

# Ústav anorganickej chémie SAV



## Správa o činnosti organizácie SAV za rok 2014

Bratislava  
január 2015

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## 1. Základné údaje o organizácii

### 1.1. Kontaktné údaje

**Názov:** Ústav anorganickej chémie SAV

**Riaditeľ:** doc. Ing. Miroslav Boča, PhD.

**Zástupca riaditeľa:** doc. Ing. Miroslav Hnatko, PhD.

**Vedecký tajomník:** doc. Ing. Zoltán Lenčoš, PhD.

**Predseda vedeckej rady:** RNDr. Jana Madejová, DrSc.

**Členovia snemu SAV:** doc. Ing. Miroslav Boča, PhD., doc. Ing. Miroslav Hnatko, PhD.

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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>	95	51	44	13	17	87	76,23	61,24
<b>Vedeckí pracovníci</b>	55	39	16	10	5	48	41,57	41,57
<b>Odborní pracovníci VŠ</b>	26	10	16	3	12	25	21,21	14,67
<b>Odborní pracovníci ÚS</b>	12	2	10	0	0	12	11,45	5
<b>Ostatní pracovníci</b>	2	0	2	0	0	2	2	0

*K – kmeňový stav zamestnancov v pracovnom pomere k 31.12.2014 (uvádzajú zamestnancov v pracovnom pomere, vrátane riadnej materskej dovolenky, zamestnancov pôsobiacich v zahraničí, v štátnych funkciách, členov Predsedníctva SAV, zamestnancov pôsobiacich v zastupiteľských zborech)*

*F – fyzický stav zamestnancov k 31.12.2014 (bez riadnej materskej dovolenky, zamestnancov pôsobiacich v zahraničí v štátnych funkciách, členov Predsedníctva SAV, zamestnancov pôsobiacich v zastupiteľských zborech)*

*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 31.12.2014)

Rodová skladba	Pracovníci s hodnosťou				Vedeckí pracovníci v stupňoch		
	DrSc.	CSc./PhD.	prof.	doc.	I.	IIa.	IIb.
<b>Muži</b>	7	33	5	8	8	14	17
<b>Ženy</b>	2	17	0	0	2	4	10

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

Veková štruktúra (roky)	< 31	31-35	36-40	41-45	46-50	51-55	56-60	61-65	> 65
<b>Muži</b>	5	7	4	5	3	0	9	8	0
<b>Ženy</b>	5	3	6	3	3	0	4	2	1

Tabuľka 1d Priemerný vek zamestnancov organizácie k 31.12.2014

	Kmeňoví zamestnanci	Vedeckí pracovníci	Riešitelia projektov
<b>Muži</b>	46,5	45,1	46,7
<b>Ženy</b>	42,1	39,8	43,0
<b>Spolu</b>	44,5	43,5	45,2

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

Ústav v roku 2014 zaznamenal zmenu v zložení vedeckej rady. Za predsedníčku vedeckej rady bola na schôdzi akademickej obce ústavu dňa 6. 5. 2014 zvolená RNDr. J. Madejová, DrSc., vedeckým tajomníkom rady sa stal doc. Ing. Z. Lenčes, PhD. Zmeny nastali aj v zastúpení ústavu v Sneme SAV. Koncom roka bol na schôdzi akademickej obce zvolený za zástupcu ústavu na sneme doc. Ing. M. Hnatko, PhD. namiesto odstupujúceho doc. Ing. M. Boču, PhD.

Priemerný vek zamestnancov ÚACH SAV dlhodobo ostáva pod hranicou 45 rokov. V roku 2014 bol priemerný vek všetkých pracovníkov ústavu 44,5 roka a priemerný vek vedeckých pracovníkov 43,5. I napriek tomu, že zamestnávanie mladých schopných postdocov na ústave je jednou z hlavných priorít, nevieme ju v primeranej požadovanej miere 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 plyní 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), pričom je to jediný prostriedok pre zvyšovanie vedeckej výkonnosti organizácie. 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, čo sa na II. oddelení vied SAV zatiaľ realizuje iba v obmedzenej forme.

Ústav sa výraznou mierou podieľa na realizácii projektov financovaných zo ŠF EÚ v pozícii partnera. V roku 2014 bol riešiteľom 6 projektov, z toho 5 projektov pokračuje z predošlých rokov. Z toho plynie aj naliehavá potreba rozšírenia administratívy ústavu. Zvýšený počet pracovníkov ústavu v posledných rokoch je spojený najmä s nárastom počtu administratívnych pracovníkov manažujúcich projekty ŠF, pričom výraznú časť administratívnych výkonov preberajú aj vedeckí pracovníci. Prepočítaný počet pracovníkov vzrástol z 59,6 FTE v roku 2008 na 76,2 FTE v roku 2014. Tento nárast je hradený z prostriedkov projektov ŠF, avšak pri problematickom prísune prostriedkov z Agentúry Ministerstva školstva, vedy, výskumu a športu SR pre ŠF EÚ (ASFEU) vznikajú veľmi napäté situácie v mzdovom fonde ústavu, z ktorého si musíme „požičiavať“ na financovanie hlavne administratívnych pracovníkov. Tento komplikovaný proces prináša ďalšiu zbytočnú administratívnu záťaž. Navyše, všetky neoprávnené výdavky na novoprijatých pracovníkov hradených zo ŠF znáša ústav, pričom tieto neoprávnené výdavky sú podľa nás agentúrou generované často neopodstatnene.

Celá vyššie opísaná situácia spôsobuje pre náš ústav nezvyčajne vysokú fluktuáciu pracovníkov, vedeckých a aj administratívnych. V roku 2014 predčasne ukončila doktorandské štúdium jedna doktorandka, ďalší doktorand prechádza v roku 2015 z dennej formy na externé formu štúdia z dôvodu získania výhodného pracovného miesta v súkromnej sfére a jedna mladá vedecká pracovníčka (obhajovala v roku 2013) ukončila pracovný pomer ku koncu roka 2014 z toho istého dôvodu, získania výhodného pracovného miesta v súkromnej sfére. V tomto roku odišli tiež traja administratívni pracovníci, ktorí sa starali o administratívu štrukturálnych fondov, tiež z dôvodu získania výhodného pracovného miesta v súkromnej sfére. Na ich miesto nastúpili dve novoprijaté pracovné sily.

Významnou udalosťou v roku 2014 bola kolaudácia novopostavenej budovy v rámci projektu Centrum aplikovaného výskumu nových materiálov a transferu technológií, kde ústav disponuje priestormi pre prístrojové vybavenie.

## 2. Vedecká činnosť

### 2.1. Domáce projekty

Tabuľka 2a Počet domácich projektov riešených v roku 2014

ŠTRUKTÚRA PROJEKTOV	Počet projektov		Čerpané financie za rok 2014 (v €)		
	A	B	A		B
			spolu	pre organi-	
1. Vedecké projekty, ktoré boli r. 2014 financované VEGA	11	2	122401	122401	3925
2. Projekty, ktoré boli r. 2014 financované APVV	6	5	254547	165564	78787
3. Projekty OP ŠF	0	6	-	-	274480
4. Projekty centier excelentnosti SAV	0	1	-	-	3947
5. Iné projekty (FM EHP, ŠPVV, Vedecko-technické projekty, ESF, na objednávku rezortov a pod.)	0	0	-	-	-

A - organizácia je nositeľom projektu

B - organizácia sa zmluvne podieľa na riešení projektu

Tabuľka 2b Počet návrhov domácich projektov podaných v roku 2014

Štruktúra projektov	Miesto podania	Organizácia je nositeľom projektu	Organizácia sa zmluvne podieľa na riešení projektu
1. Účasť na nových výzvach APVV r. 2014	-	4	2
2. Projekty výziev OP ŠF podané r. 2014	Bratislava Regióny		

**Názov projektu:** Fyzikálno-chemická, spektrálna a difrakčná analýza vybraných fluoridových tavenín na báze prvkov definovaných ako kritické z pohľadu nezávislosti v Európskej únii

**Kód projektu:** APVV-14-0853

**Podávateľ projektu:** Ústav anorganickej chémie SAV, M. Boča

**Stav:** podaný

**Názov projektu:** Fotoluminescenčné keramické materiály na báze oxynitridov kremíka (Silicon oxynitride-based photoluminescent ceramic materials)

**Evidenčné č. projektu:** APVV-14-0385

**Akronym projektu:** LuminSion

**Podávateľ projektu:** Ústav anorganickej chémie SAV, Z. Lenčoš

**Partner:** Elektrotechnický ústav SAV Bratislava, Ústav materiálového výskumu SAV - Košice

**Stav:** podaný

**Názov projektu:** Nové sklené a sklokeramické fosfory na báze hlinitanov vzácnych zemín pre aplikáciu v pevnolátkových energií šetriacich svetelných zdrojoch vyžarujúcich biele svetlo (pc –

WLED diódy).

**Kód projektu:** APVV-14-0395

**Podávateľ projektu:** TnU AD, R. Klement

**Stav:** podaný

**Názov projektu:** Progresívne materiály na báze organo-fosfóniových derivátov vrstevnatých kremičitanov: syntéza, vlastnosti, využitie

**Kód projektu:** APVV-14-0937

**Podávateľ projektu:** Ústav anorganickej chémie SAV, P. Komadel

**Partner:** Ústav polymérov SAV

**Stav:** podaný

**Názov projektu:** Vývoj pokročilých kompozitných vrstiev pre vysokoteplotnú protikoróznú ochranu kovov

**Kód projektu:** APVV-14-0370

**Podávateľ projektu:** TnUAD, D. Galusková

**Partner:** Ústav anorganickej chémie SAV

**Stav:** podaný

**Názov projektu:** Zhodnotenie druhotných surovín pre materiály s využitím v extrémnych podmienkach

**Kód projektu:** APVV-14-0845

**Podávateľ projektu:** Ústav anorganickej chémie SAV, M Hnatko

**Partner:** bez partnerov

**Stav:** podaný

## 2.2. Medzinárodné projekty

### 2.2.1. Medzinárodné projekty riešené v roku 2014

Tabuľka 2c Počet medzinárodných projektov riešených v roku 2014

ŠTRUKTÚRA PROJEKTOV	Počet projektov		Čerpané financie za rok 2014 (v €)		
	A	B	A		B
			spolu	pre organi-	
1. Projekty 7. Rámcového programu EÚ	0	2	-	-	166698
2. Multilaterálne projekty v rámci vedeckých programov COST, ERANET, INTAS, EUREKA, ESPRIT, PHARE, NATO, UNESCO,	0	3	-	-	-
3. Projekty v rámci medzivládnych dohôd o vedecko-technickej spolupráci	2	0	-	-	-
4. Bilaterálne projekty	3	0	-	-	-
5. Podpora medzinárodnej spolupráce z národných zdrojov (MVTs, APVV,...)	2	4	48375	48375	24754

<b>6. Iné projekty financované alebo spolufinancované zo zahraničných zdrojov</b>	0	0	-	-	-
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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 2014

Tabuľka 2d Počet projektov 7. RP EÚ a Horizont 2020 v roku 2014

	A	B
<b>Počet podaných projektov v 7. RP EÚ</b>		
<b>Počet podaných projektov Horizont 2020</b>		1

**Názov projektu:** New bone-mimicking all-ceramic scaffolds with biologically multifunctional properties by combining Additive Manufacturing and Freeze Foaming

**Kód projektu:** H2020-PHC-2015-AdMaFoam

**Podávateľ projektu:** Fraunhofer Institute for Ceramic Technologies and Systems, Nemecko

**Partner:** Slovensko (ÚACH SAV), Česká republika (Vysoké učení technické v Brně), Maďarsko (ITM, University of Szeged, Nanocolltech Development & Exploitation Ltd., Adjuvatix, CroMed Research and Service Centers Ltd.), Srbsko (University of Novi Sad), Rakúsko (OFI Technology & Innovation GmbH, Lithoz GmbH, Lacerta Technologies GmbH), Slovinsko (Jožef Stefan Institute), Bulharsko (Nanotechlab Ltd.)

**Stav:** podaný

A - organizácia je nositeľom projektu

B - organizácia sa zmluvne podieľa na riešení projektu

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

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

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

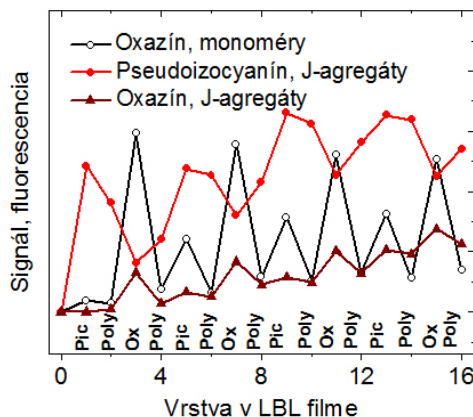
### 2.3.1. Základný výskum

**Názov:** LBL filmy polykationových elektrolytov, organických farbív a vrstevnatých hlinitokremičitanov.

**Riešiteľ:** J. Bujdák

Filmy tzv. LBL typu (angl. *layer-by-layer assemblies*) predstavujú materiály s dobre kontrolovateľnou štruktúrou, ktoré vznikajú postupnou depozíciou monomolekulových vrstiev s alternujúcim nábojom. V tejto práci sa študovali spektrálne vlastnosti LBL filmov pripravených striedavou depozíciou vrstiev polykationového elektrolytu a silikátov s adsorbovanými laserovými farbivami. Komplexná chemometrická analýza spektier nameraných po každom kroku depozície pomohla odhaliť niektoré chemické a fotofyzikálne procesy. K týmto procesom patrili čiastočná desorpcia molekúl farbiva a molekulová agregácia farbív, ako dôsledok depozície vrstiev polyelektrolytu. Rezonančný prenos energie resp. vyhasínanie fluorescencie niektorých zložiek sa zaznamenal vo viacvrstvovom filme obsahujúcom vrstvy silikátov s rôznym typom, resp. formami adsorbovaných farbív. Podrobná analýza týchto dejov pomohla pochopiť komplexný charakter mechanizmu vzniku, ale aj zmeny fotofyzikálnych vlastností počas tvorby vrstiev typu LBL.





Obr. 1. Periodický vývoj signálu flurescencie rôznych foriem farbív počas depozície vrstiev LBL filmu.

### **Publikácia:**

BUJDÁK, J. Layer-by-layer assemblies composed of polycationic electrolyte, organic dyes, and layered silicates. In *Journal of Physical Chemistry C*, 2014, vol. 118, no. 13, p. 7152-7162.

### **Projekt:**

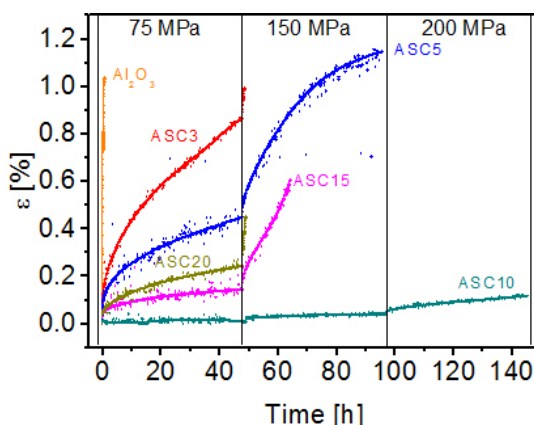
Fotoaktívne hybridné nanomateriály s luminiscenčnými a antimikrobiálnymi vlastnosťami (APVV-0291-11)  
Hybridné materiály vrstevnatých kremičitanov s kyanínovými a porfyrínovými farbivami (VEGA 2/0107/13)

**Ocenenie:** J. Bujdák získal v roku 2014 cenu Gerhard-Lagaly-Award of the DTTG *za prínos vo vedách zameraných na výskum ílových minerálov*.

### **Názov: Nanokompozity $\text{Al}_2\text{O}_3$ -SiC s výnimočnou odolnosťou voči vysokoteplotnej deformácii.**

**Riešiteľský kolektív:** M. Parchovianský, M. Michálek, P. Švančárek, M. Kašiarová, J. Dusza, M. Hnatko, D. Galusek

Viacero autorov v minulosti upozornilo na možnosť zvýšenia odolnosti korundovej keramiky voči vysokoteplotnej deformácii (creep) prídavkom nanočastíc SiC. V našej práci sme sa zamerali na detailné skúmanie vplyvu objemovej frakcie a granulometrie pridaného SiC na odolnosť korundovej keramiky voči vysokoteplotnej deformácii. Optimalizáciou podmienok spekania ako aj objemovej frakcie SiC sa podarilo pripraviť materiál s obsahom 10 obj. % SiC častíc s priemernou veľkosťou 200 nm homogénne distribuovaných v korundovej matici a s extrémne vysokou odolnosťou voči creepu. Materiál ASC10 po 150 h izotermickej výdrže pri teplote 1350 °C a zaťažení 200 MPa vykázal deformáciu v ohybe na úrovni 0,08 % v porovnaní s monolitickým referenčným materiálom ( $\text{Al}_2\text{O}_3$  bez prídavku SiC), u ktorého došlo už po 0,5 h pri zaťažení 75 MPa k deformácii na úrovni 1 % nasledovanej katastrofickým lomom skúšobnej vzorky (Obr. 1).



Obr. 1. Časová závislosť deformácie nanokompozitov  $\text{Al}_2\text{O}_3$ -SiC meraná pri zaťaženiach 75, 150 a 200 MPa a teplote 1350°C. Číslo v označení materiálu vyjadruje objemovú frakciu SiC vo vzorke

Získané výsledky umožnili navrhnúť mechanizmus zvýšenia creepovej odolnosti pripravených nanokompozitov. Nanokompozity s vysokou odolnosťou voči creepovej odolnosti sú potenciálnymi

kandidátmi ako konštrukčné materiály pre použitie v extrémnych podmienkach a tlakoch.

**Publikácie:**

PARCHOVIANSKÝ, M. - GALUSEK D. - MICHÁLEK M. - ŠVANČÁREK P. - KAŠIAROVÁ M. - DUSZA J. - HNATKO M. Effect of the volume fraction of SiC on the microstructure and creep behavior of hot pressed Al<sub>2</sub>O<sub>3</sub>/SiC composites. In Ceramics International, 2014, vol. 40, p. 1807-1814.

**Projekt:** Vývoj vodivej keramiky na báze SiC (APVV 0108-12)

### 2.3.2. Aplikačný typ

**Názov:** Vývoj nových luminofórov a inovácie uchovávania prebytkov tepla v tepelnom zásobníku

**Riešitelia:** Z. Lenčేశ, V. Pavlík

Výskum nových systémov pre akumuláciu, prípadne pre prenos tepla a ich kompatibilita s konštrukčnými materiálmi je jedným z nosných bodov európskeho strategického plánu pre energie a technológie. Zahŕňa koncept vývoja efektívnejšieho získavania a uskladňovania energie z obnoviteľných zdrojov. Ústav anorganickej chémie sa zapojil do tohto druhu výskumu pomocou celoakademického projektu SMARTGRID, v ktorom sa vybuďovala energetická sieť čerpajúca energiu zo slnka a zeme. Táto energia sa ďalej využíva na kúrenie, svietenie a napájanie účelových zariadení v budove, v ktorej je sieť nainštalovaná. Celý systém slúži ako demonštračný príklad nezávislej energetickej jednotky budúcnosti. Úlohou ÚACH bolo navrhnúť a zaviesť medzičlánok, tzv. zásobník prebytku tepla, z ktorého sa môže odčerpať toto teplo v prípade nedostatku slnečnej energie pre ohrev úžitkovej a vykurovacej vody. Zároveň sa hľadala vhodná náplň do zásobníka, ktorá umožní prijať väčšie množstvo tepla. To bolo splnené modifikáciou zmesí z komerčne dostupných, tzv. solárnych zmesí na báze dusičnanov a potvrdené meraniami ich fyzikálno-chemických vlastností. Ďalšia aktivita v projekte priniesla nové typy luminofórov na báze nitridov určené pre LED diódy. Ich výhoda spočíva v tom, že sú cenovo ešte výhodnejšie ako komerčne vyrábané typy LED diód.

**Projekt a partneri projektu boli ohodnotení cenou SAV za budovanie infraštruktúry pre vedu a za vybudovanie unikátneho testovacieho laboratória „Smartgrid“.**

**Publikácie:**

IBRAHIM, Ismail - LENČEŠ, Zoltán - BENCO, Ľubomír - HRABALOVÁ, Monika - ŠAJGALÍK, Pavol. Cerium-doped LaSi<sub>3</sub>N<sub>5</sub>: Computed electronic structure and band gaps. In Journal of the European Ceramic Society, 2014, vol. 34, no. 11, p. 2705-2712.

IBRAHIM, Ismail - LENČEŠ, Zoltán - BENCO, Ľubomír - HRABALOVÁ, Monika - ŠAJGALÍK, Pavol. Sm-doped LaSi<sub>3</sub>N<sub>5</sub>: Synthesis, computed electronic structure, and band gaps. In Journal of the American Ceramic Society, 2014, vol. 97, no. 8, p. 2546-2551.

**Projekty:**

Centrum aplikovaného výskumu nových materiálov a transferu technológií ITMS 26240220088

Efektívne riadenie výroby a spotreby energie z obnoviteľných zdrojov ITMS 26240220028

Centrum excelentnosti pre funkcionalizované viacfázové materiály

### 2.3.3. Medzinárodné vedecké projekty

**Názov:** Správanie sa nečistôt v priemyselných kyslých elektrolytoch na výrobu hliníka

**Riešitelia:** F. Šimko, M. Boča, J. Priščák

Cieľom výskumu bolo objasniť procesy prebiehajúce pri rozpúšťaní tzv. nečistôt v elektrolytoch, ktorých zloženie sa približuje reálnym podmienkam v priemyselnej výrobe hliníka. Ide o tzv. „kyslé“ elektrolyty s prebytkom AlF<sub>3</sub>. Sústavy 3NaF/AlF<sub>3</sub>-FeO, 3NaF/AlF<sub>3</sub>-FeF<sub>3</sub>/Fe<sub>2</sub>O<sub>3</sub> a 3NaF/AlF<sub>3</sub>-AlPO<sub>4</sub>-Al<sub>2</sub>O<sub>3</sub> sa analyzovali pomocou vysokoteplotnej NMR a MAS (magic angle

spinnig) NMR spektroskopie. Výsledky analýz ukázali nové fakty. V prípade systémov s Fe v oxidačnom stupni III sa potvrdil vznik stabilných  $\text{FeF}_6^{3-}$  častíc, ktoré pri reakčnej teplote ostávajú súčasťou taveniny. Pri systéme s dvojmocným Fe sa zistilo odlišné správanie. Nepotvrdili sa produkty reakcie rozpustné v tavenie, ktoré by vo svojej štruktúre obsahovali jadrá kyslíka a železa. Tie pri tavení unikali zo systému v podobe pár a následne kondenzovali nezávisle vo dvoch frakciách. V prvej z nich sa zistila prítomnosť zlúčenín  $\text{Na}_3\text{AlF}_6$  a  $\alpha\text{-Al}_2\text{O}_3$ . To znamená, že fáza FeO bola kompletne transformovaná na fázu, ktorá zo systému prchá a pri kondenzácii sa rozpadá na uvedené zlúčeniny. Za túto „medzifázu“ sa považujú oxofluorohlinítany (1), ktorých existencia je diskutovaná dlhé desaťročia. V prípade systému  $3\text{NaF}/\text{AlF}_3\text{--AlPO}_4\text{--Al}_2\text{O}_3$  výsledky ukázali, že pri rozpúšťaní  $\text{AlPO}_4$  v tavenine obsahujúcej  $\text{Al}_2\text{O}_3$  prevláda tvorba Al–O–P väzieb v porovnaní so systémom bez prídavku  $\text{Al}_2\text{O}_3$  (2, 3).

**Publikácie:**

ŠIMKO F. - RAKHMATULLIN A. - BESSADA C. - BOČA M. MAS NMR study of the solidified cryolite systems with FeO addition. In *Journal of Fluorine Chemistry*, 2014, vol. 165, p. 116-122.

RAKHMATULLIN A. - KEPPERT M. - HAARBERG G.M. - ŠIMKO F. - BESSADA C. NMR study of melts in the system  $\text{Na}_3\text{AlF}_6\text{-Al}_2\text{O}_3\text{-AlPO}_4$ . In *Molten Salts Chemistry and Technology*. Eds. Marcelle Gaune-Escard, Geir Martin Haarberg, United Kingdom: John Wiley & Sons, Ltd., 2014, p. 229-233.

RAKHMATULLIN A. - KEPPERT M. - ŠIMKO F. - BESSADA C. In-situ high temperature NMR study of aluminium phosphate dissolution in cryolite-alumina melts, prijaté v *Journal of Fluorine Chemistry*.

**Projekt:** Potenciálny vplyv draslíka a rubídia na prípravu oxyfluorohlinitanových komplexov v tuhom stave APVV-K-FR-2013-NEWPROJECT-3026

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

Tabuľka 2e Štatistika vybraných kategórií publikácií

<b>PUBLIKAČNÁ A EDIČNÁ ČINNOSŤ</b>	<b>A Počet v r. 2014/ doplňky z r. 2013</b>	<b>B Počet v r. 2014/ doplňky z r. 2013</b>	<b>C Počet v r. 2014/ doplňky z r. 2013</b>
<b>1. Vedecké monografie vydané v domácich vydavateľstvách (AAB, ABB, CAB)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>2. Vedecké monografie vydané v zahraničných vydavateľstvách (AAA, ABA, CAA)</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)</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)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>5. Kapitoly vo vedeckých monografiách vydaných v domácich vydavateľstvách (ABD, ACD)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>6. Kapitoly vo vedeckých monografiách vydaných v zahraničných vydavateľstvách (ABC, ACC)</b>	<b>1 / 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 a odborné práce v časopisoch evidovaných v Current Contents Connect (CCC) (ADC, ADCA, ADCB, ADD, ADDA, ADDB, CDC, CDCA, CDCB, CDD, CDDA, Cddb, BDC, BDCA, BDCB, BDD, BDDA, Bddb)</b>	<b>45 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>10. Vedecké a odborné práce v časopisoch neevidovaných v CCC (ADE, ADEA, ADEB, ADF, ADFA, ADFB, CDE, CDEA, CDEB, CDF, CDFA, CDFB, BDE, BDEA, BDEB, BDF, BDFA, BDFB)</b>	<b>4 / 1</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>11. Vedecké a odborné práce v zborníkoch vydaných tlačou alebo na CD</b>			
<b>a/ recenzované práce a publikované pozvané príspevky (AEC, AED, AFA, AFB, AFBA, AFBB, BEC, BED)</b>	<b>8 / 1</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>b/ nerecenzované práce (AEE, AEF, AFC, AFD, AFDA, AFDB, BEE, BEF, CEC, CED)</b>	<b>20 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>

<b>12. Vydané periodiká evidované v CCC</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>13. Ostatné vydané periodiká</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>14. Vydané alebo editované zborníky z vedeckých podujatí (FAI)</b>	<b>2/0</b>	<b>1/0</b>	<b>0/0</b>
<b>15. Vedecké práce uverejnené na internete (GHG)</b>	<b>6 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>16. Preklady vedeckých a odborných textov (EAJ)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>17. Heslá v <i>Encyklopédii Beliana</i> a iných encyklopédiách a terminologických slovníkoch (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 Ohlasy

<b>OHLASY</b>	<b>A Počet v r. 2013/ doplňky z r. 2012</b>	<b>B Počet v r. 2013/ doplňky z r. 2012</b>
<b>Citácie vo WoS (1.1, 2.1)</b>	1262 / 2	54 / 0
<b>Citácie v SCOPUS (1.2, 2.2)</b>	110 / 1	1 / 0
<b>Citácie v iných citačných indexoch a databázach (9, 10)</b>	0 / 0	0 / 0
<b>Citácie v publikáciách neregistrovaných v citačných indexoch (3, 4)</b>	0 / 0	0 / 0
<b>Recenzie na práce autorov z organizácie (5, 6, 7, 8)</b>	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 2g Vedecké podujatia

<b>Prednášky a vývesky na medzinárodných vedeckých podujatiach</b>	<b>92</b>
<b>Prednášky a vývesky na domácich vedeckých podujatiach</b>	<b>17</b>

## 2.6. Vyžiadané prednášky

### 2.6.1. Vyžiadané prednášky na medzinárodných vedeckých podujatiach

**T. Bučko**, S. Lebegue, J. G. Angyan, and J. Hafner: *Density dependent correction for the description of London dispersion forces: improved Tkatchenko-Scheffler method and its applications*, Solid State Chemistry 2014, Trenčianske Teplice, Slovensko, 8. 7. 2014.

