



## **CHEMISTRY OF COAL**

**2 ECTS**

**AGH University of Science and Technology**

**Course responsible: Dr. Grzegorz S. Jodłowski**

### **Course overview**

The aim of the course is to acquire a fundamental knowledge on the structure, properties and chemistry of coal and carbonaceous materials. Students should: 1) understand coal structure models and the genesis of natural coal, carbonaceous materials sources and physical and chemical properties of coal and carbonaceous materials; 2) understand the influence of different parameters of coal structure on the applicability of coals; and 3) be able to carry out and interpret basic physico-chemical analyses of carbonaceous materials.

The course is built of two parts: lectures and laboratories. Lectures content are:

- Introduction to coal technology, nomenclature and classification
- Theory of coal and organic derivatives genesis and metamorphism.
- Modern models of coal structure.
- Lignite and hard coal structure and microstructure.
- Carbonaceous natural fuels classification and sources.
- Texture and chemistry of coal surface.
- Carbo-chemistry of coal (coal treatment).
- Introduction to coal liquefaction and gasification.
- Review of coal derivatives and semi-products. Modern carbon materials.

Laboratory: The determination of:

- Density of hard coal by pycnometry.
- Decolouring properties of hard and active coals.
- Wettability of hard coal.
- Specific surface area of hard coal.
- Elemental analysis of hard coal.
- Surface groups of hard coal.
- Self-ignition of hard coal.

### **Outcome of the course**

After this course the student should have the knowledge of:

- structure and properties of allotropic types of carbon;
- natural kinds of coal and carbonaceous materials;

- genesis and metamorphism of coal and petroleum;
- absolute basics of coal and petroleum geology;
- models of coal structure;
- composition of crude oil;
- classification of fossil fuels;
- physical and chemical properties of hard coal;
- solvent analysis of coal or carbon materials;
- coal degasification, gasification and liquefaction;
- processes of coal burning and co-burning; production,
- developing and application of porous carbonaceous materials;
- Properties of active coal, molecular sieves, activated cokes and relative materials; carbon-mineral composites.

The student should be able to:

- carry out measurements of: coal density, enthalpy of burning, decoloring properties of active carbon;
- determine: coal surface groups, porosity of coals or active carbons
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**Course coordinator & teachers**

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