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Chemistry (Math Notes)
Module #10

TERMS

A solute is the substance that is dissolved.
A solvent is the substance that the solute is dissolved in.
A solution is the solute + the solvent.
Solubility refers to the maximum amount of solute that can be dissolved in a given amount of solvent.
A saturated solution is a solution in which the maximum amount of solute has been dissolved.
Precipitation is the process by which a solid solute leaves a solution and turns back into its solid phase.
Exothermic is a process that releases heat.
Endothermic is a process that absorbs heat.
Water is a common solvent because more substances can be dissolved in it than in solids, even gasses can be dissolved in water.
Example:

Why? Because all ionic compounds dissolve by splitting into ions. Covalent compounds don't break up into ions, but the water molecules surround these compounds.
Example:

RULES OF SOLUBILITY

1. The solubility of an solute depends both on the identity of the solute *and* the identity of the solvent. (Be sure to understand and remember the facts in Table 11.1 – p.358)
2. For solid solutes, solubility increases with increasing temperature. *(Direct relationship)*
3. For liquid solutes, solubility is not affected by temperature. *(No relationship)*
4. For gas solutes, solubility decreases with increasing temperature. *(Inverse relationship)*
5. increasing pressure increases the solubility of gases. *(Direct relationship)*
6. Pressure does not affect the solubility of solids and liquids. *(No relationship)*

FORMULAS:

Molarity (M) = $\frac{\text{moles of solute}}{\text{liters of solution}}$

Molality (m) = $\frac{\text{moles of solute}}{\text{mass of solvent (kg)}}$

When a solute is dissolved in a solvent, the resulting change in the freezing temperature is determined by the following formula: $\Delta T_f = -iK_f m$

Define Freezing Point Depression: Each solvent has its own unique freezing point

Define Boiling Point Elevation: Each solvent has its own boiling point.

When a solute is dissolved in a solvent, the resulting change in the boiling point temperature is determined by the following formula: $\Delta T_{bp} = iK_{bp} m$

What is a Solution? How do You Saturate A Solution?