

Ústav anorganickej chémie SAV, v. v. i.

**Výročná správa o činnosti a hospodárení
za rok 2025**

Bratislava
január 2026

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ČASŤ A

Ústav anorganickej chémie SAV, v. v. i.

**Výročná správa o činnosti organizácie
za rok 2025**

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 Lenčes, PhD.

Predseda správnej rady: doc. Ing. Miroslav Boča, DrSc.

Predseda vedeckej rady: Mgr. Monika Tatarková, PhD.

Predseda dozornej rady: MUDr., Mgr. Tomáš Hromádka, PhD

Člen Snemu SAV: Ing. Peter Tatarko, PhD.

Adresa: Dúbravská cesta 9, 845 36 Bratislava 45

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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	84	44	40	4	8	83	66.17	49.99	3
Vedeckí pracovníci	54	32	22	2	6	54	44.99	44.41	0
Odborní pracovníci VŠ (výskumní a vývojoví zamestnanci ¹)	8	6	2	2	0	8	5.86	5.58	0
Odborní pracovníci VŠ (ostatní zamestnanci ²)	6	3	3	0	0	6	4.46	0	1
Odborní pracovníci ÚS	10	2	8	0	1	10	8.05	0	2
Ostatní pracovníci	6	1	5	0	1	5	2.81	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 31.12.2025 (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 31.12.2025 (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 31.12.2025)

Rodová skladba	Pracovníci s hodnosťou				Vedeckí pracovníci v stupňoch		
	DrSc.	CSc./PhD.	prof.	doc.	I.	II.a.	II.b.
Muži	6	28	4	4	6	13	13
Ženy	2	22	0	1	2	8	12

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	3	2.3	11	10.2	5	5.0	4	2.5	5	4.5	3	2.0	0	0.0	4	3.1

Ženy	1	1.0	6	6.0	3	3.0	2	2.0	4	4.0	3	3.0	3	2.6	0	0.0	2	1.8
Spolu	2	2.0	9	8.3	14	13.2	7	7.0	8	6.5	8	7.5	6	4.6	0	0.0	6	4.9

A - Prepočet bez zohľadnenia úväzkov zamestnancov

B - Prepočet so zohľadnením úväzkov zamestnancov

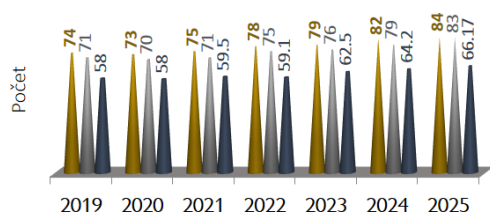
Tabuľka 1d Priemerný vek zamestnancov organizácie k 31.12.2025

	Kmeňoví zamestnanci	Vedeckí pracovníci	Riešitelia projektov
Muži	46.9	46.9	46.4
Ženy	46.2	45.3	45.5
Spolu	46.6	46.2	46.0

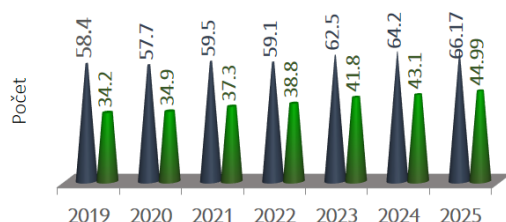
1.3. Iné dôležité informácie k základným údajom o organizácii a zmeny za posledné obdobie (v zameraní, v personálnej štruktúre a pod.)

Prepočítaný počet pracovníkov v roku 2025 je na úrovni 66,17 FTE (z toho 44,99 vedeckých pracovníkov), čo predstavuje nielen nárast v porovnaní s rokom 2024 (64,15 a 43,10), ale aj najvyšší stav pracovníkov od roku 2018. Tento stav súvisí hlavne s riešením projektov plánu obnovy a odolnosti SR, ale aj s využitím finančných prostriedkov, ktoré ústav získal na základe Výkonostných zmlúv uzatvorených s predsedníctvom SAV na roky 2024-2026. V rámci zmlúv sa vyčlenili prostriedky na vytvorenie dvoch postdoktorandských pozícií. Preto na konci roka 2024 nastúpili dvaja zahraniční vedeckí pracovníci do 40 rokov (Subrahmanyam Bandaru, Imrongnaro Longkumer) a v rôznych obdobiach roku 2025 ďalší traja (Florian Andreas Lemken, Sushmita Dwivedi, Vahid Niksefat). Okrem toho do zamestnaneckého pomeru nastúpili po úspešnej obhajobe dizertačnej práce Sanam Bashir (01/2025) a Naser Hosseini (08/2025), ktorí boli internými doktorandmi na ústave.

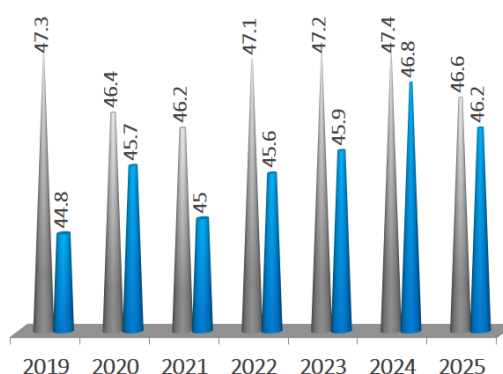
POČET ZAMESTNANCOV – KMEŇOVÍ, FYZICKÍ, PREPOČÍTANÝ STAV



FTE – VŠETCI ZAMESTNANCI VS. VEDECKÍ PRACOVNÍCI



PRÍEMERNÝ VEK KMEŇOVÍ ZAMESTNANCI VS. VEDECKÍ PRACOVNÍCI



V roku 2025 bol priemerný vek všetkých pracovníkov ústavu 46,6 roka a priemerný vek vedeckých pracovníkov 46,2 roka. Mierny pokles v porovnaní s rokom 2024, súvisí práve s navýšením počtu mladších vedeckých pracovníkov v súvislosti s riešením projektov plánu obnovy a odolnosti a

výkonnostnými zmluvami. Momentálne je na ústave zamestnaných 14 vedeckých pracovníkov zo zahraničia (viac ako polovica z celkového počtu 25). Ambíciou ústavu je motivácia zahraničných pracovníkov k dosiahnutiu kvalifikačného stupňa IIa (samostatní vedeckí pracovníci), keďže v tejto kategórii ústav aktuálne nemá nikoho zo zahraničia.

2. Vedecko-výskumná činnosť – projekty, výsledky

2.1. Domáce projekty

Tabuľka 2a Domáce projekty riešené v roku 2025

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	9	0	118067	118067	-	-	-	-
2. Projekty APVV	6	9	-	-	221638	168421	-	134483
3. Projekty EŠIF/OP ŠF, Plán obnovy EÚ	10	3	-	-	3179152	3179152	-	389539
4. Projekty SASPRO	2	0	79521	79521	-	-	-	-
5. Projekty IMPULZ	0	0	-	-	-	-	-	-
6. Iné projekty (FM EHP, Vedecko-technické projekty, na objednávku rezortov a pod.)	7	0	30183	30183	-	-	-	-

A - organizácia je nositeľom projektu

B - organizácia sa zmluvne podieľa na riešení projektu

Tabuľka 2b Domáce projekty podané v roku 2025

Štruktúra projektov	Miesto podania	Organizácia je nositeľom projektu	Organizácia sa zmluvne podieľa na riešení projektu
1. Účasť na nových výzvach APVV r. 2025	-	6	1
2. Projekty výziev EŠIF podané r. 2025	Bratislava	0	0
	Regióny	1	3

2.2. Medzinárodné projekty

2.2.1. Medzinárodné projekty riešené v roku 2025

Tabuľka 2c Medzinárodné projekty riešené v roku 2025

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		
1a. Projekty Horizont 2020	0	0	-	-	-	-	-	-
1b. Projekty Horizont Európa	0	0	-	-	-	-	-	-
2. Projekty ERA.NET, ESA, JRP	2	0	49995	49995	-	-	-	-
3. Projekty COST	0	1	-	-	-	-	5780	-
4. Projekty EUREKA, NATO, UNESCO, CERN, IAEA, IVF, ERDF a iné	1	0	-	-	-	-	-	-
5. Projekty v rámci medzivládnych dohôd	0	0	-	-	-	-	-	-
6. Projekty Mobility, Mobility Basic, Open Mobility a Mobility Visit	2	0	6000	6000	-	-	-	-
7. Bilaterálne projekty ostatné	2	0	-	-	-	-	-	-
8. Podpora MVTs z národných zdrojov (SAV, APVV a iné)	3	0	-	-	28263	28263	-	-
9. Podpora excelentného výskumu: SAS-UPJŠ ERC Visiting Fellowship Grants, Seal of Excellence, TANDEM	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 2025

Tabuľka 2d Počet projektov Horizont Európa v roku 2025

	A	B
Počet podaných projektov I. pilier (Excelentná veda: MSCA, ERC, RI)	1	0
Počet podaných projektov II. pilier (klastre 1-6)	0	0
Počet podaných projektov III. pilier (EIC, EIT)	0	2
Počet podaných projektov Widera (Teaming, Twinning, Hop On Facility ...)	0	0

A - organizácia je nositeľom projektu

B - organizácia sa zmluvne podieľa na riešení projektu

Údaje k domácim a medzinárodným projektom sú uvedené v Prílohe A-2.

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

2.3. Výber najvýznamnejších výsledkov vedeckej práce organizácie v roku 2025

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.

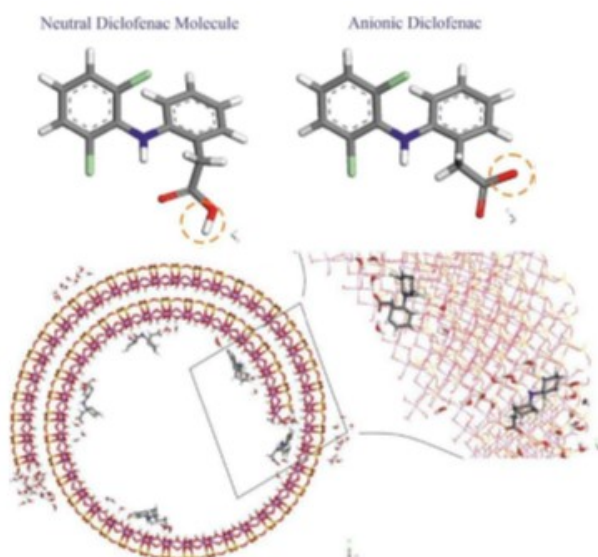
2.3.1. Výsledky na báze základného výskumu

Stabilizácia diklofenaku efektívnym viazaním na povrchu hallozyitu

Eva, SCHOLTZOVÁ

Diklofenak je nesteroidné protizápalové analgetikum hojne používané na liečbu bolesti a zápalu (940 ton/rok). Primárne sa študuje vývoj pokročilých systémov cieleného podávania liekov (stabilita diklofenaku je závislá na pH), ktoré dokážu účinne pôsobiť s obmedzenou koncentráciou liečiva, aby sa zabránilo uvoľňovaniu nadmerného množstva účinných látok do životného prostredia a výskum vhodných sorbentov pre imobilizáciu diklofenaku, ktorý sa vylučuje a uvoľňuje do odpadových vôd alebo pôdy. Na ÚACH sa venujeme molekulovým simuláciám vrstevnatých silikátov ako potenciálne vhodných sorbentov liečiv a polutantov.

Na štúdium hallozyitu ako vhodného nosiča a sorbentu pre diklofenak sa použila metóda silového poľa nakoľko sa navrhli veľké štruktúrne modely, v spolupráci so zahraničnými kolegami. Simulácie ukázali potenciál hallozyitu pre stabilizáciu diklofenaku v neutrálnej i zápornej forme (Obr 1a) s miernou preferenciou neutrálnej formy. Zistilo sa, že hallozyit sa môže použiť ako vhodný nosič pre obe formy diklofenaku alebo aj ako potenciálny sorbent na dekontamináciu pôdy alebo odpadovej vody s vysokými koncentraciami diklofenaku (Obr 1b).



Publikácie:

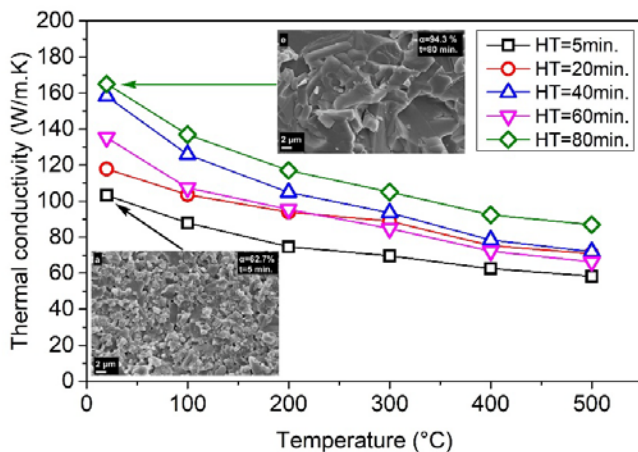
GIANNI, Eleni - POSPÍŠIL, Miroslav - SCHOLTZOVÁ, Eva**. Halloysite as a carrier/sorbent of diclofenac: A molecular simulations study. In Surfaces and interfaces, 2025, vol 70, art no. 106710. (2024: 6.3 - IF, Q1 - JCR, 1.036 - SJR, Q1 - SJR). ISSN 2468-0230. Dostupné na: <https://doi.org/10.1016/j.surfin.2025.106710> Typ: ADCA

Projekt: VEGA 2/0026/23

SiC keramické materiály s vysokou tepelnou vodivosťou

Ondrej HANZEL, Monika TATARKOVÁ, Zuzana NETRIOVÁ, Pavol ŠAJGALÍK

Hutné keramické materiály na báze SiC bez spekacích prísad boli pripravené novým kombinovaným prístupom za použitia metód ako je: rozprašovanie do tekutého dusíka, tepelné žihanie granulovaných práškov a následné spekanie pri teplote 1900°C pomocou elektrickým poľom asistovanej techniky spekania. Pomer alfa a beta fázy SiC bol riadený dobou výdrže na teplote spekania. V tejto práci bola skúmaná korelácia medzi pomerom α/β fázy, tepelnými vlastnosťami a mikroštruktúrou. Tepelná vodivosť SiC keramických materiálov sa zvýšila z hodnoty 103 W/m.K na hodnotu 165 W/m.K so zvyšujúcim sa obsahom α -fázy (z 63 na 94 %), rovnako ako aj s nárastom veľkosti zŕn. Podľa našich najlepších vedomostí, toto je najvyššia hodnota ($\lambda=165$ W/m.K), ktorá bola dosiahnutá pre triedu SiC materiálov spekaných pri teplotách $T \leq 1900^\circ\text{C}$. Táto práca potvrdzuje, že kľúčové podmienky, ktoré treba splniť pre prípravu SiC s vysokou tepelnou vodivosťou sú: vysoký obsah α -fázy, väčšie zrná a minimalizovanie hraníc zŕn.



Obr. 1: Tepelná vodivosť SiC keramiky v závislosti od teploty a od času spekania a teda aj od obsahu α -SiC a veľkosti zŕn.

Publikácia:

HANZEL, Ondrej** - TATARKOVÁ, Monika - NETRIOVÁ, Zuzana - ŠAJGALÍK, Pavol. Effect of phase composition on thermal and electrical conductivity of additive-free silicon carbide ceramics. In Journal of the European Ceramic Society, 2025, vol. 42, no. 4, art no. 117077. (2024: 6.2 - IF, Q1 - JCR, 1.3 - SJR, Q1 - SJR). <https://doi.org/10.1016/j.jeurceramsoc.2024.117077> Typ: ADCA

Projekty: VEGA. 2/0007/21 VEGA. 2/0161/22, APVV-21-0402, JRP SAV TUBITAK No. 720464

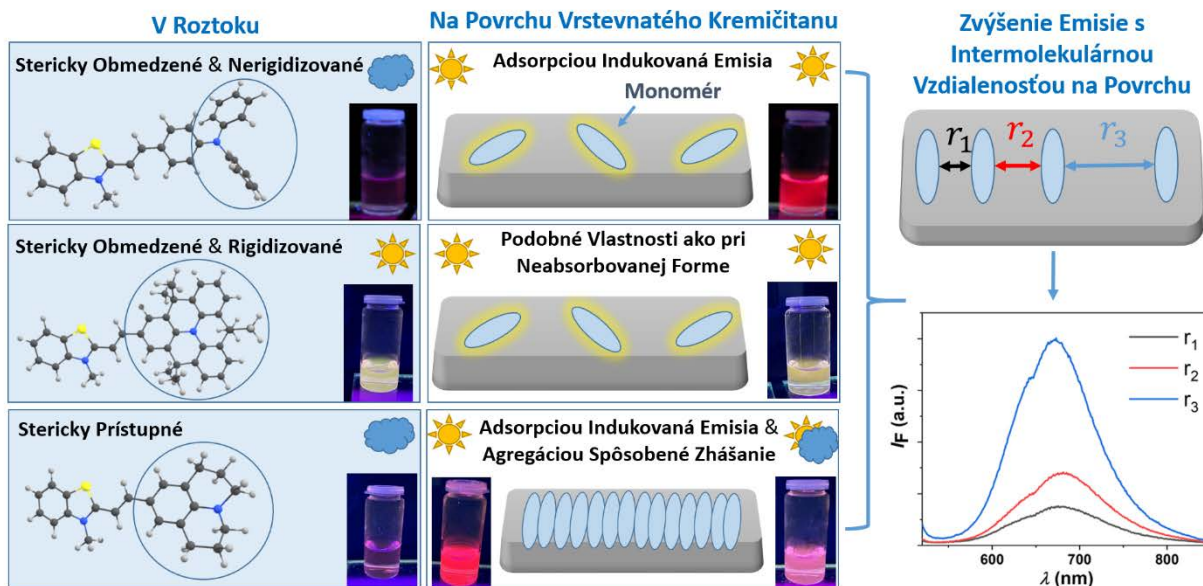
Vplyv štruktúry benzotiazolových farbív na javy vedúce k zmenám ich luminiscenčných vlastností

Viktória PLANETOVÁ, Peter BOHÁČ, Juraj BUJDÁK

Adsorpcia organických luminofórov môže viesť k javom, ktoré majú opačný vplyv na ich fotoaktivitu. Kedy a do akej miery sa uplatňujú jednotlivé javy závisí od molekulovej štruktúry, avšak jasné súvislosti neboli doposiaľ jednoznačne preukázané. Na tento účel bola zvolená séria koloidných systémov saponitu s adsorbovanými molekulami rôznych benzotiazolových derivátov.

Molekuly s rigidnou, planárnou štruktúrou viedli k tvorbe usporiadaných molekulových agregátov, čo významne znižovalo luminiscenciu. Prítomnosť objemných rigidných skupín bránila tomuto javu, ale adsorpcia všeobecne nemala veľký vplyv na luminiscenciu. Ukázalo sa, že deriváty s neplanárnymi substituentami obsahujúcimi rotujúce skupiny, ako napr. trifelynamín, vykazovali najlepšie zmeny po adsorpcii. Rotujúce skupiny bránili tvorbe agregátov. Navyše, po adsorpcii takýchto molekúl došlo k ich planarizácii a fixácii na povrchu, čo viedlo k mnohonásobnému nárastu luminiscencie.

Dosiahnuté výsledky prinášajú všeobecný návod na prípravu fotoaktívnych hybridných systémov na báze benzotiazolových farbív s požadovanými vlastnosťami.



Publikácia:

PLANETOVÁ, Viktória – BOHÁČ, Peter** – BUJDÁK, Juraj* – SIGMUNDOVÁ, Ivica – MAGDOLEN, Peter – RAJAMANI, Rajmohan – HROBÁRIK, Peter. Unlocking Light-Up Effect of Push–Pull Hemicyanine Dyes in Hybrid Silicate Dispersions: Impact of the Terminal Arylamine Functionality and Intermolecular Surface Distances. In Langmuir, 2025, vol. 41, no. 51, p. 34621–34630. (2024: 3.9 – IF, Q2 – JCR, 0.763 – SJR, Q1 – SJR). <https://doi.org/10.1021/acs.langmuir.5c05919> Typ: ADCA

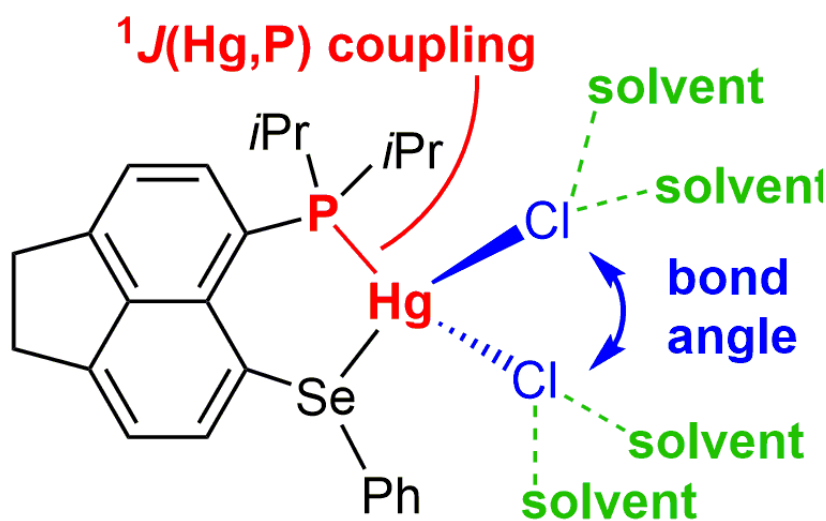
Projekty: APVV-23-0130, VEGA 2/0121/24, VEGA 2/0115/21

Investigation of the effect of solvation on $^1J(\text{Metal-P})$ spin-spin coupling

Oľga MALKINA, Stanislav KOMOROVSKÝ

NMR spin-spin couplings contain invaluable information for structure determination especially in solution when other techniques such as X-Ray are not available. Understanding factors influencing their values is crucial for the correct interpretation of experimental spectra. A surprisingly big solvent effect (50% or more of the total value) on one-bond metal-phosphorous coupling has been discovered and explained with the help of quantum-chemical calculations. It was found that one of the key parameters that define the magnitude of the solvent effect is the Cl-M-Cl angle (M = Hg, Zn). Calculations of couplings in analogous systems with other metals indicate that for metals preferring square planar structures the solvent is insignificant because these structures are fairly rigid. Tetrahedral structures are less constrained and can respond more easily to external effects such as solvation.

NMR spin-spinové interakcie obsahujú neoceniteľné informácie pre určenie štruktúry, najmä v roztoku, keď nie sú k dispozícii iné techniky, ako napríklad röntgenová spektroskopia. Pochopenie faktorov ovplyvňujúcich ich hodnoty je kľúčové pre správnu interpretáciu experimentálnych spektier. Prekvapivo veľký vplyv rozpúšťadla (50 % alebo viac z celkovej hodnoty) na interakciu kov-fosfor s jednou väzbou bol objavený a vysvetlený pomocou kvantovo-chemických výpočtov. Zistilo sa, že jedným z kľúčových parametrov, ktoré definujú veľkosť vplyvu rozpúšťadla, je uhol Cl-M-Cl (M = Hg, Zn). Výpočty interakcií v analogických systémoch s inými kovmi naznačujú, že pre kovy, ktoré uprednostňujú štvorcové planárne štruktúry, je rozpúšťadlo nevýznamné, pretože tieto štruktúry sú pomerne tuhé. Tetraedrické štruktúry sú flexibilnejšie a ľahšie reagujú na vonkajšie vplyvy, ako je solvácia.



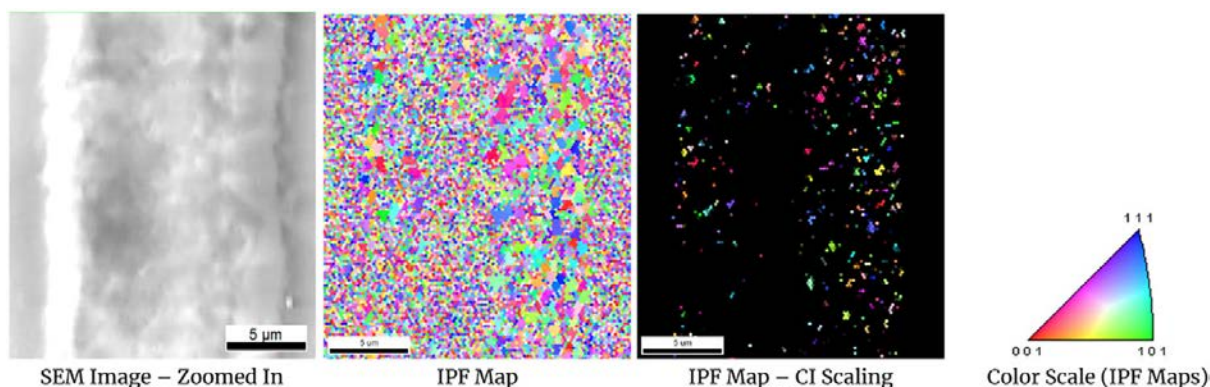
Publikácia:

MALKINA, Oľga** – BÜHL, Michael – CHALMERS, A. – KOMOROVSKÝ, Stanislav. Investigation of the effect of solvation on $^1J(\text{Metal-P})$ spin-spin coupling. In *Physical Chemistry Chemical Physics*, 2025, vol. 27, p. 3574-3582. (2024: 2.9 – IF, Q2 – JCR, 0.698 – SJR, Q2 – SJR). <https://doi.org/10.1039/d4cp04594g> Typ: ADCA

Tvorba polykryštalických kanálov YAG pomocou femtosekundového lasera v sklách spekaných z mikrogúl: smerom k erbium-dopovaným vlnovodovým laserom

Monika MICHÁLKOVÁ, Dušan GALUSEK

Vďaka vynikajúcim optickým, tepelným a mechanickým vlastnostiam je YAG (yttrito-hlinitý granát) sľubným kandidátom na aktívne fotonické integrované obvody (PICs). V tejto práci sme pripravili YAG-sklá spekaním sklenených mikrogúl, čo umožnilo širokú škálu presne kontrolovaných zložení. Femtosekundové laserové spracovanie týchto skiel konzistentne viedlo k selektívnej a výhradnej precipitácii kanálov polykryštalického YAG ako jedinej kryštálovej fázy vo všetkých zloženiach. Preukázaná spoľahlivosť tvorby kanálov YAG je kľúčovým krokom k laserom písaným vlnovodom pre integrovanú fotoniku. Na preskúmanie aktívnych prvkov sme do optimalizovanej kompozície začlenili erbium. Úspešná kryštalizácia erbium-dopovaného YAG otvára perspektívy pre on-chip vlnovodové lasery a zosilňovače v PICs.



Obr.: SEM a EBSD snímky femtosekundovej laserovej modifikácie povrchu YAG skla. Confidence Index (CI) zobrazený v odtieňoch sivej na elimináciu amorfného skleného pozadia. EBSD = elektrónová spätnorozptylová difrakcia.

Publikácia:

BARKER, Collin** - KNORR, Brian - MICHÁLKOVÁ, Monika - GHADAMYARI, Marzieh - PARCHOVIANSKY, Milan - DRDLÍK, Daniel - GALUSEK, Dušan - JAIN, Himanshu - DIEROLF, Volkmar. Femtosecond laser crystallization of YAG in yttrium aluminosilicate glasses. In International Journal of Applied Glass Science, 2025, vol. 2025, no. 4, art no. e16710. (2024: 2.5 - IF, Q2 - JCR, 0.476 - SJR, Q2 - SJR). ISSN 2041-1286. doi: 10.1111/ijag.16710.

Projekt: VEGA 2/0077/24

2.3.2. Výsledky aplikačného typu

Výroba Al_2O_3 –YAG– ZrO_2 priamou jednokrokovou metódou spark plasma sintering

Aliasghar NAJAFZADEHKHOEE, Dušan GALUSEK

Výroba eutektických keramik v zložení Al_2O_3 – $\text{Y}_3\text{Al}_5\text{O}_{12}$ – ZrO_2 zvyčajne zahŕňa vysokoteplotné tavenie, čo robí proces zložitým a nákladným. V tejto štúdii bola vyvinutá zjednodušená metóda syntézy pseudo-ternárnych eutektických keramických kompozitov. Lamelárne eutektické mikroštruktúry sa podarilo získať v kompozitoch Al_2O_3 – $\text{Y}_3\text{Al}_5\text{O}_{12}$ obsahujúcich 5 mol% ZrO_2 prostredníctvom jednokrokového procesu iskrového plazmového spekania (SPS) s použitím práškov pripravených metódou sol–gel. Čiastočná kalcinácia pri 1000°C zabezpečila vznik jemných častíc a zachovanie prchavých zložiek, čím sa podporili lokalizované plazmou asistované reakcie počas SPS. Tieto podmienky umožnili tvorbu prechodných eutektických kvapalných fáz a vývoj lamelárnych mikroštruktúr. Metóda tiež umožňuje prispôbenie mikroštruktúry úpravou podmienok kalcinácie.

Publikácia:

VAKSHOURI, Maryam** - TALIMIAN, Ali - NAJAFZADEHKHOEE, Aliasghar - GALLARDO-LÓPEZ, Ángela -

POYATO, Rosalía - GUTIÉRREZ-MORA, Felipe - GALUSEK, Dušan. Fabrication of $\text{Al}_2\text{O}_3\text{--Y}_3\text{Al}_5\text{O}_{12}\text{--ZrO}_2$ composites by single-step spark plasma sintering. In Journal of the European Ceramic Society, 2025, vol. 45, no 10, art no. 117358. (2025: 6.2 - IF, Q1 - JCR, 1.3 - SJR, Q1 - SJR). <https://doi.org/10.1016/j.jeurceramsoc.2025.117358> Type: ADCA.

Patent: Časť študovanej témy je súčasťou európskej patentovej prihlášky.

2.3.3. Výsledky na báze medzinárodnej spolupráce

Nové stratégie pre spájanie vysokoentropických keramik: od dizajnu rozhraní po vysokoteplotné spoje

Naser HOSSEINI, Monika TATARKOVÁ, Peter TATARKO

Zahraničné spolupracujúce inštitúcie:

1. Institute of Condensed Matter Chemistry and Technologies for Energy–ICMATE, National Research Council –CNR, Taliansko
2. Institute of Physics of Materials, Czech Academy of Sciences, Česká republika
3. Department of Applied Science and Technology, Politecnico di Torino, Taliansko
4. Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, Čína

Vysokoentropické keramiky predstavujú novú triedu materiálov s výnimočnými mechanickými vlastnosťami a vysokou tepelnou stabilitou. Na rozšírenie ich aplikačného potenciálu v pokročilých vesmírnych a nukleárnych systémoch je však nevyhnutné vyvinúť spoľahlivé a technologicky realizovateľné postupy spájania týchto materiálov. Predkladané práce reagujú na túto výzvu vytvorením pokročilých koncepcií spájania vysokentropických boridov a karbidov, založených na kombinácii termodynamického modelovania pomocou CALPHAD, štúdií zmáčavosti a vysokoteplotných interakcií, ako aj beztlakového spájania pomocou metodiky SPS (z angl. Spark Plasma Sintering). Pri riešení úlohy boli navrhnuté optimálne zloženia spojovacích materiálov na báze Ag-Cu-Ti a Ni-Ta, ktoré vykázali vynikajúcu zmáčavosť a kontrolované reakcie na rozhraní, čo viedlo k vzniku homogénnych spojov bez trhlín s optimalizovanými reakčnými vrstvami. Výsledné spoje dosiahli mimoriadne vysoké hodnoty pevnosti v šmyku, až ~220 MPa, pričom v niektorých prípadoch prekonal pevnosť základných keramických materiálov. Tieto výsledky spoločne predstavujú ucelený a ľahko aplikovateľný rámec pre spájanie vysokentropických keramik, ktorý výrazne posúva ich využiteľnosť v konštrukčných aplikáciách.

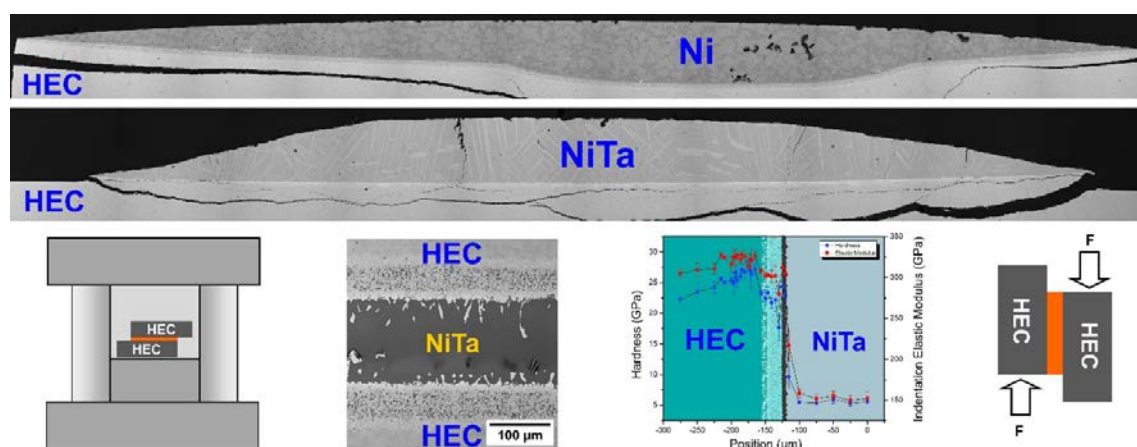


Fig. 1: Grafický abstrakt znázorňujúci zmáčavosť Ni a NiTa na povrchu vysokoentropických karbidov (HEC), schematická ilustrácia procesu spájania a odpovedajúca mikroštruktúra spoja s jeho mechanickými vlastnosťami.