**J. Bujdák**: *Hybrids based on organic dyes and smectites - fundamentals and potential applications*, MECC 2014 - 7<sup>th</sup> Mid-european Clay Conference, Dresden, Nemecko, 18. 9. 2014.

**M. Liška**, M. Chromčíková, J. Macháček, B. Hruška, V. Zemanová, T. Gavenda: *Thermodynamic*

*modell of ZnO-MoO<sub>3</sub>-P<sub>2</sub>O<sub>5</sub> glasses and its validation by MCR analysis of Raman spectra of ZnO-P<sub>2</sub>O<sub>5</sub>*, International Days of Materials Science 2014, Pardubice, ČR, 16. - 17. 9. 2014.

**M. Liška**, V. Soltesz, M. Chromčíková, J. Vokelová: *Sklováknité izolácie a bezpečnosť prevádzky jadrových elektrární*, Česká a slovenská konferencia o skle, Žďár nad Sázavou, ČR, 5. - 7. 11. 2014.

**H. Pálková**: *InfraRed Spectroscopy – a versatile tool in a qualitative analysis of materials*, Workshop Analytical methods in the service conservation and restoration work, VŠB, Centrum of Nanotechnology, ČR, 6. 11. 2014.

**Z. Lenčes**, M. Hrabalová, I. Ibrahim, L. Benco, P. Šajgalík, *Influence of lanthanoid dopant and N/O substitution on the electronic structure and luminescent properties of silicon oxynitrid phosphors*. ISNT 2014 8<sup>th</sup> International Symposium on Nitrides, 7<sup>th</sup> International Workshop on Spinel Nitrides and Related Materials, Marie Curie ITN 7<sup>th</sup> FP FUNEA, Wildbad Kreuth, Nemecko, 31. 8. – 5. 9. 2014.

**Z. Lenčes**, M. Hrabalová, I. Ibrahim, L. Benco, P. Šajgalík, *Theoretical and experimental approach to ternary silicon oxynitride-based phosphors*. 5<sup>th</sup> International Congress on Ceramics (ICC-5), Beijing, Čína, 17. – 21. 8. 2014.

**P. Šajgalík**, M. Hnatko, Z. Lenčes, M. Gall, Z. Chloup: *GB chemistry of silicon nitride based nanocomposites - implications to fracture behavior - experimental and theoretical study*, ICACC 2014 - 38<sup>th</sup> International Conference and Exposition on Advanced Ceramics and Composites, Daytona Beach, Florida, USA, 26. – 31. 1. 2014.

**P. Šajgalík**, M. Hnatko, Z. Lenčes, A. Kovalčíková: *Easy machinable SiC ceramics with high electrical conductivity*. ISSNOX4 4<sup>th</sup> international symposium on SiAlONs and non-oxides, Shiga, Japonsko, 25. – 28. 2014.

**P. Šajgalík**, J. Sedláček, Z. Lenčes, J. Dusza, H.-T. Lin: *Additive-free hot-pressed silicon carbide ceramics - a material with exceptional mechanical properties*. ISNT 2014 8<sup>th</sup> International Symposium on Nitrides, 7<sup>th</sup> International Workshop on Spinel Nitrides and Related Materials, Marie Curie ITN 7<sup>th</sup> FP FUNEA, Wildbad Kreuth, Nemecko, 31. 8. – 5. 9. 2014.

**P. Šajgalík**: From knowledge to product – Austrian industry – Slovak academia collaboration, 10. 04. 2014; iconvienna 2014, The 10th European Business and Investment Forum, East – West Summit on Innovation and Smart Cities, Viedeň, Rakúsko, 9. – 11. 4. 2014.

**P. Šajgalík**: Science in education, education in science – necessity or contradiction? 15. 05. 2014; Medzinárodná vedecká konferencia Kvalita jazykového vzdelávania na univerzitách v Európe V, Univerzita Komenského, Fakulta managementu, Bratislava 15. – 16. 05. 2014.

**P. Šajgalík**: Slovak Academy of Sciences – Promoting the excellence – the bottom-up perspective, 10 years of the V4 in European research: experience and future, Permanent Representation of Hungary to the EU, Brussels, Belgicko, 1. 7. 2014.

## 2.6.2. Vyžiadané prednášky na domácich vedeckých podujatiach

## 2.6.3. Vyžiadané prednášky na významných vedeckých inštitúciách

**P. Boháč**: *Photoactive hybrid materials based on layered silicates and organic dyes*, Nanotechnology project center, Shimane University, Matsue, Japonsko, 18. 4. 2014.

**T. Bučko**: and J. Hafner, *Role of local environment in catalytic reactions: computational experiment*, Universite de Lorraine, Francúzsko, 20. 6. 2014.

**J. Bujdák**: *Hybridné systémy organických farbív a ílových minerálov: Zaujímavé javy a možné aplikácie*, Matematicko-fyzikálna fakulta, Univerzita Karlova v Prahe, seminár Společnosti pro výzkum a využití jílu, 27. 11. 2014.

**J. Madejová**: *Application studies of near infrared spectroscopy in organo-clays studies*, CETMIC Gonnet, La Plata, Argentína, 11. 3. 2014

**J. Madejová**: *Infrared spectroscopy: a powerful tool in studies of acid-treated clay minerals*,

University San Martin, Buenos Aires, Argentína, 13. 3. 2014

**A. Prnová:** *Thermal behaviour and phase composition of glasses in the system  $Y_2O_3$ -  $Al_2O_3$* , Department of Inorganic and Physical Chemistry, Gent University, Gent, Belgicko, 22. 10. 2014.

**P. Šimurka:**  *$Al_2O_3$  -  $ZrO_2$  -  $SiO_2$  refractory corrosion in barium soda lime silicate glass melt*, Faculty of Materials Science and Ceramics, AGH University of Science and Technology, Krakov, Poľsko, 1. 12. 2014.

**P. Šajgalík:** Northwestern Polytechnical University, Xi An, Čína, séria 14-tich prednášok, 6. - 17. 10. 2014

- SiC-Si<sub>3</sub>N<sub>4</sub> processing 1,
- SiC-Si<sub>3</sub>N<sub>4</sub> processing 2,
- SiC-Si<sub>3</sub>N<sub>4</sub> properties
- Si<sub>3</sub>N<sub>4</sub> corrosion,
- Si<sub>3</sub>N<sub>4</sub> corrosion 2,
- Low cost SiAlONs corrosion
- Grafit-Si<sub>3</sub>N<sub>4</sub> wear resistant ceramics,
- Si<sub>3</sub>N<sub>4</sub> layered,
- Si<sub>3</sub>N<sub>4</sub> functionalisation,
- LPS SiC,
- SiC electrical conductivity,
- SiC additive-free,
- Ternary nitrides,
- Low cost SiAlONs.

*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 2014

### 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 2014 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 2h Experti hodnotiaci národné projekty

Meno pracovníka	Typ programu/projektu/výzvy	Počet hodnotených projektov
Boča Miroslav	VEGA	3
Bujdák Juraj	VEGA	1
Drábik Milan	VEGA	2
Hnatko Miroslav	VEGA	1
Komadel Peter	VEGA	2
Lenčes Zoltán	VEGA	6

Noga Jozef	APVV	1
	SAIA	2
	VEGA	1
Šimko František	VEGA	1

## **2.9. Účasť na spracovaní hesiel do encyklopédie Beliana**

Počet autorov hesiel: 0

## **2.10. Iné informácie k vedeckej činnosti**

Počet karentovaných publikácií a kapitol v monografiách v tomto roku dosiahol číslo 45 CC + 1 kapitola = 46, čo pri počte 41,57 vedeckých pracovníkov (prepočítaný stav, podľa Tabuľky 1a) znamená 1,1 karentovanej publikácie na vedeckého pracovníka. Tento parameter oproti vlaňajšku výrazne klesol (vlni 1,68). Takýto stav považujeme za neuspokojivý. 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 2,38, kým vlni bol 2,25. Citovanosť (vo všetkých dostupných databázach WOK – 1259, SCOPUS – 111) na vedeckého pracovníka (prepočítaný stav) je 32,9 citácie. Niekoľkoročný rast v počte citácií a ich prepočtu na vedeckého pracovníka a ich získavanie pracovníkmi všetkých oddelení ústavu sa v roku 2014 zastavil a tento parameter mierne klesol (vlni 1322 WOS a priemerne 32,9).

Relatívne vysoké renomé ústavu vo svetovej vedeckej komunite dokumentujú vyžiadané prednášky pracovníkov na medzinárodných vedeckých podujatiach, ktorých bolo 10, viaceré z nich odznali na veľmi významných svetových konferenciách, ďalších päť prednášok bolo prednesených na zahraničných pracoviskách.

Ústav anorganickej chémie má rozsiahle skúsenosti s realizáciou projektov financovaných zo ŠF EÚ v pozícii hlavného partnera aj partnera. V roku 2014 bol riešiteľom 6 projektov, z toho 5 projektov pokračuje z predošlých rokov. Koncom roka 2013 začal ústav spolupracovať s prijímateľom DEKONTA, s.r.o. a nahradil tak partnera 1 Výskumný ústav vodného hospodárstva v Bratislave v rámci projektu "Aplikovaný výskum a overenie technológií katalytickej dehalogenácie kontaminovaných vôd z priemyselných ekologických záťaží na reaktívnych bariérach", ktorý bol schválený vo výzve s kódom OPVaV-2011/4.2/07-SORO. Realizácia projektu začala vo februári 2014.

Z výzvy OPVaV-2013/2.2/09-RO bola v roku 2014 podpísaná zmluva pre projekt "Výskumné centrum ALLEGRO".



### 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 2014

Forma	Počet k 31.12.2014				Počet ukončených doktorantúr v r. 2014					
	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>	7	2	1	0	2	1	1	1	0	0
<b>Interná z iných zdrojov</b>	2	1	0	0	0	2	0	0	0	0
<b>Externá</b>	0	1	0	0	0	0	0	0	0	0
<b>Spolu</b>	9	4	1	0	2	3	1	1	0	0
<b>Súhrn</b>	13		1		5		2		0	

#### 3.2. Zmena formy doktorandského štúdia

Tabuľka 3b Počty preradení

Z formy	Interná z prostriedkov SAV	Interná z prostriedkov SAV	Interná z iných zdrojov	Interná z iných zdrojov	Externá	Externá
Do formy	Interná z iných zdrojov	Externá	Interná z prostriedkov SAV	Externá	Interná z prostriedkov SAV	Interná z iných zdrojov
Počet	0	0	0	0	0	0

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

Tabuľka 3c Menný zoznam ukončených doktorandov v roku 2014 úspešnou obhajobou

Meno doktoranda	Forma DŠ	Mesiac, rok nástupu na DŠ	Mesiac, rok obhajoby	Číslo a názov študijného odboru	Meno a organizácia školiteľa	Fakulta udeľujúca vedeckú hodnotu
Mgr. Valéria Bizovská	interné štúdium hrazené z prostriedkov SAV	9 / 2010	8 / 2014	4.1.15 anorganická chémia	RNDr. Jana Madejová DrSc., Ústav anorganickej chémie SAV	Prírodovedecká fakulta UK

Mgr. Roman Bystrický	interné štúdium hradené z prostriedkov SAV	9 / 2010	8 / 2014	4.1.15 anorganická chémia	doc. Ing. Miroslav Hnatko PhD., Ústav anorganickej chémie SAV	Prírodovedecká fakulta UK
Ing. Ondrej Hanzel	interné štúdium hradené z prostriedkov SAV	9 / 2010	8 / 2014	5.2.19 anorganická technológia a materiály	prof. RNDr. Pavol Šajgalík DrSc., Ústav anorganickej chémie SAV	Fakulta chemickej a potravinárskej technológie STU
Ing. Monika Hrabalová	interné štúdium hradené z iných zdrojov	9 / 2010	8 / 2014		prof. Ing. Zdeněk Jonšta CSc.,	Vysoká škola báňská - TU Ostrava, Česká republika
Ing. Vladana Šamajová	interné štúdium hradené z iných zdrojov	9 / 2010	8 / 2014		prof. Zdeněk Jonšta,	Vysoká škola báňská - TU Ostrava, Česká republika

Zoznam interných a externých doktorandov je uvedený v Prílohe A.

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

Tabuľka 3d Zoznam akreditovaných študijných programov s uvedením univerzity/vysokej školy a fakulty

Názov študijného programu (ŠP)	Názov študijného odboru (ŠO)	Číslo ŠO	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

Tabuľka 3e Účasť na pedagogickom procese

Menný prehľad pracovníkov, ktorí boli menovaní do odborových komisií študijných programov doktorandského štúdia	Menný prehľad pracovníkov, ktorí pôsobili ako členovia vedeckých rád univerzít, správnych rád univerzít a fakúlt	Menný prehľad pracovníkov, ktorí získali vyššiu vedeckú, pedagogickú hodnosť alebo vyšší kvalifikačný stupeň
doc. Ing. Miroslav Boča, PhD. (anorganická chémia)	prof. Ing. Dušan Galusek, DrSc. (Fakulta špeciálnej techniky TnUAD)	Ing. Mária Chromčíková, PhD. (IIa)
doc. Ing. Miroslav Boča, PhD. (anorganická technológia a materiály)	prof. Ing. Dušan Galusek, DrSc. (Fakulta zdravotníctva TnUAD)	Ing. František Šimko, PhD. (IIa)
doc. RNDr. Juraj Bujdák, DrSc. (anorganická chémia)	prof. Ing. Dušan Galusek, DrSc. (Trenčianska univerzita Alexandra Dubčeka v Trenčíne)	prof. Ing. Pavel Mach, CSc. (prof., Prírodovedecká fakulta UK)

doc. RNDr. Milan Drábik, CSc. (anorganická chémia)	prof. Ing. Marek Liška, DrSc. (Fakulta chemická, Vysoké učení technické v Brně, VUT Brno, Česko)
prof. Ing. Dušan Galusek, DrSc. (anorganická technológia a materiály)	prof. Ing. Marek Liška, DrSc. (Fakulta chemické technologie VŠCHT, Praha, ČR)
doc. Ing. Miroslav Hnatko, PhD. (anorganická technológia a materiály)	prof. Ing. Marek Liška, DrSc. (Fakulta priemyselných technológií TnUAD v Púchove)
RNDr. Peter Komadel, DrSc. (anorganická chémia)	prof. Ing. Marek Liška, DrSc. (Trenčianska univerzita Alexandra Dubčeka v Trenčíne)
doc. Ing. Zoltán Lenčéš, PhD. (anorganická technológia a materiály)	prof. RNDr. Jozef Noga, DrSc. (Prírodovedecká fakulta UK)
doc. Ing. Zoltán Lenčéš, PhD. (anorganická chémia)	prof. RNDr. Pavol Šajgalík, DrSc. (Fakulta metalurgie a materiálového inžinierství, Vysoká škola báňská TU)
doc. Ing. Zoltán Lenčéš, PhD. (odbor v zahraničí)	prof. RNDr. Pavol Šajgalík, DrSc. (Hutnícka fakulta TUKE)
prof. Ing. Marek Liška, DrSc. (anorganická technológia a materiály)	prof. RNDr. Pavol Šajgalík, DrSc. (Slovenská technická univerzita v Bratislave)
prof. Ing. Marek Liška, DrSc. (fyzika kondenzovaných látok a akustika)	prof. RNDr. Pavol Šajgalík, DrSc. (Trenčianska univerzita Alexandra Dubčeka v Trenčíne)
prof. Ing. Marek Liška, DrSc. (odbor v zahraničí)	prof. RNDr. Pavol Šajgalík, DrSc. (Vysoké učení technické, Brno)
RNDr. Jana Madejová, DrSc. (anorganická technológia a materiály)	
prof. RNDr. Jozef Noga, DrSc. (chemická fyzika)	
prof. RNDr. Jozef Noga, DrSc. (anorganická chémia)	
prof. RNDr. Jozef Noga, DrSc. (fyzika plazmy)	
prof. RNDr. Pavol Šajgalík, DrSc. (anorganická technológia a materiály)	

### 3.5. Údaje o pedagogickej činnosti

Tabuľka 3f Prednášky a cvičenia vedené v roku 2014

PEDAGOGICKÁ ČINNOSŤ	Prednášky		Cvičenia a semináre	
	doma	v zahraničí	doma	v zahraničí
<b>Počet prednášateľov alebo vedúcich cvičení</b>	2	0	6	0
<b>Celkový počet hodín v r. 2014</b>	13	0	310	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	3
2.	Počet vedených alebo konzultovaných diplomových a bakalárskych prác	3
3.	Počet pracovníkov, ktorí pôsobili ako školitelia doktorandov (PhD.)	12
4.	Počet školených doktorandov (aj pre iné inštitúcie)	29
5.	Počet oponovaných dizertačných a habilitačných prác	18
6.	Počet pracovníkov, ktorí oponovali dizertačné a habilitačné práce	7
7.	Počet pracovníkov, ktorí pôsobili ako členovia komisií pre obhajoby DrSc. prác	2
8.	Počet pracovníkov, ktorí pôsobili ako členovia komisií pre obhajoby PhD. prác	9
9.	Počet pracovníkov, ktorí pôsobili ako členovia komisií, resp. oponenti v inauguračnom alebo habilitačnom konaní na vysokých školách	5

### 3.6. Iné dôležité informácie k pedagogickej činnosti

ÚACH SAV vypísal pre akademický rok 2014/2015 celkovo 9 tém pre doktorandské štúdium v troch rôznych študijných odboroch: 4.1.15 Anorganická chémia, 5.2.19 Anorganické technológie a materiály a 4.1.11 Chemická fyzika. Na akademický rok 2014/2015 bol prijatý jeden nový študent (Ing. Michal Slaný na študijný odbor 5.2.19).

V akademickom roku 2013/2014 obhájili dizertačné práce traja študenti: Mgr. Valéria Bizovská a Mgr. Roman Bystrický v študijnom odbore 4.1.15 Anorganická chémia a Ing. Ondrej Hanzel v študijnom odbore 5.2.19 Anorganická technológia a materiály.

PhD študenti na ÚACH SAV sa pravidelne zúčastňujú na študentských vedeckých podujatiach a konferenciách, akými sú napríklad ŠVK 2014 Bratislava.

Dôležitou súčasťou pedagogického procesu na ÚACH SAV je aj organizovanie odbornej praxe pre študentov 4. a 5. ročníka (PríF UK v Bratislave v spolupráci s prof. G. Pleschom). V roku 2014 sa praxe zúčastnili traja študenti.

Dňa 22. októbra 2014 sa na ÚACH SAV konala **Súťaž mladých vedeckých pracovníkov**. Súťaže sa zúčastnilo 9 mladých pracovníkov do 35 rokov. Ich prezentácie posudzovala šesťčlenná komisia, ktorej predsedníčkou bola RNDr. Jana Madejová, DrSc. Súťaže sa zúčastnili aj PhD študenti z Univerzity Karlovy z Prahy.

#### Výsledky súťaže:

1. miesto: Mgr. Jiří Dolanský (Univerzita Karlova, Praha)
2. miesto: Mgr. Peter Boháč (ÚACH SAV)
3. miesto: Mgr. Magdaléna Precnerová (ÚACH SAV)

Na ÚACH naďalej pôsobí **Snem mladých** vedeckých pracovníkov, ktorý vznikol ako poradný orgán riaditeľa ústavu. Snem združuje doktorandov a pracovníkov s VŠ vzdelaním do 35 rokov. Ich zástupca, Ing. O. Hanzel, PhD., je členom širšieho vedenia ústavu. Jeho prostredníctvom majú členovia snemu možnosť aktívne sa podieľať na chode ústavu a zapájať sa aj do aktivít, ktoré priamo nesúvisia s doktorandským štúdiom. Výbor snemu spolu so svojimi členmi úspešne zorganizoval dňa 12. 11. 2014 Deň otvorených dverí na ÚACH SAV, ktorý sa konal v rámci Týždňa vedy na Slovensku. Táto akcia mala mimoriadny ohlas a zúčastnilo sa jej 270 študentov z bratislavských i mimobratislavských stredných škôl ako aj niekoľko študentov z PríFUK.

## **4. Medzinárodná vedecká spolupráca**

### **4.1. Medzinárodné vedecké podujatia**

#### **4.1.1. Medzinárodné vedecké podujatia, ktoré organizácia SAV organizovala v roku 2014 alebo sa na ich organizácii podieľala, s vyhodnotením vedeckého a spoločenského prínosu podujatia**

##### ***Training Workshop: Electronic and nuclear relaxation, and structure calculation***

Mariapfarr, Rakúsko, 38 účastníkov, 22.02.-24.02.2014

38 účastníkov z rôznych krajín: Francúzsko, USA, Nemecko, Veľká Británia, Fínsko, Česká republika, Švédsko, Taliansko, Slovensko a Švajčiarsko

##### ***7<sup>th</sup> Workshop on Modern Methods in Quantum Chemistry***

Mariapfarr, Rakúsko, 53 účastníkov, 23.02.-28.02.2014

53 účastníkov z rôznych krajín: Francúzsko, USA, Nemecko, Veľká Británia, Fínsko, Česká republika, Švédsko, Taliansko, Slovensko a Švajčiarsko

##### ***11<sup>th</sup> Conference on Solid State Chemistry***

Trenčianske Teplice, Slovensko, 169 účastníkov, 06.07.-11.07.2014

Počas konferencie odznelo 71 prednášok, z toho 5 plenárnych, bolo prezentovaných 95 postrov. Na konferencii participovali účastníci z 29 krajín.

##### ***11<sup>th</sup> International Conference on Relativistic Effects in Heavy-Element Chemistry and Physics (REHE-2014)***

Smolenice, 89 účastníkov, 20.09.-24.09.2014

Účastníci z celého sveta: Európa, USA, Južná Amerika, Austrália, Nový Zéland, Japonsko, Čína

#### ***5. odborný seminár s názvom Interakcia tavenín s progresívnymi anorganickými materiálmi***

Borinka, Slovensko, 35 účastníkov, 20.10.-20.10.2014

Tradičné vedecké podujatie pracovníkov vedeckých inštitúcií a vysokých škôl zo Slovenska a Čiech: ÚACH SAV Bratislava, Vysoké školy báňské TUO v Ostrave, Hutníckej fakulty TU v Košiciach a Fakulty chemickej a potravinárskej technológií STU v Bratislave. Cieľom odborného seminára bolo oboznámenie sa s aktuálnym vedeckým zameraním jednotlivých inštitúcií a upevniť pracovné ako aj osobné kontakty medzi účastníkmi odborného seminára. Seminára sa zúčastnilo 35 účastníkov, pričom odznelo celkom 20 zaujímavých príspevkov, ktoré sú zhrnuté v Zborníku príspevkov s názvom: Interakcia tavenín s progresívnymi anorganickými materiálmi.

#### **4.1.2. Medzinárodné vedecké podujatia, ktoré usporiada organizácia SAV v roku 2015 (anglický a slovenský názov podujatia, miesto a termín konania, meno, telefónne číslo a e-mail zodpovedného pracovníka)**

##### ***Engineering Ceramics 2015 – Materials for better life/Engineering Ceramics 2015 – Materials for better life***

Smolenice, Slovensko, 10.05.-14.05.2015, (Pavol Šajgalík, 02/59410429, uachsajg@savba.sk)

##### ***6<sup>th</sup> Japan-Czech-Slovak (JCS) Symposium on Theoretical Chemistry/6<sup>th</sup> Japan-Czech-Slovak (JCS) Symposium on Theoretical Chemistry***

Smolenice, Slovensko, 11.10.-14.10.2015, (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	12	6

#### 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 materiálová 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)  
 Slovenský národný komitét IUPAC (funkcia: predseda)

###### 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: predseda 2011-2015)  
 The Clay Minerals Society (funkcia: Predseda 2012-2013, Minulý predseda 2013-2014)

###### 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)

###### 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 - Výberová komisia pre nových členov (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
Noga Jozef	Agence nationale de la recherche (ANR)	1
	DAAD - German Academic Exchange Service	1
Šajgalík Pavol	DFG	1

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

**Peter Boháč**

- Interdisciplinary Graduate School of Science and Engineering, Shimane University, Matsue, Japonsko, 1. 4. – 30. 6. 2014, v rámci Národného štipendijného programu na podporu mobility študentov, doktorandov, vysokoškolských učiteľov, výskumných a umeleckých pracovníkov. Pobyt bol zameraný na štúdium fluorescenčného rezonančného prenosu energie medzi cyanínovými farbivami v štruktúre vrstevnatých kremičitanov.

