Ústav anorganickej chémie SAV, v. v. i.

Výročná správa o činnosti a hospodárení za rok 2024

Bratislava
február 2025

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ČASŤ A

Ústav anorganickej chémie SAV, v. v. i.

Výročná správa o činnosti organizácie
za rok 2024

1. Základné údaje o organizácii

1.1. Kontaktné údaje

Názov: Ústav anorganickej chémie SAV, v. v. i.
Riaditeľ: doc. Ing. Miroslav Boča, DrSc.
Zástupca riaditeľa: Ing. Helena Pálková, PhD.
Vedecký tajomník: doc. Ing. Zoltán Lenčéš, PhD.
Predseda správnej rady: Ing. Peter Tatarko, PhD.
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

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

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

Názvy a adresy organizačných zložiek a detašovaných pracovísk:

Organizačné zložky: nie sú

Detašované pracoviská:

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

Vedúci organizačných zložiek a detašovaných pracovísk:

Organizačné zložky: nie sú

Detašované pracoviská:

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

Členovia Snemu SAV za organizačné zložky:
nie sú

Typ organizácie: Verejná výskumná inštitúcia od roku 2022

1.2. Údaje o zamestnancoch

Tabuľka 1a Počet a štruktúra zamestnancov

Štruktúra zamestnancov	K	K		K do 35 rokov		F	P	T	O
		M	Ž	M	Ž				
Celkový počet zamestnancov	82	41	41	4	7	81	64.17	48.44	4
Vedeckí pracovníci	50	29	21	2	5	50	43.1	43.1	0
Odborní pracovníci VŠ (výskumní a vývojoví zamestnanci[1])	9	6	3	2	1	9	5.62	5.34	0
Odborní pracovníci VŠ (ostatní zamestnanci[2])	6	3	3	0	0	6	3.93	0	2
Odborní pracovníci ÚS	11	2	9	0	1	11	8.55	0	2
Ostatní pracovníci	6	1	5	0	0	5	2.97	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 31.12.2024 (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 31.12.2024 (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 31.12.2024)

Rodová skladba	Pracovníci s hodnosťou				Vedeckí pracovníci v stupňoch		
	DrSc.	CSc./PhD.	prof.	doc.	I.	II.a.	II.b.
Muži	6	25	4	4	6	14	9
Ženy	2	21	0	2	2	9	10

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	0.3	5	3.5	7	6.5	5	5.0	4	3.2	4	3.5	3	2.0	0	0.0	5	3.2
Ženy	1	0.3	6	5.5	3	2.2	2	2.0	5	5.0	2	2.0	3	2.6	0	0.0	2	1.8

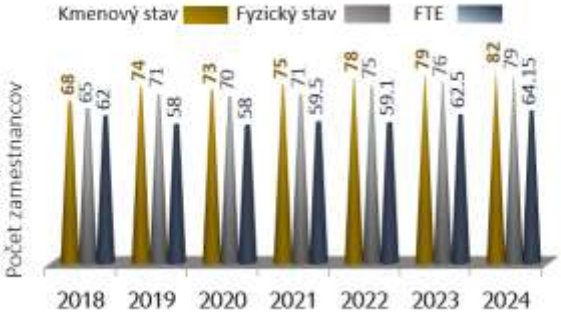
A - Prepočet bez zohľadnenia úväzkov zamestnancov
B - Prepočet so zohľadnením úväzkov zamestnancov

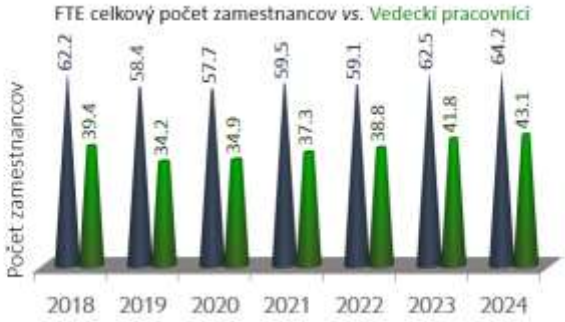
Tabuľka 1d Priemerný vek zamestnancov organizácie k 31.12.2024

	Kmeňoví zamestnanci	Vedeckí pracovníci	Riešitelia projektov
Muži	47.7	48.1	47.2
Ženy	47.0	45.1	44.6
Spolu	47.4	46.8	46.1

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

Ústav anorganickej chémie SAV v roku 2024 nezaznamenal žiadne zásadné zmeny v organizačnej štruktúre.





Prepočítaný počet pracovníkov v roku 2024 je na úrovni 64,15 FTE (z toho 43,10 vedeckých pracovníkov), čo je vyšší stav v porovnaní s rokom 2023 (62,53 a 41,75), resp. najvyšší stav pracovníkov od roku 2018. V roku 2024 bol priemerný vek všetkých pracovníkov ústavu 47,4 roka a priemerný vek vedeckých pracovníkov 46,8 roka, čo predstavuje mierny nárast v porovnaní s rokom 2023. Nárast v tomto parametri je logický dôsledok zvyšovania veku všetkých zamestnancov, keďže generačná výmena nie je plynulá. V roku 2024 ústav zamestnal vedeckú pracovníčku zo zahraničia (Imrongnaro Longkumer), ktorá prešla postupným výberovým konaním na pozíciu v projekte z Plánu obnovy SR. Jednou z hlavných priorít ústavu ostáva aj naďalej zamestnávanie mladých, schopných post-doktorandov. Po úspešnej obhajobe bola na ústav zamestnaná jedna doktorandka (Dhiya Krishnan). V roku 2024 ukončili zamestnanecký pomer piati zamestnanci. Tri administratívne pracovníčky odišli na dôchodok (Mária Strempeková, Anna Kovárová, Elena Krippelová), pracovný pomer ukončila aj projektová manažérka (Martina Pakanová). Jeden mladý vedecký pracovník (Martin Barlog) ukončil pracovný pomer, keďže sa rozhodol zostať pracovať v zahraničí. Pozície pracovníčok, ktoré odišli do dôchodku boli opätovne obsadené. Na ústav nastúpili noví pracovníci na pozíciu vedúceho hospodárskeho úseku (Igor Václav), účtovníka (Tomáš Tóth), rozpočtárky (Ema Zápražná) a projektového manažéra (Marek Hanuska). Vzhľadom na rozširujúcu sa administratívu bola vytvorená nová pracovná pozícia. Nová zamestnankyňa, Simona Gryžboňová bude zodpovedná za verejné obstarávanie a správu majetku ústavu. Do dôchodku odišiel aj vedecký pracovník, ktorý na ústave pôsobil dlhé roky, Štefan Varga.

Vzhľadom na uvedené zmeny považujeme rok 2024 za turbulentný a náročný.

2. Vedecko-výskumná činnosť – projekty, výsledky

2.1. Domáce projekty

Tabuľka 2a Domáce projekty riešené v roku 2024

ŠTRUKTÚRA PROJEKTOV	Počet		Čerpané financie (€)					
			A				B	
	A	B	Zo zdrojov SAV		Z iných zdrojov		Zo zdrojov SAV	Z iných zdrojov
			Spolu	Pre organi-záciu	Spolu	Pre organi-záciu		
1. Projekty VEGA	10	1	132888	132888	-	-	-	6104
2. Projekty APVV	6	12	-	-	251641	186063	-	137073
3. Projekty EŠIF/OP ŠF, Plán obnovy EÚ	5	0	-	-	172452	172452	-	-
4. Projekty SASPRO, MoRePro, IMPULZ	2	0	81010	81010	-	-	-	-
5. Iné projekty (FM EHP, Vedecko-technické projekty, na objednávku rezortov a pod.)	6	0	18300	18300	-	-	-	-

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

Tabuľka 2b Domáce projekty podané v roku 2024

Štruktúra projektov	Miesto podania	Organizácia je nositeľom projektu	Organizácia sa zmluvne podieľa na riešení projektu
1. Účasť na nových výzvach APVV r. 2024	-	3	
2. Projekty výziev EŠIF podané r. 2024	Bratislava		
	Regióny		

Názov projektu: Chémia a syntéza roztavených fluoridových systémov vzácnych zemín / Chemistry and Synthesis of Rare Earths Molten Fluoride Systems
Evidenčné číslo: VV-MVP-24-0169
Akronym: REE-FLAME
Koordinátor: ÚACh SAV, v.v.i. (V. Democvics Silliková)
Stav: podaný

Názov projektu: Nové biouhlím funkcionalizované geopolyméry na báze hlinitokremičitanov: Uplatniteľnosť pri nakladaní s nebezpečným odpadom / Novel biochar functionalized geopolymers based on aluminosilicates: Applicability in hazardous waste management
Identifikačné číslo: VV-MVP-24-0246

Akronym: BIOGEOALU
Hlavný koordinátor: ÚACh SAV v. v. i. (M. Slaný)
Partneri projektu: Stavebná fakulta, Slovenská technická univerzita v Bratislave; Fakulta prírodných vied, Univerzita sv. Cyrila a Metoda v Trnave; Pedagogická fakulta, Trnavská univerzita v Trnave
Stav: projekt nebol hodnotený, vzhľadom na to že koordinátor získal projekt v rámci výziev na projekty z Plánu obnovy SR, ktorých vyhodnotenie sa oneskorilo v porovnaní s plánom.

Názov projektu: High-Entropy Perovskite Oxides: Multi-Element Doping for Enhanced Thermoelectric Efficiency
Identifikačné číslo: VV-MVP-24-0382 (H. Ünsal)
Akronym:
Partneri: Ústav materiálového výskumu SAV, v. v. i. SAV, Ústav materiálového výskumu SAV, v.v.i.

2.2. Medzinárodné projekty

2.2.1. Medzinárodné projekty riešené v roku 2024

Tabuľka 2c Medzinárodné projekty riešené v roku 2024

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 Horizont 2020 a Horizont Európa	0	1	-	-	-	-	4094	-
2. Projekty ERA.NET, ESA, JRP	2	0	50000	50000	-	-	-	-
3. Projekty COST	0	1	-	-	-	-	-	2000
4. Projekty EUREKA, NATO, UNESCO, CERN, IAEA, IVF, ERDF a iné	0	1	-	-	-	-	23534	-
5. Projekty v rámci medzivládnych dohôd	0	0	-	-	-	-	-	-
6. Bilaterálne projekty MAD, Mobility, Open Mobility	0	1	-	-	-	-	3000	-
7. Bilaterálne projekty ostatné	3	0	-	-	-	-	-	-
8. Podpora MVTS z národných zdrojov (SAV, APVV a iné)	2	0	-	-	43666	43666	-	-
9. SAS-UPJŠ ERC Visiting Fellowship Grants	0	0	-	-	-	-	-	-
10. Iné projekty	0	0	-	-	-	-	-	-

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

2.2.2. Medzinárodné projekty Horizont Európa podané v roku 2024

Tabuľka 2d Počet projektov Horizont Európa v roku 2024

	A	B
Počet podaných projektov Horizont Európa	0	0

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

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

Ústav sa plánuje zúčastniť na podávaní niekoľkých projektov. Projekty sú v procese prípravy, keďže termín na uzatvorenie výzvy je 28. február 2024. Preto údaje nie sú zatiaľ skompletizované.

PSK-MSVVM-020-2024-DV-EFRR - SVaV - Strategický výskum a vývoj prostredníctvom partnerstiev

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 Geochémie PriF UK, Fakulta prírodných vied UCM v Trnave, Výskumný ústav rastlinnej výroby, Piešťany, ENVIRONCENTRUM, s.r.o., Nuclear Power, a.s.

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.

Do ďalších projektov plánuje ústav vstúpiť ako partner:
1. Žiadateľ projektu UPJŠ Košice (koordinátor),
2. Žiadateľ projektu: TnU AD (J. Kraxner), za ústav zodpovedná bude M. Michalková, ďalší partneri UACH SAV, ROna a.s., Messer s.r.o., MIKON spol. s r.o., FPT Púchov

Výzva **PSK-MSVVM-021-2024-DV-EFRR SPACE - Špičkový výskum a vývoj od myšlienky k produktu (výskum vo všetkých definovaných oblastiach RIS3+ s prienikom na vesmír)**
Koordinátor/žiadateľ: AT Crystals, s.s.o., ďalší partneri: ÚACH SAV v.v.i., Žilinská univerzita v Žiline. Zameranie projektu: laserové aplikácie vo vesmírnom priemysle.

2.3. Výber najvýznamnejších výsledkov vedeckej práce organizácie v roku 2024

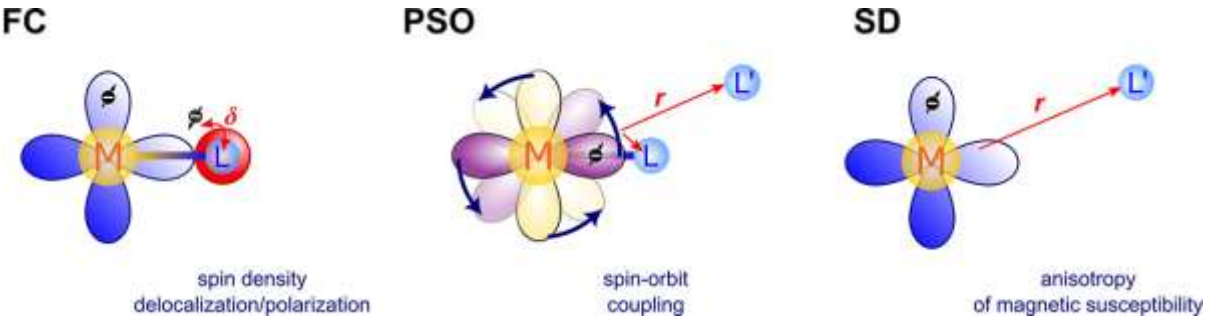
2.3.1. Výsledky na báze základného výskumu

Hlbšie porozumenie paramagnetickým efektom v NMR spektrách komplexov prechodných kovov

Riešitelia z ÚACH SAV: S. Komorovský

Nukleárna magnetická rezonancia (NMR) je výnimočná technika, ktorá má široké uplatnenie vo vede, medicíne a priemysle. NMR spektroskopia sa používa napríklad na charakterizáciu nových protirakovinových liekov alebo na štúdium spracovania jadrového odpadu. Paramagnetická NMR (pNMR) spektroskopia je mimoriadne užitočná technika na charakterizáciu paramagnetických látok, zatiaľ čo NMR spektroskopia sa tradične používa na skúmanie diamagnetických látok. Tieto dve techniky sú však úzko spojené pomocou hyperjemnej interakcie medzi elektrónmi a jadrami v paramagnetických systémoch. V tejto práci sme popísali elementárnu teóriu za hyperjemnou interakciou a pNMR posunmi. Rozdeľujeme celkový pNMR posun na tri fundamentálne fyzikálne mechanizmy: Fermi-kontaktný (FC), paramagnetický spin-orbitálny (PSO) a spin-dipolárny (SD). A diskutujeme nedávny pokrok v pochopení štrukturálnych a elektronických princípov, ktoré sú základom týchto mechanizmov.
Aj po desaťročiach pokroku v analýze pNMR spektier ich interpretácia stále zaostáva za interpretáciou NMR spektier diamagnetických látok. Táto práca je krokom k zmierneniu tejto nerovnováhy a vedie k hlbšiemu

pochopeniu chemických pojmov, ktoré sú základom hyperjemnej interakcie a jej prejavu v paramagnetických NMR spektrách.

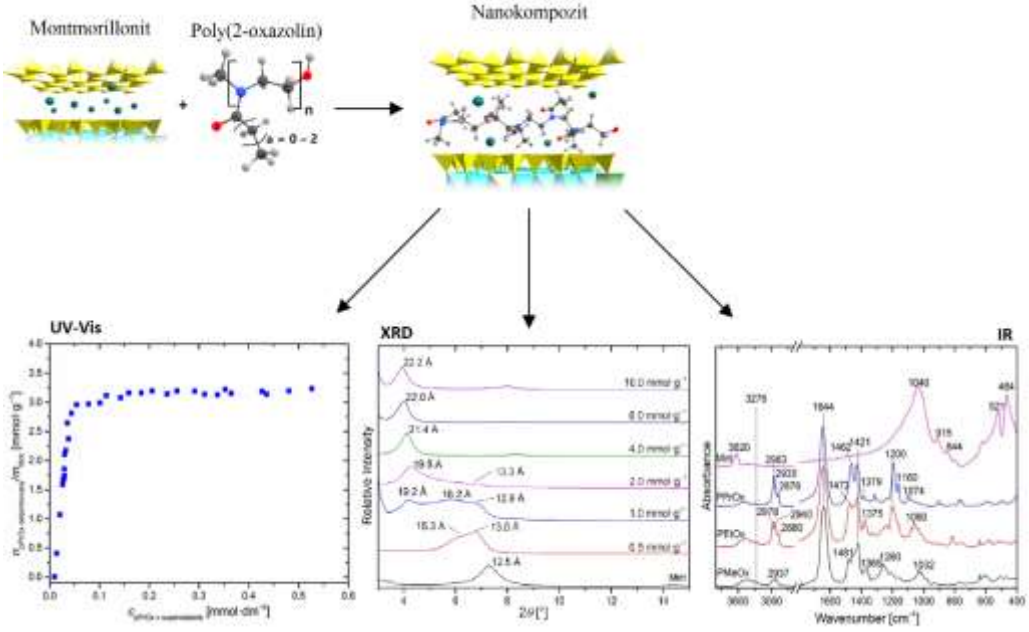


Publikácia:
NOVOTNY, Jan – KOMOROVSKÝ, Stanislav** – MAREK, Radek**. Paramagnetic Effects in NMR Spectroscopy of Transition-Metal Complexes: Principles and Chemical Concepts. In Accounts of chemical research. Reviews, 2024, vol. 57, no. 10, pp. 1467−1477. (2023: 16.4 – IF, Q1 – JCR, 5.948 – SJR, Q1 – SJR). ISSN 0001-4842. Dostupné na: https://doi.org/10.1021/acs.accounts.3c00786 Typ: **ADCA**

Nanomateriály na báze ílových minerálov a poly(2-oxazolínov)

Riešitelia z ÚACH: M. Pribus, Ľ. Jankovič, V. Kureková, M. Barlog, J. Madejová

Mnt ako prírodný materiál a POxs ako biodegradovateľné polyméry sú šetrné k životnému prostrediu, a preto nanomateriály pozostávajúce z týchto komponentov sa javia ako perspektívne pre rôzne aplikácie. V tejto práci boli po prvýkrát systematicky študované adsorpčné kapacity hybridných systémov montmorillonitu a neiónových polymérov tri poly(2-alkyl-2-oxazolíny) (POxs) s rôznymi dĺžkami alkylových reťazcov. Adsorpčné izotermy polymérov vykazovali prudký nárast adsorpcie pri nízkych obsahoch polymérov použitých na modifikáciu. Keď bol povrch Mnt nasýtený POxs, na adsorpčnej krivke sa objavilo plató a množstvo polyméru v nanokompozite sa viac nemenilo. Štruktúrne charakteristiky pripravených nanokompozitov sa študovali pomocou XRD a FT-IR metód. S rastúcim množstvom polyméru sa medzivrstvový priestor Mnt zväčšoval až do obsahu polyméru v nanokompozite 6,0 mmol g^{-1}, pri vyšších množstvách sa už prakticky nemenil. Adsorpčná kapacita je dôležitým parametrom pri dizajne nanokompozitných materiálov. Poznaním limitného množstva polyméru, je možné lepšie prispôsobiť podmienky prípravy materiálov, a tým ovplyvniť funkčnosť nanokompozitu pre konkrétnehe použitie.



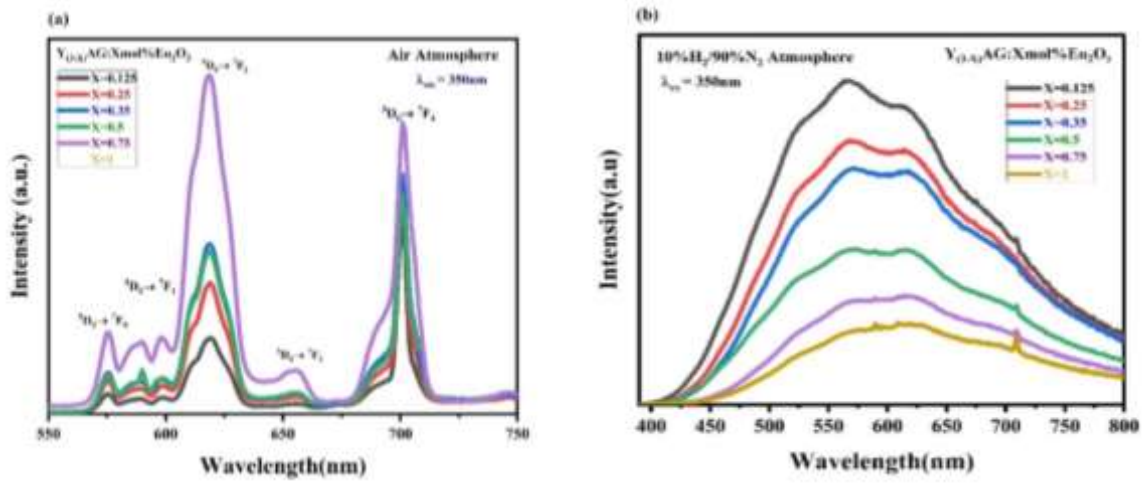
Publikácia:
PRIBUS, Marek** – JANKOVIČ, Ľuboš – KUREKOVÁ, Valéria – BARLOG, Martin – MADEJOVÁ, Jana.

Intercalation Characteristics of Montmorillonite Modified with Poly(2-n-alkyl-2-oxazoline)s. In Macromolecules, 2024, vol. 57, no. 17, p. 8362–8373. (2023: 5.1 – IF, Q1 – JCR, 1.401 – SJR, Q1 – SJR). ISSN 0024-9297. Dostupné na: https://doi.org/10.1021/acs.macromol.4c00291 Typ: ADMA
Uvedený časopis je uvedený v databáze Nature Index.

YAG: Eu mikroguľôčky pre vysokovýkonné LED konvertory farieb

Riešitelia z ÚACH: D. Galusek, M. Michálková

Vývoj vysoko výkonných luminoforov pre LED zdroje bieleho svetla je rýchlo napredujúcou oblasťou výskumu luminiscencie. Táto štúdia predstavuje syntézu nových Eu-dopovaných $Y_3Al_5O_{12}$ (YAG) luminoforov metódou sol-gel a procesu plameňovej syntézy, čo vedie k príprave amorfných mikrogúľ. Amorfný stav umožňuje redukciu Eu^{3+} na Eu^{2+} pri výrazne nižšej teplote (800 °C) ako pri tradičných keramických metódach (1600 °C).
Emisné spektrum YAG:Eu^{2+} luminoforu v mikroguľôčkach vykazovalo vlnovú dĺžku pokrývajúcu spektrum viditeľného svetla - rozsah od 450 do 800 nm s výrazným vrcholom pri 565 nm, čo znamená, že pri využití tohto typu materiálu nebude potrebné používať žiadne ďalšie dopanty na pokrytie viditeľného spektra.



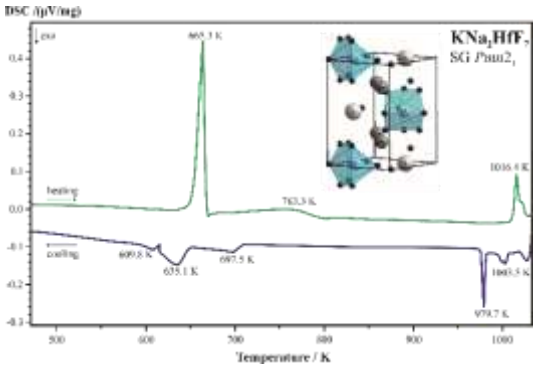
Obr. Fotoluminiscenčné emisné spektrá mikrogúľ YAG:Eu v rôznych koncentráciách a) pred redukciou, b) po reduckcii v 10% H_2/N_2

Publikácia:
GHADAMYARI, Marzieh - KLEMENT, Róbert - HOSSEINI, Hossein Ebrahim - PARCHOVIANSKÝ, Milan - KRAXNER, Jozef - GALUSEK, Dušan - NARAYANASAMY, Sathya - HACK, Erwin - BLUGAN, Gurdial - MICHÁLKOVÁ, Monika. Preparation and characterization of YAG microspheres doped with Eu2+/Eu3+ for broad band emission. In Open Ceramics, 2024, vol. 19, art no. 100654. (2023: 2.9 - IF, Q1 - JCR, 0.534 - SJR, Q2 - SJR). ISSN 2666-5395. Dostupné na: https://doi.org/10.1016/j.oceram.2024.100654 Typ: ADMA

Zložitosť systémov KNa_2ZrF_7, KNa_2HfF_7, a $KNa_2(Hf,Zr)F_7$

Riešitelia z ÚACH: O. Matselko, Z. Vasková, B. Kubíková, Z. Netriová, M. Boča

Synthesis and characterisation of the new mixed-cation fluorides KNa_2HfF_7 and $KNa_2(Hf,Zr)F_7$ (refined composition $KNa_2Hf_{0.44(1)}Zr_{0.56(1)}F_7$), together with isostructural KNa_2ZrF_7 (space group $Pmn2_1$), are presented in this work. The compounds have been obtained from aqueous solutions and structurally analysed at room temperature by powder and single-crystal X-ray diffraction. The solid-solid phase transformations have been revealed during the differential scanning calorimetry experiments and further confirmed by temperature-dependent X-ray powder diffraction. It has been found that the mixed-cation phases KNa_2ZrF_7, KNa_2HfF_7, and $KNa_2(Hf,Zr)F_7$ undergo irreversible phase transformations, which can be explained by their decomposition over 673 K.



Syntéza a charakterizácia nových zmiešaných kationových fluoridov KNa_2HfF_7 a $KNa_2(Hf,Zr)F_7$ (upravené zloženie $KNa_2Hf_{0.44(1)}Zr_{0.56(1)}F_7$), spolu s izoštruktúrnym KNa_2ZrF_7 (priestorová grupa $Pmn2_1$), sú prezentované v práci. Zlúčeniny boli získané z vodných roztokov a štrukturálne analyzované pri izbovej teplote pomocou práškovej a monokryštálovej röntgenovej difrakcie. Transformácie tuhých fáz pri zvýšených teplotách boli zistené počas experimentov diferenciálnej skenovacej kalorimetrie a ďalej potvrdené röntgenovou práškovou difrakciou závislou od teploty. Zistilo sa, že zmiešané katiónové fázy Na_2KZrF_7, Na_2KHfF_7 a $Na_2K(Zr,Hf)F_7$ podliehajú ireverzibilným fázovým transformáciám, ktoré možno vysvetliť ich rozkladom nad 673 K.

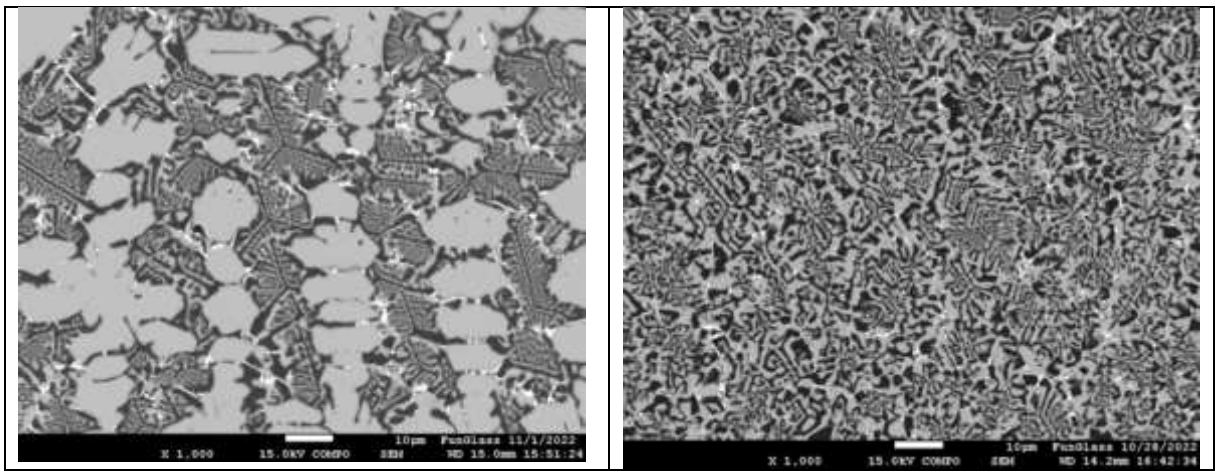
Publikácia:
MATSELKO, Oksana** – POUPON, Morgane – SAMOLOVA, Erika – VASKOVÁ, Zuzana – KUBÍKOVÁ, Blanka – NETRIOVÁ, Zuzana – MIČUŠÍK, Matej – BOČA, Miroslav. Complexity of the KNa_2ZrF_7, KNa_2HfF_7, and $KNa_2(Hf,Zr)F_7$ compounds. In Journal of Solid State Chemistry, 2024, vol. 334, art no. 124655. (2023: 3.2 – IF, Q2 – JCR, 0.6 – SJR, Q2 – SJR). ISSN 0022-4596. Dostupné na: https://doi.org/10.1016/j.jssc.2024.124655 Typ: ADCA

2.3.2. Výsledky aplikačného typu

Nový spôsob prípravy eutektických keramických kompozitov na báze pseudotermického systému Al_2O_3-$Al_3Y_5O_{12}$-ZrO_2

Riešitelia z ÚACH: A. Najafzadehkhoee, A. Talimian, D. Galusek

Bola vyvinutá jednoduchá metóda na prípravu pseudotermických eutektických keramických kompozitov. Objemové keramické kompozity na báze Al_2O_3-$Al_3Y_5O_{12}$-ZrO_2 s rôznymi mikroštruktúrnymi vlastnosťami boli pripravené pomocou spekania keramických práškov syntetizovaných Pechiniho metódou v iskrovej plazme (SPS).
Zistilo sa, že teplota a trvanie kalcinácie, ako aj program SPS ovplyvňujú mikroštruktúrne vlastnosti objemových kompozitov. Prášky sa kalcinovali pri teplotách od 900 °C do 1200 °C počas maximálne 5 hodín. Objemové kompozity sa potom vytvorili spekaním v iskrovej plazme pri teplotách od 1000 °C do 1500 °C s dobou zotrvania 1 až 10 minút.



