Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Kemija materialov**
Course title:	**Chemistry of materials**

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Enovit magistrski študijski program druge stopnje Predmetni učitelj	**/**	**3**	**Zimski** **Autumn**
Five-year master's degree program Subject Teacher	**/**		

Vrsta predmeta / Course type	Izbirni / Elective
Univerzitetna koda predmeta / University course code:	

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Terenske vaje Field work	Samost. delo Individ. work	ECTS
20	**10**				**60**	**3**

Nosilec predmeta / Lecturer:	Mihael Drofenik, Peter Krajnc

Jeziki / Languages:	**Predavanja / Lectures:**	slovenski / slovene
	Vaje / Tutorial:	slovenski / slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Znanje splošne, anorganske in organske kemije.	Knowledge of general, inorganic and organic chemistry.

Vsebina:

- Keramika in steklo
- Polprevodniki in ionski prevodniki
- Kovinski materiali
- Naravni polimeri
- Sintetični polimeri

Content (Syllabus outline):

- Ceramics and glasses
- Semiconductors and ion conductors
- Metallic materials
- Natural polymers
- Synthetic polymers

Temeljni literatura in viri / Readings:

1. W. D. Kingery, H. K. Bowen, D. R. Uhlmann, Introduction to Ceramics, John Wilay & Sons (1975)

2.K.J. Rao, Structural Chemistry of Glasses, Elsevier (2002)

3. C.E. Carraher, Jr.: Introduction to polymer chemistry, CRC Press, 2010

Cilji in kompetence:

Namen predmeta je, da pridobi kandidat osnovno uporabno znanje za razvoj in raziskave anorganskih in organskih materialov.

Slušatelji se bodo seznanili s specifičnimi lastnostmi pomembnih skupin anorganskih materialov ter spoznali njihovo uporabnost v tehniki in medicini.

Objectives and competences:

The focus of the course is to acquire basic knowledge of inorganic and organic materials for it's development and fundamental research.

Emphasis is given to learn the specific properties of important classes of inorganic materials and their applicability in technique and medicine.

Predvideni študijski rezultati:

Znanje in razumevanje:

Kandidat bo dobil temeljno in praktično znanje s področja pomembnih skupin anorganskih

materialov uporabnih v tehniki in biomedicini.

Prenesljive/ključne spretnosti in drugi atributi:

Intended learning outcomes:

Knowledge and understanding:

The candidate will be acquainted with the basic

conception of some important classes of inorganic materials which can be used in technique and medicine.

Transferable/Key Skills and other attributes:

Metode poučevanja in učenja:

Predavanja, seminarsko delo.

Learning and teaching methods:

Lectures, seminar work.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Pisni izpit (ali kolokviji)	80	Written exam (or partial exams)
Seminarska naloga	20	Project

Reference nosilca / Lecturer's references:

Mihael Drofenik

1. FERK, Gregor, BAN, Irena, STERGAR, Janja, MAKOVEC, Darko, HAMLER, Anton, JAGLIČIĆ, Zvonko, DROFENIK, Mihael. A facile route to the synthesis of coated maghemite nanocomposites for hyperthermia applications. Acta chim. slov.. [Tiskana izd.], 2012, vol. 59, no. 2, str. 366-374. http://acta.chem-soc.si/59/59-2-366.pdf.

2. MUŠIČ, Branka, DROFENIK, Mihael, VENTURINI, Peter, ŽNIDARŠIČ, Andrej. Electromagnetic wave absorption by an organic resin solution based on ferrite particles with a spinel crystal structure. Ceram. int.. [Print ed.], 2012, vol. 34, issue 4, str. 2693-2699, doi: 10.1016/j.ceramint.2011.11.037.

3. DRMOTA, Ana, DROFENIK, Mihael, ŽNIDARŠIČ, Andrej. Synthesis and characterization of nano-crystalline strontium hexaferrite using the co-precipitation and microemulsion methods with nitrate precursors. Ceram. int.. [Print ed.], 2012, vol. 38, issue 2, str. 973-979, doi: 10.1016/j.ceramint.2011.08.018.

4. OVTAR, Simona, LISJAK, Darja, DROFENIK, Mihael. The influence of processing parameters on the orientation of barium ferrite platelets during electrophoretic deposition. Colloids surf., A Physicochem. eng. asp.. [Print ed.], 2012, vol. 403, str. 139-147, doi: 10.1016/j.colsurfa.2012.04.004.

5. LISJAK, Darja, DROFENIK, Mihael. Chemical substitution - an alternative strategy for controlling the particle size of barium ferrite. Cryst. growth des., 2012, vol. 12, no. 11, str. 5174-5179, doi: 10.1021/cg301227r.

Peter Krajnc

1. KOVAČIČ, Sebastijan, JEŘÁBEK, Karel, KRAJNC, Peter, SLUGOVC, Christian. Ring opening metathesis polymerisation of emulsion templated dicyclopentadiene giving open porous materials with excellent mechanical properties. Polymer chemistry. [Print ed.], Feb. 2012, vol. 3, iss. 2, str. 325-328, doi: 10.1039/c2py00518b.

2. KOVAČIČ, Sebastijan, FERK, Gregor, DROFENIK, Mihael, KRAJNC, Peter. Nanocomposite polyHIPEs with magnetic nanoparticles : preparation and heating effect. React. funct. polym.. [Print ed.], Available online 11 May 2012, doi: 10.1016/j.reactfunctpolym.2012.05.001.

3. PULKO, Irena, KRAJNC, Peter. High internal phase emulsion templating - a path to hierarchically porous functional polymers. *Macromol. rapid commun.*, 2012, vol. 33, issue 20, str. 1731-1746, doi: 10.1002/marc.201200393.

4. PULKO, Irena, SANDHOLZER, Martina, KOLAR, Mitja, SLUGOVC, Christian, KRAJNC, Peter. Removal of an olefin metathesis catalyst using 4-nitrophenyl acrylate based polymer supports. Tetrahedron lett.. [Print ed.], 2010, vol. 51, issue 44, str. 5827-5829, doi: 10.1016/j.tetlet.2010.08.114.

5. PULKO, Irena, WALL, Jennifer, KRAJNC, Peter, CAMERON, Neil R. Ultra-high surface area functional porous polymers by emulsion templating and hypercrosslinking : efficient nucleophilic catalyst supports. Chemistry (Weinh., Print). [Print ed.], Feb. 2010, vol. 16, iss. 8, str. 2350-2354, doi: 10.1002/chem.200903043.

Projekti/Projects:

Mihael Drofenik

P2—0089 Sodobni anorganski magnetni in polprevodni materiali

Peter Krajnc

L2—2008 Makroporozne polimerne membrane za separacijo biomakromolekul

L2—2283 Vpliv sestave polimerizacijske mešanice na latnosti poroznih monolitov

J2—1176 Separacija in formulacija biološko aktivnih snovi izoliranih iz rastlinskih materialov