

SOLUTIONS

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graph TD; A[SOLUTIONS] --> B[Ideal solution]; A --> C[Non ideal solution];
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Ideal solution

Obeys Raoult's Law over entire range of concentration

$$\Delta H_{\text{mix}} = 0$$

$$\Delta V_{\text{mix}} = 0$$

A-A interactions and B-B interactions are nearly equal to those between A-B interactions, i.e., in this case the intermolecular attractive forces between the solute-solute and solvent-solvent molecules are nearly equal to those between the solute-solvent molecules

n-hexane and n-heptane, bromoethane and chloroethane, benzene and toluene,

Non ideal solution

Does not obey Raoult's law

ΔH_{mix} is not equal to 0

ΔV_{mix} is not equal to 0

A-A interactions and B-B interactions are not equal to those between A-B interactions, i.e., in this case the intermolecular attractive forces between the solute-solute and solvent-solvent molecules are not equal to those between the solute-solvent molecules

Acetone and chloroform, nitric acid and water

NON IDEAL SOLUTIONS



Positive deviation from Raoult's law

$$p_1 > x_1 p_1^0$$

$$\Delta H_{\text{mix}} > 0 \text{ (endothermic)}$$

$$\Delta V_{\text{mix}} > 0 \text{ (volume increases on mixing)}$$

A-B interactions are WEAKER than those between A-A or B-B, i.e., in this case the intermolecular attractive forces between the solute-solvent molecules are weaker than those between the solute-solute and solvent-solvent molecules.

ethanol and acetone, carbon disulphide and acetone

Form minimum boiling azeotrope

Negative deviation from Raoult's law

$$p_1 < x_1 p_1^0$$

$$\Delta H_{\text{mix}} < 0 \text{ (exothermic)}$$

$$\Delta V_{\text{mix}} < 0 \text{ (volume decreases on mixing)}$$

A-B interactions are STRONGER than those between A-A or B-B, i.e., in this case the intermolecular attractive forces between the solute-solvent molecules are stronger than those between the solute-solute and solvent-solvent molecules.

phenol and aniline, chloroform and acetone

Form maximum boiling azeotrope