Fotografia (a) vyrobenej zmiešanej laminárne usporiadanej štruktúry a (b) vyrobenej komplexnej štruktúry Wootzovej ocele zo

skenovacieho elektrónového mikroskopu

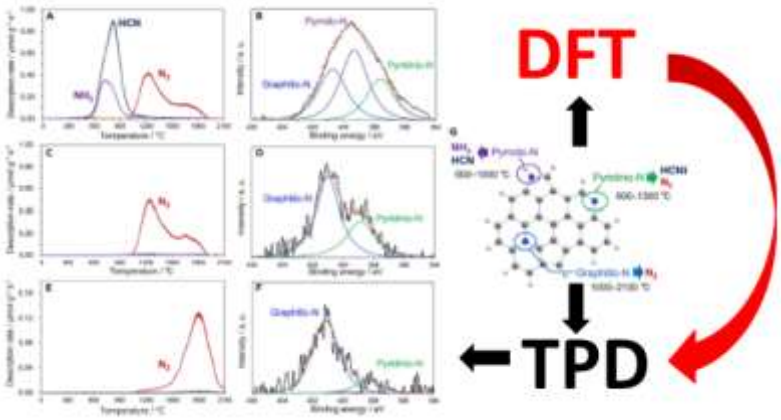
Prihláška na patent
Vakhshouri M., Najafzadehkhoee A., Talimian A., Galusek D., A method for producing eutectic ceramics composites based on the pseudo-ternary system of Al_2O_3-$Al_3Y_5O_{12}$-ZrO_2, Data number: 1000048537, Industrial Property Office of the Slovak Republic, Filed date: 30 January 2024.

2.3.3. Výsledky na báze medzinárodnej spolupráce

Kombinované štúdium procesov desorpcie plynov pri vysokých teplotách v N-dopovanom graféne

Riešitelia z ÚACH SAV: D. Moreno, P. Škorňa, E. Scholtzová

Pokročilé uhlíkové materiály pre energetické aplikácie často obsahujú dusík, ktorý ovplyvňuje ich vlastnosti. Konvenčné analytické techniky pre dusík poskytujú obmedzené informácie, čo sťažuje dizajn materiálov. Vyvinula sa pokročilá technika teplotne programovanej desorpcie (TPD) až do 2 100 °C. Pomocou röntgenovej fotoelektrónovej spektroskopie, elementárnej analýzy a modelových simulácií sa zistilo, že emisie plynov poskytujú informácie o zložení a štruktúrnom type dusíka. TPD umožňuje kvantifikáciu dusíka na úrovni 10 ppm, čo je o dva rády citlivejšie ako bežnými metódami a poskytuje základ pre výskum novej generácie so zameraním na štrukturálny dizajn na úrovni ppm s významným potenciálom pre priemyselné aplikácie. Modelové simulácie uskutočnené na ÚACH SAV pomocou DFT metódy významne prispeli k spoľahlivej validácii výsledkov získaných novou TPD technikou na Tohoku University v Japonsku. Modely simulovali procesy uvoľňovania plynov pre rôzne štruktúne okolie dusíka v graféne.



Obr. 1. Prípadová štúdia aplikácie metód TPD a DFT pre grafény s obsahom rôzneho typu dusíka. TPD profily a N1s XPS spektrá uhlíkového materiálu na báze porfyrínu.
(A–F) (A a B) Py_600, (C a D) Py_1100 a (E a ??F) koks obsahujúci dusík. (G) Zdroje produktov desorpcie ako funkcia pyrolových, pyridínových a grafitických typov dusíka.

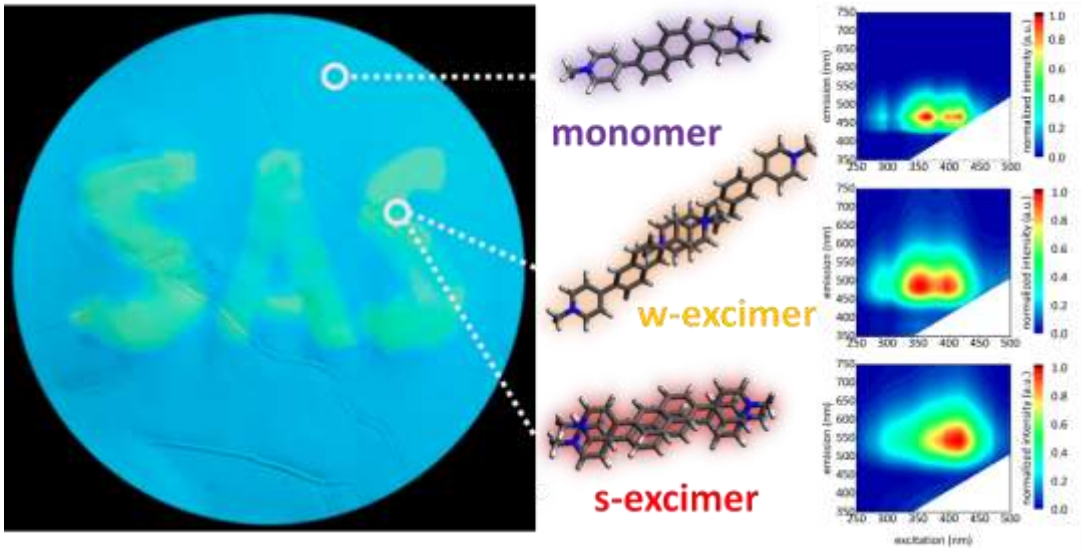
Publikácia
YOSHII, Takeharu** – NISHIKAWA, Ginga – PRASAD, Viki Kumar – SHIMIZU, Shunsuke – KAWAGUCHI, Ryo – TANG, Rui – CHIDA, Koki – SATO, Nobuhiro – SAKAMOTO, Ryota – TAKATANI, Kouhei – MORENO, Daniel – ŠKORŇA, Peter – SCHOLTZOVÁ, Eva – SZILAGYI, Robert** – NISHIHARA, Hirotomo**. Quantitative and qualitative analysis of nitrogen species in carbon at the ppm level. In Chem, 2024, vol. 10, no. 8, p. 2450-2463. (2023: 19.1 – IF, Q1 – JCR, 6.556 – SJR, Q1 – SJR). ISSN 2451-9294. Dostupné na: https://doi.org/10.1016/j.chempr.2024.03.029 Typ: ADCA

2D materiál so stimulačno-responzívnymi optickými vlastnosťami

Riešitelia z ÚACH SAV: M. Matejdes, P. Škorňa, M. Slaný, J. Bujdák

Hlbokomorské živočíchy, akými sú napríklad ryby druhu *Lampanyctus achirus*, sa pri komunikácii medzi sebou a taktiež aj s okolím spoliehajú najmä na bioluminiscenciu. Táto schopnosť produkovať svetlo je kľúčová pre rôzne stratégie prežitia vrátane vábenia partnerov, lákania koristi a vyhýbania sa predátorom. Vyžarované svetlo sa môže meniť v čase, intenzite a dokonca aj farbe, čo týmto organizmom umožňuje

vysielať komplexné signály.
Javom kedy dochádza k farebnej zmene emitovaného signálu sa venuje aj predkladaná práca zaoberajúca sa prípravou a analýzou materiálu schopného meniť svoje optické vlastnosti na základe externých stimulov. Štúdia sa zameriava predovšetkým na integráciu organických farbív s 2D materiálmi vytvárajúcimi štruktúry vykazujúcimi prepínateľné optické vlastnosti. Fotoluminescenčné zmeny takéhoto materiálu sú v tomto prípade vyvolané zmenami vo svojom bezprostrednom okolí, napríklad prítomnosť špecifických rozpúšťadiel. Dôležitým komponentom je derivát naftalénu syntetizovaný v laboratóriu profesora Kawamat-u. Táto látka je schopná v prítomnosti DMSO transformovať sa v excitovanom stave z monomérnych jednotiek na exciméry interagujúce prostredníctvom delokalizovaných π-systémov. Schopnosť reagovať na externé stimuly reverzibilným spôsobom predurčuje tento materiál na použitie nielen v optoelektronike a senzorike, ale taktiež aj v zobrazovacích technológiách.



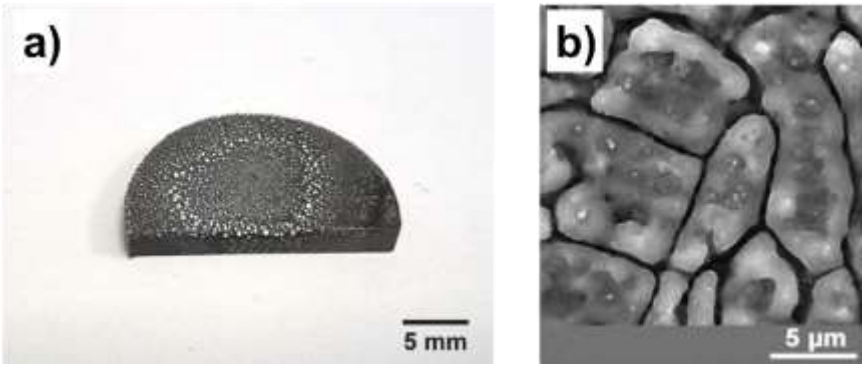
Nápis „SAS" vytvorený pomocou DMSO na povrchu tenkého filmu (λ_{ex} = 365 nm). Inset: ryba druhu Lampanyctus achirus (©BluePlanetArchive/David Wrobel).

Publikácia:
MATEJDES, Marián – ŠKORŇA, Peter – SLANÝ, Michal – KLEMENT, Róbert – **BUJDÁK, Juraj** – KAWAMATA, Jun – BREU, Josef. Excimer formation in a 2D confined space. In Materials Today Chemistry, 2024, vol. 42, art no. 102436. (2023: 6.7 - IF, Q1 - JCR, 1.239 - SJR, Q1 - SJR). ISSN 2468-5194. Dostupné na: https://doi.org/10.1016/j.mtchem.2024.102436 Typ: ADCA

Vývoj kompozitov na báze B_4C-SiC so zlepšenými vysokoteplotnými vlastnosťami

Riešitelia z ÚACH SAV: P. Tatarko, O. Hanzel, M. Hičák

Karbid tetrabóru (B_4C) je vďaka excelentnej kombinácii vlastností, akými sú extrémne vysoká tvrdosť, žiaruvzdornosť, chemická inertnosť, vysoká teplotná stabilita a nízka hustota, považovaný za jeden z najdôležitejších keramických materiálov pre obranný, jadrový a strojársky priemysel. Náročná príprava a nedostatočná odolnosť proti oxidácii limitujú širšie použitie tohto výnimočného materiálu. Z tohto dôvodu boli v spolupráci s Vinča Institute of Nuclear Sciences v Srbsku vyvinuté kompozitné materiály na báze B_4C-SiC. Systematicky sa študoval vplyv SiC vo forme vlákien (2.5 až 10 hm.%) a častíc (25 – 75 hm.%) na spekateľnosť a vysokoteplotné vlastnosti B_4C-SiC materiálov, ktoré boli pripravené na ÚACH SAV v teplotnom intervale 1850 – 2000°C a tlaku 70 MPa. V oboch prípadoch sa spekateľnosť materiálov výrazne zlepšovala s rastúcim obsahom SiC. Materiál B_4C s 5 hm.% SiC vláken dosiahol najvyššiu tvrdosť (43 GPa) z pomedzi všetkých pripravených kompozitov, a len relatívne mierne poškodenie po aplikácii kyslíkovo-acetylénového plameňa pri teplote 1800°C (**Obr. 1a**). Materiály s prídavkom SiC častíc taktiež vykázali len relatívne mierne poškodenie po testovaní pri testovaní laserovej ablácie, kde teplota povrchu vzoriek presiahla 10 000 K. Pri týchto podmienkach došlo len k lokálnemu nataveniu a fragmentácii (**Obr. 1b**), avšak nezasiahnuté oblasti boli bez prítomnosti trhlín. V obidvoch prácach sa podarilo výrazne zlepšiť aplikovateľnosť týchto materiálov v oxidačných podmienkach pri vysokých teplotách.



***Obr. 1**: a) povrch kompozitu B_4C s 5 hm.% SiC vlákien po vystavení kyslíkovo-acetylénovému plameňu pri teplote 1800°C; (b) SEM snímka povrchu B_4C-SiC kompozitu po laserovej ablácii pri teplote prevyšujúcej 10 000 K.*

Publikácie:

MATOVIĆ, Branko** - MALETAŠKIĆ, Jelena - DORDEVIĆ, Marija Prekajski - **TATARKO, Peter** - **HANZEL, Ondrej** - **HIČÁK, Michal** - CHLUP, Zdeněk - CVIJOVIĆ-ALAGIĆ, Ivana. Fabrication of boron carbide ceramics reinforced with silicon carbide fibers. In Ceramics International, 2024, vol. 50, no. 21B, p. 42188-42194. (2023: 5.1 - IF, Q1 - JCR, 0.938 - SJR, Q1 - SJR). ISSN 0272-8842. Dostupné na: https://doi.org/10.1016/j.ceramint.2024.08.062 Type: ADCA

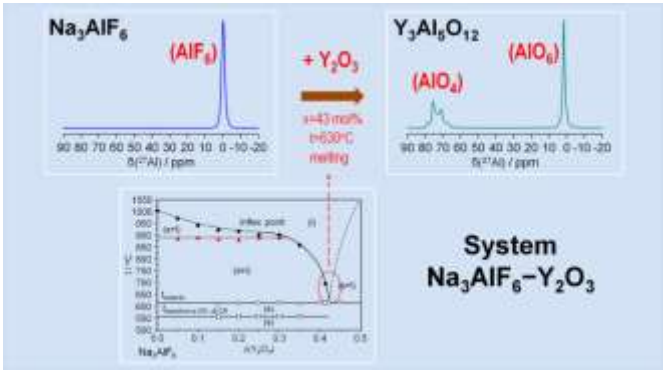
MATOVIĆ, B.** - **TATARKO, Peter** - MAKSIMOVIĆ, V. - MALETAŠKIĆ, J. - STOILJKOVIĆ, M. - **HANZEL, Ondrej** - CVIJOVIC-ALAGIC, I. Densification of additive-free B4C-SiC composites by spark plasma sintering. In Journal of the European Ceramic Society, 2024, vol. 44, no. 9., p. 5340-5346. (2023: 5.8 - IF, Q1 - JCR, 1.198 - SJR, Q1 - SJR). ISSN 0955-2219. Dostupné na: https://doi.org/10.1016/j.jeurceramsoc.2023.12.024 Type: ADCA

Projekty: APVV-21-0402; VEGA 2/0007/21

Determination of the Na_3AlF_6–Y_2O_3 Phase Diagram and its Implications for Low - Temperature YAG / Nd:YAG Synthesis

Riešitelia z ÚACH SAV: M. Korenko, F. Šimko

V práci sa vyžil process syntézy z taveninovej soli na báze roztaveného kryolitu na prípravu YAGu ($Y_3Al_5O_{12}$) a Nd dopovaného YAGu (Nd:YAG). Prvýkrát sa preukázalo, že kryštalizovaný YAG a Nd dopovaný YAG možno vyrábať bez použitia akéhokoľvek oxidu hlinitého pri teplotách už okolo 630 °C (v porovnaní s 1600°C pri syntéze v tuhom stave) len s použitím roztaveného kryolitu (Na_3AlF_6) a oxidu ytritého (Y_2O_3), kde kryolit funguje ako rozpúšťadlo a zdroj Al a ytrium ako rozpustená látka a zdroj Y a O. Ukážalo sa, že postup syntézy z taveninovej soli s použitím roztaveného Na_3AlF_6 by mohol byť uskutočniteľným spôsobom syntézy YAGu a potenciálne iných oxidových materiálov.



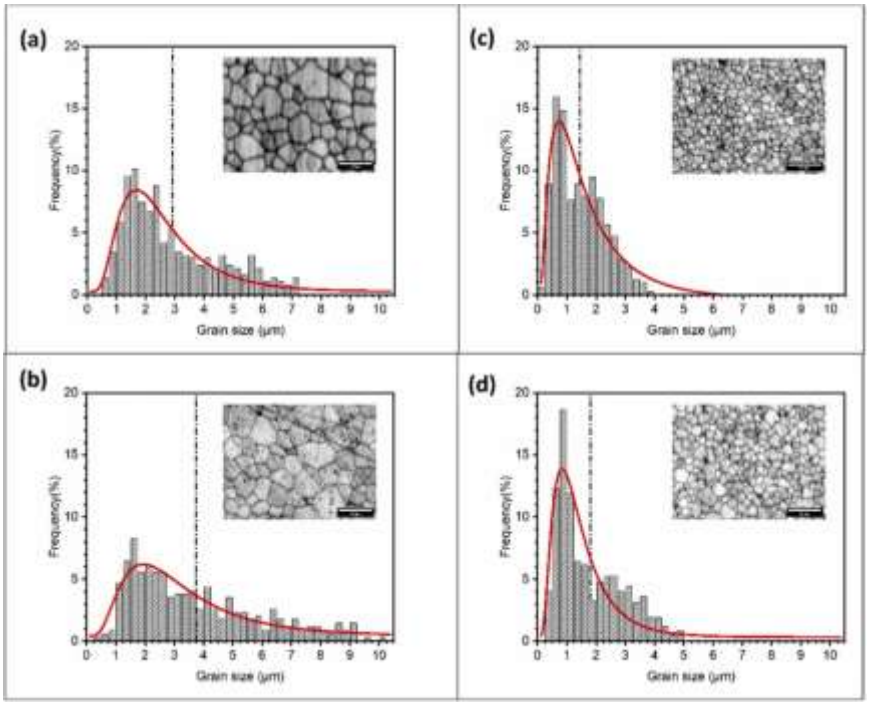
Publikácia:

KORENKO, Michal** - ŠIMKO, František** - ALLIX, Mathieu - RAKHMATULLIN, Aydar - PITCHER, Michael J. - KING, Graham. Determination of the Na3AlF6–Y2O3 Phase Diagram and Its Implications for Low-Temperature YAG/Nd:YAG Synthesis. In Crystal Growth & Design, 2024, vol. 24, no. 18, pp. 7494–7503. (2023: 3.2 - IF, Q1 - JCR, 0.649 - SJR, Q2 - SJR). ISSN 1528-7483. Dostupné na: https://doi.org/10.1021/acs.cgd.4c00684 Typ: ADCA

Spekanie v kvapalnej fáze: prístup k výrobe jemnozrnnej keramiky odolnej voči rastu zŕn

Riešitelia ÚACH SAV: A. Najafzadehkhoee, A. Talimian, D. Galusek

Bola navrhnutá inovatívna stratégia spekania na výrobu jemnozrnného transparentného oxidu ytria. Ako spekacie prísady sa použili malé množstvá Al_2O_3 a SiO_2 (≤1 hmot.%), pričom zloženie kvapalnej fázy vytvorenej prísadami sa počas spekania neustále menilo.
Pomocou týchto zmien zloženia kvapalnej fázy sa podporovalo zhutňovanie vzoriek pri nižších teplotách a potláčal sa rast zŕn počas záverečných fáz spekania. Translucentný oxid ytritý sa získal po spekaní pri teplote 1650 °C počas 2 min, čo je výrazne nižšia teplota (o 100 - 200 °C), ako pri bežne používaných postupoch spekania. Taktiež bola v pripravených materiáloch poyorovaná jemnozrnná mikroštruktúra odolná voči rastu zŕn.



Obr. Rozdelenie veľkosti zŕn a EBSD snímky vzoriek spekaných bez prídavných látok pri teplote 650 °C po dobu (a) 1 h, (b) 4 h a vzoriek spekaných s prídavkom 1 hmotn.% spekacej prísady Al_2O_3-SiO_2 pri teplote 1650 °C po dobu (c) 1 h a (d) 4 h. Zvislá čiara s bodkami predstavuje strednú veľkosť zŕn vo vzorkách

Publikácia:
NAJAFZADEHKHOEE, Aliasghar – TALIMIAN, Ali** – GIRMAN, Vladimír – SEDLÁK, Richard – HVIZDOŠ, Pavol – MACA, Karel – GALUSEK, Dušan. Liquid phase sintering of yttrium oxide: The effect of Al2O3 and SiO2 additives. In Journal of the European Ceramic Society, 2024, vol. 44, p. 383-392. (2023: 5.8 – IF, Q1 – JCR, 1.198 – SJR, Q1 – SJR). ISSN 0955-2219. Dostupné na: https://doi.org/10.1016/j.jeurceramsoc.2023.08.055 Typ: **ADCA**

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

Tabuľka 2e Štatistika vybraných kategórií publikácií

PUBLIKAČNÁ A EDIČNÁ ČINNOSŤ	Počet v r. 2024/ doplnky z r. 2023
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)	**1 / 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)	**2 / 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)	**84 / 0**
10. Vedecké práce registrované vo Web of Science Core Collection alebo Scopus (ADMA, ADMB, ADNA, ADNB)	**19 / 1**
11. Vedecké práce v ostatných domácich časopisoch (ADFA, ADFB)	**0 / 0**
12. Vedecké práce v ostatných zahraničných časopisoch (ADEA, ADEB)	**0 / 0**
13. Vedecké práce v domácich recenzovaných zborníkoch (AEDA)	**0 / 0**
14. Vedecké práce v zahraničných recenzovaných zborníkoch (AECA)	**0 / 0**
15. Publikované príspevky na domácich vedeckých konferenciách (AFB, AFD)	**4 / 0**
16. Publikované príspevky na zahraničných vedeckých konferenciách (AFA, AFC)	**5 / 0**
17. Vydané periodiká evidované v CCC, WoS Core Collection, SCOPUS	**0**
18. Ostatné vydané periodiká	**0**
19. Zostavovateľské práce knižného charakteru (FAI)	**0 / 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. 2023 (zdroj JCR) *Počet článkov / doplnky*	70 / 1	27 / 0	3 / 0	1 / 0	101 / 1
Podľa SJR z r. 2023 (zdroj Scimago)	58 / 1	40 / 0	4 / 0	1 / 0	103 / 1

Počet článkov / doplnky					

Tabuľka 2g Ohlasy

OHLASY	**Počet v r. 2023/ doplnky z r. 2022**
Citácie vo WOS (1.1, 2.1)	2400 / 43
Citácie v SCOPUS (1.2, 2.2)	292 / 18
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 / 0
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	93
Prednášky a vývesky na národných vedeckých podujatiach	53

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

BUČKO, Tomáš – GEŠVANDTNEROVÁ, Monika – ROCCA, Dario. Efficient calculation of fully anharmonic activation free energies at multiple electronic structure levels, JCS8, Sapporo, 17. 06 .- 21. 06. 2024.

DE LA TORRE OLVERA, Guido Manuel – LABUDOVÁ, Martina – HIČÁK, Michal – MEDVECKÝ, Ľubomír – HNATKO, Miroslav – TATARKOVÁ, Monika Bioactive Surface Modification of Silicon Nitride, 5th International Symposium on New Frontiers of Advanced Si-Based Ceramics and Composites, Seogipo KAL Hotel, Jeju, Južná Kórea, 16.–19. 2024

GALUSEK, Dušan, Silicate foams and scaffolds from silicone precursors with micro- and nano-sized fillers, 5th International Symposium on New Frontiers of Advanced Si-Based Ceramics and Composites, Seogipo KAL Hotel, Jeju, Korea. 16.–19. 2024

GALUSEK, Dušan, Therapeutic ions-doped glass with antimicrobial properties, 14th International Conference on Ceramic Materials and Components for Energy and Environmental Systems (CMCEE14) in Budapest, Hungary, 18.– 22. 09. 2024

KOMOROVSKÝ, Stanislav** – MIŠENKOVÁ, Debora. Relativistic density functional theory of EPR. In XVIth Workshop on Modern Methods in Quantum Chemistry, Mariapfarr, Rakúsko, 25. 02. – 01. 03. 2024

KOMOROVSKÝ, Stanislav**. Current densities as a tool for analysis of magnetic properties in the relativistic domain. In 5th Workshop on Magnetically induced molecular Currents: MAGIC 2024, Chiemsee, Nemecko, 09.–13. 09. 2024

KOMOROVSKÝ, Stanislav** – MIŠENKOVÁ, Debora. Relativistic theory of pNMR and EPR. In The 8th Japan-Czech-Slovakia International Symposium on Theoretical Chemistry (JCS8), Sapporo, Japonsko, 17.–21. 06. 2024

KUBÍKOVÁ, Blanka - ŠIMKO, František - KORENKO, Michal - MLYNÁRIKOVÁ, Jarmila - VASKOVÁ, Zuzana - BOČA, Miroslav. Study of oxides solubility in fluoride molten salts. 21st IUPAC International Symposium on Solubility Phenomena and Related Equilibrium Processes, Novi Sad, Srbsko, 09.–13. 09. 2024

LENČÉŠ, Zoltán. Electrochemical performance of graphite and graphite-silicon anodes coated with atomic layer deposited ZnO in Li-ion batteries. International Conference on Advanced Ceramics for Sustainability (Cera4S 2024) & 88th Annual Session of the Indian Ceramic Society, 26.11.2024 - 1.12.2024, Chennai, India.

LENČÉŠ, Zoltán. Performance of graphite/atomic layer deposited ZnO composite anodes in Li-ion batteries. 4th Polish-Slovak-Chinese Seminar on Ceramics, 28.-30.09.2024, Krakow, Poľsko.

MALKIN, Oľga. Investigation of solvent effects on 1J(Hg-P) in a phosphine and selenoether peri-substituted acenaphthene-based Hg complex. In XVIth Workshop on Modern Methods in Quantum Chemistry, Mariapfarr, Rakúsko, 25. 02 – 01. 03. 2024

MALKIN, Oľga. Investigation of solvent effects on 1J(Hg-P) in a phosphine and selenoether peri-substituted acenaphthene-based Hg complex. In 5th Workshop on Magnetically Induced Molecular Currents, Fraueniseln, Chiemsee, Nemecko, 09.–13. 09. 2024

MALKIN, Vladimír. Transmission of spin-polarisation by pi-orbitals. 5th Workshop on Magnetically Induced Molecular Currents, Fraueniseln, Chiemsee, Nemecko, 09.–13. 2024

MIŠENKOVÁ, Debora** – KOMOROVSKÝ, Stanislav. Relativistic theory of the EPR g-tensor. In XVIth Workshop on Modern Methods in Quantum Chemistry, Mariapfarr, Rakúsko, 25. 02. – 01. 03. 2024.

TATARKO, Peter – KOMBAMUTHU, Vasanthakumar – UNSAL, Hakan – CHLUP, Zdeněk TATARKOVÁ, Monika – KOVALČÍKOVÁ, Alexandra – DLOUHÝ, Ivo, High Entropy Diborides for High Temperature Applications: Effect of SiC Addition, 5th International Symposium on New Frontiers of Advanced Si-Based Ceramics and Composites, Seogipo KAL Hotel, Jeju, Južná Kórea, 16.–19. 2024

TATARKO, Peter. Development and Integration of Entropy Stabilized Ceramics, 2nd International Conference on Inovative Materials in Extreme Conditions (IMEC2024), Belehrad, Srbsko, 19.03 - 22.03.2024

TATARKO, Peter - HOSSEINI, Naser - CHLUP, Zdeněk - KOVALČÍKOVÁ, Alexandra - CASALEGNO, Valentina - VALENZA, Fabrizio - MALINVERNI, Carla - ZHOU, Xiaobing - DLOUHÝ, Ivo, Joining of monolithic SiC and ceramic matrix composites with refractory transition metal-based interlayer. In CMCEE 2024: 14th International conference on ceramic materials and components for energy and environmental systems. Budapešť, Maďarsko, 18.-22.8.2024

TATARKO, Peter. Development of new ultra-high temperature ceramics for extreme environment applications, 18th International Symposium on Novel and Nano Materials (ISNNM-2024) Viedeň, Rakúsko, 30.06.-03.07.2024

TATARKO, Peter. Development and characterization of ultra-high temperature ceramics, 4th International Symposium on Characterization (ISC2024) Sakarya, Turecko, 16.10.-18.10.2024

VAKSHOURI, Maryam – PRNOVÁ, Anna – VALÚCHOVÁ, Jana – MICHÁLKOVÁ, Monika – ŠVANČÁREK, Peter – NAJAFZADEHKOEE, Aliasghar – TALIMIAN, Ali – GALUSEK, Dušan a kol. Príprava a charakterizácia materiálov s eutektickou mikroštruktúrou v systéme. Konference o speciálních anorganických pigmentech a práškových materiálech. Univerzita Pardubice, 17. 09 2024

2.6.2. Vyžiadané prednášky na národných vedeckých podujatiach

2.6.3. Vyžiadané prednášky na významných vedeckých inštitúciách

MALKIN, Vladimír. Transmission of spin-polarization by pi-orbitals, Kjótska univerzita, Japonsko, 13.06.2024

MALKIN, Vladimír. Transmission of spin-polarization by pi-orbitals, Univerzita Sapporo, Japonsko,

26.06.2024

MALKINA, Oľga. Distinguishing „Through-Space“ from „Through-Bonds“ Contribution in NMR spin-spin Coupling, 13.06.2024, Kjótska univerzita, Japonsko

MALKINA, Oľga. The mistery of a through-space indirect NMR spin-spin coupling between two hydrogen atoms, Univerzita Sapporo, Japonsko, 26.06.2024

PRNOVÁ, Anna - KLEMENT, Robert - GALUSEK, Dušan. Synthesis and photoluminiscent properties of Er3+ doped glass microspheres in the system Al2O3-RE2O3 (RE=Yb and Y) Univerzita v Gente, Belgicko, 9.10.2024

TATARKO, Peter. IIT Madras, Chennai, India, Development of ultra-high temperature ceramics at IIC SAS, 06.02.-12.02.2024

TATARKO, Peter NIMTE Chinese Academy of Sciences, Ningbo, Čína, Development and integration of high entropy ceramics, 30.10.2024

TATARKOVÁ, Monika. NIMTE Chinese Academy of Sciences, Ningbo, Čína, Silicon Nitride for bio-applications, 30.10.2024

TATARKO, Peter. Ningbo University, Ningbo, Čína, Ultra-High Temperature Ceramics for Extreme Environment Applications, 01.11.2024

2.7. Patentová a licenčná činnosť na Slovensku a v zahraničí v roku 2024

2.7.1. Vynálezy, na ktoré bol v roku 2024 udelený patent

a) na Slovensku

b) v zahraničí

2.7.2. Vynálezy prihlásené v roku 2024

a) na Slovensku

Názov vynálezu: Spôsob výroby eutektických keramických kompozitov na základe pseudo-ternárneho systému Al2O3-Al3Y5O12-ZrO2
Číslo prihlášky: PP50007-2024
Dátum priority: 8.8.2024
Majiteľ / spolumajiteľ: TnU AD
Pôvodcovia vynálezu: Galusek Dušan, Najafzadehkhoee Aliasghar, Maryam Vakhshouri, Ali Talimian

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 2024

b) udelené v roku 2024

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 2024 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
Bučko Tomáš	VEGA	1
Malkin Oľga	VEGA	2
Pálková Helena	PostdokGrant	1
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

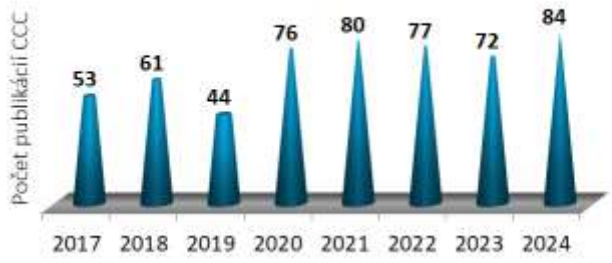
Tabuľka 2j Počet vypracovaných recenzií na vedecké monografie, vedecké štúdie a zborníky

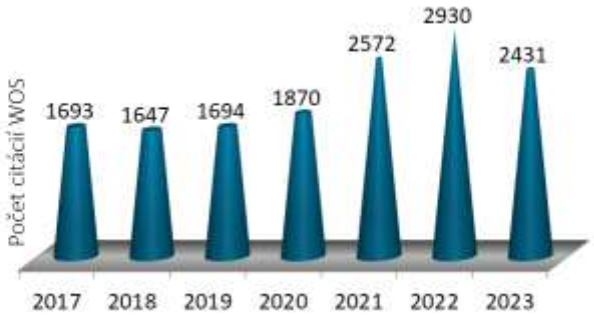
Meno pracovníka	Ved. monografie		Príspevky v časopisoch			Zborníky	
	Domáce	Zahra-ničné	WoS, SCOPUS	Iné databázy	Ostatné	Domáce	Zahra-ničné
Democvics Silliková Veronika	0	0	1	0	0	0	0
Galusek Dušan	0	0	1	0	0	1	0
Hanzel Ondrej	0	0	2	0	0	0	0
Komorovský Stanislav	0	0	1	0	0	0	0
Kureková Valéria	0	0	1	0	0	0	0
Lenčéš Zoltán	0	0	5	0	0	1	0
Malkin Oľga	0	0	2	0	0	0	0
Michálková Monika	0	0	2	0	0	0	0
Najafzadehkhoee Aliasghar	0	0	2	0	0	0	0
Pálková Helena	0	0	2	0	0	0	0
Pavlík Viliam	0	0	3	0	0	0	0
Pribus Marek	0	0	1	0	0	0	0
Prnová Anna	0	0	8	0	0	0	0

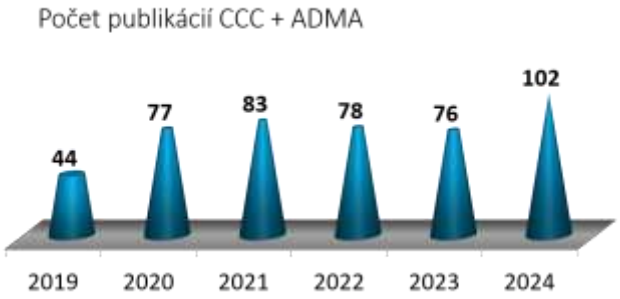
Scholtzová Eva	0	0	3	0	0	0	0
Slaný Michal	0	0	17	0	0	0	0
Tatarko Peter	0	0	15	0	0	0	0
Vasková Zuzana	1	0	0	0	0	0	0
Spolu	**1**	**0**	**66**	**0**	**0**	**2**	**0**

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 2024, sa publikovalo 84 publikácií v CCC časopisoch, t.j. 1,95 publikácie na vedeckého pracovníka. Ak do výpočtu zahrnieme aj práce v impaktovaných časopisoch zahrnutých v databázach WOS a Scopus (102 publikácií), tak počet publikácií na jedného vedeckého pracovníka stúpne na 2,37.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 vztiahnutých 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 CCC publikácií v časopisoch s IF vyšším ako 5.







