Chem 101A Exam 3 Concepts

Chapter 5 – Gases

- ✓ gas pressure – origin and conversions (5.1)
- ✓ Use ideal gas equation (PV=nRT) and related gas equations (derive formulas such as PV=constant) (5.2,5.3)
- ✓ Use density version of ideal gas equation (MP=dRT) (5.4)
- ✓ gas stoichiometry (5.4)
- ✓ STP = standard temperature, 0°C and pressure, 1 atm (5.4)
- ✓ Molar (ideal) gas volume 22.414 L/mol @STP only (5.4)
- ✓ Dalton's law of partial pressures and applications to ideal gas equation, mole fraction (5.5)
- ✓ kinetic molecular theory – model for ideal gas behavior (5.6)
- ✓ root mean square velocity given temperature and molar mass (units important!) (5.6)
- ✓ average kinetic energy of gas given temperature (5.6)
- ✓ don't forget diatomic elements (H_2,N_2,O_2,F_2,Cl_2,Br_2,I_2)
- ✓ real gas vs ideal gas behavior and VDW formula (5.8)

Chapter 6 – Thermochemistry

- ✓ First Law of Thermodynamics (kinetic, potential, chemical energy) (6.1)
- ✓ Definition of state function (6.1)
- ✓ $\Delta E = q + w$ (6.1)
- ✓ heat flow in ($q > 0$) –OR– out ($q < 0$) (6.1)
- ✓ system does work ($w < 0$) –OR– system receives work ($w > 0$) (6.1)
- ✓ PV work ($w=-P\Delta V$) for expanding/compressing gases. (expanding gas DOES work, compressing gas RECEIVES work) (6.1)
- ✓ Enthalpy, change in enthalpy, exothermic vs endothermic (6.1)
- ✓ Calorimetry (6.2)
- ✓ energy and stoichiometry (moles -> heat) (6.2)
- ✓ meaning of ΔH (6.2)
- ✓ ΔH sign for state changes (6.2)
- ✓ Applying Hess' Law (6.3)
- ✓ $\Delta H_f°$ meaning, elements in their standard states at 1 atm, 25°C (6.4)
- ✓ Use $\Delta H_f°$ of reactants, products to calculate ΔH_{rxn} (6.4)
- ✓ Know the difference and how to use/apply each: $\Delta H°_{vap}$, $\Delta H°_{sub}$, $\Delta H°_{rxn}$, $\Delta H°_{soln}$, $\Delta H_f°$