Ústav anorganickej chémie SAV, v. v. i.

Správa o činnosti organizácie SAV
za rok 2022

Bratislava
január 2023

Obsah

1. Základné údaje o organizácii

1.1. Kontaktné údaje

Názov: Ústav anorganickej chémie SAV, v. v. i.
Riaditeľ: doc. Ing. Miroslav Boča, DrSc.
Zástupca riaditeľa: Ing. Helena Pálková, PhD.
Vedecký tajomník: doc. Ing. Zoltán Lenčéš, PhD.
Predseda vedeckej rady: Mgr. Monika Tatarková, PhD.
Člen Snemu SAV: Ing. Peter Tatarko, PhD.
Adresa: Dúbravská cesta 9, 845 36 Bratislava 45

http://www.uach.sav.sk/

Tel.: 02/59410401
E-mail: uachsekr@savba.sk

Názvy a adresy organizačných zložiek a detašovaných pracovísk:

Organizačné zložky: nie sú

Detašované pracoviská:

- **Vitrum Laugaricio - Centrum kompetencie skla, spoločné pracovisko ÚACH SAV, TnU AD, RONA, a.s. a FCHPT STU**
  Študentská 2, 911 50 Trenčín
- **VC SAV – Pavilón materiálových vied**
  Dúbravská cesta 9/6319, Bratislava
- **Pracovisko pre röntgenovú práškovú difraktometriu**
  Ústav merania SAV, Dúbravská cesta 9, 841 04, Bratislava 4

Vedúci organizačných zložiek a detašovaných pracovísk:

Organizačné zložky: nie sú

Detašované pracoviská:

- **Vitrum Laugaricio - Centrum kompetencie skla, spoločné pracovisko ÚACH SAV, TnU AD, RONA, a.s. a FCHPT STU**
  prof. Ing. Dušan Galusek, DrSc.
- **VC SAV – Pavilón materiálových vied**
  doc. Ing. Miroslav Boča, DrSc.
- **Pracovisko pre röntgenovú práškovú difraktometriu**
  doc. Ing. Miroslav Boča, DrSc.

Členovia Snemu SAV za organizačné zložky:
nie sú

Typ organizácie: Verejná výskumná inštitúcia od roku 2022

1.2. Údaje o zamestnancoch

Tabuľka 1a Počet a štruktúra zamestnancov

Štruktúra zamestnancov	K	K		K do 35 rokov		F	P	T	O
		M	Ž	M	Ž				
Celkový počet zamestnancov	78	38	40	7	7	75	59.15	43.84	0
Vedeckí pracovníci	49	30	19	5	4	47	38.84	38.84	0
Odborní pracovníci VŠ (výskumní a vývojoví zamestnanci[1])	8	5	3	2	1	7	5.61	5	0
Odborní pracovníci VŠ (ostatní zamestnanci[2])	6	1	5	0	2	6	3.44	0	0
Odborní pracovníci ÚS	11	2	9	0	0	11	8.8	0	0
Ostatní pracovníci	4	0	4	0	0	4	2.46	0	0

[1] odmeňovaní podľa 553/2003 Z.z., príloha č. 5
[2] odmeňovaní podľa 553/2003 Z.z., príloha č. 3 a č. 4

K – kmeňový stav zamestnancov v pracovnom pomere k 31.12.2022 (uvádzať zamestnancov v pracovnom pomere, vrátane riadnej materskej dovolenky, zamestnancov pôsobiacich v zahraničí, v štátnych funkciách, členov Predsedníctva SAV, zamestnancov pôsobiacich v zastupiteľských zboroch)
F – fyzický stav zamestnancov k 31.12.2022 (bez riadnej materskej dovolenky, zamestnancov pôsobiacich v zahraničí v štátnych funkciách, členov Predsedníctva SAV, zamestnancov pôsobiacich v zastupiteľských zboroch)
P – celoročný priemerný prepočítaný počet zamestnancov
T – celoročný priemerný prepočítaný počet riešiteľov projektov
O – celoročný priemerný prepočítaný počet obslužného personálu podieľajúceho sa na riešení projektov (technikov, laborantov, projektových manažérov a pod.) mimo zamestnancov v administratíve, správe a údržbe budov, upratovačiek, vodičov a pod.
M, Ž – muži, ženy

Tabuľka 1b Štruktúra vedeckých pracovníkov (kmeňový stav k 31.12.2022)

Rodová skladba	Pracovníci s hodnosťou				Vedeckí pracovníci v stupňoch		
	DrSc.	CSc./PhD.	prof.	doc.	I.	II.a.	II.b.
Muži	6	26	4	5	6	12	12
Ženy	2	18	0	2	2	8	9

Tabuľka 1c Štruktúra pracovníkov podľa veku a rodu, ktorí sú riešiteľmi projektov

Veková štruktúra (roky)	< 31		31-35		36-40		41-45		46-50		51-55		56-60		61-65		> 65	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Muži	1	1.0	6	6.0	8	7.2	2	2.0	7	5.8	1	0.6	2	1.5	0	0.0	6	3.5
Ženy	2	2.0	3	2.4	1	0.8	3	3.2	3	3.0	3	2.6	1	1.0	0	0.0	2	1.8

A - Prepočet bez zohľadnenia úväzkov zamestnancov
B - Prepočet so zohľadnením úväzkov zamestnancov

Tabuľka 1d Priemerný vek zamestnancov organizácie k 31.12.2022

	Kmeňoví zamestnanci	Vedeckí pracovníci	Riešitelia projektov
Muži	46.8	46.2	46.4
Ženy	47.3	44.6	45.8
Spolu	47.1	45.6	46.2

1.3. Iné dôležité informácie k základným údajom o organizácii a zmeny za posledné obdobie (v zameraní, v organizačnej štruktúre a pod.)

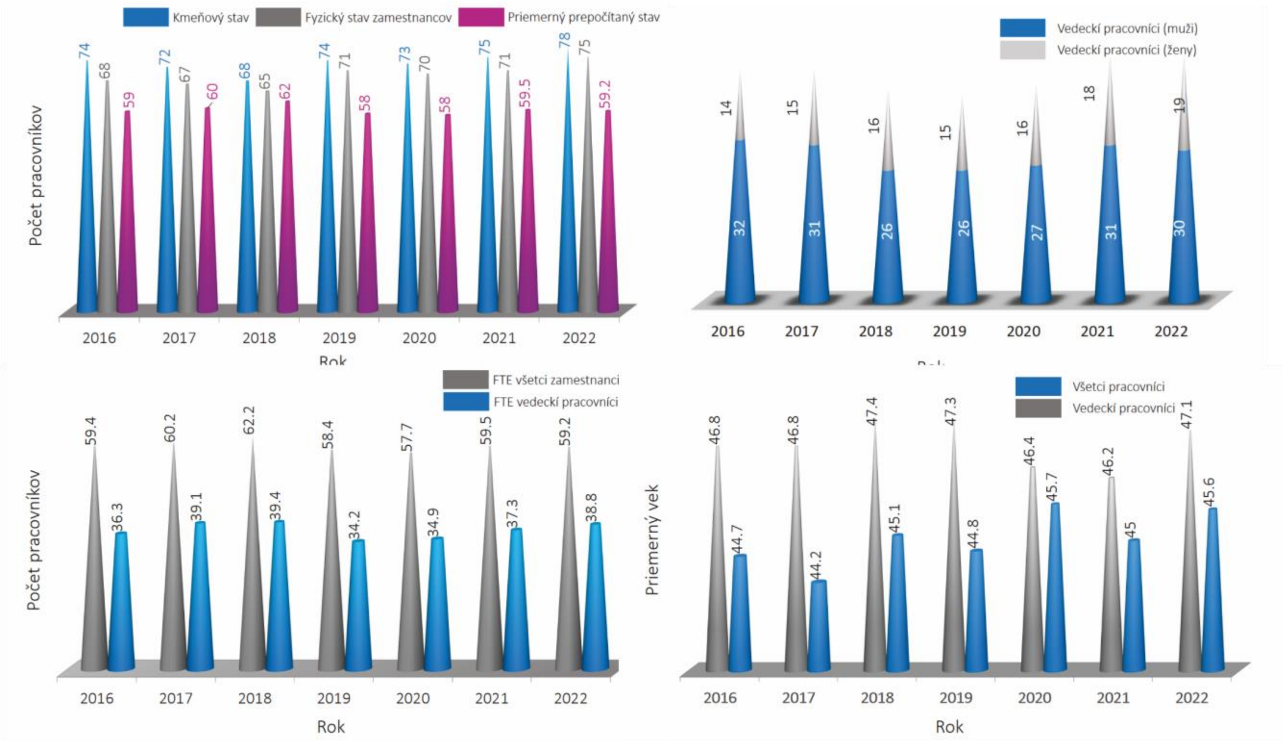
Zásadnou zmenou platnou od 1.1.2022 bola zmena formy hospodárenia prechodom Ústavu anorganickej chémie z rozpočtovej formy organizácie na verejno-výskumnú inštitúciu v. v. i. S tým súviselo množstvo zmien vyplývajúcich z legislatívy, napr. vytvorenie správnej rady ústavu, dozornej rady, ako aj potreba voľby novej vedeckej rady. Celý rok sa niesol v znamení nastavenia chodu ústavu, ako aj vnútorných predpisov, novým právnym normám, ktoré sú platné pre verejno-výskumné inštitúcie.
Treba pripomenúť, že aj napriek pomerne zásadným zmenám vyplývajúcich z prechodu na novú formu hospodárenia, zameranie výskumu ústavu ostalo zachované, a bude pravidelne dopĺňané o moderné témy a trendy v tých oblastiach výskumu, na ktoré je ústav zameraný.

Zloženie dozornej rady:
- prof. MVDr. Juraj Koppel, DrSc.
- JUDr. Glória Gajdošová
- Prof. Ing. Marián Valko, DrSc.

Zloženie správnej rady:
- doc. Ing. Miroslav Boča, DrSc.
- Ing. Elena Kripelová
- Ing. Blanka Kubíková, PhD.
- Ing. Helena Pálková, PhD.
- Ing. Peter Tatarko, PhD.

Zloženie vedeckej rady:
- prof. RNDr. Juraj Bujdák, DrSc.
- prof. Ing. Dušan Galusek, DrSc.
- Mgr. Stanislav Komorovský, PhD.
- doc. Ing. Zoltán Lenčéš, PhD.
- Ing. František Šimko, PhD.
- Mgr. Monika Tatarková, PhD.
- prof. Ing. Ján Híveš, PhD (FCHPT STU)
- Ing. Marián Kucharík, PhD. (Slovalco, a.s.)
- prof. RNDr. Jozef Noga, DrSc. (Príf UK)

Personálne zmeny, ktoré nastali v roku 2022 súviseli s prirodzenou obmenou z dôvodu odchodu zamestnancov do dôchodku a obsadením uvoľnených pracovných pozícií končiacimi doktorandami. Stabilitu v oblasti personálneho zabezpečenia chodu ústavu dokumentujú schémy nižšie, popisujúce počty pracovníkov, zastúpenie vedeckých pracovníkov a zastúpenie žien a mužov. Došlo aj k zvýšeniu priemerného veku ako kmeňových zamestnancov, tak aj vedeckých pracovníkov.



2. Vedecká činnosť

2.1. Domáce projekty

Tabuľka 2a Domáce projekty riešené v roku 2022

ŠTRUKTÚRA PROJEKTOV	Počet		Čerpané financie (€)					
	A	B	A				B	
			Zo zdrojov SAV		Z iných zdrojov		Zo zdrojov SAV	Z iných zdrojov
			Spolu	Pre organizáciu	Spolu	Pre organizáciu		
1. Projekty VEGA	10	2	114184	114184	-	-	-	7893
2. Projekty APVV	7	7	-	-	346490	274392	-	87259
3. Projekty EŠIF/OP ŠF	0	2	-	-	-	-	-	81137
4. Projekty SASPRO, MoRePro, IMPULZ	2	0	5885	5885	-	-	-	-
5. Iné projekty (FM EHP, Vedecko-technické projekty, na objednávku rezortov a pod.)	1	0	2000	2000	-	-	-	-

A - organizácia je nositeľom projektu
B - organizácia sa zmluvne podieľa na riešení projektu

Tabuľka 2b Domáce projekty podané v roku 2022

Štruktúra projektov	Miesto podania	Organizácia je nositeľom projektu	Organizácia sa zmluvne podieľa na riešení projektu
1. Účasť na nových výzvach APVV r. 2022	BA	3	6
2. Projekty výziev EŠIF podané r. 2022	Bratislava		
	Regióny		

<u>Projekty APPV – koordinátor ÚACh SAV, v.v.i</u>

Názov projektu: Fluoridové systémy pre zelenú metalurgiu a elektrochémiu (Fluoride systems for green metallurgy and electrochemistry)
Evidenčné číslo: APVV-22-0385
Akronym: FLUMECHEM
Koordinátor: ÚACh SAV, v.v.i. (Šimko František)
Partneri: FÚ SAV, v.v.i.
Stav: podaný

Názov projektu: Vývoj pokročilých metód určených na presnú predpoveď a analýzu röntgenových spektier molekúl s otvorenou obálkou (Development of advanced methods for accurate prediction and analysis of X-ray spectra of open-shell species)
Evidenčné číslo: APVV-22-0488
Akronym: DCG-XAS
Koordinátor: ÚACh SAV, v.v.i. (Stanislav Komorovsk)
Partneri: Univerzita Komenského v Bratislave - Prírodovedecká fakulta
Stav: podaný

Názov projektu: Adsorpciou indukovaná emisia v systémoch fotofukncionalyzovaných íl-polymérnych nanokompozitoch / Adsorption-induced emission in photofunctionalized clay-polymer nanocomposite systems
Evidenčné číslo: SK-FR-22-0015, bilaterálny
Akronym: FotoNanoKomp
Koordinátor: ÚACh SAV (Peter Boháč)
Partner: Laboratoire de Photochimie et d'Ingénierie Macromoléculaire (LPIM), Université de Haute Alsace (UHA), Francúzsko
Stav: Podaný

Projekty APPV – ÚACh SAV, v.v.i partner

Názov projektu: Vplyv hydrodynamických prúdov na distribúciu dopantu pri kryštalizácii z taveniny ytrito-hlinitého granátu metódou horizontálne usmernenej kryštalizácie / Research on the influence of hydrodynamic flows on the distribution of dopants and on the optical properties of the material in Horizontally Directed Crystallization of an Yttrium-Aluminum garnet single crystal for solid-state lasers
Evidenčné číslo: APVV-20-0522
Akronym: YAGHDC
Koordinátor: AT Crystals, s.r.o.
Partner: ÚACh SAV, v.v.i. (Anna Prnová)
Stav: podaný

Názov projektu: Funkcionalizované 3D sklokeramické membrány na pokročilé fotokatalytické čistenie odpadových vôd / Functionalized 3D glass-ceramic membranes for advanced photocatalytic wastewater treatment
Evidenčné číslo: APVV-22-0109
Akronym: 3DGALACTYC
Koordinátor: Univerzita Alexandra Dubčeka v Trenčíne (Monika Michálková)
Partneri: ÚACh SAV, v.v.i.; FCHPT STU
Stav: podaný

Názov projektu: Fotofunkčné hybridné materiály organických luminofórov a nanočastíc vrstevnatých silikátov (Photofunctional hybrid materials of organic luminophores and layered silicate nanoparticles)
Evidenčné číslo: APVV-22-0150
Akronym: Fotomat
Koordinátor: PriF UK
Partneri: UACh SAV, v.v.i. (Peter Boháč)
Stav: podaný

Názov projektu: Samoopravná anóda pre lítium-iónové batérie s vysokou hustotou energie / Self-

healing anode for high energy density Li-ion batteries / Self-healing anode for high energy density Li-ion batteries
Evidenčné číslo: APVV-22-0405
Akronym: HEALBAT
Koordinátor: CEMEA SAV, v.v.i
Partneri: ÚACh SAV, v.v.i. (Zoltán Lenčéš), ÚPo SAV, v.v.i.
Stav: podaný

Názov projektu: Nízkonákladová syntéza hutného biocementu a lešenia prostredníctvom alkalickej aktivácie prášku Si_3N_4 / Low-cost synthesis of bulk biocement and scaffolds via alkali-activation of Si_3N_4 powder
Evidenčné číslo: APVV-22-0499
Akronym: BIOSILSN
Koordinátor: CEMEA SAV, v.v.i.
Partneri: ÚACh SAV, v.v.i. (Monika Tatarková)
Stav: podaný

Názov projektu: Ultra-vysokoteplotné karbidy so zvýšenou oxidačnou odolnosťou / Ultra-high temperature carbides with increased oxidation resistance
Evidenčné číslo: APVV-22-0493
Akronym: NEOCAR
Koordinátor: ÚMV SAV, v.v.i.
Partneri: ÚACh SAV, v.v.i. (Peter Tatarko)
Stav: podaný

2.2. Medzinárodné projekty

2.2.1. Medzinárodné projekty riešené v roku 2022

Tabuľka 2c Medzinárodné projekty riešené v roku 2022

ŠTRUKTÚRA PROJEKTOV	Počet		Čerpané financie (€)					
			A				B	
			Zo zdrojov SAV		Z iných zdrojov			
	A	B	Spolu	Pre organizáciu	Spolu	Pre organizáciu	Zo zdrojov SAV	Z iných zdrojov
1. Projekty Horizont 2020 a Horizont Európa	1	1	-	-	-	-	3500	16850
2. Projekty ERA.NET, ESA, JRP	1	0	25000	25000	-	-	-	-
3. Projekty COST	0	0	-	-	-	-	-	-
4. Projekty EUREKA, NATO, UNESCO, CERN, IAEA, IVF, ERDF a iné	0	1	-	-	-	-	25000	-
5. Projekty v rámci medzivládnych dohôd	0	0	-	-	-	-	-	-
6. Bilaterálne projekty MAD, Mobility, Open Mobility	1	0	1500	1000	-	-	-	-
7. Bilaterálne projekty ostatné	2	0	-	-	20322	20322	-	-
8. Podpora MVTS z národných zdrojov (SAV, APVV a iné)	0	0	-	-	-	-	-	-
9. SAS-UPJŠ ERC Visiting Fellowship Grants	0	0	-	-	-	-	-	-
10. Iné projekty	0	0	-	-	-	-	-	-

A - organizácia je nositeľom projektu
B - organizácia sa zmluvne podieľa na riešení projektu

2.2.2. Medzinárodné projekty Horizont Európa podané v roku 2022

Tabuľka 2d Počet projektov Horizont Európa v roku 2022

	A	B
Počet podaných projektov Horizont Európa	1	1

A - organizácia je nositeľom projektu
B - organizácia sa zmluvne podieľa na riešení projektu

Názov projektu: Battery system with the liquid rotor charger based on molten salts
Evidenčné číslo: 101098770
Akronym: THELMA
Koordinátor: ÚACh SAV
Partneri: Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile (Taliansko); East Alfa Pipe AB (Švédsko); VUNAR a.s. (Slovensko)
Stav: podaný

Názov projektu: Radiolysis and Plasma reactors To carbon dioxide Reuse
Evidenčné číslo: SEP-210902764
Akronym: RAPTOR
Koordinátor: Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile (Taliansko)
Partneri: ÚACh SAV, v.v.i.; EURONOVIA (Francúzsko); Nucleco societa per l'ecoingegneria nucleare societa per azioni (Taliansko), Consiglio nazionale delle ricerche (Taliansko); ESU-SERVICES g.m.b.h. (Švajčiarsko)
Stav: podaný

Názov projektu: New type of cesium fluoro-, oxo-, and oxo-fluoro-aluminate complexes: stability, dynamics and structural characterization.
Evidenčné číslo:
Akronym:
Koordinátor: ÚACh SAV, v.v.i. (František Šimko)
Partneri: CNRS Orleans (Francúzsko)
Stav: schválený

Údaje k domácim a medzinárodným projektom sú uvedené v Prílohe B.

2.2.3. Zámery na čerpanie Európskych štrukturálnych a investičných fondov v ďalších výzvach

2.3. Výber najvýznamnejších výsledkov vedeckej práce organizácie v roku 2022

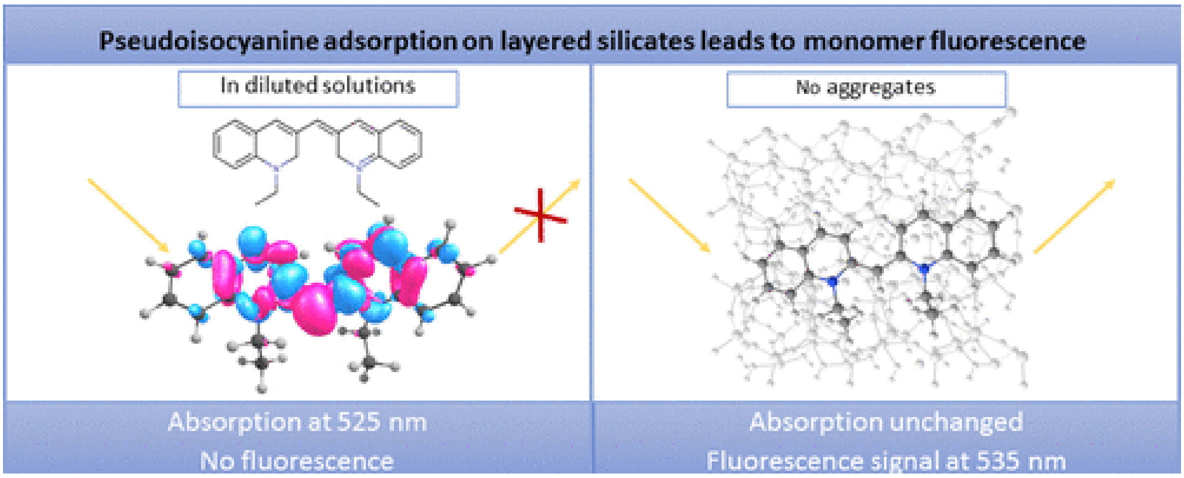
Slúži aj na výber výsledkov do výročnej správy SAV. Každý výsledok má byť charakterizovaný stručným, všeobecne zrozumiteľným popisom – maximálne 1000 znakov + 1 obrázok; bibliografický údaj uvádzajte rovnako ako v zozname publikačnej činnosti, vrátane IF. Nadpis by mal vystihnúť prínos a význam výsledku – podľa možnosti by nemal byť zredukovaný na názov/nadpis publikačného výstupu.

2.3.1. Výsledky na báze základného výskumu

ADSORPCIOU INDUKOVANÁ FLUORESCENCIA MONOMÉROV ORGANICKÝCH FARBÍV V HYBRIDNÝCH SYSTÉMOCH VRSTEVNATÝCH KREMIČITANOV

P. Boháč, M. Pribus, T. Šimonová, Ľ. Jankovič, V. Planetová, J. Bujdák

Adsorpciou indukovaná emisia predstavuje jav, kedy interakciou organických farbív s rôznymi povrchmi materiálov dochádza k potlačeniu rotačno-vibračných dezaktivačných procesov exitovaných stavov molekúl. Ich potlačenie umožňuje pozorovať fluorescenciu molekulových monomérov farbív. V našom výskume sme ako prví pozorovali adsorpciou indukovanú emisiu farbiva pseudoisocyanín (PIC), ktoré je zaujímavé z hľadiska jeho unikátnej emisie J-agregátov avšak fluorescencia monomérov tohto farbiva pozorovaná nebola. Adsorpcia molekuly PIC na povrch saponitu spôsobila zmenu dihedrálnych uhlov medzi pyridínovými podskupinami a znížila pravdepodobnosť neradiačnej relaxácie v prospech radiačnej relaxácie formou fluorescencie. Ďalším doteraz neštudovaným systémom, na ktorom sme pozorovali adsorpciou indukovanú fluorescenciu bolo zwiteriónové Reinchardove farbivo adsorbované na povrchu modifikovaného vrstevnatého kremičitanu. Nami aplikovaná špecifická modifikácia povrchu anorganického materiálu vyvolala fluorescenciu, inak nefluorescenčného farbiva



Obr. Schematické znázornenie zmeny geometrie molekuly pseudoisocyanínu po adsorpcii na povrch vrstevnatého kremičitanu Saponit, ktorá vedie k adsorpciou indukovanej fluorescencii monoméru farbiva pri vlnovej dĺžke 535 nm.

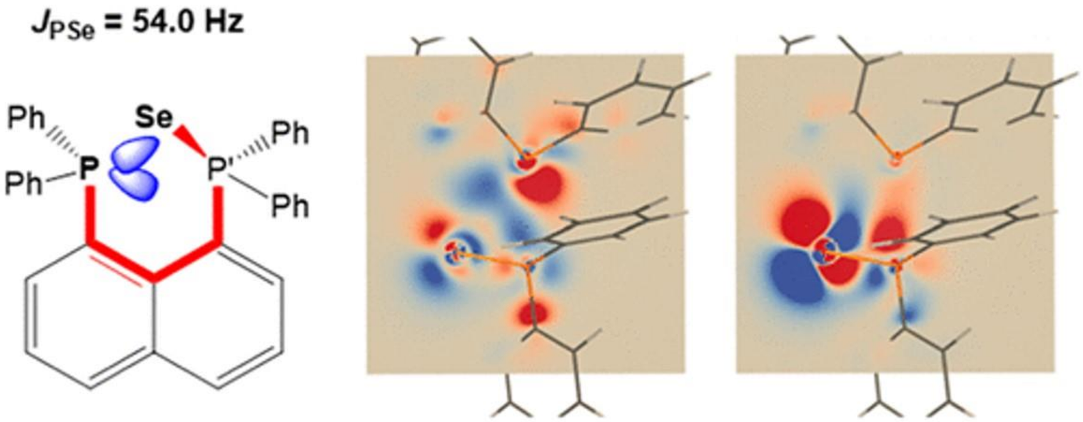
Publikácie:

1. BOHÁČ, Peter** – BUDZÁK, Šimon – PLANETOVÁ, Viktória – KLEMENT, Róbert – BUJDÁK, Juraj. Adsorption-induced fluorescence of pseudoisocyanine monomers in systems with layered silicates. In Journal of Physical Chemistry C, 2022, vol. 126, no. 40, p. 17255-17265. (2021: 4.177 – IF, Q2 – JCR, 1.103 – SJR, Q1 – SJR, karentované – CCC). https://doi.org/10.1021/acs.jpcc.2c03497
2. PRIBUS, Marek** – BUDZÁK, Šimon – PRIBUSOVÁ SLUŠNÁ, Lenka – ŠIMONOVÁ, Tímea – JANKOVIČ, Ľuboš – MÉSZÁROS, R. – BUJDÁK, Juraj. Luminescence of Reichardt´s dye in polyelectrolyte-modified saponite colloids. In Colloids and Surfaces A: Physicochemical and Engineering Aspects, 2022, vol. 642, p. 128663-1-128663-10. (2021: 5.518 – IF, Q2 – JCR, 0.758 – SJR, Q2 – SJR). https://doi.org/10.1016/j.colsurfa.2022.128663

AKO ROZLÍŠIŤ MEDZI VÄZBOVÝMI A NEVÄZBOVÝMI DRÁHAMI SPIN-SPINOVEJ INTERAKCIE

O. Malkina, V. Malkin

Nepriame NMR spin-spinové väzby obsahujú neoceniteľné informácie o štruktúre molekúl a to hlavne v prípade, keď nie sú dostupné iné techniky, ako napríklad RTG analýza. Tieto informácie však nemožno extrahovať bez pochopenia vzťahu medzi štruktúrou molekuly a samotnými spin-spinovými väzbami v skúmanom systéme. Fenomén nepriamych spin-spinových väzieb je pozoruhodne koncepčne zle pochopený v zložitých experimentálnych situáciách, v ktorých sú potenciálne zapojené naraz neväzbové („cez-priestor“), ale aj klasickejšie väzbové („cez-väzby“) dráhy interakcie. V tejto práci sme navrhli výpočtové postupy, ktoré umožňujú vizualizáciu jednotlivých prenosových dráh a odhad ich relatívnej váhy. Tieto metódy sú použiteľné pre veľké systémy s komplexnou interakciou jadrových magnetických momentov. Celkový obraz prenosových dráh v komplexnom systéme možno navyše ďalej spresniť príspevkami jednotlivých molekulových orbitálov alebo ich párov, ktoré súvisia s akýmkoľvek fragmentom molekulovej štruktúry. Navrhované metódy sú tiež použiteľné na analýzu hyperjemných väzbových dráh v EPR spektroskopii. Mohli by napríklad pomôcť vyriešiť problém, ako spinová polarizácia generovaná paramagnetickým centrom (centrami) dosiahne konkrétne aktívne jadro.



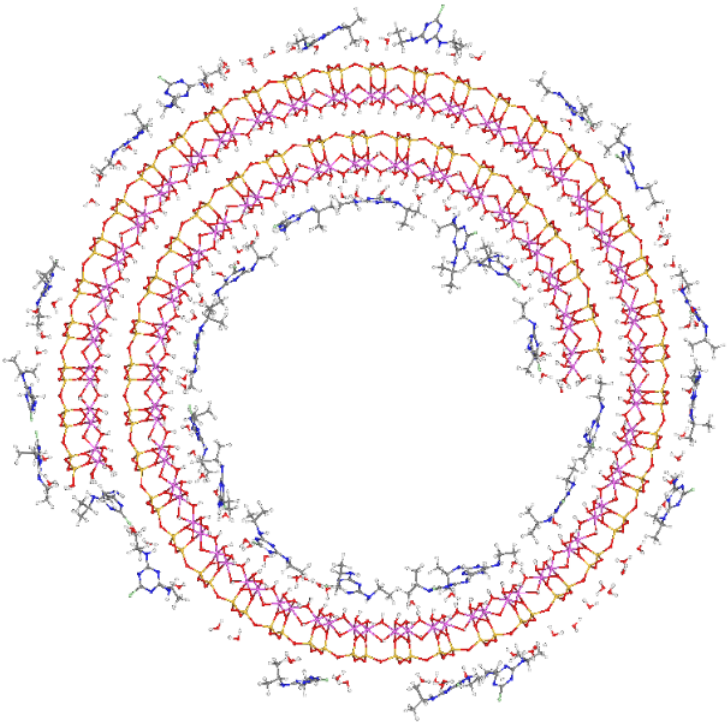
$^{5}J_{PSe}$ alebo $^{TS}J_{PSe}$? => „cez-priestor“ (**65%**) + “cez- väzby”(**35%**)

Publikácia:
MALKINA, Oľga** – HIERSO, Jean-Cyrille** – MALKIN, Vladimír. Distinguishing "through-space" from "through-bonds" contribution in indirect nuclear spin-spin coupling: General approaches applied to complex JPP and JPSe scalar couplings. In Journal of the American Chemical Society, 2022, vol. 144, no. 24, p. 10768-10784. (2021: 16.383 – IF, Q1 – JCR, 5.728 – SJR, Q1 – SJR). Dostupné na: https://doi.org/10.1021/jacs.2c01637

HALLOYZIT - ÚČINNÝ ADSORBENT POLUTANTOV ŠTUDOVANÝ TEORETICKÝMI METÓDAMI.

D. Moreno Rodríguez, Ľ. Jankovič, E. Scholtzová

Minerál halloyzit, bol študovaný *ab initio* DFT a Force field (FF) výpočtovými metódami ako potenciálny adsorbent polutantov. Významným prínosom tohto štúdia je, že neúplná experimentálna planárna štruktúra halloyzitu bola spesnená *ab initio* DFT metódou a následne bol na jej základe v spolupráci s kolegami z Karlovej Univerzity v Prahe navrhnutý model halloyzitovej špirálovej nanorúrkovej štruktúry. Tento model bol ďalej použitý pri štúdiu adsorpcie polutantov (atrazín a diuron) FF metódou, kde sa zistilo, že halloyzit účinne adsorbuje obidva herbicídy, pričom diuron sa viaže silnejšie v dôsledku svojej polárnejšej štruktúry v porovnaní s atrazínom (Obr) [1]. Tento fakt sa potvrdil aj pri sorbovaní týchto herbicídov na ďalšom nanorúrkovom minerále, imogolite a smektitoch [2]. Spresnený model planárnej štruktúry halloyzitu sa využil pri štúdiu sorpcie liečiva irinotekanu, ktoré sa využíva pri liečbe rakoviny. Halloyzit sa može v tomto prípade použiť nielen ako potenciálny nosič liečiva, ale aj pri účinnej adsorpcii irinotekanu ako polutantu z odpadových vôd [3].



Obr. Optimalizovaný model halloyzitovej špirálovej nanorúrky s adsorbovanými molekulami diuronu na jej vonkajšom a vnútornom povrchu.

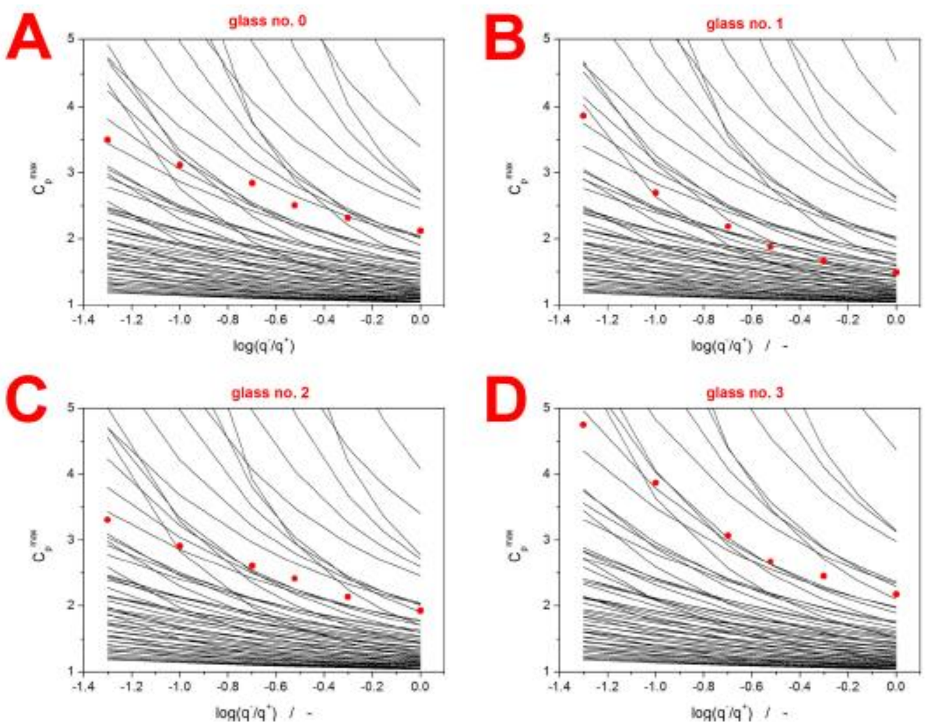
Publikácie:

1. GIANNI, Eleni** - MORENO RODRÍGUEZ, Daniel** - JANKOVIČ, Ľuboš - SCHOLTZOVÁ, Eva - POSPÍŠIL, Miroslav. How herbicides like atrazine and diuron interact with the spiral halloysite structure. In Journal of Environmental Chemical Engineering, 2022, vol. 10, no. 6, p. 108785-1-108785-10. (2021: 7.968 - IF, Q1 - JCR, 1.042 - SJR, Q1 - SJR). ISSN 2213-3437. Dostupné na: https://doi.org/10.1016/j.jece.2022.108785
2. MORENO RODRÍGUEZ, Daniel** - JANKOVIČ, Ľuboš - SCHOLTZOVÁ, Eva. Immobilisation of diuron herbicide employing smectites. In Materials Today Communications, 2022, vol. 31, p. 103252-1-103252-12. (2021: 3.662 - IF, Q3 - JCR, 0.623 - SJR, Q2 - SJR). ISSN 2352-4928. Dostupné na: https://doi.org/10.1016/j.mtcomm.2022.103252
3. GIANNI, Eleni - SCHOLTZOVÁ, Eva **.Theoretical investigation of halloysite as potential sorbent for pharmaceutical wastewaters. SUSTENG 2022, 31 Aug – 04 Sep 2022, Rethymno, Crete, Greece, p. 477-481, ISBN Number: 978-618-86417-0-9. Dostupné na: https://www.susteng.eu/p/proceedings.

