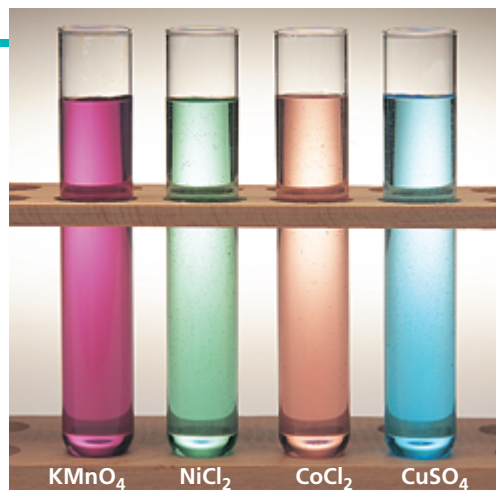


ANALYTICAL TEST

Flame tests are not commonly used to identify transition metals. The presence of a certain transition-metal ion in a solution is sometimes obvious from the solution's color. Some transition-metal ions can be more accurately identified using a procedure called qualitative analysis. **Qualitative analysis** is the identification of ions by their characteristic reactions. The transition-metal ions most often identified through qualitative analysis include copper, nickel, zinc, chromium, iron cobalt, cadmium, manganese, and tin. Most tests to identify the presence of an ion in a mixture involve causing the ion to precipitate out of solution. Some of the more dramatic precipitation reactions for transition metals are shown.



Some transition metal ions can be identified by characteristic colors of their salt solutions.



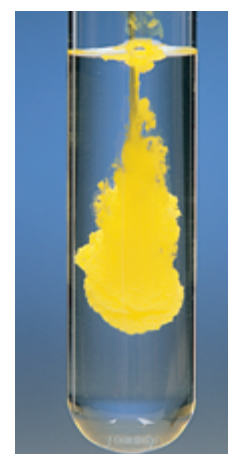
Copper (formation of $[\text{Cu}(\text{NH}_3)_4](\text{OH})_2$)



Cadmium (formation of CdS)



Zinc (formation of ZnS)



Chromium (formation of PbCrO_4)



Iron (formation of $[\text{Fe}(\text{SCN})]^{2+}$)



Manganese (formation of MnO_2)



Nickel (formation of a nickel dimethylglyoxime complex)