

Ústav polymérov SAV



**Správa o činnosti organizácie SAV
za rok 2019**

Bratislava
január 2020

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1. Základné údaje o organizácii

1.1. Kontaktné údaje

Názov: Ústav polymérov SAV

Riaditeľ: Mgr. Jaroslav Mosnáček, DrSc.

1. zástupca riaditeľa: Mgr. Zuzana Benková, PhD.

2. zástupca riaditeľa: Ing. Gerhard Grueber do 30.6.2019

Vedecký tajomník: neuvedený

Predseda vedeckej rady: Mgr. Juraj Kronek, PhD.

Člen Snemu SAV: Ing. Igor Lacík, DrSc.

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E-mail: upolsekr@savba.sk

Názvy a adresy organizačných zložiek a detašovaných pracovísk:

Organizačné zložky: nie sú

Detašované pracoviská:

- **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 organizačných zložiek a detašovaných pracovísk:

Organizačné zložky: nie sú

Detašované pracoviská:

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

Členovia Snemu SAV za organizačné zložky:
nie sú

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	O
		M	Ž	M	Ž				
Celkový počet zamestnancov	80	31	49	10	16	71	56.8	35.41	0
Vedeckí pracovníci	38	19	19	4	5	30	30.32	28.23	0
Odborní pracovníci VŠ (výskumní a vývojoví zamestnanci ¹)	24	8	16	6	10	24	10.46	7.18	0
Odborní pracovníci VŠ (ostatní zamestnanci ²)	0	0	0	0	0	0	0	0	0
Odborní pracovníci ÚS	14	2	12	0	1	13	13.27	0	0
Ostatní pracovníci	4	2	2	0	0	4	2.75	0	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 31.12.2019 (uvádzať zamestnancov v pracovnom pomere, vrátane riadnej materskej dovolenky, zamestnancov pôsobiacich v zahraničí, v štátnych funkciách, členov Predsedníctva SAV, zamestnancov pôsobiacich v zastupiteľských zboroch)

F – fyzický stav zamestnancov k 31.12.2019 (bez riadnej materskej dovolenky, zamestnancov pôsobiacich v zahraničí v štátnych funkciách, členov Predsedníctva SAV, zamestnancov pôsobiacich v zastupiteľských zboroch)

P – celoročný priemerný prepočítaný počet zamestnancov

T – celoročný priemerný prepočítaný počet riešiteľov projektov

O – celoročný priemerný prepočítaný počet obslužného personálu podieľajúceho sa na riešení projektov (technikov, laborantov, projektových manažérov a pod.) mimo zamestnancov v administratíve, správe a údržbe budov, upratovačiek, vodičov a pod.

M, Ž – muži, ženy

Tabuľka 1b Štruktúra vedeckých pracovníkov (kmeňový stav k 31.12.2019)

Rodová skladba	Pracovníci s hodnosťou				Vedeckí pracovníci v stupňoch		
	DrSc.	CSc./PhD.	prof.	doc.	I.	II.a.	II.b.
Muži	6	13	1	0	6	10	3
Ženy	1	19	0	0	1	6	12

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

Veková štruktúra (roky)	< 31		31-35		36-40		41-45		46-50		51-55		56-60		61-65		> 65	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Muži	3	0.3	5	4.1	1	1.0	8	8.0	0	0.0	0	0.0	1	1.0	1	1.0	4	2.3
Ženy	8	1.7	5	3.2	4	4.0	3	2.1	0	0.0	1	1.0	2	1.7	2	1.8	1	0.3

A - Prepočet bez zohľadnenia úväzkov zamestnancov

B - Prepočet so zohľadnením úväzkov zamestnancov

Tabuľka 1d Priemerný vek zamestnancov organizácie k 31.12.2019

	Kmeňoví zamestnanci	Vedeckí pracovníci	Riešitelia projektov
Muži	46.4	48.4	45.1
Ženy	42.6	38.9	38.8
Spolu	44.0	43.7	41.8

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

Od januára 2019 začalo funkčné obdobie nového riaditeľa Ústavu polymérov SAV Mgr. Jaroslava Mosnáčka, DrSc. Zástupcom riaditeľa pre vedu sa stala Mgr. Zuzana Benková, PhD. Zástupcom riaditeľa pre ekonomiku sa stal vedúci ETO Ing. Gerhard Grueber, ktorý zastával túto funkciu do konca júna 2019, kedy ukončil svoje pôsobenie na ÚPo SAV. V júli 2019 nahradil Ing. Gerharda Gruebera v pozícii vedúceho ETO Ing. Luboš Matis.

V máji 2019 sa uskutočnili voľby vedúcich vedeckých oddelení. Traja vedúci oddelení, Ing. Igor Lacík, DrSc, Ing. Mária Omastová, DrSc. a Mgr. Jaroslav Mosnáček, DrSc., obhájili svoju pozíciu. Novým vedúcim Oddelenia molekulových simulácií polymérov sa od júna 2019 stal Ing. Dušan Račko PhD., ktorý nahradil RNDr. Petra Cifru, DrSc.

V septembri nastúpilo na ústav polymérov 6 nových doktorandov, z čoho boli dvaja doktorandi prijatí nad kvótu pridelenú Predsedníctvom SAV s tým, že budú platení z finančných zdrojov ústavu.

V roku 2019 sa na ústave riešili 2 projekty HORIZONT 2020 (Nano2Day, EUSMI), 3 ERA-NET projekty, z ktorých dva pribudli v roku 2019 (NANO2COM, EPIC, En-ActivETICS). Pribudol taktiež projekt ŠF - CEMEA. Na všetkých týchto projektoch sa ústav zmluvne podieľal. Tieto projekty všeobecne predstavujú kvalitatívny rast pre zúčastnených vedeckých pracovníkov a doktorandov, zviditeľnenie ústavu na medzinárodnej úrovni a tiež prispievajú k vylepšeniu ekonomickej situácie ústavu. V roku 2019 sa ústav naďalej zmluvne podieľal aj na šiestich COST projektoch. Okrem toho boli finančne dobre podporené aj projekty JDRF 2-SRA-2018-521-S-B, The Chicago Diabetes Project a PlasticFreeDanube. Na ústave bolo uzavretých aj niekoľko Medziakademických dohôd, konkrétne s Poľskom, Českom, Maďarskom, Bulharskom a Nemeckom. Ústav tiež koordinoval 2 bilaterálne projekty s Kórejskou republikou a Bieloruskom financované z prostriedkov APVV. V tomto období naďalej pokračovala spolupráca s Kóreou v projekte V4-Kórea. Spolu bolo na ústave riešených 21 APVV projektov, pričom 9 z nich koordinoval Ústav polymérov SAV a z 12-tich riešených VEGA projektov figuroval Ústav polymérov SAV v 9-tich ako koordinátor. V roku 2019 sa ústav zúčastnil na podaní troch ERA-NET projektov, z ktorých dva postúpili do druhého kola posudzovania, dvoch projektov ŠF a dvoch HORIZONT 2020 projektov, z ktorých je jeden v štádiu posudzovania a jeden bol zamietnutý. Ďalší významný projekt ústavu je momentálne posudzovaný združením JDRF Beta Cell Replacement Consortium. V novembri 2019 bolo podaných celkovo 14 APVV projektov, z toho v piatich je Ústav polymérov SAV nositeľom projektu a v deviatich figuruje ako zmluvný partner projektu. Tieto projekty by mali byť vyhodnotené v prvej polovici roku 2020. Ďalšie posudzované medzinárodné projekty zahŕňajú spoluprácu s Kanadou, Belgickom a Francúzskom, s Talianskom a so Srbskom, Českom a Francúzskom. Podané medzinárodné projekty v spolupráci s Taiwanom a Poľskom sú už schválené.

Ústav poskytol aj v tomto období štartovací grant, podporujúci myšlienky vedeckých pracovníkov, ktoré by sa mohli zdať grantovým agentúram príliš smelé. V roku 2019 získali na základe vypracovanej písomnej formy a ústnej prezentácie tento grant dvaja uchádzači, Abolfazl Heydari, PhD. a Ing. Peter Čakánek.

