

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Izbrana poglavja iz anorganske kemije
Course title:	Inorganic Chemistry: Selected topics

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Ekotehnologije, 3. stopnja	/	1	1
Ecotechnologies, 3 rd cycle	/	1	1

Vrsta predmeta / Course type Izbirni / Elective

Univerzitetna koda predmeta / University course code: EKO3-750

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
15	15			15	105	5

**Navedena porazdelitev ur velja, če je vpisanih vsaj 15 študentov. Drugače se obseg izvedbe kontaktnih ur sorazmerno zmanjša in prenese v samostojno delo. / This distribution of hours is valid if at least 15 students are enrolled. Otherwise the contact hours are linearly reduced and transferred to individual work.*

Nosilec predmeta / Lecturer: Prof. dr. Boris Žemva

Jeziki / Languages: **Predavanja / Lectures:** slovenski, angleški / Slovene, English
Vaje / Tutorial: -

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Predmet je zastavljen tako, da gradi na določenem predhodnem znanju. Kandidati morajo imeti opravljen izpit in vaje iz splošne anorganske kemije, po možnosti na fakulteti za kemijo.

Prerequisites:

The course requires basic knowledge of inorganic chemistry. The candidates have to pass a theoretical and practical examination in general chemistry, preferable at the faculty of chemistry.

Vsebina:

Podiplomski študentje bodo vpeljani v tista izbrana poglavja iz anorganske kemije, ki jih bodo potrebovali pri poglobljenem raziskovalnem delu na njihovem konkretnem projektu. V okviru tega predmeta bodo obravnavali zlasti naslednje vsebine:

- Teoretski koncepti potrebni za razumevanje kemije na izbranem področju
- Izbor vsebin iz kemije elementov glavnih skupin
- Izbor vsebin iz kemije prehodnih elementov
- Izbrane vsebine iz koordinacijske kemije
- Izbor vsebin iz organokovinskih koordinacijskih

Content (Syllabus outline):

Postgraduate students will be acquainted with the selected chapters of inorganic chemistry which they are going to need for in-depth research work on an actual project. Within the scope of this course, we will principally address the following topics:

- Theoretical concepts required for an understanding of chemistry in the selected field
- Selection of topics from chemistry of main-group elements
- Selection of topics from chemistry of transitional elements
- Selection of topics from coordination chemistry
- Selection of topics from organometallic

spojin in njihova vloga pri procesih katalize

- Načrtovanje eksperimentov: izbira primernih reakcijskih pogojev, sinteznih pristopov in metod karakterizacije in ovrednotenje alternativnih sinteznih poti

coordination compounds and their role in the processes of catalysis

- Planning of experiments: selection of suitable reaction conditions, selection of different synthetic routes and methods of characterization and evaluation of alternative synthetic routes

Temeljni literatura in viri / Readings:

B. W. Pfening. Principles of Inorganic Chemistry. Ney Jersey: John Wiley and Sons (2015), 760 p., ISBN 978-1-118-85910-0
 C. E. Housecroft, A. G. Sharpe. Inorganic Chemistry, 4th ed. Essex: Pearson (2012), 1257 p., ISBN 978-0-273-74275-3
 P. W. Atkins, T. L. Overton, J. P. Rourke, M. T. Weller, F. A. Armstrong. Inorganic Chemistry, 5th ed. Oxford: Oxford University Press (2010), 864 p., ISBN 978-0-199-23617-6
 D. S. Brock, G. J. Schrobilgen, B. Žemva. Comprehensive Inorganic Chemistry II, 2nd ed. Amsterdam: Elsevier (2013), 7544 p., ISBN 978-0-080-97774-4
 G. L. Miessler, P. J. Fischer, D. A. Tarr. Inorganic Chemistry, 5th ed. Essex: Pearson (2014), 969 p., ISBN 978-0-321-81105-9

Izbor literature za specifično področje iz mednarodne znanstvene periodike.

Selection of the literature for the specific field from the international periodical publications.

