Exam 1 Study Guide

October 18, 2022

This is a checklist based on the lecture and textbook materials. It is not expected to be an all encompassing study guide but rather, provides a guideline for your studies.

Chapter 4: Chemical Composition

- Mass percent composition formula
- The concept of the mol (Avogadro's number)
- Finding molar masses
- Molarity (mol/L)
- Dilutions ($M_1V_1 = M_2V_2$)

Chapter 5: Chemical Reactions and Equations

- Components of chemical reaction - states, reactants, and products
- Balancing chemical equations
- Classes of chemical reactions - decomposition, combination, single- and double-displacement
- Metal reactivity for single-displacement reactions
- Acid-base reactions for double-displacement reactions
- Solubility rules for precipitation reactions (recall: experiment 1 - filtration technique)

Chapter 6: Quantities in Chemical Reactions

- Meaning of the balanced chemical equation (analogy to cookbook recipe)
- Stoichiometry - mole ratios, converting mols-mols and mass-mass
- Determining limiting and excess reagents
- Percent yield, actual yield, theoretical yield
- Energy changes

- Law of conservation of energy
- $q = mC\Delta T$
- Endothermic vs Exothermic reactions
- Energy sign conventions (+ and - signs)
- Calorimetry
- Heat changes in chemical reactions

Chapter 7: Electron Structure of the Atom

- Electromagnetic radiation and energy of a photon ($E_{\text{photon}} = \frac{hc}{\lambda}$)
- Atomic spectra and continuous spectra
- ROYGBV (700 nm to 400 nm) and corresponding energy