Na Ústave polymérov SAV bol aktualizovaný Pracovný poriadok, v ktorom boli uskutočnené zmeny vzťahujúce sa predovšetkým na zamestnancov v dôchodkovom veku. Po dovŕšení dôchodkového

veku sa už nebude zamestnancovi na pozícii vedeckého alebo vedecko-technického pracovníka pracovný úväzok postupne každoročne krátiť, ale o pracovnom úväzku a zaradení do platovej triedy bude rozhodovať hodnotenie pracovníka uskutočňované na pravidelnej báze Vedeckou radou a vyjadrenie vedúceho oddelenia. Ďalšie významnejšie zmeny zahŕňali body týkajúce sa dodržiavania mlčanlivosti v súlade so smernicou o ochrane osobných údajov (GDPR). S cieľom oboznámiť zamestnancov s relevantným obsahom tejto smernice boli zamestnancom tiež poskytnuté príslušné školenia.

Okrem zabezpečovania doktorandského štúdia sa ústav zapája aj do vedenia bakalárskych a dizertačných prác, čo je dôležité pri získavaní budúcich doktorandov.

V rámci spoločného projektu v roku 2019 uzavrel Ústav polymérov SAV i Zmluvu o spoločnom pracovisku s Centrom pre využitie pokročilých materiálov (CEMEA), ktoré vzniklo 1. júna 2017 s cieľom zvýšiť úroveň excelentného nezávislého výskumu a vývoja realizovaného v rámci SAV a zabezpečiť interdisciplinaritu výskumných tém. Ďalšia zmluva o spoločnom pracovisku bola uzavretá v roku 2019 s inštitúciou ICARST n.o. (International Centre for Applied Research and Sustainable Technology).

Na jeseň bola na ústave založená Rada pre transfer a komunikáciu s firmami a verejnosťou, v ktorej majú zastúpenie všetky oddelenia ústavu a jej členmi sa stali RNDr. Dmitrij Bondarev, PhD., Mgr. Jozef Kollár, PhD., Mgr. Juraj Kronek, PhD., Ing. Igor Lacík, DrSc., Ing. Matej Mičušík, PhD., Ing. Dušan Račko, PhD. a Mgr. Zdenko Špitalský, PhD. Na báze pravidelných stretnutí so zástupcami rôznych firiem bude Rada pre transfer a komunikáciu s firmami a verejnosťou propagovať aktivity ústavu, ktoré by mohli nájsť uplatnenie v aplikačnej sfére. Zároveň sa bude táto rada podieľať na medializácii ústavných aktivít v súčinnosti s hovorkyňou SAV Mgr. Monikou Hucákovou.

Ústav navštívilo viacero vedeckých pracovníkov zo zahraničia v rámci medziakademických a iných dohôd. Za účelom dlhších pracovných pobytov navštívili ústav s finančnou podporou agentúry SAIA vedeckí pracovníci z Iránu (2 ×), Poľska, Ukrajiny a Indie a ERASMUS program financoval študijné pobyty dvoch študentov z Poľska a jedného študenta z Turecka.

V roku 2019 prebehli rekonštrukčné práce v budove Overovacej jednotky Ústavu polymérov SAV pozostávajúce zo vstavby stropnej dosky a kancelárií.

2. Vedecká činnosť

2.1. Domáce projekty

Tabuľka 2a Domáce projekty riešené v roku 2019

ŠTRUKTÚRA PROJEKTOV	Počet		Čerpané financie (€)					
	A	B	A				B	
			Zo zdrojov SAV		Z iných zdrojov		Zo zdrojov SAV	Z iných zdrojov
			Spolu	Pre organizáciu	Spolu	Pre organizáciu		
1. Projekty VEGA	9	3	-	84281	-	-	9785	-
2. Projekty APVV	9	12	-	-	-	208075	-	122089
3. Projekty OP ŠF	0	1	-	-	-	-	-	15000
4. Projekty SASPRO	0	0	-	-	-	-	-	-
5. Iné projekty (FM EHP, ŠPVV, Vedecko-technické projekty, ESF, na objednávku rezortov a pod.)	1	0	-	-	-	1600	-	-

A - organizácia je nositeľom projektu

B - organizácia sa zmluvne podieľa na riešení projektu

Tabuľka 2b Domáce projekty podané v roku 2019

Štruktúra projektov	Miesto podania	Organizácia je nositeľom projektu	Organizácia sa zmluvne podieľa na riešení projektu
1. Účasť na nových výzvach APVV r. 2019	-	5	9
2. Projekty výziev OP ŠF podané r. 2019	Bratislava	0	0
	Regióny	1	1

2.2. Medzinárodné projekty

2.2.1. Medzinárodné projekty riešené v roku 2019

Tabuľka 2c Medzinárodné projekty riešené v roku 2019

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	0	2	-	-	-	-	-	11400
2. Projekty ERA.NET, ESA, JRP	0	4	-	-	-	-	-	51824
3. Projekty COST	0	6	-	-	-	-	-	10785
4. Projekty EUREKA, NATO, UNESCO, CERN, IAEA, IVF, ERDF a iné	0	1	-	-	-	-	-	28600
5. Projekty v rámci medzivládnych dohôd	0	0	-	-	-	-	-	-
6. Bilaterálne projekty MAD	4	0	-	-	-	-	-	-
7. Bilaterálne projekty ostatné	4	0	-	2050	-	19930	-	-
8. Podpora MVTs z národných zdrojov okrem SAV (APVV a iné)	1	4	-	-	-	280	-	14336
9. Iné projekty	4	0	-	-	-	516000	-	-

A - organizácia je nositeľom projektu

B - organizácia sa zmluvne podieľa na riešení projektu

2.2.2. Medzinárodné projekty Horizont 2020 podané v roku 2019

Tabuľka 2d Počet projektov Horizont 2020 v roku 2019

	A	B
Počet podaných projektov Horizont 2020	1	1

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 2019 bol podaný projekt **Inovácia produktového portfólia spoločnosti Novplasta** - zodpovedný riešiteľ za Ústav polymérov SAV **Ing. Ivan Chodák, DrSc.**, v spolupráci so žiadateľom Novplasta, s.r.o., Šenkvice v rámci schémy financovania Štrukturálne fondy, 313000 - Operačný program Výskum a inovácie - projekt čaká na vyhodnotenie.

V roku 2019 bol podaný aj projekt **TickFreeTech: Progresívne funkčné polymérne materiály s antiparazitárnym účinkom** - zodpovedná riešiteľka a koordinátorka projektu za Ústav polymérov SAV **Mgr. Katarína Mosnáčková, PhD.**, v spolupráci s inštitúciami: UVLF, SPU, UPJŠ, FEI TUKE, NbU BMC SAV, Chemosvit Fibrochem, a.s. v rámci schémy financovania DSV priemysel - podpora dlhodobého strategického výskumu - Priemysel pre 21. storočie - projekt čaká na vyhodnotenie.

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

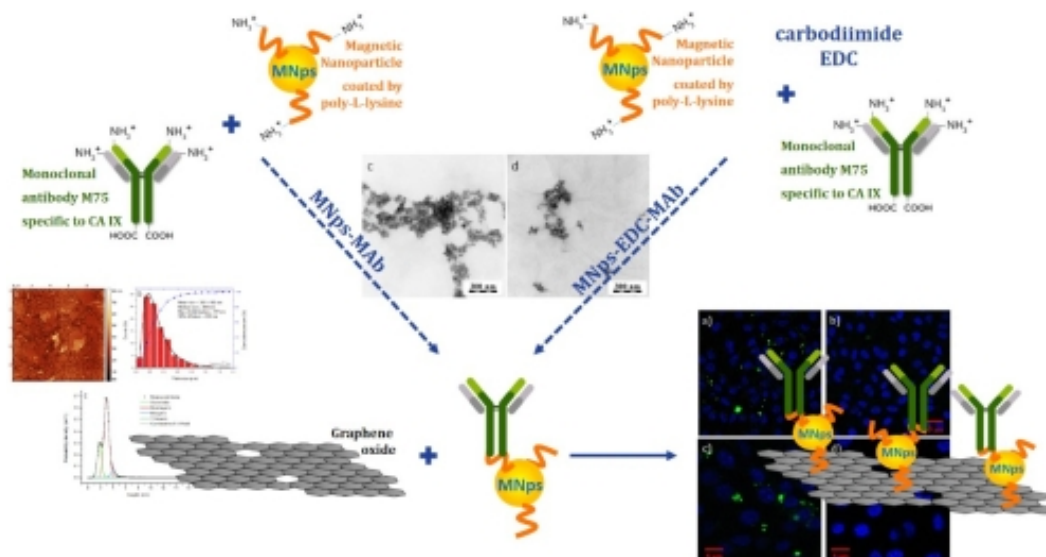
Názov: Multifunkčná grafén-oxidová nanoplatforma na cielený zásah rakoviny

Názov v angličtine: A multifunctional graphene oxide platform for cancer targeting

Ústav polymérov SAV, Virologický ústav BMC SAV, Fyzikálny ústav SAV, Ústav experimentálnej fyziky SAV

Mená riešiteľov: M. Omastová, N. Bugárová, M. Mičušík, S. Pastoreková, M. Zatošovičová, P. Šiffalovič, M. Bodík, M. Kubovčíková, I. Antal, M. Koneracká, V. Závišová

Projekty v rámci ktorých sa výsledok dosiahol: APVV 14-0120, Grafénová nanoplatforma na detekciu rakoviny. Graphene-based nanoplatform for detection of cancer.