Publikácie:

HOSSEINI, Naser - VALENZA, Fabrizio - CHLUP, Zdeněk - GAMBARO, S. - ŠIŠKA, Filip - MALINVERNI, Carla - XU, Jie - CASALEGNO, Valentina - KOVALČÍKOVÁ, Alexandra - TATARKOVÁ, Monika - SALVO, Milena - ZHOU, Xiaobing - TATARKO, Peter**. Wettability and brazing of (MoNbTaVW)C high-entropy carbide by Ni and NiTa. In Journal of Materials Research and Technology-JMR&T, 2025, vol. 39, p. 1599-1611. (2024: 6.6 - IF, Q1 - JCR, 1.318 - SJR, Q1 - SJR). <https://doi.org/10.1016/j.jmrt.2025.09.182> Typ: ADCA

HOSSEINI, Naser - VALENZA, Fabrizio - CHLUP, Zdeněk - GAMBARO, S. - MALINVERNI, Carla - CASALEGNO, Valentina - KOVALČÍKOVÁ, Alexandra - TATARKOVÁ, Monika - DLOUHÝ, Ivo - TATARKO, Peter**. Wetting and brazing of (HfTaZrNbTi)B₂ and (HfTaZrNbTi)C High-Entropy Ceramics by AgCuTi filler. In Open Ceramics, 2025, vol. 22, art no. 100792. (2024: 2.8 - IF, Q1 - JCR, 0.53 - SJR, Q2 - SJR). <https://doi.org/10.1016/j.oceram.2025.100792> Typ: ADMA

Projekty: APVV-21-0402; SK-CZ-RD-21-0089, APVV-SK-CN-23-0015

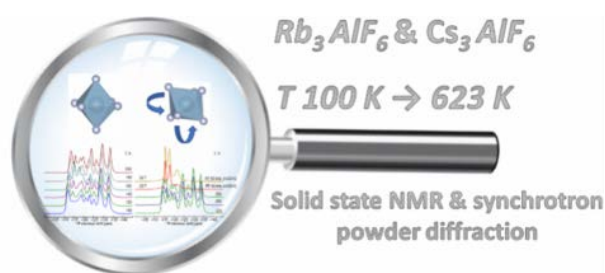
Úloha dynamických polyedrických rotácií vo fázových prechodoch Rb₃AlF₆ a Cs₃AlF₆

František ŠIMKO

Spolupracujúca inštitúcia: Conditions Extrêmes et Matériaux: Haute Température et Irradiation, Université Orléans, Francúzsko

Práca ukazuje komplementaritu použitia Rtg difrakcie a NMR analýzy na pochopenie zmien v lokálnych štruktúrach a ich dynamike, ku ktorým dochádza pri fázových prechodoch.

Metódy boli aplikované na dva fluoridové dvojité perovskity, Rb₃AlF₆ a Cs₃AlF₆, patriace do skupiny štruktúr s nekooperatívnym oktaedrickým nakláňaním - NCOT. Skúmali sa fázové prechody oboch zlúčenín, ktoré súviseli s dynamickými pohybmi ich AlF₆ oktaédrov. Očakávalo sa, že Rb₃AlF₆ a Cs₃AlF₆ prejdú zo svojich štruktúr *Fddd* alebo *C2/m* pri izbovej teplote do fáz *I4/m* a *I4₁/a* pri nižších teplotách, ale ukázalo sa, že to tak nie je. Môžu však stále uskutočniť fázové prechody kvôli zmrazeniu dynamických rotácií AlF₆, ktoré sú prítomné pri izbovej teplote. Je zaujímavé, že Rb₃AlF₆ vykazuje kryštalografické zmeny, keď sa rotácie zastavia, zatiaľ čo Cs₃AlF₆ nie. Tento rozdiel by mohol súvisieť s tým, či sa oktaedrické rotácie zastavia usporiadaným alebo neusporiadaným spôsobom. Táto práca vyplňa medzeru v chápaní kryštalografie takej komplikovanej skupiny materiálov, ako sú NCOT.

**Publikácia:**

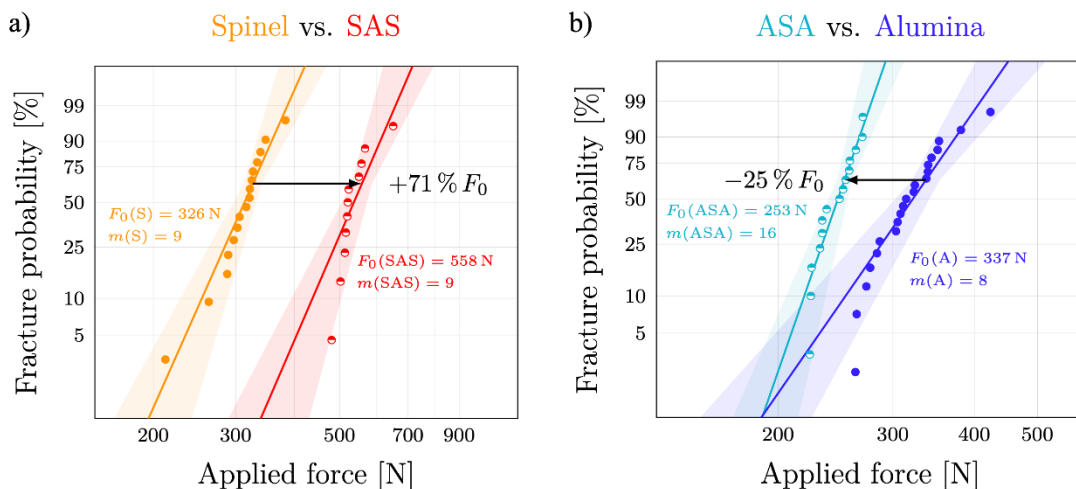
KING, Graham** - RAKHMATULLIN, Aydar - ŠIMKO, František. The Role of Dynamic Polyhedral Rotations in the Phase Transitions of Rb₃AlF₆ and Cs₃AlF₆. In *Inorganic Chemistry*, 2025, volume 64, no. 28, p. 14661-14669. (2024: 4.7 - IF, Q1 - JCR, 0.958 - SJR, Q1 - SJR). ISSN 0020-1669. <https://doi.org/10.1021/acs.inorgchem.5c02352> Typ: ADCA

Projekt: VEGA 2/0046/22

Mechanické vlastnosti optických materiálov: Zvýšenie odolnosti proti kontaktnému poškodeniu pomocou laminácie

Aliasghar NAJAFZADEHKHOEE, Dušan GALUSEK

Priehľadné keramické kompozity s vylepšenou odolnosťou voči poškodeniu sa získali vytvorením kompresnej vrstvy na povrchu kompozitov $\text{MgAl}_2\text{O}_4/\text{Al}_2\text{O}_3$. Rôzne viacvrstvové telesá boli vyrobené stohovaním a termokompresiou jednotlivých vrstiev pripravených metódou tape casting; lamelárne telesá boli následne zhutnené pomocou SPS spekania na získanie priehľadných telies. Mechanické vlastnosti vyrobených vzoriek boli študované z hľadiska sily potrebnej na iniciáciu prasklín pri Hertzovom kontakte. Výsledky ukázali, že kompozitné telesá $\text{MgAl}_2\text{O}_4/\text{Al}_2\text{O}_3/\text{MgAl}_2\text{O}_4$ vykazujú najvyššiu odolnosť voči praskaniu. Rozdiel v koeficiente tepelnej rozťažnosti vrstiev vysvetľuje tvorbu kompresnej vrstvy na povrchu, ktorá bráni iniciácii prasklín.



Weibullove rozdelenia dát RCIF pre: a) spinel versus SAS b) oxid hlinitý (alumina) versus ASA. Plné čiary predstavujú najlepšie prispôsobenie dát podľa metódy maximálnej vierohodnosti. Pásma označujú 90 % intervaly spoľahlivosti. Charakteristická hodnota RCIF (F_0) a Weibullov modul pre každú dátovú sadu sú uvedené v grafoch.

Publikácia:

NAJAFZADEHKHOEE, Aliasghar** - JABR, Abdullah - TALIMIAN, Ali - PAPSÍK, Roman - DRDLÍK, Daniel - MACA, Karel - GALUSEK, Dušan - BERMEJO, Raúl. Improving contact damage resistance of spinel translucent ceramics through a multi-layer design. In Journal of the European Ceramic Society, 2025, vol. 45, no. 4, art no. 117071. (2025: 6.2 - IF, Q1 - JCR, 1.3 - SJR, Q1 - SJR). <https://doi.org/10.1016/j.jeurceramsoc.2024.117071> Type: ADCA.

Projekt: EU NextGenerationEU through the Recovery and Resilience Plan for Slovakia under the project No. 09I03-03-V04-00196

2.4. Publikačná činnosť (zoznam je uvedený v prílohe A-3)

Tabuľka 2e Štatistika vybraných kategórií publikácií

PUBLIKAČNÁ A EDIČNÁ ČINNOSŤ	Počet v r. 2025/ doplňky z r. 2024
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)	0 / 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)	1 / 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)	57 / 0
10. Vedecké práce registrované vo Web of Science Core Collection alebo Scopus (ADMA, ADMB, ADNA, ADNBN)	18 / 0
11. Vedecké práce v ostatných domácich časopisoch (ADFA, ADFB)	0 / 0
12. Vedecké práce v ostatných zahraničných časopisoch (ADEA, ADEB)	1 / 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)	1 / 0
16. Publikované príspevky na zahraničných vedeckých konferenciách (AFA, AFC)	1 / 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. 2024 (zdroj JCR) <i>Počet článkov / doplnky</i>	44 / 0	25 / 0	3 / 0	0 / 0	72 / 0
Podľa SJR z r. 2024 (zdroj Scimago) <i>Počet článkov / doplnky</i>	44 / 0	25 / 0	4 / 0	2 / 0	75 / 0

Tabuľka 2g Ohlasy

OHLASY	Počet v r. 2024/ doplnky z r. 2023
Citácie vo WOS (1.1, 2.1)	2914 / 18
Citácie v SCOPUS (1.2, 2.2)	226 / 4
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 / 1
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	51
Prednášky a vývesky na národných vedeckých podujatiach	85

2.6. Vyžiadané prednášky

Ak boli príspevky publikované, sú súčasťou prílohy A-3, kategória (AFC, AFD, AFE, AFF, AFG, AFH)

2.6.1. Vyžiadané prednášky na medzinárodných vedeckých podujatiach

ASHER, James Richard, - BERGER, Raphael. Application of toroidal-poloidal decomposition to magnetically-induced current densities. XVIIth Workshop on Modern Methods in Quantum Chemistry. Mariapfarr, Rakúsko, 23. – 28. 02. 2025

Boccaccini, Aldo R. – GALUSEK, Dušan. Glass and glass-ceramics with therapeutic and antimicrobial properties, ACA XIII, Serbian Ceramic Society Conference, Belehrad, Srbsko, 08. – 10. 09. 2025

BOČA, Miroslav. Systematic research on the selected ternary lanthanide fluoride systems, 2025 International Academic Conference on Innovative Development of Metallurgy & International Academic Conference on High-Quality Development of Metallurgical Resources and Intelligent Preparation of Materials, Shenyang, Čína, 17. – 19. 10. 2025

BUČKO, Tomáš – VRŠKA, David – PITOŇÁK, Michal. Benchmarking electronic structure methods in anharmonic finite-temperature thermodynamic calculations, WATOC, Oslo, Nórsko, 22. – 27. 06. 2025

DRDLIKOVA, Katarina - KLEMENT, Robert - HAVLIKOVA, Tereza - MICHÁLKOVÁ, Monika - MACA, Karel - GALUSEK, Dušan - DRDLIK, Daniel. High-entropy garnets with lanthanum: structural tuning and improved photoluminescence. ACA XIII, Serbian Ceramic Society Conference, Belehrad, Srbsko, 08. – 10. 09. 2025

HANZEL, Ondrej – TATARKOVÁ, Monika – NETRIOVÁ, Zuzana – ŠAJGALÍK, Pavol. Dynamic Oxidation Resistance and Functional Properties of Additive-free Silicon Carbide Ceramics, The 14th International conference on High-Performance Ceramics (CICC-14), Haikou, China, 30.11 – 03.12.2025. Keynote lecture

HOSSEINI, Naser - VALENZA, Fabrizio - CHLUP, Zdeněk - GAMBARO, Sofia - KOVALČIKOVÁ, Alexandra - TATARKOVÁ, Monika - DLOUHÝ, Ivo - TATARKO, Peter. Novel ultra-high temperature ceramics: Processing and integration, 8th Conference of the Serbian Society for Ceramic Materials, 18-20.06.2025, Belehradc, Srbsko.

KOMOROVSKÝ, Stanislav. Current densities as a means for analyzing magnetic properties in the relativistic regime. XVIIth Workshop on Modern Methods in Quantum Chemistry. Mariapfarr, Rakúsko, 23. – 28. 02. 2025

KUBÍKOVÁ, Blanka – MLYNÁRIKOVÁ, Jarmila – VASKOVÁ, Zuzana – MATSELKO, Oksana – BOČA, Miroslav. Solubility investigation of selected RE₂O₃ in (LiF-NaF)_{eut} vs (LiF-NaF-REF₃) molten systems, 2025 International Academic Conference on Innovative Development of Metallurgy & International Academic Conference on High-Quality Development of Metallurgical Resources and Intelligent Preparation of Materials, Shenyang, Čína, 17. – 19. 10. 2025

MALKINA, Oľga. Solvent effects on 1J(Metal-P) couplings. Part 2, XVIIth Workshop on Modern Methods in Quantum Chemistry, Mariapfarr, Rakúsko, 23. – 28. 02. 2025

MALKIN, Vladimír – MALKINA, Oľga. Zurück in die Zukunft: SO correction to NMR shielding. XVIIth Workshop on Modern Methods in Quantum Chemistry, Mariapfarr, Rakúsko, 23. – 28. 02. 2025

MICHÁLKOVÁ, Monika - CIBRÍNOVÁ, Andrea - GHADAMYARI, Marzieh - VALÚCHOVÁ, Jana - HASSANI, Hamid - TALIMIAN, Ali - GALUSEK, Dušan. Cold sintering of a YAG composition glass. ACA XIII, Serbian Ceramic Society Conference, Belehrad, Srbsko, 08. – 10. 09. 2025

TALIMIAN, Ali – NAJAFZADEKHOOE, Aliasghar - MICHÁLKOVÁ, Monika – MACA, K. - GALUSEK, Dušan Hard-to-sinter oxide ceramics: are there easier ways how to sinter them? 16th Pacific Rim Conference on Ceramic and Glass Technology/GOMD 2025, Vancouver, Kanada, 04 – 09. 05. 2025

TATARKO, Peter – ÜNSAL, Hakan – ATES, Sahin – VALENZA, Fabrizio – ZHOU, Xiaobing – KUMAR, Ravi – HÍČÁK, Michal – CASALEGNO, Valentina – DLOUHÝ, Ivo. Novel ultra-high temperature ceramic matrix composites: Development and integration, The 14th International Conference on High-Performance Ceramics, Haikou, Čína, 30.11 – 03.12.2025.

2.6.2. Vyžiadané prednášky na národných vedeckých podujatiach

2.6.3. Vyžiadané prednášky na významných vedeckých inštitúciách

BOHÁČ, Peter. Photoactive Hybrid Systems Based on Layered Silicates: Interactions and Photophysical Implications. Faculty of Materials for Energy, Shimane University, Japonsko, 23. 10. 2025

BUČKO, Tomáš. An efficient approach to fully anharmonic thermodynamics and reaction kinetics at multiple levels of electronic structure, Ostravská univerzita, Česko, 28. 11. 2025

BOČA, Miroslav. Systematic research on the selected ternary lanthanide fluoride systems. Northeastern University, Shenyang, Čína, 19. 10. 2025.

BOČA, Miroslav. Density and volume properties of molten systems. Northeastern University, Shenyang, Čína, 19.10.2025.

BOČA, Miroslav. Systematic research on the selected ternary lanthanide fluoride systems. Shanghai Institute of Applied Physics, CAS v Šanghaji, Čína, 19. 11. 2025.

HANZEL, Ondrej – TATARKOVÁ, Monika – NETRIOVÁ, Zuzana – ŠAJGALÍK Pavol. Preparation and functional properties of additive-free silicon carbide ceramics, Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, Ningbo 315201, China, 05.12.2025

KUBÍKOVÁ, Blanka – MLYNÁRIKOVÁ, Jarmila – NETRIOVÁ, Zuzana – VASKOVÁ, Zuzana – MATSELKO, Oksana – BOČA, Miroslav. Physico-chemical investigation of selected lanthanide trifluorides in molten eutectic mixture LiF-NaF. Shanghai Institute of Applied Physics, CAS v Šanghaji, Čína, 19. 11. 2025.

MALKINA, Oľga – MALKIN, Vladimír. Insights from theory into the mechanism of NMR spin-spin coupling: the role of vacant antibonding orbitals, Univerzita St Andrews, Veľká Británia, 7. 10. 2025

MALKINA, Oľga – MALKIN, Vladimír. Investigation of the effect of solvation on 1J(Metal-P) spin-spin coupling, ICMUB Institut de Chimie Moléculaire de l'Université de Bourgogne, Dijon, Francúzsko, 17. 10. 2025

MATEJDES, Marián. Functionalization of layered silicates, Svolvær, Norwegian University of Science and Technology NTNU, Nórsko, 06. 06. 2025

MATEJDES, Marián. Beyond one-dimensional swelling of 2D materials, Bayreuth, Nemecko, 31. 03. 2025

PLANETOVÁ, Viktória. Insights into the photophysical properties of benzothiazole-based dyes in hybrid silicates dispersions. Shimane University, Matsue, Japonsko, 23. 10. 2025

SLANÝ, Michal. Novel thiol-functionalized montmorillonite/biochar nanocomposite for immobilization of heavy metals from contaminated floodplain soil, Bergische Universität Wuppertal, Nemecko, 17. 06. 2025

ÜNSAL, Hakan – ATES, Sahin – HICĎÁK, Michal – TATARKOVÁ, Monika – CHLUP, Zdeněk – DLOUHÝ, Ivo – KUMAR, Ravi – TATARKO, Peter. Novel ceramic composites for extreme environments, Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, Ningbo 315201, Čína, 05.12.2025

2.7. Patentová a licenčná činnosť na Slovensku a v zahraničí v roku 2025

2.7.1. Vynálezy, na ktoré bol v roku 2025 udelený patent

a) na Slovensku

b) v zahraničí

2.7.2. Vynálezy prihlásené v roku 2025

a) na Slovensku

Názov vynálezu: Tiolom funkcionizovaný ílovo-biocharový kompozitný adsorbent a jeho použitie

Číslo prihlášky: 190-2025

Dátum priority: 31.12.2025

Majiteľ / spolumajiteľ: USTARCH SAV

Pôvodcovia vynálezu: Slaný Michal, Žemlička Matúš

b) v iných krajinách ako prioritná prihláška

c) PCT

d) EP

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 2025

b) udelené v roku 2025

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 2025 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
Pavlík Viliam	Postdok Grant	6
Tatarko Peter	VEGA	2

2.9. Účasť na spracovaní hesiel do encyklopédie Beliana

Počet autorov hesiel: 0

2.10. Recenzovanie knižných publikácií a príspevkov vo vedeckých časopisoch

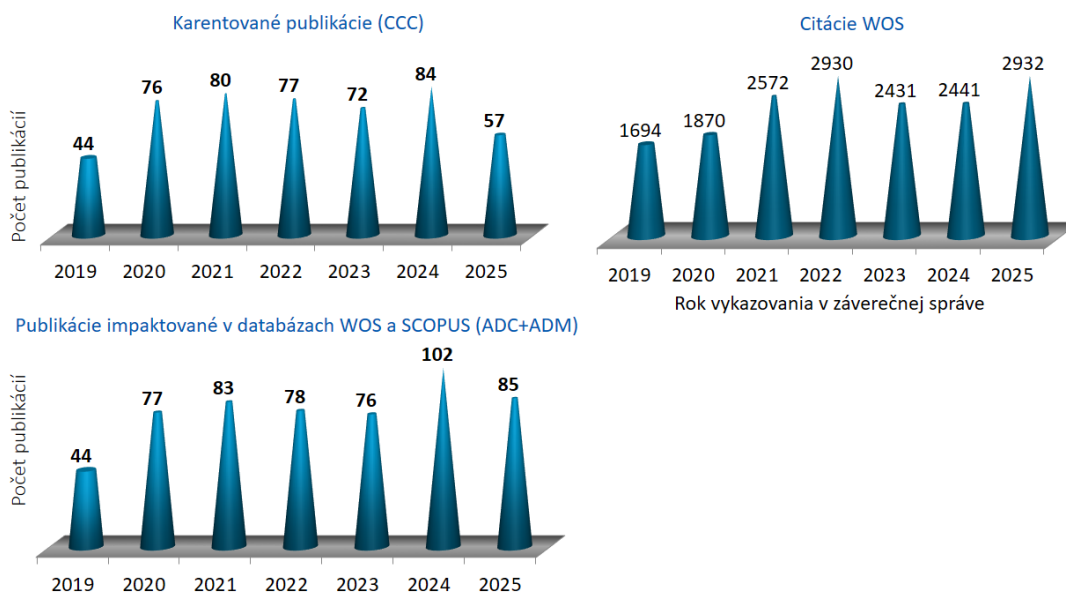
Tabuľka 2j Počet vypracovaných recenzií na vedecké monografie, vedecké štúdie a zborníky

Meno pracovníka	Ved. monografie		Príspevky v časopisoch			Zborníky	
	Domáce	Zahra-ničné	WoS, SCOPUS	Iné databázy	Ostatné	Domáce	Zahra-ničné
Boháč Peter	0	0	4	0	0	0	1
Bučko Tomáš	0	0	6	0	0	0	0
Hanzel Ondrej	0	0	6	0	0	0	0
Komorovský Stanislav	0	0	4	0	0	0	0
Kureková Valéria	0	0	0	0	0	0	0
Kureková Valéria	0	0	1	0	0	0	0
Lenčes Zoltán	0	0	11	0	0	0	0
Malkin Oľga	0	0	5	0	0	0	0
Micháľková Monika	0	0	5	0	0	0	0
Páľková Helena	0	0	2	0	0	0	0

Pavlík Viliam	0	0	1	0	0	0	4
Pribus Marek	0	0	1	0	0	0	0
Slaný Michal	0	0	7	0	0	0	0
Tatarko Peter	0	0	15	0	0	0	0
Spolu	0	0	68	0	0	0	5

2.11. Iné informácie k vedecko-výskumnej 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 2025, sa publikovalo 57 publikácií v CCC časopisoch, t.j. 1,27 publikácie na vedeckého pracovníka (FTE v 2025 - 44,99). Ak do výpočtu zahrnieme aj práce v nekarentovaných, ale impaktovaných časopisoch zahrnutých v databázach WOS a Scopus (56+15 publikácií), tak počet publikácií na jedného vedeckého pracovníka stúpne na 1,58. V obrázkoch a tabuľkách uvedených ďalej je možné sledovať trendy v posledných rokoch vo vývoji počtu karentovaných publikácií, ako aj trendy v počte karentovaných publikácií vzťahnutých na FTE vedeckých pracovníkov. Ďalším sledovanými parametrami sú ohlasy na práce s afiliáciou ústavu uvedených vo WOS databáze, ako aj vývoj priemerného impakt faktoru výstupov (podľa JCR). Podstatnou skutočnosťou je, že stabilne rastie počet publikácií v časopisoch s IF vyšším ako 5. Priemerný impakt faktor bol v roku 2025 – IF 5,13.



Významnou časťou vedeckej aktivity je účasť na výzvach v rôznych projektových schémach. Každoročne, 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).

Vo všeobecnej výzve 2024, v ktorej bol začiatok riešenia september 2025 sa podávalo niekoľko APVV projektov. Tri projekty sú financované. Zoznam podaných projektov, ktorých počty sú uvedené v tabuľke 2b

Názov projektu: Vývoj karbidu kremičitého pre extrémne aplikácie

Evidenčné číslo: APVV-24-0442

Akronym: DESICAEX

Koordinátor: ÚACh SAV, v.v.i. (O. Hanzel)

Partner/i: -

Stav: financovaný

Názov projektu: Aplikácia nových biouhlím funkcionalizovaných geopolymérov pri nakladaní s nebezpečným odpadom

Evidenčné číslo: APVV-24-0133

Akronym: BIOGEOAP

Koordinátor: ÚACh SAV, v.v.i. (M. Slaný)

Partner/i: -

Stav: financovaný

Názov projektu: Zelená energetická inovácia: Entropicky inžinierované perovskitové oxidy pre termoelektrické aplikácie

Evidenčné číslo: APVV-24-0403

Akronym: GREEN-POT

Koordinátor: ÚACh SAV, v.v.i. (H. Ünsal)

Partner/i: -

Stav: financovaný

Názov projektu: Fluoridové systémy pre recykláciu kritických materiálov / Fluoride-based systems for recycling of critical materials

Evidenčné číslo: APVV-24-0377

Akronym: FRESCO

Koordinátor: ÚACh SAV, v.v.i. (M. Boča)

Partner/i: -

Stav: nepodporený

Názov projektu: Vysokoentropická optická keramika: Od kontroly zloženia po luminiscenciu na mieru,

Evidenčné číslo: APVV-24-0363

Akronym: LUMIHEC

Podávateľ projektu: Klement/Galusek - TnUAD/UACH SAV

Stav: nepodporený

Názov projektu: Interakcie vrstevnatých silikátov s organosilánmi: Nové stratégie pre inovatívne funkčné materiály/ Tailoring layered silicates with organic silanes: A pathway to innovative functional materials

Evidenčné číslo: APVV-24-0647

Akronym: SILINOVAMA

Koordinátor: ÚACh SAV, v.v.i. (H. Pálková)

Stav: nepodporený

Názov projektu: Roztavené a tuhé fluoridy: reakcie, štruktúra a materiálové vlastnosti oxo-fluóro-hlinitanov pre elektronické aplikácie (Molten and Solid Fluorides: Reactions, Structure and Material Properties of Oxo-Fluoro-Aluminates for Electrochemical Applications)

Evidenčné číslo: APVV-25-0345

Akronym: MOREMAS

Koordinátor: ÚACh SAV, v.v.i. (F. Šimko)

Partneri: Fyzikálny ústav SAV, v.v.i.

Stav: nepodporený

Názov projektu: Mechanochemická cesta k transparentnej keramike s granátovou štruktúrou

Kód projektu: DS-FR-24-0023

Koordinátor projektu: Monika Micháľková/ TnUAD

Stav: nepodporený

Zoznam projektov podaných vo výzvach **Štrukturálnych fondov**. Žiaden z projektov nie je financovaný. **PSK-MSVVM-020-2024-DV-EFRR - SVaV - Strategický výskum a vývoj prostredníctvom partnerstiev**

Názov projektu: Výskum a vývoj materiálov na báze monokryštálov pre laserové aplikácie číslo projektu: NFP401101C098

Koordinátor/žiadateľ projektu názov inštitúcie: Ústav anorganickej chémie SAV, v. v. i. Partneri: Žilinská univerzita v Žiline, Technická univerzita v Košiciach, CVTI - Medzinárodné laserové centrum, AT Crystals, s.r.o., Crystal Tech, s.r.o.

Názov projektu: Vývoj nových funkčných geopolymérov a ich aplikácia pri ochrane životného prostredia

Identifikačné číslo: NFP401101C208

Koordinátor/žiadateľ: Slaný, Michal / Stavebná fakulta STU

Partneri: ÚACh SAV, v.v.i., Katedra mineralógie, petrológie a ložiskovej geológie, Katedra Geochemie PriF UK, Fakulta prírodných vied UCM v Trnave, Výskumný ústav rastlinnej výroby, Piešťany, ENVIRONCENTRUM, s.r.o., Nuclear Power, a.s.

Názov projektu: ProMaTech Strategický výskum a vývoj v oblasti progresívnych materiálov a technológií pre udržateľnú priemyselnú produkciu

Kód projektu: NFP401101C522

Koordinátor projektu: AT Crystals, s.s.o. Jakubíková/Kraxner/Micháľková

Partneri: ÚACh SAV v.v.i., Žilinská univerzita v Žiline.

Stav: Nefinancovaný

Názov projektu: M4E - Materiály pre efektívnu výrobu, konverziu, transport, uskladnenie a bezpečné využívanie energie

Kód projektu: NFP401103H278

Koordinátor projektu: Slovenská akadémia vied

Partneri: ÚACh SAV v.v.i., InoBat Auto j.s.a, ROEZ R&D s.r.o., Trenčianska univerzita Alexandra Dubčeka v Trenčíne, Ústav geotechniky Slovenskej akadémie vied, verejná výskumná inštitúcia, Ústav materiálového výskumu Slovenskej akadémie vied, verejná výskumná inštitúcia

Stav: Nefinancovaný

V roku 2025 sa pokračovalo v riešení projektov Plánu obnovy a odolnosti SR. K ôsmim projektom, ktoré začali v roku 2024, pribudlo ďalších päť projektov. V rámci projektu Nová generácia termoelektrických materiálov pre udržateľnú energiu s rozpočtom 3 mil. EUR bolo zaobstaraných a

nainštalovaných niekoľko prístrojov. Budovanie infraštruktúry v rámci projektov Plánu obnovy bude ukončené do polovice roka 2026.

Tiež je potrebné vyzdvihnúť úspešnosť ústavu naprieč vnútornými výzvami SAV – roku 2025 získala Tímea Šimonová PostdokGrant s hodnotením A, okrem toho piati doktorandi boli úspešní v grantovej schéme SAV - Doktgrant.

Účasť v medzinárodných schémach EÚ

V priebehu roka 2025 Ústav sa prvý krát podieľal na podaní projektu ERC.

Názov projektu: An Efficient and Robust Approach to the Prediction of EPR and Paramagnetic NMR Spectra of Systems Containing Heavy Elements

Koordinátor projektu: S. Komorovský, Ústav anorganickej chémie SAV, v. v. i.

Schéma: ERC-2025-ADG, HORIZON-ERC, HORIZON-AG-LS

Acronym: ERA-pSPEC

Evidenčné číslo: 101267234

Názov projektu: Nitrogen-doped graphene as a gas sensor: from toxic dyes towards sustainable applications,

Výzva: M-ERA.NET Call 2025

Acronym: NitroGRAPH

Koordinátor: Norwegian University of Science and Technology NTNU (Jon Fossum)

Partneri: Ústav anorganickej chémie SAV, v.v.i. (M. Matejdes), ČR – karlova Univerzita, Nórsko - NORECS AS, Norway, ATLA lasers, Brazília - São Paulo State University

Názov projektu: MXene-Based Catalysts for Sustainability Chemical Challenge

Typ projektu: COST

Evidenčné číslo: OC-[2025-1-28887](#)

Zapojili sa inštitúcie z 23 krajín, z toho dve zo Slovenska. Za ÚACH zodpovedná P. Petrisková.

3. Medzinárodná vedecká spolupráca

3.1. Medzinárodné vedecké podujatia

3.1.1. Medzinárodné vedecké podujatia, ktoré organizácia SAV organizovala v roku 2025 alebo sa na ich organizácii podieľala, s vyhodnotením vedeckého a spoločenského prínosu podujatia

XVIIth Workshop on Modern Methods in Quantum Chemistry, Mariapfarr, Rakúsko, 45 účastníkov, 23.08.-28.08.2025

Účastníci z Nemecka, Českej republiky, Dánska, Fínska, Rakúska), 29 prednášok

20th Central European Symposium on Theoretical Chemistry, Stará Lesná, Slovensko, 118 účastníkov, 08.09.-11.09.2025

Účastníci z Rakúska, Česka, Poľska, Slovenska, a Japonska, 38 prednášok, 68 postrov

Príprava a vlastnosti progresívnych keramických materiálov a skiel, Mojmirovce, Slovensko, 45 účastníkov, 29.10.-31.10.2025

Odborný seminár vedeckých pracovníkov 6 inštitúcií (UACH SAV Bratislava, UMF SAV Košice, FUNGLASS Trenčín, FCHPT STU Bratislava, FMFI UK Bratislava, CEITEC Brno) s cieľom prezentácie aktuálnych vedeckých výsledkov a nadviazania spolupráce medzi pracoviskami. Na odbornom seminári odznelo celkovo 39 prednášok.

Slovenská a česká konferencia o skle, Trenčín, 12.11.-14.11.2025

Pravidelné stretnutie odborníkov v oblasti výskumu, vývoja a technológií v oblasti skla organizované striedavo Českou a Slovenskou sklárskou spoločnosťou v spolupráci s relevantnými akademickými partnermi v oboch krajinách

3.1.2. Medzinárodné vedecké podujatia, ktoré usporiada organizácia SAV v roku 2026 (anglický a slovenský názov podujatia, miesto a termín konania, meno, telefónne číslo a e-mail zodpovedného pracovníka)

XVIIIth Workshop on Modern Methods in Quantum Chemistry/XVIIIth Workshop on Modern Methods in Quantum Chemistry, Mariapfarr, Rakúsko, 22.03.-27.03.2026, (Vladimír Malkin, 02/59410469, uachmalk@savba.sk)

3.1.3. Počet pracovníkov v programových a organizačných výboroch medzinárodných konferencií

Tabuľka 3a Programové a organizačné výbory medzinárodných konferencií

Meno pracovníka	Programový	Organizačný	Programový i organizačný
Asher James Richard	0	0	1
Komorovský Stanislav	0	0	1
Spolu	0	0	2

3.2. Členstvo a funkcie v medzinárodných orgánoch

3.2.1. Členstvo a funkcie v medzinárodných vedeckých spoločnostiach, úniách a národných komitétach SR

PharmDr., MPhil. Ayesha Asbat

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

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)

MSc. Vinny George

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

Ing. Ondrej Hanzel, PhD.

European Ceramic Society (funkcia: člen)

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)

doc. Mgr. Anna Kityk, PhD.

International Society of Electrochemistry (funkcia: člen)

Royal Society of Chemistry (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)

MSc. Parisa Labib Shotorban

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 sklárská společnost (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)

Oksana Matselko, PhD.

European Crystallographic Association (funkcia: člen)

Dr. Aliasghar Najafzadehkhoe, Ph.D.

European Ceramic Society (ECerS) (funkcia: Member)

Ing. Helena Pálková, PhD.

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

Mgr. Viktória Planetová

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)

3.3. Účast' expertov na hodnotení medzinárodných projektov (EÚ RP, ESF a iných)

Tabuľka 3b Experti hodnotiaci medzinárodné projekty

Meno pracovníka	Typ programu/projektu/výzvy	Počet hodnotených projektov
Bučko Tomáš	Fonds voor Wetenschappelijk Onderzoek - Vlaanderen – FWO, FWF Austrian Science Fund	2
Tatarko Peter	Fundamental and Applied Research, Latvian Council of Science	2
	HORIZON-MSCA-2025-PF	7

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

Peter Boháč

- Shimane University, Japonsko, 20 – 29. 10. 2025, experimentálne merania analýzy reaktívnych foriem kyslíka generovanými fotoaktívnymi hybridnými systémami pripravenými v rámci riešenia projektu APVV-22-0150 s využitím infraštruktúry laboratórií. Pozvaná prednáška " Photoactive Hybrid Systems Based on Layered Silicates: Interactions and Photophysical Implications".

Vinny George

- Polymer and Composite Engineering (PaCE) group, Department of Materials Chemistry, Faculty of Chemistry, University of Vienna, Rakúsko, 24.-26. november 2025, experimentálne práce zamerané na XPS analýzu kompozitov pripravených v rámci projektu DoktoGrant.

