Exercise 1.93

You are assigned the task of separating a desired granular material with a density of 3.62 g/cm^3 from an undesired granular material that has a density of 2.04 g/cm^3. You want to do this by shaking the mixture in a liquid in which the heavier material will fall to the bottom and the lighter material will float. A solid will float on any liquid that is more dense. Using an Internet-based source or a handbook of chemistry, find the densities of the following substances: carbon tetrachloride, hexane, benzene, and diiodomethane. Which of these liquids will serve your purpose, assuming no chemical interaction takes place between the liquid and the solids?

Solution

The numbers below are from Wikipedia.

$$\text{Density of carbon tetrachloride :} \qquad 1.5867 \ \frac{\text{g}}{\text{cm}^3}$$

$$\text{Density of hexane :} \qquad 0.6606 \ \frac{\text{g}}{\text{cm}^3}$$

$$\text{Density of benzene :} \qquad 0.8765 \ \frac{\text{g}}{\text{cm}^3}$$

$$\text{Density of diiodomethane :} \qquad 3.325 \ \frac{\text{g}}{\text{cm}^3}$$

Use diiodomethane since its density is less than that of the desired material and greater than that of the undesired material.