

Level: Master				
Course title: IHN-504 Chemistry of fullerenes				
Status: elective				
ECTS: 6				
Requirements: none				
Learning objectives To expand the students' views on cluster carbon structures, fullerenes, nanotubes and other carbon nanomaterials. The course lessons cover the most important chemical reactions of fullerenes, especially C ₆₀ , carbon nanotubes, and physico-chemical properties of carbon nanomaterials and nanocomposites. During experiments, students will synthesise and physico-chemically determine covalent fullerene derivatives, inclusive complexes, as well as nanocomposites of fullerenes by using state-of-the-art techniques for separation and determination of nanoparticles. One of the main goals is to educate students to successfully search patents and scientific literature, develop critical thinking, set up scientific hypothesis, improve writing skills and present experimental results.				
Learning outcomes Students should be able to search scientific literature and patents, recognise fundamental issues concerning chemical properties of fullerenes and other carbon nanomaterials, deal with basic knowledge of result interpretation obtained by state-of-the-art instruments for nanomaterial characterisation.				
Syllabus <i>Theoretical instruction</i> Fullerenes and their properties, chemical reactivity, regiochemistry of multiaddition reactions, nucleophilic reactions, cycloaddition reactions, hydrogenation and halogenation of C ₆₀ , radical reactions, fullerene polymers, biologically active derivatives of fullerenes, advances in nanocarbon materials. <i>Practical instruction</i> Basic principles of synthesis (synthesis of polybrominated and polyether derivatives of C ₆₀ and inclusive complexes of C ₆₀) and separation of nanoparticles, state-of-the-art techniques applied to determine synthesised derivatives: GEC, TEM, AFM, SEM, DLS and zeta-potential measurements.				
Weekly teaching load				Other:
Lectures: 2	Exercises: 2	Other forms of teaching: 1	Student research:	