

**Ústav anorganickej chémie SAV**



**Správa o činnosti organizácie SAV  
za rok 2016**

Bratislava  
január 2017



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## 1. Základné údaje o organizácii

### 1.1. Kontaktné údaje

**Názov:** Ústav anorganickej chémie SAV  
**Riaditeľ:** doc. Ing. Miroslav Boča, DrSc.  
**Zástupca riaditeľa:** doc. Ing. Miroslav Hnatko, PhD.  
**Vedecký tajomník:** doc. Ing. Zoltán Lenčes, PhD.  
**Predseda vedeckej rady:** RNDr. Jana Madejová, DrSc.  
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**Názvy a adresy detašovaných pracovísk:**

- **Vitrum Laugaricio - Centrum kompetencie skla, spoločné pracovisko ÚACH SAV, TnU AD, RONA, a.s. a FCHPT STU**  
Študentská 2, 911 50 Trenčín

**Vedúci detašovaných pracovísk:**

- **Vitrum Laugaricio - Centrum kompetencie skla, spoločné pracovisko ÚACH SAV, TnU AD, RONA, a.s. a FCHPT STU**  
prof. Ing. Dušan Galusek, DrSc.

**Typ organizácie:** Rozpočtová od roku 1953

### 1.2. Údaje o zamestnancoch

Tabuľka 1a Počet a štruktúra zamestnancov

Štruktúra zamestnancov	K	K		K do 35 rokov		F	P	T
		M	Ž	M	Ž			
<b>Celkový počet zamestnancov</b>	74	40	34	9	7	68	59,43	45,88
<b>Vedeckí pracovníci</b>	46	32	14	7	3	42	36,31	36,31
<b>Odborní pracovníci VŠ</b> (výskumní a vývojoví zamestnanci <sup>1</sup> )	7	3	4	2	2	6	5,07	5,07
<b>Odborní pracovníci VŠ</b> (ostatní zamestnanci <sup>2</sup> )	6	3	3	0	2	6	5,07	0,5
<b>Odborní pracovníci ÚS</b>	12	2	10	0	0	11	10,65	4
<b>Ostatní pracovníci</b>	3	0	3	0	0	3	2,33	0

<sup>1</sup> odmeňovaní podľa 553/2003 Z.z., príloha č. 5

<sup>2</sup> odmeňovaní podľa 553/2003 Z.z., príloha č. 3 a č. 4

K – kmeňový stav zamestnancov v pracovnom pomere k 31.12.2016 (uvádzať zamestnancov v pracovnom pomere, vrátane riadnej materskej dovolenky, zamestnancov pôsobiach v zahraničí, v štátnych funkciách, členov Predsedníctva SAV, zamestnancov pôsobiach v zastupiteľských zboroch)

F – fyzický stav zamestnancov k 31.12.2016 (bez riadnej materskej dovolenky, zamestnancov pôsobiach v zahraničí v štátnych funkciách, členov Predsedníctva SAV, zamestnancov pôsobiach v zastupiteľských zboroch)

P – celoročný priemerný prepočítaný počet zamestnancov

T – celoročný priemerný prepočítaný počet riešiteľov projektov

M, Ž – muži, ženy

Tabuľka 1b Štruktúra vedeckých pracovníkov (kmeňový stav k 31.12.2016)

Rodová skladba	Pracovníci s hodnotou				Vedeckí pracovníci v stupňoch		
	DrSc.	CSc./PhD.	prof.	doc.	I.	II.a.	II.b.
<b>Muži</b>	8	23	5	7	8	14	10
<b>Ženy</b>	2	12	0	0	2	5	7

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
<b>Muži</b>	5	4	4	7	2	2	2	8	0
<b>Ženy</b>	1	1	3	5	2	1	4	2	0

Tabuľka 1d Priemerný vek zamestnancov organizácie k 31.12.2016

	Kmeňoví zamestnanci		Vedeckí pracovníci		Riešitelia projektov	
	Bez úväzku	S úväzkom	Bez úväzku	S úväzkom	Bez úväzku	S úväzkom
<b>Muži</b>	46,6	38,3	45,4	37,8	45,2	38,0
<b>Ženy</b>	47,1	46,0	43,2	42,5	47,8	48,6
<b>Spolu</b>	46,8	41,8	44,7	39,2	46,1	41,8

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

Ústav anorganickej chémie SAV v roku 2016 nezaznamenal žiadne zásadné zmeny v organizačnej štruktúre.

Priemerný vek zamestnancov ÚACH SAV dlhodobo ostáva pod hranicou 47 rokov. V roku 2016 bol priemerný vek všetkých pracovníkov ústavu 46,8 roka a priemerný vek vedeckých pracovníkov 44,7. I napriek tomu, že zamestnávanie mladých schopných post-doktorandov na ústave je jednou z hlavných priorít, nevieme ju v požadovanej miere primerane naplniť. Ak sa podarí nejakého mladého vedeckého pracovníka po skončení PhD štúdia zamestnať, tak len cez projekty, a to znamená, že na dobu 2-3 rokov, za tabuľkovú mzdu. Mnohí z mladých vedeckých pracovníkov takúto ponuku odmietnu. Z toho plynie aj pravdepodobné zvyšovanie priemerného veku zamestnancov v blízkej budúcnosti, keďže počet pracovníkov v dôchodkovom veku je minimálny. Takáto situácia kladie nároky na personálnu a predovšetkým mzdovú politiku vedenia ústavu. Motivácia mladých pracovníkov pre zotrvanie na ústave sa realizuje predovšetkým prostredníctvom poskytnutia možnosti zvyšovania ich kvalifikácie (stupeň IIb, IIa a Ia). Zvyšovanie kvalifikácie vedeckých pracovníkov má logicky za následok zvýšený tlak na mzdový fond. Tento fakt by mohlo pri tvorbe rozpočtu, hlavne mzdových fondov ústavov, zohľadniť aj vedenie SAV pri presadzovaní vlastnej mzdovej politiky v rámci SAV. Ústav sa od roku 2008 podieľal na realizácii 13-tich projektov financovaných zo ŠF EÚ, ktoré sú aktuálne všetky ukončené. Aj napriek tomu, že tieto projekty sú ukončené, administratívne zaťaženie na ich monitoring ostáva, pričom mzdové náklady na túto administráciu už nie je možné vykryvať z projektov, ale len zo mzdového fondu. Navyše, výraznú časť administratívnych výkonov preberajú aj vedeckí pracovníci. Prepočítaný počet pracovníkov v roku 2016 je na úrovni 59,43 FTE, čo je pokles oproti roku 2015 (65,49).

## 2. Vedecká činnosť

### 2.1. Domáce projekty

Tabuľka 2a Počet domácich projektov riešených v roku 2016

ŠTRUKTÚRA PROJEKTOV	Počet projektov		Čerpané financie za rok 2016 (v €)		
	A	B	A		B
			spolu	pre ÚACH	
1. Vedecké projekty, ktoré boli r. 2016 financované VEGA	9	1	105 353	105 353	4 009
2. Projekty, ktoré boli r. 2016 financované APVV	7	5	235 122	164 237	51 049
3. Projekty OP ŠF	0	0	-	-	-
4. Projekty centier excelentnosti SAV	0	0	-	-	-
5. Iné projekty (FM EHP, ŠPVV, Vedecko-technické projekty, ESF, na objednávku rezortov a pod.)	3	0	112 022	112 022	-

A - organizácia je nositeľom projektu

B - organizácia sa zmluvne podieľa na riešení projektu

Tabuľka 2b Zoznam domácich projektov podaných v roku 2016

Štruktúra projektov	Miesto podania	Organizácia je nositeľom projektu	Organizácia sa zmluvne podieľa na riešení projektu
1. Účasť na nových výzvach APVV r. 2016	-	1	1
2. Projekty výziev OP ŠF podané r. 2016	Bratislava		2
	Regióny		6

Projekty podané v roku 2016

### APVV

**Nové sklené a sklokeramické fosfory na báze hlinitanov vzácnych zemín pre aplikácie v pevnolátkových energiách šetriacich svetelných zdrojoch vyžarujúcich biele svetlo (pc-WLED diódy)**

Evidenčné číslo projektu: APVV-16-0261

Podávateľ projektu: R. Klement, TnUAD

Partner/i: ÚACH SAV, ÚMV SAV

Stav: podaný

**Relativistické efekty v molekulových materiáloch založených na komplexoch zlata: katalytická aktivita, prenos protónov a NMR vlastnosti**

Výzva: Dunajská stratégia 2016 - riešenie spoločných projektov na podporu výskumu a vývoja formou spolupráce medzi organizáciami v Slovenskej republike a v Rakúsku, Českej republike a Srbskej republike

Evidenčné číslo projektu: DS-2016-0009

Akronym: GOLDCAT

Podávateľ projektu: ÚACH SAV (O. Malkina)

Partner/i: Masarykova Univerzita, Brno, Česko; Paris-Lodron University of Salzburg, Austria

Stav: prijatý

**Projekty štrukturálnych fondov:****Priemyselné výskumno-vývojové centrum akumulčných systémov tepla**

Evidenčné číslo projektu: NFP313010B859 ( kód ŽoNFP)

Podávateľ projektu: PREFA ALFA, a.s.

Partner/i: Trenčianska univerzita Alexandra Dubčeka v Trenčíne, ÚACH SAV

Stav: podaný,

**Gama radiačná záťaž sklovláknitých izolácií a bezpečné chladenie pri ťažkých haváriách v jadrových elektrárnach**

Evidenčné číslo projektu: NFP313010B933( kód ŽoNFP)

Akronym: GAŤAH

Podávateľ projektu: VÚEZ, a.s.

Partner/i: Trenčianska univerzita Alexandra Dubčeka v Trenčíne, ÚACH SAV

Stav: podaný

**Základný, priemyselný výskum a experimentálny vývoj metodík a priemyselných aplikácií smerujúcich k využitiu vo vybraných oblastiach hospodárskej špecializácie RIS 3 SK**

Evidenčné číslo projektu: NFP313010B828 ( kód ŽoNFP)

Podávateľ projektu: RONA, a.s.

Partner/i: Trenčianska univerzita Alexandra Dubčeka v Trenčíne, ÚACH SAV

Stav: podaný

**Výskum fyzikálnych a technických aspektov rýchleho plynom chladeného reaktora IV. generácie ALLEGRO**

Evidenčné číslo projektu: NFP313010D050( kód ŽoNFP)

Akronym: ALLEGRO 2

Podávateľ projektu: VUJE, a.s.

Partner/i: Centrum pre rozvoj energetiky, Slovenská technická univerzita v Bratislave, ÚACH SAV, Ústav materiálov a mechaniky strojov SAV, VÚEZ, a.s., Výskumný ústav zvaračský - Priemyselný inštitút SR,

Stav: podaný

**Výskum progresívnych materiálov pre priemysel**

Evidenčné číslo projektu: NFP313010C857( kód ŽoNFP)

Akronym: PROGMAT

Podávateľ projektu: CEIT, a.s.

Partner/i: Transmisie engineering a.s., ÚACH SAV, Žilinská univerzita v Žiline,

Stav: podaný

**Energetické šachty – energy shafts**

Výskum a vývoj nových metód získania energie využitím akumulčného potenciálu zemskej kôry, ako aj nových metód pre dosiahnutie relevantnej hĺbky prieniku do zemskej kôry. Výskum možností integrácie termických a elektrických energetických systémov

Evidenčné číslo projektu: NFP313010C871 ( kód ŽoNFP)

Akronym: ESH

Podávateľ projektu: ATASAC - Advanced Technology and Science Applications Centre

Partner/i: Slovenská technická univerzita v Bratislave, (Stavebná fakulta), Univerzita Komenského v Bratislave, Trenčianska univerzita Alexandra Dubčeka v Trenčíne, ÚACH SAV, ZTS INMART, a. s., PREFA ALFA a.s., SBAJ INMART a.s., DIVIDEND INDUSTRIES AB,

Stav: podaný

**Univerzitný vedecký park STU Bratislava II. fáza**

Evidenčné číslo projektu: NFP313020D243 (kód ŽoNFP)

Podávateľ projektu: Slovenská technická univerzita v Bratislave

Partner/i: Elektrotechnický ústav SAV, Univerzita Komenského v Bratislave, ÚACH SAV

Stav: podaný



**Výskum a vývoj v špecializácii “Materiálový výskum a nanotechnológie”, zameraný na priemyselné materiály, štruktúry, vrstvy rozhrania a inovačné technológie ich spracovania v prostredí simulácií a inteligentných výrobných systémov na princípe Industry 4.0“**

Evidenčné číslo projektu: NFP313010D129 (kód ŽoNFP)

Podávateľ projektu: MTF STU Trnava, CEPOMA FCHPT STU, Fakulty a CN STU v Bratislave

Partner/i: VUT FSI Brno, ŽU SjF Žilina, FMFI UK Bratislava, ÚMV SAV Košice, FÚ SAV Bratislava, ÚACH SAV Bratislava, ÚI SAV Bratislava, PRVÁ ZVÁRAČSKÁ, a.s. Bratislava, ŽP VVC s.r.o. Podbrezová, ŽOS a.s., Trnava, ŽP a.s. Podbrezová, BIATEC s.r.o. Nové Mesto n/Váhom, ZF Slovakia as.s, Trnava

## 2.2. Medzinárodné projekty

### 2.2.1. Medzinárodné projekty riešené v roku 2016

Tabuľka 2c Zoznam medzinárodných projektov riešených v roku 2016

ŠTRUKTÚRA PROJEKTOV	Počet projektov		Čerpané financie za rok 2016 (v €)		
	A	B	A		B
			spolu	pre ÚACH	
<b>1. Projekty 7. Rámcového programu EÚ a Horizont 2020</b>	0	2	-	-	40 605
<b>2. Multilaterálne projekty v rámci vedeckých programov COST, ERANET, INTAS, EUREKA, ESPRIT, PHARE, NATO, UNESCO, CERN, IAEA, ESF, ERDF a iné</b>	0	3	-	-	-
<b>3. Projekty v rámci medzivládnych dohôd o vedecko-technickej spolupráci</b>	2	0	-	-	-
<b>4. Bilaterálne projekty</b>	3	0	-	-	-
<b>5. Podpora medzinárodnej spolupráce z národných zdrojov (MVTs, APVV, ...)</b>	3	4	47 516	47 516	19 893
<b>6. Iné projekty financované alebo spolufinancované zo zahraničných zdrojov</b>	0	0	-	-	-

A - organizácia je nositeľom projektu

B - organizácia sa zmluvne podieľa na riešení projektu

### 2.2.2. Medzinárodné projekty v 7. RP EÚ a Horizont 2020 podané v roku 2016

Tabuľka 2d Počet projektov 7. RP EÚ a Horizont 2020 v roku 2016

	A	B
<b>Počet podaných projektov v 7. RP EÚ</b>	3	
<b>Počet podaných projektov Horizont 2020</b>		2

A - organizácia je nositeľom projektu

B - organizácia sa zmluvne podieľa na riešení projektu

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

### Projekty podané v roku 2016

**Názov projektu:** Development of New Ultra-High Temperature Ceramic Matrix Composites with Improved Oxidation/Ablation Properties for Aerospace Industry

**Evidenčné číslo projektu:** 750183

**Výzva:** H2020-MSCA-IF-2016

**Akronym:** UltraCom

**Podávateľ projektu:** ÚACH SAV

**Partner/i:** P. Tatarko (Slovenská Republika)

**Stav:** podaný

**Názov projektu:** Valorisation of Cellulose and Clay Highly Dispersed on Mixed Oxides Materials for Electrochemical Recovery of Actinides and Lanthanides in Molten Fluoride

**Evidenčné číslo projektu:** 751689

**Akronym:** SASAMA

**Výzva:** H2020-MSCA-IF-2016

**Podávateľ projektu:** ÚACH SAV

**Partner/i:** J.R. Njimou (Kamerun)

**Stav:** podaný

**Názov projektu:** Corrosion Mechanisms with Microstructure Damage for Ni-Based Alloys used in Molten Fluoride Salts

**Evidenčné číslo projektu:** 753557

**Akronym:** CORMFS

**Výzva:** H2020-MSCA-IF-2016

**Podávateľ projektu:** ÚACH SAV

**Partner/i:** Z. Wang (Čína)

**Stav:** podaný

**Názov projektu:** Advanced nano-ceramics for green and environmental technologies

**Evidenčné číslo projektu:** 722597

**Akronym:** ADVANTAGES

**Výzva:** Horizon 2020-MSCA-ITN-2016

**Podávateľ projektu:** University of Montpellier, CNRS, Francúzsko

**Partner/i:** ÚACH SAV (z.r. Zoltán Lenčéš); Technische Universität Darmstadt, Nemecko; Universität Bayreuth, Nemecko; University of Padova, Taliansko; University of Trento, Taliansko; EngiCer SA, Švajčiarsko; Saint-Gobain Centre de Recherches et D'Etudes Europeen, Francúzsko

**Stav:** neschválený

**Building-up Centre of Excellence for advanced materials application (CEMEA)**

H2020-WIDESPREAD-01-2016-2017-TeamingPhase2

**Evidenčné číslo:** 739559

**Podávateľ projektu:** SAV

**Partneri:** University Helsinki, VTT Technical Research Centre of Finland Ltd, ÚACH (z.r. M. Boča), ÚPo, VÚ, FÚ, EIÚ, ÚMMS, EÚ, PÚ.

**Stav:** Projekt schválený – nefinancovaný

### 2.2.3. Zámery na čerpanie štrukturálnych fondov EÚ v ďalších výzvach

## 2.3. Najvýznamnejšie výsledky vedeckej práce (maximálne 1000 znakov + 1 obrázok)

### 2.3.1. Základný výskum

**Názov:** Luminiscenčné materiály s potenciálnou aplikáciou v pc-WLED diódach

**Autori:** K. Haladejová, R. Klement, A. Prnová, D. Galusek

Z práškových prekursorov syntetizovaných sól-gél metódou boli pripravené sklá v sústave  $Y_2O_3-Al_2O_3$  a  $Y_2O_3-Al_2O_3-SiO_2$  plameňovou syntézou vo forme sklených mikrogulôčok. Sklá boli dopované prídavkom malého množstva iónov prvkov vzácnych zemín a prechodných prvkov,  $Ce^{3+}$  a  $Mn^{2+}$ , s vhodnými fotoluminiscenčnými vlastnosťami pre aplikácie v LED diódach vyžarujúcich biele svetlo. Sklokeramické materiály pripravené z  $Ce^{3+}$  skiel riadenou kryštalizáciou vykazujú pri excitácii modrým svetlom intenzívnu zeleno-žltú emisiu porovnateľnú s komerčnými fosformi pri nízkej koncentrácii dopantu. Navyše sa podarilo vhodnou voľbou časovo-teplotného režimu spracovania skiel dosiahnuť emisiu bieleho svetla pri excitácii len NUV žiarením. Kodopovaním  $Ce^{3+}$  systému iónmi  $Mn^{2+}$  sa podarilo dosiahnuť zlepšenie emisie

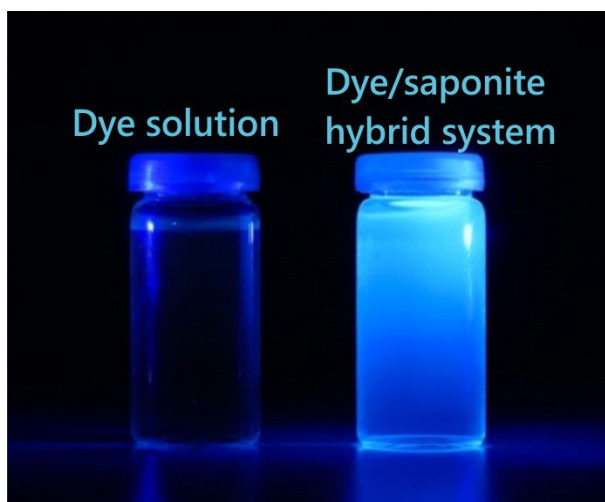
v oranžovo-červenej spektrálnej oblasti.

HALADEJOVÁ, Katarína - PRNOVÁ, Anna - KLEMENT, Róbert - TUAN, Wei-Hsing - SHIH, S. J. - GALUSEK, Dušan. Aluminate glass based phosphors for LED applications. In Journal of the European Ceramic Society, 2016, vol. 36, no. 12, p. 2969-2973. (2.933 - IF2015).

**Názov:** Zvýšená fluorescencia kyanínového farbiva NK88 adsorbovaného na povrchu vrstevnatého silikátu saponitu

**Autori:** P. Boháč, J. Bujdák, A. Czímerová

Organické farbivá pri interakcii s vrstevnatými silikátmi často menia fotofyzikálne a fotochemické vlastnosti. K nežiadúcim a veľmi častým javom patrí molekulová agregácia, ktorá môže viesť k strate fotoaktivity. V prípade tiokyanínového farbiva NK88 zo skupiny polymetínových farbív sa pozoroval opačný jav. Pri interakcii molekúl farbiva s povrchom nanočastíc syntetického silikátu typu saponitu došlo k mnohonásobnému zvýšeniu intenzity fluorescencie farbiva, pričom sa významne nemenila vlnová dĺžka emitovaného žiarenia. Zvýšená fotoaktivita súvisí so zmenami vlastností molekúl v adsorbovanom stave. Adsorpcia farbiva na časticach saponitu zabraňuje neradiačnej relaxácii excitovaných stavov rotáciou skupín molekúl farbiva, ktorá sa uplatňuje v roztoku. Chemometrická analýza spektier farbiva naznačuje párovanie excitovaných stavov molekúl a prítomnosť medzimolekulového prenosu energie. Výsledky práce naznačujú, že hybridné systémy tohto typu sa javia ako zaujímavé prekurzory pre fotofyzikálne a fotochemické aplikácie.

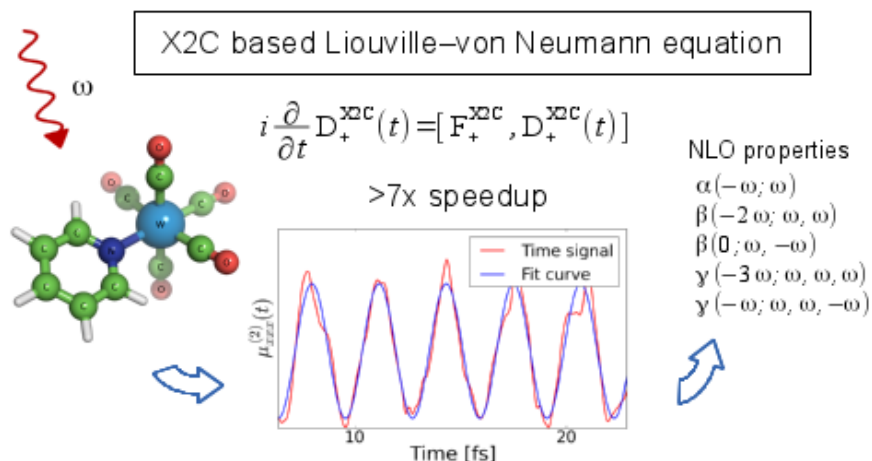


BOHÁČ, Peter - CZÍMEROVÁ, Adriana - BUJDÁK, Juraj. Enhanced luminescence of 3,3'-diethyl-2,2'-thiacyanine cations adsorbed on saponite particles. In Applied Clay Science, 2016, vol. 127-128, p. 64-69. (2.586 - IF2015).