**Juraj Bujdák**

- Laboratórium bioanorganickej chémie, Ústav anorganickej chémie, v.v.i., Akadémie vied Českej republiky, Řež (19. 8. – 22. 8. 2014). Bilaterálna spolupráca a pracovný pobyt podporovaný MAD. Vyhodnotenie časovozrozlíšenej spektroskopie niektorých typov hybridných materiálov vrstevnatých kremičitanov a organických farbív. Vyhodnotenie vzhľadom na fotoaktivitu materiálov a procesov fluorescenčného rezonančného prenosu energie medzi molekulami farbív interkalovanými vo vrstevnatom syntetickom saponite.
- Laboratórium bioanorganickej chémie, Ústav anorganickej chémie, v.v.i., Akadémie vied Českej republiky, Řež, a Matematicko-fyzikální fakulta Univerzity Karlovy v Praze (25. 11. – 27. 11. 2014). Člen komisie pre obhajobu DrSc. (oponent). Pozvaná prednáška pri príležitosti semináru Společnosti pro výzkum a využití jílu. Konzultácie výsledkov bilaterálnej spolupráce s vedeckými pracovníkmi na Ústave anorganickej chémie v Řeži.

**Dušan Galusek**

- Universität Bayreuth: pobyt sa uskutočnil v termíne od 14.-19. 7. 2014 v rámci projektu Alexander von Humboldt Institutional Cooperation „Ceramic coatings with glass fillers for high temperature corrosion protection of metals“. Náplňou stretnutia boli predbežné experimenty zamerané na vývoj nových typov antikoročných povlakov na vysokoteplotnú ochranu kovov, príprava plánu návštev a práce na rok 2014 a administratívne zabezpečenie projektu.

**Miroslav Hnatko**

- TÜBITAK Marmara Research Center, 3.11. – 4. 11. 2014, Gebze, kick-off meeting projektu SAV-TÜBITAK

**Peter Cherry**

- University of Stockholm, Švédsko, (6. 10. 2014 – 7. 12. 2014) pobyt sa uskutočnil v rámci programu 7FP grant (pNMR-EU) - Quantum-chemical calculations of EPR parameters of transition metal complexes.

**Vladimir Malkin**

- Garching Forschungszentrum, Technische Universität München, 6 – 9. 10. 2014, München, Nemecko, spolupráca na vývoji balíka ReSpect spojená s riešením projektu APVV-0483-10.

**Olga Malkin**

- Garching Forschungszentrum, Technische Universität München, 6 – 9. 10. 2014, München, Nemecko, spolupráca na vývoji balíku ReSpect spojená s riešením projektu APVV-0483-10.

**Helena Pálková**

- Jerzy Haber Institute of Catalysis and Surface Chemistry PAS, Krakow, Poľsko (17. – 29. 11. 2014) Pobyt sa uskutočnil v rámci medziakademickej spolupráce (MAD) medzi Ústavom anorganickej chémie SAV a ústavu PAV v Krakowe. Náplňou práce bolo uskutočnenie experimentov zahrnutých v spoločnom projekte „Organo-clays as intermediates for the synthesis of functional hybrid materials”.

**Anna Prnová**

- University of Gent, Gent –Belgicko (15/10-29/10/2014) Príprava roztokov v systémoch:  $\text{Al}_2\text{O}_3\text{-RE}_2\text{O}_3$  a následná príprava práškov pomocou spray-drying zariadenia. Charakterizácia pripravených systémov pomocou DTA, vyžiadaná prednáška na tému: “Thermal behavior and phase compositions of glasses in the system  $\text{Y}_2\text{O}_3\text{-Al}_2\text{O}_3$ ”, pobyt bol uskutočnený na základe MAD /UACH SAV- UG, Belgium/ a finančne podborený Royal Flemish Academy of Belgium for Science and Arts.

**Pavol Šajgalík**

- TÜBITAK Marmara Research Center, 3.11. – 4. 11. 2014, Gebze, kick-off meeting projektu SAV-TÜBITAK

**Dlhodobé pobyty pracovníkov ústavu realizované na základe získania štipendií na riešenie projektov****Peter Hrobárik**

- Institut für Chemie, Technische Universität Berlin (10. 2010 – 12. 2015). Postdoktorandský výskumný pobyt v Nemecku podporovaný nadáciou Alexander von Humboldt a Berlínskym centrom excelentnosti "UniCat". Projekt je zameraný na vývoj a aplikáciu nových relativistických metód pre výpočet a interpretáciu NMR spektier zlúčenín prechodných kovov a aktinoidov, ako aj na štúdium štruktúry a reakčných mechanizmov významných priemyselných katalyzátorov.

**Michal Korenko**

- Engineering College, Valparaiso University, Valparaiso, Indiana, USA (1.4. 2014 - 31.12. 2015). Postdoktorandský študijný pobyt podporovaný projektom ARPA-E (US Department of Energy). Projekt je zameraný na vývoj a komercializáciu vysokoteplotnej solárnej elektrolýzy horčika. Elektrolytická produkcia horčika 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 horčika. 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 horčika.

**Marián Kucharík**

- Primary Metal Technology (PMT) - Technology development, Hydro Aluminium a.s. Årdal, Nórsko, projektový inžinier (01. 11. 2008 – 31. 12. 2015). Výskum a vývoj technológie výroby hliníka Hall-Heroultovým procesom.



**Martin Pentrák**

- Department of Natural Resources and Environmental Sciences, University of Illinois at Urbana, USA, Postdoctoral Research Associate, 04. 2012 – 09. 2014, 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.

**Linda Pentráková**

- Department of Natural Resources and Environmental Sciences, University of Illinois at Urbana, USA, Postdoctoral Research Associate, 06. 2012 – 09. 2014, 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.

**Lukáš Petra**

- Sheffield Hallam University, Materials and Engineering Research Institute, United Kingdom. 1. 10. 2014 – 30. 6. 2015, výskumný pobyt je podporovaný Národným štipendijným programom na podporu mobility študentov, doktorandov a vysokoškolských učiteľov. Spolupráca v rámci IN-CROWD projektu (Iodine Nanocomposite Controlled Release Open Wound Dressings), ktorý je zameraný na prípravu, charakterizáciu a použitie samovrstviacich filmov ako povrchových vrstiev obväzov, ktoré sú schopné ničiť baktérie rezistentné voči antibiotikám min 96 h.

**Michal Repiský**

- The Centre for Theoretical and Computational Chemistry, Department of Chemistry, University of Tromsø, Nórsko, postdoktorandský výskumný pobyt v rámci projektu "Norwegian Center of Excellence", 01. 01. 2010 – 31. 12. 2014.

**Prednášky zahraničných pracovníkov, ktorí navštívili ÚACH SAV**

**Andreas Fehervari**, Monash University, Melbourne, Austrália

*Modification of geosynthetic clay liners for enhanced containment of calcic and hyper saline leachates.*  
16. 12. 2014

**Zoltán Pászti**, Research Centre for Natural Sciences, Hungarian Academy of Sciences, Budapešť, Maďarsko

*X-ray photoelectron spectroscopy: Principles and applications*, 10. 12. 2014

*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 ako aj aktuálne trendy súvisiace so spoločenskou objednávkou na domácej a zahraničnej scéne. Je založená na inovatívnosti vedeckého smerovania, ambicióznosti vedeckých osobností, ako aj 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, PhD študentov aj 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 vo 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 partnermi akademickými, ako aj priemyselnými,
- 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 nadústavných 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 zmluvou.

### **Personálna politika**

V oblasti personálnej politiky sa ústavu dlhodobo darí udržať priemerný vek zamestnancov v rozpätí 40 až 45 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:

- a/ Získavanie najlepších študentov na doktorandské štúdium vo vedných odboroch, ktoré má ústav akreditované ako externá vzdelávacia inštitúcia.
- b/ Získavanie zahraničných doktorandov prostredníctvom projektov Marie Curie Research Training Network alebo iných schém podpory zahraničných študentov (napr. DAAD), v ktorých je ústav zapojený.
- c/ Vysielanie čerstvých absolventov doktorandského štúdia na dlhodobé (najmenej 3 mesiace) pobyty do zahraničia, aby sa zoznámili s najmodernejšou prístrojovou technikou, laboratórnymi postupmi, ako aj metódami práce vo vyspelých pracoviskách v Európe a vo

svete (najčastejšie Japonsko a USA).

- d/ Organizovanie medzinárodných podujatí doma, ako aj vysielanie mladých vedeckých pracovníkov a aj doktorandov na renomované konferencie v zahraničí s cieľom získať skúsenosti s prezentovaním vedeckých výsledkov.
- e/ Pozývanie renomovaných odborníkov zo zahraničia na prednášky pre doktorandov a zamestnancov ústavu.

### **Technická infraštruktúra**

Neoddeliteľnou súčasťou vedenej 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. Prostriedky na moderné zariadenia plynú predovšetkým z projektov štrukturálnych fondov.

## **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 PríFUK v roku 2014 desiatich 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 Polyaplikovateľné heterocykly - návrh štruktúry, syntéza a vlastnosti, v ktorom ÚACH vystupuje ako partner. Pracovníci ÚACH viedli na FCHPT v roku 2014 piatich doktorandov.

**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:** Fakulta priemyselných technológií TnUAD v Púchove

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

**Začiatok spolupráce:** 2011

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

**Zhodnotenie:** V spolupráci s touto fakultou je ústav zapojený do vzdelávania na I. stupni štúdia v odbore Materiálová technológia 5.2.26, študijný program Materiály. Ing. Viliam Pavlík, PhD je vedený na čiastkový úväzok. Zamestnanci ÚACH za celé obdobie spolupráce viedli niekoľko oponentúr bakalárskych, diplomových a jednej dizertačnej práce, zúčastnili sa v komisiách pre záverečné obhajoby.

**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 2014 v spolupráci s touto univerzitou dva spoločné projekty

VEGA a tri spoločné projekty APVV. V spolupráci s TnU AD sa v rámci Operačného programu VaV riešil projekt „Centrum excelentnosti pre keramiku, sklo a silikátové materiály” akronym CEKSIM, ITMS kód 26220120056. Výsledkom projektu financovaného v celkovej sume 3,9 milióna € je zriadenie výskumného Centra excelentnosti v priestoroch TnU AD a rozvíjanie a prehĺbovanie spolupráce medzi oboma inštitúciami. 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 a materiály" na TnU AD.

**Názov univerzity/vysokej školy a fakulty:** Vysoké učení technické, Brno

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

**Začiatok spolupráce:** 2000

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

**Zhodnotenie:** V spolupráci s touto fakultou nie je v súčasnosti ústav zapojený do pedagogického procesu. S FCH VUT Brno ústav plánuje zriadiť spoločné pracovisko pre výskum a vývoj nanomateriálov. Prof. RNDr. P. Šajgalík, DrSc. a prof. Ing. M. Liška, DrSc. sú členmi Vedeckej rady FCH VUT Brno.

**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. Doc. Ing. M. Hnatko, PhD. a doc. Ing. Lenčoš, PhD. boli a školiteľmi špecialistami dvoch doktorandiek, ktoré svoju PhD prácu úspešne obhájili v priebehu roku 2014. 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 05/2011 bola podpísaná partnerská zmluva a štatút Spoločného pracoviska medzi partnermi. ÚACH v spolupráci s RONA v rámci Operačného programu VaV rieši projekt s názvom "Priemyselný výskum pre potreby zefektívnenia unikátnej technológie tavenia a tvarovania úžitkového skla", akronym PVTECHSKLO. Finančné prostriedky tohto projektu sú v celkovej výške 1 400 281 €, z čoho pre ÚACH SAV pripadne 436 700 €.

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

**Názov kontraktu:** Silicon nitride sialons for refractory

**Partner(i):** RHI AG, Technology Center, Standort Leoben, Austria; Montan Universität, Leoben, Austria

**Začiatok spolupráce** (v súlade s podpísaným kontraktom): 2008

**Ukončenie spolupráce** (ak ide o spoluprácu v krátkom období): 2014

**Objem získaných prostriedkov v bežnom roku (€):** 12530

**Stručný opis výstupu/výsledku:** Vývoj nových žiaruvzdorných materiálov na báze Al<sub>2</sub>O<sub>3</sub>-SiAlON a MgO-MgAlON.

**Zhodnotenie:** Vzhľadom na dosiahnuté výsledky v minulom období partner RHI AG predĺžil kontrakt s ÚACH SAV aj na rok 2014.

**Názov kontraktu:** Alternative Werkstoffe für Pumpenkomponenten

**Partner(i):** Materials Center Leoben, Austria; Andritz GmbH, Graz, Austria

**Začiatok spolupráce** (v súlade s podpísaným kontraktom): 2011

**Ukončenie spolupráce** (ak ide o spoluprácu v krátkom období): 2014

**Objem získaných prostriedkov v bežnom roku (€):** 17020

**Stručný opis výstupu/výsledku:** Testy využiteľnosti MDF materiálov a technológií pre inovatívne materiály v pumpách a ich komponentoch.

**Zhodnotenie:** Partner Materials Center Leoben potvrdil aktualizáciu úloh a kontrakt do apríla 2014. Na základe získaných výsledkov je ÚACH SAV zaradený v databáze Materials Center Leoben ako potenciálny partner pre spoluprácu na nadväznom projekte.

### **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.	Komisia ministra školstva pre udeľovanie Ceny ministra školstva	člen
	Slovenská komisia pre vedecké hodnosti (SKVH)	predseda
	Komisia MŠ na vyhodnocovanie žiadostí o stimuly na výskum a vývoj	člen komisie
	Komisia MŠ pre prioritné oblasti aplikovaného výskumu a experimentálneho vývoja v SR	člen pracovnej skupiny
	Rada predsedov pracovných skupín pre prioritné oblasti aplikovaného výskumu a experimentálneho vývoja	predseda

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

### **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>
prof. RNDr. Pavol Šajgalík, DrSc.	Ministerstvo školstva, vedy, výskumu a športu SR	predseda Rady predsedov pre priority výskumu

### **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	Typ <sup>1</sup>	Názov	Miesto zverejnenia	Dátum alebo počet za rok
Miroslav Boča	TV	Relácia Petržalských 13 (rozhovor)	TV Bratislava	18.4.2014
Miroslav Boča	PB	Vedecká superškola - prednáška o experimentoch s plynmi	DK Zrkadlový háj, Bratislava - Petržalka	15.4.2014
Peter Boháč	RO	relácia Boli sme pri tom - reportáž Noc výskumníkov - Deti spoznávajú zaujímavé vedecké poznatky	RTVS – Slovensko	26.9.2014
Anna Brtánová	RO	relácia Boli sme pri tom - reportáž Noc výskumníkov - Deti spoznávajú zaujímavé vedecké poznatky	RTVS – Slovensko	26.9.2014
Milan Drábik	PB	Materiálová chémia; od definície k sérii aktuálnych tém	Chemické horizonty	8.10.2014
Peter Komadel	PB	Významné fly a fľové minerály. Bentonit a montmormorillonit, ich výskyt, vlastnosti, úpravy a použitie	Národné centrum pre popularizáciu vedy a techniky v spoločnosti	15.4.2014
Oľga Malkin	PB	From a woman in science to science as a family enterprise	University of Würzburg, Nemecko	4.7.2014
Vladimír Malkin.	PB	Sustainable science: from a man in science to science for humankind	International sustainability week at the University of Würzburg, 4 - 13 July 2014, Würzburg, Germany	4.7.2014
Jozef Noga.	PB	Ako môžu dva elektróny ovplyvniť naše poznanie o vesmíre	popularizačná prednáška v rámci týždňa vedy a techniky, Univerzita J. Selyeho, Komárno	11.11.2014
Anna Prnová Robert Klement, Dušan Galusek	PB	Optické aplikácie hlinitanových skiel	Spojená škola Nová Dubnica	13.11.2014
Pavol Šajgalík	iné	Festival vedy Európska noc výskumníkov 2014, člen Steering Committee	Bratislava	26.9.2014
Pavol Šajgalík	PB	Prečo má raketoplán keramický plášť?	Spojená škola, Bratislava	9.12.2014
Milan Drábik	TL	Mól – jednotka látkového množstva. Zmena jeho definície – áno či nie?	ChemZi, 10, 1, 30	1
Stanislav Kedžuch	PB	Odborné sústredenie z chémie a biológie pre študentov stredných škôl	1.-6.6.2014 Bardejov	1

<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	9	tlač	1	TV	1
rozhlas	1	internet	0	exkurzie	1
publikácie	0	multimediálne nosiče	0	dokumentárne filmy	0
iné	1				



## 9.2. Vedecko-organizačná činnosť

Tabuľka 9c Vedecko-organizačná činnosť

Názov podujatia	Domáca/ medzinárodná	Miesto	Dátum konania	Počet účastníkov
Čo je nové v slovenskom výskume ťlov a vybraných nerudných surovín	domáca	Modra-Piesok, Slovensko	29.05.-30.05.2014	20
Príprava a vlastnosti progresívnych keramických materiálov: Odborný seminár	domáca	Terchová-Biely Potok, Slovensko	26.11.-28.11.2014	-
Training Workshop: Electronic and nuclear relaxation, and structure calculation	medzinárodná	Mariapfarr, Rakúsko	22.02.-24.02.2014	38
7th Workshop on Modern Methods in Quantum Chemistry	medzinárodná	Mariapfarr, Rakúsko	23.02.-28.02.2014	53
11th Conference on Solid State Chemistry	medzinárodná	Trenčianske Teplice, Slovensko	06.07.-11.07.2014	169
11th International Conference on Relativistic Effects in Heavy-Element Chemistry and Physics (REHE-2014)	medzinárodná	Smolenice	20.09.-24.09.2014	89
5. odborný seminár s názvom Interakcia tavenín s progresívnymi anorganickými materiálmi	medzinárodná	Borinka, Slovensko	20.10.-20.10.2014	35

## 9.3. Účasť na výstavách

**Názov výstavy:** Noc výskumníkov 2014

**Miesto konania:** Bratislava

**Dátum:** 26.9.2014

**Zhodnotenie účasti:** Prezentácia výskumu a výsledkov Oddelenia hydrosilikátov (P. Boháč, A. Brtáňová, V. Bizovská, M. Matejdes, M. Slaný, S. Sás)

## 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	5	1

## 9.5. Členstvo v redakčných radách časopisov

doc. Ing. Miroslav Boča, PhD.

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

doc. RNDr. Milan Drábik, CSc.

Ceramics-Silikáty (funkcia: člen)

ChemZi (funkcia: člen)

Pure and Applied Chemistry (funkcia: čconference editor – profilový výber SSC 2014)

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)

Sklář a keramik (funkcia: člen)

RNDr. Jana Madejová, DrSc.

Clays and Clay Minerals (funkcia: associate editor)

prof. RNDr. Pavol Šajgalík, DrSc.

Ceramics-Silikáty (funkcia: člen)

Journal of Asian Ceramic Society (funkcia: spolueditor)

Journal of Ceramic Science and Technology (funkcia: člen)

Keramický Zpravodaj (funkcia: člen)

Processing and Application of Ceramics (funkcia: člen)

**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, PhD.

Humboldtov klub v SR (funkcia: člen)

Slovenská chemická spoločnosť (funkcia: člen)

Mgr. Peter Boháč

Slovenská chemická spoločnosť (funkcia: člen)

Slovenská ílová spoločnosť (funkcia: člen)

Mgr. Anna Brtáňová, PhD.

Slovenská ílová spoločnosť (funkcia: člen)

doc. RNDr. Juraj Bujdák, DrSc.

Slovenská chemická spoločnosť (funkcia: člen)

Slovenská ílová spoločnosť (funkcia: člen)

Mgr. Adriana Czímerová, PhD.

Slovenská ílová spoločnosť (funkcia: člen)

Mgr. Alexander Čeklovský, PhD.

Slovenská ílová spoločnosť (funkcia: člen)

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)

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. Dagmar Galusková, PhD.

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

Ing. Veronika Gurišová

Slovenská chemická 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 výboru Odbornej skupiny anorganická chémia)  
Slovenská chemická spoločnosť (funkcia: člen)  
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. Jozef Kraxner, PhD.

Slovenská Sklárska spoločnosť (funkcia: člen)

Ing. Blanka Kubíková, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

Ing. Marián Kucharík, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

doc. Ing. Zoltán Lenčéš, PhD.

Humboldtov klub v SR (funkcia: člen)

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

prof. Ing. Marek Liška, DrSc.

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: vedecký tajomník, od 6.11. 2013 predseda spoločnosti)

Ing. Helena Pálková, PhD.

Slovenská ílová spoločnosť (funkcia: člen)

Ing. Viliam Pavlík, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

Ing. Martin Pentrák, PhD.

Slovenská ílová 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. Samuel Sas

Slovenská ílová spoločnosť (funkcia: člen)

Ing. Jaroslav Sedláček, PhD.

Slovenská silikátová vedecko-technická spoločnosť (funkcia: člen)

Ing. Ľudmila Sekeráková

Slovenská chemická spoločnosť (funkcia: člen)

Slovenská ílová spoločnosť (funkcia: člen)

Ing. Eva Scholtzová, CSc.

Slovenská chemická spoločnosť (funkcia: člen)

Slovenská ílová spoločnosť (funkcia: člen)

prof. RNDr. Pavol Šajgalík, DrSc.

Humboldtov klub v SR (funkcia: člen)

Slovenská chemická spoločnosť (funkcia: člen)

Slovenská silikátová vedecko-technická spoločnosť (funkcia: predseda)

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

Ing. František Šimko, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

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. Jana Valúchová, PhD.

Slovenská ílová spoločnosť (funkcia: člen)

Ing. Zuzana Vasková, PhD.

Slovenská chemická spoločnosť (funkcia: člen)

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

ÚACH SAV v roku 2014 organizoval niekoľko vedeckých podujatí. Jedným z najväčších, čo sa týka počtu účastníkov, bola 11<sup>th</sup> Conference on Solid State Chemistry (SSC 2014), v ktorej ústav vystupoval ako hlavný organizátor. Konferencia patrí do série podujatí, ktoré sa každé dva roky organizujú striedavo v Prahe, Pardubiciach a Bratislave (3x). V roku 2014 sa konferencia prvýkrát uskutočnila mimo Bratislavu. Hlavný organizátor vybral za miesto konania kúpeľné mesto Trenčianske Teplice. Ďalším podujatím so širokou medzinárodnou účasťou bola organizácia 11<sup>th</sup> International Conference on Relativistic Effects in Heavy-Element Chemistry and Physics (REHE-2014) v Smoleniciach.

Jednou z významných udalostí roku 2014 bola návšteva prezidenta Slovenskej republiky Andreja Kisku, ktorá sa uskutočnila 2. 12. 2014. Okrem oficiálnej časti, v ktorej zástupcovia akadémie predstavili najdôležitejšie výsledky a činnosť na SAV, prezident navštívil aj dva ústavy akadémie, Ústav anorganickej chémie a Elektrotechnický ústav SAV. Prezidenta na ústave sprevádzal riaditeľ ústavu M. Boča, jeho zástupca M. Hnatko a predsedníčka vedeckej rady J. Madejová. Vedúci jednotlivých oddelení ústavu oboznámili prezidenta s výskumnou činnosťou ako aj s najdôležitejšími dosiahnutými výsledkami.

Dňa 13.11.2014 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 bola pripravená prezentácia s názvami „Využitie tavenín v praxi“ a „Super-rozlíšená fluorescenčná mikroskopia“. Prehliadka ústavu pre študentov potom pokračovala vo vybraných laboratóriách, kde im mladí vedeckí pracovníci ukazovali vedecké prístroje, rozprávali o ich praktickom využití, prípadne im názorne aj toto využitie prezentovali. Na mnohých stanovištiach im zároveň predvedli efektné a zaujímavé chemické experimenty. Návštevníkov zaujala prezentácia pripravená na skenovanom elektrónovom mikroskope pod názvom „Elektrónová strelba na živé organizmy“. Dňa otvorených dverí sa zúčastnil rekordný počet študentov z bratislavských aj mimobratislavských stredných škôl (270 osôb), ako aj niekoľko študentov z PríF UK Bratislava.

