



Subject card

Subject name and code	, PG_00038999							
Field of study	Chemistry							
Date of commencement of studies	February 2024			Academic year of realisation of subject		2023/2024		
Education level	second-cycle studies			Subject group		Optional subject group		
Mode of study	Full-time studies			Mode of delivery		at the university		
Year of study	1			Language of instruction		Polish		
Semester of study	1			ECTS credits		3.0		
Learning profile	general academic profile			Assessment form		assessment		
Conducting unit	Department of Inorganic Chemistry -> Faculty of Chemistry							
Name and surname of lecturer (lecturers)	Subject supervisor			prof. dr hab. inż. Anna Dołęga				
	Teachers							
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM	
	Number of study hours	15.0	0.0	0.0	0.0	30.0	45	
	E-learning hours included: 0.0							
	Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18883							
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	45		5.0		25.0		75
Subject objectives	The aim of the course is to equip students with the basic knowledge of coordination chemistry and bioinorganic chemistry.							
Learning outcomes	Course outcome	Subject outcome			Method of verification			
	K7_W03	The student knows how the electronic configuration of transition metals determines the structure of coordination compounds and their physicochemical properties.			[SW1] Assessment of factual knowledge			
	K7_U01	The student learns to complete knowledge based on databases, literature both in Polish and English.			[SU3] Assessment of ability to use knowledge gained from the subject			
	K7_K01	Student is aware of the connections between chemical and related sciences as well as the necessity to broaden their knowledge			[SK2] Assessment of progress of work			
	K7_W02	The student knows how the entropy and enthalpy factors influence the stability of the coordination compounds. The student knows and understands the influence of various electrostatic components on the stability of coordination compounds. The student understands the influence of the electronic structure of the coordination compound on its lability in solution.			[SW1] Assessment of factual knowledge			

Subject contents	Lecture: <ol style="list-style-type: none"> 1. Fundamentals of coordination chemistry: theories of the structure of coordination compounds, isomerism. 2. Thermodynamics and kinetics - equilibrium in solutions of coordination compounds, stability and lability of complex compounds. 3. Structure and types of coordination relationships. Central atom and ligands. 4. Bonding theories, magnetic properties and electron spectroscopy of coordination compounds. 		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture - tests	50.0%	100.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Bielański A., Podstawy chemii nieorganicznej. PWN, Warszawa, 2010 2. Roat-Malone R.M.: Bioinorganic Chemistry. PWN, Warszawa, 2010 	
	Supplementary literature	Maria Cieślak-Golonka, Dr Jan Starosta, Marek Wasielewski, Wstęp do chemii koordynacyjnej, PWN, Warszawa, 2021	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Why is copper hydroxide, insoluble in water, easily dissolved in ammonia solution? Write down the reaction equation. 2. What are chelate complexes? Give an example of such a complex - write down its formula. 3. Diaminadichloroplatin (II) has two isomers and diaminadichlorozinc (II) only one. What is the coordination geometry of these metal ions in the complex compounds mentioned? Draw and name both isomers of the platinum complex. 4. Using the example of tetraaminecopper(II) write down the steps of complex formation and the expression describing the cumulative stability constant of the complex. 5. The following is a spectrochemical series of ligands: weak field ligands $I^- < Cl^- < OH^- < F^- < H_2O < NH_3 < CO / CN^-$ strong field ligands. Which of the following ligands is more likely to form a high-spin complex, Cl or CN⁻? 6. In addition to a more intense color, the tetrahedral manganese (II) complexes are often green, while the octahedral complex $[Mn(H_2O)_6]^{2+}$ is pale pink. Why? 7. Calculate the concentrations of Ag⁺ ions and NH₃ ammonia molecules present in a 0.01M $[Ag(NH_3)_2]Cl$ solution, which contains an additional 0.2 M ammonia. 8. The spin magnetic moment of the complex compound can be calculated from the number of unpaired electrons ("spin-only"). What is the approximate magnetic moment of the copper (II) complexes? 		
Work placement	Not applicable		

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