

ANORGANSKA SINTEZA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Anorganska sinteza
Course title:	Inorganic Synthesis
Članica nosilka/UL Member:	UL FKKT

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Kemija, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik, 3. letnik		izbirni

Univerzitetna koda predmeta/University course code:	0086917
Koda učne enote na članici/UL Member course code:	KESI1

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
	30	45 LV			75	5

Nosilec predmeta/Lecturer: prof. dr. Franc Perdih

Vrsta predmeta/Course type: izbirni/elective

Jeziki/Languages:

Predavanja/Lectures:	Angleščina, Slovenščina
Vaje/Tutorial:	Angleščina, Slovenščina

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

Študent oz. kandidat mora imeti predmet opredeljen kot študijsko obveznost.

Prerequisites:

The course has to be assigned to the student.

Vsebina:

Vsebina seminarjev in vaj: Študenti bodo pri predmetu sintetizirali anorganske snovi z različnimi sintezniimi tehnikami in dobljene snovi preiskali. Spoznali bodo metode sinteze: hidrotermalna sinteza, sol-gel tehnika, enostavne načine dela v inertni atmosferi, reakcije v trdnem stanju, sinteza koordinacijske spojine. Metode karakterizacije pa so predznanju študentov prirejena uporaba rentgenske praškovne analize, termične analize in infrardeče spektroskopije. Študenti bodo sintetizirali bazični bakrov(II) sulfat, zemeljskoalkalijske oksalate hidrate, polimerno snov silikon, fluorooksovanadate(IV), titanov dioksid po sol-gel postopku, itrij-barij-bakrov superprevodnik in do dve snovi, ki se uporabljata pri tekočem raziskovalnem delu nosilca predmeta ali njegovih sodelavcev. Pri seminarju bodo študenti

Content (Syllabus outline):

Syntheses and characterizations of inorganic compounds. Different methods of syntheses are applied: hydrothermal synthesis, sol-gel technique, syntheses of unstable compounds, simple experiments in an inert atmosphere, solid state reactions, syntheses of coordination compounds. Basic copper(II) sulphate, alkaline earth oxalates hydrates, a polymeric silicone, fluoridooxidovanadate(IV), titanium dioxide (sol-gel method), Y-Ba-Cu-superconductor and some new complexes which are subject of current research at the department of Inorganic chemistry are prepared and characterized. Infrared spectroscopy, UV-vis spectroscopy, thermal analysis and X-ray powder diffraction analysis are used to characterize prepared compounds. The characterization methods are

dobili potrebno teoretsko osnovo in navodila za sintezo.	adapted to the knowledge level of these students. Theoretical background is explained in seminars.
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Temeljna literatura in viri/Readings:

S. Petriček, F. Perdih in A. Demšar, Vaje iz anorganske kemije, FKKT UL, Ljubljana, 2010, 25-30, 47-68, 75-115. Articles published in scientific journals.

Cilji in kompetence:

Cilj predmeta je nadgraditi znanje študentov iz predmetov Splošna kemija in Anorganska kemija. Kompetence: Praktične laboratorijske veščine in izkušnje s področja sinteze in karakterizacije anorganskih snovi.	Objectives and competences: Expanding a basic knowledge of syntheses and characterization of inorganic compounds obtained in courses of General and Inorganic Chemistry. Practical skills in comprehensive inorganic syntheses and characterization of inorganic compounds.
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Predvideni študijski rezultati:

Znanje in razumevanje Predmet predstavlja dopolnitev predmeta Splošna in anorganska kemija s praktičnim delom in izkušnjami. Uporaba Študent spozna, da je osnovno znanje prvega letnika dobra podlaga za zanimivo laboratorijsko delo in daje študentu vznemirljivo možnost iz reaktantov sintetizirati (»ustvariti«) novo snov. Refleksija Kemija je eksperimentalna veda, zato se je študentom lažje motivirati pri osvajanju teoretskega znanja, če spoznajo, da je to znanje potrebno pri eksperimentiranju. Prenosljive spretnosti Laboratorijske veščine, izkušnje in prijemi pri načrtovanju sintez so pomembni pri drugih kemijskih predmetih in pri osebnemu strokovnemu razvoju.	Intended learning outcomes: Knowledge and Comprehension The subject adds practical skills and experience to the previous courses of General and Inorganic Chemistry. Application Students find out that basic knowledge obtained during the first year study could be applied in challenging syntheses of new compounds. Analysis Applications of a theoretical background in practicals enhance motivation of the students for a comprehensive theoretical studies. Skill-transference Ability Practical skills and experience in planning of syntheses are useful also in other courses and important for a professional development.
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Metode poučevanja in učenja:

Predmet se izvaja v obliki seminarjev in samostojnih laboratorijskih vaj. Na seminarju se tematiko vsake vaje umesti v širši kontekst anorganske kemije.	Learning and teaching methods: A broad background of each experiment performed by students in practicals is explained in seminars.
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Načini ocenjevanja:

Načini ocenjevanja:	Delež/Weight	Assessment:
Poročila vaj (pozitivno 6-10; negativno 1-5)	20,00 %	Laboratory reports (positive 6-10; negative 5) 20% Oral presentation of a selected topic in advanced inorganic syntheses in a class: 20% Written exam (positive 6-10; negative 5) 60% Laboratory reports and written exam must be positive.
Študent ustno predstavi seminar na temo sodobne anorganske sinteze kolegom	20,00 %	Oral presentation of a selected topic in advanced inorganic syntheses in a class
pisni izpit (pozitivno 6-10; negativno 1-5); Delni oceni za vaje in izpit morata biti pozitivni.	60,00 %	Written exam (positive 6-10; negative 5) Laboratory reports and written exam must be positive.

Reference nosilca/Lecturer's references:

1. D. Sanna, J. Palomba, G. Lubinu, P. Buglyó, S. Nagy, **F. Perdih**, E. Garribba: Role of ligands in the uptake and reduction of V(V) complexes in red blood cells. *J. Med. Chem.* **2019**, *62*, 654–664.
2. T. Koleša Dobravc, K. Maejima, Y. Yoshikawa, A. Meden, H. Yasui, **F. Perdih**: Bis(picolinato) complexes of vanadium and zinc as potential antidiabetic agents: synthesis, structural elucidation and in vitro insulin-mimetic activity study. *New J. Chem.* **2018**, *42*, 3619–3632.
3. T. Koleša Dobravc, E. Lodyga-Chruscinska, M. Symonowicz, D. Sanna, A. Meden, **F. Perdih**, E. Garribba: Synthesis and characterization of VIVO complexes of picolinate and pyrazine derivatives. Behavior in the solid state and aqueous solution and biotransformation in the presence of blood plasma proteins. *Inorg. Chem.* **2014**, *53*, 7960–7976.

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