CERAMIC MATERIALS FOR ENERGY INDUSTRY

3 ECTS (ELECTIVE)

AGH University of Science and Technology

Course responsible: dr. Magdalena Dudek

Course overview

The main objective of the course is to bring to the students the knowledge of the physicochemical properties of ceramic materials and their possible application to energy industry

The course is built of lectures and laboratory.

During lectures students will be acquainted with the most important issues in materials science and technology. Lectures will concern the following subjects: Introduction of ceramic materials, ceramic for turbine engines, thermal barrier coatings, corrosion of selected ceramic materials in hot gas environment, ceramic membranes in carbon dioxide capture applications and potentials, Direct carbon fuel cell, solid oxide fuel cells , ceramic materials for renewable energy

Laboratory content:

1. The oxidation and corrosion behaviour of non-oxide ceramic materials,
2. Preparation and characterization of 8YSZ thermal barrier coatings,
3. Direct carbon fuel cell with a solid oxide electrolyte,
4. Solid oxide fuel cell

Outcome of the course

After this course the student should be able to:

- Describe the physicochemical properties of ceramic materials
- Discuss and present to the public the recent possibility of application of ceramic materials as components for chemical and energy industry
- Propose adequate materials solutions for a given process in chemical or energy industry
- Basing on experimental/technological data, discuss the reasons for high temperature application of ceramic materials in energy industry

- Discuss and present to the public new possibilities of utilization of some materials as components for renewable energy
- Choose an appropriate analytical method to determine physicochemical properties of ceramic materials

Course coordinator & teachers

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