VPLYV DOPANTU LI NA OBLASŤ TRANSFORMÁCIE BIOSKLA 45S5

M. Chromčíková, M. Liška

Sklený prechod označuje transformáciu medzi podchladeným kvapalným stavom a zmrazeným (tuhým) sklovitým stavom. Kinetika skleného prechodu je poháňaná relaxačnými pohybmi určitých/dominantných štruktúrnych jednotiek. Diferenciálna skenovacia kalorimetria, termomechanická analýza a Ramanova spektroskopia boli použité na štúdium úlohy oxidov Li_2O a P_2O_5 na štruktúrne a relaxačné javy v Li-dopovanom 45S5 Bioskle. Zistilo sa, že správanie skleného prechodu je podobné pre entalpické a objemové prejavy relaxačných pohybov. Použil sa model Tool-Narayanaswamy-Moynihan (TNM). Na stanovenie relaxačných parametrov modelu bola použitá vylepšená simulačno-porovnávacia metodológia. Parametre TNM modelu a vybrané charakteristiky skelného prechodu (teplota skelného prechodu a koeficienty tepelnej rozťažnosti) nevykazovali štatisticky významnú koreláciu s konkrétnymi prvkami prítomnými v syntetizovaných sklách. Preto sa informácie o zložení skiel použili na výpočet teoretických množstiev druhov Q^n_{Si} v skle 45S5 dopovaných Li. Zistilo sa, že prakticky všetky skúmané fyzikálno-chemické veličiny súvisiace s kinetikou skleného prechodu vykazujú koreláciu s obsahom druhov Q^2_{Si}, ktoré sú zodpovedné za štruktúry vytvorenú reťazcami v študovaných sklách.



Obr. Vizuálne znázornenie simulačno-porovnávacej metódy použitej v prípade bio skiel 45S5 dopovaných Li. Body ukazujú experimentálne údaje, čiary predstavujú závislosti teoreticky simulované pre rôzne kombinácie β/x.

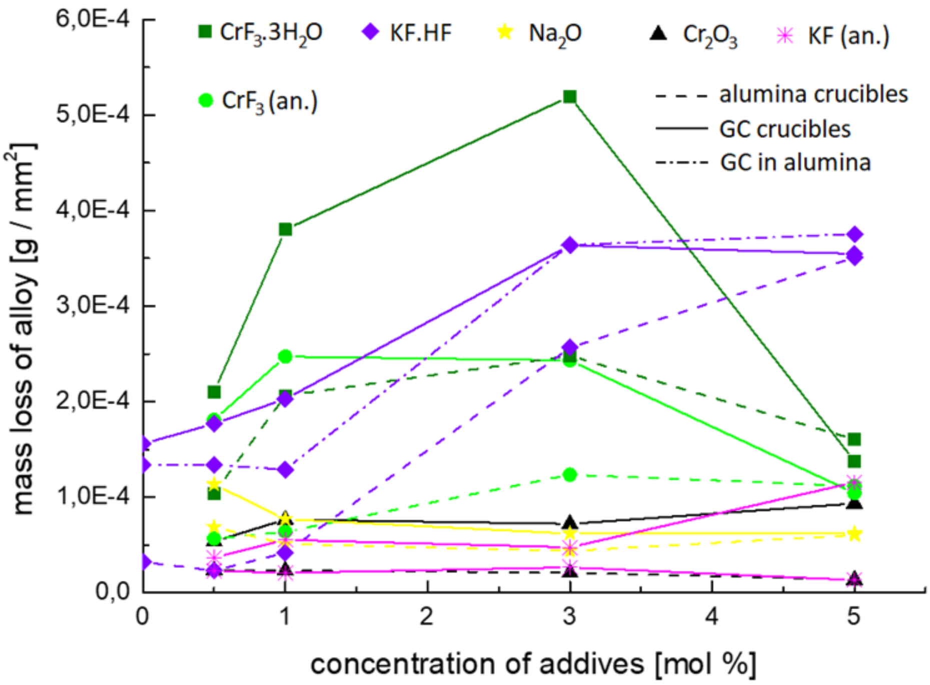
Publikácia:

CHROMČÍKOVÁ, Mária** - SVOBODA, Roman - PECUŠOVÁ, Beáta - HRUŠKA, Branislav - HUJOVÁ, Miroslava - NOWICKA, Aleksandra - LIŠKA, Marek. Effect of lithium doping on the glass transition behavior of the Bioglass 45S5. In Journal of Non-Crystalline Solids, 2022, vol. 594, p. 121797-1-121797-7. (2021: 4.458 - IF, Q1 - JCR, 0.751 - SJR, Q1 - SJR). ISSN 0022-3093. Dostupné na: https://doi.org/10.1016/j.jnoncrysol.2022.121797

NOVÝ MODEL KORÓZNYCH PROCESOV SUPERZLIATIN V ROZTAVENÝCH FLUORIDOCH.

V. Pavlík, M. Boča

Na rozsiahlom systéme koróznych experimentov bola zásadným spôsobom modifikovaná dlhoročná predstava o koróznych procesoch prebiehajúcich na superzliatinách v interakcii s roztavenými fluoridmi. Dlhodobo preferovaný model bol založený na predstave, že zásadným faktorom, ktorý negatívne ovplyvňuje koróznu odolnosť zliatin, je prítomnosť oxidových aniónov v tavenine. Na systémoch zložených z eutektickej zmesi LiF/NaF/KF v interakcii so superzliatinou Incoloy 800 H/HT a prídavkami $CrF_3 \cdot 3H_2O$, $KF \cdot HF$, Na_2O, Cr_2O_3 a CrF_3 však bolo ukázané, že oveľa väčší negatívny vplyv na koróznu odolnosť superzliatin má prítomnosť vodíkového protónu, ktorý sa do systému dostáva ako nečistota hlavne v snahe čistiť vstupnú soľ zmesou F_2/HF (minoritne aj ako vlhkosť vstupných materiálov alebo atmosférická vlhkosť). Okrem odporúčania dôsledného odstránenia a zamedzenia prístupu vodíkových protónov do systému bol tiež preukázaný nezanedbateľný vplyv výberu ostatných materiálov, ktoré vstupujú do vzájomnej interakcie s cieľom vyhnúť sa galvanickej interakcii použitých materiálov.



Obr. Závislosť zmeny hmotností korodovaných vzoriek zliatiny Incoloy 800 H/HT od koncentrácie jednotlivého prídavku do eutektickej zmesi LiF/NaF/KF.

Publikácia:

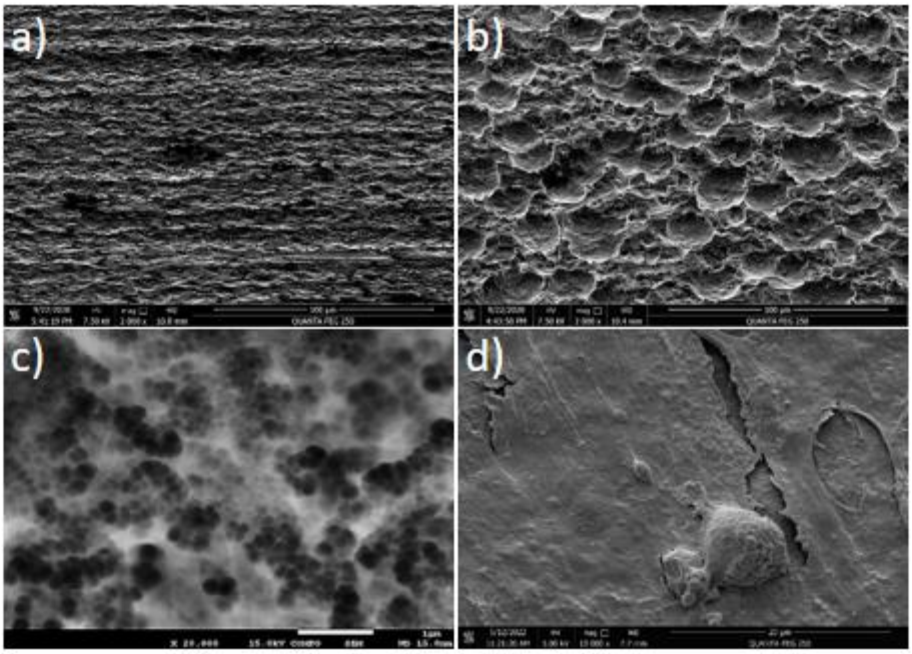
PAVLÍK, Viliam** – BOČA, Miroslav – KITYK, Anna. Accelerated corrosion testing in molten fluoride salts: Effect of additives and the crucible material. In Corrosion Science, 2022, vol. 195, p. 110011-1-110011-15. (2021: 7.720 – IF, Q1 – JCR, 1.694 – SJR, Q1 – SJR). ISSN 0010-938X. Dostupné na: https://doi.org/10.1016/j.corsci.2021.110011

2.3.2. Výsledky aplikačného typu

EKOLOGICKÁ ELEKTROCHEMICKÁ POVRCHOVÁ ÚPRAVA BIOMEDICÍNSKYCH ZLIATIN NA BÁZE TI

A Kityk, M. Hnatko

Titán a Ti zliatiny zostávajú najbežnejšími materiálmi na výrobu protéz a implantátov. Titán a jeho zliatiny nespĺňajú všetky klinické požiadavky, a aby sa zlepšili biologické, chemické a fyzikálno-mechanické vlastnosti vykonáva sa často dodatočná povrchová úprava biomedicínskych Ti-zliatin. Počas realizácie projektu APVV-0322 bola navrhnutá a preskúmaná inovatívna metóda povrchovej úpravy Ti zliatin (Ti) na *mikro* a *nano* úrovniach (Obr.), ktorá umožňuje zlepšiť koróznu odolnosť, bio-kompatibilitu a osseointegráciu titánových protéz a implantátov. Najnovšia technológia elektrochemického povrchového leptania a elektro-leštenia v ekologických hlboko eutektických rozpúšťadlách začína byť sľubnou alternatívou ku klasickým metódam povrchovej úpravy titánu. Nízka spotreba energie, primeraná cena, ekologická bezpečnosť zložiek elektrolytu a jednoduchosť implementácie metódy robia navrhovanú metódu konkurenčne lepšou v porovnaní s inými technikami povrchovej úpravy titánu. Získané výsledky sa stali základom dvoch patentových návrhov.



Obr. SEM analýza neošetrených (a) a elektrochemicky textúrovaných povrchov v DES Ti-zliatiny (b) – *mikro* textúra a c – *nano* textúra pri t=25 °C, (d) – vzorka plne pokrytá bunkami ľudských pľúcnych fibroblastov, čo dokazuje vysokú bio-kompatibilitu povrchov ošetrených navrhovanou metódou.

Patenty:

1. Európska patentová prihláška s názvom: "Method for electrochemical surface treatment of biomedical products made of titanium or Ti-based alloys" pod číslom 22193733.7 (registrácia 2.09.2022).
2. Európska patentová prihláška s názvom: “A method for electrochemical surface treatment of biomedical products made of titanium or Ti-based alloys” pod číslom 22204696.3 (registrácia 31.10.2022).

Publikácie:

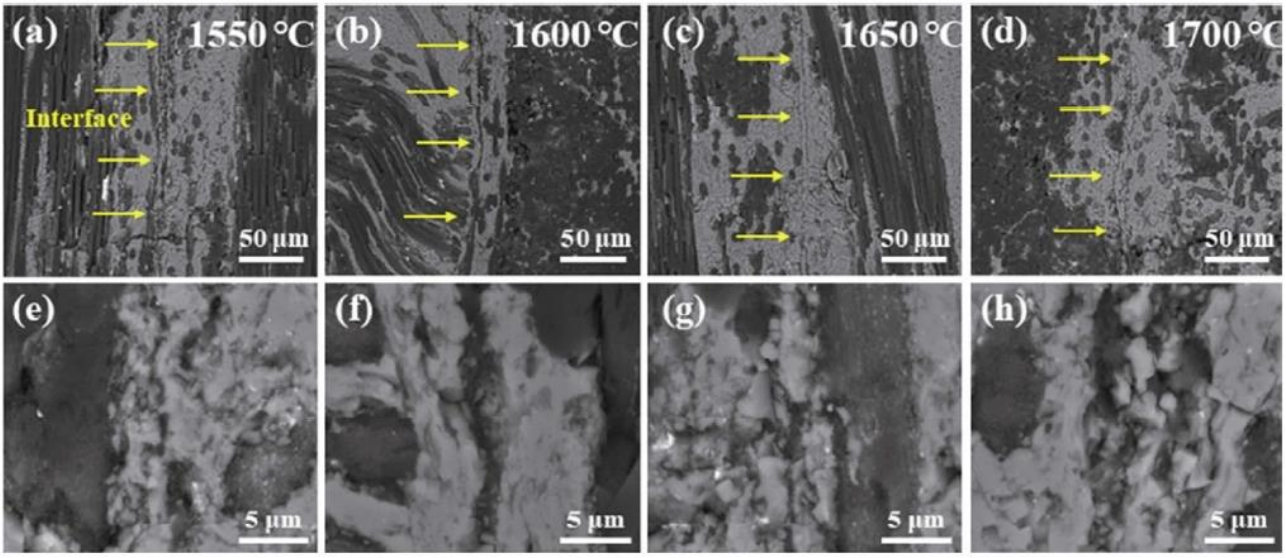
KITYK, Anna** - PROTSENKO, V. - DANILOV, F.I. - BOBROVA, Lina - HNATKO, Miroslav - PAVLÍK, Viliam - ŠOLTÝS, Ján - LABUDOVÁ, Martina - RUSKOVÁ, Magdaléna - PANGALLO, Domenico. Design of Ti-6Al-4V alloy surface properties by galvanostatic electrochemical treatment in a deep eutectic solvent Ethaline. In Surface & Coatings Technology, 2022, vol. 429, art. no. 127936. (2021: 4.865 - IF, Q2 - JCR, 0.922 - SJR, Q1 - SJR). ISSN 0257-8972. Dostupné na: https://doi.org/10.1016/j.surfcoat.2021.127936

2.3.3. Výsledky na báze medzinárodnej spolupráce

SPÁJANIE KOMPOZITOV C_f/SiC S MEDZIVRSTVOU $Y_3Si_2C_2$ POMOCOU TECHNOLÓGIE SPEKANIA V ELEKTRICKOM POLI

P. Tatarko

V tejto práci bol vôbec po prvýkrát pripravený materiál $Y_3Si_2C_2$ syntézou v roztavej soli pri relatívne nízkej teplote (900?). Takto pripravený materiál bol následne použitý ako spojovací materiál pre spájanie kompozitov SiC vystužených uhlíkovými vláknami (C_f/SiC). Počas spájania došlo k eutektickej reakcii medzi $Y_3Si_2C_2$, γ(Y–C) fázy a SiC, čo viedlo k tvorbe taveniny a následnej precipitácii častíc SiC. Prítomnosť tekutej fázy podporila spekanie novovyvinutých častíc SiC, pričom došlo k ich úplnému zhutneniu s matricou C_f/SiC. Nadbytok taveniny bol z oblasti spoja vytlačený vplyvom pôsobenia jednoosového tlaku (30 MPa), čo vo finálnej fáze viedlo k tvorbe takmer bezšvového spoja. Spoj, ktorý bol pripravený pri teplote 1600°C a výdrži 10 min, vykázal najvyššiu šmykovú pevnosť s hodnotou 17.2 ± 2.9 MPa.



Obr. Spätne odrazené SEM snímky vzoriek spojených pri rôznych teplotách: (a, e) 1550°C, (b, f) 1600°C, (c, g) 1650°C, (d, h) 1700°C.

Publikácie:

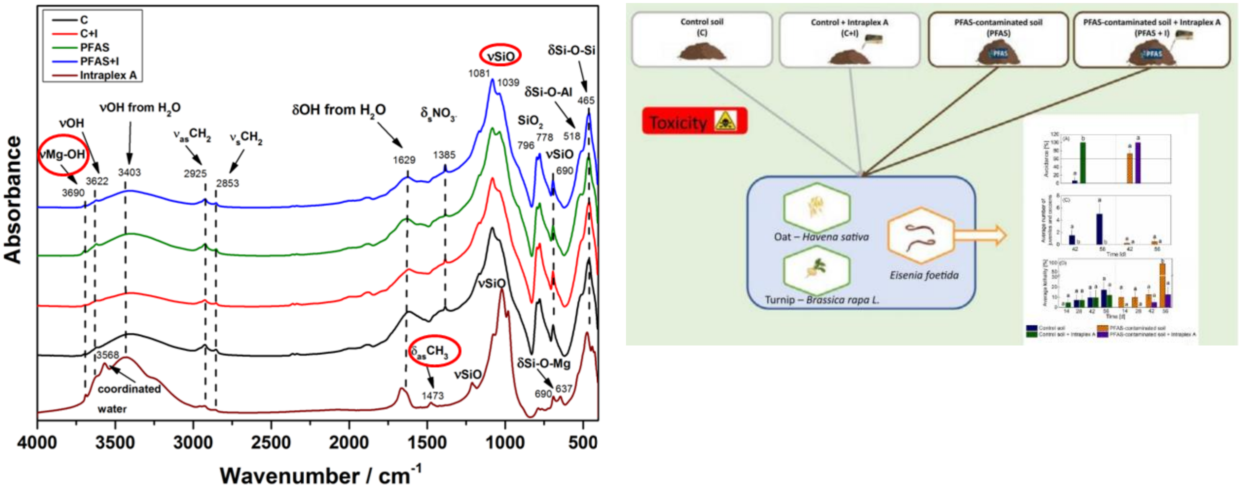
1. https://www.susteng.eu/p/proceedings.
2. YU, Teng - XU, Jie* - ZHOU, Xiaobing - **TATARKO, Peter** - LI, Yang - HUANG, Zhengren - HUANG, Qing. Near-seamless joining of C_f/SiC composites using $Y_3Si_2C_2$ via electric field-assisted sintering technique. In Journal of Advanced Ceramics, 2022, vol. 11, no. 8, p. 1196–1207. (**2021: 11.534 - IF**, Q1 - JCR, 1.558 - SJR, Q1 - SJR). ISSN 2226-4108. Dostupné na: https://doi.org/10.1007/s40145-022-0593-3

Výsledky boli získané a publikované v rámci riešenia projektu APVV-17-0328

ORGANICKY MODIFIKOVANÝ ÍLOVÝ MINERÁL A VPLYV JEHO PRÍDAVKU NA: ADSORPCIU POLUTANTOV A ZLEPŠENIE PÔDNEJ BIOTY (KVALITY) KONTAMINOVANÝCH PÔD

M. Slaný

Nový adsorpčný organo-íl (OI) pozostávajúci z ílového minerálu sépiolitu, ktorý bol modifikovaný surfaktantom (polydiallydimetylamóniový chlorid), sa využil na *in situ* imobilizáciu per- a polyfluóralkylových látok (PFAS), ktoré predstavujú globálny problém, keďže kontaminujú pôdy a ohrozujú pôdne organizmy. Uskutočnila sa detailná charakterizácia samotného OI, ako aj systémov pred a po pridaní OI k referenčnej pôde a PFAS kontaminovaj pôde. FTIR spektroskopia potvrdila prítomnosť adsorpčných skupín Mg-O, Si-O, ako aj metylových skupín, ktoré môžu významne prispieť k odstraňovaniu PFAS z pôdy. OI vykázal dobrú termickú stabilitu, pričom rozklad surfaktantu prebiehal až v teplotnom rozmedzí 250-550°C. Testom na úmrtnosť dážďoviek sa skúmal vplyv prídavku organo-ílu na pôdnu biotu v PFAS-pôdach. Zistilo sa, že úmrtnosť bola 7,6 krát nižšia po prídavku OI do kontaminovanej pôdy v porovnaní s pôdou bez pridania OI. Nižšia úmrtnosť súvisela s adsorpciou polutantu na nový adsorbent a s následným znížením toxicity pôdy. Adsorbent bol teda vysoko efektívny pri znižovaní znečistenia pôdy a jeho využitie môže viesť k zlepšeniu kvality pôdy.



Obr. Detekcia funkčných adsorpčných skupín pomocou FTIR spektroskopie a vplyv organo-ílu na adsorpciu polutantov v kontaminovaných pôdach

Publikácia

MEDEIROS MELO, Tatiane** - SCHAUERTE, Marina - BLUHM, Annika - SLANÝ, Michal - PALLER, Michael - BOLAN, Nanthi - BOSCH, Julian - FRITZSCHE, Andreas - RINKLEBE, Jörg**. Ecotoxicological effects of per- and polyfluoroalkyl substances (PFAS) and of a new PFAS adsorbing organoclay to immobilize PFAS in soils on earthworms and plants. In Journal of Hazardous Materials, 2022, vol. 433, p. 128771-1-128771-11. (**2021: 14.224 - IF**, Q1 - JCR, 1.991 - SJR, Q1 - SJR). ISSN 0304-3894. Dostupné na: https://doi.org/10.1016/j.jhazmat.2022.128771 **Typ: ADCA**

2.4. Publikačná činnosť (zoznam je uvedený v prílohe C)

Tabuľka 2e Štatistika vybraných kategórií publikácií

PUBLIKAČNÁ A EDIČNÁ ČINNOSŤ	**Počet v r. 2022/ doplnky z r. 2021**
1. Vedecké monografie a monografické štúdie vydané v domácich vydavateľstvách (AAB, ABB)	**0 / 0**
2. Vedecké monografie a monografické štúdie vydané v zahraničných vydavateľstvách (AAA, ABA)	**0 / 0**
3. Odborné monografie, vysokoškolské učebnice a učebné texty vydané v domácich vydavateľstvách (BAB, ACB, CAB)	**2 / 0**
4. Odborné monografie a vysokoškolské učebnice a učebné texty vydané v zahraničných vydavateľstvách (BAA, ACA, CAA)	**0 / 0**
5. Kapitoly vo vedeckých monografiách vydaných v domácich vydavateľstvách (ABD)	**0 / 0**
6. Kapitoly vo vedeckých monografiách vydaných v zahraničných vydavateľstvách (ABC)	**0 / 0**
7. Kapitoly v odborných monografiách, vysokoškolských učebniciach a učebných textoch vydaných v domácich vydavateľstvách (BBB, ACD)	**0 / 0**
8. Kapitoly v odborných monografiách, vysokoškolských učebniciach a učebných textoch vydaných v zahraničných vydavateľstvách (BBA, ACC)	**0 / 0**
9. Vedecké práce registrované v Current Contents Connect (ADCA, ADCB, ADDA, ADDB)	**77 / 0**
10. Vedecké práce registrované vo Web of Science Core Collection alebo Scopus (ADMA, ADMB, ADNA, ADNB)	**1 / 0**
11. Vedecké práce v ostatných domácich časopisoch (ADFA, ADFB)	**0 / 0**
12. Vedecké práce v ostatných zahraničných časopisoch (ADEA, ADEB)	**0 / 0**
13. Vedecké práce v domácich recenzovaných zborníkoch (AEDA)	**0 / 0**
14. Vedecké práce v zahraničných recenzovaných zborníkoch (AECA)	**0 / 0**
15. Publikované príspevky na domácich vedeckých konferenciách (AFB, AFD)	**11 / 0**
16. Publikované príspevky na zahraničných vedeckých konferenciách (AFA, AFC)	**9 / 0**
17. Vydané periodiká evidované v CCC, WoS Core Collection, SCOPUS	**0**
18. Ostatné vydané periodiká	**0**
19. Zostavovateľské práce knižného charakteru (FAI)	**1 / 0**
20. Preklady vedeckých a odborných textov (EAJ)	**0 / 0**
21. Heslá v odborných terminologických slovníkoch a encyklopédiách (BDA, BDB)	**0 / 0**
22. Recenzie v časopisoch a zborníkoch (EDI)	**0 / 0**

Evidujú sa len tie práce zamestnancov a doktorandov, v ktorých je uvedená afiliácia k organizácii

Tabuľka 2f Štatistika vedeckých prác podľa kvartilu vedeckého časopisu

Kvartil vedeckého časopisu	Q1	Q2	Q3	Q4	Spolu
Podľa IF z r. 2021 (zdroj JCR) *Počet článkov / doplnky*	51 / 0	20 / 0	6 / 0	1 / 0	78 / 0
Podľa SJR z r. 2021 (zdroj Scimago) *Počet článkov / doplnky*	53 / 0	20 / 0	5 / 0	0 / 0	78 / 0

Tabuľka 2g Ohlasy

OHLASY	Počet v r. 2021/ doplnky z r. 2020
Citácie vo WOS (1.1, 2.1)	1948 / 95
Citácie v SCOPUS (1.2, 2.2)	170 / 9
Citácie v iných citačných indexoch a databázach (9, 10, 3.2, 4.2)	0 / 0
Citácie v publikáciách neregistrovaných v citačných indexoch (3, 4, 3.1, 4.1)	3 / 3
Recenzie na práce autorov z organizácie (5, 6, 7, 8)	0 / 0

2.5. Aktívna účasť na vedeckých podujatiach

Tabuľka 2h Vedecké podujatia

Prednášky a vývesky na medzinárodných vedeckých podujatiach	54
Prednášky a vývesky na národných vedeckých podujatiach	55

2.6. Vyžiadané prednášky

Ak boli príspevky publikované, sú súčasťou prílohy C, kategória (AFC, AFD, AFE, AFF, AFG, AFH)

2.6.1. Vyžiadané prednášky na medzinárodných vedeckých podujatiach

ASHER, James Richard - HRICOVÍNI, Michal - HRICOVÍNI, Miloš. A study of the photochemical behaviour and relaxation mechanisms of anti-syn isomersation around quanazolinone -N-N= bons. Chemistry towards Biology - 10 Instruct, Bratislava, Slovensko, 11. – 14. 09. 2022

BOČA, Miroslav - KUBÍKOVÁ, Blanka - NETRIOVÁ, Zuzana – MATSELKO - Oksana, and MLYNÁRIKOVÁ, Jarmila; Systematic research on the selected ternary lanthanide fluoride systems. International Conference on the Cooperation and Integration of Industry, Education, Research and Application: Metallurgy and Metal Materials and New Generation of Information Technology; Northeastern University, Čína; 22. 11. 2022

BUČKO, Tomáš. Ab initio free energy calculations at multiple electronic structure levels made affordable: An effective combination of perturbation theory and machine learning, ICTAC 2022, Lyon, Francúzsko, 17. 6. 2022

BUČKO, Tomáš. MLPT - an effective method for determining free energies at multiple electronic structure levels, MLQC4Dyn 2022, Paríž, 14. 9. 2022

BUJDÁK, Juraj. Playing with dye molecules in hybrids with clay minerals to achieve photofunctionality. MECC ´20/22. 10th Jubilee Mid-European Clay Conference, Kliczków, Poľsko, 11.–15. 09. 2022

GALUSEK, Dušan. Aluminate glasses: Why are they special? 15th International Ceramics Congress CIMTEC 2022, Perugia, Taliansko, 20. –24. jún 2022

MUTLU, Nursen - KURTULDU, Fatih - NEŠČÁKOVÁ, Zuzana - ZHENG, K. - BOCCACCINI, Aldo R. - GALUSEK, Dušan. Mesoporous nanoparticles doped with ions with potential therapeutic effect: synthesis and characterization, Ceramics in Europe 2022, Krakow, Poľsko, 10.–14. júl 2022

BOCCACCINI, Aldo R. - GALUSEK, Dušan, Bioactive glasses and glass-biopolymer composites doped with therapeutic ions, 1st ESBI CONFERENCE 2022, Krems, Rakúsko, 18.–20. máj 2022

KRAXNER, Jozef - BERNARDO, Enrico - GALUSEK, Dušan. Novel approaches in additive manufacturing of glass-based structures, 97th DKG Annual Meeting of the German Ceramic Scoiety, March 7-9, 2022, virtual conference

KOMOROVSKÝ, Stanislav. Relativistic theory of pNMR and EPR. Actinides revisited 2022, Dresden, Nemecko, 21.–23. 09. 2022

LEMKEN, Florian - MALKINA, Oľga - MALKIN, Vladimír - KOMOROVSKÝ, Stanislav. Indirect Nuclear Spin-Spin & Hyperfine Coupling pathway visualisation in heavy metal complexes. Chemistry towards Biology - 10 Instruct, Bratislava, Slovensko, 11.–14. 09. 2022

MALKINA, Oľga, A mystery of a through-space indirect NMR spin-spin coupling between two hydrogen atoms, 18th Central European Symposium on Theoretical Chemistry 2022, Balatonszárszó, Maďarsko, 7.–10. 09. 2022

MALKINA, Oľga, Beyond the Dirac vector model: why one-bond reduced NMR spin-spin coupling can be negative, Chemistry towards Biology - 10 Instruct, Bratislava, Slovensko, 11.–14. 09. 2022

MALKIN, Vladimír - LEMKEN, Florian - KOMOROVSKÝ, Stanislav - MALKINA, Oľga. Visualization of EPR hyperfine structure coupling pathways. 18th Central European Symposium on Theoretical Chemistry 2022, Balatonszárszó, Maďarsko, 7.–10. 09. 2022

MIŠENKOVÁ, Debora - LEMKEN, Florian - REPISKÝ, Michal - NOGA, Jozef - MALKINA, Oľga - KOMOROVSKÝ, Stanislav. Overcoming the gauge problem for g-tensor calculations in the framework of four-component DFT. 18th Central European Symposium on Theoretical Chemistry 2022, Balatonszárszó, Maďarsko, 7.–10. 09. 2022

MORENO RODRÍGUEZ, Daniel - SCHOLTZOVÁ, Eva - NISHIHARA, H. DFT study of defects in graphene, 2nd AtomDec Annual Meeting - Atomic Design of Carbon-Based Materials for New Society, Smolenice, Slovensko, 02.11. – 04.11. 2022.

MORENO RODRÍGUEZ, Daniel, On the search for clay-herbicide interaction, Spring seminar of the Czech National Clay Group, Praha, Česká republika, 08.06. 2022.

TATARKO, Peter – ÜNSAL, Hakan – MATOVIĆ, Branko – CHLUP, Zdeněk – TATARKOVÁ, Monika – KOVALČÍKOVÁ, Alexandra – HIČÁK, Michal – DLOUHÝ, Ivo – ŠAJGALÍK, Pavol. The Effect of Rara-earth based Additives on the Mechanical Properties of ZrB2-SiC Composites prepared by Reactive and Non-Reactive Sintering Route, 15th International Ceramics Congress, CIMTEC 2022, Perugia, Taliansko, 20-24.06.2022

ÜNSAL, Hakan – GRASSO, Salvatore – KOVALČÍKOVÁ, Alexandra – HANZEL, Ondrej – TATARKOVÁ, Monika – DLOUHÝ, Ivo – TATARKO, Peter. In-situ graphene platelets formation and its suppression during reactive spark plasma sintering of boron carbide/titanium diboride composites, Keramik/Ceramics 2022, virtual conference, 07.-09.03.2022

TATARKO, Peter – ÜNSAL, Hakan – KOVALČÍKOVÁ, Alexandra – MATOVIĆ, Branko – CHLUP, Zdeněk – TATARKOVÁ, Monika – HIČÁK, Michal – DLOUHÝ, Ivo. Ultra-high temperature ceramics with improved ablation resistance, 1st International Conference on Innovative Materials in Extreme Conditions, IMEC 2022, Belehrad, Srbsko, 22–23.03.2022

2.6.2. Vyžiadané prednášky na národných vedeckých podujatiach

2.6.3. Vyžiadané prednášky na významných vedeckých inštitúciách

BUJDÁK, Juraj. Organization of luminophore molecules in hybrids with silicates to achieve photofunctionality. Department of Materials Chemistry & Research, University of Vienna, Rakúsko, 24.11.2022

TATARKO, Peter, New Diboride Ceramics for Extreme Applications, Department of Mettalurgical & Materials Engineering, Indian Institute of Technology IIT Madras, Chennai, India, 05.12.2022 (online)

LEMKEN, Florian, Long-range indirect 13C-31P coupling in isostructural nickel, palladium and platinum complexes, University of Oulu, Fínsko, 25.11.2022.

LEMKEN, Florian, Overcoming the gauge problem for g-tensor calculations in the framework of four-component DFT, Technische Universität Berlin, Nemecko, 30. 11.2022.

MALKINA, Oľga, Distinguishing “Through-Space” from “Through-Bonds” Contribution in Indirect Nuclear Spin-Spin Coupling, Technische Universität Berlin, Nemecko, 07.12.2022.

MALKIN, Vladimír, Distinguishing “Transmission of spin-polarization by pi-orbitals”, Technische Universität Berlin, Nemecko, 7.12.2022.

TATARKO, Peter, Development of advanced ceramic materials at Slovak Academy of Sciences, TUBITAK Marmara Research Center, Istanbul, Turecko, 18.10.2022

PRNOVÁ, Anna - VALÚCHOVÁ Jana - MAJEROVÁ Melinda - PARCHOVIANSKÝ Milan - MICHÁLKOVÁ Monika - GALUSEK Dušan.. Vplyv prídavku ZrO_2 na mechanické vlastnosti Al_2O_3 - Y_2O_3 Keramiky, Univerzita Pardubice, Pardubice, Česká republika, 22.9.2022

SCHOLTZOVÁ, Eva, DFT method - a useful tool for characterisation of clay minerals and organoclays, University of Patras, Dept of Geology, Patras, Greece, 12.07.2022.

SLANÝ, Michal - Clay minerals and organoclays-based nanocomposites for environmental applications, Bergische Universität Wuppertal, Nemecko, 30.05.2022

2.7. Patentová a licenčná činnosť na Slovensku a v zahraničí v roku 2022

2.7.1. Vynálezy, na ktoré bol v roku 2022 udelený patent

a) na Slovensku

b) v zahraničí

2.7.2. Vynálezy prihlásené v roku 2022

a) na Slovensku

b) v iných krajinách ako prioritná prihláška

c) PCT

d) EP

Názov vynálezu: Method for electrochemical surface treatment of biomedical products made of titanium or Ti-based alloys
Krajina: Slovensko
Číslo prihlášky: EP22193733.7
Dátum priority: 2.9.2022
Majiteľ / spolumajiteľ: CEMEA SAV, v. v. i.; ÚACH SAV, v. v. i.
Pôvodcovia vynálezu: Hnatko Miroslav, Kityk Anna,

Názov vynálezu: A method for electrochemical surface treatment of biomedical product made of titanium or Ti-based alloys
Krajina: Slovensko
Číslo prihlášky: EP22204696.3
Dátum priority: 31.10.2022
Majiteľ / spolumajiteľ: CEMEA SAV, v. v. i.; ÚACH SAV, v. v. i.
Pôvodcovia vynálezu: Hnatko Miroslav, Kityk Anna,

e) v iných krajinách v rámci tzv. národnej fázy po PCT, resp. po validácii EP

2.7.3. Úžitkové vzory na Slovensku

a) prihlásené v roku 2022

b) udelené v roku 2022

2.7.4. Realizované vynálezy

a) predané patenty resp. prihlášky vynálezov (v prípade úplnej zmeny majiteľa patentu)

b) predané licencie (v prípade že majiteľom ostáva organizácia SAV)

Finančný prínos pre organizáciu SAV v roku 2022 a súčet za predošlé roky sa neuvádzajú, ak je zverejnenie v rozpore so zmluvou súvisiacou s realizáciou patentu.

