

**Table 27-1**

**Standard Reduction Potentials for Half-Reactions\***

(Ionic concentrations, 1 M in water at 25°C)

Weak oxidizing agents	Half-Reaction	Volts	Strong reducing agents
	$\text{Li}^+ + e^- \rightarrow \text{Li}$	-3.05	
	$\frac{1}{2}\text{Ca}^{2+} + e^- \rightarrow \frac{1}{2}\text{Ca}$	-2.87	
	$\text{Na}^+ + e^- \rightarrow \text{Na}$	-2.71	
	$\frac{1}{2}\text{Mg}^{2+} + e^- \rightarrow \frac{1}{2}\text{Mg}$	-2.37	
	$\frac{1}{3}\text{Al}^{3+} + e^- \rightarrow \frac{1}{3}\text{Al}$	-1.66	
	$\frac{1}{2}\text{Mn}^{2+} + e^- \rightarrow \frac{1}{2}\text{Mn}$	-1.18	
	$\frac{1}{2}\text{Cr}^{2+} + e^- \rightarrow \frac{1}{2}\text{Cr}$	-0.91	
	$\frac{1}{3}\text{H}_3\text{BO}_3 + \text{H}^+ + e^- \rightarrow \text{B} + \text{H}_2\text{O}$	-0.87	
	$\frac{1}{2}\text{Zn}^{2+} + e^- \rightarrow \frac{1}{2}\text{Zn}$	-0.76	
	$\text{U}^{4+} + e^- \rightarrow \text{U}^{3+}$	-0.61	
	$\frac{1}{3}\text{Ga}^{3+} + e^- \rightarrow \frac{1}{3}\text{Ga}$	-0.56	
	$\text{CO}_2 + \text{H}^+ + e^- \rightarrow \text{H}_2\text{C}_2\text{O}_4$	-0.49	
	$\frac{1}{2}\text{Fe}^{2+} + e^- \rightarrow \frac{1}{2}\text{Fe}$	-0.44	
	$\text{Cd}^{2+} + e^- \rightarrow \text{Cd}$	-0.40	
	$\text{Co}^{2+} + e^- \rightarrow \text{Co}$	-0.28	
	$\frac{1}{2}\text{Ni}^{2+} + e^- \rightarrow \frac{1}{2}\text{Ni}$	-0.25	
	$\text{Sn}^{2+} + e^- \rightarrow \text{Sn}$	-0.14	
	$\text{Pb}^{2+} + e^- \rightarrow \text{Pb}$	-0.13	
	$\text{H}^+ + e^- \rightarrow \text{H}_2(\text{g})$	0.00	
	$\frac{1}{2}\text{S} + \text{H}^+ + e^- \rightarrow \frac{1}{2}\text{H}_2\text{S}(\text{g})$	0.14	
	$\frac{1}{2}\text{Sn}^{4+} + e^- \rightarrow \frac{1}{2}\text{Sn}^{2+}$	0.15	
	$\text{Cu}^{2+} + e^- \rightarrow \text{Cu}^+$	0.16	
	$\frac{1}{2}\text{SO}_4^{2-} + 2\text{H}^+ + e^- \rightarrow \frac{1}{2}\text{SO}_2(\text{aq}) + \text{H}_2\text{O}$	0.17	
	$\frac{1}{2}\text{Cu}^{2+} + e^- \rightarrow \frac{1}{2}\text{Cu}$	0.34	
	$\text{Cu}^+ + e^- \rightarrow \text{Cu}$	0.52	
	$\frac{1}{2}\text{I}_2(\text{c}) + e^- \rightarrow \text{I}^-$	0.53	
	$\text{HgCl}_2 + e^- \rightarrow \frac{1}{2}\text{Hg}_2\text{Cl}_2 + \text{Cl}^-$	0.63	
	$\text{Fe}^{3+} + e^- \rightarrow \text{Fe}^{2+}$	0.77	
	$\frac{1}{2}\text{Hg}_2^{2+} + e^- \rightarrow \text{Hg}(\text{l})$	0.79	
	$\text{Ag}^+ + e^- \rightarrow \text{Ag}$	0.80	
	$\text{NO}_3^- + 2\text{H}^+ + e^- \rightarrow \text{NO}_2 + \text{H}_2\text{O}$	0.80	
	$\frac{1}{2}\text{Hg}^{2+} + e^- \rightarrow \frac{1}{2}\text{Hg}$	0.85	
	$\text{Hg}_2^{2+} + e^- \rightarrow \text{Hg}^+$	0.92	
	$\frac{1}{3}\text{NO}_3^- + \frac{4}{3}\text{H}^+ + e^- \rightarrow \frac{1}{3}\text{NO}(\text{g}) + \frac{2}{3}\text{H}_2\text{O}$	0.96	
	$\frac{1}{2}\text{Br}_2(\text{l}) + e^- \rightarrow \text{Br}^-$	1.07	
	$\frac{1}{4}\text{O}_2 + \text{H}^+ + e^- \rightarrow \frac{1}{2}\text{H}_2\text{O}$	1.23	
	$\frac{1}{6}\text{Cr}_2\text{O}_7^{2-} + \frac{7}{3}\text{H}^+ + e^- \rightarrow \frac{1}{3}\text{Cr}^{3+} + \frac{7}{6}\text{H}_2\text{O}$	1.33	
	$\frac{1}{2}\text{Cl}_2(\text{g}) + e^- \rightarrow \text{Cl}^-$	1.36	
	$\frac{1}{3}\text{Au}^{3+} + e^- \rightarrow \frac{1}{3}\text{Au}$	1.50	
	$\frac{1}{5}\text{MnO}_4^- + \frac{8}{5}\text{H}^+ + e^- \rightarrow \frac{1}{5}\text{Mn}^{2+} + \frac{4}{5}\text{H}_2\text{O}$	1.51	
	$\frac{1}{2}\text{H}_2\text{O}_2 + \text{H}^+ + e^- \rightarrow \text{H}_2\text{O}$	1.77	
	$\frac{1}{2}\text{F}_2(\text{g}) + e^- \rightarrow \text{F}^-$	2.87	
<b>Strong oxidizing agents</b>			<b>Weak reducing agents</b>

\*For additional values see Table A-12 of the Appendix. Remember  $\text{H}^+$  stands for  $\text{H}_3\text{O}^+$  in solution.