Popis výsledku v slovenčine:

Hlavným cieľom projektu bol vývoj a príprava nového typu grafén-oxidovej multifunkčnej nanoplatformy (GO-MFN) pre detekciu nádorových buniek. V prvom kroku sa pripravili GO nanovrstvy veľkosti 300 až 500 nm, ktoré boli funkcionizované magnetickými nanočasticami a monoklonovou protilátkou (MAb) špecifickou pre marker CA IX. Magnetické nanočastice (MNps) boli pripravené metódou chemického zrážania a následne modifikované poly-L-lyzínom (PLL). Protilátka špecifická pre CA IX bola pripojená prostredníctvom amidovej väzby na magnetické nanočastice, ktoré boli opäť konjugované na GO platformu prostredníctvom amidovej väzby. Po vykonaní toxikologických testov na B16-F0 bunkovej línii nebol zistený žiadny účinok cytotoxicity GO-MFN. Bola demonštrovaná selektivita platforiem GO-MNps-MAb k zacieleniu nádorových buniek. Výsledky projektu poskytli sľubný dôkaz zacielenia nádorových buniek so širokým potenciálom pre vizualizáciu a budúcu liečbu nádorov.

Popis výsledku v angličtine:

The main goal of the project was the development and preparation of a new type of graphene-oxide multifunctional nanoplateform (GO-MFN) for the detection of tumor cells. In a first step, 300 to 500 nm GO nanolayers were prepared and functionalized with magnetic nanoparticles and a monoclonal antibody (MAb) specific for CA IX marker. Magnetic nanoparticles (MNps) were prepared by the chemical precipitation method and their surface was modified by poly-L-lysine (PLL). CA IX-specific antibody was attached via an amide bond to a modified magnetic nanoparticle that was conjugated to the GO platform again via an amide bond. After performing toxicological tests on the B16-F0 cell line, no effect of the cytotoxicity of the multifunctional GO platforms was found. The selectivity of GO-MNps-MAb platforms to target tumor cells has been demonstrated. The project results have provided promising evidence of tumor cell targeting with a wide potential for visualization and future tumor treatment.

Výstupy:

1. BUGÁROVÁ, Nikola - ŠPITÁLSKY, Zdenko - MIČUŠÍK, Matej - BODIK, Michal - ŠIFFALOVÍČ, Peter - KONERACKÁ, Martina - ZÁVIŠOVÁ, Vlasta - KUBOVČÍKOVÁ, Martina - KAJANOVÁ, Ivana - ZAŤOVIČOVÁ, Miriam - PASTOREKOVÁ, Silvia - ŠLOUF, Miroslav - MAJKOVÁ, Eva - OMASTOVÁ, Mária. A multifunctional graphene oxide platform for targeting cancer. In Cancers, 2019, vol. 11, iss. 6, art. no. 753, [19] p. (6.162 - IF2018). Typ: ADCA
2. KUBOVČÍKOVÁ, Martina - KONERACKÁ, Martina - STRBAK, O. - MOLČAN, Matúš - ZÁVIŠOVÁ, Vlasta - ANTAL, Iryna - KHMARA, Iryna - LUČANSKÁ, Daša - TOMČO, Ladislav - BARÁTHOVÁ, Monika - ZAŤOVIČOVÁ, Miriam - DOBROTA, D. - PASTOREKOVÁ, Silvia - KOPČANSKÝ, Peter. Poly-L-lysine designed magnetic nanoparticles for combined hyperthermia, magnetic resonance imaging and cancer cell

- detection. In Journal of Magnetism and Magnetic Materials, 2019, vol. 475, p. 316-326. (2.683 - IF2018). Typ: ADCA
3. KHMARA, Iryna - ŠTRBÁK, Oliver - ZÁVIŠOVÁ, Vlasta - KONERACKÁ, Martina - KUBOVČÍKOVÁ, Martina - ANTAL, Iryna - KAVEČANSKÝ, Viktor - LUČANSKÁ, Daša - DOBROTA, Dušan - KOPČANSKÝ, Peter. Chitosan-stabilized iron oxide nanoparticles for magnetic resonance imaging. In Journal of Magnetism and Magnetic Materials, 2019, vol. 474, p. 319-325. (2.683 - IF2018). Typ: ADCA
 4. ZÁVIŠOVÁ, Vlasta - KONERACKÁ, Martina - GÁBELOVÁ, Alena - SVITKOVÁ, Barbora - URSINYOVA, Monika - KUBOVČÍKOVÁ, Martina - ANTAL, Iryna - KHMARA, Iryna - JURÍKOVÁ, Alena - MOLČAN, Matúš - OGNJANOVIČ, Miloš - ANTIČ, Bratislav - KOPČANSKÝ, Peter. Effect of magnetic nanoparticles coating on cell proliferation and uptake. In Journal of Magnetism and Magnetic Materials, 2019, vol. 472, p. 66-73 (2.683 - IF2018). Typ: ADCA
 5. ANTOSOVA Andrea - BEDNARIKOVA Zuzana - KONERACKA Martina – ANTAL Iryna L - ZAVISOVA Vlasta - KUBOVCIKOVA Martina - WU Josephine W. - WANG Steven S.-S. - GAZOVA Zuzana. Destroying activity of glycine coated magnetic nanoparticles on lysozyme, α -lactalbumin, insulin and α -crystallin amyloid fibrils. Journal of Magnetism and Magnetic Materials. Volume 471, 2019, Pages 169-176. (2.683 - IF2018). Typ: ADCA

Názov: Multikomponentné hydrogélové PMCG mikrokapsuly pre enkapsuláciu pankreatických ostrovčekov

Multicomponent hydrogel PMCG microcapsules for encapsulation of pancreatic islets

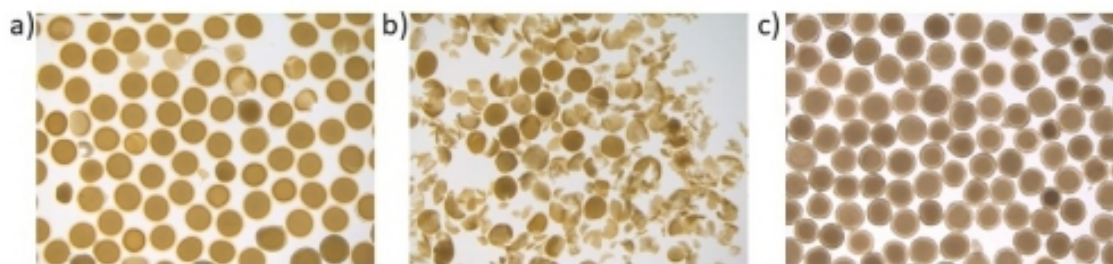
Ústav polymérov SAV

Mená riešiteľov: D. Treľová, L. Kleščíková, Z. Kroneková, F. Dorchei, M. Pelach, L. Uhelská, Z. Cseriová, E. Hipká, A. Heydari, J. Kronek, I. Lacík*

Projekty v rámci ktorých sa výsledok dosiahol: JDRF 2-SRA-2018-521-S-B, APVV-14-0858, APVV-18-0480, Chicago Diabetes Project

Popis výsledku v slovenčine:

PMCG mikrokapsuly novej generácie sú pripravené z databázy *in house* syntetizovaných polymérnych komponentov sulfát celulózy a poly(metylén-ko-kyanoguanidín) v kombinácii s alginátom sodným GMP kvality, čo nám umožňuje reprodukovateľne nastaviť charakteristiky PMCG mikrokapsúl. Výsledky transplantácií prázdnych mikrokapsúl a následne mikrokapsúl s enkapsulovanými ostrovčkami do imunokompetentných diabetických myší C57Bl/6 potvrdili biokompatibilitu PMCG mikrokapsúl a funkčnosť enkapsulovaných ostrovčekov. PMCG mikrokapsuly transplantované do intraperitonea a tiež do malého omenta primátov však vykazovali obrastanie fibrotickým tkanivom nedostatočnú mechanickú stabilitu, čím sa nepotvrdila očakávaná korelácia pre podobnú odozvu imunitného systému medzi primátmi a C57Bl/6 myšami. Tieto výsledky poukázali na nutnosť ďalšej optimalizácie mikrokapsúl smerom k zvýšeniu stability hydrogélovej siete stabilizovanej fyzikálnymi elektrostatickými interakciami.