## 10. Činnosť knižnično-informačného pracoviska

### 10.1. Knižničný fond

Tabuľka 10a Knižničný fond

<b>Knižničné jednotky spolu</b>	7554
knihy a zviazané periodiká	7554
audiovizuálne dokumenty	
z toho elektronické dokumenty (vrátane digitálnych)	
mikroformy	
iné špeciálne dokumenty - dizertácie, výskumné správy	
Počet titulov dochádzajúcich periodík	3
z toho zahraničné periodiká	3
Ročný prírastok knižničných jednotiek	41
kúpou	41
darom	
v tom výmenou	
bezodplatným prevodom	
Úbytky knižničných jednotiek	
Knižničné jednotky spracované automatizovane	

### 10.2. Výpožičky a služby

Tabuľka 10b Výpožičky a služby

<b>Výpožičky spolu</b>	68
odborná literatúra pre dospelých	10
z toho výpožičky periodík	58
prezenčné výpožičky	
MVS iným knižniciam	
MVS z iných knižníc	1
MMVS iným knižniciam	
MMVS z iných knižníc	2
Počet vypracovaných bibliografií	
Počet vypracovaných rešerší	

### 10.3. Používatelia

Tabuľka 10c Užívatelia

Registrovaní používatelia	
Návštevníci knižnice spolu (bez návštevníkov podujatí)	71

**10.4. Iné údaje**

Tabuľka 10d Iné údaje

On-line katalóg knižnice na internete ( 1=áno, 0=nie)	0
Náklady na nákup knižničného fondu v €	3761,12

**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.

- člen VR SAV

- Podpredseda pre ekonomiku

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

doc. Ing. Miroslav Boča, PhD. - 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, PhD. - Komisia SAV pre infraštruktúru a štrukturálne fondy (člen)

prof. RNDr. Pavol Šajgalík, DrSc. - Komisia SAV pre ekonomické otázky (predseda)

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

doc. Ing. Miroslav Boča, PhD. - Komisia VEGA č. 3 pre chemické vedy, chemické inžinierstvo a biotechnológie (predseda)

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 31.12.2014 spolu	v tom:			
		zo ŠR	z toho: ŠF EÚ vr. spolufina n.zo ŠR	z mimorozp. zdrojov	z toho: ŠF EÚ vr. spolufinan.z o ŠR
<b>Výdavky spolu</b>	2 263 957	1 333 448	177 568	930 509	315 480
<b>Bežné výdavky</b>	1 876 989	1 174 543	102 264	702 446	191 615
<b>v tom:</b>					
mzdy (610)	988 426	703 018	68 019	285 408	111 173
poistné a príspevok do poistovní (620)	340 223	244 446	24 102	95 777	37494
tovary a služby (630)	548 340	227 079	10 143	321 261	42 948
z toho: časopisy	4 345	3 664	0	681	218
VEGA projekty	126 326	126 326	0	0	0
MVTS projekty	71 754	71 754	0	0	0
CE	0	0	0	0	0
vedecká výchova	88 955	84 820	0	4 135	300
bežné transfery (640)	192 857	92 875	9 274	99 982	0
z toho: štipendiá	84 155	80 020	0	4 135	0
transfery partnerom projektov	108 702	12 855	9 274	95 847	300
<b>Kapitálové výdavky</b>	194 111	66 030	66 030	128 081	123 865
<b>v tom:</b>					
obstarávanie kapitálových aktív	194 111	66 030	66 030	128 081	123 865
kapitálové transfery	0	0	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 31.12.2014 spolu</b>	<b>v tom: rozpočtové</b>	<b>z mimoroz p. zdrojov</b>
<b>Príjmy spolu</b>	926 603	110	929 493
<b>Nedaňové príjmy</b>	929 603	110	929 493
<b>v tom:</b>			
príjmy z prenájmu	0	0	0
príjmy z predaja výrobkov a služieb	0	0	0
iné	929 603	110	929 493
<b>Granty a transfery (mimo zdroja 111)</b>	929 493	0	929 493
<b>v tom:</b>			
<b>tuzemské</b>	729 122	0	729 122
<b>z toho: APVV</b>	339 391	0	339 391
<b>iné</b>	389 730	0	389 730
zahraničné	200 372	0	200 372
z toho: projekty rámcového programu EÚ	166 078	0	166 078
iné	34 294	0	34 294

### **13. Nadácie a fondy pri organizácii SAV**

### **14. Iné významné činnosti organizácie SAV**

### **15. Vyznamenania, ocenenia a ceny udelené pracovníkom organizácie v roku 2014**

#### **15.1. Domáce ocenenia**

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

###### **Boča Miroslav**

Cena Slovenskej akadémie vied za budovanie infraštruktúry

*Oceňovateľ: Predsedníctvo SAV*

*Opis: Konzorcium v zložení: Technologický inštitút SAV, Fyzikálny ústav SAV, Elektrotechnický ústav SAV, Ústav anorganickej chémie SAV, Ústav materiálov a mechaniky strojov SAV a Fakulta elektrotechniky a informatiky STU v Bratislave bolo ocenené za vybudovanie unikátneho testovacieho laboratória „SmartGrid“.*

##### **15.1.2. Iné domáce ocenenia**

#### **15.2. Medzinárodné ocenenia**

###### **Bizovská Valéria**

Best poster award

*Oceňovateľ: Organizačný výbor IWLM 2014 (Francúzsko)*

*Opis: Vth International Workshop on Layered Materials, Mulhouse, Francúzsko, 27. - 29. 8. 2014, podujatie organizovala spoločnosť La Société Chimique de France.*

###### **Boháč Peter**

2. miesto v súťaži o najlepší poster študentov

*Oceňovateľ: Organizačný výbor MECC 2014 Mid-European Clay Conference (16.-19.9.2014, Nemecko)*

*Opis: Ocenenie sa udeľovalo študentom, v dvoch kategóriách – poster a prednáška. Hodnotenie postrov pozostávalo z bodovania členov komisie, pričom sa do úvahy brali obsah, forma a prezentácia postra.*

###### **Bujdák Juraj**

Gerhard-Lagaly-Award of the DTTG

*Oceňovateľ: DTTG - German-Austrian-Swiss Clay Group*

*Opis: Cena bola udelená za prínos vo vedách zameraných na výskum ílových minerálov. Podľa štatútu DTTG oceňuje medzinárodne významných vedcov s výnimočnými výsledkami vo vedných oblastiach ílovej mineralógie vo veku do 50 rokov. Táto cena bola v tomto roku udeľovaná prvýkrát počas MECC 2014 Mid-European Clay Conference (16.-19.9.2014, Nemecko).*

###### **Noga Jozef**

Zvolenie za člena International Academy of Quantum Molecular Sciences

*Oceňovateľ: IAQMS*

*Opis: [www.iaqms.org](http://www.iaqms.org)*

###### **Petra Lukáš**

1. miesto v súťaži o najlepší poster študentov

*Oceňovateľ: Organizačný výbor MECC 2014 Mid-European Clay Conference (16.-19.9.2014, Nemecko)*

*Opis: Ocenenie sa udeľovalo študentom, v dvoch kategóriách – poster a prednáška. Hodnotenie postrov pozostávalo z bodovania členov komisie, pričom sa do úvahy brali obsah, forma a prezentácia postra.*

**Šajgalík Pavol**

Short-Term Oversea Expert (2014-2016)

*Oceňovateľ: The Center for Advanced Materials and Forming Technology, Northwestern Polytechnical University, Xi'An, Čína*

#### **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)**

V priebehu roku 2014 sa na ÚACH obrátila so žiadosťou o poskytnutie informácií v súlade so zákonom č. 211/2000 Z. z. o slobodnom prístupe k informáciám v znení neskorších predpisov (Zákon o slobode informácií) jedna osoba, odpoveď jej bola zaslaná elektronickou poštou Ing. Jánom Piškom, ktorého poveril riaditeľ ÚACH. Informácie, ktoré boli požadované sa týkali: aktuálneho zoznamu nehnuteľností, v ktorých ústav vystupuje ako nájomca, vypožičiavateľ alebo užívateľ.

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

Zásadný problém, ktorý narastá niekoľko rokov a v roku 2014 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.

Navyše, mzdové prostriedky ústavu neumožňujú rozšírenie administratívy ani o toho jedného pracovníka. Výsledkom je, že potrebnú aktivitu vykonáva približne 5 vedeckých pracovníkov nad rámec alebo na úkor svojich odborných aktivít. Táto situácia je absolútne neúnosná. Namiesto podpory prichádza od štátu ďalší úder v podobe krátenia rozpočtu, čo znamená prepustenie pracovníka, respektíve nepredĺženie pracovnej zmluvy zamestnancovi, alebo dokonca dobrovoľný odchod pracovníkov, čo sa stalo skutočnosťou v šiestich prípadoch koncom roku 2014 a bude pokračovať aj v roku 2015. Deklarovaná snaha PSAV 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 ASFEU) pre všetky ústavy centrálne, čo by výrazne ústavy 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 aplikácii elektronického trhoviska.

Hlavnou pracovnou náplňou vedeckého pracovníka by mal byť výskum. Toto nie je možné naplniť minimálne z dvoch dôvodov. Prvým je už spomínaná abnormálna a nezmyselná administratívna záťaž vedeckých pracovníkov. Druhým je absencia skutočnej podpory vedy politickými špičkami. V tomto sklamali všetky doterajšie vlády a parlamenty Slovenska. Fakty, ktoré hovoria o tom, že výzvy na podávanie projektov nie sú kryté, svedčia len o tom, že reči politikov o podpore vedy sú len prázdne slová. V tejto situácii nevieme navrhnúť žiadne aktivity ako s týmto úspešne bojovať.

Nutnosť transformácie SAV je síce nespochybniteľná, ale sprievodné javy k tomuto procesu (problém ESO ako aktivita štátu vs. spájanie ústavov ako aktivita SAV) 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 za posledné tri mesiace roka 2014, protesty samotných zamestnancov ako krajný prejav nesúhlasu a možno aj sklamania s následným vyvrcholením v podobe odvolania predsedu SAV Snemom SAV.

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

RNDr. Jana Madejová, DrSc., 02/59410406

Ing. Helena Pálková, PhD., 02/59410485

**Riaditeľ organizácie SAV:**

.....  
doc. Ing. Miroslav Boča, PhD.

**Prílohy****Príloha A - Zoznam zamestnancov a doktorandov organizácie k 31.12.2014****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. RNDr. Juraj Bujdák, DrSc.	50	0.50
2.	prof. Ing. Dušan Galusek, DrSc.	55	0.55
3.	RNDr. Peter Komadel, DrSc.	100	1.00
4.	prof. Ing. Marek Liška, DrSc.	45	0.45
5.	RNDr. Jana Madejová, DrSc.	100	1.00
6.	Dr. Oľga Malkin, DrSc.	100	1.00
7.	Dr. Vladimír Malkin, DrSc.	100	1.00
8.	prof. RNDr. Jozef Noga, DrSc.	53	0.53
9.	prof. RNDr. Pavol Šajgalík, DrSc.	55	0.55
<b>Vedúci vedeckí pracovníci CSc., PhD.</b>			
1.	doc. Ing. Miroslav Boča, PhD.	100	1.00
<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. Róbert Klement, PhD.	27	0.27
9.	Ing. Michal Korenko, PhD.	100	0.41
10.	doc. Ing. Zoltán Lenčéš, PhD.	100	1.00
11.	prof. Ing. Pavel Mach, CSc.	25	0.25
12.	Ing. Helena Pálková, PhD.	100	1.00
13.	Ing. Jaroslav Sedláček, PhD.	100	1.00
14.	Ing. Eva Scholtzová, CSc.	100	1.00
15.	RNDr. Ľubomír Smrčok, CSc.	100	1.00
16.	Ing. František Šimko, PhD.	100	1.00

17.	doc. Ing. Peter Šimurka, PhD.	50	0.50
18.	Mgr. Peter Švančárek, PhD.	100	1.00
<b>Vedeckí pracovníci</b>			
1.	Mgr. Valéria Bizovská, PhD.	100	0.66
2.	Mgr. Anna Brtáňová, PhD.	100	1.00
3.	Ing. Juraj Brtko, CSc.	100	0.91
4.	Mgr. Roman Bystrický, PhD.	120	1.20
5.	Mgr. Alexander Čeklovský, PhD.	100	1.00
6.	Ing. Marián Gall, PhD.	80	0.80
7.	Ing. Ondrej Hanzel, PhD.	100	0.60
8.	RNDr. Miroslav Holubec, CSc	100	0.55
9.	Mgr. Peter Hrobárik, PhD.	0	0.00
10.	Ing. Branislav Hruška, PhD.	100	1.00
11.	Ing. Jozef Kraxner, PhD.	100	1.00
12.	Ing. Blanka Kubíková, PhD.	100	1.00
13.	Ing. Marián Kucharík, PhD.	0	0.00
14.	Mgr. Marián Matejdes, PhD.	125	1.00
15.	Ing. Monika Micháľková, PhD.	70	0.23
16.	Ing. Jarmila Mlynáriková, PhD.	100	1.00
17.	Ing. Zuzana Netriová, PhD.	100	0.75
18.	Ing. Viliam Pavlík, PhD.	100	1.00
19.	Ing. Martin Pentrák, PhD.	0	0.00
20.	Ing. Linda Pentráková, PhD.	0	0.00
21.	doc. Ing. Alfonz Plško, CSc.	28	0.28
22.	Ing. Anna Prnová, PhD.	100	1.00
23.	Mgr. Michal Repiský, PhD.	0	0.00
24.	Ing. Jana Valúchová, PhD.	100	1.00
25.	Ing. Štefan Varga, CSc.	100	1.00
26.	Ing. Zuzana Vasková, PhD.	100	1.00
27.	Ing. Martin Vitkovič, PhD.	100	1.00
<b>Odborní pracovníci s VŠ vzdelaním</b>			
1.	Mgr. Martina Bukovská	100	1.00
2.	Mgr. Lenka Dunčáková	50	0.16
3.	Ing. Katarína Faturíková, PhD.	100	0.00
4.	Ing. Veronika Gurišová	100	1.00



5.	Ing. Eva Hadzimová	100	1.00
6.	Ing. Tomáš Hanulík	28	0.28
7.	Ing. Michal Hičák	100	0.60
8.	Ing. Ingrid Hierwegová	57	0.57
9.	RNDr. Klára Hrnčiarová	50	0.50
10.	Mgr. Peter Cherry	100	1.00
11.	MSc. Ismail Ibrahim	100	1.00
12.	Mgr. Natália Jamrichová	57	0.28
13.	Ing. Hana Kaňková, PhD.	50	0.60
14.	Ing. Ľubomír Koleda	100	1.00
15.	Ing. Magdaléna Lissová, PhD.	57	0.18
16.	Ing. Svetozár Luther	100	0.91
17.	Ing. Iveta Macková	100	1.00
18.	Ing. Eva Mikšíková	125	1.25
19.	Ing. Ján Piško	100	1.00
20.	Ing. Jozef Priščák	100	1.00
21.	Ing. Milan Rešetka	100	0.91
22.	Ing. Jaroslav Rusnák, PhD.	33	0.33
23.	Bc. Bc. Marica Satinová	100	1.00
24.	Ing. Zuzana Slobodová	100	1.00
25.	Mgr. Zuzana Strapatá	50	0.16
26.	Ing. Katarína Zeleníková	30	0.30
<b>Odborní pracovníci ÚSV</b>			
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	1.00
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.	Anna Škumátová	100	1.00
12.	Alexandra Tonkovičová	100	1.00

**Ostatní pracovníci**

1.	Dana Matejkinová	100	1.00
2.	Terézia Pírová	100	1.00

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

	Meno s titulmi	Dátum odchodu	Ročný prepočítaný úväzok
<b>Vedeckí pracovníci</b>			
1.	James Richard Asher, PhD	31.10.2014	0.83
2.	Mgr. Peter Hrobárik, PhD.	31.12.2014	-
3.	Mgr. Michal Repiský, PhD.	31.12.2014	-
<b>Odborní pracovníci s VŠ vzdelaním</b>			
1.	Mgr. Martina Bukovská	31.12.2014	-
2.	prom.farm. Ľubica Gáliková	30.6.2014	0.40
3.	Ing. Katarína Hlavačková	30.9.2014	0.80
4.	Ing. Monika Hrabalová	31.8.2014	0.66
5.	Mgr. Štefan Omasta	30.9.2014	0.66
6.	Ing. Jana Vokelová	31.8.2014	0.66

**Zoznam doktorandov**

	Meno s titulmi	Škola/fakulta	Študijný odbor
<b>Interní doktorandi hradení z prostriedkov SAV</b>			
1.	Mgr. Peter Boháč	Prírodovedecká fakulta UK	4.1.15 anorganická chémia
2.	Mgr. Marcela Hrdá	Prírodovedecká fakulta UK	4.1.11 chemická fyzika
3.	Marius Kadek	Prírodovedecká fakulta UK	4.1.11 chemická fyzika
4.	Mgr. Martin Kontrík	Prírodovedecká fakulta UK	4.1.15 anorganická chémia
5.	Mgr. Lukáš Petra	Prírodovedecká fakulta UK	4.1.15 anorganická chémia
6.	Mgr. Magdaléna Precnerová	Prírodovedecká fakulta UK	4.1.15 anorganická chémia
7.	Ing. Samuel Sas	Fakulta chemickej a potravinárskej technológie STU	5.2.19 anorganická technológia a materiály
8.	Ing. Michal Slaný	Fakulta chemickej a potravinárskej technológie STU	5.2.19 anorganická technológia a materiály
9.	Ing. Michal Šimurda	Fakulta chemickej a potravinárskej technológie STU	5.2.19 anorganická technológia a materiály
<b>Interní doktorandi hradení z iných zdrojov</b>			
1.	Ing. Christina Atzenhofer	Montanuniversitaet Leoben, Rakúsko	
2.	Peter John Cherry	Prírodovedecká fakulta UK	4.1.11 chemická fyzika

3.	Ismail Ibrahim	Prírodovedecká fakulta UK	4.1.15 anorganická chémia
<b>Externí doktorandi</b>			
1.	Ing. Katarína Müllerová	Fakulta chemickej a potravinárskej technológie STU	5.2.19 anorganická technológia a materiály

## Príloha B -Projekty riešené v organizácii

### Medzinárodné projekty

#### Programy: Medziakademická dohoda (MAD)

##### 1.) Organo-ily ako medzistupeň pre prípravu nových hybridných materiálov s funkčnými vlastnosťami (*Organo-clays as intermediates for the synthesis of functional hybrid materials*)

<b>Zodpovedný riešiteľ:</b>	Helena Pálková
<b>Trvanie projektu:</b>	1.1.2013 / 31.12.2015
<b>Evidenčné číslo projektu:</b>	SAV-PAV 14
<b>Organizácia je koordinátorom projektu:</b>	áno
<b>Koordinátor:</b>	Ústav anorganickej chémie SAV
<b>Počet spoluriešiteľských inštitúcií:</b>	1 - Poľsko: 1
<b>Čerpané financie:</b>	

##### Dosiahnuté výsledky:

Na vzorkách montmorillonitu sa realizovala príprava hybridných materiálov s použitím polymérneho poly-katiónu – poly-(diallyldimethylamónneho). Materiál sa následne použil ako nosič/stabilizátor nano-častíc striebra na vzorke. Aplikovali sa rôzne podmienky prípravy vzoriek s cieľom optimalizácie výsledných vlastností. Na vzorke montmorillonitu modifikovanom kvartérnym fosfóniovým katiónom sa skúmala stabilita v kyslom prostredí. Zmeny v štruktúre materiálu sa pozorovali použitím rôznych metód. Na sledovanie množstva organického katiónu sa využila termická analýza, elementárna analýza uhlíka ako ja 31P MAS NMR metóda.

Výsledky prezentované na medzinárodných konferenciách:

1. PÁLKOVÁ, Helena – JANKOVIČ, Ľuboš – ZIMOWSKA, Malgorzata – SERWICKA, Ewa M – MADEJOVÁ, Jana, Physico-chemical properties of the acid activated organo-modified clays, XLVI Ogólnopolskie Kolokwium Katalityczne, Krakow, Poland, 19. - 21.3.2014, p. 257.
2. PÁLKOVÁ, Helena – JANKOVIČ, Ľuboš – ZIMOWSKA, Malgorzata – SULIKOWSKI, Bogdan - SERWICKA, Ewa M – MADEJOVÁ, Characterization of the acid treated clays modified with quaternary phosphonium and ammonium cations, In: IWLM Vth International Workshop on Layered Materials, 27-29 August 2014, Mulhouse, France

#### Programy: Medzivládna dohoda

##### 2.) Nové anorganické fosfory bez obsahu prvkov vzácnych zemín pre energeticky úsporné osvetľovacie zdroje (*New rare earth-free inorganic phosphors for energy-saving lighting applications*)

<b>Zodpovedný riešiteľ:</b>	Dušan Galusek
<b>Trvanie projektu:</b>	1.1.2013 / 31.12.2015
<b>Evidenčné číslo projektu:</b>	SAS-NSC JRP 2012/14
<b>Organizácia je koordinátorom projektu:</b>	áno
<b>Koordinátor:</b>	Ústav anorganickej chémie SAV
<b>Počet spoluriešiteľských inštitúcií:</b>	2 - Taiwan: 2
<b>Čerpané financie:</b>	Podpora medzinárodnej spolupráce z národných zdrojov: 22000 €

##### Dosiahnuté výsledky:

V rámci projektu sa pripravilo niekoľko hostiteľských sklenených hlinitano-kerimičitanových matric so zložením identickým so zložením kryštalického gelenitu a dopované prechodnými prvkami, resp. kodopované kombináciou prechodného prvku s malým množstvom oxidu vzácnej zeminý ako senzitizera. Pripravili sa aj viaceré ytrito-hlinitanokremičitanové sklá dopované kovmi vzácnych zemín a určil sa kinetické parametre kryštalizácie týchto skiel a vplyv priebehu kryštalizácie a fázového zloženia na luminiscenčné vlastnosti.

Publikácie:

1. PRNOVÁ, Anna - BODIŠOVÁ, Katarína - KLEMENT, R. - MIGÁT, M. - VETEŠKA, P. - ŠKRÁTEK, Martin - BRUNEEL, E. - VAN DRIESSE, I. - GALUSEK, Dušan. Preparation and characterization of Yb<sub>2</sub>O<sub>3</sub>-Al<sub>2</sub>O<sub>3</sub> glasses by the Pechini sol-gel method combined with flame synthesis. In *Ceramics International*, 2014, vol. 40, p.

6179-6184.

2. DOMANICKÁ, A. - KLEMENT, Róbert - PRNOVÁ, Anna - BODIŠOVÁ, Katarína - GALUSEK, Dušan. Luminescent rare-earth ions doped Al<sub>2</sub>O<sub>3</sub>-Y<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> glass microspheres prepared by flame synthesis. In *Ceramics International*, 2014, vol. 40, p. 6005-6012.
3. BERNARDO, E. - FIOCCO, L. - PRNOVÁ, Anna - KLEMENT, Róbert - GALUSEK, Dušan. Gehlenite: Eu<sup>3+</sup> phosphors from a silicone resin and nano-sized fillers. In *Optical Materials*, 2014, vol. 36, p. 1243-1249.
4. LIN, S.H. - TZENG W.L. - TUAN W.H. - GALUSEK, Dušan - SHIH, S.J. Correlation of photoluminescence and crystallinity for SrTiO<sub>3</sub>:Pr<sup>3+</sup>, Al<sup>3+</sup> particles by spray pyrolysis, p. 155 In: *Book of Abstracts, 11th Conference on Solid State Chemistry*, 6-11 July 2014, Trenčianske Teplice, Slovak Republic, ISBN 978-80-971648-0-5

### 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:  
 25000 €

#### Dosiahnuté výsledky:

V rámci projektu bola pripravená pórovitá keramická matrica na báze nitridu kremičitého, na ktorú bol rôznymi metódami (spin coating, dip coating, infiltrácia) nanášaný hydroxyapatit za účelom zvýšenia, resp. dosiahnutia bioaktivity materiálu. Bioaktívne materiály umožňujú lepšiu fixáciu implantátu s okolitým tkanivom a teda zohrávajú dôležitú úlohu v procese prijatia implantátu.

#### Publikácie:

1. BODIŠOVÁ, Katarína - KAŠIAROVÁ, Monika - PRAMUKOVÁ, Zuzana - DOMANICKÁ, Magdaléna - LENČEŠ, Zoltán - HNATKO, Miroslav - GROMOŠOVÁ, Silvia - ŠAJGALÍK, Pavol. Mechanical properties of macroporous silicon nitride-based ceramics designed for bone substitutes. In *Ceramics-Silikáty*, 2014, vol. 58, no. 2, p. 99-105.
2. DOMANICKÁ, Magdaléna - HNATKO, Miroslav - LENČEŠ, Zoltán - PRAMUKOVÁ, Zuzana - KAŠIAROVÁ, Monika - ŠAJGALÍK, Pavol. Preparation and characterization of Si<sub>3</sub>N<sub>4</sub> - HA porous composites. In *Príprava a vlastnosti progresívnych keramických materiálov: Odborný seminár. Zborník rozšírených abstraktov. Terchová-Biely Potok*, 26.-28.11.2014. Ed. D. Galusková. - Bratislava: ÚACH SAV, 2014, s. 44-50.
3. PRAMUKOVÁ, Zuzana - KAŠIAROVÁ, Monika - DOMANICKÁ, Magdaléna - HNATKO, Miroslav - ŠAJGALÍK, Pavol. Microstructure and mechanical properties of biomaterials based on silicon nitride. In *Training school COST action NAMABIO MP1005: 3rd course. From nano- to macro- biomaterials (design, processing, characterization, modelling) and applications to STEM cells regenerative orthopaedic and dental medicine*. Zagreb, 26.-29.4.2014. - B.V., 2014.
4. PRAMUKOVÁ, Zuzana - KAŠIAROVÁ, Monika - DOMANICKÁ, Magdaléna - HNATKO, Miroslav - ŠAJGALÍK, Pavol. The mechanical properties of cellular silicon nitride. In *CellMAT 2014: Cellular Materials*. Dresden, 22.-24.10.2014. - DGM, 2014.
5. ŠAJGALÍK, Pavol. Porous silicon nitride ceramics designed for bone substitute applications. In *2nd V4-JST workshop on advanced materials*, Warsaw, Poland, 17-18 september 2014. - Warsaw, Poland, 2014, p. 11.

### Programy: COST

#### 4.) Naša história z astrochémie (*Our Astro-Chemical History*)

**Zodpovedný riešiteľ:** Jozef Noga  
**Trvanie projektu:** 26.11.2014 / 25.11.2018  
**Evidenčné číslo projektu:** CMST COST Action CM1401  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** Institut de Planétologie et d'Astrophysique de Grenoble  
**Počet spoluriešiteľských inštitúcií:** 9 - Rakúsko: 1, Česko: 1, Nemecko: 1, Dánsko: 1, Fínsko: 1, Maďarsko: 1, Írsko: 1, Taliansko: 1, Holandsko: 1  
**Čerpané financie:**

### 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 / 30.9.2017
<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: 3667 €

### Programy: 7RP

### 6.) Pokrok vo vývoji a aplikáciách balíka NMR spektroskopie pre paramagnetické systémy. Kominovaný experimentálno-teoretický prístup (pNMR) (*Pushing the envelope of nuclear magnetic resonance spectroscopy for paramagnetic systems. A combined experimental a theoretical approach (pNMR)*)

<b>Zodpovedný riešiteľ:</b>	Vladimír Malkin
<b>Trvanie projektu:</b>	1.1.2013 / 31.12.2016
<b>Evidenčné číslo projektu:</b>	PITN-GA-2012-317127
<b>Organizácia je koordinátorom projektu:</b>	nie
<b>Koordinátor:</b>	Centre Europeen de RMN a Tres Hauts Champs
<b>Počet spoluriešiteľských inštitúcií:</b>	10 - Nemecko: 2, Fínsko: 1, Francúzsko: 1, Veľká Británia: 1, Švajčiarsko: 1, Taliansko: 2, Holandsko: 1, Švédsko: 1
<b>Čerpané financie:</b>	EU: 46222 € Podpora medzinárodnej spolupráce z národných zdrojov: 6393 €

#### Dosiahnuté výsledky:

Vyvinuli sme metódu na analýzu EPR g-tenzora pomocou vizualizácie hustoty g-tenzora a jej jednotlivých príspevkov na plne štvorkomponentnej úrovni teórie [1]. Ukázali sme, že vyvinutá metóda poskytuje zaujímavú možnosť hlbšie porozumieť faktorom, prispievajúcim ku g-tenzoru. Obzvlášť efekt vodíkových väzieb na orbitálny Zeemanov príspevok ku g-hustote sa ukázal byť veľmi poučný a priamočiary. Nový prístup rozširuje existujúce techniky analýzy aspektov, prispievajúcich k zmene g-tenzora.

#### Publikácie

1. ASHER J.R. – MALKIN V.G. – MALKINA O.L. Visualization of four-component g-tensor density as a three-dimensional function, Chem. Phys. Lett., 2014, submitted.