2.8. Účasť expertov na hodnotení národných projektov (APVV, VEGA a iných)

Tabuľka 2i Experti hodnotiaci národné projekty

Meno pracovníka	Typ programu/projektu/výzvy	Počet hodnotených projektov
Bujdák Juraj	APVV 2022 (Spravodajca prírodovedných projektov)	10
	VEGA-22	3
Pálková Helena	VEGA-22	1
Prnová Anna	VEGA-22	1
Šimko František	VEGA-22	2

2.9. Účasť na spracovaní hesiel do encyklopédie Beliana

Počet autorov hesiel: 0

2.10. Recenzovanie knižných publikácií a príspevkov vo vedeckých časopisoch

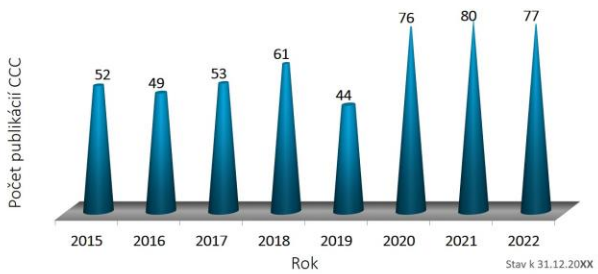
Tabuľka 2j Počet vypracovaných recenzií na vedecké monografie, vedecké štúdie a zborníky

Meno pracovníka	Ved. monografie		Príspevky v časopisoch			Zborníky	
	Domáce	Zahraničné	WoS, SCOPUS	Iné databázy	Ostatné	Domáce	Zahraničné

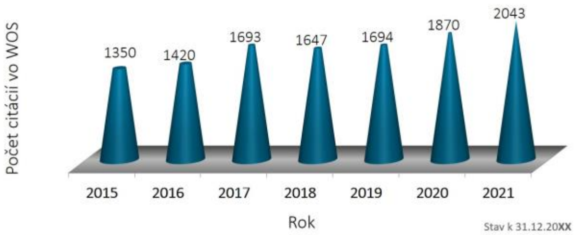
Barlog Martin	0	0	1	0	0	0	0
Boháč Peter	0	0	7	0	0	0	0
Bučko Tomáš	0	0	7	0	0	0	0
Galusek Dušan	0	0	12	0	0	0	0
Hnatko Miroslav	0	0	0	0	0	1	0
Kubíková Blanka	0	0	1	0	0	0	0
Lenčéš Zoltán	0	0	5	0	0	0	0
Malkin Oľga	0	0	5	0	0	0	0
Pálková Helena	0	0	2	0	0	0	0
Prnová Anna	0	0	4	2	0	0	0
Scholtzová Eva	0	0	2	0	0	0	0
Slaný Michal	0	0	4	0	0	0	0
Tatarko Peter	0	0	30	0	0	4	0
Spolu	**0**	**0**	**80**	**2**	**0**	**5**	**0**

2.11. Iné informácie k vedeckej činnosti.

Vývoj počtu časopiseckých karentovaných publikácií registrovaných v databáze WOS ukazuje schéma nižšie. V závislosti na metodike, na ktorú kategóriu sa vzťahuje prepočítaný podiel publikácie, je možné uvažovať o kategóriách: vedeckí pracovníci, ostatní vedeckí pracovníci s VŠ vzdelaním, ostatní pracovníci zapojení do riešenia projektov a doktorandi. Vzhľadom na to, že nie je k dispozícii jednoznačné usmernenie, budeme vychádzať z usmernenia poslednej akreditácie, kedy sa počet publikačných výstupov vzťahoval na počet zamestnancov s univerzitným titulom zapojených do výskumných projektov v danom roku. Cieľom je dosiahnuť a udržiavať dve (prípadne viac) publikácie na počet zamestnancov s univerzitným titulom zapojených do výskumných projektov, čo odpovedá štandardu vyspelých vedeckých pracovísk s podobným zameraním. V roku 2022, pri počte 43,96 pracovníkov zapojených do projektov sa dosiahlo 1,75 publikácie v kategórii karentovaných publikácií. V obrázkoch a tabuľkách uvedených ďalej je možné sledovať trendy v posledných rokoch vo vývoji počtu karentovaných publikácií, ako trendy v počte karentovaných publikácií na vedeckého pracovníka. Ďalším sledovanými parametrami sú ohlasy na práce s afiliáciou ústavu uvedených vo WOS databáze a ich prepočet na jedného vedeckého pracovníka.



Rok	2016	2017	2018	2019	2020	2021	2022
Vedecký pracovník	36,3	39,1	39,4	34,2	34,9	37,3	38,8
Pub/ 1 VP*	1,4	1,4	1,5	1,3	2,2	2,1	2,0



Rok	2016	2017	2018	2019	2020	2021	2022
Vedeckí pracovníci	36,3	39,1	39,4	34,2	34,9	37,3	38.8
cit/1 ved. prac.	36,3	37,6	41,8	45,3	40,8	42,0	52,6

Tabuľky tiež ukazujú vývoj priemerného impakt faktoru výstupov (podľa JCR). Podstatnou skutočnosťou je, že stabilne rastie počet publikácií v časopisoch s vyšším IF.

Rok/Year	2016	2017	2018	2019	2020	2021	2022
Priemerný IF	2.71	2.83	3.41	3.66	4.17	4.32	5.64
Medián IF	2.74	3.10	3.06	3.45	3.26	3.65	4.88

IF	Počet publikácií / Number of publications (ADC and ADD)					
	2017	2018	2019	2020	2021	2022
< 1	5	3	1	5	1	0
1-2	11	5	8	4	2	3
2-3	8	20	6	23	17	9
3-4	19	19	12	13	21	13
4<	8	14	17	31	39	52
∑	51	61	44	76	80	77

Významnou časťou vedeckej aktivity je účasť na výzvach v rôznych projektových schémach. Každoročne, jednotlivé vedecké tímy na ústave podávajú niekoľko APVV projektov, ako vo všeobecnej, tak aj v bilaterálnych výzvach. V schéme VEGA projektov je ústav riešiteľom stabilne vysokého počtu projektov (aj spoločných spolu s univerzitnými pracoviskami).

Tiež treba vyzdvihnúť úspešnosť ústavu naprieč všetkými vnútornými výzvami SAV; získané štipendiá v rámci Schwarzovho fondu (v roku 2022 mal ústav dvoch držiteľov štipendia), doktorandských projektov (v roku 2022 jeden projekt), bilaterálne medzinárodné projekty (TUBITAK-1, MOST-1, V4-Japan-1) vrátane projektu SASPRO II (aktuálne dva projekty). V rámci projektu CEMEA, ktorý sa začal riešiť v priebehu roka 2019 nastal výrazný pozitívny posun v obstarávavní a dodaní naplánovaných prístrojov ako aj v iných aktivitách riešených v rámci tohto projektu.

3. Doktorandské štúdium, iná pedagogická činnosť a budovanie ľudských zdrojov pre vedu a techniku

3.1. Údaje o doktorandskom štúdiu

Tabuľka 3a Počet doktorandov v roku 2022

Forma	Počet k 31.12.2022				Počet doktorandov po doktorandskej skúške		Počet ukončených doktorantúr v r. 2022					
							Ukončenie z dôvodov					
	celkový počet		z toho novoprijatí				ukončenie úspešnou obhajobou		predčasné ukončenie		neúspešné ukončenie	
	M	Ž	M	Ž	M	Ž	M	Ž	M	Ž	M	Ž
Denná zo zdrojov SAV	6	6	0	1	4	5	1	1	0	0	0	0
Denná z iných zdrojov	0	0	0	0	0	0	0	0	0	0	0	0
Externá	0	0	0	0	0	0	0	0	0	0	0	0
Spolu	6	6	0	1	4	5	1	1	0	0	0	0
Z toho zahraničných	5	4	0	0	4	3	1	0	0	0	0	0
Súhrn	12		1		9		2		0		0	

Uvádzajte len doktorandov organizácie ako externej vzdelávacej inštitúcie.
Riadok „Spolu“ je súčtom troch riadkov nad ním. Každá bunka v riadku „Súhrn“ vyjadruje celkový počet doktorandov (mužov a žien spolu), čiže je súčtom príslušných dvoch buniek z riadku „Spolu“. V stĺpci „Počet doktorandov po doktorandskej skúške“ sa uvádza počet doktorandov, ktorí počas roku 2022 boli aspoň 1 deň doktorandami po doktorandskej skúške. Sú číselne zahrnutí aj v predchádzajúcich stĺpcoch.
Pod predčasným ukončením rozumieme ukončenie bez obhajoby dizertačnej práce pričom doktorand neabsolvoval celú štandardnú dĺžku štúdia. Pod neúspešným ukončením rozumieme ukončenie bez úspešnej obhajoby dizertačnej práce, pričom študent absolvoval celú štandardnú dĺžku štúdia.

3.2. Zmena formy doktorandského štúdia

Tabuľka 3b Počty preradení z dennej formy na externú a z externej na dennú

Pôvodná forma	Denná z prostriedkov SAV	Denná z prostriedkov SAV	Denná z iných zdrojov	Denná z iných zdrojov	Externá	Externá
Nová forma	**Denná z iných zdrojov**	**Externá**	**Denná z prostriedkov SAV**	**Externá**	**Denná z prostriedkov SAV**	**Denná z iných zdrojov**
Počet	0	0	0	0	0	0

3.3. Zoznam doktorandov, ktorí ukončili doktorandské štúdium úspešnou obhajobou

Tabuľka 3c Menný zoznam ukončených doktorandov v roku 2022 úspešnou obhajobou

Meno doktoranda	Forma DŠ	Mesiac, rok nástupu na DŠ	Mesiac, rok obhajoby	Číslo a názov študijného odboru	Meno a organizácia školiteľa	Fakulta udeľujúca vedeckú hodnosť
Mgr. Patrícia Petrisková	interné štúdium hradené z prostriedkov SAV	9 / 2018	8 / 2022	4.1.15 anorganická chémia	doc. Ing. Zoltán Lenčéš PhD., Ústav anorganickej chémie SAV, v. v. i.	Prírodovedecká fakulta UK
MSc. Hakan Ünsal	interné štúdium hradené z prostriedkov SAV	9 / 2018	8 / 2022	4.1.15 anorganická chémia	Ing. Peter Tatarko PhD., Ústav anorganickej chémie SAV, v. v. i.	Prírodovedecká fakulta UK

3.4. Zoznam doktorandov, ktorí ukončili doktorandské štúdium úspešnou obhajobou v nadštandardnej dĺžke štúdia

Tabuľka 3d Menný zoznam ukončených doktorandov v roku 2022 úspešnou obhajobou v nadštandardnej dĺžke štúdia

Meno doktoranda	Forma DŠ	Mesiac, rok nástupu na DŠ	Mesiac, rok obhajoby	Číslo a názov študijného odboru	Meno a organizácia školiteľa	Fakulta udeľujúca vedeckú hodnosť

3.5. Uplatnenie absolventov doktorandského štúdia

Tabuľka 3e Prehľad uplatnenia absolventov doktorandského štúdia

Počet absolventov PhD. štúdia v roku 2022 (obhajoba leto 2022)	z toho koľkí sa zamestnali vo výskume (SAV, univerzity, rezortné výskumné ústavy)	z toho koľkí sa zamestnali v praxi mimo výskum, kde využívajú svoju kvalifikáciu	z toho koľkí sa zamestnali v praxi, kde nevyužívajú svoju kvalifikáciu	z toho koľkí boli nejaký čas nezamestnaní
2	2	0	0	0

Zoznam interných a externých doktorandov je uvedený v prílohe A.

3.6. Medzinárodné doktorandské štúdium

Tabuľka 3f Počet študentov v medzinárodných programoch doktorandského štúdia

Cotutelle	Co-direction	Iné	Zahraniční doktorandi štátne občianstvo/počet
0	0	0	IND/2, TUR/2, DEU/1, ECU/1, GRC/1, IRN/1, PAK/1, RUS/1

Zahraniční doktorandi sú doktorandi v dennej alebo externej forme štúdia, ktorí sú občanmi iných krajín. Doktorandi školení v rámci Cotutelle alebo Co-direction sa do posledného stĺpca nezapočítavajú.

3.7. Zoznam študijných odborov, na ktoré má ústav uzatvorenú rámcovú dohodu, s uvedením VŠ

Tabuľka 3g Zoznam študijných odborov, na ktoré má ústav uzatvorenú rámcovú dohodu, s uvedením univerzity/vysokej školy a fakulty, kde sa doktorandský študijný program uskutočňuje

Názov študijného odboru (ŠO)	Číslo ŠO	Názov doktorandského študijného programu	Doktorandské štúdium uskutočňované na (univerzita/vysoká škola a fakulta)
fyzika	1160	chemická fyzika	Prírodovedecká fakulta UK
chémia	1420	anorganická chémia	Prírodovedecká fakulta UK
chemické inžinierstvo a technológie	2820	anorganická technológia a materiály	Fakulta chemickej a potravinárskej technológie STU
anorganická chémia	4.1.15		Prírodovedecká fakulta UK

Názov a číslo študijného odboru vyplňte/vyberte podľa aktuálne platného zoznamu študijných odborov https://www.portalvs.sk/sk/studijne-odbory?from=menu1. Názov doktorandského študijného programu v stĺpci 3 je potrebné vložiť ako voľný text.
Do 31. 8. 2023 študujú študenti doktorandského štúdia zaradení do študijných programov podľa zoznamu MŠVVaŠ, platného do 1. 9. 2019. Pre týchto študentov je potrebné napísať názov programu ako voľný text do stĺpca 3 a nevypĺňovať stĺpce 1 a 2.

Tabuľka 3h Účasť na pedagogickom procese

Menný prehľad pracovníkov, ktorí boli menovaní do odborových komisií pre doktorandské štúdium	Menný prehľad pracovníkov, ktorí pôsobili ako členovia vedeckých rád univerzít, správnych rád univerzít a fakúlt	Menný prehľad pracovníkov, ktorí získali vyššiu vedeckú, pedagogickú hodnosť alebo vyšší kvalifikačný stupeň
doc. Ing. Miroslav Boča, DrSc. (anorganická chémia)	doc. Ing. Miroslav Boča, DrSc. (Fakulta chemickej a potravinárskej technológie STU)	
doc. Ing. Miroslav Boča, DrSc. (anorganická technológia a materiály)	doc. Ing. Miroslav Boča, DrSc. (Trenčianska univerzita Alexandra Dubčeka v Trenčíne)	
doc. Ing. Miroslav Boča, DrSc. (odbor v zahraničí)	prof. Ing. Dušan Galusek, DrSc. (Fakulta špeciálnej techniky TnUAD)	
prof. RNDr. Juraj Bujdák, DrSc. (anorganická chémia)	prof. Ing. Dušan Galusek, DrSc. (Fakulta zdravotníctva TnUAD)	
prof. RNDr. Juraj Bujdák, DrSc. (fyzikálna chémia)	prof. Ing. Dušan Galusek, DrSc. (Trenčianska univerzita Alexandra Dubčeka v Trenčíne)	

prof. Ing. Dušan Galusek, DrSc. (anorganická technológia a materiály)	prof. Ing. Marek Liška, DrSc., Dr.h.c. (Fakulta chemické technologie VŠCHT, Praha, ČR)	
prof. Ing. Dušan Galusek, DrSc. (fyzikálna chémia)	prof. Ing. Marek Liška, DrSc., Dr.h.c. (Trenčianska univerzita Alexandra Dubčeka v Trenčíne)	
prof. Ing. Dušan Galusek, DrSc. (materiály)	RNDr. Jana Madejová, DrSc. (Prírodovedecká fakulta UK)	
doc. Ing. Miroslav Hnatko, PhD. (anorganické technológie a nekovové materiály)	prof. RNDr. Pavol Šajgalík, DrSc. (Fakulta metalurgie a materiálového inženírství, Vysoká škola báňská TU)	
doc. Ing. Miroslav Hnatko, PhD. (anorganická technológia a materiály)	prof. RNDr. Pavol Šajgalík, DrSc. (Hutnícka fakulta TUKE)	
doc. Ing. Zoltán Lenčéš, PhD. (anorganická technológia a materiály)	prof. RNDr. Pavol Šajgalík, DrSc. (Slovenská technická univerzita v Bratislave)	
doc. Ing. Zoltán Lenčéš, PhD. (anorganická chémia)	prof. RNDr. Pavol Šajgalík, DrSc. (Trenčianska univerzita Alexandra Dubčeka v Trenčíne)	
doc. Ing. Zoltán Lenčéš, PhD. (odbor v zahraničí)	prof. RNDr. Pavol Šajgalík, DrSc. (Univerzita Komenského v Bratislave)	
prof. Ing. Marek Liška, DrSc., Dr.h.c. (anorganická technológia a materiály)	prof. RNDr. Pavol Šajgalík, DrSc. (Univerzita Pavla Jozefa Šafárika v Košiciach)	
prof. Ing. Marek Liška, DrSc., Dr.h.c. (fyzika kondenzovaných látok a akustika)	prof. RNDr. Pavol Šajgalík, DrSc. (Univerzita sv. Cyrila a Metoda v Trnave)	
RNDr. Jana Madejová, DrSc. (anorganická technológia a materiály)	prof. RNDr. Pavol Šajgalík, DrSc. (Vysoké učení technické, Brno)	
Dr. Oľga Malkin, DrSc. (teoretická a počítačová chémia)		
Dr. Vladimír Malkin, DrSc. (chemická fyzika)		
Dr. Vladimír Malkin, DrSc. (teoretická a počítačová chémia)		

3.8. Údaje o pedagogickej činnosti

Tabuľka 3i Prednášky a cvičenia vedené v roku 2022

PEDAGOGICKÁ ČINNOSŤ	Prednášky		Cvičenia a semináre	
	doma	v zahraničí	doma	v zahraničí
Počet prednášateľov alebo vedúcich cvičení	3	0	4	0
Celkový počet hodín v r. 2022	48	0	62	0

Prehľad prednášateľov predmetov a vedúcich cvičení, s uvedením názvu predmetu, úväzku, katedry, fakulty, univerzity/vysokej školy je uvedený v prílohe D.

Tabuľka 3j Aktivity pracovníkov na VŠ

1.	Počet pracovníkov, ktorí pôsobili ako vedúci alebo konzultanti diplomových a bakalárskych prác	0
2.	Počet vedených alebo konzultovaných diplomových a bakalárskych prác	0
3.	Počet pracovníkov, ktorí pôsobili ako školitelia doktorandov (PhD.)	12
4.	Počet školených doktorandov (aj pre iné inštitúcie)	23
5.	Počet oponovaných dizertačných a habilitačných prác	9
6.	Počet pracovníkov, ktorí oponovali dizertačné a habilitačné práce	5
7.	Počet pracovníkov, ktorí pôsobili ako členovia komisií pre obhajoby DrSc. prác	2
8.	Počet pracovníkov, ktorí pôsobili ako členovia komisií pre obhajoby PhD. prác	5
9.	Počet pracovníkov, ktorí pôsobili ako členovia komisií, resp. oponenti v inauguračnom alebo habilitačnom konaní na vysokých školách	0

3.9. Iné dôležité informácie k pedagogickej činnosti

Ústav anorganickej chémie SAV, v.v.i. sa začiatkom roka 2022 opäť zapojil do pedagogického procesu vypísaním PhD. tém ako externá vzdelávacia inštitúcia dvoch univerzít - PriF UK a FCHPT STU. Celkovo bolo vypísaných 7 tém v 4 študijných programoch (anorganická chémia, fyzikálna chémia a teoretická a počítačová chémia v spolupráci s PríF UK a anorganická technológia a materiály v spolupráci s FCHPT STU). Tieto témy boli zverejnené prostredníctvom AIS na píslušných fakultách, webových stránkach ústavu i SAV, ako aj na ďalších dvoch medzinárodných portáloch, ako vlastná iniciatíva ÚACH SAV, v.v.i. pre získanie nových doktorandov, kotrá sa za posledné roky veľmi osvedčila. Aj napriek intenzívnej komunikácii s viacerými záujemcami, si prihlášky v stanovenom termíne podali len dvaja uchádzači, ktorí sa zároveň zúčastnili aj prijímacích pohovorov. Obaja uchádzači splnili podmienky, ale do prvého ročníka bola zapísaná nakoniec len jedna študentka v programe Anorganická chémia na PríF UK. Okrem PhD. tém sa ÚACH SAV, v.v.i. podieľal na pedagogickom procese vypísaním 3 Mgr. a 2 Bc. tém na PríF UK.

Študenti doktorandského štúdia a mladí vedeckí pracovníci do 35 rokov sa zapojili do Súťaže mladých pracovníkov do 35 rokov na ÚACH SAV, v.v.i. Súťaž sa uskutočnila dňa 19.10.2022 za účasti 13 študentov doktorandského štúdia a mladých vedeckých pracovníkov z ÚACH SAV, v.v.i. Bratislava a TnUAD Trenčín. Úroveň súťažných príspevkov bola vynikajúca, čo ocenili členovia komisie, ako i ostatní zamestnanci ÚACH SAV, v.v.i., ktorí sa zúčastnili prednášok. Na ocenených miestach sa umiestnili:

1. Florian Lemken
2. Alper Güneren
3. Bruno Wolfrum

Doktorandi ÚACH sa uchádzajú aj o projekty v rámci výziev DOKTOGRANT, v roku 2022 sa o tento projekt úspešne uchádzali dvaja doktorandi – Sanam Bashir a Naser Hosseini.

4. Medzinárodná vedecká spolupráca

4.1. Medzinárodné vedecké podujatia

4.1.1. Medzinárodné vedecké podujatia, ktoré organizácia SAV organizovala v roku 2022 alebo sa na ich organizácii podieľala, s vyhodnotením vedeckého a spoločenského prínosu podujatia

2ND AtomDec Annual Meeting - Atomic Design of Carbon-Based Materials for New Society, Smolenice, Slovensko, 18 účastníkov, 02.11.-04.11.2022, (Eva Scholtzová, uacheva@savba.sk)
Počas podujatia odznelo 18 prednášok, účastníci zo Slovenska, Maďarska, Poľska, Českej Republiky, Japonska, Španielska, Veľkej Británie, Dánska

4.1.2. Medzinárodné vedecké podujatia, ktoré usporiada organizácia SAV v roku 2023 (anglický a slovenský názov podujatia, miesto a termín konania, meno, telefónne číslo a e-mail zodpovedného pracovníka)

XVth Workshop on Modern Methods in Quantum Chemistry, Mariapfarr, Rakúsko, 26.02.-03.03.2023, (Vladimír Malkin, 02/59410469, uachmalk@savba.sk)

4.1.3. Počet pracovníkov v programových a organizačných výboroch medzinárodných konferencií

Tabuľka 4a Programové a organizačné výbory medzinárodných konferencií

Meno pracovníka	Programový	Organizačný	Programový i organizačný
Galusek Dušan	3	0	0
Hanzel Ondrej	0	1	0
Hnatko Miroslav	0	1	0
Lenčéš Zoltán	0	0	1
Scholtzová Eva	0	0	1
Spolu	3	2	2

4.2. Členstvo a funkcie v medzinárodných orgánoch

4.2.1. Členstvo a funkcie v medzinárodných vedeckých spoločnostiach, úniách a národných komitétoch SR

doc. Ing. Miroslav Boča, DrSc.
European Technology Platform for Advanced Engineering Materials and Technologies (funkcia: člen správnej rady EuMat)

Mgr. Peter Boháč, PhD.
AIPEA - International Association for the study of Clays (funkcia: člen)

prof. RNDr. Juraj Bujdák, DrSc.
AIPEA - International Association for the study of Clays (funkcia: člen)

prof. Ing. Dušan Galusek, DrSc.
American Ceramic Society (funkcia: člen)
Ceramic in Modern Technologies (funkcia: člen)

European Ceramic Society (funkcia: fellow)
European Society for Bioresorbable Implants (funkcia: zakladajúci člen)
European Society on Glass Science and Technology (funkcia: člen)
International Commission on Glass (funkcia: zástupca SR v ICG council)

doc. Ing. Mária Chromčíková, PhD.
Česká sklárska spoločnosť (funkcia: člen)
TC03 (funkcia: člen)

Mgr. Ľuboš Jankovič, PhD.
AIPEA - International Association for the study of Clays (funkcia: člen)

Ing. Michal Korenko, PhD.
International Union of Pure and Applied Chemistry (IUPAC) (funkcia: National Representative (NR) of Division I)

Mgr. Valéria Kureková, PhD.
AIPEA - International Association for the study of Clays (funkcia: člen)

doc. Ing. Zoltán Lenčéš, PhD.
American Ceramic Society (funkcia: člen)
Ceramic Society of Japan (funkcia: člen)
European Ceramic Society (funkcia: člen výboru)
International Ceramic Federation (funkcia: člen)
Materials Research Society (funkcia: člen)

prof. Ing. Marek Liška, DrSc., Dr.h.c.
Česká sklárska spoločnosť (funkcia: člen výboru, čestný člen)
ICG TC03 (funkcia: člen)
Society of Glass Technology (funkcia: čestný člen - FSGT)

RNDr. Jana Madejová, DrSc.
AIPEA - International Association for the study of Clays (funkcia: člen výboru)
The Clay Minerals Society (funkcia: člen)

Dr. Vladimír Malkin, DrSc.
WATOC - World Association of Theoretical and Computational Chemists (funkcia: člen)

MSc. Daniel Moreno, PhD.

AIPEA - International Association for the study of Clays (funkcia: člen)

Ing. Helena Pálková, PhD.
AIPEA - International Association for the study of Clays (funkcia: člen)

Mgr. Marek Pribus, PhD.
AIPEA - International Association for the study of Clays (funkcia: člen)

Ing. Anna Prnová, PhD.
Slovak Fulbright Alumni Association (funkcia: člen)

Ing. Eva Scholtzová, CSc.

AIPEA - International Association for the study of Clays (funkcia: člen)

Ing. Michal Slaný, PhD.
AIPEA - International Association for the study of Clays (funkcia: člen)

prof. RNDr. Pavol Šajgalík, DrSc.
American Ceramic Society (funkcia: člen)
Ceramic Society of Japan (funkcia: člen)
Council of the European Ceramic Society (funkcia: člen)
European Ceramic Society (funkcia: člen predstavenstva)
International Ceramic Federation (funkcia: člen predstavenstva)
Materials Research Society (funkcia: člen)
Permanent Executive Committee ECerS (funkcia: volený člen)
World Academy of Ceramics (funkcia: volený člen)

Mgr. Tímea Šimonová, PhD.
AIPEA - International Association for the study of Clays (funkcia: člen)

Ing. Peter Škorňa, PhD.
AIPEA - International Association for the study of Clays (funkcia: člen)

4.3. Účasť expertov na hodnotení medzinárodných projektov (EÚ RP, ESF a iných)

Tabuľka 4b Experti hodnotiaci medzinárodné projekty

Meno pracovníka	Typ programu/projektu/výzvy	Počet hodnotených projektov
Galusek Dušan	ANR IRIS, France	1
Korenko Michal	01-HORIZON-CL4-2022-TWIN-TRANSITION	7
Tatarko Peter	HORIZON-MSCA-2022-PF-01	5
	Latvian Science Funds, open call for Fundamental and Applied Research 2022	2

4.4. Najvýznamnejšie prínosy MVTS ústavu vyplývajúce z mobility a riešenia medzinárodných projektov a iné informácie k medzinárodnej vedeckej spolupráci

Peter BOHÁČ

– Shimane University, Matsue, Japonsko, 4.4. – 27.5 2022, JSPS Invitational Fellowships for Research in Japan - FY2022(S22038), predmetom výskumu bola príprava a štúdium funkcionalyzovaných hybridných materiálov na báze vrstevnatých kremičitanov a porfyrínových farbív s fotosenzibilizačnými vlastnosťami s dôrazom na pochopenie vzťahu medzi štruktúrou materiálov a sledovanými vlastnosťami.

Tomáš BUČKO

– University of Lorraine, Saint-Avold a Nancy, Francúzsko, 19. 6. 2022 – 14. 6. 2022, pozvaný pedagogický pracovník (docent). Vývoj metódy MLPT a jej aplikácie na problémy teoretickej katalýzy.

Juraj BUJDÁK

– Department of Materials Chemistry & Research, University of Vienna, Rakúsko, 23.-25.11. 2022, vedecká spolupráca, dokončovanie experientálneho výskumu a interpretácia výsledkov, pozvaná prednáška. Cesta sa uskutočnila v rámci APVV projektu.

Oksana MATSELKO

- Inštitútu Maxa Plancka pre chemickú fyziku pevných látok, Drážďany, Nemecko, 13.–26. novembra 2022, počas výskumného pobytu bola vykonaná štruktúrna analýza vzoriek fluorolantanoidov. Pracovná cesta sa uskutočnila v rámci projektu SASPRO 2.

Monika MICHALKOVÁ

- CEITEC, Brno, Česká Republika, 4-7.12.2022, projekt v rámci ktorého sa pracovná cesta uskutočnila APVV 170049, príprava vzoriek v zložení YAG, $YSiO_5$, $Y_2Si_2O_7$ v amorfnom stave metodou SPS.
- CEITEC, Brno, Česká Republika, 26-27.10.2022, účasť na záverečnom seminári projektu INTER-TRANFER, diskusia o výsledkoch a ďalšej príprave vzoriek YAG

Eva SCHOLTZOVÁ

- VŠB Ostrava, Česko, 27.06 - 30.06.2022, AtomDeC, Pracovná cesta sa uskutočnila za účelom spoznania partnerského pracoviska a diskusie získaných výsledkov.

Michal SLANÝ

- Bergische Universität Wuppertal, Nemecko, 28. 05. – 05. 06. 2022, VEGA 2/0166/21 a APVV-18–0075, služobná zahraničná cesta za účelom nadväzovania spolupráce a vykonanie adsorpčných experimentov na ílových mineráloch a organoíloch, počas pobytu bola prednesená pozvaná prednáška „Clay minerals and organoclays-based nanocomposites for environmental applications".

Peter TATARKO

- Ústav Fyziky Materiálů, Česká akadémia vied, Brno, Česká republika, 19-22.09.2022, Mobility SAV-AVČR-21-04, cesta bola realizovaná s cieľom zúčastniť sa stretnutia riešiteľov projektu a realizovať experimentálne práce v zmysle stanovenia tvrdosti a pevnosti SiC materiálov spojených pomocou medzivrstiev $ZrSi_2$ a $ZrSi_2$+C.
- Ústav Fyziky Materiálů, Česká akadémia vied, Brno, Česká republika, 14-16.12.2022, Mobility SAV-AVČR-21-04; APVV-SK-CZ-RD-21-0089, cesta bola realizovaná s cieľom zúčastniť sa záverečného stretnutia riešiteľov projektu Mobility. Druhým bodom programu bola realizácia experimentálnych prác zameraných na stanovenie mechanických vlastností materiálov vysokoentropických karbidov a vysokoentropických boridov.

Inga Zhukova

- Vinča Institute of Nuclear Science, University of Belgrade, Belehrad, Srbsko, 03.10.-05.11.2022, mesačná výskumná stáž bola realizovaná z podpory štipendia JECS trust, ktoré udeľuje Európska keramická spoločnosť. Náplňou pracovnej cesty bola teoretická modelácia nových štruktúr diboridovej keramiky s rôznym molárnym pomerom prechodných kovov. Teoretické výsledky boli potom verifikované pomocou Rietveldovej analýzy RTG difrakčných záznamov jedného vybraného diboridového systému.

<u>Dlhodobé výskumné pobyty (3 a viac mesiacov)</u>

Michal KORENKO

- CEMHTI - Conditions Extrêmes et Matériaux: Haute Température et Irradiation, CNRS - Centre National de la Recherche Scientifique, Orléans, Francúzsko, 01.09. 2022 - 31. 08. 2023, štipendijný pobyt v rámci schémy LE STUDIUM RESEARCH PROFESSOR od Loire Valley Institute for Advanced Studies, ktorá poskytuje rôzne štipendiá vedcom pre ústavy a univerzity v regióne Centre-Val de Loire vo Francúzsku, výskum v rámci pobytu je zameraný na syntézu a charakterizáciu funkčných materiálov na báze oxo-fluoro-hlinitanov pre elektronické/elektrochemické a fotonické aplikácie pomocou aerodynamickej levitáčnej techniky (ADL) z tavenín.

Daniel MORENO RODRÍGUEZ

– Univerzita Karlova Matematicko-fyzikální fakulta, Praha, Česká republika, 01.02.2022 – 01.08.2022. Štúdium systému polutant-halloysite pomocou metód silových polí a molekulovej dynamiky. Pobyt sa uskutočnil v rámci národnej grantovej schémy SAIA.

Patrícia PETRISKOVÁ

– UCA - Universite Clermont Auvergne, CNRS- Centre National de la Recherche Scientifique, Clermont-Ferrand, Francúzsko, 1.11.2022-31.04.2023 téma práce: MgAalON ceramics doped by lanthanides as innovative supports for photocatalytic layers, pobyt hradený z Erasmus.

Prednášky zahraničných hostí na ústave

Hirotomo Nishihara, *Advanced Institute for Materials Research, Tohoku University, Japonsko, 31.10.2022*

- Functional carbon materials: new synthesis approaches and analysis method

Paraskevi Lampropoulou, *Geology Department, University of Patras, Grécko*, 30.8.2022

- Geomaterials in Industrial Materials Research

Dimitrios Papoulis, *Geology Department, University of Patras, Grécko*, 30.8.2022

- Environmental Applications of Clays and Clay Minerals

Prehľad údajov o medzinárodnej mobilite pracovníkov organizácie je uvedený v Prílohe E.
Prehľad a údaje o medzinárodných projektoch sú uvedené v kapitole 2 a Prílohe B.

5. Koncepcia dlhodobého rozvoja organizácie

Vedná politika ústavu reflektuje dlhodobé zámery a aktuálne trendy súvisiace so spoločenskou objednávkou na domácej a zahraničnej scéne. Je založená na inovatívnosti vedeckého smerovania, ambicióznosti vedeckých osobností, ako aj na autonómnosti vedúcich vedeckých tímov.

5.1. Odporúčania z posledného pravidelného hodnotenia organizácií SAV (akreditácie)

Uvádzame záverečné hodnotenie, ktoré sme dostali od hodnotiaceho panela.

> *"This Institute has rather focussed research interests, studying dependence of properties of materials upon their microstructure and composition. This obstacle seems to support the development of main study trends in distinct Departments. Besides this general idea, it can be stated that the list of research topics is impressive and has significant potential for development, especially if the researchers participate in international research networks and follow the contemporary trends in methodology advancement. Certainly, the latter aspect needs investments that can come through extensive process of grant application activity, and from large contracts with industry. Therefore, the relatively modest level of grant applications as well as the contract works in general remains the main bottleneck of the development efficacy.*
> *The publication output of the Institute has improved in last years, but not very much in terms of publications quality. Situation with patenting is still not good, and this area provides opportunity of significant improvement.*
>
> *Comments and recommendations for further improvement and development of the institute*
> *The present structure of the Institute seems to be rather optimal, Departments have experienced staff, and are equipped with necessary apparatus. Therefore, there seems to be no immediate need to proceed with some structural reforms. It is more important to create strategy for development of solid research objectives, considering the international trends and achievements. For this process the help of the International Advisory Board members can be used. And moreover, it would be important to include the research staff of the institute. And finally, invite perhaps prominent persons form industry. This planning activity is not the privilege of the Institute leadership.*
> *It would be useful to prepare and publish a full SWOT analysis, where all raised questions have some answer.*
> *Until now the publication of scientific papers has been considered as the main research output of the Institute. For evaluation of these publications a complicated classification system of publications has been created. Due to movement of the scientific publishing policy towards the Open Access publication model, it is timely to reorganize this evaluation system of publications and implement the elements of Plan S. Hopefully this will change the landscape of bibliometrics in coming decade.*
> *At the same time, it is important to motivate scientists to submit patent applications, to valorise their research results. This can be done in cooperation with companies to cover accompanying expenses. Already understanding that this may be possible could lead to several important changes.*
> *It is understandable that all these recommendations cannot be implemented by the Institute alone, without legal and financial support from the SAS.*
> *Proposal of overall institute rating: B"*

Poznámka: Treba však poznamenať, že hodnotiaci panel nemal k dispozícii nezávislý posudok.

5.2. Hlavné body Akčného plánu organizácie a stav ich plnenia

Základnými a dominantnými cieľmi, ktorým sú podriadené všetky aspekty chodu ústavu, sú odborný rast, medzinárodná integrácia a spoločenské uplatnenie/úžitok výsledkov výskumu. Napĺňanie uvedených cieľov si vyžaduje komplexný prienik aspektov, ako sú:

- aktívna účasť na domácich a zahraničných projektoch,
- aktívna publikačná činnosť v medzinárodných časopisoch a prezentácia výsledkov výskumu na medzinárodných vedeckých fórach,

- zachovanie vekovej a odbornej kontinuity,
- vytvorenie podmienok pre vzdelávanie a odborný rast nielen PhD študentov a mladých vedeckých pracovníkov, ale aj erudovaných vedeckých pracovníkov,
- aktívna účasť na vzdelávacom procese s dôrazom na druhý a tretí stupeň vysokoškolského vzdelania,
- technické zabezpečenie pre výskum,
- finančné zabezpečenie výskumu,
- personálna politika,
- zabezpečenie kontinuity v oblasti vedenia organizačných štruktúr ústavu, vytvorenie podmienok pre manažérsky rast pracovníkov,
- diseminácia a popularizácia objektov a výsledkov výskumu v odbornej a laickej spoločnosti,
- spolupráca a kooperácia s domácimi a zahraničnými akademickými, ako aj priemyselnými partnermi,
- zabezpečenie fungovania administratívnych požiadaviek.

Projektové tímy

Štruktúra ústavu v sebe inherentne zahŕňa flexibilné projektové tímy, ktoré sú vytvárané s ohľadom na objektové, resp. metodické možnosti a schopnosti jednotlivcov spájajúcich sa účelovo pri príprave a riešení projektov MŠ SR (štátne programy, projekty ŠF), VEGA, APVV, rámcových programov EÚ, NATO a v spolupráci s domácimi a zahraničnými partnermi z priemyslu. Táto flexibilná projektová štruktúra umožňuje pracovníkom resp. odborným skupinám podieľať sa na príprave vnútro-ústavných alebo aj mimo-ústavných vedeckých zoskupení, buď v rámci ústavu a SAV alebo aj mimo nich. Vedúci projektových tímov sú autonómni v rozhodovaní o spôsoboch riešenia projektu, ako aj v nakladaní s finančnými prostriedkami v súlade s projektovými cieľmi a zmluvami.

