

According to Raoult's law in equation form, for a mixture of liquids A and B, this reads:

$$p_A = x_A \times P_A^{\circ}$$

$$p_B = x_B \times P_B^{\circ}$$

In this equation, P_A and P_B are the partial vapour pressures of the components A and B.

And

The total vapour pressure of the mixture is equal to the sum of the individual partial pressures.

$$\text{Total vapour pressure} = p_A + p_B = P$$

Also x_A and x_B are the mole fractions of A and B. That is exactly what it says it is - the fraction of the total number of moles present which is A or B.

You calculate mole fraction using, for example:

$$x_A = \frac{\text{moles of A}}{\text{total number of moles}}$$

From this

$$x_A + x_B = 1$$

$$P = P_A \cdot x_A + P_B \cdot x_B = P_A \cdot x_A + P_B - P_B \cdot x_A$$

$$x_A = (P - P_B) / (P_A - P_B) = (286 - 395) / (96 - 395) = 0.3645 = n_A / (n_A + n_B); \quad n = \text{number of moles}$$

$$n_A = (n_A + n_B) \cdot 0.3645$$

From the condition, we know that mixture we have equal masses C_6H_6 (we call it a component B) and compound X (we call it a component A). It follows that $M_A \cdot n_A = M_B \cdot n_B \Rightarrow n_A = M_B \cdot n_B / M_A$. Combining these two equations, we obtain $M_B \cdot n_B / M_A = (M_B \cdot n_B + M_A \cdot n_B) / M_A \cdot 0.3645$
 $\Rightarrow M_B \cdot n_B = M_B \cdot n_B \cdot 0.3645 + M_A \cdot n_B \cdot 0.3645$
 $\Rightarrow M_B = M_B \cdot 0.3645 + M_A \cdot 0.3645$

$$\Rightarrow M_A = (M_B - M_B * 0.3645) / 0.3645 = ((6 * 12 + 6) - (6 * 12 + 6) * 0.3645) / 0.3645 = 136$$

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