### 7.) Nitridové materiály s funkčnými vlastnosťami pre aplikácie v energetike (*Functional nitrides for energy applications*)

<b>Zodpovedný riešiteľ:</b>	Pavol Šajgalík
<b>Trvanie projektu:</b>	1.1.2011 / 31.1.2015
<b>Evidenčné číslo projektu:</b>	264873
<b>Organizácia je koordinátorom projektu:</b>	nie
<b>Koordinátor:</b>	Technische Universität Darmstadt
<b>Počet spoluriešiteľských inštitúcií:</b>	9 - Nemecko: 3, Francúzsko: 2, Taliansko: 2, Švédsko: 1, Turecko: 1
<b>Čerpané financie:</b>	EU: 120476 € Podpora medzinárodnej spolupráce z národných zdrojov: 11894 €

#### Dosiahnuté výsledky:

Nitridáciou zmesí  $\text{Mg}_2\text{Si}$  (alebo  $\text{LaSi}$ ),  $\text{Si}$  a  $\text{Si}_3\text{N}_4$  boli pripravené svetlo emitujúce luminofory na báze  $\text{MgSiN}_2$  a  $\text{LaSi}_3\text{N}_5$  dopovaných oxidmi kovov vzácnych zemín:  $\text{Eu}_2\text{O}_3$ ,  $\text{Sm}_2\text{O}_3$  a  $\text{CeO}_2$ . Riešiteľský kolektív úspešne zvládol optimalizáciu prípravy luminofórov na báze ternárnych nitridov. Boli pripravené aj luminofóry na báze  $\text{SiAlONu}$  z polymérneho prekursoru. Optimalizáciou teplotného a plynového režimu syntézy luminofórov ako aj reguláciou obsahu dopantov ( $\text{Eu}$ ,  $\text{Sm}$ ,  $\text{Ce}$ ) sa podarilo pripraviť keramické luminiscenčné materiály emitujúce modré, zelené, oranžové a červené svetlo – v závislosti od typu nitridu/oxynitridu a dopantu. Kombináciou monochromatických luminofórov možno pripraviť biele svetlo emitujúce diódy (LED).

Teoretickými výpočtami (metódou HSE06) boli stanovené šírky zakázaného pásu čistého ako aj dopovaného  $\text{LaSi}_3\text{N}_5$ , v dobrej zhode s experimentálnymi údajmi.

#### Publikácie:

1. IBRAHIM, Ismail - LENČEŠ, Zoltán - BENCO, Ľubomír - HRABALOVÁ, Monika - ŠAJGALÍK, Pavol. Cerium-doped  $\text{LaSi}_3\text{N}_5$ : Computed electronic structure and band gaps. In Journal of the European Ceramic Society, 2014, vol. 34, no. 11, p. 2705-2712.
2. IBRAHIM, Ismail - LENČEŠ, Zoltán - BENCO, Ľubomír - HRABALOVÁ, Monika - ŠAJGALÍK, Pavol. Sm-doped  $\text{LaSi}_3\text{N}_5$ : Synthesis, computed electronic structure, and band gaps. In Journal of the American Ceramic Society, 2014, vol. 97, no. 8, p. 2546-2551.
3. IBRAHIM, Ismail - LENČEŠ, Zoltán - ŠAJGALÍK, Pavol – BENCO Ľ – MARSMAN M. Electronic structure and energy level schemes of  $\text{RE}_3+\text{LaSi}_3\text{N}_5$  and  $\text{RE}_2+\text{LaSi}_3\text{N}_5\text{-xOx}$  phosphors ( $\text{RE} = \text{Ce}, \text{Pr}, \text{Nd}, \text{Pm}, \text{Sm}, \text{Eu}$ ) from first principles,” Journal of Physical Chemistry, Manuscript ID: jp-2014-10583z.
4. IBRAHIM, Ismail - LENČEŠ, Zoltán - BENCO Ľ - ŠAJGALÍK, Pavol, Ab initio study of the electronic structure and band gaps of Eu-doped  $\text{LaSi}_3\text{N}_5$  phosphors: a role of oxygen atom,” J. Eur. Ceram. Soc., submitted Oct. 2014, Ref. No.: JECS-D-14-01399.
5. ŠAMAJOVÁ, Vladana - LENČEŠ, Zoltán - JONŠTA, Zdeněk. Příprava a mechanické vlastnosti kompozitů  $\text{Si}_3\text{N}_4+\text{MgSiN}_2$ . In Interakcie tavenín s progresívnymi anorganickými materiálmi. 5. odborný seminár, Borinka, Slovensko, 20. - 21. október 2014: zborník príspevkov. Editor Jana Valúchová, Bratislava, 2014, p. 127-132.
6. LENČEŠ, Zoltán – ŠAMAJOVÁ V – HANZEL Ondrej, Preparation and characterization of  $\text{Si}_3\text{N}_4\text{-MgSiN}_2$  composites“, Zborník príspevkov – Odborný seminár Príprava a vlastnosti progresívnych keramických materiálov, Terchová – Biele Potoky, 26.28.11.2014, ed. D. Galusková, s. 20-26
7. LENČEŠ, Zoltán - IBRAHIM, Ismail - HRABALOVÁ, Monika - BENCO, Ľubomír - ŠAJGALÍK, Pavol. Influence of dopant and N/O anion exchange on the electronic structure and luminescent properties of oxynitride based phosphors. In ICACC 2014. 38th international conference and exposition on advanced ceramics and composites, Daytona Beach, Florida, USA, january 26-31, 2014 : abstracts. - USA : The American Ceramic Society, 2014, p. 15-16.
8. LENČEŠ, Zoltán - HRABALOVÁ, Monika - IBRAHIM, Ismail - BENCO, Ľubomír - ŠAJGALÍK, Pavol. Theoretical and experimental approach to ternary silicon oxynitride-based phosphors. In ICC5. 5th international congress on ceramics, Beijing, China, august 17-21, 2014 : abstract. - China : The Chinese Ceramics Society, 2014, p. 161-162
9. LENČEŠ, Zoltán - HRABALOVÁ, Monika - IBRAHIM, Ismail - BENCO, Ľubomír - ŠAJGALÍK, Pavol. Influence of lanthanoid dopant and N/O substitution on the electronic structure and luminescent properties of silicon oxynitride phosphors. In ISNT 2014. 8th international symposium on nitrides in conjunction with 7th international workshop on spinel nitrides and related materials and Marie Curie ITN 7th framework program FUNEA, Wildbad Kreuth, Germany, august 31st - september 5th, 2014: conference program with abstracts. Technische Universität Darmstadt, 2014, p. 53.
10. IBRAHIM, Ismail - LENČEŠ, Zoltán - BENCO, Ľubomír - ŠAJGALÍK, Pavol. Ab-initio study of electronic structure and band gap of rare earth-doped  $\text{LaSi}_3\text{N}_5$  : FUNEA talk. In ISNT 2014. 8th international symposium on nitrides in conjunction with 7th international workshop on spinel nitrides and related materials and Marie Curie ITN 7th framework program FUNEA, Wildbad Kreuth, Germany, august 31st - september 5th, 2014 conference program with abstracts. Technische Universität Darmstadt, 2014, p. 82.
11. LENČEŠ, Zoltán - HRABALOVÁ, Monika - IBRAHIM, Ismail - BENCO, Ľubomír - ŠAJGALÍK, Pavol. Influence of rare earth dopant and N/O substitution on the electronic structure and luminescent properties of oxynitride phosphors. In ISSNOX4. 4th international symposium on SiAlONs and non-oxides, may 25-28, 2014, Nagahama Royal Hotel, Shiga, Japan: program & abstracts, p. 21.28, 2014.
12. LENČEŠ, Zoltán - HRABALOVÁ, Monika - IBRAHIM, Ismail - BENCO, Ľubomír - ŠAJGALÍK, Pavol. Influence of rare earth dopant and N/O substitution on the electronic structure and luminescent properties of silicon oxynitride phosphors. In SSC 2014. 11th conference on solid state chemistry, Trenčianske Teplice, Slovak Republic, 6-11 july 2014: book of abstracts. 2014, p. 56.

#### Programy: Bilaterálne - iné

**8.) Fyzikálno-chemická analýza fluoridových taveninových systémov pre elektrolytické vylučovanie kremíka pre fotovoltacké aplikácie** (*Physico-chemical analysis of molten fluoride systems for electrowining of solar grade silicon*)

**Zodpovedný riešiteľ:**

Michal Korenko

**Trvanie projektu:** 1.6.2013 / 31.12.2014  
**Evidenčné číslo projektu:** SK-CN-0029-12  
**Organizácia je** áno  
**koordinátorom projektu:**  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Čína: 1  
**Čerpané financie:**

Dosiahnuté výsledky:

Namerala sa elektrická vodivosť roztavených binárnych a ternárnych zmesí v systéme NaF–AlF<sub>3</sub>–SiO<sub>2</sub> ako aj viskozita binárneho podsystemu Na<sub>3</sub>AlF<sub>6</sub>–SiO<sub>2</sub>. Zistilo sa, že ako vodivosť tak aj viskozita sa s teplotou mení lineárne pri všetkých meraných zmesiach. Určili sa dva koncentračné regióny s odlišným správaním oboch meraných veličín. Prvá reprezentovala koncentračnú oblasť do 10 mól% obsahu SiO<sub>2</sub> v Na<sub>3</sub>AlF<sub>6</sub> a druhá oblasť od 10 do 40 mól% obsahu SiO<sub>2</sub>. V prvej oblasti vodivosť s pridávajúcim množstvom SiO<sub>2</sub> prekvapivo rástla, nad obsahom 10 mól% SiO<sub>2</sub> bol trend opačný a vodivosť dosť značne klesala s narastajúcim obsahom SiO<sub>2</sub>. Pri viskozite už malý prídavok SiO<sub>2</sub> nad jeho koncentráciou 10 mol% v Na<sub>3</sub>AlF<sub>6</sub> mal za následok jej prudké zvýšenie. Tieto javy sa dajú vysvetliť tvorbou amorfnej fázy v koncentračnej oblasti na 10 mol% obsahu SiO<sub>2</sub> v tavenine.

**9.) Potenciálny vplyv draslíka a rubídia na prípravu oxyfluorohlinitanových komplexov v tuhom stave**  
*(Potential influence of potassium and rubidium on the formation of oxofluoroaluminates in solid state)*

**Zodpovedný riešiteľ:** František Šimko  
**Trvanie projektu:** 1.1.2014 / 31.12.2015  
**Evidenčné číslo projektu:** K-FR-2013-NEWPROJECT-3026  
**Organizácia je** áno  
**koordinátorom projektu:**  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Francúzsko: 1  
**Čerpané financie:** APVV: 1375 €

Dosiahnuté výsledky:

Projekt sa zaoberá prípravou a charakterizáciou oxofluorohlinitanových častíc na báze K a Rb. Ide o zlúčeniny so zaujímavými fyzikálno-chemickými vlastnosťami, využiteľnými pre priemyselné aplikácie. Zlúčeniny majú vysokú iónovú vodivosť a zaujímavé optické vlastnosti a ich ostatné zlúčeniny.

Uskutočnil sa výskum materských systémov, KF–Al<sub>2</sub>O<sub>3</sub> a RbF–Al<sub>2</sub>O<sub>3</sub>, v ktorých skúmané zlúčeniny vznikajú. Systémy doteraz študované neboli. Pomocou termickej analýzy sa určili teploty primárnych, sekundárnych a terciálnych kryštalizácií, z ktorých sa zostrojili časti fázových diagramov oboch systémov do koncentrácie 30 mól.% Al<sub>2</sub>O<sub>3</sub>. Pomocou Rtg difrakčnej analýzy a MAS NMR spektroskopie zatuhnutých vzoriek sa identifikovali zloženia jednotlivých fázových polí.

Na lepšiu interpretáciu spektier týchto vzoriek sa pre oba systémy pripravili čisté referenčné látky, ktoré by mohli v danom systéme existovať, konkrétne ?-K<sub>3</sub>AlF<sub>6</sub>, KAlF<sub>4</sub>, KAlO<sub>2</sub>, K<sub>2</sub>Al<sub>2</sub>O<sub>3</sub>F<sub>2</sub>, KAl<sub>6</sub>O<sub>9</sub>.5, Rb<sub>3</sub>AlF<sub>6</sub>, RbAlF<sub>4</sub>, RbAlO<sub>2</sub>, ktoré boli následne charakterizované pomocou MQMAS, REDOR and D-HMQC NMR techník v tuhom stave. Vykonali sa aj výpočty NMR parametrov týchto zložiek použitím CASTEP DFT kódu. Vypočítané chemické posuny a kvadrupólové parametre boli v dobrej zhode s experimentálne pozorovanými hodnotami pre všetky jednotlivé zlúčeniny.

Zistila sa prítomnosť oxofluorohlinitanových častíc v oboch systémoch. Boli pripravené zlúčeniny K<sub>2</sub>Al<sub>2</sub>O<sub>3</sub>F<sub>2</sub> a Rb<sub>2</sub>Al<sub>2</sub>O<sub>3</sub>F<sub>2</sub> reakciou v tuhom stave, pričom zlúčenina Rb<sub>2</sub>Al<sub>2</sub>O<sub>3</sub>F<sub>2</sub> doteraz nikdy syntetizovaná nebola. 85Rb-19F a 27Al-19F 2D D-HMQC-HETCOR NMR experiment, uskutočnený na Rb<sub>2</sub>Al<sub>2</sub>O<sub>3</sub>F<sub>2</sub>, odhalil existenciu dvoch rozlíšiteľných Rb polôh.

**Programy: ERANET**

**10.) Kompozity keramika-grafénové platničky pre využitie v tribologických systémoch pracujúcich vo vodnom prostredí**

**Zodpovedný riešiteľ:** Pavol Šajgalík  
**Trvanie projektu:** 1.9.2014 / 31.8.2017  
**Evidenčné číslo projektu:**  
**Organizácia je** nie  
**koordinátorom projektu:**



**Koordinátor:****Počet spoluriešiteľských inštitúcií:** 0**Čerpané financie:**

Podpora medzinárodnej spolupráce z národných zdrojov: 2800 €

**Projekty národných agentúr****Programy: VEGA****1.) Roztavené fluoridové systémy pre vysokoteplotné aplikácie s potenciálom využitia v energetickom sektore** (*Molten fluoride systems for high temperature applications with potential in energy sector application*)

**Zodpovedný riešiteľ:** Miroslav Boča  
**Trvanie projektu:** 1.1.2012 / 31.12.2015  
**Evidenčné číslo projektu:** 2/0095/12  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** SAV: 22297 €

**Dosiahnuté výsledky:**

V rámci riešenia projektu boli študované rôzne systémy, ktoré majú potenciál uplatnenia v energetickom sektore.

- Štruktúra kryolitového systému  $\text{Na}_3\text{AlF}_6\text{-FeO}$  bola študovaná MAS NMR metódou. Umožnila popísať priebeh procesov prebiehajúcich v systéme.
- Elektrochemické správanie samária bolo študované v tavenine  $\text{LiF-CaF}_2$  metódou cyklickej voltametrie na inertnej wolfrámovej elektróde. Výsledky ukázali, že čisté kovové samárium nemožno získať priamou katodickou redukciou.
- Fázové rovnováhy a hustota systému  $\text{LiCl-NaCl-ZnCl}_2$  boli študované v úzkej koncentračnej oblasti, ale vhodnej na využitie systému pre elektrolytické vylučovanie zinku.
- Štúdium fázových rovnováh systému  $\text{K}_2\text{TaF}_7\text{-K}_2\text{ZrF}_6$  ukázalo prítomnosť tuhých roztokov v sledovanej sústave. Na základe výpočtov parametra kompresibility môžeme uvažovať o objemovej kontrakcii v systéme.
- Pre sústavu  $(\text{LiF-NaF-KF})_{\text{eut-Na}_7\text{Zr}_6\text{F}_{31}}$  boli zmerané viaceré fyzikálno-chemické vlastnosti. Fázový diagram sústavy je tvorený viacerými kryštalizačnými poliami. Difrakčné záznamy z rtg. práškovej analýzy ukázali prítomnosť viacerých zlúčenín. Bola identifikovaná objemová expanzia v systéme a pre túto sústavu boli namerané hodnoty viskozity a povrchového napätia.

Výsledky boli publikované v nasledovných prácach:

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**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: 11582 €

Dosiahnuté výsledky:

Na základe výsledkov z predchádzajúceho obdobia sme pokračovali v optimalizácii podmienok prípravy hybridných materiálov na báze vrstevnatý kremičitan a organické farbivo (v prevažnej miere porfyrínové) s vylepšenými fluorescenčnými vlastnosťami. Cenné výsledky boli dosiahnuté pri použití polyméru a alkylamónnych kationov, ktoré potláčajú nežiaducu agregáciu farbív, čo má zásadný vplyv na výsledné fluorescenčné vlastnosti materiálov. Podarilo sa ireverzibilne naadsorbovať polymérne farbivo, na báze rhodamínu b a polyetylénglykolu do smektitov, pričom bola pozorovaná molekulová agregácia a spektrálne zhášanie pre pripravené hybridné materiály na báze montmorillonitu „Kunipia F“, vyššia aktivita bola pozorovaná pri filmoch na báze saponitu. Práce pokračujú na meraní kvantových výťažkov pripravených hybridných materiálov.

**3.) Keramické vrstvy pripravené z organokremičitých prekursorov pre vysokoteplotnú protikoróziu 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: 2758 €

Dosiahnuté výsledky:

V rámci projektu sa vyseletovali vhodné typy organokremičitých prekursorov slúžiacie na prípravu keramických povlakov na kovových substrátoch, ako aj ytrito-hlinito-kremičitanové sklá slúžiacie ako pasívne plniva pre zníženie zmraštenia polymérov počas ich konverzie na keramiku. Plameňovou syntézou sa pripravili 4 rôzne zloženia týchto skiel vo forme sklených mikroguličiek, ktoré sa použili ako plnivo do polymérnej matrice. Celkovo sa pripravilo 25 rôznych typov povlakov na kovových substrátoch, pričom sa optimalizovali podmienky prípravy a zloženie povlakov (teplota a čas pyrolýzy, objemová frakcia skleného plniva). Vrstvy sa charakterizovali z hľadiska ich mikroštruktúry a fázového zloženia, ako aj adhézie na kovových substrátoch.

**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: 10915 €

Dosiahnuté výsledky:

V rámci systému kompozitného SiC-CNT materiálu sa úspešne podarilo pripraviť práškový prekursor. Ako katalyzátor pre tvorbu uhlíkových nanotrubiiek bolo použité železo. Homogénnu distribúciu nanočastíc Fe na povrchu SiC sme dosiahli procesom mletia SiC prášku za použitia oceľových mlecích telies, vyzrážaním koloidných častíc z vodného roztoku vo forme hematitu ( $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>), alebo prídavkom dusičnanu železitého a jeho následnou kalcináciou. Podarilo sa stanoviť

optimálne podmienky chemickej depozície acetylénu a tvorby CNT (teplota, čas, prietok  $C_2H_2$ , druh a množstvo katalyzátora, atď.) na povrchu SiC prášku. Pripravený kompozitný SiC-CNT prášok sa podarilo zhotoviť na úroveň od 85% do 95% v závislosti od prídavku CNT. TEM analýzou sme dokázali prítomnosť CNT v štruktúre kompozitu napriek vysokej teplote spekania. Do budúcnosti je potrebné verifikovať tieto výsledky Ramanovou spektroskopiou. Získali sme súbor zaujímavých výsledkov z oblasti prípravy CNT metódou CVD, ktoré vznikajú a rastú in situ priamo na povrchu SiC matrice. Máme ocharakterizovaný vplyv spôsobu aplikácie kovového katalyzátora na substrát ako aj vplyv jeho množstva, veľkosti a morfológie.

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### 5.) Štruktúra a vlastnosti oxidových skiel – molekulová dynamika, termodynamické modely, kryštalizácia, vibračné a impedančné spektrá (*Structure and properties of oxide glasses – molecular dynamics, thermodynamic models, crystallization, vibrational and impedance spectroscopy*)

<b>Zodpovedný riešiteľ:</b>	Mária Chromčíková
<b>Trvanie projektu:</b>	1.1.2012 / 31.12.2015
<b>Evidenčné číslo projektu:</b>	1/0006/12
<b>Organizácia je koordinátorom projektu:</b>	nie
<b>Koordinátor:</b>	Trenčianska univerzita Alexandra Dubčeka
<b>Počet spoluriešiteľských inštitúcií:</b>	0
<b>Čerpané financie:</b>	SAV: 1111 €

#### Dosiahnuté výsledky:

Riešenie pokračovalo najmä v oblasti tvorby termodynamických modelov fosforečnanových a chalkogenidových skiel a interpretácie Ramanových spektier skúmaných skiel založenej na prepojení vyspelých štatistických metód (Multivariate Curve resolution) a navrhnutých termodynamických modelov.

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### 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** jenie  
**koordinátorom projektu:**  
**Koordinátor:**  
**Počet spoluriešiteľských**  
**inštitúcií:**  
**Čerpané financie:** SAV: 2814 €

Dosiahnuté výsledky:

V rámci projektu sa detailne skúmal vplyv chemického a fázového zloženia na luminiscenčné vlastnosti anorganických fosforov na báze hlinitanov vzácnych zemín, vrátane fosforov kodopovaných viacerými oxidmi kovov vzácnych zemín súčasťou s cieľom dosiahnuť up-konverziu žiarenia a emisiu viditeľného žiarenia pri excitácii infračerveným zdrojom.

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2. GALUSEK, Dušan - PRNOVÁ Anna - KLEMENT, Robert - HALIAKOVÁ A. - MICHÁLKOVÁ Monika. Luminescence properties of aluminate and aluminosilicate glasses, p. 68 In: Book of Abstracts, 11th Conference on Solid State Chemistry, 6-11 July 2014, Trenčianske Teplice, Slovak Republic, ISBN 978-80-971648-0-5
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5. PRNOVÁ, Anna - HALIAKOVÁ, Anna - PAVLÍK, Viliam - BODIŠOVÁ, Katarína - KLEMENT, Róbert - BRUNEEL, E. - GALUSEK, Dušan. Thermal behaviour, phase development and viscous flow sintering of lanthanum-aluminate glasses. In 12th ESG conference, Parma, Italy, 21-24 september 2014 : book of abstracts. - Italy, 2014, p. 139.
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**7.) Svetlo emitujúce luminofóry na báze ternárnych nitridov a oxynitridov kremíka** (*Ternary silicon nitride and oxynitride-based phosphors*)

**Zodpovedný riešiteľ:** Zoltán Lenčoš  
**Trvanie projektu:** 1.1.2014 / 31.12.2017  
**Evidenčné číslo projektu:** 2/0112/14  
**Organizácia je** áno  
**koordinátorom projektu:**  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských** 0  
**inštitúcií:**  
**Čerpané financie:** SAV: 17794 €

Dosiahnuté výsledky:

Projekt je zameraný prípravou troch fotoluminiscenčných systémov na báze nitridov (MgSiN<sub>2</sub>, LaSi<sub>3</sub>N<sub>5</sub>) a oxynitridov (SiAlON)kremíka. Ternárne nitridy boli pripravené nitridáciou východiskovej zmesi práškov Si, Mg<sub>2</sub>Si alebo LaSi a Si<sub>3</sub>N<sub>4</sub>. SiAlONy boli pripravené z polymérneho prekursoru na báze polysilsequioxánu a alumatránu. Samotná príprava pozostávala zo zosieťovania a pyrolýzy polyméru a následnej karbotermockej redukcie a nitridácie. 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>. Optimalizáciou teplotného a plynového režimu syntézy luminofórov ako aj reguláciou obsahu dopantov (Eu, Sm, Ce) sa podarilo pripraviť keramické luminiscenčné materiály. Ukázalo sa, že dôležitým krokom je okrem samotnej prípravy aj následné žihanie luminofórov. Optimálna doba žihania pre všetky materiály sú 4 hodiny pri teplote 1650°C pre systémy na báze MgSiN<sub>2</sub> a SiAlONov, pre luminofóry na báze LaSi<sub>3</sub>N<sub>5</sub> je optimálna teplota žihania 1850°C. Merania fotoluminiscenčných spektier ukázali že:

- MgSiN<sub>2</sub>:Eu luminofor emituje žiarenie v červenej oblasti
- MgSiN<sub>2</sub>:Ce luminofor emituje žiarenie v zelenej oblasti
- LaSi<sub>3</sub>N<sub>5</sub>:Eu luminofor emituje žiarenie v zelenej oblasti
- LaSi<sub>3</sub>N<sub>5</sub>:Sm luminofor emituje žiarenie v oranžovej oblasti
- LaSi<sub>3</sub>N<sub>5</sub>:Ce luminofor emituje žiarenie vo fialovo-modrej oblasti

- SiAlON:Eu luminofor emituje v oranžovej oblasti viditeľného svetla
- SiHfON:Eu luminofor emituje v zeleno-žltej oblasti viditeľného svetla
- SiLuON:Eu luminofor emituje v zelenej oblasti viditeľného svetla

Bolo optimalizované aj množstvo dopantu v rozmedzí 1 – 6 mol%.

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3. IBRAHIM, Ismail - LENČEŠ, Zoltán - ŠAJGALÍK, Pavol – BENCO Ľ – MARSMAN M. Electronic structure and energy level schemes of RE<sub>3</sub>+:LaSi<sub>3</sub>N<sub>5</sub> and RE<sub>2</sub>+:LaSi<sub>3</sub>N<sub>5</sub>-xOx phosphors (RE= Ce, Pr, Nd, Pm, Sm, Eu) from first principles,” Journal of Physical Chemistry, Manuscript ID: jp-2014-10583z.
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9. LENČEŠ, Zoltán - HRABALOVÁ, Monika - IBRAHIM, Ismail - BENCO, Ľubomír - ŠAJGALÍK, Pavol. Influence of lanthanoid dopant and N/O substitution on the electronic structure and luminescent properties of silicon oxynitrid phosphors. In ISNT 2014. 8th international symposium on nitrides in conjunction with 7th international workshop on spinel nitrides and related materials and Marie Curie ITN 7th framework program FUNEA, Wildbad Kreuth, Germany, august 31st - september 5th, 2014: conference program with abstracts. Technische Universität Darmstadt, 2014, p. 53.
10. IBRAHIM, Ismail - LENČEŠ, Zoltán - BENCO, Ľubomír - ŠAJGALÍK, Pavol. Ab-initio study of electronic structure and band gap of rare earth-doped LaSi<sub>3</sub>N<sub>5</sub> : FUNEA talk. In ISNT 2014. 8th international symposium on nitrides in conjunction with 7th international workshop on spinel nitrides and related materials and Marie Curie ITN 7th framework program FUNEA, Wildbad Kreuth, Germany, august 31st - september 5th, conference program with abstracts. Technische Universität Darmstadt, 2014, p. 82.
11. LENČEŠ, Zoltán - HRABALOVÁ, Monika - IBRAHIM, Ismail - BENCO, Ľubomír - ŠAJGALÍK, Pavol. Influence of rare earth dopant and N/O substitution on the electronic structure and luminescent properties of oxynitride phosphors. In ISSNOX4. 4th international symposium on SiAlONs and non-oxides, may 25-28, 2014, Nagahama Royal Hotel, Shiga, Japan : program & abstracts. Japan, 2014, p. 21.28, 2014,
12. LENČEŠ, Zoltán - HRABALOVÁ, Monika - IBRAHIM, Ismail - BENCO, Ľubomír - ŠAJGALÍK, Pavol. Influence of rare earth dopant and N/O substitution on the electronic structure and luminescent properties of silicon oxynitride phosphors. In SSC 2014. 11th conference on solid state chemistry, Trenčianske Teplice, Slovak Republic, 6-11 july 2014: book of abstracts. 2014, p. 56.

