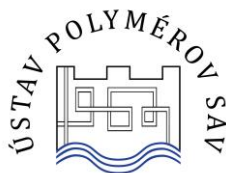


Ústav polymérov SAV



**Správa o činnosti organizácie SAV
za rok 2018**

Bratislava
január 2019

Obsah osnovy Správy o činnosti organizácie SAV za rok 2018

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1. Základné údaje o organizácii

1.1. Kontaktné údaje

Názov: Ústav polymérov SAV

Riaditeľ: Ing. Igor Lacík, DrSc.

1. zástupca riaditeľa: Mgr. Jaroslav Mosnáček, DrSc.

2. zástupca riaditeľa: Ing. Zuzana Hloušková

Vedecký tajomník: neuvedený

Predseda vedeckej rady: Mgr. Juraj Kronek, PhD.

Člen snemu SAV: Ing. Igor Lacík, DrSc.

Adresa: Dúbravská cesta 9, 845 41 Bratislava 45

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Tel.: 02/3229 4307

Fax:

E-mail: upolpodh@savba.sk

Názvy a adresy detašovaných pracovísk:

- **Detašované pracovisko Ústavu polymérov SAV**
ul. Gen. Svobodu 1069/4, 958 01 Partizánske
- **Detašované pracovisko Ústavu polymérov SAV - Pavilón materiálových vied**
Dúbravská cesta 9/6319, Bratislava

Vedúci detašovaných pracovísk:

- **Detašované pracovisko Ústavu polymérov SAV**
Prof. Ing. Ivan Chodák, DrSc.
- **Detašované pracovisko Ústavu polymérov SAV - Pavilón materiálových vied**
Ing. Mária Omastová, DrSc.

Typ organizácie: Príspevková od roku 1993

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			
Celkový počet zamestnancov	85	33	52	11	19	75	58.96	38.81
Vedeckí pracovníci	44	21	23	4	9	34	33.89	32.41
Odborní pracovníci VŠ (výskumní a vývojoví zamestnanci ¹)	23	9	14	7	9	23	7.95	6.4
Odborní pracovníci VŠ (ostatní zamestnanci ²)	1	0	1	0	0	1	1	0
Odborní pracovníci ÚS	14	2	12	0	1	14	13.65	0
Ostatní pracovníci	3	1	2	0	0	3	2.47	0

¹ odmeňovaní podľa 553/2003 Z.z., príloha č. 5² odmeňovaní podľa 553/2003 Z.z., príloha č. 3 a č. 4

K – kmeňový stav zamestnancov v pracovnom pomere k 31.12.2018 (uvádzať zamestnancov v pracovnom pomere, vrátane riadnej materskej dovolenky, zamestnancov pôsobiach v zahraničí, v štátnych funkciách, členov Predsedníctva SAV, zamestnancov pôsobiach v zastupiteľských zborech)

F – fyzický stav zamestnancov k 31.12.2018 (bez riadnej materskej dovolenky, zamestnancov pôsobiach v zahraničí v štátnych funkciách, členov Predsedníctva SAV, zamestnancov pôsobiach 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 31.12.2018)

Rodová skladba	Pracovníci s hodnosťou				Vedeckí pracovníci v stupňoch		
	DrSc.	CSc./PhD.	prof.	doc.	I.	II.a.	II.b.
Muži	7	14	1	0	7	10	4
Ženy	1	24	0	0	1	5	17

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
Muži	5	4	1	9	0	0	1	2	3
Ženy	8	6	4	2	1	0	2	3	1

Tabuľka 1d Priemerný vek zamestnancov organizácie k 31.12.2018

	Kmeňoví zamestnanci		Vedeckí pracovníci		Riešitelia projektov	
	A	B	A	B	A	B
Muži	44.4	45.7	48.0	46.1	43.1	45.0

Ženy	42.3	44.3	37.7	37.3	39.7	42.8
Spolu	43.1	44.8	42.6	41.5	41.3	43.9

A - Prepočet bez zohľadnenia úväzkov zamestnancov

B - Prepočet so zohľadnením úväzkov zamestnancov

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

V prvom polroku 2018 sa Ústav polymérov SAV spolu s ostatnými ústavmi SAV pripravoval na dlhodobu plánovanú transformáciu ústavu na verejno-výskumnú inštitúciu. Postupne boli na Ministerstvo školstva SR dodané podklady potrebné k uskutočneniu transformácie, ktorá sa mala konať 1. júla 2018. Ministerstvo školstva však prejavilo zamietavý postoj, ktorý pretrvával počas všetkých ďalších rokovaní s Predsedníctvom SAV. Počas tohto obdobia sa uskutočnili voľby členov Správnej rady (10. júl 2018). Keďže ústav nemal definovanú žiadnu právnu formu svojej existencie, nebolo možné v tomto kritickom období uzatvárať nové spolupráce a zmluvy vykonávať nákupy, prijímať hostí. Po právnych sporoch medzi ústavmi SAV a Ministerstvom školstva SR sa ústavy SAV vrátili na pôvodnú formu príspevkovej organizácie.

V roku 2018 sa skončilo druhé funkčné obdobie riaditeľa Ing. Igora Lacíka, DrSc. a vo voľbách 3. decembra 2018 bol zvolený nový riaditeľ Mgr. Jaroslav Mosnáček, DrSc.

V tomto roku boli úspešne ukončené 3 SASPRO projekty, riešili sa 2 projekty Horizont 2020 (Nano2Day, EUSMI) a pribudol aj jeden ERA-NET projekt (NANO2COM). Na projektoch sa ústav zmluvne podieľal. Tieto projekty všeobecne predstavujú kvalitatívny rast pre zúčastnených vedeckých pracovníkov a doktorandov a tiež prispievajú k vylepšeniu ekonomickej situácie ústavu. V roku 2018 sa ústav naďalej zmluvne podieľal aj na štyroch COST projektoch. Okrem toho boli finančne dobre podporené aj projekty 2-SRA-2018-521-S-B, projekt BASF AG a PlasticFreeDanube. Na ústave bolo uzavretých aj viac Medziakademických dohôd, konkrétne s Poľskom, Českom, Maďarskom a Bulharskom, a ústav koordinoval 2 projekty DS-APVV a jeden bilaterálny projekt so Srbskom financovaný tiež z prostriedkov APVV. V tomto období naďalej pokračovala spolupráca s Kóreou v projekte V4-Kórea a s Kóreou a Tureckom v projekte KONNECT ako aj s Portugalskom. Spolu bolo na ústave riešených 21 APVV projektov, pričom 8 z nich koordinoval Ústav polymérov SAV a zo 14-tich riešených VEGA projektov figuroval Ústav polymérov SAV v 11-tich ako koordinátor. V roku 2018 podal ústav 4 ERA-NET projekty, z ktorých bol zatiaľ jeden zamietnutý a dva postúpili do druhého kola posudzovania, v jednom z nich je koordinátorom Ústav polymérov SAV. Bol podaný aj významný The Chicago Diabetes Project. V novembri 2018 bolo podaných celkovo 10 APVV projektov, z toho v ôsmich je Ústav polymérov SAV nositeľom projektu a v dvoch sa zmluvne podieľa na riešení projektu. Tieto projekty by mali byť vyhodnotené v prvej polovici roku 2018. Z troch podaných bilaterálnych APVV projektov je zatiaľ schválený bilaterálny projekt s Kórejskou republikou. Ďalšie podané medzinárodné projekty zahŕňajú okrem spolupráce s európskymi štátmi aj spoluprácu s Čínou a Taiwanom (zamietnutý).

Ústav poskytol aj v tomto období štartovací grant, podporujúci myšlienky vedeckých pracovníkov, ktoré by sa mohli zdať grantovým agentúram príliš smelé. V roku 2018 získali na základe vypracovanej písomnej formy a ústnej prezentácie tento grant dvaja uchádzači, Falko Pippig a Maroš Smolíček.

Ústav navštívilo viacero vedeckých pracovníkov v rámci medziakademických a iných dohôd. Dlhší pracovný pobyt na ústave absolvovali vedeckí pracovníci z Egypta, Iránu, Poľska, Srbska a Ukrajiny.

Na ústave pôsobili aj študenti stredných a vysokých škôl na Slovensku ako aj zahraniční študenti vysokých škôl, ktorých pobyty na ústave boli hradené agentúrou SAIA a ERASMUS programom. Je potrebné vyvíjať úsilie pre získanie doktorandov už počas ich vysokoškolského štúdia, čo si vyžaduje aktívnejšie a efektívnejšie prezentovanie Ústavu polymérov SAV v ich radoch.

V roku 2018 boli na Ústave polymérov SAV 4 vedeckí pracovníci preradení do kategórie IIa, Falko Pippig, PhD., Mgr. Katarína Mosnáčková, PhD., Abolfazl Heydari, PhD. a Cristian Peptu, PhD.

2. Vedecká činnosť

2.1. Domáce projekty

Tabuľka 2a Domáce projekty riešené v roku 2018

ŠTRUKTÚRA PROJEKTOV	Počet		Čerpané financie (€)					
	A	B	A				B	
			Zo zdrojov SAV		Z iných zdrojov		Zo zdrojov SAV	Z iných zdrojov
			Spolu	Pre organizáciu	Spolu	Pre organizáciu		
1. Projekty VEGA	11	3	-	-	-	101861	-	6045
2. Projekty APVV	8	13	-	-	-	220176	-	132596
3. Projekty OP ŠF	0	0	-	-	-	-	-	-
4. Projekty SASPRO	0	0	-	-	-	-	-	-
5. Projekty centier excelentnosti SAV	0	0	-	-	-	-	-	-
6. 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 Domáce projekty podané v roku 2018

Štruktúra projektov	Miesto podania	Organizácia nositeľom projektu	je Organizácia sa zmluvne podieľa na riešení projektu
1. Účasť na nových výzvach APVV r. 2018	-	11	2
2. Projekty výziev OP ŠF podané r. 2018	Bratislava	1	
	Regióny		

2.2. Medzinárodné projekty

2.2.1. Medzinárodné projekty riešené v roku 2018

Tabuľka 2c Medzinárodné projekty riešené v roku 2018

ŠTRUKTÚRA PROJEKTOV	Počet		Čerpané financie (€)					
	A	B	A				B	
			Zo zdrojov SAV		Z iných zdrojov		Zo zdrojov SAV	Z iných zdrojov
			Spolu	Pre organizáciu	Spolu	Pre organizáciu		
1. Projekty 7. RP EÚ a Horizont 2020	3	2	-	87319	-	57959	-	4000
2. Projekty ERA.NET, ESA, JRP	0	2	-	-	-	-	-	20833
3. Projekty COST	0	4	-	-	-	-	-	-
4. Projekty EUREKA, NATO, UNESCO, CERN, IAEA, IVF, ERDF a iné	3	2	-	-	-	11713	316	26441
5. Projekty v rámci medzivládnych dohôd	0	0	-	-	-	-	-	-
6. Bilaterálne projekty MAD	5	0	-	-	-	-	-	-
7. Bilaterálne projekty ostatné	3	2	-	-	-	-	-	-
8. Podpora MVTs z národných zdrojov (SAV, APVV a iné)	3	6	-	-	-	6794	-	26907
9. Iné projekty	1	0	-	-	-	94458	-	-

A - organizácia je nositeľom projektu

B - organizácia sa zmluvne podieľa na riešení projektu

2.2.2. Medzinárodné projekty Horizont 2020 podané v roku 2018

Tabuľka 2d Počet projektov Horizont 2020 v roku 2018

	A	B
Počet podaných projektov Horizont 2020	0	0

A - organizácia je nositeľom projektu

B - organizácia sa zmluvne podieľa na riešení projektu

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

2.2.3. Zámery na čerpanie štrukturálnych fondov EÚ v ďalších výzvach

V roku 2018 bol podaný projekt **Biodegradovateľné plastové materiály pre náročné aplikácie** - zodpovedný riešiteľ za Ústav polymérov SAV **Ing. Ivan Chodák, DrSc.**, v spolupráci so spoluriešiteľskými organizáciami TUKE Košice, FCHPT STU Bratislava, UCM Trnava, VIPO a.s. Partizánske, Vegum, a.s. Dolné Vestenice v rámci schémy financovania **Štrukturálne fondy - Priemysel pre 21. storočie** - projekt čaká na vyhodnotenie

Pripravuje sa projekt **TickFreeTech: Progresívne funkčné polymérne materiály s antiparazitárnym účinkom** - zodpovedná riešiteľka a koordinátorka projektu za Ústav polymérov SAV **Mgr. Katarína Mosnáčková, PhD.**, spoluriešitelia z organizácie: I. Chodák, I. Lacík, J. Mosnáček, I. Novák, spoluriešiteľské inštitúcie: UVLF, SPU, UPJŠ, FEI TUKE, NbU BMC SAV, Chemosvit Fibrochem, a.s.- projekt sa pripravuje na podanie v rámci schémy financovania **DSV priemysel - podpora dlhodobého strategického výskumu - Priemysel pre 21. storočie**

2.3. Najvýznamnejšie výsledky vedeckej práce (maximálne 1000 znakov + 1 obrázok; bibliografický údaj uvádzajte rovnako ako v zozname publikačnej činnosti, vrátane IF)

2.3.1. Základný výskum

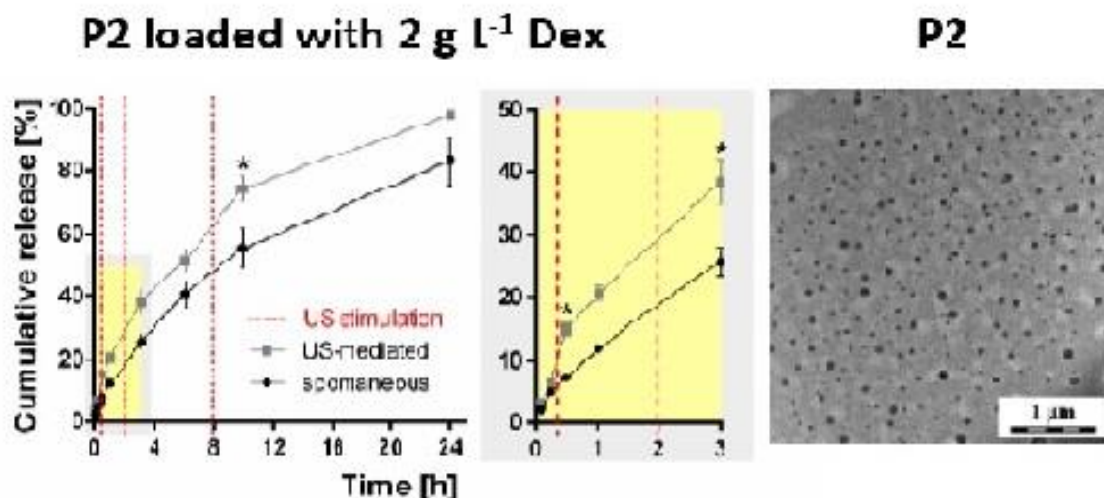
Názov: **Stimuli-senzitívne častice na báze poly(2-oxazolínov) pre kontrolované uvoľňovanie liečiv. Stimuli sensitive nanoparticles based on poly(2-oxazolines) for controlled drug delivery.**
Ústav polymérov SAV

Riešitelia: **J. Kronek, A. Zahoranová, M. Majerčíková, M. Smolíček, P. Šrámková, A. Kleinová**

Projekt: VEGA 2/0124/18, APVV 15-0485

Kontrolované uvoľňovanie liečiva z polymérneho nosiča pomocou externého alebo interného stimulu vedie k zvýšeniu efektivity uvoľňovania a k zníženiu vedľajších účinkov liečby. Náš výskum bol zameraný na štúdium vplyvu dvoch stimulov, ultrazvuku a teploty, na uvoľňovanie protizápalového liečiva dexametazónu z častíc pripravených samousporiadaním amfifilných dvoj- a trojblokových kopolymérov na báze poly(2-oxazolínov). Použitie ultrazvuku sa ukázalo ako efektívny spôsob urýchlenia uvoľňovania dexametazónu z pripravených častíc, pričom sa pozoroval efekt zloženia kopolymérov na rýchlosť uvoľňovania liečiva. Zvýšenie efektu ultrazvuku na rýchlosť uvoľňovania liečiva je možné dosiahnuť zabudovaním mechanolabilnej väzby do štruktúry polyméru. V našom prípade bola mechanolabilná disulfidická väzba do reťazca zavedená prostredníctvom dvojfunkčného brómesterového iniciátora. Sledovali sme tiež schopnosť dvojblokových poly(2-oxazolínov) odpovedať na teplotný stimul. Zistili sme, že kým blokové kopolyméry bez liečiva vykazujú termosenzitívne správanie sprevádzané zákalom alebo tvorbou nanočastíc, po enkapsulácii liečiva sa termosenzitívne správanie vo väčšine prípadov vytrácalo.

V špeciálnych prípadoch sme však pozorovali teplotou indukovaný vznik mikročastíc s veľkosťou okolo 10 μm .



Urychlené uvoľňovanie dexametazónu z poly(2-oxazolíkových) častíc pomocou ultrazvuku (vľavo), TEM snímka polymérnych častíc (vpravo).

Výstupy:

1. SALGARELLA, A. R. - ZAHORANOVÁ, A. - ŠRÁMKOVÁ, P. - MAJERČÍKOVÁ, M. - PAVLOVA, E. - LUXENHOFER, R. - KRONEK, J. - LACÍK, I. - RICOTTI, L. Investigation of drug release modulation from poly(2-oxazoline) micelles through ultrasound. In *Scientific Reports*, 2018, vol. 8, art. no. 9893. (4.122 - IF2017).
2. SMOLÍČEK, M. - ZAHORANOVÁ, A. - ŠRÁMKOVÁ, P. - LACÍK, I. - KRONEK, J. Synthesis of functional initiators: towards controlled degradation of poly(2-oxazoline)s. In *Bio-Based Polymers and Composites : BiPoCo 2018 : 4th International Conference : abstract book*. - Budapest, Hungary : Hungarian Academy of Sciences, 2018, p. 233-234.
3. MAJERČÍKOVÁ, M. - ZAHORANOVÁ, A. - KRONEK, J. Uvoľňovanie protizápalového liečiva dexametazónu z termosenzitívnych poly(2-oxazolínov). In *PREVEDA : interaktívna konferencia mladých vedcov 2018. Book of abstracts*. - Bratislava : Občianske združenie PREVEDA, 2018, abstrakt č. 1766. ISBN 978-80-972360-2-1. (Interaktívna konferencia mladých vedcov 2018).
4. ZAHORANOVÁ, A. - SALGARELLA, A.R. - MAJERČÍKOVÁ, M. - ŠRÁMKOVÁ, P. - PAVLOVA, E. - LUXENHOFER, R. - KRONEK, J. - LACÍK, I. - RICOTTI, L. Modulation of drug release from poly(2-oxazoline) micelles by physical stimuli. In *Polymery 2018 : X. Česko-slovenská konference : sborník abstraktů*. - Praha, ČR: ÚMCh AV ČR, v.v.i., 2018, p. 37. ISBN 978-80-85009-92-7.

Názov: **Jednoduché terciárne amíny ako promótoři pri fotochemicky indukovanej radikálovej polymerizácii s prenosom atómu. Simple tertiary amines as promoters in oxygen tolerant photochemically induced ATRP.**

Ústav polymérov SAV

Mená riešiteľov: **D. Bondarev, J. Mosnáček**

Projekty: APVV-15-0545

Fotoindukovaná ATRP je založená na tvorbe aktivátora absorpciou žiarenia deaktivátorom a následným jedoelektrónovým prenosom, pričom dochádza k deaktivácii rastúceho radikálu. V takomto prípade je možné uskutočniť polymerizáciu pri izbovej teplote s ppm množstvami katalyzátora a bez potreby prídavku redukčného činidla. Nedávno sme ukázali, že mierny nadbytok dusíkatého ligandu vedie k polymerizácii i v prítomnosti kyslíku, ktorý je v priebehu indukčnej periódy spotrebovaný. Optimalizáciou systému sme dosiahli to, že nadbytok pomerne drahého ligandu je možné nahradiť jednoduchými lacnými amínmi ako napr. trietylaminom pri zachovaní dobre kontrolovanej polymerizácie, vzhľadom na úzku disperzitu a kontrolovanú mólovú hmotnosť polymérov, ako aj možnosti prípravy blokových kopolymérov. Veľkou výhodou takého usporiadanie je nízka cena, dobrá reprodukovateľnosť a prevedenie reakcie pri nízkych teplotách bez potreby odstraňovania vzduchu z polymerizačnej zmesi.

Výstupy:

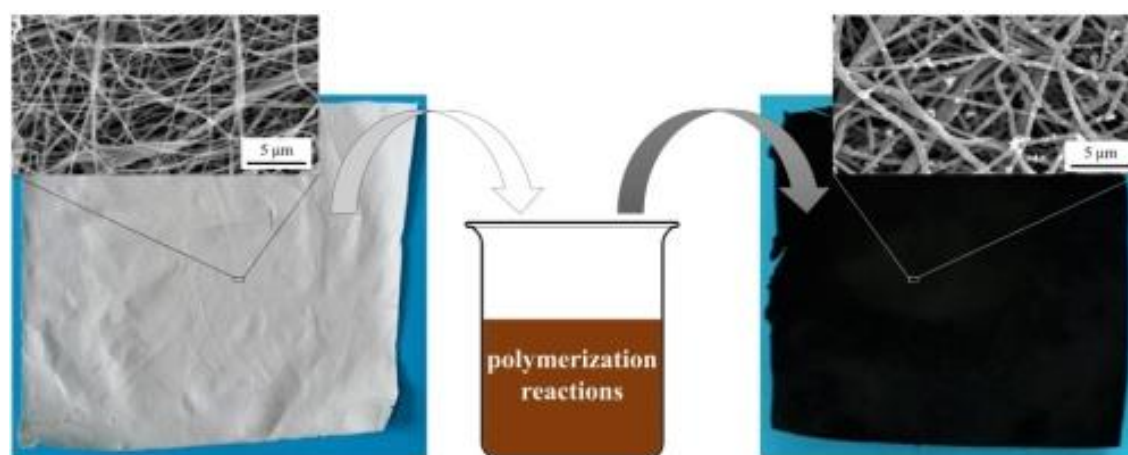
1. BONDAREV, D. - BORSKÁ, K. - ŠORAL, M. - MORAVČÍKOVÁ, D. - MOSNÁČEK, J. Simple tertiary amines as promoters in oxygen tolerant photochemically induced ATRP of acrylates. In *Polymer : the International Journal for the Science and Technology of Polymers*, vol. 161, p. 122-127 (3.483 - IF2017). ISSN 0032-3861. Typ: **ADCA**
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Názov: **Polymérne nanovlákná pripravené elektrostatickým zvlákňovaním pre pokročilé aplikácie. Electrospun polymeric nanofibers for advanced application.**

Ústav polymérov SAV

Mená riešiteľov: **M. Omastová, E. Číková, M. Mičušík, J. Kulíček, M. Procházka**

Projekty: VEGA 2/0010/18



Príprava vodivých PCL/PPy vlákien polymerizáciou pyrolu na povrchu PCL-pyrolových vlákien pripravených elektrostatickým zvlákňovaním.

Metódou elektrostatického zvlákňovania boli pripravené nové typy nanovlákní vo forme netkaných textílií na báze etylénvinylacetátového kopolyméru a kyseliny polymliečnej, polyvinylpyrolidónu (PVP) s obsahom polysacharidu tragantovej gummy a polykaprolaktónu/polypyrolu (PCL/PPy). PCL/PPy vlákna boli pripravené použitím originálneho prístupu. Ako prvý

krok sa zmiešal roztok PCL a pyrolový monomér. Prítomnosť pyrolového monoméru v pripravených vláknach bola potvrdená ToF-SIMS analýzou. Pripravené vlákna boli ponorené do roztoku oxidačného činidla obsahujúceho pyrolový monomér a aniónový tenzid. Elektricky vodivé netkané textílie sa pripravili s rôznymi pomermi PCL k pyrolovému monoméru. Prítomnosť polypyrolového povlaku na pripravenej PCL subštruktúre bola overená Fourierovou transformovanou infračervenou spektroskopiou (FTIR), röntgenovou fotoelektrónovou spektroskopiou (XPS) a štúdiom morfológie pripravených produktov. Pripravené nanovlákná boli homogénne potiahnuté polypyrolom a vzorky obsahujúce najmenej 40 hmotnostných % vodivej zložky dosiahli elektrickú vodivosť vyššiu ako 1 S/cm. Pri ďalšom zvyšovaní obsahu polypyrolu sa vodivosť zvýšila na 9 S/cm. Vzhľadom na to, že PCL/PPy vlákna nie sú toxické, pretože bola dokázaná biokompatibilita s polypyrolom, môže tento materiál nájsť použitie v bioelektronike.

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2.3.2. Aplikačný typ

Názov: **Antibakteriálne nanokompozity na báze kvantových bodiek. ANTibacterial GRaphene/POLymer NANOcomposite.**

Ústav polymérov SAV

Mená riešiteľov: **Z. Markovič**

Projekty v rámci ktorých sa výsledok dosiahol: SASPRO 1237/02/02



Ukážka rastu *S. aureus* na polymérnom kompozite A) bez ožiarovania, B) po hodinovom ožarovaní, C) ukážka priehľadnosti takto pripravených antibakteriálnych kompozitov

Popis výsledku: Uskutočnili sa antibakteriálne testy a testy biokompability pre polyméry na báze PDMS a PU s dopovanými hydrofóbnymi CQD. V prípade PU kompozitov sa navyše sledoval efekt po gama ožiarení. Okrem toho sa pripravili nové typy CQD, ktoré boli dopované chlóróm a fluórom. Získal sa fotosenzitívny polymérny kompozit CQD/PDMS, ktorý eradikuje E. coli a S. aureus už po jednej hodine ožarovania viditeľným svetlom z LED diódy. Ak sa rovnaký kompozit na báze PU ožiaril gama žiarením, antibakteriálna účinnosť sa dosiahla už po minútach ožarovania LED svetlom.

Výstupy:

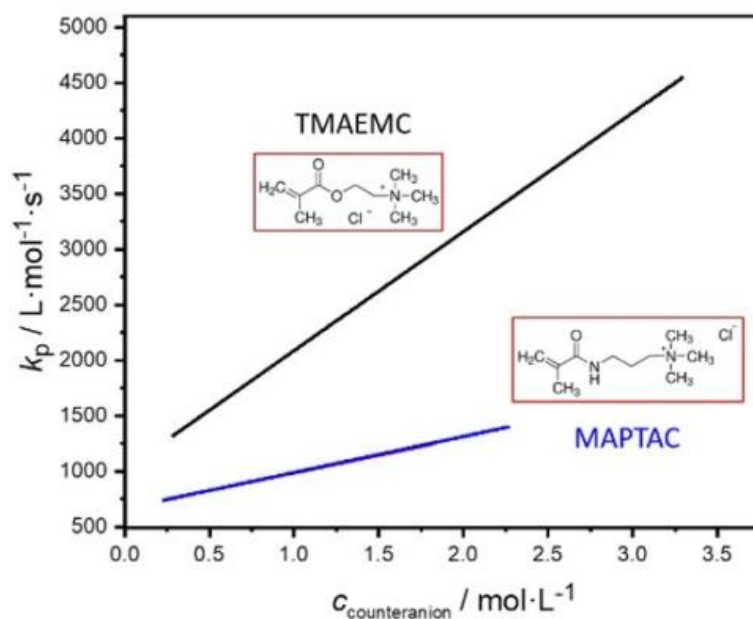
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2. STANKOVIĆ, N.K. - BODIK, M. - ŠIFFALOVIČ, P. - KOTLAR, M.- MIČUŠÍK, M.- ŠPITÁLSKY, Z. - DANKO, M. - MILIVOJEVIĆ, D.D. - KLEINOVÁ, A. - KUBAT, P. - CAPAKOVA, Z. - HUMPOLIČEK, P. - LEHOCKY, M. - TODOROVIC MARKOVIĆ, B. M. - MARKOVIĆ, Z.M.. Antibacterial and antibiofouling properties of light triggered fluorescent hydrophobic carbon quantum dots langmuir-blodgett thin films. In ACS Sustainable Chemistry & Engineering, 2018, vol. 6, p. 4154-4163. (6.140 - IF2017). (2018 - Current Contents). ISSN 2168-0485. Typ: ADCA
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4. BODIK, M. - ŠIFFALOVIČ, P. - NÁDAŽDY, P. - BENKOVIČOVÁ, M. - MARKOVIĆ, Z.M. - CHLPIK, J. - CIRAK, J. - KOTLÁR, M. - MIČUŠÍK, M.- JERGEL, M. - MAJKOVÁ, E. On the formation of hydrophobic carbon quantum dots Langmuir films and their transfer onto solid substrates. In Diamond and Related Materials, 2018, vol. 83, p. 170-176. (2.232 - IF2017). ISSN 0925-9635. Typ: ADCA

Názov: **Mechanizmus a kinetika radikálovej polymerizácie nabitých monomérov. Mechanism and kinetics of radical polymerization for charged monomers.**

Ústav polymérov SAV

Riešitelia: **A. Chovancová, E. Habánková, E. Hipká, I. Lacík.**

PROJEKT: Projekt medzi Ústavom polymérov SAV a Queens University Kingstone financovaný BASF SE Ludwigshafen



Hodnoty k_p pre TMAEMC a MAPTAC monoméry pri 25°C v závislosti od celkovej koncentrácie protiónu v systéme

Naše oddelenie má dlhodobú expertízu v štúdiu mechanizmu a kinetiky radikálovej polymerizácie vodorozpuštných monomérov vo vodnej fáze. Táto expertíza je založená na určení presných rýchlostných konštánt individuálnych reakcií až po simulácie priebehu polymerizácie a distribúcií molekulových hmotností. Základom je určenie rýchlostnej konštanty propagácie, k_p , pomocou metódy pulznej laserovej polymerizácie v prepojení na gélovú permeačnú chromatografiu (PLP-SEC). V poslednom období sme sa zamerali na metakrylátové kationové monoméry ako novú skupinu nabitých monomérov: [2-(metakryloyloxy)etyl]trimetylamóniumchlorid (TMAEMC) a [3-(metakryloylamino)propyl]trimetylamóniumchlorid (MAPTAC). V tejto oblasti neexistujú doteraz žiadne informácie o rýchlostných konštantách čiastkových dejov radikálovej polymerizácie. Obtiažnosť štúdia týchto systémov spočíva v pochopení vplyvu protiónov na polymerizačný proces, v nastavení podmienok PLP a v analýze vzniknutých polymérov SEC metódou. Naša práca viedla k súboru k_p hodnôt, ktoré poukazujú na významný vplyv koncentrácie protiiónov, ktorá priamo úmerne zvyšuje k_p hodnoty. Zaujímavým novým javom je, že tento vplyv je rôzny pre rôzne monoméry, čo poskytuje možnosť kontrolovať rýchlosť rastu reťazca jednoduchým pridaním soli do polymerizačného systému. Zistené Arrheniove parametre zaraďujú tieto monoméry do skupiny ionizovaných metakrylátových monomérov bez ohľadu na typ náboja.

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3. CHOVANCOVÁ, A.- HABÁNKOVÁ, E. - BRNGALOVÁ, V. - BARLOG, M. - LACÍK, I. Charges and propagation kinetics in radical polymerization. In *Polymery 2018: X. Česko-slovenská konference : sborník abstraktů*. - Praha, ČR : Ústav makromolekulární chemie AV ČR, v.v.i., 2018, p. 35. ISBN 978-80-85009-92-7, prednáška

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Názov: Mikropórovité uhlíkové vlákna pripravené kontrolovanou karbonizáciou celulózy. Microporous carbon fibers prepared by controlled carbonization of cellulose.

Ústav polymérov SAV

Riešitelia: **D. Berek, Ivan Novák**

V spolupráci s partnermi v Turecku sme sa zamerali na optimalizáciu využitia nášho kompozitného sorbenta na odstraňovanie iónov škodlivých kovov z pitnej vody. Okrem toho sme sa venovali príprave katalyzátorov, v ktorých ako nosiče aktívnych častíc slúžili naše mikropórovité uhlíkové vlákna. Nevýlučnú licenciu na know-how pokrytú v tomto roku udelenom patente odkúpila švajčiarska firma Aquatech-Water.com.

Výstupy:

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2.3.3. Medzinárodné vedecké projekty

Názov: Nová generácia viackomponentných PMCG mikrokapsúl s kontrolovaným povrchom pre vyhnutie sa imunitnej odpovedi po transplantácii. New generation PMCG multicomponent microcapsule with tailored biointerface to avoid immune response after transplantation

Ústav polymérov SAV

Mená riešiteľov: **D. Treľová, L. Kleščíková, V. Raus, Z. Kroneková, M. Pelach, L. Uhelská, A. Heydari, I. Lacík**

Projekty: JDRF 2-SRA-2018-521-S-B, APVV-14-0858, Chicago Diabetes Project

Enkapsulácia pankreatických ostrovčiek určených pre liečbu cukrovky typu I je už dlhodobo jednou z nosných tém oddelenia. Naša tzv. PMCG multikomponentná mikrokapsula prešla v poslednom období významným re-dizajnom. Dôvodom na tento krok bola skutočnosť, že komerčne polymérne komponenty PMCG mikrokapsuly buď prestali byť dostupné (sodná soľ sulfátu celulózy, SCS) alebo menili svoje vlastnosti (poly(metylén-ko-kyanoguanidín), PMCG), čo znemožnilo optimalizovať tieto mikrokapsuly smerom k predklinickému modelu primátov. Rôzne typy syntetizovaných polymérov viedli k vytvoreniu prvej knižnice PMCG mikrokapsúl. U týchto mikrokapsúl sa sledovala hlavne schopnosť použitých polymérov tvoriť mikrokapsuly v určitom

rozsahu enkapsulačných podmienok a tendencia mikrokapsúl obrastať fibrotickým tkanivom po transplantácii do imunokompetentných myší. Celkovo väčšina mikrokapsúl vykazovala minimálne obrastanie fibrotickým tkanivom, t.j. biokompatibilita mikrokapsúl sa javí byť postačujúca. Prvé transplantácie ukázali schopnosť PMCG mikrokapsúl zabezpečiť imunitnú ochranu, viabilitu a funkčnosť enkapsulovaných ostrovčekov. Tieto výsledky sú nádejné pre plánovanie prvých experimentov v primátoch.

Výstupy:

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2. BOCHENEK, M.A. - VEISEH, O. - VEGAS, A.J. - MCGARRIGLE, J.J. - QI, M. - MARCHESE, E. - OMAMI, M. - DOLOFF, J. C. - MENDOZA-ELIAS, J.-NOURMOHAMMADZADEH, M. - KHAN, A. - YEH, Ch.Ch. - XING, Y. - ISA, D. - GHANI, S. - LI, J. - LANDRY, C. - BADER, A. R. - OLEJNIK, K. - CHEN, M. - HOLLISTER-LOCK, J. - WANG, Y.- GREINER, D.L. - WEIR, G. C. - STRAND, B. L. - ROKSTAD, A. M. A. - LACÍK, I. - LANGER, R. - ANDERSON, D. G. - OBERHOLZER, J. Alginate encapsulation as long-term immune protection of allogeneic pancreatic islet cell transplanted into the omental bursa of macaques. In *Nature biomedical engineering*, 2018, vol. 2, no. 11, p. 810-821.
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4. KRONEKOVÁ, Z. Confocal laser scanning and Raman spectroscopy. In *Cell & Drug Encapsulation : 10th Training School on Microencapsulation : proceedings.* - Trondheim, Norway : Bioencapsulation Research Group & Norwegian University of Science and Technology, 2018, p. 68-75 (pozvaná prednáška)
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6. LACÍK, I. Hydrogel microspheres for cell encapsulation in next generation diabetes treatment. In *21th International seminar on physics and chemistry of solids*. Jan Dlugosz University, Czestochowa, Poland, 10.6.-13.6.2018 (pozvaná prednáška)

Názov: **Príprava a charakterizácia funkčných polyesterov kopolymerizáciou s otvorením kruhu laktónov. Preparation and characterization of functional polyesters by ring opening copolymerization of lactones.**

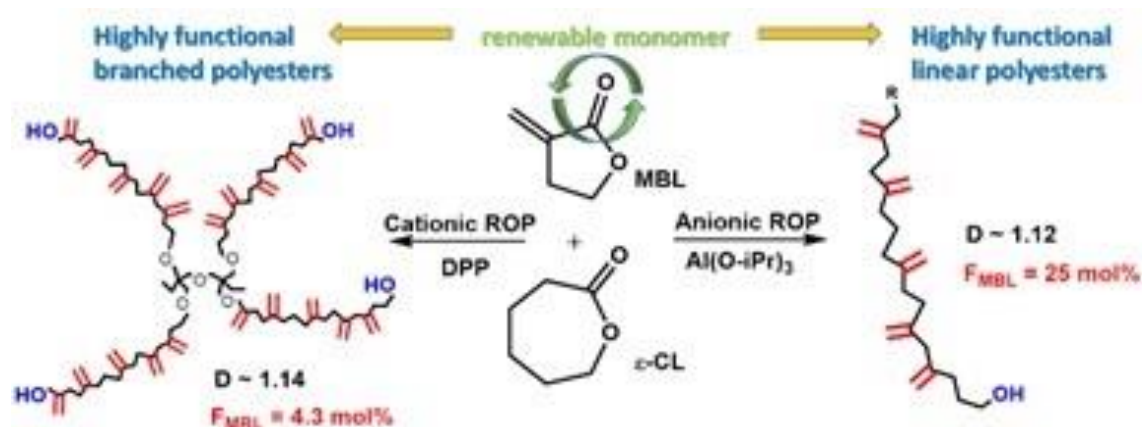
Ústav polymérov SAV

Mená riešiteľov: **M. Danko, J. Mosnáček**

Projekty: VEGA 2/0157/17, MAD SAV-PAV 2016-2018

Príprava biodegradovateľných polyesterov je stále intenzívne študovaná vďaka známym (dilaktid), ale aj novým laktónovým monomérom získavaných z obnoviteľných zdrojov. Takým monomérom je aj 5-článkový laktón Tulipalín A (α -metylén-g-butyrolaktón, α -MBL), ktorý obsahuje aj

exo-metylénovú dvojité väzbu vhodnú na post-funkcionalizáciu. Potvrdili sme možnosť prípravy lineárnych a vetvených kopolyesterov s ϵ -kaprolaktónom v podmienkach ROP za katalýzy $\text{Al}(\text{O}^i\text{Pr})_3$ alebo v podmienkach kationovej polymerizácie využitím bezkovového katalyzátora. Získali sme polyestery s nízkou disperzitou ($\bar{D} = 1.15\text{--}1.30$), pričom obsah MBL v kopolyméri bol 3–25 %. Rovnaký typ polymerizácie sme využili na prípravu dobre definovaných polylaktidov s koncovou pyrénovou funkcionálitou. Tú sme využili ako fluorescenčnú prílohu na sledovanie stereokomplexácie PLLA a PDLA enantiomérov v reálnom čase. Hlavným sledovaným parametrom bola tvorba exciméru pyrénu. Potvrdilo sa energeticky výhodnejšie paralelné (a-a-) usporiadanie reťazcov oproti antiparalelnému (a-w-), kde celkové množstvo exciméru bolo vyššie pre paralelnú tvorbu.



Výstupy:

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2. DANKO, M. - BASKO, M. - ĎURKÁČOVÁ, S. - DUDA, A. - MOSNÁČEK, J. Functional polyesters with pendant double bonds prepared by coordination-insertion and cationic ring-opening copolymerization of epsilon-caprolactone with renewable Tulipalin A. In *Macromolecules*, 2018, vol. 51, p. 3582–3596. (5.914 - IF2017). ISSN 0024-9297.

Názov: Vytváranie domén v chromatíne a odstraňovanie uzlov. Chromatin loop extrusion and chromatin unknotting

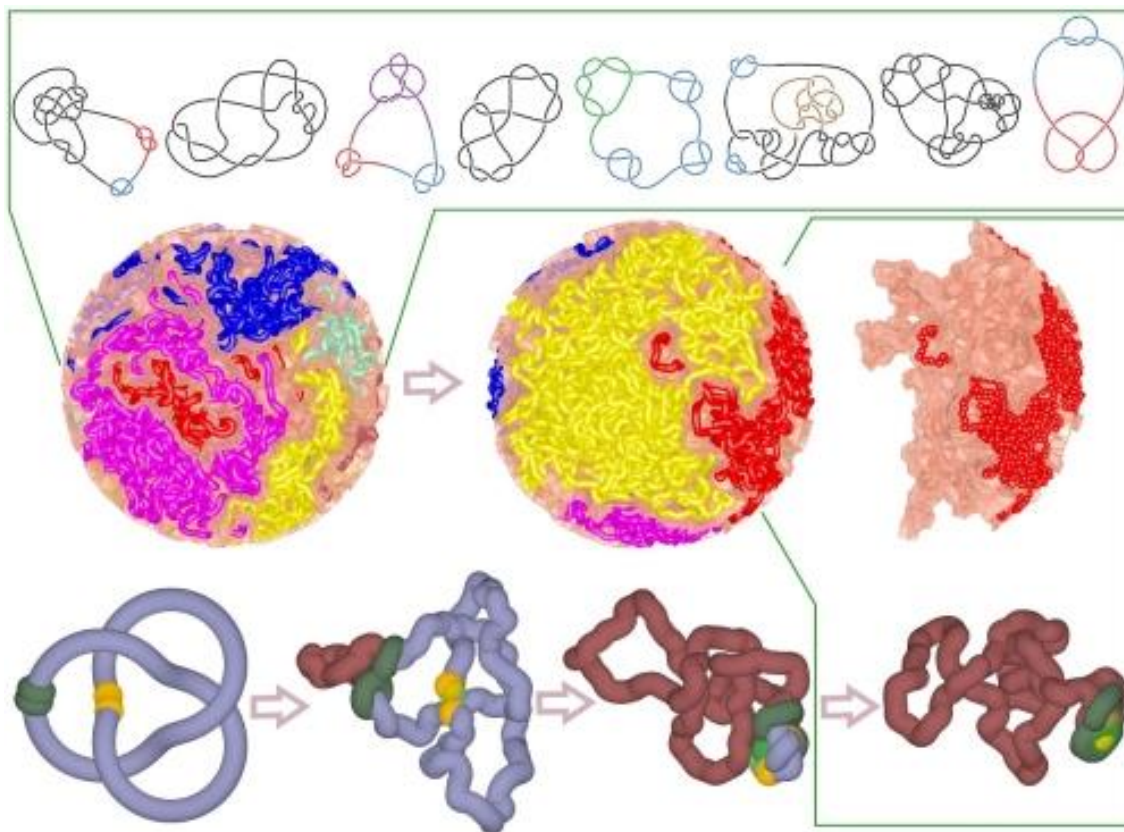
Ústav polymérov SAV, Université de Lausanne

Mená riešiteľov: **D. Račko, F. Benedetti, D. Goundaroulis, A. Stasiak**

Projekty: Leverhulme Trust RP2013-K-017, Swiss National Foundation 31003A_166684

Od roku 2012 sa vie, že vlákno tvoriace chromozóm t. j. chromatín je organizované do zhlukov nazvaných topologicky asociujúce domény. Vo vnútri domén je frekvencia vzájomných kontaktov častí chromatínu vyššia než kontakty s okolitým chromatínom, čo má význam pre kontrolu génovej expresie. Tieto zhluky sa nevytvárajú náhodne, ale majú svoju pevnú genetickú pozíciu na DNA a pravidelne sa obnovujú po mitotickom delení alebo po kontrolovaných zásahoch v experimentoch. Predpokladá sa, že pri tvorbe týchto domén hrá úlohu proteín zvaný kohezín a mechanizmus vytlačania chromatínu do slučiek cez kohezín. Otvorenou otázkou tohto mechanizmu je hnacia sila, ktorá vytláča chromatín cez kohezín, keďže experimenty ukázali že kohezín nespotrebuje pri posuve po chromatíne energiu. V našom modeli sme ukázali, že hnacou silou môže byť torzné

pnutie vytvárané prirodzene pri prepise DNA pomocou polymeráz. Druhou veľkou otázkou v biológii, na ktorú náš model poskytol odpoveď je, ako je možné, že zhluky a vlákna chromatínu nie sú zauzlené. Ukázali sme pomocou modelov, že kohezin pôsobí ako účinný molekulový hrebeň, ktorý zauzleniny pri svojom pohybe po vlákne vyčese smerom k topoizomerázam na okrajoch domén, ktoré zauzleniny odstraňuje. Model poskytol aj ďalší konzistentný obraz s experimentom vysvetľujúci efektívnu segregáciu jednotlivých chromozómov počas vyčesávania zauzlenín.



