Review Sheet for Exam on Kinetics

This review sheet provides a summary of topics covered in this section of the course, a list of equations that you should know, and a list of constants and other materials that are provided to you. As Chem 170 is a prerequisite for this course, you should be familiar with basic stoichiometric calculations.

Topics Covered

- rates of chemical reactions
- instantaneous rates and average rates
- rate laws, rate constants, and reaction orders
- differential rate laws, integrated rate laws, and half-lives
- pseudo-order rate laws
- method of initial rates
- mechanisms and rate laws
- activation energy
- thermodynamics and kinetics

Equations You Should Know

- $R = -\frac{d[A]}{dt} = -\frac{\Delta[A]}{\Delta t}$
- $R = k[A]^{\alpha}[B]^{\beta} \cdots [Z]^{\zeta}$
- $[A]_t = [A]_0 - kt$
- $\ln[A]_t = \ln[A]_0 - kt$
- $\frac{1}{[A]_t} = \frac{1}{[A]_0} + kt$
- $t_{1/2} = \frac{0.693}{k}$
- $k = Ae^{-E_a/RT}$
- $\ln(k) = \mathrm{A} - E_a/RT$

Constants and Other Materials Provided To You

- periodic table
- specific heat of water = 4.184 J/g • °C
- R = 8.314 J/K • $\mathrm{mol_{rxn}}$
- F = 96,485 C/mol $\mathrm{e^-}$ = 96,485 J/V • mol $\mathrm{e^-}$
- $K_w = 1.00 \times 10^{-14}$