**Názov:** Zrýchlenie relativistickej elektrónovej dynamiky pomocou X2C transformácie: Aplikácia na výpočty nelineárnych optických vlastností

**Autori:** L. Konečný, M. Kádek, S. Komorovský, O. Malkina, K. Ruud, M. Repický

Riešiť Diracovu rovnicu je dôležité pre popis systémov obsahujúcich ťažké atómy. Je to rovnica spájajúca kvantovú mechaniku s teóriou relativity. Riešenie jej časovej verzie poskytuje nový pohľad na spektroskopické experimenty a nové spôsoby predpovedania molekulových vlastností. Po prvý raz sme vysvetlili, ako možno aproximatívnu transformáciu (X2C) známu z riešenia bezčasovej Diracovej rovnice použiť pre časovú. Získanú metódu sme potom využili na výpočet lineárnych a nelineárnych optických (NLO) vlastností molekúl. Pilotné aplikácie ukázali, že táto nová metóda dosahuje viac ako 7-násobné urýchlenie prakticky bez straty presnosti. Preto je vhodná pre veľké systémy, ako napríklad komplexy ťažkých kovov, ktoré sú zaujímavé z hľadiska moderných optoelektronických aplikácií vďaka potenciálne vysokým hodnotám NLO vlastností. Náš program je v súčasnosti jedným z dvoch na svete umožňujúcich výpočty molekulových vlastností z časovej Diracovej rovnice.



KONEČNÝ, Lukáš - KÁDEK, Marius - KOMOROVSKÝ, Stanislav - MALKINA, Oľga - RUUD, Kenneth - REPISKÝ, Michal. Acceleration of relativistic electron dynamics by means of X2C transformation: Application to the calculation of nonlinear optical properties. In Journal of Chemical Theory and Computation, 2016, vol. 12, no., p. 5823-5833. (5.301 - IF2015).

### 2.3.2. Aplikačný typ

**Názov:** Duté amorfné a polykryštalické YAG mikrogulôčky pripravené plameňovou syntézou

**Autori:** J. Kraxner, J. Chovanec, K. Haladejová, I. Petříková, D. Galusek

Duté sklené mikrogulôčky sú cenovo veľmi výhodné materiály s veľkými možnosťami pre rôzne aplikácie, napr. ako plnivá do plastov, farieb, lakov, na uskladnenie vodíka, na výrobu izolačných materiálov, v medicíne pri liečení nádorových ochorení. Úspešne sme pripravili  $\text{Y}_3\text{Al}_5\text{O}_{12}$  sklené a polykryštalické duté mikrogulôčky s priemerom 5-35  $\mu\text{m}$  pomocou plameňovej syntézy ( $\text{O}_2/\text{CH}_4$  plameň) z práškoveho prekursoru. Riadenou kryštalizáciou zahrievaním na 1200  $^\circ\text{C}$  sa pripravili duté polykryštalické mikrogulôčky s priemernou veľkosťou zŕn YAG  $540 \pm 40$  nm. Duté YAG mikrogulôčky sú vďaka svojej nízkej hustote a vysokému obsahu  $\text{Y}_2\text{O}_3$  vhodným kandidátom pre rádioterapiu nádorových ochorení pečene.

KRAXNER, Jozef – CHOVANEC, Jozef – HALADEJOVÁ, Katarína – PETRÍKOVÁ, I. – GALUSEK, Dušan. Hollow polycrystalline YAG microspheres by flame synthesis, zaslané do Materials Letters

### 2.3.3. Medzinárodné vedecké projekty

**Názov:** Vplyv gama žiarenia na mechanické vlastnosti sklovláknitých izolácií používaných v jadrovej energetike

**Autori:** M. Chromčíková, J. Vokelová, J. Micháľková, M. Liška, J. Macháček, O. Gedeon, V. Šoltész

Zistilo sa, že vlákna sklovláknitých izolácií používaných v jadrových elektrárnach sa po ožiarení gama žiarením pri zvýšenej teplote stanú krehkými. To stavia do iného svetla výsledky všetkých testov, ktoré sa doteraz realizovali s cieľom skúmať mechanické vlastnosti vlákien (lámanie a vývoj distribúcie dĺžky) pri mechanickom namáhaní pri simulovaných podmienkach havárií typu straty chladiva. Tieto testy sa totiž realizovali na neožiarených vláknach. Pokračovanie tohto finančne náročného výskumu v spolupráci s VŠChT Praha je predmetom projektu SFEU GATAH podaného VUEZ, a.s. Levice s partnermi ÚACh SAV a TnU AD.

CHROMČÍKOVÁ, Mária - VOKELOVÁ, Jana - MICHÁLKOVÁ, J. - LIŠKA, Marek - MACHÁČEK, Jan - GEDEON, Ondrej - SOLTÉSZ, Vojtech. Chemical durability of gamma-irradiated glass fibrous insulation. In Nuclear Technology, 2016, vol. 193, no. 2, p. 297-305. (0.623 - IF2015)

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

Tabuľka 2e Štatistika vybraných kategórií publikácií

<b>PUBLIKAČNÁ A EDIČNÁ ČINNOSŤ</b>	<b>A Počet v r. 2016/ doplňky z r. 2015</b>	<b>B Počet v r. 2016/ doplňky z r. 2015</b>	<b>C Počet v r. 2016/ doplňky z r. 2015</b>
<b>1. Vedecké monografie a monografické štúdie vydané v domácich vydavateľstvách (AAB, ABB)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>2. Vedecké monografie a monografické štúdie vydané v zahraničných vydavateľstvách (AAA, ABA)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>3. Odborné monografie, vysokoškolské učebnice a učebné texty vydané v domácich vydavateľstvách (BAB, ACB, CAB)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>4. Odborné monografie a vysokoškolské učebnice a učebné texty vydané v zahraničných vydavateľstvách (BAA, ACA, CAA)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>5. Kapitoly vo vedeckých monografiách vydaných v domácich vydavateľstvách (ABD)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>6. Kapitoly vo vedeckých monografiách vydaných v zahraničných vydavateľstvách (ABC)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>7. Kapitoly v odborných monografiách, vysokoškolských učebniciach a učebných textoch vydaných v domácich vydavateľstvách (BBB, ACD)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>8. Kapitoly v odborných monografiách, vysokoškolských učebniciach a učebných textoch vydaných v zahraničných vydavateľstvách (BBA, ACC)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>9. Vedecké práce registrované v Current Contents Connect (ADCA, ADCB, ADDA, ADDB)</b>	<b>48 / 1</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>10. Vedecké práce registrované vo Web of Science Core Collection alebo Scopus (ADMA, ADMB, ADNA, ADNBN)</b>	<b>5 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>11. Vedecké práce v ostatných domácich časopisoch (ADFA, ADFB)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>12. Vedecké práce v ostatných zahraničných časopisoch (ADEA, ADEB)</b>	<b>2 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>13. Vedecké práce v domácich recenzovaných zborníkoch (AEDA)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>14. Vedecké práce v zahraničných recenzovaných zborníkoch (AECA)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>15. Publikované príspevky na domácich vedeckých konferenciách (AFB, AFD)</b>	<b>17 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>16. Publikované príspevky na zahraničných vedeckých konferenciách (AFA, AFC)</b>	<b>2 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>17. Vydané periodiká evidované v CCC, WoS Core Collection, SCOPUS</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>18. Ostatné vydané periodiká</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>19. Vydané alebo editované zborníky z vedeckých podujatí (FAI)</b>	<b>2 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>20. Preklady vedeckých a odborných textov (EAI)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>21. Heslá v odborných terminologických slovníkoch a encyklopédiách (BDA, BDB)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>

A - pracovisko SAV je uvedené ako pracovisko (adresa) autora, alebo je súčasťou kolaborácie alebo iného združenia, ktoré je uvedené ako pracovisko (adresa) autora

B - pracovisko SAV nie je na publikácii uvedené, pretože prameň údaj o pracovisku autora neobsahuje, práca ale vznikla na pracovisku SAV

C - pracovisko SAV je uvedené ako materské pracovisko autora odlišné od pracoviska, na ktorom práca vznikla (napr. „on leave...“, „permanent address...“, „present address...“)

Tabuľka 2f Štatistika vedeckých prác podľa kvartilu vedeckého časopisu

Kvartil vedeckého časopisu podľa IF z r. 2015 (zdroj JCR)	Q1	Q2	Q3	Q4	spolu
Počet článkov / doplnky	25 / 0	12 / 0	8 / 1	3 / 0	48 / 1
Kvartil vedeckého časopisu podľa SJR z r. 2015 (zdroj Scimago)					
Počet článkov	27 / 0	20 / 0	3 / 1	0 / 0	50 / 1

Tabuľka 2g Ohlasy

OHLASY	A Počet v r. 2015/ doplnky z r. 2014	B Počet v r. 2015/ doplnky z r. 2014
Citácie vo WOS (1.1, 2.1)	1300 / 10	34 / 0
Citácie v SCOPUS (1.2, 2.2)	29 / 5	0 / 0
Citácie v iných citačných indexoch a databázach (9, 10, 3.2, 4.2)	0 / 0	0 / 0
Citácie v publikáciách neregistrovaných v citačných indexoch (3, 4, 3.1, 4.1)	2 / 0	0 / 0
Recenzie na práce autorov z organizácie (5, 6, 7, 8)	0 / 0	0 / 0

A - pracovisko SAV je uvedené ako pracovisko (adresa) autora, alebo je súčasťou kolaborácie alebo iného združenia, ktoré je uvedené ako pracovisko (adresa) autora, alebo pracovisko SAV nie je na publikácii uvedené, pretože prameň údaj o pracovisku autora neobsahuje, práca ale vznikla na pracovisku SAV

B - pracovisko SAV je uvedené ako materské pracovisko autora odlišné od pracoviska, na ktorom práca vznikla (napr. „on leave...“, „permanent address...“, „present address...“)

## 2.5. Aktívna účasť na vedeckých podujatiach

Tabuľka 2h Vedecké podujatia

Prednášky a vývesky na medzinárodných vedeckých podujatiach	51
Prednášky a vývesky na domácich vedeckých podujatiach	25

## 2.6. Vyžiadané prednášky

### 2.6.1. Vyžiadané prednášky na medzinárodných vedeckých podujatiach

D. GALUSEK: Aluminate glasses based luminescent nanomaterials for HB-LEDs, International Conference on Advances in Applied Mathematic, Materials Science and Nanotechnology for Engineering and Industrial Applications, Federal Institute of Science and Technology, Angamaly, India. Key Note lecture, 7. – 9. 1. 2016

R. KLEMENT, K. HALADEJOVÁ, P. VETEŠKA, S.-J. SHIH, W.-H. TUAN, and D. GALUSEK, Visible Broadband Luminescence of Transition Metals Doped Aluminates and Aluminosilicates, The 10<sup>th</sup> Asian Meeting on Electroceramics AMEC2016, Taipei, Taiwan, Key note lecture, 4. – 7. 12. 2016

O. MALKINA: New tools for interpretation of indirect nuclear spin-spin couplings, 6<sup>th</sup> Annual Meeting of the St. Andrew Centre of Magnetic Resonance, St. Andrews, UK, 6. 6. 2016

P. ŠAJGALÍK: Additive-free hot-pressed silicon carbide ceramics – a material with exceptional mechanical properties, CENERGY (synergy) – Materials Day 2016, Ceramics for Energy, Darmstadt, Nemecko, 29. 04. 2016

P. ŠAJGALÍK: Silicon nitride-hydroxyapatite bioactive composite. 6<sup>th</sup> International Congress on Ceramics:

from Lab to Fab (ICC6), Drážďany, Nemecko, 21. – 25. 8. 2016

P. ŠAJGALÍK: Additive-free hot-pressed silicon carbide ceramics - a material with exceptional mechanical properties. 91<sup>st</sup> DKG Annual Meeting in Conjunction with the Symposium on High-Performance Ceramics, TU Bergakademie Freiberg, Nemecko, 7. – 9. 3. 2016

P. ŠAJGALÍK: Additive-free hot-pressed silicon carbide ceramics - a material with exceptional properties. 4<sup>th</sup> International Symposium on New Frontier of Advanced Si-based Ceramics and Composites (ISASC 2016), Haeundae Grand Hotel, Busan, Korea, 25. – 28. 9. 2016

P. ŠAJGALÍK: GB chemistry of silicon nitride based ceramics - implications to the ceramics properties. Conference on the Science and Engineering of Oxide Materials (CONSILOX XII), Sinaia, Rumunsko, 16. – 20. 9. 2016

P. ŠAJGALÍK: In situ formed SiC nano-inclusions in Si<sub>3</sub>N<sub>4</sub> based ceramics - thermal shock resistance, wear behavior and oxidation resistance. 40<sup>th</sup> International Conference & Exposition on Advanced Ceramics and Composites (ICACC 2016), Daytona Beach, Florida, USA, 24. – 29. 1. 2016

### 2.6.2. Vyžiadané prednášky na domácich vedeckých podujatiach

P. BOHÁČ: Štúdium prenosu energie medzi kationovými farbivami na tenkých vrstvách ílových minerálov, Workshop Materiálový výskum pomocou UV-Vis-NIR spektrofotometrie, Bratislava, 21. 1. 2016

J. BUJDÁK: Využitie UV-VIS spektroskopie: Hybridné systavy ílových minerálov a organických farbív, Workshop Materiálový výskum pomocou UV-Vis-NIR spektrofotometrie, Bratislava, 21. 1. 2016

A. ČEKLOVSKÝ: Optické vlastnosti hybridných nanomateriálov, Workshop Materiálový výskum pomocou UV-Vis-NIR spektrofotometrie, Bratislava, 21. 1. 2016

### 2.6.3. Vyžiadané prednášky na významných vedeckých inštitúciách

J. ASHER: Visualisation of the 3D g-tensor density”, Technical University of Munich, Nemecko, 8. 8. 2016

M. BOČA: Corrosion behaviour of Different Construction Materials in FLiNaK with Addition of Fluorides Salts Based on Elements of Corroded Materials,

- University of Science and Technology, Peking, Čína, 9. 5. 2016
- Shanghai Institute of Applied Physics, Chinese Academy of Science, Šanghaj, Čína, 14. 5. 2016
- Northeastern University, Shenyang, Čína, 16. 5. 2016

J. BUJDÁK: Hybrid systems based on organic dyes and layered silicates: Fundamentals and potential applications, Faculty of Sciences, Bilbao University, Španielsko, 18. 07. 2016

D. GALUSEK: Visible Broadband Luminescence of Transition Metals Doped Aluminate and Aluminosilicate Glass and Glass-Ceramics, School of Materials Science and Engineering, Northwestern Polytechnical University, Xi'an, Čína, 14. 12. 2016

B. KUBÍKOVÁ: Critical Evaluation of Volume Properties of Molten Fluoride Salts.

- Shanghai Institute of Applied Physics, Chinese Academy of Science, Šanghaj, Čína, 15. 5. 2016
- Northeastern University, Shenyang, Čína, 16. 5. 2016

O. MALKINA: Is there anything interesting about the DSO contribution to NMR spin-spin couplings?, CTCC Tromsø, Nórsko, 12. 8. 2016

V. MALKIN: Calculations of the EPR g-tensor in the framework of two- and four-component HF and DFT approaches, CTCC Tromsø, Nórsko, 12. 8. 2016

V. MALKIN: Visualization of EPR hyperfine coupling pathways, Technical University of Berlin, Nemecko, 7. 12. 2016

N.S. PATEL: High-temperature properties of materials corrosion in molten salts. Solar Thermal Group, Australian National University, Canberra, Austrália 9. 12. 2016

P. ŠAJGALÍK: Sintering, Northwestern Polytechnical University, Xi An, Čína

- Sintering, 29. 12. 2016
- Thermal shock resistance, wear behavior and oxidation resistance of silicon nitride based nano-composites, 29. 12. 2016

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

## 2.7. Patentová a licenčná činnosť na Slovensku a v zahraničí v roku 2016

### 2.7.1. Vynálezy, na ktoré bol udelený patent

### 2.7.2. Prihlásené vynálezy

### 2.7.3. Predané licencie

### 2.7.4. Realizované patenty

Finančný prínos pre organizáciu SAV v roku 2016 a súčet za predošlé roky sa neuvádzajú, ak je zverejnenie v rozpore so zmluvou súvisiacou s realizáciou patentu.

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

Tabuľka 2i Experti hodnotiaci národné projekty

Meno pracovníka	Typ programu/projektu/výzvy	Počet hodnotených projektov
Bujdák Juraj	APVV - VV 2015	1
	VEGA	1
Hnatko Miroslav	APVV - VV 2015	1
	VEGA	2
Jankovič Ľuboš	APVV - Dunajská stratégia 2016 (multilaterálne)	2
	APVV bilaterálne SK-SRB	1
	APVV Všeobecná výzva	2
	VEGA	1
Komadel Peter	APVV	2
	VEGA	2
Lenčes Zoltán	VEGA	6

## 2.9. Účasť na spracovaní hesiel do encyklopédie Beliana

Počet autorov hesiel: 0

## 2.10. Iné informácie k vedeckej činnosti.

Počet časopiseckých impaktovaných publikácií registrovaných v databáze WOS a SCOPUS v tomto roku dosiahol číslo 49. V závislosti na metodike, na ktorú kategóriu vzťahnuť 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 41,9, vrátane siedmich doktorandov 48,9. Potom na jedného pracovníka pripadá 1,2 publikácie, vrátane doktorandov - 1,0 publikácie.

Tento parameter oproti vlaňajšku mierne narástol, ale tento nárast nemožno považovať za výrazný. Takýto stav považujeme za neuspokojivý a cieľom ostáva dosiahnuť dve publikácie na vedeckého pracovníka ročne, ktorý zodpovedá štandardu vyspelých vedeckých pracovísk s podobným zameraním. Priemerný impakt faktor časopisov, v ktorých boli práce uverejnené, bol 2,68, kým vlani bol 2,26 (treba mať na pamäti, že údaje sú so záverečných správ, v ktorých sa nachádzajú aj doplnky publikácií za predchádzajúci rok, ako aj chýbajúce publikácie za rok 2016, ktorým ešte neboli priradené kompletne bibliografické údaje). Citovanosť (vo všetkých dostupných databázach WOS – 1310, SCOPUS – 34) na vedeckého pracovníka (36,3) je 37,0 citácií, čo predstavuje len veľmi mierny nárast v porovnaní s rokom 2015. Pracovníci ústavu predniesli 9 pozvaných prednášok na významných svetových konferenciách.



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

#### 3.1. Údaje o doktorandskom štúdiu

Tabuľka 3a Počet doktorandov v roku 2016

Forma	Počet k 31.12.2016				Počet ukončených doktorantúr v r. 2016					
	Doktorandi				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
<b>Interná zo zdrojov SAV</b>	4	1	0	0	2	0	0	0	0	0
<b>Interná z iných zdrojov</b>	0	1	0	0	1	0	0	0	0	0
<b>Externá</b>	1	1	0	0	0	0	0	0	0	0
<b>Spolu</b>	5	3	0	0	3	0	0	0	0	0
<b>Súhrn</b>	8		0		3		0		0	

#### 3.2. Zmena formy doktorandského štúdia

Tabuľka 3b Počty preradení z interných foriem na externé a z externej formy na interné

Pôvodná forma	Interná z prostriedkov SAV	Interná z prostriedkov SAV	Interná z iných zdrojov	Interná z iných zdrojov	Externá	Externá
Nová forma	Interná z iných zdrojov	Externá	Interná z prostriedkov SAV	Externá	Interná z prostriedkov SAV	Interná z iných zdrojov
<b>Počet</b>	0	0	0	0	0	0

#### 3.3. Zoznam doktorandov, ktorí ukončili doktorandské štúdium úspešnou obhajobou

Tabuľka 3c Menný zoznam ukončených doktorandov v roku 2016 úspešnou obhajobou

Meno doktoranda	Forma DŠ	Mesiac, rok nástupu na DŠ	Mesiac, rok obhajoby	Číslo a názov študijného odboru	Meno a organizácia školiteľa	Fakulta udeľujúca vedeckú hodnosť
Mgr. Peter Boháč	interné štúdium hradené z prostriedkov SAV	9 / 2012	8 / 2016	4.1.15 anorganická chémia	Mgr. Adriana Czímerová PhD., ÚACH SAV	Prírodovedecká fakulta UK
Peter John Cherry	interné štúdium hradené z iných zdrojov	9 / 2013	11 / 2016	4.1.11 chemická fyzika	Dr. Vladimír Malkin DrSc., ÚACH SAV	Prírodovedecká fakulta UK
Ing. Martin Kontrík	interné štúdium hradené z prostriedkov SAV	9 / 2012	8 / 2016	4.1.15 anorganická chémia	doc. Ing. Miroslav Boča DrSc., ÚACH SAV	Prírodovedecká fakulta UK

Zoznam interných a externých doktorandov je uvedený v prílohe A.

### 3.4. Zoznam akreditovaných študijných odborov s uvedením VŠ

Tabuľka 3d Zoznam akreditovaných študijných odborov s uvedením univerzity/vysokej školy a fakulty, kde sa doktorandský študijný program uskutočňuje

Názov študijného odboru (ŠO)	Číslo ŠO	Doktorandské štúdium uskutočňované na (univerzita/vysoká škola a fakulta)
chemická fyzika	4.1.11	Prírodovedecká fakulta UK
anorganická chémia	4.1.15	Prírodovedecká fakulta UK
anorganická technológia a materiály	5.2.19	Fakulta chemickej a potravinárskej technológie STU
anorganická technológia a materiály	5.2.19	Slovenská technická univerzita v Bratislave

Tabuľka 3e Účasť na pedagogickom procese

Menný prehľad pracovníkov, ktorí boli menovaní do spoločných odborových komisií pre doktorandské štúdium	Menný prehľad pracovníkov, ktorí pôsobili ako členovia vedeckých rád univerzít, správnych rád univerzít a fakúlt	Menný prehľad pracovníkov, ktorí získali vyššiu vedeckú, pedagogickú hodnotu alebo vyšší kvalifikačný stupeň
doc. Ing. Miroslav Boča, DrSc. (anorganická chémia)	prof. Ing. Dušan Galusek, DrSc. (Fakulta špeciálnej techniky TnUAD)	Ing. Blanka Kubíková, PhD. (IIa)
doc. Ing. Miroslav Boča, DrSc. (anorganická technológia a materiály)	prof. Ing. Dušan Galusek, DrSc. (Fakulta zdravotníctva TnUAD)	Ing. Viliam Pavlík, PhD. (IIa)
doc. RNDr. Juraj Bujdák, DrSc. (anorganická chémia)	prof. Ing. Dušan Galusek, DrSc. (Trenčianska univerzita Alexandra Dubčeka v Trenčíne)	doc. Ing. Miroslav Boča, DrSc. (DrSc., Slovenská Akadémia Vied)
doc. RNDr. Juraj Bujdák, DrSc. (fyzikálna chémia)	prof. Ing. Marek Liška, DrSc. (Fakulta chemické technológie VŠCHT, Praha, ČR)	
doc. RNDr. Milan Drábik, CSc. (anorganická chémia)	prof. Ing. Marek Liška, DrSc. (Trenčianska univerzita Alexandra Dubčeka v Trenčíne)	
prof. Ing. Dušan Galusek, DrSc. (anorganická technológia a materiály)	prof. RNDr. Jozef Noga, DrSc. (Fakulta prírodných vied UMB)	
doc. Ing. Miroslav Hnatko, PhD. (anorganická technológia a materiály)	prof. RNDr. Jozef Noga, DrSc. (Prírodovedecká fakulta UK)	
RNDr. Peter Komadel, DrSc. (anorganická chémia)	prof. RNDr. Pavol Šajgalík, DrSc. (Fakulta metalurgie a materiálového inžinierstva, Vysoká škola báňská TU)	
doc. Ing. Zoltán Lenčes, PhD. (anorganická technológia a materiály)	prof. RNDr. Pavol Šajgalík, DrSc. (Hutnícka fakulta TUKE)	
doc. Ing. Zoltán Lenčes, PhD. (anorganická chémia)	prof. RNDr. Pavol Šajgalík, DrSc. (Slovenská technická univerzita v Bratislave)	
doc. Ing. Zoltán Lenčes, PhD. (odbor v zahraničí)	prof. RNDr. Pavol Šajgalík, DrSc. (Trenčianska univerzita Alexandra Dubčeka v Trenčíne)	
prof. Ing. Marek Liška, DrSc.	prof. RNDr. Pavol Šajgalík, DrSc.	

