GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Supramolecular Chemistry and Technology, PG_00045475		
Field of study	Chemical Technology		
Date of commencement of studies	February 2022	Academic year of realisation of subject	2022/2023
Education level	second-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Chemistry and Technology of Functional Materials -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Ewa Wagner-Wysiecka	
	Teachers	dr hab. inż. Ewa Wagner-Wysiecka dr inż. Radosław Pomećko dr inż. Natalia Łukasik	

Lesson types and methods of instruction							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	E-learning hours included: 0.0						
	Chemia i technologie supramolekularne - wykład 2022/2023 - Moodle ID: 25701 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=25701						

Learning activity and number of study hours					
	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
	Number of study hours	30	5.0	15.0	50

Subject objectives	The aim of the course is to familiarize students with the basics of supramolecular chemistry and its applications in science and technology.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K7_K01	The student is able to propose solutions to a technical or technological problem using supramolecular chemistry methodology, is able to analyze known solutions and assess their advantages and disadvantages	[SK1] Assessment of group work skills [SK5] Assessment of ability to solve problems that arise in practice [SK3] Assessment of ability to organize work
K7_W03	The student defines the terms: the complexation constant and the HOST - GUEST interactions. The student lists and compares the types of interactions (other than covalent bonding) leading to supramolecular structures, and defines nano-scale systems. The student distinguishes the following terms: templat effect, macrocyclic effect, chelating effect. Student explains the terms: preorganization and complementarity. The student identifies individual classes of host molecules, shows the similarities of the properties of natural and synthetic ionophores. The student lists and explains the similarities and differences in the structure of hosts that complex anions, cations or neutral molecules. Student can indicate the applications of supramolecular systems and selected nanostructures in technology, medicine and environmental protection.	[SW1] Assessment of factual knowledge

Subject contents

Lecture: Historical aspects of the development of supramolecular chemistry. Basic concepts and definitions in supramolecular chemistry. Concepts: ligand, substrate, receptor, host, guest. Types of interactions in supramolecular structures and methods of investigations of guest-host interactions. Pearson's theory of hard and soft acids and bases. Supramolecular systems their role in nature. Artificial complexing compounds (podands, coronands, cryptands, spherands, calixarenes, hetero- and homo-calixarenes, metalloporphyrins and others). Strategy for the synthesis and preparation of supramolecular systems including macrocyclic compounds (template effect, preorganization, dilution method, high pressure method). Construction of exemplary supramolecular structures and selectivity of interactions. Supramolecular systems in science and technology and their connections with other fields (nanotechnology, medicine, pharmacy, environmental protection).

Laboratory:

1. Absorption properties of MOFS network exemplified with KOH / -cyclodextrin network
2. Synthesis and investigation of the properties of quantum dots
3. Synthesis of urea and thiourea clathrates. Investigation of physicochemical properties
4. Chromogenic ion receptors in analytical applications
5. Supramolecular complexes of organic compounds with cyclodextrins

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
praktyczne odrobienie wszystkich zajęć, zaliczenie kolokwiów i przygotowanie sprawozdań	100.0%	45.0%
zaliczenie pisemne	50.0%	55.0%

Recommended reading	Basic literature	1. Jonathan W. Steed, David R. Turner, Karl Wallace: "Core Concepts in Supramolecular Chemistry and Nanochemistry", Willey 2009 2. Katsuhiko Ariga, Toyoki Kunitake: "Supramolecular Chemistry - Fundamentals and Applications: Advanced Textbook", Springer Science & Business Media, 2006 3. Wybrane aspekty chemii supramolekularnej, Praca zbiorowa pod redakcją Grzegorza Schroedera, BETAGRAF P.U.H. Poznań 2009 4. Kompleksy typu gość-gospodarz. red. Grzegorz Schroeder, SERIA: Chemia Supramolekularna, BETAGRAF Poznań, 2003 5. Lab instructions
	Supplementary literature	1. Grzegorz Schroeder, Joanna Wyrwał: "Maszyny molekularne", SERIA: Chemia Supramolekularna, BETAGRAF Poznań 2004 2. Błażej Gierczyk, Joanna Kurczewska, Grzegorz Schroeder, "Pracownia z chemii supramolekularnej. Fizykochemia receptorów molekularnych", Poznań 2008
	eResources addresses	
Example issues/ example questions/ tasks being completed	Discuss the relationship between the structure of crown ethers and their selectivity towards metal cations. Discuss the strategy for the synthesis of macrocyclic compounds.	
Work placement	Not applicable	