COMMON REACTIONS

Because this region of the periodic table is so large, you would expect great variety in the types of reaction characteristics of transition metals. For example, copper oxidizes in air to form the green patina you see on the Statue of Liberty. Copper reacts with concentrated HNO_3 but not with dilute HNO_3. Zinc, on the other hand, reacts readily with dilute HCl. Iron oxidizes in air to form rust, but chromium is generally unreactive in air. Some common reactions for transition elements are shown by the following.

May form two or more different ions

Example: $Fe(s) \longrightarrow Fe^{2+}(aq) + 2e^-$

Example: $Fe(s) \longrightarrow Fe^{3+}(aq) + 3e^-$

May react with oxygen to form oxides

Example: $4Cr(s) + 3O_2(g) \longrightarrow 2Cr_2O_3(s)$

Example: $2Cu(s) + O_2(g) \longrightarrow 2CuO(s)$

May react with halogens to form halides

Example: $Ni(s) + Cl_2(g) \longrightarrow NiCl_2(s)$

May form complex ions

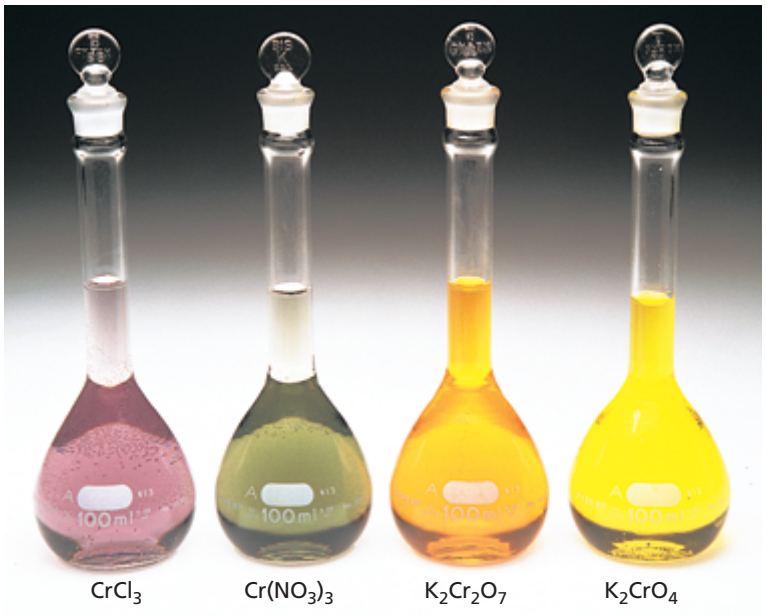
See examples in the lower right.

Copper reacts with oxygen in air.

Copper reacts with concentrated nitric acid.

Zinc reacts with dilute hydrochloric acid.

Soluble iron(III) salts form insoluble $Fe(OH)_3$ when they are reacted with a hydroxide base.



Chromium has several common oxidation states, represented here by aqueous solutions of its compounds. The violet and green solutions contain chromium in the +3 state, and the yellow and orange solutions contain chromium in the +6 oxidation state.

Complex ions belong to a class of compounds called coordination compounds. Coordination compounds show great variety in colors. Several transition-metal coordination compounds are shown.