Ch 12

Like dissolves like

\[ \text{I}_2 (s) \quad : \quad \text{I} - \text{I} \quad \text{nonpolar} \]
\[ \text{molecular} \]

\[ \text{CoCl}_2 (s) \quad \text{very polar} \]

Cobalt (II) chloride

\text{ionic} \quad \text{Co}^{2+} \quad \text{Cl}^\text{-} \quad \text{Cl}^\text{-}

\[ \text{H}_2\text{O} \quad 1.8/\text{ml} \]

\[ \text{Hexane} \quad \text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-CH}_3 \quad 0.15/\text{ml} \]

Soaps & detergents

read on your own

Concentration how much solute is dissolved

strong/weak \rightarrow \text{dilute} \quad \downarrow \text{concentrated}
**Molarity**

Most common unit of concentration used by chemists

\[ \text{Molarity} = \frac{\text{moles solute}}{\text{liters solution}} \]

Unit: \( M = \frac{\text{mol}}{L} \)

- 1.00 \text{ M} = 1.00 \text{ mol NaCl} \text{ in} \ 1 \text{ L solution}

\[ 1.00 \text{ mol NaCl} \times \frac{58.44 \text{ g NaCl}}{1 \text{ mol NaCl}} = 58.44 \text{ g NaCl} \]

Molar mass NaCl = 22.99 g + 35.45 g = 58.44 g/mol

**Volumetric flask**

1. Add 58.44 g NaCl
2. Add enough H₂O to make 1 L of solution
How do you make 250 ml of 3.5 M NaCl soln?

\[ \frac{250 \text{ ml}}{1 \text{ L}} \times \frac{3.5 \text{ mol NaCl}}{1 \text{ L}} = 87.5 \text{ g NaCl} \]

- Total vol of solution
- Molarity
- Molar mass
- Solute mass needed
- Volumetric flask
- Add H₂O to line (total solution volume)

If 4.27 L of NaOH solution were prepared from 8.32 mol NaOH, what is the molarity?

\[ M = \frac{\text{mol solute}}{\text{L solution}} \]

\[ \frac{8.32}{4.27} \approx 1.95 \]