Advanced Topics in Polymerization Reactions

2 units (selection)

Koichi Ute · Professor / Synthetic and Polymer Chemistry, Chemical Science and Technology, Earth and Life Environmental Engineering

Tomohiro Hirano · Associate Professor / Physicochemistry and Material Science, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 The purpose of this class is to understand the principles of polymer syntheses and polymer characterizations.

Outline〉 In the first half of this course (#1-#8), the basic principles of solution properties and solid-state structures of polymers are lectured. In the second half (#9-#15), recent progress in polymerization chemistry is lectured.

Style〉 Lecture

Keyword〉 ***living polymerization, stereospecific polymerization, coordination polymerization, property of polymer solution, solid-state properties of polymers***

Fundamental Lecture〉 "**Polymer Chemistry 1**"(1.0), "**Polymer Chemistry 2**" (1.0)

Relational Lecture〉 "**Advanced Organic Chemistry**"(0.5)

Requirement〉 Requires undergraduate level knowledge of chemistry.

Notice〉 Bring the textbook in the lectures #1 - #8.

Goal〉

1. To understand the principles of polymer syntheses.
2. To understand relationship between monomer structure and reactivity in polymerization reaction.
3. To understand the basic principles of solution properties and molecular weight determination.
4. To understand the basic principles of solid-state properties and the experimental methods for crystal structure determination.

Schedule〉

1. outline of macromolecular science, determination of molecular weight
2. properties of polymer solution 1 (membrane osmometry and the 2nd virial coefficient)
3. properties of polymer solution 2 (theory and experimentals of light scattering)
4. properties of polymer solution 3 (viscometry)
5. properties of polymer solution 4 (chromatography of polymer)
6. solid-state structure of polymer 1 (crystal and non-crystal, experimental methods for solid-state properties of polymers)
7. solid-state structure of polymer 2 (crystal structure)
8. thermal properties of polymers
9. classification of polymerization reaction
10. stereospecific living anionic polymerization of methacrylates
11. characterization of polymers
12. Ziegler-Natta polymerization
13. single-site catalysts
14. metathesis polymerization
15. polymerization of acetylenes

Evaluation Criteria〉 Assignment counts 100% mainly based on the report submitted.

Textbook〉 伊勢典夫他著「新高分子化学序論」化学同人

Reference〉

- ◇ 佐藤恒之他著「高分子化学」朝倉書店
- ◇ 野瀬卓平他編「大学院高分子科学」講談社
- ◇ Silverstein 他著「有機化合物のスペクトルによる同定法」東京化学同人

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216696

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Ute (化学棟 406, +81-88-656-7402, ute@chem.tokushima-u.ac.jp) Mail
(Office Hour: Monday 15:00 - 17:00)
⇒ Hirano (G405, hirano@chem.tokushima-u.ac.jp) Mail