

Chem 161
Assignment & Lecture Outline 2:
Alkanes and Alkyl Halides – Isomerism and Conformations

Read

From TWG Solomons and CB Fryhle "Organic Chemistry" 8th Edition (2004):

- Functional Group List on pp 70-71 and (Periodic Table) near Back Cover
- Chapter 4 – Alkanes: Nomenclature and Conformational Analysis
- Chapter 10 – Alkyl Halides. Radical Halogenation and Radical Reactions

Problems

Do **Not** turn in, answers available in "Study Guide and Solutions Manual for Organic Chemistry" for Solomons. This is available in the Bookstore or can be borrowed from Cameron Library's Reserve Reading Room

- **Chapter 4:** 4.1 to 4.3; 4.5; 4.10; 4.12 to 4.14; 4.19; 4.20; 4.22; 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 CO₂ and H₂O

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