O}_3 + 6\text{H}^+ + 6\text{e} \rightleftharpoons 2\text{Sb} + 3\text{H}_2\text{O}$	0.152	$\text{TcO}_4^- + 8\text{H}^+ + 7\text{e} \rightleftharpoons \text{Tc} + 4\text{H}_2\text{O}$	0.472
$\text{Cu}^{2+} + \text{e} \rightleftharpoons \text{Cu}^+$	0.153	$\text{TeO}_4^- + 8\text{H}^+ + 7\text{e} \rightleftharpoons \text{Te} + 4\text{H}_2\text{O}$	0.472
$\text{BiOCl} + 2\text{H}^+ + 3\text{e} \rightleftharpoons \text{Bi} + \text{Cl}^- + \text{H}_2\text{O}$	0.1583	$\text{IO}^- + \text{H}_2\text{O} + 2\text{e} \rightleftharpoons \text{I}^- + 2\text{OH}^-$	0.485
$\text{BiCl}_4^- + 3\text{e} \rightleftharpoons \text{Bi} + 4\text{Cl}^-$	0.16	$\text{NiO}_2 + 2\text{H}_2\text{O} + 2\text{e} \rightleftharpoons \text{Ni}(\text{OH})_2 + 2\text{OH}^-$	0.490
$\text{Fe}_2\text{O}_3 + 4\text{H}^+ + 2\text{e} \rightleftharpoons 2\text{FeOH}^+ + \text{H}_2\text{O}$	0.16	$\text{Bi}^+ + \text{e} \rightleftharpoons \text{Bi}$	0.5
$\text{Co}(\text{OH})_3 + \text{e} \rightleftharpoons \text{Co}(\text{OH})_2 + \text{OH}^-$	0.17	$\text{ReO}_4^- + 4\text{H}^+ + 3\text{e} \rightleftharpoons \text{ReO}_2 + 2\text{H}_2\text{O}$	0.510
$\text{SO}_4^{2-} + 4\text{H}^+ + 2\text{e} \rightleftharpoons \text{H}_2\text{SO}_3 + \text{H}_2\text{O}$	0.172	$\text{Hg}_2(\text{ac})_2 + 2\text{e} \rightleftharpoons 2\text{Hg} + 2(\text{ac})^-$	0.51163
$\text{Bi}^{3+} + 2\text{e} \rightleftharpoons \text{Bi}^+$	0.2	$\text{Cu}^+ + \text{e} \rightleftharpoons \text{Cu}$	0.521
$[\text{Ru}(\text{en})_3]^{3+} + \text{e} \rightleftharpoons [\text{Ru}(\text{en})_3]^{2+}$	0.210	$\text{I}_2 + 2\text{e} \rightleftharpoons 2\text{I}^-$	0.5355
$\text{SbO}^+ + 2\text{H}^+ + 3\text{e} \rightleftharpoons \text{Sb} + 2\text{H}_2\text{O}$	0.212	$\text{I}_3^- + 2\text{e} \rightleftharpoons 3\text{I}^-$	0.536
$\text{AgCl} + \text{e} \rightleftharpoons \text{Ag} + \text{Cl}^-$	0.22233	$\text{AgBrO}_3 + \text{e} \rightleftharpoons \text{Ag} + \text{BrO}_3^-$	0.546
$[\text{Ru}(\text{H}_2\text{O})_6]^{3+} + \text{e} \rightleftharpoons [\text{Ru}(\text{H}_2\text{O})_6]^{2+}$	0.23	$\text{MnO}_4^- + \text{e} \rightleftharpoons \text{MnO}_4^{2-}$	0.558
$\text{As}_2\text{O}_3 + 6\text{H}^+ + 6\text{e} \rightleftharpoons 2\text{As} + 3\text{H}_2\text{O}$	0.234	$\text{H}_3\text{AsO}_4 + 2\text{H}^+ + 2\text{e} \rightleftharpoons \text{HAsO}_2 + 2\text{H}_2\text{O}$	0.560
Calomel electrode, saturated NaCl (SSCE)	0.2360	$\text{S}_2\text{O}_6^{2-} + 4\text{H}^+ + 2\text{e} \rightleftharpoons 2\text{H}_2\text{SO}_3$	0.564
$\text{Ge}^{2+} + 2\text{e} \rightleftharpoons \text{Ge}$	0.24	$\text{AgNO}_2 + \text{e} \rightleftharpoons \text{Ag} + \text{NO}_2^-$	0.564
$\text{Ru}^{3+} + \text{e} \rightleftharpoons \text{Ru}^{2+}$	0.24	$\text{Te}^{4+} + 4\text{e} \rightleftharpoons \text{Te}$	0.568
Calomel electrode, saturated KCl	0.2412	$\text{Sb}_2\text{O}_3 + 6\text{H}^+ + 4\text{e} \rightleftharpoons 2\text{SbO}^+ + 3\text{H}_2\text{O}$	0.581
$\text{PbO}_2 + \text{H}_2\text{O} + 2\text{e} \rightleftharpoons \text{PbO} + 2\text{OH}^-$	0.247	$\text{RuO}_4^- + \text{e} \rightleftharpoons \text{RuO}_4^{2-}$	0.59
$\text{HAsO}_2 + 3\text{H}^+ + 3\text{e} \rightleftharpoons \text{As} + 2\text{H}_2\text{O}$	0.248	$[\text{PdCl}_4]^{2-} + 2\text{e} \rightleftharpoons \text{Pd} + 4\text{Cl}^-$	0.591
$\text{Ru}^{3+} + \text{e} \rightleftharpoons \text{Ru}^{2+}$	0.2487	$\text{TeO}_2 + 4\text{H}^+ + 4\text{e} \rightleftharpoons \text{Te} + 2\text{H}_2\text{O}$	0.593
$\text{ReO}_2 + 4\text{H}^+ + 4\text{e} \rightleftharpoons \text{Re} + 2\text{H}_2\text{O}$	0.2513	$\text{MnO}_4^- + 2\text{H}_2\text{O} + 3\text{e} \rightleftharpoons \text{MnO}_2 + 4\text{OH}^-$	0.595
$\text{IO}_3^- + 3\text{H}_2\text{O} + 6\text{e} \rightleftharpoons \text{I}^- + \text{OH}^-$	0.26	$\text{Rh}^{2+} + 2\text{e} \rightleftharpoons \text{Rh}$	0.600

Reaction	$E^{\circ}/V$	Reaction	$E^{\circ}/V$
$Rh^{+} + e \rightleftharpoons Rh$	0.600	$HIO + H^{+} + 2e \rightleftharpoons I^{-} + H_2O$	0.987
$MnO_4^{2-} + 2H_2O + 2e \rightleftharpoons MnO_2 + 4OH^{-}$	0.60	$VO_2^{+} + 2H^{+} + e \rightleftharpoons VO^{2+} + H_2O$	0.991
$2AgO + H_2O + 2e \rightleftharpoons Ag_2O + 2OH^{-}$	0.607	$PtO_2 + 4H^{+} + 4e \rightleftharpoons Pt + 2H_2O$	1.00