PMCG mikrokapsuly explantované po 1 mesiaci z primátov: (a) z intraperitoneálnej dutiny, (b) z malého omenta, (c) z intraperitoneálnej dutiny (mikrokapsuly boli post-gélovane Ba^{2+} iónmi)

Popis výsledku v angličtine:

The new generation of PMCG microcapsules is prepared from a library of the *in-house* synthesized polymer microcapsule components sodium cellulose sulphate and poly(methylene-co-cyanoguanidine) in combination with the GMP-grade sodium alginate, with the ability to reproducibly tune the characteristics of PMCG microcapsules. Transplantation results of empty microcapsules and subsequently microcapsules with encapsulated islets into immunocompetent diabetic C57B1/6 mice confirmed the biocompatibility of PMCG microcapsules and the functionality of the encapsulated islets. PMCG microcapsules transplanted into the intraperitoneal space, as well as into the small omentum of NHP, showed, however, the fibrotic overgrowth with insufficient mechanical stability. These results indicate that further optimization of the microcapsules is necessary to increase the stability of the hydrogel network stabilized by physical electrostatic interactions.

Výstupy:

1. KLEŠČÍKOVÁ, Lucia - TRELOVÁ, Dušana - RAUS, V. - UHELSKÁ, Lucia - KRONEKOVÁ, Zuzana - KRONEK, Juraj - PELACH, Michal - DORCHEI, Faeze - HEYDARI, Abolfazl - RIOS, P. - MCGARRIGLE, J. - WANG, Y. - ROKSTAD, A.M. - OBERHOLZER, J. - LACÍK, Igor. Multicomponent polyelectrolyte complex-based microcapsule for immunoprotection of transplanted pancreatic islets. In Polymers in Medicine 2019 : PMM - 83rd Prague Meeting on macromolecules : book of abstracts and programme. - Prague, Czech Republic : Institute of Macromolecular Chemistry CAS, 2019, p. 65.
2. TRELOVÁ, Dušana - KLEŠČÍKOVÁ, Lucia - RAUS, V. - UHELSKÁ, Lucia - KRONEKOVÁ, Zuzana - CHOVANCOVÁ, Anna - KRONEK, Juraj - PELACH, Michal - DORCHEI, Faeze - HEYDARI, Abolfazl - RIOS, P. - MCGARRIGLE, J. - WANG, Y. - ROKSTAD, A.M. - OBERHOLZER, J. - LACÍK, Igor. Multicomponent polyelectrolyte complex-based microcapsules: Correlation between the encapsulation conditions and microcapsule properties. In Polymers in Medicine 2019 : PMM - 83rd Prague Meeting on macromolecules : book of abstracts and programme. - Prague, Czech Republic : Institute of Macromolecular Chemistry CAS, 2019, p. 102.
3. LACÍK, Igor. Multicomponent alginate-based microcapsule design for immunoprotection of transplanted pancreatic islets in diabetes treatment. In 1st International Conference PSPM : Precisely Structured Polymer Materials : book of abstracts. - Lodz, Poland : Polish Academy of Sciences, Lodz Division, 2019, [1] p.
4. RYCHTER, Piotr - ROGACZ, Diana - LEWICKA, Kamila - LACÍK, Igor. Poly(methylene-co-cyanoguanidine) as an eco-friendly nitrogen fertilizer with prolonged activity. In Journal of Polymers and the Environment, 2019, vol. 27, p. 1317-1332. (2.765 - IF2018).

Názov: Modulácia vlastností sulfobetainových a karboxybetainových kopolymérov a hydrogélů.

Properties modulation of sulfobetaine and carboxybetaine copolymers and hydrogels.

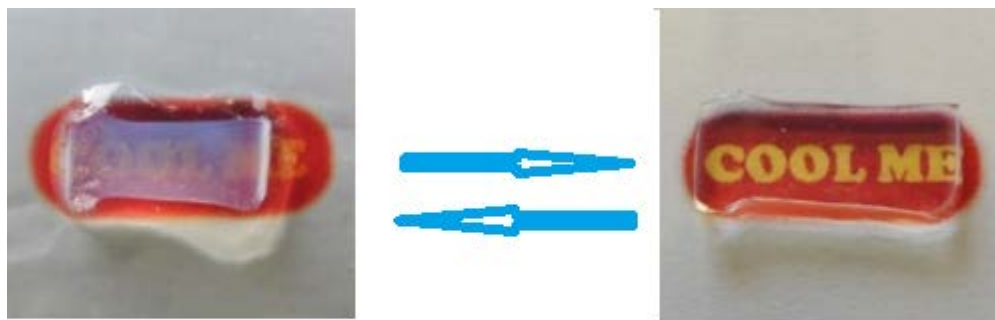
Ústav polymérov SAV

Mená riešiteľov: M. Danko

Projekty v rámci ktorých sa výsledok dosiahol: VEGA 2/0158/17

Popis výsledku v slovenčine:

Materiály, ktoré reagujú na vonkajšie podnety sú predmetom záujmu v oblasti bioinžinierstva, medicíny a nanotechnológií. Jednoduchou voľno-radikálovou polymerizáciou sme pripravili metakrylátové kopolyméry so sulfobetainovými (SB) a karboxybetainovými (CB) skupinami a ich hydrogely. Pomer komonomérov ovplyvňuje hornú kritickú teplotu rozpúšťania, ktorá môže byť navyše modulovaná pomocou pH a prítomnosťou solí. Hydrogely vykazujú v závislosti od pomeru SB/CB rôzny stav vody a mechanické vlastnosti. Skúmali sme ich odozvu na vonkajšie podnety ako teplota (Obrázok) a iónová sila. Funkcionalita karboxylátových skupín v hydrogeli dovoľuje naviazanie RDG-oligo peptid, ktorý môže podporiť adhéziu živých buniek. Kombináciou rôznych zwitteriónových monomérov je možné jednoducho pripraviť materiály s nastaviteľnými vlastnosťami a so zachovaným zwitteriónovým charakterom.



Popis výsledku v angličtine:

Materials that can respond to external stimuli are of particular interest in bioengineering, nanotechnology, and medicine. In this work we prepared copolymers bearing sulfobetaine (SB) and carboxybetaine (CB) methacrylic-based monomers and hydrogels using free-radical polymerization. The ratio of the monomers in the copolymers influences upper critical solution temperature in water, which could be modulate by pH and presence of NaCl electrolyte. Hydrogels showed tunable water state and mechanical properties according to SB/CB ratio. Responses on external stimuli such as temperature and ion strength were investigated (Picture). Presence of carboxylate group allows attachment of oligo-peptide with RDG-motif to hydrogel samples, which could promote cells adhesion. Combination of different zwitterionic monomers opens simple and efficient pathway for preparation of materials with tunable properties as multi-response systems with kept zwitterionic character.

