

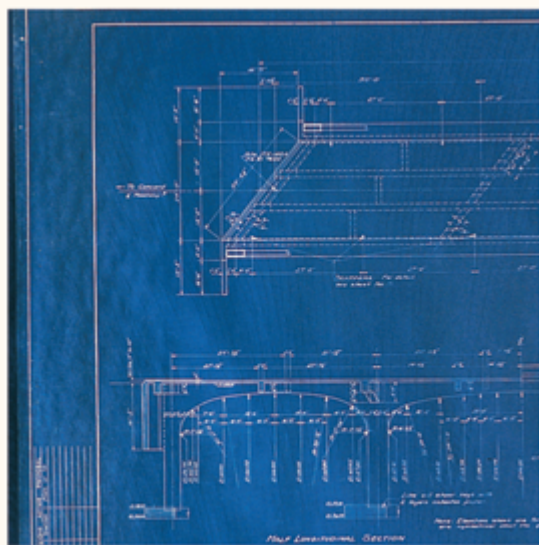
Blueprint Paper

OBJECTIVES

- Prepare blueprint paper and create a blueprint.

MATERIALS

- 10% iron(III) ammonium citrate solution
- 10% potassium hexacyanoferrate(III) solution
- 25 mL graduated cylinders, 2
- corrugated cardboard, 20 cm × 30 cm, 2 pieces
- glass stirring rod
- Petri dish
- thumbtacks, 4
- tongs
- white paper, 8 cm × 15 cm, 1 piece



BACKGROUND

Blueprint paper is prepared by coating paper with a solution of two soluble iron(III) salts—potassium hexacyanoferrate(III), commonly called *potassium ferricyanide*, and iron(III) ammonium citrate. These two salts do not react with each other in the dark. However, when exposed to UV light, the iron(III) ammonium citrate is converted to an iron(II) salt. Potassium hexacyanoferrate(III), $K_3Fe(CN)_6$, reacts with iron(II) ion, Fe^{2+} , to produce an insoluble blue compound, $KFeFe(CN)_6 \cdot H_2O$. In this compound, iron appears to exist in both the +2 and +3 oxidation states.

A blueprint is made by using black ink to make a sketch on a piece of tracing paper or clear, colorless plastic. This sketch is placed on top of a piece of blueprint paper and exposed to ultraviolet light. Wherever the light strikes the paper, the paper turns blue. The paper is then washed to remove the soluble unexposed chemical and is allowed to dry. The result is a blueprint—a blue sheet of paper with white lines.

SAFETY



For review of safety, please see **Safety in the Chemistry Laboratory** in the front of your book.

PROCEDURE

1. Pour 15 mL of a 10% solution of potassium hexacyanoferrate(III) solution into a Petri dish. With most of the classroom lights off or dimmed, add 15 mL of 10% iron(III) ammonium citrate solution. Stir the mixture.
2. Write your name on an 8 cm × 15 cm piece of white paper. Carefully coat one side of the piece of paper by using tongs to drag it over the top of the solution in the Petri dish.