$BrO_3^{-} + 3H_2O + 6e \rightleftharpoons Br^{-} + 6OH^{-}$	0.61	$RuO_4 + e \rightleftharpoons RuO_4^{-}$	1.00
$UO_2^{+} + 4H^{+} + e \rightleftharpoons U^{4+} + 2H_2O$	0.612	$V(OH)_4^{+} + 2H^{+} + e \rightleftharpoons VO^{2+} + 3H_2O$	1.00
$Hg_2SO_4 + 2e \rightleftharpoons 2Hg + SO_4^{2-}$	0.6125	$AuCl_4^{-} + 3e \rightleftharpoons Au + 4Cl^{-}$	1.002
$ClO_3^{-} + 3H_2O + 6e \rightleftharpoons Cl^{-} + 6OH^{-}$	0.62	$Pu^{4+} + e \rightleftharpoons Pu^{3+}$	1.006
$Hg_2HPO_4 + 2e \rightleftharpoons 2Hg + HPO_4^{2-}$	0.6359	$PtO_2 + 2H^{+} + 2e \rightleftharpoons PtO + H_2O$	1.01
$Ag(ac) + e \rightleftharpoons Ag + (ac)^{-}$	0.643	$OsO_4 + 4H + 4e \rightleftharpoons OsO_2 + 2H_2O$	1.02
$Sb_2O_5(\text{valentinite}) + 4H^{+} + 4e \rightleftharpoons Sb_2O_3 + 2H_2O$	0.649	$H_6TeO_6 + 2H^{+} + 2e \rightleftharpoons TeO_2 + 4H_2O$	1.02
$Ag_2SO_4 + 2e \rightleftharpoons 2Ag + SO_4^{2-}$	0.654	$[Fe(bipy)_3]^{3+} + e \rightleftharpoons [Fe(bipy)_3]^{2+}$	1.03
$ClO_2^{-} + H_2O + 2e \rightleftharpoons ClO^{-} + 2OH^{-}$	0.66	$Hg(OH)_2 + 2H^{+} + 2e \rightleftharpoons Hg + 2H_2O$	1.034
$Sb_2O_5(\text{senarmontite}) + 4H^{+} + 4e \rightleftharpoons Sb_2O_3 + 2H_2O$	0.671	$N_2O_4 + 4H^{+} + 4e \rightleftharpoons 2NO + 2H_2O$	1.035
$[PtCl_6]^{2-} + 2e \rightleftharpoons [PtCl_4]^{2-} + 2Cl^{-}$	0.68	$RuO_4 + 8H^{+} + 8e \rightleftharpoons Ru + 4H_2O$	1.038
$O_2 + 2H^{+} + 2e \rightleftharpoons H_2O_2$	0.695	$[Fe(phen)_3]^{3+} + e \rightleftharpoons [Fe(phen)_3]^{2+}$ (1 molar $H_2SO_4$ )	1.06
$p$ -benzoquinone + $2H^{+} + 2e \rightleftharpoons$ hydroquinone	0.6992	$PuO_2(OH)_2 + H^{+} + e \rightleftharpoons PuO_2OH + H_2O$	1.062
$H_3IO_6^{2-} + 2e \rightleftharpoons IO_3^{-} + 3OH^{-}$	0.7	$N_2O_4 + 2H^{+} + 2e \rightleftharpoons 2HNO_2$	1.065
$Ag_2O_3 + H_2O + 2e \rightleftharpoons 2AgO + 2OH^{-}$	0.739	$Br_2(l) + 2e \rightleftharpoons 2Br^{-}$	1.066
$Tl^{3+} + 3e \rightleftharpoons Tl$	0.741	$IO_3^{-} + 6H^{+} + 6e \rightleftharpoons I^{-} + 3H_2O$	1.085
$[PtCl_4]^{2-} + 2e \rightleftharpoons Pt + 4Cl^{-}$	0.755	$Br_2(aq) + 2e \rightleftharpoons 2Br^{-}$	1.0873
$Rh^{3+} + 3e \rightleftharpoons Rh$	0.758	$Pu^{5+} + e \rightleftharpoons Pu^{4+}$	1.099
$ClO_2^{-} + 2H_2O + 4e \rightleftharpoons Cl^{-} + 4OH^{-}$	0.76	$Cu^{2+} + 2CN^{-} + e \rightleftharpoons [Cu(CN)_2]^{-}$	1.103
$2NO + H_2O + 2e \rightleftharpoons N_2O + 2OH^{-}$	0.76	$RuO_2 + 4H^{+} + 2e \rightleftharpoons Ru^{2+} + 2H_2O$	1.120
$Po^{4+} + 4e \rightleftharpoons Po$	0.76	$[Fe(phen)_3]^{3+} + e \rightleftharpoons [Fe(phen)_3]^{2+}$	1.147
$BrO^{-} + H_2O + 2e \rightleftharpoons Br^{-} + 2OH^{-}$	0.761	$SeO_4^{2-} + 4H^{+} + 2e \rightleftharpoons H_2SeO_3 + H_2O$	1.151
$ReO_4^{-} + 2H^{+} + e \rightleftharpoons ReO_3 + H_2O$	0.768	$ClO_3^{-} + 2H^{+} + e \rightleftharpoons ClO_2 + H_2O$	1.152
$(CNS)_2 + 2e \rightleftharpoons 2CNS^{-}$	0.77	$Ir^{3+} + 3e \rightarrow Ir$	1.156
$[IrCl_6]^{3-} + 3e \rightleftharpoons Ir + 6Cl^{-}$	0.77	$Pt^{2+} + 2e \rightleftharpoons Pt$	1.18
$Fe^{3+} + e \rightleftharpoons Fe^{2+}$	0.771	$ClO_4^{-} + 2H^{+} + 2e \rightleftharpoons ClO_3^{-} + H_2O$	1.189
$AgF + e \rightleftharpoons Ag + F^{-}$	0.779	$2IO_3^{-} + 12H^{+} + 10e \rightleftharpoons I_2 + 6H_2O$	1.195
$[Fe(bipy)_2]^{3+} + e \rightleftharpoons [Fe(bipy)_2]^{2+}$	0.78	$PtOH^{+} + H^{+} + 2e \rightleftharpoons Pt + H_2O$	1.2
$TcO_4^{-} + 4H^{+} + 3e \rightleftharpoons TcO_2 + 2H_2O$	0.782	$ClO_3^{-} + 3H^{+} + 2e \rightleftharpoons HClO_2 + H_2O$	1.214
$Hg_2^{2+} + 2e \rightleftharpoons 2Hg$	0.7973	$MnO_2 + 4H^{+} + 2e \rightleftharpoons Mn^{2+} + 2H_2O$	1.224
$Ag^{+} + e \rightleftharpoons Ag$	0.7996	$O_2 + 4H^{+} + 4e \rightleftharpoons 2H_2O$	1.229
$[Os(bipy)_3]^{3+} + e \rightleftharpoons [Os(bipy)_3]^{2+}$	0.80	$O_3 + H_2O + 2e \rightleftharpoons O_2 + 2OH^{-}$	1.24
$2NO_3^{-} + 4H^{+} + 2e \rightleftharpoons N_2O_4 + 2H_2O$	0.803	$[Ru(bipy)_3]^{3+} + e \rightleftharpoons [Ru(bipy)_3]^{2+}$	1.24
$[Os(bipy)_2]^{3+} + e \rightleftharpoons [Os(bipy)_2]^{2+}$	0.81	$Tl^{3+} + 2e \rightleftharpoons Tl^{+}$	1.252
$RhOH^{2+} + H + 3e \rightleftharpoons Rh + H_2O$	0.83	$N_2H_5^{+} + 3H^{+} + 2e \rightleftharpoons 2NH_4^{+}$	1.275