Výstupy:

- DANKO, Martin - KRONEKOVÁ, Zuzana - MRLÍK, Miroslav - OSICKA, Josef - YOUSAF, Ammar bin - MIHÁLOVÁ, Andrea - TKÁČ, Ján - KASÁK, Peter. Sulfobetaines meet carboxybetaines: Modulation of thermo- and ion-responsivity, water structure, mechanical properties, and cell adhesion. In *Langmuir*, 2019, vol. 35, no. 5, p. 1391-1403. (3.683 - IF2018). ISSN 0743-7463. Typ: **ADCA**

2.3.2. Aplikačný typ

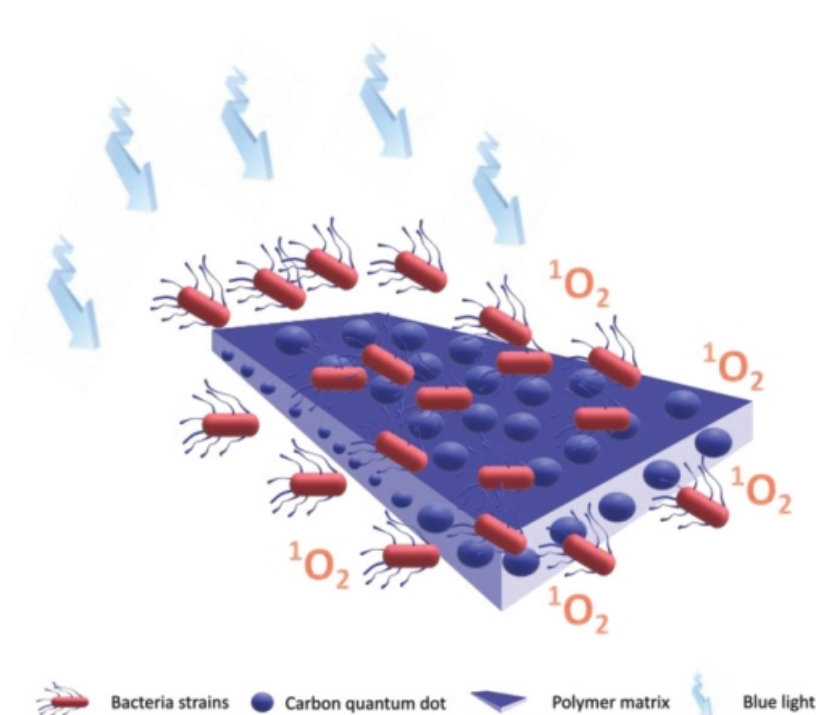
Názov: Polymérne nanokompozity na báze hydrofóbných uhlíkových kvantových bodiek a ich antibakteriálne vlastnosti

Názov v angličtine: Polymer nanocomposites based on hydrophobic carbon quantum dots and their antibacterial properties

Ústav polymérov SAV

Mená riešiteľov: Z. Špitálsky, M. Kováčová

Projekty v rámci ktorých sa výsledok dosiahol: VEGA 2/0093/16, COST CA 16217



Popis výsledku v slovenčine:

Hlavným cieľom výskumu bol vývoj nového polymérneho (nano)kompozitu s regulovateľnými antibakteriálnymi účinkami. Uhlíkové kvantové bodky fungujú na princípe fotodynamickej terapie a sú schopné produkovať reaktívne formy kyslíka. Materiál sa otestoval fyzikálno-chemickými metódami, testami biokompatibility, antibakteriálnych vlastností a taktiež na cytotoxicitu, proliferáciu a hemolýzu. Prebiehajú aj experimenty s rezistentnými typmi baktérií, získaných priamo od pacientov. Tento materiál má vysoko selektívny účinok na bakteriálne bunky a bez známok cytotoxicity a hemolýzy. Môže slúžiť ako výborná prevencia v boji proti vzniku antibiotickej rezistencie. Taktiež došlo k pokroku aj v patentovej ochrane, keďže sa vstúpilo do národných fáz, za finančnej podpory firmy i&i Prague s.r.o., ktorá pomáha identifikovať a podporovať nové vynálezy a dostať ich na trh. Výskum bol označený vo výročnej správe MZ SR ako Excelentný biomedicínsky spot.

Popis výsledku v angličtine:

The main objective of the research was the development of a new type of polymer (nano)composite with controllable antibacterial effects. Carbon quantum dots operate on the principle of photodynamic therapy and can produce reactive oxygen species. The prepared material was tested by physicochemical methods, biocompatibility tests, antibacterial properties and for cytotoxicity, proliferation, and hemolysis. There are also experiments with resistant types of bacteria obtained directly from patients. This material has a highly selective effect on bacterial cells and without signs of cytotoxicity and hemolysis. It can serve as excellent prevention against antibiotic resistance. Also, there has been progressed in patent protection as it has entered national phases, with the financial support of i&i Prague Ltd., which helps to identify, promote and bring new inventions to the market. The research was described in the Annual Report of the Ministry of Health as an Excellent Biomedical Spot.

Výstupy:

1. KOVÁČOVÁ, Mária - MARKOVIĆ, Zoran M. - HUMPOLÍČEK, Petr - MIČUŠÍK, Matej - ŠVAJDLENKOVÁ, Helena - KLEINOVÁ, Angela - DANKO, Martin - KUBÁT, Pavel - VAJDÁK, Jan - CAPÁKOVÁ, Zdenka - LEHOCKÝ, Marián - MUNSTER, Lukáš - MARKOVIĆ, Biljana M. Todorović - ŠPITÁLSKY, Zdenko. Carbon quantum dots modified polyurethane nanocomposite as effective photocatalytic and antibacterial agents. In *ACS Biomaterials Science & Engineering*, 2018, vol. 4, p. 2983-3993. (4.432 - IF2017). ISSN 2373-9878. Typ: ADMA

2. MARKOVIĆ, Zoran M. - KOVÁČOVÁ, Mária - MIČUŠÍK, Matej - DANKO, Martin - ŠVAJDLENKOVÁ, Helena - KLEINOVÁ, Angela - HUMPOLÍČEK, Petr - LEHOCKÝ, Marian - TODOROVIC-MARKOVIĆ, Biljana - ŠPITÁLSKY, Zdenko. Structural, mechanical, and antibacterial features of curcumin/polyurethane nanocomposites. In *Journal of Applied Polymer Science*, 2019, vol. 136, art. no. 47283, [8] p. (2.188 - IF2018). ISSN 0021-8995. Typ: ADCA
3. MARKOVIĆ, Zoran M. - KOVÁČOVÁ, Mária - HUMPOLÍČEK, Petr - BUDIMIR, Milica D. - VAJĎÁK, Jan - KUBÁT, Pavel - MIČUŠÍK, Matej - ŠVAJDLENKOVÁ, Helena - DANKO, Martin - CAPÁKOVÁ, Zdenka - LEHOCKÝ, Marián - MARKOVIĆ, Biljana M. Todorović - ŠPITÁLSKY, Zdenko. Antibacterial photodynamic activity of carbon quantum dots/polydimethylsiloxane nanocomposites against *Staphylococcus aureus*, *Escherichia coli* and *Klebsiella pneumoniae*. In *Photodiagnosis and Photodynamic Therapy*, 2019, vol. 26, p. 342-349. (2.589 - IF2018). ISSN 1572-1000. Typ: ADCA
4. BUDIMIR, Milica* - MARKOVIĆ, Zoran - JOVANOVIĆ, Dragana - VUJISIĆ, Miloš - MIČUŠÍK, Matej - DANKO, Martin - KLEINOVÁ, Angela - ŠVAJDLENKOVÁ, Helena - ŠPITÁLSKY, Zdenko - TODOROVIC MARKOVIĆ, Biljana. Gamma ray assisted modification of carbon quantum dot/polyurethane nanocomposites: structural, mechanical and photocatalytic study. In *RSC Advances*, 2019, vol. 9, p. 6278-6286. (3.049 - IF2018). ISSN 2046-2069. Typ: ADCA
5. PREKODRAVAC, Jovana - VASILJEVIĆ, Bojana - MARKOVIĆ, Zoran M. - JOVANOVIĆ, Dragana - KLEUT, Duška - ŠPITÁLSKY, Zdenko - MIČUŠÍK, Matej - DANKO, Martin - BAJUK-BOGDANOVIĆ, Danica - TODOROVIC-MARKOVIĆ, Biljana. Green and facile microwave assisted synthesis of (metal-free) N-doped carbon quantum dots for catalytic applications. In *Ceramics International*, 2019, vol. 45, no. 14, p. 17006-17013. (3.450 - IF2018). (2019 - Current Contents, WOS, SCOPUS). ISSN 0272-8842. Typ: ADCA
6. KOVÁČOVÁ, Mária - ŠPITÁLSKÁ, Eva - MARKOVIĆ, Zoran M. - ŠPITÁLSKY, Zdenko. Carbon Quantum Dots as Antibacterial Photosensitizers and Their Polymer Nanocomposites Applications. In *Particle & Particle Systems Characterization*, DOI: 10.1002/ppsc.201900348
7. ŠPITALSKÝ Z.- MARKOVIC Z.- KOVÁČOVÁ, M. Prioritná patentová prihláška č. 50017-2017 „Spôsob výroby nanokompozitného materiálu s antibakteriálnymi vlastnosťami, takýto materiál a jeho použitie“, marec 2017, v štádiu posudzovania. Na základe nej bolo podané rozšírenie: PCT/SK2018/050004 (WO 2018/160142) 7.9.2018 so vstupom do národných fáz: US No. 16/490,439 dňa 30.8.2019 a EP 18719324.8 dňa 10.09.2019.

