

ELECTROCHEMICAL SERIES

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There are three tables for this electrochemical series. Each table lists standard reduction potentials, E° 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) precede those for aluminum (Al). Table 2 lists only those reduction reactions that have E° 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° 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°/V | Reaction | E°/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°/V | Reaction | E°/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 |
| $\text{Ce}^{4+} + e \rightleftharpoons \text{Ce}^{3+}$ | 3.3 | $\text{Er}^{3+} + e \rightleftharpoons \text{Er}^{2+}$ | -3.0 |
| $\text{Ce}^{3+} + e \rightleftharpoons \text{Ce}^{2+}$ | -1.6 | $\text{Es}^{3+} + e \rightleftharpoons \text{Es}^{2+}$ | -1.3 |
| $\text{Ce}^{3+} + 3 e \rightleftharpoons \text{Ce}$ | -1.94 | $\text{Es}^{3+} + 3 e \rightleftharpoons \text{Es}$ | -1.91 |
| $\text{Ce}^{2+} + 2 e \rightleftharpoons \text{Ce}$ | -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 H_2SO_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°/V | Reaction | E°/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°/V |
|--|-------------|
| $\text{No}^{3+} + e \rightleftharpoons \text{No}^{2+}$ | 1.4 |
| $\text{No}^{3+} + 3 e \rightleftharpoons \text{No}$ | -1.20 |
| $\text{No}^{2+} + 2 e \rightleftharpoons \text{No}$ | -2.50 |
| $\text{Np}^{3+} + 3 e \rightleftharpoons \text{Np}$ | -1.856 |
| $\text{Np}^{4+} + e \rightleftharpoons \text{Np}^{3+}$ | 0.147 |
| $\text{NpO}_2 + \text{H}_2\text{O} + \text{H}^+ + e \rightleftharpoons \text{Np}(\text{OH})_3$ | -0.962 |
| $\text{O}_2 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{H}_2\text{O}_2$ | 0.695 |
| $\text{O}_2 + 4 \text{H}^+ + 4 e \rightleftharpoons 2 \text{H}_2\text{O}$ | 1.229 |
| $\text{O}_2 + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{HO}_2^- + \text{OH}^-$ | -0.076 |
| $\text{O}_2 + 2 \text{H}_2\text{O} + 2 e \rightleftharpoons \text{H}_2\text{O}_2 + 2 \text{OH}^-$ | -0.146 |
| $\text{O}_2 + 2 \text{H}_2\text{O} + 4 e \rightleftharpoons 4 \text{OH}^-$ | 0.401 |
| $\text{O}_3 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{O}_2 + \text{H}_2\text{O}$ | 2.076 |
| $\text{O}_3 + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{O}_2 + 2 \text{OH}^-$ | 1.24 |
| $\text{O}(\text{g}) + 2 \text{H}^+ + 2 e \rightleftharpoons \text{H}_2\text{O}$ | 2.421 |
| $\text{OH} + e \rightleftharpoons \text{OH}^-$ | 2.02 |
| $\text{HO}_2^- + \text{H}_2\text{O} + 2 e \rightleftharpoons 3 \text{OH}^-$ | 0.878 |