Personálna politika

V oblasti personálnej politiky sa ústavu dlhodobo darí udržať relatívne nízky priemerný vek zamestnancov pod 47 rokov. Podpora zamestnávania mladých vedeckých pracovníkov patrí medzi prioritné úlohy vedenia ústavu. Pre zvýšenie počtu a motivácie mladých absolventov doktorandského štúdia, aby neodchádzali z oblasti vedy do finančne lukratívnejších zamestnaní, boli prijaté nasledujúce zásady personálnej politiky:

- Získavanie najlepších študentov na doktorandské štúdium vo vedných odboroch, ktoré má ústav akreditované ako externá vzdelávacia inštitúcia.
- Získavanie zahraničných doktorandov prostredníctvom projektov Marie Curie Research Training Network alebo iných schém podpory zahraničných študentov (napr. DAAD), v ktorých je ústav zapojený.
- Vysielanie čerstvých absolventov doktorandského štúdia na dlhodobé (najmenej 3 mesiace) pobyty do zahraničia, aby sa zoznámili s najmodernejšou prístrojovou technikou, laboratórnymi postupmi a metódami práce vo vyspelých pracoviskách v Európe a vo svete (najčastejšie Japonsko a USA).
- Organizovanie medzinárodných podujatí doma, ako aj vysielanie mladých vedeckých pracovníkov a doktorandov na renomované konferencie v zahraničí s cieľom získať skúsenosti s prezentovaním vedeckých výsledkov.
- Pozývanie renomovaných odborníkov zo zahraničia na prednášky pre doktorandov a zamestnancov ústavu.

Technická infraštruktúra

Neoddeliteľnou súčasťou vednej politiky je aj rozvoj infraštruktúry. Ústav cielene buduje svoju infraštruktúru na rôznych úrovniach - cez laboratóriá na prípravu vzoriek až po laboratória na charakterizáciu pripravených materiálov. Vyžaduje si to dlhodobú aktivitu postupnej rekonštrukcie priestorov, ktorá je pre svoje špecifické požiadavky náročná ako finančne, tak aj časovo, pretože prebieha pri plnej prevádzke ostatných zariadení. Prístrojové vybavenie sleduje vzájomnú komplementaritu techník. Snahou je aj poskytovať voľné časové kapacity na merania pre partnerov na Slovensku, ako aj zapájanie ústavu prostredníctvom technickej infraštruktúry do medzinárodných zväzkov.

5.3. Aktualizácia Akčného plánu organizácie v roku 2022

Diskusie o akčnom pláne ústavu sú viacsmerným problémom. Je to dokument živý, ktorý si vyžaduje konkrétne zmeny v závislosti na okolnostiach (napr. zmeny v grantových agentúrach, legislatívne zmeny, prípadne zmeny a zámery zo strany P SAV). Na jednej strane je snaha napĺňať zadefinované ciele a ukazovatele zo strany manažmentu ústavu, na strane druhej sú impulzy zo strany vedeckých pracovníkov ako aj nevedeckých pracovníkov. V neposlednej rade je nutná aj interakcia smerom k P SAV.

6. Spolupráca s univerzitami/vysokými školami a inými subjektmi v oblasti vedy a techniky, okrem aktivít uvedených v kap. 2, 3, 4

6.1. Spoločné pracoviská organizácie

6.1.1. Spolupráca s univerzitami/VŠ (fakultami)

Názov univerzity/vysokej školy a fakulty: Fakulta chemickej a potravinárskej technológie STU
Oblasť spolupráce: vedecká spolupráca, účasť na PhD. výuke
Sídlo spoločného pracoviska (ak je vytvorené):
Začiatok spolupráce: 1990
Zhodnotenie: Ústav je zapojený do vzdelávania na III. stupni vysokoškolského štúdia v študijných programoch „Anorganická chémia", „Fyzikálna chémia" a „Anorganická technológia a materiály". Pracovníci ÚACh viedli na FChPT v roku 2022 jedného doktoranda. Doc. Ing. Miroslav Boča, DrSc. je navyše členom odborovej komisie pre študijný program Anorganická technológia a materiály a externým členom VR FCHPT STU a od 1.4.2022-31.12.2026 je členom Rady študijných programov Chemickej sekcie. Ing. František šimko, PhD. je externým členom Pracovnej skupiny Rady pre vnútorný systém zabezpečovania kvality na STU.

Názov univerzity/vysokej školy a fakulty: Fakulta materiálov, metalurgie a recyklácie TUKE
Oblasť spolupráce: vedecká spolupráca, účasť na Bc. a Mgr. výuke
Sídlo spoločného pracoviska (ak je vytvorené):
Začiatok spolupráce: 2000
Zhodnotenie: V spolupráci s touto fakultou je ústav zapojený do pedagogického procesu. Prof. RNDr. P. Šajgalík, DrSc. je členom vedeckej rady fakulty.

Názov univerzity/vysokej školy a fakulty: Montanuniversitaet Leoben, Rakúsko
Oblasť spolupráce: vedecká spolupráca, výchova doktorandov
Sídlo spoločného pracoviska (ak je vytvorené):
Začiatok spolupráce: 2008
Zhodnotenie: Spolupráca je zameraná na výchovu mladých doktorandov so zameraním na pokročilé žiaruvzdorné keramické materiály. Prof. RNDr. P. Šajgalík, DrSc. a doc. Ing. Z. Lenčéš, PhD. sú školiteľmi špecialistami doktorandov.

Názov univerzity/vysokej školy a fakulty: Prírodovedecká fakulta UK
Oblasť spolupráce: vedecká spolupráca, účasť na Bc., Mgr. a PhD. výuke
Sídlo spoločného pracoviska (ak je vytvorené):
Začiatok spolupráce: 1990
Zhodnotenie: V spolupráci s touto fakultou je ústav zapojený do vzdelávania na III. stupni vysokoškolského štúdia v študijných programoch „Anorganická chémia", „Fyzikálna chémia" a „Chemická fyzika". V roku 2021 bol podpísaný dodatok k rámcovej zmluve o spolupráci na doktorandskom štúdiu, ktorého obsahom bolo rozšírenie študijných programov, na ktorých sa ÚACH SAV môže podieľať o študijných program "Teoretická a počítačová chémia". Spoločne sa riešia projekty VEGA a APVV. prof. RNDr. J. Bujdák, DrSc. má hlavný úväzok na fakulte a čiastkový na ÚACh SAV. Prof. RNDr. J. Bujdák, DrSc. je interným členom VR ústavu a RNDr. Jana Madejová, DrSc. externým členom VR PriF UK. Doc. Ing. Miroslav Boča, DrSc je členom Rady študijných programov Chemickej sekcie PRIFUK-UK (od 1.1.2022-1.1.2027). Pracovníci ÚACh viedli na PriF UK v priebehu roka 2022 trinásť doktorandov, pričom dvaja z nich v auguste 2022 štúdium úspešne ukončil obhajobou svojej práce.

Názov univerzity/vysokej školy a fakulty: Přírodovědecká fakulta Univerzity Palackého, Olomouc, Česká republika

Oblasť spolupráce: Účasť na výuke
Sídlo spoločného pracoviska (ak je vytvorené):
Začiatok spolupráce: 2022
Zhodnotenie: Doc. Ing. M. Boča je členom odborovej komisie študijného programu P1417 - Chemie, študijného odboru Anorganická chémia, ako aj odborovej rady doktorandského študijného programu P0531D130029 Anorganická chémia.

Názov univerzity/vysokej školy a fakulty: Tohoku University, Sendai, Japonsko
Oblasť spolupráce: vedecká spolupráca
Sídlo spoločného pracoviska (ak je vytvorené):
Začiatok spolupráce: 2021
Zhodnotenie: vedecká spolupráca Tohoku University a ÚACH v rámci 2. spoločnej výzvy Japan-V4 a projektu AtomDeC, ktorého zodpovednou riešiteľkou za Slovensko je Ing. Eva Scholtzová, CSc.

Názov univerzity/vysokej školy a fakulty: Trenčianska univerzita Alexandra Dubčeka v Trenčíne
Oblasť spolupráce: vedecká spolupráca, účasť na výchove doktorandov
Sídlo spoločného pracoviska (ak je vytvorené): Centrum kompetencie pre výskum skla Vitrum Laugaricio v Trenčíne
Začiatok spolupráce: 1997
Zhodnotenie: Okrem spoločného pracoviska s TnU AD (Centrum kompetencie skla Vitrum Laugaritio) rieši ÚACh SAV v spolupráci s touto univerzitou spoločné projektyVEGA a APVV. Prof. Ing. D. Galusek, DrSc. prorektor pre vedu, výskum a medzinárodné vzťahy TnU AD je aj členom Vedeckej rady TnU AD a dvoch jej fakúlt (Fakulty zdravotníctva a Fakulty špeciálnej techniky). Pracovníci centra, zamestnanci ÚACh, sa podieľajú na pedagogickej činnosti v rámci doktorandského štúdia v odbore "Anorganická technológia". Od roku 2019 má ÚACh SAV s TnU AD rámcovú dohodu o spolupráci pri uskutočňovaní doktorandského študijného programu v odbore 5.2.19 Anorganická technológia a materiály, ktorý je od roku 2021 modifikovaný na Anorganická technológia a nekovové materiály. Viacerí pracovníci UACh SAV majú školiace práva na TnUAD a vedú na nej doktorandov v študijnom programe Anorganické technológie a materiály.

Názov univerzity/vysokej školy a fakulty: Ukrainian State University of Chemical Technology, Dnipro, Ukraine
Oblasť spolupráce: vedecká spolupráca
Sídlo spoločného pracoviska (ak je vytvorené):
Začiatok spolupráce: 2018
Zhodnotenie: Vedecká spolupráca v roku 2022 spočívala v analýzach titánových materiálov upravených elektrochemickým leštením, ktorej výsledkom bola spoločná publikácia.

Názov univerzity/vysokej školy a fakulty: University of Ghent, Belgicko
Oblasť spolupráce: príprava keramických a sklokeramických materiálov v systémoch Al2O3-La2O3, Al2O3-La2O3-ZrO2, Al2O3-Y2O3
Sídlo spoločného pracoviska (ak je vytvorené):
Začiatok spolupráce: 2010
Zhodnotenie: Vedecká spolupráca pri príprave amorfných a polykryštalických materiálov sol-gel metódami v systémoch Al2O3-RE2O3, Al2O3-RE2O3-ZrO2. Skúmanie vlastností pripravených materiálov a spoločné publikácie.Vedecká spolupráca pri príprave amorfných a polykryštalických materiálov sol-gel metódami v systémoch Al2O3-RE2O3, Al2O3-RE2O3-ZrO2m Al2O3-Y2O3.

Názov univerzity/vysokej školy a fakulty: University of Szeged, Faculty of Science and Informatics, Szeged, Hungary
Oblasť spolupráce: vedecká spolupráca

Sídlo spoločného pracoviska (ak je vytvorené):
Začiatok spolupráce: 2021
Zhodnotenie: vedecká spolupráca University of Szeged a ÚACH v rámci 2. spoločnej výzvy V4-Japan a projektu AtomDeC, ktorého zodpovednou riešiteľkou za Slovensko je Ing. Eva Scholtzová, CSc.

Názov univerzity/vysokej školy a fakulty: Vysoká škola báňská - TU Ostrava, Česká republika
Oblasť spolupráce: vedecká spolupráca, výchova doktorandov
Sídlo spoločného pracoviska (ak je vytvorené):
Začiatok spolupráce: 2010
Zhodnotenie: Spolupráca VŠB a ÚACH je zameraná na výchovu mladých pracovníkov. Prof. RNDr. P. Šajgalík, DrSc. je členom Vedeckej rady FMMI VŠB; doc. Ing. Z. Lenčéš, PhD. je členom odborovej rady doktorandského študijného programu Materiálové vědy a inženýrství. V roku 2021 sa spolupráca rozšírila aj na projekty, keďže v rámci 2. spoločnej výzvy Japan-V4 sa obidve inštitúcie spolupodieľajú na riešení projektu AtomDeC, ktorého zodpovednou riešiteľkou za Slovensko je Ing. Eva Scholtzová, CSc

Pozn.: uvádzajte len tie spolupráce, na ktoré má organizácia zmluvu resp. memorandum o zriadení spoločného pracoviska, resp. o vzájomnej spolupráci v konkrétnej oblasti výskumu

6.1.2. Spoločné pracoviská s inými organizáciami SAV

Názov organizácie: Ústav vied o Zemi SAV, v. v. i.
Oblasť spolupráce: vedecká spolupráca
Sídlo spoločného pracoviska (ak je vytvorené): Banská Bystrica
Začiatok spolupráce: 2018
Zhodnotenie: Medzi ústavom a ÚVZ SAV je uzatvorená zmluva o spolupráci na dobu neurčitú, keďže sa aj v budúcnosti predpokladá podávanie spoločných projektov.

Pozn.: uvádzajte len tie spolupráce, na ktoré má organizácia zmluvu resp. memorandum o zriadení spoločného pracoviska, resp. o vzájomnej spolupráci v konkrétnej oblasti výskumu

6.2. Spoločné pracoviská organizácie s inými inštitúciami mimo SAV a VŠ

Pozn.: uvádzajte len tie spolupráce, na ktoré má organizácia zmluvu resp. memorandum o zriadení spoločného pracoviska, resp. o vzájomnej spolupráci v konkrétnej oblasti výskumu

6.3. Spoločné projekty s univerzitami a ostatnými inštitúciami mimo SAV

Pozn.: uviesť konkrétne spoločné aj bilaterálne projekty na základe platnej zmluvy o spolupráci

6.4. Iné typy spoločných aktivít s inštitúciami mimo SAV

7. Aplikácia výsledkov výskumu v spoločenskej a hospodárskej praxi

7.1. Výsledky výskumu organizácie aplikované v spoločenskej a hospodárskej praxi

7.2. Kontraktový – zmluvný výskum (vrátane zahraničných kontraktov)

Názov/účel kontraktového výskumu: Consultation service to transfer electrochemical method in lab at Voreppe in France
Zadávateľ výskumného kontraktu: Rio Tinto Aluminium Pechiney, Francúzsko
Začiatok spolupráce: 2021
Ukončenie spolupráce: trvá
Finančný prínos pre organizáciu (€): 4500

Názov/účel kontraktového výskumu: Dissolution rate of 4 different aluminas
Zadávateľ výskumného kontraktu: Rio Tinto Aluminium Pechiney, Francúzsko
Začiatok spolupráce: 2021
Ukončenie spolupráce: trvá
Finančný prínos pre organizáciu (€): 0

7.3. Iné formy aplikácie výsledkov výskumu v spoločenskej a hospodárskej praxi

8. Aktivity pre Národnú radu SR, vládu SR, ústredné orgány štátnej správy SR a iné organizácie

8.1. Členstvo v poradných zboroch vlády SR, Národnej rady SR, ministerstiev SR, orgánoch EÚ, EP, NATO a pod.

Tabuľka 8a Členstvo v poradných zboroch Národnej rady SR, vlády SR, ministerstiev SR, orgánoch EÚ, EP, NATO a pod.

Meno pracovníka	Názov orgánu	Funkcia
doc. Ing. Miroslav Boča, DrSc.	Komisia pre obhajoby doktorských dizertačných pác v odbore anorganická chémia - 01402	predseda
prof. Ing. Dušan Galusek, DrSc.	Slovenská komisia pre vedecké hodnosti	člen
	Ad hoc komisia pre obhajoby doktorskych dizertačných prác v odbore Anorganická technológia a materiály	predseda
Ing. Michal Korenko, PhD.	Komisia pre námietky pri verejnom obstarávaní	externý člen
doc. Ing. Zoltán Lenčéš, PhD.	Sektorová rada inovácií, Národná sústava povolaní	člen
prof. RNDr. Pavol Šajgalík, DrSc.	Komisia ministra školstva pre udeľovanie Ceny ministra školstva	člen
	Komisia MŠ pre prioritné oblasti aplikovaného výskumu a experimentálneho vývoja v SR - materiálový výskum a nanotechnológie	člen pracovnej skupiny
	Slovenská komisia pre vedecké hodnosti (SKVH)	podpredseda
	Pandemická komisia MZ SR	člen
	Technologická agentúra SR	člen
	Výskumná agentúra SR	člen
	Rada predsedov pracovných skupín pre prioritné oblasti aplikovaného výskumu a experimentálneho vývoja	predseda
	Rada vlády pre vedu, techniku a inovácie	podpredseda

8.2. Expertízna činnosť a iné služby pre štátnu správu a samosprávy

8.3. Členstvo v radách štátnych programov a podprogramov ŠPVV a ŠO

Tabuľka 8b Členstvo v radách štátnych programov a podprogramov ŠPVV a ŠO

Meno pracovníka	Názov orgánu	Funkcia

8.4. Prehľad aktuálnych spoločenských problémov, ktoré riešilo pracovisko v spolupráci s Kanceláriou prezidenta SR, s vládnymi a parlamentnými orgánmi alebo pre ich potrebu

9. Vedecko-organizačné a popularizačné aktivity

9.1. Vedecko-popularizačná činnosť

Tabuľka 9a Súhrnné počty vedecko-popularizačných činností organizácie SAV

Typ	Počet	Typ	Počet	Typ	Počet
prednášky/besedy	2	tlač	0	TV	0
rozhlas	0	internet	0	exkurzie	1
publikácie	0	multimediálne nosiče	0	dokumentárne filmy	0
iné	2				

9.2. Vedecko-organizačná činnosť

Tabuľka 9b Vedecko-organizačná činnosť

Názov podujatia	Domáca/ medzinárodná	Miesto	Dátum konania	Počet účastníkov
Príprava a vlastnosti progresívnych keramických materiálov a skiel	domáca	Mojmírovce, Slovenská republika	28.09.-30.09.2022	48
2nd AtomDec Annual Meeting - Atomic Design of Carbon-Based Materials for New Society	medzinárodná	Smolenice, Slovensko	02.11.-04.11.2022	18

9.3. Účasť na výstavách

Názov výstavy: Vedecký veľtrh 2022
Miesto konania: námestie Eurovea, Bratislava
Dátum: 23.9.2022
Zhodnotenie účasti: Prezentácia výskumu a výsledkov oddelenia keramiky, oddelenia hydrosilikátov a oddelenia taveninových sústav (V. Sillíková, O. Matselko, S. Bashir, M. Pribus, P. Škorňa, D. Moreno, V. Planetová, D. Krishnan, P. Boháč). Stánok: Anorganické materiály 21. storočia

Názov výstavy: Európska Noc výskumníkov 2022
Miesto konania: Stará tržnica, Bratislava
Dátum: 30.9.2022
Zhodnotenie účasti: Prezentácia výskumu a výsledkov oddelenia keramiky, oddelenia hydrosilikátov a oddelenia taveninových sústav (V. Sillíková, O. Matselko, S. Bashir, M. Pribus, M. Slaný, M. Matejdes, V. Planetová, D. Krishnan). Stánok: Anorganické materiály 21. storočia

Názov výstavy: Deň otvorených dverí na ÚACh SAV
Miesto konania: ÚACh SAV, Bratislava
Dátum: 8.11.2022
Zhodnotenie účasti: Dňa 08.11.2022 organizoval Ústav anorganickej chémie SAV v rámci Týždňa vedy a techniky na Slovensku „Deň otvorených dverí ÚACH SAV". Pozvaní boli študenti hlavne stredných škôl zo Slovenska. Na úvod bola pre mladých návštevníkov pripravená prednáška „Syntéza pokročilej keramiky pre vesmírne technológie" a prehliadka laboratórií. Nasledovala prehliadka vybraných laboratórií ústavu, v ktorých mladí vedeckí pracovníci prostredníctvom modelových experimentov návštevníkom priblížili svoju každodennú prácu a informovali o praktickom využití zariadení. Tým najviac zvedavým názorne ukázali ich využitie aj nad rámec demonštračných

experimentov. Dňa otvorených dverí sa zúčastnilo približne 130 študentov z bratislavských aj mimobratislavských stredných škôl (Bratislava, Trnava).

9.4. Účasť v programových a organizačných výboroch národných konferencií

Tabuľka 9c Programové a organizačné výbory národných konferencií

Meno pracovníka	Programový	Organizačný	Programový i organizačný
Galusek Dušan	1	0	0
Spolu	1	0	0

9.5. Členstvo v redakčných radách časopisov

doc. Ing. Miroslav Boča, DrSc.
Chemical Papers (funkcia: Editorial Advisory Board od 9/2013)

prof. RNDr. Juraj Bujdák, DrSc.
Applied Clay Science (funkcia: associate editor)
Chemistry Africa (Springer) (funkcia: associate editor)

prof. Ing. Dušan Galusek, DrSc.
Ceramics-Silikáty (funkcia: člen)
International Journal of Applied Ceramic Technology (funkcia: associate editor)
Journal of the European Ceramic Society (funkcia: editor)
New Journal of Glass and Ceramics (funkcia: člen)

doc. Ing. Zoltán Lenčéš, PhD.
International Journal of Applied Ceramic Technology (funkcia: člen)
Journal of the Ceramic Society of Japan (funkcia: associate editor)

prof. Ing. Marek Liška, DrSc., Dr.h.c.
Ceramics - Silikáty (funkcia: člen)
European Journal of Glass Science and Technology (funkcia: regional editor)
International Journal of Applied Glass Science (funkcia: člen)
Sklář a keramik (funkcia: člen)

RNDr. Jana Madejová, DrSc.
Clays and Clay Minerals (funkcia: associate editor)

prof. RNDr. Pavol Šajgalík, DrSc.
Ceramics-Silikáty (funkcia: člen)
Journal of Asian Ceramic Society (funkcia: spolueditor)
Journal of Ceramic Science and Technology (funkcia: člen)
Keramický Zpravodaj (funkcia: člen)
Processing and Application of Ceramics (funkcia: člen)

Ing. Peter Tatarko, PhD.
International Journal of Applied Ceramic Technology (funkcia: associate editor)
Materials (funkcia: editorial board member)

9.6. Činnosť v domácich vedeckých spoločnostiach

Ing. Martin Barlog, PhD.
Slovenská ílová spoločnosť (funkcia: člen)

doc. Ing. Miroslav Boča, DrSc.
Humboldtov klub v SR (funkcia: člen)
Slovenská chemická spoločnosť (funkcia: člen)

Mgr. Peter Boháč, PhD.
Slovenská ílová spoločnosť (funkcia: člen)

prof. RNDr. Juraj Bujdák, DrSc.
Slovenská chemická spoločnosť (funkcia: člen)
Slovenská ílová spoločnosť (funkcia: člen výboru)

Mgr. Roman Bystrický, PhD.
Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)

prof. Ing. Dušan Galusek, DrSc.
Humboldtov klub v SR (funkcia: člen)
Slovenská silikátová vedecko-technická spoločnosť (funkcia: podpredseda)
Slovenská sklárska spoločnosť (funkcia: predseda (od 11/2021))

doc. Ing. Miroslav Hnatko, PhD.
Slovenská chemická spoločnosť (funkcia: člen)
Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)

doc. Ing. Mária Chromčíková, PhD.
Slovenská akreditačná spoločnosť pre vysoké školy (funkcia: člen)
Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)
Slovenská sklárska spoločnosť (funkcia: člen)

Mgr. Ľuboš Jankovič, PhD.
Slovenská ílová spoločnosť (funkcia: člen)

Ing. Michal Korenko, PhD.
Slovenská chemická spoločnosť (funkcia: predseda revíznej komisie)
Slovenská nukleárna spoločnosť (funkcia: člen)
Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)
Slovenská spoločnosť pre povrchové úpravy (funkcia: člen)

Ing. Blanka Kubíková, PhD.
Slovenská chemická spoločnosť (funkcia: člen)

Mgr. Valéria Kureková, PhD.
Slovenská chemická spoločnosť (funkcia: člen)
Slovenská ílová spoločnosť (funkcia: člen)

doc. Ing. Zoltán Lenčéš, PhD.
Humboldtov klub v SR (funkcia: člen)
Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen výboru)

prof. Ing. Marek Liška, DrSc., Dr.h.c.

Slovenská chemická spoločnosť (funkcia: člen)
Slovenská sklárska spoločnosť (funkcia: člen)

RNDr. Jana Madejová, DrSc.
Slovenská chemická spoločnosť (funkcia: člen)
Slovenská ílová spoločnosť (funkcia: člen)
Učená spoločnosť SAV (funkcia: člen)

Dr. Vladimír Malkin, DrSc.
Humboldtov klub v SR (funkcia: člen)

Ing. Monika Michálková, PhD.
Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)
Slovenská sklárska spoločnosť (funkcia: členka predstavenstva, tajomníčka od 22.10.2021)

Ing. Jarmila Mlynáriková, PhD.
Slovenská chemická spoločnosť (funkcia: člen)

MSc. Daniel Moreno, PhD.
Slovenská ílová spoločnosť (funkcia: člen)

Ing. Zuzana Netriová, PhD.
Slovenská chemická spoločnosť (funkcia: člen)

Ing. Helena Pálková, PhD.
Slovenská ílová spoločnosť (funkcia: podpredseda)

Ing. Viliam Pavlík, PhD.
Slovenská chemická spoločnosť (funkcia: člen)
Slovenská nukleárna spoločnosť (funkcia: člen)

Mgr. Marek Pribus, PhD.
Slovenská ílová spoločnosť (funkcia: člen)

Ing. Anna Prnová, PhD.
Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)
Slovenská sklárska spoločnosť (funkcia: člen)

Ing. Eva Scholtzová, CSc.
Slovenská chemická spoločnosť (funkcia: člen)
Slovenská ílová spoločnosť (funkcia: člen)

RNDr. Veronika Silliková, PhD.
Slovenská chemická spoločnosť (funkcia: člen)

Ing. Michal Slaný, PhD.
Slovenská ílová spoločnosť (funkcia: člen)

prof. RNDr. Pavol Šajgalík, DrSc.
Humboldtov klub v SR (funkcia: člen)
Slovenská chemická spoločnosť (funkcia: člen)
Slovenská silikátová vedecko-technická spoločnosť (funkcia: predseda)

Slovenská sklárska spoločnosť (funkcia: člen predstavenstva)
Učená spoločnosť SAV (funkcia: člen)

Ing. František Šimko, PhD.
Slovenská chemická spoločnosť (funkcia: člen)

Mgr. Tímea Šimonová, PhD.
Slovenská ílová spoločnosť (funkcia: člen)

Ing. Peter Škorňa, PhD.
Slovenská ílová spoločnosť (funkcia: člen)

Mgr. Peter Švančárek, PhD.
Slovenská sklárska spoločnosť (funkcia: člen)

Ing. Zuzana Vasková, PhD.
Slovenská chemická spoločnosť (funkcia: člen)

9.7. Iné dôležité informácie o vedecko-organizačných a popularizačných aktivitách

10. Činnosť knižnično-informačného pracoviska

10.1. Knižničný fond

Tabuľka 10a Knižničný fond

Knižničné jednotky spolu		7640
z toho	knihy a zviazané periodiká	7639
	audiovizuálne dokumenty	
	elektronické dokumenty (vrátane digitálnych)	1
	mikroformy	
	iné špeciálne dokumenty - dizertácie, výskumné správy	
	Rukopisy, vzácne tlače	
Počet titulov dochádzajúcich periodík		
z toho zahraničné periodiká		
Ročný prírastok knižničných jednotiek		4
v tom	kúpou	4
	darom	
	výmenou	
	bezodplatným prevodom	
	náhradou	
Úbytky knižničných jednotiek		
Knižničné jednotky spracované automatizovane		

*Výraz **„v tom“** označuje <u>úplné (vyčerpávajúce) údaje</u>, ktorých súčet sa musí rovnať údaju v riadku „spolu“, čiže nadradenému riadku.*
*Výraz **„z toho“** označuje <u>neúplné (výberové) údaje</u>, ktorých súčet sa nemusí rovnať údaju v riadku „spolu“.*

10.2. Výpožičky a služby

Tabuľka 10b Výpožičky a služby

Výpožičky spolu (riadok 1)		
v tom z r. 1	prezenčné výpožičky	
	absenčné výpožičky	
v tom z r. 1	odborná literatúra pre dospelých	
	výpožičky periodík	
MVS iným knižniciam		
MVS z iných knižníc		
MMVS iným knižniciam		
MMVS z iných knižníc		
Počet vypracovaných bibliografií		

Počet vypracovaných rešerší	50

10.3. Používatelia

Tabuľka 10c Používatelia

Registrovaní používatelia	
Návštevníci knižnice spolu (bez návštevníkov podujatí)	

10.4. Iné údaje

Tabuľka 10d Iné údaje

On-line katalóg knižnice na internete (1=áno, 0=nie)	
Náklady na nákup knižničného fondu v €	122,07

10.5. Iné informácie o knižničnej činnosti

11. Aktivity v orgánoch SAV

11.1. Členstvo vo Výbore Snemu SAV

11.2. Členstvo v Predsedníctve SAV a vo Vedeckej rade SAV

prof. RNDr. Pavol Šajgalík, DrSc.
- Predseda SAV
- predseda VR SAV

11.3. Členstvo v komisiách SAV

doc. Ing. Miroslav Boča, DrSc.
- Komisia pre posudzovanie vedeckej kvalifikácie (člen)
- Komisia SAV pre informačné a komunikačné technológie (člen)
- Komisia SAV pre vyhodnocovanie medzinárodných projektov (člen)

Ing. Michal Korenko, PhD.
- Komisia pre hodnotenie grantov doktorandov SAV (člen)

11.4. Členstvo v orgánoch VEGA

prof. Ing. Dušan Galusek, DrSc.
- Komisia VEGA č. 7 pre strojárstvo a príbuzné odbory informačných a komunikačných technológií a materiálové inžinierstvo (člen)

doc. Ing. Miroslav Hnatko, PhD.
- Komisia VEGA č. 7 pre strojárstvo a príbuzné odbory informačných a komunikačných technológií a materiálové inžinierstvo (člen)

Mgr. Stanislav Komorovský, PhD.
- Komisia VEGA č. 3 pre chemické vedy, chemické inžinierstvo a biotechnológie (člen)

Ing. Michal Korenko, PhD.
- Komisia VEGA č. 3 pre chemické vedy, chemické inžinierstvo a biotechnológie (člen)

12. Hospodárenie organizácie

12.1. Výdavky organizácie

Tabuľka 12a Výdavky organizácie (skutočnosť k 31. 12. 2022 v €)

Typ organizácie (v. v. i.)		**Zdroje, z ktorých sa kryli jednotlivé výdavky**			
Výdavky	**Spolu**	**kapitola SAV (111)**	**iné štátne a verejné zdroje**	**ostatné zdroje**	**% krytia z kapitoly SAV**
1. Bežné výdavky	**2 343 916,47**	**1 772 468,20**	**471 585,28**	**99 862,99**	**75,6**
z toho: mzdy (610)	1 279 035,62	1 053 809,00	181 105,65	44 120,97	82,4
vedecká výchova štipendiá (640)	133 072,95	133 072,95			100,0
poistné a príspevok do poisťovní (620)	445 604,14	365 967,62	64 769,15	14 867,37	82,1
tovary a služby (630)	486 203,76	219 618,63	225 710,48	40 874,65	45,2
transfery partnerom projektov (640)	75 120,00		75 120,00		
2. Kapitálové výdavky	**18 160,87**	**18 158,08**	0	2,79	99,9
z toho: obstarávanie kapitálových aktív	18 160,87	18 158,08		2,79	99,9
kapitálové transfery	0	0	0	0	0

12.2. Zdroje financovania organizácie

Tabuľka 12b Zdroje financovania organizácie (skutočnosť k 31. 12. 2022 v €)

Typ organizácie (v. v. i.)		**Z toho kategórie**			
Zdroje	**Spolu**	**Kapitálové zdroje**	**zdroje na mzdy (610)**	**zdroje na odvody do poisťovní (620)**	**zdroje na transfery partnerom projektov**
1. kapitola SAV (111)	**380 496,69**	**18 158,08**	**18 326,80**	**8 435,62**	
z toho: VEGA	122 077,00				
MVTS výskumné projekty	50 000,00	18 158,08		1 984,82	
MVTS podpora	3 500,00				
SASPRO/MOREPRO	27 805,11		18 326,80	6 450,80	
Vydávanie časopisov					
Vedecká výchova	133 072,95				

(štipendiá)					
OTAS (630)	44 041,63				
2. ŠF EÚ vr. fin. zo ŠR	**97 327,46**		**43 022,97**	**16 219,18**	
3. medzinárodné grantové projekty	**16 854,96**		**7 673,57**	**2 701,11**	
z toho: H2020	16 854,96		7 673,57	2 701,11	
4. iné štátne a verejné zdroje (spolu)	**452 542,75**		**138 082,68**	**49 192,91**	**75 120,00**
z toho: APVV	450 042,81		138 082,68	48 549,97	75 120,00
podpora z kapitoly MŠVVaŠ SR (stimuly)					
5. ostatné zdroje	**43 857,08**		**17 423,00**	**6 010,75**	
z toho: príjmy z prenájmu					
príjmy z podnikateľskej činnosti					
príjmy z expertnej činnosti a služieb	43 857,08		17 423,00	6 010,75	

13. Nadácie a fondy pri organizácii SAV

14. Informácie o aktivitách súvisiacich s uplatňovaním princípov rodovej rovnosti

14.1. Stručné hodnotenie stavu uplatňovania princípov rodovej rovnosti v organizácii, súvisiace aktivity a opatrenia, návrhy na aktualizáciu Plánu rodovej rovnosti SAV

14.2. Rodová skladba hlavných riešiteľov (vedúcich) projektov

Tabuľka 14a Rodová skladba hlavných riešiteľov domácich projektov

ŠTRUKTÚRA PROJEKTOV	Organizácia SAV je nositeľom projektu			Organizácia SAV je zmluvným partnerom		
	Počet	Hlavný riešiteľ		Počet	Hlavný riešiteľ za organizáciu	
		Muž	Žena		Muž	Žena
1. Projekty VEGA	10	5	5	2	1	1
2. Projekty APVV	7	4	3	7	3	4
3. Projekty EŠIF/OP ŠF	0	0	0	2	2	0
4. Projekty SASPRO, MoRePro, IMPULZ	2	2	0	0	0	0
5. Iné projekty (FM EHP, Vedecko-technické projekty, na objednávku rezortov a pod.)	1	0	1	0	0	0

Tabuľka 14b Rodová skladba hlavných riešiteľov medzinárodných projektov

ŠTRUKTÚRA PROJEKTOV	Organizácia SAV je nositeľom projektu			Organizácia SAV je zmluvným partnerom		
	Počet	Hlavný riešiteľ		Počet	Hlavný riešiteľ za organizáciu	
		Muž	Žena		Muž	Žena

1. Projekty Horizont 2020 a Horizont Európa	1	1	0	1	1	0
2. Projekty ERA.NET, ESA, JRP	1	1	0	0	0	0
3. Projekty COST	0	0	0	0	0	0
4. Projekty EUREKA, NATO, UNESCO, CERN, IAEA, IVF, ERDF a iné	0	0	0	1	0	1
5. Projekty v rámci medzivládnych dohôd	0	0	0	0	0	0
6. Bilaterálne projekty MAD, Mobility, Open Mobility	1	1	0	0	0	0
7. Bilaterálne projekty ostatné	2	1	1	0	0	0
8. Podpora MVTS z národných zdrojov (SAV, APVV a iné)	0	0	0	0	0	0
9. SAS-UPJŠ ERC Visiting Fellowship Grants	0	0	0	0	0	0
10. Iné projekty	0	0	0	0	0	0

14.3. Výskum zameraný na rodovú problematiku

Uveďte stručné, základné informácie o projektoch orientovaných na rodovú problematiku, ak organizácia takýto výskum realizuje. Informácie o financovaní a výsledkoch takýchto projektov sa nachádzajú v kapitole 2 a v prílohe C.

ÚACH SAV, v. v. i. sa prihlásil k dokumentu Plán rodovej rovnosti SAV (Gender Equality Plan, PRR) vypracovaný riešiteľmi projektu ATHENA (Ústav výskumu sociálnej komunikácie SAV). Na ÚACH platia všetky pravidlá odmeňovania a prístupu k informáciám ako aj k možnostiam zastávať vedúce pozície (v kolektívnych orgánoch, v projektoch atď.) rovnako pre mužov aj ženy.

