EXPERIMENT 22

Polymers and Toy Balls

OBJECTIVES

- ***Synthesize*** **two different polymers.**
- ***Prepare*** **a small toy ball from each polymer.**
- ***Observe*** **the similarities and differences between the two types of balls.**
- ***Measure*** **the density of each polymer.**
- ***Compare*** **the bounce height of the two balls.**

MATERIALS

- **2 L beaker, or plastic bucket or tub**
- **3 mL 50% ethanol solution**
- **5 oz paper cups, 2**
- **10 mL 5% acetic acid solution (vinegar)**
- **25 mL graduated cylinder**
- **10 mL graduated cylinder**
- **10 mL liquid latex**
- **12 mL sodium silicate solution**
- **distilled water**
- **gloves**
- **meterstick**
- **paper towels**
- **wooden stick**

BACKGROUND

What polymers make the best toy balls? Two possibilities are latex rubber and a polymer produced from ethanol and sodium silicate. Latex rubber is a polymer of covalently bonded atoms.

The polymer formed from ethanol, C_2H_5OH, and a solution of sodium silicate, $Na_2Si_3O_7$, also has covalent bonds. It is known as *water glass* because it dissolves in water.

In this experiment, you will synthesize rubber and the ethanol silicate polymer and test their properties.

SAFETY

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

PREPARATION

1. **Organizing Data:** Create a data table in your lab notebook in which the columns are labeled "Trial," "Height (cm)," "Mass (g)," and "Diameter (cm)." Create three rows (Trials 1, 2, and 3) in your table.

PROCEDURE

1. Fill the 2 L beaker, bucket, or tub about half-full with distilled water.
2. Using a clean 25 mL graduated cylinder, measure 10 mL of liquid latex and pour it into one of the paper cups.
3. Thoroughly clean the 25 mL graduated cylinder with soap and water, and then rinse it with distilled water.