Parisa Labib

- Jerzy Haber Institute of Catalysis and Surface Chemistry, Polish Academy of Sciences, Krakow, Poľsko. 11.-15. 11. 2025 Výskumný pobyt zameraný na experimentálne práce na projekte DoktoGrant ako aj na analýzu vzoriek pripravených v projekte použitím SEM metódy.

Michal Slaný

- ČVUT Praha, Česká republika, 06. – 10. 02. 2025, merania ICP-OES (Emisný spektrometer s indukčne viazanou plazmou) a vyhodnotenie adsorpcie na vzorkách pripravených v projekte Plánu obnovy a odolnosti 09I03-03-V04-00140.

- Bergische Universität Wuppertal, Nemecko, 14. – 06. 07. 2025, experimentálne práce v laboratóriách Laboratory of Soil- and Groundwater- Management at the Institute of Soil Engineering, Waste and Water Science of the University of Wuppertal, ktoré boli potrebné pre úspešnú implementáciu projektu Plánu obnovy a odolnosti Slovenska pod č. 09I03-03-V04-00140. Toto biogeochemické laboratórium je veľmi výnimočné a schopné simulovať reálne environmentálne podmienky v pôdach a tak testovať imobilizačnú účinnosť a vlastnosti vyvinutého kompozitu, ako keby prebiehali v reálnych podmienkach.

Marian Matejdes

- UBT Bayreuth, Nemecko, 24/03-25/04/2025 a 10/07-19/07/2025, riešenie projektu SASPRO2

1258/02/02, pokračovanie v spolupráci a experimentov na konfokálnom mikroskope PicoQuant MT200.

Pobyty dlhšie ako 1 mesiac

Asif Ali

- Faculty of Technology, University of Novi Sad, Novi Sad, Srbsko, Grant of European Ceramic Society – JECS Trust. Téma: New entropy stabilized perovskites for sustainable energy. 09.06-29.08.2025

Sanam Bashir

- Institute of Soil Research, BOKU, Vienna, Grant- Austria-Slovakia Action for postdoctoral researchers: Comparative Study of PFOA Adsorption on TBP-Modified Montmorillonite and Beidellite Using DFT and AIMD Simulations, 01.09.2025-30.11.2025

Nasser Hosseini

- Fraunhofer Institute for ceramic technologies and systems, Drážďany, Nemecko, Erasmus+ internship grant. Téma: Study of Wetting Behaviour of molten alloys on various high-entropy ceramic substrates, 02.02-30.03.2025

Viktória Planetová

- Shimane University, Matsue, Japonsko, Národný štipendijný program SR (NŠP) na podporu doktorandov, Interakcie riadené nábojom v hybridných systémoch farbiva a kremičitanu: Fotofyzikálne prechody od koloidov k tenkým filmom. Výskumný program na Univerzite Shimane bol zameraný na vývoj nových hybridných systémov, ktoré kombinujú nové kationové farbivá na báze benzotiazolu s vrstevnatými silikátmi zo skupiny smektitov. Boli študované fotofyzikálne interakcie pomocou spektroskopických metód, so zameraním na analýzu vplyvu nábojových interakcií farbív s povrchovým nábojom smektitu a prechodu z koloidnej do pevnej fázy. Veľká časť odborného programu bola zameraná na prípravu tenkých filmov novou metódou – filtráciou disperzie a následným odtlačením na sklíčko. 1.9. – 5.12. 2025

Prednášky zahraničných hostí na ÚACH SAV, v.v.i.

prof. Ravi Kumar Indian Institute of Technology Madras, Chennai (India)
Advanced Ceramics for strategic self-reliance, 8. september 2025

Dr. Eleni Gianni Department of Environment, Ionian University, Zakynthos (Grécko)
From atoms to applications: Molecular simulations of clay-organic interface. 16. december 2025

prof. Teresa J. Bandos The City College of New York (USA)
Beyond Adsorption: Exploring the silent aspect of carbon porosity

*Prehľad údajov o medzinárodnej mobilite pracovníkov organizácie je uvedený v Prílohe A-5.
Prehľad a údaje o medzinárodných projektoch sú uvedené v kapitole 2 a Prílohe A-2.*

4. Aplikácia výsledkov výskumu v praxi

4.1. Výsledky výskumu organizácie aplikované v technologickej a všeobecnej spoločenskej praxi

4.2. Kontraktový – zmluvný výskum (vrátane zahraničných kontraktov)

Názov/účel kontraktového výskumu: Dissolution rate of different aluminas (SOW 5 under contract No: CW2142413)

Zadávatel' výskumného kontraktu: Rio Tinto Aluminium Pechiney, Francúzsko

Začiatok spolupráce: 2021

Ukončenie spolupráce: 2025

Finančný prínos pre organizáciu (€): 20205

4.3. Iné formy aplikácie výsledkov výskumu a využitia odbornosti

5. Doktorandské štúdium a pedagogická činnosť

5.1. Údaje o doktorandskom štúdiu

Tabuľka 5a Počet doktorandov v roku 2025

Forma	Počet k 31.12.2025				Počet doktorandov po doktorandskej skúške		Počet ukončených doktorantúr v r. 2025					
							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	5	5	1	0	3	5	2	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	5	5	1	0	3	5	2	1	0	0	0	0
Z toho zahraničných	4	3	1	0	2	3	2	1	0	0	0	0
Súhrn	10		1		8		3		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 2025 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.

5.2. Zmena formy doktorandského štúdia

Tabuľka 5b 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

5.3. Zoznam doktorandov, ktorí ukončili doktorandské štúdium úspešnou obhajobou

Tabuľka 5c Menný zoznam ukončených doktorandov v roku 2025 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 hodnotu
MSc. Guido de La Torre Olvera	interné štúdium hrazené z prostriedkov SAV	9 / 2021	8 / 2025	1420 chémia	Mgr. Monika Tatarková PhD., Ústav anorganickej chémie SAV, v. v. i.	Prírodovedecká fakulta UK
MSc. Naser Hosseini	interné štúdium hrazené z prostriedkov SAV	11 / 2021	8 / 2025	1420 chémia	Ing. Peter Tatarko PhD., Ústav anorganickej chémie SAV, v. v. i.	Prírodovedecká fakulta UK
MSc. Inga Zhukova	interné štúdium hrazené z prostriedkov SAV	9 / 2021	8 / 2025	1420 chémia	Ing. Peter Tatarko PhD., Ústav anorganickej chémie SAV, v. v. i.	Prírodovedecká fakulta UK

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

Tabuľka 5d Menný zoznam ukončených doktorandov v roku 2025 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 hodnotu

5.5. Uplatnenie absolventov doktorandského štúdia

Tabuľka 5e Prehľad uplatnenia absolventov doktorandského štúdia

Počet absolventov PhD. štúdia v roku 2025 (obhajoba leto 2025)	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
3	2	0	0	0

Číslo v prvom stĺpci musí byť súčtom čísel v stĺpcoch 2-4, pokiaľ je známe uplatnenie dočasne nezamestnaného absolventa/ky a bude zahrnutý do stĺpcov 2-4. Ak jeho/jej uplatnenie nie je známe, musí byť číslo v stĺpci 1 súčtom čísel v stĺpcoch 2-5

Zoznam interných a externých doktorandov je uvedený v prílohe A-1.

5.6. Medzinárodné doktorandské štúdium

Tabuľka 5f Počet študentov v medzinárodných programoch doktorandského štúdia a počet zahraničných doktorandov

Cotutelle	Co-direction	Iné	Zahraníční doktorandi štátne občianstvo/počet
0	0	0	IND/2, IRN/2, PAK/2, ECU/1, ESP/1, PRT/1, RUS/1

Zahraníční 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.

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

Tabuľka 5g 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)
chémia	1420	anorganická chémia	Prírodovedecká fakulta UK
chémia	1420	anorganická chémia	Fakulta chemickej a potravinárskej technológie STU
chémia	1420	fyzikálna chémia	Prírodovedecká fakulta UK
chémia	1420	fyzikálna chémia	Fakulta chemickej a potravinárskej technológie STU
chémia	1420	teoretická a počítačová chémia	Prírodovedecká fakulta UK
chemické inžinierstvo a technológie	2820	Anorganická technológia a materiály	Fakulta chemickej a potravinárskej technológie STU
chemické inžinierstvo a technológie	2820	Anorganická technológia a nekovové materiály	Trenčianska univerzita Alexandra Dubčeka v Trenčíne

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.

Tabuľka 5h 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 hodnotu alebo vyšší kvalifikačný stupeň
doc. Ing. Miroslav Boča, DrSc. (chémia)	doc. Ing. Miroslav Boča, DrSc. (Fakulta chemickej a potravinárskej technológie STU)	

doc. Ing. Miroslav Boča, DrSc. (chemické inžinierstvo a technológie)	doc. Ing. Miroslav Boča, DrSc. (Trenčianska univerzita Alexandra Dubčeka v Trenčíne)	
doc. Ing. Miroslav Boča, DrSc. (odbor v zahraničí)	prof. RNDr. Juraj Bujdák, DrSc. (Prírodovedecká fakulta UK)	
prof. RNDr. Juraj Bujdák, DrSc. (anorganická chémia)	prof. Ing. Dušan Galusek, DrSc. (Fakulta špeciálnej techniky TnUAD)	
prof. RNDr. Juraj Bujdák, DrSc. (fyzikálna chémia)	prof. Ing. Dušan Galusek, DrSc. (Fakulta zdravotníctva TnUAD)	
prof. Ing. Dušan Galusek, DrSc. (anorganická technológia a materiály)	prof. Ing. Dušan Galusek, DrSc. (Trenčianska univerzita Alexandra Dubčeka v Trenčíne)	
prof. Ing. Dušan Galusek, DrSc. (fyzikálna chémia)	prof. Ing. Marek Liška, DrSc., Dr.h.c. (Fakulta chemické technologie VŠCHT, Praha, ČR)	
prof. Ing. Dušan Galusek, DrSc. (materiály)	prof. Ing. Marek Liška, DrSc., Dr.h.c. (Trenčianska univerzita Alexandra Dubčeka v Trenčíne)	
doc. Ing. Miroslav Hnatko, PhD. (anorganické technológie a nekovové materiály)	RNDr. Jana Madejová, DrSc. (Prírodovedecká fakulta UK)	
doc. Ing. Miroslav Hnatko, PhD. (anorganická technológia a materiály)	prof. RNDr. Pavol Šajgalík, DrSc. (Fakulta metalurgie a materiálového inžinierství, Vysoká škola báňská TU)	
doc. Ing. Mária Chromčíková, PhD. (anorganická technológia a materiály)	prof. RNDr. Pavol Šajgalík, DrSc. (Hutnícka fakulta TUKE)	
doc. Ing. Zoltán Lenčes, PhD. (anorganická technológia a materiály)	prof. RNDr. Pavol Šajgalík, DrSc. (Slovenská technická univerzita v Bratislave)	
doc. Ing. Zoltán Lenčes, PhD. (anorganická chémia)	prof. RNDr. Pavol Šajgalík, DrSc. (Trenčianska univerzita Alexandra Dubčeka v Trenčíne)	
doc. Ing. Zoltán Lenčes, 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)		

5.8. Údaje o pedagogickej činnosti

Tabuľka 5i Prednášky a cvičenia vedené v roku 2025

PEDAGOGICKÁ ČINNOSŤ	Prednášky		Cvičenia a semináre	
	doma	v zahraničí	doma	v zahraničí
Počet prednášateľov alebo vedúcich cvičení	8	1	5	0
Celkový počet hodín v r. 2025	160	4	77	0

Prehľad prednášateľov predmetov a vedúcich cvičení, s uvedením názvu predmetu, úväzku, katedry, fakulty, univerzity/vysokiej školy je uvedený v prílohe A-4.

Tabuľka 5j Aktivity pracovníkov na VŠ

1.	Počet pracovníkov, ktorí pôsobili ako vedúci alebo konzultanti diplomových a bakalárskych prác	2
2.	Počet vedených alebo konzultovaných diplomových a bakalárskych prác	3
3.	Počet pracovníkov, ktorí pôsobili ako školitelia doktorandov (PhD.)	7
4.	Počet školených doktorandov (aj pre iné inštitúcie)	10
5.	Počet oponovaných dizertačných a habilitačných prác	5
6.	Počet pracovníkov, ktorí oponovali dizertačné a habilitačné práce	3
7.	Počet pracovníkov, ktorí pôsobili ako členovia komisií pre obhajoby DrSc. prác	0
8.	Počet pracovníkov, ktorí pôsobili ako členovia komisií pre obhajoby PhD. prác	6
9.	Počet pracovníkov, ktorí pôsobili ako členovia komisií, resp. oponenti v inauguračnom alebo habilitačnom konaní na vysokých školách	1

5.9. Iné dôležité informácie k pedagogickej činnosti

Ústav anorganickej chémie SAV, v.v.i. vypísal začiatkom roka 2025 PhD. témy s tromi externými vzdelávacími inštitúciami - PríF UK, FCHPT STU a TnUAD. Celkovo bolo vypísaných 14 tém v 4 študijných programoch (anorganická chémia, fyzikálna chémia a teoretická a počítačová chémia v spolupráci s PríF UK, anorganická technológia a materiály v spolupráci s FCHPT STU a anorganická technológia a nekovové materiály v spolupráci s TnUAD), ktoré boli zverejnené prostredníctvom AIS na príslušných fakultách a webovej stránke SAV. ÚACH SAV, v.v.i. má za posledné roky vypracovaný a úspešne aplikovaný vlastný systém zverejňovania PhD. pozícií pre získanie kvalitných študentov, a okrem webovej stránky ústavu, ich zverejnil aj na ďalších dvoch medzinárodných portáloch. V stanovenom termíne si prihlášky podalo viacero uchádzačov, ktorí sa po administratívnej kontrole na príslušnej vysokej škole zúčastnili aj prijímacích pohovorov. Eormný počet záujemcov bol spôsobený vysokým počtom prihlásených adeptov na dve témy vypísané v spolupráci s TnUAD.

ÚACH SAV, v.v.i. požiadal o výnimky v počte pridelených doktorandských miest, a preto mohol rozhodnutím dekana PríF UK prijať 5 študentov na doktorandské štúdium - traja študenti v programe anorganická chémia a dvaja študenti v programe fyzikálna chémia; všetko študenti zahraničnej národnosti. V akademickom roku 2025-26 bol v zimnom semestri zapísaný len jeden študent, traja ďalší získali národné vízum v novembri 2025 a ich zápis do prvého ročníka je očakávaný vo februári 2026. Dvaja ďalší záujemci na témy vypísané s TnUAD boli pre nedostatok pridelených miest ústavu nakoniec prijatí samotnou Trenčianskou univerzitou.

Študenti doktorandského štúdia a mladí vedeckí pracovníci do 35 rokov sa zapojili do každoročne organizovanej súťaže mladých pracovníkov do 35 rokov na ÚACH SAV, v.v.i. Súťaž sa uskutočnila dňa 14.10.2025 za účasti 13 študentov doktorandského štúdia z ÚACH SAV, v.v.i. Bratislava a FUNGLASS TnUAD Trenčín. Na ocenených miestach sa umiestnili:

1. Ayesha Asbat (ÚACH SAV, v.v.i.)
2. Nariman Alipanah (FUNGLASS TnUAD)
3. Asif Ali (ÚACH SAV, v.v.i.)

Doktorandi ÚACH sa pravidelne uchádzajú aj o projekty v rámci výzvy DOKTOGRANT, v roku 2025 sa 5 študenti ÚACH SAV, v.v.i. (L. Kleman, A. Ali, B. Melo, V. George a P.Labib Shotorban) stali úspešnými podávateľkami tohoto projektu pre rok 2026. V rámci výzvy Granty pre postdoktorandov bol v decembri 2025 úspešne hodnotený projekt Mgr.Tímei Šimonovej, PhD.

6. Zmluvná spolupráca s univerzitami/vysokými školami a inými subjektmi vedy a výskumu

Pozn.: Uvádzajte formy spolupráce a aktivity, ktoré nie sú uvedené v kapitolách 2, 3, 4, 5.

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 2025 dvoch doktorandov. 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: Montanuniversitaet Leoben, Rakúsko

Oblasť spolupráce: vedecká spolupráca, výchova doktorandov

Sídlo spoločného pracoviska (ak je vytvorené):

Začiatok spolupráce: 2008

Zhodnotenie:

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“ a „Fyzikálna chémia“. 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). K 31.12. 2025 pracovníci ÚACH viedli na PriF UK 8 doktorandov, traja doktorandi v roku 2025 úspešne ukončili štúdium 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: 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 Laugaricio) rieši ÚACh SAV v spolupráci s touto univerzitou spoločné projekty VEGA 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 ÚACh SAV majú školiace práva na TnUAD a vedú na nej doktorandov v študijnom programe Anorganické technológie a materiály. V roku 2025 boli navyše vypísané dve témy pre doktorandské štúdium pracovníkom ÚACh SAV, v.v.i. Pre vysoký záujem o témy na ústave, a pri

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: V roku 2025 sa v rámci spolupráce rozpracovali nové vedecké tematiky v aktuálnych vedných smeroch.

Názov univerzity/vysokej školy a fakulty: University of Ghent, Belgicko

Oblasť spolupráce: príprava keramických a sklokeramických materiálov v systémoch $\text{Al}_2\text{O}_3\text{-La}_2\text{O}_3$, $\text{Al}_2\text{O}_3\text{-La}_2\text{O}_3\text{-ZrO}_2$, $\text{Al}_2\text{O}_3\text{-Y}_2\text{O}_3$

Sídlo spoločného pracoviska (ak je vytvorené):

Začiatok spolupráce: 2010

Zhodnotenie: Vedecká spolupráca pri príprave amorfných a polykryštalických materiálov sol-gel metódami v systémoch $\text{Al}_2\text{O}_3\text{-RE}_2\text{O}_3$, $\text{Al}_2\text{O}_3\text{-RE}_2\text{O}_3\text{-ZrO}_2$. Skúmanie vlastností pripravených materiálov a spoločné publikácie. Vedecká spolupráca pri príprave amorfných a polykryštalických materiálov sol-gel metódami v systémoch $\text{Al}_2\text{O}_3\text{-RE}_2\text{O}_3$, $\text{Al}_2\text{O}_3\text{-RE}_2\text{O}_3\text{-ZrO}_2$ a $\text{Al}_2\text{O}_3\text{-Y}_2\text{O}_3$.

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. Lenčoš, PhD. je členom odborovej rady doktorandského študijného programu Materiálové vedy a inžinýrství.

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

Názov projektu: Bentonit: strategická surovina Slovenska - inovatívne hodnotenie zdrojov a ich kvality pre jej efektívne využívanie

Agentúra: APVV, **číslo projektu:** APVV-20-0175

Spolupracujúce inštitúcie: PríF UK Bratislava, ÚACH SAV, v.v.i., Ústav vied o zemi, v.v.i, SAV, Stavebná fakulta STU Bratislava

Koordinátor projektu: PríF UK Bratislava (P. Uhlík)

Začiatok spolupráce: 2021

Koniec spolupráce: 2025

Zhodnotenie:

Názov projektu: Fotofunkčné hybridné materiály organických luminofórov a nanočastíc vrstevnatých silikáto

Agentúra: APVV, **číslo projektu:** APVV-22-0150

Spolupracujúce inštitúcie: PríF UK, ÚACH SAV, v.v.i.

Koordinátor projektu: Katedra fyzikálnej chémie, PríF UK (J. Bujdák)

Začiatok spolupráce: 2023

Koniec spolupráce: 2027

Zhodnotenie:

Názov projektu: Smerom k nanotechnológiám využívajúcim bioaktívne častice/molekuly v boji proti mikrobiálnym biofilmom

Agentúra: APVV, **číslo projektu:** APVV-21-0302

Spolupracujúce inštitúcie: PríF UK, ÚACH SAV, v.v.i.

Koordinátor projektu: Katedra mikrobiológie PríF UK (H. Bujdáková)

Začiatok spolupráce: 2022

Koniec spolupráce: 2026

Zhodnotenie:

Názov projektu: Aplikácia nových biouhlím funkcionalizovaných geopolymérov pri nakladaní s nebezpečným odpadom

Agentúra: APVV, **číslo projektu:** APVV-24

Spolupracujúce inštitúcie: Slovenská technická univerzita v Bratislave - Stavebná fakulta, Univerzita sv. Cyrila a Metoda v Trnave - Fakulta prírodných vied, Trnavská univerzita v Trnave - Pedagogická fakulta

Koordinátor projektu: ÚACH SAV, v.v.i

Začiatok spolupráce: 2025

Koniec spolupráce: 2029

Zhodnotenie:

Názov projektu: Studené spekanie skiel
Agentúra: APVV, **číslo projektu:** APVV-23-0424
Spolupracujúce inštitúcie: TnU AD
Koordinátor projektu: TnU AD
Začiatok spolupráce: 2025
Koniec spolupráce: 2028
Zhodnotenie:

Názov projektu: Funkcionalizované 3Dsklokeramické membrány na pokročilé fotokatalytické čistenie pitných vôd
Agentúra: APVV, **číslo projektu:** APVV-23-0352
Spolupracujúce inštitúcie: ÚACH SAV, v.v.i.
Koordinátor projektu: TnU AD
Začiatok spolupráce: 2025
Koniec spolupráce: 2028
Zhodnotenie:

Názov projektu: Vývoj pokročilých metód určených na presnú predpoveď a analýzu röntgenových spektier molekúl s otvorenou obálkou
Agentúra: APVV, **číslo projektu:** APVV-22-0488
Spolupracujúce inštitúcie: ÚACH SAV, v.v.i., PriF UK,
Koordinátor projektu: ÚACH SAV, v.v.i. (S. Komorovský)
Začiatok spolupráce: 2023
Koniec spolupráce: 2027
Zhodnotenie:

Názov projektu: Vývoj nových metód spájania vysoko-entropických keramických materiálov
Agentúra: APVV, **číslo projektu:** APVV-SK-CZ-RD-21-0089
Spolupracujúce inštitúcie: ÚACH SAV, v.v.i., Ústav fyziky materiálov AV ČR Brno
Koordinátor projektu: ÚACH SAV, v.v.i. (P. Tatarko)
Začiatok spolupráce: 2022
Koniec spolupráce: 2025
Zhodnotenie:

Názov projektu: Vplyv radiačnej záťaže na sklovláknitú izoláciu z hľadiska recirkulácie chladiva v havarijných podmienkach jadrových elektrární s tlakovodnými reaktormi
Agentúra: APVV, **číslo projektu:** APVV-22-0004
Spolupracujúce inštitúcie: VÚEZ, ÚACH SAV, v.v.i.
Koordinátor projektu: VÚEZ
Začiatok spolupráce: 2023
Koniec spolupráce: 2027
Zhodnotenie:

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

6.4. Iné typy spoločných aktivít s inštitúciami mimo SAV

7. Vedecko-organizačné a popularizačné aktivity

7.1. Vedecko-popularizačná činnosť

Tabuľka 7a Súhrnné počty vedecko-popularizačných činností organizácie SAV

Typ	Počet	Typ	Počet	Typ	Počet
prednášky/besedy	4	tlač	0	TV	0
rozhlas	0	internet	1	exkurzie	4
publikácie	0	multimediálne nosiče	0	dokumentárne filmy	0
iné	0				

7.2. Vedecko-organizačná činnosť

Tabuľka 7b Vedecko-organizačná činnosť

Názov podujatia	Domáca/ medzinárodná	Miesto	Dátum konania	Počet účastníkov
XVIIth Workshop on Modern Methods in Quantum Chemistry	medzinárodná	Mariapfarr, Rakúsko	23.8.-28.8.2025	45
20th Central European Symposium on Theoretical Chemistry	medzinárodná	Stará Lesná, Slovensko	8.9.-11.9.2025	118
Príprava a vlastnosti progresívnych keramických materiálov a skiel	medzinárodná	Mojmírovce, Slovensko	29.10.-31.10.2025	45
Slovenská a česká konferencia o skle	medzinárodná	Trenčín	12.11.-14.11.2025	-

7.3. Účasť na výstavách

Názov výstavy: Víkend so SAV v BA

Miesto konania: Hviezdoslavovo námestia, Bratislava

Dátum: 13.6.2025

Zhodnotenie účasti: ÚACH SAV, v.v.i. sa zúčastnil so svojim stánkom, v ktorom prezentoval výskumy, ktoré sa konajú na jednotlivých oddeleniach. Program zabezpečili: Petrisková P., Planetová V., Boháč P., Pribus M., Kleman Santos L., De La Torre Olvera G., Lemke F., Bandaru S., Unsal H., Longkumer I.

Názov výstavy: Zaži vedu

Miesto konania: Košice

Dátum: 15.5.2025

Zhodnotenie účasti: ÚACH SAV, v.v.i. sa zúčastnil so svojim stánkom, v ktorom prezentoval výskumy, ktoré sa konajú na jednotlivých oddeleniach. Program zabezpečili: Petrisková P., Planetová V.

Názov výstavy: Veletrh vedy v Prahe

Miesto konania: PVA EXPO PRAHA v Letňanech, Praha, Česká republika

Dátum: 5.6.2025

Zhodnotenie účasti: 5-7.06.2025 Náš ústav sa prvýkrát prezentoval na najväčšom populárno-

náučnom podujatí v Českej republike – Veľtrhu vedy 2025, ako súčasť expozície v stánku SAV. Na podujatí sa vystriedalo množstvo návštevníkov rôznych vekových kategórií, ktorí mohli zažiť vedu naživo a zblízka. V stánku ÚACH SAV, v.v.i. prezentovali: Petrisková P., Khrisnan D., Kleman Santos L.

Názov výstavy: Noc vedy

Miesto konania: Stará tržnica, Bratislava

Dátum: 26.9.2025

Zhodnotenie účasti: Európska noc vedy je najväčším vedeckým festivalom na Slovensku, ktorý inšpiratívnym a jedinečným spôsobom prináša novinky a informácie zo sveta výskumu a inovácií. S novým názvom nadväzuje na úspešnú tradíciu podujatia Noci výskumníkov. Noc vedy je plná fascinujúcich vedeckých zážitkov, inšpiratívnych prednášok a interaktívnych aktivít pre všetkých nadšencov vedy a techniky. V stánku ÚACH SAV, v.v.i. prezentovali: Petrisková P., Pavlík V., Unsal H., Hičák M., Bandaru S., George V., Shotorban P., Kleman Santos L., Longkumer I.

Názov výstavy: Exkurzia detí

Miesto konania: Ústav anorganickej chémie, v.v.i.

Dátum: 3.6.2025

Zhodnotenie účasti: Žiaci zo Školy v Bratislave prišli na ÚACH SAV, v.v.i. aby mohli vidieť ako reálne laboratória vyzerajú. Program doplnili rôzne zábavné experimenty a pokusy. Program zabezpečili: Hanzel O., Jurová A., Hičák M., Petrisková P.

Názov výstavy: Exkurzia detí

Miesto konania: Ústav anorganickej chémie, v.v.i.

Dátum: 10.6.2025

Zhodnotenie účasti: Žiaci z vysokej školy Prírodovedeckej fakulty Univerzity Komenského v Bratislave prišli na ÚACH SAV, v.v.i. Najskôr bola pripravená krátka prednáška o výskumnom zameraní ústavu, následne sa im ukázali laboratória a žiaci si tak mohli lepšie zväžiť prípadne štúdium u nás na ústave. Program doplnili rôzne zábavné experimenty a pokusy. Program zabezpečili: Tatarko P., Planetová V., Kubíkova B., Hanzel O., Hičák M., Boháč P., Jurová A., Pavlík V., Kureková V., Petrisková P.

7.4. Účasť v programových a organizačných výboroch národných konferencií

Tabuľka 7c Programové a organizačné výbory národných konferencií

Meno pracovníka	Programový	Organizačný	Programový i organizačný
Bujdák Juraj	1	0	0
Kureková Valéria	0	1	0
Páľková Helena	0	1	0
Šimonová Tímea	1	0	0
Spolu	2	2	0

7.5. 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 Lenčoš, PhD.

International Journal of Applied Ceramic Technology (funkcia: assoc. editor)
Journal of the European Ceramic Society (funkcia: guest 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)
Processing and Application of Ceramics (funkcia: Editorial Board member)

7.6. Činnosť v domácich vedeckých spoločnostiach

PharmDr., MPhil. Ayesha Asbat

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 výboru)

prof. RNDr. Juraj Bujdák, DrSc.

Slovenská chemická spoločnosť (funkcia: člen)
Slovenská ílová spoločnosť (funkcia: člen výboru)
Slovenská účená spoločnosť (funkcia: člen)

RNDr. Veronika Demovics Siliková, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

prof. Ing. Dušan Galusek, DrSc.

Humboldtov klub v SR (funkcia: člen)
Slovenská silikátová vedecko-technická spoločnosť (funkcia: podpredseda)

Učená spoločnosť Slovenska (funkcia: člen)

MSc. Vinny George

Slovenská ílová spoločnosť (funkcia: člen)

Ing. Ondrej Hanzel, PhD.

Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)

doc. Ing. Miroslav Hnatko, PhD.

Slovenská batériová aliancia SBaA (funkcia: člen valného zhromaždenia)

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)

MSc. Leonardo Filipe Kleman Santos

Slovenská ílová spoločnosť (funkcia: člen)

Ing. Michal Korenko, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

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)

MSc. Parisa Labib Shotorban

Slovenská ílová spoločnosť (funkcia: člen)

doc. Ing. Zoltán Lenčes, 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)

Mgr. Marián Matejdes, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

Slovenská ílová spoločnosť (funkcia: člen)

Ing. Monika Micháľková, 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)

Dr. Aliasghar Najafzadehkhoe, Ph.D.

Slovak Glass Society (funkcia: Member)

Slovak Silicate Society (SSiS) (funkcia: Member)

Ing. Zuzana Netriová, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

Ing. Helena Pálková, PhD.

Slovenská ílová spoločnosť (funkcia: člen výboru)

Ing. Viliam Pavlík, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

Slovenská nukleárna spoločnosť (funkcia: člen)

Mgr. Patrícia Petrisková, PhD.

Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)

Mgr. Viktória Planetová

Slovenská ílová spoločnosť (funkcia: člen)

Mgr. Marek Pribus, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

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)

Vedecko-technická spoločnosť (funkcia: člen)

Ing. Michal Slaný, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

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. Peter Tatarko, PhD.

Slovenská silikátová spoločnosť (funkcia: člen)

Ing. Zuzana Vasková, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

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

Názov: Sario

Miesto konania: Nová synagóga, Žilina

Dátum: 12.11.2025

Zhodnotenie účasti: Na tejto akcii sa nám podarilo naviazať niekoľko kontaktov na nové spolupráce.

Zúčastnili sa: Petrisková P., Hanuska M.

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

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 prác v odbore anorganická chémia - 01402	predseda
prof. Ing. Dušan Galusek, DrSc.	Slovenská komisia pre vedecké hodnosti	člen
	Ad hoc komisia pre obhajoby doktorských dizertačných prác v odbore Anorganická technológia a materiály	predseda
	APVV	člen pracovnej skupiny pre technické vedy
doc. Ing. Zoltán Lenčoš, PhD.	Sektorová rada inovácií, Národná sústava povolání	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 vládnyimi a parlamentnými orgánmi alebo pre ich potrebu

9. Aktivity v orgánoch SAV

9.1. Členstvo vo Výbore Snemu SAV

9.2. Členstvo v Predsedníctve SAV a vo Vedeckej rade SAV

prof. RNDr. Pavol Šajgalík, DrSc.

- Predseda SAV
- predseda VR SAV

9.3. 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)

9.4. 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 komisie)

Ing. Monika Micháľková, PhD.

- VEGA č.7 (členka komisie)

10. Starostlivosť o ľudské zdroje, rodovú rovnosť, pracovné a sociálne podmienky zamestnancov a uplatňovanie ich práv

10.1. Uplatňovanie princípov stratégie ľudských zdrojov HRS4R

ÚACH SAV, v. v. i. implementuje zásady Európskej charty pre výskumných pracovníkov a Kódex pravidiel pre ich zamestnávanie cez schému HRS4R - Human Resources Strategy for Researchers, ktorej podstatou je dôraz na pracovné podmienky, transparentný nábor na základe kvalifikácie a skúseností a vytváranie priaznivého prostredia pre kariérny rozvoj.

Uveďte stručnú charakteristiku a hodnotenie aktivít v oblasti HRS4R.

10.2. Informácie o aktivitách súvisiacich s uplatňovaním princípov rodovej rovnosti

ÚACH SAV, v. v. i. uplatňuje princípy rodovej rovnosti cez Plán rodovej rovnosti, ktorý vznikol ako súčasť projektu H2020 ATHENA – Implementing gender equality plans to unlock research potential of RPOs and RFOs in Europe (<https://cordis.europa.eu/project/id/101006416>).

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

10.2.1. Rodová skladba hlavných riešiteľov (vedúcich) projektov

Prípadný stručný komentár ako úvod (nepovinný).

Tabuľka 10a 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	9	4	5	0	0	0
2. Projekty APVV	6	6	0	9	5	4
3. Projekty EŠIF/OP ŠF, Plán obnovy EÚ	10	8	2	3	2	1
4. Projekty SASPRO	2	1	1	0	0	0
5. Projekty IMPULZ	0	0	0	0	0	0
6. Iné projekty (FM EHP, Vedecko-technické projekty, na objednávku rezortov a pod.)	7	1	6	0	0	0

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

10.2.2. Výskum zameraný na rodovú problematiku

Uvedte 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 A-3.

10.3. Informácie o pracovných a sociálnych podmienkach zamestnancov a uplatňovaní ich práv

ÚACH SAV v. v. i. sa riadi platnou legislatívnou úpravou ako aj odporúčaniami a inštrukciami z P SAV.

Uved'te stručné, základné informácie k problematike.

11. Orgány v. v. i., ich skladba a činnosť, štrukturálne, organizačné a právne zmeny v organizácii

11.1. Správna rada - zloženie a základná informácia o činnosti

Zloženie správnej rady k 31.12.2025:

- doc. Ing. Miroslav Boča, DrSc. (predseda ex offo)
 - PhDr. Ing. Igor Václav, PhD.
 - Ing. Blanka Kubíková, PhD.
 - Ing. Helena Pálková, PhD.
 - Ing. Peter Tatarko, PhD (zástupca predsedu)
-
- Prerokovanie účtovnej závierky ÚACH SAV, v.v.i. (5.3.2025)
 - Hlasovanie o návrhu rozpočtu príjmov a výdavkov ÚACH SAV, v. v. i. na roky 2025 – 2028 (28.3.2025)
 - Rokovanie o návrhu na vyhlásenie dočasnej nepotrebnosti nehnuteľného majetku (kancelária č. 3.25 a kancelária č. 3.26 na druhom poschodí v budove ÚMMS) - (23.05.2025)
 - Hlasovanie o výročnej správe o činnosti a hospodárení ÚACH SAV, v. v. i. za rok 2024 "per rollam"(18.06.2025)

Uved'te stručné, základné informácie k problematike.