#### 8.) **Příprava a vlastnosti nových typů organoílův pre polymérne a environmentálne aplikácie**

*(Preparation and properties of novel organoclays for polymer and environmental applications)*

<b>Zodpovedný riešiteľ:</b>	Jana Madejová
<b>Trvanie projektu:</b>	1.1.2013 / 31.12.2016
<b>Evidenčné číslo projektu:</b>	2/0132/13
<b>Organizácia je koordinátorom projektu:</b>	áno
<b>Koordinátor:</b>	Ústav anorganickej chémie SAV
<b>Počet spoluriešiteľských inštitúcií:</b>	0
<b>Čerpané financie:</b>	SAV: 19820 €

Dosiahnuté výsledky:

Riešenie projektu prebiehalo v súlade so stanoveným harmonogramom. Dosiahnuté výsledky boli publikované a/alebo zaslané do CC časopisov a prezentované na medzinárodných konferenciách:

1. BRTÁŇOVÁ, Anna - MADEJOVÁ, Jana - BIZOVSKÁ, Valéria - KOMADEL, Peter. Utilization of near infrared spectroscopy for studying solvation properties of Cu-montmorillonites. In Spectrochimica Acta Part A - Molecular and Biomolecular Spectroscopy, 2014, vol. 123, p. 385-391.
2. HOLEŠOVÁ, Sylva - VALÁŠKOVÁ, Marta - HLAVÁČ, Dominik - MADEJOVÁ, Jana - SAMLÍKOVÁ, Magda - TOKARSKÝ, Jonáš - PAZDZIORA, Erich. Antibacterial kaolinite/urea/chlorhexidine nanocomposites: Experiment and molecular modelling. In Applied Surface Science, 2014, vol. 305, p. 783-791.
3. MADEJOVÁ, Jana - PÁLKOVÁ, Helena - JANKOVIČ, Ľuboš. Near-infrared study of the interaction of pyridine with acid-treated montmorillonite. In Vibrational Spectroscopy, 2015, vol. 76, p. 22-30.
4. PÁLKOVÁ, Helena - HRONSKÝ, Viktor - BIZOVSKÁ, Valéria - MADEJOVÁ, Jana. Spectroscopic study of water adsorption on Li<sup>+</sup>, TMA<sup>+</sup> and HDTMA<sup>+</sup>-exchanged montmorillonite. Zaslané do Spectrochimica Acta Part A - Molecular and Biomolecular Spectroscopy.

Vth International Workshop on Layered Materials, 27-29 August 2014, Mulhouse, France

5. BIZOVSKÁ, Valéria - MADEJOVÁ, Jana - JANKOVIČ, Ľuboš - BRENDLÉ, Jocelyne. Hydration properties of montmorillonite saturated with dioctylammonium cation. In IWLM Vth International Workshop on Layered Materials, 27-29 August 2014, Mulhouse, France
6. MADEJOVÁ, Jana - SEKERÁKOVÁ, Ľudmila - JANKOVIČ, Ľuboš. Near-infrared spectroscopy for organoclays characterization. IWLM Vth International Workshop on Layered Materials, 27-29 August 2014, Mulhouse, France
7. PÁLKOVÁ, Helena - JANKOVIČ, Ľuboš - ZIMOWSKA, Malgorzata - SULIKOWSKI, Bogdan - SERWICKA, Ewa M - MADEJOVÁ, Characterization of the acid treated clays modified with quaternary phosphonium and ammonium cations, In: IWLM Vth International Workshop on Layered Materials, 27-29 August 2014, Mulhouse, France

7th Mid-European Clay Conference, Dresden, Germany, 16-19 september 2014

8. BIZOVSKÁ, Valéria - MADEJOVÁ, Jana - JANKOVIČ, Ľuboš. Hydration properties and interlayer structure of di- and tetraoctylammonium-montmorillonite. In MECC2014. 7th mid-european clay conference, Dresden, Germany, 16-19 september 2014 : programme and abstractbook. - Dresden, Germany : Deutsche Ton- und Tonmineralgruppe e.V. (DTTG), 2014, p. 101.
9. BRTÁŇOVÁ, Anna - VALKO, M. - KOMADEL, Peter. Interaction of selected organic molecules with immobilized Cu<sup>2+</sup> cations in montmorillonite. In MECC2014. 7th mid-european clay conference, Dresden, Germany, 16-19 september 2014 : programme and abstractbook. - Dresden, Germany : Deutsche Ton- und Tonmineralgruppe e.V. (DTTG), 2014, p. 104.
10. MADEJOVÁ, Jana - PÁLKOVÁ, Helena - JANKOVIČ, Ľuboš. Near-infrared study of pyridine adsorption on acid-treated montmorillonite. In MECC2014. 7th mid-european clay conference, Dresden, Germany, 16-19 september 2014 : programme and abstractbook. - Dresden, Germany : Deutsche Ton- und Tonmineralgruppe e.V. (DTTG), 2014, p. 97.
11. PÁLKOVÁ, Helena - HRONSKÝ, Viktor - BIZOVSKÁ, Valéria - MADEJOVÁ, Jana. Adsorption of water to organo-montmorillonite - spectroscopic study. In MECC2014. 7th mid-european clay conference, Dresden, Germany, 16-19 september 2014 : programme and abstractbook. - Dresden, Germany : Deutsche Ton- und Tonmineralgruppe e.V. (DTTG), 2014, p. 95.
12. PETRA, Lukáš - BILLIK, Peter - KOMADEL, Peter. Adsorption of amino acids on ground montmorillonite. In MECC2014. 7th mid-european clay conference, Dresden, Germany, 16-19 september 2014 : programme and abstractbook. - Dresden, Germany : Deutsche Ton- und Tonmineralgruppe e.V. (DTTG), 2014, p. 99.

11th conference on solid state chemistry, Trenčianske Teplice, Slovak Republic, 6-11 july 2014

13. PETRA, Lukáš - BILLIK, Peter - KOMADEL, Peter. Effect of dry grinding on adsorption properties of montmorillonite. In SSC 2014. 11th conference on solid state chemistry, Trenčianske Teplice, Slovak Republic, 6-11 july 2014 : book of abstracts. - Slovak Republic, 2014, p. 160. ISBN 978-80-971648-0-5.

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

<b>Zodpovedný riešiteľ:</b>	Oľga Malkin
<b>Trvanie projektu:</b>	1.1.2013 / 31.12.2016
<b>Evidenčné číslo projektu:</b>	2/0148/13
<b>Organizácia je koordinátorom projektu:</b>	áno
<b>Koordinátor:</b>	Ústav anorganickej chémie SAV
<b>Počet spoluriešiteľských inštitúcií:</b>	0

**Čerpané financie:**

SAV: 16178 €

Dosiahnuté výsledky:

HRDÁ, Marcela - KULICH, Tomáš - REPISKÝ, Michal - NOGA, Jozef - MALKINA, Oľga - MALKIN, Vladimír. Implementation of the diagonalization-free algorithm in the self-consistent field procedure within the four-component relativistic scheme. In Journal of Computational Chemistry, 2014, vol. 35, no. 23, p. 1725-1737.

**10.) Štúdium vplyvu obsahu vody v slinkových mineráloch na ich štruktúrne, fyzikálno-chemické a mechanické vlastnosti - modelový a experimentálny prístup** (*The influence of the water content in cementitious minerals on their structural, physical, chemical and mechanical properties – Model and experimental study*)

**Zodpovedný riešiteľ:** Eva Scholtzová  
**Trvanie projektu:** 1.1.2012 / 31.12.2014  
**Evidenčné číslo projektu:** 2/0083/12  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** SAV: 3295 €

Dosiahnuté výsledky:

Štruktúra ettringitu, hydratovanej fázy slinkových minerálov, sa stanovila experimentálne a urobila sa detailná analýza vodíkových väzieb ako aj experimentálne nameraného IČ spektra pomocou DFT metódy. Okem toho sa merali termodynamické charakteristiky ettringitu a thaumazitu ako aj cementových vzoriek. DFT metóda sa použila aj pri modelovom štúdiu rozkladu thaumazitu. Za najvýznamnejší výsledok sa dá pokladať určenie elastických konštánt thaumazitu Brillouinovou metódou ako aj ich výpočet pomocou DFT metódy.

**11.) Štúdium štruktúry a dynamiky vodíkových väzieb v tuhých látkach difrakčnými metódami kvantovej chémie a neelastickým rozptylom neutrónov** (*Structure and dynamics of hydrogen bonds in solids by diffraction methods, quantum chemistry and inelastic neutron spectroscopy (INS)*)

**Zodpovedný riešiteľ:** Ľubomír Smrček  
**Trvanie projektu:** 1.1.2012 / 31.1.2015  
**Evidenčné číslo projektu:** 2/0131/12  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** SAV: 2044 €

Dosiahnuté výsledky:

Zistili sme, že niektoré fyzikálne vlastnosti borohydridov perovskitového typu možno ovplyvniť aj slabými interakciami H...H a nielen voľbou katiónov.

## Publikácia:

SCHOUWINK, Pascal - LEY, Morten Brix - TISSOT, Antoine - HAGEMANN, Hans - JENSEN, Torben R. - SMRČOK, Ľubomír - ČERNÝ, Radovan. Structure and properties of complex hydride perovskite materials. In Nature Communications, 2014, vol. 5, p. 5706-1-5706-10.

**12.) 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: 11582 €

Dosiahnuté výsledky:

Výskum sa zaoberal fyzikálno-chemickou a termo-chemickou analýzou KF-AlF<sub>3</sub> elektrolytov s nízkou teplotou topenia, použiteľných pri elektrochemickej výrobe hliníka. Zistilo sa, ktorých využitie v procese prípravy hliníka vzrástlo s vývojom aplikácie tzv. „inertných“ katód do procesu výroby. Uskutočnila sa fyzikálna (meranie hustoty) a štruktúrna analýza systémov KF-AlF<sub>3</sub> s rôznym pomerom KF ku AlF<sub>3</sub> a s rôznym prídavkom Al<sub>2</sub>O<sub>3</sub>, ako ďalšieho reakčného činidla. Analyzovali sa procesy, prebiehajúce pri rozpúšťaní Al<sub>2</sub>O<sub>3</sub> v týchto zmesiach s rôznym pomerom KF ku AlF<sub>3</sub>. Realizovalo sa to pomocou analýzy zatuhnutých vzoriek jednotlivých zmesí pomocou Rtg difrakčnej analýzy a MAS NMR spektroskopie. Zároveň sa komplexne charakterizoval aj podsystém danej ternárnej sústavy, a to KF-Al<sub>2</sub>O<sub>3</sub>. Uskutočnila sa termálna analýza, kde sa určili teploty primárnych, sekundárnych a terciálnych kryštalizácií, z ktorých sa zostrojili časti fázových diagramov oboch systémov do koncentrácie 30 mól.% Al<sub>2</sub>O<sub>3</sub>. Pomocou Rtg difrakčnej analýzy a MAS NMR spektroskopie zatuhnutých vzoriek sa identifikovali zloženia jednotlivých fázových polí.

Tiež sa sledovali korózne vlastnosti katódového materiálu na báze TiB<sub>2</sub> v elektrolyte 1.5KF/AlF<sub>3</sub> s prídavkom 5 mól.% Al<sub>2</sub>O<sub>3</sub> elektrolytoch. Materiál vynikajúco odolával koróznemu prostrediu. Po 100 hodinovom experimente nevykazoval významné vizuálne poškodenie, čo je zhodné s údajmi získanými z literatúry. Na vzorkách bola sledovaná zmena hmotnosti pred a po korózných testoch. Pozoroval sa nárast hmotnosti, ktorý môže byť pripísaný reakcii materiálu s taveninou za vzniku koróznych produktov, usadených v póroch vzorky. Priemerný nárast hmotností na všetkých vzorkách bol približne 4%. Povrch vzoriek sa analyzoval skenovacím elektrónovým mikroskopom s využitím EDX analýzy. Výraznejšie korózne napadnutie sa pozorovalo až na vzorke po 100 hodinovej expozícii v časti vzorky ponorenej v tavenine. Korózia v tomto mieste mala škvrnitý charakter. Časti vzoriek v oblasti na rozhraní medzi hladinou taveniny a atmosférou, ako aj nad ňou neboli výraznejšie napadnuté.

### 13.) Štúdium mechanizmu korózie materiálov používaných pri tavení priemyselne vyrábaných skiel (*Study of the mechanism of corrosion of materials used in a melting of industrially produced glasses*)

<b>Zodpovedný riešiteľ:</b>	Peter Šimurka
<b>Trvanie projektu:</b>	1.1.2012 / 31.12.2015
<b>Evidenčné číslo projektu:</b>	2/0165/12
<b>Organizácia je koordinátorom projektu:</b>	áno
<b>Koordinátor:</b>	Ústav anorganickej chémie SAV
<b>Počet spoluriešiteľských inštitúcií:</b>	0
<b>Čerpané financie:</b>	SAV: 4136 €

#### Dosiahnuté výsledky:

V spolupráci s SSV Murano boli zrealizované laboratórne korózne testy žiaromateriálov typu Zirkosit a zmerané koncentračné profily sklenej fázy žiaromateriálu s obsahom 32 % ZrO<sub>2</sub>. Po doplnení databázy chemického zloženia šlír boli spracované výsledky prezentované na medzinárodných konferenciách vo forme prednášok a vývesok.

## Programy: APVV

### 14.) Anorganické fluoridové taveniny - komplexné štúdium spektrálnych, difrakčných, fyzikálnochemických, termodynamických a štruktúrnych charakteristík (*Inorganic fluoride melts - the complex study of spectral, diffraction, physicochemical, thermodynamical and structural characteristics*)

<b>Zodpovedný riešiteľ:</b>	Miroslav Boča
<b>Trvanie projektu:</b>	1.5.2011 / 31.10.2014
<b>Evidenčné číslo projektu:</b>	APVV-0460-10
<b>Organizácia je koordinátorom projektu:</b>	áno
<b>Koordinátor:</b>	Ústav anorganickej chémie SAV
<b>Počet spoluriešiteľských inštitúcií:</b>	0
<b>Čerpané financie:</b>	APVV: 27777 €

#### Dosiahnuté výsledky:

- Realizovala sa rtg. fázová analýza rôznych zatuhnutých fluoridových zmesí s prídavkom fluoridu uranítoho pre jej potenciál využitia v procese prepracovania aktinoidov. Zistil sa dôležitý vplyv prítomnosti stôp kyslíka na tvorbu urániových častíc v procese topenia a následného chladenia.
- Štruktúra kryolitového systému Na<sub>3</sub>AlF<sub>6</sub>-FeO sa študovala MAS NMR metódou, ktorá umožnila popísať priebeh procesov prebiehajúcich v systéme.
- Elektrochemické správanie samária sa študovalo v tavenine LiF-CaF<sub>2</sub> metódou cyklickej voltametrie na inertnej wolfrámovej elektróde. Výsledky ukázali, že čisté kovové samárium nemožno získať priamou katodickou redukciou.
- Fázové rovnováhy a hustota systému LiCl-NaCl-ZnCl<sub>2</sub> sa študovali v úzkej koncentračnej oblasti, ale vhodnej na využitie systému pre elektrolytické vylučovanie zinku.
- Štúdium fázových rovnováh systému K<sub>2</sub>TaF<sub>7</sub>-K<sub>2</sub>ZrF<sub>6</sub> ukázalo prítomnosť tuhých roztokov v sledovanej sústave. Na



základe výpočtov parametra kompresibility môžeme uvažovať o objemovej kontrakcii v systéme.

- Pre sústavu (LiF-NaF-KF)eut-Na<sub>7</sub>Zr<sub>6</sub>F<sub>31</sub> boli zamerané viaceré fyzikálno-chemické vlastnosti. Fázový diagram sústavy je tvorený viacerými kryštalizačnými poliami. Difrakčné záznamy z rtg. práškovej analýzy ukázali prítomnosť viacerých zlúčenín. Bola identifikovaná objemová expanzia v systéme a pre túto sústavu boli namerané hodnoty viskozity a povrchového napätia.

Výsledky boli publikované v nasledovných prácach:

1. BARBORÍK, Peter - VASKOVÁ, Zuzana - BOČA, Miroslav - PRIŠČÁK, Jozef. Physicochemical properties of the system (LiF + NaF + KF(eut) + Na<sub>7</sub>Zr<sub>6</sub>F<sub>31</sub>): Phase equilibria, density and volume properties, viscosity and surface tension. In Journal of Chemical Thermodynamics, 2014, vol. 76, p. 145-151.
  2. KORENKO, Michal - STULOV, Y.V. - KUZNETSOV, S.A. - AMBROVÁ, M. - KUBÍKOVÁ, Blanka. Electrochemical investigation of the redox couple Sm(III)/Sm(II) on a tungsten electrode in molten LiF-CaF<sub>2</sub>-SmF<sub>3</sub>. In Journal of radioanalytical and nuclear chemistry, 2014, vol. 301, no. 2, p. 589-595.
  3. KORENKO, Michal - STRAKA, Martin - UHLÍŘ, J. - SZATMÁRY, Lórant - AMBROVÁ, M. - ŠIMURDA, Michal. Phase analysis of the solidified KF-(LiF-NaF-UF<sub>4</sub>)-ZrF<sub>4</sub> molten electrolytes for the electrowinning of uranium. In Journal of radioanalytical and nuclear chemistry, 2014, vol. 302, no. 1, p. 549-554.
  4. KUBÍKOVÁ, Blanka - MLYNÁRIKOVÁ, Jarmila - VASKOVÁ, Zuzana - JEŘÁBKOVÁ, Petra - BOČA, Miroslav. Phase analysis and density of the system K<sub>2</sub>ZrF<sub>6</sub>-K<sub>2</sub>TaF<sub>7</sub>. In Monatshefte für Chemie, 2014, vol. 145, p. 1247-1252.
  5. KUBÍKOVÁ, Blanka - DANIELIK, Vladimír - ROBERT, Eric - MLYNÁRIKOVÁ, Jarmila - BOČA, Miroslav. Phase equilibrium and density investigation of the molten LiCl plus NaCl + ZnCl<sub>2</sub> system. In Journal of Chemical and Engineering Data, 2014, vol. 59, no. 8, p. 2408-2412.
- ŠIMKO, František - RAKHMATULLIN, Aydar - BESSADA, Catherine - BOČA, Miroslav. MAS NMR study of the solidified cryolite systems with FeO addition. In Journal of Fluorine Chemistry, 2014, vol. 165, p. 116-122.

## 15.) Fotoaktívne hybridné nanomateriály s luminiscenčnými a antimikrobiálnymi vlastnosťami.

(Photoactive hybrid nanomaterials with luminescent and antimicrobial properties. )

**Zodpovedný riešiteľ:** Juraj Bujdák  
**Trvanie projektu:** 1.7.2012 / 31.12.2015  
**Evidenčné číslo projektu:** APVV-0291-11  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 2 - Slovensko: 2  
**Čerpané financie:** APVV: 16970 €

### Dosiahnuté výsledky:

Podarilo sa pripraviť nové typy hybridných nanomateriálov na báze nosičov vrstevnatých kremičitanov a molekúl organických farbív. Pomocou chemisorpcie reaktívneho farbiva sa pripravil hybrid kaolinitu s interkalovanými molekulami rodamínu s výraznými luminiscenčnými vlastnosťami. Realizovali sa syntézy a interkalácie fluorescenčných polymérov vo filmoch smektitov. Vypracovali sa metodiky chemometrie pre detailnú analýzu spektier farbív. Pomocou týchto metód sa podarilo identifikovať vplyv rôznych parametrov na vznik a premeny molekulových agregátov farbív, s nimi súvisiacej fotoaktivity a luminiscenčných vlastností. Chemometrické metódy sa využili pri analýze vzniku tenkých filmov typu „layer-by-layer assemblies“, molekulovej agregácie a fotofyzikálnych vlastností týchto filmov. Pripravili sa sústavy s perspektívnymi antimikrobiálnymi vlastnosťami.

## 16.) Mechanizmy korózie a mikromechanické vlastnosti dentálnych materiálov (Mechanisms of corrosion and micromechanical properties of dental materials)

**Zodpovedný riešiteľ:** Dušan Galusek  
**Trvanie projektu:** 1.7.2012 / 31.12.2015  
**Evidenčné číslo projektu:** APVV-0218-11  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 3 - Slovensko: 3  
**Čerpané financie:** APVV: 17299 €

### Dosiahnuté výsledky:

V rámci projektu sa skúmal vplyv kyslých médií na mikromechanické vlastnosti a odolnosť voči oteru ľudských zubov a sklokeramických dentálnych materiálov na báze leucitu a disilikátu lítneho. U ľudských zubov sa zistil zásadný vplyv expozície voči kyslým médiám (kyselina citrónová, bežné kyslé nápoje) na zníženie tvrdosti a odolnosti voči oteru.

Zhoršenie vlastností, ktorému je možné predchádzať, alebo následne do istej miery eliminovať aplikáciou fluoridačných prípravkov, ktoré zabezpečujú zabudovanie fluóru do štruktúry zubnej skloviny. Sklokeramické syntetické dentálne materiály sú o niečo odolnejšie, napriek tomu však pri expozícii rádovo niekoľko hodín voči bežným kyslým médiám (nápojom) pri teplotách simulujúcich podmienky v ústnej dutine dochádza k merateľnému zníženiu mikrotvrdosti a odolnosti voči šmykovému oteru. Navrhli sa tiež mechanizmy korózie dentálnych materiálov.

Publikácie, konferencie:

1. KAŠIAROVÁ, Monika - GALUSKOVÁ, Dagmar - PRAMUKOVÁ, Zuzana - TATARKO, Peter - GAALOVÁ, Petra - GALUSEK, Dušan. Corrosion behavior of human teeth measured by nanoindentation method. In Key Engineering Materials, 2014, vol. 606, p. 145-148.
2. GALUSKOVÁ, Dagmar - KAŠIAROVÁ, Monika - HNATKO, Miroslav - GALUSEK, Dušan - DUSZA, Ján - ŠAJGALÍK, Pavol. Hydrothermal corrosion and flexural strength of Si<sub>3</sub>N<sub>4</sub>-based ceramics. In Corrosion Science, 2014, vol. 85, p. 94-100.
3. GALUSKOVÁ, Dagmar - GALUSEK, Dušan - ŠAJGALÍK, Pavol. Evaluation of corrosion of engineering ceramics by atomic emission spectrometry in inductively coupled plasma. In Ceramics-Silikáty, 2014, vol. 58, no. 1, p. 39-45.
4. GALUSKOVÁ, Dagmar - GAALOVÁ, Petra - GALUSEK, Dušan. Quantitative analysis of phosphorus with atomic emission spectroscopy for evaluation of chemical durability of biological apatite. In SSC 2014. 11th conference on solid state chemistry, Trenčianske Teplice, Slovak Republic, 6-11 July 2014 : book of abstracts. - Slovak Republic, 2014, p. 100.
5. Galusková D., Gaalová P., Galusek D., Kováč J., Kováč D., Chemical stability and corrosion of dental glass-ceramics in citric acid, p. 140 in: Book of Abstracts, 12th ESG Conference, 21-24 September 2014, Parma, Italy
6. GAALOVÁ, Petra - GALUSKOVÁ, Dagmar - ŠVANČÁRKOVÁ, Anna - BALKO, Ján - GALUSEK, Dušan. Vplyv korózie v kyslom prostredí na mikromechanické vlastnosti a odolnosti voči opotrebeniu ľudskej zubnej skloviny. In Príprava a vlastnosti progresívnych keramických materiálov : Odborný seminár. Zborník rozšírených abstraktov. Terchová-Biely Potok, 26.-28.11.2014. Ed. D. Galusková. Trenčín: Trenčianska univerzita A. Dubčeka, 2014, s. 6-7.
7. ŠVANČÁRKOVÁ, Anna - GALUSKOVÁ, Dagmar - GAALOVÁ, Petra - BALKO, Ján - GALUSEK, Dušan. Vplyv korózie v kyslom prostredí na mikromechanické vlastnosti a odolnosti voči opotrebeniu leucitovej dentálnej keramiky. In Príprava a vlastnosti progresívnych keramických materiálov : Odborný seminár. Zborník rozšírených abstraktov. Terchová-Biely Potok, 26.-28.11.2014. Ed. D. Galusková. - Trenčín : Trenčianska univerzita A. Dubčeka, 2014, s. 66-68.

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

<b>Zodpovedný riešiteľ:</b>	Pavol Hvizdoš
<b>Zodpovedný riešiteľ v organizácii SAV:</b>	Pavol Šajgalík
<b>Trvanie projektu:</b>	1.10.2013 / 30.9.2017
<b>Evidenčné číslo projektu:</b>	APVV-0108-12
<b>Organizácia je koordinátorom projektu:</b>	nie
<b>Koordinátor:</b>	
<b>Počet spoluriešiteľských inštitúcií:</b>	1 - Slovensko: 1
<b>Čerpané financie:</b>	APVV: 11928 €

### Dosiahnuté výsledky:

V rámci tejto etapy sa pokračovalo v modelových experimentoch v systéme Y<sub>2</sub>O<sub>3</sub> – SiO<sub>2</sub> – Ti – NbC. Prvé výsledky v rámci prípravy hutných keramických telies na báze SiC s rôznym prídavkom vodivej fázy s označením N50 možno zhrnúť do nasledujúcich bodov:

- Fázové zloženie vodivej fázy (s označením N50) sa pri teplote spekania kompozitu (1820°C) výrazne nemení. Vo vzorkách boli okrem nevodivých oxidických fáz (Y<sub>2</sub>SiO<sub>5</sub>, Y<sub>2</sub>O<sub>3</sub> a Y<sub>x</sub>Ti<sub>1-x</sub>O<sub>1-0,5x</sub>) zastúpené aj vodivé fázy na báze silicidov (Ti<sub>5</sub>Si<sub>3</sub>, Nb<sub>5</sub>Si<sub>3</sub>) a karbidov (NbC, TiC), čo bolo predpokladom ich ďalšieho využitia pri príprave vodivého kompozitu. Vodivá fáza pri teplote spekania (1820°C) dostatočne zmáča povrch tuhej fázy (SiC) a zrná spekaného materiálu (SiC) sú v nej čiastočne rozpustné (dôkazom je fázová transformácia SiC).
- S rastúcim obsahom vodivej fázy N50 dochádza k zvyšovaniu tvrdosti. Najvyššia tvrdosť v prípade kompozitov bola nameraná na vzorke SiC30 (17.83 GPa). V porovnaní s referenčným SiCrefl je táto hodnota o 2.8GPa nižšia, čo je spôsobené hlavne vyššou pórovitosťou. Nezanedbateľný vplyv na celkovú tvrdosť kompozitu SiC30 má aj vznik karbidov titánu a nióbu, ktoré kryštalizujú na hraniciach SiC zrn a charakter mikroštruktúry predovšetkým priemerná veľkosť SiC zrn.
- Opísaným procesom prípravy SiC kompozitov sa podarilo vytvoriť v objeme vzoriek SiC20 a SiC30 dostatočne spojitú vodivú sieť bohatú na titán a niób (výsledok rtg mikrotomografie). V prípade vzorky SiC30 došlo k dvadsaťnásobnému zvýšeniu elektrickej vodivosti v porovnaní s SiCrefl.