(anorganická technológia a materiály)	(Univerzita Komenského v Bratislave)	
prof. Ing. Marek Liška, DrSc. (fyzika kondenzovaných látok a akustika)	prof. RNDr. Pavol Šajgalík, DrSc. (Univerzita Pavla Jozefa Šafárika v Košiciach)	
RNDr. Jana Madejová, DrSc. (anorganická technológia a materiály)	prof. RNDr. Pavol Šajgalík, DrSc. (Univerzita sv. Cyrila a Metoda v Trnave)	
Dr. Oľga Malkin, DrSc. (teoretická a počítačová chémia)	prof. RNDr. Pavol Šajgalík, DrSc. (Vysoké učení technické, Brno)	
Dr. Vladimír Malkin, DrSc. (chemická fyzika)		
Dr. Vladimír Malkin, DrSc. (teoretická a počítačová chémia)		
prof. RNDr. Jozef Noga, DrSc. (chemická fyzika)		
prof. RNDr. Jozef Noga, DrSc. (anorganická chémia)		
prof. RNDr. Jozef Noga, DrSc. (fyzika plazmy)		

### 3.5. Údaje o pedagogickej činnosti

Tabuľka 3f Prednášky a cvičenia vedené v roku 2016

PEDAGOGICKÁ ČINNOSŤ	Prednášky		Cvičenia a semináre	
	doma	v zahraničí	doma	v zahraničí
Počet prednášateľov alebo vedúcich cvičení	2	2	6	0
Celkový počet hodín v r. 2016	7	10	141	0

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

Tabuľka 3g Aktivity pracovníkov na VŠ

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

### 3.6. Iné dôležité informácie k pedagogickej činnosti

ÚACH SAV vypísal pre akademický rok 2016/2017 celkovo 17 tém pre doktorandské štúdium vo všetkých akreditovaných odboroch: 4.1.15 Anorganická chémia, 5.2.19 Anorganické technológie a materiály a 4.1.11 Chemická fyzika.

V akademickom roku 2015/2016 obhájili dizertačné práce traja študenti: Mgr. Peter Boháč a Ing. Martin Kontrík v študijnom odbore 4.1.15 Anorganická chémia a John Peter Cherry v študijnom odbore 4.1.11 Chemická fyzika.

PhD študenti na ÚACH SAV sa pravidelne zúčastňujú na študentských vedeckých podujatiach a konferenciách, akými sú napr. ŠVK PriF UK 2016.

Dňa 18.10.2016 sa na ÚACH SAV konala Súťaž mladých vedeckých pracovníkov do 35 rokov. za účasti 15 mladých vedeckých pracovníkov z dvoch vedeckých inštitúcií (ÚACH SAV Bratislava a ÚACH ČAV Řež) a dvoch vysokých škôl (PriF UK Bratislava a Tn AD Trenčín). Všetky vystúpenia posudzovala 5-členná komisia a vybrala tri najlepšie prednášky.

1. Mgr. Peter Boháč, PhD. (ÚACH SAV)
2. Ing. Ondrej Hanzel, PhD. (ÚACH SAV), Mgr. Jan Hynek (ÚACH ČAV)
3. Mgr. Peter Cherry, PhD. (ÚACH SAV)

Zamestnanci ústavu sa podieľali na pedagogickom procese aj formou organizovania praxe pre študentov Prírodovedeckej fakulty UK ako aj Fakulty chemickej a potravinárskej technológie STU. Počas praxe sa študenti oboznámili s procesom prípravy materiálov ako aj s využitím rôznych špeciálnych techník/metód, ktoré sa používajú na ich charakterizáciu (viac informácií v prílohe D tejto správy).

## 4. Medzinárodná vedecká spolupráca

### 4.1. Medzinárodné vedecké podujatia

#### 4.1.1. Medzinárodné vedecké podujatia, ktoré organizácia SAV organizovala v roku 2016 alebo sa na ich organizácii podieľala, s vyhodnotením vedeckého a spoločenského prínosu podujatia

9<sup>th</sup> Workshop on Modern Methods in Quantum Chemistry, Mariapfarr, Rakúsko,  
23.02.-28.02.2016

Podujatia sa zúčastnilo 45 vedeckých pracovníkov z Nemecka, Nórska, Dánska, Českej republiky, Rakúska a Švajčiarska, bolo prednesených 27 prednášok.

8<sup>th</sup> Mid-European Clay Conference (MECC), Košice, Slovensko,  
04.07.-08.07.2016

Podujatia sa zúčastnilo 170 účastníkov z 29 krajín. Na konferencii odznelo 70 prednášok (4 pozvané prednášky, 6 keynote) a bolo odprezentovaných 87 posterov.

#### 4.1.2. Medzinárodné vedecké podujatia, ktoré usporiada organizácia SAV v roku 2017 (anglický a slovenský názov podujatia, miesto a termín konania, meno, telefónne číslo a e-mail zodpovedného pracovníka)

10<sup>th</sup> Workshop on Modern Methods in Quantum Chemistry/10th Workshop on Modern Methods in Quantum Chemistry, Mariapfarr, Rakúsko,  
05.03.-10.03.2017, (Vladimír Malkin, 02/59410469, uachmalk@savba.sk)

#### 4.1.3. Počet pracovníkov v programových a organizačných výboroch medzinárodných konferencií

Tabuľka 4a Programové a organizačné výbory medzinárodných konferencií

Typ výboru	Programový	Organizačný	Programový i organizačný
Počet členstiev	7	4	2

### 4.2. Členstvo a funkcie v medzinárodných orgánoch

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

doc. RNDr. Milan Drábik, CSc.

European Association for Chemical and Molecular Sciences (EuCheMS) (funkcia: člen v divízii anorganická chémia a v divízii chémia tuhej fázy a materiállová chémia)

Institute of Materials, Minerals and Mining, U.K. (funkcia: doživotný člen)

International Union of Pure and Applied Chemistry (IUPAC) (funkcia: titular member v divízii II anorganická chémia, associate member v medzidivíznej komisii pre terminológiu, symboly a nomenklatúru - Interdivisional Co)

prof. Ing. Dušan Galusek, DrSc.

American Ceramic Society (funkcia: člen)

European Society on Glass Science and Technology (funkcia: člen)

RNDr. Peter Komadel, DrSc.

European Clay Groups Association (funkcia: člen)

The Clay Minerals Society (funkcia: člen)

Ing. Michal Korenko, PhD.

International Union of Pure and Applied Chemistry (IUPAC) (funkcia: National Representative (NR) of

## Division I)

doc. Ing. Zoltán Lenčéš, PhD.

American Ceramic Society (funkcia: člen)  
 Ceramic Society of Japan (funkcia: člen)  
 Council of the European Ceramic Society (funkcia: člen)  
 European Ceramic Society (funkcia: člen)  
 Materials Research Society (funkcia: člen)

RNDr. Jana Madejová, DrSc.

The Clay Minerals Society (funkcia: člen)

Dr. Vladimír Malkin, DrSc.

WATOC - World Association of Theoretical and Computational Chemists (funkcia: člen)

prof. RNDr. Jozef Noga, DrSc.

International Academy of Quantum Molecular Sciences (funkcia: volený člen)  
 World Association of Theoretical and Computational Chemists (funkcia: člen)

Ing. Martin Pentrák, PhD.

The Clay Minerals Society (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)  
 ECerS (funkcia: prezident)  
 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)  
 World Academy of Ceramics - Člen výkonného výbor (funkcia: volený člen)

doc. Ing. Peter Šimurka, PhD.

European Society on Glass Science and Technology (funkcia: člen)  
 International Commission on Glass (funkcia: výkonný tajomník)

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

Tabuľka 4b Experti hodnotiaci medzinárodné projekty

Meno pracovníka	Typ programu/projektu/výzvy	Počet hodnotených projektov
-----------------	-----------------------------	-----------------------------

**4.4. Najvýznamnejšie prínosy MVTs ústavu vyplývajúce z mobility a riešenia medzinárodných projektov a iné informácie k medzinárodnej vedeckej spolupráci****James Asher**

- Technical University of Munich, Nemecko, 12. – 17. 08. 2016 (APVV-15-0726).

**Valéria Bizovská**

- Jerzy Haber Institute of Catalysis and Surface Chemistry PAS, Krakow, Poľsko (13. – 23. 10. 2016)  
 Spoločný projekt „Organo-clays as intermediates for the synthesis of functional hybrid materials”.  
 Medziakademická spolupráca (MAD) medzi Ústavom anorganickej chémie SAV a ústavom PAV.

**Miroslav Boča**

- Northeastern University, Shenyang, Čína (15.-18.05. 2016). Spoločný projekt “Nové technológie pri výrobe hliníka - Fyzikálno-chemické a elektrochemické skúmanie sľubných draselných kryolitových sústav”. Bilaterálny projekt SK-CN-2015-0014 medzi Ústavom anorganickej chémie SAV a Northeastern University.

**Juraj Bujdák**

- Univerzita Bilbao, Španielsko (16.-20. 7. 2016) pracovná cesta prebehla v rámci spoločnej vedeckej spolupráce s Virginiou Martinez Martinezovou a Inigom Lopéz Arbeolom z Katedry fyzikálnej chémie. Pozvaná prednáška: Hybrid systems based on organic dyes and layered silicates: Fundamentals and potential applications.

**Dušan Galusek**

- Universität Bayreuth, Bayreuth, Nemecko (6.-10. 7. 2016) Návšteva spoluriešiteľského pracoviska a aktivity súvisiace s riešením projektu inštitucionálnej kooperácie medzi ÚACh SAV a Univerzitou Bayreuth (dr. Motz) v rámci AvH institutional cooperation grant.

**Blanka Kubíková**

- Northeastern University, Shenyang, Čína (15. - 18. 05. 2016). Spoločný projekt “Nové technológie pri výrobe hliníka - Fyzikálno-chemické a elektrochemické skúmanie sľubných draselných kryolitových sústav”. Bilaterálny projekt SK-CN-2015-0014 medzi Ústavom anorganickej chémie SAV a Northeastern University.

**Olga Malkin**

- Technical University of Munich, Nemecko (20. 06. – 17. 07. 2016) APVV-15-0726
- Technical University of Berlin, Nemecko (6. - 13. 12. 2016), 7RP pNMR
- CTCC, University of Tromsø, Nórsko, 5. – 18. 08. 2016, APVV-15-0726

**Vladimir Malkin**

- Technical University of Berlin, Nemecko (6. - 13. 12. 2016) 7RP pNMR
- Technical University of Munich, Nemecko (20. 06. – 17. 07. 2016), v rámci August-Wilhelm Scheer Gastprofessorenprogramm.
- CTCC, University of Tromsø, Nórsko (5. - 18. 08. 2016) SAPVV-15-0726.

**Helena Pálková**

- Jerzy Haber Institute of Catalysis and Surface Chemistry PAS, Krakow, Poľsko (13. – 23. 10. 2016) Spoločný projekt „Organo-clays as intermediates for the synthesis of functional hybrid materials”. Medziakademická spolupráca (MAD) medzi Ústavom anorganickej chémie SAV a ústavom PAV.

**Patel Niketan Sarabhai**

- Ural Federal University, Jekaterinburg, Ruská federácia (7. - 25. 8. 2016). Pobyt sa uskutočnil v rámci projektu SASPRO. Bol zameraný na problematiku korózných experimentov, vyhodnotenie parametrov a nadväzovanie spolupráce.
- Solar Thermal Group, Australian National University, Canberra, Austrália (30. 11. - 16. 1. 2017). Pobyt sa uskutočnil v rámci projektu SASPRO. Uskutočnenie korózných experimentov, prednáška o ústave a výsledkoch získaných v rámci projektu.

**Pavol Šajgalík**

- Mimoriadny profesor - North Western Polytechnic University, Xi´An, Čína – dohoda o spoločných doktorandoch medzi SAV a NWPU v oblasti keramických materiálov

**Dlhodobé pobyty na zahraničných inštitúciách (viac ako 3 mesiace)****Peter Cherry**

- Magnetic Resonance Center and Department of Chemistry, University of Florence, Taliansko (13. 3. 2016 – 26. 6. 2016), v rámci projektu FP7 pNMR

**Stanislav Kedžuch**

- Kobe University, Japonsko (5. 9. 2016 - 15. 1. 2017). Cieľom pracovnej cesty bola spolupráca na vývoji metód s explicitným zahrnutím elektrónovej korelácie. Implementovala sa metóda F12-C do programu Gellan vyvíjaného japonskou stranou. Ďalej boli implementované integrály potrebné pre F12-C metódu na úrovni poruchovej teórie. Boli pripravené trojelektrónové integrály potrebné pre plnú implementáciu F12 metódy na úrovni poruchovej teórie ako aj na úrovni metódy coupled cluster s explicitným zahrnutím elektrónovej korelácie.

**Martin Kontrík**

- CEMHTI-CNRS (Conditions Extrêmes et Matériaux: Haute Température et Irradiation), Orléans, France. 5. 10. 2015 - 5. 3. 2016; výskumný pobyt bol podporovaný Národným štipendijným programom na podporu mobility študentov, doktorandov a vysokoškolských učiteľov. Pobyt bol zameraný na in-situ NMR pri vysokých teplotách draselných fluoro-oxo-hlinitanových komplexov v  $\text{KF-Al}_2\text{O}_3$  systéme.

**Michal Korenko**

- Engineering College, Valparaiso University, Valparaiso, Indiana, USA (04/2014 - 12/2016). Postdoktorandský študijný pobyt podporovaný projektom ARPA-E (US Department of Energy). Projekt je zameraný na vývoj a komercializáciu vysokoteplotnej solárnej elektrolýzy horčíka. Elektrolytická produkcia horčíka vychádza priamo z  $\text{MgO}$  rozpusteného vo fluoridovom elektrolyte. Časť energie potrebnej na vysokoteplotnú elektrolýzu je dotovaná solárnym teplom v parabolickom solárnom reaktore, pričom tento prístup umožňuje integrovať k primárnej elektrolýze aj *in situ* rafináciu horčíka. Definitívnym cieľom projektu je nová, ekonomicky kompetitívna technológia, ktorá by bola schopná zlomiť dominanciu ekologicky a energeticky necitlivého *Pidgeon procesu*, ktorým v súčasnosti Čína vyrába takmer 90% svetovej produkcie horčíka.

**Marián Kucharík**

- Primary Metal Technology (PMT) - Technology development, Hydro Aluminium a.s. Årdal, Nórsko, projektový inžinier (11/2008 – 08/2016). Výskum a vývoj technológie výroby hliníka Hall-Heroultovým procesom.

**Martin Pentrák**

- Department of Natural Resources and Environmental Sciences, University of Illinois at Urbana-Champaign, USA, Postdoctoral Research Associate, 06/2012 – 09/2016, výskum a vývoj nových progresívnych nanokompozitov na báze organoílov dôležitých pri riešení environmentálnych a priemyselných problémov, štúdium optických a termických vlastností prírodných nanomateriálov na báze ílových minerálov.

**Anna Prnová**

- Argonne National Laboratory, 9700 S. Cass Avenue, Argonne, IL 60439, USA, 6. 11. 2015 - 30. 3. 2016, Fulbright project: Study of the structure of solids and liquids in  $\text{Y}_2\text{O}_3\text{-Fe}_2\text{O}_3$  and  $\text{Y}_2\text{O}_3\text{-Ga}_2\text{O}_3$  systems by high energy X-ray diffraction, skúmanie štruktúry a štruktúrnych zmien ytrito-železitých granátov a galito-ytritých granátov, pobyt hradený Fulbrightovou nadáciou, Fulbright grant 15-22-08

**Prednášky zahraničných hostí na ÚACH SAV v roku 2016**

**Prof. Yuping Zeng:** Porous  $\text{Si}_3\text{N}_4$  ceramics prepared via reaction bonding sintering. Shanghai Institute of Ceramics, Chinese Academy of Sciences, Čína

**Prof. Norimasa Nishiyama:** Transformation toughening in silica and transparent polycrystalline cubic silicon nitride. Deutsches Elektronen-Synchrotron (DESY) Photon Science, Hamburg, Brandenburg, Nemecko, 3.10.2016

**Dr. Mrityunjay Singh:** Materials and integration challenges in alternative and renewable energy systems, NASA Glenn Research Center, Ohio Aerospace Institute, Cleveland, OH, USA, 11.11.2016



**Prof. Dongliang Jiang:** Tape casting, a flexible technique for ceramic sheets and more, CAE & WAC, Shanghai Institute of Ceramics, Chinese Academy of Sciences, Čína, 30.8.2016

**Dr. Malgorzata Zimowska:** Functionalization of innovative porous structures derived from layered minerals, Jerzy Haber Institute of Catalysis and Surface Chemistry, Polish Academy of Sciences, Kraków, Poľsko, 23.11.2016

*Prehľad údajov o medzinárodnej mobilite pracovníkov organizácie je uvedený v Prílohe E.*

*Prehľad a údaje o medzinárodných projektoch sú uvedené v kapitole 2 a Prílohe B.*

## 5. Vedná politika

Vedná politika ústavu reflektuje dlhodobé zámery a aktuálne trendy súvisiace so spoločenskou objednávkou na domácej a zahraničnej scéne. Je založená na inovatívnosti vedeckého smerovania, ambicióznosti vedeckých osobností, ako aj na autonómnosti vedúcich vedeckých tímov. Správnosť tohto smerovania dokumentuje pozícia ústavu, ktorý je hodnotený na popredných priečkach vo všetkých procesoch hodnotenia v SAV.

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 vnútroústavných alebo aj mimoústavných 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.

S cieľom plnenia stanovených zásad personálnej politiky sa Ústav anorganickej chémie ako hostiteľská organizácia pridal k úspešným prijímateľom projektov mobilného programu Slovenskej akadémie vied - SASPRO. V rámci mobilnej schémy „Incoming“, určenej pre zahraničných vedcov, nastúpil v roku 2016 na ústav jeden uchádzač zo Švédska a v rámci mobilnej schémy „Reintegrácia“, v ktorej sú cieľovou skupinou občania Slovenskej republiky, na ústav nastúpil jeden úspešný žiadateľ.

### **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.

## **6. Spolupráca s univerzitami/vysokými školami, štátnymi a neziskovými inštitúciami okrem aktivít uvedených v kap. 2, 3, 4**

### **6.1. Spolupráca s univerzitami/VŠ (fakultami)**

**Názov univerzity/vysokej školy a fakulty:** Prírodovedecká fakulta UK

**Druh spolupráce (spoločné pracovisko alebo iné):** Spoločná výchova doktorandov, spoločné riešenie projektov, spolupráca v pedagogickom procese

**Začiatok spolupráce:** 1990

**Zameranie:** vedecká spolupráca, účasť na Bc. a Mgr. výuke

**Zhodnotenie:** V spolupráci s touto fakultou je ústav zapojený do vzdelávania na III. stupni vysokoškolského štúdia v študijných programoch anorganická chémia a chemická fyzika. Spoločne sa riešia projekty VEGA a APVV. Prof. RNDr. J. Noga, DrSc., doc. RNDr. J. Bujdák, DrSc. a doc. RNDr. M. Drábik, CSc. majú hlavný úväzok na fakulte a čiastkový na ÚACH SAV. Prof. RNDr. J. Noga, DrSc. je externým členom Vedeckej rady ÚACH SAV. Doc. RNDr. Milan Drábik, CSc. je členom Akademického senátu PríF UK. Pracovníci ÚACH viedli na PríF UK v roku 2016 šiestich doktorandov.

**Názov univerzity/vysokej školy a fakulty:** Fakulta chemickej a potravinárskej technológie STU

**Druh spolupráce (spoločné pracovisko alebo iné):** Spoločné pracovisko, spoločná výchova doktorandov

**Začiatok spolupráce:** 1990

**Zameranie:** vedecká spolupráca

**Zhodnotenie:** Na základe dodatku k zmluve o zriadení spoločného pracoviska je FCHPT od roku 2008 členom konzorcia a spoluzriaďovateľom spoločného pracoviska, Centra kompetencie skla Vitrum Laugaricio – VILA. FCHPT STU je partnerom projektu APVV 0218-11 - Mechanizmy korózie a mikromechanické vlastnosti dentálnych materiálov a hlavným riešiteľom APVV projektu Heterocykly pre progresívne trendy storočia, v ktorom ÚACH vystupuje ako partner. Pracovníci ÚACH viedli na FCHPT v roku 2016 štyroch doktorandov (z toho dvaja externí).

**Názov univerzity/vysokej školy a fakulty:** Hutnícka fakulta TUKE

**Druh spolupráce (spoločné pracovisko alebo iné):** Spolupráca v pedagogickom procese

**Začiatok spolupráce:** 2000

**Zameranie:** vedecká spolupráca, účasť na Bc. a Mgr. výuke

**Zhodnotenie:** V spolupráci s touto fakultou je ústav zapojený do pedagogického procesu. Prof. RNDr. P. Šajgalík, DrSc. je členom vedeckej rady fakulty.

**Názov univerzity/vysokej školy a fakulty:** Trenčianska univerzita Alexandra Dubčeka v Trenčíne

**Druh spolupráce (spoločné pracovisko alebo iné):** Centrum kompetencie skla - Vitrum Laugaritio

**Začiatok spolupráce:** 1997

**Zameranie:** vedecká spolupráca

**Zhodnotenie:** Okrem spoločného pracoviska s TnU AD (Centrum kompetencie skla Vitrum Laugaritio) riešil ÚACH SAV v roku 2016 v spolupráci s touto univerzitou jeden spoločný projekt VEGA a dva spoločné projekty APVV. Prof. Ing. P. 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), prof. Ing. M. Liška, DrSc. je externým členom Vedeckej rady ÚACH. Pracovníci centra, zamestnanci ÚACH, sa podieľajú na pedagogickej činnosti v rámci vysokoškolského štúdia v odbore "Chemické technológie" a doktorandského štúdia v odbore "Anorganická technológia".

**Názov univerzity/vysokej školy a fakulty:** Vysoká škola báňská - TU Ostrava, Česká republika

**Druh spolupráce (spoločné pracovisko alebo iné):** Spoločná výchova doktorandov, spoločné riešenie projektov

**Začiatok spolupráce:** 2010

**Zameranie:** vedecká spolupráca, výchova doktorandov

**Zhodnotenie:** Spolupráca VŠB a ÚACH je zameraná na výchovu mladých pracovníkov. Na ÚACH pokračovali vo svojom štúdiu dve doktorandky z VŠB Ostrava. Prof. RNDr. P. Šajgalík, DrSc. je členom Vedeckej rady FMMI VŠB; doc. Ing. Z. Lenčoš, PhD. je členom odborovej rady doktorandského študijného

programu Materiálové vedy a inžinýrství.

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

**Druh spolupráce (spoločné pracovisko alebo iné):** Department of Inorganic and Physical Chemistry

**Začiatok spolupráce:** 2010

**Zameranie:** vedecká spolupráca

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

**6.2. Významné aplikácie výsledkov výskumu v spoločenskej praxi alebo vyriešenie problému pre štátnu alebo neziskovú inštitúciu**

**6.3. Iná činnosť využiteľná pre potreby spoločenskej praxe**

## **7. Spolupráca s aplikačnou a hospodárskou sférou okrem aktivít uvedených v kap. 2, 3, 4**

### **7.1. Spoločné pracoviská s aplikačnou sférou**

Názov pracoviska: Spoločné pracovisko Ústavu anorganickej chémie Slovenskej akadémie vied a RONA, a.s.

Partner(i): Rona a.s., Lednické Rovne

Zameranie: Stimulácia, rozvoj a realizácia základného a aplikovaného výskumu a vývoja v oblastiach súvisiacich s existujúcou priemyselnou základňou SR

Rok založenia: 2011

Zhodnotenie: V roku 2016 RONA a.s. podala projekt v rámci výziev štrukturálnych fondov, v ktorom ústav vystupuje ako partner.

