

Fundamentals of Organic Chemistry

Syllabus Number

5C227

Basic Major Subjects

Elective Requisites 2
credit

TAKAHASHI, Senji

1. Course Description

The following subjects will be studied in the course.

(1) Focusing on alkanes, alkenes, alkynes and dienes. Naming convention based on the IUPAC nomenclature system, structural formulation and physiological/chemical properties of these compounds will be studied as well as typical reactions.

(2) Stereochemistry of alkanes and alkenes: Focusing on structural, geometrical and asymmetric isomerizations. Naming convention based on the IUPAC nomenclature system structural, formulation and optical properties of these compounds will be studied.

2. Course Objectives

The course objectives are to understand basic chemistry which will be required to pursue other chemistry-related courses. It also leads students to have interest in chemical characteristics, reaction properties and chemical synthesis methodology of organic compounds.

3. Grading Policy

Reports and occasional test (20%) results are considered with final examination results (80%).

4. Textbook and Reference

Textbook

Harold Hart, Leslie E. Craine, David J. Hart

(translated by Kinya Akiba and Akira Oku) "Organic Chemistry : A Short Course [10th Edition]"
(Hart Kisoyukikagaku (in Japanese))

Baifukann
ISBN978-4-563-04587-6

5. Requirements (Assignments)

(Preparation of lecture) The students are required to read the corresponding part of the text in advance, make it clear what they don't understand, and be ready to ask during the lecture (1.5 hr.).

(Review of lecture) The students should check any contents, which they could not understand, after the lecture (1.5 hr.).

6. Note

7. Schedule

- [1] Classification of organic compounds
- [2] Alkane (1) Covalent bond and sp^3 hybrid orbital
- [3] Alkane (2) Nomenclature of alkanes / Conformation
- [4] Alkane (3) Preparation (Coupling : alkyl halides and organometallic compounds)
- [5] Alkane (4) Reaction (Halogenation)
- [6] Alkene (1) sp^2 hybrid orbital / Nomenclature of alkenes
- [7] Alkene (2) Preparation (Elimination of alkyl halides / Dehydration of alcohols)
- [8] Alkene (3) Reaction 1 (Addition reactions / Markovnikov addition)
- [9] Alkene (4) Reaction 2 (Oxymercuration reaction / Hydroboration / Ozonolysis)

- [10] Alkyne (1) sp hybrid orbital / Nomenclature of alkenes
- [11] Alkyne (2) Preparation (Reaction of sodium acetylide and alkyl halides)
- [12] Alkyne (3) Reaction (Addition reactions / Keto-enol tautomerism)
- [13] Diene (1) Reaction (1,2-addition and 1,4-addition)
- [14] Diene (2) Diels- Alder reaction
- [15] Stereoisomer (Configurational isomer and enantiomer / R, S convention)