## Publikácie:

1. BYSTRICKÝ, Roman - HNATKO, Miroslav - LENČEŠ, Zoltán - ŠAJGALÍK, Pavol. Štúdium procesu zhutňovania systému  $\text{Si}_3\text{N}_4\text{-Y}_2\text{O}_3\text{-SiO}_2\text{-C}$ . In Interakcie tavenín s progresívnymi anorganickými materiálmi. 5. odborný seminár, Borinka, Slovensko, 20. - 21. október 2014 : zborník príspevkov. Editor Jana Valúchová. - Bratislava, 2014, p. 57-67.
2. ŠAJGALÍK, Pavol - HNATKO, Miroslav - LENČEŠ, Zoltán - KOVALČÍKOVÁ, Alexandra. Easy machinable SiC ceramics with high electrical conductivity. In ISSNOX4. 4th international symposium on SiAlONs and non-oxides, May 25-28, 2014, Shiga, Japan: program & abstracts. 2014, p. 23.

### 18.) Štruktúra a vlastnosti oxidových skiel určených na aplikácie v jadrovej energetike (*Structure and properties of oxide glasses for application in nuclear power technology*)

<b>Zodpovedný riešiteľ:</b>	Mária Chromčíková
<b>Trvanie projektu:</b>	1.7.2012 / 31.12.2015
<b>Evidenčné číslo projektu:</b>	APVV-0487-11
<b>Organizácia je koordinátorom projektu:</b>	nie
<b>Koordinátor:</b>	Trenčianska univerzita Alexandra Dubčeka v Trenčíne
<b>Počet spoluriešiteľských inštitúcií:</b>	0
<b>Čerpané financie:</b>	APVV: 18882 €

Dosiahnuté výsledky:

Riešenie pokračovalo skúmaním závislosti fyzikálnych vlastností modelových skiel a sklotvorných tavenín pre vitifikáciu rádioaktívneho odpadu CHROMPIK. Navrhol sa termodynamicky model skúmaných skiel. Publikovali sa výsledky analýzy Ramanových spektier a kryštalizácie modelových skiel. Termogravimetricky sa preskúmala kinetika reakcie sklenej frity s koncentrátom chrompiku a nevrhol sa kinetický model.

1. CHROMČÍKOVÁ, Mária - LIŠKA, Marek - HOLUBOVÁ, Jana - ČERNOŠEK, Zdeněk. Structure of  $\text{As}_2\text{S}_3\text{-Sb}_4\text{S}_4$  glasses by combined Raman spectroscopy and thermodynamic modeling approach. In Journal of Non-Crystalline Solids, 2014, vol. 401, p. 115-118.
2. LIŠKA, Marek - CHROMČÍKOVÁ, Mária - HOLUBOVÁ, Jana - ČERNOŠEK, Zdeněk. Thermodynamic model and structure of  $\text{As}_2\text{S}_3\text{-As}_2\text{Se}_3$  glasses based on the MCR analysis of Raman spectra. In Ceramics-Silikáty, 2014, vol. 58, no. 2, p. 95-98.
3. CHROMČÍKOVÁ, Mária - LIŠKA, Marek - GAVENDA, Tadeáš - MACHÁČEK, Jan. Structure of  $\text{Na}_2\text{O-MgO-CaO-SiO}_2$  glasses by combined Raman spectroscopy and thermodynamic modeling approach. In Journal of Thermal Analysis and Calorimetry, 2014, vol. 118, no. 2, p. 835-840.

### 19.) Vývoj nitridu kremičitého s prídavkom multivrstiev grafénu. (*Development of $\text{Si}_3\text{N}_4$ with addition of graphene platelets*)

<b>Zodpovedný riešiteľ:</b>	Monika Kašiarová
<b>Zodpovedný riešiteľ v organizácii SAV:</b>	Pavol Šajgalík
<b>Trvanie projektu:</b>	1.7.2012 / 31.12.2015
<b>Evidenčné číslo projektu:</b>	APVV-0161-11
<b>Organizácia je koordinátorom projektu:</b>	nie
<b>Koordinátor:</b>	
<b>Počet spoluriešiteľských inštitúcií:</b>	0
<b>Čerpané financie:</b>	APVV: 35600 €

Dosiahnuté výsledky:

Predmetom doterajšieho výskumu bolo dosiahnutie homogénnej distribúcie multivrstiev grafénu v nitride kremičitom a taktiež ich delaminácia na grafénové multivrstvy s nižším počtom vrstiev. Na dosiahnutie delaminácie grafénových multivrstiev počas prípravy grafénových vrstiev boli použité v zásade dve metódy:

- Použitie ultrazvukovej sondy na rozdispergovanie a oddelenie grafénových multivrstiev a následné použitie centrifúgy na oddelenie frakcie s nižším počtom grafénových multivrstiev. Po tomto procese nasledovala homogenizácia v planetárnom mlyne
- Na rozdispergovanie a delamináciu grafénových multivrstiev bolo použité spoločné pôsobenie ultrazvukovej sondy a adsorpcie surfaktantu. Následne bola suspenzia miešaná, rozprašovaná do tekutého dusíka a lyofilizovaná.
- Takto pripravené kompozitné prášky na báze  $\text{Si}_3\text{N}_4$  s prídavkom multivrstiev grafénu boli spekané v žiarovom lise.

## Publikácie:

1. KAŠIAROVÁ, Monika - TATARKO, Peter - BURIK, Peter - DUSZA, Ján - ŠAJGALÍK, Pavol. Thermal shock resistance of  $\text{Si}_3\text{N}_4$  and  $\text{Si}_3\text{N}_4\text{-SiC}$  ceramics with rare-earth oxide sintering additives. In Journal of the European

- Ceramic Society, 2014, vol. 34, no. 14, p. 3301-3308.
- MICHÁLKOVÁ, Monika - KAŠIAROVÁ, Monika - TATARKO, Peter - DUSZA, Ján - ŠAJGALÍK, Pavol. Effect of homogenization treatment on the fracture behaviour of silicon nitride/graphene nanoplatelets composites. In Journal of the European Ceramic Society, 2014, vol. 34, no. 14, p. 3291-3299.
  - HANZEL, Ondrej - SEDLÁČEK, Jaroslav - ŠAJGALÍK, Pavol. Functional properties of Al<sub>2</sub>O<sub>3</sub>-MWCNT composites. In Příprava a vlastnosti progresivních keramických materiálů : Odborný seminár. Zborník rozšírených abstraktov. Terchová-Biely Potok, 26.-28.11.2014. Ed. D. Galusková. - Bratislava : ÚACh SAV, 2014, s. 8-14.
  - LENČEŠ, Zoltán - ŠAMAJOVÁ, Lenčes - HANZEL, Ondrej. Preparation and characterization of Si<sub>3</sub>N<sub>4</sub>+MgSiN<sub>2</sub> Composites, In Příprava a vlastnosti progresivních keramických materiálů : Odborný seminár. Zborník rozšírených abstraktov. Terchová-Biely Potok, 26.-28.11.2014. Ed. D. Galusková. - Bratislava : ÚACh SAV, 2014, s.
  - KAŠIAROVÁ, Monika - MICHÁLKOVÁ, Monika - DUSZA, Ján - ŠAJGALÍK, Pavol. Scratch resistance of the Si<sub>3</sub>N<sub>4</sub>-graphene nanoplatelets composites. In Local mechanical properties 2014. LMP 2014: 11th conference on Local Mechanical Properties. Book of abstracts. Stará Lesná, 12.-14.11.2014. Košice: Institute of Materials Research SAS, 2014, p. 63.

## 20.) Organoily a ich kompozity s polymérmi (*Organoclays and their composites with polymers*)

<b>Zodpovedný riešiteľ:</b>	Peter Komadel
<b>Trvanie projektu:</b>	1.5.2011 / 31.10.2014
<b>Evidenčné číslo projektu:</b>	APVV-0362-10
<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: 33200 €

### Dosiahnuté výsledky:

- BRTÁŇOVÁ, Anna - MADEJOVÁ, Jana - BIZOVSKÁ, Valéria - KOMADEL, Peter. Utilization of near infrared spectroscopy for studying solvation properties of Cu-montmorillonites. In Spectrochimica Acta Part A - Molecular and Biomolecular Spectroscopy, 2014, vol. 123, p. 385-391.
- SCHOLTZOVÁ, Eva - MADEJOVÁ, Jana - TUNEGA, Daniel. Structural properties of montmorillonite intercalated with tetraalkylammonium cations - Computational and experimental study. In Vibrational Spectroscopy, 2014, vol. 74, p. 120-126.
- MADEJOVÁ, Jana - PÁLKOVÁ, Helena - JANKOVIČ, Ľuboš. Near-infrared study of the interaction of pyridine with acid-treated montmorillonite. In Vibrational Spectroscopy, 2015, vol. 76, p. 22-30

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

<b>Zodpovedný riešiteľ:</b>	Jana Madejová
<b>Trvanie projektu:</b>	1.10.2013 / 30.9.2017
<b>Evidenčné číslo projektu:</b>	APVV-0339-12
<b>Organizácia je koordinátorom projektu:</b>	nie
<b>Koordinátor:</b>	Prírodovedecká fakulta UK
<b>Počet spoluriešiteľských inštitúcií:</b>	0
<b>Čerpané financie:</b>	APVV: 8615 €

### Dosiahnuté výsledky:

Riešenie projektu prebiehalo v súlade so stanoveným harmonogramom. Vzorky perlitov boli podrobne charakterizované viacerými fyzikálno-chemickými metódami, predovšetkým pomocou RTG a termickej analýzy a IČ spektroskopie v strednej a blízkej oblasti. Prebehli aj experimentálne práce zamerané na stanovenie kationovýmennej kapacity, získané údaje sa aktuálne vyhodnocujú. Predbežné výsledky boli a prezentované na medzinárodných konferenciách:

- PÁLKOVÁ, Helena - BIZOVSKÁ, Valéria - CZÍMEROVÁ, Adriana - MADEJOVÁ, Jana - KOMADEL, Peter - UHLÍK, Peter - LEXA, Jaroslav. Application of infrared spectroscopy for characterization of perlites. In SSC 2014. 11th conference on solid state chemistry, Trenčianske Teplice, Slovak Republic, 6-11 July 2014: book of abstracts. - Slovak Republic, 2014, p. 158. ISBN 978-80-971648-0-5.
- UHLÍK, Peter - LEXA, Jaroslav - PÁLKOVÁ, Helena - MADEJOVÁ, Jana - BLIŠŤAN, P. - BIZOVSKÁ, Valéria. Basic characterization of perlite from Lehôtka pod Brehmi deposit and its surrounds (Slovakia). In MECC2014. 7th mid-european clay conference, Dresden, Germany, 16-19 september 2014: programme and abstractbook. Dresden, Germany: Deutsche Ton- und Tonmineralgruppe e.V. (DTTG), 2014, p. 268

**22.) Relativistické výpočty parametrov NMR a EPR spektroskopie pre zlúčeniny obsahujúce ťažké prvky: pokračovanie metodologického vývoja a aplikácie** (*Relativistic calculations of parameters of NMR and EPR spectroscopy for compounds containing heavy elements: further methodological development and applications*)

**Zodpovedný riešiteľ:** Vladimír Malkin  
**Trvanie projektu:** 1.5.2011 / 30.4.2014  
**Evidenčné číslo projektu:** APVV-0483-10  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** APVV: 34318 €

Dosiahnuté výsledky:

1. REPISKÝ, Michal – KONEČNÝ, Lukáš – KÁDEK, Marius, KOMOROVSKÝ, Stanislav, MALKINA, Olga L. – MALKIN Vladimír G. – KENNETH, Ruud. Excitation energies from real-time propagation of the four-component Dirac–Kohn–Sham equation, submitted to the Journal of Chemical Theory and Computation, 2014

**23.) Polyaplikovateľné heterocykly - návrh štruktúry, syntéza a vlastnosti** (*Polyaplicable heterocycles - design, synthesis and properties*)

**Zodpovedný riešiteľ:** Ľubomír Smrček  
**Trvanie projektu:** 1.7.2012 / 31.12.2015  
**Evidenčné číslo projektu:**  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** Fakulta chemickej a potravinárskej technológie STU  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** APVV: 3762 €

Dosiahnuté výsledky:

Na základe štruktúrnych, spektroskopických dát v UV oblasti a presných kvantovochemických výpočtov bola analyzovaná dynamika molekúl v štruktúre selénového derivátu chinolónu. Pri hľadaní prekurzorov liečiv boli metódami štruktúrnej analýzy a kvantovej chémie (molekulové a aj výpočty v tuhej fáze) analyzované štruktúrne a väzbové podmienky v troch fluoroderivátoch substituovaného fluorochinolónu.

**24.) Vývoj kompozitných biomateriálov na báze nitridu kremičitého** (*Development of composite biomaterials based on silicon nitride*)

**Zodpovedný riešiteľ:** Pavol Šajgalík  
**Trvanie projektu:** 1.5.2011 / 31.10.2014  
**Evidenčné číslo projektu:** APVV-0500-10  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav anorganickej chémie SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Slovensko: 1  
**Čerpané financie:** APVV: 36000 €

Dosiahnuté výsledky:

Riešiteľskému kolektívu sa úspešne podarilo pripraviť kompozitný materiál na báze nitridu kremičitého s bioaktívnou zložkou vo forme hydroxyapatitu. Pripravená keramická matrica bola ocharakterizovaná z hľadiska mikroštruktúry, mechanických vlastností a pórovitosti, pričom tieto vlastnosti v plnej miere spadali do oblasti hodnôt nameraných pre trabekulárnu kosť, čo je hlavnou požiadavkou pri vývoji kostných náhrad. Na pripravenom kompozite bolo taktiež vykonané biologické testovanie, v rámci ktorého bola stanovená biokompatibilita a bioaktivita materiálu. Výsledkom tohto testovania je, že pripravený SN/HA kompozit je biokompatibilný, pričom vykazuje zvýšenú bioaktivitu v porovnaní s referenčnou Si<sub>3</sub>N<sub>4</sub> maticou.

Publikácie:

2. BODIŠOVÁ, Katarína - KAŠIAROVÁ, Monika - PRAMUKOVÁ, Zuzana - DOMANICKÁ, Magdaléna - LENČEŠ, Zoltán - HNATKO, Miroslav - GROMOŠOVÁ, Silvia - ŠAJGALÍK, Pavol. Mechanical properties of macroporous silicon nitride-based ceramics designed for bone substitutes. In Ceramics-Silikáty, 2014, vol. 58, no. 2, p. 99-105. (0.434 - IF2013). ISSN 0862-5468.
3. GALUSKOVÁ, Dagmar - KAŠIAROVÁ, Monika - HNATKO, Miroslav - GALUSEK, Dušan - DUSZA, Ján -

- ŠAJGALÍK, Pavol. Hydrothermal corrosion and flexural strength of Si<sub>3</sub>N<sub>4</sub>-based ceramics. In Corrosion Science, 2014, vol. 85, p. 94-100. (3.686 - IF2013). ISSN 0010-938X.
4. GALUSKOVÁ, Dagmar - GALUSEK, Dušan - ŠAJGALÍK, Pavol. Evaluation of corrosion of engineering ceramics by atomic emission spectrometry in inductively coupled plasma. In Ceramics-Silikáty, 2014, vol. 58, no. 1, p. 39-45.
  5. PRAMUKOVÁ, Zuzana - KAŠIAROVÁ, Monika - DOMANICKÁ, Magdaléna - HNATKO, Miroslav - ŠAJGALÍK, Pavol. Influence of the preparation of Si<sub>3</sub>N<sub>4</sub> based foams on the compressive strength and processing flaws. In Powder Metallurgy Progress : Journal of Science and Technology of Particle Materials, 2013, vol. 13, no. 3-4, p. 139-146. ISSN 1335-8978.
  6. KOVALČÍKOVÁ, Alexandra - DUSZA, Ján - ŠAJGALÍK, Pavol. Influence of the microstructure on macro/micro versus nanohardness of SiC ceramics. In Key Engineering Materials, 2014, vol. 606, p. 197-200. ISSN 1013-9826.
  7. VILČEKOVÁ, Zuzana - KAŠIAROVÁ, Monika - DOMANICKÁ, Magdaléna - HNATKO, Miroslav - ŠAJGALÍK, Pavol. Determination of Local Mechanical Properties of Si<sub>3</sub>N<sub>4</sub> Based Foams; Key Engineering Materials Vol. 606 (2014) pp 213-216
  8. KAŠIAROVÁ, Monika - PRAMUKOVÁ, Zuzana - BODISOVÁ, Katarína - DOMANICKÁ, Magdaléna - HNATKO, Miroslav - DUSZA, Ján - ŠAJGALÍK, Pavol - GROMOŠOVÁ, Silvia. Mechanical properties of porous Si<sub>3</sub>N<sub>4</sub> ceramics. In Key Engineering Materials, 2014, vol. 586, p. 166-169. ISSN 1013-9826.

## Programy: Štrukturálne fondy EÚ Výskum a vývoj

### 25.) Univerzitný vedecký park STU Bratislava (*University Science Park of STU Bratislava*)

<b>Zodpovedný riešiteľ:</b>	Miroslav Boča
<b>Trvanie projektu:</b>	1.2.2013 / 31.1.2015
<b>Evidenčné číslo projektu:</b>	26240220084
<b>Organizácia je koordinátorom projektu:</b>	nie
<b>Koordinátor:</b>	Slovenská technická univerzita v Bratislave
<b>Počet spoluriešiteľských inštitúcií:</b>	2 - Slovensko: 2
<b>Čerpané financie:</b>	MŠ: 32427 €

#### Dosiahnuté výsledky:

V rámci riešenia aktivity projektu boli realizované nasledovné činnosti:

- Termické analýzy a vyhodnocovanie fázových diagramov roztopených systémov solí LiF-CaF<sub>2</sub> s prídavkami rôznych mólových množstiev LaF<sub>3</sub>.
- Termické analýzy roztopených systémov solí LiF-CaF<sub>2</sub> s prídavkami rôznych mólových množstiev NdF<sub>3</sub>.
- RTG merania produktov korózie konštrukčného materiálu SS 304 po korózných testoch v tavenine NaNO<sub>3</sub> s prídavkom rôznej koncentrácie FeF<sub>3</sub>, FeF<sub>2</sub>, CrF<sub>3</sub>, NiF<sub>2</sub>, CoF<sub>2</sub> pri teplotách 200, 300, 400 a 500°C.
- Boli pripravené rôzne fluoridové zlúčeniny ako K<sub>2</sub>ZrF<sub>6</sub>.HF, KZrF<sub>5</sub>, NaNbOF<sub>4</sub>, na ktorých boli študované fázové prechody pomocou simultánnej termickej analýzy.

### 26.) Kompetenčné centrum pre nové materiály, pokročilé technológie a energetiku (*Competence center for new materials, advanced technologies and energy*)

<b>Zodpovedný riešiteľ:</b>	Karol Fröhlich
<b>Zodpovedný riešiteľ v organizácii SAV:</b>	Miroslav Boča
<b>Trvanie projektu:</b>	1.6.2011 / 30.9.2014
<b>Evidenčné číslo projektu:</b>	26240220073
<b>Organizácia je koordinátorom projektu:</b>	nie
<b>Koordinátor:</b>	
<b>Počet spoluriešiteľských inštitúcií:</b>	14 - Slovensko: 14
<b>Čerpané financie:</b>	MŠ: 11475 €

#### Dosiahnuté výsledky:

1. KUBÍKOVÁ, Blanka - DANIELIK, Vladimír - ROBERT, Eric - MLYNÁRIKOVÁ, Jarmila - BOČA, Miroslav. Phase equilibrium and density investigation of the molten LiCl plus NaCl + ZnCl<sub>2</sub> system. In Journal of Chemical and Engineering Data, 2014, vol. 59, no. 8, p. 2408-2412.
2. MICHÁLKOVÁ, Monika - KAŠIAROVÁ, Monika - TATARKO, Peter - DUSZA, Ján - ŠAJGALÍK, Pavol. Effect of homogenization treatment on the fracture behaviour of silicon nitride/graphene nanoplatelets composites. In Journal of the European Ceramic Society, 2014, vol. 34, no. 14, p. 3291-3299.

### 27.) Centrum aplikovaného výskumu nových materiálov a transferu technológií (*Center for applied research of new materials and technology transfer*)

**Zodpovedný riešiteľ:** Jaromír Pastorek  
**Zodpovedný riešiteľ v organizácii SAV:** Miroslav Boča  
**Trvanie projektu:** 1.3.2013 / 31.3.2015  
**Evidenčné číslo projektu:** ITMS 26240220088  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:**  
**Počet spoluriešiteľských inštitúcií:** 2 - Slovensko: 2  
**Čerpané financie:** MŠ: 83661 €

Dosiahnuté výsledky:

V rámci aktivity budovania centra bola koordinovaná činnosť dodávok a inštalácie zariadení v rámci projektu STA - simultánny termický analyzátor s FTIR spektrometrom, RTG difraktometer a taktiež boli dodané príslušenstvá ako: komponenty pre práškový difraktometer, komponenty elektronického systému atď.

Činnosti realizované v rámci aktivity 2.1 sú zamerané na skúmania a využitia širšieho spektra keramických materiálov a ich kompozitov tak aby pokrývali celkový zámer budovaného Laboratória keramických materiálov.

V rámci výskumných aktivít boli optimalizované zloženia vhodných keramických materiálov na báze oxidov, nitridov a karbidov s rôznymi prídavkami spekania za účelom zlepšenia mechanických a termodynamických vlastností pre ďalšie využitie v praxi. Súčasne boli skúmané materiály na báze korundu a na báze karbidu kremičitého s prídavkov uhľíkových nanorúrok (CNT), ktoré rozširuje aplikačný potenciál týchto materiálov do oblastí vyžadujúcich funkčné vlastnosti materiálov, ako napr. elektrická a tepelná vodivosť, odolnosť voči teplotným šokom, atď. Okrem toho bol skúmaný vplyv prídavku CNT na mechanické vlastnosti keramických kompozitov. V priebehu realizácie aktivity boli optimalizované postupy prípravy zmesí ako aj optimalizácia zhutňovania a bol sledovaný vývoj mikroštruktúry. V oblasti nitridov bola skúmaná možnosť prípravy keramických kompozitov s vynikajúcimi mechanickými vlastnosťami v systéme Si<sub>3</sub>N<sub>4</sub>/SiC. V súvislosti s charakterizáciou aplikačných vlastností boli vybrané druhy keramických materiálov, napr. karbid kremičitý s prídavkom do 15 hm. % kovového titánu, testované na odolnosť voči koróznemu pôsobeniu tavenín v sústave LiF-NaF-KF pri 600 až 900°C. Súčasne s experimentálnou činnosťou prebiehali modelové výpočty mechanického správania sa keramických materiálov a kompozitov pre účely optimalizácie zloženia a nastavenia parametrov procesu ich výroby.

## Publikácie:

1. HANZEL, Ondrej - SEDLÁČEK, Jaroslav - ŠAJGALÍK, Pavol. Functional properties of Al<sub>2</sub>O<sub>3</sub>-MWCNT composites. In Příprava a vlastnosti progresivních keramických materiálů : Odborný seminár. Zborník rozšírených abstraktov. Terchová-Biely Potok, 26.-28.11.2014. Ed. D. Galusková. Trenčín: Trenčianska univerzita A. Dubčeka, 2014, s. 8-14. ISBN 978-80-8075-667-3.
2. LENČEŠ, Zoltán - ŠAMAJOVÁ, Vladana - HANZEL, Ondrej. Příprava a charakterizácia kompozitov Si<sub>3</sub>N<sub>4</sub> + MgSiN<sub>2</sub>. In Příprava a vlastnosti progresivních keramických materiálů : Odborný seminár. Zborník rozšírených abstraktov. Terchová-Biely Potok, 26.-28.11.2014. Ed. D. Galusková. Trenčín: Trenčianska univerzita A. Dubčeka, 2014, s. 20-26. ISBN 978-80-8075-667-3.

**28.) Priemyselný výskum pre potreby zefektívnenia unikátnej technológie tavenia a tvarovania úžitkového skla - PVTECHSKLO** (*Industrial research for needs of the reengineering of the unique technology of the glass preparation and the forming work - PVTECHSKLO*)

**Zodpovedný riešiteľ:** Peter Šimurka  
**Trvanie projektu:** 1.4.2010 / 31.3.2014  
**Evidenčné číslo projektu:** ITMS kód: 26220220072  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** RONA, a. s.  
**Počet spoluriešiteľských inštitúcií:** 1 - Slovensko: 1  
**Čerpané financie:** MŠ: 36402 €

Dosiahnuté výsledky:

Boli ukončené zmluvné výskumy v oblasti tavenia s firmami SSV Murano, Taliansko, Messer Tatragas Slovakia a Glass Service Vsetín, ČR (1.časť) a v oblasti tvarovania s TU Liberec, ČR.

Získané výsledky boli prezentované vo forme prednášok a vývesok na medzinárodných konferenciách.