$OsO_4 + 8H^{+} + 8e \rightleftharpoons Os + 4H_2O$	0.838	$ClO_2 + H^{+} + e \rightleftharpoons HClO_2$	1.277
$ClO^{-} + H_2O + 2e \rightleftharpoons Cl^{-} + 2OH^{-}$	0.841	$[PdCl_6]^{2-} + 2e \rightleftharpoons [PdCl_4]^{2-} + 2Cl^{-}$	1.288
$Hg_2^{2+} + 2e \rightleftharpoons Hg$	0.851	$2HNO_2 + 4H^{+} + 4e \rightleftharpoons N_2O + 3H_2O$	1.297
$AuBr_4^{-} + 3e \rightleftharpoons Au + 4Br^{-}$	0.854	$AuOH^{2+} + H^{+} + 2e \rightleftharpoons Au^{+} + H_2O$	1.32
$SiO_2(\text{quartz}) + 4H^{+} + 4e \rightleftharpoons Si + 2H_2O$	0.857	$PuO_2(OH)_2 + 2H^{+} + 2e \rightleftharpoons Pu(OH)_4$	1.325
$2HNO_2 + 4H^{+} + 4e \rightleftharpoons H_2N_2O_2 + H_2O$	0.86	$HBrO + H^{+} + 2e \rightleftharpoons Br^{-} + H_2O$	1.331
$[Ru(CN)_6]^{3-} + e^{-} \rightleftharpoons [Ru(CN)_6]^{4-}$	0.86	$Cr(V) + e \rightleftharpoons Cr(IV)$	1.34
$[IrCl_6]^{2-} + e \rightleftharpoons [IrCl_6]^{3-}$	0.8665	$HCrO_4^{-} + 7H^{+} + 3e \rightleftharpoons Cr^{3+} + 4H_2O$	1.350
$N_2O_4 + 2e \rightleftharpoons 2NO_2^{-}$	0.867	$Cl_2(g) + 2e \rightleftharpoons 2Cl^{-}$	1.35827
$HO_2^{-} + H_2O + 2e \rightleftharpoons 3OH^{-}$	0.878	$Cr_2O_7^{2-} + 14H^{+} + 6e \rightleftharpoons 2Cr^{3+} + 7H_2O$	1.36
$Po^{4+} + 2e \rightleftharpoons Po^{2+}$	0.9	$ClO_4^{-} + 8H^{+} + 8e \rightleftharpoons Cl^{-} + 4H_2O$	1.389
$2Hg_2^{2+} + 2e \rightleftharpoons Hg_2^{2+}$	0.920	$ClO_4^{-} + 8H^{+} + 7e \rightleftharpoons 1/2Cl_2 + 4H_2O$	1.39
$NO_3^{-} + 3H^{+} + 2e \rightleftharpoons HNO_2 + H_2O$	0.934	$No^{3+} + e \rightleftharpoons No^{2+}$	1.4
$Pd^{2+} + 2e \rightleftharpoons Pd$	0.951	$RuO_4 + 6H^{+} + 4e \rightleftharpoons Ru(OH)_2^{2+} + 2H_2O$	1.40
$ClO_2(aq) + e \rightleftharpoons ClO_2^{-}$	0.954	$Au^{3+} + 2e \rightleftharpoons Au^{+}$	1.401
$NO_3^{-} + 4H^{+} + 3e \rightleftharpoons NO + 2H_2O$	0.957	$2NH_3OH^{+} + H^{+} + 2e \rightleftharpoons N_2H_5^{+} + 2H_2O$	1.42
$V_2O_5 + 6H^{+} + 2e \rightleftharpoons 2VO^{2+} + 3H_2O$	0.957	$BrO_3^{-} + 6H^{+} + 6e \rightleftharpoons Br^{-} + 3H_2O$	1.423
$AuBr_2^{-} + e \rightleftharpoons Au + 2Br^{-}$	0.959	$2HIO + 2H^{+} + 2e \rightleftharpoons I_2 + 2H_2O$	1.439
$HNO_2 + H^{+} + e \rightleftharpoons NO + H_2O$	0.983	$Au(OH)_3 + 3H^{+} + 3e \rightleftharpoons Au^{-} + 3H_2O$	1.45

Reaction	$E^\circ/V$	Reaction	$E^\circ/V$
$3\text{IO}_3^- + 6\text{H}^+ + 6\text{e} \rightleftharpoons \text{Cl}^- + 3\text{H}_2\text{O}$	1.451	$\text{Ag}^{3+} + \text{e} \rightleftharpoons \text{Ag}^{2+}$	1.8
$\text{PbO}_2 + 4\text{H}^+ + 2\text{e} \rightleftharpoons \text{Pb}^{2+} + 2\text{H}_2\text{O}$	1.455	$\text{Au}^{2+} + \text{e}^- \rightleftharpoons \text{Au}^+$	1.8
$\text{ClO}_3^- + 6\text{H}^+ + 5\text{e} \rightleftharpoons 1/2\text{Cl}_2 + 3\text{H}_2\text{O}$	1.47	$\text{Ag}_2\text{O}_2 + 4\text{H}^+ + \text{e} \rightleftharpoons 2\text{Ag} + 2\text{H}_2\text{O}$	1.802
$\text{CrO}_2 + 4\text{H}^+ + \text{e} \rightleftharpoons \text{Cr}^{3+} + 2\text{H}_2\text{O}$	1.48	$\text{Co}^{3+} + \text{e} \rightleftharpoons \text{Co}^{2-} \text{ (2 molar } \text{H}_2\text{SO}_4\text{)}$	1.83
$\text{BrO}_3^- + 6\text{H}^+ + 5\text{e} \rightleftharpoons 1/2\text{Br}_2 + 3\text{H}_2\text{O}$	1.482	$\text{Ag}^{3+} + 2\text{e} \rightleftharpoons \text{Ag}^+$	1.9
$\text{HClO} + \text{H}^+ + 2\text{e} \rightleftharpoons \text{Cl}^- + \text{H}_2\text{O}$	1.482	$\text{Co}^{3+} + \text{e} \rightleftharpoons \text{Co}^{2+}$	1.92
$\text{Mn}_2\text{O}_3 + 6\text{H}^+ + \text{e} \rightleftharpoons 2\text{Mn}^{2+} + 3\text{H}_2\text{O}$	1.485	$\text{Ag}^{2+} + \text{e} \rightleftharpoons \text{Ag}^+$	1.980
$\text{HO}_2 + \text{H}^+ + \text{e} \rightleftharpoons \text{H}_2\text{O}_2$	1.495	$\text{Cu}_2\text{O}_3 + 6\text{H}^+ + 2\text{e} \rightleftharpoons 2\text{Cu}^{2+} + 3\text{H}_2\text{O}$	2.0
$\text{Au}^{3+} + 3\text{e} \rightleftharpoons \text{Au}$	1.498	$\text{S}_2\text{O}_8^{2-} + 2\text{e} \rightleftharpoons 2\text{SO}_4^{2-}$	2.010
$\text{PtO}_3 + 4\text{H}^+ + 2\text{e} \rightleftharpoons \text{Pt}(\text{OH})_2 + \text{H}_2\text{O}$	1.5	$\text{OH} + \text{e} \rightleftharpoons \text{OH}^-$	2.02
$\text{MnO}_4^- + 8\text{H}^+ + 5\text{e} \rightleftharpoons \text{Mn}^{2+} + 4\text{H}_2\text{O}$	1.507	$\text{HFeO}_4^- + 7\text{H}^+ + 3\text{e} \rightleftharpoons \text{Fe}^{3+} + 4\text{H}_2\text{O}$	2.07
