


KAPITAŁ LUDZKI
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
 Unię Europejską w ramach
 Europejskiego Funduszu
 Społecznego

UNIA EUROPEJSKA
 EUROPEJSKI
 FUNDUSZ SPOŁECZNY


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| Course title | | ECTS code | |
| Coordinative chemistry | | 13.3.0407 | |
| Name of unit administrating study | | | |
| Faculty of Chemistry | | | |
| Studies | | | |
| faculty | field of study | type | drugiego stopnia |
| Wydział Chemii | Chemia | form | stacjonarne |
| | | specjalty | analityka i diagnostyka chemiczna |
| | | specialization | wszystkie |
| Teaching staff | | | |
| dr inż. Krzysztof Żamojć | | | |
| Forms of classes, the realization and number of hours | | ECTS credits | |
| Forms of classes | | 3 | |
| Lecture | | classes - 30 h | |
| The realization of activities | | tutorial classes – 10 h | |
| classroom instruction | | student's own work – 35 h | |
| Number of hours | | Total: 75 h - 3 ECTS | |
| Lecture: 30 hours | | | |
| The academic cycle | | | |
| 2022/2023 summer semester | | | |
| Type of course | | Language of instruction | |
| obligatory | | polish | |
| Teaching methods | | Form and method of assessment and basic criteria for evaluation or examination requirements | |
| multimedia-based lecture | | Final evaluation | |
| | | Examination | |
| | | Assessment methods | |
| | | - written exam with open questions | |
| | | - written exam (test) | |
| | | The basic criteria for evaluation | |
| | | A positive note from a single-choice test with approximately 60 questions. | |
| Method of verifying required learning outcomes | | | |
| The method of verifying the acquisition of knowledge: written single-choice test in the field of coordinative chemistry. | | | |
| The method of verifying the acquisition of skills: assessment of the student's involvement in discussions on the issues related to the subject. | | | |
| The method of verifying the acquisition of social competences: assessment of the student's ability to solve scientific and research problems on the basis of individual work. | | | |
| Required courses and introductory requirements | | | |
| A. Formal requirements | | | |
| None. | | | |
| B. Prerequisites | | | |
| The basics of general and inorganic chemistry. | | | |
| Aims of education | | | |
| Familiarize students with the basic aspects of coordinative chemistry. | | | |
| Course 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.

Bibliography of literature

Literature required to pass the course:

- 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

Extracurricular readings:

- 3.S. F. A. Kettle, Fizyczna chemia nieorganiczna na przykładzie chemii koordynacyjnej, Wydawnictwo Naukowe PWN, Warszawa 1999
- 4.W. Starodub, T. Starodub, J. Oszcudłowski, Chemia związków koordynacyjnych, Wydawnictwo Naukowe PWN, Warszawa 2017
- 5.L. Kolditz, Chemia nieorganiczna, cz. 1, Wydawnictwo Naukowe PWN, Warszawa 1994
- 6.R. P. Houghton, Kompleksy metali w chemii organicznej, Wydawnictwo Naukowe PWN, Warszawa 1985
- 7.S. J. Lippard, J. M. Berg, Podstawy chemii bionieorganicznej, Wydawnictwo Naukowe PWN, Warszawa 1998
- 8.P. Atkins, L. Jones, Chemistry: molecules, matter, and change, 3rd ed., W. H. Freeman and Company, New York 1997
- 9.J. A. McCleverty, T. J. Meyer, Comprehensive coordination chemistry, Elsevier, 2004
- 10.J. R. Gispert, Coordination chemistry, Wiley, 2008
- 11.V. Gutman, Coordination chemistry in non-aqueous solutions, Springer, 2007
- 12.E. Constable, Coordination chemistry of macrocyclic compounds, Oxford University Press, 1991

The learning outcomes (for the field of study and specialization)

K_W01: uses in-depth knowledge of spectroscopic methods of chemical compound analysis;
 K_W04: applies the acquired knowledge to an in-depth description of the properties of chemical connections, methods of their synthesis and analysis;
 K_W05: has extended knowledge in the field of the specialisation studied;
 K_K01: knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so;

Knowledge

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.

Skills

Student: interprets and analyzes information connected with coordinative chemistry presented as text, tables, figures, plots or schemes; finds necessary information in specialist literature.

Social competence

Student: knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so; understands the need for independent search of information in scientific literature; can ask appropriate questions.

Contact

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