Cilji in kompetence:

Cilj predmeta je razširitev znanja na ozkem področju anorganske kemije, ki ga študent potrebuje za uspešno delo na doktorski tezi.

Splošne kompetence:

- Sposobnost načrtovanja poskusov za konkretne projekte
- Širok pregled eksperimentalnih tehnik
- Pregled sodobnih metod za karakterizacijo anorganskih spojin
- Delo z agresivnimi plini pod pritiski, delo s korozivnimi tekočinami, sposobnost rokovanja z reaktivnimi snovmi in utekočinjenimi plini, delo v vakuumu, delo v suhi atmosferi itd.

Predmetno specifične kompetence:

- Študent pridobi ekspertizo na ozkem področju anorganske kemije, ki je v tesni povezavi s projektom.

Objectives and competences:

The purpose of the course is broaden of the knowledge in the narrow field of inorganic chemistry which is needed for the successful completion of the student's Doctoral Thesis.

General Competences:

- The student will master the planning of experiments for concrete projects
- The student will obtain a bright survey of experimental techniques
- The student will obtain a survey of modern methods for characterization of inorganic compounds
- The work with aggressive gases under pressure, the work with corrosive liquids, the handling of reactive compounds and liquefied gases, the work in vacuum conditions, the work in dry atmosphere etc.

Course Specific Competences:

- The student will obtain an expertise in the narrow field of inorganic chemistry in close relation with the project.

Predvideni študijski rezultati:

- Poglobljeno znanje na specifičnih področjih anorganske kemije

Intended learning outcomes:

- Expert knowledge in the specific fields of inorganic chemistry

Metode poučevanja in učenja:

Gre za delo v laboratoriju in učenje ob delu.

Learning and teaching methods:

The practical research work is performed in the laboratory and the students are learning during their research work.
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Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

Ustni izpit	80 %	Oral examination
Seminar	20 %	Seminar

Reference nosilca / Lecturer's references:

1. BROCK, David S., SCHROBILGEN, Gary J., ŽEMVA, Boris; Noble-gas chemistry. V: REEDIJK, Jan (ur.), POEPELMEIER, Kenneth (ur.). *Comprehensive Inorganic Chemistry II : from elements to applications*. 2nd ed. Burlington: Elsevier. 2013, vol. 1, p. 755-822.
2. TAVČAR, Gašper, ŽEMVA, Boris. $[\text{Li}(\text{XeF}_2)_n](\text{AF}_6)[\text{Li}(\text{XeF}_2)_n](\text{AF}_6)$ (A = P, As, Ru, Ir), the first xenon(II) compounds of lithium, Synthesis, Raman spectrum, and crystal structure of $[\text{Li}(\text{XeF}_2)_3](\text{AsF}_6)[\text{Li}(\text{XeF}_2)_3](\text{AsF}_6)$. *Inorganic Chemistry*, 2013, vol. 52, p. 4319-4323.
3. LOZINŠEK, Matic, GORESHNIK, Evgeny A., ŽEMVA, Boris. Silver(I) Tetrafluoridooxidovanadate(V) - $\text{Ag}[\text{VOF}_4]$. *Acta Chimica Slovenica*, 2014, vol. 61, p. 542-547.
4. RADAN, Kristian, GORESHNIK, Evgeny A., ŽEMVA, Boris. Xenon(II) Polyfluoridotitanates(IV): Synthesis and structural characterization of $[\text{Xe}_2\text{F}_3]^+$ and $[\text{XeF}]^+$ salts. *Angewandte Chemie International edition*, 2014, vol. 53, p. 13713-13719.
5. LEVSTIK, Adrijan, FILIPIČ, Cene, TAVČAR, Gašper, ŽEMVA, Boris. Femtosecond tunneling of polarons in $\text{Pb}_5\text{Cr}_3\text{F}_{19}$. *Journal of advanced dielectrics*, 2014, vol. 4, p. 1450020-1-1450020-5.