$\text{Mn}^{3+} + \text{e} \rightleftharpoons \text{Mn}^{2+}$	1.5415	$\text{O}_3 + 2\text{H}^+ + 2\text{e} \rightleftharpoons \text{O}_2 + \text{H}_2\text{O}$	2.076
$\text{HClO}_2 + 3\text{H}^+ + 4\text{e} \rightleftharpoons \text{Cl}^- + 2\text{H}_2\text{O}$	1.570	$\text{HFeO}_4^- + 4\text{H}^+ + 3\text{e} \rightleftharpoons \text{FeOOH} + 2\text{H}_2\text{O}$	2.08
$\text{HBrO} + \text{H}^+ + \text{e} \rightleftharpoons 1/2\text{Br}_2(\text{aq}) + \text{H}_2\text{O}$	1.574	$2\text{HFeO}_4^- + 8\text{H}^+ + 6\text{e} \rightleftharpoons \text{Fe}_2\text{O}_3 + 5\text{H}_2\text{O}$	2.09
$2\text{NO} + 2\text{H}^+ + 2\text{e} \rightleftharpoons \text{N}_2\text{O} + \text{H}_2\text{O}$	1.591	$\text{XeO}_3 + 6\text{H}^+ + 6\text{e} \rightleftharpoons \text{Xe} + 3\text{H}_2\text{O}$	2.10
$\text{Bi}_2\text{O}_4 + 4\text{H}^+ + 2\text{e} \rightleftharpoons 2\text{BiO}^+ + 2\text{H}_2\text{O}$	1.593	$\text{S}_2\text{O}_8^{2-} + 2\text{H}^+ + 2\text{e} \rightleftharpoons 2\text{HSO}_4^-$	2.123
$\text{HBrO} + \text{H}^+ + \text{e} \rightleftharpoons 1/2\text{Br}_2(\text{l}) + \text{H}_2\text{O}$	1.596	$\text{F}_2\text{O} + 2\text{H}^+ + 4\text{e} \rightleftharpoons \text{H}_2\text{O} + 2\text{F}^-$	2.153
$\text{H}_3\text{IO}_6 + \text{H}^+ + 2\text{e} \rightleftharpoons \text{IO}_3^- + 3\text{H}_2\text{O}$	1.601	$\text{FeO}_4^{2-} + 8\text{H}^+ + 3\text{e} \rightleftharpoons \text{Fe}^{3+} + 4\text{H}_2\text{O}$	2.20
$\text{HClO} + \text{H}^+ + \text{e} \rightleftharpoons 1/2\text{Cl}_2 + \text{H}_2\text{O}$	1.611	$\text{Cu}^{3+} + \text{e} \rightleftharpoons \text{Cu}^{2+}$	2.4
$\text{HClO}_2 + 3\text{H}^+ + 3\text{e} \rightleftharpoons 1/2\text{Cl}_2 + 2\text{H}_2\text{O}$	1.628	$\text{H}_4\text{XeO}_6 + 2\text{H}^+ + 2\text{e} \rightleftharpoons \text{XeO}_3 + 3\text{H}_2\text{O}$	2.42
$\text{HClO}_2 + 2\text{H}^+ + 2\text{e} \rightleftharpoons \text{HClO} + \text{H}_2\text{O}$	1.645	$\text{O}(\text{g}) + 2\text{H}^+ + 2\text{e} \rightleftharpoons \text{H}_2\text{O}$	2.421
$\text{Bk}^{4+} + \text{e} \rightleftharpoons \text{Bk}^{3+}$	1.67	$\text{Am}^{4+} + \text{e} \rightleftharpoons \text{Am}^{3+}$	2.60
$\text{NiO}_2 + 4\text{H}^+ + 2\text{e} \rightleftharpoons \text{Ni}^{2+} + 2\text{H}_2\text{O}$	1.678	$\text{H}_2\text{N}_2\text{O}_2 + 2\text{H}^+ + 2\text{e} \rightleftharpoons \text{N}_2 + 2\text{H}_2\text{O}$	2.65
$\text{MnO}_4^- + 4\text{H}^+ + 3\text{e} \rightleftharpoons \text{MnO}_2 + 2\text{H}_2\text{O}$	1.679	$\text{F}_2 + 2\text{e} \rightleftharpoons 2\text{F}^-$	2.866
$\text{PbO}_2 + \text{SO}_4^{2-} + 4\text{H}^+ + 2\text{e} \rightleftharpoons \text{PbSO}_4 + 2\text{H}_2\text{O}$	1.6913	$\text{Cm}^{4+} + \text{e} \rightleftharpoons \text{Cm}^{3+}$	3.0
$\text{Au}^+ + \text{e} \rightleftharpoons \text{Au}$	1.692	$\text{F}_2 + 2\text{H}^+ + 2\text{e} \rightleftharpoons 2\text{HF}$	3.053
$\text{PtO}_3 + 2\text{H}^+ + 2\text{e} \rightleftharpoons \text{PtO}_2 + \text{H}_2\text{O}$	1.7	$\text{Tb}^{4+} + \text{e} \rightleftharpoons \text{Tb}^{3+}$	3.1
$\text{CeOH}^{3+} + \text{H}^+ + \text{e} \rightleftharpoons \text{Ce}^{3+} + \text{H}_2\text{O}$	1.715	$\text{Pr}^{4+} + \text{e} \rightleftharpoons \text{Pr}^{3+}$	3.2
$\text{Ce}^{4+} + \text{e} \rightleftharpoons \text{Ce}^{3+}$	1.72	$\text{Cf}^{4+} + \text{e} \rightleftharpoons \text{Cf}^{3+}$	3.3
$\text{N}_2\text{O} + 2\text{H}^+ + 2\text{e} \rightleftharpoons \text{N}_2 + \text{H}_2\text{O}$	1.766	$\text{XeF} + \text{e} \rightleftharpoons \text{Xe} + \text{F}^-$	3.4
$\text{H}_2\text{O}_2 + 2\text{H}^+ + 2\text{e} \rightleftharpoons 2\text{H}_2\text{O}$	1.776		

TABLE 3. Reduction Reactions Having  $E^\circ$  Values More Negative than That of the Standard Hydrogen Electrode

Reaction	$E^\circ/V$	Reaction	$E^\circ/V$
$2\text{H}^+ + 2\text{e} \rightleftharpoons \text{H}_2$	0.00000	$\text{WO}_2 + 4\text{H}^+ + 4\text{e} \rightleftharpoons \text{W} + 2\text{H}_2\text{O}$	-0.119
$2\text{D}^+ + 2\text{e} \rightleftharpoons \text{D}_2$	-0.013	$\text{Pb}^{2+} + 2\text{e} \rightleftharpoons \text{Pb}(\text{Hg})$	-0.1205
$\text{AgCN} + \text{e} \rightleftharpoons \text{Ag} + \text{CN}^-$	-0.017	$\text{Pb}^{2+} + 2\text{e} \rightleftharpoons \text{Pb}$	-0.1262
