



Explorations Teacher's Guide

Materials and Supplies

What follows is a comprehensive list of materials and supplies necessary to complete all portions of the Explorations in Materials Science kit. Most will be readily available in a high school chemistry laboratory. In the event that the provided supplies become depleted, suppliers are listed for the materials that are difficult to obtain.

Kit Components

Bar Mold (included)

This mold is made from a polymer that can withstand temperatures up to approximately 275 °C. This is higher than the melting point of tin (232 °C). Keep in mind that many hot plates can produce temperatures in excess of 500 °C and caution your students to exercise care when using the molds on a hot plate to avoid melting them. Extra molds may be purchased from the Institute for Chemical Education (see contact information on page ii).

Anchor Cement

Used to make the ceramic samples, this finely powdered mixture of Portland cement and gypsum plaster can be obtained very inexpensively at hardware and home supply stores, under the brand names PourStone and Rockite, among others.

Epoxy

Two-part epoxy, which is mixed to form the polymer samples, can be obtained at any hardware, home supply store, or supermarket. We recommend Duro Master Mend Epoxy #81501, but most brands will work. Whatever brand you buy, be sure that it takes at least 5 minutes to set, in order to give students enough time to mix and pour the epoxy into the molds.

Tin Metal (included)

The tin shot included in this kit can be obtained from Belmont Metals. Request Grade A Tin Shot at (718) 342-4900. <http://www.belmontmetals.com> (accessed Feb. 4, 2008)

Chemicals

6.0 M HCl

6.0 M NaOH

saturated KMnO₄ solution

reducing agent (e.g. AgNO₃) (optional)

Equipment and Supplies

- gloves*
- safety goggles*
- hot plate*
- Bunsen burner*
- balance*
- tongs*
- aluminum foil*
- plastic wrap*
- petroleum jelly*
- cotton swabs*
- test tubes*
- test tube rack*
- glass microscope slides*
- dissecting microscope or magnifying glass*
- metric ruler*
- multimeter or ohmmeter*
- paraffin wax or candles*
- ring stands and clamps*
- twine or heavy duty string*
- plastic weigh boats or other disposable containers*
- kilogram weights, lead sinkers or sealable containers filled with sand or water*
- ceramic crucible or pyrex beaker*
- paper cups*
- hammer*
- small glass beaker*
- disposable glass pipettes*