### **7.2. Kontraktový – zmluvný výskum (vrátane zahraničných kontraktov)**

### **7.3. Iná činnosť využiteľná pre potreby hospodárskej praxe**

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

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

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

<b>Meno pracovníka</b>	<b>Názov orgánu</b>	<b>Funkcia</b>
prof. Ing. Dušan Galusek, DrSc.	Slovenský metrologický ústav	člen vedeckej rady
Mgr. Stanislav Kedžuch, PhD.	Slovenská komisia chemickej olympiády	podpredseda
Ing. Michal Korenko, PhD.	Komisia pre námietky pri verejnom obstarávaní	externý člen
RNDr. Jana Madejová, DrSc.	Agentúra na podporu výskumu a vývoja	Člen rady pre prírodné vedy
prof. RNDr. Jozef Noga, DrSc.	Akreditačná komisia SR	člen pracovnej skupiny pre oblasť výskumu Chémia, chemická technológia a biotechnológie
prof. RNDr. Pavol Šajgalík, DrSc.	Technologická agentúra SR	člen
	Rada predsedov pracovných skupín pre prioritné oblasti aplikovaného výskumu a experimentálneho vývoja	predseda
	Komisia MŠ pre prioritné oblasti aplikovaného výskumu a experimentálneho vývoja v SR - materiálový výskum a nanotechnológie	člen pracovnej skupiny
	Pandemická komisia MZ SR	člen
	Rada vlády pre vedu, techniku a inovácie	podpredseda
	Komisia ministra školstva pre udeľovanie Ceny ministra školstva	člen
	Slovenská komisia pre vedecké hodnosti (SKVH)	podpredseda
	Výskumná agentúra SR	člen

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

**Názov expertízy:** Autor úloh Chemickej olympiády

**Adresát expertízy:** MŠ SR

**Spracoval:** Mgr. Stanislav Kedžuch, PhD.

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

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

<b>Meno pracovníka</b>	<b>Názov orgánu</b>	<b>Funkcia</b>
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### **8.4. Prehľad aktuálnych spoločenských problémov, ktoré riešilo pracovisko v spolupráci s Kanceláriou prezidenta SR, s vládnymi a parlamentnými orgánmi alebo pre ich potrebu**

## 9. Vedecko-organizačné a popularizačné aktivity

### 9.1. Vedecko-popularizačná činnosť

#### 9.1.1. Najvýznamnejšia vedecko-popularizačná činnosť pracovníkov organizácie SAV

Tabuľka 9a Vedecko-popularizačná činnosť pracovníkov organizácie SAV

Meno	Spoluautori	Typ <sup>1</sup>	Názov	Miesto zverejnenia	Dátum alebo počet za rok
Miroslav Boča,	F. Šimko, B. Kubíková, V. Pavlík	TV	Spektrum vedy 2016 – Moderné využitie fluoridových tavenín	RTVS: STV2	22.10.2016
Peter Boháč		TV	Správy RTVS (rozhovor Noc o noci výskumníka)	RTVS	30.9.2016
Anna Prnová	Robert Klement, Dušan Galusek	PB	Nebojme sa chémie	Študentská vedecká konferencia, Gymnázium Nová Dubnica	25.11.2016
Ľubomír Smrčok		TL	Moderná veda u nás?	Časopis Týždeň	24.1.2016

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

#### 9.1.2. Súhrnné počty vedecko-popularizačných činností organizácie SAV

Tabuľka 9b Súhrnné počty vedecko-popularizačných činností organizácie SAV

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

### 9.2. Vedecko-organizačná činnosť

Tabuľka 9c Vedecko-organizačná činnosť

Názov podujatia	Domáca/ medzinárodná	Miesto	Dátum konania	Počet účastníkov
Workshop "Materiálový výskum pomocou UV-Vis-NIR spektrofotometrie"	domáca	Bratislava	21.01.-21.01.2016	30
Príprava a vlastnosti progresívnych keramických materiálov	domáca	Ružín	23.11.-25.11.2016	42
9 <sup>th</sup> Workshop on Modern Methods in Quantum Chemistry	medzinárodná	Mariapfarr, Rakúsko	23.02.-28.02.2016	45
8 <sup>th</sup> Mid-European Clay Conference (MECC)	medzinárodná	Košice, Slovensko	04.07.-08.07.2016	170

### 9.3. Účasť na výstavách

Názov výstavy: Európska Noc výskumníkov 2016

Miesto konania: Bratislava

Dátum: 30.9.2016

Zhodnotenie účasti: Prezentácia výskumu a výsledkov oddelenia keramiky, oddelenia hydrosilikátov a oddelenia taveninových sústav (R. Bystrický, M. Hičák, V. Bizovská, P. Boháč, M. Slaný, L. Petra, M. Kontrík, V. Pavlík). Stánok: Materiály pre budúcnosť

#### 9.4. Účasť v programových a organizačných výboroch národných konferencií

Tabuľka 9d Programové a organizačné výbory národných konferencií

Typ výboru	Programový	Organizačný	Programový i organizačný
Počet členstiev	0	0	1

#### 9.5. Členstvo v redakčných radách časopisov

doc. Ing. Miroslav Boča, DrSc.

Chemical Papers (funkcia: Editorial Advisory Board od 9/2013 )

doc. RNDr. Juraj Bujdák, DrSc.

ChemistrySelect (Wiley-VCH) (funkcia: člen redakčnej rady )

doc. RNDr. Milan Drábik, CSc.

Ceramics-Silikáty (funkcia: člen)

ChemZi (funkcia: člen)

prof. Ing. Dušan Galusek, DrSc.

Ceramics-Silikáty (funkcia: člen)

New Journal of Glass and Ceramics (funkcia: člen)

RNDr. Peter Komadel, DrSc.

Applied Clay Science (funkcia: člen)

Clay Minerals (funkcia: člen)

Geologica Carpathica (funkcia: člen)

prof. Ing. Marek Liška, DrSc.

Ceramics - Silikáty (funkcia: člen)

European Journal of Glass Science and Technology (funkcia: regional editor)

International Journal of Applied Glass Science (funkcia: člen)

Sklár 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)

#### 9.6. Činnosť v domácich vedeckých spoločnostiach

Mgr Valéria Bizovská, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

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)

doc. RNDr. Juraj Bujdák, DrSc.

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

Mgr. Roman Bystrický, PhD.

Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)

Mgr. Adriana Czímerová, PhD.

Slovenská ílová spoločnosť (funkcia: člen)

Mgr. Alexander Čeklovský, PhD.

Slovenská spektroskopická spoločnosť (funkcia: člen)

doc. RNDr. Milan Drábik, CSc.

Slovenská chemická spoločnosť (funkcia: člen Predsedníctva SCHS (od r. 2009))  
Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)  
Slovenský národný komitét IUPAC (funkcia: predseda)

prof. Ing. Dušan Galusek, DrSc.

Humboldtov klub v SR (funkcia: člen)  
Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)  
Slovenská sklárska spoločnosť (funkcia: člen predstavenstva, vedecký tajomník)

Ing. Veronika Gurišová

Slovenská chemická spoločnosť (funkcia: člen)

Ing. Ondrej Hanzel, PhD.

Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)

doc. Ing. Miroslav Hnatko, PhD.

Slovenská chemická spoločnosť (funkcia: člen)  
Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)

Ing. Mária Chromčíková, PhD.

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

Mgr. Ľuboš Jankovič, PhD.

Slovenská ílová spoločnosť (funkcia: člen)

Mgr. Stanislav Kedžuch, PhD.

Slovenská chemická spoločnosť (funkcia: člen predsedníctva)

RNDr. Peter Komadel, DrSc.

Slovenská chemická spoločnosť (funkcia: člen)  
Slovenská chemická spoločnosť (funkcia: člen výboru Odbornej skupiny anorganická chémia)  
Slovenská ílová spoločnosť (funkcia: podpredseda)  
Učená spoločnosť SAV (funkcia: člen)

Ing. Michal Korenko, PhD.

Slovenská chemická spoločnosť (funkcia: predseda revíznej komisie)  
Slovenská nukleárna spoločnosť (funkcia: člen)  
Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)  
Slovenská spoločnosť pre povrchové úpravy (funkcia: člen)

Ing. Blanka Kubíková, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

doc. Ing. Zoltán Lenčoš, PhD.

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

prof. Ing. Marek Liška, DrSc.

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

RNDr. Jana Madejová, DrSc.

Slovenská chemická spoločnosť (funkcia: člen)  
Slovenská ílová spoločnosť (funkcia: predseda)  
Učená spoločnosť SAV (funkcia: člen)

Ing. Zuzana Netriová, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

prof. RNDr. Jozef Noga, DrSc.

Humboldtov klub v SR (funkcia: člen)  
Slovenská akademická spoločnosť (funkcia: podpredseda)  
Učená spoločnosť SAV (funkcia: predseda)

Ing. Helena Pálková, PhD.

Slovenská ílová spoločnosť (funkcia: člen)

Ing. Viliam Pavlík, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

Mgr. Lukáš Petra

Slovenská ílová spoločnosť (funkcia: člen)

Ing. Anna Prnová, PhD.

Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)  
Slovenská Sklárska spoločnosť (funkcia: člen)

Ing. Jaroslav Sedláček, PhD.

Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)

Ing. Eva Scholtzová, CSc.

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

Ing. Michal Slaný

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)

doc. Ing. Peter Šimurka, PhD.

Slovenská sklárska spoločnosť (funkcia: predseda)

Zväz slovenských vedecko-technických spoločností (funkcia: člen rady)

Mgr. Peter Švančárek, PhD.

Slovenská sklárska spoločnosť (funkcia: člen)

Ing. Zuzana Vasková, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

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

Dňa 09.11.2016 už tradične zorganizoval Ústav anorganickej chémie SAV v rámci Týždňa vedy a techniky na Slovensku „Deň otvorených dverí ÚACH SAV“, na ktorý boli pozvaní študenti stredných ako aj vysokých škôl zo Slovenska. Pre mladých návštevníkov boli pripravené zaujímavé prezentácie s názvami „Využitie tavenín v praxi“ a „Prečo má raketoplán keramický plášť“. Prehliadka ústavu pre študentov potom pokračovala vo vybraných laboratóriách, kde im mladí vedeckí pracovníci ukázali vedecké prístroje (napr. IČ spektrometer), rozprávali o ich praktickom využití, prípadne im názorne aj toto využitie prezentovali. Na mnohých stanovištiach im zároveň predviedli efektné a zaujímavé chemické experimenty. Návštevníkov zaujala prezentácia pripravená na skenovacím elektrónovom mikroskope pod názvom „Elektrónová strelba na živé organizmy“, zmrazovanie rôznych objektov tekutým dusíkom. Dňa otvorených dverí sa zúčastnilo približne 160 študentov z bratislavských aj mimobratisklavských stredných škôl.

**10. Činnosť knižnično-informačného pracoviska****10.1. Knižničný fond**

Tabuľka 10a Knižničný fond

<b>Knižničné jednotky spolu</b>		7572
z toho	knihy a zviazané periodiká	7572
	audiovizuálne dokumenty	
	elektronické dokumenty (vrátane digitálnych)	
	mikroformy	
	iné špeciálne dokumenty - dizertácie, výskumné správy	
Počet titulov dochádzajúcich periodík		2
z toho zahraničné periodiká		2
Ročný prírastok knižničných jednotiek		10
v tom	kúpou	10
	darom	
	výmenou	
	bezodplatným prevodom	
Úbytky knižničných jednotiek		
Knižničné jednotky spracované automatizovane		

**10.2. Výpožičky a služby**

Tabuľka 10b Výpožičky a služby

<b>Výpožičky spolu</b>		60
z toho	odborná literatúra pre dospelých	28
	výpožičky periodík	32
	prezenčné výpožičky	
MVS iným knižniciam		1
MVS z iných knižníc		
MMVS iným knižniciam		
MMVS z iných knižníc		
Počet vypracovaných bibliografií		
Počet vypracovaných rešerší		

**10.3. Používatelia**

Tabuľka 10c Používatelia

Registrovaní používatelia	57
Návštevníci knižnice spolu (bez návštevníkov podujatí)	

**10.4. Iné údaje**

Tabuľka 10d Iné údaje

On-line katalóg knižnice na internete ( 1=áno, 0=nie)

Náklady na nákup knižničného fondu v €

1100,62

**10.5. Iné informácie o knižničnej činnosti**

## **11. Aktivity v orgánoch SAV**

### **11.1. Členstvo vo Výbore Snemu SAV**

### **11.2. Členstvo v Predsedníctve SAV a vo Vedeckej rade SAV**

prof. RNDr. Pavol Šajgalík, DrSc.

- Predseda SAV
- Predseda VR SAV

### **11.3. Členstvo vo vedeckých kolégiách SAV**

doc. Ing. Miroslav Boča, DrSc.

- VK SAV pre chemické vedy (člen)

RNDr. Peter Komadel, DrSc.

- VK SAV pre chemické vedy (člen)

RNDr. Jana Madejová, DrSc.

- VK SAV pre chemické vedy (člen)

prof. RNDr. Jozef Noga, DrSc.

- VK SAV pre chemické vedy (člen)

prof. RNDr. Pavol Šajgalík, DrSc.

- VK SAV pre chemické vedy (člen)

### **11.4. Členstvo v komisiách SAV**

doc. Ing. Miroslav Boča, DrSc.

- Komisia SAV pre infraštruktúru a štrukturálne fondy (člen)

### **11.5. Členstvo v orgánoch VEGA**

doc. Ing. Miroslav Boča, DrSc.

- Komisia VEGA č. 3 pre chemické vedy, chemické inžinierstvo a biotechnológie (predseda)

RNDr. Peter Komadel, DrSc.

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

doc. Ing. Zoltán Lenčoš, PhD.

- Komisia VEGA č. 7 pre strojárstvo a príbuzné odbory informačných a komunikačných technológií a materiálové inžinierstvo (člen)

RNDr. Jana Madejová, DrSc.

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

Dr. Oľga Malkin, DrSc.

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

## 12. Hospodárenie organizácie

### 12.1. Výdavky RO SAV

Tabuľka 12a Výdavky RO SAV (v €)

V ý d a v k y	Skutočnosť k 31.12.2016 spolu	v tom:			
		zo ŠR	z toho: ŠF EÚ vr. spolufinan .zo ŠR	z mimorozp. zdrojov	z toho: ŠF EÚ vr. spolufinan.zo ŠR
<b>Výdavky spolu</b>	1 717 538	1 241 346	8 541	476 192	65 459
<b>Bežné výdavky</b>	1 697 539	1 241 346	8 541	456 193	45 460
<b>v tom:</b>					
mzdy (610)	844 929	710 795	6 329	134 134	8 215
poistné a príspevkov do poisťovní (620)	293 146	247 953	2 212	45 193	1 277
tovary a služby (630)	440 882	236 850	0	204 032	35 967
z toho: časopisy	1 613	1 008	0	605	0
VEGA projekty	109 362	109 362	0	0	0
MVTS projekty	125 634	125 634	0	0	0
CE	0	0	0	0	0
vedecká výchova	2 560	2 560	0	0	0
bežné transfery (640)	116 022	43 188	0	72 834	0
z toho: štipendiá	43 058	41 109	0	1 949	0
transfery partnerom projektov	70 885	0	0	70 885	0
<b>Kapitálové výdavky</b>	19 999	0	0	19 999	19 999
<b>v tom:</b>					
obstarávanie kapitálových aktív	19 999	0	0	19 999	19 999
kapitálové transfery	28 700	28 700	0	0	0
z toho: transfery partnerom projektov	0	0	0	0	0

**12.2. Príjmy RO SAV**

Tabuľka 12b Príjmy RO SAV (v €)

<b>P r í j m y</b>	<b>Skutočnosť k 31.12.2016 spolu</b>	<b>v tom:</b>	
		<b>rozpočtové</b>	<b>z mimorozp. zdrojov</b>
<b>Príjmy spolu</b>	481 237	5 045	476 192
<b>Nedaňové príjmy</b>	481 237	5 045	476 192
<b>v tom:</b>			
príjmy z prenájmu	745	745	
príjmy z predaja výrobkov a služieb	4 300	4 300	
iné	476 192		476 192
<b>Granty a transfery (mimo zdroja 111)</b>	476 192		476 192
<b>v tom:</b>			
tuzemské	366 278		366 278
<b>z toho: APVV</b>	290 316		290 316
iné	75 962		75 962
zahraničné	109 914		109 914
z toho: projekty rámcového programu EÚ	40 605		40 605
iné	69 309		69 309

**13. Nadácie a fondy pri organizácii SAV****14. Iné významné činnosti organizácie SAV**



## **15. Vyznamenania, ocenenia a ceny udelené pracovníkom organizácie v roku 2016**

### **15.1. Domáce ocenenia**

#### **15.1.1. Ocenenia SAV**

**Madejová Jana**

Medaila SAV za podporu vedy

*Oceňovateľ: Predsedníctvo SAV*

**Malkin Oľga**

Medaila SAV za podporu vedy

*Oceňovateľ: Predsedníctvo SAV*

**Malkin Vladimír**

Medaila SAV za podporu vedy

*Oceňovateľ: Predsedníctvo SAV*

#### **15.1.2. Iné domáce ocenenia**

**Boháč Peter**

Súťaž o najlepšiu študentskú prednášku

*Oceňovateľ: Organizačný výbor MECC 2016 Mid-European Clay Conference (4.-8.7.2016), Slovensko*

*Opis: Ocenenie za najlepšiu študentskú prezentáciu na medzinárodnej konferencii (29 krajín).*

### **15.2. Medzinárodné ocenenia**

**Šajgalík Pavol**

Lee Hsun Lecture Award

*Oceňovateľ: Institute of Metals Research, Chinese Academy of Sciences, Shenyang, China*

*Opis: For his outstanding contribution to the materials science and engineering.*

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

## **17. Problémy a podnety pre činnosť SAV**

Zásadný problém, ktorý narastá niekoľko rokov a v roku 2016 sa prejavil bez náznakov zlepšenia, je absurdný nárast administratívnych nárokov na všetkých úrovniach. Dominuje im oblasť verejného obstarávania. Pre potreby naplnenia legislatívnych povinností ústavu v oblasti verejného obstarávania je jeden plný úväzok pre administratívneho pracovníka málo, ale mzdové prostriedky ústavu neumožňujú rozšírenie administratívy. Výsledkom je, že potrebnú aktivitu vykonáva približne 5 vedeckých pracovníkov nad rámec alebo na úkor svojich odborných aktivít. Táto situácia je absolútne neúnosná. Deklarovaná snaha P SAV pomôcť ústavom v tejto situácii je vítaná, ale stále nie je naplnená.

Jednou z možností, ako by mohlo Predsedníctvo pomôcť ústavom s prebujnelou administratívou, je zabezpečiť poistenie majetku (hlavne z dôvodu požiadavky VA) pre všetky ústavy centrálnе, čo by ústavy výrazne odbremenilo a pravdepodobne by sa podarilo vyrokovať nižšie ceny na poistné zmluvy od jedného dodávateľa pre väčšie množstvo prístrojov. Okrem toho chýbajú z pozície P SAV aj ďalšie aktivity v rovine všeobecných usmernení, napr. usmernenia a prípadne školenia ako postupovať pri aplikácií elektronického trhoviska.

Nutnosť transformácie SAV je síce nespochybniteľná, ale sprievodné javy k tomuto procesu vyvolávajú množstvo otázok a pochybností. V tejto neprehľadnej situácii sa netreba čudovať absencii akejkoľvek ochoty aktívne participovať na požadovaných zmenách. Ak je ústav oslovený, že sa má zapojiť do fúzných procesov, je potrebné k tejto výzve pripojiť aj veľmi konkrétne návrhy legislatívnych rámcov tejto zmeny. Doteraz používané argumenty napr. o náraste sily väčších celkov sa javia byť v rovine želaní a predpokladov. Nejasná situácia otvára priestor pre špekulácie, čo vedie následne k možno nepodloženým fámam a zneisťovaniu zamestnancov. Celú situáciu dotvárajú udalosti, ktoré vyústili k zablokovaniu procesu transformácie ústavov na verejno-výskumné inštitúcie.

**Správu o činnosti organizácie SAV spracoval(i):**

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

Ing. Helena Pálková, PhD., 02/59410485

**Riaditeľ organizácie SAV**

**Predseda vedeckej rady**

.....  
doc. Ing. Miroslav Boča, DrSc.

.....  
RNDr. Jana Madejová, DrSc.



**Prílohy*****Príloha A - Zoznam zamestnancov a doktorandov organizácie k 31.12.2016*****Zoznam zamestnancov podľa štruktúry** (nadväzne na údaje v Tabuľke 1a)

	<b>Meno s titulmi</b>	<b>Úväzok (v %)</b>	<b>Ročný prepočítaný úväzok</b>
<b>Vedúci vedeckí pracovníci DrSc.</b>			
1.	doc. Ing. Miroslav Boča, DrSc.	100	1.00
2.	doc. RNDr. Juraj Bujdák, DrSc.	50	0.50
3.	prof. Ing. Dušan Galusek, DrSc.	55	0.55
4.	RNDr. Peter Komadel, DrSc.	100	1.00
5.	prof. Ing. Marek Liška, DrSc.	45	0.45
6.	RNDr. Jana Madejová, DrSc.	100	1.00
7.	Dr. Oľga Malkin, DrSc.	100	1.00
8.	Dr. Vladimír Malkin, DrSc.	100	1.00
9.	prof. RNDr. Jozef Noga, DrSc.	53	0.53
10.	prof. RNDr. Pavol Šajgalík, DrSc.	55	0.55
<b>Samostatní vedeckí pracovníci</b>			
1.	doc. Ing. Tomáš Bučko, PhD.	25	0.25
2.	Mgr. Adriana Czímerová, PhD.	100	1.00
3.	doc. RNDr. Milan Drábik, CSc.	50	0.50
4.	doc. Ing. Miroslav Hnatko, PhD.	100	1.00
5.	Ing. Mária Chromčíková, PhD.	100	1.00
6.	Mgr. Ľuboš Jankovič, PhD.	100	1.00
7.	Mgr. Stanislav Kedžuch, PhD.	100	1.00
8.	Ing. Michal Korenko, PhD.	100	0.00
9.	Ing. Blanka Kubíková, PhD.	100	1.00
10.	doc. Ing. Zoltán Lenčేశ, PhD.	100	1.00
11.	prof. Ing. Pavel Mach, CSc.	25	0.25
12.	Ing. Helena Pálková, PhD.	100	1.00
13.	Ing. Viliam Pavlík, PhD.	100	1.00
14.	Ing. Jaroslav Sedláček, PhD.	100	1.00
15.	Ing. Eva Scholtzová, CSc.	100	1.00
16.	Ing. František Šimko, PhD.	100	1.00
17.	doc. Ing. Peter Šimurka, PhD.	100	0.91

18.	Mgr. Peter Švančárek, PhD.	100	1.00
19.	Ing. Štefan Varga, CSc.	100	1.00
<b>Vedeckí pracovníci</b>			
1.	James Richard Asher, PhD	100	0.50
2.	Mgr Valéria Bizovská, PhD.	100	1.00
3.	Mgr. Peter Boháč, PhD.	100	0.33
4.	Mgr. Roman Bystrický, PhD.	120	1.20
5.	Mgr. Alexander Čeklovský, PhD.	100	1.00
6.	Ing. Ondrej Hanzel, PhD.	100	1.00
7.	Mgr. Stanislav Komorovský, PhD.	100	0.25
8.	Ing. Martin Kontrík, PhD.	100	0.33
9.	Mgr Marián Matejdes, PhD.	100	0.00
10.	Ing. Monika Micháľková, PhD.	70	0.00
11.	Ing. Jarmila Mlynáriková, PhD.	100	1.00
12.	Ing. Zuzana Netriová, PhD.	100	1.00
13.	Dr. Niketan Patel Sarabhai	100	1.00
14.	Ing. Anna Prnová, PhD.	100	1.00
15.	Dr. Mohamed Radwan	100	1.00
16.	Ing. Jana Valúchová, PhD.	100	1.00
17.	Ing. Zuzana Vasková, PhD.	100	0.00
<b>Odborní pracovníci s VŠ vzdelaním (výskumní a vývojoví zamestnanci)</b>			
1.	Ing. Veronika Gurišová	100	0.00
2.	Ing. Eva Hadzimová	100	1.00
3.	Mgr. Peter Cherry	100	0.66
4.	Ing. Iveta Macková	100	1.00
5.	Ing. Eva Mikšíková	125	1.25
6.	Ing. Jozef Priščák	100	1.00
7.	Mgr. Pavol Weiner	100	0.16
<b>Odborní pracovníci s VŠ vzdelaním (ostatní zamestnanci)</b>			
1.	Rastislav Haška	100	0.50
2.	Ing. Irena Martel	100	1.00
3.	Ing. Ján Piško	100	1.00
4.	Ing. Jaroslav Rusnák, PhD.	33	0.33
5.	Mgr. Bc. Marica Satinová	100	1.00
6.	JUDr. Jana Šebová	100	1.00