| $\text{OsO}_4 + 8 \text{H}^+ + 8 e \rightleftharpoons \text{Os} + 4 \text{H}_2\text{O}$ | 0.838 |
| $\text{OsO}_4 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{OsO}_2 + 2 \text{H}_2\text{O}$ | 1.02 |
| $[\text{Os}(\text{bipy})_2]^{3+} + e \rightleftharpoons [\text{Os}(\text{bipy})_2]^{2+}$ | 0.81 |
| $[\text{Os}(\text{bipy})_3]^{3+} + e \rightleftharpoons [\text{Os}(\text{bipy})_3]^{2+}$ | 0.80 |
| $\text{P}(\text{red}) + 3 \text{H}^+ + 3 e \rightleftharpoons \text{PH}_3(\text{g})$ | -0.111 |
| $\text{P}(\text{white}) + 3 \text{H}^+ + 3 e \rightleftharpoons \text{PH}_3(\text{g})$ | -0.063 |
| $\text{P} + 3 \text{H}_2\text{O} + 3 e \rightleftharpoons \text{PH}_3(\text{g}) + 3 \text{OH}^-$ | -0.87 |
| $\text{H}_2\text{P}_2^- + e \rightleftharpoons \text{P} + 2 \text{OH}^-$ | -1.82 |
| $\text{H}_3\text{PO}_2 + \text{H}^+ + e \rightleftharpoons \text{P} + 2 \text{H}_2\text{O}$ | -0.508 |
| $\text{H}_3\text{PO}_3 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{H}_3\text{PO}_2 + \text{H}_2\text{O}$ | -0.499 |
| $\text{H}_3\text{PO}_3 + 3 \text{H}^+ + 3 e \rightleftharpoons \text{P} + 3 \text{H}_2\text{O}$ | -0.454 |
| $\text{HPO}_3^{2-} + 2 \text{H}_2\text{O} + 2 e \rightleftharpoons \text{H}_2\text{PO}_2^- + 3 \text{OH}^-$ | -1.65 |
| $\text{HPO}_3^{2-} + 2 \text{H}_2\text{O} + 3 e \rightleftharpoons \text{P} + 5 \text{OH}^-$ | -1.71 |
| $\text{H}_3\text{PO}_4 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{H}_3\text{PO}_3 + \text{H}_2\text{O}$ | -0.276 |
| $\text{PO}_4^{3-} + 2 \text{H}_2\text{O} + 2 e \rightleftharpoons \text{HPO}_3^{2-} + 3 \text{OH}^-$ | -1.05 |
| $\text{Pa}^{3+} + 3 e \rightleftharpoons \text{Pa}$ | -1.34 |
| $\text{Pa}^{4+} + 4 e \rightleftharpoons \text{Pa}$ | -1.49 |
| $\text{Pa}^{4+} + e \rightleftharpoons \text{Pa}^{3+}$ | -1.9 |
| $\text{Pb}^{2+} + 2 e \rightleftharpoons \text{Pb}$ | -0.1262 |
| $\text{Pb}^{2+} + 2 e \rightleftharpoons \text{Pb}(\text{Hg})$ | -0.1205 |
| $\text{PbBr}_2 + 2 e \rightleftharpoons \text{Pb} + 2 \text{Br}^-$ | -0.284 |
| $\text{PbCl}_2 + 2 e \rightleftharpoons \text{Pb} + 2 \text{Cl}^-$ | -0.2675 |
| $\text{PbF}_2 + 2 e \rightleftharpoons \text{Pb} + 2 \text{F}^-$ | -0.3444 |
| $\text{PbHPO}_4 + 2 e \rightleftharpoons \text{Pb} + \text{HPO}_4^{2-}$ | -0.465 |
| $\text{PbI}_2 + 2 e \rightleftharpoons \text{Pb} + 2 \text{I}^-$ | -0.365 |
| $\text{PbO} + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{Pb} + 2 \text{OH}^-$ | -0.580 |
| $\text{PbO}_2 + 4 \text{H}^+ + 2 e \rightleftharpoons \text{Pb}^{2+} + 2 \text{H}_2\text{O}$ | 1.455 |
| $\text{HPbO}_2^- + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{Pb} + 3 \text{OH}^-$ | -0.537 |