Názov: Stimuli-senzitívne vlastnosti a ekotoxikologický charakter hydrogélů na báze bioobnoviteľného Tulipalínu A.

Stimuli-sensitive properties and Ecotoxicological Character of Tulipalin A-Based Superabsorbent Hydrogels.

Ústav polymérov SAV

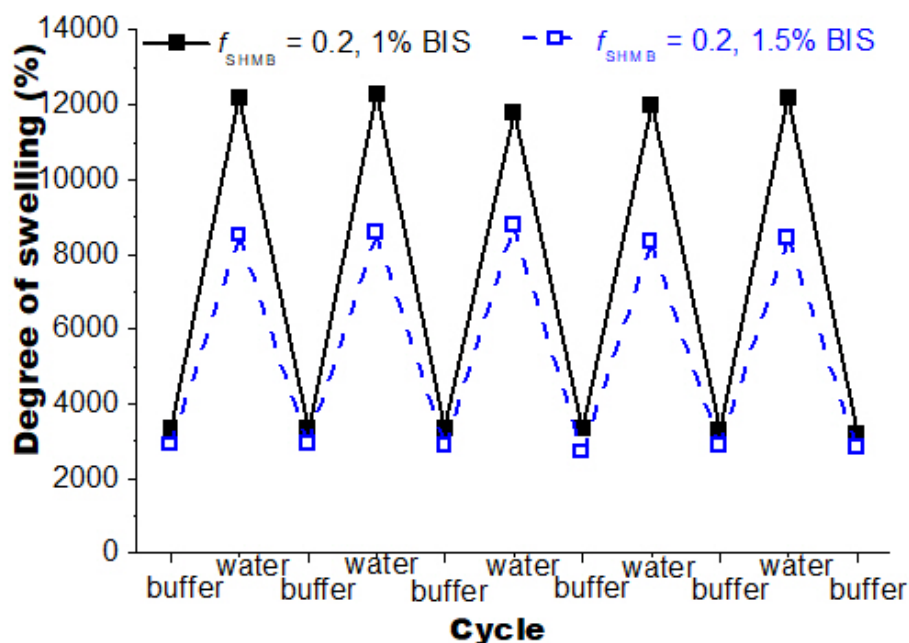
Mená riešiteľov: J. Kollár, J. Mosnáček

Projekty v rámci ktorých sa výsledok dosiahol: APVV-15-0528

Popis výsledku v slovenčine:

V nedávnych štúdiách sme ukázali, že kopolyméry na báze hydrolyzovaných nenasýtených γ -butyrolaktónových monomérov z bioobnoviteľných zdrojov sa vyznačujú superabsorbentnými vlastnosťami. V poslednej štúdii sme stanovili absorbčné vlastnosti v rôznych prostrediach za účelom bližšie simulovať podmienky v reálnych aplikáciách. Stimuli-senzitívny charakter hydrogélů sa prejavil pri zmene teploty, pH a iónovej sily pufovacieho roztoku. Proces napučovania a zmršťovania hydrogélů bol navyše reverzibilný. Výmena sodíkového katiónu za draslíkový má len minimálny vplyv na absorbčné vlastnosti hydrogélů, avšak predstavuje ekologicky vhodnejší materiál pre pôdohospodárstvo.

Fytotoxicita pripravených hydrogélů sa porovnala v reálnych podmienkach pri pestovaní jedno- a dvojkľúčolistových rastlín s komerčne dostupnými hydrogélmi. Nové hydrogély sa vyznačovali najlepšou schopnosťou viazať vodu, boli netoxické pre rastliny a môžu byť aplikované ako ekologické rezervoáre pre rast rastlín.



Popis výsledku v angličtine:

We recently showed that copolymers based on bio-derived hydrolyzed unsaturated γ -butyrolactone monomers possess superabsorbent properties. Now the swelling properties of hydrogels were investigated in various environments in order to test their behavior under conditions, which are close to that of real agricultural applications. Swelling behavior of the hydrogels were found to be sensitive to temperature, pH and ionic strength and the process of swelling and deswelling was proved to be reversible. The exchange of sodium to potassium in the structure of hydrogels had only slight effect on superior degree of swelling, but represents more environmentally friendly material for potential agriculture.

The phytotoxicological aspects of a superabsorbent on the growth of monocotyledonous and dicotyledonous plants, was investigated and compared with conventional hydrogels. Novel hydrogels are nontoxic materials with potential use as an environmentally friendly water reservoirs for plant growth.

Výstupy:

- KOLLÁR, Jozef - MRLÍK, Miroslav - MORAVČÍKOVÁ, Daniela - IVÁN, Béla - MOSNÁČEK, Jaroslav. Effect of monomer content and external stimuli on properties of renewable Tulipalin A-based superabsorbent hydrogels. In *European Polymer Journal*, 2019, vol. 115, p. 99-106. (3.621 - IF2018). ISSN 0014-3057.
- RYCHTER, Piotr - ROGACZ, Diana - LEWICKA, Kamila - KOLLÁR, Jozef - KAWALEC, Michal - MOSNÁČEK, Jaroslav. Ecotoxicological properties of Tulipalin A-based superabsorbents versus conventional superabsorbent hydrogels. In *Advances in Polymer Technology : an open access journal*, 2019, vol. 2019, art. ID 2947152, 15 p. (2.663 - IF2018). ISSN 0730-6679.

2.3.3. Medzinárodné vedecké projekty

Názov: Rýchlosť propagácie pre radikálovú polymerizáciu kyseliny akrylovej v bloku a v roztoku jej saturovaného analógu kyseliny propiónovej

The propagation rate for radical polymerization of acrylic acid in bulk and in solution of its saturated analogue propionic acid

Ústav polymérov SAV

Mená riešiteľov: E. Dušička, A. Chovancová, E. Hipká, I. Lacík*

Projekty v rámci ktorých sa výsledok dosiahol: BASF SE

Popis výsledku v slovenčine:

Rýchlostná konštanta propagácie (k_p) má zásadnú úlohu v radikálovej polymerizácii. Aj keď mnohé štúdie sa už venovali kinetike radikálovej polymerizácie kyseliny akrylovej (AA), poznatky o polymerizácii AA pri určitých podmienkach nie sú známe. V tejto štúdii sme sa zamerali na určenie k_p pre polymerizáciu AA v bloku a v roztoku kyseliny propiónovej (PA) pri 25 °C pomocou pulznej laserovej polymerizácie v kombinácii s gélovou permeačnou chromatografiou (PLP-SEC). Hodnoty k_p pre AA závisia od počtu pulzov. 3D simulácia poukázala na to, že závislosť k_p od počtu pulzov, a tým od konverzie polymerizácie, môže byť čiastočne pripísaná zvyšovaniu teploty vzhľadom na uvoľnené polymerizačné teplo. Zvyšovanie k_p hodnôt so zvýšenou koncentráciou AA v PA predstavuje nový poznatok oproti výsledkom pre iné monoméry, pre ktoré rýchlosť propagácie nezávisí od koncentrácie monoméru v rozpúšťadle podobnej chemickej štruktúry ako monomér. Tento rozdiel je pripísaný vodíkovým interakciám v prípade AA.

Popis výsledku v angličtine:

The propagation rate coefficient (k_p) plays a crucial role in the kinetics of radical polymerization. A number of studies has been devoted to describe the kinetics of acrylic acid (AA), yet, some of the polymerization conditions remained to be explored. In this study, the k_p values were determined for polymerization of AA in bulk as well as in its saturated analogue, propionic acid (PA), at 25 °C by the pulsed-laser polymerization–size-exclusion chromatography method (PLP-SEC). The k_p values for AA are found to depend on the number of pulses used in PLP experiment. The 3D simulation reveals that this dependency is partially attributed to the increase in temperature due to the heat release during polymerization with increasing conversion. The increase in k_p values with increased concentration of AA in PA is a new phenomenon not seen for polymerization of monomers in solvents of similar chemical structure that is ascribed to the hydrogen bonding interactions.