**Odborní pracovníci ÚSV**

1.	Miroslav Baďura	20	0.20
2.	Iveta Bouadjenak	100	1.00
3.	Jaromíra Dankovičová	125	1.25
4.	Jarmila Heinleinová	100	1.00
5.	Miriám Hnatková	100	0.00
6.	Anna Jurová	100	1.00
7.	Magdaléna Kňazovičová	100	1.00
8.	Anna Kovárová	100	1.00
9.	Zora Lukáčová	100	1.00
10.	Jozef Sitár	100	1.00
11.	Mária Strempeková	100	1.00
12.	Alexandra Tonkovičová	100	1.00

**Ostatní pracovníci**

1.	Margita Hudáková	1	0.33
2.	Dana Matejkinová	100	1.00
3.	Terézia Pírová	100	1.00

**Zoznam zamestnancov, ktorí odišli v priebehu roka**

	Meno s titulmi	Dátum odchodu	Ročný prepočítaný úväzok
<b>Samostatní vedeckí pracovníci</b>			
1.	Ing. Martin Pentrák, PhD.	30.9.2016	0.00
2.	RNDr. Ľubomír Smrčok, CSc.	11.8.2016	0.66
<b>Vedeckí pracovníci</b>			
1.	Ing. Katarína Faturíková, PhD.	30.11.2016	0.40
2.	Ing. Marián Kucharík, PhD.	31.8.2016	0.00
3.	Ing. Magdaléna Lissová, PhD.	30.11.2016	0.15
<b>Odborní pracovníci s VŠ vzdelaním (ostatní zamestnanci)</b>			
1.	Mgr. Zuzana Strapatá	31.3.2016	0.24
<b>Odborní pracovníci ÚSV</b>			
1.	Anna Škumátová	29.2.2016	0.20
<b>Ostatní pracovníci</b>			
1.	Rozália Müllerová	8.9.2016	0.00

**Zoznam doktorandov**

	<b>Meno s titulmi</b>	<b>Škola/fakulta</b>	<b>Študijný odbor</b>
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**Interní doktorandi hrazení z prostředkov SAV**

1.	Ing. Michal Hičák	Prírodovedecká fakulta UK	4.1.15 anorganická chémia
2.	Mgr. Marcela Hrdá	Prírodovedecká fakulta UK	4.1.11 chemická fyzika
3.	Ing. Stanislav Mikušínek	Slovenská technická univerzita v Bratislave	5.2.19 anorganická technológia a materiály
4.	Mgr. Lukáš Petra	Prírodovedecká fakulta UK	4.1.15 anorganická chémia
5.	Ing. Michal Slaný	Fakulta chemickej a potravinárskej technológie STU	5.2.19 anorganická technológia a materiály

**Interní doktorandi hrazení z iných zdrojov**

1.	Ing. Christina Atzenhofer	Montanuniversitaet Leoben, Rakúsko	
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**Externí doktorandi**

1.	Ing. Katarína Müllerová	Fakulta chemickej a potravinárskej technológie STU	5.2.19 anorganická technológia a materiály
2.	Ing. Michal Šimurda	Fakulta chemickej a potravinárskej technológie STU	5.2.19 anorganická technológia a materiály

**Zoznam emeritných vedeckých zamestnancov**

	<b>Meno s titulmi</b>
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**Príloha B - Projekty riešené v organizácii****Medzinárodné projekty****Programy: Medziakademická dohoda (MAD)****1.) Využitie organo-modifikovaných vrstevnatých silikátov ako nosičov nanočastíc kovov***(Immobilization of metal nanoparticles on organo-modified layered silicates)*

**Zodpovedný riešiteľ:** Helena Pálková  
**Trvanie projektu:** 1.1.2016 / 31.12.2018  
**Evidenčné číslo projektu:** MAD 12/2016  
**Organizácia je** áno  
**koordinátorom projektu:**  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Poľsko: 1  
**Čerpané financie:**

**Dosiahnuté výsledky:**

Na vzorkách montmorillonitu sa realizovala príprava hybridných materiálov s použitím rôznych organických kationov: polymérneho poly-kationu – poly-(diallyldimethylamóniového) (PDDA) ako aj dvoch kvartérnych alkylamóniových a fosfóniových kationov. V prípade vzoriek modifikovaných PDDA, sa materiál použil ako nosič/stabilizátor nano-častíc ruténia na vzorke. Ruténium bolo imobilizované vo vzorkách rôznymi spôsobmi s cieľom optimalizácie podmienok syntézy a prípravy katalyzátora aktívneho v reakcii hydrogenácie butanónu. Použitím SEM v spojení s EDX analýzou sa skúmali veľkosť a morfológia vzniknutých nano-častíc Ru a vplyv podmienok syntézy. Ukázal sa vplyv spôsobu prípravy na imobilizáciu nanočastíc. V katalyticky aktívnej vzorke, v ktorej sa najprv zmiešalo  $\text{RuCl}_3$  so stabilizátorom (polydiallyldimethylammonium PDDA), prebehla redukcia  $\text{Ru}^{3+}$  na  $\text{Ru}^0$  a potom sa celá disperzia pridávala k montmorillonitu. SEM merania s pomocou BSE (back-scattered) detektora jasne preukázali prítomnosť nanočastíc ruténia v takto pripravenej vzorke. Na druhej strane v katalyticky menej aktívnej vzorke, pripravenej zmiešaním montmorillonitu s PDDA, pridaním  $\text{RuCl}_3$  a následnou redukciovou, nebolo možné sledovať prítomnosť ruténia v EDS meraniach a nebolo možné stanoviť ruténium. Pravdepodobne bolo Ru v tejto vzorke zabudované hlbšie v štruktúre, a teda nebolo ho možné sledovať touto povrchovou metódou. Tým by sa mohla vysvetliť aj nízka aktivita vzorky v reakcii, keďže aktívne miesta potrebné pre tvorbu produktu neboli vytvorené v dostatočnom množstve, prípadne neboli dostupné. Uskutočnili sa aj diskusie ohľadom prípravy spoločnej publikácie s tematikou prípravy Ru nanočastíc stabilizovaných na montmorillonite modifikovanom PDDA a sledovanie ich katalytická aktivita.

Príspevky na konferenciách:

- ZIMOWSKA, Malgorzata - PÁLKOVÁ, Helena - JANKOVIČ, Ľuboš - DURACZYNSKA, D. - MORDARSKI, G. - MADEJOVÁ, Jana - SERWICKA, Ewa M. Organo-clays as supports for immobilization of rhutenium nanoparticles. In MECC 2016. 8th Mid-European clay conference, July 4-8, 2016, Košice, Slovakia: book of abstracts. Slovak Clay Group, 2016, p. 138. ISBN 978-80-972288-0-4.
- ZIMOWSKA, Malgorzata - LITYNSKA-DOBRYNSKA, L. - GURGUL, J. - SOCHA, R.P. - PÁLKOVÁ, Helena - MATACHOWSKI, L. - LATKA, K. Influence of surface composition of Fe-doped porous clay heterostructures on catalytic properties. In MECC 2016. 8th Mid-European clay conference, July 4-8, 2016, Košice, Slovakia: book of abstracts. Slovak Clay Group, 2016, p. 42. ISBN 978-80-972288-0-4.

Publikácie:

- ZIMOWSKA, Malgorzata - GURGUL, J. - PÁLKOVÁ, Helena - OLEJNICZAK, Zbigniew - LATKA, K. - LITYNSKA-DOBRYNSKA, L. - MATACHOWSKI, L. Structural rearrangements in Fe-porous clay heterostructures composites derived from Laponite® - Influence of preparation methods and Fe source. In Microporous and Mesoporous Materials, 2016, vol. 231, p. 66-81. (3.349 - IF2015).).

**Programy: Medzivládna dohoda****2.) Transparentná oxidová keramika s dodatočnými optickými funkcionalitami** *(Transparent oxide ceramics with additional optical functionalities)*

**Zodpovedný riešiteľ:** Dušan Galusek

**Trvanie projektu:** 1.1.2016 / 31.12.2018  
**Evidenčné číslo projektu:** SAS - MOST JRP 2015/06  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Taiwan: 1  
**Čerpané financie:**

Podpora medzinárodnej spolupráce z národných zdrojov: 24998 €

Dosiahnuté výsledky:

V prvej fáze riešenia projektu sa pozornosť sústredila najmä na prípravu nanopráškov dopovaných opticky aktívnymi prísadami a dostatočnou spekateľnosťou. Pripravili sa amorfné a polykryštalické prášky so zložením identickým so zložením kryštalického gelenitu dopované iónmi  $Mn^{2+}$ , ako aj prášky  $Y_3AlO_5$  a  $MgAl_2O_4$  dopované prvkami vzácnych zemín. V druhej polovici roka 2016 sa začali experimenty zamerané na optimalizáciu procesu tvarovania a spekania pripravených práškov s cieľom pripraviť hutnú transparentnú keramiku.

V spoluprácu s VUT Brno sa podarilo tiež pripraviť transparentnú polykryštalickú  $Al_2O_3$  keramiku dopovanú Eu, Nd a Er, pričom sa použil optimalizovný postup spekania kombinujúci dvojstupňové beztlakové spekanie a žiarové izostatické lisovanie. Pripravené materiály s prídavkom Eu dosahovali in-line transmisíu na úrovni 35% a intenzívnu emisiu vo viditeľnej oblasti v rozsahu od 550 do 750 nm. Keramika dopovaná Er dosahovala in-line transmisíu > 50 % a intenzívnu zelenú emisiu pri 524 nm.

Publikácie

- SHIH, S. J. - LIN, Yu-Chien - LIN, S.H. - VETEŠKA, P. - GALUSEK, Dušan - TUAN, Wei-Hsing. Preparation and characterization of Eu-doped gehlenite glassy particles using spray pyrolysis. In *Ceramics International*, 2016, vol. 42, no. 9, p. 11324-11329. (2.758 - IF2015). Typ: ADCA
- BODIŠOVÁ, Katarína - KLEMENT, Róbert - GALUSEK, Dušan - POUCHLÝ, Václav - DRDLÍK, Daniel - MACA, Karel. Luminescent rare-earth-doped transparent alumina ceramics. In *Journal of the European Ceramic Society*, 2016, vol. 36, no. 12, p. 2975-2980. (2.933 - IF2015). Typ: ADCA
- BODIŠOVÁ, Katarína - KLEMENT, Róbert - GALUSEK, Dušan - POUCHLÝ, Václav - DRDLÍK, Daniel - MACA, Karel. Luminescent rare-earth-doped transparent alumina ceramics. In *Journal of the European Ceramic Society*, 2016, vol. 36, no. 12, p. 2975-2980. (2.933 - IF2015). Typ: ADCA

**3.) Vývoj kompozitných keramických materiálov pre bioaplikácie** (*Development of ceramics composites materials for bio-applications.*)

**Zodpovedný riešiteľ:** Pavol Šajgalík  
**Trvanie projektu:** 1.9.2013 / 31.12.2016  
**Evidenčné číslo projektu:** SAS - TUBITAK JRP 2013/02  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Turecko: 1  
**Čerpané financie:**

Podpora medzinárodnej spolupráce z národných zdrojov: 20833 €

Dosiahnuté výsledky:

Výsledkom riešenia projektu je kompozitný biokeramický materiál na báze  $Si_3N_4$  a hydroxyapatitu (SN/HA kompozit). Biologické testy potvrdili jeho biokompatibilitu, ale aj zvýšenú bioaktivitu v porovnaní s referenčnou  $Si_3N_4$  matricou, čo bolo hlavným cieľom projektu. Nádramec projektu sme sa v poslednom období venovali zvyšovaniu adhézie vytvorenej HA vrstvy k  $Si_3N_4$  substrátu. Snahou bolo pripraviť bioaktívny povrch s vysokým obsahom fáz na báze kalcium silikátov alebo kalcium fosfátov (vrátane hydroxyapatitu) s dostatočnou adhéziou k substrátu. Zdrojom bioaktívnych fáz boli:

- hranice  $Si_3N_4$  zfn, ktoré primárne plnia funkciu spekacích prísad pri príprave hutných substrátov na báze  $Si_3N_4$  alebo
- hydroxyapatit pripravený sol-gel metódou, ktorý bol na horúci povrch  $Si_3N_4$  substrátu nanášaný rozprašovaním, alebo metódou spin coating.

Celý postup prípravy bioaktívneho povrchu nitridu kremičitého zabezpečil postupnú zmenu fázového zloženia smerom k povrchu tak, že jednotlivé vrstvy boli chemicky previazané.

## Publikácie:

- HIČÁK, Michal - HNATKO, Miroslav - BYSTRICKÝ, Roman - SEDLÁČEK, Jaroslav - ŠAJGALÍK, Pavol. Možnosti zvyšovania adhézie hydroxyapatitu k substrátu na báze Si<sub>3</sub>N<sub>4</sub> - štúdium vysokoteplotných reakcií v sústave SiO<sub>2</sub>-CaO-Ca<sub>10</sub>(PO<sub>4</sub>)<sub>6</sub>(OH)<sub>2</sub>. In Študentská vedecká konferencia PriF UK 2016: zborník recenzovaných príspevkov. Univerzita Komenského v Bratislave vo Vydavateľstve UK, 2016, s. 926-930. ISBN 978-80-223-4103-5. AFD

**Programy: COST****4.) Naša história z astrochémie (*Our Astro-Chemical History*)**

<b>Zodpovedný riešiteľ:</b>	Jozef Noga
<b>Trvanie projektu:</b>	26.11.2014 / 25.11.2018
<b>Evidenčné číslo projektu:</b>	CMST COST Action CM1401
<b>Organizácia je koordinátorom projektu:</b>	nie
<b>Koordinátor:</b>	Institut de Planétologie et d'Astrophysique de Grenoble
<b>Počet spoluriešiteľských inštitúcií:</b>	9 - Rakúsko: 1, Česko: 1, Nemecko: 1, Dánsko: 1, Fínsko: 1, Maďarsko: 1, Írsko: 1, Taliansko: 1, Holandsko: 1
<b>Čerpané financie:</b>	Podpora medzinárodnej spolupráce z národných zdrojov: 3500 €

Dosiahnuté výsledky:

V roku 2016 boli dokončené potenciálové hyperplochy pre interakciu atómov uhlíka a kyslíka s molekulou vodíka. Výsledky sú v štádiu prípravy na publikovanie. Súčasne bola dokončená práca o izomerácii cyklopropánu "A MRCC study of the isomerization of cyclopropane" zaslaná do časopisu Molecular Physics.

**5.) Nová generácia biomimetických implantátov pre náhradu kostí (*New generation biomimetic and customized implants for bone engineering*)**

<b>Zodpovedný riešiteľ:</b>	Pavol Šajgalík
<b>Trvanie projektu:</b>	1.2.2014 / 31.10.2017
<b>Evidenčné číslo projektu:</b>	MPNS COST Action MP1301
<b>Organizácia je koordinátorom projektu:</b>	nie
<b>Koordinátor:</b>	Belgium Ceramic Research Centre Mons
<b>Počet spoluriešiteľských inštitúcií:</b>	56 - Rakúsko: 0, Belgicko: 1, Kanada: 1, Nemecko: 3, Dánsko: 2, Španielsko: 5, Fínsko: 1, Francúzsko: 14, Veľká Británia: 6, Švajčiarsko: 1, Írsko: 2, Island: 1, Taliansko: 6, Litva: 1, Lotyšsko: 1, Holandsko: 2, Nórsko: 0, Portugalsko: 5, Slovinsko: 1, Švédsko: 2, USA: 1
<b>Čerpané financie:</b>	Podpora medzinárodnej spolupráce z národných zdrojov: 3500 €

Dosiahnuté výsledky:

V rámci riešenia projektu boli optimalizované technologické postupy prípravy kompozitných materiálov na báze nitridu kremičitého s bioaktívnou zložkou vo forme hydroxyapatitu vo forme granulátu. Pripravená keramická matrica bola ocharakterizovaná z hľadiska mikroštruktúry, fázového zloženia a pórovitosti. Na pripravených kompozitoch začali prebiehať testy biokompatibility a bioaktivity. Následne, po vyhodnotení testov, bude uvažovaná implantácia a testovanie in vivo.

**Programy: 7RP****6.) Pokrok vo vývoji a aplikáciách balíka NMR spektroskopie pre paramagnetické systémy.**

**Kombinovaný experimentálno-teoretický prístup (pNMR) (*Pushing the envelope of nuclear magnetic resonance spectroscopy for paramagnetic systems. A combined experimental and theoretical approach (pNMR)*)**

<b>Zodpovedný riešiteľ:</b>	Vladimír Malkin
<b>Trvanie projektu:</b>	1.1.2013 / 31.12.2016

**Evidenčné číslo projektu:** PITN-GA-2012-317127  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** Centre Europeen de RMN a Tres Hauts Champs  
**Počet spoluriešiteľských inštitúcií:** 10 - Nemecko: 2, Fínsko: 1, Francúzsko: 1, Veľká Británia: 1, Švajčiarsko: 1, Taliansko: 2, Holandsko: 1, Švédsko: 1  
**Čerpané financie:** EU: 40605 €  
 Podpora medzinárodnej spolupráce z národných zdrojov: 6393 €

Dosiahnuté výsledky:

- CHERRY, Peter - MALKIN, Vladimir G. - MALKINA, Olga L. - and ASHER, J. Energy anisotropy as a function of the direction of spin magnetization for a doublet system. In The Journal of Chemical Physics, 145, 174108 (2016); doi: 10.1063/1.4966236
- CHERRY, Peter - KOMOROVSKÝ, Stanislav - MALKIN, Vladimír - MALKINA, Olga. Calculations of the EPR g-tensor using unrestricted two- and four-component relativistic approaches within the HF and DFT frameworks. In Molecular Physics Special Issue Open shells. Open Questions, 2017, vol. 115, no. 1-2, p. 75-89. ISSN 0026-8976. Typ: ADCA DOI 10.1080/00268976.2016.1191688

**Programy: Bilaterálne - iné**

**7.) Ceramic coatings with glass fillers for high temperature corrosion protection of metals** (*Ceramic coatings with glass fillers for high temperature corrosion protection of metals*)

**Zodpovedný riešiteľ:** Dušan Galusek  
**Trvanie projektu:** 1.1.2014 / 31.12.2016  
**Evidenčné číslo projektu:**  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Nemecko: 1  
**Čerpané financie:**

Dosiahnuté výsledky:

Vyvinuli sa nové typy protikorózných vrstiev na báze PDC so sklenými plnivami pre vysokoteplotnú protikoróznú ochranu kovov a otestovala sa ich odolnosť voči korózii v hydrotermálnych podmienkach.

- PARCHOVIANSKÝ, Milan - BARROSO, G. - PETRÍKOVÁ, I. - MOTZ, Günter - GALUSKOVÁ, Dagmar - GALUSEK, Dušan. Polymer derived glass ceramic layers for corrosion protection of metals. In Ceramic Transactions : Advanced and Refractory Ceramics for Energy Conservation and Efficiency, 2016, vol. 256, p. 187-200.(CMCEE).
- PARCHOVIANSKÝ, Milan - PETRÍKOVÁ, I. - BARROSO, G. - ŠVANČÁREK, Peter - MOTZ, Günter - GALUSEK, Dušan. Oxidation behavior of stainless steel and polymer derived ceramic coatings In Workshop Processing and properties of advanced ceramics, November 23-25, 2016, Ružín, Slovak Republic: book of extended abstracts. Institute of Inorganic Chemistry SAS, 2016, p. 23-26.

**8.) Nové technológie pri výrobe hliníka - Fyzikálno-chemické a elektrochemické skúmanie sľubných draselných kryolitových sústav** (*New technology in Aluminium production – Physicochemical and electrochemical investigation of promising potassium cryolite molten systems*)

**Zodpovedný riešiteľ:** Blanka Kubíková  
**Trvanie projektu:** 1.1.2016 / 31.12.2017  
**Evidenčné číslo projektu:** SK-CN-2015-0014  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Čína: 1

**Čerpané financie:** Podpora medzinárodnej spolupráce z národných zdrojov: 1685 €

Dosiahnuté výsledky:

Vo vybraných draselných kryolitových sústavách ( $\text{KF-AlF}_3$ ) sa sledoval vplyv dvoch rôznych prídavkov ( $\text{Al}_2\text{O}_3$  a  $\text{LiF}$ ) na hustotu celého systému v stanovenom teplotnom intervale. Najnižšia hodnota hustoty bola zistená pre najnižší študovaný kryolitový pomer  $\text{CR}=1,3$  bez prídavku  $\text{LiF}$ . Prídavok  $\text{LiF}$  do kryolytovej zmesi bez, resp. s prídavkom  $\text{Al}_2\text{O}_3$  posúva hodnoty hustoty k hodnotám o 5 % vyšším. Prídavok  $\text{LiF}$  síce znižuje teploty primárnej kryštalizácie draselných kryolitových zmesí, ale má negatívny vplyv na rozpustnosť  $\text{Al}_2\text{O}_3$  v týchto sústavách. To vedie k zvyšovaniu hustoty študovaných zmesí.

Publikácie: Publikácia je v štádiu prípravy

**Programy:** ERANET

**9.) Kompozity keramika-grafénové platničky pre využitie v tribologických systémoch pracujúcich vo vodnom prostredí** (*Graphene-ceramic composites for tribological application in aqueous environments*)

**Zodpovedný riešiteľ:** Pavol Šajgalík  
**Trvanie projektu:** 1.9.2014 / 31.8.2017  
**Evidenčné číslo projektu:**  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:**  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** Podpora medzinárodnej spolupráce z národných zdrojov: 6500 €

Dosiahnuté výsledky:

Boli pripravené kompozitné materiály na báze  $\text{SiC}$  so spekacími prísadami  $\text{Y}_2\text{O}_3$ ,  $\text{Al}_2\text{O}_3$  a prídavkom grafénových nanoplatničiek alebo oxidu grafénu. Na takto pripravených materiáloch boli merané funkčné vlastnosti (konkrétne elektrická vodivosť a tepelná difuzivita) v rovnobežnom a kolmom smere na lisovací tlak. Bola preukázaná výrazná anizotropia funkčných vlastností ako dôsledok preferenčnej orientácie grafénových vrstiev počas spekania metódou rapid hot press. Prídavok grafénových nanoplatničiek a špeciálne oxidu grafénu viedol k výraznému nárastu elektrickej vodivosti takto pripravených kompozitov (17-násobne vyššia elektrická vodivosť ako v prípade referenčnej vzorky). Taktiež bola pozorovaná tvorba in-situ grafénu v referenčnej vzorke bez umelého pridania grafénu. In-situ tvorba grafénu bola dôsledkom použitej metódy spekania (rapid hot press) kedy elektrický prúd prechádza priamo cez formu a aj vzorku ak je vodivá. Boli urobené porovnávacie experimenty s referenčným práškom ( $\text{SiC}:\text{Y}_2\text{O}_3:\text{Al}_2\text{O}_3 - 93:5:2$  hm.%) ktorý bol spekaný metódou hot press (HP) a rapid hot press (RHP). Následne boli merané elektrická vodivosť a tepelná difuzivita pripravených referenčných vzoriek v smere rovnobežnom a kolmom na smer lisovania. Výsledky merania elektrickej vodivosti a tepelnej difuzivity potvrdili, že vzorka spekaná metódou rapid hot press mala o tri rády vyššiu elektrickú vodivosť a o 20 % vyššiu tepelnú difuzivitu v porovnaní s referenčným práškom spekaným metódou hot press. Ramanova spektroskopia, SEM, TEM analýza potvrdili prítomnosť in-situ grafénových domén vo vzorke spekanej metódou RHP, ktoré spôsobili zvýšenie funkčných vlastností takto pripraveného materiálu.

