

RAOULT'S LAW

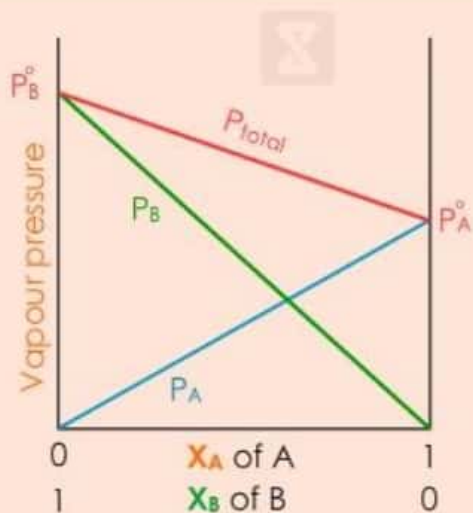
The vapour pressure of a solution of a non-volatile solute is equal to the vapour pressure of the pure solvent at that temperature multiplied by its mole fraction.

$$P_{\text{SOLN}} = X_{\text{SOLVENT}} P^{\circ}_{\text{SOLVENT}}$$

P_{SOLN} = VAPOUR PRESSURE OF THE SOLUTION

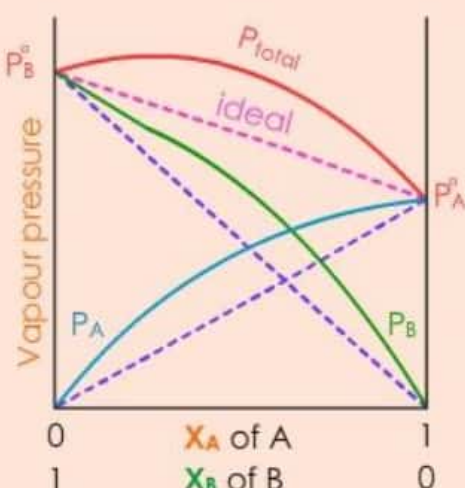
X_{SOLVENT} = MOLE FRACTION OF THE SOLVENT

$P^{\circ}_{\text{SOLVENT}}$ = VAPOUR PRESSURE OF THE PURE SOLVENT



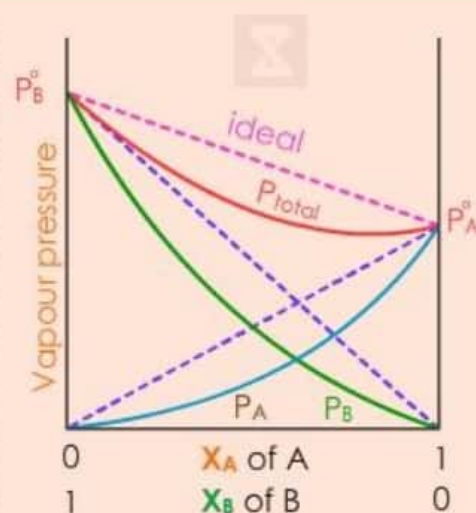
$$\begin{aligned} P_A &= X_A P_A^{\circ} \\ P_B &= X_B P_B^{\circ} \\ P_{\text{Total}} &= P_A + P_B \end{aligned}$$

Raoult's law



$$\begin{aligned} P_A &> X_A P_A^{\circ} \\ P_B &> X_B P_B^{\circ} \\ P_{\text{Total}} &> P_{\text{Ideal}} \end{aligned}$$

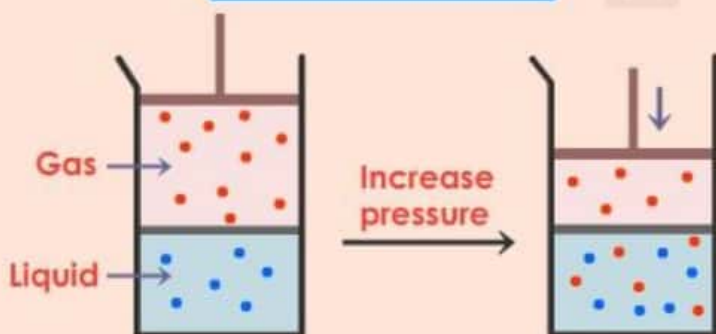
Positive deviation from Raoult's law



$$\begin{aligned} P_A &< X_A P_A^{\circ} \\ P_B &< X_B P_B^{\circ} \\ P_{\text{Total}} &< P_{\text{Ideal}} \end{aligned}$$

Negative deviation from Raoult's law

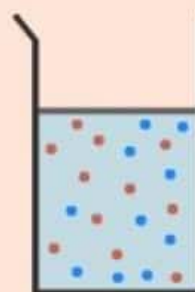
HENRY'S LAW



$$P = K_H \cdot C$$

At a constant temperature, the amount of a given gas that dissolves in a given type and volume of liquid is directly proportional to the partial pressure of that gas in equilibrium with that liquid.

VAPOUR PRESSURE



$$\begin{aligned} P_{\text{Total}} &= P_A + P_B \\ P_A &= X_A \cdot P_A^{\circ} \\ P_B &= X_B \cdot P_B^{\circ} \end{aligned}$$

Each substance has a lower vapour pressure from that of a pure substance !

Even though it looks like the mix may be "50/50", "A" particles have a higher vapour pressure (evaporate more easily) than the "B" substance.