IF	Publikácie v karentovaných časopisoch (ADCA, ADDA)					
	2019	2020	2021	2022	2023	2024
< 1	1	5	1	0	6	1
1-3	14	27	19	12	25	19
3-5	23	38	32	30	12	21
5-7	4	4	22	20	25	27
7-10	1	0	4	7	2	9
10 <	1	2	2	8	2	7
∑	44	76	80	77	72	84

Rok	2019	2020	2021	2022	2023	2024
Priemerný IF	3.68	4.17	4.33	5.64	4.03	5.50
Median IF	3.45	3.26	3.65	4.87	4.40	5.1

Významnou časťou vedeckej aktivity je účasť na výzvach v rôznych projektových schémach. Každoročne, jednotlivé vedecké tímy na ústave podávajú niekoľko APVV projektov, ako vo všeobecnej, tak aj v bilaterálnych výzvach. V schéme VEGA projektov je ústav riešiteľom stabilne vysokého počtu projektov (aj spoločných spolu s univerzitnými pracoviskami).
Tiež je potrebné vyzdvihnúť úspešnosť ústavu naprieč vnútornými výzvami SAV; získané štipendiá v rámci Schwarzovho fondu (v roku 2024 získala štipendium Patrícia Petrisková), doktorandských projektov DoktoGrant (Inga Zhuková), PostdokGrant (Veronika Silliková, Marek Pribus, Patrícia Petrisková). Pokračovalo riešenie projektov TUBITAK-1, MOST-1, V4-Japan-1 vrátane projektu SASPRO II (dva projekty). V rámcí výziev EÚ sa ústav zapojil aj do výzvy na projekty COST (2 projekty).

V roku 2024 boli vyhodnotené aj výzvy Plánu obnovy a odolnosti SR. Pomerne vysoká úspešnosť bola v výzve **09I03-03-V04 -** Štipendiá pre excelentných výskumníkov a výskumníčky R2-R4: ústav získal 7 projektov z 12 podaných,

R2

- Aliasghar Najafzadehkhoee: Design, analysis and mechanical characterization of laminar ceramics
- Florian Lemken: Study of C-C Coupling Propagated by π-Orbitals
- Daniel Moreno: A theoretical approach to defects in clay minerals (projekt odmietol z dôvodu prijatia inej pozície v zahraničí)
- Michal Slaný: Novel thiol-functionalized montmorillonite/biochar nanocomposite for immobilization of heavy metals from contaminated floodplain soil

R3

- Eva Scholtzová: 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

- Michalková Monika: Development of advanced luminescent glass 3D structures
- Márius Kádek: Redefining boundaries: relativistic computational tools for complex 2D materials (projekt odmietol z dôvodu prijatia inej pozície v zahraničí)

Prehľad ostatných úspešných projektov
- 09I01-03-V02 - Podpora prípravy projektov v Horizonte Európa - 1x (kumulatívna žiadosť za dva projekty) Miroslav Boča: Podpora prípravy projektov v programe Horizont Európa
- 09I03-03-V03 - Veľké projekty pre excelentných výskumníkov - 1x
Peter Tatarko: Nová generácia termoelektrických materiálov pre udržateľnú energiu
- 09I03-03-V06 - Kapitálový booster pre schémy na podporu výskumu a vývoja - 1x
Stanislav Komorovský, **APVV projekt vo VV 2022:** Vývoj pokročilých metód určených na presnú predpoveď a analýzu röntgenových spektier molekúl s otvorenou obálkou
- 09I02-03-V02 - „Matching" granty ku zdrojom získaným od súkromného sektora v rámci výskumnej spolupráce – 2 projekty MatchingP1 - 09I02-03-V02-00042, MatchingP2 - 09I02-03-V02-00043
- 09I01-03-V04 - Podpora medzinárodnej spolupráce a zapájania sa do projektov Horizont Európa a Európsky inovačný a technologický inštitút.

- Keramické anódy na báze SiOC pre udržatelné sodíkovo iónové a kovové batérie (SiOC-based ceramic anodes for sustainable sodium ion and metal batteries) Akronym: SASIBA Trvanie projektu: 1.1.2025 - 30.6.2026

ÚACH SAV, v.v.i. ako partner:
- 09I04-03-V02 - Podpora výskumných projektov zameraných na dekarbonizáciu ekonomiky v TRL úrovniach 1-3 - 1x (Cemea, v.v.i.)
- 09I05-03-V02 - Podpora výskumných projektov zameraných na digitalizáciu ekonomiky v TRL úrovniach 1-3 - 1x

- Advanced Modelling of Light-Matter Interactions on Near-Term ExaScale Supercomputers, koordinátor projektu: Univerzita Komenského v Bratislave, partneri: ÚACH SAV, v.v.i. (S. Komorovský), Národné superpočítačové centrum, z. z. p. o.

Zamestnanci ústavu v roku 2024 participovali na podávaní dvoch projektov COST
1. Innovative research network in alumino-silicate nanotubes, Akronym: LUMEN, Open Call Collection OC-2024-1, Proposal Reference OC-2024-1-27785
2. Kolaboratívne nástroje pre prúdové hustoty indukovaných elektrónov / Collaborative Tools for Induced Electron Current Densities, Acronym: CTIECD, Partnerské inštitúcie z nasledovných krajín: Rakúsko, Bulharsko, Chorvátsko, Česká republika, Dánsko, Estónsko, Fínsko, Francúzsko, Maďarsko, Taliansko, Litva, Holandsko, Poľsko, Srbsko, Slovensko, Španielsko, Švédsko, Turecko, Ukrajina, Spojené kráľovstvo

3. Medzinárodná vedecká spolupráca

3.1. Medzinárodné vedecké podujatia

3.1.1. Medzinárodné vedecké podujatia, ktoré organizácia SAV organizovala v roku 2024 alebo sa na ich organizácii podieľala, s vyhodnotením vedeckého a spoločenského prínosu podujatia

Modern Methods in Quantum Chemistry, Mariapfarr, Rakúsko, 43 účastníkov, 25.02.-01.03.2024
Účastníci z Nemecka, Českej republiky, Dánska, Fínska, Rakúska, 25 prednášok.

PROCESSING AND PROPERTIES OF ADVANCED CERAMICS AND GLASS and a Joint annual meeting of the Silicate Scientific Technological Society, Vršatecké Podhradie, 80 účastníkov, 16.10.-18.10.2024

3.1.2. Medzinárodné vedecké podujatia, ktoré usporiada organizácia SAV v roku 2025 (anglický a slovenský názov podujatia, miesto a termín konania, meno, telefónne číslo a e-mail zodpovedného pracovníka)

Slovenská a česká konferencia o skle/Slovenská a česká konferencia o skle, Trenčín, 12.11.-14.11.2025, (Dušan Galusek, 032/7400590, dusan.galusek@tnuni.sk)
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

3.1.3. Počet pracovníkov v programových a organizačných výboroch medzinárodných konferencií

Tabuľka 3a Programové a organizačné výbory medzinárodných konferencií

Meno pracovníka	Programový	Organizačný	Programový i organizačný
Scholtzová Eva	1	0	0
Tatarko Peter	2	0	0
Spolu	3	0	0

3.2. Členstvo a funkcie v medzinárodných orgánoch

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

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

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

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

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

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

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 sklárska spoločnosť (funkcia: člen výboru, čestný člen)
ICG TC03 (funkcia: člen)
Society of Glass Technology (funkcia: čestný člen - FSGT)

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

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

Oksana Matselko, PhD.
European Crystallographic Association (funkcia: člen)

Dr. Aliasghar Najafzadehkhoee, 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. Účasť 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
Tatarko Peter	European Commission / MSCA-IF	7
	Latvian Science Fund / call for fundamental and applied research	2

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

V roku 2024 sa vedeckí pracovníci ÚACH zúčastnili v zahraničí rôznych konferencií a navštívili v rámci projektov a grantov rôzne pracoviská na vedeckých inštitúciách (Príloha A5 – Medzinárodná mobilita). Na druhej strane, zo zahraničia na ústave absolvovali výskumné pobyty Emilija Nidžović, Vinča Institute of Nuclear Sciences, University of Belgrade, Belehrad, Srbsko je u nás na 3 mesačnom pobyte (od 2.12. 2024) v rámci mobility grantu z JECS Trust pod vedením P. Tatarku (názor projektu: Influence of fiber addition on the mechanical properties of aluminate high-entropy spinel oxides). PhD. študent Giyos Khamdamov z Uzbekistanu na ústave absolvuje 8 mesačnú stáž (od 1.11.2024) v rámci SAIA pod vedením Z. Lenčéša. Jeho práca sa zameriava na vývoj anód pre lítiové a sodíkové batérie. PhD. študent Asif Ali z Department of Physics, Abdul Wali Khan University v Mardan z Pakistanu absolvoval v roku 2024 9-mesačný pobyt na ústave pod

vedením P. Tatarku v rámci SAIA grantu.

Pobyty vedeckých pracovníov a študentov na inštitúciách v zahraničí

A. Prnová, J. Michalík, M. Chromčíková

- University of Ghent, Belgicko pobyty v rámci projektu Mobility SAV, práca je zameraná na prípravu keramických a sklokeramických materiálov v systémoch Al_2O_3-La_2O_3, Al_2O3- La_2O_3-ZrO_2, Al_2O_3-Y_2O_3

František ŠIMKO

- CEMHTI - Conditions Extrêmes et Matériaux: Haute Température et Irradiation, CNRS - Centre National de la Recherche Scientifique, Orléans, Francúzsko, 05-06. 2024, štipendijný pobyt "Invited professor"v rámci schémy v regióne Centre-Val de Loire vo Francúzsku.

Dlhodobé pobyty

Nasser Hosseini

- Swiss Federal Laboratories for Materials Science and Technology (Empa), Laboratory for High Performance Ceramics, Duebendorf, Švajčiarsko, Grant of European Ceramic Society – JECS Trust and Erasmus+ internship grant. Téma: Development of metal matrix composite braze filler for joining of (TiZrHfNbTa)B2 boride ceramics to superalloys 01.07-30.08.2024

Martin BARLOG

- pracovný pobyt, Univerzita Bayreuth, Fakulta anorganickej chémie I, Oddelenie polymérov a koloidnej chémie, Bayreuth, Nemecko, 05.10.2023 - 30.09.2024, práca zameraná na prípravu materiálu za účelom selektívnej adsorpcie jednotlivých plynov z atmosféry.

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

Assoc. Prof. Takeharu Zoshi, Tohoku University, Sendai, Japonsko

- Advanced temperature programmed desorption up to 2100°C: a novel analytical technique for heteroatom characterization. 24.9.2024

Assoc. Prof. Robert Karoly Szilagyi, The University of British Columbia, Okanagan, Kanada

- Phylloaluminosilicates and Iron-Sulphur Minerals linked by Maquette Chemistry! 6.9.2024

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 4 under contract No:CW2142413)
Zadávateľ výskumného kontraktu: Rio Tinto Aluminium Pechiney, Francúzsko
Začiatok spolupráce: 2021
Ukončenie spolupráce: 2024
Finančný prínos pre organizáciu (€): 27000

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 2024

Forma	Počet k 31.12.2024				Počet doktorandov po doktorandskej skúške		Počet ukončených doktorantúr v r. 2024					
							Ukončenie z dôvodov					
	celkový počet		z toho novoprijatí				ukončenie úspešnou obhajobou		predčasné ukončenie		neúspešné ukončenie	
	M	Ž	M	Ž	M	Ž	M	Ž	M	Ž	M	Ž
Denná zo zdrojov SAV	6	6	3	2	4	6	1	3	0	0	0	0
Denná z iných zdrojov	0	0	0	0	0	0	0	0	0	0	0	0
Externá	0	0	0	0	0	0	0	0	0	0	0	0
Spolu	6	6	3	2	4	6	1	3	0	0	0	0
Z toho zahraničných	5	4	3	2	3	3	1	2	0	0	0	0
Súhrn	12		5		10		4		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 2024 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 2024 úspešnou obhajobou

Meno doktoranda	Forma DŠ	Mesiac, rok nástupu na DŠ	Mesiac, rok obhajoby	Číslo a názov študijného odboru	Meno a organizácia školiteľa	Fakulta udeľujúca vedeckú hodnosť
MSc. Alper Guneren	interné štúdium hradené	9 / 2020	8 / 2024	1420 chémia	doc. Ing. Zoltán Lenčéš PhD., Ústav	Prírodovedecká fakulta UK

	z prostriedkov SAV				anorganickej chémie SAV, v. v. i.	
MSc. Dhiya Krishnan	interné štúdium hradené z prostriedkov SAV	11 / 2020	8 / 2024	1420 chémia	Ing. František Šimko PhD., Ústav anorganickej chémie SAV, v. v. i.	Prírodovedecká fakulta UK
Mgr. Debora Mišenková	interné štúdium hradené z prostriedkov SAV	9 / 2019	8 / 2024	1420 chémia	Mgr. Stanislav Komorovský 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 2024 úspešnou obhajobou v nadštandardnej dĺžke štúdia

Meno doktoranda	**Forma DŠ**	**Mesiac, rok nástupu na DŠ**	**Mesiac, rok obhajoby**	**Číslo a názov študijného odboru**	**Meno a organizácia školiteľa**	**Fakulta udeľujúca vedeckú hodnosť**
MSc. Sanam Bashir	interné štúdium hradené z prostriedkov SAV	12 / 2020	12 / 2024	1420 chémia	Ing. Eva Scholtzová CSc., Ústav anorganickej chémie SAV, v. v. i.	Prírodovedecká fakulta UK

5.5. Uplatnenie absolventov doktorandského štúdia

Tabuľka 5e Prehľad uplatnenia absolventov doktorandského štúdia

Počet absolventov PhD. štúdia v roku 2024 (obhajoba leto 2024)	**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	1	1	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	Zahraniční doktorandi štátne občianstvo/počet
0	0	0	PAK/3, IND/2, IRN/2, ECU/1, ESP/1, PRT/1, RUS/1, TUR/1

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

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 hodnosť 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 inženírství, Vysoká škola báňská TU)	
doc. Ing. Mária Chromčíková, PhD. (anorganická technológia a materiály)	prof. RNDr. Pavol Šajgalík, DrSc. (Hutnícka fakulta TUKE)	
doc. Ing. Zoltán Lenčéš, PhD. (anorganická technológia a materiály)	prof. RNDr. Pavol Šajgalík, DrSc. (Slovenská technická univerzita v Bratislave)	
doc. Ing. Zoltán Lenčéš, PhD. (anorganická chémia)	prof. RNDr. Pavol Šajgalík, DrSc. (Trenčianska univerzita Alexandra Dubčeka v Trenčíne)	
doc. Ing. Zoltán Lenčéš, PhD. (odbor v zahraničí)	prof. RNDr. Pavol Šajgalík, DrSc. (Univerzita Komenského v Bratislave)	
prof. Ing. Marek Liška, DrSc., Dr.h.c. (anorganická technológia a materiály)	prof. RNDr. Pavol Šajgalík, DrSc. (Univerzita Pavla Jozefa Šafárika v Košiciach)	
prof. Ing. Marek Liška, DrSc., Dr.h.c. (fyzika kondenzovaných látok a akustika)	prof. RNDr. Pavol Šajgalík, DrSc. (Univerzita sv. Cyrila a Metoda v Trnave)	
RNDr. Jana Madejová, DrSc. (anorganická technológia a materiály)	prof. RNDr. Pavol Šajgalík, DrSc. (Vysoké učení technické, Brno)	
Dr. Oľga Malkin, DrSc. (teoretická a počítačová chémia)		
Dr. Vladimír Malkin, DrSc. (chemická fyzika)		
Dr. Vladimír Malkin, DrSc. (teoretická a počítačová chémia)		

5.8. Údaje o pedagogickej činnosti

Tabuľka 5i Prednášky a cvičenia vedené v roku 2024

PEDAGOGICKÁ ČINNOSŤ	Prednášky		Cvičenia a semináre	
	doma	v zahraničí	doma	v zahraničí
Počet prednášateľov alebo vedúcich cvičení	6	1	6	0
Celkový počet hodín v r. 2024	210	8	212	0

Prehľad prednášateľov predmetov a vedúcich cvičení, s uvedením názvu predmetu, úväzku, katedry, fakulty, univerzity/vysokej 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**	4
3.	**Počet pracovníkov, ktorí pôsobili ako školitelia doktorandov (PhD.)**	12
4.	**Počet školených doktorandov (aj pre iné inštitúcie)**	23
5.	**Počet oponovaných dizertačných a habilitačných prác**	8
6.	**Počet pracovníkov, ktorí oponovali dizertačné a habilitačné práce**	3
7.	**Počet pracovníkov, ktorí pôsobili ako členovia komisií pre obhajoby DrSc. prác**	1
8.	**Počet pracovníkov, ktorí pôsobili ako členovia komisií pre obhajoby PhD. prác**	5
9.	**Počet pracovníkov, ktorí pôsobili ako členovia komisií, resp. oponenti v inauguračnom alebo habilitačnom konaní na vysokých školách**	1

5.9. Iné dôležité informácie k pedagogickej činnosti

Ústav anorganickej chémie SAV, v.v.i. sa zapojil do pedagogického procesu začiatkom roka 2024 vypísaním PhD. tém ako externej vzdelávacej inštitúcie dvoch univerzít - PríF UK a FCHPT STU. Celkovo bolo vypísaných 15 tém v 4 študijných programoch (anorganická chémia, fyzikálna chémia a teoretická a počítačová chémia v spolupráci s PríF UK a anorganická technológia a materiály v spolupráci s FCHPT STU), 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 podali 8 uchádzači, ktorí sa zároveň zúčastnili aj prijímacích pohovorov. Štyria uchádzači splnili podmienky a boli zapísaní do prvého ročníka na PríF UK; dvaja študenti v programme teoretická a počítačová chémia, po jednom v programoch anorganická chémia a fyzikálna chémia. Jedna študentka prijatá v programme anorganická chémia na PríF UK ešte v akademickom roku 2023/2024 bola zapísaná do prvého ročníka k 1.2.2024 pre komplikácie spojené so získaním termínu na veľvyslanectve Slovenskej republiky v Teheráne. V novembri 2024 si potenciálni školitelia ÚACH SAV, v.v.i. mohli vypísať tému aj v programe anorganická technológia a nekovové materiály v rámci platnej rámcovej zmluvy o doktorandskom štúdiu medzi trenčianskou Univerzitou Alexandra Dubčeka (TnUAD) a ÚACH SAV, v.v.i. V tomto programme mal ústav zvrejnené dve témy. Prijímacie konanie je naplánované na január 2025.

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 10.10.2024 za účasti 13 študentov doktorandského štúdia z ÚACH SAV, v.v.i. Bratislava a TnUAD Trenčín.

Potvrdil sa trend z minulých rokov, kedy je úroveň súťažných príspevkov vynikajúca, čo ocenili členovia komisie, ako i ostatní zamestnanci ÚACH SAV, v.v.i., ktorí sa zúčastnili súťažných prezentácií. Na ocenených miestach sa umiestnili:

1. Martina Vitázková (TnUAD)
2. Naser Hosseini (ÚACH SAV, v.v.i.)
3. Viktória Planetová (ÚACH SAV, v.v.i.)

Doktorandi ÚACH sa pravidelne uchádzajú aj o projekty v rámci výzvy DOKTOGRANT, v roku 2024 sa tri študentky ÚACH SAV, v.v.i. (V. Planetová, V. George a P. Labib Shotorban) stali úspešnými podávateľkami projektov pre rok 2025. V rámci výzvy Granty pre postdoktorandov boli v roku 2024 podporené štyri projekty postdoktorandov z ÚACH SAV, v.v.i. – V. Demovics Silliková, P. Petrisková, H. Ünsal a M. Pribus.

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 2024 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: Dlhoročná spolupráca v roku 2023 vyústila do ďalšej spoločnej publikácie. Jeden vedecký pracovník absolvoval výskumný pobyt na partnerskom pracovisku.

Názov univerzity/vysokej školy a fakulty: Prírodovedecká fakulta UK
Oblasť spolupráce: vedecká spolupráca, účasť na Bc., Mgr. a PhD. výuke
Sídlo spoločného pracoviska (ak je vytvorené):
Začiatok spolupráce: 1990
Zhodnotenie: V spolupráci s touto fakultou je ústav zapojený do vzdelávania na III. stupni vysokoškolského štúdia v študijných programoch „Anorganická chémia", „Fyzikálna chémia" a „Chemická fyzika". V roku 2021 bol podpísaný dodatok k rámcovej zmluve o spolupráci na doktorandskom štúdiu, ktorého obsahom bolo rozšírenie študijných programov, na ktorých sa ÚACH SAV môže podieľať o študijných program "Teoretická a počítačová chémia". Spoločne sa riešia projekty VEGA a APVV. prof. RNDr. J. Bujdák, DrSc. má hlavný úväzok na fakulte a čiastkový na ÚACh SAV. Prof. RNDr. J. Bujdák, DrSc. je interným členom VR ústavu a RNDr. Jana Madejová, DrSc. externým členom VR PriF UK. Doc. Ing. Miroslav Boča, DrSc je členom Rady študijných programov Chemickej sekcie PRIFUK-UK (od 1.1.2022-1.1.2027). K 31.12. 2024 pracovníci ÚACh viedli na PriF UK desať doktorandov, traja doktorandi v roku 2024 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 Laugaritio) rieši ÚACh SAV v spolupráci s touto univerzitou spoločné projektyVEGA a APVV. Prof. Ing. D. Galusek, DrSc. prorektor pre vedu, výskum a medzinárodné vzťahy TnU AD je aj členom Vedeckej rady TnU AD a dvoch jej fakúlt (Fakulty zdravotníctva a Fakulty špeciálnej techniky). Pracovníci centra, zamestnanci ÚACh, sa podieľajú na pedagogickej činnosti v rámci doktorandského štúdia v odbore "Anorganická technológia". Od roku 2019 má ÚACh SAV s TnU AD rámcovú dohodu o spolupráci pri uskutočňovaní doktorandského študijného programu v odbore 5.2.19 Anorganická technológia a materiály, ktorý je od roku 2021 modifikovaný na Anorganická technológia a nekovové materiály. Viacerí pracovníci UACh SAV majú školiace práva na TnUAD a vedú na nej doktorandov v študijnom programe Anorganické technológie a materiály. V roku 2024, v rámci výziev APVV začalo riešenie dvoch projektov TnU AD, na ktorých je ústav partnerom.

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 2023 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 Al2O3-La2O3, Al2O3-La2O3-ZrO2, Al2O3-Y2O3
Sídlo spoločného pracoviska (ak je vytvorené):
Začiatok spolupráce: 2010
Zhodnotenie: Vedecká spolupráca pri príprave amorfných a polykryštalických materiálov sol-gel metódami v systémoch Al2O3-RE2O3, Al2O3-RE2O3-ZrO2. Skúmanie vlastností pripravených materiálov a spoločné publikácie. Vedecká spolupráca pri príprave amorfných a polykryštalických materiálov sol-gel metódami v systémoch Al2O3-RE2O3, Al2O3-RE2O3-ZrO2m Al2O3-Y2O3.

Názov univerzity/vysokej školy a fakulty: Vysoká škola báňská - TU Ostrava, Česká republika
Oblasť spolupráce: vedecká spolupráca, výchova doktorandov
Sídlo spoločného pracoviska (ak je vytvorené):
Začiatok spolupráce: 2010
Zhodnotenie: Spolupráca VŠB a ÚACH je zameraná na výchovu mladých pracovníkov. Prof. RNDr. P. Šajgalík, DrSc. je členom Vedeckej rady FMMI VŠB; doc. Ing. Z. Lenčéš, PhD. je členom odborovej rady doktorandského študijného programu Materiálové vědy a inženýrství. V roku 2021 sa spolupráca rozšírila aj na projekty, keďže v rámci 2. spoločnej výzvy Japan-V4 sa obidve inštitúcie spolupodieľajú na riešení projektu AtomDeC, ktorého zodpovednou riešiteľkou za Slovensko je Ing. Eva Scholtzová, CSc. Projekt skončil v októbri 2024.

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: PriF UK, ÚACH SAV, v.v.i.
Koordinátor projektu: Katedra fyzikálnej chémie, PriF 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: Pokročilé materiály s eutektickou mikroštruktúrou pre vysokoteplotné funkčné aplikác
Agentúra: APVV
číslo projektu: APVV-19-0010
Spolupracujúce inštitúcie: TnU AD, ÚACH SAV, v.v.i.
Koordinátor projektu: TnU AD
Začiatok spolupráce: 2021
Koniec spolupráce: 2024
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: Atómová koncepcia materiálov na báze uhlíka pre novú normálnu spoločnosť

Agentúra: SAV, Višegrádsky Fond
číslo projektu: V4-Japan Joint Research Program
Spolupracujúce inštitúcie: ÚACH SAV, v.v.i., University of Sendai (JPN), VŠB Ostrava (CZ), The University of British Columbia (CAN), Faculty of Science and Informatics University of Szeged (HU), Institute of Fundamental Technological Research PAS Warsaw (PL)
Koordinátor projektu: Advanced Institute for Materials Research (AIMR) Tohoku University Sendai, Japonsko
Začiatok spolupráce: 2021
Koniec spolupráce: 2024
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 materiálů 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	1	tlač	1	TV	1
rozhlas	0	internet	3	exkurzie	0
publikácie	0	multimediálne nosiče	0	dokumentárne filmy	0
iné	2				

7.2. Vedecko-organizačná činnosť

Tabuľka 7b Vedecko-organizačná činnosť

Názov podujatia	Domáca/ medzinárodná	Miesto	Dátum konania	Počet účastníkov
Modern Methods in Quantum Chemistry	medzinárodná	Mariapfarr, Rakúsko	25.2.-1.3.2024	43
PROCESSING AND PROPERTIES OF ADVANCED CERAMICS AND GLASS and a Joint annual meeting of the Silicate Scientific Technological Society	medzinárodná	Vršatecké Podhradie	16.10.-18.10.2024	80

7.3. Účasť na výstavách

Názov výstavy: Doktorandská búrka
Miesto konania: Dúbravská cesta 9, Bratislava
Dátum: 15.5.2024
Zhodnotenie účasti: Podujatie organizované P. SAV. Žiaci zo stredných a vysokých škôl prišli do areálu SAV aby sa pozreli na ich možnosti štúdia na výskumných inštitúciách SAV. Za ústav sa zúčastnili P. Petrisková, V. Planetová, M. Hanuska.

Názov výstavy: Sario
Miesto konania: Hotel Atrium, Nový Smokovec 42, 062 01 Vysoké Tatry
Dátum: 10.4.2024
Zhodnotenie účasti: Nadviazanie kontaktov s potenciálnymi partnermi vo výskume (P. Petrisková, M. Hanuska):

Názov výstavy: Víkend so SAV v BA
Miesto konania: Hviezdoslavovo námestie, Bratislava
Dátum: 14.6.2024
Zhodnotenie účasti: ÚACH SAV, v.v.i. sa zúčastnil so svojim stánkom, v ktorom naši vedeckí pracovníci prezentovali výskum na jednotlivých oddeleniach. Program zabezpečili: Petrisková P., Planetová V., Boháč P., Pavlík V., Pribus M.

Názov výstavy: Noc vedy
Miesto konania: Stará tržnica, Bratislava
Dátum: 27.9.2024
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., Pribus M., Boháč P., Santos L., Unsal H.

Názov výstavy: Víkend so SAV v BA a V TT
Miesto konania: Trojičné námestie, Trnava
Dátum: 22.6.2024
Zhodnotenie účasti: ÚACH SAV, v.v.i. sa zúčastnil so svojim stánkom, v ktorom prezentoval výskum na jednotlivých oddeleniach. Program zabezpečili: Petrisková P., Planetová V., M. Hičák.