Publikácie: (publikácia zaslaná do Journal of the European Ceramic Society)

- HANZEL, Ondrej - SEDLÁK, Richard - SEDLÁČEK, Jaroslav - ŠAJGALÍK, Pavol. Anisotropy of functional properties of  $\text{SiC}/\text{GNPs}$  and  $\text{SiC}/\text{GO}$  composites = Anizotropia funkčných vlastností  $\text{SiC}/\text{GNPs}$  a  $\text{SiC}/\text{GO}$  kompozitov. In Workshop Processing and properties of advanced ceramics, November 23-25, 2016, Ružín, Slovak Republic : book of extended abstracts. p. 4-9. ISBN 978-80-971648-5-0.
- HANZEL, Ondrej - SEDLÁK, Richard - SEDLÁČEK, Jaroslav - ŠAJGALÍK, Pavol. Electrical and thermal conductivity of silicon carbide/graphene composites. In Workshop on graphene/ceramic composites: Programme and abstracts. Cuenca (Spain), 28.-30.9.2016. - B.V., 2016, p. 70.

**Programy:** Horizont 2020

**10.) Building-up Centre of Excellence for advanced materials application — CEMEA** (*Building-up Centre of Excellence for advanced materials application — CEMEA*)

**Zodpovedný riešiteľ:** Ján Malík  
**Zodpovedný riešiteľ v organizácii SAV:** Miroslav Boča

**Trvanie projektu:** 1.6.2015 / 30.6.2016  
**Evidenčné číslo projektu:** 664337 - H2020-WIDESPREAD-2014-1  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:**  
**Počet spoluriešiteľských inštitúcií:** 7 - Fínsko: 2, Slovensko: 5  
**Čerpané financie:**

Dosiahnuté výsledky:

**Projekty národných agentúr**

**Programy: VEGA**

**1.) Roztavené fluoridové systémy s vyššou funkcionalitou** (*Molten fluoride systems with higher functionality*)

**Zodpovedný riešiteľ:** Miroslav Boča  
**Trvanie projektu:** 1.1.2016 / 31.12.2019  
**Evidenčné číslo projektu:** 2/0114/16  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** VEGA: 22052 €

Dosiahnuté výsledky:

Fluoridový systém  $(\text{LiF-NaF})_{\text{eut}}\text{-LaF}_3$  bol detailne študovaný z hľadiska základných fyzikálno-chemických vlastností (hustota a objemové vlastnosti, elektrická vodivosť a povrchové napätie), vrátane fázových rovnováh, v limitovanom koncentračnom rozsahu, a to metódami, vhodnými pre agresívne fluoridové systémy pri vysokých teplotách. Niektoré zatuhnuté vzorky boli analyzované aj rtg. práškovou difrakčnou analýzou a dosiahnuté výsledky sa aktuálne spracúvajú tak, aby bolo možné porovnať vplyv kationov alkalických kovov na priebeh získaných závislostí.

Publikácie: Publikácia z dosiahnutých výsledkov sa pripravuje

**2.) Hybridné materiály vrstevnatých kremičitanov s kyanínovými a porfyrínovými farbivami** (*Hybrid materials based on layered silicates with cyanine and porphyrine dyes*)

**Zodpovedný riešiteľ:** Adriana Czímerová  
**Trvanie projektu:** 1.1.2013 / 31.12.2016  
**Evidenčné číslo projektu:** 2/0107/13  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** SAV: 11373 €

Dosiahnuté výsledky:

V sledovanom období projekt prešiel do poslednej fázy riešenia. Najdôležitejším výsledkom z tohto obdobia bolo štúdium vplyvu záporného náboja vrstiev ťlových minerálov na adsorpciu kationového meso-tetrakis(N-methylpyridinium-4-yl) porfyrínu. Na zmenu fluorescencečných spektier navyše vplyvajú aj štruktúrne zmeny farbiva (protonizácia, narovnávanie molekuly porfyrínu). Navyše boli vypočítané kvantové výťažky vzniknutých supramolekulových systémov. Okrem tohto pokračovalo sa aj vo výskume kationového kyanínového farbiva, kde sa

zistil vplyv rôzneho rozpúšťadla na spektrálne vlastnosti farbiva. Navyše tento efekt – nazývaný ako solvatochromizmus – bol následne študovaný aj na systéme saponit/kyanínové farbivo. Zistili sa foto-fyzikálne vlastnosti hybridných systémov saponit/kyanín, ktorý bol rozpustený v rôznych rozpúšťadlách. Okrem toho sa študovali fluorescenčné vlastnosti kyanínového farbiva 3,3'-dietyl-2,2'-tiacyanín v hybridnom systéme so syntetickým smektitom Sumecton, kde bol sledovaný výrazný nárast (80%) intenzity fluorescencie v porovnaní s roztokom farbiva. Vplyvom interakcie farbiva NK88 na povrchu smektitu boli potlačené neradiačné reflexné procesy farbiva NK88, ako vibračno-rotácia relaxácia. Postúpili sme aj v príprave tenkých vrstiev pomocou metódy „layer-by-layer“, kde sme študovali prenos energie medzi dvomi kationmi farbiva ukotvenými v anorganickom nosiči. Hlavným poznatkom z tohto štúdia je vplyv vzdialenosti medzi farbivami na dosiahnutie vyššie spomínaného efektu.

Publikácie:

- BOHÁČ, Peter - CZÍMEROVÁ, Adriana - BUJDAK, Juraj. Enhanced luminescence of 3,3'-diethyl-2,2'-thiacyanine cations adsorbed on saponite particles. In Applied Clay Science, 2016, vol. 127-128, p. 64-69. (2.586 - IF2015). (2016 - Current Contents). ISSN 0169-1317.
- ČEKLOVSKÝ, Alexander - BOHÁČ, Peter - CZÍMEROVÁ, Adriana. Spectral behaviour of TMPyP/layered silicate hybrid nanomaterials in aqueous dispersions of reduced-charge montmorillonites. In Applied Clay Science, 2016, vol. 126, p. 68-71. (2.586 - IF2015). (2016 - Current Contents). ISSN 0169-1317.

### 3.) Keramické vrstvy pripravené z organokremičitých prekursorov pre vysokoteplotnú protikoroziu ochranu kovov (*Ceramic coatings with glass fillers for high temperature corrosion protection of metals*)

**Zodpovedný riešiteľ:** Dušan Galusek  
**Trvanie projektu:** 1.1.2014 / 31.12.2016  
**Evidenčné číslo projektu:** 2/0058/14  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Slovensko: 1  
**Čerpané financie:** SAV: 5623 €

#### Dosiahnuté výsledky:

Vyvinuli sa nové typy protikorozičných vrstiev na báze PDC so sklenými plnivami pre vysokoteplotnú protikoroziu ochranu kovov a otestovala sa ich odolnosť voči korózii pri teplotách do 1100 °C v čistom kyslíku, na vzduchu a v atmosférach s rôznym obsahom vodnej pary. Pripravené vrstvy zvyšujú koróziu odolnosť testovaného druhu ocele pri teplotách do 900 °C.

- PARCHOVIANSKÝ, Milan - BARROSO, G. - PETRÍKOVÁ, I. - MOTZ, Günter - GALUSKOVÁ, Dagmar - GALUSEK, Dušan. Polymer derived glass ceramic layers for corrosion protection of metals. In Ceramic Transactions : Advanced and Refractory Ceramics for Energy Conservation and Efficiency, 2016, vol. 256, p. 187-200.(CMCEE).
- PARCHOVIANSKÝ, Milan - PETRÍKOVÁ, I. - BARROSO, G. - ŠVANČÁREK, Peter - MOTZ, Günter - GALUSEK, Dušan. Oxidation behavior of stainless steel and polymer derived ceramic coatings In Workshop Processing and properties of advanced ceramics, November 23-25, 2016, Ružín, Slovak Republic: book of extended abstracts. Institute of Inorganic Chemistry SAS, 2016, p. 23-26.

### 4.) Zlepšenie funkčných vlastností keramických materiálov prídavkom uhlíkových nanorúrok a grafénu (*Improvement of functional properties of ceramic materials with the addition of carbon nano-tubes and graphene*)

**Zodpovedný riešiteľ:** Miroslav Hnatko  
**Trvanie projektu:** 1.1.2014 / 31.12.2017  
**Evidenčné číslo projektu:** 2/0065/14  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** SAV: 6770 €

#### Dosiahnuté výsledky:

V rámci uplynulého obdobia bola zvládnutá optimalizácia režimu spekania pripravených prekursorov ako aj optimalizácia chemického zloženia a množstva spekacích prísad. Úspešne sa podarilo pripraviť kompozity ocharakterizovať s cieľom potvrdiť prítomnosť CNT ako aj dostatočnú homogenitu ich distribúcie v objeme materiálu po spekaní (boli použité techniky ako DTA/TG, SEM, TEM). Výsledky nepotvrdili výrazný vplyv nežiadúcich produktov procesu prípravy CNT metódou CCVD (amorfný uhlík, Fe) na výsledné mechanické vlastnosti a elektrickú/tepelnú vodivosť keramického SiC/CNT kompozitu.

#### Publikácie:

- HNATKO, Miroslav - KAŠIAROVÁ, Monika - GALUSKOVÁ, Dagmar - BYSTRICKÝ, Roman - LENČEŠ, Zoltán - SEDLÁČEK, Jaroslav - ŠAJGALÍK, Pavol. Corrosion of engineering ceramic materials by molten iron part I: Silicon nitride and SiAlON. In Corrosion Science, 2016, vol. 107, p. 76-84. (5.154 - IF2015). ISSN 0010-938X. Typ: ADCA
- HNATKO, Miroslav - KAŠIAROVÁ, Monika - GALUSKOVÁ, Dagmar - SEDLÁČEK, Jaroslav - BYSTRICKÝ, Roman - LENČEŠ, Zoltán - ŠAJGALÍK, Pavol. Corrosion of engineering materials by molten iron Part II: Alumina. In Corrosion Science, 2016, vol. 109, p. 230-237. (5.154 - IF2015). ISSN 0010-938X. Typ: ADCA
- KOVALČÍKOVÁ, Alexandra - SEDLÁČEK, Jaroslav - LENČEŠ, Zoltán - BYSTRICKÝ, Roman - DUSZA, Ján - ŠAJGALÍK, Pavol. Oxidation resistance of SiC ceramics prepared by different processing routes. In Journal of the European Ceramic Society, 2016, vol. 36, p. 3783-3793. (2.933 - IF2015). ISSN 0955-2219. Typ: ADCA
- ŠAJGALÍK, Pavol - SEDLÁČEK, Jaroslav - LENČEŠ, Zoltán - DUSZA, Ján - LIN, Hua-Tay. Additive-free hot-pressed silicon carbide ceramics - A material with exceptional mechanical properties. In Journal of the European Ceramic Society, 2016, vol. 36, no. 6, p. 1333-1341. (2.933 - IF2015). ISSN 0955-2219. Typ: ADCA
- HANZEL, Ondrej - SEDLÁK, Richard - SEDLÁČEK, Jaroslav - ŠAJGALÍK, Pavol. Anisotropy of functional properties of SiC/GNPs and SiC/GO composites = Anizotropia funkčných vlastností SiC/GNPs a SiC/GO kompozitov. In Workshop Processing and properties of advanced ceramics, November 23-25, 2016, Ružín, Slovak Republic: book of extended abstracts. editor Jana Valúchová. - Bratislava, Slovak Republic: Institute of Inorganic Chemistry SAS, 2016, p. 4-9. ISBN 978-80-971648-5-0. AFD
- BYSTRICKÝ, Roman - SEDLÁČEK, Jaroslav - FIDES, Martin - ŠAJGALÍK, Pavol. Electrically conductive composites based on SiC with addition of Ti and NbC = Elektricky vodivé kompozity na báze SiC s prídavkom Ti a NbC. In Workshop Processing and properties of advanced ceramics, November 23-25, 2016, Ružín, Slovak Republic: book of extended abstracts. editor Jana Valúchová. - Bratislava, Slovak Republic: Institute of Inorganic Chemistry SAS, 2016, p. 32-37. ISBN 978-80-971648-5-0. AFD

### 5.) Štruktúra a vlastnosti oxidových skiel - termodynamický model, entalpická a objemová relaxácia

(Structure and properties of oxide glasses - thermodynamic models, enthalpic and structural relaxation)

<b>Zodpovedný riešiteľ:</b>	Mária Chromčíková
<b>Trvanie projektu:</b>	1.1.2016 / 31.12.2020
<b>Evidenčné číslo projektu:</b>	2/0088/16
<b>Organizácia je koordinátorom projektu:</b>	áno
<b>Koordinátor:</b>	Ústav anorganickej chémie SAV
<b>Počet spoluriešiteľských inštitúcií:</b>	1 - Slovensko: 1
<b>Čerpané financie:</b>	SAV: 1837 €

#### Dosiahnuté výsledky:

Výsledky získané pri interpretácii vysokoteplotných Ramanových spektier sodno-boritanových skiel pomocou termodynamického modelu boli formou prednášky prezentované na konferencii Solid State Chemistry. Výsledky získané pri interpretácii koeficientov teplotnej rozťažnosti, teploty transformácie a viskozity sklotvorných tavenín so zložením blízky sklu pre vitrifikáciu rádioaktívneho odpadu Chrompic boli formou prednášky prezentované na SGT Centenary Conference & ESG 13<sup>th</sup> Conference. Štruktúrna relaxácia kremičitanových skiel s obsahom oxidu zirkoničitého boli prezentované na konferencii Solid State Chemistry. Štruktúra a Ramanové spektrá PbO-W2O3-P2O2 skiel boli opublikované v Eur. J. Glass Sci. Technology.

### 6.) Nové anorganické fosfory na báze hlinitanov vzácnych zemín pre aplikácie v LED diódach vyžarujúcich biele svetlo (New rare-earth aluminate-based inorganic phosphors for applications in white light emitting LEDs)

<b>Zodpovedný riešiteľ:</b>	Róbert Klement
<b>Trvanie projektu:</b>	1.1.2014 / 31.12.2017



**Evidenčné číslo projektu:** 1/0631/14  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:**  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** SAV: 4009 €

#### Dosiahnuté výsledky:

Vyvinuli sa nové typy anorganických fosforov na báze skiel so zložením identickým s minerálnym gelenitom dopovaným prvkami vzácnych zemín ako ak prechodnými kovmi (Mn). Otestoval sa vplyv kompenzácie náboja na luminiscenciu anorganických fosforov na báze wilemitu s Mn ako opticky aktívnou prísadou.

- ŠVANČÁREK, Peter - KLEMENT, Róbert - GALUSEK, Dušan. Photoluminescence of  $(\text{ZnO})_x\text{-Z}(\text{SiO}_2)_y\text{:}(\text{MnO})_z$  green phosphors prepared by direct thermal synthesis: The effect of ZnO/SiO<sub>2</sub> ratio and Mn<sup>2+</sup> concentration of luminescence. In *Ceramics International*, 2016, vol. 42, p. 16852-16860. (2.758 - IF2015). doi: 10.1016/j.ceramint.2016.07.176
- SHIH, S. J. - LIN, Yu-Chien - LIN, S.H. - VETEŠKA, P. - GALUSEK, Dušan - TUAN, Wei-Hsing. Preparation and characterization of Eu-doped gehlenite glassy particles using spray pyrolysis. In *Ceramics International*, 2016, vol. 42, no. 9, p. 11324-11329. (2.758 - IF2015). doi: 10.1016/j.ceramint.2016.04.053

### **7.) Svetlo emitujúce luminofóry na báze ternárnych nitridov a oxynitridov kremíka (*Ternary silicon nitride and oxynitride-based phosphors*)**

**Zodpovedný riešiteľ:** Zoltán Lenčేశ  
**Trvanie projektu:** 1.1.2014 / 31.12.2017  
**Evidenčné číslo projektu:** 2/0112/14  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** SAV: 11785 €

#### Dosiahnuté výsledky:

Projekt je zameraný prípravou troch fotoluminiscenčných systémov na báze nitridov ( $\text{MgSiN}_2$ ,  $\text{LaSi}_3\text{N}_5$ ) a oxynitridov ( $\text{SiAlON}$  a  $\text{MgAlON}$ ). Luminofory na báze oxynitridov kremíka boli pripravené z polymérneho prekursoru na báze polysilsequioxánu a alumatránu ( $\text{SiAlON}_y$ ) resp. acetátov hafnia ( $\text{SiHfON}$ ) alebo lutécia ( $\text{SiLuON}$ ). Ako dopanty boli použité oxidy kovov vzácnych zemín:  $\text{Eu}_2\text{O}_3$ ,  $\text{Sm}_2\text{O}_3$  a  $\text{CeO}_2$ . Pyrolýzou polyméru a následnou karbotermickou redukciou a nitridáciou zmesí boli pripravené luminofory. Na dosiahnutie vyššej intenzity emitovaného svetla bolo potrebné žihať vzorky pri 1600 C po dobu 2-4 hodín. Takto pripravený luminofor  $\text{SiAlON}:\text{Eu}$  emituje v oranžovej oblasti viditeľného svetla,  $\text{SiHfON}:\text{Eu}$  emituje v zeleno-žltej oblasti a  $\text{SiLuON}:\text{Eu}$  emituje v zelenej oblasti viditeľného svetla.

Luminofory na báze  $\text{MgAlON}$ u boli pripravené zo zmesi  $\text{MgO}$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{AlN}$  a  $\text{Eu}_2\text{O}_3$  spekaním v rapid hot-press (RHP) a následným dospekaním v izostatickom žiarovom lise. Pripravený traslucetný luminofor emituje svetlo v zeleno-žltej oblasti viditeľného svetla.

Použitím výpočtového kódu VASP a hybridného funkcionálu HSE06 bola vypočítaná elektrónová štruktúra a šírky zakázaného pásma  $\text{LaSi}_3\text{N}_5$  dopovaného lantanoidmi. Experimentálne boli pripravené luminofori na báze  $\text{LaSi}_3\text{N}_5$  dopované Ce, Eu, Sm a Nd. Šírka zakázaného pásma stanovené difúznou reflektanciou vykazovala dobrú zhodu s vypočítanými hodnotami.

#### **Publikácie:**

- IBRAHIM, Ismail - LENČEŠ, Zoltán - BENCO, Ľubomír - ŠAJGALÍK, Pavol. Lanthanide-doped  $\text{LaSi}_3\text{N}_5$  based phosphors: Ab initio study of electronic structures, band gaps, and energy level locations. In *Journal of Luminescence*, 2016, vol. 172, p. 83-91. (2.693 - IF2015). ADCA
- LENČEŠ, Zoltán - CZÍMEROVÁ, Adriana - VYLEŽÍKOVÁ, M. - ŠAJGALÍK, Pavol - JONŠTA, Zdeněk. Influence of Eu and Ce additives on the luminescent properties of  $\text{MgSiN}_2$  = Vplyv prídavku Eu a Ce na fotoluminiscenčné vlastnosti  $\text{MgSiN}_2$ . In *Workshop Processing and properties of advanced ceramics*, November 23-25, 2016, Ružín, Slovak Republic: book of extended abstracts. editor Jana Valúchová. - Bratislava, Slovak Republic: Institute of Inorganic Chemistry SAS, 2016, p. 98-102. AFD

## 8.) Príprava a vlastnosti nových typov organoíllov pre polymérne a environmentálne aplikácie (Preparation and properties of novel organoclay for polymer and environmental applications)

**Zodpovedný riešiteľ:** Jana Madejová  
**Trvanie projektu:** 1.1.2013 / 31.12.2016  
**Evidenčné číslo projektu:** 2/0132/13  
**Organizácia je** áno  
**koordinátorom projektu:**  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských** 0  
**inštitúcií:**  
**Čerpané financie:** SAV: 22052 €

### Dosiahnuté výsledky:

V poslednom roku riešenia projektu sa pozornosť sústredila na dokončenie a vyhodnotenie plánovaných experimentov. Usporiadanie organických katiónov vo pripravených z trimetylalkylamóniových katiónov (Cn-TMA, n=4–18) a montmorillonitu (MMT) sa študovalo pomocou RTG analýzy a IČ spektroskopie. Pre C4-C10 katióny bol pozorovaný vznik monovrstiev, pre C12 prechod od mono- k dvojvrstve, pre C14 a C16 dvojvrstva a pre C18 sa potvrdilo parafinické usporiadanie. IČ spektroskopie ukázala, že so stúpajúcou dĺžkou alkylového reťazca sa pás valenčných vibrácií a overtónu CH<sub>2</sub> skupín posúvajú k nižším vlnovým, čo indikuje pokles množstva neusporiadaných gauche a nárast usporiadaných trans konformérov [1]. DFT výpočty ukázali že štruktúru MMT interkalovaného butylamóniovými (1C4-4C4) katiónmi stabilizujú stredne silné N-H...O (1C4-3C4) a o niečo slabšie C-H...O vodíkové väzby, ktorými sa dané katióny viažu na skelet MMT [2]. Pripravili sa organoíly MMT a tetrabutyl- amóniových a fosfóniových katiónov a porovnávala sa ich termická stabilita. TG analýza a IČ analýza plynných produktov rozkladu surfaktantu ukázali, že Bu<sub>4</sub>P-SAZ má výrazne vyššiu tepelnú stabilitu, keďže iniciačná teplota jeho termického rozkladu bola o 150°C vyššia ako Bu<sub>4</sub>N-SAZ [3]. Preverila sa schopnosť organoíllov s chelátujúcimi funkčnými skupinami (OH, COOH a SH) sorbovať Cu<sup>2+</sup> a Ni<sup>2+</sup>. Výsledky ukázali len minimálne zvýšenie adsorpčnej kapacity použitých adsorbentov. Preto sa následne skúmali mechanochemicky aktivované materiály na báze syntetického íloveho minerálu saponitu. Takto upravené ílové minerály majú niekoľkonásobne väčšiu adsorpčnú kapacitu v porovnaní s pôvodnou vzorkou [4].

1. MADEJOVÁ, Jana - SEKERÁKOVÁ, Ľudmila - BIZOVSKÁ, Valéria - SLANÝ, Michal - JANKOVIČ, Ľuboš. Near-infrared spectroscopy as an effective tool for monitoring the conformation of alkylammonium surfactants in montmorillonite interlayers. In Vibrational Spectroscopy, 2016, vol. 84, p. 44-52. (1.682 - IF2015). (2016 - Current Contents).
2. SCHOLTZOVÁ, Eva - MADEJOVÁ, Jana - JANKOVIČ, Ľuboš - TUNEGA, Daniel. Structural and spectroscopic characterization of montmorillonite intercalated with N-butylammonium cations (N = 1-4) - modeling and experimental study. In Clays and Clay Minerals, 2016, vol. 64, no. 4, p. 401-412. (1.222 - IF2015). (2016 - Current Contents).
3. PÁLKOVÁ, Helena - ZIMOWSKA, Malgorzata - JANKOVIČ, Ľuboš - SULIKOWSKI, B - SERWICKA, Ewa M. - MADEJOVÁ, Jana. Thermal stability of tetrabutyl-phosphonium and -ammonium exchanged montmorillonite: influence of acid treatment. In Applied Clay Science, 2017, vol. 138, p. 63-73
4. PETRA, Lukáš - BILLIK, Peter - MELÍCHOVÁ, Zuzana - KOMADEL, Peter: Mechanochemically activated saponite as materials for Cu<sup>2+</sup> and Ni<sup>2+</sup> removal from aqueous solutions. Journal of Hazardous Materials (HAZMAT-D-16-06038)

## 9.) ReSpect - praktický a účinný výpočtový nástroj pre štúdium zlúčenín ťažkých prvkov (ReSpect - a practical and efficient computational tool to study heavy element compounds)

**Zodpovedný riešiteľ:** Oľga Malkin  
**Trvanie projektu:** 1.1.2013 / 31.12.2016  
**Evidenčné číslo projektu:** 2/0148/13  
**Organizácia je** áno  
**koordinátorom projektu:**  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských** 0  
**inštitúcií:**  
**Čerpané financie:** SAV: 12488 €

### Dosiahnuté výsledky:

WODYŃSKI, Artur – MALKINA, Olga L. - and PECUL, Magdalena. The Relativistic Effects on the Carbon-Carbon Coupling Constants Mediated by a Heavy Atom. In J. Phys. Chem. A 120 (2016) 5624-5634.