Výstupy:

1. DUŠIČKA, Eva - NIKITIN, Anatoly N. - LACÍK, Igor. Propagation rate coefficient for acrylic acid polymerization in bulk and in propionic acid by the PLP-SEC method: experiment and 3D simulation. In *Polymer Chemistry*, 2019, vol. 10, p. 5870-5878. (4.760 - IF2018).
2. NIKITIN, Anatoly N. - LACÍK, Igor - HUTCHINSON, Robin A. - BUBACK, Michael - RUSSELL, Gregory T. Detection of PLP structure for accurate determination of propagation rate coefficients over an enhanced range of PLP-SEC conditions. In *Macromolecules*, 2019, vol. 52, p. 55-71. (5.997 - IF2018). ISSN 0024-9297
3. EZENWAJIAKU, I. H. - CHOVANCOVÁ, Anna - LISTER, K. - LACÍK, Igor - HUTCHINSON, R.A. Experimental and Modeling Investigation of Radical Homopolymerization of 2-(Methacryloyloxyethyl) Trimethylammonium Chloride in Aqueous Solution. *Macromol. React. Eng.* **2019**, Oct. 9, doi: 10.1002/mren.201900033. (1.567 - IF2018), F

Názov: Tvoria topologicky asociované domény DNA superzávitnice?

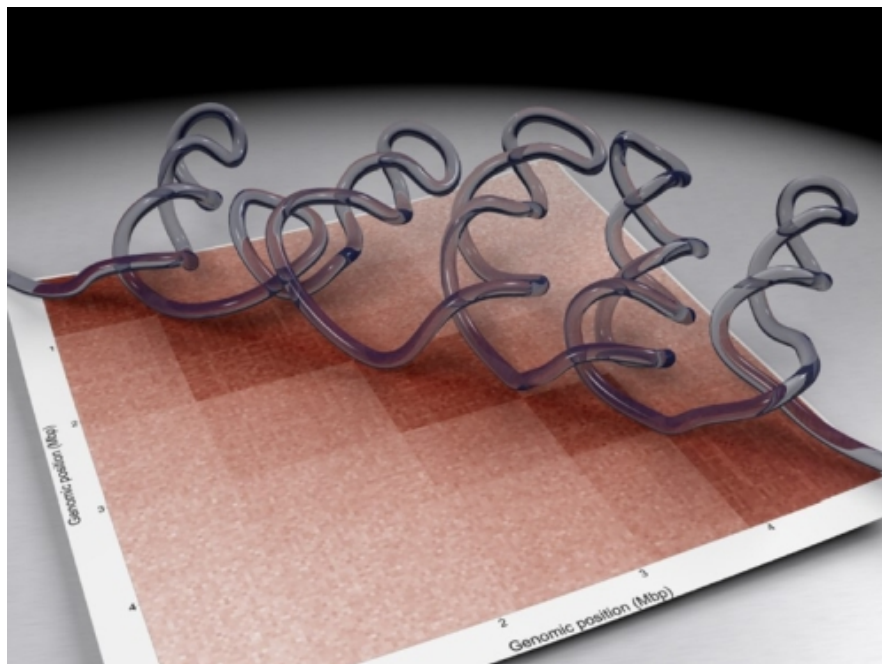
Are TADs supercoiled?

Ústav polymérov SAV

Mená riešiteľov: D. Račko, A. Stasiak

Projekty v rámci ktorých sa výsledok dosiahol: Swiss National Science Foundation

[31003A_166684], Leverhulme Trust [RP2013-K-017]

**Popis výsledku v slovenčine:**

Topologicky asociované domény (TAD) sú megabázové stavebné bloky medzifázových chromozómov vo vyšších eukaryotoch. TAD sú chromozomálne oblasti so zvýšenou frekvenciou vnútorných interakcií. Ako vyzerá štruktúra TAD so zvýšenou frekvenciou vnútorných interakcií zatiaľ nie je preskúmané. Sumarizujeme tu experimentálne štúdie skúmajúce prítomnosť supervinutia (supercoiling) v medzifázových chromozómoch. Ukázali sme tiež, ako môže byť supervinutie chromatinových vlákien generované počas transkripcie a ako sa očakáva, že supervinutie indukuje zahustenie jednotlivých TAD, a tak podporuje interakciu medzi zosilňovačmi a ich príbuznými promótormi, ktoré sú umiestnené v rovnakom TAD. Ďalej navrhujeme, ako transkripciou vnesené supervinutie poskytuje odpoveď na dlho hľadané riešenie otázky, ako je riadené vytlačenie chromatinových slučiek, a vysvetľuje mechanickú úlohu transkripcie eRNA.

Popis výsledku v angličtine:

Topologically associating domains (TADs) are megabase-sized building blocks of interphase chromosomes in higher eukaryotes. TADs are chromosomal regions with increased frequency of internal interactions. The internal structure of TADs, causing their increased frequency of internal interactions, is not established yet. We survey here experimental studies investigating presence of supercoiling in interphase chromosomes. We also presented how supercoiling of chromatin fibres can be generated during transcription and how supercoiling is expected to induce compaction of individual TADs and thus promote interaction between enhancers and their cognate promoters that are located in the same TAD. In addition, we propose that transcription-induced supercoiling is likely to provide a long-sought solution to the question of how chromatin loop extrusion is driven and explains the mechanical role of eRNA transcription.

Výstupy:

RAČKO, Dušan - BENEDETTI, Fabrizio - DORIER, Julien - STASIAK, Andrzej. Are TADs supercoiled? In *Nucleic acids research*, 2019, vol. 47, no. 2, p. 521-532. (11.147 - IF2018). ISSN 0305-1048. Typ: ADCA (+ journal cover)

Názov: Charakteristika medzifázových vlastností amfifilných gradientových kopolymérov na báze poly(2-oxazolínov).

Characterization of interfacial properties for amphiphilic gradient copolymers based on poly(2-oxazolines).

Ústav polymérov SAV, Hanyang University, Seoul, Kórejská republika

Mená riešiteľov: Z. Kroneková, A. Zahoranová, J. Kronek*, D. Sohn

Projekty v rámci ktorých sa výsledok dosiahol: APVV-SK-KR-18-0011

Popis výsledku v slovenčine:

Gradientové kopolyméry pripravené kationovou polymerizáciou hydrofilného 2-etyl-2-oxazolínu s hydrofóbnym 2-(4-alkyloxyfenyl)-2-oxazolínom predstavujú alternatívny typ amfifilných kopolymérov schopných samousporiadať sa na rozhraní fáz. V rámci projektu s kórejskou Hanyang University je cieľom využitie gradientových kopolymérov ako lapačov endotoxínov pri liečbe sepsy. Schopnosť ich usporiadania na rozhraní hydrofóbnej a hydrofilnej fázy sa študovala pomocou tvorby Langmuir-Blodgetových (LB) filmov a tiež pomocou AFM. Skladanie gradientových kopolymérov vo forme LB filmov závisí od pomeru hydrofilného a hydrofóbného monoméru a má bimodálny priebeh. To značí, že počas usporiadavania dochádza ku konformačnej reorientácii polymérnych reťazcov. Navyše, gradientové kopolyméry majú v porovnaní s blokovými kopolymérmi rigidnejšiu štruktúru. AFM merania nám ukázali tvorbu sférických nanočastíc s veľkosťou do 100 nm pri nanosení roztoku gradientových kopolymérov na silikónovú podložku.

Popis výsledku v angličtine:

Gradient copolymers prepared by cationic polymerization of hydrophilic 2-ethyl-2-oxazoline and hydrophobic 2-(4-alkoxyphenyl)-2-oxazolines represent an alternative type of amphiphilic copolymers able to self-assemble on phase interfaces. The project with Korean Hanyang University was aimed at utilization of gradient copolymers as endotoxin scavengers in the treatment of sepsa. An ability of their self-assembly at the interface of hydrophobic and hydrophilic phases was studied using Langmuir-Blodgett (LB) films and AFM. A folding of gradient copolymers in the form of LB films depends on the ratio of hydrophilic nad hydrophobic monomers and it exhibits a bimodal course that demonstrates the conformational reorientation of polymeric chains. Moreover, gradient copolymers possess a more rigid structure compared to block copolymers. AFM measurements showed the formation of spherical nanoparticles of the size up to 100 nm after solution deposition of gradient copolymers on silicon support.

Výstupy:

1. KRONEK, Juraj - JEONG, Jiwon - KRONEKOVÁ, Zuzana - DATTA, Shuhashis - JANCURA, Daniel - SOHN, Daewon. Synthesis of gradient copolymers based on one-pot cationic copolymerization of aliphatic and aromatic 2-oxazolines. In *Annual Fall Meeting*. - Jeju : The Polymer Society of Korea, 2019, 2019, vol. 44, no.2, p. 40. .
2. JIWON, Jeong - KRONEK, Juraj - KRONEKOVÁ, Zuzana - SOHN, Daewon. Characteristics of oxazoline based gradient and block copolymers by Langmuir-blodgett method. In *Annual Fall Meeting*. - Jeju : The Polymer Society of Korea, 2019, 2019, vol. 44.

