Chem 115 Class Notes 2/21/08 KF

***As a reminder, things to be memorized for the exam next week on Thursday Feb. 28:
1) The names and symbols of the first 36 elements…on periodic table
2) The names and formulas for polyatomic ions (w/charges)… can be found on class website: http://alpha.chem.umb.edu/chemistry/ch115/sevian/index.html... also, make sure to study how to figure out names of ions with common roots, like ClO_2^- is chlorite, so BrO_2^- is bromite
3) The Solubility Guidelines…page 127 in book or Lecture 8 slides: top of page 2

Exchange Reactions

-chemical reactions are important to study because they play an integral part in producing chemicals that we use in many products. Sulfuric acid, nitrogen, ethylene, and propylene are some of the most produced chemicals made by industries.

-chemical changes are always about electrons

electrons are involved in 4 types of processes:

-transfer of a proton, H^+, which is a hydrogen atom without its electron
-a sharing of electron pairs between two chemical species
-a transfer of an electron from one chemical species to another.
- a sharing of single electron between two species

How do we know a chemical reaction has occurred?

On a macroscopic level (what we observe with our senses):

-a solid appears (a precipitate)
-a gas forms (presence of bubbles, smell a new odor)
-a change in color

can indicate chemical or physical change:

-heat released
-heat absorbed
-a chemical changes phases (e.g. gas to liquid)

3 Types of Chemical Reactions in Aqueous Solutions:

1) Precipitation reaction- there is a formation of a solid where there was none previously
2) Acid-base reactions- happens when the pH of the product solution is different from the pH of the reactant solution
3) Oxidation-reduction (redox) reaction- electricity can be generated if the reactions are separated in a certain way. Combustion reactions are an example of this. So is rusting.

-exchange reactions are chemical reactions that involve positive ions and negative ions to *exchange* partners when mixed in a solution.

Ex: $AgNO_{3(aq)} + KCl_{(aq)} \rightarrow AgCl_{(s)} + KNO_{3(aq)}$

-when two ionic solutions are mixed, you can use the solubility guidelines to tell if one of the products is a **precipitate**, which is an insoluble (cannot be dissolved) solid as a result of a chemical reaction. In the example above, silver chloride (AgCl), is the precipitate.

-to predict whether an ionic product dissolves or forms a precipitate, you must rely on the Solubility Guidelines.

-if there is a reaction, meaning that a precipitate has formed, a **net ionic equation** can be written. A net ionic equation shows the ions (with their charges) that are involved in the production of the precipitate. The ions that do not participate in making the precipitate are known as the **spectators** and are omitted in this equation. For our example above, the net ionic equation is as follows:

$$Ag^{+}_{(aq)} + Cl^{-}(aq) \rightarrow AgCl_{(s)}$$