11.2. Vedecká rada - zloženie a základná informácia o činnosti

Predseda: Mgr. Monika Tatarková, PhD.

Podpredseda: doc. Ing. Zoltán Lenčoš, CSc.

Členovia z ÚACH

doc. RNDr. Juraj Bujdák, DrSc.

prof. Ing. Dušan Galusek, DrSc.

Mgr. Stanislav Komorovský, PhD.

Externí členovia

prof. Ing. Ján Híveš, PhD.

Ing. Marián Kucharík, PhD.

prof. RNDr. Jozef Noga, DrSc.

Zasadnutia vedeckej rady v roku 2025

- Nové doktorandské témy, najlepšie výsledky ÚACH v 2024, vyjadrenie VR k výskumnej činnosti ÚACH SAV v.v.i. za rok 2024, zloženie Medzinárodného poradného výboru (22.01.2025)
- Správa o činnosti a hospodárení ústavu za 2024 (4.02.2025)
- Prerokovanie štatútu medzinárodného poradného výboru (10.03.2025)
- Kandidáti na členov komisií VEGA pri funkčné obdobie 2025 – 2029 (24.03.2025)
- Výročná správa o hospodárení ÚACH SAV, v. v. i. za rok 2024 (20.06.2025)
- Hodnotenie publikačných aktivít oddelení a jednotlivých vedeckých pracovníkov za rok 2024, ročné hodnotenie doktorandov v akademickom roku 2024/2025 (23.09.2025)
- Hlasovanie o návrhu na priznanie vedeckého kvalifikačného stupňa IIa (30.09.2025)
- Návrh členov výberovej komisie pre obsadenie funkčného miesta Ústavu anorganickej chémie v.v.i. (06.10.2025)
- Prerokovanie návrhu o zaradení medzi školiteľov v doktorandskom študijnom programe (3.12.2025)

Uved'te stručné, základné informácie k problematike.

11.3. Dozorná rada - zloženie a základná informácia o činnosti

Zloženie dozornej rady k 31.12.2025:

- MUDr. Mgr. Tomáš Hromádka, PhD. (predseda)
 - JUDr. Glória Gajdošová
 - Prof. Ing. Marián Valko, DrSc.
-
- Prerokovanie účtovnej uzávierky (31.3.2025)
 - Návrh na vydanie súhlasu s vyhlásením dočasnej nepotrebnosti nehnuteľného a hnutel'ného majetku (7.4.2025)
 - Prerokovanie návrhu darovacej zmluvy, ktorou sa ÚACh SAV, v. v. i. zaväzuje prijať dar od ÚMMS SAV, v. v. i. (18.7.2025)
 - Prerokovanie zmluvy o výpožičke kancelárskych priestorov medzi ÚACh SAV, v. v. i. a CEMEA SAV, v. v. i. pre potreby Kancelárie transferu technológií SAV (18.7.2025)
 - Súhlas na právny úkon vedúci k nadobudnutiu majetku (modulárny potenciostat/galvanostat, stolový energodisperzný spektrometer, sekvenčná naprašovačka, počítačový klaster a.i.) (18.7.2025)
 - Výročná správa o činnosti a hospodárení ÚACh SAV, v. v. i. za rok 2024 (18.7.2025)
 - Rokovanie DR – hospodárenie ÚACH SAV v 2025, správa o činnosti (8.12.2025)
 -

Uved'te stručné, základné informácie k problematike.

11.4. Informácie o štrukturálnych a organizačných zmenách v organizácii

V roku 2025 nenastali žiadne štrukturálne ani organizačné zmeny v organizácii

Uved'te stručné, základné informácie k problematike.

11.5. Zmeny zakladacej listiny, vnútorných predpisov organizácie alebo zakladateľa

V roku 2025 nenastali žiadne zmeny zakladacej listiny organizácie.

Uved'te stručné, základné informácie k problematike.

12. Činnosť knižnično-informačného pracoviska organizácie

12.1. Knižničný fond

Tabuľka 12a Knižničný fond

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

Výraz „v tom“ označuje úplné (vyčerpávajúce) údaje, ktorých súčet sa musí rovnať údaju v riadku „spolu“, čiže nadradenému riadku.

Výraz „z toho“ označuje neúplné (výberové) údaje, ktorých súčet sa nemusí rovnať údaju v riadku „spolu“.

12.2. Výpožičky a služby

Tabuľka 12b 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		

12.3. Používatelia

Tabuľka 12c Používatelia

Registrovaní používatelia	
Návštevníci knižnice spolu (bez návštevníkov podujatí)	

12.4. Iné údaje

Tabuľka 12d Iné údaje

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

12.5. Iné informácie o knižničnej činnosti

13. Nadácie a fondy pri organizácii SAV

14. Realizácia Koncepcie dlhodobého rozvoja a Akčného plánu organizácie

14.1. Odporúčania z posledného pravidelného (akreditačného) hodnotenia organizácií SAV

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 from 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"

14.2. 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 laboratória 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.

14.3. Aktualizácia Akčného plánu organizácie v roku 2025

Diskusie o akčnom pláne ústavu sú viacsmerým 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 naplňovať zadané 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. Akčný plán bude aktualizovaný v nasledovnom roku.

15. Iné významné činnosti organizácie

16. Poskytovanie informácií v súlade so zákonom o slobodnom prístupe k informáciám

Uved'te informácie v súlade so zákonom č. 211/2000 Z.z. o slobodnom prístupe k informáciám.

17. Problémy organizácie a podnety pre Predsedníctvo SAV k činnosti 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 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 (často nekonceptné), 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.

Vzhľadom na relatívne veľký počet zahraničných pracovníkov pôsobiach na ústave sa stáva vnútornou potrebou ústavu vypracovanie rozsiahlej dokumentácie aj v anglickom jazyku (napríklad organizačný poriadok, pracovný poriadok a podobne) aby naši zahraniční kolegovia mali k dispozícii základné informácie.

Inou vnútornou potrebou je zavedenie pravidelných školení o kybernetickej bezpečnosti vzhľadom na stále narastajúce množstvo spôsobov akými sú pracovníci atakovaní vo virtuálnom prostredí.

Uved'te informácie a podnety v súlade s názvom kapitoly.

18. Vyjadrenia vedeckej rady organizácie k výsledkom výskumnej činnosti za uplynulý rok

Vedecká rada ÚACH SAV v.v.i. prijala nasledujúce zhodnotenie výsledkov výskumnej činnosti:

Počet publikácií zaradených v databázach CCC je 57, čo predstavuje 1,27 publikácie na jedného vedeckého pracovníka. Publikačný priemer je v porovnaní s minulým rokom nižší (1,93), publikačnú aktivitu ústavu však VR hodnotí ako dobrú. Vysoká kvalita vedeckých výstupov je potvrdená publikovaním v renomovaných vedeckých časopisoch, z ktorých 58% je zaradených do kvartilu Q1, pričom 16 publikácií bolo v prvom decile.

Ústav je zapojený do riešenia projektov v rôznych projektových schémach. Počet riešených domácich projektov schémy VEGA je 9, počet riešených APVV projektov je 15, z toho v šiestich projektoch je ÚACH hlavným riešiteľom. Počet APVV projektov, v ktorých ústav vystupuje ako nositeľ projektu v posledných rokoch klesá, avšak VR veľmi pozitívne hodnotí úspešnosť ústavu vo všeobecnej výzve 2025, v ktorej ÚACH SAV získal 3 vedecké projekty, v ktorých je hlavným riešiteľom.

Ústav je zapojený do mnohých projektov z výziev Plánu obnovy, celkovo získal 13 projektov. VR pozitívne hodnotí aj rozširovanie prístrojového vybavenia, ktoré môže výrazne ovplyvniť kvalitu výskumnej činnosti a atraktivitu ústavu pre vedeckú prácu.

V rámci programu SASPRO realizovali a úspešne ukončili svoje výskumné aktivity dvaja štipendisti, ktorí ostali pôsobiť na ústave, čo potvrdzuje atraktivitu organizácie pre vedeckú činnosť. V oblasti medzinárodnej vedeckej spolupráce bol ústav v roku 2025 zapojený do 8 projektov.

VR pozitívne hodnotí zapojenie ústavu do výchovy doktorandov. V roku 2025 bol celkový počet školených doktorandov 13, z ktorých traja v roku 2025 ukončili doktorandské štúdium úspešnou obhajobou. Od septembra 2025 bolo prijatých 5 nových doktorandov, kvôli problémom s vízami však niektorí nastúpia na doktorandské štúdium až od februára roku 2026. Kvalita doktorandov sa prejavila úspešnosťou pri získavaní projektov DoktoGrant. Dosiahnuté vedecké výsledky a kvalita doktorandského štúdia sú na ročnej báze monitorované vedeckou radou.

Na základe vyššie uvedeného VR ÚACH SAV, v.v.i. konštatuje, že Ústav anorganickej chémie SAV v.v.i. je spôsobilý vykonávať vedecko-výskumnú činnosť na excelentnej úrovni.

Uvádzajte tu stručné rámcové hodnotenie výsledkov výskumnej činnosti schválené vedeckou radou organizácie a jej vyjadrenie k spôsobilosti organizácie vykonávať výskumnú činnosť.

Schválila vedecká rada organizácie SAV dňa 21.1.2025

Mgr. Monika Tatarková, PhD.
predseda vedeckej rady

Výročnú správu o činnosti organizácie za rok 2025 vypracoval(i):

doc. Ing. Zoltán Lenčేశ, PhD., 02/59410408

Ing. Helena Pálková, PhD., 02/59410485

Bratislava, 31.1.2026

doc. Ing. Miroslav Boča, DrSc.

riaditeľ organizácie

PRÍLOHY k časti A

Príloha A-1

Zoznam zamestnancov a doktorandov organizácie k 31.12.2025

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	0.80
6.	Dr. Oľga Malkin, DrSc.	100	1.00
7.	Dr. Vladimír Malkin, DrSc.	100	1.00
8.	prof. RNDr. Pavol Šajgalík, DrSc.	60	0.56
Samostatní vedeckí pracovníci			
1.	Mgr. Peter Boháč, PhD.	100	1.00
2.	doc. Ing. Tomáš Bučko, PhD.	25	0.25
3.	Ing. Ondrej Hanzel, PhD.	100	1.00
4.	doc. Ing. Miroslav Hnatko, PhD.	50	0.50
5.	doc. Ing. Mária Chromčíková, PhD.	60	0.60
6.	Mgr. Ľuboš Jankovič, PhD.	100	1.00
7.	Mgr. Stanislav Komorovský, PhD.	100	1.00
8.	Ing. Michal Korenko, PhD.	100	0.00
9.	Ing. Blanka Kubíková, PhD.	100	1.00
10.	doc. Ing. Zoltán Lenčes, PhD.	100	1.00
11.	Ing. Monika Micháľková, PhD.	100	1.00
12.	Ing. Jarmila Mlynáriková, PhD.	100	1.00
13.	Ing. Helena Pálková, PhD.	100	1.00
14.	Ing. Viliam Pavlík, PhD.	25	0.35
15.	Ing. Anna Prnová, PhD.	100	1.00
16.	Ing. Eva Scholtzová, CSc.	100	1.00
17.	Ing. Michal Slaný, PhD.	100	1.00
18.	Ing. František Šimko, PhD.	100	1.00
19.	Mgr. Peter Švančárek, PhD.	100	1.00

20.	Ing. Peter Tatarko, PhD.	100	1.00
21.	Mgr. Monika Tatarková, PhD.	100	1.00
Vedeckí pracovníci			
1.	James Richard Asher, PhD	100	1.00
2.	MSc. Subrahmanyam Bandaru, PhD.	100	1.00
3.	MSc. Sanam Bashir, PhD.	100	1.00
4.	RNDr. Veronika Demovics Silliková, PhD.	100	1.00
5.	MSc. Sushmita Dwivedi, PhD.	100	0.08
6.	MSc. Hamid Hassani, PhD.	100	1.00
7.	Ing. Michal Hičák, PhD.	100	1.00
8.	MSc. Naser Hosseini, PhD.	100	0.33
9.	MSc. Dhiya Krishnan, PhD.	100	1.00
10.	Mgr. Valéria Kureková, PhD.	100	1.00
11.	MSc. Florian Andreas Lemken, PhD.	100	0.58
12.	MSc. Imrongnaro Longkumer, PhD.	100	1.00
13.	Mgr. Marián Matejdes, PhD.	100	1.00
14.	Oksana Matselko, PhD.	100	1.00
15.	Dr. Aliasghar Najafzadehkhoe, Ph.D.	100	1.00
16.	Ing. Zuzana Netriová, PhD.	100	1.00
17.	MSc. Vahid Niksefat, PhD.	100	0.08
18.	Mgr. Patrícia Petrisková, PhD.	100	1.00
19.	Mgr. Marek Pribus, PhD.	100	1.00
20.	Mgr. Tímea Šimonová, PhD.	100	1.00
21.	Ing. Peter Škorňa, PhD.	100	1.00
22.	Ing. Gianmarco Taveri, PhD.	25	0.25
23.	MSc. Hakan Ünsal, PhD.	100	1.00
24.	Ing. Jana Valúchová, PhD.	100	1.00
25.	Ing. Zuzana Vasková, PhD.	100	1.00
Odborní pracovníci s VŠ vzděláním (výzkumní a vývojoví zamestnanci)			
1.	MSc. Asif Ali	30	0.30
2.	Ing. Eva Hadzimová	100	1.00
3.	MSc. Giyos Khamdamov	100	0.25
4.	Ing. Iveta Macková	100	1.00
5.	Mgr. Marek Pribus, PhD.	28	0.28
6.	Ing. Jozef Priščák	100	1.00

7.	Mgr. Ľuboš Ravas	100	0.33
8.	Mgr. Pavol Weiner	100	1.00
Odborní pracovníci s VŠ vzdelaním (ostatní zamestnanci)			
1.	Ing. Marek Hanuska	100	1.00
2.	Ing. Ingrid Hierwegová	20	0.20
3.	Ing. Helena Pálková, PhD.	26	0.26
4.	JUDr. Bc. Marica Slaná	100	1.00
5.	Mgr. Tomáš Tóth	100	1.00
6.	PhDr. Ing. Igor Václav, PhD.	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.	Simona Gryžboňová	100	1.00
6.	Miriám Hnatková	100	1.00
7.	Anna Jurová	100	1.00
8.	Alexandra Tonkovičová	60	0.60
9.	Ema Zápražná	100	1.00
10.	Denisa Žilinská	100	1.00
Ostatní pracovníci			
1.	Anna Jurová	30	0.30
2.	Ing. Iveta Macková	20	0.20
3.	Ing. Zuzana Netriová, PhD.	25	0.25
4.	Tereza Ondišová	100	0.58
5.	Ing. František Šimko, PhD.	40	0.40
6.	Jana Šuliaková	100	1.00

Zoznam zamestnancov, ktorí odišli v priebehu roka

	Meno s titulmi	Dátum odchodu	Ročný prepočítaný úväzok
Samostatní vedeckí pracovníci			
1.	doc. Mgr. Anna Kityk, PhD.	31.3.2025	0.06
Odborní pracovníci s VŠ vzdelaním (výskumní a vývojoví zamestnanci)			
1.	MSc. Naser Hosseini	31.8.2025	0.20
2.	Ing. Ján Ramaj	31.8.2025	0.30

3.	MSc. Inga Zhukova	31.8.2025	0.20
Ostatní pracovníci			
1.	Terézia Pírová	27.1.2025	0.08

Zoznam doktorandov

	Meno s titulmi	Škola/fakulta	Študijný odbor
Interní doktorandi hrazení z prostředků SAV			
1.	MSc. Asif Ali	Prírodovedecká fakulta UK	1420 chémia
2.	Mphil. Ayesha Asbat	Prírodovedecká fakulta UK	1420 chémia
3.	MSc. Kumar Ashutosh	Prírodovedecká fakulta UK	1420 chémia
4.	MSc. Vinny George	Prírodovedecká fakulta UK	1420 chémia
5.	MSc. Leonardo Filipe Kleman Santos	Prírodovedecká fakulta UK	1420 chémia
6.	MSc. Parisa Labib Shotorban	Prírodovedecká fakulta UK	1420 chémia
7.	MSc. Bryan Alexis Melo Flores	Prírodovedecká fakulta UK	1420 chémia
8.	RNDr. Jakub Michalík	Fakulta chemickej a potravinárskej technológie STU	2820 chemické inžinierstvo a technológie
9.	Mgr. Viktória Planetová	Prírodovedecká fakulta UK	1420 chémia
10.	Ing. Lucia Šedivá	Fakulta chemickej a potravinárskej technológie STU	2820 chemické inžinierstvo a technológie
Interní doktorandi hrazení z iných zdrojov			
<i>organizácia nemá interných doktorandov hrazených z iných zdrojov</i>			
Externí doktorandi			
<i>organizácia nemá externých doktorandov</i>			

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 A-2

Projekty riešené v organizácii

Medzinárodné projekty

Programy: COST

1.) Nové vysoko-entropické materiály pre udržateľnú energetiku (*Novel high-entropy materials for sustainable energy*)

Zodpovedný riešiteľ: Peter Tatarko
Trvanie projektu: 3.10.2023 / 2.10.2027
Evidenčné číslo projektu: CA22123
Organizácia je koordinátorom projektu: nie
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: SAV: 5780 €

Dosiahnuté výsledky:

V súlade s plánom projektu sa počet partnerov v priebehu roka 2024 výrazne zvýšil. Organizovali sa spoločné workshopy a pracovné stretnutia či už za osobnej účasti partnerov, alebo v hybridnom režime (online+osobná účasť). Nakoľko je hlavným cieľom projektu združovať odborníkov v danej oblasti a vytvoriť základy pre budúce centrum excelentnosti pre pokročilé funkčné materiály, ktoré pomôžu pri prechode k zjednotenej a silnejšie EÚ, očakáva sa, že táto platforma bude ďalej rásť, a prípadne sa rozšíri aj o primeyselnú sféru.

Programy: Multilaterálne - iné

2.) Relativistické vplyvy na magnetickú odozvu (*Relativistic Effects on Magnetic Resp*)

Zodpovedný riešiteľ: Stanislav Komorovský
Trvanie projektu: 1.7.2025 / 30.6.2027
Evidenčné číslo projektu: DS-FR-24-0049
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 3125 €

Dosiahnuté výsledky:

Počas úvodného pol roka sa nám podarilo vyvinúť a implementovať do programového balíka ReSpect metódu určenú na populačnú analýzu multi-komponentných molekulových orbitálov. Táto technika je vhodná na chemickú analýzu relativistických výpočtov. Zároveň sme v spolupráci s našimi zahraničnými partnermi pracovali na príprave publikácie zaoberajúcej sa spin-orbitálnymi efektami na magneticky indukovaných prúdoch v hydridoch ťažkých kovov. V tejto štúdii sme využívame práce implementovanú populačnú analýzu.

Programy: Bilaterálne - iné

3.) Nové vysokoentropické borido-karbidy pre vysokoteplotné aplikácie (*Novel high entropy diborodicarbides for ultra-high temperature applications*)

Zodpovedný riešiteľ: Peter Tatarko
Trvanie projektu: 1.7.2024 / 30.6.2026
Evidenčné číslo projektu:
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 1 - Čína: 1
Čerpané financie: -
 Podpora medzinárodnej spolupráce z národných zdrojov: 6515 €

Dosiahnuté výsledky:

Výskumné aktivity v roku 2025 boli primárne zamerané na charakterizáciu fázového zloženia a mikroštruktúry novovyvinutých borido-karbidov (Y_{0,25}Yb_{0,25}Dy_{0,25}Er_{0,25})B₂C₂. Tieto výsledky potvrdili tvorbu jednofázového tuhého roztoku s typickou tetragonálnou štruktúrou a rovnomernou distribúciou jednotlivých prvkov. Požadované materiály sa teda úspešne podarilo pripraviť. Boli študované koeficienty teplotnej rozťažnosti, a tepelná vodivosť týchto materiálov, a začalo sa so štúdiom mechanických vlastností. V ďalšom kroku riešenia projektu budú komplexne vyhodnotené mechanické vlastnosti týchto materiálov. Teoretickými výpočtami bola tiež navrhnutá nová štruktúra borido-karbidu s potenciálne výnimočnou teplotnou stabilitou a neutrónovou absorpciou, GdB₂C₂. V roku 2025 sa túto štruktúru podarilo pripraviť a v nasledujúcom kroku bude charakterizovaná.

HOSSEINI, Naser - VALENZA, Fabrizio - CHLUP, Zdeněk - GAMBARO, S. - ŠIŠKA, Filip - MALINVERNI, Carla - XU, Jie - CASALEGNO, Valentina - KOVALČÍKOVÁ, Alexandra - TATARKOVÁ, Monika - SALVO, Milena - ZHOU, Xiaobing - TATARKO, Peter**. Wettability and brazing of (MoNbTaVW)C high-entropy carbide by Ni and NiTa. In Journal of Materials Research and Technology-JMR&T, 2025, vol. 39, p. 1599-1611. (2024: 6.6 - IF, Q1 - JCR, 1.318 - SJR, Q1 - SJR). ISSN 2238-7854. Dostupné na: <https://doi.org/10.1016/j.jmrt.2025.09.182> Typ: ADCA

TATARKOVÁ, Monika - HOSSEINI, Hamid - CHLUP, Z. - DLOUHÝ, I. - ZHOU, X. - CASALEGNO, V. - FERRARIS, M. - KOVALČÍKOVÁ, Alexandra - TATARKO, Peter. Mechanical performance of joined high-entropy ceramics: fracture and strength analysis. In FAC 2025: Fracture mechanics and fractography of advanced ceramics conference 2025. The 8th international conference. Book of abstracts. Smolenice, 6.-9.10.2025. - Košice: Institute of Materials Research SAS, 2025, p. 48. ISBN 978-80-89782-19-2. (FAC 2025: Fracture mechanics and fractography of advanced ceramics conference 2025.) Typ: AFH

4.) 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: -
 Podpora medzinárodnej spolupráce z národných zdrojov: 18623 €

Dosiahnuté výsledky:

Hlavné aktivity v poslednom polroku riešenia projektu boli zamerané na štúdium vysokoteplotnej pevnosti spojov (Hf-Zr-Ti-Ta-Nb)C s medzivrstvou vysokoentropickej zliatiny (Hf-Zr-Ti-Ta-Nb), ako aj detailné štúdium rozhrania pomocou EBSD a nanoidentácie. Časť prác sa sústredila na štúdium pevnosti spojov (Hf-Zr-Ti-Ta-Nb)B₂ pri izbovej teplote, ako aj pri vysokých teplotách. V poslednej etape sa riešenie projektu sústredilo na optimalizáciu spájania kompozitných materiálov na báze Cf/SiC a (Hf-Zr-Ti-Ta-Nb)B₂ pomocou medzivrstvy (Hf-Zr-Ti-Ta-Nb).

HOSSEINI, Naser - VALENZA, Fabrizio - CHLUP, Zdeněk - GAMBARO, S. - ŠIŠKA, Filip - MALINVERNI, Carla - XU, Jie - CASALEGNO, Valentina - KOVALČÍKOVÁ, Alexandra - TATARKOVÁ, Monika - SALVO, Milena -

ZHOU, Xiaobing - TATARKO, Peter**. Wettability and brazing of (MoNbTaVW)C high-entropy carbide by Ni and NiTa. In Journal of Materials Research and Technology-JMR&T, 2025, vol. 39, p. 1599-1611. (2024: 6.6 - IF, Q1 - JCR, 1.318 - SJR, Q1 - SJR). ISSN 2238-7854. Dostupné na: <https://doi.org/10.1016/j.jmrt.2025.09.182> Typ: ADCA

HOSSEINI, Naser - VALENZA, Fabrizio - CHLUP, Zdeněk - GAMBARO, S. - MALINVERNI, Carla - CASALEGNO, Valentina - KOVALČÍKOVÁ, Alexandra - TATARKOVÁ, Monika - DLOUHÝ, Ivo - TATARKO, Peter**. Wetting and brazing of (HfTaZrNbTi)B₂ and (HfTaZrNbTi)C High-Entropy Ceramics by AgCuTi filler. In Open Ceramics, 2025, vol. 22, art no. 100792. (2024: 2.8 - IF, Q1 - JCR, 0.53 - SJR, Q2 - SJR). ISSN 2666-5395. Dostupné na: <https://doi.org/10.1016/j.oceram.2025.100792> Typ: ADMA

Programy: JRP

5.) Transformácia bioinertného na bioaktívne prostredníctvom povrchového inžinierstva (Transforming bioinert to bioactive through surface engineering)

Zodpovedný riešiteľ: Dušan Galusek
Trvanie projektu: 1.1.2023 / 31.12.2025
Evidenčné číslo projektu:
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 2 - Taiwan: 2
Čerpané financie: SAV: 24995 €

Dosiahnuté výsledky:

V práci boli syntetizované mezoporézne bioaktívne sklá (MBG) dopované B, Co a ich kombináciou pomocou mikroemulziou modifikovanej sol-gél metódy. TEM analýzy potvrdili mezoporéznú štruktúru nanočastíc so štrbinovitými alebo klinovitými pórmí, čo korešpondovalo s N₂ adsorpčnými izotermami typu IV a hysteréznymi charakteristikami typu H3/H4. Dopovanie neovplyvnilo disperziu nanočastíc so stabilnou textúrou a porozitou.

Biologické testy na MG 63 a HDFa potvrdili vysokú biokompatibilitu referenčných a B dopovaných vzoriek vo všetkých testovaných koncentráciách. Co dopované MBGN vykazovali koncentráciou podmienený pokles viability najmä pri vyšších koncentráciách, pričom kodopovanie B+Co ukázalo síce synergické, ale variabilné účinky – nízku viabilitu pri 500 µg/mL a hodnoty porovnateľné alebo vyššie ako kontrola pri nižších koncentráciách. Co dopované vzorky vykazovali zvýšenú produkciu VEGF A, čo poukazuje na ich potenciál pre angiogénzu, zatiaľ čo REF a B dopované MBGN vykazovali nižšiu angiogénnu odpoveď a vyššiu LDH aktivitu.

MBG nanočastice boli následne aplikované na ZrO₂ substráty pomocou metódy dip coating po úprave povrchu plazmou. SEM preukázalo vytvorenie homogénneho, vysoko porézneho povlaku s rovnomerne distribuovanými časticami. Priama kultivácia MG 63 buniek počas 7 dní potvrdila úplné prekrytie povrchu vrstvou buniek, čo potvrdzuje ich vynikajúcu adhéziu a proliferáciu srostredkovanú MBG povlakom.

Vyvinutý homogénny MBG povlak predstavuje technologicky jednoduché, ekologicky priaznivé a nákladovo efektívne riešenie vhodné pre medicínske aplikácie. Výsledky viedli k podaniu patentovej prihlášky definujúcej spôsob prípravy homogénnych MBG povlakov.

6.) Novel Ultra-High Temperature Ceramic Matrix Cpmposites for Application in Harsh Aerospace Environments (Novel Ultra-High Temperature Ceramic Matrix Cpmposites for Application in Harsh Aerospace Environments)

Zodpovedný riešiteľ: Peter Tatarko
Trvanie projektu: 1.1.2024 / 31.12.2026
Evidenčné číslo projektu: JRP SAV-TUBITAK 720464
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 1 - Turecko: 1
Čerpané financie: MVTs-SAV: 25000 €

Dosiahnuté výsledky:

Keramické kompozity s uhlíkovými vláknami (Cf/SiC a Cf/C) boli vyvinuté projektovým partnerom Marmara Research Center TUBITAK. Tieto vzorky boli povlakované vrstvou ultra-vysokoteplotnej keramiky (UHTC) na báze ZrB₂ s cieľom zvýšiť ich odolnosť voči oxidácii a ablácii. Povlak bol nanášaný pri izbovej teplote a vytvrdzovaný v niekoľkých vrstvách pri 200°C. Povlakované vzorky boli ďalej žihané pri 1400°C v argónovej atmosfére, aby sa odstránili organické zlúčeniny a zlepšila tepelná stabilita. Odolnosť proti ablácii bola študovaná kyslíkovo-acetylenovým plameňom pri teplotách 2050°C – 2300°C. Výsledky ukázali zvýšenie ablačnej odolnosti povlakovaných vzoriek o 50% v porovnaní s nepovlakovanými vzorkami. Tieto výsledky zdôrazňujú potenciál UHTC povlakov pre zvyšovanie odolnosti keramických kompozitov v leteckých a hypersonických aplikáciách.

ÜNSAL, Hakan** - ATEŞ, Ş. - HIČÁK, Michal - TATARKOVÁ, Monika - CHLUP, Z. - DLOUHÝ, I. - KUMAR, R. - TATARKO, Peter. Ultra-high-temperature ceramic matrix composite: design and ablation resistance. In Processing and Properties of Advanced Ceramics and Glasses: Book of Abstract. - Bratislava: Institute of Inorganic Chemistry, Slovak Academy of Sciences, 2025, p. 38. ISBN 978-80-69178-01-4. (Processing and Properties of Advanced Ceramics and Glasses.) Typ: AFH

Programy: Mobility

7.) Vývoj nových spojovacích materiálov pre vysokoentropické boridy (*Development of new brazing fillers for joining of high entropy borides*)

Zodpovedný riešiteľ:	Peter Tatarko
Trvanie projektu:	1.1.2025 / 31.12.2026
Evidenčné číslo projektu:	CNR-SAS-2024-03
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	-
	Podpora medzinárodnej spolupráce z národných zdrojov: 3000 €

Dosiahnuté výsledky:

V súlade s plánom projektu bola prvotná etapa riešenia zameraná na prípravu základných materiálov – vysokoentropických boridov (HEB), ktoré boli následne použité na testy zmáčavosti. Na základe termodynamických výpočtov boli zvolené nasledujúce zliatiny na báze Ni: NiTa, NiNb, NiB₅₀, NiBTA. Boli realizované testy zmáčavosti, pričom zliatiny NiB₅₀ a NiBTA sa javili ako najperspektívnejšie s ohľadom na uhol zmáčania a reakcie so základným materiálom. V ďalšom kroku budú dôkladne študované fázy vznikajúce pri interakcii týchto roztavených zliatin s povrchom HEB. Ak sa potvrdí ich vhodnosť, budú tieto zliatiny použité na spájanie materiálov HEB.

HOSSEINI, Naser - VALENZA, Fabrizio - CHLUP, Zdeněk - GAMBARO, S. - ŠIŠKA, Filip - MALINVERNI, Carla - XU, Jie - CASALEGNO, Valentina - KOVALČÍKOVÁ, Alexandra - TATARKOVÁ, Monika - SALVO, Milena - ZHOU, Xiaobing - TATARKO, Peter**. Wettability and brazing of (MoNbTaVW)C high-entropy carbide by Ni and NiTa. In Journal of Materials Research and Technology-JMR&T, 2025, vol. 39, p. 1599-1611. (2024: 6.6 - IF, Q1 - JCR, 1.318 - SJR, Q1 - SJR). ISSN 2238-7854. Dostupné na: <https://doi.org/10.1016/j.jmrt.2025.09.182> Typ: ADCA

HOSSEINI, Naser - VALENZA, Fabrizio - CHLUP, Zdeněk - GAMBARO, S. - MALINVERNI, Carla - CASALEGNO, Valentina - KOVALČÍKOVÁ, Alexandra - TATARKOVÁ, Monika - DLOUHÝ, Ivo - TATARKO, Peter**. Wetting and brazing of (HfTaZrNbTi)B₂ and (HfTaZrNbTi)C High-Entropy Ceramics by AgCuTi filler. In Open Ceramics, 2025, vol. 22, art no. 100792. (2024: 2.8 - IF, Q1 - JCR, 0.53 - SJR, Q2 - SJR). ISSN 2666-5395. Dostupné na: <https://doi.org/10.1016/j.oceram.2025.100792> Typ: ADMA

Programy: Mobility Visit

8.) Návšteva zahraničného host'a

Zodpovedný riešiteľ: Eva Scholtzová
Trvanie projektu: 22.4.2025 / 27.4.2025
Evidenčné číslo projektu:
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských 3 - Slovensko: 2, USA: 1
inštitúcií:
Čerpané financie: SAV: 3000 €

Dosiahnuté výsledky:

V rámci projektu sa uskutočnila významného zahraničného hosťa: prof. Teresa J. Bandos The City College of New York (USA) Beyond Adsorption: Exploring the silent aspect of carbon porosity.

Domáce projekty

Programy: VEGA

1.) Keramické kompozitné materiály na báze SiC s vysokou tepelnou vodivosťou (Silicon carbide ceramic composite materials with high thermal conductivity)

Zodpovedný riešiteľ: Ondrej Hanzel
Trvanie projektu: 1.1.2025 / 31.12.2028
Evidenčné číslo projektu: 2/0094/25
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských 0
inštitúcií:
Čerpané financie: VEGA SAV: 5066 €

Dosiahnuté výsledky:

V rámci riešenia projektu boli pripravené granulované prášky karbidu kremičitého s prídavkom 0.5 a 1 hm. % Sc₂O₃ bez granulačných aditív pomocou vymrazovacieho granulátora. Následne takto pripravené kompozitné prášky SiC-0.5hm. % Sc₂O₃ a SiC-1hm. % Sc₂O₃ boli spekané v rapid hot presse pri teplote 2050°C, tlaku 30 MPa po dobu 60 minút vo vákuu. Podarilo sa pripraviť veľmi hutné kompozitné materiály s relatívnou hustotou vyššou ako 99.5 %. Na týchto materiáloch boli merané tepelné vlastnosti (tepelná difuzivita, špecifická tepelná kapacita a tepelná vodivosť). Pre vzorky SiC s 1 hm. % Sc₂O₃ bola dosiahnutá vysoká tepelná vodivosť na úrovni 200 W/m.K.

2.) Monitorovanie vplyvu dopandov na biosklá novej generácie s využitím pri príprave bioskla s vhodnými biomedicínskymi vlastnosťami (Monitoring the influence of dopands on new-generation bioglasses with use in the preparation of glass-ceramics with suitable biomedical properties.)

