

CHEM 1305 - Chapter 07 - Handout

Memorize:

Table 7.1 (solubility rules); types of reaction classifications

Define the following terms; explain the following concepts, and answer the following questions:

- 1) Name four of the “driving forces” that pull reactants toward products
 - a) FORMATION OF A GAS
 - b) FORMATION OF WATER
 - c) FORMATION OF A SOLID
 - d) TRANSFER OF ELECTRONS

- 2) Strong Electrolyte
 - a) define: SUBSTANCE THAT COMPLETELY IN WATER TO PRODUCE SEPARATE IONS (e.g., $\text{NaCl} \rightarrow \text{Na}^+ + \text{Cl}^-$).

 - b) ****what property does a strong electrolyte impart to water?**
WATER (OR MORE PROPERLY, THE AQUEOUS SOLUTION OF WATER PLUS THE ELECTROLYTE) BECOMES A GOOD CONDUCTOR OF ELECTRIC CURRENT.

- 3) Arrange the following in order of weakest --> strongest electrolyte:
tap water, deionized water, salt water

DEIONIZED WATER < TAP WATER < SALT WATER

4) Mark each of the following with an “N” (for NOT soluble, or only very slightly soluble, in water) or “Y” (for soluble in water)

- a) NaCl - Y (a sodium compound, therefore soluble)
- b) AgCl - N
- c) PbSO₄ - N (one of three sulfates that are NOT soluble)
- d) NaNO₃ - Y (nitrates always soluble, are sodium compounds)
- e) Fe (OH)₃ - N (transition metal hydroxyl's not soluble; note: GP 1 & II hydroxyl's are)
- f) Ba(OH)₂ - Y (Group II hydroxyl)
- g) NH₄NO₃ - Y (all common ammonium compounds soluble)
- h) NH₄Cl - Y (ditto)
- i) PbCl₂ - N (halogen salts with Hg²⁺, Ag⁺, Pb²⁺ not soluble)
- j) CuS - N (sulfides are generally insoluble)

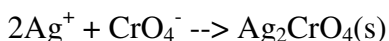
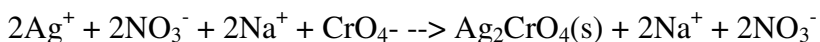
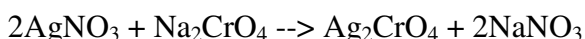
5) List and describe the three types of equations for reactions in aqueous solutions:

- a) MOLECULAR - (all compounds written as charge neutral species)
- b) TOTAL IONIC - (all, and only, ionizable materials written as ions)
- c) NET IONIC - (only the substances that contribute to the formation of the PPT are shown.)
(Corollary: all 'spectator ions' are removed from the Total Ionic Eq.)

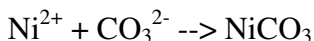
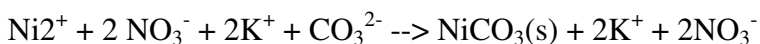
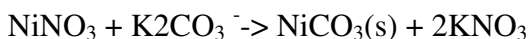
6) Ions called SPECTATOR IONS are present, but do not participate directly in a reaction in solution.

7) Write Molecular, Total Ionic, Net Ionic equations for the following reactions:

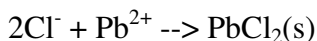
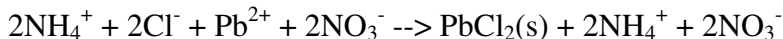
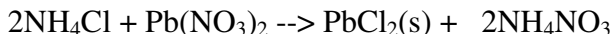
- a) Aqueous silver nitrate is added to aqueous sodium chromate to form solid silver chromate and aqueous sodium nitrate.



- b) Aqueous nickel(II) nitrate is added to aqueous potassium carbonate to form solid nickel(II) carbonate and aqueous potassium nitrate.



- c) Aqueous ammonium chloride and aqueous lead(II) nitrate react to form solid lead (II) chloride and aqueous ammonium nitrate.



- 8) Define the following”
- a) acid - SUBSTANCE THAT DONATES H+ WHEN DISSOLVED IN WATER
 - b) strong acid - ACID THAT DISSOCIATES 100%
 - c) base - SUBSTANCE THAT DONATES HO- WHEN DISSOLVED IN WATER
 - d) strong base - BASE THAT DISSOCIATES 100%
- 9) ARRHENIUS (last name of scientist) who proposed that an acid is a substance that produces H^+ ions (protons) when it is dissolved in water.
- 10) The name given to reactions that involve the transfer of electron(s) is OXIDATION-REDUCTINO, OR 'REDOX' FOR SHORT.
- 11) * List eight reaction classifications:
- a) PRECIPITATION
 - b) DOUBLE DISPLACEMENT
 - c) ACID-BASE
 - d) REDOX
 - e) SINGLE DISPLACEMENT
 - f) COMBUSTION
 - g) SYNTHESIS (OR COMBINATION)
 - h) DECOMPOSITION
- 12) *Can a given reaction have more than one classification? (Y or N)