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	0	0	1
Galusek Dušan	0	0	1
Pálková Helena	0	0	1
Spolu	0	0	3

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)
Open Ceramics (funkcia: guest editor)

doc. Ing. Zoltán Lenčéš, PhD.
International Journal of Applied Ceramic Technology (funkcia: člen)
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)

7.6. Činnosť v domácich vedeckých spoločnostiach

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

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

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

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

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

prof. Ing. Marek Liška, DrSc., Dr.h.c.
Slovenská chemická spoločnosť (funkcia: člen)
Slovenská sklárska spoločnosť (funkcia: člen)

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

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

Mgr. Marián Matejdes, PhD.
Slovenská chemická spoločnosť (funkcia: člen)
Slovenská ílová spoločnosť (funkcia: člen)

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

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

Dr. Aliasghar Najafzadehkhoee, 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. Zuzana Vasková, PhD.
Slovenská chemická spoločnosť (funkcia: člen)

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

Okrem podujatí uvedených v kapitole 7.3., a v 3.1.1. vedeckí pracovníci z ústavu organizovali ďalšie podujatia.

Názov: Medzinárodný deň žien
Miesto konania: Dúbravská cesta 9, Bratislava
Dátum: 08.03.2024
Zhodnotenie účasti: V roku 2024 ústav oslávil so všetkými zamestnankyňami Medzinárodný deň žien.

Názov: Exkurzia nadaných detí
Miesto konania: Dúbravská cesta 9, Bratislava
Dátum: 29.05.2024
Zhodnotenie účasti: Žiaci zo Školy pre mimoriadne nadané deti a gymnázium v Bratislave prišli na ÚACH SAV, v.v.i. Pripravená pre ne bola úvodná krátka prednáška o výskumnom zameraní ústavu, následne im bola predvedená práca na SEM mikroskope. Program doplnili rôzne zábavné experimenty a pokusy vo viacerých laboratóriách ústavu. Program zabezpečili: Hnatko M., Hanzel O., Kubíkova B., Tatarko P., Pribus M., Boháč P., Jurová A.

Názov: Deň otvorených dverí na ÚACh SAV, v.v.i.
Miesto konania: Dúbravská cesta 9, Bratislava
Dátum: 12.11.2024
Deň otvorených dverí, ktorý je organizovaný v rámci Týždňa vedy a techniky na Slovensku mladými vedeckými pracovníkmi je prezentáciou výsledkov výskumu na ÚACH SAV, v.v.i. Pozvaní boli študenti základných aj stredných škôl zo Slovenska. Súčsťou programu bola prehliadka vybraných laboratórií ústavu,

v ktorých vedeckí pracovníci prostredníctvom modelových experimentov návštevníkom priblížili svoju každodennú prácu a informovali o praktickom využití zariadení. Tým najviac zvedavým názorne ukázali ich využitie aj nad rámec demonštračných experimentov. Dňa otvorených dverí sa zúčastnilo približne 160 študentov mimobratislavských škôl (Pezinok, Trnava, Ružomberok, Žilina). Podujatie zabezpečili: Petrisková P., Boháč P., Hanzel O., Hičák M., Mlynáriková J., Jurová A., Planetová V., Tatarko P., Kureková V., D. Krishnan

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 doktorskych dizertačných prác v odbore Anorganická technológia a materiály	predseda
	APVV	člen pracovnej skupiny pre technické vedy
doc. Ing. Zoltán Lenčéš, PhD.	Sektorová rada inovácií, Národná sústava povolaní	člen
prof. RNDr. Pavol Šajgalík, DrSc.	Komisia ministra školstva pre udeľovanie Ceny ministra školstva	člen
	Komisia MŠ pre prioritné oblasti aplikovaného výskumu a experimentálneho vývoja v SR - materiálový výskum a nanotechnológie	člen pracovnej skupiny
	Slovenská komisia pre vedecké hodnosti (SKVH)	podpredseda
	Pandemická komisia MZ SR	člen
	Technologická agentúra SR	člen
	Výskumná agentúra SR	člen
	Rada predsedov pracovných skupín pre prioritné oblasti aplikovaného výskumu a experimentálneho vývoja	predseda
	Rada vlády pre vedu, techniku a inovácie	podpredseda

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

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

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

Meno pracovníka	Názov orgánu	Funkcia

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

9. 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)

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	10	4	6	1	1	0
2. Projekty APVV	6	4	2	12	7	5
3. Projekty EŠIF/OP ŠF, Plán obnovy EÚ	5	3	2	0	0	0
4. Projekty SASPRO, MoRePro, IMPULZ	2	1	1	0	0	0
5. Iné projekty (FM EHP, Vedecko-technické projekty, na objednávku rezortov a pod.)	6	1	5	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
1. Projekty Horizont 2020 a Horizont Európa	0	0	0	1	1	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	0	0	0	1	0	1
5. Projekty v rámci medzivládnych dohôd	0	0	0	0	0	0
6. Bilaterálne projekty MAD, Mobility, Open Mobility	0	0	0	1	0	1
7. Bilaterálne projekty ostatné	3	3	0	0	0	0
8. Podpora MVTS z národných zdrojov (SAV, APVV a iné)	2	2	0	0	0	0
9. SAS-UPJŠ ERC Visiting Fellowship Grants	0	0	0	0	0	0
10. Iné projekty	0	0	0	0	0	0

10.2.2. Výskum zameraný na rodovú problematiku

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

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

Uveďte stručné, základné informácie k problematike.

Zloženie správnej rady k 31.12.2024:
· doc. Ing. Miroslav Boča, DrSc. (predseda ex offo)
· Ing. Igor Václav
· Ing. Blanka Kubíková, PhD.
· Ing. Helena Pálková, PhD.
· Ing. Peter Tatarko, PhD (zástupca predsedu)

- 19.02.2024 - prerokovanie účtovej závierky,
- per rollam dňa 28.03.2024 - návrh rozpočtu na rok 2024,
- 23.05.2024 - prerokovanie Výročnej správy o činnosti a hospodárení ÚACH SAV, v. v. i. za rok 2023, stanovenie výšky rezervného donfu, zrušenie knižnice a schválenie smernice č. 7/2024,
- 28.11.2024 - doplňujúce voľby člena Správnej rady

11.2. Vedecká rada - zloženie a základná informácia o činnosti

- 23.01.2024 - schvaľovanie nových tém pre PhD. štúdium, výber najvýznamnejších výsledkov za rok 2023, hodnotenie výskumnej činnosti ústavu,
- 06.02.2024 - správa o činnosti VR za rok 2023 a ústavu za rok 2023, schvaľovanie tém doktorandského štúdia, návrh na udelenie odborovej plakety SAV Dionýza Ilkoviča,
- 28.02.2024 - schválenie autorských podielov pre Súťaž MVP a doktorandov,
- 14.03.2024 - schvaľovanie ceny SAV za výsledky MVTS, uznesenie o publikovaní v predátorských časopisoch,
- 12.04.2024 - hodnotenie publikačných aktivít oddelení a vedeckých pracovníkov,
- per rollam dňa 13.06.2024 - Výročná správa o činnosti a hospodárení ÚACH SAV, v. v. i. za rok 2023,
- 21.10.2024 - návrhy tém dizertačných prác pre akademický rok 2025/2026 TnUAD,
- 09.10.2024 - zasadnutie AO - Vyjadrenie podpory pre kandidátov na Predsedu SAV hlasovaním

Uveďte stručné, základné informácie k problematike.

11.3. Dozorná rada - zloženie a základná informácia o činnosti

Uveďte stručné, základné informácie k problematike.
Zloženie dozornej rady k 31.12.2024:

- MUDr. Mgr. Tomáš Hromádka, PhD. (predseda)
- JUDr. Glória Gajdošová
- Prof. Ing. Marián Valko, DrSc.

- 01.03.2024 - voľba predsedu Dozornej rady ÚACH SAV, v. v. i.,
- per rollam dňa 22.03.2024 - prerokovanie účtovnej závierky,
- per rollam dňa 24.06.2024 - návrh zmlúv medzi UACH a CEMEA o spolumajiteľstve PPV,
- per rollam dňa 25.06.2024 - prerokovanie Výročnej správy o činnosti a hospodárení ÚACH SAV, v. v. i. za rok 2023,
- per rollam dňa 15.07.2024 - návrh zmluvy medzi UACH a CEMEA o spolumajiteľstve PPV,
- per rollam dňa 02.09.2024 - súhlas na právny úkon - nadobudnutie majetku (prístroje),
- 19.12.2024 – on-line rokovanie členov DR s riaditeľom ústavu – správa o fungovaní organizácie

11.4. Informácie o štrukturálnych a organizačných zmenách v organizácii

Uveďte stručné, základné informácie k problematike.
V roku 20204 nenastali žiadne štrukturálne ani organizačné zmeny v organizáci.

11.5. Zmeny zakladacej listiny, vnútorných predpisov organizácie alebo zakladateľa

Uveďte stručné, základné informácie k problematike.
V roku 20204 nenastali žiadne zmeny zakladacej listiny organizácie.

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

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 form industry. This planning activity is not the privilege of the Institute leadership.
It would be useful to prepare and publish a full SWOT analysis, where all raised questions have some answer. Until now the publication of scientific papers has been considered as the main research output of the Institute. For evaluation of these publications a complicated classification system of publications has been created. Due to movement of the scientific publishing policy towards the Open Access publication model, it is timely to reorganize this evaluation system of publications and implement the elements of Plan S. Hopefully this will change the landscape of bibliometrics in coming decade.
At the same time, it is important to motivate scientists to submit patent applications, to valorise their research results. This can be done in cooperation with companies to cover accompanying expenses. Already understanding that this may be possible could lead to several important changes.
It is understandable that all these recommendations cannot be implemented by the Institute alone, without legal and financial support from the SAS.
Proposal of overall institute rating: B"

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

14.3. Aktualizácia Akčného plánu organizácie v roku 2024

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

15. Iné významné činnosti organizácie

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

Uveďte 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 ako celku

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 (častokrát nekoncepčné), nedostatok financií na samotnú vedu, komplikovaná aktuálna celospoločenská situácia a nedostatok informácií spôsobuje zásadné komplikácie pri plánovaní akýchkoľvek aspektov základného, ako aj rozvojového fungovania organizácie. Preto je viac ako žiadúce výrazne zintenzívniť komunikáciu medzi ústavmi a rovnako aj smerom k P SAV s cieľom výmeny informácií, skúseností s riešením problémov, ako aj s cieľom hľadania perspektív pre ďalší rozvoj.

Uveďte 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: Priemer publikácií zaradených v databázach CCC je 1,93 publikácie na jedného vedeckého pracovníka. Publikačný priemer je vyšší ako bol minulý rok (1,74) a blíži sa k dvom publikáciám na vedeckého pracovníka, ktorý je dlhodobým cieľom ústavu. Publikačnú aktivitu ústavu hodnotí VR ako dobrú. Vysoká kvalita vedeckých výstupov je potvrdená publikovaním v renomovaných vedeckých časopisoch. V roku 2024 bolo 96% publikácií ústavu zaradených do kvartilov Q1 a Q2.
Ústav je zapojený do riešenia projektov v rôznych projektových schémach. Počet riešených domácich projektov schémy VEGA je 11 (10 ako hlavný riešiteľ) a počet riešených APVV projektov je 18, z toho je v šiestich projektoch ÚACH hlavným riešiteľom projektov. Počet APVV projektov, v ktorých ústav vystupuje ako nositeľ projektu v posledných rokoch klesá. Pozorujeme zvýšenú aktivitu vedeckých pracovníkov pri podávaní APVV projektov, ktorá sa zatiaľ neodrazila na vyššej úspešnosti získavania projektov. Ústav sa zapojil do mnohých z výziev Plánu obnovy, celkovo získal 13 projektov. V rámci programu SASPRO realizujú svoje výskumné aktivity na ústave dvaja štipendisti, čo potvrdzuje atraktivitu organizácie pre vedeckú činnosť. V oblasti medzinárodnej vedeckej spolupráce bol ústav v roku 2024 zapojený do 8 projektov, vrátane jedneho projektu H 2020 (spoluriešiteľ). VR vyzýva vedeckých pracovníkov na intenzívnejší rozvoj medzinárodnej vedeckej spolupráce so zameraním sa na podávanie prestížnych projektov.
VR pozitívne hodnotí zapojenie ústavu do výchovy doktorandov. V roku 2024 bol celkový počet školených doktorandov 12, z ktorých štyria v roku 2024 ukončili doktorandské štúdium úspešnou obhajobou. Pozitívom je prijatie 5 doktorandov 1. ročníka, čo zabezpečí kontinuitu vedeckej výchovy. Dobrou praxou je zapájanie doktorandov do projektov riešených na ústave hneď po nástupe na doktorandské štúdium. Kvalita doktorandského štúdia a dosiahnuté vedecké výsledky 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 výskumnú činnosť.

Schválila vedecká rada organizácie SAV dňa 4.2.2025

Mgr. Monika Tatarková, PhD.
predseda vedeckej rady

Výročnú správu o činnosti organizácie za rok 2024 vypracoval(i):

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

Bratislava, 12.2.2025

doc. Ing. Miroslav Boča, DrSc.
riaditeľ organizácie

PRÍLOHY k časti A

Príloha A-1

Zoznam zamestnancov a doktorandov organizácie k 31.12.2024

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.	50	0.50
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.	doc. Mgr. Anna Kityk, PhD.	25	0.62
8.	Mgr. Stanislav Komorovský, PhD.	100	1.00
9.	Ing. Michal Korenko, PhD.	100	1.00
10.	Ing. Blanka Kubíková, PhD.	100	1.00
11.	doc. Ing. Zoltán Lenčéš, PhD.	100	1.12
12.	Ing. Monika Michálková, PhD.	100	0.86
13.	Ing. Jarmila Mlynáriková, PhD.	100	1.00
14.	Ing. Helena Pálková, PhD.	100	1.00
15.	Ing. Viliam Pavlík, PhD.	100	1.00
16.	Ing. Anna Prnová, PhD.	100	1.00
17.	Ing. Eva Scholtzová, CSc.	100	1.00
18.	Ing. Michal Slaný, PhD.	100	1.00
19.	Ing. František Šimko, PhD.	100	1.00

20.	Mgr. Peter Švančárek, PhD.	100	1.00
21.	Ing. Peter Tatarko, PhD.	100	1.00
22.	Mgr. Monika Tatarková, PhD.	100	1.00
23.	Ing. Štefan Varga, CSc.	25	0.25
Vedecký pracovníci			
1.	James Richard Asher, PhD	100	1.00
2.	RNDr. Veronika Demovics Silliková, PhD.	100	1.00
3.	MSc. Hamid Hassani, PhD.	100	1.00
4.	Ing. Michal Hičák, PhD.	100	1.00
5.	MSc. Dhiya Krishnan, PhD.	100	0.17
6.	Mgr. Valéria Kureková, PhD.	100	1.00
7.	MSc. Imrongnaro Longkumer, PhD.	100	0.08
8.	Mgr. Marián Matejdes, PhD.	100	1.00
9.	Oksana Matselko, PhD.	100	1.00
10.	Dr. Aliasghar Najafzadehkhoee, Ph.D.	100	1.00
11.	Ing. Zuzana Netriová, PhD.	100	1.00
12.	Mgr. Patrícia Petrisková, PhD.	100	1.00
13.	Mgr. Marek Pribus, PhD.	100	1.00
14.	Mgr. Tímea Šimonová, PhD.	50	0.50
15.	Ing. Peter Škorňa, PhD.	100	1.00
16.	Ing. Gianmarco Taveri, PhD.	25	0.63
17.	MSc. Hakan Ünsal, PhD.	100	1.00
18.	Ing. Jana Valúchová, PhD.	100	1.00
19.	Ing. Zuzana Vasková, PhD.	100	1.00
Odborní pracovníci s VŠ vzdelaním (výskumní a vývojoví zamestnanci)			
1.	MSc. Asif Ali	30	0.30
2.	Ing. Eva Hadzimová	100	1.00
3.	MSc. Naser Hosseini	30	0.30
4.	Ing. Iveta Macková	100	1.00
5.	Mgr. Marek Pribus, PhD.	28	0.28
6.	Ing. Jozef Priščák	100	1.00
7.	Ing. Ján Ramaj	50	0.42
8.	Mgr. Pavol Weiner	100	1.00
9.	MSc. Inga Zhukova	30	0.30
Odborní pracovníci s VŠ vzdelaním (ostatní zamestnanci)			

1.	Ing. Marek Hanuska	100	0.75
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	0.08
6.	PhDr. Ing. Igor Václav, PhD.	100	0.17
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	0.25
6.	Miriam Hnatková	100	1.00
7.	Anna Jurová	100	1.00
8.	Anna Kovárová	100	1.00
9.	Alexandra Tonkovičová	60	0.60
10.	Ema Zápražná	100	0.75
11.	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.	Terézia Pírová	100	1.00
5.	Ing. František Šimko, PhD.	40	0.22
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.	Prangya Paramita Sahoo, PhD.	30.6.2024	0.50
2.	Ing. Štefan Varga, CSc.	31.12.2024	0.25
Vedeckí pracovníci			
1.	Ing. Martin Barlog, PhD.	30.9.2024	0.00
2.	MSc. Daniel Moreno, PhD.	12.3.2024	0.17
Odborní pracovníci s VŠ vzdelaním (výskumní a vývojoví zamestnanci)			

1.	MSc. Alper Güneren	31.8.2024	0.02
Odborní pracovníci s VŠ vzdelaním (ostatní zamestnanci)			
1.	Ing. Elena Krippelová	15.12.2024	1.00
2.	PhDr. Martina Pakanová	31.7.2024	0.42
3.	Ing. Jaroslav Rusnák, PhD.	19.2.2024	0.05
Odborní pracovníci ÚSV			
1.	Anna Kovárová	31.12.2024	1.00
2.	Mária Strempeková	30.6.2024	0.50

Zoznam doktorandov

	Meno s titulmi	**Škola/fakulta**	**Študijný odbor**
Interní doktorandi hradení z prostriedkov SAV			
1.	MSc. Asif Ali	Prírodovedecká fakulta UK	1420 chémia
2.	Mphil. Ayesha Asbat	Prírodovedecká fakulta UK	1420 chémia
3.	MSc. Guido de La Torre Olvera	Prírodovedecká fakulta UK	1420 chémia
4.	MSc. Vinny George	Prírodovedecká fakulta UK	1420 chémia
5.	MSc. Naser Hosseini	Prírodovedecká fakulta UK	1420 chémia
6.	MSc. Leonardo Filipe Kleman Santos	Prírodovedecká fakulta UK	1420 chémia
7.	MSc. Parisa Labib Shotorban	Prírodovedecká fakulta UK	1420 chémia
8.	MSc. Bryan Alexis Melo Flores	Prírodovedecká fakulta UK	1420 chémia
9.	RNDr. Jakub Michalík	Fakulta chemickej a potravinárskej technológie STU	2820 chemické inžinierstvo a technológie
10.	Mgr. Viktória Planetová	Prírodovedecká fakulta UK	1420 chémia
11.	Ing. Lucia Šedivá	Fakulta chemickej a potravinárskej technológie STU	2820 chemické inžinierstvo a technológie
12.	MSc. Inga Zhukova	Prírodovedecká fakulta UK	1420 chémia
Interní doktorandi hradení z iných zdrojov			
organizácia nemá interných doktorandov hradených z iných zdrojov			
Externí doktorandi			
organizácia nemá externých doktorandov			

Zoznam zamestnancov prijatých do jedného roka od získania PhD.

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

Zoznam emeritných vedeckých zamestnancov

	Meno s titulmi

Príloha A-2

Projekty riešené v organizácii

Medzinárodné projekty

Programy: COST

1.) European Materials Acceleration Center for Energy *(European Materials Acceleration Center for Energy)*

Zodpovedný riešiteľ:	Peter Tatarko
Trvanie projektu:	3.10.2023 / 2.10.2027
Evidenčné číslo projektu:	A22123
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	MVTS-COST: 2000 €

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). Za najdôležitejší prínos možno považovať vytvorenie tzv. chainmap, to znamená online patformy, ktorá predstavuje databázu všetkých partnerov projektu s ich kontaktmi, výskumným zameraním, a infraštruktúrou. Nakoľko je hlavným cieľom projektu združovať odborníkov v danej oblasti a vytvoriť základy pre budúce centrum excelentnosti pre pokročilé funkčne 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.) Atómová koncepcia materiálov na báze uhlíka pre novú normálnu spoločnosť *(Atomic Design of Carbon-Based Materials for New Normal Society)*

Zodpovedný riešiteľ:	Eva Scholtzová
Trvanie projektu:	1.11.2021 / 30.10.2024
Evidenčné číslo projektu:	V4-Japan Joint Research Program
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Advanced Institute for Materials Research (AIMR) Tohoku University Sendai
Počet spoluriešiteľských inštitúcií:	5 - Kanada: 1, Česko: 1, Maďarsko: 1, Japonsko: 1, Poľsko: 1
Čerpané financie:	SAV: 23534 €

Dosiahnuté výsledky:
V roku 2024 bola publikovaná práca s našim externým spolupracovníkom z Kanady a japonskými kolegami v renomovanom vedeckom časopise[1], ktorej dôležitú časť tvorili aj naše validačné výpočty v tuhej fáze ohľadom tvorných tepiel pri uvoľňovaní zlúčenín (NH3, HCN, a N2) zo štruktúry pokročilého uhlíkového materiálu obsahujúceho N v podobe pyrolic-, pyridinic- and graphitic-N zoskupenia pri rôznych vysokých teplotách. Japonskými kolegami bola vyvinutá pokročilá vákuová teplotne-programovateľná desorpčná technika (TPD) pre teploty až do 2100 °C na charakterizáciu pokročilých materiálov na báze uhlíka a výsledky meraní touto metódou sa validovali aj našimi výpočtami na navrhnutých modeloch. Taktiež sme ukončili výpočty ohľadom štúdie vplyvu defektov v grafén na efektivitu adsorpcie malých molekúl polutantov (CO2 a NH3) [2] . Práca ukázala, že defekty spolu s orientáciou molekúl zohrávajú kľúčovú úlohu pri adsorpcii na povrchu pokročilých uhlíkových materiálov pripravených v rámci nášho Konzorcia.
Ďalej sme dokončili prácu o charakterizácii medziproduktov pri syntéze g-C3N4 DFT metódou v spolupráci s českými kolegami , ktorí daný materiál pripravili inovatívnou metódou [3].
Boli dokončené porovnávacie výpočty k efektívnej adsorpcii benzethonium chloridu (antiseptikum) na ílových mineráloch kaolinite a montmorillonite, ktoré predstavujú lacnejšiu variantu účinných adsorbentov polutantov, hoci s nižšou adsorpčnou efektivitou v porovnaní s grafén oxidom, ktorý bol študovaný maďarskými kolegami [4, 5].
DFT metóda bola použitá aj na štúdium vplyvu defektov v grafén na adsorpciu Kongo red farbiva [6], ktorého adsorpcia na pokročilých uhlíkových materiáloch bola študovaná experimentálne v spolupráci s českou a poľskou pracovnou

skupinou. Čaká sa na dokončenie experimentov a spoločná práca bude zaslaná na publikovanie vo vedeckom odbornom časopise.
V spolupráci s poľskou a českou skupinou boli pripravené modely na štúdium vzájomných interakcií ionogélu s povrchom modifikovaného grafénu a zistilo sa, že nový materiál, pripravený japonskými kolegami obsahujúci defekty v štruktúre je aj podľa predbežných experimentálnych meraní vhodnejší na prípravu nového superkapacitora. Čakáme na dokončenie experimentálnej charakterizácie, aby mohla byť spoločná práca zaslaná na publikovanie v odbornom časopise.
1.YOSHII, Takeharu** – NISHIKAWA, Ginga – PRASAD, Viki Kumar – SHIMIZU, Shunsuke – KAWAGUCHI, Ryo – TANG, Rui – CHIDA, Koki – SATO, Nobuhiro – SAKAMOTO, Ryota – TAKATANI, Kouhei – MORENO, Daniel – ŠKORŇA, Peter – SCHOLTZOVÁ, Eva – SZILAGYI, Robert** – NISHIHARA, Hirotomo**. Quantitative and qualitative analysis of nitrogen species in carbon at the ppm level. In Chem, 2024, vol. 10, no. 8, p. 2450-2463. (2023: 19.1 – IF, Q1 – JCR, 6.556 – SJR, Q1 – SJR). ISSN 2451-9294. Dostupné na: https://doi.org/10.1016/j.chempr.2024.03.029 Typ: ADCA
2.MORENO RODRÍGUEZ, Daniel – SCHOLTZOVÁ, Eva** – NISHIHARA, Hirotomo. Defect-driven variations in graphene for enhanced adsorption of CO2 and NH3: A DFT study. In AtomDeC 4th International symposium : V4-JP. – Tohoku : AIMR Tohoku University Sendai, Japan, 2024. (AtomDeC 4th International symposium : medzinárodná konferencia) Typ: GII
3.MICHALSKA, Monika** – PAVLOVSKY, Jiri – SCHOLTZOVÁ, Eva* – ŠKORŇA, Peter – MATEJKA, Vlastimil – BOCHENEK, Kamil – JAIN, Amrita – CHIDA, Koki – YOSHII, Takeharu – NISHIHARA, Hirotomo. A facile approach for fabricating g-C3N4-based materials as metal-free photocatalysts. In Results in Engineering, 2024, vol. 24, art no. 103109. (2023: 6.0 – IF, Q1 – JCR, 0.794 – SJR, Q1 – SJR). ISSN 2590-1230. Dostupné na: https://doi.org/10.1016/j.rineng.2024.103109 Typ: ADMA
4.SCHOLTZOVÁ, Eva. Comparison of adsorption effectivity of layered inorganic structures for benzethonium cation by dft method. In 10th Workshop of Slovak Clay Group : Book of abstracts. 10. – Bratislava : Slovak Clay Group, p. 20. ISBN 978-80-972367-7-9. (10th Workshop of Slovak Clay Group : vedecká konferencia. 10th Workshop of Slovak Clay Group : vedecká konferencia) Typ: AFH
5.SCHOLTZOVÁ, Eva** – SZABO, Tamas – JANKOVIČ, Ľuboš. Combined DFT and experimental study of adsorption effectivity of graphene oxide and kaolinite for benzethonium chloride. In International Conference on Materials Science, Engineering and Technology : Abstract book. – Singapore, 2024, p. 39. (International Conference on Materials Science, Engineering and Technology : Hybridná konferencia) Typ: GII
6.ŠKORŇA, Peter** – SCHOLTZOVÁ, Eva. Adsorption of congo red dye onto the surface of graphene structure – theoretical approach. In AtomDeC 4th International symposium : V4-JP. – Tohoku : AIMR Tohoku University Sendai, Japan, 2024. (AtomDeC 4th International symposium : medzinárodná konferencia) Typ: GII

Programy: Bilaterálne - iné

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

Zodpovedný riešiteľ:	František Šimko
Trvanie projektu:	1.9.2022 / 30.6.2024
Evidenčné číslo projektu:	101008500
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	1 - Francúzsko: 1
Čerpané financie:	-

Dosiahnuté výsledky:

4.) 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: 3250 €

Dosiahnuté výsledky:
Prvý polrok riešenia projektu bol v súlade s projektovým plánom primárne zameraný na predikciu nových zložení a štruktúr vysokoentropických borido-karbidov pomocou ab-initio výpočtov. Tie boli realizované na ÚACH SAV pomocou DFT (Density Functional Theory) výpočtov implementovaných v programe VASP (Vienna Ab-initio Simulation Package). Týmto spôsobom boli vypočítané rôzne kombinácie RE-B2C2 štruktúr obsahujúcich štyri prvky vzácnych zemín (RE). Na základe výsledkov bola ako najvhodnejšia štruktúra zvolená (Y0,25Yb0,25Dy0,25Er0,25)B2C2. Materiály tohto chemického zloženia boli následne experimentálne pripravené pomocou syntéze a spekania v elektrickom poli (SPS). V ďalšom kroku riešenia projektu budú tieto experimentálne materiály charakterizované.

5.) 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: 40416 €

Dosiahnuté výsledky:
Úspešne sa podarilo pripraviť vysokopevné spoje (Hf-Zr-Ti-Nb-Ti)C bez medzivrstvy, ako aj s medzivrstvou na báze HEA (Hf-Zr-Ti-Nb-Ti). Rovnako sa úspešne podarilo pripraviť a v plnej miere charakterizovať spoje (Mo-Nb-Ta-V-W)C metódou beztlakového spájania pomocou roztavených zliatin NiTa a AgCuTi. Hlavné aktivity v roku 2024 boli primárne zamerané na detailné štúdium fázového zloženia a mikroštruktúry reakčných zón, ako aj mechanických vlastností týchto spojov.

Výstupy:
KOMBAMUTHU, Vasanthakumar - ÜNSAL, Hakan - CHLUP, Zdeněk - TATARKOVÁ, Monika - KOVALČÍKOVÁ, Alexandra - ZHUKOVA, Inga - HOSSEINI, Naser - HIČÁK, Michal - DLOUHÝ, Ivo - TATARKO, Peter. Effect of SiC on densification, microstructure and mechanical properties of high entropy diboride (Ti0.2Zr0.2Hf0.2Nb0.2Ta0.2)B2. In Journal of the European Ceramic Society, 2024, vol. 44, no. 9, pp. 5358–5369. (2023: 5.8 - IF, Q1 - JCR, 1.198 - SJR, Q1 - SJR). ISSN 0955-2219: https://doi.org/10.1016/j.jeurceramsoc.2023.12.072 Typ: ADCA

HOSSEINI, Naser - VALENZA, Fabrizio - GAMBARO, Sofia - CHLUP, Zdeňek - KOVALČÍKOVÁ, Alexandra - DLOUHÝ, Ivo - TATARKO, Peter. Wettability, high-temperature interaction, and brazing of (Mo-Nb-Ta-V-W)C high entropy carbide by NiTa eutectic alloy. In 11th International Conference on High Temperature Capillarity – HTC 2024 : Book of Abstract. - Jönköping : Jönköping University – Department of Materials and Manufacturing, 2014, p. 43. ISBN 978-91-989295-0-8.

HOSSEINI, Naser - VALENZA, Fabrizio - CHLUP, Zdeněk - GAMBARO, Sofia - KOVALČÍKOVÁ, Alexandra - DLOUHÝ, Ivo - TATARKO, Peter. Wetting and Joining of High Entropy Carbides by NiTa Eutectic Alloy. In 4th International Symposium on Characterization – ISC 24: Abstract book. - Sakarya, Turkey, p. 171

TATARKO, Peter - HOSSEINI, Naser - CHLUP, Zdeněk - KOVALČÍKOVÁ, Alexandra - CASALEGNO, Valentina - VALENZA, Fabrizio - MALINVERNI, Carla - ZHOU, Xiaobing - DLOUHÝ, Ivo. Joining of monolithic SiC and ceramic matrix composites with refractory transition metal-based interlayer. In CMCEE 2024: 14th International conference on ceramic materials and components for energy and environmental systems. Budapest, 18.-22.8.2024. - Budapest : Akadémiai kiadó, 2024, p. 323. ISBN 978-963-664-060-6.