*Simulácia ôsmych polymérnych reťazcov predstavujúcich chromozómy stesnané v bunkovom jadre. Počiatočná štruktúra (**vl'avo**) bola generovaná náhodným krokom, a ako ukázala počítačová analýza pomocou vyvinutého softvérového balíka Knoto-ID, bola silne zauzlená. V **hornej časti** vidíme, že v štruktúre boli identifikované veľmi komplexné kompozitné uzly, pričom reťazce boli zároveň katenované – zreťazené. Počas tvorby domén pohybom kohezinu po vláknach chromatínu sa uzly aj zreťazenia odstránili mechanizmom ilustrovaným v **dolnej časti** obrázku. Po odstránení uzlov sa chromozómy segregovali do vlastných chromozomálnych oblastí, čo dodatočne ukázala aj analýza veľkosti rozhraní medzi chromozómami, ktorých veľkosť klesla na polovicu (**vp'ravo**).*

Výstupy:

1. RAČKO, Dušan - BENEDETTI, Fabrizio - GOUNDAROULIS, Dimos - STASIAK, Andrzej. Chromatin loop extrusion and chromatin unknotting. In Polymers : Open Access Polymer Science Journal, 2018, vol. 10, art.no. 1126. (2.935 - IF2017). ISSN 2073-4360
2. RAČKO, Dušan - BENEDETTI, Fabrizio - DORIER, Julien - STASIAK, Andrzej. Transcription-induced supercoiling as the driving force of chromatin loop extrusion during formation of TADs in interphase chromosomes. In Nucleic acids research, 2018, vol. 46, no. 4, p. 1648-1660. (11.561 - IF2017). ISSN 0305-1048.

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

Tabuľka 2e Štatistika vybraných kategórií publikácií

PUBLIKAČNÁ A EDIČNÁ ČINNOSŤ	Počet v r. 2018/ doplňky z r. 2017
1. Vedecké monografie a monografické štúdie vydané v domácich vydavateľstvách (AAB, ABB)	0 / 0
2. Vedecké monografie a monografické štúdie vydané v zahraničných vydavateľstvách (AAA, ABA)	0 / 0
3. Odborné monografie, vysokoškolské učebnice a učebné texty vydané v domácich vydavateľstvách (BAB, ACB, CAB)	0 / 0
4. Odborné monografie a vysokoškolské učebnice a učebné texty vydané v zahraničných vydavateľstvách (BAA, ACA, CAA)	0 / 0
5. Kapitoly vo vedeckých monografiách vydaných v domácich vydavateľstvách (ABD)	0 / 0
6. Kapitoly vo vedeckých monografiách vydaných v zahraničných vydavateľstvách (ABC)	4 / 0
7. Kapitoly v odborných monografiách, vysokoškolských učebniciach a učebných textoch vydaných v domácich vydavateľstvách (BBB, ACD)	0 / 0
8. Kapitoly v odborných monografiách, vysokoškolských učebniciach a učebných textoch vydaných v zahraničných vydavateľstvách (BBA, ACC)	0 / 0
9. Vedecké práce registrované v Current Contents Connect (ADCA, ADCB, ADDA, ADDB)	78 / 2
10. Vedecké práce registrované vo Web of Science Core Collection alebo Scopus (ADMA, ADMB, ADNA, ADN B)	16 / 2
11. Vedecké práce v ostatných domácich časopisoch (ADFA, ADFB)	0 / 0
12. Vedecké práce v ostatných zahraničných časopisoch (ADEA, ADEB)	2 / 0
13. Vedecké práce v domácich recenzovaných zborníkoch (AEDA)	0 / 0
14. Vedecké práce v zahraničných recenzovaných zborníkoch (AECA)	0 / 0
15. Publikované príspevky na domácich vedeckých konferenciách (AFB, AFD)	6 / 0
16. Publikované príspevky na zahraničných vedeckých konferenciách (AFA, AFC)	10 / 0
17. Vydané periodiká evidované v CCC, WoS Core Collection, SCOPUS	0
18. Ostatné vydané periodiká	0
19. Zostavovateľské práce knižného charakteru (FAI)	1 / 0
20. Preklady vedeckých a odborných textov (EAJ)	0 / 0
21. Heslá v odborných terminologických slovníkoch a encyklopédiách (BDA, BDB)	0 / 0
22. Recenzie v časopisoch a zborníkoch (EDI)	0 / 0

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

Tabuľka 2f Štatistika vedeckých prác podľa kvartilu vedeckého časopisu

Kvartil vedeckého časopisu	Q1	Q2	Q3	Q4	Spolu
Podľa IF z r. 2017 (zdroj JCR) <i>Počet článkov / doplnky 2016</i>	30 / 1	29 / 0	16 / 1	8 / 0	83 / 2
Podľa SJR z r. 2017 (zdroj Scimago) <i>Počet článkov / doplnky 2016</i>	47 / 1	29 / 1	6 / 2	12 / 0	94 / 4

Tabuľka 2g Ohlasy

OHLASY	Počet v r. 2017/ doplnky z r. 2016
Citácie vo WOS (1.1, 2.1)	1950 / 3
Citácie v SCOPUS (1.2, 2.2)	219 / 0
Citácie v iných citačných indexoch a databázach (9, 10, 3.2, 4.2)	0 / 0
Citácie v publikáciách neregistrovaných v citačných indexoch (3, 4, 3.1, 4.1)	0 / 0
Recenzie na práce autorov z organizácie (5, 6, 7, 8)	0 / 0

2.5. Aktívna účasť na vedeckých podujatiach

Tabuľka 2h Vedecké podujatia

Prednášky a vývesky na medzinárodných vedeckých podujatiach	86
Prednášky a vývesky na domácich vedeckých podujatiach	7

2.6. Vyžiadané prednášky

2.6.1. Vyžiadané prednášky na medzinárodných vedeckých podujatiach

1. **BEREK, Dušan** - NOVÁK, Ivan. Carbon fibers: Removal of heavy metals, color and radioactivity. Building Your Water Market : Geneva & Montreux Switzerland, Aqua Tech, 18. - 21.9. 2018
2. **BEREK, Dušan**. Liquid chromatography of synthetic polymers. 77th Global Summit on Stem Cell & Tissue Engineering and 78th World Conference on Analytical & Bioanalytical Chemistry : Barcelona, Spain, 23. - 24.7. 2018
3. **BEREK, Dušan**. Retention mechanisms in liquid chromatography of synthetic macromolecules. 77th Global Summit on Stem Cell & Tissue Engineering and 78th World Conference on Analytical & Bioanalytical Chemistry : Barcelona, Spain, 23. - 24.7. 2018
4. **BEREK, Dušan**. Molecular characterization of synthetic polymers with help of liquid chromatography. 18th International Conference on World Analytical Chemistry & Mass Spectrometry & World HPLC, Separation Techniques and Pharmacovigilance: Toronto, Canada, 29. - 30.8. 2018
5. **BEREK, Dušan**. Polymer liquid chromatography. In Polychar 26 : World Forum on Advanced Materials: Tbilisi, Georgia, 10. - 13.9. 2018
6. **CHODÁK, Ivan**. Effect of biodegradation on physical properties of PLA-based blends. International Conference on Materials Science and Engineering: Moscow, Russia, 23. - 25.7. 2018
7. **KRONEKOVÁ, Zuzana**. Confocal laser scanning and Raman spectroscopy. Cell & Drug Encapsulation : 10th Training School on Microencapsulation: Trondheim, Norway: Bioencapsulation Research Group & Norwegian University of Science and Technology, 18. - 21.9. 2018
8. **LACÍK, Igor**. Microcapsule physico-chemical characterization. Cell & Drug Encapsulation : 10th Training School on Microencapsulation: Trondheim, Norway: Bioencapsulation

- Research Group & Norwegian University of Science and Technology, 18. - 21.9. 2018
9. **LACÍK, Igor.** Hydrogel microspheres for cell encapsulation in next generation diabetes treatment. In ISPCS '18 : XXI International Seminar on Physics and Chemistry of Solids and advanced materials: Czestochowa, Poland, 10. - 13.6. 2018
 10. **LACÍK, Igor.** Pulsed-laser initiated polymerization in aqueous solution. 9th PULS-2018 with RKCM'2018 : 9th PULS Conference on Pulse Investigations in Chemistry, Physics, and Biology with 4th Reaction Kinetics in Condensed Matter: Lodz, Poland, 2. - 6.9. 2018
 11. **MICUŠÍK, Matej - ČÍKOVÁ, Eliška - OMASTOVÁ, Mária.** Smart electrically conductive polymeric nanocomposites. In Berlin, Deutschland, 23. - 24.5. 2018
 12. **OMASTOVÁ, Mária.** Polymeric nanocomposites with advanced properties. Polymers - Site of Advanced Horizons and Ambits: Zlín, ČR, 2. - 4.5. 2018
 13. **OMASTOVÁ, Mária.** Elastomeric nanocomposite for advanced application. SEPM 2018: Science and Engineering of Polymeric Materials: Sousse, Tunisia, 18. - 21.3. 2018
 14. **PEPTU, Cristian.** Nanostructured electrospun mats based on novel cyclodextrin-oligoester derivatives. ICPAM-12 : 12th International Conference on Physics of Advanced Materials: Heraklion, Greece, 22. - 28. 9. 2018

2.6.2. Vyžiadané prednášky na domácich vedeckých podujatiach

1. **BEREK, Dušan.** Molecular characterization of synthetic macromolecules by liquid chromatography. 24th International Symposium on Separation Sciences (ISSS 2018), 21st International Conference Analytical Methods and Human Health (AMHH 2018), Jasná, Slovensko, 17. - 20.6. 2018
2. **ECKSTEIN, Anita.** Polyméry v súčasnosti. 1. Slovenská Lach:ner konferencia, Televízna veža Kamzík, Bratislava, 25.10. 2018
3. **KOVÁČOVÁ, Mária – MARKOVIČ, Zoran - ŠPITALSKÝ, Zdenko.** Fotodynamická terapia, kvantové bodky a ich použitie. 1. Slovenská Lach:ner konferencia, Televízna veža Kamzík, Bratislava, 25.10. 2018
4. **LACÍK, Igor.** Transplantácia pankreatických ostrovčekov: možnosť zlepšenia kontroly hladiny cukru transplantáciou enkapsulovaných buniek, 2. Kongres Slovenskej transplantologickej spoločnosti SLS s medzinárodnou účasťou. Carlton Radisson Blue Hotel, Bratislava, Slovensko, 18. - 20.10. 2018
5. **LACÍK, Igor.** Enkapsulované pankreatické ostrovčeky: možnosť zlepšenia kontroly hladiny cukru. Odborný workshop Inovatívne spôsoby edukácie rodičov a detí s ochorením diabetes mellitus I. typu, Fakulta zdravotníckych odborov PU v Prešove, Prešov, Slovensko, 12.10. 2018
6. **LACÍK, Igor.** Polymérne biomateriály pre zdravie (aj na liečbu cukrovky), 77. Rozhovory s vedou, Alumni klub STU Bratislava, 6.2. 2018
7. **LACÍK, Igor.** Innovative islet transplantation: present to future. Biomedicine "Life Science Innovation Day", UK Bratislava, Science Park, <https://fns.uniba.sk/20180529>, 29.5. 2018
8. **LACÍK, Igor.** Bude enkapsulácia pankreatických ostrovčekov riešením pre diabetikov? Prednáška na neformálnom stretnutí s diabetickými deťmi a ich rodičmi (pozvanie J. Pavlusiková a E. Korená), Vrátna dolina, Slovensko, 15. - 17.6. 2018
9. **ŠPITALSKÝ, Zdenko – KOVÁČOVÁ, Mária – SVOBODA, Peter.** 3D tlač polymérnych kompozitov. 1. Slovenská Lach:ner konferencia, Televízna veža Kamzík, Bratislava, 25.10. 2018

2.6.3. Vyžiadané prednášky na významných vedeckých inštitúciách

1. **DANKO, Martin.** Sulfobetaine and carboxybetaine copolymers and hydrogels: Modulation of thermo- and ion responsiveness, water state, mechanical properties and cell

- adhesion. Centre of Molecular and Macromolecular Studies PAS, Lodz, Poland, 26.4. 2018
2. **HABÁNKOVÁ, Eva** - LACÍK, Igor. Determination of k_p for AA and MAA in their saturated analogues, organic solvents and in bulk. BASF SE Ludwigshafen, Germany, prednáška počas záverečného seminára k projektu, 16.8. 2018
 3. **CHOVANCOVÁ, Anna** - HIPKÁ, Eva - LACÍK, Igor. Determination of k_p values by PLP-SEC for TMAEMC and MAPTAC. BASF SE Ludwigshafen, Germany, prednáška počas záverečného seminára k projektu, 16.8. 2018
 4. **KRONEK, Juraj**. Poly(2-oxazolíny) – materiály pre široké spectrum aplikácií. Katedra makromolekulární fyziky, Matematicko-fyzikální fakulta University Karlovy, Praha. ČR, 10.4. 2018
 5. KRONEKOVÁ, Zuzana - ŠRÁMKOVÁ, Petra - ZAHORANOVÁ, Anna - SMOLÍČEK, Maroš – **KRONEK, Juraj**. Functional poly(2-oxazolines) as building blocks for biomedical materials. Hanyang University, Seoul, Kórejská republika, 7.11. 2018
 6. **LACÍK, Igor**. Polymeric microcapsules for immunoprotection of pancreatic islets in diabetes treatment. Universita Tomáše Bati Zlín, ČR - 7.9. 2018
 7. **LACÍK, Igor** - HUTCHINSON, R.A. Measuring and Modeling of Aqueous Radical (Co)polymerization of Cationic Monomers. BASF SE Ludwigshafen, Germany, “Tandem” prednáška počas záverečného seminára k projektu, 16.8. 2018
 8. **LACÍK, Igor**. Next generation diabetes treatment by encapsulated insulin-producing cells. CEITEC Vysoké učení technické v Brně, ČR, pozvaná prednáška v rámci Advanced Materials and Nanotechnology Seminar Series, 11.12. 2018
 9. **OMASTOVÁ, Mária**. Polymeric nanocomposites: from laboratory preparation to specific application. Middle East Technical University Ankara, Turecko, 4.10. 2018
 10. **PEPTU, Cristian**. Mass spectrometry as a tool for uncovering structural features of cyclodextrin derivatives Seminar at VNU University of Science, Faculty of Chemistry, Hanoi, Vietnam, 22.4. 2018
 11. **PEPTU, Cristian**. Polyglobalide polymer gels prepared by photoinitiated thiol-ene coupling Center of Polymer and Carbon Materials Sciences, Zabrze, Poland, 20.6. 2018
 12. **PIPIG, Falko**. The Chemistry of Tulipalins. dies academicus of the University of Applied Sciences Zittau/Görlitz, Germany, 6.6. 2018
 13. **ŠVAJDLKOVÁ, Helena**. Positron annihilation study of free volume in photopolymers. Ústav makromolekulární chemie AV ČR v Prahe, ČR, 15.11. 2018

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 2018

2.7.1. Vynálezy, na ktoré bol udelený patent

Číslo PV: Patent No 2398772(Čína), **EP 2710076 – Európsky patent**

Mená autorov: CHODÁK, I. - ALEX, P. - BAKOŠ, D. - BUGAJ, P. - PAVLAČKOVÁ, M. - TOMANOVÁ, K. - BENOVIČ, F. - PLAVEC, R. - MIHALÍK, M. – BOTOŠOVÁ, M.

Názov vynálezu: Biologically degradable polymeric composition with high deformability

Majiteľ / spolumajiteľ: Ústav polymérov SAV

Číslo PV: 288563

Mená autorov: BEREK, D. – NOVÁK, I. – MUNKA, K. – VARGA, S. - KARÁCSONYOVÁ, M.

Názov vynálezu: Spôsob prípravy kompozitného sorbenta na odstraňovanie kontaminantov z vôd

Majiteľ / spolumajiteľ: Ústav polymérov SAV, Výskumný ústav vodného hospodárstva, Centrum vedecko-technických informácií SR

Číslo PV: 8207 - Úžitkový vzor

Mená autorov: ŠPITÁLSKY, Z. - KOVÁČOVÁ, M. - ĎURIŠ, V. - VYSOPAL, M. – SVOBODA, P.

Názov vynálezu: Polymérne kompozity pre 3D tlač.

Majiteľ / spolumajiteľ: Ústav polymérov SAV, MYMEDIA s.r.o.

Číslo PV: 288548

Mená autorov: CAPEK, I.

Názov vynálezu: Spôsob prípravy strieborných nanočastíc vo vodnej polyakrylamidovej disperzii

Majiteľ / spolumajiteľ: Ústav polymérov SAV, Bratislava

2.7.2. Prihlásené vynálezy

Číslo PV: PCT/SK2018/050004

Mená autorov: ŠPITÁLSKY, Z. - MARKOVIC, Z.

Názov vynálezu: Manufacture method of nanomaterial with antibacterial properties, the material thereof, and its use

Majiteľ / spolumajiteľ: Ústav polymérov SAV

Číslo PV: PP 50071-2018

Mená autorov: NOVÁK, I. – HRKÚT, P. – ČAPLOVIČ, I. – GAŽI, Š.

Názov vynálezu: Zariadenie na rovnomerné opracovanie povrchu sypkých materiálov v plazme

Majiteľ / spolumajiteľ: ústav informatiky SAV, Ústav polymérov SAV, Elektrotechnický ústav SAV

2.7.3. Predané licencie

Predmet licencie:

Nadobúdateľ licencie: PANARA a.s.

Číslo PV:

Mená autorov: CHODÁK, I.- ALEXEY, P. - BAKOŠ, D. - BUGAJ, P. - PAVLAČKOVÁ, M. - TOMANOVÁ, K. - BENOVIČ, F. - PLAVEC, R. - MIHALÍK, M. – BOTOŠOVÁ, M.

Názov vynálezu: Biologicky degradovateľná polymérna kompozícia so zlepšenými vlastnosťami

Majiteľ / spolumajiteľ: Ústav polymérov SAV

Finančný prínos pre organizáciu v roku 2018: 0

Súčet za predošlé roky: 0 €

Predmet licencie: nevýlučná licencia na vynález

Nadobúdateľ licencie: AQUA+TECH SPECIALITIES SA

Číslo PV:

Mená autorov: BEREK, D. – NOVÁK, I. – MUNKA, K. – VARGA, S.- KARÁCSONYOVÁ, M.

Názov vynálezu: Method for preparing composite sorbent for removing contaminants from water

Majiteľ / spolumajiteľ: Ústav polymérov SAV, Výskumný ústav vodného hospodárstva, CVTI

Finančný prínos pre organizáciu v roku 2018: 0

Súčet za predošlé roky: 0 €

2.7.4. Realizované patenty

Realizátor:

Rok začiatku realizácie:

Číslo PV: PP 26-2011

Mená autorov: CHODÁK, I. - ALEX, P. - BAKOŠ, D. - BUGAJ, P. - PAVLAČKOVÁ, M. - TOMANOVÁ, K. - BENOVIČ, F. - PLAVEC, R. - MIHALÍK, M. – BOTOŠOVÁ, M.

Názov vynálezu: Biologicky degradovateľná polymérna kompozícia so zlepšenými vlastnosťami

Majiteľ / spolumajiteľ: Ústav polymérov SAV

Finančný prínos pre organizáciu v roku 2018: Sk

Súčet za predošlé roky: €

Realizátor:

Rok začiatku realizácie:

Číslo PV: PCT/SK2015/050003 – medzinárodná prihláška

Mená autorov: BEREK, D. – NOVÁK, I. – MUNKA, K. – VARGA, S.- KARÁCSONYOVÁ, M.

Názov vynálezu: Method for preparing composite sorbent for removing contaminants from water

Majiteľ / spolumajiteľ: Ústav polymérov SAV, Výskumný ústav vodného hospodárstva, CVTI

Finančný prínos pre organizáciu v roku 2018: 0 Sk

Súčet za predošlé roky: 0 €

Finančný prínos pre organizáciu SAV v roku 2018 a súčet za predošlé roky sa neuvádzajú, ak je zverejnenie v rozpore so zmluvou súvisiacou s realizáciou patentu.

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

Tabuľka 2i Experti hodnotiaci národné projekty

Meno pracovníka	Typ programu/projektu/výzvy	Počet hodnotených projektov
Berek Dušan	VEGA	1
Danko Martin	VEGA	2
Eckstein Anita	VEGA	1
Chodák Ivan	APVV otvorená výzva	1
Kronek Juraj	VEGA	1
Kroneková Zuzana	ISC GREEN 2018 - konferencia mladých vedcov	1
Lacík Igor	APVV VV2017	12
Mičušík Matej	VEGA	1
Mosnáček Jaroslav	MŠVVaŠ SR - projekt priemyselného výskumu	1
Novák Igor	APVV	2
	VEGA	1
Šišková Alena	VEGA	1
Špitálsky Zdenko	VEGA	1

2.9. Účasť na spracovaní hesiel do encyklopédie Beliana

Počet autorov hesiel: 0

2.10. Recenzovanie publikácií a príspevkov vo vedeckých časopisoch

Tabuľka 2j Počet recenzovaných monografií, článkov, zborníkov

Meno pracovníka	Knížné monografie		Príspevky v časopisoch			Zborníky	
	Domáce	Zahra- ničné	WoS, SCOPUS	Iné databázy	Ostatné	Domáce	Zahra- ničné
Bartoš Josef	0	0	3	0	0	0	0
Benková Zuzana	0	0	1	0	0	0	0
Berek Dušan	0	0	4	0	0	0	0
Cifra Peter	0	0	3	0	0	0	0
Danko Martin	0	0	8	0	0	0	0
Eckstein Anita	0	0	1	0	0	0	0
Heydari Abolfazl	0	0	1	0	0	0	0
Chodák Ivan	0	0	11	0	0	0	0
Kronek Juraj	0	0	8	0	0	0	0
Kroneková Zuzana	0	0	1	0	0	0	0
Lacík Igor	0	0	7	0	0	0	0
Mičušik Matej	0	0	9	0	0	0	0
Mosnáček Jaroslav	0	0	13	0	0	0	0
Novák Igor	0	0	10	0	0	0	0
Omastová Mária	0	0	3	0	0	0	0
Račko Dušan	0	0	4	0	0	0	0
Špitálsky Zdenko	0	0	6	0	2	0	0
Spolu	0	0	93	0	2	0	0

2.11. Iné informácie k vedeckej činnosti.

Hodnotenie organizačných útvarov ústavu Vedeckou radou Ústavu polymérov SAV sa už tradične uskutočnilo formou dvojdnového kolokvia, ktoré sa konalo v prvej polovici decembra 2018 v zasadacej miestnosti Ústavu polymérov. Kolokvium bolo organizované a vedené Vedeckou radou a pre každé oddelenie bol určený hodnotiteľ z členov VR. Podkladom pre hodnotenie oddelení bol písomný materiál štrukturovaný podľa zásad definovaných Vedeckou radou. Cieľom hodnotenia bolo získať komplexný prehľad jednak o činnosti jednotlivých oddelení a zároveň o príspevku vedeckých a vedecko-technických pracovníkov do výstupov oddelení v kontexte posledných troch rokov. Aj tento rok sa zopakovala schéma prezentovania zavedená v roku 2017, keďže sa osvedčila a prejavila ako pútavejšia a efektívnejšia. Po úvodnom prejave vedúceho oddelenia nasledovali prezentácie nosných tém oddelenia vybranými vedeckými pracovníkmi a prezentáciu uzavrel znova vedúci oddelenia načrtnutím budúceho zamerania. Samotné hodnotenie oddelení sa uskutočnilo na základe posudkov vypracovaných hodnotiteľmi na zasadnutí Vedeckej rady za prítomnosti vedúcich jednotlivých oddelení.

Zameranie ústavu pokračovalo v pôvodných témach a zároveň sa na ústave rozvíjali nové témy v oblasti bioaplikácií, biokompatibilitu a nanotechnológií. Tematický profil pracoviska je tvorený štyrmi základnými oblasťami charakterizujúcimi zameranie jednotlivých oddelení: syntéza a

modifikácia polymérov, biomateriály a bioaplikácie, polymérne kompozity a počítačové modelovanie. Kvantitatívne a kvalitatívne vedecké, projektové a popularizačné výstupy – počty publikácií, citácií, projektov a projektových spoluprác, popularizačných článkov, popularizačných akcií a vystúpení v médiách, ako aj iné ukazovatele sú za rok 2018 uspokojivé. Doleuvedená tabuľka dokumentuje vývoj počtu publikácií a citácií za posledných 5 rokov. Rastúci trend v počte CC publikácií a citácií plynulo pokračoval aj v roku 2018. Je potrebné zobrať do úvahy, že časť výstupov je produkovaná aj vedeckými pracovníkmi nad 65 rokov vrátane emeritných vedeckých pracovníkov. Na ústave sa kladie dôraz na formovanie ďalších vedeckých osobností v oddeleniach z mladšej generácie vedeckých pracovníkov. Okrem finančných odmien ústav pravidelne organizuje súťaž o najlepšiu publikáciu mladých vedeckých pracovníkov.

Rok	CC publikácie	Monografie a kapitoly v knihách	Citácie
2014	65	2	1664
2015	65	3	1817
2016	70	7	1700
2017	71	3	2114
2018	78	3	2169

Vedecká rada Ústavu polymérov SAV organizuje pravidelne semináre vedeckých pracovníkov ústavu ako aj prednášky zahraničných vedcov počas ich návštev ústavu. Aktivity v organizovaní prednášok vychádzajú aj z Rady mladých vedcov, ktorá pripravuje prednášky na aktuálne témy pre svojich členov.

Uskutočnilo sa hodnotenie mladých vedeckých pracovníkov, ktorým v roku 2018 končila pracovná zmluva. Na základe ich vedeckých výstupov a vedecko-organizačných prípadne pedagogických aktivít z hodnotiaceho obdobia, ktoré boli zhrnuté vo forme formulára a stručne prezentované spolu s plánovaným budúcim zameraním, boli navrhnuté a schválené nové pracovné zmluvy. Cieľom hodnotenia je vytvoriť si obraz o vedeckom profile mladých vedeckých pracovníkov a ich budúcim zameraní a v prípade potreby usmerniť ich vedecký výskum a vývoj. Zároveň je to určitá selekcia mladých vedeckých pracovníkov, ktorá by mala viesť k zamestnávaniu kvalitných vedeckých pracovníkov schopných samostatne rozvíjať výskum na Ústave polymérov SAV, zlepšovať jeho schopnosť konkurovať prestížnym svetovým pracoviskám a budovať jeho povedomie doma aj v zahraničí.

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 2018

Forma	Počet k 31.12.2018						Počet ukončených doktorantúr v r. 2018					
	Doktorandi						Ukončenie z dôvodov					
	celkový počet		z toho novoprijatí		po skúške		ukončenie úspešnou obhajobou		predčasné ukončenie		neúspešné ukončenie	
	M	Ž	M	Ž	M	Ž	M	Ž	M	Ž	M	Ž
Denná zo zdrojov SAV	4	6	1	2	0	0	0	4	1	0	0	0
Denná z iných zdrojov	0	0	0	0	0	0	0	0	0	0	0	0
Externá	0	1	0	0	0	0	0	1	0	0	0	0
Spolu	4	7	1	2	0	0	0	5	1	0	0	0
Súhrn	11		3		0		5		1		0	

Uvádzajte len doktorandov organizácie ako externej vzdelávacej inštitúcie

3.2. Zmena formy doktorandského štúdia

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

Pôvodná forma	Denná z prostriedkov SAV	Denná z prostriedkov SAV	Denná z iných zdrojov	Denná z iných zdrojov	Externá	Externá
Nová forma	Denná z iných zdrojov	Externá	Denná z prostriedkov SAV	Externá	Denná z prostriedkov SAV	Denná z iných zdrojov
Počet	0	1	0	0	0	0

3.3. Zoznam doktorandov, ktorí ukončili doktorandské štúdium úspešnou obhajobou

Tabuľka 3c Menný zoznam ukončených doktorandov v roku 2018 úspešnou obhajobou

Meno doktoranda	Forma DŠ	Mesiace, rok nástupu na DŠ	Mesiace, rok obhajoby	Číslo a názov študijného odboru	Meno a organizácia školiteľa	Fakulta udeľujúca vedeckú hodnotu
Ing. Eliška Číková	interné štúdium hrazené z	9 / 2014	8 / 2018	4.1.19 makromolekulová chémia	Ing. Mária Omastová DrSc., Ústav polymérov SAV	Fakulta chemickej a potravinárskej technológie STU

	prostriedkov SAV					
Ing. Martina Hudáková	externé štúdium	9 / 2014	8 / 2018	4.1.19 makromolekulová chémia	Ing. Jozef Rychlý DrSc., Ústav polymérov SAV	Fakulta chemickej a potravinárskej technológie STU
Ing. Anna Chovancová	interné štúdium hrazené z prostriedkov SAV	9 / 2011	8 / 2018	4.1.19 makromolekulová chémia	Ing. Igor Lacík DrSc., Ústav polymérov SAV	Fakulta chemickej a potravinárskej technológie STU
Mgr. Petra Mazancová	interné štúdium hrazené z prostriedkov SAV	9 / 2015	8 / 2018	4.1.19 makromolekulová chémia	Ing. Filip Rázga PhD., Ústav polymérov SAV	Fakulta chemickej a potravinárskej technológie STU
Ing. Veronika Némethová	interné štúdium hrazené z prostriedkov SAV	9 / 2014	8 / 2018	4.1.19 makromolekulová chémia	Ing. Filip Rázga PhD., Ústav polymérov SAV	Fakulta chemickej a potravinárskej technológie STU

Zoznam interných a externých doktorandov je uvedený v prílohe A. **3.4. Medzinárodné doktorandské štúdium**

Tabuľka 3d Počet študentov v medzinárodných programoch doktorandského štúdia

Cotutelle	Co-direction	Iné	Zahraniční doktorandi
0	0	0	3

3.5. Zoznam akreditovaných študijných odborov s uvedením VŠ

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

Názov študijného odboru (ŠO)	Číslo ŠO	Doktorandské štúdium uskutočňované na (univerzita/vysoká škola a fakulta)
fyzikálna chémia	4.1.18	Prírodovedecká fakulta UK
makromolekulová chémia	4.1.19	Fakulta chemickej a potravinárskej technológie STU
technológia makromolekulových látok	5.2.21	Fakulta chemickej a potravinárskej technológie STU

Tabuľka 3f Účasť na pedagogickom procese

Menný prehľad pracovníkov, ktorí boli menovaní do spoločných odborových komisií pre doktorandské štúdium	Menný prehľad pracovníkov, ktorí pôsobili ako členovia vedeckých rád univerzít, správnych rád univerzít a fakúlt	Menný prehľad pracovníkov, ktorí získali vyššiu vedeckú, pedagogickú hodnotu alebo vyšší kvalifikačný stupeň
Mgr. Zuzana Benková, PhD. (fyzikálna chémia)	Ing. Igor Lacík, DrSc. (Fakulta chemickej a potravinárskej technológie STU)	Abolfazl Heydari, PhD. (IIa)
RNDr. Peter Cifra, DrSc. (fyzikálna chémia)	Ing. Igor Lacík, DrSc. (Univerzita T. Bati, Zlín, Česká Republika)	Mgr. Katarína Mosnáčková, PhD. (IIa)
RNDr. Peter Cifra, DrSc. (makromolekulová chémia)	Ing. Mária Omastová, DrSc. (Fakulta prírodných vied UCM)	Mgr. Cristian Peptu, PhD. (IIa)
Mgr. Martin Danko, PhD. (makromolekulová chémia)		Falko Pippig, PhD. (IIa)
Štefan Chmela, DrSc. (makromolekulová chémia)		Ing. Eliška Číková, PhD. (PhD., Fakulta chemickej a potravinárskej technológie STU)
Prof. Ing. Ivan Chodák, DrSc. (technológia makromolekulových látok)		Ing. Martina Hudáková, PhD. (PhD., Fakulta chemickej a potravinárskej technológie STU)
Prof. Ing. Ivan Chodák, DrSc. (odbor v zahraničí)		Ing. Anna Chovancová, PhD. (PhD., Fakulta chemickej a potravinárskej technológie STU)
Ing. Ivica Janigová, PhD. (technológia makromolekulových látok)		Mgr. Petra Mazancová, PhD. (PhD., Fakulta chemickej a potravinárskej technológie STU)
Mgr. Zuzana Kroneková, PhD. (biofyzika)		Mgr. Veronika Némethová, PhD. (PhD., Fakulta chemickej a potravinárskej technológie STU)
Ing. Igor Lacík, DrSc. (biofyzika)		
Ing. Igor Lacík, DrSc. (makromolekulová chémia)		
Ing. Igor Lacík, DrSc. (odbor v zahraničí)		
Ing. Matej Mičušík, PhD. (technológia makromolekulových látok)		
Mgr. Jaroslav Mosnáček, DrSc. (makromolekulová chémia)		
Mgr. Jaroslav Mosnáček, DrSc. (odbor v zahraničí)		
Ing. Igor Novák, PhD. (odbor v zahraničí)		
Ing. Mária Omastová, DrSc. (fyzikálna chémia)		
Ing. Mária Omastová, DrSc. (makromolekulová chémia)		

Mgr. Zdenko Špitálsky, PhD. (technológia makromolekulových látok)		
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3.6. Údaje o pedagogickej činnosti

Tabuľka 3g Prednášky a cvičenia vedené v roku 2018

PEDAGOGICKÁ ČINNOSŤ	Prednášky		Cvičenia a semináre	
	doma	v zahraničí	doma	v zahraničí
Počet prednášateľov alebo vedúcich cvičení	7	0	6	0
Celkový počet hodín v r. 2018	31	0	776	0

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

Tabuľka 3h Aktivity pracovníkov na VŠ

1.	Počet pracovníkov, ktorí pôsobili ako vedúci alebo konzultanti diplomových a bakalárskych prác	8
2.	Počet vedených alebo konzultovaných diplomových a bakalárskych prác	12
3.	Počet pracovníkov, ktorí pôsobili ako školitelia doktorandov (PhD.)	14
4.	Počet školených doktorandov (aj pre iné inštitúcie)	19
5.	Počet oponovaných dizertačných a habilitačných prác	19
6.	Počet pracovníkov, ktorí oponovali dizertačné a habilitačné práce	10
7.	Počet pracovníkov, ktorí pôsobili ako členovia komisií pre obhajoby DrSc. prác	0
8.	Počet pracovníkov, ktorí pôsobili ako členovia komisií pre obhajoby PhD. prác	7
9.	Počet pracovníkov, ktorí pôsobili ako členovia komisií, resp. oponenti v inauguračnom alebo habilitačnom konaní na vysokých školách	2

3.7. Iné dôležité informácie k pedagogickej činnosti

Vedeckí pracovníci Ústavu polymérov SAV sa aktívne podieľajú aj na výchove študentov a doktorandov. V roku 2018 pracovníci ústavu pôsobili pedagogicky ako prednášatelia semestrálnych prednášok a seminárov a vedúci cvičení pre študentov na Prírodovedeckej fakulte UK a na Fakulte chemickej a potravinárskej technológie STU v Bratislave.

Na interné doktorandské štúdium boli prijatí traja noví doktorandi, Monika Majerčíková (na ústave pracovala na svojej diplomovej práci už počas vysokoškolského štúdia), Faeze Dorchei (Irán) a Gamal Zain (Egypt) a doktorandské štúdium ukončilo obhajobou päť doktorandiek, Anna Chovancová, Petra Mazancová, Veronika Némethová, Eliška Číková a Martina Hudáková.

Okrem školenia doktorandov sa ústav venoval aj vedeniu štyroch bakalárskych prác (2 z Príf UK Bratislava a 2 z MFT STU Trnava) a dvoch diplomových prác (Príf UK Bratislava a UCM Trnava). Traja stredoškolskí študenti vykonávali na ústavu svoju povinnú stredoškolskú prax a do riešenia parciálnych problémov sa tiež zapojili traja študenti v pozícii vedecko-technickej výpomoci (UCM Trnava, Univerzita vo Warwicku a SPŠ chemická). Pre zviditeľnenie Ústavu polymérov SAV malo

význam aj školenie zahraničných študentov, konkrétne to boli traja študenti, z Poľska, Egypta a Ukrajiny, ktorým pobyt na ústave hradila SAIA, a jeden študent z Poľska, ktorý pôsobil na ústave v rámci programu ERASMUS. Význam takýchto pobytov je pritiahnuť na ústav aj zahraničných doktorandov a tým prispieť k budovaniu multinárodného a multikultúrneho prostredia medzi mladými začínajúcimi vedeckými pracovníkmi. Príkladom sú aj dvaja doktorandi zo zahraničia, ktorí začali svoje doktorandské štúdium na ústave v septembri 2018.

V rámci Vedeckej rady sa už dlhšie diskutuje o skvalitnení prípravy doktorandov. Okrem prednášok, ktoré absolvujú na Prírodovedeckej fakulte UK alebo Fakulte chemickej a potravinárskej technológie STU, sa uvažuje aj o organizovaní ďalších odborných prednášok, čím sa prehĺbia vedomosti doktorandov o nosných témach ústavu. Prednášateľmi na týchto špeciálnych kurzoch by mali byť okrem vedeckých pracovníkov ústavu aj pozvaní hostia. Vedenie ústavu a Vedecká rada kladú veľký dôraz na kvalitnú prípravu PhD študentov, ktorej súčasťou sú každoročné hodnotenia doktorandov. V roku 2018 sa toto hodnotenie konalo v septembri, pričom doktorandi prezentovali výsledky dosiahnuté v priebehu ukončeného akademického roka 2017/2018. Motiváciou v tomto štádiu prípravy je vyhodnotenie najlepších doktorandov za posledný akademický rok, ktorí získajú pravidelnú mesačnú finančnú prémie k štipendiu.

Ústav sa aktívne zúčastňoval rôznych akcií, na ktorých prezentoval svoje aktivity študentom stredných a vysokých škôl ako aj širokej verejnosti. S cieľom takejto popularizácie sa v novembri 2018 organizoval na ústave Deň otvorených dverí pre študentov stredných a vysokých škôl. Vo vstupnej hale mali študenti možnosť zúčastniť sa na pokusoch a dozvedieť sa niečo viac o projekte PlasticFreeDanube v rámci budovania ich ekologického povedomia. Takisto sa oboznámili s bežne sa vyskytujúcimi makromolekulami. Následne študenti absolvovali exkurziu v laboratóriu Oddelenia kompozitných materiálov a Oddelenia molekulových simulácií polymérov. Počas celého podujatia mali študenti možnosť diskutovať s vedeckými pracovníkmi ústavu o rôznych témach týkajúcich sa polymérov. Ústav polymérov SAV sa takisto zapojil aj do akcie Európska noc výskumníkov, ktorá sa konala koncom septembra 2018 v budove Starej Tržnice v Bratislave. V tomto roku sa reprezentačný stánok ústavu nazýval Polymérna kuchyňa a široká verejnosť tu mala možnosť oboznámiť sa s chemickými receptmi realizovateľnými aj doma v kuchyni. Popularizačná aktivita Nájdí v sebe vedca bola určená pre žiakov 5. ročníka Základnej školy Pavla Marceľho v Bratislave a pozostávala zo štyroch exkurzií rozdelených do štyroch dní v marci a apríli 2018. Žiaci sa dozvedeli o existencii prírodných a syntetických polymérov, o polymerizácii a separácii polymérov ako aj o ich recyklovateľnosti. O úspechu tejto akcie svedčí aj Cena SAV za popularizáciu vedy, udelená v júli 2018 v Smoleniciach. Ďalšou, akciou určenou pre širokú verejnosť, do ktorej sa ústav zapojil, bol Víkend so SAV. Ústav polymérov SAV tu prezentoval veľmi praktické ukážky ako elektrovodivé lepidlo a biodegradovateľné plasty, ktoré boli vyvinuté na ústave v spolupráci s FCHPT STU, ale aj ďalšie zaujímavosti ako NANO-Art, kde sa spája veda s umením a vytvárajú sa umelecké diela pomocou tzv. upcyklácie. Osobitný úspech mali “živé knihy“, v ktorých Ústav polymérov SAV prispel informáciami o vývoji v liečbe cukrovky a vývoji nových typov biokompatibilných polymérov pre medicínske aplikácie. Zaujímavé boli tiež prednášky a diskusie nielen o mede a včelích produktoch, ale hlavne o svete polymérov. V roku 2018 pokračovala aj spolupráca medzi Ústavom polymérov SAV a Vysokou školou výtvarných umení na dizajne interiérových objektov s detailným zameraním na využitie farieb pri elektrostatickom zvlákňovaní. Výstupy tejto spolupráce boli prezentované na výstave a zaregistrované v katalógu výstav. V auguste 2018 vedeckí pracovníci predstavili v rámci detských letných táborov v INSPIRO na hodinke vedy, ktorá sa uskutočnila štyrikrát, žiakom vekovej kategórie 7-13 rokov pútavým spôsobom jednoduché experimenty uskutočniteľné v bežnom živote.

4. Medzinárodná vedecká spolupráca

4.1. Medzinárodné vedecké podujatia

4.1.1. Medzinárodné vedecké podujatia, ktoré organizácia SAV organizovala v roku 2018 alebo sa na ich organizácii podieľala, s vyhodnotením vedeckého a spoločenského prínosu podujatia

V dňoch 2.-5. októbra 2018 sa konala jubilejná **X. Česko-Slovenská konferencia Polymery 2018**, ktorá sa uskutočnila na Zámku Třešť v Českej republike. Tento ročník konferencie zorganizoval Ústav makromolekulární chemie AV ČR v spolupráci s Ústavom polymérov SAV. Táto konferencia predstavuje obľúbenú formu stretnutí českých a slovenských odborníkov zameraných na výskum polymérov, na ktorej sa môžu vzájomne informovať o výsledkoch riešených projektov, okrem iného aj z oblasti cieleného a aplikovaného výskumu. Predstavuje tiež možnosť výmeny poznatkov medzi predstaviteľmi rôznych generácií polymérnych vedcov.

4.1.2. Medzinárodné vedecké podujatia, ktoré usporiada organizácia SAV v roku 2019 (anglický a slovenský názov podujatia, miesto a termín konania, meno, telefónne číslo a e-mail zodpovedného pracovníka)

BYPoS 2019 : 8th Bratislava Young Polymer Scientists Workshop/BYPoS 2019, Hotel Marlene, Ošadnica, 25.03.-28.03.2019, (Alena Šišková, 02/ 3229 4301, upolalsi@savba.sk)

8th Bratislava Young Polymer Scientists Workshop 2019

V roku 2018 sa začala organizačne zabezpečovať konferencia: Bratislava Young Polymer Scientists Workshop (BYPoS) 2019. Tento krát ide už o ôsmu konferenciu v tejto konferenčnej sérii, ktorá sa organizuje v jeden a pol až dvojročných intervaloch už od roku 2007. Konferencia je zameraná na všetky oblasti makromolekulej chémie, počnúc syntézou, modifikáciou a charakterizáciou cez polymérne zmesi a kompozity ďalej technológie spracovania, inteligentné polyméry a biopolyméry. Program zahŕňa aj oblasti bio-aplikácie polymérov, stabilitu a degradáciu polymérov a samozrejme fyziku polymérov. Konferencia sa uskutoční v termíne 25. - 28. 03. 2019 v hoteli Marlene v Ošadnici. Do programu sme zaradili aj príspevky troch pozvaných skúsených prednášateľov. Na 8.ročníku BYPoS sú pozvaní ako domáci prednášateľ Dr. Martin Danko z Ústavu polymérov aj ako zástupcu odbornej skupiny Polyméry, Slovenskej Chemickej Spoločnosti a tiež dvaja zahraniční prednášatelia a to docentka Darinka Christova (Institute of Polymers, Bulgarian Academy of Sciences, Sofia, Bulgaria) ako aj Dr. Piotr Rychter (Faculty of Mathematics and Natural Science, Jan Długosz University in Częstochowa, Poland). Očakávame opäť viacerých mladých slovenských, ale aj zahraničných účastníkov, ktorí budú mať príležitosť nielen odprezentovať si svoje doterajšie výsledky vo forme prednášok, ale zároveň získať skúsenosti s prezentovaním pred medzinárodným publikom, naučiť sa mnoho nového v oblasti makromolekulárnej chémie a tiež nadviazať nové priateľstvá a kontakty, ktoré im môžu pomôť v budúcnosti.

