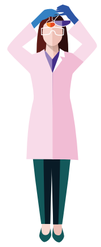
Based on Physical State

- Gas in Gas (Air)
- Gas in liquid (Soda water)
- Gas in Solid (Hydrogen in Pd)
- Liquid in gas (Fog)
- Liquid in liquid (Alcohol in H_2O)
- Liquid in Solid (Amalgams)
- Solid in gas (Smog)
- Solid in liquid (Sugar in water)
- Solid in Solid (alloys)



Based on Concentration

- Dilate Solution
- Concertated Solution
- Solurated Solution
- Saper Solurated Solution

Types of Solutions

Concentration terms

Mole fraction (x)

$$= \frac{\text{No. of moles of Solute}}{\text{Total moles in Solution}}$$

Mass percentage (w/w)

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

Molarity (M)

$$= \frac{\text{No. of moles of Solute}}{\text{Volume of Solution (L)}}$$

Parts per million (PPM)

$$= \frac{\text{No. of parts of Solute}}{\text{Total No. of parts of all compounts of Solution}}$$

Molality (M)

$$= \frac{\text{No. of moles of Solute}}{\text{weight of the Solvent in Kg}}$$

Volume % (V/V)

$$\frac{\text{Volume of Solute}}{\text{Total volume of Solution}} \times 100$$

Mass by volume %

$$= \frac{\text{mass of Solute}}{\text{Total moles in Solution}}$$

Normality (N)

$$= \frac{\text{No. of grams equivalent of Solute}}{\text{Volume of Solution (L)}}$$

SOLUBILITY

Gas in liquid

Effect of pressure

Solubility increases with increase in pressure

Solid in liquid

Effect of Nature of Solute of Solvent

→ Like dissoles Like

Effect of temp →
Exothermic Process:-
Increase with rise in temp.
Effect → Endothermic Process:-
Decrease with rise in temp.
Effect of prassure
→ No effect

Liquid in liquid

Effect of pressure

Raoult's Law

Partial vapour pressure = Parical presssure × Mole fraction

$$P_s = P_A^\circ X_A + P_B^\circ X_B$$

Henry's Law

Partial pressure of gas in vapour Phase

Mole fraction of the gas (x)

$$P = KHX$$

Homogenous mixture of two or more pure substance

SOLUTION

Solvent (Max.amount)

Solute (Min.amount)

Colligative property

OSmotic Pressure

Pressure applied to Stop the flow of Salvent through Semi permeable memberane

$\pi = CRT$

Elevation of Boiling Point

$$\Delta T_b = \frac{K_b \times 1000 \times w_2}{M_2 \times w_1}$$

Depression in freezing point

$$\Delta T_f = \frac{K_f \times w_2 \times 1000}{M_2 \times w_1}$$

Relating loucing of rapour pressure

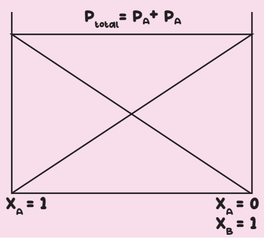
$$\frac{w_2 \times M_1}{M_2 \times w_1} = \frac{P_A - P_S}{P_A}$$

Ideal & NON ideal Solution

Ideal

Raoult's Law

$$P_s = P_A^\circ X_A + P_B^\circ X_B$$

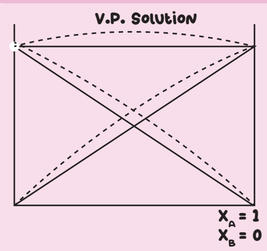


NON Ideal

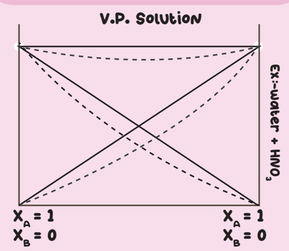
Does Not obey Rault's law

$$P_s \neq P_A^\circ X_A + P_B^\circ X_B$$

Positive deviation



Negative deviation



Azeofropeo

- Constant boiling mixtures

Positive deviation mixture

Minimum boiling azeotropes
Ex. 95% Ethonol in water

Nagative deviation mixture

Maximum boiling azeotropes
Ex. 68% HNO3 in water

Van't hoff factor (i)

Ratio of the Normal mass to the obsered molecular mass of the solute:

$$i = \frac{\text{Normal molor mass}}{\text{Ab Normal Molar Malar mass}}$$