

## The Reduction of Chromium

### Purpose

To demonstrate two oxidation states of chromium, generate heat, and produce a gel by mixing two liquids.

### Materials

Two 250 mL Erlenmeyer flasks	0.5M $K_2Cr_2O_7$
Tall form beaker	4M $NaHSO_3$
Two 50 mL graduated cylinders	Hot plate

### Procedure

1. Prepare solution 0.5M  $K_2Cr_2O_7$ . Dissolve 14.7g of potassium dichromate in 100 mL of warm distilled water.
2. Prepare solution 4M  $NaHSO_3$ . Dissolve 41.6g of sodium bisulfite in 100 mL of warm distilled water.
3. Place 50 mL of  $K_2Cr_2O_7$  solution in the beaker and add an equal amount of  $NaHSO_3$  solution to the beaker.
4. The mixture will immediately turn a very dark green, generating quite a bit of heat, and after about 20-30 seconds it will become a gel and lighten.

### Additional Information

1. More than one reaction appears to occur in this system. The most significant reaction involves the reduction of chromium and the subsequent formation of hydrated hydroxide:
2. It is likely the ions of the sulfate and sodium are incorporated in the gel to form an alum  $[KCr(SO_4)_2]$ .
3. This demonstration is a fine introduction to an oxidation-reduction reactions unit.

### Disposal

Remaining solution/solid should be placed in a properly labeled waste container. A spatula may be necessary to scoop out the gel.

### Reference

Summerlin, L., Ealy, J., and Borgford, c> Chemical Demonstrations, Volume II, ACS, 1987.