15. Iné významné činnosti organizácie SAV

16. Vyznamenania, ocenenia a ceny udelené pracovníkom organizácie v roku 2022

16.1. Domáce ocenenia

16.1.1. Ocenenia SAV

Slaný Michal
Súťaž mladých vedeckých pracovníkov SAV do 35 rokov (1. miesto za II. oddelenie SAV)
Oceňovateľ: Predsedníctvo SAV
Opis: Ílové minerály a nanokompozitné materiály na báze organoílov pre environmentálne aplikácie. 16. jún 2022

16.1.2. Iné domáce ocenenia

Cena za vedu a techniku 2021 - Vedecko-technický tím pod vedením Jána Duszu a **Pavla Šajgalíka**
Oceňovateľ: Ministerstvo školstva, vedy, výskumu a športu Slovenskej republiky
Opis: Ocenenie za vedecké výsledky svetového významu v oblasti výskumu a vývoja keramických kompozitov s grafénom. Ocenení za ÚACh SAV (Pavol Šajgalík,; Zoltán Lenčéš,; Miroslav Hnatko; Monika Tatarková; Monika Michalková; Peter Tatarko; Ondrej Hanzel) (16.12.2022)

16.2. Medzinárodné ocenenia

17. Poskytovanie informácií v súlade so zákonom č. 211/2000 Z. z. o slobodnom prístupe k informáciám v znení neskorších predpisov (Zákon o slobode informácií)

18. Problémy a podnety pre činnosť SAV

Zásadný problém, ktorý narastá niekoľko rokov bez náznakov akéhokoľvek zlepšenia, sú administratívne nároky na pracovníkov na všetkých úrovniach. Pre potreby naplnenia legislatívnych povinností ústavu v napríklad v oblasti verejného obstarávania je jeden plný úväzok pre administratívneho pracovníka málo, ale mzdové prostriedky ústavu neumožňujú rozšírenie administratívy bez zásahu do výskumných kapacít. Výsledkom je, že niektoré administratívne výkony vykonávajú aj vedeckí pracovníci, nad rámec alebo na úkor svojich odborných aktivít. Pre mnohé z týchto aktivít by sme privítali centralizovanejší a systematickejší prístup. Situácia sa však skomplikovala prechodom na verejno-výskumné inštitúcie.
Rýchle zmeny v legislatíve (častokrát nekoncepčné), nedostatok financií na samotnú vedu, komplikovaná aktuálna celospoločenská situácia a nedostatok informácií spôsobuje zásadné komplikácie pri plánovaní akýchkoľvek aspektov základného, ako aj rozvojového fungovania organizácie. Preto je viac ako žiadúce výrazne zintenzívniť komunikáciu medzi ústavmi a rovnako aj smerom k P SAV s cieľom výmeny informácií, skúseností s riešením problémov, ako aj s cieľom hľadania perspektív pre ďalší rozvoj.

Správu o činnosti organizácie SAV spracoval(i):

Zdena Kapišinská,
doc. Ing. Zoltán Lenčéš, PhD., 02/59410408
Ing. Helena Pálková, PhD., 02/59410485

Schválila vedecká rada organizácie SAV dňa 30.1.2023

Riaditeľ organizácie SAV	**Predseda vedeckej rady**
....	....
doc. Ing. Miroslav Boča, DrSc.	Mgr. Monika Tatarková, PhD.

Prílohy

Príloha A - Zoznam zamestnancov a doktorandov organizácie k 31.12.2022

Zoznam zamestnancov podľa štruktúry

	Meno s titulmi	Úväzok (v %)	Ročný prepočítaný úväzok
Vedúci vedeckí pracovníci DrSc.			
1.	doc. Ing. Miroslav Boča, DrSc.	100	1.00
2.	prof. RNDr. Juraj Bujdák, DrSc.	50	0.50
3.	prof. Ing. Dušan Galusek, DrSc.	55	0.55
4.	prof. Ing. Marek Liška, DrSc., Dr.h.c.	50	0.50
5.	RNDr. Jana Madejová, DrSc.	80	0.86
6.	Dr. Oľga Malkin, DrSc.	100	1.00
7.	Dr. Vladimír Malkin, DrSc.	100	1.00
8.	prof. RNDr. Pavol Šajgalík, DrSc.	50	0.50
Samostatní vedeckí pracovníci			
1.	doc. Ing. Tomáš Bučko, PhD.	25	0.25
2.	Ing. Ondrej Hanzel, PhD.	100	1.00
3.	doc. Ing. Miroslav Hnatko, PhD.	50	0.50
4.	doc. Ing. Mária Chromčíková, PhD.	60	0.60
5.	Mgr. Ľuboš Jankovič, PhD.	100	1.00
6.	Mgr. Stanislav Komorovský, PhD.	100	1.00
7.	Ing. Michal Korenko, PhD.	100	1.00
8.	Ing. Blanka Kubíková, PhD.	100	1.00
9.	doc. Ing. Zoltán Lenčéš, PhD.	100	1.00
10.	Ing. Monika Michálková, PhD.	75	0.75
11.	Ing. Jarmila Mlynáriková, PhD.	100	1.00
12.	Ing. Helena Pálková, PhD.	100	1.00
13.	Ing. Viliam Pavlík, PhD.	100	0.50
14.	Ing. Anna Prnová, PhD.	100	1.00
15.	Ing. Eva Scholtzová, CSc.	100	1.00
16.	Ing. František Šimko, PhD.	100	1.00
17.	Mgr. Peter Švančárek, PhD.	100	1.00
18.	Ing. Peter Tatarko, PhD.	100	1.00
19.	Mgr. Monika Tatarková, PhD.	100	1.00
20.	Ing. Štefan Varga, CSc.	25	0.25

Vedeckí pracovníci			
1.	James Richard Asher, PhD	100	1.00
2.	Ing. Martin Barlog, PhD.	100	1.00
3.	Mgr. Peter Boháč, PhD.	100	1.00
4.	Mgr. Roman Bystrický, PhD.	20	0.20
5.	doc. RNDr. Edmund Dobročka, CSc.	20	0.20
6.	Ing. Michal Hičák, PhD.	100	1.00
7.	doc. Mgr. Anna Kityk, PhD.	40	0.40
8.	Mgr. Valéria Kureková, PhD.	100	0.83
9.	Mgr. Marián Matejdes, PhD.	100	0.55
10.	Oksana Matselko, PhD.	100	1.00
11.	MSc. Daniel Moreno, PhD.	100	0.83
12.	Ing. Zuzana Netriová, PhD.	125	1.25
13.	Mgr. Patrícia Petrisková, PhD.	100	0.16
14.	Mgr. Marek Pribus, PhD.	100	1.00
15.	RNDr. Veronika Silliková, PhD.	100	1.00
16.	Ing. Michal Slaný, PhD.	100	1.00
17.	Mgr. Tímea Šimonová, PhD.	100	0.00
18.	Ing. Peter Škorňa, PhD.	100	1.00
19.	MSc. Hakan Ünsal, PhD.	100	0.33
20.	Ing. Jana Valúchová, PhD.	100	1.00
21.	Ing. Zuzana Vasková, PhD.	100	1.00
Odborní pracovníci s VŠ vzdelaním (výskumní a vývojoví zamestnanci)			
1.	Ing. Eva Hadzimová	100	1.00
2.	MSc. Naser Hosseini	30	0.10
3.	Ing. Iveta Macková	100	1.00
4.	Dr. Aliasghar Najafzadehkhoee	100	1.00
5.	Mgr. Marek Pribus, PhD.	28	0.28
6.	Ing. Jozef Priščák	100	1.00
7.	Mgr. Pavol Weiner	100	1.00
8.	MSc. Inga Zhukova	30	0.10
Odborní pracovníci s VŠ vzdelaním (ostatní zamestnanci)			
1.	Ing. Ingrid Hierwegová	5	0.05
2.	Ing. Elena Krippelová	100	1.00
3.	Mgr. Martina Pakanová	100	1.00

4.	Ing. Helena Pálková, PhD.	26	0.06
5.	Ing. Jaroslav Rusnák, PhD.	33	0.33
6.	JUDr. Bc. Marica Slaná	100	1.00
Odborní pracovníci ÚSV			
1.	Miroslav Baďura	20	0.20
2.	Iveta Bouadjenak	100	1.00
3.	Iveta Bouadjenak	25	0.25
4.	Slavomír Daniš	100	1.00
5.	Miriam Hnatková	100	1.00
6.	Anna Jurová	100	1.00
7.	Zdena Kapišinská	35	0.35
8.	Anna Kovárová	100	1.00
9.	Mária Strempeková	100	1.00
10.	Alexandra Tonkovičová	100	1.00
11.	Denisa Žilinská	100	1.00
Ostatní pracovníci			
1.	Anna Jurová	30	0.26
2.	Ing. Iveta Macková	20	0.20
3.	Terézia Pírová	100	1.00
4.	Jana Šuliaková	100	0.67

Zoznam zamestnancov, ktorí odišli v priebehu roka

	Meno s titulmi	Dátum odchodu	Ročný prepočítaný úväzok
Samostatní vedeckí pracovníci			
1.	Mgr. Jan Novotný, PhD.	31.8.2022	0.33
2.	Ing. Jaroslav Sedláček, PhD.	31.1.2022	0.00
Odborní pracovníci s VŠ vzdelaním (výskumní a vývojoví zamestnanci)			
1.	MSc. Hakan Ünsal	23.8.2022	0.13
Ostatní pracovníci			
1.	Ingrida Kutašovičová	30.4.2022	0.33

Zoznam doktorandov

	Meno s titulmi	Škola/fakulta	Študijný odbor
Interní doktorandi hradení z prostriedkov SAV			
1.	MSc. Ramu Ambati	Prírodovedecká fakulta UK	1420 chémia

2.	MSc. Sanam Bashir	Prírodovedecká fakulta UK	1420 chémia
3.	Guido Manuel De La Torre Olvera	Prírodovedecká fakulta UK	1420 chémia
4.	MSc. Alper Guneren	Prírodovedecká fakulta UK	1420 chémia
5.	Naser Hosseini	Prírodovedecká fakulta UK	1420 chémia
6.	MSc. Dhiya Krishnan	Prírodovedecká fakulta UK	1420 chémia
7.	Florian Andreas Lemken	Prírodovedecká fakulta UK	1160 fyzika
8.	Mgr. Jakub Michalík	Fakulta chemickej a potravinárskej technológie STU	2820 chemické inžinierstvo a technológie
9.	Mgr. Debora Mišenková	Prírodovedecká fakulta UK	1160 fyzika
10.	Mgr. Viktória Planetová	Prírodovedecká fakulta UK	1420 chémia
11.	Eva Skoura	Prírodovedecká fakulta UK	1420 chémia
12.	Inga Zhukova	Prírodovedecká fakulta UK	1420 chémia
Interní doktorandi hradení z iných zdrojov			
organizácia nemá interných doktorandov hradených z iných zdrojov			
Externí doktorandi			
organizácia nemá externých doktorandov			

Zoznam zamestnancov prijatých do jedného roka od získania PhD.

	Meno s titulmi	**Dátum obhajoby**	**Dátum prijatia**	**Úväzok (v %)**

Zoznam emeritných vedeckých zamestnancov

	Meno s titulmi

Príloha B - Projekty riešené v organizácii

Medzinárodné projekty

Programy: Multilaterálne - iné

1.) Atómová koncepcia materiálov na báze uhlíka pre novú normálnu spoločnosť *(Atomic Design of Carbon-Based Materials for New Normal Society)*

Zodpovedný riešiteľ:	Eva Scholtzová
Trvanie projektu:	1.11.2021 / 30.10.2024
Evidenčné číslo projektu:	V4-Japan Joint Research Program
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Advanced Institute for Materials Research (AIMR) Tohoku University Sendai
Počet spoluriešiteľských inštitúcií:	5 - Kanada: 1, Česko: 1, Maďarsko: 1, Japonsko: 1, Poľsko: 1
Čerpané financie:	SAV: 25000 €

Dosiahnuté výsledky:

Naša skupina pokračovala v štúdiu disociačných procesov pri teplotne programovanej desorpcii (TPD) materiálov, konkrétne N dopovaného grafénu ab initio DFT metódou na vybraných periodických modeloch, ktoré potvrdili zistenia na klastrových modeloch a boli v súlade s experimentálnymi meraniami (desorpcia NH3, HCN a N2 v rozmedzí 300 °C to 2100 °C) v spolupráci s japonskou stranou. Výsledky sa spracovávajú do publikácie. Ďalej bola zaslaná do tlače spoločná publikácia s japonskými partnermi s našou analýzou Ramanových spektier pripraveného GMS materiálu pomocou DFT metódy. Analýza potvrdila, že bol skutočne pripravený GMS materiál s 5 a 7-člennými kruhmi ako defektami v grafénovej štruktúre. Taktiež sa analyzovali zmeny v elektrónovej štruktúre defektného grafénu (5,7 a 5,8-členných kruhov ako defektov) a v graféne (6-členné kruhy).
V spolupráci s českou stranou sme pomocou počítaných Rtg záznamov jednotlivých reaktantov DFT metódou analyzovali namerané Rtg záznamy syntetizovaného g-C3N4. Výsledky sa spracúvajú do publikácie. V druhom roku riešenia projektu pripadla slovenskej strane úloha zorganizovať 2. výročný míting riešiteľov projektu a členov poradného výboru, kde prezentovali dosiahnuté výsledky všetci zúčastnení formou prednášok. Toto stretnutie sa konalo na Smolenickom zámku v dňoch 2.11.-4.11. 2022. Príspevky boli publikované v zborníku (ISBN 978-80-973578-2-5, ISBN 978-80-973578-3-2) a míting sa stretol s pozitívnym ohlasom.

SCHOLTZOVÁ, Eva - NISHIHARA, H. Characterization of the carbon-based material by DFT method. In ICMS XXXI. 31th International Conference on Multidisciplinary Studies "Recent Ideas and Research", 18-19 November 2022, Université du Luxembourg: Book of Proceedings. - Luxembourg: Revistia Publishing, 2022, p. 418. ISBN 978-1-915312-05-1. (ICMS XXXI. International Conference on Multidisciplinary Studies "Recent Ideas and Research") Typ: AFG

SCHOLTZOVÁ, Eva**. Atomically designed carbon based materials studied by DFT method. In 2nd AtomDec Annual Meeting - Atomic Design of Carbon-Based Materials for New Society, November 2 - 4, 2022, Smolenice, Slovakia: Book of Abstracts. - Slovakia: Institute of Inorganic Chemistry, Slovak Academy of Sciences, 2022, p. 16-17. ISBN 978-80-973578-3-2. (AtomDec Annual Meeting) Typ: AFH

MORENO RODRÍGUEZ, Daniel** - SCHOLTZOVÁ, Eva - NISHIHARA, H. DFT study of defects in graphene. In 2nd AtomDec Annual Meeting - Atomic Design of Carbon-Based Materials for New Society, November 2 - 4, 2022, Smolenice, Slovakia: Book of Abstracts. - Slovakia: Institute of Inorganic Chemistry, Slovak Academy of Sciences, 2022, p. 23-24. ISBN 978-80-973578-3-2. (AtomDec Annual Meeting) Typ: AFH

NISHIKAWA, G. - YOSHII, T. - TAKATANI, K. - SCHOLTZOVÁ, Eva - SZILAGYI, R. - NISHIHARA, H. Analysis of nitrogen-doped carbon materials using temperature programed desorption method. In 130th Catalysis Society of Japan Meeting, Toyama University, Toyama, Japan, 20.09.-26.09.2022: Book of abstracts. - Japan: Catalysis Society of Japan, 2022, p. 236. (Catalysis Society of Japan Meeting) Typ: GII

ŠKORŇA, Peter** - SCHOLTZOVÁ, Eva - MICHALSKA, M. Thermal treatment processing of melamine precursor for preparing graphitic carbon nitride materials - theoretical calculations. In 2nd AtomDec Annual Meeting - Atomic Design of Carbon-Based Materials for New Society, November 2 - 4, 2022, Smolenice, Slovakia: Book of Abstracts. - Slovakia: Institute of Inorganic Chemistry, Slovak Academy of Sciences, 2022, p. 30-31. ISBN 978-80-973578-3-2. (AtomDec Annual Meeting) Typ: AFH

YOSHII, T.** - NISHIKAWA, G. - TANG, R. - SCHOLTZOVÁ, Eva - SZILAGYI, R. - NISHIHARA, H. Advanced temperature-programmed desorption as a new characterization method for N-doped carbons. In 2nd AtomDec Annual Meeting - Atomic Design of Carbon-Based Materials for New Society, November 2 - 4, 2022, Smolenice, Slovakia: Book of Abstracts. - Slovakia: Institute of Inorganic Chemistry, Slovak Academy of Sciences, 2022, p. 20-21. ISBN 978-80-973578-3-2. (AtomDec Annual Meeting) Typ: AFH

Publikácia zaslaná do tlače:
YU, Wei - YOSHII, Takeharu - NISHIOKA, Kiho - ZHOU, Yi - INOUE, Kazutoshi - TANG, Rui - PAN Zheng-ze - SCHOLTZOVÁ - Eva – TUNEGA, Daniel – TANAKA, Hideki - KOTANI, Motoko - TERASAKI, Osamu - NAKANISHI, Shuji - NISHIHARA, Hirotomo. Edge-Site-Free and Topological-Defect-Rich Carbon Cathode for Li-O2 Batteries. Zaslané do časopisu Advanced Energy Materials (aenm.202300044).

Programy: Bilaterálne - iné

2.) Percepcia spinovej interakcie na pokročilej úrovni *(Spin Coupling Advanced Level Perception)*

Zodpovedný riešiteľ:	Oľga Malkin
Trvanie projektu:	1.2.2020 / 31.12.2022
Evidenčné číslo projektu:	SK-FR-19-0001
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	1 - Francúzsko: 1
Čerpané financie:	APVV: 2650 €

<u>*Dosiahnuté výsledky:*</u>
MALKINA, Oľga** - HIERSO, Jean-Cyrille** - MALKIN, Vladimír. Distinguishing "through-space" from "through-bonds" contribution in indirect nuclear spin-spin coupling: General approaches applied to complex JPP and JPSe scalar couplings. In Journal of the American Chemical Society, 2022, vol. 144, no. 24, p. 10768-10784. (2021: 16.383 - IF, Q1 - JCR, 5.728 - SJR, Q1 - SJR). ISSN 0002-7863. Dostupné na: https://doi.org/10.1021/jacs.2c01637 Typ: ADCA

MALKINA, Oľga** - LEMKEN, Florian - ASHER, James Richard - HIERSO, Jean-Cyrille - BÜHL, Michael - MALKIN, Vladimír**. Transmission of spin-polarization by pi-orbitals: an approach to assessing its effect on NMR spin-spin coupling and EPR hyperfine structure. In Physical Chemistry Chemical Physics, 2022, vol. 24, no. 32, p. 24039-24049. (2021: 3.945 - IF, Q1 - JCR, 0.899 - SJR, Q1 - SJR). ISSN 1463-9076. Dostupné na: https://doi.org/10.1039/d2cp03295c Typ: ADCA

3.) Vývoj nových metód spájania vysoko-entropických keramických materiálov *(Development of new joining methods for high entropy ceramics)*

Zodpovedný riešiteľ:	Peter Tatarko
Trvanie projektu:	1.7.2022 / 30.6.2025
Evidenčné číslo projektu:	APVV-SK-CZ-RD-21-0089
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	1 - Česko: 1
Čerpané financie:	APVV: 17672 €

Dosiahnuté výsledky:
Úvodná fáza riešenia projektu bola zameraná na homogenizáciu vstupných surovín a následného spekania získaných práškových zmesi s cieľom pripraviť vysokoentropické karbidy (Hf-Zr-Ta-Nb-Ti)C a (Mo-W-Ta-Nb-V)C, a boridy (Hf-Zr-Ta-Nb-Ti)B2. Zatiaľ čo vysokoentropické karbidy boli pripravené syntézou v tuhom stave zo zmesi odpovedajúcich monokarbidov, vysokoentropické boridy boli pripravené boro/karbo-termickou redukciou zmesi oxidov odpovedajúcich prechodných kovov. Tieto materiály budú použité ako základné materiály pre vývoj nových metód spájania vysokoentropických keramických materiálov v ďalších fázach riešenia projektu.

Publikácie:
HOSSEINI, Naser - CHLUP, Zdeněk - HANZEL, Ondrej - KOVALČÍKOVÁ, Alexandra - DLOUHÝ, Ivo - TATARKO, Peter. Joining of ceramics for extreme environments using field assisted sintering technology. In Workshop Processing and properties of advanced ceramics and glasses, Mojmírovce, September 28-30, 2022, Slovak Republic: Proceedings. Ed. Jana Valúchová; recenzenti: Miroslav Hnatko, Ľuboš Bača, Marián Janek, Alexandra Kovalčíková, Zdeněk Chlup, Peter Tatarko. - Bratislava, Slovak Republic: Institute of Inorganic Chemistry SAS, 2022, p. 37-41. ISBN 978-80-973578-1-8. Typ: AFD

Programy: Horizont 2020

4.) Sodík-iónové a sodík-kovové batérie novej generácie pre efektívne a udržateľné uskladnenie energie *(Sodium-Ion and sodium Metal Batteries for efficient and sustainable next-generation energy storage)*

Zodpovedný riešiteľ:	Zoltán Lenčéš
Trvanie projektu:	1.1.2021 / 31.12.2024
Evidenčné číslo projektu:	963542
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Technische Universität Darmstadt
Počet spoluriešiteľských inštitúcií:	14 - Nemecko: 2, Francúzsko: 3, Veľká Británia: 3, Holandsko: 1, Nórsko: 2, Švédsko: 2, Ukrajina: 1
Čerpané financie:	SAV: 3500 € EU: 16850 €

Dosiahnuté výsledky:
Vysokoporézne keramické anódy na báze Si-O-C pre sodíkové batérie boli pripravené z pyrolyzovaného polymérneho prekurzoru Polyramic, resp. zo zmesi práškov pyrolyzovaného polyméru, kremíka a uhlíka. Boli optimalizované podmienky zosieťovania a pyrolýzy polyméru pri teplotách 250°C/3 h 900°C/3 h a 1200°C/1 h v atmosfére argónu alebo dusíka. Podmienky mletia práškových zmesí v planetovom mlyne boli vypočítané z regresných rovníc o vplyve rýchlosti mletia, obsahu mlecích guličiek a času mletia na veľkosť častíc mletého prášku a jeho kontamináciu karbidom wolfrámu. Bola stanovená veľmi dobrá zhoda s vypočítanými a experimentálne nameranými hodnotami veľkosti častíc mletých práškov.
Zloženie anód bolo zhodné so zložením, ktoré používajú partneri v TU Darmstadt, tzn. pomer aktívneho materiálu, vodivého uhlíka a spojiva bol 94:2:4. Ako spojivo bol použitý polyvinylidene fluoride (PVDF) v rozpúšťadle N-methyl-2-pyrrolidone (NMP). Elektrochemické merania však ukázali, že dochádza k lámaniu/drobeniu častíc Si počas nabíjacích-vybíjacích cyklov a výraznému poklesu kapacity. Z toho dôvodu bol zvýšený obsah spojiva na 10% a boli testované ďalšie spojivá: carboxymethyl celulóza (CMC) a styrene-butadiene rubber (SBR) v pomere 1:1 a novovyvinuté spojivá na báze alginátov (dopamín-alginát (d-Alg) a sulfo-alginát (s-Alg)). Anódy s oboma spojivami CMC:SBR a Alg vykazovali vyššiu špecifickú kapacitu v porovnaní s anódami obsahujúcimi PVDF spojivo. Zo všetkých testovaných anód mali najvyššiu špecifickú kapacitu anódy so sulfo-alginátom, cca. 170 mAh/g. Boli testované aj dva elektrolyty, NaPF6 v ECLDMC (pomer 50:50) a NaFSI v ECLDMC (pomer 50:50). Namerané špecifické vybíjacie kapacity boli porovnateľné (~170 mAh/g), preto bude v budúcnosti používaný lacnejší elektrolyt na báze NaPF6.

5.) New type of cesium fluoro-, oxo-, and oxo-fluoro-aluminate complexes: stability, dynamics and structural characterization *(New type of cesium fluoro-, oxo-, and oxo-fluoro-aluminate complexes: stability, dynamics and structural characterization)*

Zodpovedný riešiteľ:	František Šimko
Trvanie projektu:	1.7.2022 / 30.6.2024
Evidenčné číslo projektu:	101008500
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	1 - Francúzsko: 1
Čerpané financie:	-

Dosiahnuté výsledky:
PANACEA - Paneurópska infraštruktúra NMR v pevnej fáze umožňuje prístup k meraniu NMR spektier na inštitúciách podieľajúcich sa na projekte. Projekt získal financovanie z programu Európskej únie pre výskum a inovácie Horizont 2020.

Programy: JRP

6.) Vývoj bioaktívneho funkčne gradientného nitridu kremičitého *(Development of functionally graded silicon nitride with improved bioactivity)*

Zodpovedný riešiteľ:	Miroslav Hnatko
Trvanie projektu:	1.1.2021 / 31.12.2023
Evidenčné číslo projektu:	JRP SAV – TUBITAK 546676
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	1 - Turecko: 1
Čerpané financie:	SAV: 25000 €

Dosiahnuté výsledky:
V spolupráci s partnerskou organizáciou TUBITAK Maramara Research center boli pripravené funkčne gradientné materiály na báze Si3N4 kombináciou techník odlievania pások a spekania. Finálne materiály pozostávali z 36 vrstiev (pások) s funkčne gradientným zložením: "hutná časť" pozostávala z 12 pások so zložením Si3N4 a Y2O3. "Prechodová oblasť" bola tvorená gradientným zložením kde množstvo CaSiO3 sa zvyšovalo smerom k pórovitej časti, pričom obsah Y2O3 sa znižoval až na nulu. "Pórovitá časť" okrem Si3N4 a CaSiO3 tiež obsahovala grafit, ktorý mal funkciu pórotvorného činidla. Bol študovaný vplyv tlaku počas izostatického lisovania za studena, teploty výpalu, ako aj teploty spekania (v rozsahu 1500°C – 1700°C) na mikroštruktúru a potenciálnu deformáciu vzoriek funkčne gradientného materiálu. Podarilo sa identifikovať vhodné podmienky prípravy bez viditeľného porušenia tvaru a štruktúry materiálu. Štúdium mechanických vlastností a biologických vlastností bude realizované v ďalšom kroku riešenia projektu.

Publikácie:

DE LA TORRE OLVERA, Guido - HIČÁK, Michal - HNATKO, Miroslav - TATARKOVÁ, Monika. Effect of oxyacetylene flame to form a porous layer in silicon nitride. In Workshop Processing and properties of advanced ceramics and glasses, Mojmírovce, September 28-30, 2022, Slovak Republic : Proceedings. Ed. Jana Valúchová; recenzenti: Miroslav Hnatko, Ľuboš Bača, Marián Janek, Alexandra Kovalčíková, Zdeněk Chlup, Peter Tatarko. - Bratislava, Slovak Republic : Institute of Inorganic Chemistry SAS, 2022, p. 31-36. ISBN 978-80-973578-1-8. (Processing and properties of advanced ceramics and glasses) Typ: AFD

DE LA TORRE OLVERA, Guido - HIČÁK, Michal - HNATKO, Miroslav - LABUDOVÁ, Martina - TATARKOVÁ, Monika. Modification of the surface layer of silicon nitride using oxyacetylene flame. In Ceramics in Europe 2022 : Abstract book. Kraków, 10.-14.7.2022. - B.V., 2022, p. 454. ISBN 978-83-942760-9-6. (Ceramics in Europe 2022) Typ: AFG

DE LA TORRE OLVERA, Guido - ÜNSAL, Hakan - TABAK, Yasemin - VATANSEVER, Bayise Kavakli - KILIC, Aysen - POLAT, Seyda - HNATKO, Miroslav - LENČÉŠ, Zoltán - TATARKOVÁ, Monika. Functionally graded silicon nitride with improved bioactivity prepared by tape casting. In ISC´22. 2nd International Symposium on Characterization, 22-25 September 2022, Afyonkarahisar, Turkey : Abstract Book. - Turkey : Evcin ArGe, 2022, p. 197. (ISC´22 International Symposium on Characterization) Typ: GII

ÜNSAL, Hakan - KOVALČÍKOVÁ, Alexandra - HIČÁK, Michal - CHLUP, Zdeněk - DLOUHÝ, Ivo - TATARKO, Peter. Ablation behavior of rare-earth modified ZrB2-SiC composites prepared by reaction sintering of ZrSi2, B4C and C. In Ceramics in Europe 2022 : Abstract book. Kraków, 10.-14.7.2022. - B.V., 2022, p. 568. ISBN 978-83-942760-9-6. (Ceramics in Europe 2022) Typ: AFG

ÜNSAL, Hakan - GRASSO, Salvatore - KOVALČÍKOVÁ, Alexandra - HANZEL, Ondrej - TATARKOVÁ, Monika - DLOUHÝ, Ivo - TATARKO, Peter. Effect of the electric field on the in-situ formation of graphene nanoplatelets during reactive sintering of B4C-TiB2 composites. In Ceramics in Europe 2022 : Abstract book. Kraków, 10.-14.7.2022. - B.V., 2022, p. 556. ISBN 978-83-942760-9-6. (Ceramics in Europe 2022) Typ: AFG

Programy: Mobility

7.) Reakčné spájanie pokročilých keramických materiálov na báze SiC *(Reaction bonding of advanced SiC-based ceramics)*

Zodpovedný riešiteľ:	Peter Tatarko
Trvanie projektu:	1.1.2021 / 31.12.2022
Evidenčné číslo projektu:	SAV-AVČR-21-04
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	1 - Česko: 1
Čerpané financie:	SAV: 1000 €

Dosiahnuté výsledky:

V súlade s plánom projektu sa výskum orientoval na pochopenie vplyvu podmienok spájania (teplota, čas, tlak, atmosféra) na vývoj mikroštruktúry a fáz na rozhraní SiC/ZrSi2, ako aj odpovedajúce mechanické vlastnosti spojov. Napriek optimalizácii procesu spájania, bolo rozhranie okrem majoritnej fázy ZrC stále tvorené pomerne veľkým množstvom zvyškového ZrSi2 a voľného Si. Z tohto dôvodu sa pristúpilo k optimalizáciu chemického zloženia spoja pomocou prídavku uhlíkových sadzí. Následne sa študoval vplyv podmienok procesu spájania (prevažne vplyv teploty) na tvorbu mikroštruktúry a mechanické vlastnosti spojov. Najlepšie mechanické vlastnosti boli získané pri teplote spájania 1550°C.

Publikácie:

HOSSEINI, Naser - CHLUP, Zdeněk - HANZEL, Ondrej - KOVALČÍKOVÁ, Alexandra - DLOUHÝ, Ivo - TATARKO, Peter. Joining of ceramics for extreme environments using field assisted sintering technology. In Workshop Processing and properties of advanced ceramics and glasses, Mojmírovce, September 28-30, 2022, Slovak Republic : Proceedings. Ed. Jana Valúchová; recenzenti: Miroslav Hnatko, Ľuboš Bača, Marián Janek, Alexandra Kovalčíková, Zdeněk Chlup, Peter Tatarko. - Bratislava, Slovak Republic: Institute of Inorganic Chemistry SAS, 2022, p. 37-41. ISBN 978-80-973578-1-8. (Processing and properties of advanced ceramics and glasses) Typ: AFD

HOSSEINI, Naser - ÜNSAL, Hakan - VALENZA, Fabrizio - KOMBAMUTHU, Vasanthakumar - ZHUKOVA, Inga - KOVALČÍKOVÁ, Alexandra - DLOUHÝ, Ivo - TATARKO, Peter. Wetting, interfacial reaction and joining of monolithic SiC and Cf/SiC composites by ZrSi2 alloy. In Ceramics in Europe 2022 : Abstract book. Kraków, 10.-14.7.2022. - B.V., 2022, p. 520. ISBN 978-83-942760-9-6. (Ceramics in Europe 2022) Typ: AFG

HOSSEINI, Naser - CHLUP, Zdeněk - VALENZA, Fabrizio - KOVALČÍKOVÁ, Alexandra - DLOUHÝ, Ivo - TATARKO, Peter. Wetting and joining of SiC-based advanced ceramics by ZrSi2 alloy. In ISC´22. 2nd International Symposium on Characterization, 22-25 September 2022, Afyonkarahisar, Turkey : Abstract Book. - Turkey : Evcin ArGe, 2022, p. 201. (ISC´22 International Symposium on Characterization) Typ: GII

KOMBAMUTHU, Vasanthakumar - HOSSEINI, Naser - ÜNSAL, Hakan - ZHUKOVA, Inga - TATARKOVÁ, Monika - KOVALČÍKOVÁ, Alexandra - DLOUHÝ, Ivo - DUSZA, Ján - TATARKO, Peter. Effect of SiC particulates/whiskers reinforcements on properties of spark plasma sintered high entropy borides (Ti0.2Zr0.2Hf0.2Nb0.2Ta0.2)B2 synthesized using boro/carbothermal reduction. In Ceramics in Europe 2022 : Abstract book. Kraków, 10.-14.7.2022. - B.V., 2022, p. 525. ISBN 978-83-942760-9-6. (Ceramics in Europe 2022) Typ: AFG

ÜNSAL, Hakan - HANZEL, Ondrej - GRASSO, Salvatore - KOVALČÍKOVÁ, Alexandra - DLOUHÝ, Ivo - TATARKO, Peter. Preparation and characterization of B4C/TiB2 composites. In IMEC 2022. 1st International Conference on Innovative Materials in Extreme Conditions, 22-23 March 2022, Belgrade, Serbia : Program and Book of Abstracts. - Belgrade, Serbia : Vinča Institute of Nuclear Sciences - National Institute of the Republic of Serbia, University of Belgrade and Serbian Society for Innovative Materials in Extreme Conditions, 2022, p. 28. (IMEC 2022. International Conference on Innovative Materials in Extreme Conditions) Typ: GII

Domáce projekty

Programy: VEGA

1.) Fázové premeny oxidov kovov v roztavených fluoridových systémoch *(Phase changes of metal oxides in fluoride melts)*

Zodpovedný riešiteľ:	Miroslav Boča
Trvanie projektu:	1.1.2020 / 31.12.2023
Evidenčné číslo projektu:	2/0024/20
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 21695 €

<u>*Dosiahnuté výsledky:*</u>
Na zliatine Incoloy 800H/HT v prostredí roztavených fluoridov bol študovaný vplyv korózneho napadnutia vplyvom rôznych nečistôt, vrátane oxidov. Cieľom takéhoto štúdia bolo zistenie, aké častice (anióny kyslíka vs. katióny vodíka) sú hnacou silou korózneho procesu. Výsledky ukázali, že na intenzitu kórózneho napadnutia má vplyv predovšetkým prítomnosť a koncentrácia prítomných kationov vodíka, vo výrazne menšej miere je to prítomnosť a koncentrácia aniónov kyslíka. V niektorých prípadoch dokonca nebol pozorovaný korózny účinok na študovaný materiál. Dôležitým faktorom na vplyv korózneho účinku mal i materiál použitého téglika, v ktorom experimenty prebiehali. Výsledky sú publikované v nasledovnom príspevku:

PAVLÍK, Viliam** - BOČA, Miroslav - KITYK, Anna. Accelerated corrosion testing in molten fluoride salts: Effect of additives and the crucible material. In Corrosion Science, 2022, vol. 195, p. 110011-1-110011-15. (2021: 7.720 - IF, Q1 - JCR, 1.694 - SJR, Q1 - SJR). ISSN 0010-938X. Dostupné na: https://doi.org/10.1016/j.corsci.2021.110011

2.) Hlinitano-kremičitanové sklené a sklokeramické materiály spevnené iónovou výmenou a dodatočnými funckionalitami *(Ion exchange strengthened aluminosilicate glass/glass-ceramics with additional functionalities)*

Zodpovedný riešiteľ:	Dušan Galusek
Trvanie projektu:	1.1.2021 / 31.12.2024
Evidenčné číslo projektu:	VEGA 2/0028/21
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	1 - Slovensko: 1
Čerpané financie:	SAV: 7822 €

Dosiahnuté výsledky:
Hlavným cieľom projektu bolo objasniť vplyv nukleačných činidiel na kryštalizačné správanie a tvorbu kryštalických fáz v sklokeramike Na2O-MgO-Al2O3-SiO2. Sklá obsahujúce rôzne množstvá TiO2, ZrO2 a SnO2 ako nukleačné činidlá sa pripravili bežným tavením; nukleačné činidlá boli vybrané tak, aby vyvolali objemovú kryštalizáciu a zabezpečili prípravu transparentnej sklokeramiky. Študovali sa účinky nukleačných činidiel a procesov tepelného spracovania na tvorbu hlinitokremičitanovej a spinelovej fázy. Získané výstupy umožnili prípravu sklokeramiky s rôznymi kryštalickými fázami pomocou kombinácií nukleačných činidiel. Sklokeramika sa použila na skúmanie vplyvu výmeny iónov Na/K na mechanické vlastnosti sklokeramiky MgO-Al2O3-SiO2. V druhej časti projektu sa skúmal vplyv procesov iónovej výmeny na mechanické vlastnosti borosilikátových a boraluminátových skiel. Alkalické borosilikátové sklo sa získavalo komerčne, zatiaľ čo hlinitoboritanové sklo sa pripravilo na pracovisku. Napriek nižším kompresným napätiam v borosilikátových sklách v porovnaní s komerčnými chemicky spevnenými sklami, napr. Gorilla® Glass, iónová výmena Na/K zvýšila odolnosť voči vzniku trhlín počas indentačných testov (kolmé zaťaženie) ako aj odolnosť voči poškriabaniu. Iónová výmena lítia so sodíkom v borohlinitanovom skle zlepšuje odolnosť proti tvorbe trhlín pri kolmom indentačnom zaťažení z 20N na viac ako 100N (limit merania).
(i) A. Talimian, A., Csanádi, T., Limbach, R., Dusza, J., Wondraczek, L., Galusek, D., Scratch behavior of ion-exchange strengthened soda lime silicate and sodium borosilicate glass, 14th Pacific Rim Conference on Ceramic and Glass Technology with 2021 Glass & Optical Materials Division Annual Meeting, Vancouver (Virtual Conference)
(ii) Talimian, A., Galusek, D., Limbach, R., Rouxel, T., Wondraczek, L.?, Toughening of lithium boroaluminate glass using ion-exchange processes, 26th International Congress on Glass (ICG2022), Berlin

3.) Luminofory s nulovým teplotným zhášaním luminiscencie pre aplikácie v pc-WLED s NUV excitáciou *(Zero-thermal-quenching phosphors for NUV converted pc-WLEDs application)*

Zodpovedný riešiteľ:	Dušan Galusek
Trvanie projektu:	1.1.2022 / 31.12.2024
Evidenčné číslo projektu:	VEGA 1/0476/22
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	MŠ: 5520 €

Dosiahnuté výsledky:
R. Klement , K. Mihaldová , I. Parchovianská , A. Prnová , M. Parchovianský PHOTOLUMINESCENCE OF EU3+/2+ -DOPED YTTRIUM ALUMINATE GLASSES WITH EUTECTIC COMPOSITIONProcessing and Properties of Advanced Ceramics and Glasses, 28-30.9.2022, Mojmírovce, SRISBN 978-80-973578-1-8

4.) Elektromagnetické tienenie funkčne gradientných vrstevnatých kompozitov na báze SiC s prídavkom grafénu a uhlíkových nanorúrok *(Electromagnetic shielding properties of functionally graded layered SiC-graphene and SiC-carbon nanotubes composites)*

Zodpovedný riešiteľ:	Ondrej Hanzel
Trvanie projektu:	1.1.2021 / 31.12.2024
Evidenčné číslo projektu:	2/0007/21
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 8872 €

Dosiahnuté výsledky:
V rámci riešenia projektu boli pripravené stabilné keramické suspenzie s rôznym prídavkom uhlíkových nanorúrok

(CNTs). Bol optimalizovaný zeta potenciál daných suspenzií s cieľom zabrániť aglomerácií a sedimentácií uhlíkových nanorúrok počas prípravy. Taktiež bol optimalizovaný proces vymrazovacej granulácie. Následne boli z niektorých kompozitných práškov postupným zalisovaním do formy vytvorené vrstevnaté materiály s usporiadaním vrstiev 0-5-15 % CNTs a vrstevnaté materiály s usporiadaním vrstiev 15-5-0-5-15 % CNTs, ktoré boli spekané metódou rapid hot press (RHP) pri teplote 1800°C, vo vákuu po dobu 5 minút a pri tlaku 50 MPa. Relatívna hustota pripravených 3- a 5-vrstvových kompozitov bola vyššia ako 97 %.
Na takto pripravených hutných materiáloch bola vykonaná mikroštruktúrna analýza a boli merané funkčné vlastnosti (konkrétne elektrická vodivosť a tepelná difuzivita). Elektrická vodivosť 3-vrstvových kompozitných materiálov dosahovala 1800 S/m v prípade merania na strane vrstvy s 15 hm. % CNTs, v prípade merania na strane vrstvy SiC bez prídavku grafénu elektrická vodivosť dosahovala 100 S/m. Elektrická vodivosť 5-vrstvových kompozitných materiálov dosahovala 1100 S/m z oboch strán. Tieto výsledky dokazujú, že použitie metód vymrazovacej granulácie a spekania v rapid hot presse umožňuje získať hutné vrstevnaté kompozitné materiály SiC-CNTs s vysokou elektrickou vodivosťou.

