Chemical Process Design and Development

2 units (selection)

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Target〉 The purpose of this class is to introduce the basic theory of both reaction engineering and plant engineering

Outline〉 The required properties of industrial catalysts, as well as their application to industrial processes will be explained. The recent techniques to analyze the local structure of active sites will also be introduced. An emphasis is placed on the application of XPS, EXAFS and solid NMR. Portfolio style is also available.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***catalyst, NMR, EXAFS, chemical reactor, microreactor***

Fundamental Lecture〉 "**Surface Science and Technology**"(0.5), "**Advanced Molecular Transformations**"(0.4)

Relational Lecture〉 "**Advanced Molecular Design**"(0.3), "**Materials Chemistry**"(0.3)

Requirement〉 Requires undergraduate level knowledge of catalyst chemistry and reaction engineering.

Notice〉 Preparations for lessons review will be needed.

Goal〉

1. To understand the state of art of industrial catalysts and its industrial applications in the lectures from 1st to 5th and 11th to 13th.
2. To understand the advanced technique of analysing local structure of catalysts in the lectures from 6th to 10th and 14th to 15th.

Schedule〉

1. Industrial catalysts(1): State of art of reactors and catalysts
2. Industrial catalysts(2): Catalyst preparation
3. Industrial catalysts(3): Status and future of catalysts for chemicals' production
4. Industrial catalysts(4): Status and future of catalysts for environment protection
5. Industrial catalysts(5): Applcations to industrial plants, including microreactors
6. Analysis of local structure (1): XPS
7. Analysis of local structure (2): Introduction to EXAFS
8. Analysis of local structure (3): Application of EXAFS
9. Analysis of local structure (4): Introduction to solid state NMR
10. Analysis of local structure (5): Application of solid state NMR
11. Case study (1): Application of EXAFS to catalysts
12. Case study (2): Application of EXAFS to environmental protection materials
13. Case study (3): Application of solid state NMR to catalysts
14. Case study (4): Application of solid state NMR to environmental protection materials
15. Case study (5): Summary. Submission of the report on the present course will be requested.

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

Textbook〉 All lecture documents will be opened through U-learning system.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216877

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

Contact〉

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