| $\text{PbO}_2 + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{PbO} + 2 \text{OH}^-$ | 0.247 |
| $\text{PbO}_2 + \text{SO}_4^{2-} + 4 \text{H}^+ + 2 e \rightleftharpoons \text{PbSO}_4 + 2 \text{H}_2\text{O}$ | 1.6913 |
| $\text{PbSO}_4 + 2 e \rightleftharpoons \text{Pb} + \text{SO}_4^{2-}$ | -0.3588 |
| $\text{PbSO}_4 + 2 e \rightleftharpoons \text{Pb}(\text{Hg}) + \text{SO}_4^{2-}$ | -0.3505 |
| $\text{Pd}^{2+} + 2 e \rightleftharpoons \text{Pd}$ | 0.951 |
| $[\text{PdCl}_4]^{2-} + 2 e \rightleftharpoons \text{Pd} + 4 \text{Cl}^-$ | 0.591 |
| $[\text{PdCl}_6]^{2-} + 2 e \rightleftharpoons [\text{PdCl}_4]^{2-} + 2 \text{Cl}^-$ | 1.288 |
| $\text{Pd}(\text{OH})_2 + 2 e \rightleftharpoons \text{Pd} + 2 \text{OH}^-$ | 0.07 |
| $\text{Pm}^{2+} + 2 e \rightleftharpoons \text{Pm}$ | -2.2 |
| $\text{Pm}^{3+} + 3 e \rightleftharpoons \text{Pm}$ | -2.30 |
| $\text{Pm}^{3+} + e \rightleftharpoons \text{Pm}^{2+}$ | -2.6 |
| $\text{Po}^{4+} + 2 e \rightleftharpoons \text{Po}^{2+}$ | 0.9 |
| $\text{Po}^{4+} + 4 e \rightleftharpoons \text{Po}$ | 0.76 |
| $\text{Pr}^{4+} + e \rightleftharpoons \text{Pr}^{3+}$ | 3.2 |
| $\text{Pr}^{2+} + 2 e \rightleftharpoons \text{Pr}$ | -2.0 |
| $\text{Pr}^{3+} + 3 e \rightleftharpoons \text{Pr}$ | -2.353 |

| Reaction | E°/V |
|---|-------------|
| $\text{Pr}^{3+} + e \rightleftharpoons \text{Pr}^{2+}$ | -3.1 |
| $\text{Pt}^{2+} + 2 e \rightleftharpoons \text{Pt}$ | 1.18 |
| $[\text{PtCl}_4]^{2-} + 2 e \rightleftharpoons \text{Pt} + 4 \text{Cl}^-$ | 0.755 |
| $[\text{PtCl}_6]^{2-} + 2 e \rightleftharpoons [\text{PtCl}_4]^{2-} + 2 \text{Cl}^-$ | 0.68 |
| $\text{Pt}(\text{OH})_2 + 2 e \rightleftharpoons \text{Pt} + 2 \text{OH}^-$ | 0.14 |
| $\text{PtO}_3 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{PtO}_2 + \text{H}_2\text{O}$ | 1.7 |
| $\text{PtO}_3 + 4 \text{H}^+ + 2 e \rightleftharpoons \text{Pt}(\text{OH})_2^{2+} + \text{H}_2\text{O}$ | 1.5 |
| $\text{PtOH}^+ + \text{H}^+ + 2 e \rightleftharpoons \text{Pt} + \text{H}_2\text{O}$ | 1.2 |
| $\text{PtO}_2 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{PtO} + \text{H}_2\text{O}$ | 1.01 |
| $\text{PtO}_2 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{Pt} + 2 \text{H}_2\text{O}$ | 1.00 |
| $\text{Pu}^{3+} + 3 e \rightleftharpoons \text{Pu}$ | -2.031 |
| $\text{Pu}^{4+} + e \rightleftharpoons \text{Pu}^{3+}$ | 1.006 |
| $\text{Pu}^{5+} + e \rightleftharpoons \text{Pu}^{4+}$ | 1.099 |
| $\text{PuO}_2(\text{OH})_2 + 2 \text{H}^+ + 2 e \rightleftharpoons \text{Pu}(\text{OH})_4$ | 1.325 |
| $\text{PuO}_2(\text{OH})_2 + \text{H}^+ + e \rightleftharpoons \text{PuO}_2\text{OH} + \text{H}_2\text{O}$ | 1.062 |