BIMac 2019, 23th Bratislava International Conference on Macromolecules: Computational Approach to Polymers in Biological and Soft Matter/BIMac 2019, 23. Bratislavská medzinárodná konferencia o makromolekulách, Hotel Falkensteiner Bratislava, SR, 60 účastníkov, 30.06.-03.07.2019, (Zuzana Benková, 02/ 3229 4314, upolzben@savba.sk)

V roku 2018 začal organizovať Ústav polymérov SAV 23. ročník medzinárodnej konferencie BIMac, ktorá sa uskutoční v termíne 30. júna - 3. júla 2019 v hoteli Falkensteiner. Konferencia nadväzuje na dlhoročnú tradíciu konferencií, ktorá začala ešte v roku 1968. Tento ročník konferencie je zameraný na počítačové modelovanie biochemických a biofyzikálnych systémov a javov ako aj mäkkej hmoty s rozmanitými aplikáciami v polymérnej fyzike, biochémii, biofyzike, molekulej biológii a potenciálne aj v biotechnológii, nanotechnológii a biomedicíne. V súčasnosti

nadobúda počítačové modelovanie veľké uplatnenie pri vysvetľovaní experimentálnych zistení, interpretácii pozorovaných javov a predpovediach vlastností a správania sa systémov. Konferencia má zdôrazniť túto významnú úlohu počítačového modelovania a zároveň vytvoriť interdisciplinárne prostredie, kde vedci môžu nadviazať nové kontakty a dať do pozornosti ich najnovšie výsledky a zistenia. Organizátormi konferencie sú Zuzana Benková, Dušan Račko, Peter Čakánek, Silvia Podhradská a Alena Šišková.

BIMac 2019 je rozdelená na viac sekcií, ako sú Polymérna výpočtová fyzika a biofyzika, Štatistická mechanika v biologickom kontexte, Modelovanie biologických systémov, Polymérna topológia, Geometricky a topologicky obmedzené polyméry, Mäkká kondenzovaná hmota, Koloidy a Hrubozrnné modely. Pozvanie prijali popredné vedecké osobnosti v danej tematike, Prof. M. Natália D. S. Cordeiro z Univerzity v Porte, Prof. Andrzej Stasiak z Univerzity v Lausanne a Prof. Christos N. Likos z Univerzity vo Viedni. V rámci spoločenského programu bude organizovaná prehliadka Bratislavy ukončená spoločnou večerou.

Registrácia je otvorená zatiaľ do 14. 4. 2019, pričom môže byť uzávierka registrácie v prípade potreby posunutá až do 31. 5. 2019 a platba je realizovateľná do 31. 5. 2019. Snahou organizátorov je získať sponzorské príspevky od rôznych grantových agentúr ako aj od organizácií a spoločností, ktoré by mohli využiť konferenciu na ich vlastnú propagáciu.

4.1.3. Počet pracovníkov v programových a organizačných výboroch medzinárodných konferencií

Tabuľka 4a Programové a organizačné výbory medzinárodných konferencií

Meno pracovníka	Programový	Organizačný	Programový i organizačný
Chodák Ivan	0	1	0
Lacík Igor	2	0	0
Omastová Mária	0	1	0
Spolu	2	2	0

4.2. Členstvo a funkcie v medzinárodných orgánoch

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

Ing. Igor Lacík, DrSc.

Bioencapsulation Research Group (funkcia: člen)

CPS UTB Zlín, ČR (funkcia: člen Dozornej rady)

IUPAC Subcommittee Modelling of Free Radical Polymerization Kinetics and Processes (funkcia: člen)

Titular Member IUPAC (funkcia: člen)

Ing. Igor Novák, PhD.

Society of Plastics Engineers, Antwerp, Belgicko (funkcia: člen)

Ing. Mária Omastová, DrSc.

European Polymer Federation (funkcia: národný reprezentant SR)

NK IUPAC (funkcia: členka)

SK UNECSO (funkcia: členka)

RNDr. Michal Procházka, PhD.

EuCheMS European Young Chemists' Network (funkcia: delegát Slovenskej chemickej spoločnosti)

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

Tabuľka 4b Experti hodnotiaci medzinárodné projekty

Meno pracovníka	Typ programu/projektu/výzvy	Počet hodnotených projektov
Chodák Ivan	APVV bilaterálna výzva PL-SK	3
	National Research, Development and Innovation Office Hungary	2
Lacík Igor	ETH Zurich postdoctoral programme	1
	Juvenile Diabetes Research Foundation Innovative Grants	2
Mičušík Matej	Le Studium Research Fellowships of 12 months - Loire Valley Institute for Advanced Studies, France	1
Mosnáček Jaroslav	Ministry of Science and Higher Education in Poland	1

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

Ing. Igor Lacík, DrSc.

Polymer Division IUPAC: ako titulárny člen zodpovedný za posúdenie aplikácií o IUPAC podporu konferencií (posúdených približne 10-15 aplikácií)

Enkapsulačné konzorcium Juvenile Diabetes Research Foundation: ako člen tohto konzorcia posudzovanie podaných projektov a iniciácia vzniku JDRF microcapsule characterization core.

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

Účasť ústavu na rozvoji vednej politiky sa realizovala a realizuje cez člena SKVH Ing. Igora Lacíka, DrSc. a zastúpením pracovníkov ústavu v predsedníctve SAV, Sneme SAV, v Rade riaditeľov II. Oddelenia vied a ďalších komisiách SAV a mimo SAV, ako aj v komisiách grantových agentúr VEGA a APVV.

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): Chemický ústav-neformálna spolupráca, spoločné výsledky a publikácie

Začiatok spolupráce: 2010

Zameranie: spektrálna charakterizácia organických molekúl v roztokoch a polymérových maticiach pre aplikácie vo fotonike a senzorike

Zhodnotenie: V roku 2018 pokračovala spolupráca v charakterizácii derivátov s pyrénovým fluorofórom kovalentne viazaným s radikálovým centrom tetrametylpiperidínu s metyl-amínovým alebo imínovým mostíkom. Výraznou mierou prispeli DFT počítačové kalkulácie robené na PriFUK k interpretácii získaných spektrálnych výsledkov. Polymérne matrice ako aj kontrolované polymerizácie monomérnych fotoprepínačov sú jedným z cieľov podaného návrhu spoločného projektu v schéme APVV-2018.

Výstupy:

DANKO, Martin - KOLLÁR, Jozef - CIGÁŇ, Marek - CHMELA, Štefan - HRDLOVIČ, Pavol. Synthesis and spectral properties of probes based on pyrene and 2,2,6,6-tetramethylpiperidine-1-H- or 1-oxyl. In Dyes and Pigments, 2018, vol. 153, p. 189-199. (3.767 - IF2017). ISSN 0143-7208.

Názov univerzity/vysokej školy a fakulty: Prírodovedecká fakulta UK

Druh spolupráce (spoločné pracovisko alebo iné): neformálna spolupráca, spoločné výsledky, publikácie a návrhy projektov

Začiatok spolupráce: 2017

Zameranie: detailná charakterizácia na ĽUPo SAV pripravovaných konjugovaných polymérov pomocou pokročilých spektroskopických metód, štúdium možností využitia týchto polymérov vo fotonických aplikáciách

Zhodnotenie: Roku 2017 začala spolupráca na charakterizácii nového tiofenického kopolyméru a štúdiu jeho interakcií s fullerénovými derivátmi. Charakterizácia pomocou transientnej absorpcie, statické a časovo rozlíšene fluorescence v roztokoch a pevnej fáze bola zhrnutá do dvoch publikácií, z nich jedna (roztoky) vyšla koncom roku 2018 a druhá (pevná fáza) je aktuálne v recenznom konaní v Journal of Physical Chemistry. Spolupráca je plánovaná aj na ďalšie roky a bol podaný spoločný projekt vo výzve APVV-2018.

Výstupy:

SLUŠNÁ, Lenka - HAIZER, Ľudovít - JÁNÉ, Eduard - BONDAREV, Dmitrij, SZOCS, Vojtech - DRŽÍK, Michal - NOSKOVIČOVÁ, Eva - LORENC, Dušan - VELIČ Dušan. Linear and Multi-Photon Fluorescence of Thiophene Based Copolymer with Electron-Accepting Side Chains. In Journal of Fluorescence, 2018, 28 (6), 1333-1340 (1.665 - IF2017). ISSN: 1053-0509

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

Druh spolupráce (spoločné pracovisko alebo iné): spoločné pracovisko

Začiatok spolupráce: 2008

Zameranie: výskum biodegradovateľných plastov

Zhodnotenie: Spolupráca sa v roku 2018 obmedzila na sporadické kontakty a informácie ohľadom zavádzania spoločného patentu do priemyselnej praxe. Partner z STU nám pripravil niekoľko zmesí na báze PLA / PHB, ktoré sme použili pri výskume jednak plnenia termoplastickým škrobom a jednak na merania metódou NMR v spolupráci s TUKE Košice.

Výstupy:

1. MOSNÁČKOVÁ, Katarína - ŠLOSÁR, Miroslav - ŠIŠKOVÁ, Alena - KOLLÁR, Jozef - CHODÁK, Ivan - CHMELA, Štefan - ALEX, Pavol - JANIGOVÁ, Ivica - MOSNÁČEK,

Jaroslav. Ageing of poly(lactid acid)/poly(3-hydroxybutyrate)/carbon black composite films under various outdoor and laboratory conditions. In Bio-Based Polymers and Composites : BiPoCo 2018 : 4th International Conference : abstract book. - Budapest, Hungary : Hungarian Academy of Sciences, 2018, p. 389-390.

2. SEDNIČKOVÁ, Michaela - PEKAŘOVÁ, Silvie - KUCHARCZYK, Pavel - BOČKAJ, Ján - JANIGOVÁ, Ivica - KLEINOVÁ, Angela - JOCHEC MOŠKOVÁ, Daniela - OMANÍKOVÁ, Leona - PERŤOCHOVÁ, Dagmar - KOUTNÝ, Marek - SEDLAŘÍK, Vladimír - ALEXEY, Pavol - CHODÁK, Ivan. Changes of physical properties of PLA-based blends during early stage of biodegradation in compost. In *International Journal of Biological Macromolecules*, 2018, vol. 113, p. 434-442.

Názov univerzity/vysokej školy a fakulty: Drevárska fakulta TUZVO

Druh spolupráce (spoločné pracovisko alebo iné): zmluva o spolupráci

Začiatok spolupráce: 2018

Zameranie: Štúdium povrchových vlastností vybraných druhov dreva.

Zhodnotenie: Pri štúdiu povrchových vlastností dubového, bukového a jaseňového dreva upraveného plazmou kopolanárneho bariérového výboja pri atmosférickom tlaku vo vzduchu a v inertnom procesnom plyne (argón) sa zistilo, že povrchová drsnosť dreva sa podľa výsledkov AFM meraní výrazne rastie v závislosti od času modifikácie bariérovou plazmou vo vzduchu. V porovnaní s týmito zmenami je rast drsnosti argónom upraveného povrchu dreva zanedbateľný. Povrchová energia skúmaných druhov dreva sa po 120 s modifikácii atmosférickou plazmou (výkon = 300 W) vo vzduchu sa zvýšila o 15.5 – 20.5 mJ.m⁻². Pri použití argónu bol nárast povrchovej energie skúmaných druhov dreva nižší 6.2 – 11.5 mJ.m⁻². Povrchová energia skúmaných druhov dreva modifikovaného bariérovou plazmou vo vzduchu po 30 dňoch starnutia klesla o 20.5 - 25 %, po úprave plazmou v argóne o 9.2 – 15 %. Pevnosť adhézných spojov dreva upraveného plazmou vo vzduchu a v argóne s použitím epoxidových a polyuretánových adhezív sa v súčasnosti skúma.

1. NOVÁK, Igor - LEHOCKÝ, Marian - CHODÁK, Ivan - KLEINOVÁ, Angela - JURKOVIČ, Peter - MATYAŠOVSKÝ, Ján. Antibacterial modification of polyolefin veneers. In PLASTKO 2018 : sborník příspěvků z konference. - Zlín, ČR : Universita Tomáše Bati ve Zlíně, 2018, p. 137-141. ISBN 978-80-7454-727-0.

2. NOVÁK, Igor - KRUPA, Igor - SEDLIAČIK, Ján - NÓGELLOVÁ, Zuzana - MATYAŠOVSKÝ, Ján - DUCHOVIČ, Peter - JURKOVIČ, Peter. Investigation of plastic/wood composites. In Innovations in Forest Industry and Engineering Design : INNO '2018 : proceedings. - Sofia, Bulgaria : University of Forestry, 2018, p. 25-28. Dostupné na internete: <<http://inno.ltu.bg>>.

Názov univerzity/vysokej školy a fakulty: Vysoká škola výtvarných umení v Bratislave

Druh spolupráce (spoločné pracovisko alebo iné): Spolupráca v rámci projektu ITMS 26240220088, podporeného operačným programom vedy a výskumu a financovaného ERDF

Začiatok spolupráce: 2016

Zameranie: Prepojenie textilných technológií s abstraktným umením.

Zhodnotenie: Tento rok bola spolupráca venovaná dizajnu interiérových objektov akými sú napríklad tienidlá s detailným zameraním na využitie farieb pri elektrostatickom zvlákňovaní. Pri zvlákňovaní boli použité jednak pôvodnené obchodné farby zo spracovávaného plastového odpadu ako aj dodatočne pridané fluorescenčné farbivá, ktoré umožnili získať špeciálne farebné efekty pri osvetľovaní. Účasť na výstave: POCTA SÚKNU - Textil v kontextu umění. Galéria 8SMIČKA, 19.4. - 12.8. 2018. Humpolec, ČR. Frajová, Jaroslava - Šišková, Alena. Vzorčky nanovláknenné textilie. Katalóg výstavy, s. 93 ISBN 978-80-907185-0-0

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

7.2. Kontraktový – zmluvný výskum (vrátane zahraničných kontraktov)

Názov kontraktu: **Meranie horľavosti PUR pien**

Partner(i): Kingspan Hradec Králové

Začiatok spolupráce (v súlade s podpísaným kontraktom): 2015

Ukončenie spolupráce (ak ide o spoluprácu v krátkom období): 2018

Objem získaných prostriedkov v bežnom roku (€): 2277

Názov kontraktu: **Stanovenie rýchlostných konštánt a modelovanie súčasných v budúcnosti študovaných polymerizačných procesov a systémov v BASF.** (Kinetic coefficients and models for existing and future polymerization processes and systems at BASF).

Partner(i): BASF SE Ludwigshafen (Nemecko), Queen's University, Kingston (Kanada)

Začiatok spolupráce (v súlade s podpísaným kontraktom): 2015

Ukončenie spolupráce (ak ide o spoluprácu v krátkom období): 2018

Objem získaných prostriedkov v bežnom roku (€): 35000

Stručný opis výstupu/výsledku: získanie individuálnych rýchlostných konštánt pre rôzne homopolymerizačné a kopolymerizačné systémy.

Zhodnotenie: Doterajšie poznatky boli rozšírené o homopolymerizáciu monomérov s permanentným kationovým a aniónovým nábojom, o kopolymerizáciu rôznych nabitých monomérov za vzniku polyamfolytov a SEC analýzu vzniknutých produktov.

Názov kontraktu: **Nehořlavé systémy podle EN 45545 pro výrobu kompozitov**

Partner(i): UTB Zlín

Začiatok spolupráce (v súlade s podpísaným kontraktom): 2017

Ukončenie spolupráce (ak ide o spoluprácu v krátkom období): 2018

Objem získaných prostriedkov v bežnom roku (€): 1750

Názov kontraktu: **Charakterizácia povrchu sklenených vzoriek**

Partner(i): Turkiye Sise ve Cam Fabrikalari a.s.

Začiatok spolupráce (v súlade s podpísaným kontraktom): 2018

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

Objem získaných prostriedkov v bežnom roku (€): 5200

Názov kontraktu: **Príprava a charakterizácia mikrokapsúl pre farmaceutický priemysel**

Partner(i): Otsuka Pharmaceutical Factory Inc. Japan

Začiatok spolupráce (v súlade s podpísaným kontraktom): 2018

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

Objem získaných prostriedkov v bežnom roku (€): 63470

Názov kontraktu: **Analýzy XPS**

Partner(i): Elektrotechnický ústav SAV Bratislava

Začiatok spolupráce (v súlade s podpísaným kontraktom): 2018

Ukončenie spolupráce (ak ide o spoluprácu v krátkom období): 2018

Objem získaných prostriedkov v bežnom roku (€): 708

Názov kontraktu: **Lepenie UZ meničov na nerezový substrát**

Partner(i): ECOSON s.r.o.

Začiatok spolupráce (v súlade s podpísaným kontraktom): 2018

Ukončenie spolupráce (ak ide o spoluprácu v krátkom období): 2018

Objem získaných prostriedkov v bežnom roku (€): 6260

Názov kontraktu: **Lepidlo Elektropol**

Partner(i): SOS Elektronik s.r.o.

Začiatok spolupráce (v súlade s podpísaným kontraktom): 2018

Ukončenie spolupráce (ak ide o spoluprácu v krátkom období): 2018

Objem získaných prostriedkov v bežnom roku (€): 1100

Názov kontraktu: **Meranie vzoriek DMA**

Partner(i): VÚT Brno, Fakulta chemická

Začiatok spolupráce (v súlade s podpísaným kontraktom): 2018

Ukončenie spolupráce (ak ide o spoluprácu v krátkom období): 2018

Objem získaných prostriedkov v bežnom roku (€): 1200

Názov kontraktu: **Meranie XPS spektier PLA**

Partner(i): STU Bratislava, FCHPT

Začiatok spolupráce (v súlade s podpísaným kontraktom): 2018

Ukončenie spolupráce (ak ide o spoluprácu v krátkom období): 2018

Objem získaných prostriedkov v bežnom roku (€): 1080

Názov kontraktu: **Úprava povrchu koronárnou plazmou**

Partner(i): TU vo Zvolene, Drevárska fakulta

Začiatok spolupráce (v súlade s podpísaným kontraktom): 2018

Ukončenie spolupráce (ak ide o spoluprácu v krátkom období): 2018

Objem získaných prostriedkov v bežnom roku (€): 1260

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.

Meno pracovníka	Názov orgánu	Funkcia
RNDr. Peter Cifra, DrSc.	Komisia pre obhajoby DrSc.	predseda
Ing. Igor Lacík, DrSc.	Komisia pre obhajoby DrSc. v odbore biofyzika	člen
	Ministerstvo školstva, vedy, výskumu a športu SR	člen Slovenskej komisie pre vedecké hodnosti SKVH – podskupina odborov vedy a techniky: chemické vedy
	Komisia pre DSc. v odbore Makromolekulárni chemie v ČR	člen
Mgr. Jaroslav Mosnáček, DrSc.	Komisia pre obhajovy DSc. v odbore makromolekulárni chemie ČR	člen

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

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

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

Meno pracovníka	Názov orgánu	Funkcia
Ing. Igor Lacík, DrSc.	Rada APVV pre prírodné vedy	člen
Ing. Mária Omastová, DrSc.	Rada APVV pre MVTs	člen

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

9. Vedecko-organizačné a popularizačné aktivity

9.1. Vedecko-popularizačná činnosť

Tabuľka 9a Súhrnné počty vedecko-popularizačných činností organizácie SAV

Typ	Počet	Typ	Počet	Typ	Počet
prednášky/besedy	31	tlač	6	TV	5
rozhlas	3	internet	14	exkurzie	49
publikácie	0	multimediálne nosiče	0	dokumentárne filmy	0
iné	1				

9.2. Vedecko-organizačná činnosť

Tabuľka 9b Vedecko-organizačná činnosť

Názov podujatia	Domáca/ medzinárodná	Miesto	Dátum konania	Počet účastníkov
-----------------	-------------------------	--------	---------------	---------------------

9.3. Účasť na výstavách

Názov výstavy: **Pocta súknu - Textil v kontextu umění**

Miesto konania: Galéria 8SMIČKA, 19.4 - 12.8. 2018, Humpolec, ČR

Dátum: 19.4.2018

Zhodnotenie účasti: Výstupom prezentácie bolo uvedenie príspevku v katalógu z výstavy. Frajová, Jaroslava-Šišková, Alena: Vzorky nanovláknenné textilie. In Textil v kontextu umění: Pocta suknu.-Humpolec, ČR: Nadační fond osmička, 2018, P.93. ISBN 978-80-907185-0-0

Názov výstavy: **The Scientific Art Exhibition: 4.10. - 3.11.2018**

Miesto konania: Galerie La Sonnette, Laussane, Švajčiarsko

Dátum: 4.10.2018

Zhodnotenie účasti: D.Račko : Chromosome Gem. obrázok na výstave

9.4. Účasť v programových a organizačných výboroch národných konferencií

Tabuľka 9c Programové a organizačné výbory národných konferencií

Meno pracovníka	Programový	Organizačný	Programový i organizačný
Bondarev Dmitrij	0	0	1
Kuliček Jaroslav	0	1	0
Špitálsky Zdenko	0	1	0
Spolu	0	2	1

9.5. Členstvo v redakčných radách časopisov

Doc. Ing. Dušan Berek, DrSc.

Chemistry and Chemical Technology (Ukraina) (funkcia: člen edičnej rady)

International Journal of Polymeric Materials (USA) (funkcia: člen edičnej rady)

Macromolecules - An Indian Journal (India) (funkcia: člen edičnej rady)

Ing. Anita Eckstein, PhD.

Advances in Materials Science and Engineering (funkcia: hosťujúci editor špeciálneho vydania)

Prof. Ing. Ivan Chodák, DrSc.

The Open Macromolecules Journal (TOMACROJ), Bentham Open (funkcia: člen redakčnej rady)

Mgr. Jaroslav Mosnáček, DrSc.

časopis ISRN Polymer Science (funkcia: člen edičnej rady)

Frontiers in Materials: Composite Materials (funkcia: review editor časopisu)

Ing. Igor Novák, PhD.

CHEMagazín (ČR) (funkcia: externý člen edičnej rady)

Urob si sám (funkcia: člen redakčnej rady)

Ing. Mária Omastová, DrSc.

ChemZi (funkcia: členka redakčnej rady)

Ing. Dušan Račko, PhD.

Frontiers (funkcia: review editor)

Polymers (funkcia: editor špeciálneho čísla)

Ing. Alena Šišková, PhD.

Advances in Materials Science and Engineering (funkcia: hosťujúci editor špeciálneho vydania)

9.6. Činnosť v domácich vedeckých spoločnostiach

Mgr. Martin Danko, PhD.

SCHS (funkcia: Predseda výboru odbornej skupiny Polyméry)

RNDr. Agnesa Fiedlerová

SCHS (funkcia: Tajomníčka výboru odbornej skupiny Polyméry)

Štefan Chmela, DrSc.

SCHS (funkcia: Člen výboru odbornej skupiny Polyméry)

Mgr. Juraj Kronek, PhD.

SCHS (funkcia: Podpredseda odbornej skupiny Polyméry)

Ing. Igor Lacík, DrSc.

Slovenská chemická spoločnosť (funkcia: Člen)

Slovenský národný komitét IUPAC (funkcia: Člen)

Ing. Mária Omastová, DrSc.

SCHS (funkcia: Podpredsedníčka výboru odbornej skupiny Polyméry)

RNDr. Michal Procházka, PhD.

Mladí vedci SAV (funkcia: Predseda)

Odborná skupina Polyméry pri SCHS (funkcia: Člen výboru)

Slovenská chemická spoločnosť (funkcia: Člen predsedníctva)

Ing. Alena Šišková, PhD.

Rada mladých vedcov (funkcia: Predseda)

Mgr. Anna Zahoranová, PhD.

Rada mladých vedcov (funkcia: Predseda)

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

Ústav polymérov SAV sa snaží vyvíjať významné vedecko-popularizačné aktivity v rôznych médiách v zmysle súčasných trendov SAV. Propagácia sa v roku 2018 týkala mnohých vystúpení formou tlače, rozhlasu, televízie, internetu, osobných stretnutí a podobne. Vedecká činnosť ústavu a riešené projekty boli prezentované pre širokú verejnosť aj tento rok na Európskej noci výskumníkov, Dni otvorených dverí či Víkende so SAV. Ing. Igor Lacík, DrSc. tiež predstavil Ústav polymérov SAV spolu s ostatnými ústavmi SAV s chemicky orientovaným výskumom na zasadnutí IUPAC, ktoré sa uskutočnilo v apríli 2018 na Slovensku a to na FCHPT STU.

Vedeckí pracovníci získali viacero významných ocenení. Ing. Igor Lacík bol ocenený ako Osobnosť vedy a techniky 2018, Ing. Mária Omastová, DrSc. a Mgr. Zdenko Špitálsky, PhD. získali Ocenenie predsedníctva SAV, Mgr. Zdenka Špitálskeho, PhD. ocenil tiež Literárny fond Prémiov za výnimočný vedecký ohlas na jedno dielo a spolu s Mgr. Máriou Kováčovou prevzali ocenenie Najpútavejší eko-plagát na konferencii s medzinárodnou účasťou. O zviditeľnenie ústavu sa postarala aj Mgr. Zuzana Kroneková, PhD. Čestným uznaním L'ORÉAL – UNESCO PRE ŽENY VO VEDE 2018 a Ing. Eva Habánková Cenou za najlepšiu prednášku študenta na X. Česko-Slovenskej konferencii Polymery 2018. Je namieste spomenúť aj Cenu za najlepšiu bakalársku prácu pod vedením Mgr. Zdenka Špitálskeho, PhD a 2. cenu Ministerstva hospodárstva SR Inovatívny čin roka 2017, za materiál vyvinutý v spolupráci s Oddelením kompozitných materiálov. Ing. Róbert Balogh získal Diplom za vynikajúci príspevok pri príležitosti X. Interaktívnej konferencie mladých vedcov 2018 a popularizačná činnosť Ing. Aleny Šiškovej, PhD. a Mgr. Silvie Podhradskej, PhD. bola odmenená Cenou SAV za popularizáciu vedy za projekt Nájdi v sebe vedca.

Práca na téme liečby cukrovky je propagovaná cez neinvestičný fond Cukrovka n.f. (www.cukrovkanf.sk).

10. Činnosť knižnično-informačného pracoviska

10.1. Knižničný fond

Tabuľka 10a Knižničný fond

Knižničné jednotky spolu		8156
z toho	knihy a zviazané periodiká	8156
	audiovizuálne dokumenty	0
	elektronické dokumenty (vrátane digitálnych)	2
	mikroformy	0
	iné špeciálne dokumenty - dizertácie, výskumné správy	148
	Rukopisy, vzácne tlače	0
Počet titulov dochádzajúcich periodík		1
z toho zahraničné periodiká		1
Ročný prírastok knižničných jednotiek		4
v tom	kúpou	3
	darom	1
	výmenou	0
	bezodplatným prevodom	0
	náhradou	0
Úbytky knižničných jednotiek		0
Knižničné jednotky spracované automatizovane		0

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

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

10.2. Výpožičky a služby

Tabuľka 10b Výpožičky a služby

Výpožičky spolu (riadok 1)		509
v tom z r. 1	prezenčné výpožičky	22
	absenčné výpožičky	487
v tom z r. 1	odborná literatúra pre dospelých	509
	výpožičky periodík	22
MVS iným knižniciam		3
MVS z iných knižníc		1
MMVS iným knižniciam		0
MMVS z iných knižníc		0
Počet vypracovaných bibliografií		0

Počet vypracovaných rešerší	212
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10.3. Používatelia

Tabuľka 10c Používatelia

Registrovaní používatelia	49
Návštevníci knižnice spolu (bez návštevníkov podujatí)	105

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 €	410

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

Ing. Mária Omastová, DrSc.

- členka Predsedníctva SAV, zástupkyňa podpredsedu pre zahraničné styky
- členka Vedeckej rady SAV

11.3. Členstvo vo vedeckých kolégiách SAV

RNDr. Peter Cifra, DrSc.

- VK SAV pre chemické vedy (člen)

Ing. Igor Lacík, DrSc.

- VK SAV pre chemické vedy (člen)

Ing. Mária Omastová, DrSc.

- VK SAV pre chemické vedy (člen)

11.4. Členstvo v komisiách SAV

Prof. Ing. Tomáš Bleha, DrSc.

- Komisia SAV pre vyhodnocovanie medzinárodných projektov (člen)

Prof. Ing. Ivan Chodák, DrSc.

- Komisia SAV pre duševné vlastníctvo, inovácie a technologický transfer (člen)
- Rada programu centier excelentnosti SAV (člen)

Mgr. Jaroslav Mosnáček, DrSc.

- Komisia SAV pre infraštruktúru a štrukturálne fondy (člen)

Ing. Mária Omastová, DrSc.

- Akreditačná komisia SAV (Predsedníčka)
- Komisia SAV pre vyhodnocovanie medzinárodných projektov (Predsedníčka)
- Porota pre udeľovanie Medzinárodnej ceny SAV (člen)

Mgr. Zdenko Špitálsky, PhD.

- Komisia SAV pre komunikáciu a médiá (člen)

11.5. Členstvo v orgánoch VEGA

RNDr. Peter Cifra, DrSc.

- Komisia VEGA číselný kód 10409, Odbor vedy a techniky/špecializácia: Makromolekulová chémia (člen)

Mgr. Jaroslav Mosnáček, DrSc.

- Komisia VEGA číselný kód 10409, Odbor vedy a techniky/špecializácia: Makromolekulová chémia (člen)

12. Hospodárenie organizácie

12.1. Výdavky PO SAV

Tabuľka 12a Výdavky PO SAV (v €)

V ý d a v k y	Skutočnosť k 31.12.2018 spolu	v tom:			
		zo ŠR od zriaďovateľ a	z vlastných zdrojov	z iných zdrojov	z toho: ŠF EÚ
Výdavky spolu	2641212,58	1472110,11	290782,73	878319,74	
Bežné výdavky	2595241,96	1472110,11	274259,93	848871,92	
v tom:					
mzdy (610)	1121923,26	869130,40	69928,60	182864,26	
poistné a príspevok do poisťovní (620)	390412,72	301665,06	17728,64	71019,02	
tovary a služby (630)	632527,83	206656,65	177753,35	248117,83	
z toho: časopisy	0	0	0	0	
VEGA projekty	107906,70	107906,70	0	0	
MVTS projekty	47740	47740	0	0	
CE	0	0	0	0	
vedecká výchova	4525,73	4525,73	0	0	
bežné transfery (640)	450378,15	94658	8849,34	346870,81	
z toho: štipendiá	95912,50	94658	1254,50	0	
transfery partnerom projektov	346870,81	0	0	346870,81	
Kapitálové výdavky	45970,62	0	16522,80	29447,82	
v tom:					
obstarávanie kapitálových aktív	45970,62	0	16522,80	29447,82	
kapitálové transfery	29447,82	0	0	29447,82	
z toho: transfery partnerom projektov	0	0	0	0	

12.2. Príjmy PO SAV

Tabuľka 12b Príjmy PO SAV (v €)

P r í j m y	Skutočnosť k 31.12.2018 spolu	v tom:	
		rozpočtové	z mimoroz p. zdrojov
Príjmy spolu	2746931,70	1472110,11	1274821,59

Nedaňové príjmy	2731339,70	1472110,11	1259229,59
v tom:			
príjmy z prenájmu	0	0	0
príjmy z predaja výrobkov a služieb	131916,04	0	131916,04
iné	17426,33	0	17426,33
Granty a transfery (mimo zdroja 111)	1109887,22	0	1109887,22
v tom:			
tuzemské	581382,41	0	581382,41
z toho: APVV	551773	0	551773
iné	29609,41	0	29609,41
zahraničné	528504,81	0	528504,81
z toho: projekty rámcového programu EÚ	0	0	0
iné	0	0	0
Daňové príjmy	15592	0	15592
príjmy z prenájmu	15592	0	15592

13. Nadácie a fondy pri organizácii SAV

Názov: **Neinvestičný fond Cukrovka n.f. (www.cukrovkanf.sk)**

Zameranie: Podpora výskumu spojeného s liečbou cukrovky transplantáciou pankreatických ostrovčiek

Opis: Neinvestičný fond Cukrovka n.f. má za cieľ získať prostriedky najmä na:

- podporu výskumu a všetkých aktivít spojených s liečbou cukrovky transplantáciou pankreatických ostrovčiek, ktoré sú enkapsulované v polymérnej membráne,
- podporu vzdelávania a informovania verejnosti vo forme podávania informácií o nových trendoch v liečbe cukrovky,
- podporu študijných pobytov, školení, prednášok, konferencií,
- podporu tvorby prístrojovej infraštruktúry

14. Iné významné činnosti organizácie SAV

15. Vyznamenania, ocenenia a ceny udelené pracovníkom organizácie v roku 2018

15.1. Domáce ocenenia

15.1.1. Ocenenia SAV

Lazar Milan

Zlatá medaila SAV

Oceňovateľ: Predsedníctvo SAV

Opis: Cena za celoživotný prínos v oblasti chémie a polymérov

Omastová Mária

Vedecká publikácia v medzinárodnom vedeckom časopise s najvyšším počtom citácií

Oceňovateľ: Predsedníctvo SAV a Predsedníctvo AV ČR

Opis: Ocenenie spoločných publikácií zo SAV a AV ČR, ktoré vznikli v rámci spolupráce v období 1993-2018

Podhradská Silvia

Cena SAV za popularizáciu vedy

Oceňovateľ: Predsedníctvo SAV

Opis: Cena bola udelená za projekt Nájdí v sebe vedca 3.7. 2018 v Smoleniciach

Rychlá Lýdia

Medaila SAV za podporu vedy

Oceňovateľ: Predsedníctvo SAV

Opis: Cena za podporu vedy a vytvorenie školy o chemiluminiscencii polymérov

Šišková Alena

Cena SAV za popularizáciu vedy

Oceňovateľ: Predsedníctvo SAV

Opis: Cena bola udelená za projekt Nájdí v sebe vedca 3.7. 2018 v Smoleniciach

Špitálsky Zdenko

Vedecká publikácia s mimoriadne vysokým počtom citácií

Oceňovateľ: Predsedníctvo SAV

15.1.2. Iné domáce ocenenia

Balogh Róbert

Diplom za vynikajúci príspevok v sekcii Organická, bioorganická, farmaceutická chémia, farmakológia a toxikológia

Oceňovateľ: občianske združenie Preveda

Opis: Cena bola udelená v rámci oceňovania pri príležitosti X. Interaktívnej konferencie mladých vedcov v Bratislave

Kroneková Zuzana

Čestné uznanie L'OREAL - UNESCO pre ženy vo vede

Oceňovateľ: UNESCO

Opis: Cena za projekt Polymérne systémy pre kombinovanú imunoterapiu

Lacík Igor

Osobnosť vedy a techniky

Oceňovateľ: Ministerstvo školstva, vedy, výskumu a športu SR

Špitálsky Zdenko

Cena dekana za vynikajúcu bakalársku prácu

Oceňovateľ: Dekan FCHPT

Opis: Bc. práca T. Lacenovej pod vedením Z. Špitálskeho

Špitálsky Zdenko

Inovatívny čin roka 2017

Oceňovateľ: Ministerstvo hospodárstva SR

Opis: Firma MYMEDIA s.r.o. v spolupráci s OKM ÚPo SAV vyvinula materiál, ocenený na Medzinárodnom strojárskom veľtrhu v Nitre 22.5.2018

Špitálsky Zdenko

Najpútavejší ekoplagát

Oceňovateľ: CVTI Bratislava

Opis: Konferencia s medzinárodnou účasťou Transfer technológií na Slovensku a v zahraničí, autori Z. Špitálský, M. Kováčová, V. Ďuriš, M. Vysopal, P. Svoboda

Špitálsky Zdenko

Prémia za výnimočný vedecký ohlas na jedno dielo

Oceňovateľ: Literárny fond

Opis: Práca autorov Z. Špitálský, D. Tasis, K. Papagelis, C. Galiotis

15.2. Medzinárodné ocenenia

Berek Dušan

Certificate of Achievement

Oceňovateľ: Organizing Committee of 18th International Conference on World HPLC &

Separation Techniques Toronto, Canada

Opis: For phenomenal and worthy oral presentation

Berek Dušan

Certificate of Recognition

Oceňovateľ: WBCABC-2018 Organizing Committee Members Barcelona, Spain

Opis: For phenomenal and worthy plenary presentation at World Conference on Analytical & Bioanalytical Chemistry Barcelona, Spain

Berek Dušan

Certificate of Recognition

Oceňovateľ: WCABC-2018 Organizing Committee Members Barcelona, Spain

Opis: For phenomenal and worthy oral presentation at World Conference on Analytical & Bioanalytical Chemistry Barcelona, Spain

Berek Dušan

Medal of contribution

Oceňovateľ: Committee of Analytical Chemistry Polish Academy of Sciences

Opis: Uznanie za zásluhy v oblasti analytickej chémie

Habánková Eva

Cena za najlepšiu prednášku študenta

Oceňovateľ: vedecký výbor konferencie

Opis: Cena udelená na X. Česko-slovenskej konferencii Polymery 2018, Třešť, ČR

Omastová Mária

Best poster award

Oceňovateľ: Organizing committee of International Conference Baltic Polymer Symposium 2018

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)

Na pracovisku nebola zaznamenaná žiadna požiadavka o poskytnutie informácií v zmysle uvedeného zákona.

17. Problémy a podnety pre činnosť SAV

V roku 2018 sa uskutočnil pokus o transformáciu Ústavu polymérov SAV na verejno-výskumnú inštitúciu spolu s ostatnými ústavmi SAV. To si vyžadovalo množstvo administratívnej práce na splnení všetkých podmienok vyžadovaných na zaregistrovanie ústavu v tejto právnej forme. Ministerstvo školstva SR však prejavilo zamietavý postoj a nakoniec sa ústav vrátil na formu príspevkovej organizácie. Obdobie, kedy nemal ústav definovanú právnu formu spôsobovalo problémy pri medzinárodnej vedeckej interakcii ako aj v ekonomických záležitostiach ústavu.

Za posledné roky sa nám podarilo vytvoriť pomerne kvalitné podmienky z pohľadu infraštruktúry avšak rozvoj ústavu (a SAV), ďalšie financovanie, kvalita projektov a kvalita výstupov je kriticky podmienená kvalitou ľudských zdrojov. Ústav polymérov SAV sa snaží naplno využívať rôzne možnosti získavania postdoktorandov zo zahraničia, najmä cez agentúru SAIA a program ERASMUS, cez ktoré prišlo pracovať na ústav v roku 2018 na dobu minimálne jedného mesiaca viacero postdoktorandov alebo študentov z rôznych krajín sveta. Pretrvával problém prijímania postdoktorandov z ázijských krajín v dôsledku prílišnej byrokracie pri získavaní prechodného

pobytu, čo častokrát odradí aktívnych vedeckých pracovníkov po ukončení doktorandského štúdia zbierať ďalšie vedecké skúsenosti na slovenských vedeckých inštitúciách.

Pri zavádzaní nových schválených zákonov by Ústav polymérov SAV privítal ak by predsedníctvo SAV vždy vypracovalo podklady k realizácii týchto zákonov v praxi a zabezpečilo ich distribúciu medzi ústavmi, napr. pri Zákone o ochrane osobných údajov. Takisto by bolo vhodné zabezpečiť komunikáciu ústavov s právnikmi cez predsedníctvo SAV. Je potrebné aj naďalej pokračovať v rozbehnutom zviditeľňovaní SAV medzi širokou verejnosťou a v medziústavnej spolupráci.

Správu o činnosti organizácie SAV spracoval(i):

Mgr. Jaroslav Mosnáček, DrSc. 02/3229 4388

Mgr. Zuzana Benková, PhD., 02/ 3229 4314

Mgr. Monika Majerčíková, 02/ 3229 4319

Mgr. Zdenko Špitálsky, PhD., 02/ 3229 4325

Riaditeľ organizácie SAV

Predseda vedeckej rady

.....

Ing. Igor Lacík, DrSc.

.....

Mgr. Juraj Kronek, PhD.

Prílohy

Príloha A

Zoznam zamestnancov a doktorandov organizácie k 31.12.2018

Zoznam zamestnancov podľa štruktúry (nadväzne na údaje v Tabuľke 1a)

	Meno s titulmi	Úväzok (v %)	Ročný prepočítaný úväzok
Vedúci vedeckí pracovníci DrSc.			
1.	Ing. Josef Bartoš, DrSc.	100	1.00
2.	RNDr. Peter Cifra, DrSc.	100	1.00
3.	Štefan Chmela, DrSc.	60	0.60
4.	Prof. Ing. Ivan Chodák, DrSc.	100	1.00
5.	Ing. Igor Lacík, DrSc.	100	1.00
6.	Mgr. Jaroslav Mosnáček, DrSc.	100	1.00
7.	Ing. Mária Omastová, DrSc.	70	0.70
8.	Ing. Jozef Rychlý, DrSc.	30	0.30
Samostatní vedeckí pracovníci			
1.	Mgr. Zuzana Benková, PhD.	100	1.00
2.	RNDr. Dmitrij Bondarev, PhD.	100	1.00
3.	Mgr. Martin Danko, PhD.	100	1.00
4.	Ing. Anita Eckstein, PhD.	100	1.00
5.	Abolfazl Heydari, PhD.	100	1.00
6.	Ing. Ivica Janigová, PhD.	100	1.00
7.	Mgr. Jozef Kollár, PhD.	100	1.00
8.	Mgr. Juraj Kronek, PhD.	100	1.00
9.	Mgr. Zuzana Kroneková, PhD.	100	1.00
10.	Ing. Matej Mičušík, PhD.	100	1.00
11.	Mgr. Katarína Mosnáčková, PhD.	100	1.00
12.	Ing. Igor Novák, PhD.	40	0.40
13.	Mgr. Cristian Peptu, PhD.	100	1.00
14.	Ing. Dušan Račko, PhD.	100	0.42
15.	Mgr. Zdenko Špitálsky, PhD.	100	1.00
Vedeckí pracovníci			
1.	Ing. Katarína Borská, PhD.	100	0.00
2.	Ing. Gabriela Hloušková, PhD.	100	0.00
3.	Ing. Anna Chovancová, PhD.	100	1.00

4.	Ing. Markéta Ilčíková, PhD.	100	0.00
5.	Ing. Daniela Johec Mošková, PhD.	60	0.00
6.	Ing. Lucia Kleščíková, PhD.	100	1.00
7.	Ing. Jaroslav Kuliček, PhD.	100	0.95
8.	Ing. Miroslava Lukešová, PhD.	100	0.00
9.	Ing. Marta Malíková, PhD.	50	0.00
10.	Ing. Daniela Moravčíková, PhD.	100	0.10
11.	Mgr. Michal Pelach, PhD.	100	1.00
12.	Falko Pippig, PhD.	100	1.00
13.	Mgr. Silvia Podhradská, PhD.	100	1.00
14.	RNDr. Michal Procházka, PhD.	100	1.00
15.	Ing. Michaela Sedničková, PhD.	100	0.09
16.	Ing. Alena Šišková, PhD.	100	1.00
17.	Mgr. Petra Šrámková, PhD.	100	0.42
18.	Ing. Helena Švajdlenková, PhD.	100	1.00
19.	Ing. Dušana Treľová, PhD.	100	1.00
20.	Ing. Lucia Uhelská, PhD.	30	0.30
21.	Mgr. Anna Zahoranová, PhD.	100	1.00
Odborní pracovníci s VŠ vzdelaním (výskumní a vývojoví zamestnanci)			
1.	Ing. Róbert Balogh	10	0.10
2.	Mgr. Stanislav Bilka	5	0.05
3.	Ing. Nikola Bugárová	10	0.10
4.	Ing. Zuzana Cseriová	100	1.00
5.	Ing. Katarína Csomorová	100	1.00
6.	Ing. Peter Čakánek	10	0.10
7.	PharmDr. Faeze Dorchei	10	0.02
8.	RNDr. Agnesa Fiedlerová	80	0.80
9.	Ing. Gerhard Grueber	100	0.82
10.	Ing. Eva Habánková	10	0.10
11.	Ing. Ana Hološ	10	0.10
12.	Ing. Ľudmila Hrčková	40	0.40
13.	Ing. František Ivanič	10	0.10
14.	Ing. Angela Kleinová	100	1.00
15.	Mgr. Igor Koreň	20	0.20
16.	Mgr. Mária Kováčová	10	0.10

17.	Ing. Monika Majerčíková	10	0.02
18.	Mgr. Petra Mazancová, PhD.	10	0.10
19.	Mgr. Veronika Némethová, PhD.	10	0.10
20.	Ing. Zuzana Nógellová	100	1.00
21.	MSc. Hamed Peidayesh	100	0.18
22.	Mgr. Maroš Smolíček	20	0.17
23.	MSc. Gamal Zain	10	0.02

Odborní pracovníci s VŠ vzdelaním (ostatní zamestnanci)

1.	Mgr. Monika Majerčíková	100	1.00
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Odborní pracovníci ÚSV

1.	Viera Bombová	100	1.00
2.	Katarína Cinová	100	1.00
3.	Nadežda Danková	100	1.00
4.	Eva Hipká	100	1.00
5.	Ivona Hrodeková	100	1.00
6.	Jozef Kandrác	80	0.80
7.	Viera Karlíková	100	1.00
8.	Marcela Kimličková	100	1.00
9.	Zuzana Kuželová	100	1.00
10.	Dagmar Maierová	100	1.00
11.	Marta Mitošinková	100	1.00
12.	Iveta Nestarcová	100	1.00
13.	Bc. Lenka Stašková	100	1.00
14.	Milan Trocha	100	0.50

Ostatní pracovníci

1.	Apostol Todorov Nedelčev	40	0.40
2.	Zuzana Ondrušová	100	1.00
3.	Daniela Pírová	100	1.00

Zoznam zamestnancov, ktorí odišli v priebehu roka

	Meno s titulmi	Dátum odchodu	Ročný prepočítaný úväzok
Samostatní vedeckí pracovníci			
1.	Mgr. Cristian Peptu, PhD.	31.12.2018	1.00
2.	Ing. Filip Rázga, PhD.	30.11.2018	0.38
Vedeckí pracovníci			

1.	Ing. Eliška Číková, PhD.	31.10.2018	0.28
2.	Mgr. Zoran Markovic, PhD.	30.11.2018	0.95
Odborní pracovníci s VŠ vzdelaním (výskumní a vývojoví zamestnanci)			
1.	Mgr. Stanislav Bilka	31.12.2018	0.05
2.	Ing. Zuzana Hloušková	9.3.2018	0.20
3.	Mgr. Petra Mazancová, PhD.	31.12.2018	0.10
4.	Mgr. Veronika Némethová, PhD.	31.12.2018	0.10
5.	Ing. Lucia Rišpanová	31.8.2018	0.09
6.	Ing. Ondrej Žigo, PhD.	31.1.2018	0.08
Odborní pracovníci ÚSV			
1.	Erika Juričkovičová	30.4.2018	0.35
Ostatní pracovníci			
1.	Peter Kečkész	28.2.2018	0.07

Zoznam doktorandov

	Meno s titulmi	Škola/fakulta	Študijný odbor
Interní doktorandi hrazení z prostředků SAV			
1.	Ing. Róbert Balogh	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
2.	Ing. Nikola Bugárová	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
3.	Ing. Peter Čakánek	Prírodovedecká fakulta UK	4.1.18 fyzikálna chémia
4.	PharmDr. Faeze Dorchei	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
5.	Ing. Eva Habánková	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
6.	Ing. Ana Hološ	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
7.	Ing. František Ivanič	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
8.	Mgr. Mária Kováčová	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
9.	Ing. Monika Majerčíková	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
10.	MSc. Gamal Zain	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
Interní doktorandi hrazení z iných zdrojov			
<i>organizácia nemá interných doktorandov hrazených z iných zdrojov</i>			

Externí doktorandi			
1.	Ing. Lucia Rišpanová	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia

Zoznam zamestnancov prijatých do jedného roka od získania PhD.

