Chem 164/261
Assignment 2 & Lecture Outline 2:
Alkanes and Alkyl Halides – Isomerism and Conformations

Read

TWG Solomons and CB Fryhle "Organic Chemistry" 10e Edition (2011) (8th or 9th Edition also OK):

- Functional Group List on pp 73-74 (pp 68-69 -9th Edition; pp 70-71 - 8th Edition) and (Periodic Table) one page back from Inside Back Cover
- Chapter 4 – Alkanes: Nomenclature and Conformational Analysis
- Chapter 10 – Alkyl Halides. Radical Halogenation Sections 10.1 to 10.7

Problems

Do **Not** turn in, answers available in "Study Guide and Solutions Manual for Organic Chemistry" for Solomons. This is available in the Bookstore - For earlier editions solve same problem numbers

- **Chapter 4:** 4.1 to 4.3; 4.5; 4.10; 4.12 to 4.14; 4.19; 4.20; 4.23; 4.24, 4.37; 4.39
- **Chapter 10:** 10.1; 10.2; 10.4 to 10.9; 10.11; 10.12; 10.14; 10.24

Lecture Outline #2

I. **Introduction**
   A. Formula Conventions
   B. Nomenclature
      1. Common Names
      2. International Systems – IUPAC
      3. Cycloalkanes

II. **Sources of Alkanes and Physical Properties**
   A. Sources of Hydrocarbons
   B. Physical Properties – boiling point, melting point, solubility
   C. Combustion to CO_2 and H_2O

III. **Conformation of Molecules**
   A. Non-bonded Interactions in Open-chain hydrocarbons
      1. Ethane
      2. Butane
   B. Cycloalkane Conformation
      1. Cyclopropane
      2. Cyclohexane
      3. Other cycloalkanes

   C. Substituted Cycloalkanes and Geometrical Isomerism

1. Monosubstituted Cycloalkanes – Conformation
2. Disubstituted Cycloalkanes – Isomerism
3. Polycyclic Cycloalkanes

IV. **Chemical Properties of Alkanes**

A. General Properties and Reaction Mechanisms
B. Halogenation of Alkanes
    1. Methane Halogenation
        a) Mechanism of Chlorination
        b) Reaction Rates and Transition States
        c) Reactions with Different Halogens
    2. Halogenation of Higher Alkanes and Stability of Radicals
        a) Inductive Effects
        b) Hammond Postulate

V. **Introduction to Alkyl Halides**

A. Nomenclature
B. General Properties