1. KRAXNER, Jozef - ŠIMURKA, Peter - KLEMENT, Robert - PAUČO, T. - VRÁBEL, P. Korózia Al<sub>2</sub>O<sub>3</sub> - ZrO<sub>2</sub> - SiO<sub>2</sub> (AZS) materiálu používaného pri tavení úžitkového skla. VIII. Medzinárodná vedecká konferencia žiaromateriály, pece a tepelné izolácie, s. 128-134, Nový Smokovec, Apríl 2014, ISBN 978-80-553-1673-4 (prednáška)
2. ŠIMURKA, Peter - KRAXNER, Jozef - KLEMENT, Robert - VRÁBEL, P. - PAUČO, T. Glass Defects in Tableware Glass Production Originating from AZS Refractories Šimurka P., Kraxner J. Klement R., Vrábel P., Paučo T. Book of abstracts 12th ESG Conference, s.92, 12 PM, September 2014, Parma, Taliansko (prednáška)

3. ŠIMURKA, Peter - KRAXNER, Jozef - VRÁBEL, P. - PAUČO, T. Knots in Tableware glass Products Originating from AZS Refractories. 7. Medzinárodná konferencia "STEKLOPROGRESS - XXI" Máj, 2014, Saratov, Rusko (prednáška)
4. ŠIMURKA, Peter - KRAXNER, Jozef - VRÁBEL, P. - PAUČO, T. - SANCHETTI, S. - FALCONE, S. Al<sub>2</sub>O<sub>3</sub>-ZrO<sub>2</sub>-SiO<sub>2</sub> refractory corrosion in barium soda lime silicate glass melt. In SSC 2014. 11th conference on solid state chemistry, Trenčianske Teplice, Slovak Republic, 6-11 july 2014 : book of abstracts. - Slovak Republic, 2014, p. 143.
5. ŠIMURKA, Peter - KRAXNER, Jozef - VRÁBEL, P. - PAUČO, T. - SANCHETTI, S. - FALCONE, S. Štúdium korózie AZS žiaromateriálov pri tavení úžitkového skla, Sborník abstraktu Česká a slovenská konferencia o skle, 5.-7. november 2014, Žďár nad Sázavou, Česká republika ISBN 978-80-7080-902-0 (poster)
6. KRAXNER, Jozef - KLEMENT, Robert - ŠIMURKA, Peter - VRÁBEL, P. - PAUČO, T. - JURÁSEK I. Corrosion behavior of ZrO<sub>2</sub>-SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub> refractories in barium soda lime silicate glass melt. In Book of Abstracts of the 12th ESG Conference, September 2014, Parma, Taliansko, p.184.

**29.) Znalostná databáza a expertný systém environmentálneho riešenia havárií straty chladiva v prevádzke jadrovej elektrárne - ZDESJE.** (*Knowledge database and expert system for environmental friendly solutions of loss of coolant accidents in atomic nuclear power plants - ZDESJE.*)

<b>Zodpovedný riešiteľ:</b>	Peter Šimurka
<b>Trvanie projektu:</b>	1.4.2010 / 31.3.2014
<b>Evidenčné číslo projektu:</b>	ITMS 26220220072
<b>Organizácia je koordinátorom projektu:</b>	nie
<b>Koordinátor:</b>	VÚEZ, a.s.
<b>Počet spoluriešiteľských inštitúcií:</b>	1 - Slovensko: 1
<b>Čerpané financie:</b>	MŠ: 89743 €

Dosiahnuté výsledky:

Získali sa experimentálne dáta pre statické a prietokové lúžiacie testy v sústavách sklovláknitá izolácia<sub>4</sub> – chladivo<sub>4</sub>, sklovláknitá izolácia<sub>4</sub> - destilovaná voda, sklená drvína<sub>4</sub> – chladivo<sub>4</sub> a sklená drvína<sub>4</sub> - destilovaná voda. Špecializovaným softwarom PHREEQC (<http://www.xs4all.nl/~appt/index.html>) sa pokračovalo v modelovaní situácií skúmaných experimentálne. V prípade detailnejšieho rozboru sústavy sklovláknitá izolácia<sub>3</sub> – chladivo<sub>3</sub> sa na základe detailnej matematicko-štatistickej analýzy aplikácie termodynamického modelu na získané experimentálne dáta navrhol aj plauzibilný kinetický model založený na predpoklade kongruentného rozpúšťania sklovláknitej izolácie

1. CHROMČÍKOVÁ, Mária - MICHÁLKOVÁ, J. - VLČKOVÁ, Patrícia - VOKELOVÁ, Jana - FATURÍKOVÁ, Katarína - LIŠKA, Marek. Kinetics of IZOMER TT glass grains leaching in corrosive media. In SSC 2014. 11th conference on solid state chemistry, Trenčianske Teplice, Slovak Republic, 6-11 july 2014 : book of abstracts. - Slovak Republic, 2014, p. 173.
2. VLČKOVÁ, Patrícia - VOKELOVÁ, Jana - MICHÁLKOVÁ, J. - FATURÍKOVÁ, Katarína - CHROMČÍKOVÁ, Mária - LIŠKA, Marek. Kinetics of leaching of IZOMER TT glass fiber in corrosive media. In SSC 2014. 11th conference on solid state chemistry, Trenčianske Teplice, Slovak Republic, 6-11 july 2014 : book of abstracts. - Slovak Republic, 2014, p. 186.
3. VOKELOVÁ, Jana - VLČKOVÁ, Patrícia - MICHÁLKOVÁ, J. - FATURÍKOVÁ, Katarína - CHROMČÍKOVÁ, Mária - LIŠKA, Marek. Kinetics of leaching of IZOMER TT glass grains under static conditions in distilled water and in borate coolant solution. In SSC 2014. 11th conference on solid state chemistry, Trenčianske Teplice, Slovak Republic, 6-11 july 2014 : book of abstracts. - Slovak Republic, 2014, p. 187.
4. LIŠKA, Marek - CHROMČÍKOVÁ, Mária - MACHÁČEK, Jan - HRUŠKA, Branislav - ZEMANOVÁ, Vladimíra - GAVENDA, Tadeáš. Thermodynamic model of ZnO-MoO<sub>3</sub>-P<sub>2</sub>O<sub>5</sub> glasses and its validation by MCR analysis of Raman spectra of ZnO-P<sub>2</sub>O<sub>5</sub> glasses. In International days of materials science 2014, ReAdMat, Pardubice, september 16-17, 2014 : book of abstracts. - Pardubice, Czech Republic : University of Pardubice, 2014, p. 10. prednaska pozvana.
5. CHROMČÍKOVÁ, Mária - LIŠKA, Marek - MACHÁČEK, Jan - HRUŠKA, Branislav - ZEMANOVÁ, Vladimíra - GAVENDA, Tadeáš. Thermodynamic model and MCR analysis of Raman spectra of CaO-P<sub>2</sub>O<sub>5</sub> glasses. In International days of materials science 2014, ReAdMat, Pardubice, september 16-17, 2014 : book of abstracts. - Pardubice, Czech Republic : University of Pardubice, 2014, p. 52.
6. HRUŠKA, Branislav - TEPLANOVÁ, Magdaléna - CHROMČÍKOVÁ, Mária - ZEMANOVÁ, Vladimíra - LIŠKA, Marek. DTA a TG analýza vitifikácie CHROMPIK-u. In Česká a slovenská konferencia o skle, Žďár nad Sázavou, 5. - 7. 11. 2014 : sborník abstraktů. - Praha, Česká republika : Vysoká škola chemicko-technologická v Praze, 2014, s. 33.



## Programy: Štrukturálne fondy EÚ Bratislavský kraj

**30.) Aplikovaný výskum a overenie technológií katalytickej dehalogenácie kontaminovaných vôd z priemyselných ekologických záťaží na reaktívnych bariérach** (*Investigation and verification of catalytic dehalogenation on reactive barriers technologies - treatment of contaminated water from polluted industrial sites*)

<b>Zodpovedný riešiteľ:</b>	Adriana Czímerová
<b>Trvanie projektu:</b>	1.2.2014 / 30.06.2015
<b>Evidenčné číslo projektu:</b>	ITMS 26240220078
<b>Organizácia je koordinátorom projektu:</b>	nie
<b>Koordinátor:</b>	Dekonta s. r. o.
<b>Počet spoluriešiteľských inštitúcií:</b>	0
<b>Čerpané financie:</b>	MŠ: 20772 €

### Dosiahnuté výsledky:

V rámci riešenia projektu sa navrhol a sprevádzkoval vsádzkový a prietokový reaktor pre modelovanie procesu anaeróbnej redukcie znečistenia podzemných vôd. Doteraz získané výsledky výskumu poskytli informácie a potrebné vstupné údaje pre projektovanie a realizáciu výstavby bariéry. Pre návrh a prevádzku sa definovali limitujúce parametre prevádzky – zrnitosť inertného materiálu v bariére, vhodné pomery granulovaného železa v bariére, vplyv zloženia granulovaného železa na proces kryštalizácie oxidačných produktov železa a následnej adsorpcie znečistenia na ich povrchu, inhibičný a katalytický vplyv vybraných anorganických ukazovateľov kvality podzemnej vody, ako aj požadovaný rozsah pH a ORP pre priebeh redukčných procesov v horninovom prostredí. Dôležitým poznáním, ktoré vyplynulo z riešenia je zdokumentovanie migrácie oxidačných produktov granulovaného železa z bariéry do okolitého horninového prostredia. Skutočnosť výrazne posúva poznanie využitia granulovaného železa ako redukčného prostriedku pre sanáciu najmä starých environmentálnych záťaží na Slovensku.

Výsledky boli prezentované na konferenciách:

1. HOLUBEC, Miroslav - KOMADEL, Peter. Possibilities for removal of chlorinated hydrocarbons from soil matrix using zero valent iron. In SSC 2014. 11th conference on solid state chemistry, Trenčianske Teplice, Slovak Republic, 6-11 july 2014 : book of abstracts. - Slovak Republic, 2014, p. 140.
2. HOLUBEC, Miroslav - MATEJDES, Marián - CZÍMEROVÁ, Adriana. Influence of bentonite on sorption of organic compounds in groundwater aquifer. In MECC2014. 7th mid-european clay conference, Dresden, Germany, 16-19 september 2014: programme and abstractbook. - Dresden, Germany : Deutsche Ton- und Tonmineralgruppe e.V. (DTTG), 2014, p. 307.

## Programy: Centrá excelentnosti SAV

**31.) Centrum excelentnosti pre funkcionalizované viacfázové materiály** (*Center of Excellence for Functionalized Multiphase Materials*)

<b>Zodpovedný riešiteľ:</b>	Marián Krajčí
<b>Zodpovedný riešiteľ v organizácii SAV:</b>	Pavol Šajgalík
<b>Trvanie projektu:</b>	1.8.2011 / 31.12.2014
<b>Evidenčné číslo projektu:</b>	
<b>Organizácia je koordinátorom projektu:</b>	nie
<b>Koordinátor:</b>	
<b>Počet spoluriešiteľských inštitúcií:</b>	5 - Slovensko: 5
<b>Čerpané financie:</b>	SAV: 3947 €

**Príloha C - Publikačná činnosť organizácie (generovaná z ARL)****ABC Kapitoly vo vedeckých monografiách vydané v zahraničných vydavateľstvách**

- ABC01 GALUSEK, Dušan - SEDLÁČEK, Jaroslav - KLEMENT, Róbert - ŠVANČÁREK, Peter. Silicon carbide-containing alumina nanocomposites: processing and properties. In Advances in ceramic matrix composites. - UK : Woodhead Publishing Limited, 2014, p. 43-78. ISBN 978-0-85709-120-8.

**ADCA Vedecké práce v zahraničných karentovaných časopisoch impaktovaných**

- ADCA01 ANTAL, Peter - SCHWENDT, Peter - TATIERSKY, Jozef - GYEPES, Róbert - DRÁBIK, Milan. Interaction between chiral ions: synthesis and characterization of tartratanadates(V) with tris(2,2'-bipyridine) complexes of iron(II) and nickel(II) as cations. In Transition Metal Chemistry : An International Journal, 2014, vol. 39, p. 893-900. (1.402 - IF2013). (2014 - Current Contents). ISSN 0340-4285.
- ADCA02 BARBIERIKOVÁ, Zuzana - DVORANOVÁ, Dana - BELLA, Maroš - MILATA, Viktor - CZÍMEROVÁ, Adriana - BREZOVÁ, Vlasta. Fused-ring derivatives of quinoxalines: spectroscopic characterization and photoinduced processes investigated by EPR spin trapping technique. In Molecules, 2014, vol. 19, no. 8, p. 12078-12098. (2.095 - IF2013). (2014 - Current Contents). ISSN 1420-3049.
- ADCA03 BARBORÍK, Peter - VASKOVÁ, Zuzana - BOČA, Miroslav - PRIŠČÁK, Jozef. Physicochemical properties of the system (LiF + NaF + KF(eut) + Na7Zr6F31): Phase equilibria, density and volume properties, viscosity and surface tension. In Journal of Chemical Thermodynamics, 2014, vol. 76, p. 145-151. (2.423 - IF2013). (2014 - Current Contents). ISSN 0021-9614.
- ADCA04 BERNARDO, E. - FIOCCO, L. - PRNOVÁ, Anna - KLEMENT, Róbert - GALUSEK, Dušan. Gehlenite: Eu<sup>3+</sup> phosphors from a silicone resin and nano-sized fillers. In Optical Materials, 2014, vol. 36, p. 1243-1249. (2.075 - IF2013). (2014 - Current Contents). ISSN 0925-3467.
- ADCA05 BODIŠOVÁ, Katarína - KAŠIAROVÁ, Monika - PRAMUKOVÁ, Zuzana - DOMANICKÁ, Magdaléna - LENČEŠ, Zoltán - HNATKO, Miroslav - GROMOŠOVÁ, Silvia - ŠAJGALÍK, Pavol. Mechanical properties of macroporous silicon nitride-based ceramics designed for bone substitutes. In Ceramics-Silikáty, 2014, vol. 58, no. 2, p. 99-105. (0.434 - IF2013). (2014 - Current Contents). ISSN 0862-5468.
- ADCA06 BRTÁŇOVÁ, Anna - MADEJOVÁ, Jana - BIZOVSKÁ, Valéria - KOMADEL, Peter. Utilization of near infrared spectroscopy for studying solvation properties of Cu-montmorillonites. In Spectrochimica Acta Part A - Molecular and Biomolecular Spectroscopy, 2014, vol. 123, p. 385-391. (2.129 - IF2013). (2014 - Current Contents). ISSN 1386-1425.
- ADCA07 BUČKO, Tomáš - LEBÈGUE, Sébastien - ÁNGYÁN, János G. - HAFNER, Jürgen. Extending the applicability of the Tkatchenko-Scheffler dispersion correction via iterative Hirshfeld partitioning. In Journal of Chemical Physics, 2014, vol. 141, p. 034114-1-034114-17. (3.122 - IF2013). (2014 - Current Contents). ISSN 0021-9606.
- ADCA08 BUJDÁK, Juraj. Layer-by-layer assemblies composed of polycationic electrolyte, organic dyes, and layered silicates. In Journal of Physical Chemistry C, 2014, vol. 118, no. 13, p. 7152-7162. (4.835 - IF2013). (2014 - Current Contents, WOS, SCOPUS). ISSN 1932-7447.
- ADCA09 BUTVINOVÁ, Beata - BUTVIN, Pavol - MAŤKO, Igor - ŠVEC, Peter - CHROMČÍKOVÁ, Mária - SITEK, J. - DEKAN, J. Magnetic and surface properties of high-induction nanocrystalline Fe-Nb-Cu-B/P-Si ribbons. In IEEE Transactions on Magnetism, 2014, vol. 50, no. 4, 2002904. (1.213 - IF2013). (2014 - Current Contents, WOS, SCOPUS). ISSN 0018-9464.
- ADCA10 DOMANICKÁ, A. - KLEMENT, Róbert - PRNOVÁ, Anna - BODIŠOVÁ, Katarína - GALUSEK, Dušan. Luminescent rare-earth ions doped Al<sub>2</sub>O<sub>3</sub>-Y<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> glass microspheres prepared by flame synthesis. In Ceramics International, 2014, vol. 40, p. 6005-6012. (2.086 - IF2013). (2014 - Current Contents). ISSN 0272-8842.
- ADCA11 GALUSKOVÁ, Dagmar - KAŠIAROVÁ, Monika - HNATKO, Miroslav - GALUSEK, Dušan - DUSZA, Ján - ŠAJGALÍK, Pavol. Hydrothermal corrosion and flexural strength of Si<sub>3</sub>N<sub>4</sub>-based ceramics. In Corrosion Science, 2014, vol. 85, p. 94-100. (3.686 - IF2013). (2014 -

- Current Contents). ISSN 0010-938X.
- ADCA12 GALUSKOVÁ, Dagmar - GALUSEK, Dušan - ŠAJGALÍK, Pavol. Evaluation of corrosion of engineering ceramics by atomic emission spectrometry in inductively coupled plasma. In *Ceramics-Silikáty*, 2014, vol. 58, no. 1, p. 39-45. (0.434 - IF2013). (2014 - Current Contents). ISSN 0862-5468.
- ADCA13 HANZEL, Ondrej - SEDLÁČEK, Jaroslav - ŠAJGALÍK, Pavol. New approach for distribution of carbon nanotubes in alumina matrix. In *Journal of the European Ceramic Society*, 2014, vol. 34, p. 1845-1851. (2.307 - IF2013). (2014 - Current Contents, WOS, SCOPUS). ISSN 0955-2219.
- ADCA14 HOLEŠOVÁ, Sylva - VALÁŠKOVÁ, Marta - HLAVÁČ, Dominik - MADEJOVÁ, Jana - SAMLÍKOVÁ, Magda - TOKARSKÝ, Jonáš - PAZDZIARA, Erich. Antibacterial kaolinite/urea/chlorhexidine nanocomposites: Experiment and molecular modelling. In *Applied Surface Science*, 2014, vol. 305, p. 783-791. (2.538 - IF2013). (2014 - Current Contents). ISSN 0169-4332.
- ADCA15 HRDÁ, Marcela - KULICH, Tomáš - REPISKÝ, Michal - NOGA, Jozef - MALKINA, Oľga - MALKIN, Vladimír. Implementation of the diagonalization-free algorithm in the self-consistent field procedure within the four-component relativistic scheme. In *Journal of Computational Chemistry*, 2014, vol. 35, no. 23, p. 1725-1737. (3.601 - IF2013). (2014 - Current Contents). ISSN 0192-8651.
- ADCA16 HRICOVÍNI, Miloš - DRIGUEZ, Pierre-Alexandre - MALKINA, Oľga. NMR and DFT analysis of trisaccharide from heparin repeating sequence. In *Journal of Physical Chemistry B*, 2014, vol. 118, no. 41, p. 11931-11942. (3.377 - IF2013). (2014 - Current Contents, WOS, SCOPUS). ISSN 1520-6106.
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**FAI Redakčné a zostavovateľské práce knižného charakteru (bibliografie, encyklopédie, katalógy, slovníky, zborníky...)**

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

Ing. Viliam Pavlík, PhD.

Názov semestr. predmetu: Anorganická priemyselná chémia

Počet hodín za semester: 9

Názov katedry a vysokej školy: Fakulta priemyselných technológií TnUAD v Púchove, katedra

**Semestrálne cvičenia:**

Mgr. Peter Boháč

Názov semestr. predmetu: Laboratórne cvičenia zo všeobecnej a anorganickej chémie

Počet hodín za semester: 48

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

Mgr. Anna Brtáňová, PhD.

Názov semestr. predmetu: Anorganická chémia - časť laboratórne cvičenia

Počet hodín za semester: 52

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

Ing. Martin Kontrík

Názov semestr. predmetu: Všeobecná a anorganická chémia (Laboratórne cvičenia)

Počet hodín za semester: 52

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

Mgr. Lukáš Petra

Názov semestr. predmetu: Anorganická chémia - časť laboratórne cvičenia (študenti 1. ročníka, odbor Chémia)

Počet hodín za semester: 52

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

**Semináre:**

Mgr. Stanislav Kedžuch, PhD.

Názov semestr. predmetu: Výpočtový seminár I

Počet hodín za semester: 72

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

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

**Terénne cvičenia:**

doc. Ing. Zoltán Lenčes, PhD.

Názov semestr. predmetu: Nové anorganické materiály

Počet hodín za semester: 2

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

**Individuálne prednášky:**

doc. Ing. Zoltán Lenčéš, PhD.

Názov semestr. predmetu: Nové anorganické materiály

Počet hodín za semester: 4

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

**Príloha E - Medzinárodná mobilita organizácie****(A) Vyslanie vedeckých pracovníkov do zahraničia na základe dohôd:**

D r u h d o h o d y						
Krajina	MAD, KD, VTS		Medziústavná		Ostatné	
	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní
Belgicko	Róbert Klement	16				
	Anna Prnová	15				
Česko	Juraj Bujdák	4				
	Juraj Bujdák	3				
Poľsko	Helena Pálková	12				
Počet vyslaní spolu	5	50				

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

(D) Prijatie vedúcych pracovníkov zo zahraničia na základe dohody.								
Krajina	MAD, KD, VTS		D r u h d o h o d y		Medziústavná		Ostatné	
	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní		
Česko	Jiří Hybler	7						
	Ondřej Demel	11						
India					Niketan Patel	58		
Pol'sko	Małgorzata Zimowska	11			Artur Wodynski	60		
					Artur Wodynsky	60		
Rakúsko					Christina Atzenhofer	28		
					Sabine Gschiel	20		
Rusko					Igor Petrushenko, PhD	30		
Švédsko					Sheryar Khan	60		
USA					Shelly A. Arreguin	90		
Počet prijatí spolu	3	29			8	406		

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

Krajina	Názov konferencie	Meno pracovníka	Počet dní
Česko	AMS	Helena Pálková	3
	Borate and Phosphate	Branislav Hruška	5
		Mária Chromčíková	5
	ESAS	Mária Chromčíková	7
	IDMS	Mária Chromčíková	4
	Konferencia o skle	Branislav Hruška	4
		Mária Chromčíková	4
		Peter Šimurka	3
	REFRA and HITHERM	Miroslav Hnatko	3
	Rozhovory o krystalografii	Lubomír Smrčok	2
	seminár	Ondřej Hanzel	5

		Magdaléna Precnerová	5
	Zjazd chemických spoločností	Martin Kontrík	4
		Viliam Pavlík	4
		František Šimko	4
		Michal Šimurda	4
Čile	WATOC	Jozef Noga	15
Čína	Annual Conference	Eva Scholtzová	11
	ICC5	Zoltán Lenčేశ	8
Dánsko	EPDIC	Lubomír Smrček	4
Francúzsko	IUPAC	Juraj Bujdák	8
		Adriana Czímerová	8
		Alexander Čeklovský	8
		Samuel Sas	8
	IWLM	Valéria Bizovská	4
		Peter Komadel	4
		Jana Madejová	4
		Helena Pálková	4
Japonsko	SiAlONs	Zoltán Lenčేశ	6
		Pavol Šajgalík	6
Maďarsko	CESTC	Stanislav Kedžuch	5
Nemecko	ARG	Oľga Malkin	10
		Vladimír Malkin	10
	International Symposium	Ismail Ibrahim	8
	MECC	Valéria Bizovská	5
		Peter Boháč	5
		Anna Brtánová	5
		Juraj Bujdák	5
		Peter Komadel	5
		Jana Madejová	5
		Marián Matejdes	5
		Helena Pálková	5
		Lukáš Petra	5
	Symposium on Nitrides	Zoltán Lenčేశ	6
		Pavol Šajgalík	4
Poľsko	Workshop on „Advanced Materials	Miroslav Boča	2
		Zoltán Lenčేశ	2
	Workshop on „Advanced Materials"	Pavol Šajgalík	2
Rakúsko	Modern Methods in Quantum Chemistry	James Richard Asher	8
		Oľga Malkin	8
		Vladimír Malkin	8
	Modern Methods in Quantum Chemistry	Peter Cherry	8
Rusko	Glass and modern technologies - XXI	Peter Šimurka	3
	Stekloprogress	Peter Šimurka	5
Srbsko	DRC	Dušan Galusek	3
Taliansko	ESG	Dušan Galusek	13
		Jozef Kraxner	6
		Anna Prnová	6
		Peter Šimurka	5
USA	CMS	Peter Komadel	9

	ICEACC	Zoltán Lenčéš	7
		Pavol Šajgalík	7
	Sanibel Symposium	Jozef Noga	9
Veľká Británia	Inside Raman	Mária Chromčíková	5
		Marek Liška	5
	pNMR	Vladimír Malkin	3
<b>Spolu</b>	<b>34</b>	<b>66</b>	<b>376</b>

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

Skratky použité v tabuľke C:

AMS - Účasť na medzinárodnom vedeckom podujatí: "Analytical methods in the service conservation and resoration work"

Annual Conference - Konferencia: "BIT s 3th Annual Conference and EXPO of Analytic 2014"

ARG - Alumni-Referentin und Geschäftsführerin des Alumni-Vereins

Borate and Phosphate - Konferencia: Borate and Phosphate conferences.

CESTC - Účasť na konferencii: "Central European Symposium on Theoretical Chemistry"

CMS - Medzinárodná konferencia: "51th Clay Minerals Society Annual meeting"

DRC - Účasť na výročnej konferencii: "Danube Rector Conference"

EPDIC - Konferencia: European Powder Diffraction Meeting XIV

ESAS - ESAS 2014 and 15th Czech-Slovak Spectroscopic Conference

ESG - 12th ESG Conference 2014

Glass and modern technologies - XXI - Konferencia: "Glass and modern technologies - XXI"

ICC5 - 5th International Congress on Ceramics

ICEACC - 38th International Conference and Exposition on Advanced Ceramics and Composites

IDMS - Účasť na konferencii: "International Days of Material Science"

Inside Raman - Workshop: "Inside Raman 2014".

International Symposium - 8 th International Symposium on Nitrides in Conjunction with the 7th International Workshop on Spinel Nitrides and related Materials and the Marie Curie

IUPAC - Medzinárodná konferencia: 25th IUPAC 2014 Symposium on Photochemistry

IWLM - 5th International Workshop on Layered Materials Mulhouse

Konferencia o skle - Česká a Slovenská konferencia o skle

MECC - 7th Mid-European Clay Conference

Modern Methods in Quantum Chemistry - VII Workshop on Modern Methods in Quant. Chem.

Modern Methods in Quantum Chemistry - VII Workshop on Modern Methods in Quantum Chemistry

Modern Methods in Quantum Chemistry - VII Workshop on Modern Methods in Quant. Chem.

pNMR - pNMR FP7-PEOPLE-2012-ITN

REFRA and HITHERM - Konferencia: REFRA and HITHERM 2014

Rozhovory o krystalografii - 295. "Rozhovory o krystalografii"

Sanibel Symposium - Sanibel Symposium 2014

seminár - Seminár - Týden materiálových charakteristik

SiAlONs - Konferencia: 4th International Symposium on SiAlONs and Non-oxides

Stekloprogress - Medzinárodná konferencia: "Stekloprogress - XXII"

Symposium on Nitrides - 8th International Symposium on Nitrides

WATOC - 10th Congress of the World Association of Theoretical and Computational Chemists

Workshop on „Advanced Materials - Účasť na konferencii: "2nd V4-JST Workshop on „Advanced Materials"

Workshop on „Advanced Materials" - Účasť na konferencii: "2nd V4-JST Workshop on „Advanced Materials"

Zjazd chemických spoločností - 66 zjazd chemických spoločností