Publikácie:

HANZEL, Ondrej** - LENČÉŠ, Zoltán - KIM, Young-Wook - ŠAJGALÍK, Pavol. Effect of sintering additives and sintering conditions on electrical and thermal properties of SiC-GNPs and SiC-GO composites. In Ceramics in Europe 2022 : Abstract book. Kraków, 10.-14.7.2022. - B.V., 2022, p. 292. ISBN 978-83-942760-9-6.

ÜNSAL, Hakan - GRASSO, Salvatore - KOVALČÍKOVÁ, Alexandra - HANZEL, Ondrej - TATARKOVÁ, Monika - DLOUHÝ, Ivo - TATARKO, Peter**. Effect of the electric field on the in-situ formation of graphene nanoplatelets during reactive sintering of B4C-TiB2 composites. In Ceramics in Europe 2022: Abstract book. Kraków, 10.-14.7.2022. - B.V., 2022, p. 556. ISBN 978-83-942760-9-6.

HANZEL, Ondrej - LENČÉŠ, Zoltán - KIM, Young-Wook - FEDOR, Ján - ŠAJGALÍK, Pavol. Silicon carbide - graphene composites with high thermal and electrical conductivity. In KERAMIK/CERAMICS 2022, 97. DKG Annual Meeting, virtual conference, 07.-09.03.2022 : Abstracts. - Köln, Germany: Deutsche Keramische Gesellschaft e.V., 2022, p. 64.

HANZEL, Ondrej - LENČÉŠ, Zoltán - KIM, Young-Wook - FEDOR, Ján - ŠAJGALÍK, Pavol. Silicon carbide - graphene composites with high functional properties. In IMEC 2022. 1st International Conference on Innovative Materials in Extreme Conditions, 22-23 March 2022, Belgrade, Serbia: Program and Book of Abstracts. - Belgrade, Serbia : Vinča Institute of Nuclear Sciences - National Institute of the Republic of Serbia, University of Belgrade and Serbian Society for Innovative Materials in Extreme Conditions, 2022, p. 27.

5.) Štruktúra a vlastnosti bio aktívnych skiel dopovaných iónmi s potenciálne terapeutickými a antibakteriálnymi účinkami *(Structure and properties of bioactive glasses doped with ions with potential therapeutic and antibacterial effects)*

Zodpovedný riešiteľ:	Mária Chromčíková
Trvanie projektu:	1.1.2020 / 31.12.2023
Evidenčné číslo projektu:	2/0164/
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	1 - Slovensko: 1
Čerpané financie:	SAV: 533 €

Dosiahnuté výsledky:

Podstatou riešeného projektu v roku 2022 bolo komplexné skúmanie vzťahov medzi zložením, štruktúrou a fyzikálnymi vlastnosťami bio skiel obsahujúcich okrem SiO2 aj sieťotvorný oxid P2O5. Po príprava homogénnych bio skiel bola kvantifikovaná sklotvornosť v skúmaných sústavách a zmerané základných fyzikálnochemických vlastností získaných skiel a sklotvorných tavenín. Procesov entalpickej relaxácie v transformačnej oblasti pomocou Tool-Narayanaswamy-Moynihan modelu bol kvantitatívne opísaný na bio sklách dopovaných Li2O a úspešne opublikovaný v Journal of Non-Crystalline Solids.

6.) Pórovité keramické anódy pre sodíkové batérie novej generácie *(Porous ceramic anodes for novel sodium-ion batteries)*

Zodpovedný riešiteľ:	Zoltán Lenčéš
Trvanie projektu:	1.12.2022 / 31.12.2024
Evidenčné číslo projektu:	2/0167/22
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 8133 €

Dosiahnuté výsledky:

Vysokoporézne keramické anódy na báze Si-O-C pre sodíkové batérie boli pripravené z pyrolyzovaného polymérneho prekurzoru Polyramic, resp. zo zmesi práškov pyrolyzovaného polyméru, kremíka a uhlíka. Podmienky mletia práškových zmesí v planetovom mlyne boli vypočítané z regresných rovníc o vplyve rýchlosti mletia, obsahu mlecích guličiek a času mletia na veľkosť častíc mletého prášku a jeho kontamináciu karbidom wolfrámu.
Zloženie anód, tzn. pomer aktívneho materiálu, vodivého uhlíka a spojiva bol 94:2:4. Ako spojivo bol použitý polyvinylidene fluoride (PVDF) v rozpúšťadle N-methyl-2-pyrrolidone (NMP). Elektrochemické merania však ukázali, že dochádza k lámaniu/drobeniu častíc Si počas nabíjacích-vybíjacích cyklov a výraznému poklesu kapacity. Z toho dôvodu bol zvýšený obsah spojiva na 10% a boli testované ďalšie spojivá: carboxymethyl celulóza (CMC) a styrene-butadiene rubber (SBR) v pomere 1:1 a novovyvinuté spojivá na báze alginátov (dopamín-alginát (d-Alg) a sulfo-alginát (s-Alg)). Anódy s oboma spojivami CMC:SBR a Alg vykazovali vyššiu špecifickú kapacitu v porovnaní s anódami obsahujúcimi PVDF spojivo. Zo všetkých testovaných anód mali najvyššiu špecifickú kapacitu anódy so sulfo-alginátom, cca. 170 mAh/g.

GÜNEREN, Alper – LENČÉŠ, Zoltán – NADA, Ahmed, Improvement of the performance of Silicon-graphite anodes in Li-ion batteries by application of self-healing binder, Proc. Processing and properties of advanced ceramics and glasses, Mojmírovce, Slovak republic, Sept. 28-30, 2022, pp. 72-75. ISBN 978-80-973578-1-8
KUCHERYAVAYA, Anastasia – LENČÉŠ, Zoltán – HARMUTH, Harald – ŠAJGALÍK, Pavol, Zirconium oxycarbides and oxycarbonitrides: a review. Int. J. Appl. Ceram. Technol. 2022;1–22. https://doi.org/10.1111/ijac.14188

7.) Pokrok vo výpočte a interpretácii spektroskopických parametrov zlúčenín ťažkých prvkov

(Advancing in calculation and interpretation of spectroscopic parameters of heavy element compounds)

Zodpovedný riešiteľ:	Oľga Malkin
Trvanie projektu:	1.1.2021 / 31.12.2024
Evidenčné číslo projektu:	2/0135/21
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 14038 €

Dosiahnuté výsledky:

HRICOVÍNI, Michal – ASHER, James Richard – HRICOVÍNI, Miloš**. A study of the photochemical behaviour and relaxation mechanisms of anti-syn isomerisation around quinazolinone -N-N=bonds. In RSC Advances, 2022, vol. 12, no. 42, p. 27442-27452. (2021: 4.036 – IF, Q2 – JCR, 0.667 – SJR, Q1 – SJR). ISSN 2046-2069. Dostupné na: https://doi.org/10.1039/d2ra04529j Typ: ADCA

MALKINA, Oľga** - LEMKEN, Florian - ASHER, James Richard - HIERSO, Jean-Cyrille - BÜHL, Michael - MALKIN, Vladimír**. Transmission of spin-polarization by pi-orbitals: an approach to assessing its effect on NMR spin-spin coupling and EPR hyperfine structure. In Physical Chemistry Chemical Physics, 2022, vol. 24, no. 32, p. 24039-24049. (2021: 3.945 - IF, Q1 - JCR, 0.899 - SJR, Q1 - SJR). ISSN 1463-9076. Dostupné na: https://doi.org/10.1039/d2cp03295c Typ: ADCA

MALKINA, Oľga** - HIERSO, Jean-Cyrille** - MALKIN, Vladimír. Distinguishing "through-space" from "through-bonds" contribution in indirect nuclear spin-spin coupling: General approaches applied to complex JPP and JPSe scalar couplings. In Journal of the American Chemical Society, 2022, vol. 144, no. 24, p. 10768-10784. (2021: 16.383 - IF, Q1 - JCR, 5.728 - SJR, Q1 - SJR). ISSN 0002-7863. Dostupné na: https://doi.org/10.1021/jacs.2c01637 Typ: ADCA

KONEČNÝ, Lukáš** - VÍCHA, Jan - KOMOROVSKÝ, Stanislav - RUUD, Kenneth - REPISKÝ, Michal**. Accurate X-ray absorption spectra near L- and M-edges from relativistic four-component damped response time-dependent density functional theory. In Inorganic Chemistry, 2022, vol. 61, no. 2, p. 830-846. (2021: 5.436 - IF, Q1 - JCR, 1.121 - SJR, Q1 - SJR). ISSN 0020-1669. Dostupné na: https://doi.org/10.1021/acs.inorgchem.1c02412 Typ: ADCA

CUYACOT, Ben Joseph R. - NOVOTNÝ, Jan - BERGER, Raphael J. F. - KOMOROVSKÝ, Stanislav** - MAREK, Radek**. Relativistic spin-orbit electronegativity and the chemical bond between a heavy atom and a light atom. In Chemistry -A European Journal, 2022, vol. 28, no. 24, art. no. e202200277. (2021: 5.020 - IF, Q2 - JCR, 1.343 - SJR, Q1 - SJR). ISSN 0947-6539. Dostupné na: https://doi.org/10.1002/chem.202200277 Typ: ADCA

MIŠENKOVÁ, Debora - LEMKEN, Florian - REPISKÝ, Michal - NOGA, Jozef - MALKINA, Oľga - KOMOROVSKÝ, Stanislav**. The four-component DFT method for the calculation of the EPR g-tensor using a restricted magnetically balanced basis and London atomic orbitals. In Journal of Chemical Physics, 2022, vol. 157, no. 16, art. no. 164114. (2021: 4.304 - IF, Q1 - JCR, 1.103 - SJR, Q1 - SJR). ISSN 0021-9606. Dostupné na: https://doi.org/10.1063/5.0103928 Typ: ADCA

8.) Vývoj a charakterizácia sférických mikročastíc vhodných na prípravu 3D sklených a sklo-keramických štruktúr *(Development and characterisation of spherical microparticles for preparation of advanced 3D glass and glass-ceramic structures)*

Zodpovedný riešiteľ:	Monika Michálková
Trvanie projektu:	1.1.2020 / 31.12.2023
Evidenčné číslo projektu:	1/0456/20
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	VEGA MŠ: 2373 €

Dosiahnuté výsledky:

DASAN, Arish** - KRAXNER, Jozef - GRIGOLATO, Luca - SAVIO, Gianpaolo - ELSAYED, Hamada - GALUSEK, Dušan - BERNARDO, Enrico**. 3D printing of hierarchically porous lattice structures based on akermanite glass microspheres and reactive silicone binder. In Journal of Functional Biomaterials, 2022, vol. 13, no. 1, p. 8-1-8-11. (2021: 4.901 - IF, Q2 - JCR, 0.875 - SJR, Q2 - SJR). ISSN 2079-4983. Dostupné na: https://doi.org/10.3390/jfb13010008 Typ: ADCA

KRAXNER, Jozef** - ELSAYED, Hamada - DASAN, Arish - HUJOVÁ, Miroslava - MICHÁLKOVÁ, Monika - MICHÁLEK, Martin - BERNARDO, Enrico - GALUSEK, Dušan. Additive manufacturing of Ca-Mg silicate scaffolds supported by flame-synthesized glass microspheres. In Ceramics International, 2022, vol. 48, no. 7, p. 9107-9113. (2021: 5.532 - IF, Q1 - JCR, 0.887 - SJR, Q1 - SJR, karentované - CCC).. ISSN 0272-8842. Dostupné na: https://doi.org/10.1016/j.ceramint.2021.12.095 Typ: ADCA

MAHMOUD, Mokhtar** - KRAXNER, Jozef - KAŇKOVÁ, Hana - HUJOVÁ, Miroslava - CHEN, Si - GALUSEK, Dušan - BERNARDO, Enrico. Porous glass microspheres from alkali-activated fiber glass waste. In Materials, 2022, vol. 15, no. 3, p. 1043-1-1043-9. (2021: 3.748 - IF, Q1 - JCR, 0.604 - SJR, Q2 - SJR). ISSN 1996-1944. Dostupné na: https://doi.org/10.3390/ma15031043 Typ: ADCA

9.) Potenciál vrstevnatých aluminosilikátov ako excelentných nosičov polykatiónov: dizajnovanie nových kompozitných nanomateriálov *(Potential of layered aluminosilicates as*

excellent guests to accommodate polymeric cations: design of new composite materials)

Zodpovedný riešiteľ:	Helena Pálková
Trvanie projektu:	1.1.2021 / 31.12.2024
Evidenčné číslo projektu:	2/0166/21
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 17229 €

Dosiahnuté výsledky:

V roku 2022 sa dokončili experimentálne práce série organoílov z Na-Mt Kunipia a neiónového polyméru poly(2-metyl-2-oxazolín) a katiónového polyméru poly(etylénimínu). Okrem toho sa pripravili nové série vzoriek smektitov modifikovaných poly(etyl-oxazolínom) a poly(propyl-oxazolínom), ich charakterizácia je naplánovaná na rok 2023. Ukončili sa práce na vzorkách ílového minerálu modifikovaného polyelektrolytom (PDDA) pričom sa na vzorkách sledoval vplyv modifikácie na luminiscenčné vlastnosti Reichardovho farbiva, ktoré pred modifikáciou nevykazovalo fluorescenčné vlastnosti. Pokračujú experimentálne práce na optimalizácii prípravy a charakterizácii saponitu modifkovaného biopolymérom.

PRIBUS, Marek** - BUDZÁK, Šimon - PRIBUSOVÁ SLUŠNÁ, Lenka - ŠIMONOVÁ, Tímea - JANKOVIČ, Ľuboš - MÉSZÁROS, R. - BUJDÁK, Juraj. Luminescence of Reichardt´s dye in polyelectrolyte-modified saponite colloids. In Colloids and Surfaces A: Physicochemical and Engineering Aspects, 2022, vol. 642, p. 128663-1-128663-10. (2021: 5.518 - IF, Q2 - JCR, 0.758 - SJR, Q2 - SJR).
BOHÁČ, Peter** - BUDZÁK, Šimon - PLANETOVÁ, Viktória - KLEMENT, Róbert - BUJDÁK, Juraj. Adsorption-induced fluorescence of pseudoisocyanine monomers in systems with layered silicates. In Journal of Physical Chemistry C, 2022, vol. 126, no. 40, p. 17255-17265. (2021: 4.177 - IF, Q2 - JCR, 1.103 - SJR, Q1 - SJR, karentované - CCC).
MEDEIROS MELO, Tatiane** - SCHAUERTE, Marina - BLUHM, Annika - SLANÝ, Michal - PALLER, Michael - BOLAN, Nanthi - BOSCH, Julian - FRITZSCHE, Andreas - RINKLEBE, Jörg**. Ecotoxicological effects of per- and polyfluoroalkyl substances (PFAS) and of a new PFAS adsorbing organoclay to immobilize PFAS in soils on earthworms and plants. In Journal of Hazardous Materials, 2022, vol. 433, p. 128771-1-128771-11. (2021: 14.224 - IF, Q1 - JCR, 1.991 - SJR, Q1 - SJR). ISSN 0304-3894.

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MADEJOVÁ, Jana - BARLOG, Martin - SLANÝ, Michal - JANKOVIČ, Ľuboš. Characterization of montmorillonite modified with polyoxazoline. In MECC ´20/22. 10th Jubilee Mid-European Clay Conference, Kliczków, Poland, September 11-15, 2022: Book of abstracts. Kraków, Poland, 2022, p. 62. ISBN 978-83-65955-60-9. Type: AFG
MADEJOVÁ, Jana** - BARLOG, Martin - JANKOVIČ, Ľuboš - SLANÝ, Michal - PÁLKOVÁ, Helena. Comparative study of alkylammonium- and alkylphosphonium-based analogues of organo-montmorillonites. In AIPEA - XVII International Clay Conference - ICC 2022, 25-29 July 2022, Istanbul, Turkey: Scientific Research Abstracts. Turkey, 2022, p. 164

10.) Porozumenie mechanizmu interakcií znečisťujúcich látok adsorbovaných na povrchu aluminosilikátových štruktúr *(Insight into the mechanism of interactions of pollutants adsorbed on the surface of aluminosilicate structures)*

Zodpovedný riešiteľ:	Eva Scholtzová
Trvanie projektu:	1.1.2019 / 31.12.2022
Evidenčné číslo projektu:	2/0021/19
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 8614 €

Dosiahnuté výsledky:

BASHIR, Sanam** - ŠKORŇA, Peter - SCHOLTZOVÁ, Eva. Theoretical DFT-D3 study of interactions between montmorillonite clay and different polymers. In Czech Chemical Society Symposium Series, 2022, roč. 20, č. 4, s. 238. ISSN 2336-7202. (Sjezd českých a slovenských chemických společností) Typ: AFG

BASHIR, Sanam - SCHOLTZOVÁ, Eva** - TUNEGA, Daniel. Theoretical study of interactions in the clay-polymer advanced hybrid nanomaterials. In AIPEA - XVII International Clay Conference - ICC 2022, 25-29 July 2022, Istanbul, Turkey : Scientific Research Abstracts. - Turkey, 2022, p. 101. (AIPEA - International Clay Conference ICC) Typ: GII

BÖHM, Leonard** - GRANČIČ, Peter - SCHOLTZOVÁ, Eva - HEYDE, Benjamin Justus - DÜRING, Rolf-Alexander - SIEMENS, Jan - GERZABEK, Martin H. - TUNEGA, Daniel. Adsorption of the hydrophobic organic pollutant hexachlorobenzene to phyllosilicate minerals. In Environmental science and pollution research, p. ISSN 0944-1344 IF=5.19. Typ: ADCA

GIANNI, Eleni** - MORENO RODRÍGUEZ, Daniel** - JANKOVIČ, Ľuboš - SCHOLTZOVÁ, Eva - POSPÍŠIL, Miroslav. How herbicides like atrazine and diuron interact with the spiral halloysite structure. In Journal of Environmental Chemical Engineering, 2022, vol. 10, no. 6, p. 108785-1-108785-10. (2021: 7.968 - IF, Q1 - JCR, 1.042 - SJR, Q1 - SJR). ISSN 2213-3437. Dostupné na: https://doi.org/10.1016/j.jece.2022.108785 Typ: ADCA
MORENO RODRÍGUEZ, Daniel** - JANKOVIČ, Ľuboš - SCHOLTZOVÁ, Eva. Immobilisation of diuron herbicide employing smectites. In Materials Today Communications, 2022, vol. 31, p. 103252-1-103252-12. (2021: 3.662 - IF, Q3 - JCR, 0.623 - SJR, Q2 - SJR). ISSN 2352-4928. Dostupné na: https://doi.org/10.1016/j.mtcomm.2022.103252 Typ: ADCA

MORENO RODRÍGUEZ, Daniel**. On search of the clay-herbicide interaction. In Informátor, 2022, no. 71, p. 3-8. ISSN 1802-2480. Typ: AFA

MORENO RODRÍGUEZ, Daniel - GIANNI, Eleni - JANKOVIČ, Ľuboš - SCHOLTZOVÁ, Eva - POSPÍŠIL, Miroslav. How atrazine and diuron are absorbed into spiral halloysite structure. In MECC ´20/22. 10th Jubilee Mid-European Clay Conference, Kliczków, Poland, September 11-15, 2022 : Book of abstracts. - Kraków, Poland, 2022, p. 67. ISBN 978-83-65955-60-9. (MECC ´20/22. Jubilee Mid-European Clay Conference) Typ: AFG

SCHOLTZOVÁ, Eva - ZIMOWSKA, Malgorzata - TUNEGA, Daniel. Ab initio thermodynamics study of the MgCO3 formation. In MECC ´20/22. 10th Jubilee Mid-European Clay Conference, Kliczków, Poland, September 11-15, 2022 : Book of abstracts. - Kraków, Poland, 2022, p. 77. ISBN 978-83-65955-60-9. (MECC ´20/22. Jubilee Mid-European Clay Conference) Typ: AFG

ŠKORŇA, Peter** - JANKOVIČ, Ľuboš - SCHOLTZOVÁ, Eva - TUNEGA, Daniel. Hexavalent chromium adsorption by tetrahexylphosphonium modified beidellite clay. In Applied Clay Science, 2022, vol. 228, p. 106623-1-106623-8. (2021: 5.907 - IF, Q1 - JCR, 0.958 - SJR, Q1 - SJR). ISSN 0169-1317. Dostupné na: https://doi.org/10.1016/j.clay.2022.106623 Typ: ADCA

ŠKORŇA, Peter - JANKOVIČ, Ľuboš - SCHOLTZOVÁ, Eva - TUNEGA, Daniel. Perchlorate pollutants adsorption by tetrahexylphosphonium-modified beidellite clay - theoretical and experimental research. In MECC ´20/22. 10th Jubilee Mid-European Clay Conference, Kliczków, Poland, September 11-15, 2022 : Book of abstracts. - Kraków, Poland, 2022, p. 82. ISBN 978-83-65955-60-9. (MECC ´20/22. Jubilee Mid-European Clay Conference) Typ: AFG

MADEJOVÁ, Jana** - BARLOG, Martin - SLANÝ, Michal - BASHIR, Sanam - SCHOLTZOVÁ, Eva - TUNEGA, Daniel - JANKOVIČ, Ľuboš. Advanced materials based on montmorillonite modified with poly(ethylenimine) and poly(2-methyl-2-oxazoline): Experimental and DFT study. In Colloids and Surfaces A: Physicochemical and Engineering Aspects, 2023, vol. 659, art. no. 130784. ISSN 0927-7757. Typ: ADCA

MURÁTH, Szabolcs - DVORNÍKOVÁ, Natálie - MORENO RODRÍGUEZ, Daniel - NOVOTNÝ, Radek - POSPÍŠIL, Miroslav - URBANOVÁ, Martina - BRUS, Jiří - KOVANDA, František**. Intercalation of atorvastatin and valsartan into Mg-Al layered double hydroxide host using a restacking procedure. In Applied Clay Science, 2023, vol. 231, p. 106717-1-106717-12. ISSN 0169-1317. Dostupné na: https://doi.org/10.1016/j.clay.2022.106717 Typ: ADCA

11.) Fluoridové taveninové systémy pre zelenú výrobu hliníka bez produkcie CO2 *(Molten fluoride systems for green production of aluminium without CO2 emissions)*

Zodpovedný riešiteľ:	František Šimko
Trvanie projektu:	1.1.2022 / 31.12.2025
Evidenčné číslo projektu:	2/0046/22
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 14676 €

Dosiahnuté výsledky:

Pomocou termickej analýzy sa stanovili fázové diagramy systémov Na3AlF6–NdF3 a (Na3AlF6–NdF3)eut–Nd2O3. Systém Na3AlF6–NdF3 je jednoduchý eutektický systém s eutektickým bodom so súradnicami: 49 mol% NdF3, a t = 905oC. Dané eutektické zloženie sa následne použilo na termickú analýzu trojzložkového systému (Na3AlF6–NdF3)eut–Nd2O3. Zistilo sa, že súradnice eutektického bodu sústavy (Na3AlF6–NdF3)eut–Nd2O3 sú približne 46 mol% Nd2O3 a t = 733oC. Po termickej analýze bola vykonaná röntgenová difrakcia stuhnutých vzoriek oboch systémov. XRD analýza systému Na3AlF6–NdF3 ukázala tvorbu dvoch nových zlúčenín; NaNdF4 a NdOF. Tvorba NdOF je pravdepodobne produktom vysokoteplotnej hydrolýzy medzi vlhkosťou v atmosfére a NdF3. XRD analýza stuhnutých vzoriek systému (Na3AlF6–NdF3)eut–Nd2O3 ukázala tvorbu nasledujúcich nových zlúčenín; NaNdF4, NdOF, NdAlO3 a NaF.

12.) In-situ tvorba bioaktívneho funkčne gradientného nitridu kremičitého počas spekania v elektrickom poli *(The in-situ formation of bioactive functionally graded silicon nitride by field assisted sintering)*

Zodpovedný riešiteľ:	Monika Tatarková
Trvanie projektu:	1.1.2022 / 31.12.2024
Evidenčné číslo projektu:	2/0161/22
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 12572 €

Dosiahnuté výsledky:

Projekt skúma vývoj novej funkčne gradientnej (FG) biokeramiky na báze Si3N4 spekaním za asistencie elektrického prúdu s následným tepelným spracovaním povrchu kyslíkovo-acetylénovým plameňom. FG Si3N4 sa pripravil in-situ počas spekania homogénnej práškovej zmesi za asistencie elektrického poľa. V prvom roku riešenia bolo skúmané rôzne usporiadanie spekacej sústavy s cieľom zistiť usporiadanie s maximálnym smerovým účinkom elektrického prúdu na migráciu bioaktívnych prísad k jednému z povrchov materiálu. Tým sa zabezpečí tvorba Si3N4 biomateriálu so súvislou gradientnou štruktúrou priamo z homogénnej práškovej zmesi. Bol analyzovaný vplyv asymetrického spekania na funkčne gradientnú mikroštruktúru nitridu kremičitého s rôznymi kombináciami spekacích prísad s cieľom objasniť vplyv elektrického prúdu na in-situ tvorbu funkčne gradientného Si3N4.

Publikácie:

HIČÁK, Michal - MEDVECKÝ, Ľubomír - HNATKO, Miroslav - ŠTULAJTEROVÁ, Radoslava - GIRETOVÁ, Mária - TATARKOVÁ, Monika - LENČÉŠ, Zoltán - ŠAJGALÍK, Pavol. Porous silicon nitride-based drug delivery carrier. In International Journal of Applied Ceramic Technology, 2022, vol. 19, no. 2, p. 882-892. (2021: 2.328 - IF, Q2 - JCR, 0.388 - SJR, Q2 - SJR). ISSN 1546-542X. Dostupné na: https://doi.org/10.1111/ijac.13908 Typ: ADCA

DE LA TORRE OLVERA, Guido - HIČÁK, Michal - HNATKO, Miroslav - TATARKOVÁ, Monika. Effect of oxyacetylene flame to form a porous layer in silicon nitride. In Workshop Processing and properties of advanced ceramics and glasses, Mojmírovce, September 28-30, 2022, Slovak Republic : Proceedings. Ed. Jana Valúchová; recenzenti: Miroslav Hnatko, Ľuboš Bača, Marián Janek, Alexandra Kovalčíková, Zdeněk Chlup, Peter Tatarko. - Bratislava, Slovak Republic : Institute of Inorganic Chemistry SAS, 2022, p. 31-36. ISBN 978-80-973578-1-8. (Processing and properties of advanced ceramics and glasses) Typ: AFD

DE LA TORRE OLVERA, Guido - HIČÁK, Michal - HNATKO, Miroslav - LABUDOVÁ, Martina - TATARKOVÁ, Monika. Modification of the surface layer of silicon nitride using oxyacetylene flame. In Ceramics in Europe 2022 : Abstract book. Kraków, 10.-14.7.2022. - B.V., 2022, p. 454. ISBN 978-83-942760-9-6.

DE LA TORRE OLVERA, Guido - HIČÁK, Michal - LABUDOVÁ, Martina - HNATKO, Miroslav - TATARKOVÁ, Monika. Development of silicon nitride with bioactive surface using oxyacetylene flame. In ISC´22. 2nd International Symposium on Characterization, 22-25 September 2022, Afyonkarahisar, Turkey : Abstract Book. - Turkey : Evcin ArGe, 2022, p. 199. Typ: GII

DE LA TORRE OLVERA, Guido - ÜNSAL, Hakan - TABAK, Yasemin - VATANSEVER, Bayise Kavakli - KILIC, Aysen - POLAT, Seyda - HNATKO, Miroslav - LENČÉŠ, Zoltán - TATARKOVÁ, Monika. Functionally graded silicon nitride with improved bioactivity prepared by tape casting. In ISC´22. 2nd International Symposium on Characterization, 22-25 September 2022, Afyonkarahisar, Turkey: Abstract Book. Turkey: Evcin ArGe, 2022, p. 197. Typ: GII

TATARKOVÁ, Monika - TATARKO, Peter - KOVALČÍKOVÁ, Alexandra - DLOUHÝ, Ivo - DUSZA, Ján - ŠAJGALÍK, Pavol. Boron nitride nanosheets as a reinforcement for silicon nitride. In Ceramics in Europe 2022 : Abstract book. Kraków, 10.-14.7.2022. - B.V., 2022, p. 252. ISBN 978-83-942760-9-6. Typ: AFG

ZHUKOVA, Inga - KOMBAMUTHU, Vasanthakumar - HOSSEINI, Naser - ÜNSAL, Hakan - TATARKOVÁ, Monika - KOVALČÍKOVÁ, Alexandra - DLOUHÝ, Ivo - DUSZA, Ján - TATARKO, Peter. Theoretical predictions and synthesis of high-entropy diboride systems with different molar ratios of transition metals. In Ceramics in Europe 2022 : Abstract book. Kraków, 10.-14.7.2022. - B.V., 2022, p. 566. ISBN 978-83-942760-9-6. Typ: AFG

HOSSEINI, Naser - ÜNSAL, Hakan - VALENZA, Fabrizio - KOMBAMUTHU, Vasanthakumar - ZHUKOVA, Inga - KOVALČÍKOVÁ, Alexandra - DLOUHÝ, Ivo - TATARKO, Peter. Wetting, interfacial reaction and joining of monolithic SiC and Cf/SiC composites by ZrSi2 alloy. In Ceramics in Europe 2022: Abstract book. Kraków, 10.-14.7.2022. - B.V., 2022, p. 520. ISBN 978-83-942760-9-6. Typ: AFG

Programy: APVV

13.) Interakcia fluoridových taveninových systémov prvkov vzácnych zemín s oxidmi kritických prvkov v kontexte špeciálnych aplikácií *(Interaction of fluoride melts of rare earth elements with oxides of critical elements in the context of special applications)*

Zodpovedný riešiteľ:	Miroslav Boča
Trvanie projektu:	1.7.2020 / 30.6.2024
Evidenčné číslo projektu:	APVV-19-0270
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 60000 €

Dosiahnuté výsledky:

V rámci projektu boli študované viaceré fluoridové systémy: (LiF-MgF2)eut-LnF3; Ln = Sm, Gd, Nd; (LiF-CaF2)eut-NdF3 a (LiF-NaF)eut-NdF3, pričom boli sledované tri rôzne fyzikálno-chemické vlastnosti – fázové rovnováhy, hustota a objemové vlastnosti a elektrická vodivosť. Vo všetkých prípadoch bola použitá aj rtg. prášková difrakčná analýza zatuhnutých vzoriek, ktoré dodali doplňujúcu informáciu k vyhodnoteným výsledkom zo štúdia fázových rovnováh. Získané výsledky boli porovnávané s výsledkami podobných fluoridových sústav a boli publikované a prezentované vo viacerých odborných publikáciách, ako i vedeckých podujatiach.

KUBÍKOVÁ, Blanka** - MLYNÁRIKOVÁ, Jarmila - MATSELKO, Oksana - MIKŠÍKOVÁ, Eva - NETRIOVÁ, Zuzana - VASKOVÁ, Zuzana - BOČA, Miroslav. Phase equilibria and volume properties of (LiF-MgF2)eut-LnF3 (Ln = Sm, Gd, Nd) molten systems. In Journal of Molecular Liquids, 2022, vol. 353, p. 118694-1-118694-10. (2021: 6.633 - IF, Q1 - JCR, 0.914 - SJR, Q1 - SJR, karentované - CCC). (2022 - Current Contents, WOS, SCOPUS). ISSN 0167-7322. Dostupné na: https://doi.org/10.1016/j.molliq.2022.118694

KORENKO, Michal** - KRISHNAN, Dhiya - ŠIMKO, František - AMBROVÁ, Marta - SZATMÁRY, Lóránt. Electrical conductivity of the molten systems of (LiF - CaF2)eut - NdF3 and (LiF - NaF)eut - NdF3. In Journal of Molecular Liquids, 2022, vol. 365, p. 120012-1-120012-7. (2021: 6.633 - IF, Q1 - JCR, 0.914 - SJR, Q1 - SJR, karentované - CCC). ISSN 0167-7322. Dostupné na: https://doi.org/10.1016/j.molliq.2022.120012

BOČA, Miroslav** - KUBÍKOVÁ, Blanka - NETRIOVÁ, Zuzana - MATSELKO, Oksana - MLYNÁRIKOVÁ, Jarmila. Systematic research on the selected ternary lanthanide fluoride systems. In 28th EUCHEM conference on Molten Salts and Ionic Liquids, Patras, 5-10th June 2022 : book of abstracts. - Greece: Institute of Chemical Engineering Sciences, 2022, p. 62.