Zodpovedný riešiteľ: Mária Chromčíková
Trvanie projektu: 1.1.2025 / 31.12.2028
Evidenčné číslo projektu: 2/0043/25
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských 0
inštitúcií:
Čerpané financie: VEGA SAV: 2988 €

Dosiahnuté výsledky:

Podstatou riešeného projektu v roku 2025 bolo komplexné skúmanie vzťahov medzi zložením, štruktúrou a fyzikálnymi vlastnosťami bio skiel obsahujúcich popri SiO₂ aj sieťotvorný oxid P₂O₅. Po príprave homogénnych bio skiel bola v skúmaných sústavách kvantifikovaná ich sklotvornosť a boli zmerané základné fyzikálnochemické vlastnosti získaných skiel a sklotvorných tavenín. Súčasťou riešenia bolo aj štúdium kinetiky kryštalizácie a testovanie vhodnosti rôznych kinetických modelov na opis kryštalizačného správania týchto materiálov.

3.) Pokrok vo výpočte a interpretácii parametrov magnetickej rezonancie na nerelativistickej ako aj relativistickej úrovni (*Advancing in calculation and interpretation of magnetic resonance parameters at both non-relativistic and relativistic levels of theory*)

Zodpovedný riešiteľ: Stanislav Komorovský
Trvanie projektu: 1.1.2025 / 1.1.2028
Evidenčné číslo projektu: 2/0118/25
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: VEGA SAV: 13161 €

Dosiahnuté výsledky:

Vývoj dvoj-zložkovej teórie určenej na predpoveď EPR g-tenzora so zahrnutím Londonových orbitálov. Cieľom metóda je presné zahrnutie relativistických efektov ako aj schopnosť predpovedať EPR spektrá veľkých systémov obsahujúcich ťažké elementy. Zároveň sme publikovali dvoj-zložkovú metódu na výpočet EPR parametrov postavenú na kineticky obmedzenej báze pre malú komponentu štvor-zložkovej vlnovej funkcie.

Čiastkové výsledky boli publikované v kvalitnom impaktovanom časopise:

REPISKÝ, Michal** – KOMOROVSKÝ, Stanislav** – KONECNY, Lukas – KADEK, Marius – MOITRA, Torsha – JOOSTEN, Marc – MIŠENKOVÁ, Debora – VIKHAMAR-SANDBERG, Rasmus – KAUPP, Martin – RUUD, Kenneth – MALKINA, Oľga – MALKIN, Vladimír. X2C Hamiltonian Models in ReSpect: Bridging Accuracy and Efficiency. In Journal of Physical Chemistry A. Molecules, spectroscopy, kinetics, environment, and general theory, 2025, vol. 129, no. 34, p. 7980-7998. (2024: 2.8 – IF, Q2 – JCR, 0.634 – SJR, Q2 – SJR). ISSN 1089-5639. Dostupné na: <https://doi.org/10.1021/acs.jpca.5c02990> Typ: ADCA

4.) Žiadúce a nežiadúce interakcie roztavených fluoridov s materiálmi na báze kritických prvkov (*Desirable and undesirable interactions between molten fluorides and materials of critical elements*)

Zodpovedný riešiteľ: Blanka Kubíková
Trvanie projektu: 1.1.2024 / 31.12.2027
Evidenčné číslo projektu: 2/0083/24
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: MŠVVaM SR a SAV: 21936 €

Dosiahnuté výsledky:

Bola realizovaná komplexná fázová analýza troch roztavených systémov obsahujúcich fluoridy kovov vážnych zemín LiF–NaF)eut–LnF₃ (Ln = Sm, Gd, and Nd). Fázové rovnováhy boli študované v pomerne širokom koncentračnom intervale. Jednotlivé kryštalizačné polia boli detailne popísané. Rtg. prášková difrakčná analýza zatuhnutých zmesí potvrdila výsledky z fázových rovnováh; boli potvrdené známe dvoj- i trojzložkové fluoridové zlúčeniny. vrátane NaLnF₄

(Ln = Sm, Gd, and Nd), a LiGdF_4 v Gd systéme.

Výsledky poukázali na podobné správanie týchto systémov, vrátane prítomnosti oblastí tuhých roztokov, a zároveň zdôrazňujú špecifické rozdiely, napr. pri tvorbe zlúčenín. Tieto zistenia prispievajú k hlbšiemu pochopeniu správania sa systémov fluoridov lanthanidov, ktoré sú relevantné pre aplikácie v technológiách roztavených solí a spracovaní kovov vzácnych zemín.

KUBÍKOVÁ, Blanka** - MLYNÁRIKOVÁ, Jarmila - MATSELKO, Oksana - NETRIOVÁ, Zuzana - VASKOVÁ, Zuzana - SHI, Zhongning - BOČA, Miroslav. Thermal and phase analysis in the $(\text{LiF?NaF})_{\text{eut?}}\text{LnF}_3$ (Ln = Sm, Gd, and Nd) molten systems. In Journal of Thermal Analysis and Calorimetry, 2025, vol. 150, p. 14761–14769. (2024: 3.1 - IF, Q2 - JCR, 0.551 - SJR, Q2 - SJR). ISSN 1388-6150. Dostupné na: <https://doi.org/10.1007/s10973-025-14639-1> Typ: ADCA.

5.) Pórovité anódy na báze SiOC pre sodíkové batérie novej generácie (*SiOC-based anodes for the new generation sodium-ion batteries*)

Zodpovedný riešiteľ: Zoltán Lenčoš
Trvanie projektu: 1.1.2025 / 31.12.2028
Evidenčné číslo projektu: 2/0128/25
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: MŠVVaM SR a SAV: 13574 €

Dosiahnuté výsledky:

Pórovitosť SiOC keramiky sme riadili podmienkami zosieťovania a pyrolýzy polysiloxánového polyméru ako prekursora pre keramický materiál SiOC. Taktiež sa optimalizovali podmienky mletia pyrolyzovaného SiOC s použitím nádoby a guľôčok z WC. Fázové zloženie mletých práškov SiOC bolo stanovené XRD meraniami. Zloženie suspenzie obsahujúcej SiOC pre odlievanie pásky bolo optimalizované, čo viedlo k hmotnostnému pomeru SiOC:C:spojivo = 80:10:10, kde C je sada s vysokou elektrickou vodivosťou a spojivom je zmes karboxylmetylcelulózy (CMC) a styrenbutadiénového kaučuku (SBR). Ako spojivo bol použitý aj sírou dopovaný alginát (s-Alg). SiOC suspenzie sme odlievali na medenú fóliu a odliate pásky (anódy) boli sušené vo vákuu. Z SiOC pásiiek boli vyrezané okrúhle anódy s priemerom 8 mm. Polčlánky sodíkových batérií boli skladané v gloveboxe v atmosfére argónu. Následne boli vykonané elektrochemické merania vrátane testov rýchlostnej kapacity, cyklických testov a elektrochemickej impedančnej spektroskopie (EIS). Kapacitu SiOC anódy sa podarilo zvýšiť prídavkom 20 hm.% cínu.

6.) Vývoj pokročilých luminiscenčných sklenených 3D štruktúr pomocou aditívnej výroby (*Development of advanced luminescent glass 3D structures by additive techniques*)

Zodpovedný riešiteľ: Monika Micháľková
Trvanie projektu: 1.1.2024 / 31.12.2027
Evidenčné číslo projektu: VEGA 2/0077/24
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: MŠVVaM SR a SAV: 4383 €

Dosiahnuté výsledky:

Možnosť kryštalizovania yttrito-hlinitého granátu pomocou laseru bola demonštrovaná v publikácii: BARKER, Collin** - KNORR, Brian - MICHÁLKOVÁ, Monika - GHADAMYARI, Marzieh - PARCHOVIANSKY, Milan - DRDLÍK, Daniel - GALUSEK, Dušan - JAIN, Himanshu - DIEROLF, Volkmar. Femtosecond laser crystallization of YAG in yttrium aluminosilicate glasses. In International Journal of Applied Glass Science, 2025, vol.

7.) Vrstevnaté silikáty ako perspektívna platforma pre prípravu funkčných anorganicko-organických kompozitných materiálov (*Layered silicates as a promising platform for the preparation of functional inorganic-organic composite materials*)

Zodpovedný riešiteľ: Helena Pálková
Trvanie projektu: 1.1.2025 / 31.12.2028
Evidenčné číslo projektu: 2/0161/25
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: MŠVVaM SR a SAV: 26981 €

Dosiahnuté výsledky:

V prvom roku riešenia sa rozpracovali rôzne problematiky zamerané na prípravu nanokompozitných materiálov na báze smektitov a biopolymérov (chitosanu) pričom zámerom bolo pripraviť materiály s antibakteriálnymi vlastnosťami niekoľkonásobnou depozíciou vrstiev chitosanu ako aj viacvrstvové materiály vo forme filmov/fólií, ktoré kyslom alebo zásaditým prostredím reagujú zmenou tvaru. Ďalšou rozpracovanou témou bolo štúdium materiálov založených na kationových derivátoch benzotiazolu a ich fotoaktívnych vlastností. Kým čisté roztoky farbív boli nefluorescenčné, časovo nestabilné a dochádzalo k ich postupnému blednutiu, stabilizovali sa adsorpciou na povrch silikátu. Navyše, hybridné systémy vykazovali luminiscenciu. S časom dochádzalo k preusporiadaniu molekúl na povrchu častíc, čo viedlo k spektrálnym zmenám, vrátane zvýšenie emisie a k farebným zmenám.

PLANETOVÁ, Viktória - BOHÁČ, Peter** - BUJDÁK, Juraj* - SIGMUNDOVÁ, Ivica - MAGDOLEN, Peter - RAJAMANI, Rajmohan - HROBÁRIK, Peter. Unlocking Light-Up Effect of Push–Pull Hemicyanine Dyes in Hybrid Silicate Dispersions: Impact of the Terminal Arylamine Functionality and Intermolecular Surface Distances. In *Langmuir*, 2025, vol. 41, no. 51, p. 34621–34630. (2024: 3.9 - IF, Q2 - JCR, 0.763 - SJR, Q1 - SJR). ISSN 0743-7463. Dostupné na: <https://doi.org/10.1021/acs.langmuir.5c05919> Typ: ADCA

8.) Pokročilé materiály na báze anorganických vrstevnatých štruktúr študované modelovým a experimentálnym prístupom (*Advanced materials based on the inorganic layered structures studied by model and experimental approaches*)

Zodpovedný riešiteľ: Eva Scholtzová
Trvanie projektu: 1.1.2023 / 31.12.2026
Evidenčné číslo projektu: 2/0026/23
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: MŠVVaM SR a SAV: 13161 €

Dosiahnuté výsledky:

V tomto roku pokračovali štúdie efektívnosti adsorpcie a spôsobu interakcie ílových minerálov, konkrétne hallozyitu a montmorillonitu s polutantami ako sú pesticídy, perfluorokarboxylové kyseliny a oxyanióny. Čiastkové výsledky boli prezentované na zahraničných konferenciách a domácich workshopoch a ucelené vo forme publikácií v zahraničných karentovaných časopisoch:

- ELENÍ, Gianni** - SCHOLTZOVÁ, Eva - TYROLOGOU, Pavlos - COUTO, Nazaré - POSPÍŠIL, Miroslav - PAPOULIS, Dimitrios - KOUKOUZAS, Nikolaos. Nanotubular clay minerals for simultaneous sorption of pesticides and PFCAs: a molecular simulation study. In Integrated Environmental Assessment and Management, 2025, vol. 21, no. 6, p. 1403-1415. (2024: 8.4 - IF, Q1 - JCR, 0.936 - SJR, Q1 - SJR). ISSN 1551-3777. Dostupné na: <https://doi.org/10.1093/iteam/vjae038> Typ: ADCA
- GIANNI, Eleni - POSPÍŠIL, Miroslav - SCHOLTZOVÁ, Eva**. Halloysite as a carrier/sorbent of diclofenac: A molecular simulations study. In Surfaces and interfaces, 2025, vol 70, art no. 106710. (2024: 6.3 - IF, Q1 - JCR, 1.036 - SJR, Q1 - SJR). ISSN 2468-0230. Dostupné na: <https://doi.org/10.1016/j.surfin.2025.106710> Typ: ADCA
- ŠKORŇA, Peter** - JANKOVIČ, Ľuboš - SCHOLTZOVÁ, Eva - TUNEGA, Daniel. Perchlorate and periodate adsorption by tetrahexylphosphonium-modified beidellite clay. In Journal of Molecular Structure, 2025, vol. 1349, art no. 143771. (2024: 4.7 - IF, Q2 - JCR, 0.628 - SJR, Q2 - SJR). ISSN 0022-2860. Dostupné na: <https://doi.org/10.1016/j.molstruc.2025.143771> Typ: ADCA

9.) 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 áno
koordinátorom projektu:
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: MŠVVaM SR a SAV: 16817 €

Dosiahnuté výsledky:

V roku 2025 sa nášmu tímu podarilo komplexne objasniť štruktúru a teplotné premeny polymorfných fáz fluoroscandátu rubídneho a cézneho (Rb₃ScF₆ a Cs₃ScF₆) ktoré patria do rodiny dvojítych perovskitov s nekooperatívnym natáčaním oktaedrov. Pomocou kombinácie synchrotrónovej a neutrónovej difrakcie spolu so solid-state NMR sme presne určili štruktúru α -, β - a γ -fáz. Výskum priniesol nové poznatky o dynamike rotácie oktaedrov ScF₆ a ukázal, že substitúcia najmä Cs významne spomaľuje lokálne dynamické procesy, čo je zásadné pre návrh stabilných, tepelne odolných halogenidových materiálov využiteľných v optoelektronike a luminiscenčných aplikáciách.

KING, Graham** - RAKHMATULLIN, Aydar - ŠIMKO, František. The Role of Dynamic Polyhedral Rotations in the Phase Transitions of Rb₃AlF₆ and Cs₃AlF₆. In Inorganic Chemistry, 2025, volume 64, no. 28, p. 14661-14669. (2024: 4.7 - IF, Q1 - JCR, 0.958 - SJR, Q1 - SJR). ISSN 0020-1669. <https://doi.org/10.1021/acs.inorgchem.5c02352>

RAKHMATULLIN, Aydar** - KING, Graham - MOLOKEEV, Maxim S. - POLOVOV, Ilya B. - MAKSIMTSEV, Konstantin V. - SUARD, Emmanuelle - BAKIROV, Rinat - ŠIMKO, František - BESSADA, Catherine - ALLIX, Mathieu. Crystal Structures of Three Polymorphs of Cs₃ScF₆ by Means of Solid-State NMR, X Ray, and Neutron Diffraction. In Crystal Growth & Design, 2025, vol 25, no. 4, p. 1217–1223. (2024: 3.4 - IF, Q1 - JCR, 0.633 - SJR, Q2 - SJR). ISSN 1528-7483. <https://doi.org/10.1021/acs.cgd.4c01598> Typ: ADCA

Programy: APVV

10.) Fotofunkčné hybridné materiály organických luminofórov a nanočastíc vrstevnatých silikátov (*Photofunctional hybrid materials of organic luminophores and nanoparticles of layered silicates*)

Zodpovedný riešiteľ: Peter Boháč
Trvanie projektu: 1.7.2023 / 30.6.2027
Evidenčné číslo projektu: APVV-22-0150
Organizácia je nie
koordinátorom projektu:
Koordinátor: Prírodovedecká fakulta UK
Počet spoluriešiteľských 0

inštitúcií:

Čerpané financie:

APVV: 27500 €

Dosiahnuté výsledky:

V ďalšom roku riešenia projektu sa pokračovalo v syntéze a komplexná charakterizácia organických luminofórov založených na BODIPY. Uskutočnili sa teoretické výpočty základných a excitovaných stavov na podporu interpretácie experimentálnych výsledkov. Z vybraných BODIPY luminofórov sa pripravili hybridné systémy so Sap na sledovanie zmien fotoaktivity. Ďalej prebiehal výskum zameraný na ďalšiu skupinu benzotiazolových farbív, so zameraním na vplyv rôznych parametrov na fotofyzikálne vlastnosti a sprevádzajúce javy v systémoch hybridných sústav s vrstevnatými kremičitanmi zo skupiny smektitov. Testovali sa reprezentatívne luminofóry štruktúrne podobných derivátov monokatiónu a dikatiónu, vplyv smektitov líšiacich sa hustotou povrchového náboja, stupňa adsorpcie a koncentrácie, a sledovali sa časové zmeny luminiscenčných vlastností na fotofyzikálne vlastnosti hybridných sústav.

Analyzovali sa zmeny fotofyzikálnych vlastností spojené s prechodom hybridných systémov z koloidnej disperzie do pevnej fázy vo forme tenkých filmov v sústavách monokatión/Sap a dikatión/Sap. Zmerali sme absorpčné a emisné spektrá a kvantové výťažky, ktoré sa následne porovnávali so spektrálnymi vlastnosťami disperzií a roztokov daných farbív. K sérii tejto skupiny luminofórov patrili aj deriváty tiazolovej oranže (TO). Hodnotila sa stabilita a spektrálne vlastnosti v sérii rozpúšťadiel s rôznou polaritou (etanol, izopropanol, DMSO a voda). Fluorescenčné vlastnosti boli následne detailne charakterizované vo vodnom prostredí a porovnané s hybridnými sústavami so Sap. Sledoval sa vplyv adsorpcie na optické vlastnosti systému, predovšetkým zmeny v intenzite a charaktere fluorescence v porovnaní s roztokmi. Benzotiazolové deriváty sa použili aj ako ligandy na prípravu koordinačných zlúčenín. Komplex irídia základného derivátu sa otestoval pre hybridné disperzie vybraných syntetických smektitov (Sap, Laponit B a Laponit RD) s meniacou sa povrchovou koncentráciou Ir^{III} komplexu. Sústavy sa charakterizovali absorpčnou a emisnou spektroskopiou, časovo-rozlíšenou luminiscenciou a meraniami excitačno-emisných matíc. Spektrá sa analyzovali chemometricky a stanovili sa kvantové výťažky. Stanovil sa aj hydrodynamický priemer častíc [Ir(ppy)₂(dbzt)](PF₆) v roztoku. Prebehli experimenty zamerané na fotosenzibilizačné vlastnosti komplexného luminofóru a na vplyv prítomnosti elektrón-donorovej skupiny v štruktúre dibenzotiazolového ligandu na fotoaktivitu komplexov v hybridných sústavách so Sap. Za účelom potvrdenia súvislostí, ktoré sa pozorovali pre komplexný katión Ir^{III} s S,N-heteroaromatickým ligandom, pripravili sa aj ďalšie cyklometalované komplexné zlúčeniny ruténia a irídia a ich *terc*-butylové analógy.

Publikačné výstupy:

BUJDÁK, Juraj – SKOURA, Eva – BURGYNÁ, Larysa – BILSKÁ, Katarína – BUJDÁKOVÁ, Helena. Photoactive Clay/Polymer Nanocomposite Surfaces: A Promising Strategy for Combatting Pathogenic Biofilms. In XVIII ICC – International Clay Conference: Programme and Abstracts. 18. – Dublin: The Mineralogical Society of the UK and Ireland, 2025, p. 239. ISBN 9780903056694.

BOHÁČ, Peter – BUDZÁK, Šimon – SASAI, Ryo – PLANETOVÁ, Viktória – BUJDÁK, Juraj. From Quenching to Fluorescence Enhancement: Central Metal Effects in Porphyrin–Smectite Hybrids. In XVIII ICC – International Clay Conference: Programme and Abstracts. 18. – Dublin: The Mineralogical Society of the UK and Ireland, 2025, p. 311. ISBN 9780903056694.

SANTOS KLEMAN, Leonardo – BOHÁČ, Peter – BUJDÁK, Juraj. Synthesis and Characterization of BODIPY with different meso groups for the study of hybrid materials. In XVIII ICC – International Clay Conference: Programme and Abstracts. 18. – Dublin: The Mineralogical Society of the UK and Ireland, 2025, p. 575. ISBN 9780903056694.

ŠIMONOVÁ, Tímea – BUJDÁK, Juraj – HROBÁRIK, Peter. Hybrid systems based on layered silicate nanoparticles and luminescent iridium(III) complexes. In Clay Minerals and Selected Industrial Minerals in Material Science, Applications, and Environmental Technology – 11th Workshop of Slovak Clay Group: Book of Abstracts. – Bratislava: Slovak Clay Group, 2025, p. 31. ISBN 978-80-972367-9-3.

PLANETOVÁ, Viktória - BOHÁČ, Peter** - BUJDÁK, Juraj* - SIGMUNDOVÁ, Ivica - MAGDOLEN, Peter - RAJAMANI, Rajmohan - HROBÁRIK, Peter. Unlocking Light-Up Effect of Push–Pull Hemicyanine Dyes in Hybrid Silicate Dispersions: Impact of the Terminal Arylamine Functionality and Intermolecular Surface Distances. In Langmuir, 2025, vol. 41, no. 51, p. 34621–34630. (2024: 3.9 - IF, Q2 - JCR, 0.763 - SJR, Q1 - SJR). ISSN 0743-7463. Dostupné na: <https://doi.org/10.1021/acs.langmuir.5c05919> Typ: ADCA

11.) Vývoj karbidu kremičitého pre extrémne aplikácie (*Development of silicon carbide for extreme application*)

Zodpovedný riešiteľ: Ondrej Hanzel
Trvanie projektu: 1.9.2025 / 31.8.2029
Evidenčné číslo projektu: APVV-24-0442
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských 0
inštitúcií:
Čerpané financie: APVV: 25000 €

Dosiahnuté výsledky:

V prvej etape projektu bol preskúmaný a optimalizovaný nový prístup prípravy SiC granulovaných práškov bez prídavku tradičných spekacích prísad. Tento postup pozostával z troch hlavných krokov: rozprašovanie vodnej suspenzie SiC s organickými granulárnymi aditívami do tekutého dusíka s následnou lyofilizáciou, druhý krok bolo tepelné žihanie takto pripravených granulovaných práškov a finálny krok bolo spekanie žíhaných granulovaných SiC práškov. Ako počiatočné SiC prášky boli použité submikrónový γ -SiC (Superior Graphite, USA) a SiC nanoprášok (Hoganas BF-17). Pri submikrónovom prášku sa podarilo optimalizovať proces spekania a dosiahnuť hutné SiC materiály s relatívnou hustotou viac ako 98 %. Pri materiáloch vychádzajúcich z nanopráškov sa podarilo dosiahnuť hutnosť na úrovni 95 % a je nutná ďalšia optimalizácia.

Výstupy:

HANZEL, Ondrej** - TATARKOVÁ, Monika - NETRIOVÁ, Zuzana - HIČÁK, Michal - ŠAJGALÍK, Pavol. Oxycetylene torch resistance and thermal conductivity of additive-free silicon carbide ceramics. In Processing and Properties of Advanced Ceramics and Glasses : Book of Abstract. - Bratislava : Institute of Inorganic Chemistry, Slovak Academy of Sciences, 2025, p. 16. ISBN 978-80-69178-01-4. (Processing and Properties of Advanced Ceramics and Glasses.) Typ: AFH

HIČÁK, Michal** - ŠAJGALÍK, Pavol - HANZEL, Ondrej. Dynamic oxidation of selected non-oxide ceramics. In Processing and Properties of Advanced Ceramics and Glasses : Book of Abstract. - Bratislava : Institute of Inorganic Chemistry, Slovak Academy of Sciences, 2025, p. 18. ISBN 978-80-69178-01-4. (Processing and Properties of Advanced Ceramics and Glasses.) Typ: AFH

12.) Nanoštrukturované, funkčne navrstvené a bio-inšpirované 3D implantáty 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 áno
koordinátorom projektu:
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských 1 - Slovensko: 1
inštitúcií:
Čerpané financie: APVV: 26367 €

Dosiahnuté výsledky:

Projekt dosiahol významný pokrok vo vývoji materiálov, výrobe povlakov a funkčnom hodnotení. Cieľom bola modifikácia bioinertných implantátov povrchovou úpravou s cieľom zlepšiť ich spojenie s hostiteľským tkanivom, zaviesť dodatočné funkcie a vyhnúť sa invazívnym revíziám. Na základe výsledkov je možné konštatovať, že celkové vedecké ciele projektu boli splnené a preukázali významný pokrok vo vývoji materiálov a výrobe povlakov. Modifikované bioinertné implantáty boli vylepšené povrchovými úpravami, ktoré preukázateľne zlepšili integráciu s tkanivom a zaviedli dodatočné funkcie. Projekt úspešne riešil tri hlavné spôsoby povrchovej úpravy materiálov na báze Ti zliatin, ktoré priniesli originálne výsledky, napr. „modelovanie“ kosti podobnej štruktúry pomocou ekologickej elektrochemickej úpravy, vývoj rádioopacitného bioaktívneho skla s prídavkom a prípravu nanorúrok pomocou anodickej oxidácie. Z hodnotenia projektu priamo vyplýva, že projekt bol mimoriadne úspešný vo svojich primárnych vedeckých cieľoch dosiahol významný publikačný úspech (citácie) a dokázal premeniť výskum na hmatateľné aplikované výsledky

(patenty).

13.) 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*)

Zodpovedný riešiteľ: Stanislav Komorovský
Trvanie projektu: 1.7.2023 / 30.6.2027
Evidenčné číslo projektu: APVV-22-0488
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 1 - Slovensko: 1
Čerpané financie: APVV: 44250 €

Dosiahnuté výsledky:

Vyvinuli sme relativistickú pod-priestorovú DR-TDDFT metódu určenú na výpočet absorpčných spektier v X-ray oblasti pre systémy s otvorenou obálkou. Metódu sme následne implementovali do programového balíka ReSpect. Táto metóda je vhodná na výpočet spektier pre kvantovo mechanické systémy obsahujúce ľubovoľné elementy z periodickej tabuľky, keďže je založená na Dirac-Coulomb Hamiltoniáne. Metódu sme implementovali v presnom štvor-komponentnom obraze, takže je vhodná na získavanie referenčných výsledkov užitočných pri vývoji menej presných techník. Zároveň sme metodológiu implementovali aj v dvoj-zložkovom obraze takže je použiteľná aj na výpočet elektrónových X-ray spektier veľkých systémov.

Čiastkové výsledky boli publikované vo vysoko impaktovaných časopisoch:

AVILA, Gustavo** – SUNAGA, Ayaki – KOMOROVSKÝ, Stanislav – MÁTYUS, Edit. Hyperfine Rovibrational States of H+3 in a Weak External Magnetic Field. In Physical Review Letters, 2025, volume 135, no. 4, art no. 043003. (2024: 9 – IF, Q1 – JCR, 2.856 – SJR, Q1 – SJR). ISSN 0031-9007. Dostupné na: <https://doi.org/10.1103/lclp-852d> Typ: ADCA

MALKINA, Oľga** – BÜHL, Michael – CHALMERS, A. – KOMOROVSKÝ, Stanislav. Investigation of the effect of solvation on 1J(Metal-P) spin-spin coupling. In Physical Chemistry Chemical Physics, 2025, vol. 27, p. 3574-3582. (2024: 2.9 – IF, Q2 – JCR, 0.698 – SJR, Q2 – SJR). ISSN 1463-9076. Dostupné na: <https://doi.org/10.1039/d4cp04594g> Typ: ADCA

REPISKÝ, Michal** – KOMOROVSKÝ, Stanislav** – KONECNY, Lukas – KADEK, Marius – MOITRA, Torsha – JOOSTEN, Marc – MIŠENKOVÁ, Debora – VIKHAMAR-SANDBERG, Rasmus – KAUPP, Martin – RUUD, Kenneth – MALKINA, Oľga – MALKIN, Vladimír. X2C Hamiltonian Models in ReSpect: Bridging Accuracy and Efficiency. In Journal of Physical Chemistry A.Molecules, spectroscopy, kinetics, environment, and general theory, 2025, vol. 129, no. 34, p. 7980-7998. (2024: 2.8 – IF, Q2 – JCR, 0.634 – SJR, Q2 – SJR). ISSN 1089-5639. Dostupné na: <https://doi.org/10.1021/acs.jpca.5c02990> Typ: ADCA

Výsledky boli prezentované na konferenciách (pozvané prednášky):

KOMOROVSKÝ, Stanislav**. Current densities as a means for analyzing magnetic properties in the relativistic regime. In XVIIth Workshop on Modern Methods in Quantum Chemistry. – Institute of Inorganic Chemistry, Slovak Academy of Sciences, 2025, p. 24. ISBN 978-80-973578-9-4. (XVIIth Workshop on Modern Methods in Quantum Chemistry – MMQC2025.) Typ: AFG

MALKIN, Vladimír** – MALKINA, Oľga. Zurück in die Zukunft: SO correction to NMR shielding. In XVIIth Workshop on Modern Methods in Quantum Chemistry. – Institute of Inorganic Chemistry, Slovak Academy of Sciences, 2025, p. 30. ISBN 978-80-973578-9-4. (XVIIth Workshop on Modern Methods in Quantum Chemistry – MMQC2025.) Typ: AFG

MALKINA, Oľga**. Solvent effects on 1J(Metal-P) couplings. Part 2. In XVIIth Workshop on Modern Methods in Quantum Chemistry. – Institute of Inorganic Chemistry, Slovak Academy of Sciences, 2025, p. 31. ISBN 978-80-973578-9-4. (XVIIth Workshop on Modern Methods in Quantum Chemistry – MMQC2025.) Typ: AFG

14.) Ultra-vysokoteplotné karbidy so zvýšenou oxidačnou odolnosťou (*Novel enhanced oxidation-resistant ultra-high temperature carbides*)

Zodpovedný riešiteľ: Alexandra Kovalčíková
Zodpovedný riešiteľ v organizácii SAV: Peter Tatarko
Trvanie projektu: 1.7.2023 / 30.6.2027
Evidenčné číslo projektu: APVV-22-0493
Organizácia je koordinátorom projektu: nie
Koordinátor: Ústav materiálového výskumu SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 18700 €

Dosiahnuté výsledky:

Hlavné vedecké aktivity projektu boli orientované na štúdium vplyvu SiC whiskerov (SiCw) na odolnosť voči ablácii a oxidácii vysokoentropických karbidov (TiZrHfNbTa)C. Kompozity vysokoentropických karbidov a SiCw boli pripravené metódami práškovej metalurgie a spekania pomocou Spark Plasma Sintering. Odolnosť voči ablácii bola vyhodnocovaná v kyslíkovo-acetylénovom plameni pri teplote 2100 °C po dobu 60 s. Zistilo sa, že zvyšujúci sa obsah SiCw výrazne zlepšil ablačnú odolnosť, pričom dynamická rýchlosť oxidácie klesla až o 84 % pri vzorke s 10 hm. % SiCw. Tieto výsledky podčiarkujú strategický význam SiCw pre vývoj materiálov odolných voči extrémnym podmienkam.

ĐAKOVÁ, Lenka** - HRUBOVČÁKOVÁ, Monika - TATARKO, Peter - HIČÁK, Michal - SEDLÁK, Richard - HVIŠČOVÁ, Petra - KOVALČÍKOVÁ, Alexandra. Enhanced ablation/oxidation resistance of high-entropy carbides: The role of SiC whiskers. In International Journal of Applied Ceramic Technology, 2025, vol. 22, art. no. e70059. (2024: 2.3 - IF, Q2 - JCR, 0.423 - SJR, Q3 - SJR). ISSN 1744-7402. Dostupné na: <https://doi.org/10.1111/ijac.70059> Typ: ADCA

ĐAKOVÁ, Lenka - KOVALČÍKOVÁ, Alexandra - HRUBOVČÁKOVÁ, Monika - TATARKO, Peter - HIČÁK, Michal - DUSZA, Ján. Ablation resistance of high-entropy carbide ceramics with the addition of SiC whiskers. In Metallography and fractography 2025 : 19th international symposium on Metallography, fractography and materials science. Abstract booklet. Nový Smokovec, 23.-25.4.2025. - Košice : Technical University of Košice, 2025, p. 42. ISBN 978-80-553-4818-6. Typ: AFH

KOVALČÍKOVÁ, Alexandra** - ĐAKOVÁ, Lenka - HRUBOVČÁKOVÁ, Monika - TATARKO, Peter - HIČÁK, Michal - SEDLÁK, Richard - HANZEL, Ondrej. Enhanced mechanical properties and ablation/oxidation resistance of high entropy carbides. In 14th international conference on high-performance ceramics : CICC 14th. Abstracts. Haikou, 30.11.-3.12.2025. - Beijing : The Chinese ceramic society, 2025, p. 714. (International conference on High-performance ceramics : CICC 14th.) Typ: GII

15.) Multifunkčné kompozitné materiály pre cielenú detekciu, adsorpciu a dekontamináciu nebezpečných organických molekúl (*Multifunctional composite materials for detection, adsorption and decontamination of hazardous organic molecules*)

Zodpovedný riešiteľ: Juraj Kronek
Zodpovedný riešiteľ v organizácii SAV: Ľuboš Jankovič
Trvanie projektu: 1.7.2024 / 30.6.2028
Evidenčné číslo projektu: APVV-23-0635
Organizácia je koordinátorom projektu: nie
Koordinátor: Ústav polymérov SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 20800 €

Dosiahnuté výsledky:

Pre úvodnú štúdiu interakcií montmorillonitu sa zvolil montmorillonit Kunipia (KUN) a technicky (štruktúrne) najdostupnejší hydrofilný polymér zo skupiny poly(2-alkenyl-oxazolínov), poly(2-izpropenyl-2-oxazolín) (PiPOx). Zo sodného montmorillonitu (Na-KUN) a PiPOx sa pripravila séria organo-montmorillonitov (O-Mt). Uhlíková analýza pripravených PiPOx interkalátov odhalila, že adsorpcia tohto unikátneho polyméru je takmer kvantitatívna, čiže viac než 95 % polyméru sa imobilizovalo v rámci ílovej matrice, pričom mierne vyšší obsah PiPOx sa pozoroval v prípade polyméru s vyššou mólovou hmotnosťou.

