Review Sheet for First Exam

Topics Covered

- stoichiometry (review Chem 170 modules) and math review
- types of chemical reactions
- reaction energy diagrams
- thermodynamics vs. kinetics
- calorimetry
- enthalpy (including enthalpy of atom combination and formation)
- Hess's law
- entropy
- Gibb's free energy
- predicting signs of ΔH^{o}, ΔS^{o} and ΔG^{o} and predicting effect of temperature on ΔG^{o}
- thermodynamics of redox reactions
- relationship between thermodynamics (ΔG^{o}), equilibrium (K) and potential (E^{o})

Equations You Should Know

- $-q_{rxn} = q_{soln} = m\mathrm{S}\Delta T$
- $\Delta \mathrm{H} = \frac{\mathrm{q_{rxn}}}{\mathrm{n_{LR}}} \times \frac{\nu_{LR}}{\mathrm{mol_{rxn}}}$
- $\Delta H^{o}_{rxn} = \left[\sum n_i \left(\Delta H^{o}_{f}\right)_i\right]_{prod} - \left[\sum n_i \left(\Delta H^{o}_{f}\right)_i\right]_{react}$ (also for ΔS^{o} or ΔG^{o})
- $\Delta \mathrm{S^{o}} = \frac{\Delta \mathrm{H^{o}_{unavail}}}{\mathrm{T}}$
- $\Delta G^{o} = \Delta H^{o} - \mathrm{T}\Delta \mathrm{S} = -\mathrm{R}T\ln K = -n\mathrm{F}E^{o}$
- $\Delta G = \Delta \mathrm{G^{o}} + \mathrm{R}T\ln Q$
- $E^{o}_{rxn} = E^{o}_{red} + E^{o}_{ox}$
- $\mathrm{E} = \mathrm{E^{o}} - (\mathrm{R}T/n\mathrm{F})\ln Q$

Constants Provided To You

- specific heat of water = 4.184 J/g•^{o}C
- R = 8.314 J/K•mol$_{rxn}$
- F = 96,485 C/mol e^{-} = 96,485 J/V•mol e^{-}