	Meno s titulmi	Dátum obhajoby	Dátum prijatia	Úväzok (v %)
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Zoznam emeritných vedeckých zamestnancov

	Meno s titulmi
1.	Ing. Jaroslav Bartoň, DrSc.
2.	Ing. Dušan Berek, DrSc.
3.	Prof. Ing. Tomáš Bleha, DrSc.
4.	Prof. Ing. Eberhard Borsig, DrSc.
5.	Prof., RNDr. Ignác Capek, DrSc.
6.	Doc. Ing. Štěpán Florian, PhD.
7.	Prof., RNDr. Pavol Hrdlovič, DrSc.
8.	Ing. Dieter Lath, PhD.
9.	Ing. Milan Lazar, DrSc.
10.	Ing. Ivan Lukáč, PhD.
11.	Ing. Ivan Novák, CSc.
12.	Ing. Juraj Pavlinec, PhD.
13.	RNDr. Jan Plaček, PhD.
14.	Ing. Vladimír Pollák, PhD.
15.	Ing. Lýdia Rychlá, DrSc.
16.	RNDr. František Szocs, DrSc.
17.	Prof., RNDr. Jozef Tiňo, DrSc.

Príloha B

Projekty riešené v organizácii

Medzinárodné projekty

Programy: Medziakademická dohoda (MAD)

1.) Syntéza funkcionalizovaných biokompatibilných polyesterových kopolymérov. (*Synthesis of functionalized biocompatible polyester copolymers.*)

Zodpovedný riešiteľ:	Martin Danko
Trvanie projektu:	1.1.2016 / 31.12.2018
Evidenčné číslo projektu:	bilaterálny slovensko-poľský
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií:	2 - Poľsko: 2
Čerpané financie:	mobilita

Dosiahnuté výsledky:

Stereokomplexy polylaktidu sú tvorené interakciou poly(L-laktidových) a poly(D-laktidových) enantiomérov, pričom vykazujú teploty topenia až o 50 °C vyššie ako príslušné homopolyméry. Študovali sme kinetiku ich tvorby v reálnom čase pomocou fluorescence pyrénu, ktorý bol kovalentne viazaný na polylaktidové reťazce v polohe alfa- (na začiatku reťazca) a v polohe omega- (na konci reťazca). Veľmi dobre definované polyméry vhodné pre tento výskum boli získané polymerizáciou s otvorením kruhu laktidu pomocou iniciácie s pyrénovým derivátom a post-modifikáciou koncových hydroxylov polylaktidov. Hlavným sledovaným parametrom bola tvorba exciméru pyrénu. Potvrdilo sa energeticky výhodnejšie (získané z termodynamiky) paralelné usporiadanie (alfa-alfa-) oproti antiparalelnému (alfa-omega-), kde celkové množstvo exciméru bolo vyššie pre paralelnú tvorbu.

Hviezdicové P(MBL-co-CL) polyestery boli pripravené použitím difenyl fosfinu ako katalyzátora a tetraetylenglykolu ako iniciátora. Jedná sa o funkčné štatistické polyestery vhodné na prípravu mechanicky stabilnejších sieťovaných materiálov.

Výstupy:

1. DANKO, Martin - HRDLOVIČ, Pavol - BRZEZINSKI, Marek - DUDA, Andrzej - BIELA, Tadeusz. Real-time monitoring of stereocomplex formation of poly(L-lactide) and poly(D-lactide) decorated with a pyrene derivative as a fluorescence probe. In Polymer: the International Journal for the Science and Technology of Polymers, 2018, vol. 156, p. 76-84. (3.483 - IF2017). ISSN 0032-3861.
2. DANKO, Martin - BASKO, Malgorzata - ĎURKÁČOVÁ, Slávka - DUDA, Andrzej - MOSNÁČEK, Jaroslav. Functional polyesters with pendant double bonds prepared by coordination-insertion and cationic ring-opening copolymerization of epsilon-caprolactone with renewable Tulipalin A. In Macromolecules, 2018, vol. 51, p. 3582-3596. (5.914 - IF2017). ISSN 0024-9297.
3. DANKO, Martin - ĎURKÁČOVÁ, Slávka - BASKO, Malgorzata - MOSNÁČEK, Jaroslav. Ring-opening polymerization of Tulipalin A and epsilon-caprolactone. In Bordeaux Polymer Conference 2018: abstract book. - Bordeaux, France: Bordeaux INP, 2018, non. p. Dostupné na internete: <<http://bpc2018.u-bordeaux.fr/en>>.

2.) Kationové poly(2-oxazolíny) pre transport génov a liečiv (*Cationic poly(2-oxazolines) for gene delivery and drug delivery applications*)

Zodpovedný riešiteľ: Juraj Kronek
Trvanie projektu: 1.1.2018 / 31.12.2020
Evidenčné číslo projektu: MAD
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 1 - Bulharsko: 1
Čerpané financie: mobilita

Dosiahnuté výsledky:

Prvý rok riešenia spoločného projektu bol zameraný na prípravu štatistických kopolymérov polyetylénimínu a poly(2-metyl-2-oxazolínu). Pripravené kopolyméry sa využili na prípravu polyplexov s DNA.

Výstupy:

1. IVANOV, M.- HALADJOVA, E. - SMOLÍČEK, Maroš - KRONEK, Juraj - MOMEKOVA, D. - UGRINOVA, I. – RANGELOV, S. Polymer systems for transport of nucleic acids: physicochemical characteristics and biological properties. IX. Scientific Session Young Scientists in the Polymer World, 7.6. 2018, Sofia, Bulharsko.
2. IVANOV, M.- HALADJOVA, E. - SMOLÍČEK, Maroš - KRONEK, Juraj - MOMEKOVA, D. - UGRINOVA, I. – RANGELOV, S. Determination of physicochemical characteristics and biological properties of new nanosized structures obtained from polymers and DNA. XI. Spring Seminar Interdisciplinary Chemistry, 20-22.04.2018, Sofia, Bulharsko.

3.) Ekologicky nezávadné multifunkčné polyméry. (*Bio-friendly multifunctional polymers.*)

Zodpovedný riešiteľ: Jaroslav Mosnáček
Trvanie projektu: 1.1.2016 / 31.12.2018
Evidenčné číslo projektu: SK-HU MAD
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 1 - Maďarsko: 1
Čerpané financie: mobilita

Dosiahnuté výsledky:

V roku 2018 sa ukončilo a vyhodnotilo testovanie plastifikovaných PLA/PHB filmov plnených 3 hmot.% uhlíkových sadzí, ako potencionálneho materiálu pre kompostovateľné mulčovacie fólie. Pokračovalo sa v testovaní superabsorbentných hydrogélů za rôznych podmienok, ako sú pH, teplota, iónová sila a protión a výsledky boli spísané a odoslané do European Polymer Journal. Pokračoval taktiež výskum v oblasti vývoja makrostabilizátorov na báze hypervetvených polyglycerolov nesúcich tienené fenolické antioxidanty. Začala sa taktiež spolupráca v oblasti polymerizáciou indukovaného samosporiadávania, pričom sa skúšali využiť podmienky nami vyvinutej fotochemicky indukovanej radikálovej polymerizácie s prenosom atómu. Pre pokračovanie spolupráce sa spísal a podal ďalší spoločný MAD projekt, ktorý je v posudzovaní.

4.) Štúdium povrchových vlastností vybraných funkcionalizovaných polyolefínov. (*Study of surface properties of selected functionalized polyolefins.*)

Zodpovedný riešiteľ: Igor Novák
Trvanie projektu: 1.1.2014 / 31.12.2018
Evidenčné číslo projektu: -
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 1 - Česko: 1
Čerpané financie: mobilita

Dosiahnuté výsledky:

V rámci spolupráce s ÚMCH AVČR, Praha, ČR som sa venoval skúmaniu povrchových vlastností nereaktívnych tavných adhezív na báze metalocénových polyolefínov. Metalocénový polyolefín na báze etylén-hexénového kopolyméru vo forme prášku bol modifikovaný ozónom za účelom aktivácie povrchu, pričom sa vytvárajú peroxidy a hydroperoxidy. Na upravený povrch sa potom v tavenine očkoval vhodný monomér typu kyseliny akrylovej alebo kyseliny krotónovej. V dôsledku zvýšenia hydrofilnosti vzorky očkovaného metalocénového kopolyméru bol zistený prírastok polárnej zložky povrchovej energie o 70% a tepelná odolnosť adhézných spojov v odlupovaní a v šmyku (kartón) sa po očkovaní kyselinou akrylovou zvýšila 1,3 násobne. Povrchová energia zistená metódou visiacej kvapky v tavenine potvrdila výsledky získané goniometricky s použitím sady testovacích kvapalín s rôznou polaritou.

Výstupy:

1. CHODÁK, Ivan - PAVLINEC, Jiří - PREŤO, Jozef - VANKO, Vladimír - NOVÁK, Igor. Effect polar groups grafting to metallocene polyolefins on hotmelt adhesive properties. In Bio-Based Polymers and Composites : BiPoCo 2018 : 4th International Conference : abstract book. - Budapest, Hungary : Hungarian Academy of Sciences, 2018, p. 280-281.
2. NOVÁK, Igor - PAVLINEC, Jiří - PREŤO, Jozef - VANKO, Vladimír. Hot-melt adhesives based on metallocene polyolefins. In PLASTKO 2018 : sborník příspěvků z konference. - Zlín, ČR : Universita Tomáše Bati ve Zlíně, 2018, p. 165-167. ISBN 978-80-7454-727-0.

5.) Pokročilá LCn-MSn metóda pre charakterizáciu bio-polymérov a produktov ich degradácie. (*Advanced LC-MSn for characterization of bio-polymers and their degradation products.*)

Zodpovedný riešiteľ: Alena Šišková
Trvanie projektu: 1.1.2016 / 31.12.2018
Evidenčné číslo projektu: SAV- PAV MAD
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 1 - Poľsko: 1
Čerpané financie: mobilita

Dosiahnuté výsledky:

V hodnotenom období bola venovaná pozornosť analýze získaných dát. Výsledky ukázali, že

hrúbka a spôsob výroby polymérnych obalov založených na PLA má významný vplyv na rýchlosť ich degradácie. Aplikácia ESI-MS podporená analýzou HPLC pre monitorovanie hydrolytickej degradácie vzoriek PLA/(R, S)-PHB/Fólie a PLA/(R, S)-PHB/C (v tvare kocky) potvrdila uvoľnenie vo vode rozpustných produktov do degradačného média a umožnila ich štrukturálnu analýzu na molekulárnej úrovni. Vo vode rozpustné produkty degradácie boli identifikované ako mliečna a 3-hydroxymaslová kyselina ako aj ich oligoméry, OLA a OHB. Zistilo sa, že hrúbka skúmanej vzorky nemá za následok zvýšenie celkového množstva kyselín uvoľnených do média a že hrúbka materiálov mení degradačný profil materiálu. Teda, produkty degradácie nemajú vplyv na životné prostredie zvýšením kyslých produktov, ktoré sú výsledkom organickej recyklácie obalov vyrobených z PLA-PHB. Výsledky tejto štúdie môžu byť užitočné pre perspektívnu aplikáciu takýchto materiálov na navrhovanie nových biologicky odbúrateľných obalov na báze PLA-PHB šetrných k životnému prostrediu najmä v kozmetickom a potravinárskom priemysle. Výsledky projektu boli publikované v časopise Waste Management.

Výstupy:

1. SIKORSKA, W. - MUSIOL, M. - ZIEBA, M. - RYCHTER, P. - LEWICKA, K. - ŠIŠKOVÁ, Alena - MOSNÁČKOVÁ, Katarína - KOWALCZUK, M. - ADAMUS, G. Prediction studies of environment-friendly biodegradable polymeric packaging based on PLA. Influence of aspecimens' thickness on the hydrolytic degradation profile. In Waste Management, 2018, vol. 78, p. 938-947. (4.723 - IF2017). ISSN 0956-053X.

Programy: Medziústavná dohoda

6.) Príprava a elektrické vlastnosti vodivých polymérov, kompozitov a nanoštrukturovaných materiálov (*Preparation and Electrical Properties of Conducting Polymers, Composites, and Nanostructured Materials*)

Zodpovedný riešiteľ:	Mária Omastová
Trvanie projektu:	1.1.2017 / 31.12.2021
Evidenčné číslo projektu:	Zmluva o spolupráci
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií:	2 - Česko: 2
Čerpané financie:	-

Dosiahnuté výsledky:

Spolupráca je zameraná na prípravu vodivých mikro a nanočastíc. Vodivý polymér, polypyrol, bol chemicky polymerizovaný na časticiach disulfidu volfrámu. Výsledná vodivosť kompozitov prekročila vodivosť základných komponentov. Tento synergický účinok sa vysvetľuje nanášaním viac vodivého usporiadaného polypyrolu a menej vodivého globulárneho polypyrolu na povrch menej vodivých WS₂ častíc, ktoré boli úplne pokryté. Táto hypotéza bola potvrdená štúdiom morfológie riadkovacím elektrónovým mikroskopom. Podobne Ramanova spektroskopia a XPS výsledky preukázali prítomnosť kompaktnej PPy vrstvy.

Výstupy:

1. Jaroslav Stejskal, Udit Acharya, Patrycja Bober, Milena Hajná, Miroslava Trchová, Matej Mičušík, Mária Omastová, Igor Pašti, Nemanja Gavrilov. Surface modification of tungsten disulfide with polypyrrole in enhancement of the conductivity by balancing fractions of more conducting ordered and less conducting globular polymer phases: impact on hydrogen evolution reaction.

Odoslané do Applied Surface Science.

Programy: COST

7.) Európska sieť pre prepojenie výskumu a inovácií v pokročilom a inteligentnom textile (European network to connect research and innovation efforts on advanced Smart textiles)

Zodpovedný riešiteľ: Anita Eckstein
Trvanie projektu: 11.10.2017 / 10.10.2022
Evidenčné číslo projektu: COST CA17107
Organizácia je koordinátorom projektu: nie
Koordinátor: Catalan Technical Textiles Cluster, Španielsko
Počet spoluriešiteľských inštitúcií: 52 inštitúcií z 28 krajín
Čerpané financie: 0

Dosiahnuté výsledky:

Zapojenie do COST od novembra 2018, zatiaľ neboli uskutočnené žiadne experimenty.
Výstupy v roku 2018: nie sú

8.) Multifunkčné nano-uhlíkové kompozitné materiály: riešenie dvoch hlavných problémov týchto materiálov (1) dostatočná dispergácia nano-uhlíkového plniva, (2) dostatočne silná medzifázová interakcia nano-uhlíkové plnivo a kompozitná matrica. (Multi-Functional Nano-Carbon Composite Materials Network (MultiComp): two main problems to be solved for composite materials : (1) adequate dispersion of the nano-carbon reinforcement material, and (2) strong enough interfacial bonding between the nano- c)

Zodpovedný riešiteľ: Matej Mičušík
Trvanie projektu: 1.4.2016 / 30.4.2020
Evidenčné číslo projektu: COST CA15107
Organizácia je koordinátorom projektu: nie
Koordinátor: Karlsruhe Institute of Technology, Germany
Počet spoluriešiteľských inštitúcií: 1 - Nemecko: 1
Čerpané financie: -
Podpora medzinárodnej spolupráce z národných zdrojov: 4480 €

Dosiahnuté výsledky:

Spolu s Janom Vlčekom (Ústav fyziky a mŕčickej techniky Vysoká škola chemicko-technologická v Praze) sme sa snažili nájsť vhodnú maticu na prípravu kompozitov na báze ftalokyaninov, fullerénov, porfyrínov. Podmienkou bolo, aby bol daný polymér dobre rozpustný v toluéne, prípadne v inom organickom rozpúšťadle. Nakoniec sme sa rozhodli pre otestovanie PE-oktenu a EVA polymérov. Takýto kompozit sa potom dá použiť ako senzor plynov založenom na optickej detekcii (princíp zhasania luminiscencie).

Výstupy:

1. MIČUŠÍK, M. - KULIČEK, J.- GEMEINER, P.- MIKULA, M.- OMASTOVÁ, M.

Multi-walled carbon nanotubes/polypyrrole composites with different surfactants. COST Action CA15107 meeting. Multi-functional Nano-Carbon Composite Materials Network, March 8th - 9th, 2018, Vilnius University, Physics Faculty, Vilnius, Lithuania. M. Mičušík.

9.) Stabilizovaná fotovoltaika ďalšej generácie: objasnenie mechanizmov degradácie organických solárnych článkov komplementárnymi charakterizačnými technikami (StableNextSol). (*Stable Next-Generation Photovoltaics: Unraveling degradation mechanisms of Organic Solar Cells by complementary characterization techniques (StableNextSol).*)

Zodpovedný riešiteľ: Mária Omastová
Trvanie projektu: 1.2.2015 / 31.3.2018
Evidenčné číslo projektu: MVTS - COST MP 1307
Organizácia je koordinátorom projektu: nie
Koordinátor: Fundaci Institut Catal De Nanocicia I Nanotecnologia, Barcelona
Počet spoluriešiteľských inštitúcií: 1 - Španielsko: 56 inštitúcií
Čerpané financie: -
Podpora medzinárodnej spolupráce z národných zdrojov: 1120 €

Dosiahnuté výsledky:

V uplynulom období sa porovnali hybridné materiály na báze mnohostenných uhlíkových nanotrubičiek (MWCNT) a vodivého polyméru polypyrrolu (PPy), ktoré boli pripravené chemickou oxidačnou polymerizáciou a elektrochemickou polymerizáciou pyrolu v prítomnosti tenzidov. Polymerizácie prebiehali na povrchu vodivého skla FTO (Fluorine doped Tin Oxide). Charakterizácia povrchov pripravených hybridov pomocou riadkovej elektrónovej mikroskopie a röntgenovej fotoelektrónovej spektroskopie (XPS) a testovanie účinnosti ako elektród v DSSC článkoch ukázali, že hybridný materiál pripravený chemickou oxidačnou polymerizáciou pyrolu na MWCNT v prítomnosti kationového tenzidu v hmotnostnom pomere PPy/MWCNT 70:30 je vhodnou alternatívou pre prípravu protielektród v DSSC.

Výstupy:

1. KULIČEK, Jaroslav - MIČUŠÍK, Matej - GEMEINER, Pavol - OMASTOVÁ, Mária. Hybrid nanocomposites as counter electrodes in dye-sensitized solar cells. In SEPV 2018 : Stability of Emerging Photovoltaics from Fundamental to Applications : A StableNextSol COST Action MP1307 Meeting: abstract book. - Barcelona, Spain : Institut Català de Nanociencia i Nanotecnologia, 2018, abstr. no. 24. Dostupné na internete: <www.stabilityemergingphotovoltaics.com>. Typ: AFG.
2. KULIČEK, Jaroslav - GEMEINER, Pavol - OMASTOVÁ, Mária - MIČUŠÍK, Matej. Polymer based nanocomposites as counter electrodes in solar cells applications. In 3rd International Meeting on Materials Science for Energy Related Applications : book of abstracts. - Belgrade, Serbia : University of Belgrade - Faculty of Physical Chemistry, 2018, p.31-32. ISBN 978-86-82139-72-0. Typ: AFG

10.) Európske topologické interdisciplinárne pôsobenie (European Topology Interdisciplinary Action)

Zodpovedný riešiteľ: Dušan Račko
Trvanie projektu: 10.6.2018 / 31.12.2022

Evidenčné číslo projektu: COST CA17139
Organizácia je koordinátorom projektu: nie
Koordinátor: Max Planck Institut fur Polymerforschung Mainz (RP), Uni. Vienna (Luca Tubiana)
Počet spoluriešiteľských inštitúcií: 2 - Rakúsko: 1, Nemecko: 1
Čerpané financie: 0

Dosiahnuté výsledky:

Výstupy: ešte nie sú, prvý meeting pracovnej skupiny sa koná 5. - 9.2. 2019

Programy: 7RP

11.) ANTIGRAPONANO: Antibakteriálne polymérne nanokompozity na báze grafénu.
(*ANTibacterial GRaphene/POLymer NANOcomposite.*)

Zodpovedný riešiteľ: Zoran Markovic
Trvanie projektu: 1.12.2015 / 30.11.2018
Evidenčné číslo projektu: SASPRO 1237/02/02 (co-funded by Maria Curie Actions)
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: EU: 26540 €
SAV: 39811 €

Dosiahnuté výsledky:

Uskutočnili sa antibakteriálne testy a testy biokompability pre polyméry na báze PDMS a PU s dopovanými hydrofóbnymi CQD. V prípade PU kompozitov sa navyše sledoval efekt po gama ožiarení. Okrem toho sa pripravili nové typy CQD, ktoré boli dopované chlóróm a fluórom.

Výstupy:

1. STANKOVIĆ, Nenad K. - BODIK, Michal - ŠIFFALLOVIĆ, Peter - KOTLAR, Mario - MIČUŠÍK, Matej - ŠPITÁLSKY, Zdenko - DANKO, Martin - MILIVOJEVIĆ, Dušan D. - KLEINOVÁ, Angela - KUBAT, Pavel - CAPAKOVA, Zdenka - HUMPOLIČEK, Petr - LEHOCKY, Marian - TODOROVIC MARKOVIĆ, Biljana M. - MARKOVIĆ, Zoran M. Antibacterial and antibiofouling properties of light triggered fluorescent hydrophobic carbon quantum dots langmuir-blodgett thin films. In ACS Sustainable Chemistry & Engineering, 2018, vol. 6, p. 4154-4163. (6.140 - IF2017). (2018 - Current Contents). ISSN 2168-0485. Typ: ADCA
2. MARKOVIĆ, Zoran M. - JOVANOVIĆ, Svetlana P. - MAŠKOVIĆ, Pavle Z. - DANKO, Martin - MIČUŠÍK, Matej - PAVLOVIĆ, Vladimir B. - MILIVOJEVIĆ, Dušan D. - KLEINOVÁ, Angela - ŠPITÁLSKY, Zdenko - TODOROVIC MARKOVIĆ, Biljana M. Photo-induced antibacterial activity of four graphene based nanomaterials on a wide range of bacteria. In RSC Advances, 2018, vol. 8, p. 31337-31347. (2.936 - IF2017). ISSN 2046-2069. Typ: ADCA
3. BODIK, Michal - ŠIFFALLOVIĆ, Peter - NÁDAŽDY, Peter - BENKOVIČOVÁ, Monika - MARKOVIĆ, Zoran M. - CHLPIK, Juraj - CIRAK, Július - KOTLÁR, Mário - MIČUŠÍK, Matej - JERGEL, Matej - MAJKOVÁ, Eva. On the formation of hydrophobic carbon quantum dots Langmuir films and their transfer onto solid substrates. In Diamond and Related Materials, 2018, vol. 83, p. 170-176. (2.232 - IF2017). ISSN 0925-9635. Typ: ADCA

12.) Funkčné hviezdicové architektúry skladajúce sa z cyklodextrínového jadra a bioinšpirovaných syntetických ramien pre všestranné systémy aplikovateľné ako nosiče liečiv. (Functional Star Architectures Based On Cyclodextrin Cores And Bioinspired Synthetic Arms For Versatile Drug Delivery Systems.)

Zodpovedný riešiteľ: Cristian Peptu
Trvanie projektu: 1.1.2016 / 31.12.2018
Evidenčné číslo projektu: SASPRO 1237/02/02 (co-funded by Maria Curie Actions)
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: EU: 25702 €
SAV: 38556 €

Dosiahnuté výsledky:

Výskumné aktivity počas tretieho roku riešenia projektu zahŕňali prípravu polymérnych sietí na báze pripravených derivátov CD. Avšak pokusy aplikácie tiol-énového kaplingu so špeciálne pripravenými tiolmi funkcionalizovanými polymermi nevedli k tvorbe gélu. Dôvodom môže byť nízky obsah allylových skupín na molekulu CD a tým nízku pravdepodobnosť tvoriť sieťované štruktúry. Preto sme sa v ďalšom výskume odchyľili od pôvodnej idey prípravy CD sietí cez tiol-énový kapling. Ukázalo sa, že CD deriváty sa môžu modifikovať cez oxa-Michaelovu adíciu OH skupín na divinyl-sulfón. Sieťovanie môže byť uskutočnené medzi tiolom a alkénom radiklovým mechanizmom alebo Michaelovou adíciou. Zvolili sme sieťovanie mechanizmom Michaelovou adíciou a postupné sieťovanie sa pozorovalo po zmiešaní reaktanov už pri izbovej teplote. Proces sieťovania bol následne kontrolovaný zmenou pH reakčnej zmesi.

13.) CASSETTE: Konjugovaný anti-sense systém pre selektívne a špecifické umlčanie BCR-ABL: Inovatívna stratégia pre liečbu CLM. (Conjugated Antisense system for Selective and Specific BCR-ABL supprEsson: An innovaTive straTegy for CML treatment.)

Zodpovedný riešiteľ: Filip Rázga
Trvanie projektu: 1.4.2015 / 31.12.2018
Evidenčné číslo projektu: SASPRO 0057/01/02 (co-funded by Maria Curie Actions)
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: EU: 5717 €
SAV: 8952 €

Dosiahnuté výsledky:

Programy: Multilaterálne - iné

14.) Stanovenie rýchlostných konštánt a modelovanie súčasných a v budúcnosti študovaných polymerizačných procesov a systémov v BASF. (Kinetic coefficients and models for existing and

future polymerization processes and systems at BASF.)

Zodpovedný riešiteľ: Igor Lacík
Trvanie projektu: 1.9.2015 / 31.8.2018
Evidenčné číslo projektu: projekt BASF AG, Ludwigshafen, Nemecko
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 1 - Nemecko: 1
Čerpané financie: BASF: 11713 €

Dosiahnuté výsledky:

V tomto projekte sme riešili niekoľko tém. Ukončili sme štúdium venované rýchlostnej konštante propagácie, kp, pre kationové metakrylátové monoméry. V téme polymerizácie neionizovanej kyseliny akrylovej a metakrylovej sa získali nové kp hodnoty pre polymerizáciu v bloku a v rôznych organických rozpušťadlách, ktoré zahŕňali aj nasýtené analógy týchto monomérov. Stanovili sa kp hodnoty pre rôzne kopolyméry s rôznym typom náboja, s čím súvisela aj nutnosť určenia podmienok presného stanovenia mólovej hmotnosti týchto kopolymérov metódou gélovej permeačnej chromatografie. Spoločne s Queens University v Kingstone boli navrhnuté a verifikované modely homopolymerizácie a kopolymerizácie nabitých monomérov, ktoré boli overené na simulácii konverzie a distribúcií mólových hmotností. V nezmlyvnej spolupráci s Dr. A. Nikitinom z Ruskej akadémie vied sa spresnili podmienky stanovenia kp hodnôt metódou PLP-SEC. Momentálne pracujeme na niekoľkých článkoch, ktoré budú predstavovať výstupy pre túto tému.

Výstupy:

1. NIKITIN, A.N. - LACÍK, Igor - HUTCHINSON, R.A. - BUBACK, M. - RUSSELL, G. T. Detection of PLP structure for accurate determination of propagation rate coefficients over an enhanced range of PLP-SEC conditions, *Macromolecules*, odoslané 9/2018 (5.914- IF2017)
2. HABÁNKOVÁ, Eva - CHOVANCOVÁ, Anna - NIKITIN, A. - LACÍK, Igor. Propagation rate of acrylic and methacrylic acids by PLP-SEC. In *Polymery 2018 : X. Česko-slovenská konference : sborník abstraktů*. - Praha, ČR : Ústav makromolekulární chemie AV ČR, v.v.i., 2018, p. 36. ISBN 978-80-85009-92-7, prednáška
3. CHOVANCOVÁ, Anna - HABÁNKOVÁ, Eva - BRNGALOVÁ, V. - BARLOG, M. - LACÍK, Igor. Charges and propagation kinetics in radical polymerization. In *Polymery 2018: X. Česko-slovenská konference : sborník abstraktů*. - Praha, ČR : Ústav makromolekulární chemie AV ČR, v.v.i., 2018, p. 35. ISBN 978-80-85009-92-7, prednáška
4. LACÍK, Igor. Pulsed-laser initiated polymerization in aqueous solution. In 9th PULS Conference on Pulse Investigations in Chemistry, Physics, and Biology, Lodz, Poland, 2.-6.9.2018, pozvaná prednáška
5. CHOVANCOVÁ, Anna - HABÁNKOVÁ, Eva - LACÍK, Igor. PLP-SEC investigation of propagation rate for charged monomers polymerized in aqueous solutions. In *World Polymer Congress IUPAC Macro 2018*, Cairns, Australia, 1.-5.7.2018, prednáška

15.) Kompozity na báze vodivých polymérov. (*Composites based on conductive polymers.*)

Zodpovedný riešiteľ: Matej Mičušík
Trvanie projektu: 1.1.2017 / 31.12.2018
Evidenčné číslo projektu: DS-2016-0027
Organizácia je áno

koordinátorom projektu:

Koordinátor: Ústav polymérov SAV

Počet spoluriešiteľských 0

inštitúcií:

Čerpané financie: -

Podpora medzinárodnej spolupráce z národných zdrojov: 2718 €

Dosiahnuté výsledky:

Publikovali sme predošlú štúdiu o kompozitoch na báze lignín/PPy. Potom sme za asistencie farbiva metyl oranže (MO) pripravili polypyrrolové (PPy) nanotrubičky s vysokou elektrickou vodivosťou ~ 100 S cm⁻¹. Okrem MO sa študoval aj vplyv Acid Blue 25 na výslednú vodivosť a morfológiu PPy. Takto pripravené PPy nanoštruktúry sa následne karbonizovali v inertnej atmosfére za prítomnosti dusíka, čím vznikli nanotubulárne dusík obsahujúce uhlíkové nanoštruktúry. Takéto nanotrubičky sa potom pokrývali globulárnym aj nanoštruktúrovaným PPy a študovali sa jeho chemické a elektrochemické vlastnosti. Tieto hybridné štruktúry sa potom ďalej miešali s polymérnymi matricami, výsledné kompozity sa budú testovať na ich potenciálne použitie pre elektromagnetické tienenie.

Výstupy:

1. BOBER, Patrycja - GAVRILOV, Nemanja - KOVALCIK, Adriana - MIČUŠÍK, Matej - UNTERWEGER, Christoph - PAŠTI, Igor A. - ŠEDĚNKOVÁ, Ivana - ACHARYA, Udit - PFLEGER, Jiří - FILIPPOV, Sergey K. - KULIČEK, Jaroslav - OMASTOVÁ, Mária - BREITENBACH, Stefan - ĆIRIĆ-MARJANOVIĆ, Gordana - STEJSKAL, Jaroslav. Electrochemical properties of lignin/polypyrrole composites and their carbonized analogues. In Materials Chemistry and Physics, 2018, vol. 213, p. 352-361. (2.210 - IF2017). ISSN 0254-0584. Typ: ADCA
2. KULIČEK, Jaroslav - GEMEINER, Pavol - OMASTOVÁ, Mária - MIČUŠÍK, Matej. Polymer based nanocomposites as counter electrodes in solar cells applications. In 3rd International Meeting on Materials Science for Energy Related Applications : book of abstracts. - Belgrade, Serbia : University of Belgrade - Faculty of Physical Chemistry, 2018, p.31-32. ISBN 978-86-82139-72-0. Typ: AFG.

16.) Farbivom senzibilizované solárne články na báze pevných perovskitových elektrolytov.
(*Dye-sensitized solar cell based on perovskite solid-state electrolyte (DOPE)*)

Zodpovedný riešiteľ: Mária Omastová

Trvanie projektu: 1.9.2016 / 31.8.2018

Evidenčné číslo projektu: Projekt KONNECT Joint Call on “Resources and Sustainability”

Organizácia je nie

koordinátorom projektu:

Koordinátor: Chung-Ang University, Korea

Počet spoluriešiteľských 4 - Slovensko: 2, Turecko: 2

inštitúcií:

Čerpané financie: -

Podpora medzinárodnej spolupráce z národných zdrojov: 8240 €

Dosiahnuté výsledky:

Kompozity PPy/MWCNT sa pripravili v troch pomeroch zložiek 50:50, 70:30 a 90:10 jednoduchou trojstupňovou oxidačnou polymerizáciou pyrolu. Pripravené nanokompozity sa použili ako lacná alternatívna protielektroda oproti bežne používanej Pt elektródy v DSSC. Disperzie kompozitov PPy/MWCNT boli nanosené na FTO substráty metódou “doctor-blade“. Štúdium povrchu pomocou

SEM potvrdilo kompozitnú štruktúru PPy/ MWCNT s napolymerizovanými PPy nanovrstvami okolo MWCNT. Kompaktná štruktúra medzi PPy a MWCNT umožňuje úzke interakcie a efektívny transport elektrónov v kompozitoch a bola potvrdená FTIR a XPS meraním. PPy/MWCNT s pomerom 70:30 dosiahla najnižšiu hodnotu meraného odporu $R_{ct} = 16 \Omega \text{ cm}^2$, dokonca nižšiu ako štandardná Pt CE $R_{ct} = 20 \Omega \text{ cm}^2$ a mala dobrú elektrochemickú stabilitu a katalytickú aktivitu v prítomnosti jodidového elektrolytu. Účinnosti pripravených DSSC boli výrazne vyššie pre CE s kompozitom PPy/MWCNT ako pre PPy CE. PPy/MWCNT 70:30 dosiahli približne o 30% nižšiu účinnosť ($\eta = 4,9\%$) v porovnaní so štandardnou Pt CE ($\eta = 7,1\%$). V nadväznosti na predchádzajúcu prácu PPy/MWCNT nanokompozity boli pripravené kombináciou elektrochémie a tlačovej metódy s pomerom zložiek PPy:MWCNT 70:30 a rôznymi povrchovo aktívnymi činidlami ako polopriehľadné kompozitné protielektrody pre DSSC. PPy/MWCNT kompozity boli pripravené chronoamperometrickou elektropolymerizáciou PPy na FTO sklo s alebo bez MWCNT. MWCNT boli rozdispergovane v n-butylalkohole nanášali sa na FTO sklo „doctor-blade“ technikou. Pri príprave PPy/MWCNT boli použité povrchovo aktívne látky, kationový CTAB, aniónový DBSNa a neiónový Tween 20 tenzid. Morfológia ukázala dobrú interakciu medzi PPy a MWCNT. XPS meraním pre vzorky PPy/DBSNa a PPy/DBSNa/MWCNT sa potvrdil pík S2p zodpovedajúci skupine SO_3^{2-} v DBS. V prípade vzoriek PPy/CTAB, PPy/CTAB/MWCNT, PPy/Tween20 a PPy/Tween20/MWCNT bol pomocou XPS zaznamenaný chlórový anión ako protiión v štruktúre PPy. PPy elektrodeponovaný na FTO skle v prítomnosti DBSNa vykazoval veľmi dobrú účinnosť CE v DSSC. PPy/DBSNa a PPy/DBSNa/MWCNT CE dosahujú vysokú elektrochemickú katalytickú aktivitu. Najnižšie hodnoty R_{ct} poskytujú PPy/Tween20/MWCNT a PPy/DBSNa/MWCNT. DSSC zostavené s PPy/DBSNa/MWCNT CE dosiahli vyššiu účinnosť konverzie ($\eta = 2,89\%$) ako PPy/DBSNa CE ($\eta = 2,75\%$) alebo PPy/Tween20/MWCNT CE rovnako ako aj PPy/Tween20 CE ($\eta = 1,80\%$), PPy/CTAB CE ($\eta = 1,73\%$) a PPy/CTAB/MWCNT CE ($\eta = 1,67\%$). CE pripravená elektropolymerizáciou PPy na MWCNT s neiónovým (Tween 20) a aniónovým (DBSNa) povrchovo aktívnym činidlom poskytla sľubné výsledky.

Výstupy:

1. KULIČEK, Jaroslav - GEMEINER, Pavol - OMASTOVÁ, Mária - MIČUŠÍK, Matej. Preparation of polypyrrole/multi-walled carbon nanotube hybrids by electropolymerization combined with a coating method for counter electrodes in dye-sensitized solar cells. In Chemical Papers, 2018, vol. 72, no. 7, p. 1651-1667. (0.963 - IF2017). ISSN 0366-6352. Typ: ADDA
2. Jongee Park, Nursev Erdogan, Asmae Bouziani, Matej Micusik, SooYoung Kim, Eva Majkova, Maria Omastova, Abdullah Ozturk. Photocatalytic Activity of TiO2 Nanoparticles Containing Anatase, Rutile, and Brookite. Odoslané do Journal of Colloid and Interface Science.

17.) Antibakteriálne polymérne nanokompozity z uhlíkových nanočastíc. (*Antibacterial polymeric nanocomposites on the base of carbon nanomaterials.*)

Zodpovedný riešiteľ:	Zdenko Špitálsky
Trvanie projektu:	1.1.2017 / 31.12.2018
Evidenčné číslo projektu:	DS-2016-0021
Organizácia je	áno
koordinátorom projektu:	
Koordinátor:	Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií:	2 - Česko: 1, Srbsko: 1
Čerpané financie:	-
	Podpora medzinárodnej spolupráce z národných zdrojov: 2588 €

Dosiahnuté výsledky:

Pripravila sa séria polymérnych kompozitov na báze polyuretánu alebo silikónu, ktoré boli charakterizované na antibakteriálne vlastnosti, test biokompability a hemolytický test.

Výstupy:

1. STANKOVIČ, Nenad K. - BODIK, Michal - ŠIFFALOVICH, Peter - KOTLAR, Mario - MIČUŠÍK, Matej - ŠPITÁLSKY, Zdenko - DANKO, Martin - MILIVOJEVIĆ, Dušan D. - KLEINOVÁ, Angela - KUBAT, Pavel - CAPAKOVA, Zdenka - HUMPOLIČEK, Petr - LEHOCKY, Marian - TODOROVICH MARKOVIĆ, Biljana M. - MARKOVIĆ, Zoran M. Antibacterial and antibiofouling properties of light triggered fluorescent hydrophobic carbon quantum dots langmuir-blodgett thin films. In ACS Sustainable Chemistry & Engineering, 2018, vol. 6, p. 4154-4163. (6.140 - IF2017). (2018 - Current Contents). ISSN 2168-0485. Typ: ADCA
2. MARKOVIĆ, Zoran M. - JOVANOVIĆ, Svetlana P. - MAŠKOVIĆ, Pavle Z. - DANKO, Martin - MIČUŠÍK, Matej - PAVLOVIĆ, Vladimir B. - MILIVOJEVIĆ, Dušan D. - KLEINOVÁ, Angela - ŠPITÁLSKY, Zdenko - TODOROVICH MARKOVIĆ, Biljana M. Photo-induced antibacterial activity of four graphene based nanomaterials on a wide range of bacteria. In RSC Advances, 2018, vol. 8, p. 31337-31347. (2.936 - IF2017). ISSN 2046-2069. Typ: ADCA
3. BODIK, Michal - ŠIFFALOVICH, Peter - NÁDAŽDY, Peter - BENKOVIČOVÁ, Monika - MARKOVIĆ, Zoran M. - CHLPIK, Juraj - CIRAK, Július - KOTLÁR, Mário - MIČUŠÍK, Matej - JERGEL, Matej - MAJKOVÁ, Eva. On the formation of hydrophobic carbon quantum dots Langmuir films and their transfer onto solid substrates. In Diamond and Related Materials, 2018, vol. 83, p. 170-176. (2.232 - IF2017). ISSN 0925-9635. Typ: ADCA

Programy: Bilaterálne - iné

18.) Bezpečnosť a kvalita potravín v nanotechnológii. (*Safety and quality of food in nanotechnology.*)

Zodpovedný riešiteľ:	Zuzana Benková
Trvanie projektu:	1.9.2016 / 31.12.2018
Evidenčné číslo projektu:	NORTE-01-0145-FEDER-000011
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Univerzita v Porte
Počet spoluriešiteľských inštitúcií:	1 - Portugalsko: 1
Čerpané financie:	0

Dosiahnuté výsledky:

Riešenie projektu bolo zamerané na využitie uhlíkových nanorúrok v biochemických procesoch. Pomocou molekulovo-dynamických a ab-initio výpočtov sa skúmali vplyvy rôznych modifikácií nanorúrok na ich rozpustnosť vo vode. Tiež sa študoval vplyv priemeru nanorúrok na ich vzájomné interakcie.

