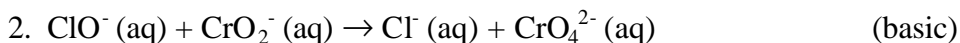
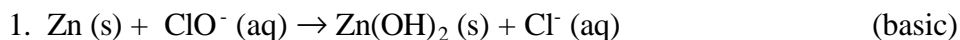


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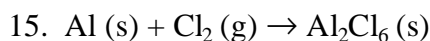
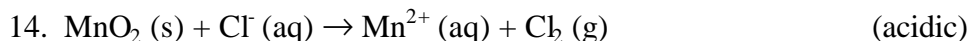
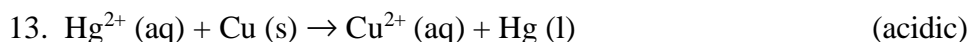
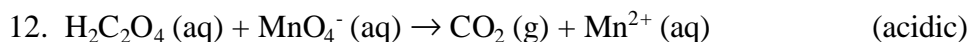
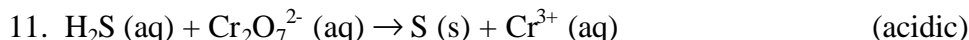
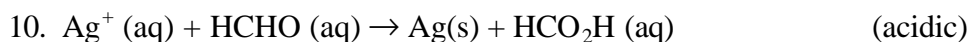
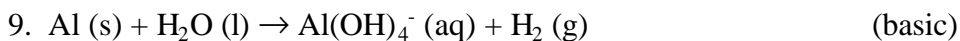
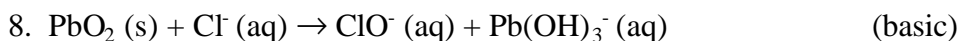
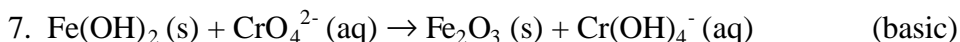
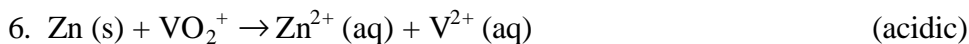
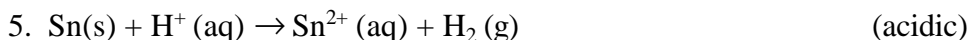
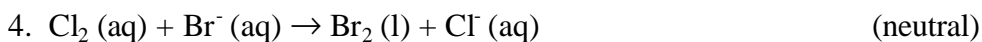
Redox Reaction Balancing

If you would like to read more about balancing redox reactions, see Chapter 4 in the text. Most of this was covered in lecture, but there are a few different examples.

Balance the following redox reactions. The conditions of the reaction are shown in parentheses. The word “neutral” indicates the solution is not basic, contains OH^- (aq), or acidic, contains H^+ (aq). No indication of conditions means that the reaction is not in solution.



N. B. this is an example of a *disproportionation* reaction where the same chemical species (Br_2 in this case) is both the oxidant and the reductant.



Answers

- $$\text{Zn(s)} + \text{ClO}^- (\text{aq}) + \text{H}_2\text{O (l)} \rightarrow \text{Zn(OH)}_2 (\text{s}) + \text{Cl}^- (\text{aq})$$
- $$3 \text{ClO}^- (\text{aq}) + 2 \text{CrO}_2^- (\text{aq}) + 2 \text{OH}^- (\text{aq}) \rightarrow 3 \text{Cl}^- (\text{aq}) + 2 \text{CrO}_4^{2-} (\text{aq}) + \text{H}_2\text{O (l)}$$
- $$6 \text{Br}_2 (\text{l}) + 12 \text{OH}^- (\text{aq}) \rightarrow 10 \text{Br}^- (\text{aq}) + 2 \text{BrO}_3^- (\text{aq}) + 6 \text{H}_2\text{O (l)}$$
- $$\text{Cl}_2 (\text{aq}) + 2 \text{Br}^- (\text{aq}) \rightarrow \text{Br}_2 (\text{l}) + 2 \text{Cl}^- (\text{aq})$$
- $$\text{Sn(s)} + 2 \text{H}^+ (\text{aq}) \rightarrow \text{Sn}^{2+} (\text{aq}) + \text{H}_2 (\text{g})$$
- $$3 \text{Zn (s)} + 2 \text{VO}_2^+ + 8 \text{H}^+ (\text{aq}) \rightarrow 3 \text{Zn}^{2+} (\text{aq}) + 2 \text{V}^{2+} (\text{aq}) + 4 \text{H}_2\text{O (l)}$$
- $$6 \text{Fe(OH)}_2 (\text{s}) + 2 \text{CrO}_4^{2-} (\text{aq}) \rightarrow 3 \text{Fe}_2\text{O}_3 (\text{s}) + 2 \text{Cr(OH)}_4^- (\text{aq}) + \text{H}_2\text{O (l)} + 2 \text{OH}^- (\text{aq})$$
- $$\text{PbO}_2 (\text{s}) + \text{Cl}^- (\text{aq}) + \text{H}_2\text{O (l)} + \text{OH}^- (\text{aq}) \rightarrow \text{ClO}^- (\text{aq}) + \text{Pb(OH)}_3^- (\text{aq})$$
- $$2 \text{Al (s)} + 6 \text{H}_2\text{O (l)} + 2 \text{OH}^- (\text{aq}) \rightarrow 2 \text{Al(OH)}_4^- (\text{aq}) + 3 \text{H}_2 (\text{g})$$
- $$2 \text{Ag}^+ (\text{aq}) + \text{HCHO (aq)} + \text{H}_2\text{O (l)} \rightarrow 2 \text{Ag(s)} + \text{HCO}_2\text{H (aq)} + 2 \text{H}^+ (\text{aq})$$
- $$3 \text{H}_2\text{S (aq)} + \text{Cr}_2\text{O}_7^{2-} (\text{aq}) + 8 \text{H}^+ (\text{aq}) \rightarrow 3 \text{S (s)} + 2 \text{Cr}^{3+} (\text{aq}) + 7 \text{H}_2\text{O (l)}$$
- $$5 \text{H}_2\text{C}_2\text{O}_4 (\text{aq}) + 2 \text{MnO}_4^- (\text{aq}) + 6 \text{H}^+ (\text{Aq}) \rightarrow 10 \text{CO}_2 (\text{g}) + 2 \text{Mn}^{2+} (\text{aq}) + 8 \text{H}_2\text{O (l)}$$
- $$\text{Hg}^{2+} (\text{aq}) + \text{Cu (s)} \rightarrow \text{Cu}^{2+} (\text{aq}) + \text{Hg (l)} \text{ [it really doesn't matter that it is in acid!]}$$
- $$\text{MnO}_2 (\text{s}) + 2 \text{Cl}^- (\text{aq}) + 4 \text{H}^+ (\text{aq}) \rightarrow \text{Mn}^{2+} (\text{aq}) + \text{Cl}_2 (\text{g}) + 2 \text{H}_2\text{O (l)}$$
- $$2 \text{Al (s)} + 3 \text{Cl}_2 (\text{g}) \rightarrow \text{Al}_2\text{Cl}_6 (\text{s})$$