KRISHNAN, Dhiya** - KORENKO, Michal - ŠIMKO, František. Electrical conductivity of the molten systems of (LiF - CaF2)eut - NdF3 and (LiF - NaF) eut - NdF3. In Czech Chemical Society Symposium Series. - Praha, ČR : Czech Chemical Society, 2022, roč. 20, č. 4, s. 246. ISSN 2336-7202.

KUBÍKOVÁ, Blanka** - MLYNÁRIKOVÁ, Jarmila - NETRIOVÁ, Zuzana - VASKOVÁ, Zuzana - MATSELKO, Oksana - BOČA, Miroslav. Physico-chemical investigation of selected lanthanide trifluorides in molten eutectic mixture LiF-MgF2. In 28th EUCHEM conference on Molten Salts and Ionic Liquids, Patras, 5-10th June 2022 : book of abstracts. - Greece : Institute of Chemical Engineering Sciences, 2022, p. 63.

14.) Anódy pre Li-iónové batérie na báze uhlík-kremíkových kompozitov *(Carbon-silicon based composite anodes for Li-ion batteries)*

Zodpovedný riešiteľ:	Karol Fröhlich
Zodpovedný riešiteľ v organizácii SAV:	Zoltán Lenčéš
Trvanie projektu:	1.7.2020 / 30.6.2024
Evidenčné číslo projektu:	APPV-19-0461
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Centrum pre využitie pokročilých materiálov SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	3 - Slovensko: 3
Čerpané financie:	APVV: 6330 €

Dosiahnuté výsledky:

Aktívny materiál v anóde Li-batérií na báze uhlíka a kremíka (C/Si) v pomere 80:20 hm% bol pripravený vysokoenergetickým mletím v planetovom mlyne za podmienok mletia vypočítaných z regresných rovníc o vplyve rýchlosti mletia, obsahu mlecích guličiek a času mletia na veľkosť častíc C/Si prášku a jeho kontamináciu karbidom wolfrámu. Taktiež boli optimalizované viskozity suspenzií pozostávajúcich z 80% aktívneho materiálu SiOC + C/Si, 10% vodivého uhlíka a 10% spojiva na odlievanie pások anód. Kremíkové častice sa v dôsledku objemovej zmeny (?300%) rozpadajú a anóda stráca svoju integritu a nábojovú kapacitu. Jednou z možností ako sa vyhnúť takejto degradácii je použitie takých spojív, ktoré by zabránili/obmedzili praskaniu Si častíc. Z toho dôvodu bolo testovaných viacero druhov spojív: celulóza/styrén-butadiénový kaučuk (CMC/SBR), a novovyvinuté spojivá dopamín-alginát (d-Alg) a sulfo-alginát (s-Alg). Študoval sa aj vplyv obsahu spojiva, konkrétne 4 hm% a 10 hm% spojiva. Elektrochemické testy ukázali, že najvyššiu špecifickú kapacitu mali anódy so spojivom na báze sulfo-alginátu, kedy sa kapacita stabilizovala na hodnote približne 600 mAh/g aj po 20 nabíjacích a vybíjacích cykloch.
Doterajšie výsledky ukazujú sa, že vďaka vetvenej nelineárnej štruktúre sulfo-alginátu má spojivo lepší kontakt, viac bodových kontaktov OH- skupín s povrchom kremíka. V dôsledku toho integrita anódy a teda kapacita batérie je vo väčšej miere zachovaná aj pri vyšších rýchlostiach nabíjania.

GÜNEREN, Alper – LENČÉŠ, Zoltán – NADA, Ahmed, Improvement of the performance of Silicon-graphite anodes in Li-ion batteries by application of self-healing binder, Proc. Processing and properties of advanced ceramics and glasses, Mojmírovce, Slovak republic, Sept. 28-30, 2022, pp. 72-75. ISBN 978-80-973578-1-8
GÜNEREN, Alper – LENČÉŠ, Zoltán – NADA, Ahmed Self-healing binder adaption to silicon-graphite blended anodes. Abstract Book of the Ceramics in Europe 2022, July 10-14, 2022, Krakow, Poland, p. 409. ISBN: 978-83-942760-9-6
SAHOO, Prangya P. - GÜNEREN, Alper – HUDEC, Boris – MIČUŠÍK, Matej – LENČÉŠ, Zoltán, P. ŠIFFALOVIČ, Peter – FRÖHLICH, Karol: Improved properties of Li-ion battery electrodes protected by Al2O3 and ZnO ultrathin layers prepared by atomic layer deposition. In: 242nd Electrochemical Society Meeting, Atlanta, USA, 9-13.10. 2022.

15.) Nové sklenené a sklokeramické fosfory na báze hlinitanov vzácnych zemín pre aplikácie v pevnolátkových energiu šetriacich svetelných zdrojoch vyžarujúcich biele svetlo (pc-ELED diódy) *(Novel glass and glass-ceramic rare-earth aluminates-based phosphors for energy-savin solid state lighting sources emitting while light (pc-WLEDs))*

Zodpovedný riešiteľ:	Dušan Galusek
Trvanie projektu:	1.8.2018 / 31.7.2022
Evidenčné číslo projektu:	APVV-17-0049
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Trenčianska univerzita Alexandra Dubčeka v Trenčíne
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 6720 €

Dosiahnuté výsledky:

Optimalizovaná bola príprava mikroguľôčok v systéme Y2O-Al2O3 dopovanom luminiscenčne aktívnymi iónmi Ce3+, Eu3+/2+, Mn2+/4+. Detailne preštudované boli luminiscenčné vlastnosti v závislosti od koncentrácie aktivátora, podmienok prípravy skryštalizovaných mikroguľočok (optimalizovaný časovo-teplotný režim v redukčnej atmosfére). Eu2+ -dopované systémy vykazujú pri excitácii NUV emisiu bieleho svetla, ktorú je možno ladiť vlnovou dĺžkou excitačného žiarenia s posunom do červenej spektrálnej oblasti. Z Ce3+ dopovaných sklených mikroguľočok boli žiarovým lisovaním pripravené sklo-kryštalické dvojfázové (YAG/Al2O3) translucentné kompakty s luminiscenčnými vlastnosťami, ktoré emitujú žlté svetlo pri excitácii NUV a modrým svetelným žiarením. Žiarovým lisovaním a technikou SPS (Spark Plasma Sintering) boli pripravené kompozity dopované Eu2+/Eu3+ emitujúce biele a červené svetlo pri excitácii NUV iba s jedným typom aktivátora v matrici. Detailne preštudované boli aj transparentné/translucentné materiály na báze Al2O3 dopované luminiscenčnými aktivátormi Dy3+,Tb3+ a ich kombináciou s Cr3+ (Dy3+/Cr3+, Tb3+/Cr3+), čo umožnilo ladenie farby emitovaného svetla (luminiscencie) v závislosti od excitačnej vlnovej dĺžky.

R. Klement, K. Drdlíková, D. Drdlík, K. Maca, Photoluminescence of rare-earth/transition metal-doped transparent/translucent polycrystalline Al2O3 ceramics: A review, J. Am. Ceram. Soc. 106 (2023) 172-185.

K. Drdlíková, R. Klement, J. Svoboda, D. Drdlík, D. Galusek, K. Maca, Luminescent Dy3+ and Dy3+/Cr3+ doped transparent Al2O3 ceramics: Microstructure and optical properties, J. Eur. Ceram. Soc. 42 (2022) 4343-4352.

P. Švančárek, R. Klement, W. Wisniewski, M. Parchovianský, D. Galusek, ZnO-doped Y2O3 ceramic: A prospective Warm White Light Fluorescent Material, J. Eur. Ceram. Soc. 42 (2022) 2478-2486.

B. Pecušová, A. Prnová, J. Valúchová, M. Parchovianský, R. Klement, D. Galusek, Crystallization and photoluminescence properties of Er-doped microspheres with ytterbium-aluminium garnet composition, Ceram. Int. (2022), DOI: 10.1016/j.ceramint.2022.08.070

16.) Nanoštrukturované, funkčne navrstvené a bio-inšpirované 3D iplantáty na báze titánu *(Nanostructured, functionally graded, and bioinspired 3D Ti-based implants)*

Zodpovedný riešiteľ:	Miroslav Hnatko
Trvanie projektu:	1.8.2021 / 30.6.2025
Evidenčné číslo projektu:	APVV-20-0322
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	1 - Slovensko: 1
Čerpané financie:	APVV: 42310 €

Dosiahnuté výsledky:
Experimentálne práce prebiehali v súlade so stanoveným harmonogramom na rok 2022, t.j. bola realizovaná ďalšia optimalizácia procesov modifikácie povrchu Ti zliatiny. Bolo realizované hodnotenie biologickej aktivity, biokompatibility a antibakteriálnych vlastností zložiek, ktoré boli realizované ponorením do roztoku s podobným zložením ako ľudská krvná plazma bez organických zložiek (SBF) na základe in vitro simulácie podmienok in vivo (ISO 23317:2014). Bola študovaná schopnosť materiálu indukovať a vytvárať hydroxyapatit (HA) na svojom povrchu (technikami SEM-EDX, XRD a FTIR).

Publikácie:
KITYK, Anna** - PROTSENKO, V. - DANILOV, F.I. - BOBROVA, Lina - HNATKO, Miroslav - PAVLÍK, Viliam - ŠOLTÝS, Ján - LABUDOVÁ, Martina - RUSKOVÁ, Magdaléna - PANGALLO, Domenico. Design of Ti-6Al-4V alloy surface properties by galvanostatic electrochemical treatment in a deep eutectic solvent Ethaline. In Surface & Coatings Technology, 2022, vol. 429, art. no. 127936. (2021: 4.865 - IF, Q2 - JCR, 0.922 - SJR, Q1 - SJR). ISSN 0257-8972. Dostupné na: https://doi.org/10.1016/j.surfcoat.2021.127936 (ITMS2014+: 313021T081: Vybudovanie Centra pre využitie pokročilých materiálov Slovenskej akadémie vied) Typ: ADCA

17.) Nové vysoko-entropické keramické materiály pre pokročilé aplikácie *(New High - Entropy Ceramics for Advanced Applications)*

Zodpovedný riešiteľ:	Pavol Hvizdoš
Zodpovedný riešiteľ v organizácii SAV:	Pavol Šajgalík
Trvanie projektu:	1.7.2020 / 30.6.2024
Evidenčné číslo projektu:	APPV-19-0497
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Ústav materiálového výskumu SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 18500 €

Dosiahnuté výsledky:
Cieľom bolo pripraviť tzv. duálny vysokoentropický materiál, ktorý pozostáva z 60% vysokoentropického karbidu (Hf-Zr-Ta-Nb-Ti)C a 40% vysokoentropického boridu (Hf-Zr-Ta-Nb-Ti)B2. Tento materiál bol pripravený boro/karbotermickou redukciou zmesi oxidov jednotlivých prechodných kovov. Bol študovaný vplyv podmienok redukcie na čistotu, fázové zloženie a mriežkové parametre výslednej kryštálovej štruktúry. Následne sa študoval vplyv podmienok spekania s cieľom získať plne hutný materiál. V nasledujúcej etape riešenia projektu budú hodnotené mechanické vlastnosti tohto materiálu.

Publikácie:
KOMBAMUTHU, Vasanthakumar - HOSSEINI, Naser - ÜNSAL, Hakan - ZHUKOVA, Inga - TATARKOVÁ, Monika - KOVALČÍKOVÁ, Alexandra - DLOUHÝ, Ivo - DUSZA, Ján - TATARKO, Peter. Effect of SiC particulates/whiskers reinforcements on properties of spark plasma sintered high entropy borides (Ti0.2Zr0.2Hf0.2Nb0.2Ta0.2)B2 synthesized using boro/carbothermal reduction. In Ceramics in Europe 2022 : Abstract book. Kraków, 10.-14.7.2022. - B.V., 2022, p. 525. ISBN 978-83-942760-9-6. (Ceramics in Europe 2022) Typ: AFG

KOVALČÍKOVÁ, Alexandra - IVOR, Michal - TATARKO, Peter - ÜNSAL, Hakan - SEDLÁK, Richard - MEDVEĎ, Dávid - DUSZOVÁ, Annamária - BACZEK, Elżbieta - PODSIADLO, Marcin - DUSZA, Ján. Oxidation behaviour and thermal shock resistance of ceramic composites based on carbides and borides. In 15th international ceramics congress : CIMTEC 2022. Perugia, 20.-24.6.2022. - B.V., 2022, p. 6/11. (VEGA 2/0118/20: Vysokoteplotné vlastnosti boridových MeB2 (Me=Ti, Zr, Hf) keramických kompozitných materiálov. International ceramics congress: CIMTEC 2022)

18.) Bentonit: strategická surovina Slovenska - inovatívne hodnotenie zdrojov a ich kvality pre jej efektívne využívanie *(Bentonite: Slovak strategic raw material - Innovative assessment of bentonite quality and origin for its efficient use)*

Zodpovedný riešiteľ:	Jana Madejová
Trvanie projektu:	1.1.2021 / 30.6.2025
Evidenčné číslo projektu:	APVV-20-0175
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Univerzita Komenského v Bratislave
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 8000 €

Dosiahnuté výsledky:

V roku 2022 prebiehala charakterizácia vzoriek odobratých zo slovenských ložísk bentonitov. Pre stanovenie katiónovej výmennej kapacity (KVK) bentonitov sa využila metóda Cu-trien, ktorá je založená na výmene farebného komplexu Cu(II)-trietyléntetramín za vymeniteľné katióny, kompenzujúce záporný náboj vrstiev montmorillonitu (Mt). Následne bol v supernatante metódou UV-Vis spektroskopie meraný nadbytok komplexu Cu-trien a vypočítaná hodnota KVK. Analyzovaných bolo 30 vzoriek, predovšetkým z ložiska Lutila, ale aj iných ložísk ako Kopernica, Jelšový potok a podobne. Výsledné hodnoty KVK boli porovnané s obsahom montmorillonitu (Mt) vo vzorkách. Na základe KVK sa vzorky rozdelili do dvoch skupín. 1) Vzorky s KVK v rozmedzí 95 – 125 cmol (+) / kg, ide o vzorky s obsahom Mt v rozmedzí 65 – 80 hm.%. 2) Vzorky s KVK v rozmedzí 27 - 57 cmol (+) / kg obsahovali len 20 až 35 hm.% Mt a ako hlavnú fázu mali opál-C alebo opál-CT.

IČ spektroskopia sa využila najmä na získanie informácií o minerálnom zložení bentonitov. Porovnávali sa spektrá hrobozrnnej (<0.25 mm) a jemnozrnnej (<0.25?m) frakcie z lokalít Bartošová lehôtka (BL), Stará Kremnička (STK), Lutila (LUI), Jelšový potok (JP) a Kopernica (KOP). Vo vzorke BL bol popri Mt identifikovaný aj kaolinit a cristobalit. Po seprácii nebol pozorovaný rozdiel medzi spektrami. Vo vzorkách z lokality STK bol popri Mt pozorovaný aj kaolinit, množstvo ktorého v jemnozrnnej frakcii stúplo. Vzorky obsahovali aj cristobalit, v hrubozrnnej frakcii ho bolo viac ako v jemnozrnnej. Vo vzorkách z lokalít JP a KOP dominoval Mt a malé množstvo kaolinitu. Vo vzorkách bolo prítomné aj amorfné SiO2, ktorého množstvo sa po separácii znížilo.

19.) Bionanokompozitné materiály na báze vrstevnatých silikátov *(Bionanocomposites based on organic polycations and layered silicates)*

Zodpovedný riešiteľ:	Jana Madejová
Trvanie projektu:	1.7.2020 / 30.6.2024
Evidenčné číslo projektu:	APVV-19-0487
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 32300 €

Dosiahnuté výsledky:

V roku 2022 sa dokončili experimentálne práce a DTF výpočty série organoílov z Na-Mt Kunipia a neiónového polyméru poly(2-metyl-2-oxazolín) a katiónového polyméru poly(etylénimínu). Po spracovaní výsledkov sa pripravila publikácia „Madejová et al.: Advanced materials based on montmorillonite modified with poly(ethylenimine) and poly(2-methyl-2-oxazoline): Experimental and DFT study", ktorá bola prijatá do časopisu Colloids and Surfaces A: Physicochemical and Engineering Aspects a bude publikovaná v januári 2023. Pripravili sa nové série vzoriek smektitov modifikovaných poly(etyl-oxazolínom) a poly(propyl-oxazolínom), ich charakterizácia je naplánovaná na rok 2023. Pokračoval aj výskum zameraný na kompozitné materiály pripravené zo smektitov modifikovaných alkylamóniovými a alkyfosfóniovými katiónmi a flourescečnými farbivami.

PRIBUS, Marek** - BUDZÁK, Šimon - PRIBUSOVÁ SLUŠNÁ, Lenka - ŠIMONOVÁ, Tímea - JANKOVIČ, Ľuboš - MÉSZÁROS, R. - BUJDÁK, Juraj. Luminescence of Reichardt´s dye in polyelectrolyte-modified saponite colloids. In Colloids and Surfaces A: Physicochemical and Engineering Aspects, 2022, vol. 642, p. 128663-1-128663-10. (2021: 5.518 - IF, Q2 - JCR, 0.758 - SJR, Q2 - SJR).
BOHÁČ, Peter** - BUDZÁK, Šimon - PLANETOVÁ, Viktória - KLEMENT, Róbert - BUJDÁK, Juraj. Adsorption-

induced fluorescence of pseudoisocyanine monomers in systems with layered silicates. In Journal of Physical Chemistry C, 2022, vol. 126, no. 40, p. 17255-17265. (2021: 4.177 - IF, Q2 - JCR, 1.103 - SJR, Q1 - SJR, karentované - CCC).

Konferencie:
MADEJOVÁ, Jana - BARLOG, Martin - SLANÝ, Michal - JANKOVIČ, Ľuboš. Characterization of montmorillonite modified with polyoxazoline. In MECC ´20/22. 10th Jubilee Mid-European Clay Conference, Kliczków, Poland, September 11-15, 2022: Book of abstracts. - Kraków, Poland, 2022, p. 62. ISBN 978-83-65955-60-9. Type: AFG
MADEJOVÁ, Jana** - BARLOG, Martin - JANKOVIČ, Ľuboš - SLANÝ, Michal - PÁLKOVÁ, Helena. Comparative study of alkylammonium- and alkylphosphonium-based analogues of organo-montmorillonites. In AIPEA - XVII International Clay Conference - ICC 2022, 25-29 July 2022, Istanbul, Turkey: Scientific Research Abstracts. Turkey, 2022, p. 164

20.) Vývoj nástrojov pre pokročilú analýzu a predikciu parametrov spektier EPR, NMR a pNMR komplexných systémov obsahujúcich ťažké prvky *(Development of tools for advanced analysis and prediction of parameters of EPR, NMR and pNMR spectra of complex systems containing heavy elements)*

Zodpovedný riešiteľ:	Oľga Malkin
Trvanie projektu:	1.7.2020 / 30.6.2024
Evidenčné číslo projektu:	APVV-19-0516
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 37500 €

Dosiahnuté výsledky:
KONEČNÝ, Lukáš** - VÍCHA, Jan - KOMOROVSKÝ, Stanislav - RUUD, Kenneth - REPISKÝ, Michal**. Accurate X-ray absorption spectra near L- and M-edges from relativistic four-component damped response time-dependent density functional theory. In Inorganic Chemistry, 2022, vol. 61, no. 2, p. 830-846. (2021: 5.436 - IF, Q1 - JCR, 1.121 - SJR, Q1 - SJR). ISSN 0020-1669. Dostupné na: https://doi.org/10.1021/acs.inorgchem.1c02412 Typ: ADCA

CUYACOT, Ben Joseph R. - NOVOTNÝ, Jan - BERGER, Raphael J. F. - KOMOROVSKÝ, Stanislav** - MAREK, Radek**. Relativistic spin-orbit electronegativity and the chemical bond between a heavy atom and a light atom. In Chemistry -A European Journal, 2022, vol. 28, no. 24, art. no. e202200277. (2021: 5.020 - IF, Q2 - JCR, 1.343 - SJR, Q1 - SJR). ISSN 0947-6539. Dostupné na: https://doi.org/10.1002/chem.202200277 Typ: ADCA

MIŠENKOVÁ, Debora - LEMKEN, Florian - REPISKÝ, Michal - NOGA, Jozef - MALKINA, Oľga - KOMOROVSKÝ, Stanislav**. The four-component DFT method for the calculation of the EPR g-tensor using a restricted magnetically balanced basis and London atomic orbitals. In Journal of Chemical Physics, 2022, vol. 157, no. 16, art. no. 164114. (2021: 4.304 - IF, Q1 - JCR, 1.103 - SJR, Q1 - SJR). ISSN 0021-9606. Dostupné na: https://doi.org/10.1063/5.0103928 Typ: ADCA

MALKINA, Oľga** - LEMKEN, Florian - ASHER, James Richard - HIERSO, Jean-Cyrille - BÜHL, Michael - MALKIN, Vladimír**. Transmission of spin-polarization by pi-orbitals: an approach to assessing its effect on NMR spin-spin coupling and EPR hyperfine structure. In Physical Chemistry Chemical Physics, 2022, vol. 24, no. 32, p. 24039-24049. (2021: 3.945 - IF, Q1 - JCR, 0.899 - SJR, Q1 - SJR). ISSN 1463-9076. Dostupné na: https://doi.org/10.1039/d2cp03295c Typ: ADCA

MALKINA, Oľga** - HIERSO, Jean-Cyrille** - MALKIN, Vladimír. Distinguishing "through-space" from "through-bonds" contribution in indirect nuclear spin-spin coupling: General approaches applied to complex JPP and JPSe scalar couplings. In Journal of the American Chemical Society, 2022, vol. 144, no. 24, p.

10768-10784. (2021: 16.383 - IF, Q1 - JCR, 5.728 - SJR, Q1 - SJR). ISSN 0002-7863. Dostupné na: https://doi.org/10.1021/jacs.2c01637 Typ: ADCA

HRICOVÍNI, Michal – ASHER, James Richard – HRICOVÍNI, Miloš**. A study of the photochemical behaviour and relaxation mechanisms of anti-syn isomerisation around quinazolinone -N-N=bonds. In RSC Advances, 2022, vol. 12, no. 42, p. 27442-27452. (2021: 4.036 – IF, Q2 – JCR, 0.667 – SJR, Q1 – SJR). ISSN 2046-2069. Dostupné na: https://doi.org/10.1039/d2ra04529j Typ: ADCA

21.) Povrchy polymérov modifikované vrstevnatými nanočasticami a fotoaktívnymi farbivami *(Polymer surfaces modified with layered nanoparticles and photoactive dyes)*

Zodpovedný riešiteľ:	Helena Pálková
Trvanie projektu:	1.7.2019 / 30.6.2023
Evidenčné číslo projektu:	APVV-18-0075
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 24000 €

Dosiahnuté výsledky:

Výskum prebiehal dvomi hlavnými smermi: Jedným bola optimalizácia vlastností prekurzorov v podobe hybridných koloidov farbív a silikátov. Našli sa nové systémy, v ktorých došlo k významnému zvýšeniu fotoaktivity adsorbovaných farbív. Ďalším smerom bolo rozpracovanie metód prípravy kompozitov s fotoaktívnym povrchom a fotodezinfekčnými vlastnosťami. Výsledky viedli k vzniku niekoľkých publikácií, boli súčasťou dvoch pozvaných prednášok a viacerých výstupov na konferenciách.

SKOURA, Eva - BOHÁČ, Peter - BARLOG, Martin - PÁLKOVÁ, Helena - DANKO, Martin - ŠURKA, Juraj - MAUTNER, Andreas - BUJDÁK, Juraj**. Modified polymer surfaces: Thin films of silicate composites via polycaprolactone melt fusion. In International Journal of Molecular Sciences, 2022, vol. 23, art. no. 9166, [16] p. (2021: 6.208 - IF, Q1 - JCR, 1.176 - SJR, Q1 - SJR, karentované - CCC).
BOHÁČ, Peter** - BUDZÁK, Šimon - PLANETOVÁ, Viktória - KLEMENT, Róbert - BUJDÁK, Juraj. Adsorption-induced fluorescence of pseudoisocyanine monomers in systems with layered silicates. In Journal of Physical Chemistry C, 2022, vol. 126, no. 40, p. 17255-17265. (2021: 4.177 - IF, Q2 - JCR, 1.103 - SJR, Q1 - SJR, karentované - CCC).
PRIBUS, Marek** - BUDZÁK, Šimon - PRIBUSOVÁ SLUŠNÁ, Lenka - ŠIMONOVÁ, Tímea - JANKOVIČ, Ľuboš - MÉSZÁROS, R. - BUJDÁK, Juraj. Luminescence of Reichardt´s dye in polyelectrolyte-modified saponite colloids. In Colloids and Surfaces A: Physicochemical and Engineering Aspects, 2022, vol. 642, p. 128663-1-128663-10. (2021: 5.518 - IF, Q2 - JCR, 0.758 - SJR, Q2 - SJR).

22.) Smerom k nanotechnológiám využívajúcim bioaktívne častice/molekuly v boji proti mikrobiálnym biofilmom *(Towards nanotechnologies using bioactive particles/molecules in the fight against microbial biofilms)*

Zodpovedný riešiteľ:	Helena Pálková
Trvanie projektu:	1.7.2022 / 30.6.2026
Evidenčné číslo projektu:	APVV-21-0302
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Prírodovedecká fakulta UK
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 5000 €

Dosiahnuté výsledky:
Zo strany nášho ústavu sa rozpracovávali postupy a stratégie príprav hybridných systémov tvoriacich základ prípravy komplexných materiálov s antimikrobiálnymi vlastnosťami. Hlavné zameranie bolo na koloidné systémy fotosenzibilizátorov a vrstevnatých silikátov.

23.) Pokročilé materiály s eutektickou mikroštruktúrou pre vysokoteplotné funkčné aplikácie
(Advanced materials with eutectic microstructure for high temperature and functional applications)

Zodpovedný riešiteľ:	Anna Prnová
Trvanie projektu:	1.7.2020 / 30.6.2024
Evidenčné číslo projektu:	APVV-19-0010
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Trenčianska univerzita Alexandra Dubčeka v Trenčíne
Počet spoluriešiteľských inštitúcií:	1 - Slovensko: 1
Čerpané financie:	APVV: 18709 €

Dosiahnuté výsledky:
Boli pripravené materiály s eutektickou mikroštruktúrou a zaujímavými mechanickými vlastnosťami v systémoch Al2O3-Y2O3 a Al2O3-Y2O3-ZrO2 Hv=17,3GPa a KIC=4.33 MPa.m1/2, vyvinula sa metodika mletia prekurzorovych praskov pred spekaním, čím sa vylepšila homogenita keramických materiálov a získali sa materiály s vyšším stupňom zhutnenia a nižšou pórovitosťou. Ďalšie vylepšenia sa týkali odstraňovania uhlíkových zvyškov z práškov po sol-gel metóde, čo tiež prispelo k zníženiu počtu defektov vo výsledných keramických materiáloch. Priparavili sa systémy s eutektickým zložením a s YbAG zložením v systéme Al2O3-Yb2O3, dopované Er a u týchto materiálov boli získané zaujímavé PL vlastnosti. Ďalej bolo skúmané teplotné správanie a kinetika kryštalizácie systémov s rôznym obsahom YAG a ?- Al2O3 a vplyv pomeru týchto dvoch fáz na teploty spekania, rýchlosť a mechanizmus kryštalizácie a na výsledné mechanické a vysokoteplotné vlastnosti. Publikácie:
•PRNOVÁ, Anna** – VALÚCHOVÁ, Jana – MICHÁLKOVÁ, Monika – PECUŠOVÁ, Beáta – PARCHOVIANSKÝ, Milan – ŠVANČÁREK, Peter – HANZEL, Ondrej – POUCHLÝ, Václav – GALUSEK, Dušan. Pressure assisted sintering of Al2O3–Y2O3 glass microspheres: sintering conditions, grain size, and mechanical properties of sintered ceramics. In Pure and Applied Chemistry, 2022, vol. 94, no. 2, p. 157-167. (2021: 2.320 – IF, Q3 – JCR, 0.440 – SJR, Q2 – SJR). ISSN 0033-4545. Dostupné na: https://doi.org/10.1515/pac-2021-0705 Typ: ADCA
•PRNOVÁ, Anna – VALÚCHOVÁ, Jana – MAJEROVÁ, Melinda – PARCHOVIANSKÝ, Milan – MICHÁLKOVÁ, Monika – GALUSEK, Dušan. Vplyv prídavku ZrO2 na mechanické vlastnosti Al2O3-Y2O3 keramiky. In 24. ročník konference o speciálních anorganických pigmentech a práškových materiálech, Pardubice, 22. září 2022 : Sborník příspěvků. Recenzenti: Pavla Honcová, Petr Bělina, Žaneta Dohnalová, Petra Šulcová. – Pardubice, Czech republic : Univerzita Pardubice, 2022, p. 69-73. ISBN 978-80-7560-419-4. (VEGA č. 2/0028/21 : Ion exchange strengthened aluminosilicate glass/glass-ceramics with additional functionalities. VEGA č. 2/0141/21 : SQUID magnetometry of nano- and microparticles, nanocolloids and nanostructures in new applications in the field of biomedicine and materials research associated with the development of new measurement methods and procedures. Konference o speciálních anorganických pigmentech a práškových materiálech) Typ: AFA
• PRNOVÁ, Anna – VALÚCHOVÁ, Jana – PECUŠOVÁ, Beáta – PLŠKO, Alfonz – GALUSEK, Dušan. Termická analýza skiel v systéme Al2O3-Y2O3-RE2O3 (RE = Er, Nd). In TAS 2022. Termoanalytický seminář, 27. leden 2022, Pardubice, Česká republika : Sborník příspěvků. Recenzenti: Petra Šulcová, Václav Slovák. – Pardubice, Česká republika : Česká společnost chemická, z.s., 2022, p. 44-49. ISBN 978-80-88307-09-9. Typ: AFC
• PRNOVÁ, Anna – MICHALÍK, Jakub – PECUŠOVÁ, Beáta – KLEMENT, Róbert – VALÚCHOVÁ, Jana – GALUSEK, Dušan. Study of thermal and PL properties of Er3+ doped aluminate glasses, impact of crystallinity on PL properties. In Czech Chemical Society Symposium Series, 2022, roč. 20, č. 4, s. 270. ISSN 2336-7202. Typ: AFG
• VALÚCHOVÁ, Jana – PRNOVÁ, Anna – PARCHOVIANSKÝ, Milan – GALUSEK, Dušan. Použitie kombinácie DSC termickej analýzy a vysokoteplotnej RTG práškovej difrakčnej analýzy pri skúmaní teplotného správania sa sklených mikroguľôčok v systéme Al2O3-Y2O3-ZrO2. In 24. ročník konference o speciálních anorganických pigmentech a práškových materiálech, Pardubice, 22. září 2022 : Sborník příspěvků. Recenzenti: Pavla Honcová, Petr Bělina, Žaneta Dohnalová, Petra Šulcová. – Pardubice, Czech republic: Univerzita Pardubice, 2022, p. 80-85. ISBN 978-80-7560-419-4. Typ: AFC
• VALÚCHOVÁ, Jana** – PRNOVÁ, Anna – PECUŠOVÁ, Beáta – PARCHOVIANSKÝ, Milan – MICHÁLKOVÁ, Monika – KLEMENT, Róbert – GALUSEK, Dušan. The influence of ZrO2 addition on thermal behavior and mechanical properties of Al2O3-Y2O3-ZrO2 ceramics. In PNCS16 – Canterbury 2022. 16th International Conference on the Physics of Non-Crystalline Solids, University of Kent, Canterbury, 10-15 July 2022 : Programme and abstracts. – Canterbury, UK : Society of Glass Technology, 2022, p. Typ: GII

24.) Vývoj nových keramických materiálov komplexného zloženia pre extrémne aplikácie *(Development of new compositionally-complex ceramics for extreme applications)*

Zodpovedný riešiteľ:	Peter Tatarko
Trvanie projektu:	1.7.2022 / 30.6.2026
Evidenčné číslo projektu:	APVV-21-0402
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 24306 €

Dosiahnuté výsledky:

Počiatočná etapa projektu bola zameraná na teoretické výpočty a predikcie štruktúr vysokoentropických boridov, pozostávajúcich z 5-tich prechodných kovov. Cieľom výpočtov bolo navrhnúť nový typ štruktúr pozostávajúcich z rôznych molárnych pomerov jednotlivých prechodných kovov (Hf, Zr, Ta, Nb, Ti). Teoretické výsledky boli potom porovnané s výsledkami pre ekvimolárny systém. Na základe teoretických výpočtov boli zvolené 3 systémy s rôznym pomerom jednotlivých kovov, ktoré budú pripravené boro/karbo-termickou redukciou oxidov prechodných kovov.

Publikácie:

ZHUKOVA, Inga - KOMBAMUTHU, Vasanthakumar - TATARKOVÁ, Monika - ZAGORAC, Dejan - KOVALČÍKOVÁ, Alexandra - DLOUHÝ, Ivo - MATOVIČ, Branko - TATARKO, Peter. Theoretical predictions and synthesis of high-entropy diboride systems with different molar ratios of transition metals. In Workshop Processing and properties of advanced ceramics and glasses, Mojmírovce, September 28-30, 2022, Slovak Republic: Proceedings. Ed. Jana Valúchová; recenzenti: Miroslav Hnatko, Ľuboš Bača, Marián Janek, Alexandra Kovalčíková, Zdeněk Chlup, Peter Tatarko. Bratislava, Slovak Republic: Institute of Inorganic Chemistry SAS, 2022, p. 86-91. ISBN 978-80-973578-1-8. (Processing and properties of advanced ceramics and glasses) Typ: AFD

25.) Vývoj žiaruvzdorných pyrochlórnych fáz pre vysokoteplotné aplikácie neoxidovej keramiky *(Development of refractory pyrochlore phases for high temperature applications of non-oxide ceramics)*

Zodpovedný riešiteľ:	Peter Tatarko
Trvanie projektu:	1.8.2018 / 30.6.2022
Evidenčné číslo projektu:	APVV-17-0328
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 20526 €

Dosiahnuté výsledky:

V súlade s harmonogramom projektu bola záverečná fáza zameraná na podrobnú analýzu a štúdium mikroštruktúry, chemického a fázového zloženia oxidačnej/ablátovanej vrstvy materiálov na báze ZrB2–25vol.% SiC. Za najdôležitejší výsledok a zároveň aj výstup celého projektu možno považovať získanie nových vedeckých poznatkov v zmysle pochopenia vplyvu prísad na báze vzácnych zemín na mechanické vlastnosti a hlavne oxidačnú/ablačnú odolnosť materiálov ZrB2-SiC. Bol jasne pochopený a vysvetlený rozdiel medzi vplyvom prísady vo forme oxidov (Yb2O3) a zirkoničitanov (Yb2Zr2O7) na odpovedajúce vysokoteplotné vlastnosti materiálov. Prítomnosť prvku vzácnej zeminy (Yb) stabilizovala vysokoteplotnú modifikáciu oxidačnej vrstvy ZrO2 (t-ZrO2), čo malo vplyv na výrazné zvýšenie odolnosti proti oxidácii/ablácii.

Súčasne sa študovalo využitie prvkov vzácnych zemín na zlepšenie vlastnosti materiálov SiC, ako aj na spájanie kompozitných materiálov Cf/SiC.