| $\text{Ra}^{2+} + 2 e \rightleftharpoons \text{Ra}$ | -2.8 |
| $\text{Rb}^+ + e \rightleftharpoons \text{Rb}$ | -2.98 |
| $\text{Re}^{3+} + 3 e \rightleftharpoons \text{Re}$ | 0.300 |
| $\text{ReO}_4^- + 4 \text{H}^+ + 3 e \rightleftharpoons \text{ReO}_2 + 2 \text{H}_2\text{O}$ | 0.510 |
| $\text{ReO}_2 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{Re} + 2 \text{H}_2\text{O}$ | 0.2513 |
| $\text{ReO}_4^- + 2 \text{H}^+ + e \rightleftharpoons \text{ReO}_3 + \text{H}_2\text{O}$ | 0.768 |
| $\text{ReO}_4^- + 4 \text{H}_2\text{O} + 7 e \rightleftharpoons \text{Re} + 8 \text{OH}^-$ | -0.584 |
| $\text{ReO}_4^- + 8 \text{H}^+ + 7 e \rightleftharpoons \text{Re} + 4 \text{H}_2\text{O}$ | 0.368 |
| $\text{Rh}^+ + e \rightleftharpoons \text{Rh}$ | 0.600 |
| $\text{Rh}^{3+} + 3 e \rightleftharpoons \text{Rh}$ | 0.758 |
| $[\text{RhCl}_6]^{3-} + 3 e \rightleftharpoons \text{Rh} + 6 \text{Cl}^-$ | 0.431 |
| $\text{RhOH}^{2+} + \text{H}^+ + 3 e \rightleftharpoons \text{Rh} + \text{H}_2\text{O}$ | 0.83 |
| $\text{Ru}^{2+} + 2 e \rightleftharpoons \text{Ru}$ | 0.455 |
| $\text{Ru}^{3+} + e \rightleftharpoons \text{Ru}^{2+}$ | 0.2487 |
| $\text{RuO}_2 + 4 \text{H}^+ + 2 e \rightleftharpoons \text{Ru}^{2+} + 2 \text{H}_2\text{O}$ | 1.120 |
| $\text{RuO}_4^- + e \rightleftharpoons \text{RuO}_4^{2-}$ | 0.59 |
| $\text{RuO}_4 + e \rightleftharpoons \text{RuO}_4^-$ | 1.00 |
| $\text{RuO}_4 + 6 \text{H}^+ + 4 e \rightleftharpoons \text{Ru}(\text{OH})_2^{2+} + 2 \text{H}_2\text{O}$ | 1.40 |
| $\text{RuO}_4 + 8 \text{H}^+ + 8 e \rightleftharpoons \text{Ru} + 4 \text{H}_2\text{O}$ | 1.038 |
| $[\text{Ru}(\text{bipy})_3]^{3+} + e^- \rightleftharpoons [\text{Ru}(\text{bipy})_3]^{2+}$ | 1.24 |
| $[\text{Ru}(\text{H}_2\text{O})_6]^{3+} + e^- \rightleftharpoons [\text{Ru}(\text{H}_2\text{O})_6]^{2+}$ | 0.23 |
| $[\text{Ru}(\text{NH}_3)_6]^{3+} + e^- \rightleftharpoons [\text{Ru}(\text{NH}_3)_6]^{2+}$ | 0.10 |
| $[\text{Ru}(\text{en})_3]^{3+} + e^- \rightleftharpoons [\text{Ru}(\text{en})_3]^{2+}$ | 0.210 |
| $[\text{Ru}(\text{CN})_6]^{3-} + e^- \rightleftharpoons [\text{Ru}(\text{CN})_6]^{4-}$ | 0.86 |
| $\text{S} + 2 e \rightleftharpoons \text{S}^{2-}$ | -0.47627 |
| $\text{S} + 2 \text{H}^+ + 2 e \rightleftharpoons \text{H}_2\text{S}(\text{aq})$ | 0.142 |
| $\text{S} + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{SH}^- + \text{OH}^-$ | -0.478 |
| $2 \text{S} + 2 e \rightleftharpoons \text{S}_2^{2-}$ | -0.42836 |
| $\text{S}_2\text{O}_6^{2-} + 4 \text{H}^+ + 2 e \rightleftharpoons 2 \text{H}_2\text{SO}_3$ | 0.564 |
| $\text{S}_2\text{O}_8^{2-} + 2 e \rightleftharpoons 2 \text{SO}_4^{2-}$ | 2.010 |