$2\text{WO}_3 + 2\text{H}^+ + 2\text{e} \rightleftharpoons \text{W}_2\text{O}_5 + \text{H}_2\text{O}$	-0.029	$\text{CrO}_4^{2-} + 4\text{H}_2\text{O} + 3\text{e} \rightleftharpoons \text{Cr}(\text{OH})_3 + 5\text{OH}^-$	-0.13
$\text{W}_2\text{O}_5 + 2\text{H}^+ + 2\text{e} \rightleftharpoons 2\text{WO}_2 + \text{H}_2\text{O}$	-0.031	$\text{Sn}^{2+} + 2\text{e} \rightleftharpoons \text{Sn}$	-0.1375
$\text{Ag}_2\text{S} + 2\text{H}^+ + 2\text{e} \rightleftharpoons 2\text{Ag} + \text{H}_2\text{S}$	-0.0366	$\text{In}^+ + \text{e} \rightleftharpoons \text{In}$	-0.14
$\text{Fe}^{3+} + 3\text{e} \rightleftharpoons \text{Fe}$	-0.037	$\text{O}_2 + 2\text{H}_2\text{O} + 2\text{e} \rightleftharpoons \text{H}_2\text{O}_2 + 2\text{OH}^-$	-0.146
$\text{Hg}_2\text{I}_2 + 2\text{e} \rightleftharpoons 2\text{Hg} + 2\text{I}^-$	-0.0405	$\text{MoO}_2 + 4\text{H}^+ + 4\text{e} \rightleftharpoons \text{Mo} + 4\text{H}_2\text{O}$	-0.152
$\text{Tl}(\text{OH})_3 + 2\text{e} \rightleftharpoons \text{TlOH} + 2\text{OH}^-$	-0.05	$\text{AgI} + \text{e} \rightleftharpoons \text{Ag} + \text{I}^-$	-0.15224
$\text{TiOH}^{3+} + \text{H}^+ + \text{e} \rightleftharpoons \text{Ti}^{3+} + \text{H}_2\text{O}$	-0.055	$2\text{NO}_2^- + 2\text{H}_2\text{O} + 4\text{e} \rightleftharpoons \text{N}_2\text{O}_2^{2-} + 4\text{OH}^-$	-0.18
$2\text{H}_2\text{SO}_3 + \text{H}^+ + 2\text{e} \rightleftharpoons \text{HS}_2\text{O}_4^- + 2\text{H}_2\text{O}$	-0.056	$\text{H}_2\text{GeO}_3 + 4\text{H}^+ + 4\text{e} \rightleftharpoons \text{Ge} + 3\text{H}_2\text{O}$	-0.182
$\text{P}(\text{white}) + 3\text{H}^+ + 3\text{e} \rightleftharpoons \text{PH}_3(\text{g})$	-0.063	$\text{SnO}_2 + 3\text{H}^+ + 2\text{e} \rightleftharpoons \text{SnOH}^+ + \text{H}_2\text{O}$	-0.194
$\text{O}_2 + \text{H}_2\text{O} + 2\text{e} \rightleftharpoons \text{HO}_2^- + \text{OH}^-$	-0.076	$\text{CO}_2 + 2\text{H}^+ + 2\text{e} \rightleftharpoons \text{HCOOH}$	-0.199
$2\text{Cu}(\text{OH})_2 + 2\text{e} \rightleftharpoons \text{Cu}_2\text{O} + 2\text{OH}^- + \text{H}_2\text{O}$	-0.080	$\text{Mo}^{3+} + 3\text{e} \rightleftharpoons \text{Mo}$	-0.200
$\text{Se} + 2\text{H}^+ + 2\text{e} \rightleftharpoons \text{H}_2\text{Se}$	-0.082	$\text{Ga}^+ + \text{e} \rightleftharpoons \text{Ga}$	-0.2
$\text{WO}_3 + 6\text{H}^+ + 6\text{e} \rightleftharpoons \text{W} + 3\text{H}_2\text{O}$	-0.090	$2\text{SO}_2^{2-} + 4\text{H}^+ + 2\text{e} \rightleftharpoons \text{S}_2\text{O}_6^{2-} + \text{H}_2\text{O}$	-0.22
$\text{SnO}_2 + 4\text{H}^+ + 2\text{e} \rightleftharpoons \text{Sn}^{2+} + 2\text{H}_2\text{O}$	-0.094	$\text{Cu}(\text{OH})_2 + 2\text{e} \rightleftharpoons \text{Cu} + 2\text{OH}^-$	-0.222
$\text{Md}^{3+} + \text{e} \rightleftharpoons \text{Md}^{2+}$	-0.1	$\text{V}_2\text{O}_5 + 10\text{H}^+ + 10\text{e} \rightleftharpoons 2\text{V} + 5\text{H}_2\text{O}$	-0.242
$\text{P}(\text{red}) + 3\text{H}^+ + 3\text{e} \rightleftharpoons \text{PH}_3(\text{g})$	-0.111	$\text{CdSO}_4 + 2\text{e} \rightleftharpoons \text{Cd} + \text{SO}_4^{2-}$	-0.246
$\text{SnO}_2 + 4\text{H}^+ + 4\text{e} \rightleftharpoons \text{Sn} + 2\text{H}_2\text{O}$	-0.117	$\text{V}(\text{OH})_4^+ + 4\text{H}^+ + 5\text{e} \rightleftharpoons \text{V} + 4\text{H}_2\text{O}$	-0.254
$\text{GeO}_2 + 2\text{H}^+ + 2\text{e} \rightleftharpoons \text{GeO} + \text{H}_2\text{O}$	-0.118	$\text{V}^{3+} + \text{e} \rightleftharpoons \text{V}^{2+}$	-0.255



Reaction	$E^\circ/V$	Reaction	$E^\circ/V$
$Ni^{2+} + 2 e \rightleftharpoons Ni$	-0.257	$NbO_2 + 4 H^+ + 4 e \rightleftharpoons Nb + 2 H_2O$	-0.690
$PbCl_2 + 2 e \rightleftharpoons Pb + 2 Cl^-$	-0.2675	$Ag_2S + 2 e \rightleftharpoons 2 Ag + S^{2-}$	-0.691
$H_3PO_4 + 2 H^+ + 2 e \rightleftharpoons H_3PO_3 + H_2O$	-0.276	$AsO_4^{3-} + 2 H_2O + 2 e \rightleftharpoons AsO_2^- + 4 OH^-$	-0.71
$Co^{2+} + 2 e \rightleftharpoons Co$	-0.28	$Ni(OH)_2 + 2 e \rightleftharpoons Ni + 2 OH^-$	-0.72
$PbBr_2 + 2 e \rightleftharpoons Pb + 2 Br^-$	-0.284	$Co(OH)_2 + 2 e \rightleftharpoons Co + 2 OH^-$	-0.73
$Tl^+ + e \rightleftharpoons Tl(Hg)$	-0.3338	$NbO + 2 H^+ + 2 e \rightleftharpoons Nb + H_2O$	-0.733
$Tl^+ + e \rightleftharpoons Tl$	-0.336	$H_2SeO_3 + 4 H^+ + 4 e \rightleftharpoons Se + 3 H_2O$	-0.74