Výstupy:

1. BENKOVÁ, Zuzana - ČAKÁNEK, Peter - D. S. CORDEIRO, M. Natália. Molecular dynamics simulations of interactions between carbon nanotube coated with poly(ethylene oxide) and oligopeptides. In ECIS 2018: Book of abstracts. - Ljubljana, Slovenia, 2018, PP2.29. Výveska
2. ČAKÁNEK, Peter - BENKOVÁ, Zuzana - D. S. CORDEIRO, M. Natália. Poly(ethylene oxide) as protective barrier of carbon nanotubes against protein adsorption-molecular dynamics study. In NanoBio 2018: Book of abstracts. - Heraklion, Crete, 2018, WS1-P12. Výveska

19.) Príprava syntetických polymérnych materiálov s antibakteriálnymi povrchmi

Zodpovedný riešiteľ: Igor Novák
Trvanie projektu: 1.1.2016 / 31.12.2018
Evidenčné číslo projektu:
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 1 - Česko: 1
Čerpané financie: -

Dosiahnuté výsledky:

Na povrch nízko hustotného polyetylénu (LDPE) sa za účelom prípravy aktívnych antibakteriálnych biomateriálov imobilizoval po povrchovej úprave nízkoteplotnou plazmou sparfloxacín, enrofloxacin, a lomefloxacin. Sparfloxacín, enrofloxacin a lomefloxacin boli vybrané kvôli svojim bakteriocídnym vlastnostiam, pričom sa na plazmou upravený povrch LDPE naviazal N-alylmetylamin. Pripravené povrchy antibakteriálne modifikovaného LDPE boli skúmané z hľadiska povrchových vlastností, FTIR a SEM. Antibakteriálna aktivita pripraveného modifikovaného LDPE proti vplyvu *S. aureus* a *E. coli* potvrdila účinnosť biocídneho účinku v prípade všetkých imobilizovaných antibakteriálnych látok.

Výstupy:

1.OZALTIN, Kadir - LEHOCKY, Marian - HUMPOLICEK, Petr - VESELA, Daniela - MOZETIC, Miran - NOVÁK, Igor - SAHA, Petr. Preparation of active antibacterial biomaterials based on sparfloxacín, enrofloxacin, and lomefloxacin deposited on polyethylene. In Journal of Applied Polymer Science, 2018, vol. 135, art. no. 46174. (1.901 - IF2017). ISSN 0021-8995. Typ: ADCA
2.NOVAK, Igor - LEHOCKY, Marian - CHODAK, Ivan - KLEINOVA, Angela - JURKOVIC, Peter - MATYASOVSKY, Jan. Antibacterial modification of polyolefin veneers. In PLASTKO 2018 : sborník príspevků z konference. - Zlin, CR : Universita Tomase Bati ve Zlině, 2018, p. 137-141. ISBN 978-80-7454-727-0.

20.) Štúdium povrchových a adhézných vlastností polyimidu a jeho kopolymérov

Zodpovedný riešiteľ: Igor Novák
Trvanie projektu: 1.1.2018 / 31.12.2018
Evidenčné číslo projektu:
Organizácia je koordinátorom projektu: nie
Koordinátor: Ústav polymérov FCHT, VŠCHT Praha
Počet spoluriešiteľských inštitúcií: 1 - Česko: 1
Čerpané financie: -

Dosiahnuté výsledky:

Na Ústave polymérov FCHT VŠCHT v Prahe sa synteticky pripravili vzorky lineárnych a vysoko vetvených polyimidov s mezopórovitým oxidom kremičitým. Skúmali sa povrchové vlastnosti pripravených hybridných kompozitných materiálov, pričom sa zistil rast polárnej zložky voľnej povrchovej energie lineárnych polyimidov v závislosti od rastu koncentrácie SiO₂ a pri 20 hmot. % SiO₂ dosahoval 80%. Pri vysokovetvených polyimidoch bol tento prírastok polárnej zložky

povrchovej energie ešte vyšší a dosahoval pri až 90 %. Homogenita vzoriek lineárnych a vysokovetvených polyimidov s SiO₂ sa posudzovala SEM na priereze vzoriek a výsledky sa doplnili o dielektrické merania, AFM, mikroindentačné, XPS, TOF SIMS a adhézne merania. Vzhľadom na finálnu kompletizáciu výsledkov meraní v roku 2018 neboli výsledky meraní polyimidov s SiO₂ prezentované na konferenciách. V súčasnosti sa pripravuje v spolupráci s VŠCHT, Praha, ČR a ÚMCH AV ČR, Praha, ČR spoločná publikácia.

21.) Antibakteriálne polymérne nanokompozitné vlákna z uhlíkových nanomateriálov.
(*Antibacterial polymeric nanocomposites fibers based on carbon nanomaterials.*)

Zodpovedný riešiteľ: Zdenko Špitálsky
Trvanie projektu: 1.11.2017 / 31.12.2018
Evidenčné číslo projektu: SK-SRB-2016-0038
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 1
Čerpané financie: -
Podpora medzinárodnej spolupráce z národných zdrojov: 1488 €

Dosiahnuté výsledky:

Podarilo sa pripraviť a charakterizovať nové typy uhlíkových kvantových bodiek. Najmä ich modifikované s chlóróm a fluórom môžu priniesť nové unikátne vlastnosti do budúcnosti.

Výstupy:

1. MARKOVIĆ, Zoran M. - JOVANOVIĆ, Svetlana P. - MAŠKOVIĆ, Pavle Z. - DANKO, Martin - MIČUŠÍK, Matej - PAVLOVIĆ, Vladimir B. - MILIVOJEVIĆ, Dušan D. - KLEINOVÁ, Angela - ŠPITÁLSKY, Zdenko - TODOROVIC MARKOVIĆ, Biljana M. Photo-induced antibacterial activity of four graphene based nanomaterials on a wide range of bacteria. In RSC Advances, 2018, vol. 8, p. 31337-31347. (2.936 - IF2017). ISSN 2046-2069. Typ: ADCA
2. BODIK, Michal - ŠIFFALOVIĆ, Peter - NÁDAŽDY, Peter - BENKOVIČOVÁ, Monika - MARKOVIĆ, Zoran M. - CHLPIK, Juraj - CIRAK, Július - KOTLÁR, Mário - MIČUŠÍK, Matej - JERGEL, Matej - MAJKOVÁ, Eva. On the formation of hydrophobic carbon quantum dots Langmuir films and their transfer onto solid substrates. In Diamond and Related Materials, 2018, vol. 83, p. 170-176. (2.232 - IF2017). ISSN 0925-9635. Typ: ADCA

Programy: European Regional Development Fund (ERDF)

22.) Odpad z makro plastov v a pozdĺž Dunaja. (*Macro plastic waste in and along the Danube.*)

Zodpovedný riešiteľ: Mária Omastová
Trvanie projektu: 1.9.2017 / 30.9.2020
Evidenčné číslo projektu: INTERREG V-A SK-AT / 2017 / TP / 01
Organizácia je nie
koordinátorom projektu:
Koordinátor: Univerzita prírodných zdrojov a života vo Viedni – Odbor vody-atmosféry a životného prostredia (BOKU)
Počet spoluriešiteľských inštitúcií: 4

Čerpané financie: ERDF: 26441 €
SAV: 316 €
Podpora medzinárodnej spolupráce z národných zdrojov: 5600 €

Dosiahnuté výsledky:

Pripravila sa metodika pre kvalitatívnu analýzu zloženia plastového odpadu zo zberov. Analyzovali sa vzorky zo štyroch zberov odpadu, z toho tri boli na rakúskej strane a jeden na slovenskej. Infračervená spektroskopia (FTIR) a Röntgenová fotoelektrónová spektroskopia (XPS) sa použili na identifikáciu a chemickú analýzu plastového odpadu. Prvý návrh metodiky skúmania a určovania plastového odpadu sme zhrnuli do štyroch bodov:

1. vizuálne triedenie plastového odpadu a váženie každej frakcie
2. precízna fotodokumentácia zo zberu a triedenia ako aj z prípravy pre chemickú analýzu
3. FTIR analýza
4. XPS analýza povrchu ako aj priečnych rezov, ak je to potrebné
5. Komplexná analýza zberu a triedenia na základe váženia a chemickej analýzy

Výstupy: Pripravili sa štyri správy z jednotlivých zberov plastov, správa za prvý rok riešenia a niekoľko výstupov v rámci propagácie a diseminácie projektu, novinové články, príspevky v SRO1 a STV1.

Programy: ERANET

23.) Pokročilé polymérne kompozity plnené novými 2D nanočasticami (*Advanced polymer composites filled with novel 2D nanoparticles*)

Zodpovedný riešiteľ: Mária Omastová
Trvanie projektu: 1.9.2018 / 31.8.2021
Evidenčné číslo projektu: M-ERA.NET Call 2017
Organizácia je koordinátorom projektu: nie
Koordinátor: Institute for Mechanics of Materials University of Latvia
Počet spoluriešiteľských inštitúcií: 2
Čerpané financie: ERANET: 8333 €

Dosiahnuté výsledky:

Úlohou slovenskej skupiny je príprava elektricky vodivých kompozitov a meranie elektrických a termofyzikálnych vlastností kompozitov, skúmanie štruktúry vystužených kompozitov. Riešitelia z Ústavu polymérov SAV koordinujú WP 3 Charakterizácia - experimentálne testovanie základných fyzikálnych vlastností vyvinutého materiálu a získavanie údajov pre ďalšie modelovanie a WP 5 Overenie, rozšírenie a validácia- testovanie rôznych variantov vyvinutých materiálov v podmienkach blízkych prevádzke. Keďže projekt začal v septembri 2018, pripravili sa zatiaľ plnivá MXeny a grafén oxid. V ďalšom kroku sa začne s prípravou kompozitov na báze epoxidov.

Výstupy:

1. PROCHÁZKOVÁ, Simona - PROCHÁZKA, Michal - ZELENIAKIENÉ, Daiva - ANISKEVICH, Andrey - OMASTOVÁ, Mária. Preparation and characterisation of novel 2D materials-MXenes. In Czech Chemical Society Symposium Series, 2018, roč. 16, č.5, s. 443. ISSN 2336-7202.(Sjezd českých a slovenských chemických spoločností). Typ: AFG.

Programy: Iné

24.) Nová generácia viackomponentných PMCG mikrokapsúl s kontrolovaným povrchom pre vyhnutie sa imunitnej odpovedi po transplantácii. (*New generation PMCG multicomponent microcapsule with tailored biointerface to avoid immune response after transplantation.*)

Zodpovedný riešiteľ: Igor Lacík
Trvanie projektu: 1.9.2017 / 31.8.2019
Evidenčné číslo projektu: 2-SRA-2018-521-S-B
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 3 - Česko: 1, Nórsko: 1, USA: 1
Čerpané financie: JDRF: 94458 €

Dosiahnuté výsledky:

Rôzne typy syntetizovaných polymérov sodného sulfátu celulózy a poly(metylén-co-kyanoguanidínu) v kombinácii s komerčným ultračistým alginátom sodným viedli k vytvoreniu prvej knižnice tzv. PMCG mikrokapsúl. U týchto mikrokapsúl sa sledovala hlavne schopnosť použitých polymérov tvoriť mikrokapsuly v určitom rozsahu enkapsulačných podmienok a tendencia mikrokapsúl obrastať fibrotickým tkanivom po transplantácii do imunokompetentných myší. Celkovo väčšina mikrokapsúl vykazovala žiadne príp. minimálne obrastanie fibrotickým tkanivom, t.j. biokompatibilita mikrokapsúl sa javí byť postačujúca. Prvé transplantácie poukázali na schopnosť PMCG mikrokapsúl zabezpečiť imunitnú ochranu, viabilitu a funkčnosť enkapsulovaných ostrovčiek. Tieto výsledky sú nádejné pre plánovanie prvých experimentov v primátoch.

Výstupy:

1. KRONEKOVÁ, Zuzana - PELACH, Michal - MAZANCOVÁ, Petra - UHELSKÁ, Lucia - TRELOVÁ, Dušana - RÁZGA, Filip - NÉMETHOVÁ, Veronika - SZALAI, Szabolcs - CHORVÁT, Dušan Jr. - MCGARRIGLE, James J. - OMAMI, Mustafa - ISA, Douglas - GHANI, Sofia - MAJKOVÁ, Eva - OBERHOLZER, José - RAUS, Vladimír - ŠIFFALOVÍČ, Peter - LACÍK, Igor. Structural changes in alginate-based microspheres exposed to in vivo environment as revealed by confocal Raman microscopy. In Scientific Reports, 2018, vol. 8, art. no. 1637
2. BOCHENEK, Matthew A. - VEISEH, Omid - VEGAS, Arturo J. - MCGARRIGLE, James J. - QI, Meirigeng - MARCHESE, Enza - OMAMI, Mustafa - DOLOFF, Joshua C. - MENDOZA-ELIAS, Joshua - NOURMOHAMMADZADEH, Mohammad - KHAN, Arshad - YEH, Chuh-Chieh - XING, Yuan - ISA, Douglas - GHANI, Sofia - LI, Jie - LANDRY, Casey - BADER, Andrew R. - OLEJNIK, Karsten - CHEN, Michael - HOLLISTER-LOCK, Jennifer - WANG, Yong - GREINER, Dale L. - WEIR, Gordon C. - STRAND, Berit Lokensgard - ROKSTAD, Anne Mari A. - LACÍK, Igor - LANGER, Robert - ANDERSON, Daniel G. - OBERHOLZER, Jose. Alginate encapsulation as long-term immune protection of allogeneic pancreatic islet cell transplanted into the omental bursa of macaques. In Nature biomedical engineering, 2018, vol. 2, no. 11, p. 810-821
3. KRONEKOVÁ, Z. - PELACH, M. - MAZANCOVÁ, P. - UHELSKÁ, L. - KLEŠČÍKOVÁ, L. - TRELOVÁ, D. - RÁZGA, F. - NÉMETHOVÁ, V. - MAJKOVÁ, E. - ŠIFFALOVÍČ, P. - RAUS, V. - CHORVÁT, D. - MCGARRIGLE, J.J. - OMAMI, M. - ISA, D. - GHANI, S. - OBERHOLZER, J. - LACÍK, I. Confocal Raman microscopy imaging of alginate-based microspheres: the microsphere structure and its changes in vivo. In World Polymer Congress IUPAC Macro 2018, Cairns, Australia, 1.-5.7.2018, prednáška

4. KRONEKOVÁ, Zuzana. Confocal laser scanning and Raman spectroscopy. In Cell & Drug Encapsulation : 10th Training School on Microencapsulation : proceedings. - Trondheim, Norway : Bioencapsulation Research Group & Norwegian University of Science and Technology, 2018, p. 68-75 (pozvaná prednáška)
5. LACÍK, Igor. Microcapsule physico-chemical characterization. In Cell & Drug Encapsulation : 10th Training School on Microencapsulation : proceedings. - Trondheim, Norway : Bioencapsulation Research Group & Norwegian University of Science and Technology, 2018, p. 58-66 (pozvaná prednáška)
6. LACÍK, Igor. Hydrogel microspheres for cell encapsulation in next generation diabetes treatment. In 21th International seminar on physics and chemistry of solids. Jan Dlugosz University, Czestochowa, Poland, 10.6.-13.6.2018 (pozvaná prednáška)

Programy: Horizont 2020

25.) Uväznený n-propanol pomocou ESR a LF-BDS (*Confined n-Propanol by ESR and LF-BDS. Confined n-Propanol by ESR and HF-BDS*)

Zodpovedný riešiteľ:	Josef Bartoš
Trvanie projektu:	1.1.2018 / 31.12.2018
Evidenčné číslo projektu:	EUSMI E180300076
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií:	1 - Španielsko: 1
Čerpané financie:	-
	Podpora medzinárodnej spolupráce z národných zdrojov: 4480 €

Dosiahnuté výsledky:

V nadväznosti na dva domáce projekty bolo vykonané počiatočné štúdium relaxačnej dynamiky prototypového polárneho protického média n-propanolu (n-PrOH) v objemovom stave a uväznených stavoch v sérii rôznych anorganických SiO₂ matric pomocou nízko- a vysoko-frekvenčnej verzie širokopásmovej dielektrickej spektroskopie (LF-BDS a HF-BDS). Vyšetroval sa vplyv okrem interných parametrov rôznych SiO₂ matric, ako sú stredná veľkosť, regularita a chemické zloženie povrchu pórov, aj externého parametra súvisiaceho s úpravou a prípravou vzoriek. Zistilo sa, že kritickým externým parametrom pre spoľahlivú BDS odozvu uväznených systémov sú teplota a doba sušenia SiO₂ matrice kvôli adsorpčnej schopnosti SiO₂ matric. Z tohto dôvodu boli v 1. etape získané finálne relaxačné dáta pre n-PrOH v objemovom stave ako aj pre modifikovanú SG100A-C4 matricu, ktorá vykázala značnú zmenu parametrov hlavného relaxačného píku. Orientačné merania na- za daných ad hoc podmienok sušenia-upravených nemodifikovaných irregulárnych SG a regulárnych MCM-41 a SBA-15 matriciach odhalili podstatné vplyvy priestorovej limitácie na relaxačnú odozvu n-PrOH média. Finálne výsledky pre nemodifikované SiO₂ matrice vyžadujú optimalizáciu sušiackej procedúry, a po následnej kvantitatívnej analýze budú mať veľký význam pri interpretácii dynamických vlastností spinovej sondy TEMPO v n-PrOH v rôznych fyzikálnych stavoch získaných v rámci domácich APVV a VEGA projektov. Tieto aspekty sú predmetom ďalšieho podaného EUSMI 2019 projektového návrhu.

Výstupy:

1. BARTOŠ, Josef - ŠVAJDLENKOVÁ, Helena - ALEGRÍA, A. - ARRESE-IGOR, S. EUSMI proposal report E180300076

2. BARTOŠ, Josef - ŠVAJDLENKOVÁ, Helena - ALEGRÍA, A. - ARRESE-IGOR, S. EUSMI
proposal report E180300077

26.) Multifunkčné polymérne kompozity dotované novými 2D nanočasticami pre pokročilé aplikácie (*Multifunctional polymer composites doped with novel 2D nanoparticles for advanced applications*)

Zodpovedný riešiteľ: Mária Omastová
Trvanie projektu: 1.5.2018 / 1.4.2022
Evidenčné číslo projektu: H2020-MSCA-RISE-2017, Proposal Number 777810
Organizácia je koordinátorom projektu: nie
Koordinátor: Latvijas Universitate
Počet spoluriešiteľských inštitúcií: 10
Čerpané financie: EU: 4000 €
Podpora medzinárodnej spolupráce z národných zdrojov: 2987 €

Dosiahnuté výsledky:

Riešitelia z ÚPo SAV sú hlavným koordinátorom WP3 Charakterizácia. Cieľom tejto časti je experimentálna charakterizácia pripravených kompozitov MXen/polymér zameraná na skúmanie vzájomného vzťahu medzi vlastnosťami MXenov a elektro-termomechanickými vlastnosťami z nich pripravených nanokompozitov. V prvej etape sa z MAX fázy pripravili MXeny dvomi rozličnými postupmi, ktorých výsledkom je rozvrstvené plnivo. V ďalšom kroku sa plnivo zmiešalo s polymetymetakrylátom a vytvorili sa polymérne kompozity. Pre sériu kompozitov pripravených rôznymi postupmi sa merala elektrická vodivosť, ktorá pri plnení 10 až 30 hm. % dosiahla hodnotu 1×10^{-4} S/cm.

Výstupy:

1. PROCHÁZKA, Michal - PROCHÁZKOVÁ, Simona - ZELENIAKIENÉ, Daiva - ANISKEVICH, Andrey - OMASTOVÁ, Mária. Preparation and characterisation of novel 2D materials - MXenes. In Czech Chemical Society Symposium Series, 2018, roč. 16, č. 5, s. 436. ISSN 2336-7202.(Sjezd českých a slovenských chemických spoločností). Typ: AFG.
2. ZELENIAKIENE, D. - MONASTYRECKIS, G. - OMASTOVÁ, Mária - ANISKEVICH, A. Modelling of mechanical properties of novel polymer composites reinforced with 2D graphene and MXene nanoparticles. In Baltic Polyme Symposium : BPS 2018 : programme and proceedings. - Riga, Latvia: Riga Technical University, 2018, p. 82. Typ: AFG.

Programy: JRP

27.) Bezolovnaté perovskitové solárne články s dlhodobou stabilitou. (*Pb-free Perovskite solar cells with Long-term stability.*)

Zodpovedný riešiteľ: Mária Omastová
Trvanie projektu: 1.11.2017 / 31.10.2020
Evidenčné číslo projektu: Joint Reseach Program on Chemistry and Chemical Engineering
V4-Kórea
Organizácia je koordinátorom projektu: nie

Koordinátor: Chung-Ang University Seoul
Počet spoluriešiteľských inštitúcií: 1 - Česko: 0, Maďarsko: 0, Kórejská republika: 1, Poľsko: 0
Čerpané financie: JRP: 12500 €

Dosiahnuté výsledky:

Boli pripravené hybridné elektródy na báze grafénu a polypyrolu. Optimalizovali vlastnosti hybridných elektród variáciou ich zloženia a použitím rôznych typov tenzidov počas polymerizácie pyrolu. Pre porovnanie vlastností sa pripravili elektródy z čistého polypyrolu a elektródy obsahujúce mnohostenné uhlíkové nanotrubičky. Na vodivom ITO substráte sa pripravili filmy grafénu, na ktoré sa polymerizoval polypyrolový film v prítomnosti aniónového tenzidu sodnej soli kyseliny dodecylbenzyl sulfónovej (NaDBS). Podobne sa pripravili elektródy s vrstvou mnohostenných uhlíkových nanotrubičiek s polypyrolom. Pripravené elektródy sa testovali pomocou energeticky rozlíšiteľnej elektrochemickej impedančnej spektroskopie (ER-EIS). Táto metóda umožňuje charakterizovať elektrónovú štruktúru reprezentovanú elektrónovou hustotou stavov (DOS). Zistilo sa, že pridaním grafénu a/alebo MWCNT do PPy-DBS dochádza k nárastu DOS v zakázanom pase voči vrstve čistého PPy-DBS. Pre vrstvy grafen:MWCNT-PPy-DBS sa pozoruje dodatočný pás stavov pod LUMO (-2.3 eV), ktorý s koncentráciou grafénu narastá. Tento pás stavov je podľa spektier typicky pre čistý grafén. V grafénovej vrstve sa pozoroval pás stavov v okolí -4.7 eV zodpovedajúci kyslíkovým defektom, čo potvrdzuje jeho čiastočnú oxidáciu. Elektródy sa poskytli kórejskému partnerovi pre zostavenie solárneho článku.

Výstupy:

1. MAJKOVÁ, Eva - SUBAIR, Riyas - ŠIFFALOVÍČ, Peter - NÁDAŽDY, Vojtech - SHABELNYIK, T. - HALAHOVETS, Yuriy - JERGEL, Matej - KULIČEK, Jaroslav - MIČUŠÍK, Matej - OMASTOVÁ, Mária. Time-resolved GIWAXS studies of the organometallic perovskite layer structure annealed of various temperatures. In 21st Sede Boqer Symposium on Solar Electricity Production : book of abstracts. - Negev : Ben-Gurion University of the Negev, 2018, non. p. Dostupné na internete: <<http://in.Ben-GurionUniversity.ac.il/en/solar/Pages/Symposium.aspx>>. Typ: AFG.
2. KULIČEK, Jaroslav - GEMEINER, Pavol - OMASTOVÁ, Mária - MIČUŠÍK, Matej. Polymer based nanocomposites as counter electrodes in solar cells applications. In 3rd International Meeting on Materials Science for Energy Related Applications : book of abstracts. - Belgrade, Serbia : University of Belgrade - Faculty of Physical Chemistry, 2018, p.31-32. ISBN 978-86-82139-72-0. Typ: AFG.

Domáce projekty

Programy: VEGA

1.) Porovnanie mechanizmov účinku nanočastíc zlata a magnetitu na jednotlivé typy renálnych buniek. (*Mechanisms of gold and magnetic nanoparticle effects on renal cells.*)

Zodpovedný riešiteľ: Andrea Bábelová
Zodpovedný riešiteľ v organizácii SAV: Filip Rázga
Trvanie projektu: 1.1.2015 / 31.12.2018
Evidenčné číslo projektu: 2/0113/15
Organizácia je koordinátorom projektu: nie

Koordinátor: Biomedicínske centrum SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: 0

Dosiahnuté výsledky:

2.) Charakterizácia komplexných organických látok v mezo-škálovej priestorovej limitácii pomocou externých prôbovacích techník. (*Characterization of complex organic compounds under meso-scale spatial restriction using external probing techniques.*)

Zodpovedný riešiteľ: Josef Bartoš
Trvanie projektu: 1.1.2016 / 31.12.2019
Evidenčné číslo projektu: 2/0030/16
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: VEGA: 6247 €

Dosiahnuté výsledky:

V počiatočnej etape systematického štúdia modelového polárneho protického média – n-propanolu (n-PrOH) – v objemovom a rôznych priestorovo-limitovaných fyzikálnych stavoch v rôznych originálnych, nemodifikovaných SiO₂ matriciach sa vyšetril vplyv veľkosti a regularity pórov pomocou ESR techniky. Zistilo sa, že ESR odozva je veľmi citlivá k obidvom parametrom pórov matrice. Z detailnej analýzy získaných spektrálnych dát cez široké teplotné intervaly od 100K do 350K vyplýva, že dynamika spinovej sondy TEMPO je veľmi výraznejšie spomalená v regulárnej SBA-15 matrici s $D_{\text{pore}} = 85 \text{ \AA}$ oproti irregulárnym SG matriciam s $D_{\text{pore}} = 60 \text{ \AA}$ a 100 \AA ako aj 300 \AA , pričom pre posledne menovanú SG matricu s maximálnymi 300 \AA pórmi je porovnateľná s dynamikou v bulk stave n-PrOHu.

V spolupráci s PALS skupinou v Lubline, PL sa realizovalo počiatočné kombinované ESR, PALS a DSC štúdium prototypového nepolárneho aromatického média: metyl-benzénu (MeBZ) v objemovom stave. Odhalili sa početné nové korelácie medzi ESR, PALS a DSC dátami, ktoré prispievajú k mikroskopickému pochopeniu ich makroskopického chovania.

Výstupy:

1. BARTOŠ, Josef - LUKEŠOVÁ, Miroslava - ŠVAJDLENKOVÁ, Helena – ŠAUŠA, Ondrej. Bulk and confined non-polar nad polar chain organics by external probing ESR technique. AIP Conference Proceedings 1981, 020081 (2018) F, podiel: 0,75
2. BARTOŠ, Josef - ZGARDZINSKA, Bozena - CHARMAS, Barbora - ŠVAJDLENKOVÁ, Helena - LUKEŠOVÁ, Miroslava - WYSOGLAD, Konrad. A combined molecular and atomic probe characterization of aromatic hydrocarbons via ESR and PALS: Methylbenzene. In EUROMAR Nantes 2018 : abstract book. - Nantes, France: University of Nantes, 2018, p. 591. Dostupné na internete: <www.euromar2018.org>.

3.) Interakcie povrchov modifikovaných polyetylénoxidov s voľnými polymérmi. (*Interactions of surfaces modified by poly(ethylene oxide) with free polymers.*)

Zodpovedný riešiteľ: Zuzana Benková

Trvanie projektu: 1.1.2016 / 31.12.2019
Evidenčné číslo projektu: 2/0098/16
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských 0
inštitúcií:
Čerpané financie: VEGA: 7753 €

Dosiahnuté výsledky:

Riešenie projektu bolo zamerané na atomistické molekulovo-dynamické simulácie uhlíkových nanorúrok pokrytých poly(etylénoxidovými) (PEO) reťazcami a ich interakcií s peptidmi rôznej afinity k vode. Skúmal sa vplyv vody a povrchovej hustoty PEO na tieto interakcie. Zistilo sa, že priťahovanie peptidov k PEO vrstve či ich odpudzovanie je komplexnejší proces a nedá sa vysvetliť len na základe hydratacie PEO vrstvy a priestorových interakcií, ale pravdepodobne sa musí zobrať do úvahy aj nárast entropie molekúl vody, ku ktorému dochádza, keď sa molekuly vody vypudzujú z vrstvy PEO približovaním peptidu k tejto vrstve.

Výstupy:

1. BENKOVÁ, Zuzana - ČAKÁNEK, Peter - D. S. CORDEIRO, M. Natália. Molecular dynamics simulations of interactions between carbon nanotube coated with poly(ethylene oxide) and oligopeptides. In ECIS 2018: Book of abstracts. - Ljubljana, Slovenia, 2018, PP2.29. Výveska
2. ČAKÁNEK, Peter - BENKOVÁ, Zuzana - D. S. CORDEIRO, M. Natália. Poly(ethylene oxide) as protective barrier of carbon nanotubes against protein adsorption-molecular dynamics study. In NanoBio 2018: Book of abstracts. - Heraklion, Crete, 2018, WS1-P12. Výveska

4.) Nanoštruktúra (bio)makromolekulových systémov stiesnených v nanokanáloch. (*Structural transitions of confined semi-flexible macromolecules.*)

Zodpovedný riešiteľ: Peter Cifra
Trvanie projektu: 1.1.2016 / 31.12.2019
Evidenčné číslo projektu: 2/0055/16
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských 0
inštitúcií:
Čerpané financie: VEGA: 2861 €

Dosiahnuté výsledky:

Popri výsledkoch obmedzovania polymérov v nanopostoch uvedených v APVV projekte č.1 sem patria aj výsledky vyšetovania detailov anizotropie orientačných korelácií reťazcov uväznených v nanokanáloch, a podobne výsledky v rámci štúdia elasticity obmedzovaných reťazcov z porovnávania nárokov reťazcov na rovnaké natiahnutie buď natáňovaním silou, alebo zodpovedajúcim uväznením v nanokanáli. Tieto výsledky prehlbujú poznanie v oblasti rôznym spôsobom obmedzovaných polymérov.

Výstupy:

1. BLEHA, Tomáš - CIFRA, Peter. Stretching and compression of DNA by external forces under nanochannel confinement. In Soft Matter, 2018, vol. 14, p. 1247-1259. (3.709 - IF2017). ISSN 1744-683X.

2. BLEHA, Tomáš - CIFRA, Peter. Correlation anisotropy and stiffness of DNA molecules confined in nanochannels. In Journal of Chemical Physics, 2018, vol. 149, art. no. 054903. (2.843 - IF2017). ISSN 0021-9606.

5.) Príprava a štúdium polymérov a polymérnych materiálov z obnoviteľných zdrojov.
(*Development and study of polymers and polymeric materials based on renewable resources.*)

Zodpovedný riešiteľ: Martin Danko
Trvanie projektu: 1.1.2017 / 31.12.2020
Evidenčné číslo projektu: 2/0158/17
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: VEGA: 24035 €

Dosiahnuté výsledky:

Projekt je zameraný za prípravu polyesterov pomocou polymerizácie s otvorením kruhu využitím laktónov z obnoviteľných zdrojov. Pokračovala charakterizácia pripravených funkčných polyesterov na báze epsilon-kaprolaktónu a alfa-metylén-gamma-butyrolaktónu (P(MBL-co-CL)). V podmienkach ROP iniciáciou $\text{Al}(\text{OiPr})_3$ v teplotnom rozmedzí 0 – 20 °C sme pripravili polyméry s $M_n = 20\,000\text{--}60\,000\text{ g mol}^{-1}$ pre obsah MBL v kopolyméri 5-13 mol % a s $M_n = 5\,000\text{--}15\,000\text{ g mol}^{-1}$ pre obsah MBL v kopolyméri 15-25 mol %. Vo všetkých prípadoch sa jednalo o lineárne polyesťery s úzkou disperzitou do $D = 1.3$. Štruktúra štatistických kopolymérov bola potvrdená 2D NMR a MALDI-TOF spektroskopiou. Zvyšovaním obsahu MBL sa znižuje $T_m = 55\text{ °C}$ pre čistý PCL na $T_m = 24\text{ °C}$ pre polymér s obsahom MBL 25 mol%, pričom rovnako klesá aj kryštalizačná teplota z $T_c = 26\text{ °C}$ na $T_c = -2,5\text{ °C}$.

Polyzwitteriónové polyméry sú navonok neutrálne materiály využívané vďaka ich vysokej biokompatibilite v oblasti biologických aplikácií, separácií a čistení vody. Ich vlastnosti je možné nastaviť prostredníctvom mólovej hmotnosti alebo štruktúry. Pripravili sme sériu polysulfobetainových (SBE) a karboxybetainových (CBA) kopolymérov a ich hydrogélův. V závislosti od obsahu CBA vykazujú rôznu kritickú teplotu rozpúšťania (UCST) a hydrogély aj štruktúru vody, a tým aj mechanické vlastnosti hydrogélův. Študovali sme ich odozvu na vonkajšie podnety ako teplota a pH, ktoré sa tiež menia v závislosti obsahu CBA. Vďaka možnosti post-modifikácie kopolymérov a hydrogélův cez karboxylát je možné kontrolovať uchytenie buniek na ich povrchu a zmeniť ich biozánášanie z pôvodných materiálov bez zanášania na povrchy vhodné na uchytenie buniek.

Nanoprecipitácia sa využíva ako účinná metóda na enkapsuláciu liečiv. My sme pripravili polymérne nanočastice zložené z polymérov získané z bioobnoviteľných monomérov alfa-metylén-gamma-butyrolaktón (MBL) a gamma-metyl-alfa-metylén-gamma-butyrolaktón (MeBL). Sledovali sme vplyv viacerých parametrov prípravy na veľkosť a distribúciu nanočastíc, ako aj na maximálnu kapacitu uchytenia liečiva. V našej štúdii sme pre tento účel použili kurkumín. Veľkosť a distribúcia nanočastíc sa stanovili pomocou DLS a koncentrácia liečiva pomocou UV-VIS. Maximálna kapacita viazaného kurkumínu dosahovala 20 hm% pri zachovaní pomerne uniformných nanočastíc o veľkosti cca 200-300 nm.

Výstupy:

1. DANKO, Martin - BASKO, Malgorzata - ĎURKÁČOVÁ, Slávka - DUDA, Andrzej - MOSNÁČEK, Jaroslav. Functional polyesters with pendant double bonds prepared by coordination-insertion and cationic ring-opening copolymerization of epsilon-caprolactone with

- renewable Tulipalin A. In *Macromolecules*, 2018, vol. 51, p. 3582-3596. (5.914 - IF2017). ISSN 0024-9297.
2. DANKO, Martin - KOLLÁR, Jozef - CIGÁŇ, Marek - CHMELA, Štefan - HRDLOVIČ, Pavol. Synthesis and spectral properties of probes based on pyrene and 2,2,6,6-tetramethylpiperidine-1-H or 1-oxyl. In *Dyes and Pigments*, 2018, vol. 153, p. 189-199. (3.767 - IF2017). ISSN 0143-7208.
3. DANKO, Martin - HRDLOVIČ, Pavol - BRZEZINSKI, Marek - DUDA, Andrzej - BIELA, Tadeusz. Real-time monitoring of stereocomplex formation of poly(L-lactide) and poly(D-lactide) decorated with a pyrene derivative as a fluorescence probe. In *Polymer: the International Journal for the Science and Technology of Polymers*, 2018, vol. 156, p. 76-84. (3.483 - IF2017). ISSN 0032-3861.
4. JESZEOVÁ, Lenka - PUŠKÁROVÁ, Andrea - BUČKOVÁ, Mária - KRAKOVÁ, Lucia - GRIVALSÝ, Tomáš - DANKO, Martin - MOSNÁČKOVÁ, Katarína - CHMELA, Štefan - PANGALLO, Domenico. Microbial communities responsible for the degradation of poly(lactic acid)/poly(3-hydroxybutyrate) blend mulches in soil burial respirometric tests. In *World Journal of Microbiology & Biotechnology*, 2018, vol. 34, art. no. 101. (2.100 - IF2017). ISSN 0959-3993.
5. DANKO, Martin - ĎURKÁČOVÁ, Slávka - BAŠKO, Malgorzata - MOSNÁČEK, Jaroslav. Ring-opening polymerization of Tulipalin A and epsilon-caprolactone. In *Bordeaux Polymer Conference 2018: abstract book*. - Bordeaux, France: Bordeaux INP, 2018, non. p. Dostupné na internete: <<http://bpc2018.u-bordeaux.fr/en>>.
6. DANKO, Martin - KRONEKOVÁ, Zuzana - MRLÍK, Miroslav - OSIČKA, Josef - KASÁK, Peter. Sulfobetaine and carboxybetaine copolymers and hydrogels: Modulation of thermo- and ion responsiveness, water state, mechanical properties and cell adhesion. In *8th IUPAC International Conference on Green Chemistry: book of abstracts*. - Bangkok, Thailand: Chulalongkorn University, 2018, p. 106. (IUPAC International Conference on Green Chemistry. IUPAC International Conference on Green Chemistry).
7. BALOGH, Róbert - DANKO, Martin - ECKSTEIN ANDICSOVÁ, Anita - KOZMA, Erika. Thiazolo[5.4-D]thiazole derivatives as building block for pi-conjugated semiconductors. In *Czech Chemical Society Symposium Series*, 2018, roč. 16, č. 5, s. 344. ISSN 2336-7202. (Sjezd českých a slovenských chemických spoločností).
8. BALOGH, Róbert - DANKO, Martin - ECKSTEIN ANDICSOVÁ, Anita - KOZMA, Erika. Syntéza a charakterizácia nových polymérov na báze tiazo[5.4-d]tiazo[5.4-d] ako fotoaktívnych materiálov. In *PREVEDA: interaktívna konferencia mladých vedcov 2018. Book of abstracts*. - Bratislava: Občianske združenie PREVEDA, 2018, abstr. č. 1733. ISBN 978-80-972360-2-1. (Interaktívna konferencia mladých vedcov 2018).
9. BALOGH, Róbert - ECKSTEIN ANDICSOVÁ, Anita - DANKO, Martin - KOZMA, Erika. Příprava a charakterizácia nových polymérov na báze tiazo[5.4-D]tiazo[5.4-d] pre fotonické zariadenia. In *Polymery 2018: X. Česko-slovenská konference: sborník abstraktů*. - Praha, ČR: Ústav makromolekulární chemie AV ČR, v.v.i., 2018, p. 27. ISBN 978-80-85009-92-7. (Polymery 2018 : X. Česko-slovenská konference. Polymery 2018: X. Česko-slovenská konference).
10. BALOGH, Róbert - DANKO, Martin - ECKSTEIN ANDICSOVÁ, Anita - KOZMA, E. - TOKÁROVÁ, Z. Design and synthesis of thiazolo[5.4-D]thiazole oligomers for organic semiconductors. In *Career in Polymers X: book of abstracts*. - Prague, Czech Republic: Institute of Macromolecular Chemistry CAS, 2018, 112. ISBN 978-80-85009-90-3.
11. MOSNÁČKOVÁ, Katarína - ŠLOSÁR, Miroslav - ŠIŠKOVÁ, Alena - KOLLÁR, Jozef - CHODÁK, Ivan - CHMELA, Štefan - ALEXÝ, Pavol - JANIGOVÁ, Ivica - MOSNÁČEK, Jaroslav. Ageing of poly(lactid acid)/poly(3-hydroxybutyrate)/carbon black composite films under various outdoor and laboratory conditions. In *Bio-Based Polymers and Composites: BiPoCo 2018: 4th International Conference: abstract book*. - Budapest, Hungary: Hungarian Academy of Sciences, 2018, p. 389-390.
12. PIPPIG, Falko - MOSNÁČEK, J. Synthesis and Characterization of Functional Polyamides from Tulipalin A. N.I.C.E. Conference 2018: 4th International Conference on Bioinspired and Biobased Chemistry and Materials : Nice, France, 14–17 October, 2018 : book of abstracts.

6.) Nové elektro- a foto-aktívne deriváty pre elektroniku a polymerizačné systémy. (*New electro- and photo- active derivatives for small molecules and polymer systems.*)

Zodpovedný riešiteľ: Anita Eckstein
Trvanie projektu: 1.1.2017 / 31.12.2020
Evidenčné číslo projektu: 2/0161/17
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: VEGA: 4846 €

Dosiahnuté výsledky:

Pre prípravu elektro- a foto-aktivných zlúčenín boli zosyntetizované a študované tiazolo[5.4-d]tiazolové monoméry. Funkcionalizáciou monomérnych jednotiek, ktoré následne reagovali s rôznymi donorovými jednotkami boli pripravené donorno-akceptorné (D-A) deriváty. Fotofyzikálne a elektrochemické vlastnosti týchto linkerov sa prezentovali s využitím kombinovaného teoretického a experimentálneho prístupu. Pripravili sa aj krátke oligoméry obsahujúce oxadiazoly ako linker. Nové fotoiniciátory boli pripravené na báze imidov kyseliny 1,8-naftoovej, ktoré predstavujú kategóriu zlúčenín s optimálnymi fyzikálno-chemickými vlastnosťami, ako je rozpustnosť, absorbanca a schopnosť zabudovať sa do výsledného polymérneho reťazca ako terminálna skupina.

Výstupy:

1. ECKSTEIN ANDICSOVÁ, Anita - VÉGH, Daniel - KRUTOŠÍKOVÁ, Alžbeta - TOKÁROVÁ, Zita. Insights into the triple self-condensation reaction of triphenyl-based methyl ketones and related compounds. In *Arkivoc: Archive for organic chemistry: the free internet journal for organic chemistry*, 2018, vol. 2018, part v, p. 124-139. (1.048 - IF2017). ISSN 1551-7004.
2. KOZMA, E. - MRÓZ, W. - ECKSTEIN ANDICSOVÁ, Anita - LUKEŠ, V. - GALEOTTI, F. - ŠÍŠKOVÁ, Alena - DANKO, Martin - CATELLANI, M. A joint experimental and theoretical study on the electro-optical properties of 1,6- and 1,7-fluorenyl disubstituted perylene diimide isomers. In *New Journal of Chemistry*, 2018, vol. 42, p. 1061-1066. (3.201 - IF2017). ISSN 1144-0546.
3. BALOGH, Róbert - DANKO, Martin - ECKSTEIN ANDICSOVÁ, Anita - KOZMA, E. - TOKÁROVÁ, Z. Design and synthesis of thiazolo[5.4-D]thiazole oligomers for organic semiconductors. In *Career in Polymers X : book of abstracts*. - Prague, Czech Republic : Institute of Macromolecular Chemistry CAS, 2018, 112. ISBN 978-80-85009-90-3.
4. BALOGH, Róbert - DANKO, Martin - ECKSTEIN ANDICSOVÁ, Anita - KOZMA, Erika. Thiazolo[5.4-D]thiazole derivatives as building block for pi-conjugated semiconductors. In *Czech Chemical Society Symposium Series*, 2018, roč. 16, č. 5, s. 344. ISSN 2336-7202. (Sjezd českých a slovenských chemických spoločností).
5. BALOGH, Róbert - ECKSTEIN ANDICSOVÁ, Anita - DANKO, Martin - KOZMA, Erika. Príprava a charakterizácia nových polymérov na báze tiazolo[5.4-D]tiazolu pre fotonické zariadenia. In *Polymery 2018 : X. Česko-slovenská konferencie : zborník abstraktů*. - Praha, ČR : Ústav makromolekulární chemie AV ČR, v.v.i., 2018, p. 27. ISBN 978-80-85009-92-7. (Polymery 2018 : X. Česko-slovenská konferencie. Polymery 2018 : X. Česko-slovenská konferencie).
6. BALOGH, Róbert - DANKO, Martin - ECKSTEIN ANDICSOVÁ, Anita - KOZMA, Erika. Syntéza a charakterizácia nových polymérov na báze tiazolo[5.4-d]tiazolu ako fotoaktívnych materiálov. In *PREVEDA : interaktívna konferencia mladých vedcov 2018. Book of abstracts*. - Bratislava : Občianske združenie PREVEDA, 2018, abstr. č. 1733. ISBN

978-80-972360-2-1.(Interaktívna konferencia mladých vedcov 2018).

7.) Príprava a charakterizácia štruktúry a vlastností biodegradovateľných multifázových polymérnych materiálov na báze modifikovaného škrobu (*Preparation and characterization of the structure and properties of biodegradable multiphase modified-starch-based polymeric materials*)

Zodpovedný riešiteľ: Ivan Chodák
Trvanie projektu: 1.1.2017 / 31.12.2020
Evidenčné číslo projektu: VEGA 1/0570/17
Organizácia je koordinátorom projektu: nie
Koordinátor: Technická univerzita Košice
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: VEGA: 6045 €

Dosiahnuté výsledky:

Podrobne sa preštudoval vplyv plastifikátora pre termoplastický škrob (TPS) na vlastnosti jednak samotného TPS a jednak kompozitov TPS s biodegradovateľnými plastami. Dokázalo sa, že rozličné plastifikátory majú podstatný vplyv na fyzikálne vlastnosti TPS a tieto vlastnosti sa prejavujú v rôznej miere aj pri zmesiach TPS s poly(butylén adipátom-co-tereftalátom). Metóda NMR výrazne prispela k porozumeniu interakcií medzi jednotlivými zložkami zmesi a poskytla údaje k presnejšiemu postupu optimalizácie zloženia zmesi pre konkrétne aplikácie.