Publikačné výstupy:

KRONEKOVÁ, Zuzana - JANKOVIČ, Ľuboš - MOŠKOVÁ, Zuzana - MINARČÍKOVÁ, Alžbeta - ZHUKOUSKAYA, Hanna - KUČKA, Jan - VETRÍK, Miroslav - HRUBÝ, Martin - KRONEK, Juraj**. Partially hydrolyzed poly(2-oxazoline)s as a new class of biocompatible modifiers of montmorillonites for the adsorption and decontamination of the organophosphate paraoxon. In Colloids and Surfaces A: Physicochemical and Engineering Aspects, 2025, vol. 713, art. no. 136534, [13] p. (2024: 5.4 - IF, Q2 - JCR, 0.944 - SJR, Q1 - SJR)

2. ŠKORŇA, Peter – JANKOVIČ, Ľuboš – SCHOLTZOVÁ, Eva – TUNEGA, Daniel. Perchlorate and periodate adsorption by tetrahexylphosphonium-modified beidellite clay. Journal of Molecular Structure, 1349, 143771, 2026, <https://doi.org/10.1016/j.molstruc.2025.143771>

16.) Vplyv radiačnej záťaže na sklovláknitú izoláciu z hľadiska recirkulácie chladiva v havarijných podmienkach jadrových elektrární s tlakovodnými reaktormi (*Influence of radiation load on fiberglass insulation in terms of refrigerant recirculation in emergency conditions of nuclear power plants with pressurized water reactors*)

Zodpovedný riešiteľ:	Marek Liška
Trvanie projektu:	1.7.2023 / 30.6.2026
Evidenčné číslo projektu:	APVV-22-0004
Organizácia je koordinátorom projektu:	nie
Koordinátor:	VÚEZ, a.s.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 16232 €

Dosiahnuté výsledky:

Vykonal sa ťahové testy jednotlivých vlákien ožiarenej a neožiarenej sklovláknitej izolácie. Predbežné výsledky ukazujú, že modul pružnosti a pevnosť nie sú ožiarovaním štatisticky významne ovplyvnené. Tento predbežný výsledok je v súlade so štruktúrou skla (vysoký stupeň zosieťovania), z ktorého je sklovláknitá izolácia vyrobená.

V spolupráci s VŠChT Praha a LIM, a.s. Praha sa vyvíjala metóda stanovenia krehkosti na základe analýzy obrazu (distribúcie dĺžky) vlákien mechanicky drvených kvantifikovaným spôsobom. Na drvenie sklovláknitej izolácie ponorenej v izopropanole sa otestovali ultrazvukové delo, achátový planetárny mlyn a zirkoničitý planetárny mlyn. V prípade ultrazvukového delu nedošlo k požadovanej mechanickej deštrukcii. V prípade achátového planetárneho mlynu dochádzalo k ablácii achátových stien a mlecích guľových telies. Vznikajúca achátová drvina potom prekryla polámané vlákna a zabránila analýze obrazu. V súčasnosti sa pokračuje na vývoji metodiky založenej na použití zirkoničitého planetárneho mlyna.

17.) 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: Katedra ložiskovej geológie PriF UK v Bratislave
Počet spoluriešiteľských inštitúcií: 4 - Slovensko: 4
Čerpané financie: APVV: 6000 €

Dosiahnuté výsledky:

V poslednom polroku riešenia projektu sa organoily, pripravené modifikáciou montmorillonitov (Mt) organickými kationmi (surfaktantmi), testovali ako potenciálne adsorpčné materiály pre remediáciu odpadových vôd. Ako modelové znečisťujúce látky boli vybrané dve farbivá, kationové farbivo metylénová modrá (MB) a aniónové farbivo Floxín B (PhB). Adsorpčné testy sa realizovali na montmorillonite Wyoming (SWy, USA), svetovo-uznávaný ílový štandard a na montmorillonite zo slovenského ložiska Lutila (Lut). Z experimentálnych meraní adsorpčných rovnováh sa vypočítali Langmuirove adsorpčné kapacity, ktoré ukázali dva zásadne odlišné režimy adsorpcie riadené povrchovým nábojom, ióno-výmennou kapacitou a typom surfaktantu. V prípade kationovej MB vykazujú nemodifikované Mt najvyššie adsorpčné kapacity v celom skúmanom koncentračnom rozsahu. Toto správanie je v súlade s dominantnou úlohou kationovej výmeny na negatívne nabitých povrchoch montmorillonitov. Organo-modifikácia surfaktantmi viedla k systematickému poklesu adsorpčnej kapacity MB v oboch vzorkách, zapríčinenému čiastočným alebo úplným obsadením vymeniteľných pozícií v medzivrstviach Mt organickými kationmi, ako aj znížením dostupnosti negatívne nabitých povrchov minerálu. Naopak, adsorpčné správanie aniónového PhB vykazuje opačný trend. Nemodifikované Mt ukázali len zanedbateľnú adsorpciu farbiva, čo odráža silné elektrostatické odpudzovanie medzi negatívne nabitým ílovým povrchom a aniónom. Na druhej strane, modifikácia organickými kationmi zásadne zmenila priebeh adsorpcie PhB a umožnila jeho efektívnu adsorpciu na SWy aj Lut. Prítomnosť organických surfaktantov neutralizovala povrchový náboj Mt a vytvorila hydrofóbne domény, ktoré uľahčili príjem aniónových látok prostredníctvom elektrostatickej príťažlivosti, párovania iónov a hydrofóbných interakcií. Porovnanie získaných výsledkov ukázalo vysoko konzistentné trendy, čo naznačuje, že slovenský montmorillonit Lut je štrukturálne a funkčne porovnateľný s často používaným referenčným ílovitým minerálom SWy.

Výstupy:

KUREKOVÁ, Valéria** - KOVÁČIK, D. - BILSKÁ, K. - BUJDÁKOVÁ, H. - GREAD, F. - OSACKÝ, M. - PRIBUS, Marek. Preparation and characterization of trimethyl chitosan - smectite nanocomposites. In Clay Minerals and Selected Industrial Minerals in Material Science, Applications, and Environmental Technology - 11th Workshop of Slovak Clay Group: Book of Abstracts. - Bratislava: Slovak Clay Group, 2025, p. 25. ISBN 978-80-972367-9-3. (11th Workshop of Slovak Clay Group: Vedecká konferencia.) Typ: AFH

18.) Funkcionalizované 3D sklokeramické membrány na pokročilé fotokatalytické čistenie pitných vôd (*Functionalized 3D glass-ceramic membranes for advanced photocatalytic drinking water treatment*)

Zodpovedný riešiteľ: Monika Micháľková
Trvanie projektu: 1.7.2024 / 30.6.2028
Evidenčné číslo projektu: APVV-23-0352
Organizácia je koordinátorom projektu: nie
Koordinátor: TnU AD
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 10604 €

Dosiahnuté výsledky:

1. ABD-ELSATAR, Ahmed Gamal** - ELSAYED, Hamada - BASAK, Onat - MOSAS, Kamalan - NOWICKA, Aleksandra - KAŇKOVÁ, Hana - MEHTA, Akansha - RAHEL, Jozef - KRAXNER, Jozef - GALUSEK, Dušan - BERNARDO, Enrico. Greener, safer, and stronger: plasma ion-exchanged pharmaceutical glass vials for precision drug delivery dosing. In Applied Surface Science Advances, 2025, vol. 27, art no. 100760. (2024: 8.7 - IF, Q1 - JCR, 1.467 - SJR, Q1 - SJR). ISSN 2666-5239. Dostupné na: <https://doi.org/10.1016/j.apsadv.2025.100760> Typ: ADMA
2. LAGO, Diana** - KRAXNER, Jozef - GALUSEK, Dušan - BERNARDO, Enrico. Development of porous membranes by alkali activation of borosilicate glass: effect of wastewater acidity on copper adsorption. In Developments in the Built Environment, 2025, vol. 23, art no. 100705. (2024: 8.2 - IF, Q1 - JCR, 1.516 - SJR, Q1 - SJR). ISSN 2666-1659. Dostupné na: <https://doi.org/10.1016/j.dibe.2025.100705> Typ: ADCA
3. OURGESSA, Abel W.** - KRAXNER, Jozef - GAMAL ABD-ELSATAR, Ahmed - GALUSEK, Dušan -

BERNARDO, Enrico - MAHMOUD, Mokhtar - ELSAYED, Hamada. Direct ink writing of lightweight 3D structures from alkali-activated waste fiberglass and glass microsphere fillers. In Open Ceramics, 2025, vol. 23, art no. 100825. (2024: 2.8 - IF, Q1 - JCR, 0.53 - SJR, Q2 - SJR). ISSN 2666-5395. Dostupné na: <https://doi.org/10.1016/j.oceram.2025.100825> Typ: ADMA

19.) 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: -

Dosiahnuté výsledky:

V predposlednom roku riešenia projektu sa pokračovalo v testovaní a optimalizácii prípravy antimikrobiálnych nanomateriálov s cieľom zlepšiť antibiofilmové vlastnosti. Dokončil sa aj výskum na nanomateriáli založenom na modifikácii PU (polyuretánu) organoíлом ODTMA/Sap (octadecyltrimetylamóniový kation/ílový minerál saponit) s funkcionalizovaným xanténovým farbivom floxínom B (PhB) na kombinovanom biofilme kvasinky *C. albicans* a *S. aureus*. Pripravené nanokompozitné materiáli boli testované aj proti stafylokokovým biofilmom, testy boli doplnené o stanovenie tvorby ROS (reactive oxygen species).

Vo výskume zameranom na modifikáciu povrchu polypropylénu (PP) sa experimentálne práce zamerali na aktiváciu povrchu PP, aby bol vhodný na následnú depozíciu vrstiev „layer-by-layer“ zložených z chitosanu (CH) alebo N,N,N-trimetylchitosanu (TMCH), v kombinácii so Sap alebo montmorillonitom Lutilla (LU). Pripravili sa aj vzorky hydrogélů s modifikovaným povrchom. Hydrogél bol zložený zo zosieťovaných reťazcov polyvinylalkoholu; povrch bol modifikovaný organoíлом (OC) v zložení saponit s naviazaným hexadecyltrimetylamóniovými (HDTMA) kationmi a fotoaktívnou látkou PhB. Pripravené hydrogély sa testovali proti *S. aureus* EDCC 5055 po PDI a bola podrobne charakterizovaná ich štruktúra. Chitosan sa využil aj v práci zameranej na prípravu kompozitných materiálov v kombinácii s rôznymi typmi smektitov s cieľom pripraviť materiál vo forme dvojvrstvého filmu s polyvinylalkoholom, ktorý vplyvom zmeny pH prostredia (kyslé/zásadité) reaguje reverzibilnou zmenou tvaru.

Súčasťou prác bolo hľadanie nových materiálov a účinných molekúl fotosenzibilizátorov. Realizovali sa nové syntézy benzotiazolov a hľadali sa vzťahy medzi ich molekulovou štruktúrou a ich fotoaktivitou hlavne v hybridných sústavách s vrstevnatými silikátmi. Niektoré z benzotiazolov sa použili na prípravu koordinačných zlúčenín s kationmi irídia a sledovali spektrálne zmeny v sústavách so silikátmi. Pripravila sa rozsiahla séria zložená z 20-tich derivátov BODIPY luminofórov, ktoré v súčasnosti patria k perspektívnym fotosenzibilizátorom.

Publikačné výstupy:

Planetová, V., Boháč P., Bujdák J., Sigmundová I., Magdolen P., Rajamani R., Hrobárik P. Unlocking Light-Up Effect of Push-Pull Hemicyanine Dyes in Hybrid Silicate Dispersions: Impact of the Terminal Arylamine Functionality and Intermolecular Surface Distances. Langmuir. 2025, vol. 30, iss. 41, (2024: 4,6– IF, Q1 – JCR, 0,617 – SJR, Q1 -SJR) <https://pubs.acs.org/doi/10.1021/acs.langmuir.5c05919>

GEORGE, Vinny – BOHÁČ, Peter – BUJDÁK, Juraj. Fabrication of nanocomposite hydrogels featuring functional photoactive surfaces for photodynamic inactivation. In Clay Minerals and Selected Industrial Minerals in Material Science, Applications, and Environmental Technology – 11th Workshop of Slovak Clay Group: Book of Abstracts. – Bratislava: Slovak Clay Group, 2025, p. 7. ISBN 978-80-972367-9-3. http://www.slovakclaygroup.sk/images/Book_of_abstracts_2025_FV.pdf

SANTOS KLEMAN, Leonardo – BOHÁČ, Peter – BUJDÁK, Juraj. Exploring the adsorption properties of bodipy on saponite for functional hybrid materials. In Clay Minerals and Selected Industrial Minerals in Material Science, Applications, and Environmental Technology – 11th Workshop of Slovak Clay Group: Book of Abstracts. – Bratislava: Slovak Clay Group, 2025, p. 9. ISBN 978-80-972367-9-3. http://www.slovakclaygroup.sk/images/Book_of_abstracts_2025_FV.pdf

LABIB SHOTORBAN, Parisa – PÁLKOVÁ, Helena. FTIR spectroscopic study of modified clay minerals as components in functional materials design. In Clay Minerals and Selected Industrial Minerals in Material Science, Applications, and Environmental Technology – 11th Workshop of Slovak Clay Group: Book of Abstracts. Bratislava: Slovak Clay Group, 2025, p. 10. ISBN 978-80-972367-9-3. http://www.slovakclaygroup.sk/images/Book_of_abstracts_2025_FV.pdf

KUREKOVÁ, Valéria – KOVÁČIK, Dušan – BILSKÁ, Katarína – BUJDÁKOVÁ, Helena – GREAD, Faisal – OSACKÝ, Marek – PRIBUS, Marek. Preparation and characterization of trimethyl chitosan–smectite nanocomposites. In Clay Minerals and Selected Industrial Minerals in Material Science, Applications, and Environmental Technology – 11th Workshop of Slovak Clay Group: Book of Abstracts. – Bratislava: Slovak Clay Group, 2025, p. 25. ISBN 978-80-972367-9-3. http://www.slovakclaygroup.sk/images/Book_of_abstracts_2025_FV.pdf

20.) Studené spekanie skiel (*Cold sintering of glass*)

Zodpovedný riešiteľ: Anna Prnová
Trvanie projektu: 1.7.2024 / 30.6.2028
Evidenčné číslo projektu: APVV-23-0424
Organizácia je koordinátorom projektu: nie
Koordinátor: TnU AD
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 22168 €

Dosiahnuté výsledky:

Projekt zahŕňa spracovanie skiel s vysokou tendenciou ku kryštalizácii v kombinácii s luminiscenčnými materiálmi. Na vyvolanie fotoluminiscenčných vlastností v sklách spekaných za studena boli vyvinuté nové fosfory výsledky sú zhrnuté v nasledovných publikáciách:

1. CHAUHAN, Avnee** - FRICKEL, Andreas - PAKOLLU, Kousik - BEGAND, Sabine - HERRMANN, Mathias - BERNARDO, Enrico - GALUSEK, Dušan. Polymorphic transitions and phase stability of $\text{CeO}_2\text{-(Dy,La,Sm,Y)}_2\text{O}_3$ high-entropy oxides consolidated by spark plasma sintering. In Journal of the European Ceramic Society, 2025, vol. 45, art no. 117552. (2024: 6.2 - IF, Q1 - JCR, 1.3 - SJR, Q1 - SJR). ISSN 0955-2219. Dostupné na: <https://doi.org/10.1016/j.jeurceramsoc.2025.117552> Typ: ADCA

2. CHAUHAN, Avnee** - BERNARDO, Enrico - FRICKEL, Andreas - BEGAND, Sabine - HERRMANN, Mathias - GALUSEK, Dušan**. Highly dense translucent $\text{CeO}_2\text{-(RE, Y, Sm, La)}_2\text{O}_3$ (RE = Dy, Gd) high-entropy ceramics for multi-wavelength emission. In International Journal of Applied Ceramic Technology, 2025, vol. 22, no. 6, art no. e70047. (2024: 2.3 - IF, Q2 - JCR, 0.423 - SJR, Q3 - SJR). ISSN 1546-542X. Dostupné na: <https://doi.org/10.1111/ijac.70047> Typ: ADCA

21.) Aplikácia nových biouhlím funkcionalizovaných geopolymérov pri nakladaní s nebezpečným odpadom (*Application of novel biochar-functionalized geopolymers in hazardous waste management*)

Zodpovedný riešiteľ: Michal Slaný
Trvanie projektu: 1.9.2025 / 31.8.2029
Evidenčné číslo projektu: APVV-24-0133
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 3 - Slovensko: 3
Čerpané financie: APVV: 11390 €

Dosiahnuté výsledky:

Projekt začal 1.9. 2025 a odvtedy sa podarilo pripraviť niektoré geopolymérne kompozity na báze kalcinovaných ílových prekurozorov metabentonitu a metakaolínu. Boli vykonané niektoré štruktúrne a fyzikálno-chemické analýzy. Podarilo sa vykonať aj prvotné adsorpčné experimenty. Koncom roka 2025 bol do vedeckého časopisu Construction and Building Materials (Elsevier) zaslaný rukopis CONBUILDMAT-D-25-24470 - Characterization of the microstructure of clay with gum arabic used as a binder in mortars and building composites based on hemp shives, ktorý je v súčasnosti v stave „Under review,,

22.) 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: 40677 €

Dosiahnuté výsledky:

Hlavné aktivity projektu boli zamerané na dôkladnú charakterizáciu všetkých študovaných neekvimolárnych zložení boridov: (Ta_{0.6}Hf_{0.1}Zr_{0.1}Ti_{0.1}Nb_{0.1})B₂, (Ta_{0.6}Hf_{0.25}Zr_{0.05}Ti_{0.05}Nb_{0.05})B₂, (Ta_{0.6}Hf_{0.2}Zr_{0.1}Ti_{0.05}Nb_{0.05})B₂. Bolo potvrdené, že experimentálne materiály mali zloženie odpovedajúce navrhovaným zloženiam. Za účelom stanovenia mechanizmov opotrebenia boli podrobne študované povrchy materiálov po tribologických skúškach. Pre vzorky s najlepšou odolnosťou proti opotrebeniu bola pozorovaná tvorba súvislého tribofilmu, ktorý chránil povrch vzorky pred ďalším porušením. Bolo zistené, že výsledky odolnosti proti opotrebeniu dobre korelujú s mechanickými vlastnosťami materiálov, obzvlášť s pomerom Youngovho modulu pružnosti a tvrdosti (E/H). Za najdôležitejší výsledok možno považovať skutočnosť, že strategicky navrhnuté neekvimolárne entropiou-stabilizované diboridy vykazujú výrazne lepšie mechanické vlastnosti v porovnaní s ekvimolárnymi zloženiami.

HOSSEINI, Naser - VALENZA, Fabrizio - CHLUP, Zdeněk - GAMBARO, S. - ŠIŠKA, Filip - MALINVERNI, Carla - XU, Jie - CASALEGNO, Valentina - KOVALČÍKOVÁ, Alexandra - TATARKOVÁ, Monika - SALVO, Milena - ZHOU, Xiaobing - TATARKO, Peter**. Wettability and brazing of (MoNbTaVW)C high-entropy carbide by Ni and NiTa. In Journal of Materials Research and Technology-JMR&T, 2025, vol. 39, p. 1599-1611. (2024: 6.6 - IF, Q1 - JCR, 1.318 - SJR, Q1 - SJR). ISSN 2238-7854. Dostupné na: <https://doi.org/10.1016/j.jmrt.2025.09.182> Typ: ADCA

ĐAKOVÁ, Lenka** - HRUBOVČÁKOVÁ, Monika - TATARKO, Peter - HIČÁK, Michal - SEDLÁK, Richard - HVIŠČOVÁ, Petra - KOVALČÍKOVÁ, Alexandra. Enhanced ablation/oxidation resistance of high-entropy carbides: The role of SiC whiskers. In International Journal of Applied Ceramic Technology, 2025, vol. 22, art. no. e70059. (2024: 2.3 - IF, Q2 - JCR, 0.423 - SJR, Q3 - SJR). ISSN 1744-7402. Dostupné na: <https://doi.org/10.1111/ijac.70059> Typ: ADCA

HOSSEINI, Naser - VALENZA, Fabrizio - CHLUP, Zdeněk - GAMBARO, S. - MALINVERNI, Carla - CASALEGNO, Valentina - KOVALČÍKOVÁ, Alexandra - TATARKOVÁ, Monika - DLOUHÝ, Ivo - TATARKO, Peter**. Wetting and brazing of (HfTaZrNbTi)B₂ and (HfTaZrNbTi)C High-Entropy Ceramics by AgCuTi filler. In Open Ceramics, 2025, vol. 22, art. no. 100792. (2024: 2.8 - IF, Q1 - JCR, 0.53 - SJR, Q2 - SJR). ISSN 2666-5395. Dostupné na: <https://doi.org/10.1016/j.oceram.2025.100792> Typ: ADMA

KOVALČÍKOVÁ, Alexandra - TATARKO, Peter - SEDLÁK, Richard - CHLUP, Zdeněk - MEDVEĎ, Dávid - MÚDRA, Erika - DUSZA, Ján. Secondary phases reinforced carbide and boride ceramics: Effect of silicon carbide and graphene platelets on mechanical and tribological properties. In 16th Pacific RIM conference on ceramic and glass technology/GOMD 2025: Abstract book. Vancouver, 4.-9.5.2025. - S.l.: The American Ceramic Society, 2025, p. 121.

23.) Základ k ekologicky udržateľným sodíkovo-iónovým batériám pre nízko nákladovú technológiu (Towards Eco-sustainable Sodium-ion batteries for a LOW-cost technology)

Zodpovedný riešiteľ: Gianmarco Taveri
Zodpovedný riešiteľ v organizácii SAV: Zoltán Lenčes
Trvanie projektu: 1.7.2024 / 30.6.2028
Evidenčné číslo projektu: APVV-23-0474
Organizácia je koordinátorom projektu: nie
Koordinátor: Centrum pre využitie pokročilých materiálov SAV, v. v. i.

Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 12479 €

Dosiahnuté výsledky:

Zloženie suspenzie obsahujúcej SiOC na odlievanie pásky bolo optimalizované, čo viedlo k hmotnostnému pomeru SiOC:C:spojivo = 80:10:10, kde C je sadza s vysokou elektrickou vodivosťou a spojivo je zmes karboxymetylcelulózy (CMC) a styrénbutadiénového kaučuku (SBR). Ako spojivo bol použitý aj sírou dopovaný alginát (s-Alg). SiOC anódy so spojivom s-Alg vykazovali lepšiu stabilitu v porovnaní s anódami so spojivom CMC + SBR. Okrem toho je s-Alg rozpustný vo vode, takže proces prípravy anódy je ekologický.

SiOC anódy boli pripravené odlievaním suspenzie na medenú fóliu (hrúbka 6 μm). Odliate anódy vo forme pásky (s hrúbkou 100 μm) sa sušili na vzduchu 2 hodiny a následne sa sušili vo vákuovej sušičke pri teplote 100 °C počas 24 hodín. Z pásky sa vyrazili disky s priemerom 18 mm. Polčlánky sa zostavili v gloveboxe naplneným argónom. Ako protielektroda sa použil kovový sodík a elektródy sa namočili do 100 % NaPF₆ v elektrolyte EC/DEC (1:1 hm. %).

Povrchová morfológia a prierezové plochy anód boli charakterizované pomocou rastrovacieho elektrónového mikroskopu. Elementárne zloženie prierezov bolo určené EDX analýzou.

Elektrochemické testy:

Výkonnosť prútu bola skúmaná pomocou zariadenia 8X-PAT Channel a softvéru EL-Cell. Konštantný prúd bol aplikovaný medzi 0,005 – 2,5 V oproti Na/Na⁺ pri použití 0,025, 0,1, 0,5, 1 a 2 A/g, následne počas 10 cyklov. Špecifická kapacita bola približne 180 mAh/g pri použití 0,025 A/g, ktorá sa postupne (podľa očakávania) znižovala na 50 mAh/g pri použití 1 A/g. Kapacita bola dobre zachovaná počas cyklovania, približne na úrovni 87 %.

24.) Zelená energetická inovácia: Entropicky inžinierované perovskitové oxidy pre termoelektrické aplikácie (*Green Energy Innovation: Entropy-Engineered Perovskite Oxides for Thermoelectric Applications*)

Zodpovedný riešiteľ: Hakan Ünsal
Trvanie projektu: 1.9.2025 / 30.8.2029
Evidenčné číslo projektu: APVV-24-0403
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 20737 €

Dosiahnuté výsledky:

Počas prvých štyroch mesiacov riešenia projektu (september – december 2025) boli výskumné aktivity zamerané na pracovný balík WP1, ktorého cieľom bol návrh a teoretický výpočet nových dvojmiestne substituovaných vysokoentropických perovskitových oxidov. Hlavným cieľom tejto úvodnej fázy bolo posúdiť syntetizovateľnosť a štruktúrnú stabilitu vopred vybraných zložení pomocou teoretických výpočtov. V rámci úlohy T1.1 boli vypočítané formovacie energie a fázová stabilita rôznych zložení odvodených od referenčnej štruktúry (Sr_{1-x}Ca_xBa_{1-y}La_yTiO₃) s riadenou substitúciou na B-mieste. Všetky skúmané zloženia vykazovali záporné energie v rozsahu od 3,13 do 3,19 eV, čo naznačuje dobrú termodynamickú stabilitu a realizovateľnosť experimentálnej syntézy. Vypočítané tolerančné faktory boli blízke hodnote 1 (t = 1,003 – 1,009), čo potvrdzuje štruktúrnu kompatibilitu s perovskitovou mriežkou.

V rámci úlohy T1.2 boli výpočtami stanovené teoretické hustoty vybraných systémov. Získané hodnoty hustoty vykazovali systematický nárast so zvyšujúcim sa obsahom Nb, pričom dosahovali hodnoty nad 5,43 g/cm³, čo odráža vplyv substitúcie na B-mieste na kompaktnosť mriežky. Možno konštatovať, že práca realizovaná počas prvej etapy vytvorila teoretický základ projektu a identifikovala niekoľko energeticky stabilných vysokoentropických perovskitových zložení vhodných na ďalší experimentálny výskum v nasledujúcich fázach projektu.

Programy: SASPRO

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

Zodpovedný riešiteľ: Marián Matejdes
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: 44728 €

Dosiahnuté výsledky:

V záverečnej etape výskumu sa pozornosť sústredila na skúmanie naviazania kvantových bodov na okraje silikátových doštičiek, čo predstavuje kľúčový krok smerom k vývoju plne funkčného hybridného systému. Počiatočné pokusy využívajúce metódu horúcej injekcie viedli k tomu, že kvantové body boli zachytené medzi znovu naskladanými dvojitémi vrstvami. Na prekonanie tohto problému bol preto vyvinutý nový dvojkrokový postup.

V prvom kroku sa sterické tienenie spôsobené vyčnievajúcimi interkalovanými fotoaktívnymi molekulami eliminovalo úpravou pH pod bod nulového náboja silanolových skupín silikátu, čo v dôsledku odpudivých interakcií spôsobilo desorpciu fotoaktívnych molekúl z okrajov. V druhom kroku sa použila predsilanizácia na vytvorenie stabilných a robustných kotviacich miest pre kvantové body, pričom okraje sa funkcionalizovali pomocou (3-merkaptopropyl)triethoxysilánu a (3-aminopropyl)triethoxysilánu.

V súlade s konceptom tvrdých a mäkkých kyselín a zásad vykazovali mäkké kyslé ióny Cd²⁺ potrebné pre rast kvantových bodov silnejšiu väzbovú afinitu k mäkkému donorovému atómu síry v (3-merkaptopropyl)triethoxysiláne než k atómu dusíka v (3-aminopropyl)triethoxysiláne, čo viedlo k pevnejšiemu a spoľahlivejšiemu naviazaniu. Úspešná aplikácia tejto metódy, najmä s využitím binárneho rozpúšťadla EtOH:H₂O v pomere 3:1 počas predsilanizačného procesu, viedla k uspokojivému prichyteniu kvantových bodov na okraje anténnych dvojvrstiev.

26.) 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: Oksana Matselko
Trvanie projektu: 1.9.2022 / 31.8.2025
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: 34793 €

Dosiahnuté výsledky:

Boli identifikované a podrobne charakterizované dve nelineárne opticky aktívne zlúčeniny, KNa₂(Hf,Zr)F₇ a KNa₂HfF₇, ktoré rozširujú skupinu fluoridov prechodných kovov s konfiguráciou d⁰. Pre obe zlúčeniny bola experimentálne potvrdená odozva druhého harmonického generovania (SHG) pri excitácii laserovým žiarením s vlnovou dĺžkou 1064 nm.

Práškové vzorky vykazujú fázovo zladiteľnú SHG odozvu so strednou intenzitou, pričom intenzita signálu dosahuje približne 0,66-násobok pre KNa₂(Hf,Zr)F₇ a 0,57-násobok pre KNa₂HfF₇ v porovnaní s referenčným materiálom KDP. Výpočty elektronickej štruktúry potvrdili široké zakázané pásma pre analyzované fluoridy, čo poukazuje na ich vhodnosť na aplikácie v infračervenej oblasti. Štruktúrne a optické vlastnosti zlúčenín boli ďalej podporené výsledkami NMR spektroskopie v tuhej fáze, FTIR a UV-vis-NIR spektroskopie.

Okrem nelineárno-optických vlastností boli stanovené aj frekvenčne závislé hodnoty striedavej elektrickej vodivosti a permitivity, čím bola doplnená komplexná charakterizácia ich fyzikálnych vlastností.

MATSELKO, Oksana** - VASKOVÁ, Zuzana - NETRIOVÁ, Zuzana - RUSNÁK, Jaroslav - YAN, Mei - TANG, Ru-

Ling - GUO, Sheng-Ping - BASHIR, Sanam - SCHOLTZO VÁ, Eva - RAKHMATULLIN, Aydar - KLEMENT, Róbert - BOČA, Miroslav. $\text{KNa}_2(\text{Hf,Zr})\text{F}_7$ and KNa_2HfF_7 : isostructural fluorides with phase-matchable second-harmonic generation. In Materials Today Chemistry (under review)

Spontánne ochladené vzorky systémov $(\text{LiF}-\text{CaF}_2)_{\text{eut}}-\text{nLnF}_3$ ($\text{Ln} = \text{Nd, Sm, Gd}$) boli analyzované práškovou röntgenovou difrakciou s cieľom upresniť zloženie predtým neidentifikovaných fáz. Okrem kryštalizácie LiF , NdF_3 , $\text{CaSm}_{1-y}\text{F}_{3-y}$ alebo LiGdF_4 sa pozoruje tvorba kubických fáz $\text{Ca}_{1-x}\text{Ln}_x\text{F}_{2+x}$ ($x \approx 0,2-0,35$ pre Nd , $0,16-0,39$ pre Sm , $0,17-0,32$ pre Gd). Fázy $\text{Ca}_{1-x}\text{Ln}_x\text{F}_{2+x}$ a $\text{CaSm}_{1-y}\text{F}_{3-y}$ vznikajú v dôsledku izomorfnej heterovalentnej substitúcie a sú charakterizované početnými defektami v kryštálovej štruktúre. Merania striedavej elektrickej vodivosti pri izbovej teplote (1 kHz–1 MHz) preukázali ich vplyv na zmenu vodivosti.

MATSELKO, Oksana** - NETRIOVÁ, Zuzana - MLYNÁRIKOVÁ, Jarmila - KUBÍKOVÁ, Blanka – RUSNÁK, Jaroslav - BOČA, Miroslav. Components interaction in the systems $(\text{LiF}-\text{CaF}_2)_{\text{eut}}-\text{nLnF}_3$ ($\text{Ln} = \text{Nd, Sm, Gd}$). In Chemical Papers (accepted)

Programy: DoktoGrant

27.) Multifunctional hydrogel nanocomposite with photoactive surfaces for photodynamic applications. (*Multifunctional hydrogel nanocomposite with photoactive surfaces for photodynamic applications.*)

Zodpovedný riešiteľ:	Vinny George
Trvanie projektu:	1.1.2025 / 31.12.2025
Evidenčné číslo projektu:	
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 2998 €

Dosiahnuté výsledky:

Synthetic saponite was modified with hexadecyltrimethylammonium bromide (HDTMA) at an nHDTMA/mSap ratio of 0.8 mmol g⁻¹ to produce organoclay. Organoclay was then used to intercalate phloxine B at various phloxine B/saponite ratios, generating a series of ternary systems. Thin films were prepared by vacuum filtration. After evaluating several hydrogel formulations, a poly(vinyl alcohol)/glycerol hydrogel was selected as the matrix due to its straightforward preparation, optical transparency, and mechanical stability. Surface-modified composites were produced by casting a hydrogel precursor (10 wt% poly(vinyl alcohol) in water with glycerol as a 1:1 co-solvent, where glycerol acted as both crosslinker and plasticiser) onto freshly prepared films in a mould. Films with varying phloxine B/saponite compositions and their corresponding hydrogel composites prepared for detailed characterization.

Chemometric analysis of the emission spectra further supported these conclusions by confirming that different emissive species and environments were present in the films and in the composites. Time-resolved fluorescence measurements were used to evaluate different emissive species and their lifetimes, providing additional evidence for photophysical behaviour of different species.

Surface bactericidal activity was evaluated using *Staphylococcus aureus*. The base hydrogel, hydrogel modified with organoclay film, and the final phloxine B-containing composite were compared. The organoclay-containing material demonstrated antibacterial activity due to the surfactant, while the phloxine B containing composite achieved a high killing efficiency (approximately 99.99%), confirming the system's effectiveness even at low photosensitizer loading.

GEORGE, V.** - BOHÁČ, Peter - BUJDÁK, Juraj. Fabrication of nanocomposite hydrogels featuring functional photoactive surfaces for photodynamic inactivation. In Clay Minerals and Selected Industrial Minerals in Material Science, Applications, and Environmental Technology - 11th Workshop of Slovak Clay Group: Book of Abstracts. Bratislava: Slovak Clay Group, 2025, p. 7. ISBN 978-80-972367-9-3. Typ: AFH

GEORGE, Vinny** - BOHÁČ, Peter - BUJDÁK, Juraj. Photosensitizer-Loaded Nanocomposite Hydrogels with Functional Photoactive Surfaces for Photodynamic Applications. In XVIII ICC - International Clay Conference: Programme and Abstracts. 18. Dublin: The Mineralogical Society of the UK and Ireland, 2025, p. 608. ISBN 9780903056694. Dostupné na internete: <https://icc.aipea.org/wp-content/uploads/sites/3/2025/07/ICC-Programme-and->

28.) Shape Memory Bio-nanocomposite based on Modified-Clay Minerals as Potential Materials for Dual Delivery System (*Shape Memory Bio-nanocomposite based on Modified-Clay Minerals as Potential Materials for Dual Delivery System*)

Zodpovedný riešiteľ: Parisa Labib Shotorban
Trvanie projektu: 1.1.2025 / 31.12.2025
Evidenčné číslo projektu: APP0633
Organizácia je
koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských
inštitúcií: 0
Čerpané financie: SAV: 2999 €

Dosiahnuté výsledky:

Bol vyvinutý dvojvrstvový nanokompozitný systém na báze modifikovaných smektitov s polymérmi ako pH-responzívnymi nosičmi s vlastnosťami vhodnými pre biomedicínske aplikácie. Vypracoval sa postup prípravy viackomponentných nanokompozitných materiálov a optimalizovali sa podmienky syntézy. Vrstvy kompozitu boli pripravené inkorporáciou častíc smektitu do: 1) polyvinylalkoholu pomocou cyklov zmrazovania a rozmrazovania, 2. do chitosanu. Vrstva chitosanu bola nanosená na povrch kompozitu smektitu s PVA, čím sa vytvoril dvojvrstvový systém. Optimálna hrúbka dvojvrstvého filmu bola dosiahnutá použitím 30 ml roztoku vo forme s priemerom 85 mm. Obe vrstvy boli systematicky skúmané z hľadiska pomeru smektitu k polyméru a hrúbky vrstvy. Charakterizácia bola vykonaná pomocou FTIR spektroskopie, röntgenovej difrakcie a skenovacej elektrónovej mikroskopie. Experimentálne výsledky ukázali, že obsah polyméru presahujúci kationovú výmennú kapacitu (CEC) smektitov je vhodný pre efektívnu tvorbu filmu. Zo SEM snímok vyplynulo, že vrstvy smektitu boli nadmerne pokryté polymérom. Okrem toho sa vyhodnotil vplyv kyslého prostredia potrebného na rozpúšťanie chitosanu na štruktúru smektitu. Analýzou FTIR spektier sa zistila prítomnosť amorfného SiO₂ ako produktu rozkladu. Rozdielna intenzita absorpčných pásov potvrdila rozdielny rozsah štrukturálnych zmien v smektitov vplyvom tohto prostredia. XRD spektrá vykazovali mierne posuny charakteristického maxima d(001) smerom k nižšiemu uhlu 2 θ , čo naznačuje zmenu bazálnej vzdialenosti v štruktúre smektitu.