$In^{3+} + 3 e \rightleftharpoons In$	-0.3382	$Cr^{3+} + 3 e \rightleftharpoons Cr$	-0.744
$TlOH + e \rightleftharpoons Tl + OH^-$	-0.34	$Ta_2O_5 + 10 H^+ + 10 e \rightleftharpoons 2 Ta + 5 H_2O$	-0.750
$PbF_2 + 2 e \rightleftharpoons Pb + 2 F^-$	-0.3444	$TlI + e \rightleftharpoons Tl + I^-$	-0.752
$PbSO_4 + 2 e \rightleftharpoons Pb(Hg) + SO_4^{2-}$	-0.3505	$Zn^{2+} + 2 e \rightleftharpoons Zn$	-0.7618
$Cd^{2+} + 2 e \rightleftharpoons Cd(Hg)$	-0.3521	$Zn^{2+} + 2 e \rightleftharpoons Zn(Hg)$	-0.7628
$PbSO_4 + 2 e \rightleftharpoons Pb + SO_4^{2-}$	-0.3588	$CdO + H_2O + 2 e \rightleftharpoons Cd + 2 OH^-$	-0.783
$Cu_2O + H_2O + 2 e \rightleftharpoons 2 Cu + 2 OH^-$	-0.360	$Te + 2 H^+ + 2 e \rightleftharpoons H_2Te$	-0.793
$Eu^{3+} + e \rightleftharpoons Eu^{2+}$	-0.36	$ZnSO_4 \cdot 7H_2O + 2 e \rightleftharpoons Zn(Hg) + SO_4^{2-} + 7 H_2O$ (Saturated $ZnSO_4$ )	-0.7993
$PbI_2 + 2 e \rightleftharpoons Pb + 2 I^-$	-0.365	$Bi + 3 H^+ + 3 e \rightleftharpoons BiH_3$	-0.8
$SeO_3^{2-} + 3 H_2O + 4 e \rightleftharpoons Se + 6 OH^-$	-0.366	$SiO + 2 H^+ + 2 e \rightleftharpoons Si + H_2O$	-0.8
$Se + 2 H^+ + 2 e \rightleftharpoons H_2Se(aq)$	-0.399	$Cd(OH)_2 + 2 e \rightleftharpoons Cd(Hg) + 2 OH^-$	-0.809
$In^{2+} + e \rightleftharpoons In^+$	-0.40	$2 H_2O + 2 e \rightleftharpoons H_2 + 2 OH^-$	-0.8277
$Cd^{2+} + 2 e \rightleftharpoons Cd$	-0.4030	$2 NO_3^- + 2 H_2O + 2 e \rightleftharpoons N_2O_4 + 4 OH^-$	-0.85
$Cr^{3+} + e \rightleftharpoons Cr^{2+}$	-0.407	$H_3BO_3 + 3 H^+ + 3 e \rightleftharpoons B + 3 H_2O$	-0.8698
$2 S + 2 e \rightleftharpoons S_2^{2-}$	-0.42836	$P + 3 H_2O + 3 e \rightleftharpoons PH_3(g) + 3 OH^-$	-0.87
$Tl_2SO_4 + 2 e \rightleftharpoons Tl + SO_4^{2-}$	-0.4360	$Ti^{3+} + e \rightleftharpoons Ti^{2+}$	-0.9
$In^{3+} + 2 e \rightleftharpoons In^+$	-0.443	$HSnO_2^- + H_2O + 2 e \rightleftharpoons Sn + 3 OH^-$	-0.909
$Fe^{2+} + 2 e \rightleftharpoons Fe$	-0.447	$Cr^{2+} + 2 e \rightleftharpoons Cr$	-0.913
$H_3PO_3 + 3 H^+ + 3 e \rightleftharpoons P + 3 H_2O$	-0.454	$Se + 2 e \rightleftharpoons Se^{2-}$	-0.924
$Bi_2O_3 + 3 H_2O + 6 e \rightleftharpoons 2 Bi + 6 OH^-$	-0.46	$SO_4^{2-} + H_2O + 2 e \rightleftharpoons SO_3^{2-} + 2 OH^-$	-0.93
$NO_2^- + H_2O + e \rightleftharpoons NO + 2 OH^-$	-0.46	$Sn(OH)_6^{2-} + 2 e \rightleftharpoons HSnO_2^- + 3 OH^- + H_2O$	-0.93
$PbHPO_4 + 2 e \rightleftharpoons Pb + HPO_4^{2-}$	-0.465	$SnO_2 + 2 H_2O + 4 e \rightleftharpoons Sn + 4 OH^-$	-0.945
$S + 2 e \rightleftharpoons S^{2-}$	-0.47627	$In(OH)_3 + 3 e \rightleftharpoons In + 3 OH^-$	-0.99
$S + H_2O + 2 e \rightleftharpoons HS^- + OH^-$	-0.478	$NpO_2 + H_2O + H^+ + e \rightleftharpoons Np(OH)_3$	-0.962
$B(OH)_3 + 7 H^+ + 8 e \rightleftharpoons BH_4^- + 3 H_2O$	-0.481	$In(OH)_4^- + 3 e \rightleftharpoons In + 4 OH^-$	-1.007
$In^{3+} + e \rightleftharpoons In^{2+}$	-0.49	$In_2O_3 + 3 H_2O + 6 e \rightleftharpoons 2 In + 6 OH^-$	-1.034
$ZnOH^+ + H^+ + 2 e \rightleftharpoons Zn + H_2O$	-0.497	$PO_4^{3-} + 2 H_2O + 2 e \rightleftharpoons HPO_3^{2-} + 3 OH^-$	-1.05
$GaOH^{2+} + H^+ + 3 e \rightleftharpoons Ga + H_2O$	-0.498	$Yb^{3+} + e \rightleftharpoons Yb^{2+}$	-1.05
$H_3PO_3 + 2 H^+ + 2 e \rightleftharpoons H_3PO_2 + H_2O$	-0.499	$Nb^{3+} + 3 e \rightleftharpoons Nb$	-1.099
$TiO_2 + 4 H^+ + 2 e \rightleftharpoons Ti^{2+} + 2 H_2O$	-0.502	$Fm^{3+} + e \rightleftharpoons Fm^{2+}$	-1.1
$H_3PO_2 + H^+ + e \rightleftharpoons P + 2 H_2O$	-0.508	$2 SO_3^{2-} + 2 H_2O + 2 e \rightleftharpoons S_2O_4^{2-} + 4 OH^-$	-1.12
$Sb + 3 H^+ + 3 e \rightleftharpoons SbH_3$	-0.510	$Te + 2 e \rightleftharpoons Te^{2-}$	-1.143
$HPbO_2^- + H_2O + 2 e \rightleftharpoons Pb + 3 OH^-$	-0.537	$V^{2+} + 2 e \rightleftharpoons V$	-1.175
$Ga^{3+} + 3 e \rightleftharpoons Ga$	-0.549	$Mn^{2+} + 2 e \rightleftharpoons Mn$	-1.185
$TlCl + e \rightleftharpoons Tl + Cl^-$	-0.5568	$Zn(OH)_4^{2-} + 2 e \rightleftharpoons Zn + 4 OH^-$	-1.199
$Fe(OH)_3 + e \rightleftharpoons Fe(OH)_2 + OH^-$	-0.56	$CrO_2 + 2 H_2O + 3 e \rightleftharpoons Cr + 4 OH^-$	-1.2
$TeO_3^{2-} + 3 H_2O + 4 e \rightleftharpoons Te + 6 OH^-$	-0.57	$No^{3+} + 3 e \rightleftharpoons No$	-1.20