TATARKO, Peter - HOSSEINI, Naser - VALENZA, Fabrizio - ÜNSAL, Hakan - CHLUP, Zdeněk - KOVALČÍKOVÁ, Alexandra - DLOUHÝ, Ivo. Development and Integration of Entropy Stabilized Ceramics. In IMEC 2024: 2nd international conference on innovative materials in extreme conditions. Book of abstracts. Belgrade, 20.-22.3.2024. - Belgrade: University of Belgrade, 2024, p. 82. ISBN 978-86-7306-171-9

Programy: Horizont 2020

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

Zodpovedný riešiteľ:	Zoltán Lenčéš
Trvanie projektu:	1.1.2021 / 31.12.2024
Evidenčné číslo projektu:	963542
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Technische Universität Darmstadt
Počet spoluriešiteľských inštitúcií:	14 - Nemecko: 2, Francúzsko: 3, Veľká Británia: 3, Holandsko: 1, Nórsko: 2, Švédsko: 2, Ukrajina: 1
Čerpané financie:	SAV: 4094 €

Dosiahnuté výsledky:
Študoval sa vplyv vrstvičky ZnO pripravenej depozíciou atómovej vrstvy (ALD) na elektrochemické vlastnosti SiOC/C (hmotnostný pomer 20/80) anódy v sodíkovej batérii. Hrúbka ZnO vrstvy bola kontrolovaná počtom depozičných cyklov (10 - 40 cyklov). Elektrochemické testy ukázali, že špecifická kapacita nevzrástla tak výrazne, ako v prípade lítiovej batérie s Si-grafitovou anódou. Študovali sme aj tvorbu fáz v SEI (solid electrolyte interface). Klasickými XRD meraniami sa nepodarilo presne identifikovať vznikajúce kryštalické fázy. Na detailnejšiu analýzu bude nutné/vhodné použiť in operando SAXS/WAXS merania v spolupráci s Fyzikálnym ústavom SAV.
Publikácie:
GÜNEREN, Alper – SAHOO, Prangya P. – HUDEC, Boris – MIČUŠÍK, Matej – LENČÉŠ, Zoltán – FRÖLICH, Karol, Performance of graphite/atomic layer deposited ZnO composite anodes in Li-ion batteries. Book of abstracts, 4th Polish-Slovak-Chinese Seminar on Ceramics, September 28 – October 1, 2024, Krakow, Poland, Ed. Zbigniew Pedzich, Polish Ceramic Society, Krakow 2024, p. 16. ISBN 978-83-65955-78-4 Typ: AFG
GÜNEREN, Alper – SAHOO, Prangya P. – HUDEC, Boris – MIČUŠÍK, Matej – LENČÉŠ, Zoltán – FRÖLICH, Karol, Atomic layer deposition assisted graphite/ZnO composite anodes in Li-ion batteries. Book of abstracts, 2nd International Conference on Innovative Materials in Extreme Conditions, 20-22 March 2024, Belgrade, Serbia, p. 40. ISBN 978-86-7306-171-9 Typ: AFG

Programy: JRP

7.) 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: 25000 €

Dosiahnuté výsledky:
V druhom roku projektu sa činnosti venovali najmä zdokonaľovaniu a reprodukcii mezopórovitého bioaktívneho skla (MBG) na zirkoničitom substráte. Vďaka skúsenostiam získaným počas prvého roka a po analýze údajov, najmä tých, ktoré sa týkali fyzikálno-chemických a biologických vlastností nanočastíc MBG, ako aj vlastností disperzií MBG, bola vybraná špecifická disperzia MBG na dôkladné štúdium rôznych parametrov s cieľom nájsť optimálne podmienky prípravy.
Zoznam publikovaných výstupov:
1.Fatih Kurtuldu, Nurshen Mutlu, Ralf P. Friedrich, Ana M. Beltran, Liliana Liverani, Rainer Detsch, Christoph Alexiou, Dusan Galusek, Aldo R. Boccaccini, "Gallium-containing mesoporous nanoparticles influence in-vitro osteogenic and osteoclastic activity, Biomaterials Advances 162 (2024) 213922, https://doi.org/10.1016/j.bioadv.2024.213922
2.Nurshen Mutlu, Marcela Arango-Ospina, Rainer Detsch, Dusan Galusek, Aldo R. Boccaccini, Zinc and gallium doped borate bioactive glasses influence in-vitro angiogenesis: New evidence in cell co-culture studies, Materials Letters 377 (2024) 137529, https://doi.org/10.1016/j.matlet.2024.137529
3.Fulden Dogrul, Qaisar Nawaz, Hamada Elsayed, Liliana Liverani, Dusan Galusek, Enrico Bernardo, Aldo R. Boccaccini, Polymer-derived Biosilicate-C composite foams: In-vitro bioactivity, biocompatibility and antibacterial

activity, Journal of the European Ceramic Society 44 (2024) 6124–6134, https://doi.org/10.1016/j.jeurceramsoc.2024.03.006
4.G.A. Clavijo-Mejía, M. Michalek, L. Youssef, H. Kankova, D. Galusek, A.R. Boccaccini, Bioactivity of radiopaque 45S5 bioactive glass with progressive additions of Bi2O3: A dissolution study under static conditions, Ceramics International 50 (2024) 27216–27226, https://doi.org/10.1016/j.ceramint.2024.05.019

8.) 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:
Prvotná etapa projektu bola zameraná na prípravu keramických kompozitov s uhlíkovými vláknami (Cf/SiC a Cf/C) s rôznou pórovitosťou. Za účelom zlepšenia vysokoteplotných vlastností týchto materiálov, boli vzorky následne infiltrované vysokoteplotnou keramikou na báze ZrB2. Nakoľko pórovitosť prvej série vzoriek nebola dostatočná, infiltrácia nebola úspešná. Z tohto dôvodu sa požadované vysokoteplotné zloženie na vzorky nanášalo vo forme externého povlaku. Pomocou polymérnych rozpúšťadiel sa pripravila suspenzia tohto zloženia, ktorá bola nanesaná na povrch Cf/SiC and Cf/C. Po vysušení a tepelnom spracovaní sa študovalo chemické zloženie povrchovej vrstvy a mikroštruktúra. Zároveň sa uskutočnili aj prvotné skúšky vysokoteplotnej odolnosti týchot materiálov.

Výstupy:
CHEN, Lianghao - CUI, Pengzing - YANG, Guangyong - TATARKO, Peter - DAI, Jian-Qing - WANG, Canglong - ZHOU, Xiaobing**. Fabrication, microstructure, and properties of Dy-doped (Y1-xDyx)3Si2C2 ceramics fabricated by in situ reactive spark plasma sintering. In International Journal of Applied Ceramic Technology, 2024, vol. 21, no. 6, p. 3906-3917. (2023: 1.8 - IF, Q2 - JCR, 0.387 - SJR, Q3 - SJR). ISSN 1546-542X. Dostupné na: https://doi.org/10.1111/ijac.14818 Typ: ADCA

GALIZIA, Pietro** - UCCELLO, Andrea - GHEZZI, Francesco - LABATE, Luca - TIRIBILLI, Bruno - HANZEL, Ondrej - SALVADORI, Martina - BRANDI, Fernando - FAILLA, Simone - MELANDRI, Cesare - CREMONA, Anna - PEDRONI, Matteo - DE ANGELI, Marco - PERELLI CIPPO, Enrico - GIZZI, Leonida Antonio - TATARKO, Peter - SCITI, Diletta. Thermal properties of MB2-WC (M = Ti, Zr, Hf) and tungsten and their stability after deuterium plasma exposure. In Open Ceramics, 2024, vol. 20, art no. 100696. (2023: 2.9 - IF, Q1 - JCR, 0.534 - SJR, Q2 - SJR). ISSN 2666-5395. Dostupné na: https://doi.org/10.1016/j.oceram.2024.100696 Typ: ADMA

Programy: Mobility

9.) Technologicky nenáročná príprava hlinitanových skiel so zaujímavými optickými vlastnosťami *(The technologically undemanding of aluminate glasses with interesting optical properties)*

Zodpovedný riešiteľ:	Anna Prnová
Trvanie projektu:	1.1.2023 / 31.12.2024
Evidenčné číslo projektu:	Open-Mob-2022-06
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 3000 €

Dosiahnuté výsledky:
V rámci projektu boli pripravené hlinitanové sklá v systémoch: Al2O3-Yb2O3-Er2O3 a Al2O3-Y2O3-Yb2O3-Er2O3 so zaujímavými optickými vlastnosťami a emisiou čistého červeného svetla pri excitácii žiarením s vlnovou dĺžkou 980nm. Bola preskúmaná štruktúra a termické vlastnosti týchto skiel a vplyv zloženia na termické vlastnosti a optické vlastnosti. Najlepšie výsledky boli dosiahnuté pri systémoch identických s YbAG zložením, pričom veľkosť prídavku

Er2O3 sa pohybovala od 0.5 do 0.75 mol.%. V prípade systému Al2O3-Y2O3-Yb2O3-Er2O3 boli zaujímavé optické vlastnosti dosiahnuté už pri prídavku Er2O3 v množstve 0.1 a 0.25 mol.%.
Publikácie:
•MICHALÍK, J.** – PECUŠOVÁ, B. – MICHÁLKOVÁ, Monika – VALÚCHOVÁ, Jana – PARCHOVIANSKY, Milan – PRNOVÁ, Anna – KLEMENT, R. – GALUSEK, Dušan. Preparation and characterization of up-conversion materials with garnet structure in four-component system Al2O3-Y2O3-Yb2O3-Er2O3. In Fun Glass School 2024/1, Oponice, June 10–12, 2024 : Book of abstracts. – Trenčín, Slovakia : Centre for functional and surface functionalized glass, 2024, p. 23. ISBN 978-80-8295-021-5. (FunGlass School 2024/1 : vedecká konferencia) Typ: AFH
•MICHALÍK, Jakub – PECUŠOVÁ, Beáta – MICHÁLKOVÁ, Monika – VALÚCHOVÁ, Jana – PARCHOVIANSKY, Milan – PRNOVÁ, Anna – KLEMENT, Róbert – GALUSEK, Dušan. Preparation and characterisation of UC materials with garnet structure in Al2O3-Y2O3-Yb2O3-Er2O3 system. In 76. sjezd českých a slovenských chemických společností : Ročník 22 – Czech Chemical Society Symposium Series 22 (5). – Praha, Česká republika : Chemické listy, 2024, s. 135. ISSN 2336-7202. Dostupné na internete: http://www.ccsss.cz (76. sjezd českých a slovenských chemických společností) Typ: AFG
•PRNOVÁ, Anna** – AKUSEVICH, A. – PECUŠOVÁ, B. – VALÚCHOVÁ, Jana – KLEMENT, R. – GALUSEK, Dušan. Study of thermal behavior of aluminate glasses. In Fun Glass School 2024/1, Oponice, June 10–12, 2024 : Book of abstracts. – Trenčín, Slovakia : Centre for functional and surface functionalized glass, 2024, p. 9. ISBN 978-80-8295-021-5. (FunGlass School 2024/1 : vedecká konferencia) Typ: AFH

Domáce projekty

Programy: VEGA

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

Zodpovedný riešiteľ:	Dušan Galusek
Trvanie projektu:	1.1.2021 / 31.12.2024
Evidenčné číslo projektu:	VEGA 2/0028/21
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	1 - Slovensko: 1
Čerpané financie:	SAV: 12039 €

Dosiahnuté výsledky:
V projekte sa modifikovali povrchy hlinitokremičitanových skiel a sklokeramiky pomocou procesov iónovej výmeny s cieľom zlepšiť ich mechanické vlastnosti. Skúmalo sa využitie iónovej výmeny na získanie nových funckionalít, napríklad na vytvorenie vrstvy obohatenej striebrom na modelovom skle. Na štúdium kryštalizácie skiel sa vyvinuli alternatívne metódy založené na konštrukcii 'master' kriviek. Tie umožnili predpovedať rozsah kryštalizácie skiel počas tepelného spracovania. Vyvinuli sa tiež nové typy hlinitokremičitanovýcj skliel s obsahom10 mol % Na2O použiteľné pre iónovú výmenu. Sklokeramické vzorky pripravené z týchto skiel vykazovali po iónovej výmene výrazné zlepšenie mechanických vlastností. Fundamentálne istenia získané v tejto práci sa aplikovali v ďalších procesoch: spekanie keramiky, spekanie v kvapalnej fáze a zvýšenie odolnosti krehkých materiálov voči poškodeniu.
Výstupy:
A. Najafzadehkhoee, A. Talimian, V. Girman, R. Sedlák, P. Hvizdoš, K. Maca, D. Galusek, Liquid phase sintering of yttrium oxide: The effect of Al2O3 and SiO2 additives, Journal of European Ceramic Society, 44 (2024) 383–392, https://doi.org/10.1016/j.jeurceramsoc.2023.08.055
A. Talimian, R. Limbach, D. Galusek, L. Wondraczek, Hardness and scratch resistance of chemically strengthened alkali-borosilicate thin glass, Journal of American Ceramic Society, 2024;107:5212–5223, DOI: 10.1111/jace.19804

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

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

inštitúcií:
Čerpané financie: MŠ: 6104 €

Dosiahnuté výsledky:
Optimalizovaná bola príprava mikroguľôčok v systéme Y2O-Al2O3 dopovanom luminiscenčne aktívnymi iónmi Eu3+/2+. Detailne preštudované boli luminiscenčné vlastnosti v závislosti od koncentrácie aktivátora. Eu2+ -dopované systémy vykazujú pri excitácii NUV emisiu bieleho svetla, ktorú je možno ladiť vlnovou dĺžkou excitačného žiarenia s posunom do červenej spektrálnej oblasti. Pripravené systémy vykazovali nízke zhášanie luminiscencie s teplotou v teplotnom intervale 25-200°C. Žiarovým lisovaním a technikou SPS (Spark Plasma Sintering) boli pripravené kompozity dopované Eu2+/Eu3+ emitujúce biele a červené svetlo pri excitácii NUV iba s jedným typom aktivátora v matrici. Z pohľadu optickej termometrie sa sľubnými javia oxy-fluorifové sklá obsahujúce fluoridové nano-krytalické NaYF4 a LiYF4 fázy dopované Er3+/Yb3+ aktivátormi. Študovaný bol efekt prídavku Al2O3 na kryštalizáciu fluoridovej fázy v oxyfluoridových sklach rôzneho zloženia. Optimalizovaním procesu žiarového lisovania bola pripravená transparentná sklokeramika obsahujúca nano-kryštalické fluoridové fázy, čo skrátilo prípravu transparentnej oxyfluoridovej sklokeramiky z niekoľkých desiatok hodín na niekoľko minút. Syntetizované boli komplexné germaničitany dopované Bi3+ iónmi, ktoré vykazujú luminiscenciu v UV/modrej spektrálnej oblasti s pomerne vysokým kvantovým výťažkom, ako aj perzistentnú luminiscenciu a mechanoluminiscenciu, s potenciálnym využitím proti falšovaniu.

Výstupy:

M. Ghadamyari, R. Klement, H. Ebrahim Hosseini, G. Blugan, M. Michálková: Preparation and characterization of YAG microspheres doped with Eu2+/Eu3+ for broad band emission
Open Ceramics, 2024, 19, 100654.

N.M.P. Truong, M. Michálková, M. Sedano, M.J. Pascual, R. Klement: Pressure-assisted sintering approaches for up-converting LiYF4:Er/Yb transparent oxyfluoride glass-ceramics
Open Ceramics, 2024, 20, 100713.

R. Dagupati, M. Sedano, R. Klement, J.J. Velazquez, A. Duran, F. Munoz, M.J. Pascual, D. Galusek:The influence of Al2O3 concentration on the NaYF4 crystallization in oxyfluoride glass–ceramics, International Journal of Applied Glass Science, 2024, 15(1), pp. 44–56.

H.E. Hosseini, J. Cao, Y. Ding, M. Ghadamyari, D. Galusek, R. Klement, L. Wondraczek: Preparation and optical properties of Bi3+-doped K4SrGe3O9 as a UVA phosphor, Optical Materials Express, 2024, 14(10), pp. 2384–2399.

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

Zodpovedný riešiteľ: Ondrej Hanzel
Trvanie projektu: 1.1.2021 / 31.12.2024
Evidenčné číslo projektu: 2/0007/21
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: SAV: 9907 €

Dosiahnuté výsledky:
V tejto fáze projektu sme sa rozhodli pripraviť jednoduchšie vrstevnaté materiály zložené iba z dvoch vrstiev a to: SiC vrstvy s in-situ grafénom a SiC vrstvy s relatívne nízkym obsahom uhlíkových nanoštruktúr (GNPs, CNTs) do 3 hm. %. Boli pripravené granulované prášky s prídavkom 1, 2 a 3 hm.% GNPs a CNTs, ktoré boli stabilizované pomocou SDS (dodecyl síranom sodným) a boli použité aj malé množstvá organických aditív (do 1 hm.%), ktoré umožňujú vytvorenie stabilného granulovaného prášku po vymrazení. Takto pripravené granulované prášky boli žíhané na vzduchu pri teplote 300°C po dobu 3 h a následne spekané v SPS pri teplote 1900°C s dobou výdrže od 5 minút po 80 minút a tlaku 70 MPa vo vákuu. Týmto postupom sa podarilo pripraviť hutné samostatné kompozitné materiály SiC-GNPs a SiC-CNTs ako aj vrstevnaté materiály, ktoré sa skladali z jednej vrstvy SiC a druhá vrstva bola tvorená SiC materiálom s prídavkom 1, 2 alebo 3 hm.% GNPs alebo CNTs. Keďže obsahy CNTs a GNPs boli relatívne nízke, podarilo sa výrazne zvýšiť elektrickú vodivosť až po prekročení určitého perkolačného prahu, čo bolo dosiahnuté pri obsahu 3 % CNTs a GNPs kde sa podarilo zvýšiť elektrickú vodivosť na úroveň 480 S/m pre kompozitné vrstevnaté materiály s CNTs a 720 S/m pre kompozitné

vrstevnaté materiály s GNPs. V prípade vrstevnatých materiálov a referenčného SiC materiálu, platí že všetky pripravené vrstevnaté materiály boli hutné a mali relatívnu hustotu vyššiu ako 96,5 %. Celková efektivita elektromagnetického tienenia sa výrazne zvýšila pri SiC materiáli s prídavkom 3 hm. % CNT na úroveň 75,19 dB a pri materiáli s prídavkom 3 hm. % GNPs až na úroveň 85,51 dB čo znamená, že v oboch prípadoch bolo tienených viac ako 99,9999 % elektromagnetických vĺn.

Publikácie:
HANZEL, Ondrej** - TATARKOVÁ, Monika - NETRIOVÁ, Zuzana - ŠAJGALÍK, Pavol. Additive-free SiC ceramics with high thermal conductivity. In 4th Polish-Slovak-Chinese seminar on ceramics : Book of abstracts. Zakopane, 28.9.-1.10.2024. - B.V., 2024, p. 20. ISBN 978-83-65955-78-4. (Polish-Slovak-Chinese seminar on ceramics) Typ: AFG

BHANDARI, Subhadip - HANZEL, Ondrej - VETEŠKA, P. - JANEK, Marián - DE BONA, Emanuele - SGLAVO, Vincenzo M. - BIESUZ, Mattia** - FRANCHIN, Giorgia**. From rapid prototyping to rapid firing: on the feasibility of high-speed production for complex BaTiO3 components. In Journal of the American Ceramic Society, 2024, vol. 107, no. 10, p. 6562-6573. (2023: 3.5 - IF, Q1 - JCR, 0.819 - SJR, Q1 - SJR). ISSN 0002-7820. Dostupné na: https://doi.org/10.1111/jace.19950 Typ: ADCA

MATOVIĆ, B.** - TATARKO, Peter - MAKSIMOVIĆ, V. - MALETAŠKIĆ, J. - STOILJKOVIĆ, M. - HANZEL, Ondrej - CVIJOVIC-ALAGIC, I. Densification of additive-free B4C-SiC composites by spark plasma sintering. In Journal of the European Ceramic Society, 2024, vol. 44, no. 9., p. 5340-5346. (2023: 5.8 - IF, Q1 - JCR, 1.198 - SJR, Q1 - SJR). ISSN 0955-2219. Dostupné na: https://doi.org/10.1016/j.jeurceramsoc.2023.12.024 Typ: ADCA

HANZEL, Ondrej* - TATARKOVÁ, Monika - ŠAJGALÍK, Pavol. Functional properties of additive-free silicon carbide ceramics. In CMCEE 2024 : 14th International conference on ceramic materials and components for energy and environmental systems. Budapest, 18.-22.8.2024. - Budapest : Akadémiai kiadó, 2024, p. 451. ISBN 978-963-664-060-6. (CMCEE 2024 : International conference on ceramic materials and components for energy and environmental systems) Typ: AFG

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: 21365 €

Dosiahnuté výsledky:
V rámci štúdia interakcií roztavených fluoridov s materiálmi na báze kritických prvkov, bola realizovaná komplexná analýza rozpustnosti vybraných oxidov kovov vzácnych zemín (RE2O3) v príslušných fluoridových zmesiach (LiF-NaF-REF3). Pre porovnanie vplyvu prídavku fluoridu príslušného kovu vzácnych zemín, boli získané výsledky porovnávané s rozpustnosťou týchto oxidov v roztavenej eutektickej zmesi (LiF-NaF). Rozpustnosť RE2O3 v (LiF-NaF)eut bola minimálna na rozdiel od rozpustnosti RE2O3 v tavenine (LiF-NaF-REF3). Bolo pozorované výrazné zvýšenie rozpustnosti oxidov v daných zmesiach a potvrdil sa pozitívny vplyv prídavku REF3 do roztavenej zmesi LiF-NaF na rozpustnosť príslušného oxidu RE2O3.

KUBÍKOVÁ, Blanka - ŠIMKO, František - KORENKO, Michal - MLYNÁRIKOVÁ, Jarmila - VASKOVÁ, Zuzana - BOČA, Miroslav. Study of oxides solubility in fluoride molten salts. In 21st IUPAC International Symposium on Solubility Phenomena and Related Equilibrium Processes (ISSP21) : Book of Abstracts. - Novi Sad : University of Novi Sad, Faculty of Sciences, Novi Sad, Serbia, 2024, p.12. ISBN 978-86-7031-667-6. (21st IUPAC International Symposium on Solubility Phenomena and Related Equilibrium Processes (ISSP21) : medzinárodná konferencia).

KUBÍKOVÁ, Blanka - VASKOVÁ, Zuzana - MLYNÁRIKOVÁ, Jarmila - BOČA, Miroslav. Solubility investigation of selected RE2O3 in (LiF-NaF)eut vs (LiF-NaF-REF3) molten systems. In 29th EUCHEMS Conference on Molten Salts and Ionic Liquids : Book of Abstracts, p.73. (Euchemsil 2024).

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

batteries)

Zodpovedný riešiteľ:	Zoltán Lenčéš
Trvanie projektu:	1.12.2022 / 31.12.2024
Evidenčné číslo projektu:	2/0167/22
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 8876 €

Dosiahnuté výsledky:
Boli pripravené Si/C anódy v hmotnostnom pomere 20%/80%, kde bol elektricky vodivý uhlík pridaný vo forme grafénu. Nepodarilo sa dosiahnuť výraznejšieho zlepšenia elektrochemických vlastností anódy v dôsledku kolmej orientácie grafénových vrstvičiek k toku Na iónov, nakoľko anódy boli pripravené metódou tape casting, kde majú predĺžené grafénové častice tendenciu smerovej orientácie paralelne so smerom odlievania pásky.
Systematicky sme študovali aj vplyv vrstvičky ZnO pripravenej depozíciou atómovej vrstvy (ALD) na elektrochemické vlastnosti C/Si anódy. Hrúbku ZnO vrstvy sme kontrolovali počtom depozičných cyklov (od 10 do 50 cyklov). Elektrochemické testy ukázali, že najvyššiu kapacitu mali anódy so ZnO vrstvou pripravenej 20 ALD cyklami. Na porovnanie boli pripravené aj anódy s prídavkom ZnO nanoprášku a mikroprášku, ale špecifická kapacita bola nižšia v porovnaní s anódou pokrytou ALD ZnO vrstvičkou.
Prídavkom 10 hm.% fluoroetylén karbonátu (FEC) sa podarilo štvornásobne zvýšiť špecifickú kapacitu anódy pri vysokých rýchlostiach nabíjania (C-rate 4) a stabilnú hodnotu kapacity aj po 600 cykloch nabíjania/vybíjania pri rýchlosti nabíjania C-rate 1.
Publikácie:
•GÜNEREN, Alper** - MIČUŠÍK, Matej - PRECNEROVÁ, Magdaléna - LENČÉŠ, Zoltán. Insight into the slope-plateau capacity behaviour of polymer-derived silicon oxycarbide anodes in Na-ion batteries. In Journal of the European Ceramic Society, 2024, vol. 44, no. 9, pp. 5460 - 5470. (2023: 5.8 - IF, Q1 - JCR, 1.198 - SJR, Q1 - SJR). ISSN 0955-2219. Dostupné na: https://doi.org/10.1016/j.jeurceramsoc.2024.01.053 Typ: ADCA
•GÜNEREN, Alper - NADA, Ahmed A. - OPÁLKOVÁ ŠIŠKOVÁ, Alena - MOSNÁČKOVÁ, Katarína - KLEINOVÁ, Angela - MOSNÁČEK, Jaroslav - LENČÉŠ, Zoltán. Novel alginate-based binders for silicon-graphite anodes in lithium-ion batteries: effect of binder chemistry on the electrochemical performance. In Journal of Applied Electrochemistry, 2024, vol. 54, no. 6, p. 1409-1423. (2023: 2.4 - IF, Q3 - JCR, 0.491 - SJR, Q2 - SJR). ISSN 0021-891X. Dostupné na: https://doi.org/10.1007/s10800-023-02038-z Typ: ADCA
•SAHOO, Prangya Parimita** - GU?NEREN, Alper - HUDEC, Boris - MIKOLÁŠEK, M. - NADA, Ahmed A. - PRECNEROVÁ, Magdaléna - MIČUŠÍK, Matej - LENČÉŠ, Zoltán - NÁDAŽDY, Peter - FRÖHLICH, Karol. Stabilization of the solid-electrolyte-interphase layer and improvement of the performance of silicon?graphite anodes by nanometer-thick atomic-layer-deposited ZnO films. In ACS Applied Nano Materials, 2024, vol. 7, p. 18486–18498. (2023: 5.3 - IF, Q2 - JCR, 1.134 - SJR, Q1 - SJR). ISSN 2574-0970. Dostupné na: https://doi.org/10.1021/acsanm.3c05066 Typ: ADCA
•GÜNEREN, Alper** - LENČÉŠ, Zoltán*. Statistical approach for the preparation of silicon-graphite anodes: The role of oxygen content and crystallite size on electrochemical performance. In Powder Technology, 2024, vol. 443, art. no. 119982. (2023: 4.5 - IF, Q2 - JCR, 0.97 - SJR, Q1 - SJR). ISSN 0032-5910. Dostupné na internete: https://doi.org/10.1016/j.powtec.2024.119982 Typ: ADCA

6.) Pokrok vo výpočte a interpretácii spektroskopických parametrov zlúčenín ťažkých prvkov *(Advancing in calculation and interpretation of spectroscopic parameters of heavy element compounds)*

Zodpovedný riešiteľ:	Oľga Malkin
Trvanie projektu:	1.1.2021 / 31.12.2024
Evidenčné číslo projektu:	2/0135/21
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 12819 €

Dosiahnuté výsledky:
MALKINA, Oľga L – BUEHL, M. – CHALMERS, B. A. – KOMOROVSKÝ, Stanislav, Ivestigation of the solvent effect on 1J(Metal-P) spin-spin coupling, Phys. Chem. Chem. Phys., 2025, DOI: 10.1039/D4CP04594G.