**10.) Elektrolyty s nízkou teplotou topenia a zmáčané katódy s potenciálom pre zlepšenie procesu výroby hliníka** (*Low melting electrolytes and wetted cathodes with potential for electrolytic aluminium production*)

**Zodpovedný riešiteľ:** František Šimko  
**Trvanie projektu:** 1.1.2014 / 31.12.2017  
**Evidenčné číslo projektu:** 2/0116/14  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** SAV: 11373 €

**Dosiahnuté výsledky:**

Uskutočnil sa základný popis binárnych systémov  $\text{KF-Al}_2\text{O}_3$  a  $\text{RbF-Al}_2\text{O}_3$ ; definovali sa fázové polia v meranej časti fázového diagramu pomocou termickej analýzy; identifikovali primárne tuhé fázy, existujúce v systéme ktoré sa následne pripravili v ich čistom stave a štruktúrne charakterizovali pomocou Rtg a NMR analytických metód. V poslednom kroku sa pripravili a popísali štruktúry oxofluórohlinitanových komplexov v oboch systémoch. Pri oboch systémoch sa zistilo, že sa nejedná o jednoduché eutektické sústavy, ale o komplikované quarternárne systémy, obsahujúce viacero nových fáz, a to hlinitan draselný a rubídny, draselnú a rubídnu beta aluminu, draselný a rubídny kryolit a oxofluórohlinitan draselný a rubídny. Dané fázy sa najskôr syntetizovali a potom boli prvý krát charakterizované pomocou NMR spektroskopie. Pri oxofluórohlinitan rubínom sa prvýkrát určila štruktúra danej zlúčeniny. Ide o neobvyklé tetredrické usporiadanie  $[\text{AlO}_3\text{F}]$  tetraédrov navzájom spojených rohmi, v ktorých sú atómy kyslíka. Tie sú pospájané do vrstiev, medzi ktorými sa nachádzajú mobilné ióny rubídia.

Vykonal sa aj korózne experimenty zamerané na objasnenie možných interakcií  $\text{TiB}_2$  s roztaveným elektrolytom zloženia  $1,3\text{KF-AlF}_3$  s prídavkom 4,5hmot.%  $\text{Al}_2\text{O}_3$ , ktorej zloženie je zaujímavé z hľadiska nízkoteplotnej výroby hliníka. Boli vykonané statické korózne testy  $\text{TiB}_2$  v tavenine pri teplote  $680^\circ\text{C}$  po dobu 200 hodín. Korózne produkty boli analyzované pomocou XRD, IR, SEM-EDX a EBSD analytických metód. Korózne napadnutie bolo vyhodnotené ako škvrnitá a bodová korózia. SEM-EBSD analýza potvrdila oxidáciu zrn  $\text{TiB}_2$ , ktoré boli v kontakte s koróznym médiom a vznik  $\text{TiO}_2$  ako korózneho produktu, čo korešponduje so SEM-EDX analýzou. Analýza taveniny pomocou MAS NMR a IČ spektroskopie potvrdila okrem  $\text{K}_3\text{AlF}_6$  a  $\text{KAlF}_4$  aj prítomnosť bóru v podobe hlinitoboritanu so  $(\text{BO}_3)^{3-}$  a  $(\text{BO}_4)^{4-}$  štruktúrnym fragmentami.

**Programy: APVV**

**11.) Fluoridové taveniny kritických prvkov pre nekonvenčné aplikácie** (*Fluoride melts of critical elements for unconventional applications*)

**Zodpovedný riešiteľ:** Miroslav Boča  
**Trvanie projektu:** 1.7.2016 / 30.6.2020  
**Evidenčné číslo projektu:** APVV-15-0479  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** APVV: 40000 €

**Dosiahnuté výsledky:**

- Bola zmeraná hustota roztavených systémov  $\text{MF-K}_2\text{TaF}_7$  ( $\text{MF} = \text{LiF}, \text{NaF}$  and  $\text{KF}$ ) v celom koncentračnom rozsahu a následne boli v celom koncentračnom rozsahu vypočítané objemové veličiny: molárny objem, dodatkový molárny objem, parciálny molárny objem; molárny dodatkový parciálny objem bol vypočítaný pre jednotlivé zložky systémov v nekonečnom zriedení. V študovaných systémoch bola pozorovaná objemová kontrakcia. Výsledky boli zaslané do Journal of Thermal Analysis and Calorimetry

- Boli zmerané  $^{19}\text{F}$  MAS NMR a XPS spektrá 11-tich fluorido-zirkoničtanov ( $\text{Li}_2\text{ZrF}_6$ ,  $\text{Rb}_2\text{ZrF}_6$ ,  $\text{Cs}_2\text{ZrF}_6$ ,  $\text{Na}_3\text{ZrF}_7$ ,  $(\text{NH}_4)_3\text{ZrF}_7$ ,  $\text{K}_3\text{ZrF}_7$ ,  $\text{Li}_4\text{ZrF}_8$ ,  $\text{K}_2\text{ZrF}_6$ ,  $\text{Na}_5\text{Zr}_2\text{F}_{13}$ ,  $\text{Na}_7\text{Zr}_6\text{F}_{31}$ , and  $(\text{NH}_4)_2\text{ZrF}_6$ ). Spektrálne dáta boli korelované so štruktúrnymi parametrami študovaných zlúčenín (koordinačné číslo centrálného atómu a väzbové módy fluoridových atómov). Na základe XPS spektroskopie bolo preukázané, že väzbové energie F 1s elektrónov sú citlivé na koordinačné správanie sa fluoridových atómov (iónové, terminálne alebo mostíkové) zatiaľ čo väzbové energie zirkónových orbitálov nie sú selektívne citlivé na koordinačné vlastnosti centrálného atómu.  $^{19}\text{F}$  NMR chemický posun koreluje s iónovým polomerom kationov v radoch  $\text{Li}_2\text{ZrF}_6$ ,  $\text{Rb}_2\text{ZrF}_6$ ,  $\text{Cs}_2\text{ZrF}_6$  and  $\text{K}_3\text{ZrF}_7$ ,  $(\text{NH}_4)_3\text{ZrF}_7$  and  $\text{Na}_3\text{ZrF}_7$ .

## 12.) Prevencia a eradikácia mikrobiálnych biofilmov vo vzťahu k nanomateriálom (*Prevention and eradication of microbial biofilms in relationship to nanomaterials*)

<b>Zodpovedný riešiteľ:</b>	Juraj Bujdák
<b>Trvanie projektu:</b>	1.7.2016 / 30.6.2020
<b>Evidenčné číslo projektu:</b>	APVV-15-0347
<b>Organizácia je koordinátorom projektu:</b>	nie
<b>Koordinátor:</b>	Prírodovedecká fakulta UK
<b>Počet spoluriešiteľských inštitúcií:</b>	0
<b>Čerpané financie:</b>	APVV: 11000 €

### Dosiahnuté výsledky:

Realizovali sme zaobstaranie a charakterizáciu viacerých skupín biologicky aktívnych látok, najmä iónových surfaktantov, fotosenzibilizátorov, polyelektrolytov a niektorých antibiotík. Začali sa pilotné experimenty, v ktorých sa realizovala príprava a charakterizácia niektorých typov hybridných materiálov na báze organických zlúčenín a vrstevnatých nanomateriálov. Prebehli testy adsorpcie organických zlúčenín v koloidných systémoch a popísali sa zmeny fotofyzikálnych vlastností vybraných fotosenzibilizátorov v hybridných sústavách.

## 13.) Keramické materiály pre použitie v extrémnych podmienkach (*Ceramic materials for extreme operating conditions*)

<b>Zodpovedný riešiteľ:</b>	Ján Dusza
<b>Zodpovedný riešiteľ v organizácii SAV:</b>	Pavol Šajgalík
<b>Trvanie projektu:</b>	1.7.2016 / 30.6.2020
<b>Evidenčné číslo projektu:</b>	APV-15-0469
<b>Organizácia je koordinátorom projektu:</b>	nie
<b>Koordinátor:</b>	
<b>Počet spoluriešiteľských inštitúcií:</b>	0
<b>Čerpané financie:</b>	APVV: 12000 €

### Dosiahnuté výsledky:

V rámci projektu boli vyselektované systémy, na ktorých bude prebiehať ďalší výskum. ÚACH SAV ako spoluriešiteľ bude zodpovedný za optimalizáciu technológie prípravy a zloženia keramických materiálov najmä na báze  $\text{TiB}_2$ ,  $\text{TaB}_2$  a  $\text{HfB}_2$ . Pripravené zmesi s vhodnými spekaciami prísadami na báze karbidov, nitridov, organo-kovových polymérnych prekursorov budú zhutňované žiarovým lisovaním, či už konvenčným alebo FAST technikou (SPS, rapid hot pressing (RHP), atď.). Prvotné testy prebiehali v modelovom systéme  $\text{ZrB}_2 - \text{Si}_3\text{N}_4 - \text{SiC}$ , ktorý patrí medzi najviac popísaný v odbornej literatúre. Použitím RHP, v porovnaní s konvenčným HP, pri rovnakých podmienkach zhutňovania (okrem rýchlosti ohrevu až do  $100^\circ/\text{min}$ ) bolo možné dosiahnuť pri relatívne nízkej teplote  $1800^\circ\text{C}$  výrazne zvýšenie hutnosti až na takmer 95 %.

Publikácie:

V rámci projektu zatiaľ nevznikla žiadna publikácia

## 14.) Kompozitné vrstvy pre vysokoteplotnú protikoroziu ochranu kovov (*Advanced composite coatings for high temperature corrosion protection of metals*)

**Zodpovedný riešiteľ:** Dušan Galusek  
**Trvanie projektu:** 1.7.2016 / 30.6.2020  
**Evidenčné číslo projektu:** APVV-15-0014  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 2 - Slovensko: 2  
**Čerpané financie:** APVV: 11250 €

Dosiahnuté výsledky:

Vzhľadom na to, že project je iba v prvom polroku riešenia, nie sú zatiaľ k dispozícii žiadne kompletne výsledky. Pripravil sa celý rad protikorózných vrstiev s rôznym zložením na oceľových substrátoch a momentálne prebiehajú testy oxidačnej a koróznej odolnosti.

**15.) Zhodnotenie druhotných surovín pre materiály s využitím v extrémnych podmienkach**  
*(Assessment of secondary raw materials for the preparation of materials used in extreme conditions)*

**Zodpovedný riešiteľ:** Miroslav Hnatko  
**Trvanie projektu:** 1.7.2016 / 30.6.2020  
**Evidenčné číslo projektu:** APVV-15-0540  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** APVV: 17423 €

Dosiahnuté výsledky:

V rámci projektu boli pre účely projektu vyselektované zdroje druhotných surovín pre následný výskum ich zhodnotenia na materiály na báze oxidov, karbidov a nitridov s využitím v extrémnych podmienkach. Za posledné obdobie boli charakterizované fázové a chemické zloženia, ako aj termické správanie sa druhotných surovín z výroby ferozliatin, niklu, spaľovania komunálneho odpadu a cementárskej výroby. V rámci nadviazanej spolupráce s výrobnohospodárskou sférou SR budú tieto výstupy zahrnuté do následnej optimalizácie s ohľadom na existujúcu technológiu.

Publikácie:

V rámci projektu zatiaľ nevznikla žiadna publikácia.

**16.) Vývoj vodivej keramiky na báze SiC** *(Development SiC based conductive ceramics)*

**Zodpovedný riešiteľ:** Pavol Hvizdoš  
**Zodpovedný riešiteľ v organizácii SAV:** Pavol Šajgalík  
**Trvanie projektu:** 1.10.2013 / 30.9.2017  
**Evidenčné číslo projektu:** APVV-0108-12  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:**  
**Počet spoluriešiteľských inštitúcií:** 1 - Slovensko: 1  
**Čerpané financie:** APVV: 17122 €

Dosiahnuté výsledky:

Kompozity na báze SiC s prídavkom 30, 40 a 50 hmotnostných % Ti a NbC, ktoré boli pripravené metódou HP dvojstupňovým spekaním pri teplotách 1650 °C a 1850 °C, boli zmerané magnetické vlastnosti. Z výsledkov vyplýva, že feromagnetický charakter referenčnej vzorky sa prídavkom 40 a 50% Ti a NbC fázy mení pri 2 K na

paramagnetický, pričom prídavok 30% Ti a NbC vo vzorke vykazuje diamagnetické vlastnosti. Pri teplote 300 K vzorky s 30 a 40 % prídavkom Ti a NbC vykazujú diamagnetický charakter, pričom vzorka s 50% prídavkom Ti a NbC vykazuje paramagnetický charakter.

Kompozity na báze SiC s prídavkom 20, 30 a 40% Ti a NbC boli pripravené aj metódou rapid-HP (pri teplote 1850 °C s výdržou 30 min). Vzorky boli charakterizované RTG difrakčnou analýzou a elektrónovou mikroskopiou. Na vzorkách boli zmerané mechanické vlastnosti a elektrická vodivosť. V porovnaní so vzorkami pripravenými metódou HP dvojstupňovým spekaním, majú vzorky pripravené metódou rapid-HP vyššiu tvrdosť, nižšiu lomovú húževnatosť a porovnateľnú elektrickú vodivosť.

Publikácie:

- KOVALČÍKOVÁ, Alexandra - SEDLÁČEK, Jaroslav - LENČEŠ, Zoltán - BYSTRICKÝ, Roman - DUSZA, Ján - ŠAJGALÍK, Pavol. Oxidation resistance of SiC ceramics prepared by different processing routes. In Journal of the European Ceramic Society, 2016, vol. 36, p. 3783-3793. (2.933 - IF2015). ISSN 0955-2219. Typ: ADCA
- ŠAJGALÍK, Pavol - SEDLÁČEK, Jaroslav - LENČEŠ, Zoltán - DUSZA, Ján - LIN, Hua-Tay. Additive-free hot-pressed silicon carbide ceramics - A material with exceptional mechanical properties. In Journal of the European Ceramic Society, 2016, vol. 36, no. 6, p. 1333-1341. (2.933 - IF2015). ISSN 0955-2219. Typ: ADCA
- BYSTRICKÝ, Roman - SEDLÁČEK, Jaroslav - FIDES, Martin - ŠAJGALÍK, Pavol. Electrically conductive composites based on SiC with addition of Ti and NbC = Elektricky vodivé kompozity na báze SiC s prídavkom Ti a NbC. In Workshop Processing and properties of advanced ceramics, November 23-25, 2016, Ružín, Slovak Republic: book of extended abstracts, editor Jana Valúchová, Bratislava, Slovak Republic: Institute of Inorganic Chemistry SAS, 2016, p. 32-37. ISBN 978-80-971648-5-0.

#### 17.) Nanokompozitné materiály na báze organo-fosfóniových smektitov a polymérov (*Nanocomposite materials based on organo-phosphonium smectites and polymers*)

<b>Zodpovedný riešiteľ:</b>	Peter Komadel
<b>Trvanie projektu:</b>	1.7.2016 / 30.6.2020
<b>Evidenčné číslo projektu:</b>	APVV-15-0741
<b>Organizácia je koordinátorom projektu:</b>	áno
<b>Koordinátor:</b>	Ústav anorganickej chémie SAV
<b>Počet spoluriešiteľských inštitúcií:</b>	1 - Slovensko: 1
<b>Čerpané financie:</b>	APVV: 15000 €

##### Dosiahnuté výsledky:

V prvom polroku riešenia projektu sa vybrali ílové materiály vhodné pre prípravu organoílov. Zvolili sa dioktaedrické smektity montmorillonity z ložiska Cheto v Arizone (SAz-1, USA), ložiska Jelšovský Potok (JP, Slovensko, Envigeo, a.s.) a syntetický trioktaedrický smektit saponit Sumecton (Kunimine Industries Co., Ltd., Japan). Jemné frakcie montmorillonitov sa separovali štandardným postupom pomocou sedimentácie vo vode a koagulácie s roztokom NaCl. Chemické zloženie vzoriek sa stanovilo chemickou analýzou, štruktúrne charakteristiky sa získali RTG analýzou a IČ spektroskopiou v strednej a blízkej oblasti. Interkalačná schopnosť sodného montmorillonitu Na-SAz sa študovala na základe predošlých experimentov pre jeden selektívne vybraný surfaktant - tetrabutylfosfónium bromid 4P4-Br. Pripravila sa plne saturovaná vzorka (100 % CEC) montmorillonitu. Expanzia medzivrstvia po nasýtení organofosfóniovými kationmi sa stanovila RTG práškovou difrakciou, hrúbka vrstvy + medzivrstvia vzrástla z pôvodných 1,2 na 1,8 nm, indikujúc prevažne monomolekulové usporiadanie kationov. Termická analýza 4P4-SAz preukázala mimoriadnu termickú stabilitu tohto fosfóniového organoílu, keďže významný rozklad nastával až po dosiahnutí teploty nad 400°C. Stabilita organoílu v kyslom prostredí sa študovala reakciou s roztokom HCl. Stanovením obsahu organického uhlíka sa zistil postupný rozklad vzorky spojený s deinterkaláciou surfaktantu. Pripravili sa aj modely montmorillonitu interkalovaného tetrabutylfosfóniovými (4A4) a tetrabutylfosfóniovými (4P4), a stabilita týchto interkalátov sa skúmala pomocou DFT metódy. Analýza vypočítaných vodíkových väzieb vlnových CH valenčných vibrácií, interkalačných a adsorpčných energií modelov ukázala, že 4P4-SAz je stabilnejší ako 4A4-SAz montmorillonit.

#### 18.) Fotoluminescenčné keramické materiály na báze oxynitridov kremíka (*Silicon oxynitride-based photoluminescent ceramic materials*)

<b>Zodpovedný riešiteľ:</b>	Zoltán Lenčes
<b>Trvanie projektu:</b>	1.7.2015 / 30.6.2019
<b>Evidenčné číslo projektu:</b>	APVV-14-0385
<b>Organizácia je</b>	áno

**koordinátorom projektu:**

**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 2 - Slovensko: 2  
**Čerpané financie:** APVV: 35464 €

**Dosiahnuté výsledky:**

Luminofoxy na báze oxinitridov kremíka boli pripravené z polymérneho prekursoru na báze polysilsequioxánu a alumatránu (SiAlONy) resp. acetátov hafnia (SiHfON) alebo lutécia (SiLuON). Ako dopanty boli použité oxidy kovov vzácnych zemín: Eu<sub>2</sub>O<sub>3</sub>, Sm<sub>2</sub>O<sub>3</sub> a CeO<sub>2</sub>. Pyrolýzou polyméru a následnou karbotermickou redukciou a nitridáciou zmesí boli pripravené luminofoxy. Na dosiahnutie vyššej intenzity emitovaného svetla bolo potrebné žihať vzorky pri 1600 °C po dobu 2-4 hodín. Takto pripravený luminofor SiAlON:Eu emituje v oranžovej oblasti viditeľného svetla, SiHfON:Eu emituje v zeleno-žltej oblasti a SiLuON:Eu emituje v zelenej oblasti viditeľného svetla.

Metódou MOCVD boli pripravené tenké fotoluminiscenčné vrstvy (20-30 nm) YAG:Ce na kremenných sklíčkach. YAG:Ce emituje žiarenie v zelenej (nižšia intenzita) a v červenej (vysoká intenzita) oblasti viditeľného svetla. Študoval sa aj vplyv žihania vzoriek v rôznych atmosférach (O<sub>2</sub>, N<sub>2</sub>, N<sub>2</sub>+H<sub>2</sub>) na farbu emitovaného žiarenia. Redukčná atmosféra (H<sub>2</sub>) spôsobila červený posuv emitovaného žiarenia.

Publikácie:

- IBRAHIM, Ismail - LENČEŠ, Zoltán - BENCO, Ľubomír - ŠAJGALÍK, Pavol. Lanthanide-doped LaSi<sub>3</sub>N<sub>5</sub> based phosphors: Ab initio study of electronic structures, band gaps, and energy level locations. In Journal of Luminescence, 2016, vol. 172, p. 83-91. (2.693 - IF2015). ADCA
- LENČEŠ, Zoltán - CZÍMEROVÁ, Adriana - VYLEŽÍKOVÁ, M. - ŠAJGALÍK, Pavol - JONŠTA, Zdeněk. Influence of Eu and Ce additives on the luminescent properties of MgSiN<sub>2</sub>. In Book of extended abstracts of the Processing and properties of advanced ceramics, 23.-25.11.2016, Ružín, Slovakia, pp. 98-102.

### 19.) Genéza perlitu a inovatívne prístupy pri jeho ťažbe a spracovaní (*Perlite genesis and innovative approaches to its exploitation and processing*)

**Zodpovedný riešiteľ:** Jana Madejová  
**Trvanie projektu:** 1.10.2013 / 30.9.2017  
**Evidenčné číslo projektu:** APVV-0339-12  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** Prírodovedecká fakulta UK  
**Počet spoluriešiteľských inštitúcií:** 2 - Slovensko: 2  
**Čerpané financie:** APVV: 10927 €

**Dosiahnuté výsledky:**

Sledovali sa dehydratačné vlastnosti perlitov pomocou infračervenej spektroskopie v blízkej (NIR) oblasti, s využitím špeciálnej temperovateľnej cely v teplotnom rozmedzí od 25°C až do 600°C. So zvyšujúcou sa teplotou dochádzalo k postupnému znižovaniu intenzít absorpčných pásov priradeným vibráciám molekúl vody, pričom najväčší pokles nastal v teplotnom rozmedzí od 250 do 550°C, pri vyšších teplotách sa už nezaznamenali výrazné zmeny v spektrách. Pre stanovenie množstva odchádzajúcej vody sa použil pás priradený jej kombinačnej vibrácii pri 5240 cm<sup>-1</sup>. Použitím normalizácie spektier, s následným vyhodnotením zmien v ploche tohto pásu sa dosiahla veľmi dobrá korelácia s hodnotami pre úbytok hmotnosti získanými z termogravimetrickej analýzy. Vyhodnotenie zmien v spektrách surových perlitov sa uskutočnilo na základe metodiky vypracovanej pre ílové minerály.

