Topic 5E - Molality

Colligative Properties

Properties that depend on the relative <u>numbers</u> of solute and solvent particles, and <u>not</u> on their chemical identities.

Units

Molality (m)

$$m = \frac{\text{Amount (moles) of solute}}{\text{Mass (kg) of solvent}}$$

Molality is determined by the relative amounts of solute and solvent **before** mixing, and is independent of temperature. Molality is "solvent-oriented."

Molarity is determined by the relative amounts of solute and solvent **after** mixing, and is temperature-dependent because solution density is temperature-dependent. Molarity is "solution-oriented."

Conversion of molarity into molality requires that the density of the solution be known.

Mole Fraction (x)

$$x_{solute} = \frac{\text{Moles of solute}}{\text{Moles of solute} + \text{moles of solvent}}$$

$$= 1 - x_{solvent}$$