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

Zodpovedný riešiteľ:	Monika Michálková
Trvanie projektu:	1.1.2024 / 31.12.2027
Evidenčné číslo projektu:	VEGA 2/0077/24
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 4269 €

Dosiahnuté výsledky:
MICHÁLKOVÁ, Monika** - GHADAMYARI, Marzieh - PARCHOVIANSKY, Milan - KLEMENT, Robert - KRAXNER, Jozef - GALUSEK, Dušan. Viscous flow sintering of translucent PiG with luminescent YAG:Eu3+/2+ microspheres. In Fun Glass School 2024/1, Oponice, June 10–12, 2024 : Book of abstracts. - Trenčín, Slovakia : Centre for functional and surface functionalized glass, 2024, p. 6. ISBN 978-80-8295-021-5. (FunGlass School 2024/1 : vedecká konferencia) Typ: AFH

GHADAMYARI, Marzieh - KLEMENT, Róbert - HOSSEINI, Hossein Ebrahim - PARCHOVIANSKÝ, Milan - KRAXNER, Jozef - GALUSEK, Dušan - NARAYANASAMY, Sathya - HACK, Erwin - BLUGAN, Gurdial - MICHÁLKOVÁ, Monika. Preparation and characterization of YAG microspheres doped with Eu2+/Eu3+ for broad band emission. In Open Ceramics, vol. 19, 2024, art no. 100654. ISSN 2666-5395. Dostupné na: https://doi.org/10.1016/j.oceram.2024.100654 Typ: ADMA

GHADAMYARI, Marzieh** - KLEMENT, Róbert - HOSSEINI, Hossein Ebrahim - GALUSEK, Dušan - MICHÁLKOVÁ, Monika. Synthesis and characterization of novel germanate phosphor. In Fun Glass School 2024/1, Oponice, June 10–12, 2024 : Book of abstracts. - Trenčín, Slovakia : Centre for functional and surface functionalized glass, 2024, p. 22. ISBN 978-80-8295-021-5. (FunGlass School 2024/1 : vedecká konferencia) Typ: AFH

8.) Potenciál vrstevnatých aluminosilikátov ako excelentných nosičov polykatiónov: dizajnovanie nových kompozitných nanomateriálov *(Potential of layered aluminosilicates as excellent guests to accommodate polymeric cations: design of new composite materials)*

Zodpovedný riešiteľ:	Helena Pálková
Trvanie projektu:	1.1.2021 / 31.12.2024
Evidenčné číslo projektu:	2/0166/21
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 22006 €

Dosiahnuté výsledky:
[1].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. (2023: 5.1 - IF, Q1 - JCR, 1.401 - SJR, Q1 - SJR). https://doi.org/10.1021/acs.macromol.4c00291 Typ: ADMA
[2].BASHIR, Sanam** - TUNEGA, Daniel - SCHOLTZOVÁ, Eva. Mechanical properties of pristine smectite clay minerals and clay-polymer hybrids studied by density functional theory. In Clays and Clay Minerals, 2024, vol. 72, no. e28, p. 1-9. (2023: 2 - IF, Q2 - JCR, 0.367 - SJR, Q2 - SJR). https://doi.org/10.1017/cmn.2024.31 Typ: ADCA
[3].Slaný, Michal** - JANKOVIČ, Ľuboš - MATEJDES, Marián - Žemlička, Matúš - MADEJOVÁ, Jana Novel poly(2-ethyl-2-oxazoline) and poly(diallyldimethylammonium chloride) polymer functionalized montmorillonite: Physicochemical aspects and near-IR study of hydration properties. Journal of molecular structure, 2025, vol. 1321, part 2, 139855. https://doi.org/10.1016/j.molstruc.2024.139855
[4].MADEJOVÁ, Jana** - PÁLKOVÁ, Helena. Review of the application of infrared spectroscopy in studies of acid-treated clay minerals. In Clays and Clay Minerals, 2024, vol. 72, art no. e30. (2023: 2 - IF, Q2 - JCR, 0.367 - SJR, Q2 - SJR). https://doi.org/10.1017/cmn.2024.24 Typ: ADCA

9.) 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:	SAV: 11394 €

Dosiahnuté výsledky:

•Štúdium mechanických vlastností dioktaédrických a trioktaédrických ílových minerálov ukázalo výhodnejšie mechanické vlastnosti študovaných trioktaédrických než dioktaédrických ílových minerálov a následne aj ich modifikovaných štruktúr polymérom (PMeOx)

BASHIR, Sanam** - TUNEGA, Daniel - SCHOLTZOVÁ, Eva. Mechanical properties of pristine smectite clay minerals and clay-polymer hybrids studied by density functional theory. In Clays and Clay Minerals, 2024, vol. 72, no. e28, p. 1-9. (2023: 2 - IF, Q2 - JCR, 0.367 - SJR, Q2 - SJR). ISSN 0009-8604. Dostupné na internete: https://doi.org/10.1017/cmn.2024.31 Typ: ADCA

•Spolupráca s poľskými kolegami študovala adsorpčné vlastnosti montmorillonitu a beidellitu pre styrén experimentálnym a modelovým prístupom

MATUSIK, Jakub** - SCHOLTZOVÁ, Eva - LIS, Kinga - MARZEC, Mateusz. Induced ?–complexation properties of smectites impregnated by Ni, Cu and Ag transition metals: The highly efficient styrene uptake. In Applied Surface Science, 2024, vol. 675, art no. 160999. (2023: 6.3 - IF, Q1 - JCR, 1.21 - SJR, Q1 - SJR). ISSN 0169-4332. Dostupné na: https://doi.org/10.1016/j.apsusc.2024.160999 Typ: ADCA

•Porovnávacia štúdia ukázala efektivitu adsorpcie dvoch rôznych modifikovaných montmorilonitov polymérom a tetrahexyl fosfóniovým katiónom pre oxyanión selénového typu.

ŠKORŇA, Peter** - BASHIR, Sanam - SCHOLTZOVÁ, Eva - TUNEGA, Daniel. Model study on potential removal of toxic Se(VI) by organically modified montmorillonite. In Computational and Theoretical Chemistry, 2024, vol. 1242, art no. 114939. (2023: 3 - IF, Q3 - JCR, 0.405 - SJR, Q2 - SJR). ISSN 2210-271X. Dostupné na: https://doi.org/10.1016/j.comptc.2024.114939 Typ: ADCA

•Vyvinutá pokročilá teplotná programovateľná desorpčná technika do 2100°C japonskými kolegami bola validovaná teoretickými výpočtovými metódami na nami navrhnutých modeloch štruktúr dopovaných grafénových štruktúr dusíkom.

YOSHII, Takeharu** - NISHIKAWA, Ginga - PRASAD, Viki Kumar - SHIMIZU, Shunsuke - KAWAGUCHI, Ryo - TANG, Rui - CHIDA, Koki - SATO, Nobuhiro - SAKAMOTO, Ryota - TAKATANI, Kouhei - MORENO, Daniel - ŠKORŇA, Peter - SCHOLTZOVÁ, Eva - SZILAGYI, Robert** - NISHIHARA, Hirotomo**. Quantitative and qualitative analysis of nitrogen species in carbon at the ppm level. In Chem, 2024, vol. 10, no. 8, p. 2450-2463. (2023: 19.1 - IF, Q1 - JCR, 6.556 - SJR, Q1 - SJR). ISSN 2451-9294. Dostupné na: https://doi.org/10.1016/j.chempr.2024.03.029 Typ: ADCA

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

Zodpovedný riešiteľ:	František Šimko
Trvanie projektu:	1.1.2022 / 31.12.2025
Evidenčné číslo projektu:	2/0046/22
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 16379 €

Dosiahnuté výsledky:
KORENKO, Michal** - ŠIMKO, František** - ALLIX, Mathieu - RAKHMATULLIN, Aydar - PITCHER, Michael J. - KING, Graham. Determination of the Na3AlF6–Y2O3 Phase Diagram and Its Implications for Low-Temperature YAG/Nd:YAG Synthesis. In Crystal Growth & Design, 2024, vol. 24, no. 18, pp. 7494–7503. (2023: 3.2 - IF, Q1 - JCR, 0.649 - SJR, Q2 - SJR). ISSN 1528-7483. Dostupné na: https://doi.org/10.1021/acs.cgd.4c00684 Typ: ADCA

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

Zodpovedný riešiteľ:	Monika Tatarková
Trvanie projektu:	1.1.2022 / 31.12.2024
Evidenčné číslo projektu:	2/0161/22
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 13834 €

Dosiahnuté výsledky:
Hlavné aktivity boli zamerané na štúdium lokálnych mechanických vlastností (prevažne tvrdosti) funkčne gradientných (FG) Si3N4 materiálov s prísadami CaSiO3 a Y2O3. Koncentračný gradient u týchto materiálov bol pripravený dvomi spôsobmi: priamym vplyvom elektrického prúdu a tvorbou vrstevnatých kompozitov so zložením Si3N4+Y2O3, Si3N4+CaSiO3 a Si3N4+CaSiO3+Y2O3. V oboch prípadoch bolo jednoznačne preukázané, že v priečnom reze materiálov sa koncentrácia CaSiO3 plynule zvyšuje, zatiaľ čo koncentrácia Y2O3 klesá. Tým sa vytvoril tzv. bioaktívny povrch zložený z Si3N4 a biaktívnej prísady CaSiO3, zatiaľ čo zvýšená koncentrácia Y2O3 v iných častiach materiálu zabezpečila jeho dobré mechanické vlastnosti. Vo finálnom kroku boli systematicky študované rôzne parametre kyslíkovo-acetylénového plameňa na optimálnu tvorbu pórovitej bioaktívnej vrstvy. Za účelom zlepšenia homogenity a veľkosti pórov, boli do bioaktívnej vrstvy pridávané rôzne obsahy pórotvorného činidla vo forme grafitu. Za hlavný výstup projektu možno považovať stanovenie optimálneho chemického zloženia FG Si3N4 materiálu, ako aj parametrov tepelného opracovania plameňom, ktoré viedli k najlepším bioaktívnym vlastnostiam týchto materiálov.

Programy: APVV

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

Zodpovedný riešiteľ:	Miroslav Boča
Trvanie projektu:	1.7.2020 / 30.6.2024
Evidenčné číslo projektu:	APVV-19-0270
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 20000 €

Dosiahnuté výsledky:
Bola uskutočnená komplexná analýza objemových vlastností roztavených fluoridových systémov na báze zirkónia MF-K2ZrF6 (M = Li, Na a K) na základe experimentálneho merania hustoty pomocou Archimedovej metódy. Parciálne molárne objemy K2ZrF6 boli vypočítané použitím dvoch rôznych prístupov - jednoduchej polynomickej regresnej analýzy a viaczložkovej polynomickej regresnej analýzy vo forme Redlichovej-Kisterovej rovnice. Dodatkový molárny objem nadobúda zápornú hodnotu v celom koncentračnom rozsahu pre všetky tri skúmané systémy. Avšak dodatkový parciálny molárny objem K2ZrF6 v KF vykazuje menšiu celkovú objemovú kontrakciu, ktorá dosahuje 60 % objemovej kontrakcie K2ZrF6 v LiF alebo NaF. Navyše získané údaje o hustote, molárnych a parciálnych molárnych objemov boli po prepočte na sústavy MF-ZrF4 porovnané s dostupnými literárnymi údajmi. Parciálny molárny objem ZrF4 v MF-ZrF4 (M = Li, Na a K) systémoch je tiež výrazne odlišný v systéme KF na rozdiel od LiF a NaF. Tieto údaje umožňujú jednoduchý a rýchly prístup k hustote a objemovým vlastnostiam potrebným pre praktické aplikácie skúmaných systémov.

MLYNÁRIKOVÁ, Jarmila - BOČA, Miroslav. Density and volume properties of MF-K2ZrF6 (M = Li, Na, and K). In

Journal of Molecular Liquids, 2024, vol. 395, art no. 123880. (2023: 5.3 - IF, Q1 - JCR, 0.918 - SJR, Q1 - SJR). ISSN 0167-7322. Dostupné na: https://doi.org/10.1016/j.molliq.2023.123880

MLYNÁRIKOVÁ, Jarmila - BOČA, Miroslav. Critical evaluation of volume properties of the zirconium-based fluorides melts MF-K2ZrF6 (M = Li, Na, and K). In 21st IUPAC International Symposium on Solubility Phenomena and Related Equilibrium Processes (ISSP21) : Book of Abstracts. - Novi Sad : University of Novi Sad, Faculty of Sciences, Novi Sad, Serbia, 2024, p.49. ISBN 978-86-7031-667-6. (21st IUPAC International Symposium on Solubility Phenomena and Related Equilibrium Processes (ISSP21) : medzinárodná konferencia).

MLYNÁRIKOVÁ, Jarmila - BOČA, Miroslav. Critical evaluation of volume properties of the zirconium based fluorides melts MF?K2ZrF6 (M = Li, Na, and K). In 29th EUCHEMS Conference on Molten Salts and Ionic Liquids : Book of Abstracts, p.128. (Euchemsil 2024).

13.) 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 / 30.6.2026
Evidenčné číslo projektu:	APVV-22-0150
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Prírodovedecká fakulta UK
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 27000 €

Dosiahnuté výsledky:
MATEJDES, Marián** - ŠKORŇA, Peter - SLANÝ, Michal - KLEMENT, Róbert - BUJDÁK, Juraj - KAWAMATA, Jun - BREU, Josef. Excimer formation in a 2D confined space. In Materials Today Chemistry, 2024, vol. 42, art no. 102436. (2023: 6.7 - IF, Q1 - JCR, 1.239 - SJR, Q1 - SJR). ISSN 2468-5194. Dostupné na: https://doi.org/10.1016/j.mtchem.2024.102436 Typ: ADCA
BASHIR, Sanam - TUNEGA, Daniel - SCHOLTZOVÁ, Eva. Mechanical properties of pristine smectite clay minerals and clay-polymer hybrids studied by density functional theory. In Clays and Clay Minerals, 2024, vol. 72, no. e28, p. 1-9. (2023: 2 - IF, Q2 - JCR, 0.367 - SJR, Q2 - SJR). ISSN 0009-8604. Dostupné na internete: https://doi.org/10.1017/cmn.2024.31 Typ: ADCA
ŠKORŇA, Peter - BASHIR, Sanam - SCHOLTZOVÁ, Eva - TUNEGA, Daniel. Model study on potential removal of toxic Se(VI) by organically modified montmorillonite. In Computational and Theoretical Chemistry, 2024, vol. 1242, art no. 114939. (2023: 3 - IF, Q3 - JCR, 0.405 - SJR, Q2 - SJR). ISSN 2210-271X. Dostupné na: https://doi.org/10.1016/j.comptc.2024.114939 Typ: ADCA

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

Zodpovedný riešiteľ:	Karol Fröhlich
Zodpovedný riešiteľ v organizácii SAV:	Zoltán Lenčéš
Trvanie projektu:	1.7.2020 / 30.6.2024
Evidenčné číslo projektu:	APPV-19-0461
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Centrum pre využitie pokročilých materiálov SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	3 - Slovensko: 3
Čerpané financie:	APVV: 2687 €

Dosiahnuté výsledky:
Boli pripravené Si/C anódy v hmotnostnom pomere 20%/80%, kde bol elektricky vodivý uhlík pridaný vo forme grafénu. Nepodarilo sa dosiahnuť výraznejšieho zlepšenia elektrochemických vlastností anódy v dôsledku kolmej orientácie grafénových vrstvičiek k toku Na iónov, nakoľko anódy boli pripravené metódou tape casting, kde majú predĺžené grafénové častice tendenciu smerovej orientácie paralelne so smerom odlievania pásky.

Systematicky sme študovali aj vplyv vrstvičky ZnO pripravenej depozíciou atómovej vrstvy (ALD) na elektrochemické vlastnosti C/Si anódy. Hrúbku ZnO vrstvy sme kontrolovali počtom depozičných cyklov (od 10 do 50 cyklov). Elektrochemické testy ukázali, že najvyššiu kapacitu mali anódy so ZnO vrstvou pripravenej 20 ALD cyklami. Na porovnanie boli pripravené aj anódy s prídavkom ZnO nanoprášku a mikroprášku, ale špecifická kapacita bola nižšia v porovnaní s anódou pokrytou ALD ZnO vrstvičkou.
Prídavkom 10 hm.% fluoroetylén karbonátu (FEC) sa podarilo štvornásobne zvýšiť špecifickú kapacitu anódy pri vysokých rýchlostiach nabíjania (C-rate 4) a stabilnú hodnotu kapacity aj po 600 cykloch nabíjania/vybíjania pri rýchlosti nabíjania C-rate 1.
Publikácie:
•GÜNEREN, Alper** - MIČUŠÍK, Matej - PRECNEROVÁ, Magdaléna - LENČÉŠ, Zoltán. Insight into the slope-plateau capacity behaviour of polymer-derived silicon oxycarbide anodes in Na-ion batteries. In Journal of the European Ceramic Society, 2024, vol. 44, no. 9, pp. 5460 - 5470. (2023: 5.8 - IF, Q1 - JCR, 1.198 - SJR, Q1 - SJR). ISSN 0955-2219. Dostupné na: https://doi.org/10.1016/j.jeurceramsoc.2024.01.053 Typ: ADCA
•GÜNEREN, Alper - NADA, Ahmed A. - OPÁLKOVÁ ŠIŠKOVÁ, Alena - MOSNÁČKOVÁ, Katarína - KLEINOVÁ, Angela - MOSNÁČEK, Jaroslav - LENČÉŠ, Zoltán. Novel alginate-based binders for silicon-graphite anodes in lithium-ion batteries: effect of binder chemistry on the electrochemical performance. In Journal of Applied Electrochemistry, 2024, vol. 54, no. 6, p. 1409-1423. (2023: 2.4 - IF, Q3 - JCR, 0.491 - SJR, Q2 - SJR). ISSN 0021-891X. Dostupné na: https://doi.org/10.1007/s10800-023-02038-z Typ: ADCA
•SAHOO, Prangya Parimita** - GU?NEREN, Alper - HUDEC, Boris - MIKOLÁŠEK, M. - NADA, Ahmed A. - PRECNEROVÁ, Magdaléna - MIČUŠÍK, Matej - LENČÉŠ, Zoltán - NÁDAŽDY, Peter - FRÖHLICH, Karol. Stabilization of the solid-electrolyte-interphase layer and improvement of the performance of silicon?graphite anodes by nanometer-thick atomic-layer-deposited ZnO films. In ACS Applied Nano Materials, 2024, vol. 7, p. 18486–18498. (2023: 5.3 - IF, Q2 - JCR, 1.134 - SJR, Q1 - SJR). ISSN 2574-0970. Dostupné na: https://doi.org/10.1021/acsanm.3c05066 Typ: ADCA
•GÜNEREN, Alper** - LENČÉŠ, Zoltán*. Statistical approach for the preparation of silicon-graphite anodes: The role of oxygen content and crystallite size on electrochemical performance. In Powder Technology, 2024, vol. 443, art. no. 119982. (2023: 4.5 - IF, Q2 - JCR, 0.97 - SJR, Q1 - SJR). ISSN 0032-5910. Dostupné na internete: https://doi.org/10.1016/j.powtec.2024.119982 Typ: ADCA

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

Zodpovedný riešiteľ:	Miroslav Hnatko
Trvanie projektu:	1.8.2021 / 30.6.2025
Evidenčné číslo projektu:	APVV-20-0322
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	1 - Slovensko: 1
Čerpané financie:	APVV: 32500 €

Dosiahnuté výsledky:
1. A. Kityk, M. Hnatko, V. Pavlik, M. Balog, J. Šoltys, M. Labudova. Advancing biomedical substrate engineering: An eco-friendly route for synthesizing micro- and nanotextures on 3D printed Ti-6Al-4V. Journal of Materials Research and Technology 28 (2024) 2098-2115. https://doi.org/10.1016/j.jmrt.2023.12.164.

2. A. Kityk, V. Pavlik, M. Hnatko. Reshaping the future of battery waste: Deep eutectic solvents in Li-ion battery recycling. Journal of Energy Storage 97, Part B (2024) 112990. https://doi.org/10.1016/j.est.2024.112990.

3. A. Kityk, V. Pavlik, M. Hnatko. Breaking barriers in electrodeposition: Novel eco-friendly approach based on utilization of deep eutectic solvents. Advances in Colloid and Interface Science 334 (2024) 103310. https://doi.org/10.1016/j.cis.2024.103310.

4. M. Hnatko, V. Pavlik, A. Kityk. Photocatalytic and Biomedical TiO? Nanostructures via Green Electrochemical Processing in Deep Eutectic Solvents. Conference abstract. - PROCESSING AND PROPERTIES OF ADVANCED CERAMICS AND GLASS. 16-18 October, 2024. Vršatské Podhradie. – P. 30.

5. Kityk, M. Hnatko, V. Pavlik, M. Hičák. Sustainable Solutions in Biomedical Substrate Design: Micro- and Nanotexturing on 3D Printed Titanium Alloys. Conference abstract. -2nd International Conference on Innovative Materials in Extreme Conditions 20-22 March 2024, Belgrade, Serbia. – P. 54.

6. M. Hnatko, A. Kityk. Eco-Friendly Micro- and Nanotexturing of 3D Printed Titanium Alloys for Enhanced Biomedical Applications. Conference abstract. - 4th POLISH-SLOVAK-CHINESE SEMINAR ON CERAMICS. September 28th – October 1st 2024. Kraków, Poland. – P. 17-18.

7. Kityk, M. Hnatko. Method for electrochemical surface treatment of biomedical products made of titanium or Ti-based alloys. European Patent EP 4332278. Unitary effect has been registered in the Register for Unitary Patent Protection. 28.08.2024. European patent office.

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

Zodpovedný riešiteľ:	Pavol Hvizdoš
Zodpovedný riešiteľ v organizácii SAV:	Pavol Šajgalík
Trvanie projektu:	1.7.2020 / 30.6.2024
Evidenčné číslo projektu:	APPV-19-0497
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Ústav materiálového výskumu SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 9700 €

Dosiahnuté výsledky:
NAUGHTON-DUSZOVÁ, Annamária** - MEDVEĎ, Dávid - ĎAKOVÁ, Lenka - KOVALČÍKOVÁ, Alexandra - ŠVEC, Peter Jr. - TATARKO, Peter - ÜNSAL, Hakan - HVIZDOŠ, Pavol - ŠAJGALÍK, Pavol - DUSZA, Ján. Dual-phase high-entropy carbide/boride ceramics with excellent tribological properties. In Journal of the European Ceramic Society, 2024, vol. 44, p. 5391-5400. (2023: 5.8 - IF, Q1 - JCR, 1.198 - SJR, Q1 - SJR). ISSN 0955-2219. Dostupné na: https://doi.org/10.1016/j.jeurceramsoc.2023.12.081 Typ: ADCA

NAUGHTON-DUSZOVÁ, Annamária** - MEDVEĎ, Dávid - ĎAKOVÁ, Lenka - KOVALČÍKOVÁ, Alexandra - ŠVEC, Peter Jr. - TATARKO, Peter - ÜNSAL, Hakan - HVIZDOŠ, Pavol - ŠAJGALÍK, Pavol - DUSZA, Ján. Wear characteristics of dual-phase high-entropy ceramics: Influence of the testing method. In International Journal of Applied Ceramic Technology, 2024, vol. 21, p. 2678-2689. (2023: 1.8 - IF, Q2 - JCR, 0.387 - SJR, Q3 - SJR). ISSN 1546-542X. Dostupné na: https://doi.org/10.1111/ijac.14651 Typ: ADCA

17.) 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: 41075 €

Dosiahnuté výsledky:
Vyvinuli sme teóriu na pre referenčnú metódu na výpočet absorpčných spektier v X-ray oblasti pre systémy s otvorenou obálkou v rámci DR-TDDFT metodológie. Po implementovaní bude táto metóda vhodná na praktické kvantovo chemické výpočty len v prípade ak sa dá aktívny priestor výrazne obmedziť. Ide však o dôležitý krok v projekte keďže nám táto metóda poskytne referenčné dáta, ktoré budú užitočné pri implementovaní hlavného cieľa projektu: takzvanej podpriestorovej metódy DR-TDDFT.

Výsledky boli prezentované na konferenciách (pozvané prednášky):
KOMOROVSKÝ, Stanislav** – MIŠENKOVÁ, Debora. Relativistic density functional theory of EPR. In XVIth Workshop on Modern Methods in Quantum Chemistry, Mariapfarr, Rakúsko, 25. 02. – 01. 03. 2024.

MIŠENKOVÁ, Debora** – KOMOROVSKÝ, Stanislav. Relativistic theory of the EPR g-tensor. In XVIth Workshop on Modern Methods in Quantum Chemistry, Mariapfarr, Rakúsko, 25. 02. – 01. 03. 2024.

KOMOROVSKÝ, Stanislav**. Current densities as a tool for analysis of magnetic properties in the relativistic domain. In 5th Workshop on Magnetically induced molecular Currents: MAGIC 2024, Chiemsee, Nemecko, 09. 09. – 13. 09. 2024.

KOMOROVSKÝ, Stanislav** – MIŠENKOVÁ, Debora. Relativistic theory of pNMR and EPR. In The 8th Japan-Czech-Slovakia International Symposium on Theoretical Chemistry (JCS8), Sapporo, Japonsko, 17. 06. – 21. 06. 2024.

MALKINA, Oľga** – MALKIN, Vladimír. Investigation of solvent effects on 1J(Hg-P) in a phosphine and selenoether peri-substituted acenaphthene-based Hg complex. In XVIth Workshop on Modern Methods in Quantum Chemistry, Mariapfarr, Rakúsko, 25. 02. – 01. 03. 2024.

MALKINA, Oľga** – MALKIN, Vladimír. Investigation of solvent effects on 1J(Hg-P) in a phosphine and selenoether peri-substituted acenaphthene-based Hg complex. In 5th Workshop on Magnetically induced molecular Currents: MAGIC 2024, Chiemsee, Nemecko, 09. 09. – 13. 09. 2024.

18.) 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:
Riešenie projektu nadviazalo na predchádzajúce etapy, pričom hlavnou aktivitou bolo štúdium mikroštrukúry a fázové zloženia, a tiež mechanických vlastností pripravenych vysokoentropických karbidov na báze (Mo-Nb-Ta-V-W)C a (Zr-Hf-Ta-Nb-Ti)C. Za účelom zlepšenia spekateľnosti a ich mechanických vlastností boli následne pripravené kompozitné materiály na báze (Zr-Hf-Ta-Nb-Ti)C s prídavkom SiC whiskrov v rôznom pomere. Za najdôležitejší výsledok možno považovať skutočnosť, že bol preukázaný pozitívny vplyv whiskrov na mechanické vlastnosti.

Výstupy:
ĎAKOVÁ, Lenka - HRUBOVČÁKOVÁ, Monika - KOVALČÍKOVÁ, Alexandra - ANDREJOVSKÁ, Jana - TATARKO, Peter - HIČÁK, Michal - DUSZA, Ján. SiC whiskers as a secondary phase within the structure of HEC and its effect on tribological and oxidation properties. In Processing and properties of advanced ceramics and glass : Scientific seminar. Vršatecké Podhradie, 16.-18.10.2024. - B.V., 2024, p. 22. ISBN 978-80-8295-029-1. Typ: AFH

KOVALČÍKOVÁ, Alexandra - TATARKO, Peter - CHLUP, Zdeněk - SEDLÁK, Richard - MÚDRA, Erika - DUSZA, Ján. A role of micro/nano graphene platelets on strengthening and toughening mechanisms of TiB2-SiC ceramic composites. In IMEC 2024 : 2nd international conference on innovative materials in extreme conditions. Book of abstracts. Belgrade, 20.-22.3.2024. - Belgrade : University of Belgrade, 2024, p. 27. ISBN 978-86-7306-171-9. Typ: AFE

KOVALČÍKOVÁ, Alexandra - TATARKO, Peter - CHLUP, Zdeněk - SEDLÁK, Richard - MEDVEĎ, Dávid - MÚDRA, Erika - DUSZA, Ján. Mechanical properties and tribological behavior of titanium diboride ceramic tool material: Synergic effect of silicon carbide and micro/nano graphene platelets. In ISASC 2024 : 5th International symposium on new frontier of advanced Si-based ceramics and composites. Abstract e-book. Jeju, 16.-19.6.2024. - B.V., 2024, p. 68. Typ: GII

TATARKO, Peter - ÜNSAL, Hakan - HOSSEINI, Naser - KOVALČÍKOVÁ, Alexandra - CHLUP, Zdeněk - TATARKOVÁ, Monika - DLOUHÝ, Ivo. Development of new ultra-high temperature ceramics for extreme environment applications. In ISNNM-2024 : The 18th International Symposium on Novel and Nano Materials. Abstract book. Vienna, 30.6.-5.7.2024. - B.V., 2024, p. 88. (ISNNM-2024 : International symposium on novel and nano materials) Typ: GII

TATARKO, Peter - ÜNSAL, Hakan - HOSSEINI, Naser - ZHUKOVA, Inga - KOVALČÍKOVÁ, Alexandra - CHLUP, Z. - TATARKOVÁ, Monika - DLOUHÝ, I. Ultra-High Temperature Ceramics for Extreme Environment Applications. In 4th Polish-Slovak-Chinese seminar on ceramics : Book of abstracts. Zakopane, 28.9.-1.10.2024. - B.V., 2024, p. 19. ISBN 978-83-65955-78-4. (Polish-Slovak-Chinese seminar on ceramics) Typ: AFG

19.) 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: 5800 €

Dosiahnuté výsledky:
Projekt APVV-23-0635 je zameraný vývoj multifázových materiálov na báze funkčných polymérov a ílových minerálov pre efektívnejšiu adsorpciu a dekontamináciu nebezpečných organických zlúčenín v porovnaní so súčasnými prístupmi.
V rámci prvej etapy APVV projektu sa optimalizovali podmienky radikálovej polymerizácie s prenosom atómu, pričom sa podarila pripraviť séria poly(2-izopropenyl-2-oxazolínov). Zistili sme, že in vitro cytotoxicita poly(2-izopropenyl-2-oxazolínu) závisí aj od spôsobu izolácie a použitia vhodného purifikačného postupu. Vyššie uvedenou optimalizáciou polymerizačných podmienok pre polymerizáciu 2-izopropenyl-2-oxazolínu vo vodnej fáze sa nám podarilo nájsť operačné okno, ktoré nám umožňuje pripraviť poly(2-izoproenyl-2-oxazolín) bezpečný pre medicínske a environmentálne aplikácie v širokom rozsahu mólových hmotností.
Interkalácia PIPOx-u v prítomnosti Mt Kunipia poskytla prvotný pohľad na správanie sa tohto unikátneho polyméru. Zistil sa signifikantný nárast medzivrstvovej vzdialenosti d001 z hodnoty 12,5 ? (pre pôvodný Na-Mt) na hodnotu 23 ?. Prítomnosť polyméru v interkalate potvrdili pásy valenčných vibrácií CH2 skupín (3000-2850 cm-1), pás N=C vibrácie pri 1655 cm-1 a deformačné vibrácie CH2 skupín (1500-1200 cm-1). Absorpčné pásy PIPOx-u v oblasti pod 1200 cm-1 prekryli silnejšie pásy funkčných skupín montmorillonitu, Si-O a deformačné OH.
Výsledky riešenia projektu boli prezentované v štyroch príspevkoch na domácich a zahraničných konferenciách a taktiež sme sa zapojili do popularizačných aktivít. V uplynulom roku boli do riešenia projektu zapojení traja doktorandi a bola vytvorená post-doktorandská pozícia.

Vystupy:

KRONEKOVÁ, Zuzana - JANKOVIČ, Luboš - MOŠKOVÁ, Zuzana - MINARČÍKOVÁ, Alžbeta - ZHUKOUSKAYA, Hanna - KUČKA, Jan - VETRÍK, Miroslav - HRUBÝ, Martin - KRONEK, Juraj **. Partially hydrolyzed poly(2-oxazoline)s as new class of biocompatible modifiers of montmorillonites for adsorption and decontamination of organic molecules. Colloids and Surfaces A: Physicochemical and Engineering Aspects, v recenznom konaní, prijatý posudok s potrebou ďalšej úpravy rukopisu

RANA, A. - LOBAZ, V. - ELTER, J.K.- KUCKA, J. - PANKRAC, J. - KRONEK, J. - HRUBY, M., Poly(2-oxazoline)-stabilized nanoparticle-based carriers for binding to cell membrane receptors, In Stará Lesná, Slovakia, XIII Slovak-Czech conference, October 1 -4, 2024

KRONEK,, J. - KRONEKOVÁ, Z. - MAJERČÍKOVÁ, M. - MINARČÍKOVÁ, A. - MLYNÁRIKOVÁ, M. – STRASSER, P. – TEASDALE, I. Poly(2-isopropenyl-2-oxazoline) as a versatile functional polymer for advanced materials, In Stará Lesná, Slovakia, XIII Slovak-Czech conference, October 1 -4, 2024

PRIBUS, Marek – KUREKOVÁ, Valéria – BARLOG, Martin – JANKOVIČ, Ľuboš – MADEJOVÁ, Jana. Preparation and characterisation of montmorillonite/poly(2-ethyl-2-oxazoline) nanocomposites. In Book of Abstracts MECC‘2024. 11th. – Plzeň : Czech National Clay Group, 2024, p. 84. ISBN 1802-2480.

SLANÝ, Michal – JANKOVIČ, Ľuboš – MATEJDES, Marián – MADEJOVÁ, Jana. Physicochemical aspects and near-

IR study of hydration properties of poly(2-ethyl-2-oxazoline) and poly(diallyldimethylammonium chloride) functionalized montmorillonite. In Book of Abstracts MECC‘2024. 11th. – Plzeň : Czech National Clay Group, 2024, p. 85. ISBN 1802-2480.

