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

Read

Organic Chemistry, L Wade, UA Custom Edition, 2013, Volume 1 (Chem 164/261)

- Functional Group List - Inside Front Cover (also Handout)
- Periodic Table – Inside Back Cover - know 1st 10 elements (up through Neon)
- Relative Strength of Acids and Bases – Table 1.5
- Chapter 4 – Structure of Alkanes (Isomerism and Conformations)
- Chapter 5 – Chemical Reactions (Halogenation of Alkanes, Thermodynamics & Kinetics)
- Chapter 7 – Alkyl Halides (Only sections 7.1 to 7.5 – Nomenclature & Physical Properties)

Problems: (do all "*solved problems*" in chapters listed below)

Do **Not** turn in, answers available in "Student Solutions Manual for Organic Chemistry" for LG Wade

- **Chapter 4:** 4.1 to 4.8; 4.10 to 4.12; 4.14 to 4.21; 4.24; 4.25; 4.28; 4.29; 4.33a-f; 4.37
- **Chapter 5:** 5.1; 5.2; 5.9a; 5.15; 5.18; 5.19; 5.23b-c; 5.30; 5.36; 5.37; 5.39; 5.42; 5.43
- **Chapter 7:** 7.2; 7.3; 7.7; 7.8a

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