Percentage Composition

Percentage means “out of 100’

If in a test you score 30 / 40, we can convert it to a percentage

\[ \text{Percentage} = \frac{\text{Score}}{\text{possible}} \times 100 = \frac{30}{40} \times 100 = 75\% \]

The percentage composition of a chemical substance is basically the same, but instead of looking at test scores etc, we look at the mass percentage

Example 1

What is the percentage of water in margarine if a 1.30 g mass of margarine contains 0.400 g of water?

\[ \%(\text{water}) = \frac{\text{mass of water}}{\text{total mass}} \times 100 = \frac{0.400 \text{ g}}{1.30 \text{ g}} \times 100 = 30.8 \% \]

In chemistry, we sometimes need to know the percentage of a particular element in a compound

Example 2

What is the percentage of magnesium (Mg) and Chlorine (Cl) in magnesium chloride (MgCl2)?

Hint: Use the molar masses of both Mg and MgCl2

\[ \%\text{(Mg)} = \frac{m(\text{Mg})}{M(\text{MgCl}_2)} = \frac{24.0 \text{ g mol}^{-1}}{95.0 \text{ g mol}^{-1}} = 25.3 \% \ (3\text{sf}) \]

\[ \%\text{(Cl)} = \frac{m(\text{Cl})}{M(\text{MgCl}_2)} = \frac{71.0 \text{ g mol}^{-1}}{95.0 \text{ g mol}^{-1}} = 74.7 \% \ (3\text{sf}) \]