20.) 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 / 30.6.2027
Evidenčné číslo projektu:	APVV-22-0004
Organizácia je koordinátorom projektu:	nie
Koordinátor:	VÚEZ, a.s.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 16225 €

Dosiahnuté výsledky:

21.) 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: 8170 €

Dosiahnuté výsledky:
V roku 2024 sa začala riešiť úloha zameraná na modifikáciu ílových minerálov zo skupiny smektitov organickými látkami s cieľom pripraviť organoíly s potenciálom využitia pri ochrane životného prostredia a v biomedicínskych aplikáciách. Po dôkladnej analýze montmorillonitov (Mnt) zo slovenských bentonitových lokalít sa na štúdium vybral montmorillonit z nového ložiska Lutila (Lu), ktorý je podrobne študovaný v rámci projektu. Ako porovnávací štandard sa pre prvú sériu experimentov vybral prírodný montmorillonit z lokality Wyoming (SWy) získaný zo zbierky ílových minerálov The Clay Minerals Society (USA). V prípade druhej série to bol syntetický saponit Sumecton (Su) z Kunimine Industries Co., Ltd. (Japan). V úvodnej fáze sa pozornosť venovala najmä základnej charakterizácii vybraných smektitov a optimalizácii podmienok prípravy jednotlivých typov organoílov, následne pokračovala ich komplexná charakterizácia. V rámci riešenia projektu sa pripravila publikácia sumarizujúca výsledky získané pri kyselinovej aktivácii ílových minerálov nielen z rôznych svetových ložísk, ale aj z viacerých slovenských lokalít. Hlavnou metódou bola infračervená spektroskopia v strednej a blízkej oblasti. Študoval sa 1) vplyv rôznych parametrov na rýchlosť rozpúšťania ílových minerálov, 2) využitie aktivovaných ílov ako adsorbentov anorganických a organických polutantov, 3) ich využitie pri katalýze.

MADEJOVÁ, Jana** - PÁLKOVÁ, Helena. Review of the application of infrared spectroscopy in studies of acid-treated clay minerals. In Clays and Clay Minerals, 2024, vol. 72, art no. e30. (2023: 2 - IF, Q2 - JCR, 0.367 - SJR, Q2 - SJR). ISSN 0009-8604. https://doi.org/10.1017/cmn.2024.24
KUREKOVÁ, Valéria** – KOVÁČIK, Dušan – BILSKÁ, Katarína – BUJDÁKOVÁ, Helena – PRIBUS, Marek. Formation and properties of trimethyl chitosan/smectite nanocomposites. In Book of Abstracts MECC‘2024. 11th. – Plzeň: Czech National Clay Group, 2024, p. 79. ISBN 1802-2480.

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

Zodpovedný riešiteľ: Jana Madejová
Trvanie projektu: 1.7.2020 / 30.6.2024
Evidenčné číslo projektu: APVV-19-0487
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 24500 €

Dosiahnuté výsledky:
V prvom polroku 2024 sa ukončili viaceré experimentálne práce, vyhodnotili získané výsledky a finalizovali sa publikácie súvisiace s témou a cieľom projektu. Publikácia zameraná na charakterizáciu kompozitných materiálov na báze montmorilonitu a troch polymérov - poly(2-metyl-2-oxazolín), poly(2-etyl-2-oxazolín) a poly(2-propyl-2-oxazolín) bola publikovaná v časopise Macromolecules [1]. Porovnali sa hydratačné vlastnosti montmorillonitu funkcionalizovaného neiónovým polymérom poly(2-etyl-2-oxazolínom) a katiónovým polymérom poly(diallyldimetylammónium chloridom). Publikácia bude publikovaná v 2025 v časopise Journal of Molecular Structures [2]. Pokračovalo sa vo výskume fotoaktívnych hybridných materiálov na báze metyl-porfyrínových farbív PtTMPyP4+ a PdTMPyP4+ v systéme so syntetickým saponitom.
Súbežne s experimentálnymi prácami pokračovali aj kvantovo-chemické simulačné výpočty. Analyzované vodíkové väzby a interkalačné energie ukázali vyššiu stabilitu hybridných štruktúr s trioktaédrickými smektitmi (saponit a hektorit), ktorá sa prejavila aj v ich lepších mechanických vlastnostiach v porovnaní s materiálmi na báze dioktaédrických smektitov (montmorillonit a beidellit) [3]. DFT metóda sa využila aj pri modelovej štúdii imobilizácie toxického selén oxyaniónu montmorillonitom modifikovaným poly(2-metyl-2-oxazolínom) a tetrabutylfosfó-niovým katiónom. Vypočítané interakčné energie ukázali, že obidva organoíly sú schopné adsorbovať anion Se(VI) do medzivrstvového priestoru a vytvoriť stabilný adsorbent-adsorbát complex [4].
Testovali sa mechanické a dynamické vlastnosti štyroch polymérnych matríc, v ktorých sa ako modifikátor použil montmorillonit modifikovaný poly(2-etyl-2-oxazolínom) a jeho kopolymérom s poly(etylénimínom). Výsledky boli podkladom pre publikáciu uverejnenú v časopise Materials [5]. Záverom je možné konštatovať, že ciele projektu boli splnené a APVV agentúra vyhodnotila projekt stupňom: "Vynikajúca úroveň".
[1] 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. (2023: 5.1 - IF, Q1 - JCR, 1.401 - SJR, Q1 - SJR). ISSN 0024-9297. https://doi.org/10.1021/acs.macromol.4c00291
[2] SLANÝ, Michal - JANKOVIČ, Ľuboš - MATEJDES, Marián - ŽEMLIČKA, Matúš, - MADEJOVÁ, Jana. Novel poly(2-ethyl-2-oxazoline) and poly(diallyldimethylammonium chloride) polymer functionalized montmorillonite: Physicochemical aspects and Near-IR study of hydration properties. Journal of Molecular Structure 1321 no. 139855. 2025. https://doi.org/10.1016/molstruc.2024.139855
[3] BASHIR, Sanam - TUNEGA, Daniel - SCHOLTZOVÁ, Eva. Mechanical properties of pristine smectite clay minerals and clay-polymer hybrids studied by density functional theory. In Clays and Clay Minerals, 2024, vol. 72, no. e28, p. 1-9. (2023: 2 - IF, Q2 - JCR, 0.367 - SJR, Q2 - SJR). ISSN 0009-8604. https://doi.org/10.1017/cmn.2024.31
[4] ŠKORŇA, Peter - BASHIR, Sanam - SCHOLTZOVÁ, Eva - TUNEGA, Daniel. Model study on potential removal of toxic Se(VI) by organically modified montmorillonite. In Computational and Theoretical Chemistry, 2024, vol. 1242, art no. 114939. (2023: 3 - IF, Q3 - JCR, 0.405 - SJR, Q2 - SJR). ISSN 2210-271X. https://doi.org/10.1016/j.comptc.2024.114939
[5] BOHÁČ, Peter - NÓGELLOVÁ, Zuzana - ŠLOUF, Miroslav - KRONEK, Juraj - JANKOVIČ, Ľuboš - PEIDAYESH, Hamed - MADEJOVÁ, Jana - CHODÁK, Ivan. Nanocomposites of natural rubber containing montmorillonite modified by poly(2-oxazolines). In Materials, 2024, vol. 17, art. no. 4017, [11] p. (2023: 3.1 - IF, Q1 - JCR, 0.565 - SJR, Q2 - SJR). ISSN 1996-1944. https://doi.org/10.3390/ma17164017

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

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

Čerpané financie: APVV: 24375 €

Dosiahnuté výsledky:
NOVOTNÝ, Ján – KOMOROVSKÝ, Stanislav – MAREK, R. Paramagnetic Effects in NMR Spectroscopy of Transition-Metal Complexes: Principles and Chemical Concepts, ACCOUNTS OF CHEMICAL RESEARCH 57 (10), pp.1467-1477, 2024.

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

Zodpovedný riešiteľ:	Monika Michálková
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: 4952 €

Dosiahnuté výsledky:
Výsledky projektu boli publikované v nasledujúcich vedeckých časopisoch:
1.1.02 Diana Lago, Giulia Tameni, Jozef Kraxner, Dusan Galusek, Enrico Bernardo, Cesium stabilization by engineered alkaline attack of glass for pharmaceutical containers, Materials Letters 372 (2024) 137097https://doi.org/10.1016/j.matlet.2024.137097
2.1.02 Ahmed Gamal Abd-Elsatar, Hamada Elsayed, Hana Kankova, Branislav Hruska, Jozef Kraxner, Enrico Bernardo, Dusan Galusek: Ion-exchange enhancement of borosilicate glass vials for pharmaceutical packaging, Open Ceramics 20 (2024) 100689, https://doi.org/10.1016/j.oceram.2024.100689

Výsledky projektu boli prezentované na nasledujúcich podujatiach:
1.Mokhtar Mahmoud, Jozef Kraxner, Martin Michálek, Hamada Elsayed, Enrico Bernardo, Dušan Galusek - Masked stereolithography of 3D scaffolds using porous glass microspheres, 4th PSC Krakow, Poland, 28.9.-1.10.24, ISBN 978-83-65955-78-4
3.Zafarana S. E. , Scanferla P., Finocchiaro C., Barone G., Mazzoleni P., Galusek D, Kraxner J: Alkali-Activated Materials based on Volcanic Ash and Waste Glass: sustainable and alternative geomaterials from waste to resource, FunGlass School 2024/2, Vršatské Podhradie, November 11- 13, 2024, ISBN 978-80-8295-030-7
4.A. Dasan, J. Kraxner, E. Bernardo, D. Galusek: Transforming waste glass into high-value products through digital innovation and sintering-aided additive manufacturing technology FunGlass School 2024/2, Vršatské Podhradie, November 11- 13, 2024, ISBN 978-80-8295-030-7,
5.Mokhtar Mahmoud, Jozef Kraxner , Hamada Elsayed, Enrico Bernardo, Dušan Galusek: Fabrication and Application of Porous Glass Microspheres Derived from Fiber Glass Waste FunGlass School 2024/2, Vršatské Podhradie, November 11- 13, 2024, ISBN 978-80-8295-030-7,

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

Zodpovedný riešiteľ:	Monika Michálková
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: 10959 €

Dosiahnuté výsledky:
MICHÁLKOVÁ, Monika** - GHADAMYARI, Marzieh - PARCHOVIANSKY, Milan - KLEMENT, Robert - KRAXNER, Jozef - GALUSEK, Dušan. Viscous flow sintering of translucent PiG with luminescent YAG:Eu3+/2+ microspheres. In Fun Glass School 2024/1, Oponice, June 10–12, 2024 : Book of abstracts. - Trenčín, Slovakia : Centre for functional and surface functionalized glass, 2024, p. 6. ISBN 978-80-8295-021-5. (FunGlass School 2024/1 : vedecká konferencia) Typ: AFH

GHADAMYARI, Marzieh** - KLEMENT, Róbert - HOSSEINI, Hossein Ebrahim - GALUSEK, Dušan - MICHÁLKOVÁ, Monika. Synthesis and characterization of novel germanate phosphor. In Fun Glass School 2024/1, Oponice, June 10–12, 2024 : Book of abstracts. - Trenčín, Slovakia : Centre for functional and surface functionalized glass, 2024, p. 22. ISBN 978-80-8295-021-5. (FunGlass School 2024/1 : vedecká konferencia) Typ: AFH

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

Zodpovedný riešiteľ:	Helena Pálková
Trvanie projektu:	1.7.2022 / 30.6.2026
Evidenčné číslo projektu:	APVV-21-0302
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Prírodovedecká fakulta UK
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 16000 €

Dosiahnuté výsledky:
PRIBUS, Marek** - BUDZÁK, Šimon - PRIBUSOVÁ SLUŠNÁ, Lenka - ŠIMONOVÁ, Tímea - JANKOVIČ, Ľuboš - MÉSZÁROS, R. - BUJDÁK, Juraj. Luminescence of Reichardt´s dye in polyelectrolyte-modified saponite colloids. In Colloids and Surfaces A: Physicochemical and Engineering Aspects, 2022, vol. 642, art. no. 128663. (2021: 5.518 - IF, Q2 - JCR, 0.758 - SJR, Q2 - SJR, karentované - CCC). https://doi.org/10.1016/j.colsurfa.2022.128663 Type: ADCA
KUREKOVÁ, Valéria** - KOVÁČIK, D. - BILSKÁ, K. - BUJDÁKOVÁ, H. - PRIBUS, Marek. Formation and properties of trimethyl chitosan/smectite nanocomposites. In Book of Abstracts MECC‘2024. 11th. 11th Mid-European Clay Conference, Plzeň: Czech National Clay Group, 2024, p. 79. Typ: AFG

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

Zodpovedný riešiteľ:	Anna Prnová
Trvanie projektu:	1.7.2020 / 30.6.2024
Evidenčné číslo projektu:	APVV-19-0010
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Trenčianska univerzita Alexandra Dubčeka v Trenčíne
Počet spoluriešiteľských inštitúcií:	1 - Slovensko: 1
Čerpané financie:	APVV: 10640 €

Dosiahnuté výsledky:
Boli pripravené nové keramické materiály s eutektickou mikroštruktúrou pre vysokoteplotné aplikácie. Výskum bol v poslednej etape riešenia zameraný hlavne na prípravu väčších kusových vzoriek. V tomto smere boli optimalizované hlavne podmienky spekania vzoriek. SPS metódou boli pripravené vysokohomogénne vzorky s teoretickou hustotou 98-99%, pričom hodnoty tvrdosti (Hv) sa pohybovali od 14.6 do 16 GPa. Pripravili sa systémy so zložením identickým s YAG, dopované Yb2O3 (20, 25 a 30 mol.%) a Er2O3 (0,1 a 0,25 mol.%), pričom u týchto materiálov boli získané zaujímavé PL vlastnosti (čisté červené svetlo pri excitácii 980nm) . Ďalej bolo skúmané teplotné správanie a kinetika kryštalizácie Er2O3 a Yb2O3 dopovaných systémov a so zložením identickým s YAG. Bola dokončená optimalizácia prípravy práškových systémov mletím, pričom sa podstatne skrátil čas mletia. Tieto optimalizované prášky boli podrobené termickým analýzam a bola podrobne preskúmaná kinetika kryštalizácie a tiež bol preskúmaný vplyv veľkosti častíc a distribúcie veľkosti častíc na spekacie schopnosti a výsledné mechanické vysokoteplotné vlastnosti materiálov.
Publikácie:
•AKUSEVICH, A.** – PECUŠOVÁ, Beáta – PRNOVÁ, Anna – VALÚCHOVÁ, Jana – PARCHOVIANSKÁ, Ivana – PARCHOVIANSKÝ, Milan – MICHÁLKOVÁ, Monika – ŠVANČÁREK, Peter – KLEMENT, Róbert. Study of thermal behavior and crystallization kinetics of glass microspheres in the Y3Al5O12 Al2O3 system. In Journal of Thermal Analysis and Calorimetry, 2024, vol. 149, pp. 10999–11012. (2023: 3 – IF, Q2 – JCR, 0.585 – SJR, Q2 – SJR). ISSN 1388-6150. Dostupné na: https://doi.org/10.1007/s10973-024-13567-w Typ: ADMA
•KAJAN, Juraj** – DAMAZYAN, Grigori – TINKOVA, Vira – PRNOVÁ, Anna – MICHÁLKOVÁ, Monika – ŠVANČÁREK, Peter – GREGOR, Tomáš – AKUSEVICH, Alena – HRUŠKA, Branislav – GALUSEK, Dušan. A Feature of the Horizontal Directional Solidification (HDS) Method Affects the Microstructure of Al2O3/YAG Eutectic Ceramics. In Crystals, 2024, vol. 14, art no. 858. (2023: 2.4 – IF, Q2 – JCR, 0.449 – SJR, Q2 – SJR). ISSN 2073-4352. Dostupné na: https://doi.org/10.3390/cryst14100858 Typ: ADCA
•MICHÁLKOVÁ, Monika** – KRAXNER, Jozef – MAHMOUD, Mokhtar – PÁLKOVÁ, Helena – GHADAMYARI,

Marzieh – PRNOVÁ, Anna – GALUSEK, Dušan. The Origins Of Blowing Of Glass Microspheres Produced From Sol-Gel Precursors. In Ceramics-Silikáty, 2024, vol. 68, no. 2, p. 174-180. (2023: 0.6 – IF, Q4 – JCR, 0.231 – SJR, Q3 – SJR). ISSN 0862-5468. Dostupné na: https://doi.org/10.13168/cs.2024.0017 Typ: ADCA
•VAKHSHOURI, Maryam** – NAJAFZADEHKHOEE, Aliasghar – TALIMIAN, Ali – PERNIA, Cristina López – POYATO, Rosalía – GALLARDO-LÓPEZ, Ángela – GUTIÉRREZ-MORA, Felipe – PRNOVÁ, Anna – GALUSEK, Dušan. Al2O3/Y3Al5O12 (YAG)/ZrO2 composites by single-step powder synthesis and spark plasma sintering. In Journal of the European Ceramic Society, 2024, vol. 44, no. 12, pp. 7180-7188. (2023: 5.8 – IF, Q1 – JCR, 1.198 – SJR, Q1 – SJR). ISSN 0955-2219. Dostupné na: https://doi.org/10.1016/j.jeurceramsoc.2024.05.004 Typ: ADCA
•Vira Tinkova, Juraj Kajan, Grigori Damazyan, Anna Prnová, Monika Michálková, Peter Švančárek, Tomáš Gregor, Branislav Hruška, Dušan Galusek, Preparation of monophasic YAG raw material by multi?stage process, Discover Applied Sciences (2024) 6:73 | https://doi.org/10.1007/s42452-02,

28.) 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: 43613 €

Dosiahnuté výsledky:
Za najdôležitejší poznatok tejto etapy projektu možno považovať skutočnosť, že sa potvrdila hlavná hypotéza projektu, ktorou bol predpoklad, že neekvimolárne zloženie diboridov môže viesť k jeho lepším mechanickým vlastnostiam. To bolo preukázané vyššou tvrdosťou, pevnosťou a výrazne lepšou odolnosťou proti opotrebeniu neekvimolárnych systémov v porovnaní s ekvimolárnym systémom. Zároveň za veľmi dôležitý výsledok možno považovať skutočnosť, že sa podarilo experimentálne overiť zloženie pripravených materiálov, ktoré vo veľkej miere odpovedá predpokladaným zloženiam materiálov. Bol tiež realizovaný skríning 126 diboridových štruktúr pomocou teoretických výpočtov, ktoré zohľadnili všetky možné kombinácie deviatich kovov (Hf, Zr, Ta, Nb, Ti, V, W, Mo, Cr) na vytvorenie päťzložkového diboridu. Boli zvolené ďalšie najvhodnejšie štruktúry na experimentálnu prípravu: (Hf-Zr-Nb-Ti-V)B2 a (Hf-Zr-Ta-Ti-V)B2.

Výstupy:
KOMBAMUTHU, Vasanthakumar - ÜNSAL, Hakan - CHLUP, Zdeněk - TATARKOVÁ, Monika - KOVALČÍKOVÁ, Alexandra - ZHUKOVA, Inga - HOSSEINI, Naser - HIČÁK, Michal - TATARKO, Peter**. Effect of SiC on densification, microstructure and mechanical properties of high entropy diboride (Ti0.2Zr0.2Hf0.2Nb0.2Ta0.2)B2. In Journal of the European Ceramic Society, 2024, vol. 44, no. 9, pp. 5358–5369. (2023: 5.8 - IF, Q1 - JCR, 1.198 - SJR, Q1 - SJR). ISSN 0955-2219. Dostupné na: https://doi.org/10.1016/j.jeurceramsoc.2023.12.072 Typ: ADCA

NAUGHTON-DUSZOVÁ, Annamária** - MEDVEĎ, Dávid - ĎAKOVÁ, Lenka - KOVALČÍKOVÁ, Alexandra - ŠVEC, Peter Jr. - TATARKO, Peter - ÜNSAL, Hakan - HVIZDOŠ, Pavol - ŠAJGALÍK, Pavol - DUSZA, Ján. Dual-phase high-entropy carbide/boride ceramics with excellent tribological properties. In Journal of the European Ceramic Society, 2024, vol. 44, p. 5391-5400. (2023: 5.8 - IF, Q1 - JCR, 1.198 - SJR, Q1 - SJR). ISSN 0955-2219. Dostupné na: https://doi.org/10.1016/j.jeurceramsoc.2023.12.081. Typ: ADCA

NAUGHTON-DUSZOVÁ, Annamária** - MEDVEĎ, Dávid - ĎAKOVÁ, Lenka - KOVALČÍKOVÁ, Alexandra - ŠVEC, Peter Jr. - TATARKO, Peter - ÜNSAL, Hakan - HVIZDOŠ, Pavol - ŠAJGALÍK, Pavol - DUSZA, Ján. Wear characteristics of dual-phase high-entropy ceramics: Influence of the testing method. In International Journal of Applied Ceramic Technology, 2024, vol. 21, p. 2678-2689. (2023: 1.8 - IF, Q2 - JCR, 0.387 - SJR, Q3 - SJR). ISSN 1546-542X. Dostupné na: https://doi.org/10.1111/ijac.14651. Typ: ADCA

29.) 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 Lenčéš
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: 6240 €

Dosiahnuté výsledky:
V prvom polroku riešenia projektu „TESLOW“ výskumný tím získal odpadové materiály z rôznych zdrojov na prípravu prekurzorov pre katódu a anódu. Ohľadom anódy, biomasa z kultivovaných húb (Aspergillus Niger) bola získaná od výskumného tímu z Univerzity Komenského a bola pyrolyzovaná v čistom Ar plyne. Priemyselné odpady boli chemicky charakterizované pred separáciou odpadu v súvislosti s vývojom kátody. Okrem toho výskumný tím pracoval na chemickej úprave aktívneho materiálu katódy dopovaním chrómom.

Programy: SASPRO

30.) 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: 42526 €

Dosiahnuté výsledky:
Partikulárne ciele dosiahnuté počas druhej fázy projektu boli zamerané predovšetkým na syntézu a imobilizáciu kvantových bodov po okrajoch silikátových dvoj-vrstiev enkapsulujúcich fotoaktívne molekuly. Dvoj-vrstvy boli pripravené použitím fluorohektoritu, vrstevnatého silikátu slúžiacieho ako hostiteľ pre kvantové body. Takto pripravené heteroštruktúry sú nevyhnutné pre vývoj funkčných systémov, v ktorých dochádza k prenosu energie z fotoaktívnych molekúl na kvantové body.
Imobilizácia kvantových bodov bola riešená prostredníctvom metódy horúcej injekcie umožňujúcej rýchlu nukleáciu a kontrolovaný rast kvantových bodov. Tento prístup bol najprv úspešne aplikovaný na delaminovaný fluorohektorit. Použitím toho istého experimentálneho postupu však prepojenie kvantových bodov na okraje dvoj-vrstiev nebolo možné. Na prekonanie vzniknutého problému bola potrebná rozsiahla optimalizácia experimentálneho postupu zahŕňajúca desorpciu fotoaktívnych molekúl z okrajov silikátových vrstiev, čím sa zlepšila dostupnosť a afinita silanolových skupín vzhľadom k Cd2+.
Dosiahnuté výsledky a popularizácia projektu boli prezentované prostredníctvom konferencií, popularizačných textov a publikácie.
•Publikácie:
M. Matejdes, P. Škorňa, M. Slaný, R. Klement, J. Bujdák, J. Kawamata, J. Breu, Excimer formation in a 2D confined space, Materials Today Chemistry, 42, 2024, 102436.
•Konferenčné príspevky:
M. Matejdes, J. Bujdák (2024). Confinement-induced spectral changes of dicationic naphthalene derivative. In Book of Abstracts, Clay minerals and selected industrial minerals in material science, applications, and environmental technology, 10th Workshop of Slovak Clay Group, 24.-26. June 2024, Tatranská Lomnica, Slovakia, ISBN 978-80-972367-7-9, p. 18.
M. Matejdes, P. Škorňa, M. Slaný, R. Klement, J. Bujdák, J. Kawamata, J. Breu (2024). Stimuli-induced optical modulation. In Book of Abstracts, 11th Mid-European Clay Conference, September 15-20, 2024, Pilsen, Czech Republic, p. 60.
•Popularizačné texty:
M. Matejdes (24th June 2024). Where on Earth does Hydrogen hide? (in Slovak language), https://vedator.space/kde-sa-na-zemi-ukryva-vodik/
M. Matejdes (28th August 2024). Hydrogen: The Hidden Hero (Part One) (in Slovak language), https://vedator.space/vodik-skryty-hrdina-cast-prva/

31.) 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: 38484 €

Dosiahnuté výsledky:
New mixed-cation fluorides Na2KHfF7 and Na2K(Zr,Hf)F7 together with isostructural Na2KZrF7 have been synthesised by reactions in aqueous solutions and structurally characterised at room temperature using powder and single-crystal X-ray diffraction. The solid-solid phase transformations at elevated temperatures have been revealed during the differential scanning calorimetry experiments and further confirmed by temperature-dependent X-ray powder diffraction. It has been found that mixed-cation phases Na2KZrF7, Na2KHfF7 and Na2K(Zr,Hf)F7 undergo irreversible phase transformations, which can be explained by their decomposition over 400°C.
Compounds KNa2ZrF7, KNa2HfF7 and KNa2(Zr,Hf)F7 are crystallizing in a noncentrosymmetric space group (Pmn21). This type of fluorides is of great interest due to their possible nonlinear properties, in particular piezoelectricity, nonlinear optics, pyroelectricity, ferroelectricity, and ferroelasticity. [1]

Nové zmiešané katiónové fluoridy Na2KHfF7 a Na2K(Zr,Hf)F7 spolu s izoštrukturálnym Na2KZrF7 boli syntetizované reakciami vo vodných roztokoch a štrukturálne charakterizované pri laboratórnej teplote s použitím prášku a monokryštálovej röntgenovej difrakcie. Transformácie tuhých fáz pri zvýšených teplotách boli odhalené počas experimentov diferenciálnej skenovacej kalorimetrie a ďalej potvrdené röntgenovou práškovou difrakciou závislou od teploty. Zistilo sa, že zmiešané katiónové fázy Na2KZrF7, Na2KHfF7 a Na2K(Zr,Hf)F7 podliehajú ireverzibilným fázovým transformáciám, ktoré možno vysvetliť ich rozkladom nad 400°C.
Zlúčeniny KNa2ZrF7, KNa2HfF7 a KNa2(Zr,Hf)F7 kryštalizujú v necentrosymetrickej priestorovej grupe (Pmn21). Tento typ fluoridov je veľmi zaujímavý pre ich možné nelineárne vlastnosti, najmä piezoelektrickosť, nelineárnu optiku, pyroelektrickosť, feroelektrickosť a feroelasticitu. [1]

In addition, mild hydrothermal synthesis was performed for the preparation of samples in the systems M-R-F. This method allows to obtain ternary compounds at mild conditions. Reactions are carried out in solutions placed in the stainless steel autoclaves with a Teflon liner under autogenous pressure. Mild hydrothermal synthesis neither requires complicated apparatus nor causes pollution [2,3].

Okrem toho bola použitá mierna hydrotermálna syntéza na prípravu vzoriek v systémoch M-R-F. Táto metóda umožňuje získať ternárne zlúčeniny za miernych podmienok. Reakcie sa uskutočňujú v roztokoch umiestnených v autoklávoch z nehrdzavejúcej ocele s teflónovou vložkou pod autogénnym tlakom. Mierna hydrotermálna syntéza nevyžaduje komplikované zariadenie ani nespôsobuje znečistenie [2,3].

[1] O. Matselko, M. Poupon, E. Samolova, Z. Vasková, B. Kubíková, Z. Netriová, M. Mičušík, M. Boča, Complexity of the Na2KZrF7, Na2KHfF7 and Na2K(Zr,Hf)F7, J. Solid State Chem. 334 (2024) 124655.
[2] O. Matselko, B. Kubíková, Z. Netriová, M. Boča, Formation of the ternary fluorides from the molten salts and by means of the mild hydrothermal synthesis. In 29th EUCHEMS Conference on Molten Salts and Ionic Liquids : Book of Abstracts, p.127. (Euchemsil 2024)
[3] O. Matselko, B. Kubíková, Z. Netriová, M. Boča, Controlled synthesis of fluorides using mild hydrothermal method. In 13th International Symposium on Crystallization in Glasses and Liquids: Abstracts. – Orleáns: Le studium, Loire valley, Institute for advanced studies, Region centre-Val de Loire, 2024, p.10. (13th International Symposium on Crystallization in Glasses and Liquids: medzinárodná konferencia)

Programy: DoktoGrant

32.) Theoretical predictions and synthesis of (Ti-Zr-Hf-Nb-Ta)B2 structures with non-equimolar compositions *(Theoretical predictions and synthesis of (Ti-Zr-Hf-Nb-Ta)B2 structures with non-equimolar compositions)*

Zodpovedný riešiteľ:	Inga Zhukova
Trvanie projektu:	1.1.2024 / 31.12.2024

Evidenčné číslo projektu: APP0541
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: SAV: 2000 €

Dosiahnuté výsledky:
Riešením projektu sa podarilo vyvinúť a charakterizovať nové zloženia vysokoentropických diboridov (HEB) s neekvimolárnymi pomermi prechodných kovov, čím sa dosiahol významný pokrok v teoretickom modelovaní aj experimentálnom overovaní. S využitím DFT výpočtov a špeciálnych kvázináhodných štruktúr (SQS) teoretické predpovede preukázali štrukturálnu stabilitu a vynikajúce mechanické vlastnosti neekvimolárnych zložení, ako napríklad [Ta0.6Hf0.1Zr0.1Ti0.1Nb0.1]B2. Tieto predpovede boli experimentálne potvrdené, pričom spekanie pomocou SPS prinieslo jednofázové hexagonálne štruktúry typu AlB2 s vysokou čistotou. Výsledky projektu preukázali, že diboridy s neekvimolárnymi zloženiami mali zvýšenú tvrdosť a nanotvrdosť v porovnaní s diboridom s ekvimolárnmy zložením prechodných kovov. Súhra medzi teoretickými a experimentálnymi výsledkami ukázala potenciál neekvimolárnych HEB ako vysokovýkonných materiálov pre extrémne prostredia.
Výstupy:

TATARKO, Peter - ÜNSAL, Hakan - HOSSEINI, Naser - ZHUKOVA, Inga - KOVALČÍKOVÁ, Alexandra - CHLUP, Z. - TATARKOVÁ, Monika - DLOUHÝ, I. Ultra-High Temperature Ceramics for Extreme Environment Applications. In 4th Polish-Slovak-Chinese seminar on ceramics : Book of abstracts. Zakopane, 28.9.-1.10.2024. - B.V., 2024, p. 19. ISBN 978-83-65955-78-4. (Polish-Slovak-Chinese seminar on ceramics) Typ: AFG

ZHUKOVA, Inga - TATARKOVÁ, Monika - KOVALČÍKOVÁ, Alexandra - CHLUP, Z. - CSANÁDI, T. - DLOUHÝ, I. - ZAGORAC, D. - MATOVIC, B. - TATARKO, Peter. Discovery of Novel High-Entropy Transition Metal Borides: Theoretical Insights and Experimental Confirmations. In 48th International Conference & Exposition on Advanced Ceramics & Composites : Abstract book. - Florida : The American Ceramic Society, 2024, p. 109. (48th ICACC24 : medzinárodná konferencia) Typ: GII

Programy: Plán obnovy EÚ

33.) Development of advanced luminescent glass 3D structures *(Development of advanced luminescent glass 3D structures)*

Zodpovedný riešiteľ: Monika Michálková
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: MŠ: 24492 €

Dosiahnuté výsledky:
M. Michálková, M. Ghadamyari, M. Parchoviansky, R. Klement, D. Galusek: The influence of phosphor crystallinity on the optical properties of PiG. Processing and properties of advanced ceramics and glass, Vršatske Podhradie, Oct. 16-18, 2024, ISBN 978-80-8295-029-1, EAN 9788082950291.