Na zloženom kompozite sa sledovala odozva materiálu na zmenu pH prostredia, ktoré simulovalo rôzne biologické prostredie. Pri vystavení kompozitu rôznym pH, materiál reagoval zrolovaním alebo vyrovnaním filmu.

LABIB SHOTORBAN, Parisa** - PÁLKOVÁ, Helena. Infrared spectroscopic analysis of smectite-chitosan nanocomposites. In XVIII ICC - International Clay Conference: Programme and Abstracts. 18. Dublin: The Mineralogical Society of the UK and Ireland, 2025, p. 489. ISBN 9780903056694. <https://icc.aiepa.org/wp-content/uploads/sites/3/2025/08/ICC-Programme-and-Abstracts-xx.pdf> (XVIII ICC - International Clay Conference.)
Typ: AFG

LABIB SHOTORBAN, Parisa** - PÁLKOVÁ, Helena. FTIR spectroscopic study of modified clay minerals as components in functional materials design. In Clay Minerals and Selected Industrial Minerals in Material Science, Applications, and Environmental Technology - 11th Workshop of Slovak Clay Group: Book of Abstracts. Bratislava: Slovak Clay Group, 2025, p. 10. ISBN 978-80-972367-9-3. http://www.slovakclaygroup.sk/images/Book_of_abstracts_2025_FV.pdf Typ: AFH

29.) Optimizing Luminophore-Silicate Interactions for Advanced Hybrid Materials with Enhanced Photoactivity (*Optimizing Luminophore-Silicate Interactions for Advanced Hybrid Materials with Enhanced Photoactivity*)

Zodpovedný riešiteľ: Viktória Planetová
Trvanie projektu: 1.1.2025 / 31.12.2025
Evidenčné číslo projektu:

Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských 0
inštitúcií:
Čerpané financie: SAV: 2999 €

Dosiahnuté výsledky:

Boli pripravené hybridné systémy zložené z nových kationových farbív na báze benzotiazolu (monokatión a dikatión) s vrstevnatými kremičitanmi zo skupiny smektitov s rôznou hustotou povrchového náboja. Cieľom bolo študovať molekulové interakcie pomocou spektroskopických metód so zameraním na analýzu vplyvu nábojových interakcií organických farbív vo vzťahu k povrchovému náboju vrstevnatých kremičitanov a vplyvu prechodu z koloidnej do pevnej fázy na výsledné fotofyzikálne vlastnosti. Vzorky boli pripravené v rôznych pomeroch farbivo/smektit, vo forme koloidných disperzií a tenkých filmov. Na týchto vzorkách boli vykonané spektroskopické merania: absorpčné spektrá, emisné spektrá, kvantové výťažky a v prípade tenkých filmov aj XRD. Samotné roztoky farbív nevykazovali fotoluminiscenčné vlastnosti. Po fixácii na smektit boli pozorované zvýšenia emisie, pričom najvýznamnejší nárast kvantového výťažku bol nameraný pre monokatión/saponit, a to až 23 %. Pri tomto filme sme tiež dosiahli až 40-násobný nárast intenzity emisie oproti danej disperzii, z ktorej bol film pripravovaný. Pre filmy dikatiónového farbiva bolo naopak pozorované zníženie emisie v porovnaní s disperziami. Hybridné materiály vykazovali zvýšenie fotoluminiscencie, čo umožní ich potenciálne využitie v rôznych technologických oblastiach. Zároveň tento výskum prispieva k základnému pochopeniu mechanizmov a interakcií organických farbív, a tým aj k optimalizácii prípravy nových hybridných materiálov.

Dosiahnuté výsledky boli prezentované na konferencii vo forme postera.

PLANETOVÁ, Viktória** – BOHÁČ, Peter – HROBÁRIK, Peter – BUJDÁK, Juraj. Unlocking Fluorescence Enhancement in Benzothiazole-based Dyes in Hybrid Silicate Dispersions. In XVIII ICC – International Clay Conference : Programme and Abstracts. 18. – Dublin : The Mineralogical Society of the UK and Ireland, 2025, p. 577. ISBN 9780903056694. Dostupné na internete: <https://icc.aipea.org/wp-content/uploads/sites/3/2025/07/ICC-Programme-and-Abstracts-x.pdf> (XVIII ICC – International Clay Conference.) Typ: AFG

Programy: Plán obnovy EÚ

30.) „Matching“ granty ku zdrojom získaným od súkromného sektora („Matching“ granty ku zdrojom získaným od súkromného sektora)

Zodpovedný riešiteľ: Miroslav Boča
Trvanie projektu: 1.2.2025 / 31.3.2026
Evidenčné číslo projektu:
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských 0
inštitúcií:
Čerpané financie: -

Dosiahnuté výsledky:

V roku 2025 začalo obstarávanie prístrojov a zariadení.

1. Modulárny potentiostat/galvanostat
2. Stolový energodisperzný (EDX XRF) spektrometer
3. Sekvenčná naprašovačka
4. Zvárací komplet/set
5. Držiak na vzorky k impedančnému spektrometru
6. Držiak TG-DSC/cp do analyzátora

31.) „Matching“ granty ku zdrojom získaným od súkromného sektora („Matching“ granty ku

zdrojom získaným od súkromného sektora)

Zodpovedný riešiteľ: Miroslav Boča
Trvanie projektu: 1.2.2025 / 31.3.2026
Evidenčné číslo projektu:
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: -

Dosiahnuté výsledky:

V roku 2025 začalo obstarávanie prístrojov a zariadení. Ide o spojené financovanie z dvoch "Matching" projektov.

1. Modulárny potentiostat/galvanostat
2. Stolový energodisperzný (EDX XRF) spektrometer
3. Sekvenčná naprašovačka
4. Zvárací komplet/set
5. Držiak na vzorky k impedančnému spektrometru
6. Držiak TG-DSC/cp do analyzátora

32.) Materiály so zvýšenou bezpečnosťou pre Li-iónové batérie (*Enhanced safe materials for Li-ion batteries*)

Zodpovedný riešiteľ: Karol Fröhlich
Zodpovedný riešiteľ v organizácii SAV: Zoltán Lenčes
Trvanie projektu: 1.5.2025 / 31.8.2026
Evidenčné číslo projektu: 09I04-03-V02-00028
Organizácia je koordinátorom projektu: nie
Koordinátor: Centrum pre využitie pokročilých materiálov SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: Plán obnovy SR: 146849 €

Dosiahnuté výsledky:

V rámci projektu boli skúmané vlastnosti kremíkových/grafitových (Si/Gr) anód používaných v lítium-iónových batériách, so zameraním na obsah kremíka v anóde (20 – 50 %), typ spojiva s vlastnosťami spomaľujúcimi horenie, vplyv ZnO povlakov a pridanie fluóretylénkarbonátu (FEC) do elektrolytu. Si/Gr anóda bola pripravená planetárnym guľovým mletím zmesi Si/Gr za optimalizovaných podmienok mletia (WC mlecie médium s priemerom $d = 2$ mm, rýchlosť 450 ot./min, čas 12 h), čo viedlo k priemernej veľkosti častíc kremíka 3 μm a minimálnej kontaminácii z mlecieho média. Systematicky sme skúmali vplyv ultratenkých ZnO povlakov na kremíkovo-grafitovú anódu, pripravenú metódou depozície atomárnych vrstiev (ALD), s a bez prísady FEC v elektrolyte. Ukázalo sa, že tenký povlak ZnO účinne modifikuje vrstvu SEI, čím znižuje odpor SEI a prenos náboja, a tým uľahčuje transport lítiových iónov do objemu anódy. V dôsledku toho sa výrazne zlepšila prenosová kapacita Si-grafitovej anódy s povlakom ZnO. Prítomnosť stabilnejšej vrstvy SEI bola potvrdená elektrochemickou impedančnou spektroskopiou. Povlaky ZnO ako aj prísada FEC významne ovplyvňujú prenosovú kapacitu a dlhodobú cyklickú stabilitu anód. Kombinácia povlakov ZnO nanosených metódou ALD s prísadou FEC v elektrolyte vykazovala najlepší výkon, pričom sa zvýšila prenosová kapacita aj zachovanie kapacity počas dlhších cyklov. Tieto zistenia sú ďalej potvrdené elektrochemickou impedančnou spektroskopiou (EIS), ktorá zdôrazňuje zlepšenie výkonu anódy. Okrem toho postmortálna analýza pomocou röntgenovej fotoelektrónovej spektroskopie (XPS) ukázala zvýšené množstvo LiF v medzifázovej vrstve tuhého elektrolytu (SEI). Toto zvýšenie obsahu LiF môže prispieť k zvýšenej stabilite a výkonu pozorovanému u anód s povlakom ZnO v kombinácii s prísadou FEC v elektrolyte.

SAHOO, Prangya Parimita - GÜNEREN, Alper - HUDEC, Boris - MIČUŠÍK, Matej - ŠVEC, Peter Jr. - PRECNEROVÁ, Magdaléna - NADA, Ahmed A. - LENČEŠ, Zoltán - FRÖHLICH, Karol**. Silicon/Graphite Anode Performance Improvement: A Combination of Atomic Layer-Deposited ZnO Coatings with a Fluoroethylene Carbonate Additive. In ACS Applied Energy Materials, 2025, vol. 8, no. 11, p. 6925-6934. (2024: 5.5 - IF, Q2 - JCR, 1.378 - SJR, Q1 - SJR). ISSN 2574-0962. Dostupné na: <https://doi.org/10.1021/acs.aem.4c02912>

33.) Pokročilé modelovanie interakcií svetlo-hmota na exascale superpočítačoch blízkej budúcnosti (*Advanced Modelling of Light-Matter Interactions on Near-Term ExaScale Supercomputers*)

Zodpovedný riešiteľ: Stanislav Komorovský
Trvanie projektu: 1.1.2024 / 1.8.2026
Evidenčné číslo projektu: 09I05-03-V02-00034
Organizácia je koordinátorom projektu: nie
Koordinátor: Univerzita Komenského v Bratislave
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: Výskumná agentúra: 189820 €

Dosiahnuté výsledky:

Vývoj teoretických základov a pilotnej CPU implementácie dvojzložkovej self-konzistentnej procedúry založenej na Kramersovo-nespriahnutých orbitáloch. Dvojzložková metóda využíva prístup založený na atómovom strednom poli čo vedie k presnému dvojzložkovému Hamiltoniánu s orbitálmi Gaussovského typu. Implementácia je zverejnená v programovom balíku ReSpect na stránke respectprogram.org

Čiastkové výsledky boli publikované v impaktovanom časopise:

REPISKÝ, Michal** – KOMOROVSKÝ, Stanislav** – KONECNY, Lukas – KADEK, Marius – MOITRA, Torsha – JOOSTEN, Marc – MIŠENKOVÁ, Debora – VIKHAMAR-SANDBERG, Rasmus – KAUPP, Martin – RUUD, Kenneth – MALKINA, Oľga – MALKIN, Vladimír. X2C Hamiltonian Models in ReSpect: Bridging Accuracy and Efficiency. In Journal of Physical Chemistry A.Molecules, spectroscopy, kinetics, environment, and general theory, 2025, vol. 129, no. 34, p. 7980-7998. (2024: 2.8 – IF, Q2 – JCR, 0.634 – SJR, Q2 – SJR). ISSN 1089-5639. Dostupné na: <https://doi.org/10.1021/acs.jpca.5c02990> Typ: ADCA

34.) 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*)

Zodpovedný riešiteľ: Stanislav Komorovský
Trvanie projektu: 1.8.2024 / 1.3.2026
Evidenčné číslo projektu: 09I03-03-V06-00103
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: Výskumná agentúra: 58056 €

Dosiahnuté výsledky:

Obstaranie dvoch pracovných staníc (workstations) s výkonnou grafickou kartou určenou na vedecké vysokovýkonné počítanie (HPC).

35.) Demonštrácia viazania cez priestor šíreného π -orbitálmi (*Study of C-C Coupling*)

Propagated by π -Orbitals)

Zodpovedný riešiteľ: Florian Andreas Lemken
Trvanie projektu: 1.6.2025 / 31.5.2026
Evidenčné číslo projektu:
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: Plán obnovy SR: 37633 €

Dosiahnuté výsledky:

All software created in the context of this project has been collected in a coherent software package for easy distribution. This package contains a programme for the automated identification of π -orbitals (tool 1) and a programme for the calculation of a coupled molecular response to a nuclear magnetic moment (tool 2). The third software tool (tool 3), indicated in the project proposal, is a second-order charge-density response code for the generation of coupling deformation densities (CDD).[1] Due to the significant increase of work hours required for the completion of tool2 and thus WP1 (vide infra), the proposed approach for this tool was substituted with the spin-spin coupling constant density (SSCCD), an alternative approach already implemented in the ReSpect software package. This is in accordance with point 1 of the risk management plan (cf. 3.2.1 of project proposal).

As the purpose of the project is the identification of a novel through-space (TS) pathway for the propagation of indirect nuclear spin-spin coupling (SSC), the name Magnetic Pathway-finder for Interactions and Energies (MAGPIE) was considered. However, this name has been utilised for several commercial software packages, protected by intellectual property rights. Although, the project does not envision marketable usage of software created therein, nor any competition with commercial software packages being reasonable to expect, we found it prudent to prevent any potential for legal conflict. Therefore, the name STRAKA was chosen. This is not an acronym in any way, but simply the translation of the word magpie into Slovak. We find that this choice of name puts additional emphasis on the institutional origin of the software.

Outputs:

LEMKEN, Florian – JANČIŠINOVÁ, Andrea Through-Space Spin-Spin Coupling Pathway Propagated via π -Orbitals. 20th CESTC, BOOK OF ABSTRACTS, High Tatras, Slovakia, September 8-11, 2025, PB3/91, ISBN 978–80–69178–00–7

36.) Keramické anódy na báze SiOC pre udržateľné sodíkovo iónové a kovové batérie (*SiOC-based ceramic anodes for sustainable sodium ion and metal batteries*)

Zodpovedný riešiteľ: Zoltán Lenčes
Trvanie projektu: 1.1.2025 / 30.6.2026
Evidenčné číslo projektu: 09101-03-V04-00093
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: Plán obnovy SR: 19636 €

Dosiahnuté výsledky:

Optimalizovali sa podmienky zosieťovania a pyrolýzy polysiloxánového polyméru ako prekursora pre keramický materiál SiOC ako aj podmienky mletia pyrolyzovaného SiOC s použitím nádoby a guľôčok z karbidu volfrámu. Fázové zloženie mletých práškov SiOC bolo stanovené XRD meraniami. Zloženie suspenzie obsahujúcej SiOC pre odlievanie pásky bolo optimalizované, čo viedlo k hmotnostnému pomeru SiOC:C:spojivo = 80:10:10, kde C je sadza s vysokou elektrickou vodivosťou a spojivom je zmes karboxylmetylcelulózy (CMC) a styrébutadiénového kaučuku (SBR). Ako spojivo bol použitý aj sírou dopovaný alginát (s-Alg).

SiOC suspenzie sme odlievali na medenú fóliu a odliate pásky (anódy) boli sušené vo váku. Z SiOC pásiiek boli vyrezané okrúhle anódy s priemerom 8 mm. Polčlánky sodíkových batérií boli skladané v gloveboxe v atmosfére argónu. Následne

boli vykonané elektrochemické merania vrátane testov rýchlostnej kapacity, cyklických testov a elektrochemickej impedančnej spektroskopie (EIS). Kapacitu SiOC anódy sa podarilo zvýšiť prídavkom 20 hm.% cínu.

37.) Vývoj pokročilých luminiscenčných sklenených 3D štruktúr (*Development of advanced luminescent glass 3D structures*)

Zodpovedný riešiteľ: Monika Micháľková
Trvanie projektu: 1.7.2024 / 30.6.2026
Evidenčné číslo projektu: 09I03-03-V04-00198
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: Plán obnovy SR: 106480 €

Dosiahnuté výsledky:

1. GHADAMYARI, Marzieh** - HOSSEINI, Hossein Ebrahim - MICHÁLKOVÁ, Monika - STUCCHI DE CAMARGO, Andréa Simone - GALUSEK, Dušan - CHUKOVAE, Oksana - JACOBSON, Luiz Gustavo - KLEMENT, Róbert. Synthesis, characterization, and optical properties of undoped KZGO Polycrystals. In FunGlass School 2025/1 : Book of Abstracts. - Trenčín, Slovakia : Centre for functional and surface functionalized glas, 2025, p. 8. ISBN 978-80-8295-046-8. (FunGlass School 2025/1 : vedecká konferencia.) Typ: AFH
2. GHADAMYARI, M. - HOSSEINI, H. E. - MICHÁLKOVÁ, Monika - STUCCHI DE CAMARGO, A. S. - CHUKOVA, O. - JACOBSON, L. G. - KLEMENT, R.** - GALUSEK, Dušan**. Achieving broadband emission from K₂ZnGeO₄ polycrystals. In FAC 2025 : Fracture mechanics and fractography of advanced ceramics conference 2025. The 8th international conference. Book of abstracts. Smolenice, 6.-9.10.2025. - Košice: Institute of Materials Research SAS, 2025, p. 22. ISBN 978-80-89782-19-2. (FAC 2025 : Fracture mechanics and fractography of advanced ceramics conference 2025.) Typ: AFH
3. CIBRÍNOVÁ, Andrea** - GHADAMYARI, Marzieh - NOVOKHATSKA, Anastasiia - MAHMOUD, Mokhtar - MICHÁLKOVÁ, Monika. Optimisation of 3D printing and sintering parameters required for PiG (phosphor in glass) preparation. In The Slovak and Czech Glass Conference 2025 : Book of Abstracts. - Trenčín, Slovakia: FunGlass – Centre for Functional and Functionalized Glass & Slovak Glass Society, 2025, p. 39. ISBN 978-80-8295-053-6. Dostupné na internete: https://www.funglass.eu/wp-content/uploads/2025/04/SaCZK_2025.pdf (The Slovak and Czech Glass Conference 2025.) Typ: AFH
4. MICHÁLKOVÁ, Monika** - GHADAMYAR, M. - PARCHOVIANSKY, M. - KLEMENT, R. - CIBRÍNOVÁ, A. - KRAXNER, J. - GALUSEK, Dušan. Effect of Glass Refractive Index on Phosphor-in-Glass Luminescence Performance. In The Slovak and Czech Glass Conference 2025: Book of Abstracts. - Trenčín, Slovakia: FunGlass – Centre for Functional and Functionalized Glass & Slovak Glass Society, 2025, p. 58. ISBN 978-80-8295-053-6. Dostupné na internete: https://www.funglass.eu/wp-content/uploads/2025/04/SaCZK_2025.pdf (The Slovak and Czech Glass Conference 2025.) Typ: AFH

38.) Návrh, analýza a mechanická charakterizácia laminárnej keramiky (*Design, analysis and mechanical characterization of laminar ceramics*)

Zodpovedný riešiteľ: Aliasghar Najafzadehkhoe
Trvanie projektu: 1.7.2024 / 30.6.2026
Evidenčné číslo projektu: 09I03-03-V04-00196
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: Plán obnovy SR: 101098 €

Dosiahnuté výsledky:

NAJAFZADEHKhOEE, Aliasghar** - JABR, Abdullah - TALIMIAN, Ali - PAPSÍK, Roman - DRDLÍK, Daniel -

MACA, Karel - GALUSEK, Dušan - BERMEJO, Raúl. Improving contact damage resistance of spinel translucent ceramics through a multi-layer design. In Journal of the European Ceramic Society, 2025, vol. 45, no. 4, art no. 117071. (2024: 6.2 - IF, Q1 - JCR, 1.3 - SJR, Q1 - SJR). ISSN 0955-2219. Dostupné na: <https://doi.org/10.1016/j.jeurceramsoc.2024.117071> Typ: ADCA

39.) Cériom dopovaná usmernene solidifikovaná eutektická keramika YAG(Y3Al5O12)/Al2O3 pre senzory a fosfory pripravená horizontálne usmernenou kryštalizáciou (*Directionally Solidified Ce-doped YAG(Y3Al5O12)/Al2O3 Eutectic Ceramics for sensors and phosphors prepared by Horizontal Directed Crystallization*)

Zodpovedný riešiteľ: Anna Prnová
Trvanie projektu: 1.6.2024 / 30.6.2026
Evidenčné číslo projektu: 09I05-03-V02-00065 / 09I05-03-V02-00065/2025/VA
Organizácia je koordinátorom projektu: nie
Koordinátor: Žilinská univerzita v žiline
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: Plán obnovy SR: 52870 €

Dosiahnuté výsledky:

V rámci riešenia projektu boli pomocou horizontálne usmernenej kryštalizácie, pripravené keramické materiály so zložením YAG(Y3Al5O12)/Al2O3. V pripravených materiáloch bola skúmaná morfológia kryštálov a stupeň distribúcie atómov Ceru v objeme materiálu (SEM, SEM EDX a SEM EBSD). Ďalej bol sledovaný rast kryštálov vo vzorke (RTG a HT RTG) a bola modifikovaná príprava štartovacích práškov pre prípravu tohto typu materiálov (PSA, STA a SEM).

40.) Vplyv štrukturálnych substitúcií na vlastnosti anorganických vrstvených štruktúr, základ pre atómovo navrhnuté pokročilé materiály pre zelené technologické aplikácie, študované modelovým prístupom (*Effect of structural substitutions on properties of inorganic layered structures, a basis for atomically designed advanced materials for green technological applications, studied by modelling approach*)

Zodpovedný riešiteľ: Eva Scholtzová
Trvanie projektu: 1.9.2024 / 31.8.2026
Evidenčné číslo projektu: 09I03-03-V04-00009
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: Plán obnovy SR: 135805 €

Dosiahnuté výsledky:

Pokračovalo sa v štúdiu vplyvu topologických defektov na vzájomnú interakcia molekúl s povrchom grafénu (napr., malých molekúl, farbív) ako aj vplyvu množstva vody v medzivrství vermiculitu na interakcie organického modifikátora s povrchom ílu. Čiastkové výsledky boli prezentované na zahraničných konferenciách vo forme prednášok a posterov. Ucelené výsledky boli publikované v zahraničných CC časopisoch, alebo sú v recenznom konaní:

•MORENO-RODRIGUEZ, Daniel - SCHOLTZOVÁ, Eva - NISHIHARA, Hiroto**.

The interplay between topological defects and CO2 and NH3 adsorption in graphene. In Materials Chemistry Frontiers, 2025, vol. 9, no. 8, p. 3548-3558. (2024: 6.5 - IF, Q1 - JCR, 1.444 - SJR, Q1 - SJR, karentované - CCC). (2025 - Current Contents). ISSN 2052-1537. Dostupné na: <https://doi.org/10.1039/d5qm00443h> Typ: ADCA

•SCHOLTZOVÁ, Eva**.

Influence of Water Amount on the Stability of Intercalated Vermiculites – Computational Study. In WSEAS Transactions on Environment and Development, 2025, vol. 21, p. 266-273. (2024: 0.196 - SJR, Q3 - SJR). ISSN 2224-3496. Dostupné na: <https://doi.org/10.37394/232015.2025.21.23> Typ: ADMA

41.) Nový tiolom funkcionalizovaný nanokompozit montmorillonit/biochar pre imobilizáciu ťažkých kovov z kontaminovanej záplavovej pôdy (Novel thiol-functionalized montmorillonite/biochar nanocomposite for immobilization of heavy metals from contaminated floodplain soil)

Zodpovedný riešiteľ: Michal Slaný
Trvanie projektu: 1.7.2024 / 30.6.2026
Evidenčné číslo projektu: 09I03-03-V04-00140
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: Plán obnovy SR: 89043 €

Dosiahnuté výsledky:

Úspešne sa podarilo pripraviť unikátny tiolom funkcionalizovaný nanokompozit montmorillonit/biochar a použiť ho pre sanáciu ťažkých kovov V a Cr v redoxných environmentálnych podmienkach. Boli tiež vykonané dôkladné štruktúrne a tiež fyzikálno chemické charakteristiky. Všetky dôležité výsledky sú koncom roka 2025 zhrnuté vo finalnom drafte manuskriptu, ktorý je pripravený na predloženie do zahraničného karentovaného vedeckého časopisu. Veľkým úspechom projektu je podanie finálnej patentovej prihlášky.

Výstupy:

GUNARATHNE, Viraj - MEDEIROS MELO, Tatiane - SCHAUERTE, Marina - GROTH, Felix - SLANÝ, Michal - RINKLEBE, Jörg**. Immobilization of per- and polyfluorinated alkyl substances (PFAS) from field contaminated groundwater by a novel organo-clay vs. colloidal activated carbon under flow conditions. In Journal of Hazardous Materials, 2025, vol. 488, art no. 137273. (2024: 11.3 - IF, Q1 - JCR, 3.078 - SJR, Q1 - SJR). ISSN 0304-3894. Dostupné na: <https://doi.org/10.1016/j.jhazmat.2025.137273> Typ: ADCA

BERSHADSKYI, A.** - JURIČEK, A. - REZBÁRIK, Š.J. - VAVRINCOVÁ, L. - HORNÍK, M. - SLANÝ, Michal. Novel functional geopolymer composites based on calcined clays with excellent immobilization properties. In Clay Minerals and Selected Industrial Minerals in Material Science, Applications, and Environmental Technology - 11th Workshop of Slovak Clay Group: Book of Abstracts. - Bratislava: Slovak Clay Group, 2025, p. 3. ISBN 978-80-972367-9-3. (11th Workshop of Slovak Clay Group: Vedecká konferencia.) Typ: AFH

SLANÝ, Michal**. Physico-chemical characterization of a thiol-functionalized montmorillonite/biochar composite. In Clay Minerals and Selected Industrial Minerals in Material Science, Applications, and Environmental Technology - 11th Workshop of Slovak Clay Group: Book of Abstracts. - Bratislava: Slovak Clay Group, 2025, p. 30. ISBN 978-80-972367-9-3. (11th Workshop of Slovak Clay Group : Vedecká konferencia.) Typ: AFH

SLANÝ, Michal** - JURIČEK, Adrián - GOLIAN-STRUHÁROVÁ, Alena - REZBÁRIK, Šimon Ján - VAVRINCOVÁ, Lenka - HORNÍK, Miroslav. Adsorption of Cs-137 and Co-60 by metabentonite and metakaolin-based geopolymer composites. In XVIII ICC - International Clay Conference: Programme and Abstracts. 18. - Dublin : The Mineralogical Society of the UK and Ireland, 2025, p. 630. ISBN 9780903056694. Dostupné na internete: <https://icc.aiepa.org/wp-content/uploads/sites/3/2025/07/ICC-Programme-and-Abstracts-x.pdf> (XVIII ICC - International Clay Conference.) Typ: AFG

SLANÝ, Michal - ŽEMLIČKA, Matúš. Tiolom funkcionalizovaný ílovo-biocharový kompozitný adsorbent a jeho použitie: Patentová prihláška PP190-2024, dátum podania prihlášky: 31.12.2025. Banská Bystrica, Slovakia: Úrad priemyselného vlastníctva Slovenskej republiky, 2025 Typ: AGJ

42.) Nová generácia termoelektrických materiálov pre udržateľnú energiu (Next Generation Thermoelectrics for Sustainable Energy)

Zodpovedný riešiteľ: Peter Tatarko
Trvanie projektu: 1.4.2024 / 30.6.2026
Evidenčné číslo projektu:
Organizácia je áno

koordinátorom projektu:**Koordinátor:** Ústav anorganickej chémie SAV, v. v. i.**Počet spoluriešiteľských** 0**inštitúcií:****Čerpané financie:** Plan Obnovy: 2631401 €**Dosiahnuté výsledky:**

V rámci projektu boli navrhnuté nové entropicky stabilizované perovskitové oxidy s potenciálom zlepšeného termoelektrického výkonu pomocou výpočtov tolerančného faktora, valencie väzby (SPuDS) a DFT výpočtov (VASP). Ako perspektívna bola identifikovaná základná štruktúra $(\text{Sr}^{2+}\text{Ba}^{2+}\text{Ca}^{2+}\text{La}^{3+})\text{TiO}_3$. Následne boli pomocou DFT a BoltzTraP analyzované viaczložkové štruktúry s rôznym obsadením (substitúciou) B-miesta, pričom ako obzvlášť zaujímavá sa ukázala štruktúra $(\text{Sr}^{2+}\text{Ca}^{2+}\text{Ba}^{2+}\text{La}^{3+})(\text{Ti}^{4+}\text{Zr}^{4+}\text{Nb}^{5+})\text{O}_3$. Optimalizácia zloženia ukázala, že neekvimolárne zloženie s obsahom La na úrovni 0,02–0,08 vedie k najlepším vlastnostiam. Pre experimentálne overenie bolo vybraných 10 ESPO štruktúr, ktoré boli pripravené planétovým mletím a syntézou v tuhom stave, pričom boli stanovené optimálne podmienky prípravy materiálov.

ALI, Asif** - TATARKOVÁ, Monika - SRDIČ, V. V. - KANAS, N. - HANZEL, Ondrej - TATARKO, Peter. Enhancing thermoelectric performance of stabilized high-entropy perovskite ceramics through Nb⁵⁺ substitution. In Processing and Properties of Advanced Ceramics and Glasses : Book of Abstract. - Bratislava : Institute of Inorganic Chemistry, Slovak Academy of Sciences, 2025, p. 6. ISBN 978-80-69178-01-4. (Processing and Properties of Advanced Ceramics and Glasses.) Typ: AFH

BANDARU, Subrahmanyam** - LONGKUMER, Imrongnaro - ÜNSAL, Hakan - HANZEL, Ondrej - TATARKO, Peter. Insights into electronic structure and thermoelectric behavior of highentropy perovskites. In Processing and Properties of Advanced Ceramics and Glasses : Book of Abstract. - Bratislava : Institute of Inorganic Chemistry, Slovak Academy of Sciences, 2025, p. 7. ISBN 978-80-69178-01-4. (Processing and Properties of Advanced Ceramics and Glasses.) Typ: AFH

TATARKO, Peter*** - ÜNSAL, Hakan - LONGKUMER, I. - BANDARU, S. - ALI, Asif - ZHUKOVA, I. Next generation thermoelectrics for sustainable energy: an introduction to the nextgenerationeu project. In Processing and Properties of Advanced Ceramics and Glasses : Book of Abstract. - Bratislava : Institute of Inorganic Chemistry, Slovak Academy of Sciences, 2025, p. 35. ISBN 978-80-69178-01-4. (Processing and Properties of Advanced Ceramics and Glasses.) Typ: AFH

Programy: PostdokGrant**43.) Hydrotermálna syntéza fluoroskandátov alkalických kovov (Hydrothermal synthesis alkali-metal fluoroscandates)****Zodpovedný riešiteľ:** Veronika Demovics Silliková**Trvanie projektu:** 1.7.2024 / 31.12.2025**Evidenčné číslo projektu:** APD0029**Organizácia je** áno**koordinátorom projektu:****Koordinátor:** Ústav anorganickej chémie SAV, v. v. i.**Počet spoluriešiteľských** 0**inštitúcií:****Čerpané financie:** SAV: 7200 €**Dosiahnuté výsledky:**

Na systematickú analýzu tvorby fluoroskandátov alkalických kovov v roztokoch bola použitá mierna hydrotermálna syntéza s použitím $\text{Sc}(\text{NO}_3)_3$. Syntéza zahŕňala miešanie východiskových chemikálií vo vode, zahrievanie v autoklávoch s teflonovou vložkou, filtráciu a sušenie. Podrobnejšie bola študovaná tvorba zlúčenín v systémoch NaF/ScF_3 , KF/ScF_3 , CsF/ScF_3 . Úpravou pomerov zložiek bolo možné získať zlúčeniny NaScF_4 , Na_3ScF_6 , KSc_2F_7 , $\text{K}_5\text{Sc}_3\text{F}_{14}$, $\text{CsSc}_3\text{F}_{10}$ a neznáme zlúčeniny, pri ktorých je potvrdená ďalšia analýza. V prípade syntézy s LiF nebol pozorovaný vznik žiadnych nových zlúčenín; finálnym produktom bol vždy LiF a ScF_3 .

44.) Translucentné luminiscenčné materiály ako inovatívny substrát pre fotokatalytické vrstvy

Zodpovedný riešiteľ: Patrícia Petrisková
Trvanie projektu: 1.7.2024 / 31.12.2025
Evidenčné číslo projektu:
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: SAV: 8000 €

Dosiahnuté výsledky:

V rámci vývoja luminiscenčných materiálov na báze oxinitridov bolo pripravených sedem rôznych zložení tuhých roztokov MgAlON zo zmesi práškov oxidov MgO, Al₂O₃ a nitridu AlN ich spekaním pri 1800 °C po dobu 3 h v statickej atmosfére dusíka. Analýzou pripravených práškov bolo potvrdené, že veľkosť častíc MgAlON práškov klesá so zvyšujúcim sa podielom AlN vo východiskovej zmesi.

