GDAŃSK UNIVERSITY OF TECHNOLOGY

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 he 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

<table>
<tr><td>Subject contents</td><td>Lecture:

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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Lecture - tests</td><td>50.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>1. Bielański A., Podstawy chemii nieorganicznej. PWN, Warszawa, 2010
2. Roat-Malone R.M.: Bioinorganic Chemistry. PWN, Warszawa, 2010</td></tr><tr><td>Supplementary literature</td><td>Maria Cieślak-Golonka, Dr Jan Starosta, Marek Wasielewski, Wstęp do chemii koordynacyjnej, PWN, Warszawa, 2021</td></tr><tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>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 NH_3 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?</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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