Výstupy:

1. BARAN, Anton - VRÁBEL, Peter - OLČÁK, Dušan - CHODÁK, Ivan. Solid state ¹³C-NMR study of plasticized PLA/PHB polymer blend. In Journal of Applied Polymer Science, 2018, vol. 135, art. no. 46296. (1.901 - IF2017). ISSN 0021-8995. Typ: ADCA
2. SEDNIČKOVÁ, Michaela - PEKAŘOVÁ, Silvie - KUCHARCZYK, Pavel - BOČKAJ, Ján - JANIGOVÁ, Ivica - KLEINOVÁ, Angela - JOCHEC MOŠKOVÁ, Daniela - OMANÍKOVÁ, Leona - PERĎOCHOVÁ, Dagmar - KOUTNÝ, Marek - SEDLAŘÍK, Vladimír - ALEXYY, Pavol - CHODÁK, Ivan. Changes of physical properties of PLA-based blends during early stage of biodegradation in compost. In International Journal of Biological Macromolecules, 2018, vol. 113, p. 434-442. (3.909 - IF2017). ISSN 0141-8130. Typ: ADCA
3. CHODÁK, Ivan - PEKAŘOVÁ, Silvie - BOČKAJ, Ján - KOUTNÝ, Marek - KUCHARCZYK, Pavel - SEDLAŘÍK, Vladimír - JANIGOVÁ, Ivica - SEDNIČKOVÁ, Michaela - JOCHEC MOŠKOVÁ, Daniela. Effect of biodegradation on physical properties of PLA-based blends. In Journal of Materials Sciences & Engineering, 2018, vol. 7, p. 29. ISSN 2169-0022. Typ: AFG. P
4. CHODÁK, Ivan - PEKAŘOVÁ, Silvie - KOUTNÝ, Marek - KUCHARCZYK, Pavel - BOČKAJ, Ján - SEDLAŘÍK, Vladimír - JANIGOVÁ, Ivica - SEDNIČKOVÁ, Michaela - JOCHEC MOŠKOVÁ, Daniela - ALEXYY, Pavol. Effect of biodegradation on physical properties of PLA-based blends. In Bio-Based Polymers and Composites : BiPoCo 2018 : 4th International Conference : abstract book. - Budapest, Hungary : Hungarian Academy of Sciences, 2018, p. 57-58. Typ: AFG.
5. IVANIČ, František - CHODÁK, Ivan. Comparison of poly(butylene adipate-co-terephthalate)/thermoplastic starch blends using two different plasticizers for starch plasticization. In Bio-Based Polymers and Composites : BiPoCo 2018 : 4th International Conference : abstract book. - Budapest, Hungary : Hungarian Academy of Sciences, 2018, p. 381-382. Typ: AFG.
6. IVANIČ, František - CHODÁK, Ivan. Vplyv vloženia a koncentrácie termoplastického škrobu na

fyzikálne vlastnosti zmesi s polybutylén-adipát-tereftalátom. In PLASTKO 2018 : sborník príspevků z konference. - Zlín, ČR : Universita Tomáše Bati ve Zlíně, 2018, p. 135-136. ISBN 978-80-7454-727. Typ: AFG.

7. ŠOLTÝS, Alojz - HRONSKÝ, Viktor - ŠMÍDOVÁ, Natália - OLCÁK, Dušan - IVANIČ, František - CHODÁK, Ivan. Solid state H NMR study of corn starch plasticized by urea and glycerol. In Bio-Based Polymers and Composites : BiPoCo 2018 : 4th International Conference : abstract book. - Budapest, Hungary : Hungarian Academy of Sciences, 2018, p. 312-313. Typ: AFG.

8.) Kombinované polymérne systémy pre imunoterapiu rakoviny (*Combined polymer systems for cancer immunotherapy*)

Zodpovedný riešiteľ:	Zuzana Kroneková
Trvanie projektu:	1.1.2018 / 31.12.2020
Evidenčné číslo projektu:	VEGA 2/0124/18
Organizácia je	áno
koordinátorom projektu:	
Koordinátor:	Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	VEGA: 16799 €

Dosiahnuté výsledky:

V uplynulom období sa pripravili prvé polyméry poly(2-izopropenyl-2-oxazolínu) (PIPOx-u) s rôznou dĺžkou reťazca a úzkou disperzitou metódou kontrolovanej ATRP polymerizácie. Po základnej fyzikálno-chemickej charakterizácii prebieha testovanie biokompatibility týchto polymérov. Kopolyméry na báze 2-oxazolínov boli použité aj na prípravu nanočastíc, ktoré sa použili na enkapsuláciu kurkumínu ako protinádorového liečiva. Preukázala sa predĺžená stabilita účinnej látky a protirakovinové účinky pripravených nanočastíc. Kopolyméry PIPOx-u s N-(vinylpyrolidónom) boli využité na prípravu nanokompozitných materiálov pre nanokatalytické a biomedicínske aplikácie. Paralelne sa pripravili polyméry na báze β -cyclodextrínu, ktoré boli využité ako polymérne nosiče DNAému rozpoznávajúceho DNA c-Myc gén, ktorý slúži na kontrolu a supresiu tumorových génov. Účinnosť tejto „anti-sense“ technológie bola overená na MCF-7 rakovinovej línii izolovanej z karcinómu prsníka.

Výstupy:

1. KRONEKOVÁ, Zuzana - PAULOVÍČOVÁ, Ema - PAULOVÍČOVÁ, Lucia - KRONEK, Juraj. Poly(2-isopropenyl-2-oxazoline) as a tool for combined cancer immunotherapy. In 8th Slovak Biophysical Symposium: Book of Contributions. - Košice, Slovakia: Slovak Biophysical Society: COPYVAIT, 2018, p. 38-39. ISBN 978-80-973086-7-4.(Slovak Biophysical Symposium). Prednáška.
2. DATTA, Shubhashis - JUTKOVÁ, Annamária - ŠRÁMKOVÁ, Petra - LENKAVSKÁ, Lenka - HUNTOŠOVÁ, Veronika - CHORVÁT, Dušan - MIŠKOVSKÝ, Pavol - JANCURA, Daniel - KRONEK, Juraj. Unravelling the excellent chemical stability and bioavailability of solvent responsive curcumin-loaded 2-ethyl-2-oxazoline-graft-2-(4-dodecyloxyphenyl)-2-oxazoline copolymer nanoparticles for drug delivery. In Biomacromolecules, 2018, vol. 19, p. 2459-2471. (5.738 - IF2017).
3. PALEM, Ramasubba Reddy - GANESH, Shimoga D. - SAHA, Nabanita - KRONEK, Juraj - SÁHA, Petr. Green synthesis of silver polymer nanocomposites of poly(2-isopropenyl-2-oxazoline-co-N-vinylpyrrolidone) and its catalytic activity. In Journal of Polymer Research, 2018, vol. 25, art. no. 152. (1.434 - IF2017).

4. FARROKHI, Fatemeh - KARAMI, Zahra - ESMAEILI-MAHANI - Saeed - HEYDARI, Abolfazl, Delivery of DNzyme targeting c-Myc gene using β -cyclodextrin polymer nanocarrier for therapeutic application in human breast cancer cell line, Journal of Drug Delivery Science and Technology, Vol. 47, 2018, p. 477-484 (2.297 - IF2017).

9.) Mikroštruktúra a sorpčné vlastnosti uhlíkových vlákien pripravených karbonizáciou celulóзовých prekurzorov

Zodpovedný riešiteľ: Igor Matko
Zodpovedný riešiteľ v organizácii SAV: Helena Švajdlenková
Trvanie projektu: 1.1.2017 / 31.12.2020
Evidenčné číslo projektu: VEGA 2/0127/17
Organizácia je koordinátorom projektu: nie
Koordinátor: Fyzikálny ústav SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: 0

Dosiahnuté výsledky:

Pre sériu pripravených uhlíkových mikrovlákien sa stanovil ich povrch pomocou BET metódy absorpciou argónu. Veľkosť pórov vlákien bola stanovená aj pomocou PALS metódy. Taktiež sa charakterizovala u vlákien absorpčná schopnosť vody pomocou testu zmáčania a termogravimetrickej analýzou. Uhlíkové vlákna plnené vodou boli analyzované pomocou DSC ako aj PALS technikou. Ukázalo sa, že absorpčná schopnosť vody u vlákien nie je proporcionálna (úmerná) špecifickému povrchu uhlíkových vlákien ale zohrávajú rolu aj ďalšie faktory.

Výstupy:

1. MATKO, Igor – ŠAUŠA, Ondrej - NOVÁK, Ivan - ŠVAJDLENKOVÁ, Helena - ČECHOVÁ, Katarína, - BEREK, Dušan - PECZ, Michal. Thermoanalytical and microstructural characterisation of microporous carbon fibers. ESTAC12: The 12th European Symposium on Thermal Analysis and Calorimetry, 27th and , Brasov, Romania, 30th of August 2018. Book of Abstracts ISBN 973-3-940237-50-7. POSTER PS1.094, p.279.
2. MATKO, Igor – ŠAUŠA, Ondrej – ČECHOVÁ, Katarína,- NOVÁK, Ivan - ŠVAJDLENKOVÁ, Helena - - BEREK, Dušan - PECZ, Michal. Porous carbon fibers prepared from cellulose: characterization of microstructure and water sorption properties. In J. Thermal Analysis and Calorimetry, 2018, (JTAC-D-18-02384). Odoslaný.

10.) Príprava a štúdium polymérnych materiálov na báze termoplastického škrobu (*Preparation and characterization of polymeric materials based on thermoplastic starch*)

Zodpovedný riešiteľ: Katarína Mosnáčková
Trvanie projektu: 1.1.2018 / 31.12.2021
Evidenčné číslo projektu: VEGA 2/0019/18
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských 0

inštitúcií:

Čerpané financie:

VEGA: 3231 €

Dosiahnuté výsledky:

Boli pripravené zmesi TPS a PBAT (polybutylene adipate terephthalate) s hmotnostným obsahom 0 – 50 % TPS. Na prípravu TPS boli použité viaceré zmäkčovadlá pričom testované boli i ich kombinácie (močovina a glycerol) za účelom dosiahnutia čo najúčinnnejšej plastifikácie a dobrých mechanických vlastností. Pripravené vzorky boli testované prostredníctvom ťahových testov a dynamicko-mechanickej analýzy za účelom posúdenia základných materiálových charakteristík. Pre zlepšenie homogenity namiešanej zmesi TPS v polymérnej matrici sa začalo s modifikáciami natívneho škrobu očkovaním karboxylovými kyselinami (olejová a stearová) a polymliečnej kyseliny prostredníctvom kondenzačných reakcií a aniónovej polymerizácie L-laktidu s otvorením kruhu. Prítomnosť naočkovaných kyselín bola potvrdená z FTIR a TGA analýzy.

Výstupy:

1. JOCHEC MOŠKOVÁ, Daniela - JANIGOVÁ, Ivica - NÓGELLOVÁ, Zuzana - SEDNIČKOVÁ, Michaela - JANKOVIČ, Ľuboš - KOMADEL, Peter - ŠLOUF, Miroslav - CHODÁK, Ivan. Prediction of compatibility of organomodified clay with various polymers using rheological measurements. In Polymer Testing, 2018, vol. 69, p. 359-365. (2.247 - IF2017). ISSN 0142-9418. Typ: ADCA
2. IVANIČ, František - CHODÁK, Ivan. Comparison of poly(butylene adipate-co-terephthalate)/thermoplastic starch blends using two different plasticizers for starch plasticization. In Bio-Based Polymers and Composites : BiPoCo 2018 : 4th International Conference : abstract book. - Budapest, Hungary : Hungarian Academy of Sciences, 2018, p. 381-382. Typ: AFG
3. MOSNÁČKOVÁ, Katarína - ŠLOSÁR, Miroslav - ŠIŠKOVÁ, Alena - KOLLÁR, Jozef - CHODÁK, Ivan - CHMELA, Štefan - ALEXYS, Pavol - JANIGOVÁ, Ivica - MOSNÁČEK, Jaroslav. Ageing of poly(lactid acid)/poly(3-hydroxybutyrate)/carbon black composite films under various outdoor and laboratory conditions. In Bio-Based Polymers and Composites : BiPoCo 2018 : 4th International Conference : abstract book. - Budapest, Hungary : Hungarian Academy of Sciences, 2018, p. 389-390. Typ: AFG
4. ŠOLTÝS, Alojz - HRONSKÝ, Viktor - ŠMÍDOVÁ, Natália - OLČÁK, Dušan - IVANIČ, František - CHODÁK, Ivan. Solid state H NMR study of corn starch plasticized by urea and glycerol. In Bio-Based Polymers and Composites : BiPoCo 2018 : 4th International Conference : abstract book. - Budapest, Hungary : Hungarian Academy of Sciences, 2018, p. 312-313. Typ: AFG
5. IVANIČ, František - CHODÁK, Ivan. Vplyv vloženia a koncentrácie termoplastického škrobu na fyzikálne vlastnosti zmesí s polybutylén-adipát-tereftalátom. In PLASTKO 2018 : zborník príspevků z konferencie. - Zlín, ČR : Universita Tomáše Bati ve Zlíně, 2018, p. 135-136. ISBN 978-80-7454-727-0. Typ: AFG

11.) Polymérne materiály pre pokročilé aplikácie. (Polymeric materials for advanced application)

Zodpovedný riešiteľ:	Mária Omastová
Trvanie projektu:	1.1.2018 / 31.12.2021
Evidenčné číslo projektu:	VEGA 2/0019/18
Organizácia je	áno
koordinátorom projektu:	
Koordinátor:	Ústav polymérov SAV
Počet spoluriešiteľských	0
inštitúcií:	

Čerpané financie: VEGA: 17660 €

Dosiahnuté výsledky:

Metódou elektrostatického zvlákňovania boli pripravené polykaprolaktónové/polypyrolové (PCL/PPy) vlákna použitím originálneho prístupu. Ako prvý krok sa zmiešali roztoky PCL a pyrolového monoméru. Prítomnosť pyrolu v pripravených vláknach bola potvrdená ToF-SIMS analýzou. V ďalšom kroku boli vlákna ponorené do roztoku obsahujúceho oxidačné činidlo, pyrolový monomér a aniónový tenzid, aby sa na ich povrchu vytvorila vodivá vrstva polypyrolu. Elektricky vodivé netkané textílie sa pripravili s rôznymi pomermi PCL k polypyrolu. Prítomnosť polypyrolového povlaku na pripravenej PCL subštruktúre bola overená Fourierovou transformovanou infračervenou spektroskopiou (FTIR), röntgenovou fotoelektrónovou spektroskopiou (XPS) a štúdiom morfológie pripravených produktov. Pripravené nanovlákná boli homogénne potiahnuté polypyrolom a vzorky obsahujúce najmenej 40 hm. % vodivej zložky dosiahli elektrickú vodivosť 1 S/cm. Pri ďalšom zvyšovaní obsahu polypyrolu sa vodivosť zvýšila na 9 S/cm. Vzhľadom na to, že PCL/PPy vlákna nie sú toxické, pretože bola dokázaná ich biokompatibilita, môže tento materiál nájsť použitie v bioelektronike.

Výstupy:

1. ČÍKOVÁ, Eliška - MIČUŠÍK, Matej - ŠIŠKOVÁ, Alena - PROCHÁZKA, Michal - FEDORKO, Pavol - OMASTOVÁ, Mária*. Conducting electrospun polycaprolactone/ polypyrrole fibers. In Synthetic Metals, 2018, vol. 235, p. 80-86. (2.526 - IF2017). ISSN 0379-6779. Typ: ADCA
2. ČÍKOVÁ, Eliška - KULÍČEK, Jaroslav - JANIGOVÁ, Ivica - OMASTOVÁ, Mária*. Electrospinning of ethylene vinyl acetate/poly(lactic acid) blends on a water surface. In Materials, 2018, vol. 11, art. no. 1737. (2.467 - IF2017). ISSN 1996-1944. Typ: ADCA
3. ALFONSO, J. E. Martín - ČÍKOVÁ, Eliška - OMASTOVÁ, Mária - VALENCIA, C. - FRANCO, J.M. Electrospun polyvinylpyrrolidone/essential oil composites fibers. In Polymer Networks and Gels 2018 : book of abstracts and programme. - Prague, Czech republic : Institute of Macromolecular Chemistry, Czech Academy of Sciences, 2018, p. 208. ISBN 978-80-85009-91-0. Typ: AFG
4. MIČUŠÍK, Matej - ČÍKOVÁ, Eliška - OMASTOVÁ, Mária. Smart electrically conductive polymeric nanocomposites. In Nanostruc 2018 : International Conference on Structural Nano Composites : abstract book. - Berlin, Deutschland : Hochschule fur Technik und Wirtschaft Berlin, 2018, p.20 -21. Typ: AFG.

12.) Modelovanie a syntéza hybridného konjugovaného systému pre protinádorovú terapiu.
(*Modeling and synthesis of hybrid conjugated systems for anticancer therapy.*)

Zodpovedný riešiteľ: Filip Rázga
Trvanie projektu: 1.1.2015 / 31.12.2018
Evidenčné číslo projektu: 2/0094/15
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských 0
inštitúcií:
Čerpané financie: VEGA: 4475 €

Dosiahnuté výsledky:

V rámci hodnoteného projektu bol nadizajnovaný a zosyntetizovaný hybridný konjugovaný antisense systém, ktorý bol následne testovaný v in vitro podmienkach s cieľom potvrdiť jeho schopnosť selektívne rozpoznať cieľovú fúzu BCR/ABL nukleovú kyselinu. Získané výsledky

jednoznačne potvrdili, že v rámci stoviek rôznych nukleových kyselín (vrátane priamych homológov), hybridný konjugovaný antisense systém selektívne rozpoznáva cieľovú nukleovú kyselinu, pričom jednoznačne vykazuje výrazne vyššiu selektivitu rozpoznávania a stabilitu väzby v porovnaní so štandardnými oligonukleotidmi, ktoré sa dnes bežne používajú. Paralelne boli detailne testované častice na báze kovov a chitozánu ako potenciálne nosiče. Získané výsledky poslúžili ako základ pre formulovanie principiálnych odporúčaní pre vedecké komunity, ktoré sa zaoberajú kontrolovanou prípravou týchto systémov, ich správnu charakterizáciou, biologickým testovaním a interpretáciou získaných biologických dát.

Výstupy:

1. MAZANCOVÁ, Petra - NÉMETHOVÁ, Veronika - TREĽOVÁ, Dušana - KLEŠČÍKOVÁ, Lucia - LACÍK, Igor - RAZGA, Filip: Dissociation of chitosan/tripolyphosphate complexes into separate components upon pH elevation. In Carbohydrate Polymers, 2018, vol. 192, p. 104-110. (5.158 - IF2017). ISSN 0144-8617
2. NÉMETHOVÁ, Veronika - RÁZGA, Filip: Chronic myelogenous leukemia on target. In CANCER MED-US, 2018, vol. 7, p. 3406-3410. (3.202 - IF2017). ISSN 2045-7634.

13.) Elektricky vodivé nanokompozity na báze nanoštruktúrneho grafitu. (*Electrically conductive polymer nanocomposites based on the nanostructured graphite.*)

Zodpovedný riešiteľ: Zdenko Špitálsky
Trvanie projektu: 1.1.2016 / 31.12.2019
Evidenčné číslo projektu: 2/0093/16
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských 0
inštitúcií:
Čerpané financie: VEGA: 9906 €

Dosiahnuté výsledky:

Vákuovou filtráciou sa pripravili polymérne nanokompozity SBS s elektrochemicky exfoliovaným grafénom. Pripravené nanokompozity sa charakterizovali XRD, FTIR, XPS, AFM a Ramanovou spektroskopiou. Zistilo sa, že grafén vytvára veľmi jemnú vrstvu na polymérnom filme. Zvyšovanie jeho koncentrácie vedie k zvýšeniu nerovnosti a teda nárastu hydrofobicity, ale zároveň k výraznému poklesu elektrického odporu.

Výstupy:

1. KEPIĆ, Dejan P. - RISTIĆ, Ivan S. - MARINOVIC-CINCOVIĆ, Milena T. - PERUŠKO, Davor B. - ŠPITÁLSKY, Zdenko - PAVLOVIĆ, Vladimir B. - BUDIMIR, Milica D. - ŠIFFALOVIĆ, Peter - DRAMIĆANIN, Miroslav D. - MIČUŠÍK, Matej - KLEINOVÁ, Angela - JANIGOVÁ, Ivica - MARKOVIĆ, Zoran M. - TODOROVIC MARKOVIĆ, Biljana M. Simple route for the preparation of graphene/poly(styrene-b-butadiene-b-styrene) nanocomposite films with enhanced electrical conductivity and hydrophobicity. In Polymer International, 2018, vol. 67, iss. 8, p. 1118-1127. (2.352 - IF2017). ISSN 0959-8103. Typ: ADCA
2. KELNAR, Ivan - KRATOCHVÍL, Jaroslav - KAPRÁLKOVÁ, Ludmila - ŠPITÁLSKY, Zdenko - UJČIČ, Massimo - ZHIGUNOV, Alexander - NEVORALOVÁ, Martina. Effect of graphene oxide on structure and properties of impact-modified polyamide 6. In Polymer - Plastics Technology and Engineering, 2018, vol. 57, no. 9, p. 827-835. (1.655 - IF2017). ISSN 0360-2559. Typ: ADCA

14.) Príprava polymérnych mikrosfér interným gélovaním v emulzii a kritické zhodnotenie ich vlastností smerom k funkčnej liečbe cukrovky typu I. (*Preparation of polymeric microspheres via internal gelation in emulsion and critical evaluation of their properties toward functional treatment of type I diabetes.*)

Zodpovedný riešiteľ: Dušana Treľová
Trvanie projektu: 1.1.2016 / 31.12.2018
Evidenčné číslo projektu: 2/0059/16
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: VEGA: 4048 €

Dosiahnuté výsledky:

V uplynulom hodnotiacom období sa pozornosť mierne odklonila od prípravy emulzných alginátových mikrosfér a mikrokapsúl a orientovala sa viac na a) testovanie novo-syntetizovaných komponentov na prípravu externe gélovaných PMCG mikrokapsúl, sodnej soli sulfátu celulózy (SCS) a poly(metylén-ko-kyanoguanidínu) (PMCG), a tiež ultračistých komerčných alginátov v smere získania PMCG mikrokapsuly novej generácie, a b) prípravu iných typov hydrogélů a štúdium komplexotvorných vlastností polymérov ako je napr. chitozán. Aktivity súvisiace s riešením projektu v danom hodnotiacom období zahŕňali tiež spoluprácu s Prof. C. Hoesli z McGill univerzity v Kanade, v rámci ktorej sme boli zodpovední za štúdium permeability alginátových mikrosfér pripravených emulzným spôsobom a tiež za spracovanie a hodnotenie výsledkov do pripravovanej publikácie.

Výstupy:

1. MAZANCOVÁ, Petra - NÉMETHOVÁ, Veronika - TREĽOVÁ, Dušana - KLEŠČÍKOVÁ, Lucia - LACÍK, Igor - RÁZGA, Filip. Dissociation of chitosan/tripolyphosphate complexes into separate components upon pH elevation. In Carbohydrate Polymers, 2018, vol. 192, p. 104-110 (5.158 - IF2017).

Programy: APVV

15.) BIONANOGOLD: Nanočastice zlata: vplyv fyzikálno-chemických vlastností na distribúciu, akumuláciu a toxicitu in vivo. (*Gold nanoparticles: impact of physico-chemical properties on distribution, accumulation and long-term toxicity in vivo.*)

Zodpovedný riešiteľ: Andrea Bábelová
Zodpovedný riešiteľ v organizácii SAV: Filip Rázga
Trvanie projektu: 1.7.2017 / 30.6.2021
Evidenčné číslo projektu: APVV-16-0579
Organizácia je koordinátorom projektu: nie
Koordinátor: Biomedicínske centrum SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: 0

Dosiahnuté výsledky:

16.) IRENKA: Imobilizované rekombinantné mikroorganizmy pre biotechnologickú produkciu chemických špecialít pomocou biokatalytických kaskádových reakcií. (*Immobilized recombinant microorganisms for the biotechnological production of chemical specialties using biocatalytic cascade reactions.*)

Zodpovedný riešiteľ: Marek Bučko
Zodpovedný riešiteľ v organizácii SAV: Igor Lacík
Trvanie projektu: 1.7.2016 / 30.6.2020
Evidenčné číslo projektu: APVV- 15 – 0227
Organizácia je koordinátorom projektu: nie
Koordinátor: Chemický ústav SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 9280 €

Dosiahnuté výsledky:

Charakterizovali sa hydrogélové imobilizačné systémy pre imobilizáciu katalyzátorov fyzikálno-chemickými metódami. Získali sa poznatky ohľadne využitia syntetizovaného sulfátu celulózy s nízkym stupňom substitúcie pre tvorbu mikrokapsúl využitých na daný účel imobilizácie biokatalyzátorov.

17.) CONFMAC: Štrukturálne prechody (bio)makromolekúl v nanokanáloch. (*Structural transitions of (bio)macromolecules in nanochannels.*)

Zodpovedný riešiteľ: Peter Cifra
Trvanie projektu: 1.7.2016 / 30.6.2020
Evidenčné číslo projektu: APVV-15-0323
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 24242 €

Dosiahnuté výsledky:

Skúmali sme správanie menej ohybných polymérov v poli dlhých cylindrických nanopostov, špeciálne blokového kopolyméru pozostávajúceho z ohybného a menej ohybného bloku. Detailné poznanie o možnej kontrole konformačného správania v prostredí rozškatulkovania (kompartimentalizácie) môže z praktického hľadiska prispieť k novým procesom úschovy informácií a aj k prehĺbeniu znalostí o obmedzovaných polyméroch.

Uskutočnili sme hrubozrné simulácie diblokového kopolyméru pozostávajúceho z ohybného a tuhšieho reťazca v hustom poli paralelných nanopostov. Vyšetřili sme vzájomné interakcie medzi blokmi za týchto podmienok a to porovnaním ich veľkosti, štruktúry a rozdeľovania medzi nanopostami s vlastnosťami zodpovedajúcich separátnych reťazcov. Geometriu poľa nanopostov sme varírovali pri konštantnej vzdialenosti postov a pri konštantnej veľkosti prechodovej štrbiny medzi postami, pričom veľkosti intersticiálnych objemov medzi postami boli porovnateľné alebo menšie, ako veľkosti reťazcov. Porovnaním blokov zo separátnymi analogickými reťazcami sme

ukázali, že vzájomné interakcie blokov sú v poli nanopostov tienené a bloky sa chovajú nezávisle. Pri konštantnej veľkosti štrbiny medzi nanopostami sa prejavujú kompetitívne javy z natiahnutia reťazcov pozdĺž intersticiálnych objemov a z laterálneho šírenia reťazca medzi týmito objemami, čo vedie ku nemonotónnemu chovaniu „spanu“ reťazca pozdĺž nanopostov. Poloha výsledného maxima, kde span je funkciou objemového zlomku nanopostov, sa mení s tuhosťou reťazca a pre diblok je diktovaná poloohybným blokom. Poloohybný blok penetruje medzi nanopostami ľahšie a expanzia celého dibloku je riadená semiflexibilným blokom. Hlavné zistenia boli vysvetlené pomocou vyjadrenia voľnej energie obmedzovania, kde obmedzenie v intersticiálnom objeme bolo približené geometriou nanokanálu a úzky prechod medzi nanopostami geometriou štrbiny. Porovnanie týchto veličín určilo podmienku prechodu reťazca medzi nanopostami.

Výstupy:

1. RIŠPANOVÁ, Lucia - BENKOVÁ, Zuzana – CIFRA, Peter. Block-copolymer of flexible and semi-flexible block confined in nanopost array. In Polymers : Open Access Polymer Science Journal, 2018, vol. 10, no. 12, art.no. 1301. (2.935 - IF2017). ISSN 2073-4360.

18.) MOPODEG: Modifikované polyméry z obnoviteľných zdrojov a ich degradácia. (Modified polymers from renewable resources and their degradation.)

Zodpovedný riešiteľ: Štefan Chmela
Trvanie projektu: 1.7.2016 / 30.6.2020
Evidenčné číslo projektu: APVV-15-0528
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 39083 €

Dosiahnuté výsledky:

Pokračovalo sa v štúdiách polymerizácie laktidu v roztoku ako aj v komore Plastografu Brabender. Pri roztokových polymerizáciách sa testovali anorganický cínatý iniciátor (2-etylhexanoát cínatý) ako aj titaničité iniciátory (tetrabutyl a tetrapropyl ortotitanát). Boli testované aj organické iniciátory TBD (1,5,7-triazabicyklo[4.4.0]dec-5-én) a DBU (1,8-diazabicyklo[5.4.0]undec-7-én), ktoré pri roztokovej polymerizácii vykázali výnimočnú aktivitu. Polymerizácia laktidu v roztoku v prítomnosti TBD dosiahla konverziu 98 % za 1 minútu pri laboratórnej teplote. Prídavok 5 % kolagénu do reakčnej zmesi spôsobil zníženie konverzie na ca 60 % ako aj mierne zníženie mólovej hmotnosti. V prípade použitia keratínu ako ko-iniciačného aditíva sa získali konverzie okolo 95 %, čo predstavuje výborné konverzie.

Polymerizácie v komore Plastografu Brabender boli iniciované oktanoátom cínatým v pomere PLA : Sn/Oct2/ 1 : 1000. Ako bio-prodegradačné aditíva boli použité nové typy keratínu a kolagénu pripravené bázičnou hydrolýzou, ktoré pri TGA meraní vykázali samotné dostatočnú termickú stabilitu a nezmenili farbu ani po 40 minútach pri 180 oC. Prítomnosť keratínu v koncentračnom rozmedzí 2,5 – 7,5 % mierne znížila výslednú konverziu z pôvodných 90 % na 70-80 %, pričom sa nevykázal jasný trend dosiahnutej konverzie na obsah keratínu.

Pokračovalo sa v štúdiu procesu stárnutia fólií čistej zmesi biopolymérov polylaktidu/polyhydroxybutyrátu ako aj zmesi plnenej 1 váh. % sadzí. Lisované fólie sa testovali pri ich využití ako mulčovacie fólie v poľnohospodárstve. Degradácia bola sledovaná pomocou gélovej permeačnej chromatografie, DSC a mechanické vlastnosti pomocou DMTA a na Instrone. Prídavok sadzí do PLA/PHB zmesí sa prejavil zvýšenou odolnosťou voči foto a termodegradácii. Pravdepodobným dôvodom je zabránenie dodatočnej kryštalizácii zmesi PLA/PHB v priebehu

prírodného stárnutia vplyvom sadzí, čo sa prejavilo dlhším zachovaním mechanických vlastností.

Výstupy:

1. JESZEOVÁ, Lenka - PUŠKÁROVÁ, Andrea - BUČKOVÁ, Mária - KRAKOVÁ, Lucia - GRIVALSKÝ, Tomáš - DANKO, Martin - MOSNÁČKOVÁ, Katarína - CHMELA, Štefan - PANGALLO, Domenico. Microbial communities responsible for the degradation of poly(lactic acid)/poly(3-hydroxybutyrate) blend mulches in soil burial respirometric tests. In World Journal of Microbiology & Biotechnology, 2018, vol. 34, art. no. 101. (2.100 - IF2017). ISSN 0959-3993.
2. DANKO, Martin - BASKO, Malgorzata - ĎURKÁČOVÁ, Slávka - DUDA, Andrzej - MOSNÁČEK, Jaroslav. Functional polyesters with pendant double bonds prepared by coordination-insertion and cationic ring-opening copolymerization of epsilon-caprolactone with renewable Tulipalin A. In Macromolecules, 2018, vol. 51, p. 3582-3596. (5.914 - IF2017). ISSN 0024-9297.
3. JANIGOVÁ, Ivica - CSOMOROVÁ, Katarína - RYCHLÝ, Jozef - FIEDLEROVÁ, Agnesa - CHMELA, Štefan - ŠLOUF, Miroslav. Effect of UV radiation on thermal properties of polyhydroxybutyrate. In Polymery 2018 : X. Česko-slovenská konference : sborník abstraktů. - Praha, ČR : Ústav makromolekulární chemie AV ČR, v.v.i., 2018, p. 64. ISBN 978-80-85009-92-7.(Polymery 2018 : X. Česko-slovenská konference. Polymery 2018 : X. Česko-slovenská konference).
4. MOSNÁČKOVÁ, Katarína - ŠLOSÁR, Miroslav - ŠIŠKOVÁ, Alena - KOLLÁR, Jozef - CHODÁK, Ivan - CHMELA, Štefan - ALEXÝ, Pavol - JANIGOVÁ, Ivica - MOSNÁČEK, Jaroslav. Ageing of poly(lactid acid)/poly(3-hydroxybutyrate)/carbon black composite films under various outdoor and laboratory conditions. In Bio-Based Polymers and Composites : BiPoCo 2018 : 4th International Conference : abstract book. - Budapest, Hungary : Hungarian Academy of Sciences, 2018, p. 389-390.V (Mosnáčková)
5. DANKO, Martin - ĎURKÁČOVÁ, Slávka - BAŠKO, Malgorzata - MOSNÁČEK, Jaroslav. Ring-opening polymerization of Tulipalin A and epsilon-caprolactone. In Bordeaux Polymer Conference 2018 : abstract book. - Bordeaux, France : Bordeaux INP, 2018, non. p. Dostupné na internete: <<http://bpc2018.u-bordeaux.fr/en>>.
6. DANKO, Martin - KRONEKOVÁ, Zuzana - MRLÍK, Miroslav - OSIČKA, Josef - KASÁK, Peter. Sulfobetaine and carboxybetaine copolymers and hydrogels: Modulation of thermo- and ion responsiveness, water state, mechanical properties and cell adhesion. In 8th IUPAC International Conference on Green Chemistry : book of abstracts. - Bangkok, Thailand : Chulalongkorn University, 2018, p. 106.(IUPAC International Conference on Green Chemistry. IUPAC International Conference on Green Chemistry).
7. ŠIŠKOVÁ, Alena - OPÁLEK, Andrej - PÁSZTÓI, Balázs - PEPTU, Cristian. Water-soluble non-polymeric and polymeric nanofibers with drugs delivery potentialities. In POC 2018 : 17th Polymers and Organic Chemistry Conference : abstract book. - Montpellier, France : Institute Charles Gerhardt, School of Chemistry of Montpellier, 2018, p56. Typ: AFG, Šišková – výveska.

19.) METALLOCENE: Nereaktívne tavné lepidlá na báze metallocénových polymérov pre priemyselné aplikácie. (*Unreactive melt adhesives based on metallocene polymers for industrial applications.*)

Zodpovedný riešiteľ:	Ivan Chodák
Trvanie projektu:	1.7.2015 / 30.6.2019
Evidenčné číslo projektu:	APVV-14-0566
Organizácia je	áno
koordinátorom projektu:	
Koordinátor:	Ústav polymérov SAV

Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 22111 €

Dosiahnuté výsledky:

V uplynulom období sa ukončila modifikácia vybraných metallocénových polyolefínov naočkovaním polárnych skupín (kyselina akrylová a krotónová. Tieto materiály sa testovali ako aditíva pre zvýšenie adhézie a pevnosti adhézneho spoja pre papier a kartón. Na základe výsledkov sa optimalizovalo zloženie tavného lepidla.

Výstupy:

1. PAVLINEC Juraj- NOVÁK Igor- RYCHLÝ Jozef- KLEINOVÁ Angela- NÓGELLOVÁ Zuzana - PREŤO, Jozef- VANKO Vladimír- ŽIGO Ondrej- CHODÁK Ivan. Hot Melt Adhesives Prepared by Grafting Acrylic and Ceotonic Acids onto Metallocene Ethylene-Octene Copolymers, odoslané do J. Plastics Film and Sheeting.
2. CHODÁK, Ivan - PAVLINEC, Jiří - PREŤO, Jozef - VANKO, Vladimír - NOVÁK, Igor. Effect polar groups grafting to metallocene polyolefins on hotmelt adhesive properties. In Bio-Based Polymers and Composites : BiPoCo 2018 : 4th International Conference : abstract book. - Budapest, Hungary: Hungarian Academy of Sciences, 2018, p. 280-281. Typ: AFG.
3. NOVÁK, Igor - LEHOCKÝ, Marian - CHODÁK, Ivan - KLEINOVÁ, Angela - JURKOVIČ, Peter - MATYAŠOVSKÝ, Ján. Antibacterial modification of polyolefin veneers. In PLASTKO 2018 : sborník príspevků z konference. - Zlín, ČR : Universita Tomáše Bati ve Zlíně, 2018, p. 137-141. ISBN 978-80-7454-727-0. Typ: AFC .
4. CHODÁK, Ivan - PAVLINEC, Jiří - PREŤO, Jozef - VANKO, Vladimír - NOVÁK, Igor. Effect polar groups grafting to metallocene polyolefins on hotmelt adhesive properties. In Bio-Based Polymers and Composites : BiPoCo 2018 : 4th International Conference: abstract book. - Budapest, Hungary: Hungarian Academy of Sciences, 2018, p. 280-281. AFG.

20.) NANOSEN: Nanočasticové sensory pre plynné biomarkery chorôb. (*Nanoparticles-based sensors of gaseous biomarkers of diseases.*)

Zodpovedný riešiteľ: Ján Ivančo
Zodpovedný riešiteľ v organizácii SAV: Jaroslav Mosnáček
Trvanie projektu: 1.7.2015 / 30.6.2019
Evidenčné číslo projektu: APVV-14-0891
Organizácia je koordinátorom projektu: nie
Koordinátor: Fyzikálny ústav SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 19315 €

Dosiahnuté výsledky:

Výskum v oblasti nanočasticových biosenzorov plynov bol zameraný na opätovnú prípravu polymérnych surfaktantov, ktoré stabilizujú železné nanočastice a zväčšujú ich medzimolekulovú vzdialenosť. Tieto deriváty boli pripravené technikou ATRP. Vzniknuté polyméry boli charakterizované pomocou metód GPC a NMR, pričom sa potvrdil kontrolovaný proces polymerizácie. Grafting from metódou boli polymérne reťazce naviazané na povrch železných nanočastíc. Hustota naviazania polymérov na nanočastice sa stanovila pomocou TGA. Vypočítaná hodnota predstavuje približne 0.5 – 1 reťazca na nm², v závislosti od chemického zloženia a dĺžky

polymérneho reťazca. Okrem železných nanočastíc sme sa zamerali aj na prípravu WO₃ nanočastíc, ktoré taktiež slúžia ako chemirezistory. Komerčne dostupné WO₃ nanočastice sme úspešne modifikovali pripravenými polymérnymi surfaktantmi. Syntetizované WO₃ sa zatiaľ modifikovať nepodarilo.

Výstupy:

1. OSIČKA, Josef - MRLIK, Miroslav - ILČÍKOVÁ, Markéta - MUNSTER, Lukas - BAZANT, Pavel - ŠPITÁLSKY, Zdenko - MOSNÁČEK, Jaroslav. Light-induced actuation of poly(dimethylsiloxane) filled with graphene oxide grafted with poly(2-(trimethylsilyloxy)ethyl methacrylate). In Polymers : Open Access Polymer Science Journal, 2018, vol. 10, art. no. 1059. (2.935 - IF2017). ISSN 2073-4360.
2. OSIČKA, Josef - MRLIK, Miroslav - ILČÍKOVÁ, Markéta - HANULÍKOVÁ, Barbora - SEDLAČIK, Michal - MOSNÁČEK, Jaroslav. Reversible actuation ability upon light stimulation of the smart systems with controllably grafted graphene oxide with poly (glycidyl methacrylate) and PDMS elastomer: Effect of compatibility and graphene oxide reduction on the photo-actuation performance. In Polymers : Open Access Polymer Science Journal, 2018, vol. 10, art.no. 832. (2.935 - IF2017). ISSN 2073-4360.

21.) BIOGLYKO: Biočipy a biosenzory pre glykorozpoznávanie, ich vývoj, príprava a využitie pri výskume rakoviny. (*Biochips and biosensors for glycorecognition, their development, preparation and application in cancer research.*)

Zodpovedný riešiteľ:	Jaroslav Katrlík
Zodpovedný riešiteľ v organizácii SAV:	Jaroslav Mosnáček
Trvanie projektu:	1.7.2015 / 30.6.2019
Evidenčné číslo projektu:	APVV-143-0753
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Chemický ústav SAV
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 5975 €

Dosiahnuté výsledky:

Sulfobetainové zwiteriónové ko-polyméry obsahujúce pendantnú fotocitlivú skupinu na báze metakrylamidu boli syntetizované a použité na modifikáciu polyetylénových a polystyrénových povrchov. Na upravených povrchoch získaných s kovalentným zosieťovaním zwiteriónových ko-polymérov s povrchmi polymérov pomocou UV žiarenia pri 365 nm sa následne študovalo stárnutie na vzduchu a v morskej vode. Potvrdila sa dlhodobá stabilita takýchto povrchov, pričom nedochádzalo k ich zanášaniam ani po pol roku v morskej vode.

Výstupy:

1. MOSNÁČEK, Jaroslav - OSIČKA, Jozef - POPELKA, Anton - ZAVAHIR, Sifani - BEN-HAMADOU, Radhouane - KASÁK, Peter. Photochemical grafting of polysulfobetaine onto polyethylene and polystyrene surfaces and investigation of long-term stability of the polysulfobetaine layer in seawater. In Polymers for Advanced Technologies, 2018, vol. 29, iss. 7, p. 1930-1938. (2.137 - IF2017). ISSN 1042-7147.

22.) Nanomat: Nanokompozitné materiály na báze organo-fosfóniových smektitov a

polymérov. (*Nanocomposite materials based on organo-phosphonium smectites and polymers.*)

Zodpovedný riešiteľ: Peter Komadel
Zodpovedný riešiteľ v organizácii SAV: Ivan Chodák
Trvanie projektu: 1.7.2016 / 30.6.2020
Evidenčné číslo projektu: APVV-15-0741
Organizácia je koordinátorom projektu: nie
Koordinátor: Ústav anorganickej chémie SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 23692 €

Dosiahnuté výsledky:

Pripravil sa montmorilonit (MMT) povrchovo modifikovaný štyrmi komerčnými a viacerými cielene syntetizovanými fosfóniovými ligandami. Tieto látky sa v súčasnosti testujú ako plnivá pre dve matrice, a to polybutylén-adipát-co-tereftalát a styrén-butadiénový kaučuk. Predbežne sú pripravené zmesi, ktoré sa budú testovať na celý rad fyzikálnych vlastností.

Doriešil sa postup charakterizácie modifikovaných plnív na báze MMT meraním reologických vlastností disperzií plnív v sústave rozličných rozpúšťadiel. Tento postup, publikovaný v Polymer Testing, umožňuje získať rýchlu informáciu o vhodnosti použitia plniva s určitou modifikáciou pre konkrétnu polymérnu maticu.

Výstupy:

1. JOCHEC MOŠKOVÁ, Daniela - JANIGOVÁ, Ivica - NÓGELLOVÁ, Zuzana - SEDNIČKOVÁ, Michaela - JANKOVIČ, Ľuboš - KOMADEL, Peter - ŠLOUF, Miroslav - CHODÁK, Ivan. Prediction of compatibility of organomodified clay with various polymers using rheological measurements. In Polymer Testing, 2018, vol. 69, p. 359-365. (2.247 - IF2017). ISSN 0142-9418. Typ: ADCA
2. IVANIČ, František - CHODÁK, Ivan. Vplyv zloženia a koncentrácie termoplastického škrobu na fyzikálne vlastnosti zmesí s polybutylén-adipát-tereftalátom. In PLASTKO 2018 : sborník příspěvků z konference. - Zlín, ČR : Universita Tomáše Bati ve Zlíně, 2018, p. 135-136. ISBN 978-80-7454-727-0. Typ: AFG.

