CATALYSIS IN FUEL INDUSTRY AND AIR POLLUTION CONTROL

4 ECTS

AGH University of Science and Technology

Course responsible: Prof. dr. Teresa Grzybek

Course overview

The main objective of the course is to bring to the students the knowledge of the catalytic methods in fuel processing and environmental protection. The course is built of two parts: lectures and laboratories.

Lectures:

During lectures students will be acquainted with the most important issues in adsorption and catalysis as applied to fuel processing and environmental protection. Lectures will concern the following subjects:

- Interface phenomena.
- Fundamentals of adsorption.
- Physical sorption and chemisorption.
- Porous solids and their characterization.
- The application of adsorbents.
- The structure of catalysts – the role of active component, carrier and promoters.
- Acidic catalysts.
- Dispersion. Bi-functional catalysts.
- Monoliths. The preparation of catalysts. Deactivation and the methods of its limitation.
- Methods of catalysts characterization.
- Selected catalytic processes.

Laboratory exercises are:

1. Treatment of waste water by adsorption methods
2. The preparation of catalysts
3. The determination of textural properties
4. Structure determination: XRD
5. Surface characterization methods: XPS
6. The determination of catalytic activity

Outcome of the course

After completion of the course students should be able to:

- Describe the state of technology in refining industry and environmental protection and indicate the current world trends
- Discuss and present to the public the current technological state of the above
- Propose a type of catalyst for a given process
- Basing on experimental/technological data, discuss the reasons for deactivation and indicate typical methods to prolong catalyst life
- Propose a preparation method for a catalyst and carry it out
- Choose an appropriate analytical method to determine catalyst properties
- Analyse most important properties of an adsorbent (texture, amounts sorbed etc.) and a catalyst (activity, selectivity, texture, structure etc.)

Course coordinator & teachers

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