Publikácie:
YU, Teng - XU, Jie - ZHOU, Xiaobing - TATARKO, Peter - LI, Yang - HUANG, Zhengren - HUANG, Qing. Near-seamless joining of Cf/SiC composites using Y3Si2C2 via electric field-assisted sintering technique. In Journal of Advanced Ceramics, 2022, vol. 11, no. 8, p. 1196–1207. (2021: 11.534 - IF, Q1 - JCR, 1.558 - SJR, Q1 - SJR). ISSN 2226-4108. Dostupné na: https://doi.org/10.1007/s40145-022-0593-3 Typ: ADCA

XU, Jie - ZHOU, Xiaobing - ZOU, Shunrui - CHEN, Lu - TATARKO, Peter - DAI, Jian-Qing - HUANG, Zhengren - HUANG, Qing. Low-temperature Pr3Si2C2-assisted liquid-phase sintering of SiC with improved thermal conductivity. In Journal of the American Ceramic Society, 2022, vol. 105, no. 9, p. 5576-5584. (2021: 4.186 - IF, Q1 - JCR, 0.779 - SJR, Q1 - SJR, karentované - CCC). (2022 - Current Contents, WOS, SCOPUS). ISSN 0002-7820. Dostupné na: https://doi.org/10.1111/jace.18520 Typ: ADCA

ÜNSAL, Hakan - KOVALČÍKOVÁ, Alexandra - HIČÁK, Michal - CHLUP, Zdeněk - DLOUHÝ, Ivo - TATARKO, Peter. Ablation resistance of ZrB2-SiC composites prepared by reaction sintering of ZrSi2, B4C, C, and rare-earth based additives. In KERAMIK/CERAMICS 2022, 97. DKG Annual Meeting, virtual conference, 07.-09.03.2022 : Abstracts. - Köln, Germany : Deutsche Keramische Gesellschaft e.V., 2022, p. 138. (KERAMIK/CERAMICS 2022. DKG Annual Meeting) Typ: GII

ÜNSAL, Hakan - KOVALČÍKOVÁ, Alexandra - HIČÁK, Michal - CHLUP, Zdeněk - DLOUHÝ, Ivo - TATARKO, Peter. Ablation behavior of rare-earth modified ZrB2-SiC composites prepared by reaction sintering of ZrSi2, B4C and C. In Ceramics in Europe 2022 : Abstract book. Kraków, 10.-14.7.2022. - B.V., 2022, p. 568. ISBN 978-83-942760-9-6. (Ceramics in Europe 2022) Typ: AFG

TATARKO, Peter - ÜNSAL, Hakan - MATOVIC, Branko - CHLUP, Zdeněk - TATARKOVÁ, Monika - KOVALČÍKOVÁ, Alexandra - HIČÁK, Michal - DLOUHÝ, Ivo - ŠAJGALÍK, Pavol. The effect of rare-earth based additives on the ablation resistance of ZrB2-SiC composites. In ISC´22. 2nd International Symposium on Characterization, 22-25 September 2022, Afyonkarahisar, Turkey : Abstract Book. - Turkey : Evcin ArGe, 2022, p. 178. (ISC´22 International Symposium on Characterization) Typ: GII

TATARKO, Peter - ÜNSAL, Hakan - KOVALČÍKOVÁ, Alexandra - MATOVIC, Branko - CHLUP, Zdeněk - TATARKOVÁ, Monika - HIČÁK, Michal - DLOUHÝ, Ivo. Ultra-high temperature ceramics with improved ablation resistance. In IMEC 2022. 1st International Conference on Innovative Materials in Extreme Conditions, 22-23 March 2022, Belgrade, Serbia : Program and Book of Abstracts. - Belgrade, Serbia : Vinča Institute of Nuclear Sciences - National Institute of the Republic of Serbia, University of Belgrade and Serbian Society for Innovative Materials in Extreme Conditions, 2022, p. 18. (IMEC 2022. International Conference on Innovative Materials in Extreme Conditions) Typ: GII

KOVÁČOVÁ, Zuzana - OROVČÍK, Ľubomír - BAČA, Ľuboš - TATARKO, Peter - DOBROČKA, Edmund - KITZMANTEL, M. - NEUBAUER, Erich. Oxidation performance of ZrB2-SiC composites tested above 2000 °C and effect of Y-containing additives. In Ceramics in Europe 2022 : Abstract book. Kraków, 10.-14.7.2022. - B.V., 2022, p. 526. ISBN 978-83-942760-9-6. (Ceramics in Europe 2022) Typ: AFG

26.) Vývoj bioaktívneho nitridu kremičitého modifikáciou povrchovej vrstvy *(Development of the bioactive silicon nitride by surface modification)*

Zodpovedný riešiteľ:	Monika Tatarková
Trvanie projektu:	1.7.2019 / 31.12.2022
Evidenčné číslo projektu:	APPV-18-0542
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 57450 €

Dosiahnuté výsledky:
Povrch hutných materiálov na báze nitridu kremičitého spekaných s rôznymi bioaktívnymi prísadami bol oplyvnený

rôznymi technikami s cieľom zistiť vplyv povrchovej modifikácie na viabilitu buniek. Bola definovaná technika, ktorou sa podarilo z pôvodne inertného povrchu nitridu kremičitého vytvoriť bioaktívny povrch. Taktiež bola overená cytotoxicita pripravených materiálov a boli vybrané materiály, ktoré sú pre ľudský organizmus bezpečné. Na vybraných materiáloch boli uskutočnémé mechanické skúšky, ktoré potvrdili, že mechanické vlastnosti pripravených bioaktívnych Si3N4 materiálov sú porovnateľné s vlastnosťami inertného komerčne pripraveného nitridu kremičitého.

Publikácie:
HIČÁK, Michal - MEDVECKÝ, Ľubomír - HNATKO, Miroslav - ŠTULAJTEROVÁ, Radoslava - GIRETOVÁ, Mária - TATARKOVÁ, Monika - LENČÉŠ, Zoltán - ŠAJGALÍK, Pavol. Porous silicon nitride-based drug delivery carrier. In International Journal of Applied Ceramic Technology, 2022, vol. 19, no. 2, p. 882-892. (2021: 2.328 - IF, Q2 - JCR, 0.388 - SJR, Q2 - SJR). ISSN 1546-542X. Dostupné na: https://doi.org/10.1111/ijac.13908 Typ: ADCA

DE LA TORRE OLVERA, Guido - HIČÁK, Michal - HNATKO, Miroslav - TATARKOVÁ, Monika. Effect of oxyacetylene flame to form a porous layer in silicon nitride. In Workshop Processing and properties of advanced ceramics and glasses, Mojmírovce, September 28-30, 2022, Slovak Republic : Proceedings. Ed. Jana Valúchová; recenzenti: Miroslav Hnatko, Ľuboš Bača, Marián Janek, Alexandra Kovalčíková, Zdeněk Chlup, Peter Tatarko. Bratislava, Slovak Republic: Institute of Inorganic Chemistry SAS, 2022, p. 31-36. ISBN 978-80-973578-1-8. Typ: AFD

DE LA TORRE OLVERA, Guido - HIČÁK, Michal - HNATKO, Miroslav - LABUDOVÁ, Martina - TATARKOVÁ, Monika. Modification of the surface layer of silicon nitride using oxyacetylene flame. In Ceramics in Europe 2022 : Abstract book. Kraków, 10.-14.7.2022. - B.V., 2022, p. 454. ISBN 978-83-942760-9-6. Typ: AFG

DE LA TORRE OLVERA, Guido - HIČÁK, Michal - LABUDOVÁ, Martina - HNATKO, Miroslav - TATARKOVÁ, Monika. Development of silicon nitride with bioactive surface using oxyacetylene flame. In ISC´22. 2nd International Symposium on Characterization, 22-25 September 2022, Afyonkarahisar, Turkey: Abstract Book. Turkey: Evcin ArGe, 2022, p. 199. Typ: GII

TATARKOVÁ, Monika - TATARKO, Peter - KOVALČÍKOVÁ, Alexandra - DLOUHÝ, Ivo - DUSZA, Ján - ŠAJGALÍK, Pavol. Boron nitride nanosheets as a reinforcement for silicon nitride. In Ceramics in Europe 2022: Abstract book. Kraków, 10.-14.7.2022. - B.V., 2022, p. 252. ISBN 978-83-942760-9-6. Typ: AFG

Programy: SASPRO

27.) Výskum ternárnych fáz v systémoch M-R-F (kde M – Li-Cs, (NH4); R – Sc, Y, Ln) pre vývoj nových multifunkčných materiálov *(Investigation of the ternary phases in the systems M-R-F (where M – Li-Cs, (NH4); R – Sc, Y, Ln) for the development of new multifunctional materials)*

Zodpovedný riešiteľ:	Miroslav Boča
Trvanie projektu:	1.9.2022 / 31.8.2024
Evidenčné číslo projektu:	1171/01/02
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 1558 €

Dosiahnuté výsledky:
Projekt je zameraný na ternárne fluoridy v systémoch M-R-F (kde M – Li-Cs, (NH4); R – Sc, Y, Ln) s dôrazom na teplotne riadené fázové premeny v tuhom stave a fotoluminiscenčné vlastnosti zlúčenín s ďalším stanovením zákonitostí štruktúrnych premien a zmien vlastností, v závislosti od obsahu M a R. Hlavnou výzvou takéhoto druhu výskumu je, že je ťažké predpovedať, ktorá zlúčenina je schopná takýchto transformácií, kým sa nezískajú všetky experimentálne údaje. Bola uskutočnená syntéza zlúčenín NaRF4 (R = La, Nd, Sm, Gd) z roztokov a reakcií v tuhom stave s ďalšou fázovou, štruktúrnou a termaľnou analýzou získaných vzoriek. Počas výskumného pobytu v Inštitúte Maxa Plancka pre chemickú fyziku pevných látok (Drážďany, Nemecko) bola vykonaná štrukturálna analýza aj pre iné vzorky fluorolantanoidov, napr. LiGdF4, zlúčeniny systémov {Na,Rb,(NH4)}-Sc-F.

28.) Umelé fotosyntetické systémy založené na fotoaktívnych molekulách a kvantových bodoch *(Artificial photosynthetic systems based on photoactive molecules and quantum dots)*

Zodpovedný riešiteľ:	Juraj Bujdák
Trvanie projektu:	1.9.2022 / 31.8.2025
Evidenčné číslo projektu:	1258/02/02
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 4327 €

Dosiahnuté výsledky:
Cieľom projektu SASPRO2 1258/02/02 je príprava umelého fotosyntetického systému schopného vo vodnom prostredí a pri správne nastavených podmienkach generovať reaktívne druhy kyslíka, alebo rozkladať vodu za účelom produkcie H2. V počiatočnom kroku je naplánovaná syntéza nových fotoaktívnych látok a následná optimalizácia prípravy monovrstiev fotoaktívnych molekúl enkapsulovaných medzi dvoma vrstvami syntetického hektoritu. V rámci optimalizácie sa testuje kompozícia binárnych rozpúšťadiel a ich vplyv na priebeh iónovej výmeny medzi fotoaktívnymi molekulami a sodnými katiónmi nachádzajúcich sa v medzivrství hektoritu.

Programy: Štrukturálne fondy EÚ Výskum a inovácie

29.) Vybudovanie centra pre využitie pokročilých materiálov SAV *(Building a centre for advanced material application SAS)*

Zodpovedný riešiteľ:	Miroslav Hnatko
Zodpovedný riešiteľ v organizácii SAV:	Miroslav Hnatko
Trvanie projektu:	1.7.2019 / 30.6.2023
Evidenčné číslo projektu:	NFP313020T081
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Centrum pre využitie pokročilých materiálov SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	6 - Slovensko: 6
Čerpané financie:	MŠ: 42516 €

Dosiahnuté výsledky:

Programy: DoktoGranty

30.) Photoactive Surfaces of Polymer Nanocomposites with Antimicrobial Properties *(Photoactive Surfaces of Polymer Nanocomposites with Antimicrobial Properties)*

Zodpovedný riešiteľ:	Eva Skoura
Trvanie projektu:	1.1.2022 / 31.12.2022
Evidenčné číslo projektu:	APP0331
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských	0

inštitúcií:	
Čerpané financie:	SAV: 2000 €

Dosiahnuté výsledky:

Vypracovala sa metóda modifikácie povrchu polyméru v podobe tenkého filmu nanokompozit s vrstevnatým silikátom. Princípom je difúzia roztaveného polyméru do mikrometrovej vrstvy organoílu. Pripravili sa materiály kompozitu funkcionalizovaného metylénovou modrou. Výsledky sú súčasťou publikácie, tvoria významnú časť výsledkov doktorandského štúdia a sú dôležité v pokračujúcom výskume. Jedným z výstupov je začiatok úspešnej spolupráce s pracoviskom na Univerzite vo Viedni.

Programy: Európsky fond regionálneho rozvoja (EFRR)

31.) Rozvoj a podpora výskumno – vývojových aktivít Centra pre testovanie kvality a diagnostiku materiálov v oblastiach špecializácie RIS3 SK (ITMS2014+: 313011W442) *(Rozvoj a podpora výskumno – vývojových aktivít Centra pre testovanie kvality a diagnostiku materiálov v oblastiach špecializácie RIS3 SK)*

Zodpovedný riešiteľ:	Dušan Galusek
Trvanie projektu:	1.1.2019 / 30.6.2023
Evidenčné číslo projektu:	ITMS2014+ 313011W442
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Trenčianska univerzita Alexandra Dubčeka v Trenčíne
Počet spoluriešiteľských inštitúcií:	4 - Slovensko: 4
Čerpané financie:	ŠF: 38621 €

Dosiahnuté výsledky:

Spekanie v kvapalnej fáze sa po prvýkrát využilo na výrobu vysoko hutnej Y2O3 keramiky pre optické aplikácie. Študovanli sa účinky prídavku Al2O3 a Si02, do 1 % hm., ako prísad na podporu spekania, na spekanie nanopráškov Y2O3. Optimalizácia koncentrácie aditíva a režimu spekania umožnila výrobu vysoko hutného translucentného Y2O3 pri teplote spekania o 100-200°C nižšej v porovnaní s komerčnými výrobnými procesmi. Pripravené materiály vykazovali jemnozrnnú mikroštruktúru.

Y2O3 keramika s vysokou hustotou sa tiež pripravila pridaním oxidov prechodných kovov ako prísad na podporu spekania metódou SPS. Dopovanie aj malým množstvom dvojmocných prechodných kovov výrazne podporuje zhutňovanie Y2O3; v dôsledku závislosti chémie defektov na rozpustnosti prvkov prechodných kovov si ich vplyv na Y2O3 vyžaduje ďalšie štúdium. Ióny prechodných kovov pôsobia ako opticky aktívne prvky v štruktúre Y2O3 a sú použiteľné pri modifikácii optických vlastností Y2O3.

Ďalšia aktivita projektu sa zamerala na výrobu vrstevnatých materiálov žiarovým lisovaním pások 8Y-FSZ, 10Y-FSZ a MgAl2O4 pripravených metódou tape casting; vrsetvanté kompozity sa zhutňovali metódou SPS, aby sa získali transparentné/translucentné materiály. Rozdiel v koeficiente teplotnej rozťažnosti vrstiev má za následok vznik striedavých tlakových a ťahových zvyškových napätí. Mechanické vlastnosti keramického laminátu, najmä odolnosť voči tvorbe trhlín, sa zlepšujú vytváraním povrchového tlakového napätia v štruktúrach 8Y-FSZ/MgAl2O4.

1. Aliasghar Najafzadehkhoee, Ali Talimian, Jaroslav Sedláček, Maksym Lisnichuk, Pavol Hvizdoš, Dušan Galusek, Translucent yttrium oxide ceramics from low-density green bodies shaped by uniaxial pressing, https://doi.org/10.1016/j.jeurceramsoc.2022.04.036.
2. Aliasghar Najafzadehkhoee, Ali Talimian, Václav Pouchlý, Ángela Gallardo-López, Rosalia Poyato Galan, Robert Klement, Karel Maca, Felipe Gutiérrez-Mora, Dušan Galusek, Densification behaviour and optical properties of nano-Y2O3 ceramics doped with bivalent transition metals, Ceramics in Europe 2022, Krakow, PL, 10-14.7.2022, ISBN 978-83-942760-9-6.
3. Aliasghar Najafzadehkhoee, Ali Talimian, Vladimir Girman, Tomáš Spusta, Pavol Hvizdoš, Karel Maca, Dušan Galusek, Liquid Phase Sintering of Yttrium Oxide, FunGlass School 2022/1, Čertov, June 1- 3, ISBN 978-80-8075-976-6.
4. Ali Talimian, Dušan Galusek, Aliasghar Najafzadehkhoee, Vaclav Pouchly, Karel Maca, Improving Mechanical Properties of Laminated Transparent Ceramics by Engineering Residual Stress Profiles, CIMTEC 2022, 25-29.6.2022, Perugia, ITA, http://2022.cimtec-congress.org/abstracts/15th-international-ceramics-congress.

Príloha C - Publikačná činnosť organizácie (*generovaná z ARL*)

ACB Vysokoškolské učebnice vydané v domácich vydavateľstvách

ACB01 JAKUBČINOVÁ, Jana - FESZTEROVÁ, Melánia - SILLIKOVÁ, Veronika. Organická chémia v otázkach a úlohách. Recenzenti: Malgorzata Kowalska, Pavel Bobáľ. 1. vyd. Nitra, Slovenská republika : Univerzita Konštantína Filozofa v Nitre, 2022. 213 s. ISBN 978-80-558-1952-5

ACB02 OSACKÝ, Marek - ŠUCHA, Vladimír - UHLÍK, Peter - MAJZLAN, Juraj - MADEJOVÁ, Jana - KOMADEL, Peter - ŠIMON, Peter - BUJDÁK, Juraj. Laboratórne postupy úpravy a metódy výskumu nerudných surovín. 1. vyd. Bratislava : Univerzita Komenského v Bratislave, 2021. 158 s. ISBN 978-80-223-5285-7

ADCA Vedecké práce v zahraničných karentovaných časopisoch – impaktovaných

ADCA01 AFSHARIMANI, Nasima** - TALIMIAN, Ali - MERINO, Emilia - DURÁN, Alicia - CASTRO, Yolanda - GALUSEK, Dušan. Improving corrosion protection of Mg alloys (AZ31B) using graphene-based hybrid coatings. In International Journal of Applied Glass Science, 2022, vol. 13, no. 1, pp. 143-150. (2021: 2.087 - IF, Q2 - JCR, 0.378 - SJR, Q3 - SJR). ISSN 2041-1286. Dostupné na: https://doi.org/10.1111/ijag.16539

ADCA02 BABU, Singarapu - BALDA, Rolindes - FERNÁNDEZ, Joaquin - SEDANO, Mercedes - GORNI, Giulio - CABRAL, A. A. - GALUSEK, Dušan - DURÁN, Alicia - PASCUAL, María Jesús**. KLaF4:Nd3+doped transparent glass-ceramics processed by spark plasma sintering. In Journal of Non-Crystalline Solids, 2022, vol. 578, art. no. 121289. (2021: 4.458 - IF, Q1 - JCR, 0.751 - SJR, Q1 - SJR). ISSN 0022-3093. Dostupné na: https://doi.org/10.1016/j.jnoncrysol.2021.121289

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ADCA04 BOHÁČ, Peter** - BUDZÁK, Šimon - PLANETOVÁ, Viktória - KLEMENT, Róbert - BUJDÁK, Juraj. Adsorption-induced fluorescence of pseudoisocyanine monomers in systems with layered silicates. In Journal of Physical Chemistry C, 2022, vol. 126, no. 40, p. 17255-17265. (2021: 4.177 - IF, Q2 - JCR, 1.103 - SJR, Q1 - SJR, karentované - CCC). (2022 - Current Contents, WOS, SCOPUS). ISSN 1932-7447. Dostupné na: https://doi.org/10.1021/acs.jpcc.2c03497

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ADCA13 GALUSKOVÁ, Dagmar** - KAŇKOVÁ, Hana - ŠVANČÁRKOVÁ, Anna - BUŇOVÁ, Lenka - GALUSEK, Dušan. Direct monitoring of immediate release of Zn from zinc-doped bioactive glass. In International Journal of Applied Glass Science, 2022, vol. 13, no. 3, p. 476-483. (2021: 2.087 - IF, Q2 - JCR, 0.378 - SJR, Q3 - SJR). ISSN 2041-1286. Dostupné na: https://doi.org/10.1111/ijag.16568

ADCA14 GEŠVANDTNEROVÁ, Monika** - BUČKO, Tomáš** - RAYBAUD, Pascal** - CHIZALLET, Céline**. Monomolecular mechanisms of isobutanol conversion to butenes catalyzed by acidic zeolites: Alcohol isomerization as a key to the production of linear butenes. In Journal of Catalysis, 2022, vol. 413, p. 786-802. (2021: 8.047 - IF, Q1 - JCR, 1.936 - SJR, Q1 - SJR). ISSN 0021-9517. Dostupné na: https://doi.org/10.1016/j.jcat.2022.07.025

ADCA15 GIANNI, Eleni** - MORENO RODRÍGUEZ, Daniel** - JANKOVIČ, Ľuboš - SCHOLTZOVÁ, Eva - POSPÍŠIL, Miroslav. How herbicides like atrazine and diuron interact with the spiral halloysite structure. In Journal of Environmental Chemical Engineering, 2022, vol. 10, no. 6, art. no. 108785. (2021: 7.968 - IF, Q1 - JCR, 1.042 - SJR, Q1 - SJR). ISSN 2213-3437. Dostupné na: https://doi.org/10.1016/j.jece.2022.108785

ADCA16 HERZOG, Basile - DA SILVA, Maurício Chagas - CASIER, Bastien - BADAWI, Michael - PASCALE, Fabien - BUČKO, Tomáš** - LEBèGUE, Sébastien - ROCCA, Dario**. Assessing the accuracy of machine learning thermodynamic perturbation theory: Density functional theory and beyond. In Journal of Chemical Theory and Computation, 2022, vol. 18, no. 3, p. 1382-1394. (2021: 6.578 - IF, Q1 - JCR, 1.619 - SJR, Q1 - SJR). ISSN 1549-9618. Dostupné na: https://doi.org/10.1021/acs.jctc.1c01034

ADCA17 HIČÁK, Michal - MEDVECKÝ, Ľubomír - HNATKO, Miroslav - ŠTULAJTEROVÁ, Radoslava - GIRETOVÁ, Mária - TATARKOVÁ, Monika - LENČÉŠ, Zoltán** - ŠAJGALÍK, Pavol. Porous silicon nitride-based drug delivery carrier. In International Journal of Applied Ceramic Technology, 2022, vol. 19, no. 2, p. 882-892. (2021: 2.328 - IF, Q2 - JCR, 0.388 - SJR, Q2 - SJR). ISSN 1546-542X. Dostupné na: https://doi.org/10.1111/ijac.13908

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ADCA19 CHROMČÍKOVÁ, Mária** - SVOBODA, Roman - PECUŠOVÁ, Beáta - HRUŠKA, Branislav - HUJOVÁ, Miroslava - NOWICKA, Aleksandra - LIŠKA, Marek. Effect of lithium doping on the glass transition behavior of the Bioglass 45S5. In Journal of Non-Crystalline Solids, 2022, vol. 594, p. 121797-1-121797-7. (2021: 4.458 - IF, Q1 - JCR, 0.751 - SJR, Q1 - SJR). ISSN 0022-3093. Dostupné na: https://doi.org/10.1016/j.jnoncrysol.2022.121797

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ADCA22 KITYK, Anna** - PROTSENKO, V. - DANILOV, F.I. - BOBROVA, Lina - HNATKO, Miroslav -

PAVLÍK, Viliam - ŠOLTÝS, Ján - LABUDOVÁ, Martina - RUSKOVÁ, Magdaléna - PANGALLO, Domenico. Design of Ti-6Al-4V alloy surface properties by galvanostatic electrochemical treatment in a deep eutectic solvent Ethaline. In Surface & Coatings Technology, 2022, vol. 429, art. no. 127936. (2021: 4.865 - IF, Q2 - JCR, 0.922 - SJR, Q1 - SJR). ISSN 0257-8972. Dostupné na: https://doi.org/10.1016/j.surfcoat.2021.127936 (ITMS2014+: 313021T081 : Vybudovanie Centra pre využitie pokročilých materiálov Slovenskej akadémie vied)

ADCA23 KODĚRA, Peter** - MAJZLAN, Juraj - POLLOK, Kilian - KIEFER, Stefan - ŠIMKO, František - SCHOLTZOVÁ, Eva - LUPTÁKOVÁ, Jarmila - CAWTHORN, Grant. Ferrous hydroxychlorides hibbingite [gamma-Fe2(OH)3Cl] and parahibbingite [beta-Fe2(OH)3Cl] as a concealed sink of Cl and H2O in ultrabasic and granitic systems. In American Mineralogist, 2022, vol. 107, no. 5, p. 826-841. (2021: 3.066 - IF, Q2 - JCR, 1.246 - SJR, Q1 - SJR). ISSN 0003-004X. Dostupné na: https://doi.org/10.2138/am-2022-8011

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ADCA27 KUBÍKOVÁ, Blanka** - MLYNÁRIKOVÁ, Jarmila - MATSELKO, Oksana - MIKŠÍKOVÁ, Eva - NETRIOVÁ, Zuzana - VASKOVÁ, Zuzana - BOČA, Miroslav. Phase equilibria and volume properties of (LiF-MgF2)eut-LnF3 (Ln = Sm, Gd, Nd) molten systems. In Journal of Molecular Liquids, 2022, vol. 353, p. 118694-1-118694-10. (2021: 6.633 - IF, Q1 - JCR, 0.914 - SJR, Q1 - SJR, karentované - CCC). (2022 - Current Contents, WOS, SCOPUS). ISSN 0167-7322. Dostupné na: https://doi.org/10.1016/j.molliq.2022.118694

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AEC01 SEDLÁČEK, Jaroslav - GALUSEK, Dušan - ŠVANČÁREK, Peter - BROWN, Andy - BRYDSON, R. Alumina-carbon composites with high hardness. In EURO CERAMICS VIII. PTS 1-3. Eds. H. Mandal, L. Ovecoglu. - 2004, p. 841-844. ISBN 0-87849-946-6. ISSN 1013-9826. Dostupné na: https://doi.org/10.4028/www.scientific.net/kem.264-268.841

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1. [1.1] MARDER, Rachel - GHOSH, Priyadarshini - REIMANIS, Ivar - KAPLAN, Wayne D. The influence of carbon on the microstructure and wear resistance of alumina. In JOURNAL OF THE AMERICAN CERAMIC SOCIETY, 2021, vol. 104, no. 8, pp. 4214-4225. ISSN 0002-7820. Dostupné na: https://doi.org/10.1111/jace.17832., Registrované v: WOS

AECA Vedecké práce v zahraničných recenzovaných zborníkoch a kratšie kapitoly/state v zahraničných vedeckých monografiách alebo VŠ učebniciach

AECA01 MACHÁČEK, Jan - CHARVÁTOVÁ, Soňa - GEDEON, Ondrej - LIŠKA, Marek. First principles molecular simulations of soda-lime-silica glass. In Glass - The Challenge for the 21st Century : 9th Conference of the European Society of Glass Science and Technology/Annual Meeting of the International Commission on Glass, Trenčín, June 22-26, 2008. - Zurich : TRANS TECH PUBLICATIONS LTD., 2008, p. 85-88. ISBN 978-0-87849-387-6. ISSN 1022-6680.

Citácie:

1. [1.1] ZHANG, Xiaobo - LIU, Chengjun - JIANG, Maofa. Effect of Na Ions on Melt Structure and Viscosity of CaO-SiO2 Na2O by Molecular Dynamics Simulations. In ISIJ INTERNATIONAL, 2021, vol. 61, no. 5, pp. 1389-1395. ISSN 0915-1559. Dostupné na: https://doi.org/10.2355/isijinternational.ISIJINT-2020-635., Registrované v: WOS

2. [1.1] ZHANG, Xiaobo - LIU, Chengjun - JIANG, Maofa. Molecular Dynamics Simulations of Melt Structure Properties of CaO-Al2O3-Na2O Slag. In METALLURGICAL AND MATERIALS TRANSACTIONS B-PROCESS METALLURGY AND MATERIALS PROCESSING SCIENCE, 2021, vol. 52, no. 4, pp. 2604-2611. ISSN 1073-5615. Dostupné na: https://doi.org/10.1007/s11663-021-02184-9., Registrované v: WOS

Príloha D - Údaje o pedagogickej činnosti organizácie

Semestrálne prednášky:

Mgr. Stanislav Komorovský, PhD.
Názov semestr. predmetu: Relativistické efekty v chémii
Počet hodín za semester: 20
Názov katedry a vysokej školy: Prírodovedecká fakulta UK, Katedra anorganickej chémie

Ing. Blanka Kubíková, PhD.
Názov semestr. predmetu: Metody chemického výskumu
Počet hodín za semester: 2
Názov katedry a vysokej školy: Prírodovedecká fakulta UK, Katedra fyzikálnej a teoretickej chémie

Ing. Anna Prnová, PhD.
Názov semestr. predmetu: Anorganická chémia
Počet hodín za semester: 26
Názov katedry a vysokej školy: Trenčianska univerzita Alexandra Dubčeka v Trenčíne, neuvedená

Semestrálne cvičenia:

Ing. Blanka Kubíková, PhD.
Názov semestr. predmetu: Metodika experimentu vo fyzikálnej chémii
Počet hodín za semester: 5
Názov katedry a vysokej školy: Prírodovedecká fakulta UK, Katedra fyzikálnej a teoretickej chémie

doc. Ing. Zoltán Lenčéš, PhD.
Názov semestr. predmetu: Materiálová chémia
Počet hodín za semester: 4
Názov katedry a vysokej školy: Prírodovedecká fakulta UK, Katedra anorganickej chémie

Ing. Jarmila Mlynáriková, PhD.
Názov semestr. predmetu: Metodika experimentu vo fyzikálnej chémii
Počet hodín za semester: 5
Názov katedry a vysokej školy: Prírodovedecká fakulta UK, Katedra fyzikálnej a teoretickej chémie

Ing. Zuzana Netriová, PhD.
Názov semestr. predmetu: Metodika experimentu vo fyzikálnej chémii
Počet hodín za semester: 5
Názov katedry a vysokej školy: Prírodovedecká fakulta UK, Katedra fyzikálnej a teoretickej chémie

Semináre:

James Richard Asher, PhD
Názov semestr. predmetu: General and Inorganic Chemistry
Počet hodín za semester: 44
Názov katedry a vysokej školy: Prírodovedecká fakulta UK, Katedra anorganickej chémie

Ing. Blanka Kubíková, PhD.
Názov semestr. predmetu: Metodika experimentu vo fyzikálnej chémii

Počet hodín za semester: 1
Názov katedry a vysokej školy: Prírodovedecká fakulta UK, Katedra fyzikálnej a teoretickej chémie

Ing. Jarmila Mlynáriková, PhD.
Názov semestr. predmetu: Metodika experimentu vo fyzikálnej chémii
Počet hodín za semester: 1
Názov katedry a vysokej školy: Prírodovedecká fakulta UK, Katedra fyzikálnej a teoretickej chémie

Ing. Zuzana Netriová, PhD.
Názov semestr. predmetu: Metodika experimentu vo fyzikálnej chémii
Počet hodín za semester: 1
Názov katedry a vysokej školy: Prírodovedecká fakulta UK, Katedra fyzikálnej a teoretickej chémie

Terénne cvičenia:

Individuálne prednášky:

Príloha E - Medzinárodná mobilita organizácie

(A) Vyslanie vedeckých pracovníkov do zahraničia na základe dohôd:

Krajina	Druh dohody					
	MAD, KD, VTS		Medziústavná		Ostatné	
	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní
Česko					Peter Tatarko	1
					Peter Tatarko	4
					Peter Tatarko	3
					Hakan Ünsal	1
Japonsko					Peter Boháč	56
Nemecko					Michal Slaný	8
Srbsko					Inga Zhukova	7
					Inga Zhukova	34
Počet vyslaní spolu					**8**	**114**

(B) Prijatie vedeckých pracovníkov zo zahraničia na základe dohôd:

Krajina	Druh dohody					
	MAD, KD, VTS		Medziústavná		Ostatné	
	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní
Česko					Pikulova	3
					Radek Novotný	8
Ukrajina					Ivanushko	7
Počet prijatí spolu					**3**	**18**

(C) Účasť pracovníkov pracoviska na konferenciách v zahraničí (nezahrnutých v "A"):

Krajina	Názov konferencie	Meno pracovníka	Počet dní
Česko	INTER-TRANFER	Monika Michálková	5
	Molekulová spektroskopia	Jana Madejová	3
		Helena Pálková	3
	NANOCON	Eva Skoura	3
	SAP a PM	Jakub Michalík	3
		Anna Prnová	3
		Jana Valúchová	2
	Termoanalytický seminár	Anna Prnová	3
	Zjazd chemikov	Ramu Ambati	4
		Sanam Bashir	4
		Dhiya Krishnan	4

		Anna Prnová	4
Grécko	EUCHEMSIL	Miroslav Boča	6
		Michal Korenko	6
		Blanka Kubíková	6
		František Šimko	6
Chorvátsko	CEEC-PCMS 1	Michal Slaný	6
Japonsko	ICCCI	Pavol Šajgalík	5
	SSPT	Pavol Šajgalík	5
Luxembursko	ICMS	Eva Scholtzová	4
	SSP MEOPS	Michal Korenko	2
Maďarsko	CESTC	Florian Lemken	4
		Oľga Malkin	4
		Vladimír Malkin	4
Nemecko	ABP	Alper Güneren	4
	Actinides revisited	Stanislav Komorovský	4
Nemecko (online)	Keramik, DKG	Ondrej Hanzel	3
		Michal Hičák	3
		Zoltán Lenčéš	3
		Pavol Šajgalík	3
		Peter Tatarko	3
Poľsko	ECerS	Guido de La Torre Olvera	10
		Alper Güneren	5
		Ondrej Hanzel	5
		Naser Hosseini	5
		Zoltán Lenčéš	5
		Patrícia Petrisková	5
		Pavol Šajgalík	5
		Peter Tatarko	5
		Monika Tatarková	5
		Hakan Ünsal	5
		Inga Zhukova	8
	MECC	Martin Barlog	5
		Peter Boháč	5
		Juraj Bujdák	5
		Marián Matejdes	5
		Helena Pálková	5
		Eva Scholtzová	5
		Michal Slaný	5
		Peter Škorňa	5
	MECC 2022	Jana Madejová	5
		Daniel Moreno	5
Srbsko	IMEC	Ondrej Hanzel	4
		Michal Hičák	4
		Miroslav Hnatko	4
		Zoltán Lenčéš	4
		Peter Tatarko	4
		Hakan Ünsal	4
Španielsko	Workshop YRCGMA	Guido de La Torre Olvera	5

Taliansko	CIMTEC	Pavol Šajgalík	6
		Peter Tatarko	6
	Spea	Patrícia Petrisková	7
Turecko	ICC	Peter Boháč	7
		Jana Madejová	8
		Eva Scholtzová	8
Veľká Británia	ICPNCS	Anna Prnová	8
Spolu	**25**	**66**	**314**

Vysvetlivky: MAD - medziakademické dohody, KD - kultúrne dohody, VTS - vedecko-technická spolupráca v rámci vládnych dohôd

Skratky použité v tabuľke C:

ABP - Advanced Battery Power
Actinides revisited - Actinides revisited
CEEC-PCMS 1 - 1st Central and European conference on Physical Chemistry and Materials Sicence
CESTC - 18th Central European Symposium on Theoretical Chemistry
CIMTEC - 15th International Ceramics Congress
ECerS - 17th Conference and Exhibition of the European Ceramic Society
EUCHEMSIL - 28th EUCHEM Conference on Molten Salts and Ionic Liquids
ICC - XVII International Clay Conference
ICCCI - 7th International Conference on the Characterization and Control of Interfaces for High Quality Advanced Materials
ICMS - 31th International Conference on Multidisciplinary Studies "Recent Ideas and Research"
ICPNCS - 16th International Conference of Physics and Non Crystalline Solids
IMEC - 1st International Conference on Innovative Materials in Extreme Conditions
INTER-TRANFER - seminári projektu INTER-TRANFER
Keramik, DKG - Keramik/Ceramics 2022 97. DKG-Jahrestagung / 97th DKG Annual Meeting
MECC - Mid-European Clay Conference
MECC 2022 - Mid-European Clay Conference
Molekulová spektroskopia - Molekulová spektroskopia
NANOCON - 14th International Conference on Nanomaterials-Research and Applications
SAP a PM - 24. ročník Konference o Speciálních Anorganických Pigmentech a Práškových Materiálech
Spea - 11th European Conference on Solar Chemistry and Photocatalysis: Rnvironmental Applications
SSP MEOPS - From sand to solar panels: Maana Electric opens production site"
SSPT - 57th Summar Symposium on Powder Technology
Termoanalytický seminár - Termoanalytický seminár
Workshop YRCGMA - II. Workshop for Young Researchers in Ceramic and Glasses for Medical Applications
Zjazd chemikov - 74. Zjazd chemikov

Príloha F - Vedecko-popularizačná činnosť pracovníkov organizácie SAV

Meno	Spoluautori	Typ[1]	Názov	Miesto zverejnenia	Dátum alebo počet za rok
Peter Tatarko		PB	Development of advanced ceramic materials at	IIT Madras, Chennai, India	5.12.2022
Peter Tatarko		PB	Svet Moderných Keramických Materiálov	ÚACH SAV, v.v.i. Deň otvorených dverí	8.11.2022
Peter Tatarko	Ondrej Hanzel, Michal Hičák	EX	Exkurzia pre študentov 4.ročníka FCHPT STU	ÚACH SAV, v.v.i.	30.11.2022
Viliam Pavlík		PB	Letná škola mladých vedcov	UACH SAV, v.v.i., 18.-22.7.2022	1
Anna Prnová	Jana Valúchová, Dušan Galusek	PB	Nebojme sa chémie	Gymnázium Nová Dubnica	1

[1] *PB - prednáška/beseda, TL - tlač, TV - televízia, RO - rozhlas, IN - internet, EX - exkurzia, PU - publikácia, MM - multimédiá, DO - dokumentárny film*