

→ Chapter 4: Types of Chemical Reactions and Solution Stoichiometry

→ VOCAB:

- ◆ aqueous solutions - solutions in which water is the solvent or dissolving medium
- ◆ polar molecule - a molecule that has a permanent dipole moment
- ◆ hydration - the interaction between solute particles and water molecules
- ◆ solubility - the amount of a substance that dissolves in a given volume of solvent at a given temperature
- ◆ anions - negative ions
- ◆ cations - positive ions
- ◆ electrical conductivity - a solution's ability to conduct an electric current
- ◆ electrolyte - a substance that when dissolved in water produces a solution that can conduct electricity
- ◆ standard solution - solution whose concentration is accurately known

- 4.1 Water, the Common Solvent

- H₂O molecules are bent at 105 degrees (H-O-H)
- water is the universal solvent
- δ (delta) indicates a partial charge (less than one unit of charge)
- water is a polar molecule b/c of unequal charge distribution
 - ◆ this gives H₂O the ability to dissolve compounds
- when ionic substances (salts) dissolve in H₂O, they break up into the individual anions and cations
 - (aq) designates that ions are hydrated by unspecified amt. of H₂O
- solubility of ionic substances in water varies greatly BUT when an ionic solid does dissolve in water, the ions become hydrated and are dispersed (move around independently)
 - ◆ depends on relative attractions of the ions for each other (these forces hold the solid together)
 - ◆ depends on the attractions of the ions for water molecules (which cause the solid to disperse in water)
- "Like dissolves like"
 - ◆ water usually dissolves polar and ionic substances
 - ◆ it does dissolve nonionic substances (ex) ethanol
 - ◆ it does not dissolve fats/oils

- 4.2 The Nature of Aqueous Solutions: Strong and Weak Electrolytes

- a solution is a homogenous mixture (same throughout)
- (substance → solute) → dissolved in (liquid water → solvent)
- pure water is not a good conductor
 - ◆ substances that contain strong electrolytes
 - ◆ solutions that conduct a small current contain weak electrolytes
 - ◆ substances that don't allow the flow of a current contain nonelectrolytes [ex) table sugar and ethanol]