University of Gdańsk

Subject card

Subject name and code	Monographic lecture - Electronic structure of molecular anions, PG_00117800						
Field of study	Chemistry						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2027/2028			
Education level	Master's studies		Subject group	Obligatory subject group in the field of study Optional subject group			
Mode of study	full-time studies		Mode of delivery	at the university			
Year of study	2		Language of instruction	English			
Semester of study	4		ECTS credits	3.0			
Learning profile	academic		Assessment form	credit			
Conducting unit	Department of Theoretical Chemistry -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. Piotr Skurski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	E-learning hours included: 0.0						
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		40.0	75
Subject objectives	Explaining the most important types and properties of various molecular anions. Teaching students about the role of molecular anions in chemistry.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEMMU2_K01] Knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so.	Student knows the limitations of her/his own knowledge; understands the need for further education	[SK1] oral statement/conversation/ discussion
[CHEMMU2_W07] Selects experimental and theoretical techniques to the extent necessary to understand the description and modelling of medium complexity chemical processes.	Student selects suitable computational tools to the extent necessary to study various types of anions	[SW4] test/exam - oral or written
[CHEMMU2_U02] Critically assesses the results of conducted, performed observations and theoretical calculations and discusses errors.	Student critically assesses the results of performed theoretical calculations and discusses them in the context of predicted properties of molecular anions	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written
[CHEMMU2_W05] Has extended knowledge in the field of the specialisation studied.	Student has extended knowledge in the field of electronic structure of molecular anions	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
[CHEMMU2_W08] Demonstrates knowledge of theoretical computational and IT methods used to solve problems in chemistry.	Student demonstrates in-depth knowledge of various anions and their role in chemistry	[SW4] test/exam - oral or written
[CHEMMU2_U04] Applies acquired knowledge of chemistry and related scientific disciplines.	Student applies acquired knowledge of the electronic structure of molecular anions, general chemistry and related scientific disciplines	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written

Subject contents

Electronic structure of molecular anions, most fundamental properties of molecular anions, classification of anions based on the potential responsible for an excess electron binding, various types of molecular anions: valence-bound anions, multipole-bound anions, metastable anions, multiply charged anions, cluster anions, double-Rydberg anions, solvated electrons. Modern theoretical methods used for studying molecular anions, the most recent discoveries concerning the subject. The electronic, kinetic and thermodynamic stability of anions. The role that molecular anions play in chemistry.

Prerequisites and co-requisites

Basic knowledge in chemistry and physics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written final exam	51.0%	100.0%

Recommended reading

Basic literature	J. Simons An Introduction to Theoretical Chemistry Theoretical Prospects of Negative Ions, ed. J. Kalcher, Research Signpost, Trivandrum, 2002
Supplementary literature	J. Simons Quantum Mechanics in Chemistry
eResources addresses	

Example issues/ example questions/ tasks being completed

Describe the most important features of a dipole-bound anion.

Work placement

Not applicable

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