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

Zodpovedný riešiteľ: Aliasghar Najafzadehkhoee
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: MŠ: 28682 €

Dosiahnuté výsledky:
Aliasghar Najafzadehkhoee, Ali Talimian, Abdullah Jabr, Roman Papšík, Daniel Drdlík, Karel Maca, Dušan Galusek, Raúl Bermejo, Vplyv vrstevnatej architektúry a zvyškového napätia na kontaktné poškodenie transparentnej keramiky, 14th International Conference on Ceramic Materials and Components for Energy and Environmental Systems (CMCEE14), 18–22 August 2024, Budapest, Hungary.

35.) 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:	MŠ: 28512 €

Dosiahnuté výsledky:
•Prebiehali výpočty na modeloch modifikovaného grafénu rôznymi defektami, ohľadom štúdia ich vplyvu na adsorpčnú efektivitu materiálu na CO2 a NH3. Defekty boli vyvolané substitúciou 6- členných kruhov v štruktúre grafénu 5,7- a 5, 8- člennými kruhmi. Výsledky sú spracovávané do publikácie v renomovanom vedeckom časopise

. Študovala sa efektivita adsorpcie rôznych oxyniónov na montmorilonite

•Pripravili sa štruktúrne modely pre štúdium vplyvu substitúcií v oktaédrických sieťach ílových minerálov montmorillonitu a saponitu na efektivitu adsorpcie fenantrolínu.

36.) 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:	MŠ: 27218 €

Dosiahnuté výsledky:
Projekt oficiálne začal 1.7. 2024.

Podarilo sa vyvinúť úplne nový nanokompozit montmorillonit/biochar funkcionalizovaný tiolom (TFMB). Montmorillonit sa zmiešal s biocharom v rovnakom pomere, pričom sa použili planetárne mlyny. Ďalej sa tento kompozit montmorillonit/biochar pomocou hydrotermálnej syntézy modifikoval za vzniku TFMB. Na základe ATR-FTIR analýzy sa po modifikácii thiolom, konkrétne (3–mercaptopropyl)trimethoxysilanom objavili v IR spektrách pásy patriace thiolu a CH skupinám.

Tiež sa odobrali vzorky zo záplavovej pôdy v okolo povodí rieky Morava, Devínska Nová Ves. Vzorky sa odoberali po vrstvách, vrchná vrstva, ďalej v hlbke 20, 40, 60 a 80 cm. Výsledky naznačili zmeny pH, konduktivity a tiež katiónovýmennej kapacity (CEC). Momentálne prebiehajú XRF testy pre stanovenie 35 prvkov, taktiež stanovenie DOC a chemické zloženie pôdy.

Publikácie:
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. Journal of Hazardous Materials, In press, Dostupné na: https://doi.org/10.1016/j.jhazmat.2025.137273

37.) 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 koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	Plan Obnovy: 63548 €

Dosiahnuté výsledky:
V súlade s plánom projektu boli hlavné výskumné aktivity v prvom roku riešenia projektu zamerané primárne na teoretické predikcie štruktúr perovskitových oxidov s rôznym chemickým zložením. Výsledky preukázali, že najvhodnejšou štruktúrou sa javí zloženie obsahujúce katióny Sr, Ca, Ba a La na A-mieste perovskitovej štruktúry ABO3. Študoval sa vplyv dopovania B-miesta na stabilitu a formovaciu energiu štruktúr. Na základe rozboru teoretických výpočtov boli vyselektované viaceré štruktúry, obsahujúce rôzne dopandy na B-mieste, a tie boli následne experimentálne pripravené. V niektorých prípadoch sa podarilo získať jednofázové zloženie, v iných sa riešiteľský tím zamerá na optimalizáciu. V ďalšej etape budú postupne charakterizované tieto experimentálne pripravené materiály, a zároveň budú ďalej prebiehať teoretické výpočty za účelom dizajnu ďalších štruktúr s možnými vylepšenými termoelektrickými vlastnosťami.

Výstupy:
ASIF, Ali - RAZ, Muhammad - TATARKO, Peter. Structure-properties relationship and effect of cation defects in A-site modified (Ba0.8Ca0.2Ti1-x)O3. In Processing and properties of advanced ceramics and glass : Scientific seminar. Vršatecké Podhradie, 16.-18.10.2024. - B.V., 2024, p. 9-14. ISBN 978-80-8295-029-1. (Processing and properties of advanced ceramics and glass) Typ: AFD

Programy: PostdokGrant

38.) Hydrotermálna syntéza fluoroskandátov alkalických kovov *(Hydrothermal synthesis alkali-metal fluoroscandates)*

Zodpovedný riešiteľ:	Veronika Democvics Silliková
Trvanie projektu:	1.7.2024 / 31.12.2025
Evidenčné číslo projektu:	APD0029
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 4800 €

Dosiahnuté výsledky:
Mierna hydrotermálna syntéza bola použitá na systematické štúdium tvorby fluoroskandátov alkalických kovov a amónia v roztokoch. Použitím tejto metódy boli pripravené nasledujúce zlúčeniny: (NH4)2Sc3F11, (NH4)3ScF6, NaScF4, Na3ScF6, KSc2F7, K5Sc3F14, CsSc3F10 a CsScF4. Syntéza zahŕňala miešanie východiskových chemikálií vo vode s HF, zahrievanie v Teflonom vystlaných autoklávoch a následnú filtráciu a sušenie. Získané zlúčeniny boli charakterizované pomocou XRPD, DSC a SEM s EDXS.

39.) Translucentné luminiscenčné materály ako inovatívny substrát pre fotokatalytické vrstvy *(Translucent luminescent ceramic materials as innovative substrate for photocatalytic layers)*

Zodpovedný riešiteľ:	Patrícia Petrisková
Trvanie projektu:	1.7.2024 / 31.12.2025
Evidenčné číslo projektu:	
Organizácia je koordinátorom	áno

projektu:
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: SAV: 4000 €

Dosiahnuté výsledky:
V prvom polroku riešenia projektu sme okrem študovania literatúry pracovali aj na príprave translucentného MgAlONu ako aj jeho dopáciu prvkami vzácnych zemín (lantanoidov), vplyv množstva a druhu lantanoidov na fotoluminiscenčné vlastnosti. Lantanoidy boli pridávané vo forme oxidov Ln2O3, a fluoridov LnF3, kde Ln = Ce, Eu, Sm, Nd, Er a Yb. Vzorky boli pripravené za optimalizovaných podmienok spekania pri teplote 1600?C po dobu 3 hodín v pretlaku dusíka 2 MPa.

V lete 2024 som sa zúčastnila na letnej škole International summer school on early-deployable small modular reactors v Talianskom Lecco dňa 24-28.6.2024.

40.) Vývoj hybridných nanomateriálov s antimokrobiálnymi 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 koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: SAV: 2500 €

Dosiahnuté výsledky:
V roku 2024 sme sa zaoberali štúdiom fotoluminiscenčných vlastností hybridného nanomateriálu pozostávajúceho zo saponitu, polyelektrolytu (poly(dialyldimetylamónium chlorid)-u – PDDA) a xanténového farbiva (Floxínu B). Popri tom boli študované aj adsorpčné vlastnosti Floxínu B na saponite modifikovanom rôznym množstvom PDDA. V priebehu roka 2024 sa preskúmalo desať takýchto systémov a v roku 2025 sa pokračuje v štúdiu ďalších systémov. Celkovo budú preskúmané systémy s loadingom polyméru od 0.1 mmol/g do 2.0 mmol/g a rôznym množstvom farbiva v prípade každého zo spomínaných organoílov.

Programy: Návratová projektová schéma

41.) Nové hybridné nanomateriály na báze vrstevnatých hlinitokremičitanov a kvartérnych polykatiónov chitosanu *(Novel hybrid nanomaterials based on layered aluminosilicates and chitosan quaternary polycations)*

Zodpovedný riešiteľ: Valéria Kureková
Trvanie projektu: 1.7.2023 / 30.6.2024
Evidenčné číslo projektu:
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: SAV: 2500 €

Dosiahnuté výsledky:
V druhej etape projektu sa pokračovalo v príprave tenkých filmov na báze trimetyl chitosanu (TMCH) a smektitu metódou „layer-by-layer“. Pri príprave boli použité dva rozdielne smektity: komerčný Sumecton (Su) s nižším záporným nábojom a z nového slovenského ložiska montmorillonit Lutila (Lu) s vyšším záporným nábojom. Postupným striedaním kladne nabitého TMCH a záporne nabitého smektitu (Su, resp. Lu) bolo nanesených 20 vrstiev. Na základe výsledkov infračervenej spektroskopie bol najvýraznejší nárast vrstiev pozorovaný pre filmy pripravené použitím Lu. Stanovením anti-biofilmovej aktivity bolo pozorované, že najvyššiu antibakteriálnu účinnosť preukázala vzorka TMCH-Lu, z čoho možno predpokladať, že priamo súvisí aj s hrúbkou pripraveného filmu. V rámci riešenia projektu sa podarilo pripraviť aj deriváty chitosanu s tromi etylovými, resp. propylovými reťazcami so stupňom kvarternizácie 44, resp. 21 %. Z

pripravených derivátov chitosanu boli pripravené tenké, vo vode rozpustné transparentné filmy, ktoré sa pripravili ich zmiešaním so smektitom Su v rôznom pomere (5 a 10 hm. %). V závislosti od použitého derivátu, ako aj množstva smektitu, vykazovali filmy rozdielne mechanické, ako aj tepelné vlastnosti.

42.) Hybridné sústavy 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 koordinátorom projektu:	áno
Koordinátor:	Ústav anorganickej chémie SAV, v. v. i.
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 2500 €

Dosiahnuté výsledky:

V období od 7/2024 do 12/2024 sa realizovala prvá a druhá etapa z harmonogramu aktivít riešenia projektu. Bola uskutočnená základná spektrálna charakterizácia cyklometalovaného komplexu irídia [Ir(2-fenylpyridín)2(2,2‘-dibenzo[d]tiazol)]PF6 v dimetylsulfoxide (DMSO), ktorá zahŕňala priradenie jednotlivých absorpčných pásov v spektre k príslušným elektrónovým prechodom, stanovenie molárneho absorpčného koeficientu Ir(III) komplexu v DMSO, a zaznamenanie základných parametrov v jeho emisnom spektre. Uskutočnila sa príprava a charakterizácia koloidných hybridných sústav Ir(III) komplexu so vzorkami vybraného dioktaedrického (montmorillonit Kunipia F) a trioktaedrických smektitov (saponit Sumecton (SapS), Laponit B (LapB)). Interakcia Ir komplexu s časticami vrstevnatých kremičitanov viedla k zvýšeniu jeho fotoaktivity v prípade disperzií vybraných dioktaedrických aj trioktaedrických smektitov. K najvýraznejšiemu zvýšeniu intenzity emisného spektra dochádzalo po adsorpcii Ir(III) molekúl na povrch častíc syntetických trioktaedrických smektitov, SapS a LapB. Miera nárastu integrálnej intenzity emisného spektra Ir(III) komplexu v hybridných sústavách s povrchovou koncentráciou luminofóru 0,003 mmol/g bola 31,6 a 23,4 percentná (pre LapB a SapS). V prípade všetkých smektitov sa pozorovalo, že nárast intenzity emisie komplexu je ovplyvnený stupňom nasýtenia povrchu kremičitanu molekulami Ir(III) komplexu, a jeho miera klesá so zvyšujúcou sa povrchovou koncentráciu komplexu. Táto skutočnosť naznačuje, že naviazanie Ir(III) molekúl na povrch smektitových častíc vedie k potláčaniu neradiačných procesov počas relaxácie excitovaného stavu komplexného luminofóru, a v týchto sústavách sa uplatňuje jav adsorpciou-indukovanej emisie (AdIE).

Príloha A-3

Publikačná činnosť organizácie

Príloha je generovaná z ARL.

ABC Kapitoly vo vedeckých monografiách vydané v zahraničných vydavateľstvách

ABC01 KOMOROVSKÝ, Stanislav. Relativistic Theory of EPR and (p)NMR. In Comprehensive Computational Chemistry. Vol. 3.Relativistic Effects and the Chemistry of Heavy Elements. 1. vyd. - Oxford : Elsevier, 2024, pp. 280–314. ISBN 978-012821978-2. Dostupné na: https://doi.org/10.1016/B978-0-12-821978-2.00098-2

ABC02 NAJAFZADEHKHOEE, Aliasghar - VAKHSHOURI, Maryam - HVIZDOŠ, Pavol - GALUSEK, Dušan. High-temperature W/ZrC composite coatings. In Ceramic coatings for high-temperature environments : From thermal barrier to environmental barrier applications. - Cham : Springer Nature Switzerland AG, 2024, p. 471-491. ISBN 978-3-031-40808-3. Dostupné na: https://doi.org/10.1007/978-3-031-40809-0_15 (CEDITEK II : Rozvoj a podpora výskumno-vývojových aktivít Centra pre testovanie kvality a diagnostiku materiálov v oblastiach špecializácie RIS3 SK)

ACB Vysokoškolské učebnice vydané v domácich vydavateľstvách

ACB01 FESZTEROVÁ, Melánia - JAKUBČINOVÁ, Jana - SILLIKOVÁ, Veronika. Experimentálna organická chémia : Vysokoškolská učebnica. Recenzenti: Justyna Bojanowicz, Elżbieta Sałata. 1. vyd. Nitra : Univerzita Konštantína Filozofa, 2024. 133 s. Prírodovedec, č. 847. ISBN 978-80-558-2139-9

ADCA Vedecké práce v zahraničných karentovaných časopisoch – impaktovaných

ADCA01 ARUCHAMY, Udhaya Kumar - MERINO, Emilia - DURÁN, Alicia - PÁLKOVÁ, Helena - GALUSEK, Dušan** - CASTRO, Yolanda**. Humidity-induced curing and anti-corrosion properties of GPTMS-modified polyorganosilazane functionalized silica coating on AA2024-T3 aluminum alloy. In Journal of Sol-Gel Science and Technology, 2024, vol. 112, no. 1, p. 140-151. (2023: 2.3 - IF, Q2 - JCR, 0.448 - SJR, Q2 - SJR). ISSN 0928-0707. Dostupné na: https://doi.org/10.1007/s10971-024-06473-y

ADCA02 BAČA, Ľuboš** - SIVČÁKOVÁ, Tatiana - VARCHULOVÁ NOVÁKOVÁ, Zuzana - MATEJDES, Marián - HORVÁTH ORLOVSKÁ, Martina - THURZO, Andrej - DANIŠOVIČ, Ľuboš - JANEK, Marián. Synthesis, sintering, radiopacity and cytotoxicity of Ca, Sr and Baphosphate bioceramics. In Journal of the European Ceramic Society, 2024, vol. 44, no. 9, art no. 5298-5307. (2023: 5.8 - IF, Q1 - JCR, 1.198 - SJR, Q1 - SJR). ISSN 0955-2219. Dostupné na: https://doi.org/10.1016/j.jeurceramsoc.2023.12.034

ADCA03 BASAK, Onat - HRUŠKA, Branislav - BUŇOVÁ, Lenka - MUÑOZ, Francisco - MICHÁLEK, Martin - CHROMČÍKOVÁ, Mária**. The influence of time dependent Al2O3 dissolution during melting on the structure-bioactivity correlation of Mg containing silica-based bioactive glasses. In Journal of Non-Crystalline Solids, 2024, vol. 629, art no. 122873. (2023: 3.2 - IF, Q1 - JCR, 0.655 - SJR, Q2 - SJR, karentované - CCC). (2024 - Current Contents, WOS, SCOPUS). ISSN 0022-3093. Dostupné na: https://doi.org/10.1016/j.jnoncrysol.2024.122873

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Príloha A-4

Údaje o pedagogickej činnosti organizácie

Semestrálne prednášky:

prof. Ing. Dušan Galusek, DrSc.
Názov semestr. predmetu: Anorganická technológia a materiály
Počet hodín za semester: 16
Názov katedry a vysokej školy: Trenčianska univerzita Alexandra Dubčeka v Trenčíne, FunGlass

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

Ing. Anna Prnová, PhD.
Názov semestr. predmetu: Anorganická chémia
Počet hodín za semester: 30
Názov katedry a vysokej školy: Trenčianska univerzita Alexandra Dubčeka v Trenčíne, FunGlass

Ing. Michal Slaný, PhD.
Názov semestr. predmetu: Chémia stavebných materiálov
Počet hodín za semester: 26
Názov katedry a vysokej školy: Slovenská technická univerzita v Bratislave, Katedra materiálového inžinierstva a fyziky

Ing. Michal Slaný, PhD.
Názov semestr. predmetu: Maltoviny
Počet hodín za semester: 10
Názov katedry a vysokej školy: Slovenská technická univerzita v Bratislave, Katedra materiálového inžinierstva a fyziky

Ing. Michal Slaný, PhD.
Názov semestr. predmetu: Stavebné materiály
Počet hodín za semester: 4
Názov katedry a vysokej školy: Slovenská technická univerzita v Bratislave, Katedra materiálového inžinierstva a fyziky

Ing. Michal Slaný, PhD.
Názov semestr. predmetu: Stavebné materiály 1
Počet hodín za semester: 4
Názov katedry a vysokej školy: Slovenská technická univerzita v Bratislave, Katedra materiálového inžinierstva a fyziky

Ing. Michal Slaný, PhD.
Názov semestr. predmetu: Štruktúra stavebných materiálov
Počet hodín za semester: 20
Názov katedry a vysokej školy: Slovenská technická univerzita v Bratislave, Katedra materiálového inžinierstva a fyziky

Semestrálne cvičenia:

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

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 fzyikálnej a teoretickej chémie

Dr. Aliasghar Najafzadehkhoee, Ph.D.
Názov semestr. predmetu: Fundamentals of colloidal chemistry, Collodial systems: characterization and utilization
Počet hodín za semester: 2
Názov katedry a vysokej školy: Trenčianska univerzita Alexandra Dubčeka v Trenčíne, Inorganic technologies and materials

Mgr. Viktória Planetová
Názov semestr. predmetu: Cvičenie z fyzikálnej chémie
Počet hodín za semester: 60
Názov katedry a vysokej školy: Univerzita Komenského v Bratislave, Katedra fyzikálnej a teoretickej chémie

Semináre:

James Richard Asher, PhD
Názov semestr. predmetu: Chemical Basics
Počet hodín za semester: 26
Názov katedry a vysokej školy: Univerzita Komenského, Botanická záhrada, Katedra Anorganickej Chemie

James Richard Asher, PhD
Názov semestr. predmetu: General and Inorganic Chemistry (BiC)
Počet hodín za semester: 52
Názov katedry a vysokej školy: Univerzita Komenského, Botanická záhrada, Katedra Anorganickej Chemie

James Richard Asher, PhD
Názov semestr. predmetu: General and Inorganic Chemistry (ENST)
Počet hodín za semester: 28
Názov katedry a vysokej školy: Univerzita Komenského, Botanická záhrada, Katedra Anorganickej Chemie

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 fzyikálnej a teoretickej chémie

Ing. Michal Slaný, PhD.
Názov semestr. predmetu: Vybrané state z chémie
Počet hodín za semester: 26

Názov katedry a vysokej školy: Slovenská technická univerzita v Bratislave, Katedra materiálového inžinierstva a fyziky

Terénne cvičenia:

Individuálne prednášky:

Ing. Eva Scholtzová, CSc.
Názov semestr. predmetu:
Počet hodín za semester: 8
Názov katedry a vysokej školy: University of Patras, Greece, Department of Geology

Ing. Eva Scholtzová, CSc.
Názov semestr. predmetu: odborna prax studentov II.st. št. program Anorganická chémia
Počet hodín za semester: 75
Názov katedry a vysokej školy: Univerzita Komenského v Bratislave, katedra anorganickej chemie

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**
Belgicko					Mária Chromčíková	6
					Jakub Michalík	6
					Anna Prnová	6
Česko					Michal Hičák	1
					Miroslav Hnatko	1
					Naser Hosseini	2
					Naser Hosseini	1
					Zoltán Lenčéš	1
					Zoltán Lenčéš	1
					Marek Liška	5
					Marek Liška	5
					Monika Michálková	2
					Peter Tatarko	2
					Peter Tatarko	1
					Peter Tatarko	1
Čína					Peter Tatarko	8
					Monika Tatarková	8
India					Peter Tatarko	7
Nemecko					Zoltán Lenčéš	2
Švajčiarsko					Naser Hosseini	62
Taliansko					Peter Tatarko	2
Počet vyslaní spolu					**21**	**130**

(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**
Počet prijatí spolu						

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

Krajina	**Názov konferencie**	**Meno pracovníka**	**Počet dní**
Česko	76. Sjezd chemiků	Jakub Michalík	4
		Lucia Šedivá	4
	Anorganické nekovové materiály	Guido de La Torre Olvera	3
		Naser Hosseini	3

	Construmat	Michal Slaný	3
	Graphene week	Marek Pribus	5
	ICCT	Lucia Šedivá	4
	LMP	Aliasghar Najafzadehkhoee	3
	MECC	Peter Boháč	6
		Juraj Bujdák	6
		Valéria Kureková	6
		Marián Matejdes	3
		Viktória Planetová	6
		Marek Pribus	6
		Eva Scholtzová	6
		Michal Slaný	6
		Peter Škorňa	6
Čierna Hora	RAD	Mária Chromčíková	7
Francúzsko	ICG	Veronika Democvics Silliková	4
		Oksana Matselko	4
India	CERA/InCerS	Miroslav Hnatko	6
		Zoltán Lenčéš	6
		Peter Tatarko	6
Japonsko	IS	Eva Scholtzová	18
		Peter Škorňa	9
	JCS8	Stanislav Komorovský	5
		Oľga Malkin	5
		Vladimír Malkin	5
		Debora Mišenková	5
Kórejská republika	ISASC	Dušan Galusek	9
		Pavol Šajgalík	5
		Peter Tatarko	7
		Monika Tatarková	7
Maďarsko	CMCEE	Dušan Galusek	4
		Ondrej Hanzel	5
		Monika Michálková	5
		Aliasghar Najafzadehkhoee	5
		Peter Tatarko	5
Nemecko	MAGIC	James Richard Asher	5
		Stanislav Komorovský	5
		Oľga Malkin	5
		Vladimír Malkin	5
Poľsko	PSC/SC	Ondrej Hanzel	3
		Miroslav Hnatko	3
		Zoltán Lenčéš	3
		Pavol Šajgalík	3
		Peter Tatarko	3
Rakúsko	ISNNM	Peter Tatarko	5
	MMQC	James Richard Asher	6
		Stanislav Komorovský	6
		Oľga Malkin	6
		Vladimír Malkin	6
		Debora Mišenková	6
Singapur	ICMET	Eva Scholtzová	7
Srbsko	IMEC	Ondrej Hanzel	4
		Miroslav Hnatko	4

		Zoltán Lenčéš	4
		Pavol Šajgalík	4
		Peter Tatarko	4
		Hakan Ünsal	4
	ISSP	Miroslav Boča	5
		Blanka Kubíková	5
		Zuzana Netriová	5
	TCC	Dušan Galusek	4
Španielsko	EUCHEMSIL	Miroslav Boča	5
		Veronika Demovics Silliková	5
		Blanka Kubíková	5
		Oksana Matselko	5
		Jarmila Mlynáriková	5
	Photochemistry	Peter Boháč	6
		Viktória Planetová	6
Švédsko	HTC	Naser Hosseini	5
Turecko	ISC	Peter Tatarko	3
		Hakan Ünsal	3
USA	CMS/ACC	Ľuboš Jankovič	9
		Jana Madejová	9
		Helena Pálková	9
		Eva Scholtzová	9
	ICACC	Pavol Šajgalík	6
		Inga Zhukova	8
Veľká Británia	ESG	Dušan Galusek	6
	PEC/JECS Trust Meeting	Pavol Šajgalík	2
Spolu	**30**	**82**	**438**

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

Skratky použité v tabuľke C:

76. Sjezd chemiků - 76. Sjezd chemiků
Anorganické nekovové materiály - "Anorganické nekovové materiály"
CERA/InCerS - International Conference on Advances Ceramics for Sustainability a 88th Annual Session of the Indian Ceramic Society
CMCEE - 14th International Conference on Ceramic Materials and Components for Energy and Environmental Systems
CMS/ACC - 61st CMS Meeting/5th Asian Clay Conference
Construmat - Construmat 2024
ESG - 15th European Society of Glass Conference
EUCHEMSIL - 29th EUCHEMS Conference on molten Salts and Ionic Liquids
Graphene week - Graphene week
HTC - 11th International Conference on High Temperature Capillarity
ICACC - 48th International Conference and Exposition on Advanced Ceramics and Composites
ICCT - 11th Intenational Conference on Chemical Technology
ICG - 13th International Symposium on Crystallization in Glasses and Liquids
ICMET - 2nd International Conference on Materials Science, Engineering and Technology
IMEC - 2nd International Conference on Innovative Materials in Extreme
IMEC - 2nd International Conference on Innovative Materials in Extreme Conditions
IS - AtomDec 4th International Symposium
ISASC - 5th International Symposium on New Frontier of Advanced Si-Based Ceramics and Composites
ISC - 4th International Symposium on Characterization
ISNNM - 18th International Symposium on Novel and Nano Materials
ISSP - 21st IUPAC International Symposium on Solubility Phenomena and Related Equilibrium Processes
JCS8 - 8th Japan-Czech-Slovakia International Symposium on Theoretical Chemistry

LMP - 16th International Conference on Local Mechanical Properties
MAGIC - 5th Workshop on MAGnetically Induced Molecular Currents
MECC - „Mid-European Clay Conference"
MMQC - XVIth Workshop on Modern Methods in Quantum Chemistry
PEC/JECS Trust Meeting - účasť na PEC a JECS Trust Meetingu Európskej keramickej spoločnosti
Photochemistry - Photochemistry
PSC/SC - 4th Polish-Slovak-Chinese Seminar on Ceramics
RAD - 12th International Conference on Radiation, Natural Sciences, Medicine, Engineering, Technology and Ecology
TCC - 3rd Teaming Club Conference

Príloha A-6

Vedecko-popularizačná činnosť pracovníkov organizácie

Meno	Spoluautori	Typ[1]	Názov	Miesto zverejnenia	Dátum alebo počet za rok
Dušan Galusek		TL	Interview pre Slovak Spectator	The Slovak Spectator, 29. Feb 2024	29.2.2024
Marián Matejdes		IN	Kde sa na Zemi ukrýva vodík?	Vedator_sk https://vedator.space/kde-sa-na-zemi-ukryva-vodik/	24.6.2024
Marián Matejdes		TV	Projekt umelej fotosyntézy - reportáž	VAT - magazín, RTVS Dvojka (https://www.stvr.sk/televizia/archiv/14067/473924#563)	29.6.2024
Marián Matejdes		IN	Vodík: Skrytý hrdina	Vedator_sk https://vedator.space/vodik-skryty-hrdina-cast-prva/	28.8.2024
IViliam Pavlík		iné	Letná škola mladých vedcov	https://www.all4science.sk/letna-skola-mladych-vedcov-2024/	15.7.2024
Ing. Peter Tatarko, PhD.		IN	tlačová správa - výskum pokročilých kompozitných materiálov a inovatívny spôsob spájania	www.sav.sk, www.teraz.sk, www.zive.aktuality.sk	2.1.2024

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

Príloha A-7

Vyznamenania, ceny a iné ocenenia udelené organizácii a jej pracovníkom v roku 2024

Domáce ocenenia

Ocenenia SAV

Boča Miroslav
•Čestná plaketa SAV Dionýza Ilkoviča za zásluhy vo fyzikálno-chemických vedách
Oceňovateľ:

Boča Miroslav
Cena SAV za výsledky medzinárodnej vedecko-technickej spolupráce pre rok 2024 (člen kolektívu)
Oceňovateľ:

Galusek Dušan
Cena SAV za budovanie infraštruktúry
Oceňovateľ: SAV

Petrisková Patrícia
Podporný Fond Štefana Schwarza - SAV
Oceňovateľ: Predsedníctvo SAV

Scholtzová Eva
Špičkové publikácie SAV
Oceňovateľ: SAV
Opis: V kategórii ŠPIČKOVÉ ČASOPISECKÉ PUBLIKÁCIE za publikáciu Uhlíková katóda bez okrajových/hraničných miest a s bohatými topologickými defektmi pre vysokovýkonné lítium-kyslíkové batérie publikovanú v Advanced Science.YU, Wei - YOSHII, Takeharu - AZIZ, Alex - TANG, Rui - PAN, Zheng-Ze - INOUE, Kazutoshi - KOTANI, Motoko - TANAKA, Hideki - SCHOLTZOVÁ, Eva - TUNEGA, Daniel - NISHINA, Yuta - NISHIOKA, Kiho - NAKANISHI, Shuji - ZHOU, Yi - TERASAKI, Osamu - NISHIHARA, Hirotomo. Edge-Site-Free and Topological-Defect-Rich Carbon Cathode for High-Performance Lithium-Oxygen Batteries. In Advanced Science, 2023, vol. 10, no. 16, art. no. 2300268-1-2300268-10. (2022: 15.1 - IF, Q1 - JCR, 4.086 - SJR, Q1 - SJR). ISSN 2198-3844. Dostupné na: https://doi.org/10.1002/advs.202300268 Typ: ADCA

Šimonová Tímea
Čestné uznanie v súťaži mladých vedeckých pracovníkov a pracovníčok SAV do 35 rokov
Oceňovateľ: Predsedníctvo SAV
Opis: Čestné uznanie bolo udelené za prezentovanie výsledkov súťažných vedeckých publikácií na tému 'Mechanizmus tvorby molekulových agregátov organických farbív v koloidných disperziách vrstevnatých kremičitanov'.

Iné domáce ocenenia