$2 SO_3^{2-} + 3 H_2O + 4 e \rightleftharpoons S_2O_3^{2-} + 6 OH^-$	-0.571	$ZnO_2^- + 2 H_2O + 2 e \rightleftharpoons Zn + 4 OH^-$	-1.215
$PbO + H_2O + 2 e \rightleftharpoons Pb + 2 OH^-$	-0.580	$H_2GaO_3^- + H_2O + 3 e \rightleftharpoons Ga + 4 OH^-$	-1.219
$ReO_2^- + 4 H_2O + 7 e \rightleftharpoons Re + 8 OH^-$	-0.584	$H_2BO_3^- + 5 H_2O + 8 e \rightleftharpoons BH_4^- + 8 OH^-$	-1.24
$SbO_3^- + H_2O + 2 e \rightleftharpoons SbO_2^- + 2 OH^-$	-0.59	$SiF_6^{2-} + 4 e \rightleftharpoons Si + 6 F^-$	-1.24
$Ta^{3+} + 3 e \rightleftharpoons Ta$	-0.6	$Zn(OH)_2 + 2 e \rightleftharpoons Zn + 2 OH^-$	-1.249
$U^{4+} + e \rightleftharpoons U^{3+}$	-0.607	$ZnO + H_2O + 2 e \rightleftharpoons Zn + 2 OH^-$	-1.260
$As + 3 H^+ + 3 e \rightleftharpoons AsH_3$	-0.608	$Es^{3+} + e \rightleftharpoons Es^{2+}$	-1.3
$Nb_2O_5 + 10 H^+ + 10 e \rightleftharpoons 2 Nb + 5 H_2O$	-0.644	$Pa^{3+} + 3 e \rightleftharpoons Pa$	-1.34
$NbO_2 + 2 H^+ + 2 e \rightleftharpoons NbO + H_2O$	-0.646	$Ti^{3+} + 3 e \rightleftharpoons Ti$	-1.37
$Cd(OH)_4^{2-} + 2 e \rightleftharpoons Cd + 4 OH^-$	-0.658	$Ce^{3+} + 3 e \rightleftharpoons Ce(Hg)$	-1.4373
$TlBr + e \rightleftharpoons Tl + Br^-$	-0.658	$UO_2^{2+} + 4 H^+ + 6 e \rightleftharpoons U + 2 H_2O$	-1.444
$SbO_2^- + 2 H_2O + 3 e \rightleftharpoons Sb + 4 OH^-$	-0.66	$Zr^{4+} + 4 e \rightleftharpoons Zr$	-1.45
$AsO_2^- + 2 H_2O + 3 e \rightleftharpoons As + 4 OH^-$	-0.68		

Reaction	$E^\circ/V$	Reaction	$E^\circ/V$
$\text{Cr}(\text{OH})_3 + 3 e \rightleftharpoons \text{Cr} + 3 \text{OH}^-$	-1.48	$\text{Am}^{3+} + e \rightleftharpoons \text{Am}^{2+}$	-2.3
$\text{Pa}^{4+} + 4 e \rightleftharpoons \text{Pa}$	-1.49	$\text{Fm}^{2+} + 2 e \rightleftharpoons \text{Fm}$	-2.30
$\text{HfO}_2 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{Hf} + 2 \text{H}_2\text{O}$	-1.505	$\text{Pm}^{3+} + 3 e \rightleftharpoons \text{Pm}$	-2.30
$\text{Hf}^{4+} + 4 e \rightleftharpoons \text{Hf}$	-1.55	$\text{Sm}^{3+} + 3 e \rightleftharpoons \text{Sm}$	-2.304
$\text{Sm}^{3+} + e \rightleftharpoons \text{Sm}^{2+}$	-1.55	$\text{Al}(\text{OH})_3 + 3 e \rightleftharpoons \text{Al} + 3 \text{OH}^-$	-2.31
$\text{ZrO}_2 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{Zr} + 2 \text{H}_2\text{O}$	-1.553	$\text{Tm}^{3+} + 3 e \rightleftharpoons \text{Tm}$	-2.319
$\text{Mn}(\text{OH})_2 + 2 e \rightleftharpoons \text{Mn} + 2 \text{OH}^-$	-1.56	$\text{Nd}^{3+} + 3 e \rightleftharpoons \text{Nd}$	-2.323
$\text{Ba}^{2+} + 2 e \rightleftharpoons \text{Ba}(\text{Hg})$	-1.570	$\text{Al}(\text{OH})^- + 3 e \rightleftharpoons \text{Al} + 4 \text{OH}^-$	-2.328
$\text{Bk}^{2+} + 2 e \rightleftharpoons \text{Bk}$	-1.6	$\text{H}_2\text{AlO}_3^- + \text{H}_2\text{O} + 3 e \rightleftharpoons \text{Al} + 4 \text{OH}^-$	-2.33
$\text{Cf}^{3+} + e \rightleftharpoons \text{Cf}^{2+}$	-1.6	$\text{Ho}^{3+} + 3 e \rightleftharpoons \text{Ho}$	-2.33
$\text{Ti}^{2+} + 2 e \rightleftharpoons \text{Ti}$	-1.630	$\text{Er}^{3+} + 3 e \rightleftharpoons \text{Er}$	-2.331
$\text{Md}^{3+} + 3 e \rightleftharpoons \text{Md}$	-1.65	$\text{Ce}^{3+} + 3 e \rightleftharpoons \text{Ce}$	-2.336
$\text{HPO}_3^{2-} + 2 \text{H}_2\text{O} + 2 e \rightleftharpoons \text{H}_2\text{PO}_2^- + 3 \text{OH}^-$	-1.65	$\text{Pr}^{3+} + 3 e \rightleftharpoons \text{Pr}$	-2.353
$\text{Al}^{3+} + 3 e \rightleftharpoons \text{Al}$	-1.662	$\text{ZrO}(\text{OH})_2 + \text{H}_2\text{O} + 4 e \rightleftharpoons \text{Zr} + 4 \text{OH}^-$	-2.36
$\text{SiO}_3^{2-} + \text{H}_2\text{O} + 4 e \rightleftharpoons \text{Si} + 6 \text{OH}^-$	-1.697	$\text{Mg}^{2+} + 2 e \rightleftharpoons \text{Mg}$	-2.372
$\text{HPO}_3^{2-} + 2 \text{H}_2\text{O} + 3 e \rightleftharpoons \text{P} + 5 \text{OH}^-$	-1.71	$\text{Y}^{3+} + 3 e \rightleftharpoons \text{Y}$	-2.372
$\text{HfO}^{2+} + 2 \text{H}^+ + 4 e \rightleftharpoons \text{Hf} + \text{H}_2\text{O}$	-1.724	$\text{La}^{3+} + 3 e \rightleftharpoons \text{La}$	-2.379
$\text{ThO}_2 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{Th} + 2 \text{H}_2\text{O}$	-1.789	$\text{Tm}^{2+} + 2 e \rightleftharpoons \text{Tm}$	-2.4
$\text{H}_2\text{BO}_3^- + \text{H}_2\text{O} + 3 e \rightleftharpoons \text{B} + 4 \text{OH}^-$	-1.79	$\text{Md}^{2+} + 2 e \rightleftharpoons \text{Md}$	-2.40
