

Forensic Glass Analysis Experiment

Density of Glass: The Flotation Method Handout

(adapted from ChemMatters, "More Than Meets The Eye" Brian Rohrig)

Rationale

There are many methods to examine glass. One method is to measure the density of glass through the flotation method. In the flotation method a glass fragment will either float in a liquid of greater density, sink in a liquid of lower density, or remain suspended in a liquid of equal density.

Materials

- Apron
- Safety gloves
- Safety goggles
- Glass fragments
- Bromoform ($d=2.89\text{g/cm}^3$)
- Bromobenzene ($d=1.52\text{g/cm}^3$)
- Pasteur pipettes
- Stirring rods
- Test tubes
- Tweezers

Safety

Students are to handle all scientific equipment in a proper lab environment with the utmost safety in mind. In addition, the chemicals bromoform and bromobenzene are slightly toxic.

Procedures

1. Use tweezers to place a small fragment of glass in a 10cm or smaller test tube
2. Using a Pasteur pipette, add bromoform. The test tube should be a quarter full of the liquid
3. On a separate sheet of paper count and record the number of drops of bromoform used. The glass should float on the surface of the liquid
4. Add bromobenzene
5. On the same sheet of paper count and record the number of drops of bromobenzene used. Adjust the density of the liquid in the test tube so that the fragment is suspended. Use a stirring rod to mix the two liquids before observing the location of the glass each time
6. Record the number of drops of bromobenzene needed
7. Using the formula below, calculate the density of the mixture of bromoform and bromobenzene:

$$D = \frac{X(2.89) + Y(1.52)}{X+Y}$$

D = density

X = drops of bromoform

Y = drops of bromobenzene

