Course:
Recent Advances in Organic metals and Structural Analysis

Teaching hours: 15 h

Prerequisites: The course is primarily open to all PhD students at Gdansk University of Technology.

Course outline

The first part of the course concerns the issues of organic conductors of electricity, their synthesis, properties, physical basics. The main focus is on issues related to the chemical synthesis of this type molecules, products isolation and possible side reactions.

The second part of the course is dealing with nanotechnological aspects of research. The recent progresses in gold nanoparticles, metallic organic frameworks, self-assembled monolayers and analytical application of calixarenes are presented. The analytical technics available for characterization of these nanostructures are also included.

General topics coverage:

1. Band theory of solids. Semiconductors, insulators, metals, conducting polymers, doping of polymers
2. Synthesis of polymeric conductors (PANI, PPV)
3. Non-polymeric organic conductors
4. Organic superconductors
5. Practical application of organic conductors
6. Frontier molecular orbitals theory
7. Metallic organic frameworks
8. Gold nanoparticles and self-assembled monolayers
9. The analytical application of calixarenes

Teaching mode

There will be 15 hours of lectures. During the course students will be asked to discuss particular examples together with solving example problem during classes.

Examination

After each part of the lecture, a short test is planned. Passing of the course will be based on the average of the two parts.

Literature:

1. Takehiko Mori Tadashi Kawamoto Annu. Rep. Prog. Chem., Sect. C: Phys. Chem.**,** 2007,103, 134-172
2. Akiko Kobayashi, Emiko Fujiwara, Hayao Kobayashi Chem. Rev.2004, 104, 11, 5243–5264
3. Heidi L. van de Wouw, Juan Chamorro, Michael Quintero, Rebekka S. Klausen *J. Chem. Educ.* 2015, 92, 12, 2134–2139
4. Hayao Kobayashi, HengBo Cui, Chem. Rev. 2004, 104, 5265–5288
5. J.L. Bredas G. B. Street, Acc, Chem, Res, 1985, 18, 309-315
6. D. Lorcy, N, Bellec, Chem. Rev. 2004, 104, 5185–5202