Hutné MgAlON vzorky s relatívnou hustotou 95-98 % teoretickej hustoty boli pripravené reakčným beztlakovým spekaním. Žiarovým izostatickým lisovaním (HIP) pri 1800 oC po dobu 5 h a tlaku argónu 200 MPa sa podarilo pripraviť translucenčný spinel MgAlON. Výsledky ukázali, že so zvyšujúcim sa obsahom dusíka optická priepustnosť materiálov klesá. V rámci projektu bol študovaný aj vplyv množstva lantanoidov (Eu, Ce, Er) v koncentráciách 0,25 mol%, 0,15 mol% a 0,10 mol% na luminiscenčné vlastnosti oxinitridového spinelu MgAlON. V prípade dopantov Eu a Ce sa intenzita emitovaného žiarenia zvyšovala so zvyšujúcim sa obsahom lantanoidu, kým v prípade luminoforov dopovaných Er bola dosiahnutá maximálna luminiscencia pre vzorku s najnižším obsahom dopantu (0,10 mol% Er. Výsledky ukazujú, že v prípade MgAlON hostujúcej mriežky v porovnaní s MgAl₂O₄ spinelom došlo k miernemu červenému posuvu maxim emisií v dôsledku prítomnosti dusíka v štruktúre a zvýšeniu kovalentnosti väzieb v blízkom okolí dopantu. Za účelom fotokatalytických aplikácií boli na transparentnom oxidovom spineli MgAl₂O₄ a translucenčnom oxinitridovom spineli MgAlON pripravené TiO₂ nanorúrky (TiNT) anodickou oxidáciou titánovej vrstvičky nanosenej magnetronovým naprašovaním na tieto keramické podložky. XRD analýza potvrdila že vypestované TiO₂ nanorúrky mali kryštalografickú štruktúru anatasu.

Fotokatalytickú aktivitu TiNTs sme testovali odstránením troch modelových polutantov kofeínu, bisfenolu A a ibuprofenu. Nanorúrky vypestované na MgAlON-ovom substráte vykazovali najlepšiu fotokatalytickú aktivitu dosahujúcu 88 % pri odstraňovaní kofeínu, 48% pri odstraňovaní ibuprofenu a 37 % pri odstraňovaní BPA, a to aj vďaka dopávaniu nanorúrok dusíkom, čo zvýšilo degradáciu o 15%. Analýzou rýchlosti degradácie znečisťujúcich látok sme ukázali, že degradáciu kofeínu a ibuprofenu možno dobre prispôsobiť reakciou pseudo-prvého rádu, zatiaľ čo degradáciu BPA možno lepšie prispôsobiť frakčnému kinetickému modelu prvého rádu. Keďže TiNT vzorky po príprave na tepelno-chemicky stabilnom keramickom MgAlON spineli boli homogénne a orientované, čo bolo potvrdené aj SEM analýzou, je možné MgAlON keramický materiál použiť ako nosič pre výrobu nanorúrok TiNTs, čím sme splnili ciele.

•PETRISKOVÁ, Patrícia** - CHENG, Peng - ROCH, Tomas - METIVIER, Helene - MAILHOT, Gilles - BRIGANTE, Marcello - MONFORT, Olivier. Recycled magnetite as sustainable photo-catalyst for hydrogen peroxide and peroxydisulfate activation: insights into efficiency and mechanism of Picloram removal in water. In *Catalysis Science and Technology*, 2025, vol. 15, p. 7516-7524. (2024: 4.2 - IF, Q2 - JCR, 1.026 - SJR, Q2 - SJR). ISSN 2044-4753. Dostupné na: <https://doi.org/10.1039/d5cy00954e> Typ: ADCA

•PETRISKOVÁ, Patrícia** - MONFORT, O. - LENČEŠ, Zoltán. Transparent/translucent phosphors as advanced supports for photocatalytic TiO₂ nanotube arrays. In 38th European Conference on Surface Science : Book of Abstracts. - Braga, Portugal: Organizing Committee of ECOSS-38, 2025, p. 451. (38th European Conference on Surface Science - ECOSS-38.) Typ: GII

45.) Vývoj hybridných nanomateriálov s antimikrobiálnymi vlastnosťami založených na vrstevnatých silikátoch a xanténových farbivách (*Development of Hybrid Nanomaterials with Antimicrobial Properties based on Layered Silicates and Xantene Dyes*)

Zodpovedný riešiteľ: Marek Pribus
Trvanie projektu: 1.7.2024 / 31.12.2025
Evidenčné číslo projektu: APD0134
Organizácia je áno

koordinátorom projektu:**Koordinátor:** Ústav anorganickej chémie SAV, v. v. i.**Počet spoluriešiteľských** 0**inštitúcií:****Čerpané financie:** SAV: 3487 €**Dosiahnuté výsledky:**

Bola pripravená séria koloidných disperzií pozostávajúca zo saponitu, ktorý bol modifikovaný rôznym množstvom kationového polyméru (polyDADMAC). Z každej disperzie sa následne pripravila séria koloidných disperzií, v ktorej bolo rovnaké množstvo saponitu, polyelektrolytu a menilo sa množstvo Floxínu B dodaného do systému. Pripravené koloidné disperzie sa následne analyzovali pomocou absorpčnej a fluorescenčnej spektroskopie. Z nameraných dát sa potom skúmali fotofyzikálne vlastnosti jednotlivých systémov a adsorpčné izotermy Floxínu B na saponite modifikovanom rôznym množstvom polyméru. Posledným krokom bola príprava tenkých vrstiev nanomateriálu (pozostávajúceho zo saponitu, polyméru a Floxínu B) aplikovaná na polymérnej (polyuretánovej) matrici a štúdium antimikrobiálnych vlastností tohto materiálu. Po úspešnom otestovaní materiálu sa pripravili ešte ďalšie dva nanokompozity s rovnakým zložením, len namiesto Floxínu B ako fotosenzibilizátora sa v jednom prípade použil Erytrozín B a v druhom prípade Eozín Y. Účinnosť všetkých troch pripravených nanomateriálov v inhibícii patogénnych mikroorganizmov je viac ako 99%.

Programy: Návratová projektová schéma**46.) Hybridné systavy zložené z nanočastíc vrstevnatých kremičitanov a luminiscenčných komplexných zlúčenín irídia (III) (Hybrid systems consisting of layered silicate nanoparticles and luminescent iridium(III) complex compounds.)****Zodpovedný riešiteľ:** Tímea Šimonová**Trvanie projektu:** 1.7.2024 / 30.6.2025**Evidenčné číslo projektu:****Organizácia je** áno**koordinátorom projektu:****Koordinátor:** Ústav anorganickej chémie SAV, v. v. i.**Počet spoluriešiteľských** 0**inštitúcií:****Čerpané financie:** SAV: 2500 €**Dosiahnuté výsledky:**

Hlavný cieľ projektu, ktorým bola príprava hybridných sústav zložených z nanočastíc vrstevnatého kremičitanu a komplexného kationu $[\text{Ir}(2\text{-fenylypyridín})_2(2,2'\text{-dibenzo[d]tiazol})]^+$ ($[\text{Ir}(\text{ppy})_2(\text{dbzt})]^+$) s dôrazom na dosiahnutie čo najvyššej luminiscenčnej intenzity komplexu, bol splnený. Výsledky fotoluminiscenčných meraní potvrdili, že v študovaných hybridných disperziách sa intenzívne uplatňuje jav tzv. adsorpciou-indukovanej emisie (AdIE). Adsorpcia viedla k zvýšenej fotoaktivite luminiscenčného komplexného kationu Ir(III) v disperziách všetkých vybraných di- aj trioktaedrických smektitov, pričom k najvýraznejšiemu (až 24,7-násobnému) zvýšeniu intenzity emisie komplexu dochádzalo v disperziách syntetického trioktaedrického smektitu s nízkym nábojom, saponitu Sumecton. Počas optimalizácie zloženia hybridných disperzií sa zistilo, že miera nárastu intenzity emisie je ovplyvnená stupňom nasýtenia povrchu silikátu, a mierne klesá so zvyšujúcou sa povrchovou koncentráciou adsorbovaných komplexných kationov. Tento vplyv je pravdepodobne následkom fotofyzikálnych interakcií medzi adsorbovanými molekulami komplexu pri vyšších povrchových koncentráciách. Adsorbované kationy $[\text{Ir}(\text{ppy})_2(\text{dbzt})]^+$ komplexu nemali schopnosť vytvárať diméry alebo vyššie molekulové agregáty s efektívnym vplyvom na fotoaktivitu. Jav AdIE bol pozorovaný aj v prípade interakcie molekúl Ir(III) komplexu s povrchom smektitových častíc modifikovaných kationmi kvartérnej amóniovej soli.

Konferenčný príspevok:

ŠIMONOVÁ, Tímea - BUJDÁK, Juraj - HROBÁRIK, Peter. Hybrid systems based on layered silicate nanoparticles and luminescent iridium(III) complexes. In Clay Minerals and Selected Industrial Minerals in Material Science, Applications, and Environmental Technology - 11th Workshop of Slovak Clay Group : Book of Abstracts. - Bratislava : Slovak Clay Group, 2025, p. 31. ISBN 978-80-972367-9-3. (11th Workshop of Slovak Clay Group : Vedecká konferencia.) Typ: AFH

Príloha A-3

Publikačná činnosť organizácie

Príloha je generovaná z ARL.

ABC Kapitoly vo vedeckých monografiách vydané v zahraničných vydavateľstvách

- ABC01 KLEMENT, Róbert - ŠVANČÁREK, Peter - PARCHOVIANSKÝ, Milan - SEDLÁČEK, Jaroslav - GALUSEK, Dušan. Al₂O₃-SiC nanocomposites: Preparation, microstructure and properties. In Advances in Ceramic Matrix Composites. 3rd ed. - Cambridge ; London : Elsevier : Woodhead Publishing, 2025, pp. 51-95. ISBN 978-0-443-18598-4.

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- ADCA02 ANAND, Akriti** - SENGUPTA, Susanta - GALUSEK, Dušan - BELTRAN, Ana M. - GALUSKOVA, Dagmar** - BOCCACCINI, Aldo R.**. A new approach to overcome cytotoxic effects of Cu by delivering dual therapeutic ions (Sr, Cu). In Journal of Trace Elements in Medicine and Biology, 2025, vol. 87, art. no. 127565. (2024: 3.3 - IF, Q2 - JCR, 0.743 - SJR, Q1 - SJR). ISSN 0946-672X. Dostupné na: <https://doi.org/10.1016/j.jtemb.2024.127565>
- ADCA03 AVILA, Gustavo** - SUNAGA, Ayaki - KOMOROVSKÝ, Stanislav - MÁTYUS, Edit. Hyperfine Rovibrational States of H⁺3 in a Weak External Magnetic Field. In Physical Review Letters, 2025, vol. 135, no. 4, art. no. 043003. (2024: 9 - IF, Q1 - JCR, 2.856 - SJR, Q1 - SJR). ISSN 0031-9007. Dostupné na: <https://doi.org/10.1103/lclp-852d>
- ADCA04 AZADMEHR, Sadegh - ALAMDARI, Sanaz - TAFRESHI, Majid Jafar - TANVEER, Zaighum - MIRZAEI, Omid - NAJAFZADEHKHOEE, Aliasghar - VELÁZQUEZ, Jose J. Controlled co-precipitation synthesis of Gd and Mn doped zinc tungstate: insights into structural, optical, magnetic behavior, and dielectric properties. In Applied Physics A: Materials Science & Processing, 2025, vol. 131, no. 5, art. no. 339. (2024: 2.8 - IF, Q2 - JCR, 0.486 - SJR, Q2 - SJR). ISSN 0947-8396. Dostupné na: <https://doi.org/10.1007/s00339-025-08399-w>
- ADCA05 BARKER, Collin** - KNORR, Brian - MICHÁLKOVÁ, Monika - GHADAMYARI, Marzieh - PARCHOVIANSKY, Milan - DRDLÍK, Daniel - GALUSEK, Dušan - JAIN, Himanshu - DIEROLF, Volkmar. Femtosecond laser crystallization of YAG in yttrium aluminosilicate glasses. In International Journal of Applied Glass Science, 2025, vol. 16, iss. 4, art. no. e16710. (2024: 2.5 - IF, Q2 - JCR, 0.476 - SJR, Q2 - SJR). ISSN 2041-1286. Dostupné na: <https://doi.org/10.1111/ijag.16710>
- ADCA06 BHANDARI, Subhadip** - HANZEL, Ondrej - KERMANI, Milad - SGLAVO, Vincenzo M. - BIESUZ, Mattia - FRANCHIN, Giorgia. Rapid debinding and sintering of alumina ceramics fabricated by direct ink writing. In Journal of the European Ceramic Society, 2025, vol. 45, no. 5, art. no. 117144. (2024: 6.2 - IF, Q1 - JCR, 1.3 - SJR, Q1 - SJR). ISSN 0955-2219. Dostupné na: <https://doi.org/10.1016/j.jeurceramsoc.2024.117144>
- ADCA07 BRČEKOVÁ, Jana** - OSACKÝ, Marek - LALINSKÁ-VOLEKOVÁ, Bronislava - ŠARINOVÁ, Katarína - MIGLIERINI, Marcel - PÁLKOVÁ, Helena - DURMEKOVÁ, Tatiana. Effect of thermal treatment on mineralogy, geochemistry, and physical properties of two genetically different sandstones: relevance to building stones fire impact. In Environmental Earth Sciences, 2025, vol. 84, no. 20, art. no. 589. (2024: 2.8 - IF, Q2 - JCR, 0.683 - SJR, Q1 - SJR). ISSN 1866-6280. Dostupné na: <https://doi.org/10.1007/s12665-025-12571-z>
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AGJ Patentové prihlášky, prihlášky úžitkových vzorov, prihlášky dizajnov, prihlášky ochranných známok, žiadosti o udelenie dodatkových ochranných osvedčení,...

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ADCA358

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ADCA434

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ADCA437

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ADCA439

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ADCA448

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ADCA450

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ADCA594

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ADCA596

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ADCA597

SINGH, Meinam Annebushan** - SARMA, Deba Kumar - HANZEL, Ondrej - SEDLÁČEK, Jaroslav - ŠAJGALÍK, Pavol. Surface characteristics enhancement of MWCNT alumina composites using multi-pass WEDM process. In *Journal of the European Ceramic Society*, 2018, vol. 38, no. 11, p. 4035-4042. (2017: 3.794 - IF, Q1 - JCR, 1.068 - SJR, Q1 - SJR, karentované - CCC). (2018 - Current Contents). ISSN 0955-2219. Dostupné na: <https://doi.org/10.1016/j.jeurceramsoc.2018.04.062>

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ADCA602

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ADCA603

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ADCA701

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ADCA702

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<https://doi.org/10.1016/j.ceramint.2024.01.419>, Registrované v: WOS

ADCA703

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>

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ADCA704

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ADCA708

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- ADMB05 HAWASH, H. B. I.** - CHMIELEWSKA, Eva - NETRIOVÁ, Zuzana - MAJZLAN, Juraj - PÁLKOVÁ, Helena - HUDEC, Pavol - SOKOLÍK, Róbert. Innovative comparable study for application of iron oxyhydroxide and manganese dioxide modified clinoptilolite in removal of Zn(II) from aqueous medium. In *Journal of Environmental Chemical Engineering*, 2018, vol. 6, no. 5, p. 6489-6503. (2017: 0.924 - SJR, Q1 - SJR). ISSN 2213-3437. Dostupné na: <https://doi.org/10.1016/j.jece.2018.09.024>
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- ADMB06 KAŠIAROVÁ, Monika - PRAMUKOVÁ, Zuzana - BODIŠOVÁ, Katarína - DOMANICKÁ, Magdaléna - HNATKO, Miroslav - DUSZA, Ján - ŠAJGALÍK, Pavol - GROMOŠOVÁ, Silvia. Mechanical properties of porous Si₃N₄ ceramics. In *Key Engineering Materials*, 2014, vol. 586, p. 166-169. (2013: 0.190 - SJR, Q3 - SJR). (2014 - SCOPUS). ISSN 1013-9826. Dostupné na: <https://doi.org/10.4028/www.scientific.net/KEM.586.166>
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- ADMB07 KITÝK, Anna** - PROTSENKO, V. - PAVLÍK, Viliam - BOČA, Miroslav. Corrosion resistance of AISI 304 and AISI 316 stainless steels in a solar salt used in concentrated solar power plants: The effect of NaCl impurities. In *Voprosy khimii i khimicheskoi tekhnologii*, 2019, no. 3, p. 123-131. (2018: 0.131 - SJR, Q4 - SJR). ISSN 0321-4095. Dostupné na: <https://doi.org/10.32434/0321-4095-2019-124-3-123-131>
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- ADMB08 KITÝK, Anna** - PROTSENKO, V. - DANILOV, F.I. - PAVLÍK, Viliam - HNATKO, Miroslav. The effect of electropolishing in a deep eutectic solvent (Ethaline) on the surface properties and corrosion resistance of aluminium-magnesium alloy. In *Voprosy khimii i khimicheskoi tekhnologii*, 2020, no. 4, p. 66-71. (2019: 0.222 - SJR, Q3 - SJR). ISSN 0321-4095. Dostupné na: <https://doi.org/10.32434/0321-4095-2020-131-4-66-71>
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- ADMB10 MARINHA, Daniel** - MEYER, Astrid J. - KUCHARÍK, Marián - BOUVET, Silvie - BOČA, Miroslav - KORENKO, Michal - DANIELIK, Vladimír - ŠIMKO, František. Following Alumina Dissolution Kinetics with Electrochemical and Video Analysis Tools. In Minerals, Metals and Materials Series : Light Metals 2023, 2023, pp. 77-86. (2022: 0.196 - SJR, Q3 - SJR). ISSN 2367-1696. Dostupné na: https://doi.org/10.1007/978-3-031-22532-1_10
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- ADMB11 PUTENPURAYIL, Nibu Govindan - NAJAFZADEHKHOEE, Aliasghar** - TALIMIAN, Ali - POUCHLY, Vaclav - MICHÁLKOVÁ, Monika - ŠVANČÁREK, Peter - KLEMENT, Róbert - GALUSEK, Dušan. Sintering of Ce³⁺-doped yttria nanoparticles prepared by precipitation method. In Open Ceramics, 2023, vol. 13, art no. 100315. (2022: 0.544 - SJR, Q2 - SJR). ISSN 2666-5395. Dostupné na: <https://doi.org/10.1016/j.oceram.2022.100315>
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*AFDA Publikované príspevky na medzinárodných vedeckých konferenciách poriadaných v SR

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3. [1.1] ISLAM, M.A. - PELL, A.J. Delving into theoretical and computational considerations for accurate calculation of chemical shifts in paramagnetic transition metal systems using quantum chemical methods. In PHYSICAL CHEMISTRY CHEMICAL PHYSICS. ISSN 1463-9076, APR 24 2024, vol. 26, no. 16, p. 12786-12798. Dostupné na: <https://doi.org/10.1039/d4cp00683f>, Registrované v: WOS
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2. [1.1] DOS SANTOS, V.R. - CAMPOS, T.M.B. - ANSELMINI, C. - DE SOUZA, J.R. - LEMES, A.P. - THIM, G.P. - BOTTINO, M.C. - BORGES, A.L.S. - TRICHÊS, E.D. Development of PHBV electrospun fibers containing a borate bioactive glass doped with Co, Cu, and Zn for wound dressings. In JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART B-APPLIED BIOMATERIALS. ISSN 1552-4973, AUG 2024, vol. 112, no. 8, art. no. e35459. Dostupné na: <https://doi.org/10.1002/jbm.b.35459>, Registrované v: WOS
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KESHAVAMURTHY, K. - RAO, S.V. - HEGDE, B.G. Nonlinear optical coefficients of Samarium-activated lithium zinc borate glasses in femtosecond and nanosecond regimes. In OPTICS AND LASER TECHNOLOGY. ISSN 0030-3992, JAN 2024, vol. 168, art. no. 109859. Dostupné na:

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7. [1.1] RAJENDRAN, A.K. - ANTHRAPER, M.S.J. - HWANG, N.S. - RANGASAMY, J. Osteogenesis and angiogenesis promoting bioactive ceramics. In MATERIALS SCIENCE & ENGINEERING R-REPORTS. ISSN 0927-796X, JUN 2024, vol. 159, art. no. 100801. Dostupné na: <https://doi.org/10.1016/j.mser.2024.100801>, Registrované v: WOS

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10. [1.2] ELLAKWA, Takwa E. - ELLAKWA, Ayman - ABU-KHADRA, Ahmad S. - GOMAA, Hosam M. - EL-TAIB HEAKAL, Fakiha - EL-SAYED ELLAKWA, Doha. Reviewing and exploring boron oxide's role in bioactive glasses: a synthesis of modeling and applications. In Journal of the Australian Ceramic Society, 2024-01-01, pp. ISSN 25101560. Dostupné na:

<https://doi.org/10.1007/s41779-024-01103-w>, Registrované v: SCOPUS

Príloha A-4

Údaje o pedagogickej činnosti organizácie

Semestrálne prednášky:

James Richard Asher, PhD

Názov semestr. predmetu: General and Inorganic Chemistry (Biological Chemistry students)

Počet hodín za semester: 40

Názov katedry a vysokej školy: Univerzita Komenského v Bratislave, Katedra Anorganickej Chemie

James Richard Asher, PhD

Názov semestr. predmetu: General and Inorganic Chemistry (Environmental Studies students)

Počet hodín za semester: 20

Názov katedry a vysokej školy: Univerzita Komenského v Bratislave, Katedra Anorganickej Chemie

Mgr. Peter Boháč, PhD.

Názov semestr. predmetu: Introduction to chemistry of materials

Počet hodín za semester: 3

Názov katedry a vysokej školy: Univerzita Komenského v Bratislave, Laboratórium pokročilých materiálov

Mgr. Stanislav Komorovský, PhD.

Názov semestr. predmetu: Relativistické efekty v chémii

Počet hodín za semester: 24

Názov katedry a vysokej školy: Univerzita Komenského v Bratislave, Prírodovedecká fakulta, Katedra teoretickej a počítačovej chémie

Ing. Blanka Kubíková, PhD.

Názov semestr. predmetu: Metódy chemického výskumu

Počet hodín za semester: 1

Názov katedry a vysokej školy: Prírodovedecká fakulta UK, Katedra analytickej chémie

doc. Ing. Zoltán Lenčéš, PhD.

Názov semestr. predmetu: Introduction to chemistry of materials

Počet hodín za semester: 2

Názov katedry a vysokej školy: Prírodovedecká fakulta UK, Laboratórium pre pokročilé materiály

Ing. Monika Micháľková, PhD.

Názov semestr. predmetu: Sintering/Viscous flow sintering

Počet hodín za semester: 2

Názov katedry a vysokej školy: Trenčianska univerzita Alexandra Dubčeka v Trenčíne, FunGlass

Ing. Michal Slaný, PhD.

Názov semestr. predmetu: Maltoviny

Počet hodín za semester: 12

Názov katedry a vysokej školy: Stavebná fakulta STU, Katedra materiálového inžinierstva a fyziky

Ing. Michal Slaný, PhD.

Názov semestr. predmetu: Stavebné materiály a chémia

Počet hodín za semester: 26

Názov katedry a vysokej školy: Stavebná fakulta STU, Katedra materiálového inžinierstva a fyziky

Ing. Michal Slaný, PhD.

Názov semestr. predmetu: Štruktúra stavebných materiálov

Počet hodín za semester: 26

Názov katedry a vysokej školy: Stavebná fakulta STU, Katedra materiálového inžinierstva a fyziky

Semestrálne cvičenia:

MSc. Leonardo Filipe Kleman Santos

Názov semestr. predmetu: Laboratórne techniky

Počet hodín za semester: 27

Názov katedry a vysokej školy: Prírodovedecká fakulta UK, Katedra fyzikálnej a teoretickej chémie

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

Ing. Jarmila Mlynáriková, PhD.

Názov semestr. predmetu: Metodika experimentu vo fyzikálnej chémii

Počet hodín za semester: 10

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:

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: 2

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

Ing. Michal Slaný, PhD.

Názov semestr. predmetu: Vybrané state z chémie

Počet hodín za semester: 14

Názov katedry a vysokej školy: Stavebná fakulta STU, Katedra materiálového inžinierstva a fyziky

Ing. Michal Slaný, PhD.

Názov semestr. predmetu: Vybrané state z chémie

Počet hodín za semester: 12

Názov katedry a vysokej školy: Stavebná fakulta STU, Katedra materiálového inžinierstva a fyziky

Terénne cvičenia:

Individuálne prednášky:

Ing. Blanka Kubíková, PhD.

Názov semestr. predmetu: Selected topics from physical chemistry

Počet hodín za semester: 4

Názov katedry a vysokej školy: Northeastern University Shenyang, Čína, School of Metallurgy

Mgr. Valéria Kureková, PhD.

Názov semestr. predmetu: Advanced characterization methods

Počet hodín za semester: 4

Názov katedry a vysokej školy: Univerzita Komenského v Bratislave, Prírodovedecká fakulta

Príloha A-5

Medzinárodná mobilita organizácie

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

Krajina	D r u h d o h o d y					
	MAD, KD, VTS		Medziústavná		Ostatné	
	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní
Česko					Mária Chromčíková	5
					Marek Liška	5
					Marek Liška	5
					Marek Liška	5
					Marek Liška	5
Čína					Miroslav Boča	17
					Miroslav Boča	6
					Blanka Kubíková	17
					Blanka Kubíková	6
Francúzsko					Oľga Malkin	6
					Vladimír Malkin	6
					Patrícia Petrisková	9
Japonsko					Peter Boháč	9
					Pavol Šajgalík	7
Nemecko					Marián Matejdes	32
					Marián Matejdes	14
					Michal Slaný	23
Nórsko					Marián Matejdes	5
					Bryan Alexis Melo Flores	19
Poľsko					Parisa Labib Shotorban	6
					Helena Pálková	3
Rakúsko			Vinny George	3	James Richard Asher	4
					Florian Lemken	4

Srbsko					Asif Ali	7
Švédsko					Bryan Alexis Melo Flores	7
Veľká Británia					Oľga Malkin	5
					Vladimír Malkin	5
Počet vyslaní spolu			1	3	27	242

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

Krajina	D r u h d o h o d y					
	MAD, KD, VTS		Medziústavná		Ostatné	
	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní
Grécko					Eleni Giani	4
Počet prijatí spolu					1	4

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

Krajina	Názov konferencie	Meno pracovníka	Počet dní
Belgicko	Workshop on Retrosynthesis	Leonardo Filipe Kleman Santos	4
Česko	26.ročník konference o speciálných anorganických p	Anna Prnová	3
	Anorganické nekovové materiály	Anna Prnová	4
	Veletrh vedy	Leonardo Filipe Kleman Santos	6
		Dhiya Krishnan	6
		Patrícia Petrisková	6
Čína	5th Polish-Slovak-Chinese International Seminar on	Pavol Šajgalík	7
	CICC	Dušan Galusek	7
		Ondrej Hanzel	7
		Peter Tatarko	7
	Mat Science	Eva Scholtzová	9
	Polish-Slovak-Chinese International Seminar on Cer	Dušan Galusek	4
		Ondrej Hanzel	4
		Peter Tatarko	4
Francúzsko	CC	Eva Scholtzová	6
		Peter Škorňa	6
Írsko	ICC	Ayesha Asbat	6
		Sanam Bashir	6
		Peter Boháč	6
		Juraj Bujdák	6

		Vinny George	6
		Ľuboš Jankovič	6
		Leonardo Filipe Kleman Santos	6
		Valéria Kureková	6
		Parisa Labib Shotorban	6
		Helena Pálková	6
		Viktória Planetová	6
		Marek Pribus	6
		Eva Scholtzová	6
		Michal Slaný	6
		Peter Škorňa	6
Kanada	PacRim	Dušan Galusek	8
Maďarsko	JTACC	Anna Prnová	4
Nemecko	ECerS	Asif Ali	6
		Subrahmanyam Bandaru	6
		Dušan Galusek	5
		Ondrej Hanzel	6
		Naser Hosseini	7
		Zoltán Lenčéš	6
		Imrongnaro Longkumer	6
		Aliasghar Najafzadehkhoe	5
		Pavol Šajgalík	7
		Peter Tatarko	7
		Hakan Ünsal	8
	NMQC	Bryan Alexis Melo Flores	6
	QBIC	Florian Lemken	5
Poľsko	International Workshop School of Clay Mineralogy	Leonardo Filipe Kleman Santos	6
		Parisa Labib Shotorban	6
	QQAC	Vinny George	5
Portugalsko	ECOSS	Patrícia Petrisková	7
	ESFC	Miroslav Boča	7
		Blanka Kubíková	7
	Polymers	Eva Scholtzová	7
	Teaming Club Conference	Dušan Galusek	7
Rakúsko	ISMMS	Ayesha Asbat	3
		Eva Scholtzová	3
	MMQC	James Richard Asher	6
		Stanislav Komorovský	6
		Oľga Malkin	6
		Vladimír Malkin	6
		Bryan Alexis Melo Flores	6
Srbsko	8CSCS	Ondrej Hanzel	4
		Michal Hičák	4
		Miroslav Hnatko	4

		Zoltán Lenčes	4
		Imrongnaro Longkumer	4
		Pavol Šajgalík	3
		Peter Tatarko	4
		Monika Tatarková	4
		Hakan Ünsal	4
	ACA	Dušan Galusek	4
	ACAC	Monika Michálková	2
	CYSC	Asif Ali	6
Španielsko	EUROMAT	Ondrej Hanzel	5
		Peter Tatarko	5
		Monika Tatarková	5
	Future Materials	Eva Scholtzová	9
	MATA	Marián Matejdes	6
Švajčiarsko	ICECEM	Eva Scholtzová	4
Spolu	31	79	441

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

Skratky použité v tabuľke C:

26.ročník konference o speciálních anorganických p - 26.ročník konference o speciálních anorganických pigmentech a práškových materiálech

5th Polish-Slovak-Chinese International Seminar on - 5th Polish-Slovak-Chinese International Seminar on Ceramics

8CSCS - 8th Conference of the Serbian Society for Ceramic Materials

ACA - 13th Advanced Ceramics and Applications

ACAC - XIII. Advanced Ceramics and Applications Conference

Anorganické nekovové materiály - Anorganické nekovové materiály

CC - The World Conference of Carbon

CICC - 14th International Conference on High-Performance Ceramic

CYSC - Conference for Young Scientists in Ceramics

ECerS - 19th Conference of the European Ceramic Society

ECOSS - 38th European Conference on Surface Science

ESFC - 21st European Symposium on Fluorine Chemistry

EUROMAT - 18th European Congress and Exhibition on Advanced Materials and Processes

Future Materials - Future Materials

ICC - 18th International Clay Conference

ICECEM - 7th International Conference and Environment, Chemical Engineering and Materials

International Workshop School of Clay Mineralogy - International Workshop School of Clay Mineralogy

ISMMS - International Symposium: Molecular modeling in soil science

JTACC - Journal of Thermal Analysis and Calorimetry Conference

Mat Science - Mat Science

MATA - MATA

MMQC - XVII Workshop on Modern Methods in Quantum Chemistry

NMQC - Numerical Methods in Quantum Chemistry

PacRim - 16th Pacific Conference on Ceramic and Glass Technology

Polish-Slovak-Chinese International Seminar on Cer - 5th Polish-Slovak-Chinese International Seminar on Ceramics

Polymers - Polymers

QBIC - 7th Quantum Bioinorganic Chemistry

QQAC - 11th edition of the DTTG's school of clay mineralogy 'Qualitative and Quantitative Analysis of Clays and Clay Minerals

Teaming Club Conference - 4th Teaming Club Conference

Veletrh vedy - Veletrh vedy

Workshop on Retrosynthesis - Workshop on Retrosynthesis

Príloha A-6**Vedecko-popularizačná činnosť pracovníkov organizácie**

Meno	Spoluautori	Typ¹	Názov	Miesto zverejnenia	Dátum alebo počet za rok
prof. RNDr. Juraj Bujdák, DrSc.		IN	Clay Minerals Group interview with Juraj Bujdak by Francis Clegg	Y tube https://www.youtube.com/watch?v=KNgNI87-4N8	1.7.2025
prof. Ing. Dušan Galusek, DrSc.		PB	Can Glass Help Us Against Antibiotic-Resistant Bacteria?	Vedatour Piešťany	2025
Ing. Viliam Pavlík, PhD.	Patricia Petrisková	PB	Cesta za vedou	https://www.sav.sk/?lang=sk&doc=services-news&source_no=20&news_no=13262	27.11.2025
Ing. Viliam Pavlík, PhD.		PB	Deň otvorených dverí ÚACH SAV	https://uach.sav.sk/sk/o-ustave/fotogaleria/dni-otvorených-dverí/	1
Ing. Viliam Pavlík, PhD.		PB	My sme SAV	https://www.sav.sk/?lang=sk&doc=services-news&source_no=20&news_no=12877	1

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

Príloha A-7

Vyznamenania, ceny a iné ocenenia udelené organizácii a jej pracovníkom v roku 2025

Domáce ocenenia

Ocenenia SAV

Pribus Marek

Špičkové publikácie SAV

Oceňovateľ: Predsedníctvo SAV

Opis: Ocenenie udelilo Predsedníctvo SAV za Špičkové publikácie SAV za rok 2024. Ocenenie v kategórii publikácie v Nature Index časopisoch. PRIBUS, Marek – JANKOVIČ, Ľuboš – KUREKOVÁ, Valéria – BARLOG, Martin – MADEJOVÁ, Jana. Intercalation Characteristics of Montmorillonite Modified with Poly(2-n-alkyl-2-oxazoline)s. In Macromolecules, 2024, vol. 57, no. 17, p. 8362–8373. <https://doi.org/10.1021/acs.macromol.4c00291>

Iné domáce ocenenia

Pavlík Viliam

Hlavná cena "Challenger Science"

Oceňovateľ: ESET & Civitta

Opis: Challenger Science je vzdelávací program pre výskumníkov pôsobiacich na slovenských vedeckých a akademických inštitúciách. https://www.sav.sk/?lang=sk&doc=services-news&source_no=20&news_no=13264

Medzinárodné ocenenia

Planetová Viktória

CMS Research Grant Award

Oceňovateľ: The Clay Mineral Society

Opis: CMS 2025 Research Grant - The Research Grant program provides partial financial support of research for students of clay science and technology.

Planetová Viktória

Student Poster Presentation Prize

Oceňovateľ: Mineralogical Society

Opis: The 18th International Clay Conference, 2025

Uvádzajte v štruktúre: názov ocenenia, udeľujúca inštitúcia, meno a priezvisko ocenennej osoby.