| $\text{S}_2\text{O}_8^{2-} + 2 \text{H}^+ + 2 e \rightleftharpoons 2 \text{HSO}_4^-$ | 2.123 |
| $\text{S}_4\text{O}_6^{2-} + 2 e \rightleftharpoons 2 \text{S}_2\text{O}_3^{2-}$ | 0.08 |
| $2 \text{H}_2\text{SO}_3 + \text{H}^+ + 2 e \rightleftharpoons \text{HS}_2\text{O}_4^- + 2 \text{H}_2\text{O}$ | -0.056 |
| $\text{H}_2\text{SO}_3 + 4 \text{H}^+ + 4 e \rightleftharpoons \text{S} + 3 \text{H}_2\text{O}$ | 0.449 |
| $2 \text{SO}_3^{2-} + 2 \text{H}_2\text{O} + 2 e \rightleftharpoons \text{S}_2\text{O}_4^{2-} + 4 \text{OH}^-$ | -1.12 |
| $2 \text{SO}_3^{2-} + 3 \text{H}_2\text{O} + 4 e \rightleftharpoons \text{S}_2\text{O}_3^{2-} + 6 \text{OH}^-$ | -0.571 |
| $\text{SO}_4^{2-} + 4 \text{H}^+ + 2 e \rightleftharpoons \text{H}_2\text{SO}_3 + \text{H}_2\text{O}$ | 0.172 |
| $2 \text{SO}_4^{2-} + 4 \text{H}^+ + 2 e \rightleftharpoons \text{S}_2\text{O}_6^{2-} + \text{H}_2\text{O}$ | -0.22 |
| $\text{SO}_4^{2-} + \text{H}_2\text{O} + 2 e \rightleftharpoons \text{SO}_3^{2-} + 2 \text{OH}^-$ | -0.93 |
| $\text{Sb} + 3 \text{H}^+ + 3 e \rightleftharpoons \text{SbH}_3$ | -0.510 |
| $\text{Sb}_2\text{O}_3 + 6 \text{H}^+ + 6 e \rightleftharpoons 2 \text{Sb} + 3 \text{H}_2\text{O}$ | 0.152 |
| Sb_2O_5 (senarmontite) $+ 4 \text{H}^+ + 4 e \rightleftharpoons \text{Sb}_2\text{O}_3 + 2 \text{H}_2\text{O}$ | 0.671 |
| Sb_2O_5 (valentinite) $+ 4 \text{H}^+ + 4 e \rightleftharpoons \text{Sb}_2\text{O}_3 + 2 \text{H}_2\text{O}$ | 0.649 |

| Reaction | E°/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 |
| SiO_2 (quartz) + 4 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°/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 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° Values More Positive than That of the Standard Hydrogen Electrode

| Reaction | E°/V | Reaction | E°/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 | $[\text{Ferricinium}]^+ + \text{e} \rightleftharpoons \text{ferrocene}$ | 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 |
| $\text{IO}_3^- + 2\text{H}_2\text{O} + 4\text{e} \rightleftharpoons \text{I}^- + 4\text{OH}^-$ | 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°/V | Reaction | E°/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 |
| $Hg^{2+} + 2e \rightleftharpoons Hg$ | 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°/V | Reaction | E°/V |
|--|-------------|--|-------------|
| $3\text{IO}_3^- + 6\text{H}^+ + 6\text{e} \rightleftharpoons \text{I}^- + 3\text{H}_2\text{O}$ | 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° Values More Negative than That of the Standard Hydrogen Electrode

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