

Unit
2
Solutions

Expressing Concentrations:

There are different ways by which concentration of solution can be described.

(i) **Mass Percentage (W/W):**

Mass of solute dissolved in 100g of a solution.

$$\text{Mass \%} = \frac{\text{Mass of Solute}}{\text{Mass of Solution}} \times 100$$

(ii) **Volume Percentage (V/V):**

Volume of solute dissolved in 100ml of a solution.

$$\text{Volume \%} = \frac{\text{Volume of Solute}}{\text{Volume of Solution}} \times 100$$

(iii) **Mass by volume Percentage (W/V):**

Mass of solute dissolved in 100ml of a solution.

$$\text{Mass by Volume} = \frac{\text{Mass of Solute}}{\text{Volume of Solution}} \times 100$$

(iv) **Parts per million:**

No of parts of solute present in 10^6 parts of solution is known as parts per million.

(v) **Mole fraction (χ):**

The ratio of no moles of given component to the total no of moles of solution is known as Mole fraction.

$$\text{Mole fraction } (\chi) = \frac{\text{No of moles of one component}}{\text{Total no of moles of solution}}$$

For a binary solution,

$$\text{Mole fraction of component A} = \frac{\text{No of moles of A}}{\text{Total no of moles}} = \frac{n_A}{n_A + n_B}$$

$$\text{Mole fraction of component B} = \frac{\text{No of moles of B}}{\text{Total no of moles}} = \frac{n_B}{n_A + n_B}$$

$$\text{Sum of mole fractions of A \& B} = \chi_A + \chi_B = 1$$