23.) DARLINK: Vysokoselektívna liečba nádorových ochorení: komplexy endogénnych lipoproteínov s DARPinmi ako nová generácia transportných systémov pre cieleň transport liečiv. (*Towards highly selective cancer treatment: Endogenous lipoprotein-DARPin complexes as a new generation of targeted drug delivery vehicles.*)

Zodpovedný riešiteľ: Juraj Kronek
Trvanie projektu: 1.7.2016 / 30.6.2020
Evidenčné číslo projektu: APVV-15-0485
Organizácia je koordinátorom projektu: nie
Koordinátor: Prírodovedecká fakulta Univerzity Pavla Jozefa Šafárika, Košice
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 15091 €

Dosiahnuté výsledky:

V uplynulom období sme sa zamerali na využitie gradientových kopolymérov zložených z hydrofilných alifatických a hydrofóbných aromatických 2-oxazolínov pre transport modelového protirakovinového liečiva, v našom prípade kurkumínu a hypericínu. Enkapsuláciou uvedených liečiv sa získali nanočastice s vysokou enkapsulačnou kapacitou, zvýšenou chemickou stabilitou liečiva a efektívnou internalizáciou do rakovinových buniek.

Výstupy:

1. DATTA, Shubhashis - JUTKOVÁ, Annamária - ŠRÁMKOVÁ, Petra - LENKAVSKÁ, Lenka - HUNTOŠOVÁ, Veronika - CHORVÁT, Dušan - MIŠKOVSKÝ, Pavol - JANCURA, Daniel - KRONEK, Juraj. Unravelling the excellent chemical stability and bioavailability of solvent responsive curcumin-loaded 2-ethyl-2-oxazoline-grad-2-(4-dodecyloxyphenyl)-2-oxazoline copolymer nanoparticles for drug delivery. In Biomacromolecules, 2018, vol. 19, p. 2459-2471. (5.738 - IF2017)
2. SALGARELLA, Alice Rita - ZAHORANOVÁ, Anna - ŠRÁMKOVÁ, Petra - MAJERČÍKOVÁ, Monika - PAVLOVA, Ewa - LUXENHOFER, Robert - KRONEK, Juraj - LACÍK, Igor - RICOTTI, Leonardo. Investigation of drug release modulation from poly(2-oxazoline) micelles through ultrasound. In Scientific Reports, 2018, vol. 8, art. no. 9893. (4.122 - IF2017).
3. DATTA, Shubhashis - JUTKOVÁ, Annamária - ŠRÁMKOVÁ, Petra - LENKAVSKÁ, Lenka - HUNTOŠOVÁ, Veronika - PETRENČÍKOVÁ, Nadežda - CHORVÁT, Dušan - MIŠKOVSKÝ, Pavol - JANCURA, Daniel - KRONEK, Juraj. Curcumin loaded 2-ethyl-2-oxazoline-grad-2-(4-dodecyloxyphenyl)-2-oxazoline copolymer nanoparticles with excellent chemical stability and bioavailability. In ISBPPB 2018 : final programme and book of abstracts. - Kraków, Poland : Polish Society for Biomaterials, 2018, p. 32. Prednáška.
4. KRONEK, Juraj - PETRENČÍKOVÁ, Nadežda - KRONEKOVÁ, Zuzana - DATTA, Shubhashis - JANCURA, Daniel. Gradient copolymers from aromatic and aliphatic 2-oxazolines as promising biomedical materials. In Engineering of Biomaterials : Journal of Polish Society for Biomaterials and Faculty of Materials Science and Ceramics, 2018, vol. 21, no. 148, p. 96. Prednáška.

24.) Syntéza a charakterizácia hybridných polymérnych systémov pre odchytyvanie endotoxínov (*The design and characterization of hybrid polymeric scavengers for endotoxins*)

Zodpovedný riešiteľ:	Juraj Kronek
Trvanie projektu:	1.9.2018 / 31.12.2019
Evidenčné číslo projektu:	APVV-SK-KR-18-0011
Organizácia je	áno
koordinátorom projektu:	
Koordinátor:	Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 2441 €

Dosiahnuté výsledky:

Uplynulé obdobie sme využili na návštevu Hanyang University, počas ktorej som predniesol pozvanú prednášku sumarizujúcu súčasné smery výskumu v oblasti funkčných poly(2-oxazolínov). Zároveň sme naplánovali potrebné experimenty na nasledujúce obdobie a taktiež nevyhnutnú výmenu študovaných materiálov.

Výstupy:

1. KRONEKOVÁ, Zuzana - ŠRÁMKOVÁ, Petra - ZAHORANOVÁ, Anna - SMOLÍČEK, Maroš - KRONEK, Juraj. Functional poly(2-oxazolines) as building blocks for biomedical materials. In

Hanyang University, Seoul, Kórejská reublika, 7.11.2018.

25.) MEREDIT: Materiály a procesy pre funkčnú enkapsuláciu pankreatických ostrovčekov v liečbe diabetu. (*MEREDIT: Materials and processes for functional encapsulation of pancreatic islets in diabetes treatment.*)

Zodpovedný riešiteľ: Igor Lacík
Trvanie projektu: 1.7.2015 / 30.6.2019
Evidenčné číslo projektu: APVV-14-0858
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 1 - Slovensko: 1
Čerpané financie: APVV: 47385 €

Dosiahnuté výsledky:

Bol publikovaný významný článok, ktorý pre enkapsulačnú komunitu zavádza metódu konfokálnej Ramanovej mikroskopie pre analýzu priestorovej distribúcie polymérov tvoriacich alginátové mikrosféry a multikomponentné mikrokapsuly. Diskusia k tomuto článku zdôrazňuje nutnosť poznať charakteristiky mikrokapsúl stabilizovaných elektrostatickými interakciami po expozícii in vivo prostrediu. Významnosť tohto prístupu je dokumentovaná dvomi pozvanými prednáškami (Z. Kroneková a I. Lacík) ohľadne charakterizácie mikrokapsúl na 10th Microencapsulation Training School (Trondheim, 9/2018). Pripravila sa predbežná knižnica mikrokapsúl tvorených syntetizovanými polymérmi sulfátu celulózy a poly(metylén-ko-kyanoguanidínu) a zároveň pri použití komerčného vysokočistého alginátu sodného. Tieto tri polyméry sú základom multikomponentnej tzv. PMCG mikrokapsuly, ktorej prípravu a vlastnosti študujeme s cieľom štandardizácie procesu a vlastností, a tiež ju testujeme na pokusných myšiach v spolupráci s University of Illinois in Chicago. Vlastnosti mikrokapsúl závisia od procesu enkapsulácie, pričom našou snahou je určiť mieru, s akou jednotlivé parametre ovplyvňujú výsledné vlastnosti. V projekte sme sa tiež venovali vplyvu elektrostatických interakcií na tvorbu komplexu medzi chitozánom a tripolyfosfátom a ďalším štúdiám, ktoré sa venovali interakciám relevantných polymérov a hydrogélových materiálov.

Výstupy:

1. KRONEKOVÁ, Zuzana - PELACH, Michal - MAZANCOVÁ, Petra - UHELSKÁ, Lucia - TREĽOVÁ, Dušana - RÁZGA, Filip - NÉMETHOVÁ, Veronika - SZALAI, Szabolcs - CHORVÁT, Dušan Jr. - MCGARRIGLE, James J. - OMAMI, Mustafa - ISA, Douglas - GHANI, Sofia - MAJKOVÁ, Eva - OBERHOLZER, José - RAUS, Vladimír - ŠIFFALOVÍČ, Peter - LACÍK, Igor. Structural changes in alginate-based microspheres exposed to in vivo environment as revealed by confocal Raman microscopy. In Scientific Reports, 2018, vol. 8, art. no. 1637. (4.122 - IF2017).
2. MAZANCOVÁ, Petra - NÉMETHOVÁ, Veronika - TREĽOVÁ, Dušana - KLEŠČÍKOVÁ, Lucia - LACÍK, Igor - RÁZGA, Filip. Dissociation of chitosan/tripolyphosphate complexes into separate components upon pH elevation. In Carbohydrate Polymers, 2018, vol. 192, p. 104-110. (5.158 - IF2017). ISSN 0144-8617.
3. KRONEKOVÁ, Zuzana. Confocal laser scanning and Raman spectroscopy. In Cell & Drug Encapsulation: 10th Training School on Microencapsulation, Trondheim, Norway: Bioencapsulation Research Group & Norwegian University of Science and Technology, 2018, p. 68-75. Pozvaná prednáška
4. LACÍK, Igor. Microcapsule physico-chemical characterization. In Cell & Drug Encapsulation:

10th Training School on Microencapsulation, Trondheim, Norway: Bioencapsulation Research Group & Norwegian University of Science and Technology, 2018, p. 58-66. Pozvaná prednáška

26.) VIS-CuM: Fotochemicky indukovaná med'ou sprostredkovaná radikálová polymerizácia s prenosom atómu. (*Photochemically induced copper-mediated atom transfer radical polymerization.*)

Zodpovedný riešiteľ: Jaroslav Mosnáček
Trvanie projektu: 1.7.2016 / 30.6.2020
Evidenčné číslo projektu: APVV-15-0545
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 55410 €

Dosiahnuté výsledky:

Optimalizovali sa podmienky fotoATRP v prítomnosti limitovaného množstva vzduchu pre metyl akrylát a n-butyl akrylát v DMSO, DMF a MeCN ako rozpúšťadlách. Preštudoval sa vplyv prídavku rôznych terciárnych amínov na veľkosť indukčnej periódy a kinetiku polymerizácie. Takýto produkt bol potvrdený NMR spektroskopiou pri použití TPMA ako ligandu. Zo študovaných terciárnych amínov mal najvýraznejší vplyv na indukčnú periódu ako i na kinetiku polymerizácie trietylamín. Ukázalo sa, že na rozdiel od ostatných študovaných rozpúšťadiel, v DMSO dochádza k výraznému urýchleniu polymerizácie i v prípade iných terciárnych amínov. Predpokladá sa, že dochádza k jedoelektrónovému prenosu z komplexu katalyzátora medi v excitovanom stave na ligand (terciárny amín), pričom jednak vzniknutý kation radikál amínu reaguje s kyslíkom a dochádza k rozkladu amínu na aldehyd. Navyše DMSO napomáha tomuto prenosu elektrónu medzi med'nou soľou a amínom a tým urýchluje polymerizáciu. Otestoval sa aj vplyv koncentrácie uhlíkových nanotrubičiek na rýchlosť fotoATRP, pričom dochádzalo fotochemicky k opätovnej redukcii deaktivátora, ktorý by sa počas polymerizácie hromadil v zmesi dôsledkom lapania radikálov uhlíkovými nanotrubičkami. Uskutočnili sa i prvé pokusy o využitie fotoATRP pri polymerizáciou indukovanom samousporiadaní.

Výstupy:

1. MRLÍK, Miroslav - ILČÍKOVÁ, Markéta - PLACHÝ, Tomáš - MOUČKA, Robert - PAVLÍNEK, Vladimír - MOSNÁČEK, Jaroslav. Tunable electrorheological performance of silicone oil suspensions based on controllably reduced graphene oxide by surface initiated atom transfer radical polymerization poly(glycidyl methacrylate). In Journal of Industrial and Engineering Chemistry, 2018, vol. 57, p. 104-112. (4.841 - IF2017). ISSN 1226-086X.
2. SAVIN, Corina L. - PEPTU, Cristian - KRONEKOVÁ, Zuzana - SEDLAČÍK, Milan - MRLÍK, Miroslav - SASINKOVÁ, Vlasta - PEPTU, Catalina - POPA, Marcel - MOSNÁČEK, Jaroslav. Polyglobalide-based porous networks containing poly(ethylene glycol) structures prepared by photoinitiated thiol-ene coupling. In Biomacromolecules, 2018, vol. 19, p. 3331-3342. (5.738 - IF2017). ISSN 1525-7797.
3. OSIČKA, Josef - MRLIK, Miroslav - ILČÍKOVÁ, Markéta - MUNSTER, Lukas - BAZANT, Pavel - ŠPITÁLSKY, Zdenko - MOSNÁČEK, Jaroslav. Light-induced actuation of poly(dimethylsiloxane) filled with graphene oxide grafted with poly(2-(trimethylsilyloxy)ethyl methacrylate). In Polymers : Open Access Polymer Science Journal, 2018, vol. 10, art. no. 1059. (2.935 - IF2017). ISSN 2073-4360.
4. OSIČKA, Josef - MRLIK, Miroslav - ILČÍKOVÁ, Markéta - HANULÍKOVÁ, Barbora -

SEDLAČIK, Michal - MOSNÁČEK, Jaroslav. Reversible actuation ability upon light stimulation of the smart systems with controllably grafted graphene oxide with poly (glycidyl methacrylate) and PDMS elastomer: Effect of compatibility and graphene oxide reduction on the photo-actuation performance. In Polymers : Open Access Polymer Science Journal, 2018, vol. 10, art.no. 832. (2.935 - IF2017). ISSN 2073-4360.

27.) Časovo-rozlišené štúdium rastu hybridných van der Waalových heteroštruktúr
(*Real-time grow studies of hybrid van der Waals heterostructures*)

Zodpovedný riešiteľ: Nad'a Mrk'vková
Zodpovedný riešiteľ v organizácii SAV: Jaroslav Mosnáček
Trvanie projektu: 1.10.2018 / 30.6.2022
Evidenčné číslo projektu: APVV-17-0352
Organizácia je koordinátorom projektu: nie
Koordinátor: Fyzikálny ústav SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 1354 €

Dosiahnuté výsledky:

Našou úlohou v rámci projektu je syntéza molekúl, ktoré sú schopné vytvárať polovodiče s malou molekulovou hmotnosťou a ktoré sú vhodné pre optoelektroniku. Na budovanie takýchto makromolekúl boli strategicky zvolené akceptorové a donorové jednotky. Ako akceptorové molekuly boli navrhnuté relatívne nové deriváty tiazolu [5,4-d] tiazolu (TzTz). Tieto bicyklické heteroaromatické zlúčeniny sú charakterizované tuhú a ko-planárnou štruktúrou, vysokou stabilitou a dobrými elektron - akceptornými vlastnosťami a tým pádom, môžu byť vhodným kandidátom pre tento výskum. Jadro TzTz je vytvorené cyklizáciou aldehydov s dithioxamidom, ktorá môže byť ďalej funkcionalizovaná s rôznymi donorovými jednotkami za účelom budovania malých molekúl.

28.) GONanoplatfrom: Grafénová nanoplatforma na detekciu rakoviny. (*Graphene-based nanoplatfrom for detection of cancer.*)

Zodpovedný riešiteľ: Mária Omastová
Trvanie projektu: 1.7.2015 / 30.6.2019
Evidenčné číslo projektu: APVV-14-0120
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 21408 €

Dosiahnuté výsledky:

Grafén oxidová nanoplatforma (GON) bola podrobená separáciám veľkostí, čím sme dokázali oddeliť 100-150 nm malé nanoplatfromy. GON bola modifikovaná biotín-avidín komplexom za účelom naviazania extracelulárnej biotinovanej protilátky M75. Reakcie prebiehajú v 3 krokoch, pričom každý krok bol kontrolovaný. Bunkové línie boli kultivované v prítomnosti modifikovanej nanoplatfromy. Výsledky reakcií sa sledovali na konfokálnom mikroskope. Po kultivácii buniek s

nanoplatformou na podložnom sklíčku boli bunkové línie sledované aj Ramanovou spektroskopiou s imerzným objektívom. Pri meraniach sa prechádzalo bunkou vo viacerých úrovniach nad krycím sklíčkom, čím sa zabezpečilo premeranie vnútra bunky v Z-ovej osi. Na základe získaných výsledkov sme dospeli k záveru, že GO nanoplatforma preniká aj do vnútra buniek. Deje sa to aj napriek prítomnosti extracelulárnej protilátky, ktorá samostatná zostáva na povrchu buniek. Toto zistenie nám slúži ako nepriamy dôkaz naviazania protilátok na GO nanoplatformu.

Projektový partneri začali skúmať modifikované magnetické nanočastice monoklonálnou protilátkou v 3D sféroidoch, aby sa čo najviac priblížili podmienkam pri raste nádoru. Rovnakým testom bude podrobená aj modifikovaná GO nanoplatforma.

V rámci spolupráce na projekte spolupracovníci z Ústavu experimentálnej fyziky v Košiciach modifikovali magnetické nanočastice, pomocou glycínu. Pomocou TGA bol určený optimálny pomer MNps ku glycínu. S týmito nanočasticami sa bude v ďalšom kroku modifikovať GO nanoplatforma.

Výstupy:

1. ANTAL, Iryna - KONERACKÁ, Martina - KUBOVČÍKOVÁ, Martina - ZÁVIŠOVÁ, Vlasta - KHMARA, Iryna - LUCANSKÁ, Dáša - JELENSKÁ, Lenka - VIDLIČKOVÁ, Ivana - ZAŤOVIČOVÁ, Miriam - PASTOREKOVÁ, Silvia - BUGÁROVÁ, Nikola - MIČUŠÍK, Matej - OMASTOVÁ, Mária - KOPČANSKÝ, Peter. D,L-lysine functionalized Fe₃O₄ nanoparticles for detection of cancer cells. In Colloids and Surfaces B - Biointerfaces, 2018, vol. 163, p. 236-245. (3.997 - IF2017). ISSN 0927-7765. Typ: ADCA
2. KHMARA, Iryna - KUBOVČÍKOVÁ, Martina - KONERACKÁ, Martina - KALSKA-SZOSTKO, B. - ZÁVIŠOVÁ, Vlasta - ANTAL, Iryna - RAJŇÁK, Michal - DANKOVÁ, Zuzana - KAVEČANSKÝ, Viktor - OMASTOVÁ, Mária - KOPČANSKÝ, Peter. Preparation and Characterization of Magnetic Nanoparticles. In Acta Physica Polonica A, 2018, vol. 133, no. 3, p. 704-706. (0.857 - IF2017). (2018 - Current Contents, WOS, SCOPUS). ISSN 1898-794X.(PM 2017 : European Conference Physics of Magnetism). Typ: ADCA.
3. ELIÁŠOVÁ SOHOVÁ, Marianna - BODIK, Michal - ŠIFFALOVÍČ, Peter - BUGÁROVÁ, Nikola - LABUDOVÁ, Martina - ZAŤOVIČOVÁ, Miriam - HIANIK, Tibor - OMASTOVÁ, Mária - MAJKOVÁ, Eva - JERSEL, Matej - PASTOREKOVÁ, Silvia. Label-free tracking of nanosized graphene oxide cellular uptake by confocal Raman microscopy. In Analyst, 2018, vol. 143, iss. 15, p. 3686-3692. (3.864 - IF2017). ISSN 0003-2654. Typ: ADCA
4. BUGÁROVÁ, Nikola - BODIK, Michal - ŠIFFALOVÍČ, Peter - KONERACKÁ, Martina - ZAŤOVIČOVÁ, Miriam - ŠPITÁLSKY, Zdenko - MIČUŠÍK, Matej - OMASTOVÁ, Mária. Graphene oxide nanoplatform for cancer-targeted therapy. In Graphene 2018 : The largest European Event in Graphene and 2D Materials. - Dresden, Germany: Technische Universität Dresden, 2018, non. p. Typ: AFG.
5. BUGÁROVÁ, Nikola - BODIK, Michal - MIČUŠÍK, Matej - ŠPITÁLSKY, Zdenko - ŠIFFALOVÍČ, Peter - KONERACKÁ, Martina - ZAŤOVIČOVÁ, Miriam - OMASTOVÁ, Mária. Two 2D nanoplatforms for cancer targeting. In ICONAN 2018 : International Conference on Nanomedicine and Nanobiotechnology : book of abstracts. - Fontanay-Aux-Roses, France : PremC, 2018, p. 98.(ICONAN 2018 : International Conference on Nanomedicine and Nanobiotechnology. ICONAN 2018 : International Conference on Nanomedicine and Nanobiotechnology). Typ: AFG.
6. MIČUŠÍK, Matej - BODIK, Michal - BUGÁROVÁ, Nikola - ŠIFFALOVÍČ, Peter - KOLLÁR, Jozef - OMASTOVÁ, Mária. MoS₂ nanoplatforms for detection of cancer. In ICONAN 2018 : International Conference on Nanomedicine and Nanobiotechnology : book of abstracts. - Fontanay-Aux-Roses, France : PremC, 2018, p. 53.(ICONAN 2018 : International Conference on Nanomedicine and Nanobiotechnology. ICONAN 2018: International Conference on Nanomedicine and Nanobiotechnology). Typ: AFG.
7. OMASTOVÁ, Mária - BUGÁROVÁ, Nikola - MIČUŠÍK, Matej - ŠPITÁLSKY, Zdenko - BODIK, Michal - ŠIFFALOVÍČ, Peter - KONERACKÁ, Martina - ZAŤOVIČOVÁ, Miriam. Graphene oxide nanoplatforms for cancer cells targeting. In ICONAN 2018 : International

Conference on Nanomedicine and Nanobiotechnology : book of abstracts. - Fontanay-Aux-Roses, France : PremC, 2018, p. 127.(ICONAN 2018 : International Conference on Nanomedicine and Nanobiotechnology. ICONAN 2018 : International Conference on Nanomedicine and Nanobiotechnology). Typ: AFG.

29.) NANOSIMKA: Účinok nanoenkapsulovaného simvastatínu na kardiovaskulárny systém pri experimentálnom metabolickom syndróme. (*Effects of nanoencapsulated simvastatin on cardiovascular system in experimental metabolic syndrome.*)

Zodpovedný riešiteľ: Oľga Pecháňová
Zodpovedný riešiteľ v organizácii SAV: Jaroslav Mosnáček
Trvanie projektu: 1.7.2015 / 30.6.2019
Evidenčné číslo projektu: APVV-14-0932
Organizácia je koordinátorom projektu: nie
Koordinátor: Centrum experimentálnej medicíny SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 9685 €

Dosiahnuté výsledky:

Z troch komponentov – N-dodecylmetakrylamid (DMAm), vinylpyrolidón (VP) a poly(etylén glycol) metakrylát PEG360 boli pripravené polymérne nanočastice s veľkosťou cca. 280 nm. Reprodukateľné a stabilné nanočastice sa dosiahli mólovým pomerom jednotlivých monomérov 11 : 1 : 14 (DMAm : VP : PEG). Naplnené nanočastice so simvastatínom alebo koenzímom Q10 boli testované in vivo na Zucker potkanoch, pričom sa sledovala rýchlosť a miesto uvoľňovania týchto aktívnych látok. Výsledky týchto štúdií sú ešte vo fáze spracovania.

Výstupy:

1. ECKSTEIN ANDICSOVÁ, Anita - DANKO, Martin - MOSNÁČEK, Jaroslav. Preparation of amphiphilic block copolymers for drug distribution. In POC 2018: 17th Polymers and Organic Chemistry Conference: abstract book. - Montpellier, France: Institute Charles Gerhardt, School of Chemistry of Montpellier, 2018, p57. Výveska: Eckstein

30.) LiKoZIP: Lignín ako kompozitný komponent do fenolformaldehydových živíc a drevoplastu. (*Lignin as composite component for phenol-formaldehyde resins and wood-plastic composite.*)

Zodpovedný riešiteľ: Michal Procházka
Trvanie projektu: 1.7.2016 / 30.6.2020
Evidenčné číslo projektu: APVV-15-0201
Organizácia je koordinátorom projektu: nie
Koordinátor: Medzinárodné laserové centrum, Bratislava
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 3000 €

Dosiahnuté výsledky:

V uplynulom roku boli na ÚPo pripravované preglejky, na ktoré boli následne testované mechanické vlastnosti. Získané hodnoty pevnosti lepeného spoja slúžili projektovému partnerovi na charakterizáciu pripravených živíc.

31.) MOR4CML: Multivalentný morpholino-based antisense system pre CML. (*Multivalent morpholino-based antisense system for CML.*)

Zodpovedný riešiteľ: Filip Rázga
Trvanie projektu: 1.7.2016 / 30.6.2020
Evidenčné číslo projektu: APVV-15-0215
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 8096 €

Dosiahnuté výsledky:

Projekt bol prenesený na Lekársku fakultu UK v Bratislave na základe zmeny žiadateľskej organizácie.

32.) ENDONANOSAFE: Potenciálne riziko nanočastíc kovov a oxidov kovov používaných v nanomedicíne: vplyv na reprodukčný a imunitný systém a mozog. (*Potential risk of metal and metal oxide nanoparticles used for biomedical applications: focus on reproductive and immune systems and brain.*)

Zodpovedný riešiteľ: Soňa Scsuková
Zodpovedný riešiteľ v organizácii SAV: Jozef Kollár
Trvanie projektu: 1.7.2016 / 30.6.2020
Evidenčné číslo projektu: APVV-15-0296
Organizácia je koordinátorom projektu: nie
Koordinátor: Biomedicínske centrum SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 8000 €

Dosiahnuté výsledky:

V treťom roku riešenia projektu sme v súlade s plánovanými cieľmi projektu testovali imunotoxicitu a oxidačné vlastnosti vybraných komerčne dostupných kovových nanočastíc (striebro, zlato) v in vitro podmienkach na vybraných bunkových líniiach (U937, THP-1, COV434, TM3, MCF7). Stanovili sa markery zápalu (interleukíny), oxidačného poškodenia lipidov, proteínov a celkový antioxidačný status buniek, ako aj prítomnosť reaktívnych druhov kyslíka (ROS). Sledovali sme vplyv veľkosti, zloženia a povrchovej úpravy medených nanočastíc na ich biologický účinok pomocou vybraných in vitro testov (MTT, LDH, aktivita kaspázy-3, detekcia ROS). Fyzikálno-chemické vlastnosti (veľkosť, distribúcia, stabilita, zeta potenciál) testovaných medených nanočastíc v rôznych experimentálnych podmienkach sme overili pomocou metódy DLS.

Výstupy:

1. KOLLÁR, J. - MOSNÁČEK, J. - KASÁK, P. Betaine-based materials – preparation and their tunable properties. 4th International Conference on Bioinspired and Biobased Chemistry and Materials, Nice, France, abstract book: október 13-18, 2018, BIOTECH-OR30, strana 176.
2. KOLLÁR, J. - Mrlík, M. - HRČKOVÁ, L. - Luk, S.B. - MOSNÁČEK, J. Bio-sourced butyrolactone materials – synthesis and their tunable properties. 8th IUPAC International Conference on Green Chemistry, Bangkok, Thailand, September 9-14, 2018.

33.) FYVLASOVMAC: Fyzikálne vlastnosti organických látok a vody uväznených v mezopóroch anorganických matric. (*Physical properties of organic compounds and water confined in mesopores of inorganic matrices.*)

Zodpovedný riešiteľ: Ondrej Šauša
Zodpovedný riešiteľ v organizácii SAV: Josef Bartoš
Trvanie projektu: 1.7.2017 / 30.6.2021
Evidenčné číslo projektu: APVV 16-0369
Organizácia je koordinátorom projektu: nie
Koordinátor: Fyzikálny ústav SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 24066 €

Dosiahnuté výsledky:

V systematickom štúdiu prototypového nepolárneho média – n-undekánu (n-UND) – v objemovom a priestorovo-limitovaných fyzikálnych stavoch sa vyšetril vplyv chemického povrchu pórov nepravidelných SiO₂ (SG) matric pomocou troch experimentálnych techník: DSC, PALS a ESR. Zistilo sa, že ESR a DSC odozvy sú, s výnimkou veľmi nízkych teplôt, relatívne citlivé k chemickému zloženiu povrchov pórov matrice na rozdiel od PALS odozvy. Detailná kombinovaná analýza získaných dát odhalila, že v prípade ESR techniky korektnosť charakterizácie závisí na kombinácii fyzikálno-chemickej podstaty všetkých troch zložiek meracieho systému tj. média, matrice a vonkajšia sonda kvôli interakcii polárnej spinovej sondy s pôvodným polárnym silanolovým povrchom SG10 nm-SIL matrice oproti jej absencii v modifikovanej SG10 nm-C4 matrice s nepolárnym silanizovaným povrchom.

Výstupy:

1. BARTOŠ, Josef - ŠAUŠA, Ondrej - ŠVAJDLENKOVÁ, Helena – MAŤKO, Igor - ČECHOVÁ, Katarína. Bulk and confined n-alkanes: n-undecane in unmodified vs. modified silicagels by extrinsic PALS and ESR techniques. Microporous and Mesoporous Materials. práca odoslaná

34.) MoSense: Inovatívna MoS₂ platforma pre diagnózu a cielenú liečbu rakoviny. (*Smart MoS₂ platform for cancer diagnosis and targeted treatment.*)

Zodpovedný riešiteľ: Peter Šiffalovič
Zodpovedný riešiteľ v organizácii SAV: Matej Mičušík
Trvanie projektu: 1.7.2016 / 30.6.2020
Evidenčné číslo projektu: APVV-15-0641

Organizácia je nie
koordinátorom projektu:
Koordinátor: Fyzikálny ústav SAV
Počet spoluriešiteľských 0
inštitúcií:
Čerpané financie: APVV: 11500 €

Dosiahnuté výsledky:

Pripravili sa vodné koloidné roztoky MoS₂, ktoré sme chemicky funkcionalizovali s protilátkami špecificky citlivými na určité rakovinové bunky. Pripravili sa prvé biokonjugované MoS₂ nanoplatformy. MoS₂ nanoplatformy sa pozorovali aj po internalizácii bunkami MDCK (Madin-Darby Canine Kidney). Zistili sme, že stabilita MoS₂ nanoplatforiem je závislá od koncentrácie MoS₂ v roztoku. Pri koncentráciách väčších ako 1 mg/ml dochádza k oxidácii a po centrifugácii a koncentráciách nad 20 mg/ml sa v roztoku nachádzajú prevažne nestechiometrické oxidy (potvrdené XPS, Raman, UV-vis), ktoré navyše vykazujú relatívne silnú fotoluminiscenciu. EPR potvrdila tvorbu fotoindukovaného singletového kyslíka, čo by sa dalo využiť na fotodynamickú terapiu. Okrem optimalizácie biokonjugácie sa snažíme objasniť mechanizmus tvorby MoOx častíc, ktorý zatiaľ nie je presvedčivo popísaný v literatúre. Navyše sme pomocou XPS a UV-vis štúdie potvrdili stabilitu MoS₂ vodných koloidov pri pH 7.2 a koncentrácii 1mg/ml, kedy nedochádza k oxidácii MoS₂ ani po niekoľkých mesiacoch.

Výstupy:

1. BODIK, Michal - ŠIFFALOVÍČ, Peter - NÁDAŽDY, Peter - BENKOVIČOVÁ, Monika - MARKOVIČ, Zoran M. - CHLPIK, Juraj - CIRAK, Július - KOTLÁR, Mário - MIČUŠÍK, Matej - JERSEL, Matej - MAJKOVÁ, Eva. On the formation of hydrophobic carbon quantum dots Langmuir films and their transfer onto solid substrates. In Diamond and Related Materials, 2018, vol. 83, p. 170-176. (2.232 - IF2017). ISSN 0925-9635. Typ: ADCA.
2. MIČUŠÍK, Matej - BODIK, Michal - BUGÁROVÁ, Nikola - ŠIFFALOVÍČ, Peter - KOLLÁR, Jozef - OMASTOVÁ, Mária. MoS₂ nanoplatforms for detection of cancer. In ICONAN 2018 : International Conference on Nanomedicine and Nanobiotechnology : book of abstracts. - Fontanay-Aux-Roses, France : PremC, 2018, p. 53.(ICONAN 2018 : International Conference on Nanomedicine and Nanobiotechnology. ICONAN 2018: International Conference on Nanomedicine and Nanobiotechnology). Typ: AFG. P, M. Mičušík

35.) Glykánové bionanosenzory a bioanalytické zariadenia - ich konštrukcia, validácia a aplikácia v diagnostike rakoviny (*Glycan bionanosensors and bioanalytical devices - their construction, validation and application for cancer diagnostics*)

Zodpovedný riešiteľ: Ján Tkáč
Zodpovedný riešiteľ v Jaroslav Mosnáček
organizácii SAV:
Trvanie projektu: 1.10.2018 / 30.6.2022
Evidenčné číslo projektu: APVV-17-0300
Organizácia je nie
koordinátorom projektu:
Koordinátor: Chemický ústav SAV
Počet spoluriešiteľských 0
inštitúcií:
Čerpané financie: APVV: 1638 €

Dosiahnuté výsledky:

Pripravili sa sulfobetainové a karboxybetainové zwiteriónové ko-polyméry na báze metakrylamidu obsahujúce pendantnú fotocitlivú azidovú skupinu a použili sa na fotochemickú modifikáciu uhlíkovej elektródy pre následné využitie v biosensoroch.

Výstupy v roku 2018:

1. CHOCHOLOVÁ, Erika, Došeková - BERTÓK, Tomáš - LORENCOVÁ, Lenka - HOLAZOVÁ, Alena, Šedivá - FARKAŠ, Pavol - VIKARTOVSKÁ, Alica, Welwardová - BELLA, Vladimír - VELICOVÁ, Darina - KASÁK, Peter - ECKSTEIN ANDICSOVÁ, Anita - MOSNÁČEK, Jaroslav - HAŠKO, Daniel - TKÁČ, Ján. Advanced antifouling zwitterionic layer based impedimetric HER2 biosensing in human serum: Glycoprofiling as a novel approach for breast cancer diagnostics. In Sensors and Actuators B, 2018, vol.272, p. 626-633. (5.667 - IF2017). ISSN 0925-4005.

Príloha C

Publikačná činnosť organizácie (generovaná z ARL)

ABC Kapitoly vo vedeckých monografiách vydané v zahraničných vydavateľstvách

- ABC01 BENEDETTI, Fabrizio - RAČKO, Dušan - DORIER, Julien - STASIAK, Andrzej. Introducing supecoiling into models of chromosome structure. In Modeling the 3D Conformation of Genomes. 1. vyd. - [S. l.] : CRC Press, 2018, p. 115-138. ISBN 978-1-13850-079-2.
- ABC02 KRAJČOVIČ, Tomáš - BUČKO, Marek - VIKARTOVSKÁ, Alica, Welwardová - LACÍK, Igor - UHELSKÁ, Lucia - CHORVÁT, Dušan - NEDĚLA, Vilém - TIHLAŘÍKOVÁ, Eva - GERICKE, Martin - HEINZE, Thomas - GEMEINER, Peter. Polyelectrolyte complex beads by novel two-step process for improved performance of viable whole-cell Baeyer-Villiger monooxygenase by immobilization. In Immobilized Biocatalysts. - Basel, Switzerland : MDPI, 2018. ISBN 978-3-03897-318-8.
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ADCA Vedecké práce v zahraničných karentovaných časopisoch – impaktovaných

- ADCA01 ANTAL, Iryna - KONERACKÁ, Martina - KUBOVČÍKOVÁ, Martina - ZÁVIŠOVÁ, Vlasta - KHMARA, Iryna - LUČANSKÁ, Daša - JELENSKÁ, Lenka - VIDLIČKOVÁ, Ivana - ZAŤOVIČOVÁ, Miriam - PASTOREKOVÁ, Silvia - BUGÁROVÁ, Nikola - MIČUŠÍK, Matej - OMASTOVÁ, Mária - KOPČANSKÝ, Peter. D,L-lysine functionalized Fe₃O₄ nanoparticles for detection of cancer cells. In Colloids and Surfaces B - Biointerfaces, 2018, vol. 236, p. 236-245. (3.997 - IF2017). (2018 - Current Contents, WOS, SCOPUS). ISSN 0927-7765.
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- ADCA32 CHUBAR, N. - GERDA, V. - MÍČUŠÍK, Matej - OMASTOVÁ, Mária - HEISTER, K. - MAN, P. - YABLOKOVA, G. - BANERJEE, D. - FRAISSARD, J. Anion removal potential of complex metal oxides estimated from their atomic scale structural properties. In *Acta Physica Polonica A*, 2018, vol. 133, no. 4, p. 1091-1096. (0.857 - IF2017). (2018 - Current Contents, WOS, SCOPUS). ISSN 1898-794X.
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ADMA02 PASZKIEWICZ, Sandra - NACHMAN, Malgorzata - SZYMCZYK, Anna - ŠPITÁLSKY, Zdenko - MOSNÁČEK, Jaroslav - ROSLANIEC, Zbigniew. Influence of expanded graphite (EG) and graphene oxide (GO) on physical properties of PET based nanocomposites. In *Polish journal of chemical technology*, 2014, vol.16, no.4, p. 45-50. (0.474 - IF2013). ISSN 1509-8117.

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1. [1.1] GHADAMI, A. - EHSANI, M. - KHONAKDAR, H.A. *Interrelationship of thermal and mechanical properties of poly(ethylene terephthalate)/poly(ethylene 2,6-naphthalate)/graphene nanocomposites*. In *JOURNAL OF VINYL & ADDITIVE TECHNOLOGY*. ISSN 1083-5601, AUG 2017, vol. 23, no. 3, p. 210-218., Registrované v: WOS

2. [1.1] JEONG, S.H. - YOON, K.H. - MIN, B.G. - LEE, Y.S. - LEE, S.P. - PARK, S.B. *Heat resistance, impact strength, and transparency of PET copolymer containing fluorenylidene bis(2-phenoxyethanol)*. In *FIBERS AND POLYMERS*. ISSN 1229-9197, SEP 2017, vol. 18, no. 9, p. 1638-1643., Registrované v: WOS

3. [1.1] KONG, L.S. - LEE, Y.S. - YOON, K.H. *Thermal and Mechanical Properties of PET/PEN-FBPE Copolymers Containing Fluorenylidenebis(2-phenoxyethanol)*. In *POLYMER-KOREA*. ISSN 0379-153X, SEP 2017, vol. 41, no. 5, p. 844-849., Registrované v: WOS

4. [1.1] SAHLI, M. - CABLE, A. - CHETEHOUNA, K. - HAMAMDA, S. - GASCOIN, N. - REVO, S. *Preparation and characterization of polytetrafluoroethylene (PTFE)/Thermally Expanded Graphite (TEG) nanocomposites*. In *COMPOSITES PART B-ENGINEERING*. ISSN 1359-8368, SEP 1 2017, vol. 124, p. 175-181., Registrované v: WOS

5. [1.1] STANISZEWSKI, Z. - PIEGAT, A. - OKROJ, W. - WALKOWIAK-PRZYBYLO, M. - JAKUBOWSKI, W. - WALKOWIAK, B. - BUDNER, B. - MROZ, W. - SOBOLEWSKI, P. - EL FRAY, M. *The effect of carbon nanoparticles on biological properties of polyester nanocomposites*. In *JOURNAL OF BIOMATERIALS APPLICATIONS*. ISSN 0885-3282, MAY 2017, vol. 31, no. 10, p. 1328-1336., Registrované v: WOS

ADMA03 PASZKIEWICZ, Sandra - SZYMCZYK, Anna - ŠPITÁLSKY, Zdenko - MOSNÁČEK, Jaroslav - JANUS, Ewa - ROSLANIEC, Zbigniew. Wplyw dodatku ekspandowanego grafitu (EG) na przebieg syntezy i charakterystykę poli(tereftalanu etyleny) modyfikowanego 1,4-cykloheksanodimetanolem (PETG). In *POLIMERY-W*, 2013, vol. 58, nr. 11 - 12, p. 893 - 899. (0.470 - IF2012). ISSN 0032-2725.

Citácie:

1. [1.2] DONG, X.- ZHOU, S. *Study on the effect of heat stretching behavior on COC/PETG microvoid shrink film*. (2017) *Gongneng Cailiao/Journal of Functional Materials*, 48 (2), p. 02211-02214 and 02220., Registrované v: Scopus

ADMB Vedecké práce v zahraničných neimpaktovaných časopisoch registrovaných v

databázach Web of Science alebo SCOPUS

- ADMB01 BEKHTA, Pavlo - PROSZYK, Stanislav - KRYSTOFIAK, Tomasz - SEDLIAČIK, Ján - NOVÁK, Igor - MAMOŇOVÁ, Miroslava. Effects of short-term thermomechanical densification on the structure and properties of wood veneers. In Wood Materials Science & Engineering, 2017, vol. 12, no. 1, p. 40-54. (2017 - Scopus). ISSN 1748-0272.
Citácie:
1. [1.2] IGAZ, R.- KRIŠTÁK, L.- RUŽIAK, I.- GAJTANSKA, M.- KUČERKA, M. Thermophysical properties of OSB boards versus equilibrium moisture content. (2017) BioResources, 12 (4), p. 8106-8118., Registrované v: Scopus
2. [1.2] KARIZ, M.- KUZMAN, M.K.-SERNEK, M.- HUGHES, M.- RAUTKARI, L.- KAMKE, F.A.- KUTNAR, A. Influence of temperature of thermal treatment on surface densification of spruce. (2017) European Journal of Wood and Wood Products, 75 (1), p. 113-123., Registrované v: Scopus
3. [1.2] PELIT, H.- YALÇIN, M. Resistance of mechanically densified and thermally post-treated pine sapwood to wood decay fungi. (2017) Journal of Wood Science, 63 (5), p. 514-522., Registrované v: Scopus
- ADMB02 CAPEK, Ignác. Preparation and functionalization of gold nanoparticles. In Journal of Surface Science and Technology, 2013, vol. 29, no. 3-4, p. 1-18. (2013 - SCOPUS). ISSN 0970-1893.
Citácie:
1. [1.1] RAO, Y. - INWATI, G.K. - SINGH, M. Green synthesis of capped gold nanoparticles and their effect on Gram-positive and Gram-negative bacteria. In FUTURE SCIENCE OA. ISSN 2056-5623, NOV 2017, vol. 3, no. 4., Registrované v: WOS
2. [1.1] SALMANOGLI, A. - SALIMI, K. - FARHADNIA, F. - USTA, D.D. Sensitive plasmonic-photonics nanosensor as a morphologic mask. In OPTICAL MATERIALS. ISSN 0925-3467, AUG 2017, vol. 70, p. 73-82., Registrované v: WOS
- ADMB03 KLEINOVÁ, Angela - HURAN, Jozef - SASINKOVÁ, Vlasta - PERNÝ, M. - ŠÁLY, V. - PACKA, J. FTIR spectroscopy of silicon carbide thin films prepared by PECVD technology for solar cell application. In Proceedings of the SPIE, 2015, vol. 9563, 95630U. (2015 - SCOPUS, WOS). ISSN 0277-786X.
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1. [1.2] KHAN, Sharif - ORDONEZ, Juan S. - STIEGLITZ, Thomas. Dual-sided process with graded interfaces for adhering underfill and globtop materials to microelectrode arrays. In International IEEE/EMBS Conference on Neural Engineering, NER. ISSN 19483546, 2017-08-10, pp. 247-250., Registrované v: SCOPUS
- ADMB04 MAHOU, Redouan - HLOUŠKOVÁ, Gabriela - GONELLE - GISPERT, Carmen - MEIER, Raphael - SCHMITT, Frederic - TRAN, Nhu Mai - DUFRESNE, Murielle - ALTIMARI, Ilaria - LACÍK, Igor - BUHLER, Leo - JUILLERAT - JEANNERET, Lucienne - LEGALLAIS, Cécile - WANDREY, Christine. Combined electrostatic and covalent polymer networks for cell microencapsulation. In Macromolecular Symposia, 2013, vol. 329, p. 49 - 57. ISSN 1022-1360.
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1. [1.1] AGUERO, L. - ZALDIVAR-SILVA, D. - PENA, L. - DIAS, M.L. Alginate microparticles as oral colon drug delivery device: A review. In CARBOHYDRATE POLYMERS. ISSN 0144-8617, JUL 15 2017, vol. 168, p. 32-43., Registrované v: WOS
2. [1.1] MACHAIDZE, Z. - YEH, H. - WEI, L.L. - SCHUETZ, C. - CARVELLO,

- M. - SGROI, A. - SMITH, R.N. - SCHUURMAN, H.J. - SACHS, D.H. - MOREL, P. - MARKMANN, J.F. - BUHLER, L.H. Testing of microencapsulated porcine hepatocytes in a new model of fulminant liver failure in baboons. In XENOTRANSPLANTATION. ISSN 0908-665X, MAY-JUN 2017, vol. 24, no. 3., Registrované v: WOS*
- ADMB05 PASZKIEWICZ, Sandra - ROSLANIEC, Zbigniew - SZYMCZYK, Anna - ŠPITÁLSKY, Zdenko - MOSNÁČEK, Jaroslav. Morphology and thermal properties of expanded graphite (EG)/poly(ethylene terephthalate) (PET) nanocomposites. In Chemik : miesiecznik naukowo-techniczny, 2012, tom. 66, nr. 1, p. 21 - 30. (2012 - SCOPUS). ISSN 0009-2886.
- Citácie:
- [1.1] AHMED, M.M.M. - IMAE, T. Graphene-Based Nanolayers Toward Energy Storage Device. In NANOLAYER RESEARCH: METHODOLOGY AND TECHNOLOGY FOR GREEN CHEMISTRY. 2017, p. 353-389., Registrované v: WOS
 - [1.1] KASTAN, A. - YALCIN, Y. - UNAL, H. - TALAS, S. Investigation on thermal properties of nanoclay added polyamide 6 / high density polyethylene (HDPE) composites. In JOURNAL OF THE FACULTY OF ENGINEERING AND ARCHITECTURE OF GAZI UNIVERSITY. ISSN 1300-1884, 2017, vol. 32, no. 1, p. 89-99., Registrované v: WOS
- ADMB06 PEOGLOS, V. - LOGAKIS, E. - PANDIS, Ch. - PISSIS, P. - PIONTECK, J. - POTSCHEKE, P. - MIČUŠÍK, Matej - OMASTOVÁ, Mária. Thermal and electrical characterization of multi-walled carbon nanotubes reinforced polyamide 6 nanocomposites. In Journal of Nanostructured Polymers and Nanocomposites, 2007, vol. 3, no.4, p. 116-124. ISSN 1790-4439.
- Citácie:
- [1.1] ARBOLEDA-CLEMENTE, L. - ARES-PERNAS, A. - GARCIA, X. - DOPICO, S. - ABAD, M.J. Segregated conductive network of MWCNT in PA12/PA6 composites: Electrical and rheological behavior. In POLYMER COMPOSITES. ISSN 0272-8397, DEC 2017, vol. 38, no. 12, p. 2679-2686., Registrované v: WOS
- ADMB07 PISSIS, P. - GEORGOUSIS, G. - PANDIS, C. - GEORGIOPOULOS, P. - KYRITSIS, A. - KONTOU, E. - MIČUŠÍK, Matej - CZANIKOVÁ, Klaudia - OMASTOVÁ, Mária. Strain and damage sensing in polymer composites and nanocomposites with conducting fillers. In Procedia Engineering, 2015, vol. 114, p. 590-597. (2015 - SCOPUS). ISSN 1877-7058.
- Citácie:
- [1.1] BABRA, T.S. - TRIVEDI, A. - WARRINER, C.N. - BAZIN, N. - CASTIGLIONE, D. - SIVOUR, C. - HAYES, W. - GREENLAND, B.W. Fluoride degradable and thermally debondable polyurethane based adhesive. In POLYMER CHEMISTRY. ISSN 1759-9954, DEC 14 2017, vol. 8, no. 46, p. 7207-7216., Registrované v: WOS
 - [1.1] BALTZIS, D. - BEKAS, D.G. - TZACHRISTAS, G. - PARLAMAS, A. - KARABELA, M. - ZAFEIROPOULOS, N.E. - PAIPETIS, A.S. Multi-scaled carbon reinforcements in ternary epoxy composite materials: Dispersion and electrical impedance study. In COMPOSITES SCIENCE AND TECHNOLOGY. ISSN 0266-3538, DEC 1 2017, vol. 153, p. 7-17., Registrované v: WOS
- ADMB08 SINGLA, P. - KAUR, P. - MEHTA, R. - BEREK, Dušan - UPADHAYAY, S.N. Ring-opening polymerization of lactide using microwave and conventional heating. In Procedia Chemistry, 2012, vol. 4, p. 179-185. ISSN 1876-6196.
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- [1.1] DE OLIVEIRA, J. - VANDENBERGHE, L.P.S. - ZAWADZKI, S.F. -

RODRIGUES, C. - DE CARVALHO, J.C. - SOCCOL, C.R. Production and Application of Polylactides. In CURRENT DEVELOPMENTS IN BIOTECHNOLOGY AND BIOENGINEERING: PRODUCTION, ISOLATION AND PURIFICATION OF INDUSTRIAL PRODUCTS. 2017, p. 633-653., Registrované v: WOS

- ADMB09 TORRAS, N. - ZINOVIEV, K.E. - CAMARGO, C.J. - CAMPO, E.M. - CAMPANELLA, H. - ESTEVE, J. - MAESHAL, J.E. - TERENTJEV, E.M. - OMASTOVÁ, Mária - KRUPA, Igor - TEPLICKÝ, P. - MAMOJKA, B. - BURNS, B. - RODER, B. - VALLRIBERA, M. - MALET, R. - ZUFFANELLI, S. - SOLER, V. - ROIG, J. - WALKER, N. - WENN, D. - VOSSEN, F. - CROMPTVOETS, F.M.H. Nematic opto-mechanical actuators for the fabrication of refreshable tactile systems. In Proceedings of the 17th International Conference on Solid-State Sensors, Actuators and Microsystems : Transducers 2013 & EUROSENSORS XXVII. - IEEE, 2013, p. 1691-1694. ISBN 978-1-4673-5981-8.

