

## Tutorial 0010

### Density

A piece of jewelry weighs 10.440 g and has a volume of 0.887 cm<sup>3</sup>. The jewelry contains only gold and silver, which have densities of 19.3 g/cm<sup>3</sup> and 10.5 g/cm<sup>3</sup> respectively. Assume that the total volume of the jewelry is the sum of the volumes of the gold and silver that it contains, what is the percentage (by mass) of gold in the jewelry?

(Circle the correct answer): a)77.5 %      b)52.3 %,      c)33.4 %,      d)23.7 %

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1. A square piece of aluminum foil, 5.0 cm, along the edge, is found to weigh 0.1148 g. Given that the density of aluminum is 2.70 g/cm<sup>3</sup>, what is the thickness of this foil in angstrom.

2. The density of uranium, U, is 18.95 g/mL. What is the volume, in mL, of 123 g of uranium?

3. An empty graduated cylinder weighs 60.52 g. Some gasoline is added to the cylinder and its volume is measured to be 33.27 mL. Together the graduated cylinder and the gasoline weigh 83.14 g. Calculate the density of this sample of gasoline.

(Answer: 0.06799 g/mL)

4. A 4.0 in square piece of aluminum foil is found to weigh 0.466 g. What is the thickness of the foil, in millimeters, if the density of the foil is 2.69 g/cm<sup>3</sup>?

(Answer: 0.017 mm)

5. A 60.3-g sample of a pulverized metal ore is placed in a container whose volume is 50.0 mL. The container is then completely filled with water and weighed. The ore and water have a combined mass of 102.3 g. Assuming that the density of water is 1.00 g/cm<sup>3</sup>, calculate the density, in g/cm<sup>3</sup>, of the metal ore.

(Answer: 7.5 g/cm<sup>3</sup>.)

## **Physical and Chemical Properties**

### **1. Determine if this is a physical (P) or chemical (C) property.**

1. Plants use carbon dioxide and water to make sugar.
2. Water vapour in the air on cold day forms frost.
3. Melting point of a solid is  $52^{\circ}\text{C}$ .
4. A block of styrofoam floats on water.
5. Sugar becomes caramel when heated above its melting point.
6. Iron dissolves in hydrochloric acid and hydrogen gas evolves.
7. Lithium metal has a shiny surface. After exposure to air, it becomes dull.
8. An iron nail is attracted to a magnet.

### **1. Determine if this is a physical (P) or chemical (C) change.**

1. A pure water is separated from seawater.
2. Electricity is passed through water to produce hydrogen and oxygen gases.
3. A white T-shirt is dyed red.
4. A wet mop dries in the sun
5. Making ice cube in the freezer.
6. An iron bar rusts.
7. Boiling of an egg.
8. Potato is washed with water.