$\text{Sr}^{2+} + 2 e \rightleftharpoons \text{Sr}(\text{Hg})$	-1.793	$\text{Th}(\text{OH})_4 + 4 e \rightleftharpoons \text{Th} + 4 \text{OH}^-$	-2.48
$\text{U}^{3+} + 3 e \rightleftharpoons \text{U}$	-1.798	$\text{HfO}(\text{OH})_2 + \text{H}_2\text{O} + 4 e \rightleftharpoons \text{Hf} + 4 \text{OH}^-$	-2.50
$\text{H}_2\text{PO}_2^- + e \rightleftharpoons \text{P} + 2 \text{OH}^-$	-1.82	$\text{No}^{2+} + 2 e \rightleftharpoons \text{No}$	-2.50
$\text{Be}^{2+} + 2 e \rightleftharpoons \text{Be}$	-1.847	$\text{Dy}^{3+} + e \rightleftharpoons \text{Dy}^{2+}$	-2.6
$\text{Np}^{3+} + 3 e \rightleftharpoons \text{Np}$	-1.856	$\text{Pm}^{3+} + e \rightleftharpoons \text{Pm}^{2+}$	-2.6
$\text{Fm}^{3+} + 3 e \rightleftharpoons \text{Fm}$	-1.89	$\text{Be}_2\text{O}_3^{2-} + 3 \text{H}_2\text{O} + 4 e \rightleftharpoons 2 \text{Be} + 6 \text{OH}^-$	-2.63
$\text{Th}^{4+} + 4 e \rightleftharpoons \text{Th}$	-1.899	$\text{Sm}^{2+} + 2 e \rightleftharpoons \text{Sm}$	-2.68
$\text{Am}^{2+} + 2 e \rightleftharpoons \text{Am}$	-1.9	$\text{Mg}(\text{OH})_2 + 2 e \rightleftharpoons \text{Mg} + 2 \text{OH}^-$	-2.690
$\text{Pa}^{4+} + e \rightleftharpoons \text{Pa}^{3+}$	-1.9	$\text{Nd}^{3+} + e \rightleftharpoons \text{Nd}^{2+}$	-2.7
$\text{Es}^{3+} + 3 e \rightleftharpoons \text{Es}$	-1.91	$\text{Mg}^+ + e \rightleftharpoons \text{Mg}$	-2.70
$\text{Cf}^{3+} + 3 e \rightleftharpoons \text{Cf}$	-1.94	$\text{Na}^+ + e \rightleftharpoons \text{Na}$	-2.71
$\text{Lr}^{3+} + 3 e \rightleftharpoons \text{Lr}$	-1.96	$\text{Yb}^{2+} + 2 e \rightleftharpoons \text{Yb}$	-2.76
$\text{Eu}^{3+} + 3 e \rightleftharpoons \text{Eu}$	-1.991	$\text{Bk}^{3+} + e \rightleftharpoons \text{Bk}^{2+}$	-2.8
$\text{Er}^{2+} + 2 e \rightleftharpoons \text{Er}$	-2.0	$\text{Ho}^{3+} + e \rightleftharpoons \text{Ho}^{2+}$	-2.8
$\text{Pr}^{2+} + 2 e \rightleftharpoons \text{Pr}$	-2.0	$\text{Ra}^{2+} + 2 e \rightleftharpoons \text{Ra}$	-2.8
$\text{Pu}^{3+} + 3 e \rightleftharpoons \text{Pu}$	-2.031	$\text{Eu}^{2+} + 2 e \rightleftharpoons \text{Eu}$	-2.812
$\text{Cm}^{3+} + 3 e \rightleftharpoons \text{Cm}$	-2.04	$\text{Ca}^{2+} + 2 e \rightleftharpoons \text{Ca}$	-2.868
$\text{Am}^{3+} + 3 e \rightleftharpoons \text{Am}$	-2.048	$\text{Sr}(\text{OH})_2 + 2 e \rightleftharpoons \text{Sr} + 2 \text{OH}^-$	-2.88
$\text{AlF}_6^{3-} + 3 e \rightleftharpoons \text{Al} + 6 \text{F}^-$	-2.069	$\text{Sr}^{2+} + 2 e \rightleftharpoons \text{Sr}$	-2.899
$\text{Sc}^{3+} + 3 e \rightleftharpoons \text{Sc}$	-2.077	$\text{Fr}^+ + e \rightleftharpoons \text{Fr}$	-2.9
$\text{Ho}^{2+} + 2 e \rightleftharpoons \text{Ho}$	-2.1	$\text{La}(\text{OH})_3 + 3 e \rightleftharpoons \text{La} + 3 \text{OH}^-$	-2.90
$\text{Nd}^{2+} + 2 e \rightleftharpoons \text{Nd}$	-2.1	$\text{Ba}^{2+} + 2 e \rightleftharpoons \text{Ba}$	-2.912
$\text{Cf}^{2+} + 2 e \rightleftharpoons \text{Cf}$	-2.12	$\text{K}^+ + e \rightleftharpoons \text{K}$	-2.931
$\text{Yb}^{3+} + 3 e \rightleftharpoons \text{Yb}$	-2.19	$\text{Rb}^+ + e \rightleftharpoons \text{Rb}$	-2.98
$\text{Ac}^{3+} + 3 e \rightleftharpoons \text{Ac}$	-2.20	$\text{Ba}(\text{OH})_2 + 2 e \rightleftharpoons \text{Ba} + 2 \text{OH}^-$	-2.99
$\text{Dy}^{2+} + 2 e \rightleftharpoons \text{Dy}$	-2.2	$\text{Er}^{3+} + e \rightleftharpoons \text{Er}^{2+}$	-3.0
$\text{Tm}^{3+} + e \rightleftharpoons \text{Tm}^{2+}$	-2.2	$\text{Ca}(\text{OH})_2 + 2 e \rightleftharpoons \text{Ca} + 2 \text{OH}^-$	-3.02
$\text{Pm}^{2+} + 2 e \rightleftharpoons \text{Pm}$	-2.2	$\text{Cs}^+ + e \rightleftharpoons \text{Cs}$	-3.026
$\text{Es}^{2+} + 2 e \rightleftharpoons \text{Es}$	-2.23	$\text{Li}^+ + e \rightleftharpoons \text{Li}$	-3.0401
$\text{H}_2 + 2 e \rightleftharpoons 2 \text{H}^-$	-2.23	$3 \text{N}_2 + 2 \text{H}^+ + 2 e \rightleftharpoons 2 \text{HN}_3$	-3.09
$\text{Gd}^{3+} + 3 e \rightleftharpoons \text{Gd}$	-2.279	$\text{Pr}^{3+} + e \rightleftharpoons \text{Pr}^{2+}$	-3.1
$\text{Tb}^{3+} + 3 e \rightleftharpoons \text{Tb}$	-2.28	$\text{Ca}^+ + e \rightleftharpoons \text{Ca}$	-3.80
$\text{Lu}^{3+} + 3 e \rightleftharpoons \text{Lu}$	-2.28	$\text{Sr}^+ + e \rightleftharpoons \text{Sr}$	-4.10
$\text{Dy}^{3+} + 3 e \rightleftharpoons \text{Dy}$	-2.295		