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- ADMB10 YANG, Yu - DLUBEK, Gunter - BARTOŠ, Josef - ŠVAJDLENKOVÁ, Helena - KRAUSE-REHBERG, Reinhard. Relationships between positron lifetime and dynamics of polymers. In Materials Science Forum, 2013, vol. 733, p. 179 - 182. (2013 - WOS, SCOPUS). ISSN 0255-5476.

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ADNA Vedecké práce v domácich impaktovaných časopisoch registrovaných v databázach Web of Science alebo SCOPUS

- ADNA01 HURAN, Jozef - VALOVIČ, Albín - KUČERA, Michal - KLEINOVÁ, Angela - KOVÁČOVÁ, Eva - BOHÁČEK, Pavol - SEKÁČOVÁ, Mária. Hydrogenated amorphous silicon carbon nitride films prepared by PECVD technology: properties. In Journal of Electrical Engineering, 2012, vol. 65, p. 333-335. (0.370 - IF2011). (2012 - INSPEC, SCOPUS). ISSN 1335-3632.

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2. [1.1] FAINER, N.I. - PLEKHANOV, A.G. - GOLUBENKO, A.N. - RUMYANTSEV, Y.M. - MAKSIMOVSKII, E.A. - SHAYAPOV, V.R. In JOURNAL OF STRUCTURAL CHEMISTRY. JAN 2017, vol. 58, no. 1, p. 119-125., Registrované v: WOS

3. [1.1] KHATAMI, Z. - WILSON, P.R. - WOJCIK, J. - MASCHER, P. In THIN SOLID FILMS. JAN 31 2017, vol. 622, p. 1-10., Registrované v: WOS

4. [1.1] PORADA, O.K. - MANZHARA, V.S. - KOZAK, A.O. - IVASHCHENKO, V.I. - IVASHCHENKO, L.A. In JOURNAL OF NANO- AND ELECTRONIC PHYSICS. 2017, vol. 9, no. 2., Registrované v: WOS

ADNB Vedecké práce v domácich neimpaktovaných časopisoch registrovaných v databázach Web of Science alebo SCOPUS

- ADNB01 BEKHTA, Pavlo - SEDLIAČIK, Ján - SALDAN, Roman - NOVÁK, Igor. Effect of different hardeners for urea-formaldehyde resin on properties of birch plywood. In Acta Facultatis Xylologiae, 2016, roč. 58, no. 2, s. 65-72. ISSN 1336-3824.

Citácie:

1. [1.1] RUZIAK, I. - IGAZ, R. - KRISTAK, L. - REH, R. - MITTERPACH, J. - OCKAJOVA, A. - KUCERKA, M. Influence of Urea-formaldehyde Adhesive Modification with Beech Bark on Chosen Properties of Plywood. In BIORESOURCES. ISSN 1930-2126, 2017, vol. 12, no. 2, p. 3250-3264., Registrované v: WOS

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

- AECA01 NOVÁK, Igor - CHODÁK, Ivan - SEDLIAČIK, Ján - PRACHÁR, Jozef - JURKOVIČ, Peter - MATYAŠOVSKÝ, Ján. Pre-treatment of polyester-based veneers. In Annals Warsaw University of Life Sciences : Forestry and Wood Technology. - Warsaw, Poland : Warsaw University of Life Sciences Press, 2015, no. 92, p. 312-315. ISSN 1898-5912.

Citácie:

1. [1.1] GORJANC, M. - MOZETIC, M. - PRIMC, G. - VESEL, A. - SPASIC, K. - PUAC, N. - PETROVIC, Z.L. - KERT, M. Plasma treated polyethylene terephthalate for increased embedment of UV-responsive microcapsules. In APPLIED SURFACE SCIENCE. ISSN 0169-4332, OCT 15 2017, vol. 419, p. 224-234., Registrované v: WOS

***AED Vedecké práce v domácich recenzovaných vedeckých zborníkoch, monografiách**

- AED01 CIGÁŇ, Alexander - POLOVKOVÁ, Júlia - KRUPA, Igor - KOŇAKOVSKÝ, Anton - MAŇKA, Ján. Preparation and properties of YBCO-PE composites. In MEASUREMENT 2009 : International Conference on Measurement. Editors M. Tyšler, J. Maňka, V. Witkovský. - Bratislava : Institute of Measurement Science SAS, 2009, p. 381-384. ISBN 978-80-969672-1-6.

Citácie:

1. [1.1] PILIPENKO, A.O. - NEDILKO, S.A. - DZIAZKO, O.G. - VOITENKO, T.A. - FESICH, I.V. - ZELENKO, M.A. - STRUTYNSKA, N.Y. - GALAGAN, Y. - GOLOVCHENKO, O.I. High-temperature Superconducting Nanocomposites and their Stability. In PROCEEDINGS OF THE 2017 IEEE 7TH INTERNATIONAL CONFERENCE NANOMATERIALS: APPLICATION & PROPERTIES (NAP). ISSN 2306-580X, 2017., Registrované v: WOS

***AEE Vedecké práce v zahraničných nerecenzovaných vedeckých zborníkoch, monografiách**

- AEE01 ZOIS, H. - APEKIS, L. - OMASTOVÁ, Mária. Electrical properties and percolation phenomena in carbon black filled polymer composites. In Proceedings : International Symposium on Electrets, 1999, P. 529 - 532.

Citácie:

1. [1.1] NUDMAN, D. - WEIZMAN, O. - AMIR, E. - OPHIR, A. Development and characterization of expanded graphite filled-PET/PVDF blend: thermodynamic

and kinetic effects. In POLYMERS FOR ADVANCED TECHNOLOGIES. ISSN 1042-7147, MAY 2017, vol. 28, no. 5, SI, p. 590-599., Registrované v: WOS

AFC Publikované príspevky na zahraničných vedeckých konferenciách

- AFC01 NOVÁK, Igor - POPELKA, Anton - VANKO, Vladimír - PREŤO, Jozef - SEDLIAČIK, Ján - CHODÁK, Ivan - KLEINOVÁ, Angela - POLLÁK, Vladimír. Modification of wood by low-temperature atmospheric discharge plasma. In Annals of Warsaw University of Life Sciences - SGGW : Forestry and Wood Technology. - Warsaw, Poland : Warsaw University of Life Sciences Press, 2011, no. 75, P. 135 - 141. ISSN 1898-5912.

Citácie:

1. [1.1] YAMAMOTO, A. - KYMALAINEN, M. - LINDROOS, T. - ROHUMAA, A. - SOKKA, K. - RAUTKARI, L. Surface Activation of Wood by Corona Treatment and NaOH Soaking for Improved Bond Performance in Plywood. In BIORESOURCES. ISSN 1930-2126, 2017, vol. 12, no. 4, p. 9198-9211., Registrované v: WOS

AFK Postery zo zahraničných konferencií

- AFK01 ŤAPAJNA, Milan - STOKLAS, Roman - GREGUŠOVÁ, Dagmar - VÁLIK, Lukáš - GUCMANN, Filip - HUŠEKOVÁ, Kristína - HAŠČÍK, Štefan - FRÖHLICH, Karol - TÓTH, L. - PÉCZ, B. - MIČUŠÍK, Matej - BRUNNER, F. - HASHIZUME, T. - KUZMÍK, Ján. On the origin of surface donors in AlGaIn/GaN metal-oxide semiconductor heterostructures with Al₂O₃ gate dielectric—correlation of electrical, structural, and chemical properties(International Workshop on Nitride Semiconductors : IWN 2016).

Citácie:

1. [1.1] AKAZAWA, M. - SEINO, A. In PHYSICA STATUS SOLIDI B-BASIC SOLID STATE PHYSICS. AUG 2017, vol. 254, no. 8., Registrované v: WOS

Príloha D

Údaje o pedagogickej činnosti organizácie

Semestrálne prednášky:

RNDr. Peter Cifra, DrSc.

Názov semestr. predmetu: makromolekulová chémia

Počet hodín za semester: 16

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

Mgr. Juraj Kronek, PhD.

Názov semestr. predmetu: makromolekulová chémia

Počet hodín za semester: 6

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

Semestrálne cvičenia:

Mgr. Zuzana Benková, PhD.

Názov semestr. predmetu: Molekulová dynamika

Počet hodín za semester: 2

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

Ing. Peter Čakánek

Názov semestr. predmetu: Základné cvičenie z fyzikálnej chémie

Počet hodín za semester: 50

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

Semináre:

Mgr. Zuzana Benková, PhD.

Názov semestr. predmetu: Molekulová dynamika

Počet hodín za semester: 2

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

Ing. Igor Lacík, DrSc.

Názov semestr. predmetu: Biomaterials and Microcapsules for diabetes treatment

Počet hodín za semester: 2

Názov katedry a vysokej školy: Slovenská technická univerzita v Bratislave, FCHPT

Terénne cvičenia:

Mgr. Martin Danko, PhD.

Názov semestr. predmetu: Vedenie odbornej praxe študenta Martina Országa z Gymnázia

I.Lettricha v Martine

Počet hodín za semester: 120

Názov katedry a vysokej školy: Ústav polymérov SAV, Bratislava, Ústav polymérov SAV

Ing. Anita Eckstein, PhD.

Názov semestr. predmetu: Biodegradovateľné obalové materiály pre kozmetické účely - vedenie SAIA štipendistky Joanna Rydz z Centre of Polymer and Carbon Materials Poľsko

Počet hodín za semester: 120

Názov katedry a vysokej školy: Ústav polymérov SAV, Bratislava, Ústav polymérov SAV

Ing. Anita Eckstein, PhD.

Názov semestr. predmetu: Príprava fotoiniciátorov pre ATRP - vedenie študentky na technickej výpomoci Petra Maxiánová z UCM v Trnave

Počet hodín za semester: 180

Názov katedry a vysokej školy: Ústav polymérov SAV, Bratislava, Ústav polymérov SAV

Ing. Alena Šišková, PhD.

Názov semestr. predmetu: Príprava bakteriálnej celulózy s použitím alternatívnych zdrojov stimulujúcich látok pre rast, čistenie, sušenie a charakterizáciu vstiev - vedenie vedecko-technickej výpomoci Patrícia Šablicová SPŠ Chemická Bratislava

Počet hodín za semester: 120

Názov katedry a vysokej školy: Ústav polymérov SAV, Bratislava, Ústav polymérov SAV

Ing. Alena Šišková, PhD.

Názov semestr. predmetu: Príprava nanovlákných vrstiev pomocou elektrostatického zvlákňovania na báze acetátu a následná modifikácia pripravených vrstiev, filmov a modifikácia v roztoku - vedenie vedecko technickej výpomoci Dorota Gašparíková University of Warwick

Počet hodín za semester: 180

Názov katedry a vysokej školy: Ústav polymérov SAV, Bratislava, Ústav polymérov SAV

Individuálne prednášky:

Mgr. Zuzana Benková, PhD.

Názov semestr. predmetu: Prezentácia molekulových simulácií polymérov

Počet hodín za semester: 1

Názov katedry a vysokej školy: Fakulta chemickej a potravinárskej technológie STU, prednášky pre študentov

Prof. Ing. Ivan Chodák, DrSc.

Názov semestr. predmetu: Makromolekulová chémia - prednášky pre doktorandov

Počet hodín za semester: 2

Názov katedry a vysokej školy: Slovenská technická univerzita v Bratislave, FCHPT

Mgr. Jaroslav Mosnáček, DrSc.

Názov semestr. predmetu: Makromolekulová chémia - prednášky pre doktorandov

Počet hodín za semester: 2

Názov katedry a vysokej školy: Slovenská technická univerzita v Bratislave, Fakulta chemickej a potravinárskej technológie

Ing. Mária Omastová, DrSc.

Názov semestr. predmetu: Makromolekulová chémia - prednášky pre doktorandov

Počet hodín za semester: 2

Názov katedry a vysokej školy: Slovenská technická univerzita v Bratislave, FCHPT

Mgr. Zdenko Špitálsky, PhD.

Názov semestr. predmetu: Makromolekulová chémia - prednášky pre doktorandov

Počet hodín za semester: 2

Názov katedry a vysokej školy: Slovenská technická univerzita v Bratislave, FCHPT

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

Krajina	D r u h d o h o d y					
	MAD, KD, VTS		Medziústavná		Ostatné	
	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní
Bulharsko	Juraj Kronek	6				
Česko	Mária Kováčová	5	Ivica Janigová	4	Ana Hološ	1
	Igor Lacík	1	Mária Kováčová	1	Ivan Chodák	1
	Zoran Markovic	1	Jaroslav Kuliček	3	Juraj Kronek	2
	Mária Omastová	4	Matej Mičušík	3	Juraj Kronek	2
			Michal Procházka	1	Igor Lacík	1
			Zdenko Špitálsky	1	Monika Majerčíková	6
			Anna Zahoranová	1	Zoran Markovic	7
			Anna Zahoranová	2	Zoran Markovic	1
					Jaroslav Mosnáček	42
					Veronika Némethová	1
					Igor Novák	2
					Michal Procházka	4
					Michal Procházka	1
					Filip Rázga	1
					Helena Švajdlenková	4
Grécko					Mária Omastová	3
Kórejská republika					Juraj Kronek	6
					Zuzana Kroneková	6
Lotyšsko	Michal Procházka	4			Mária Omastová	5
Maďarsko	Jaroslav Mosnáček	5				
	Alena Šišková	12				
Nemecko	Eva	2				

	Habánková					
	Anna Chovancová	2				
	Igor Lacík	2				
Poľsko	Martin Danko	7	Zuzana Kroneková	5		
	Anita Eckstein	3	Cristian Peptu	3		
	Jaroslav Mosnáček	7				
	Alena Šišková	3				
Portugalsko					Zuzana Benková	30
					Zuzana Benková	3
					Zuzana Benková	31
Rakúsko	Nikola Bugárová	5			Jaroslav Kuliček	2
	Jaroslav Kuliček	5			Matej Mičušík	1
	Matej Mičušík	1			Matej Mičušík	1
	Matej Mičušík	2			Matej Mičušík	1
	Mária Omastová	3			Mária Omastová	2
					Mária Omastová	1
					Silvia Podhradská	2
					Silvia Podhradská	1
Srbsko	Mária Kováčová	5	Zoran Markovic	10		
	Jaroslav Kuliček	7	Zoran Markovic	9		
	Zoran Markovic	5				
Španielsko	Josef Bartoš	30				
	Helena Švajdlenková	30				
Taliansko					Anna Zahoranová	54
					Anna Zahoranová	13
Turecko					Mária Omastová	5
Ukrajina					Mária Omastová	31

USA	Igor Lacík	4				
	Igor Lacík	5				
Veľká Británia					Peter Čakánek	13
Vietnam					Cristian Peptu	10
Počet vyslaní spolu	27	166	12	43	36	297

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

Krajina	D r u h d o h o d y					
	MAD, KD, VTS		Medziústavná		Ostatné	
	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní
Česko	Jan Nedbal	2			Martin Cvek	3
	Jan Prokeš	2			Martin Hrubý	3
	Jaroslav Stejskal	7				
	Marian Lehocký	7				
	Miroslava Trchová	7				
	Petra Rejmontová	11				
	Z. Capáková	11				
Egypt					Ahmed Nada	84
					Eman AboBakr Ali	89
					Khadiga Hassane	89
Irán					Hassan Sheibani	91
Kanada					Ikenna Henny Ezenwajiaku	3
					Robin Hutchinson	3
Maďarsko	Dr. Balázs Pásztói	5			Zsófia Osváth	5
	Dr. Béla Iván	2				
Poľsko	Dr. Joanna Rydz-Pawlak	5			Joanna Rydz-Pawlak	184
	Dr. Magdaléna Zieba	5			Krzysztof Jerczynski	42
	Dr. Malgorzata Basko	9			Monika Anna Żygo	82

	Dr. Marta Musiol	5			Szczepan Bednarz	90
	Dr. Marta Socka	9				
	Dr. Wanda Sikorska	5				
Rakúsko	Barbara Liedl	2				
	Christoph Unterweger	1				
Srbsko	Biljana Todorović Marković	27			Biljana Todorović Marković	90
	Dejann Kepic	5				
	Jovana Prekodravac	10				
	Milica Budimir	5				
Ukrajina					Serhii Yakushchenko	42
Počet prijatí spolu	21	142			15	900

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

Krajina	Názov konferencie	Meno pracovníka	Počet dní
Austrália	Macro 2018	Igor Lacík	7
Bulharsko	MMT 2018	Jaroslav Mosnáček	8
		Katarína Mosnáčková	8
Česko	Anamet Seminár	Petra Mazancová	1
	Anamet seminár	Veronika Némethová	10
		Filip Rázga	10
	Careers in Polymers	Róbert Balogh	3
	CCSSS 2018	Róbert Balogh	4
		Zoran Markovic	4
		Michal Procházka	4
	P.SAHA 18	Mária Omastová	3
	PLASTKO 2018	František Ivanič	3
		Mária Kováčová	3
		Igor Novák	2
	Polymery 2018	Róbert Balogh	4
		Eva Habánková	4
		Abolfazl Heydari	4
		Ana Hološ	4
		Ivica Janigová	4
		Igor Lacík	4
		Anna Zahoranová	4
	X. Liblice	Peter Cifra	6
		Lucia Rišpanová	6
Francúzsko	BPC 2018	Dmitrij Bondarev	5

		Martin Danko	5
		Ana Hološ	5
		Jaroslav Mosnáček	5
	ESPS 2018	Cristian Peptu	6
		Helena Švajdlenková	4
	EUROMAR 2018	Josef Bartoš	5
		Helena Švajdlenková	5
	NICE conference 2018	Jozef Kollár	6
		Falko Pippig	4
	POC 2018	Anita Eckstein	5
		Alena Šišková	5
Grécko	ICPAM 2018	Cristian Peptu	9
	NanoBio 2018	Zuzana Benková	6
		Peter Čakánek	6
Gruzínsko	Polychar 2018	Dušan Berek	4
Izrael	SBSOLARSYMP	Mária Omastová	4
Japonsko	BPCH 2018	Ivan Chodák	9
Kanada	World HPLC	Dušan Berek	3
Litva	MultiComp	Matej Mičušík	4
Maďarsko	36th IMMS 2018	Cristian Peptu	4
	BiPoCo 2018	Ivan Chodák	5
		František Ivanič	5
		Jaroslav Mosnáček	5
		Katarína Mosnáčková	5
		Anna Zahoranová	5
	Junior-Euromat 2018	František Ivanič	5
Nemecko	Dies Academicus	Falko Pippig	1
	Graphene 2018	Nikola Bugárová	5
	KHK	Ivan Chodák	4
	Nanobruken 2018	Michal Procházka	5
	NANOSTRUC 2018	Mária Omastová	5
Nórsko	TSM 2018	Faeze Dorchei	6
		Zuzana Kroneková	6
		Igor Lacík	6
Poľsko	BMVM	Juraj Kronek	4
	ISBPPB 2018	Juraj Kronek	5
		Zuzana Kroneková	5
	ISPCS '18	Igor Lacík	4
	PULS 2018	Igor Lacík	3
	XXX ISC Wood Materials	Igor Novák	3
Rumunsko	COST COREMI	Zdenko Špitálsky	4
Rusko	MSE 2018	Ivan Chodák	5
Slovinsko	ECIS 2018	Zuzana Benková	6
		Peter Čakánek	6
Srbsko	MSERA 2018	Jaroslav Kuliček	4
Španielsko	GSSC	Dušan Berek	3
	SEPV 2018	Jaroslav Kuliček	6
		Mária Omastová	6
Švajčiarsko	IC Water Market	Dušan Berek	4

Taliansko	EYCN Symposium	Michal Procházka	4
	ICONAN 2018	Nikola Bugárová	5
		Matej Mičušík	5
		Mária Omastová	5
	TOP 2018	Josef Bartoš	8
		Helena Švajdlenková	8
Thajsko	Green Chemistry	Martin Danko	9
		Jozef Kollár	9
Tunisko	SEPM 2018	Mária Omastová	5
USA	APS March Meeting	Peter Cifra	11
	Biomaterials 2018	Igor Lacík	6
Spolu	50	84	430

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

Skratky použité v tabuľke C:

36th IMMS 2018 - 36th Informal Meeting on Mass Spectrometry
 Anamet seminár - ANAMET Seminár, Malvern Pananalytical
 APS March Meeting - American Physical Society March Meeting 2018
 Biomaterials 2018 - Exploring the NEXUS of Research and Application. 2018 Annual Meeting & Exposition
 BiPoCo 2018 - 4th International Conference Bio-Based Polymers and Composites
 BMVM - 27th Biomaterials in Medicine and Veterinary Medicine annual conference
 BPC 2018 - Bordeaux Polymer Conference 2018
 BPCH 2018 - 7th World Congress on Biopolymers and Polymer Chemistry
 Careers in Polymers - Workshop Career in Polymers X
 CCSSS 2018 - 70. sjezd českých a slovenských chemických společností
 COST COREMI - 4th COST COREMI Conference. Improving current understanding and research for sustainable control of the poultry red mite *Dermanyssus gallinae*
 Dies Academicus - Dies Academicus of the University of Applied Sciences Zittau/Gorlitz
 ECIS 2018 - 32th Conference of The European Colloid and Interface Society
 ESPS 2018 - The 5th European Symposium of Photopolymer Science
 EUROMAR 2018 - EUROMAR 2018 Nantes. European Magnetic Resonance Meeting
 EYCN Symposium - EYCN Symposium 2018
 Graphene 2018 - The largest European Event in Graphene and 2D Materials
 Green Chemistry - 8th IUPAC International Conference on Green Chemistry
 GSSC - Global Summit on Stem Cell & Tissue Engineering and World Conference on Analytical & Bioanalytical Chemistry
 IC Water Market - International Conference Water Market
 ICONAN 2018 - International Conference on Nanomedicine and Nanobiotechnology
 ICPAM 2018 - The 12th International Conference on Physics of Advanced Materials
 ISBPPB 2018 - 4th International Conference on Biomedical Polymers & Polymeric Biomaterials
 ISPCS '18 - XXI International Seminar on Physics and Chemistry of Solids and Advanced Materials
 Junior-Euromat 2018 - FEMS Junior Euromat Conference 2018
 KHK - 13. Kautschuk-Herbst-Kolloquium
 Macro 2018 - Macro 2018 World Polymer Congress
 MMT 2018 - 20th International Conference Materials, Methods & Technologies
 MSE 2018 - International Conference on Materials Science and Engineering
 MSERA 2018 - 3th International Meeting on Materials Science for Energy Related Applications
 MultiComp - Multi-Functional Nano-Carbon Composite Materials Network. COST Action CA15107 meeting
 NanoBio 2018 - 1st International Conference Nanotechnologies and Bionanoscience
 Nanobrücken 2018 - Nanobrücken 2018. A Nanomechanical Testing Conference and Bruker Hyston User Meeting
 NANOSTRUC 2018 - International Conference on Structural Nano Composites
 NICE conference 2018 - 4th International Conference on Bioinspired and Biobased Chemistry and Materials
 P.SAHA 18 - Polymers - Site of Advanced Horizons and Ambits
 PLASTKO 2018 - PLASTKO 2018
 POC 2018 - 17th Polymers and Organic Chemistry Conference
 Polychar 2018 - Polychar 2018, 26th World Forum on Advanced Materials

Polymery 2018 - Polymery 2018 - česko slovenská konferencie
PULS 2018 - 9th PULS Conference on Pulse Investigations in Chemistry, Physics, and Biology
SBSOLARSYMP - 21st Sede Boqer Symposium on Solar Electricity Production
SEPM 2018 - Science and Engineering of Polymeric Materials
SEPV 2018 - Stability of Emerging Photovoltaics: from Fundamentals to Applications
SEPV 2018 - Stability of Emerging Photovoltaics from Fundamental to Applications. A StableNextSol COST Action
MP1307 Meeting
TOP 2018 - 9th International Conference Times of Polymers & Composites
TSM 2018 - 10th Training School on Microencapsulation
World HPLC - 18th International Conference World HPLC, Separation Techniques and Pharmacovigilance
X. Liblice - Tenth Liblice Conference on the Statistical Mechanics of Liquids
XXX ISC Wood Materials - XXX International Scientific Conference Wood - Materials of the XXI-st Century

Príloha F**Vedecko-popularizačná činnosť pracovníkov organizácie SAV**

Meno	Spoluautori	Typ¹	Názov	Miesto zverejnenia	Dátum alebo počet za rok
Ing. Róbert Balogh		PB	Hodinka s vedou	Denný detský tábor INSPIRO, Bratislava	2018
Ing. Róbert Balogh		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	21.3.2018
Ing. Róbert Balogh		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	28.3.2018
Ing. Róbert Balogh		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	11.4.2018
Ing. Róbert Balogh		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	18.4.2018
Ing. Róbert Balogh		PB	Polymérna kuchyňa. Stanovenie prítomnosti škrobu v ryži, múke, pudingu pomocou iódovej tinktúry - ukážky	Európska noc výskumníkov, Stánok ÚPo SAV v Starej Tržnici v Bratislave	28.9.2018
Ing. Róbert Balogh		PB	Rozdiel medzi termosenzitívnymi a termogélujúcimi polymérmi	Deň otvorených dverí ÚPo SAV	7.11.2018
Ing. Nikola Bugárová		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	21.3.2018
Ing. Nikola Bugárová		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	28.3.2018
Ing. Nikola Bugárová		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	11.4.2018
Ing. Nikola Bugárová		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	18.4.2018
Ing. Nikola Bugárová		PB	Svet polymérov	Víkend so SAV - stánok Ústavu polymérov SAV	8.9.2018

Ing. Peter Čakánek		PB	Počítačové simulácie polymérov	Deň otvorených dverí ÚPo SAV	7.11.2018
Ing. Anita Eckstein, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave, 11.4. 2018	Ústav polymérov SAV Bratislava	11.4.2018
Ing. Anita Eckstein, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave, 18.4. 2018	Ústav polymérov SAV Bratislava	18.4.2018
Ing. Anita Eckstein, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave, 21.3. 2018	Ústav polymérov SAV Bratislava	21.3.2018
Ing. Anita Eckstein, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave, 28.3. 2018	Ústav polymérov SAV Bratislava	28.3.2018
Prof. Ing. Ivan Chodák, DrSc.		RO	Túto hudbu mám rád s Ivanom Chodákom	Rádio Slovensko, Rádio Regina	21.1.2018
Ing. František Ivanič		PB	Biodegradovateľné polyméry	Deň otvorených dverí ÚPo SAV	7.11.2018
Ing. František Ivanič		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	28.3.2018
Ing. František Ivanič		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	11.4.2018
Ing. František Ivanič		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	18.4.2018
Ing. František Ivanič		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	21.3.2018
Viera Karlíková		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	18.4.2018
Viera Karlíková		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	21.3.2018
Viera Karlíková		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	28.3.2018
Viera Karlíková		EX	Nájdí v sebe vedca -	Ústav polymérov	11.4.2018

			organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	SAV Bratislava	
Mgr. Mária Kováčová		PB	Biodegradovateľné plasty	Víkend so SAV - stánok Ústavu polymérov SAV	7.9.2018
Mgr. Mária Kováčová		TL	Kováčová, M. - Špitálsky, Z.: Slovenská stopa v 3D tlači	Quark, roč. 24, č.6 (2018), s. 44-45	1.6.2018
Mgr. Mária Kováčová		PB	Mikroskopia sveta okolo nás	Denný detský tábor INSPIRO, Bratislava	2018
Mgr. Juraj Kronek, PhD.	Kroneková Zuzana	PB	Víkend so SAV - Živá kniha - Polyméry v medicíne	Stánok ÚPo SAV - Primaciálne námestie Bratislava	7.9.2018
Mgr. Zuzana Kroneková, PhD.		PB	Kroneková Zuzana - Kronek Juraj: Živá kniha - Polyméry v medicíne	Víkend so SAV - stánok Ústavu polymérov SAV	7.9.2018
Mgr. Zuzana Kroneková, PhD.		TV	Nobelove ceny a ženy vo vede	https://www.rtvs.sk/televizia/archiv/12957/168571#1058	5.10.2018
Mgr. Zuzana Kroneková, PhD.		TV	Ženy vo vede. Ranné správy RTVS.	http://www.rtvs.sk/televizia/archiv/12993/168994#2435	8.10.2018
Mgr. Zuzana Kroneková, PhD.	Kronek Juraj	IN	Biomateriálový výskum napreduje míľovými krokmi. VEDA NA DOSAH.	http://vedanadosah.cvtisr.sk/biomaterialovy-v-yskum-napreduje-milovyimi-krokmi	18.6.2018
Ing. Jaroslav Kuliček, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	21.3.2018
Ing. Jaroslav Kuliček, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	28.3.2018
Ing. Jaroslav Kuliček, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	11.4.2018
Ing. Jaroslav Kuliček, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	18.4.2018
Ing. Jaroslav Kuliček, PhD.		PB	Projekt PlasticFreeDanube	Deň otvorených dverí ÚPo SAV	7.11.2018
Ing. Igor Lacík, DrSc.		PB	Bude enkapsulácia pankreatických ostrovčiek riešením pre diabetikov? Prednáška na neformálnom stretnutí s diabetickými deťmi a	Vrátna dolina, SR, 15.-17.6. 2018	2018

			ich rodičmi (požvanie J. Pavlusiková a E, Korená)		
Ing. Igor Lacík, DrSc.		IN	Cenu za vedu a techniku 2018 v kategórii Osobnosť vedy a techniky získal Ing. I. Lacík, DrSc. VEDA NA DOSAH	http://vedanadosah.cvtisr.sk/cenu-za-vedu-a-techniku-2018-v-kategorii-osobnost-vedy-a-techniky-ziskal-ing-igor-lacik-drsc	9.11.2018
Ing. Igor Lacík, DrSc.		IN	Cukrovkárom skvalitnia život pankreatické ostrovčeky. Tlačová správa	https://dia.hnonline.sk/info-pre-diabetikov/1829909-cukrovkarom-skvalitnia-zivot-pankreaticke-ostrovceky	12.10.2018
Ing. Igor Lacík, DrSc.		TV	Igor Lacík. Ranné správy RTVS	https://www.rtv.s.sk/telvizia/archiv/12993/169660#2422	16.10.2018
Ing. Igor Lacík, DrSc.		IN	Igor Lacík. Správy SAV	https://www.sav.sk/index.php?lang=sk&doc=services-news&source_no=20&news_no=7872	12.10.2018
Ing. Igor Lacík, DrSc.		IN	Ku skvalitneniu života cukrovkárov pomôžu pankreatické ostrovčeky. Tlačová správa	https://www.24hod.sk/sav-ku-skvalitneniu-zivota-cukrovkarov-pomozu-pankreaticke-ostrovceky-cl623357.html	12.10.2018
Ing. Igor Lacík, DrSc.		TL	Nádej pre cukrovkárov. In Život, roč. 45, 2018, s. 56-59	Život, roč. 45, 2018, s. 56-59	10.11.2018
Ing. Igor Lacík, DrSc.		IN	Pankreatické ostrovčeky skvalitnia diabetikom život. Tlačová správa	http://vedeckykaleidoskop.cvtisr.sk/2018/10-2018/sav-pankreaticke-ostrovceky-skvalitnia-diabetikom-zivot.html?page_id=8186&lang=en	12.10.2018
Ing. Igor Lacík, DrSc.		PB	Polymérne biomateriály pre zdravie (aj na liečbu cukrovky)	77.Rozhovory s vedou. Alumni Klub STU Bratislava	6.2.2018
Ing. Igor Lacík, DrSc.		TL	Slovenskí vedci vyvíjajú nový spôsob kontroly hladiny cukru v tele diabetikov. Denník N	https://dennikn.sk/1270116/slovenski-vedci-vyvijaju-novy-sposob-kontroly-hladiny-cukru-v-tele-diabetikov/	24.10.2018
Ing. Monika Majerčíková		PB	Makromolekulové látky v mamej kuchyni	Deň otvorených dverí ÚPo SAV	7.11.2018
Ing. Monika Majerčíková		PB	Polymérna kuchyňa. Stanovenie prítomnosti škrobu v ryži, múke, pudingu pomocou iódovej tinktúry - ukážky	Európska noc výskumníkov. Stánok ÚPo SAV v Starej Tržnici v Bratislave	28.9.2018

Mgr. Zoran Markovic, PhD.		IN	Vynález Zorana Markovića z projektu SASPRO čaká na patent	www.aktuality.sav.sk	19.3.2018
Mgr. Katarína Mosnáčková, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	28.3.2018
Mgr. Katarína Mosnáčková, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	18.4.2018
Mgr. Katarína Mosnáčková, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	21.3.2018
Mgr. Katarína Mosnáčková, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	11.4.2018
Ing. Igor Novák, PhD.		PB	Elektrovodivé lepidlo	Víkend so SAV - stánok Ústavu polymérov SAV	8.9.2018
Ing. Igor Novák, PhD.		TL	Novák, I.- Žigo, O.: Plasty a kompozitné materiály využívané v automobiloch.	Plastics Production, roč. 13, č.2 (2018), s. 70-71	2018
Ing. Igor Novák, PhD.		TL	Novák, I. - Florián, Š.: Spájanie lepením pri výrobe automobilov.	Plastics Production, roč. 13, č.1 (2018), s. 56-57	2018
Ing. Mária Omastová, DrSc.		TV	Zaplastovaný Dunaj - Správy RTVS	http://www.rtvsk.sk/televizia/archiv/13982/169744#2288	18.10.2018
Ing. Mária Omastová, DrSc.	Rebayová A. - RepaNet o.z.	RO	Za Dunaj bez plastov - projekt : Novinky a zaujímavosti zo sveta vedy - Rádio Regina	http://www.rtvsk.sk/radio/archiv/11376/1037986	3.12.2018
Falko Pippig, PhD.		PB	The Chemistry of Tulipalins	University of Applied Sciences Zittau/Görlitz in Zittau, Germany	6.6.2018
Mgr. Silvia Podhradská, PhD.		PB	Hodinka s vedou	Denný detský tábor INSPIRO, Bratislava	2018
Mgr. Silvia Podhradská, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	21.3.2018
Mgr. Silvia Podhradská, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	28.3.2018
Mgr. Silvia Podhradská, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	11.4.2018

Mgr. Silvia Podhradská, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	18.4.2018
Mgr. Silvia Podhradská, PhD.		RO	Nájdí v sebe vedca 2018	slovensko.rtvsk.sk	28.3.2018
Mgr. Silvia Podhradská, PhD.		IN	Nájdí v sebe vedca 2018: Deti sa na jeden deň opäť stali skutočnými vedcami	vedanadosah.cvti.sk	27.3.2018
Mgr. Silvia Podhradská, PhD.		IN	Nájdí v sebe vedca 2018: Deti sa na jeden deň stali skutočnými vedcami	eduworl.d.sk	22.3.2018
Mgr. Silvia Podhradská, PhD.		IN	Nájdí v sebe vedca 2018: Deti sa na jeden deň stali skutočnými vedcami	magazin.panobcan.sk	22.3.2018
Mgr. Silvia Podhradská, PhD.		IN	Nájdí v sebe vedca 2018: Deti sa na jeden deň stali skutočnými vedcami	www.aktuality.sav.sk	22.3.2018
Mgr. Silvia Podhradská, PhD.		TV	Nájdí v sebe vedca 2018: Deti sa na jeden deň stali skutočnými vedcami	www.hlavnespravy.sk	23.3.2018
Mgr. Silvia Podhradská, PhD.		IN	Nájdí v sebe vedca 2018: Deti sa na jeden deň stali skutočnými vedcami	www.news.sk	23.3.2018
Mgr. Silvia Podhradská, PhD.		IN	Nájdí v sebe vedca 2018: Deti sa na jeden deň stali skutočnými vedcami	www.pcrevue.sk	22.3.2018
Mgr. Silvia Podhradská, PhD.		PB	Nano-Art	Víkend so SAV - stánok Ústavu polymérov SAV	7.9.2018
Mgr. Silvia Podhradská, PhD.		PB	Polymérna kuchyňa. Stanovenie prítomnosti škrobu v ryži, múke, pudingu pomocou iódovej tinktúry - ukážky	Európska noc výskumníkov. Stánok ÚPo SAV v Starej Tržnici v Bratislave	28.9.2018
Mgr. Silvia Podhradská, PhD.		EX	Predstavenie laboratória na Oddelení kompozitných termoplastov	Deň otvorených dverí ÚPo SAV	7.11.2018
Mgr. Silvia Podhradská, PhD.	M. Grman	IN	Naši vedci kazia nezničiteľný materiál	https://www.aktuality.sk/clanok/587419/nasi-vedci-kazia-neznictelny-material/?preview=014ffb0c8d0b64bafa576194bf89136979180e63	28.5.2018
Mgr. Silvia Podhradská, PhD.	M. Grman	DO	Naši vedci kazia nezničiteľný materiál	www.aktuality.sk	28.5.2018
RNDr. Michal Procházka, PhD.		PB	Polymérna kuchyňa. Receptár super	Európska noc výskumníkov. Stánok	28.9.2018

			nápadov na domácu zábavu s kuchynskou chémiou	ÚPo SAV v Starej Tržnici v Bratislave	
RNDr. Michal Procházka, PhD.		PB	Živá kniha - Svet polymérov	Víkend so SAV - stánok Ústavu polymérov SAV	7.9.2018
Ing. Dušan Račko, PhD.		PB	Efficient mechanisms of unknotting in biological systems - poster	Víkend so SAV - stánok Ústavu polymérov SAV	7.9.2018
Ing. Dušan Račko, PhD.		PB	Počítačové simulácie polymérov	Deň otvorených dverí ÚPo SAV	7.11.2018
Ing. Alena Šišková, PhD.		PB	Hodinka s vedou	Denný detský tábor INSPIRO, Bratislava	2018
Ing. Alena Šišková, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV	21.3.2018
Ing. Alena Šišková, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	11.4.2018
Ing. Alena Šišková, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	18.4.2018
Ing. Alena Šišková, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	28.3.2018
Ing. Alena Šišková, PhD.		PB	Polymérna kuchyňa. Výroba domáceho slizu - ukážky	Európska noc výskumníkov. Stánok ÚPo SAV v Starej Tržnici v Bratislave	28.9.2018
Ing. Alena Šišková, PhD.	Frajová Jaroslava	iné	Pocta súknu - Textil v kontextu umení	Humpolec	19.4.2018
Mgr. Zdenko Špitálsky, PhD.		PB	SARIO Business link - Slovak Matchmaking Fair	Bratislava	13.11.2018
Mgr. Zdenko Špitálsky, PhD.	Kováčová Mária	TL	Nové polymérne kompozity pre 3D tlač	Prešporský podnikateľ, marec 2018	2018
Mgr. Petra Šrámková, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	21.3.2018
Mgr. Petra Šrámková, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	28.3.2018
Mgr. Petra Šrámková, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	11.4.2018

Mgr. Petra Šrámková, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	18.4.2018
Ing. Helena Švajdlenková, PhD.		PB	Možnosti vzdelávania na ÚPo SAV	Gymnázium Nová Baňa	2018
Ing. Helena Švajdlenková, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	11.4.2018
Ing. Helena Švajdlenková, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	18.4.2018
Ing. Helena Švajdlenková, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	21.3.2018
Ing. Helena Švajdlenková, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	28.3.2018
Mgr. Anna Zahoranová, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	18.4.2018
Mgr. Anna Zahoranová, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	21.3.2018
Mgr. Anna Zahoranová, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	28.3.2018
Mgr. Anna Zahoranová, PhD.		EX	Nájdí v sebe vedca - organizácia návštev detí zo ZŠ P. Marcelyho v Bratislave	Ústav polymérov SAV Bratislava	11.4.2018
Mgr. Anna Zahoranová, PhD.		PB	Polymérna kuchyňa. Stanovenie prítomnosti bielkovín vo vajíčku - ukážky	Európska noc výskumníkov. Stánok ÚPo SAV v Starej Trznici v Bratislave	28.9.2018
Mgr. Anna Zahoranová, PhD.		PB	Svet polymérov	Víkend so SAV - stánok Ústavu polymérov SAV	8.9.2018

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