Výsledky sú uvedené v publikačných výstupoch:

- BIZOVSKÁ, Valéria - PÁLKOVÁ, Helena - MADEJOVÁ, Jana. Near-infrared study of water adsorption on homoionic forms of montmorillonite. In Clays and Clay Minerals, 2016, vol. 64, no. 5, p. 571-585. (1.222 - IF2015). Typ: ADCA
- BIZOVSKÁ, Valéria - PÁLKOVÁ, Helena - MADEJOVÁ, Jana. Near infrared study of the hydration properties of industrial silicate materials. In MECC 2016. 8th Mid-European clay conference, July 4-8, 2016, Košice, Slovakia: book of abstracts. Slovak Clay Group, 2016, p. 113. Typ: AFH

### 20.) Vývoj nových teoretických nástrojov pre predikciu a interpretáciu EPR a NMR parametrov (*Developing new theoretical tools for prediction and interpretation of EPR and NMR parameters*)

**Zodpovedný riešiteľ:** Vladimír Malkin  
**Trvanie projektu:** 1.7.2016 / 30.6.2020

**Evidenčné číslo projektu:** APVV-15-0726  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Slovensko: 1  
**Čerpané financie:** APVV: 20100 €

Dosiahnuté výsledky:

KONECNÝ, Lukáš – KADEK, Marius – KOMOROVSKÝ, Stanislav - MALKINA, Olga L. - RUUD, Kenneth, - and REPISKÝ, Michal, Acceleration of Relativistic Electron Dynamics by Means of X2CTransformation: Application to the Calculation of Nonlinear Optical Properties, J. Chem. Theory Comput. 2016, 12, 5823-5833, DOI: 10.1021/acs.jctc.6b00

**21.) Heterocykly pre progresívne trendy storočia (*Heterocycles for progressive trends of the century*)**

**Zodpovedný riešiteľ:** Ľubomír Smrčok  
**Trvanie projektu:** 1.7.2016 / 31.8.2016  
**Evidenčné číslo projektu:** APVV-15-0589  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** Fakulta chemickej a potravinárskej technológie STU Bratislava  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:**

Dosiahnuté výsledky:

**22.) Vlastnosti nových progresívnych konštrukčných materiálov v agresívnom prostredí roztavených solí (*The behaviour of new progressive construction materials in aggressive environment of molten salts*)**

**Zodpovedný riešiteľ:** František Šimko  
**Trvanie projektu:** 1.7.2016 / 30.6.2020  
**Evidenčné číslo projektu:** APVV-15-0738  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Slovensko: 1  
**Čerpané financie:** APVV: 25000 €

Dosiahnuté výsledky:

Projekt je zameraný na komplexný výskum korózných procesov pokročilých konštrukčných materiálov, prebiehajúcich v agresívnych roztavených fluoridových soliach. Objektami výskumu sú špeciálne zliatiny a keramické materiály pre vysokoteplotné aplikácie. Uskutočnila sa pracovná rešerž z príspevkov pre oblasť korózie materiálov v roztavených soliach. Zmesi binárnych zlúčenín LiF–NaF–KF, LiF–NaF a NaF(KF)–AlF<sub>3</sub> budú slúžiť ako korózne médiá pri korózných experimentoch. Realizovali sa prípravne práce na prípravu experimentálnych zariadení, ktoré budú slúžiť na uskutočnenie rýchlych vizuálnych, statických korózných testov a statických dlhodobých korózných testov. Uskutočnili sa rýchle vizuálne korózne testy kovy zliatin kovov a tzv. metaloidov typu Ni-Si-B, Ni-Cr-Si a Ni-Cr-Fe-Si-B v tavenine LiF–NaF.

**Programy: SASPRO**

**23.) Vlastnosti materiálov po vysokoteplotných koróziách v roztopených soliach (*High-temperature properties of materials corrosion in molten salts*)**

**Zodpovedný riešiteľ:** Miroslav Boča



**Trvanie projektu:** 5.11.2015 / 4.11.2018  
**Evidenčné číslo projektu:** 1119/02/02  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** SAV: 28312 €  
 SAV EÚ: 22074 €

Dosiahnuté výsledky:

Predmetom projektu je otestovať rôzne materiály, hlavne zliatiny nad teplotou 800 °C, v rôznom prostredí roztopených solí. Testovanie a vyhodnocovanie prebieha podľa platných svetových noriem STN a prípadne ASTM. V prípade nedostatočnosti noriem sa vyvíja vlastná metóda a testuje sa. Testujú sa zliatiny na báze niklu, napríklad: Hastelloy, Haynes, Inconel, Incoloy a pod. Zameranie projektu je objasniť korózný mechanizmus na základe meraní váhových úbytkov a koróznej rýchlosti materiálov pri strednej a dlhodobej koróznej záťaži. Na podporu tvrdení a záverov je použité široké spektrum analytických metód od fyzikálno-chemických a elektrochemických, doplnených RTG metódami, mikroskopiami s analýzou prvkov až po spektroskopické metódy. Väčšina spomenutých zliatin bola úspešne testovaná v roztopenej soľnej zmesi FLINAK, s intervalmi 8 h, 24 h, 30 h a 48 h. Taktiež sa našiel spôsob, ako predĺžiť čas expozície na 100h použitím kelímok zo skelného uhlíka.

- PATEL, Niketan S. - PAVLÍK, Viliam - BOČA, Miroslav. High temperature corrosion behavior of Haynes 230 in molten fluoride eutectic salts. The Material Science and Engineering Congress (MSE 2016), Darmstadt, Germany, September 27-29/2016.
- PATEL, Niketan. High temperature corrosion behavior of superalloys in molten salts, Young Scientist Competition, Institute of Inorganic Chemistry, Bratislava, Slovakia. October 18th 2016.

**24.) Zviditeľniť relativistickú kvantovú chémiu: Relativistické paramagnetické NMR** (*Moving relativistic quantum chemistry out of the shadow: Relativistic paramagnetic NMR*)

**Zodpovedný riešiteľ:** Vladimír Malkin  
**Trvanie projektu:** 1.10.2016 / 31.12.2018  
**Evidenčné číslo projektu:** 1536/03/02  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** SAV: 2553 €  
 SAV EÚ: 5850 €

Dosiahnuté výsledky:

Bol dosiahnutý čiastočný pokrok pri vývoji metód na výpočet excitačných energií bezspinových systémov (systémy s uzavretou obálkou). Konkrétne bola implementovaná TDDFT metóda s využitím Tamm-Dancoffovej aproximácie. Neočakávaným excelentným výsledkom je objavenie nového kvantového čísla pre Dirac-Coulomb Hamiltonián. Okrem všeobecnej dôležitosti tohto objavu pre kvantovú chémiu bude nové kvantové číslo užitočné pri charakterizácii excitovaných stavov získaných vyššie spomenutou metódou. Výsledkom je jedna publikácia v karentovanom časopise:

- KOMOROVSKÝ, Stanislav - REPISKÝ, Michal - BUČINSKÝ, Lukáš. New quantum number for the many-electron Dirac-Coulomb Hamiltonian. In Physical Review A, 2016, vol. 94, p. 052104-1-052104-14. (2.765 - IF2015). ISSN 1050-2947.

**25.) Transparentné luminescentné oxinitridy** (*Transparent luminescent oxynitrides*)

**Zodpovedný riešiteľ:** Pavol Šajgalík  
**Trvanie projektu:** 1.1.2016 / 31.12.2018  
**Evidenčné číslo projektu:** 1329/03/03  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 0

**inštitúcií:****Čerpané financie:**

SAV: 29045 €

SAV EÚ: 24188 €

**Dosiahnuté výsledky:**

V prvej fáze projektu boli optimalizované podmienky prípravy MgAlONu zo zmesi MgO, Al<sub>2</sub>O<sub>3</sub>, AlN a Eu<sub>2</sub>O<sub>3</sub> spekaním v rapid hot-presse (RHP) a následným dospekaním v izostatickom žiarovom lise (HIP). Bol študovaný vplyv zloženia východiskovej zmesi, spôsobu oddelenia vzorky od grafitovej formy, teploty spekania, použitého mechanického tlaku (RHP) resp. tlaku plynu (HIP) na výslednú hutnosť a optickú priepustnosť pripraveného materiálu. Optimalizáciou uvedených faktorov sa podarilo pripraviť transparentný MgAlON.

**Príloha C - Publikačná činnosť organizácie (generovaná z ARL)****ADCA Vedecké práce v zahraničných karentovaných časopisoch – impaktovaných**

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- ADCA03 BALTRUSAITIS, J. - BUČKO, Tomáš - MICHAELS, W. - MAKKEE, M. - MUL, G. Catalytic methyl mercaptan coupling to ethylene in chabazite: DFT study of the first C-C bond formation. In Applied Catalysis B: Environmental, 2016, vol. 187, p. 195-203. (8.328 - IF2015). (2016 - Current Contents). ISSN 0926-3373.
- ADCA04 BARANYAIOVÁ, Tímea - BUJDÁK, Juraj. Reaction kinetics of molecular aggregation of rhodamine 123 in colloids with synthetic saponite nanoparticles. In Applied Clay Science, 2016, vol. 134, p. 103-109. (2.586 - IF2015). (2016 - Current Contents). ISSN 0169-1317.
- ADCA05 BIZOVSKÁ, Valéria - PÁLKOVÁ, Helena - MADEJOVÁ, Jana. Near-infrared study of water adsorption on homo-ionic forms of montmorillonite. In Clays and Clay Minerals, 2016, vol. 64, no. 5, p. 571-585. (1.222 - IF2015). (2016 - Current Contents). ISSN 0009-8604.
- ADCA06 BODIŠOVÁ, Katarína - KLEMENT, Róbert - GALUSEK, Dušan - POUCHLÝ, Václav - DRDLÍK, Daniel - MACA, Karel. Luminescent rare-earth-doped transparent alumina ceramics. In Journal of the European Ceramic Society, 2016, vol. 36, no. 12, p. 2975-2980. (2.933 - IF2015). (2016 - Current Contents). ISSN 0955-2219.
- ADCA07 BOHÁČ, Peter - CZÍMEROVÁ, Adriana - BUJDÁK, Juraj. Enhanced luminescence of 3,3'-diethyl-2,2'-thiacyanine cations adsorbed on saponite particles. In Applied Clay Science, 2016, vol. 127-128, p. 64-69. (2.586 - IF2015). (2016 - Current Contents). ISSN 0169-1317.
- ADCA08 BUČKO, Tomáš - ŠIMKO, František. On the structure of crystalline and molten cryolite: Insights from the ab initio molecular dynamics in NpT ensemble. In Journal of Chemical Physics, 2016, vol. 144, p. 064502-1-064502-10. (2.894 - IF2015). (2016 - Current Contents). ISSN 0021-9606.
- ADCA09 BUČKO, Tomáš - LEBÉGUE, Sébastien - GOULD, Tim - ÁNGYÁN, János G. Many-body dispersion corrections for periodic systems: an efficient reciprocal space implementation. In Journal of Physics: Condensed Matter, 2016, vol. 28, no. 4, p. 045201-1-045201-13. (2.209 - IF2015). (2016 - Current Contents). ISSN 0953-8984.
- ADCA10 BUJDÁK, Juraj. Hybrid systems based on organic dyes and clay minerals: Fundamentals and potential applications. In Clay Minerals, 2015, vol. 50, no. 5, p. 549-571. (0.969 - IF2014). (2015 - Current Contents). ISSN 0009-8558.
- ADCA11 BUJDÁK, Juraj - RATULOVSKÁ, Jana - DONAUEROVÁ, Alena - BUJDÁKOVÁ, Helena. Hybrid materials based on luminescent alkaloid berberine and saponite. In Journal of Nanoscience and Nanotechnology, 2016, vol. 16, no. 8, p. 7801-7804. (1.338 - IF2015). (2016 - Current Contents). ISSN 1533-4880.
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- ADCA18 GOULD, Tim - LEBÈGUE, Sébastien - ÁNGYÁN, János G. - BUČKO, Tomáš. A fractionally ionic approach to polarizability and van der Waals many-body dispersion calculations. In Journal of Chemical Theory and Computation, 2016, vol. 12, p. 5920-5930. (5.301 - IF2015). (2016 - Current Contents). ISSN 1549-9618.
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- ADCA23 CHIBANI, Siwar - CHEBBI, Mouheb - LEBÈGUE, Sébastien - BUČKO, Tomáš - BADAWI, Michael. A DFT investigation of the adsorption of iodine compounds and water in H-, Na-, Ag-, and Cu- mordenite. In Journal of Chemical Physics, 2016, vol. 144, p. 244705-1-244705-10. (2.894 - IF2015). (2016 - Current Contents). ISSN 0021-9606.
- ADCA24 CHROMČÍKOVÁ, Mária - VOKELOVÁ, Jana - MICHÁLKOVÁ, J. - LIŠKA, Marek - MACHÁČEK, Jan - GEDEON, Ondrej - SOLTÉSZ, Vojtech. Chemical durability of gamma-irradiated glass fibrous insulation. In Nuclear Technology, 2016, vol. 193, no. 2, p. 297-305. (0.623 - IF2015). (2016 - Current Contents). ISSN 0029-5450.
- ADCA25 CHROMČÍKOVÁ, Mária - HRUŠKA, Branislav - HOLUBOVÁ, Jana - LISSOVÁ, Magdaléna - LIŠKA, Marek. The Raman spectra and structure of PbO-WO<sub>3</sub>-P<sub>2</sub>O<sub>5</sub> glasses. In Physics and Chemistry of Glasses: European Journal of Glass Science and Technology Part B, 2016, vol. 57, no. 1, p. 32-36. (0.630 - IF2015). (2016 - Current Contents). ISSN 1753-3562.
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- ADCA27 JANÍKOVÁ, V. - JÓNA, Eugen - JANÍK, R. - PAVLÍK, Viliam - ONDRUŠOVÁ, D.

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AED01 KRAXNER, Jozef - KLEMENT, Róbert - CHROMČÍKOVÁ, Mária - LIŠKA, Marek. The effect of CaO and MgO on physical properties of MgO-CaO-B<sub>2</sub>O<sub>3</sub>-Al<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> glasses with composition close to the E-glass fibers. In Glass - The Challenge for the 21st Century : 9th Conference of the European Society of Glass Science and Technology/Annual Meeting of the International Commission on Glass, Trenčín, June 22-26, 2008. Eds. M. Liška, D. Galusek, R. Klement, V. Petrušková. - Zurich : TRANS TECH PUBLICATIONS LTD., 2008, p. 81-84. ISBN 978-0-87849-387-6. ISSN 1022-6680.

**Citácie:**

1. [1.1] VEIT, Ulrike - HOUET, Yves - LAURENT, Dimitri - RUESSEL, Christian. Liquidus temperatures of calcium magnesium aluminosilicate glass-forming compositions determined via gradient furnace and from the melting peak by differential thermal analysis. In THERMOCHIMICA ACTA. ISSN 0040-6031, 2015, vol. 618, no., pp. 1., WOS

AED02 MIŠÍKOVÁ, L. - LIŠKA, Marek. Kinetics of E-glass fibres leaching in borate solution and distilled water. In Glass - The Challenge for the 21st Century : 9th Conference of the European Society of Glass Science and Technology/Annual Meeting of the International Commission on Glass, Trenčín, June 22-26, 2008. Eds. M. Liška, D. Galusek, R. Klement,

V. Petrušková. - Zurich : TRANS TECH PUBLICATIONS LTD., 2008, p. 355-358. ISBN 978-0-87849-387-6. ISSN 1022-6680.

**Citácie:**

1. [1.1] LUSIS, Andrej - PENTJUŠS, Evalds - BAJARS, Gunars - SIDOROVICHA, Uljana - STRAZDS, Guntis. A Comparative Study of Natural Fiber and Glass Fiber Fabrics Properties with Metal or Oxide Coatings. In 12TH RUSSIA/CIS/BALTIC/JAPAN SYMPOSIUM ON FERROELECTRICITY AND 9TH INTERNATIONAL CONFERENCE ON FUNCTIONAL MATERIALS AND NANOTECHNOLOGIES (RCBJSF-2014-FM&NT). ISSN 1757-8981, 2015, vol. 77, no., pp., WOS

AED03 MIŠÍKOVÁ, L. - LIŠKA, Marek. Kinetics of E-glass fibres leaching in borate solution and distilled water. In Glass - The Challenge for the 21st Century : 9th Conference of the European Society of Glass Science and Technology/Annual Meeting of the International Commission on Glass, Trenčín, June 22-26, 2008. Eds. M. Liška, D. Galusek, R. Klement, V. Petrušková. - Zurich : TRANS TECH PUBLICATIONS LTD., 2008, p. 355-358. ISBN 978-0-87849-387-6. ISSN 1022-6680.

**Citácie:**

1. [1.1] LUSIS, Andrej - PENTJUŠS, Evalds - BAJARS, Gunars - SIDOROVICHA, Uljana - STRAZDS, Guntis. A Comparative Study of Natural Fiber and Glass Fiber Fabrics Properties with Metal or Oxide Coatings. In 12TH RUSSIA/CIS/BALTIC/JAPAN SYMPOSIUM ON FERROELECTRICITY AND 9TH INTERNATIONAL CONFERENCE ON FUNCTIONAL MATERIALS AND NANOTECHNOLOGIES (RCBJSF-2014-FM&NT). ISSN 1757-8981, 2015, vol. 77, no., pp., WOS

### Nezaradené publikácie

01 KÚDELA, Stanislav - GERGELY, Vladimír - SMRČOK, Ľubomír - OSWALD, Steffen - BAUNACK, Stefan - WETZIG, Klaus. Phase transformations of deltaAl203 Saffil fibres during their interaction with molten MgLi alloys.

**Citácie:**

1. [1.1] WU, R. - YAN, Y. - WANG, G. - MURR, L. E. - HAN, W. - ZHANG, Z. - ZHANG, M. Recent progress in magnesium-lithium alloys. In INTERNATIONAL MATERIALS REVIEWS. ISSN 0950-6608, 2015, vol. 60, no. 2, pp. 65-100., WOS

**Príloha D - Údaje o pedagogickej činnosti organizácie**Semestrálne prednášky:

doc. Ing. Miroslav Hnatko, PhD.

Názov semestr. predmetu: Pokročilé keramické materiály

Počet hodín za semester: 3

Názov katedry a vysokej školy: Fakulta chemickej a potravinárskej technológie STU, Ústav anorganickej chémie

doc. Ing. Zoltán Lenčes, PhD.

Názov semestr. predmetu: Materiálová chémia

Počet hodín za semester: 4

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

Semestrálne cvičenia:

Mgr. Valéria Bizovská, PhD.

Názov semestr. predmetu: Metódy charakterizácie anorganických látok a materiálov (študenti 3. a 4. ročníka)

Počet hodín za semester: 3

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

Ing. Michal Hičák

Názov semestr. predmetu: Materiálová chémia (prax študentov na ÚACH)

Počet hodín za semester: 30

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

doc. Ing. Zoltán Lenčes, PhD.

Názov semestr. predmetu: Materiálová chémia (prax študentov na ÚACH)

Počet hodín za semester: 30

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

Ing. Michal Slaný

Názov semestr. predmetu: Špeciálne metódy výskumu nerúd pre študentov 4. ročníka

Počet hodín za semester: 2

Názov katedry a vysokej školy: Prírodovedecká fakulta UK, Katedra ložiskovej geológie

Semináre:

Mgr. Stanislav Kedžuch, PhD.

Názov semestr. predmetu: Výpočtový seminár II

Počet hodín za semester: 24

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

Mgr. Lukáš Petra

Názov semestr. predmetu: Chemické výpočty (1)

Počet hodín za semester: 52

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

Terénne cvičenia:

Individuálne prednášky:

Dr. Oľga Malkin, DrSc.

Názov semestr. predmetu: Interpretation of NMR and EPR parameters

Počet hodín za semester: 2

Názov katedry a vysokej školy: Technical University of Munich (TUM), Nemecko, Graduate School of TUM

Dr. Oľga Malkin, DrSc.

Názov semestr. predmetu: Visualization of NMR indirect nuclear spin-spin coupling pathways

Počet hodín za semester: 2

Názov katedry a vysokej školy: Technical University of Munich (TUM), Nemecko, Graduate School of TUM

Dr. Vladimír Malkin, DrSc.

Názov semestr. predmetu: Introduction to theory of QM calculation of NMR and EPR parameters

Počet hodín za semester: 2

Názov katedry a vysokej školy: Technical University of Munich (TUM), Nemecko, Graduate School of TUM

Dr. Vladimír Malkin, DrSc.

Názov semestr. predmetu: Methodology of the calculations of NMR and EPR parameters

Počet hodín za semester: 2

Názov katedry a vysokej školy: Technical University of Munich (TUM), Nemecko, Graduate School of TUM

Dr. Vladimír Malkin, DrSc.

Názov semestr. predmetu: Relativistic calculations of NMR and EPR parameters of compounds containing heavy elements (scalar effects, SO effects, finite nuclei effects) + interpretation of the parameters at the relativistic level of theory

Počet hodín za semester: 2

Názov katedry a vysokej školy: Technical University of Munich (TUM), Nemecko, Graduate School of TUM



**Príloha E - 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
Čína	Miroslav Boča	2				
	Blanka Kubíková	2				
Poľsko	Valéria Bizovská	11				
	Helena Pálková	11				
<b>Počet vyslaní spolu</b>	<b>4</b>	<b>26</b>				

**(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
Česko	Jiří Hybler	7				
	Mariana Klementová	5				
Pakistan					Syed Awais Rouf	91
Poľsko	Małgorzata Zimowska	11				
Rakúsko					Anastasia Kucheryavaya	7
					Christina Atzenhofer	32
Rusko					Igor Petrushenko	30
<b>Počet prijatí spolu</b>	<b>3</b>	<b>23</b>			<b>4</b>	<b>160</b>

**(C) Účast' pracovníkov pracoviska na konferenciách v zahraničí (nezahrnutých v "A"):**

Krajina	Názov konferencie	Meno pracovníka	Počet dní
Česko	MgČns	Martin Kontrík	3
		Viliam Pavlík	3
	PANCh	Jozef Noga	6
	SAPPM	Anna Prnová	2
	SSCh	Milan Drábik	6
		Mária Chromčíková	6
		Marek Liška	6
		Eva Hadzimová	4
	Zjazd chemikov	Jarmila Mlynáriková	4
		Zuzana Netriová	4
Čína	ICG	Peter Šimurka	4
	LSEM	Miroslav Boča	3
Francúzsko	HTMC	Miroslav Boča	3
		Martin Kontrík	3
India	FISAT	Dušan Galusek	7
Japonsko	Symposium on Photochemistry	Adriana Czímerová	10
		Alexander Čeklovský	10
Kórejská republika	ISASC	Zoltán Lenčes	6

		Pavol Šajgalík	8
Nemecko	AMSHC	Pavol Šajgalík	2
	CENERGY	Zoltán Lenčes	3
		Pavol Šajgalík	2
	ICC	Pavol Šajgalík	4
	MSE	Niketan Patel	4
	SNRM	Zoltán Lenčes	6
Portugalsko	IMHI	Jaroslav Sedláček	4
Rakúsko	DRC	Dušan Galusek	2
	MMQC	Oľga Malkin	8
		Vladimír Malkin	8
Rumunsko	CONSILOX	Pavol Šajgalík	5
Španielsko	ENM	Anna Prnová	7
	GCC	Ondrej Hanzel	3
Taiwan	AMEC	Dušan Galusek	4
Taliansko	WAC	Pavol Šajgalík	5
USA	ICACC	Ondrej Hanzel	7
		Zoltán Lenčes	7
		Pavol Šajgalík	7
Veľká Británia	AMACMR	Oľga Malkin	6
		Vladimír Malkin	6
	SGT and ESG	Marek Liška	6
<b>Spolu</b>	<b>27</b>	<b>40</b>	<b>204</b>

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

Skratky použité v tabuľke C:

AMACMR - 6th Annual Meeting of the St. Andrews Centre of Magnetic Resonance  
AMEC - International association for the measurement and evaluation of communication  
AMSHC - 91st DKG Annual Meeting and Symposium on High-Performance Ceramics  
CENERGY - Sympóziu: Ceramics for Energy  
CONSILOX - 12th Conference on the Science and Engineering of Oxide Materials  
DRC - The Danube Rectors' Conference  
ENM - EMN 3CG Meeting: Collaborative Conference on Crystal Growth  
FISAT - Federal Institute for Science and Technology  
GCC - Workshop: On Graphene/Ceramic Composites  
HTMC - 15th International IUPAC on High Temperature Materials Chemistry  
ICACC - 40th International Conference and Exposition on Advanced Ceramics and Composites  
ICC - 6st International Congress on Ceramics  
ICG - 24th International Congress on Glass  
IMHI - Workshop: "Interactions between materials and host tissues"  
ISASC - 4th International Symposium on New Frontier of Advanced Si-Based Ceramics and Composites  
LSEM - Liquid Salts for Energy and Materials  
MgČns - 16. Mikulášské setkání Mladé generace České nukleární společnosti  
MMQC - VIIIth Workshop on Modern Methods in Quantum Chemistry  
MSE - Materials Science and Engineering  
PANCh - 2th konferencia Pokroky anorganické chemie  
SAPPM - 18 ročník Konference o Speciálních Anorganických Pigmentech a Práškových Materiálech  
SGT and ESG - Society of Glass Technology Centenary Conference and 13th European Society of Glass  
Science and Technology Conference  
SNRM - 8th international Workshop on Spinel Nitrides and Related Materials  
SSCh - Solid State Chemistry 2016  
Symposium on Photochemistry - 26th IUPAC International Symposium on Photochemistry  
WAC - World Academy of Ceramics  
Zjazd chemikov - 68.Zjazd chemikov