Solutions Reference Sheet

Definitions

Solute
The substance that is being dissolved in a solution

Solvent
The substance that something is being dissolved into

Solution
The solute and solvent combined

Solubility
The amount of solute that can be dissolved at a given temperature

Saturated solution
Maximum amount of solute dissolved

Unsaturated solution
Less than the maximum amount of solute dissolved

Supersaturated solution
More than the maximum amount of solute dissolved

Dissolve
When molecules of solute are surrounded by molecules of solvent and are pulled apart from other solute molecules

Dissociate
When an ionic compound has it's ionic bond disrupted by solvent molecules and it breaks into individual ions

Electrolytes
Ionic solutes that dissociate into ions in a solution

Non-electrolytes
Covalent compounds that do not dissociate into ions in a solution

Heat of solution
The energy involved when solute dissolves/ dissociates

~~Colligative Properties~~
~~Properties whose value depend only on the number of solute particles, and not on what they are. Examples: boiling point elevation, freezing point depression, osmotic pressure.~~

~~Osmotic Pressure~~
~~The minimum pressure that stops osmosis.~~

Equations

$$Mass\ Percent = \left(\frac{mass\ of\ solute}{mass\ of\ solution}\right) x\ 100$$

$$Parts\ per\ Million = \left(\frac{mass\ of\ solute}{mass\ of\ solution}\right) x\ 1{,}000{,}000$$

$$Parts\ per\ Billion = \left(\frac{mass\ of\ solute}{mass\ of\ solution}\right) x\ 10^9$$

$$Grams\ per\ Liter = \left(\frac{mass\ of\ solute}{volume\ of\ solution}\right)$$

$$Mole\ fraction\ of\ A = Xa = \left(\frac{n_A}{n_A + n_B + \cdots}\right)$$

$$Mole\ \%\ of\ A = Xa = \left(\frac{n_A}{n_A + n_B + \cdots}\right) x\ 100$$

$$Molarity = M = \left(\frac{moles\ of\ solute}{Liters\ of\ solution}\right)$$

$$Dilutions = M_1V_1 = M_2V_2$$

$$Molality = m = \left(\frac{moles\ of\ solute}{kilograms\ of\ solvent}\right)$$

$$\Delta H_{soln} = \Delta H_{solute} + \Delta H_{solvent} + \Delta H_{mix}$$

~~$$P_{soln} = X_{solvent}P^{\circ}_{solvent}$$~~

~~$$\Delta P = P^{\circ}_{solvent} - P_{solution} = X_{solute}P^{\circ}_{solvent}$$~~

~~$$P_{total} = P_A + P_B = X_AP^{\circ}_A + X_BP^{\circ}_B$$~~

~~$$\Delta T = i \bullet K_f \bullet m_{solute}$$~~

~~$$\Delta T = i \bullet K_b \bullet m_{solute}$$~~

~~$$\pi = iMRT$$~~