University of Gdańsk

Subject card

Subject name and code	Coordinative chemistry, PG_00117687						
Field of study	Chemistry						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2026/2027			
Education level	Master's studies		Subject group	Obligatory subject group in the field of study 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	3.0			
Learning profile	academic		Assessment form	exam			
Conducting unit	Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Krzysztof Żamojć				
	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	Familiarize students with the basic aspects of coordinative chemistry.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[CHEMMU2_W05] Has extended knowledge in the field of the specialisation studied.	Student knows basic concepts of coordinative chemistry; determines possible structure of the complex based on the value of coordination number; can name coordination compounds; can distinguish the main types of isomerism of coordination compounds; understands how equilibria in aqueous solutions of complexes are established; knows, what factors influence on the values of stability constants of complexes in aqueous solutions; understands what is the kinetics and mechanism of ligands' exchange in complexes; writes basic oxidation and reduction reactions of coordination compounds; knows and understands valence bond theory in coordination compounds; knows and understands crystal field theory in coordination compounds; knows and understands ligand field and molecular orbital theories in coordination compounds; can explain spectroscopic and magnetic properties of metal complexes; mentions the most important complexes in nature and human activity. Student interprets and analyzes information connected with coordinative chemistry presented as text, tables, figures, plots or schemes; finds necessary information in specialist literature.	[SW4] test/exam - oral or written

Course outcome	Subject outcome	Method of verification
[CHEMMU2_W04] Applies the acquired knowledge to an in-depth description of the properties of chemical connections, methods of their synthesis and analysis.	Student knows basic concepts of coordinative chemistry; determines possible structure of the complex based on the value of coordination number; can name coordination compounds; can distinguish the main types of isomerism of coordination compounds; understands how equilibria in aqueous solutions of complexes are established; knows, what factors influence on the values of stability constants of complexes in aqueous solutions; understands what is the kinetics and mechanism of ligands' exchange in complexes; writes basic oxidation and reduction reactions of coordination compounds; knows and understands valence bond theory in coordination compounds; knows and understands crystal field theory in coordination compounds; knows and understands ligand field and molecular orbital theories in coordination compounds; can explain spectroscopic and magnetic properties of metal complexes; mentions the most important complexes in nature and human activity. Student interprets and analyzes information connected with coordinative chemistry presented as text, tables, figures, plots or schemes; finds necessary information in specialist literature.	[SW4] test/exam - oral or written

Course outcome	Subject outcome	Method of verification
[CHEMMU2_W01] Uses knowledge of spectroscopic methods of chemical compound analysis.	Student knows basic concepts of coordinative chemistry; determines possible structure of the complex based on the value of coordination number; can name coordination compounds; can distinguish the main types of isomerism of coordination compounds; understands how equilibria in aqueous solutions of complexes are established; knows, what factors influence on the values of stability constants of complexes in aqueous solutions; understands what is the kinetics and mechanism of ligands' exchange in complexes; writes basic oxidation and reduction reactions of coordination compounds; knows and understands valence bond theory in coordination compounds; knows and understands crystal field theory in coordination compounds; knows and understands ligand field and molecular orbital theories in coordination compounds; can explain spectroscopic and magnetic properties of metal complexes; mentions the most important complexes in nature and human activity. Student interprets and analyzes information connected with coordinative chemistry presented as text, tables, figures, plots or schemes; finds necessary information in specialist literature.	[SW4] test/exam - oral or written
[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 understands the need for independent search of information in scientific literature; can ask appropriate questions.	[SK4] test/exam - oral or written

Subject contents

Basic concepts of coordinative chemistry; coordination numbers and corresponding structures of complexes; nomenclature of coordination compounds; isomerism of coordination compounds; equilibria in aqueous solutions of complexes; stability constants of complexes in aqueous solutions; the kinetics and mechanism of ligands' exchange in complexes; oxidation and reduction reaction of coordination compounds; valence bond theory in coordination compounds; crystal field theory in coordination compounds; ligand field and molecular orbital theories in coordination compounds; spectroscopic and magnetic properties of metal complexes; complexes in nature and human activity.

Prerequisites and co-requisites

The basics of general and inorganic chemistry.

Assessment methods and criteria

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

Recommended reading

Basic literature

1. M. Cieślak-Golonka, J. Starosta, M. Wasielewski, Wstęp do chemii koordynacyjnej, Wydawnictwo Naukowe PWN, Warszawa 2010
2. A. Bielański, Podstawy chemii nieorganicznej, cz. 2 i 3, Wydawnictwo Naukowe PWN, Warszawa 1998

	Supplementary literature	1. S. F. A. Kettle, Fizyczna chemia nieorganiczna na przykładzie chemii koordynacyjnej, Wydawnictwo Naukowe PWN, Warszawa 1999 2. W. Starodub, T. Starodub, J. Oszczudłowski, Chemia związków koordynacyjnych, Wydawnictwo Naukowe PWN, Warszawa 2017 3. L. Kolditz, Chemia nieorganiczna, cz. 1, Wydawnictwo Naukowe PWN, Warszawa 1994 4. R. P. Houghton, Kompleksy metali w chemii organicznej, Wydawnictwo Naukowe PWN, Warszawa 1985 5. S. J. Lippard, J. M. Berg, Podstawy chemii bionieorganicznej, Wydawnictwo Naukowe PWN, Warszawa 1998 6. P. Atkins, L. Jones, Chemistry: molecules, matter, and change, 3rd ed., W. H. Freeman and Company, New York 1997 7. J. A. McCleverty, T. J. Meyer, Comprehensive coordination chemistry, Elsevier, 2004 8. J. R. Gispert, Coordination chemistry, Wiley, 2008 9. V. Gutman, Coordination chemistry in non-aqueous solutions, Springer, 2007 10. E. Constable, Coordination chemistry of macrocyclic compounds, Oxford University Press, 1991
	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Providing the correct name of the complex compound based on the given chemical formula. 2. Selecting the correct type of isomerism based on the given isomer formulas of the complex compound. 3. Calculation of the stabilization energy of a complex compound in a crystal field.	
Work placement	Not applicable	

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