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

Tabuľka 2e Štatistika vybraných kategórií publikácií

PUBLIKAČNÁ A EDIČNÁ ČINNOSŤ	Počet v r. 2019/ doplňky z r. 2018
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)	2 / 0
7. Kapitoly v odborných monografiách, vysokoškolských učebniciach a učebných textoch vydaných v domácich vydavateľstvách (BBB, ACD)	0 / 0
8. Kapitoly v odborných monografiách, vysokoškolských učebniciach a učebných textoch vydaných v zahraničných vydavateľstvách (BBA, ACC)	0 / 0
9. Vedecké práce registrované v Current Contents Connect (ADCA, ADCB, ADDA, ADDB)	60 / 2
10. Vedecké práce registrované vo Web of Science Core Collection alebo Scopus (ADMA, ADMB, ADNA, ADN B)	12 / 0
11. Vedecké práce v ostatných domácich časopisoch (ADFA, ADFB)	0 / 0
12. Vedecké práce v ostatných zahraničných časopisoch (ADEA, ADEB)	4 / 1
13. Vedecké práce v domácich recenzovaných zborníkoch (AEDA)	0 / 0
14. Vedecké práce v zahraničných recenzovaných zborníkoch (AECA)	1 / 0
15. Publikované príspevky na domácich vedeckých konferenciách (AFB, AFD)	4 / 0
16. Publikované príspevky na zahraničných vedeckých konferenciách (AFA, AFC)	5 / 4
17. Vydané periodiká evidované v CCC, WoS Core Collection, SCOPUS	0
18. Ostatné vydané periodiká	0
19. Zostavovateľské práce knižného charakteru (FAI)	2 / 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. 2018 (zdroj JCR) <i>Počet článkov / doplnky 2017</i>	35 / 0	18 / 2	11 / 0	4 / 0	68 / 2
Podľa SJR z r. 2018 (zdroj Scimago) <i>Počet článkov / doplnky 2017</i>	45 / 1	19 / 1	3 / 0	5 / 0	72 / 2

Tabuľka 2g Ohlasy

OHLASY	Počet v r. 2018/ doplnky z r. 2017
Citácie vo WOS (1.1, 2.1)	2038 / 4
Citácie v SCOPUS (1.2, 2.2)	49 / 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)	9 / 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	91
Prednášky a vývesky na domácich vedeckých podujatiach	57

2.6. Vyžiadané prednášky

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

2.6.1. Vyžiadané prednášky na medzinárodných vedeckých podujatiach

LACÍK, Igor. Report on the IUPAC PD-Endorsed Conferences. IUPAC Polymer Division Meeting, IUPAC General Assembly Meeting, 5. - 10.7. 2019, Paríž Francúzsko.

LACÍK, Igor. Alginate-based microcapsules for immunoprotection of transplanted pancreatic cells: the next generation of diabetes treatment. Pozvaná prednáška v rámci SFB/TRR 225 seminárov, 16.10.2019, Wuerzburg University, Nemecko.

LACÍK, Igor. Characterization of Microcapsules. Pozvaná prednáška počas Chicago Diabetes Project mítingu, 10. - 11.5. 2019, University of Virginia, Charlottesville, VA, USA.

KRONEK, Juraj. Gradient copolymers based on aliphatic and aromatic 2-oxazolines as versatile tool for colloidal and interfacial systems. Prednáška na špeciálnom chemickom seminári, 8.11. 2019, Hanyang University, Seoul, Republic of Korea.

KOVÁČOVÁ, Mária - ŠPITÁLSKY, Zdenko. Light activated polymer nanocomposites doped with new type of hydrophobic carbon quantum dots for antibacterial applications. COST action CA16217, Pozvaná prednáška, 25.3.2019, New Coatings in Urinary Stents. Workshop. Malta University, Malta.

2.6.2. Vyžiadané prednášky na domácich vedeckých podujatiach

LACÍK, Igor. Polymeric biomaterials for immunoprotection of pancreatic islets in diabetes treatment. Biomedicine "Life Science Innovation Day", Pozvaná prednáška, 22.5. 2019, UK Bratislava, Science Park.

LACÍK, Igor. Liečba cukrovky transplantáciou enkapsulovaných pankreatických ostrovčiek, DIAstretko rodičov a detí ohľadne diabetu, 26.-28.4.2019, penzión Kubíková Belá.

2.6.3. Vyžiadané prednášky na významných vedeckých inštitúciách

LACÍK, Igor. PLP-SEC study into propagation rate for ionized monomers polymerized in aqueous solutions. Prednáška počas pobytu v George August Universität, Goettingen, 10.4. 2019, Goettingen, Nemecko.

BONDAREV, Dmitrij. Oxygen-Tolerant Atom Transfer Radical Polymerization. v rámci študijného

pobytu, 12.7.2019, FT UNSW Sydney, Austrália.

MOSNÁČEK, Jaroslav. Atom transfer radical polymerization (ATRP): Development of photoATRP and hybrid materials prepared by ATRP, 13.2.2019, UTB Zlín.

MOSNÁČEK, Jaroslav. Polymers from Renewable Unsaturated gamma-Butyrolactones, 20.3.2019, UTB Zlín.

2.7. Patentová a licenčná činnosť na Slovensku a v zahraničí v roku 2019

2.7.1. Vynálezy, na ktoré bol v roku 2019 udelený patent

a) na Slovensku

b) v zahraničí

2.7.2. Vynálezy prihlásené v roku 2019

a) na Slovensku

Názov vynálezu: Spôsob sieťovania polystyrénu

Číslo prihlášky: PP50057-2019

Dátum priority: 2019

Majiteľ / spolumajiteľ: Ústav polymérov SAV

Pôvodcovia vynálezu: Lukáč Ivan, Danko Martin, Mosnáček Jaroslav, Chmela Štefan

Názov vynálezu: Spôsob prípravy aditíva pre zvýšenie polarítav tavných lepidiel

Číslo prihlášky: PP50034-2019

Dátum priority: 2019

Majiteľ / spolumajiteľ: Ústav polymérov SAV, VIPO a.s. Partizánske

Pôvodcovia vynálezu: Chodák Ivan, Pavlinec Juraj, Novák Igor, Rychlý Jozef, Preťo Jozef, Vanko Vladimír

b) v iných krajinách ako prioritná prihláška

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

Číslo prihlášky: EP 18719324.8, US 16/490,439

Dátum priority: 30.8.2019

Majiteľ / spolumajiteľ: Ústav polymérov SAV

Pôvodcovia vynálezu: Špitálsky Zdenko, Markovic Zoran, Kováčová Mária

c) PCT

d) EP

e) v iných krajinách v rámci tzv. národnej fázy po PCT, resp. po validácii EP

2.7.3. Úžitkové vzory na Slovensku

a) prihlásené v roku 2019

Názov UV: Skúšobné teliesko na stanovenie adhézneho pevnosti tavného lepidla k substrátu v trhácom stroji

Číslo UV: PUV 96-2019

Dátum prihlášky: 2019

Majiteľ / spolumajiteľ UV: Ústav polymérov SAV, VIPO a.s. Partizánske

Pôvodcovia UV: Chodák Ivan, Novák Igor, Pavlinec Juraj, Rychlý Jozef, Vanko Vladimír, Pret'o Jozef, Hudec Ivan

b) udelené v roku 2019

2.7.4. Realizované vynálezy

a) predané patenty resp. prihlášky vynálezov (v prípade úplnej zmeny majiteľa patentu)

b) predané licencie (v prípade že majiteľom ostáva organizácia SAV)

Finančný prínos pre organizáciu SAV v roku 2019 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
Bartoš Josef	VEGA	1
Bondarev Dmitrij	VEGA	1
Eckstein Anita	VEGA	1
Lacík Igor	APVV	12
	Výzva MZ SR 2019	6
Novák Igor	VEGA	1
Opálková Šišková Alena	APVV	1
Špitálsky Zdenko	APVV	1
	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	4	0	0	0	0
Cifra Peter	0	0	4	0	0	0	0
Danko Martin	0	0	15	0	0	0	0
Eckstein Anita	0	1	6	0	0	0	1

Heydari Abolfazl	0	0	2	0	0	0	0
Chodák Ivan	0	0	13	0	0	0	0
Kollár Jozef	0	0	1	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	3	0	0	0	0
Mosnáček Jaroslav	0	0	14	0	0	0	0
Mosnáčková Katarína	0	0	2	0	0	0	0
Novák Igor	0	0	9	0	0	0	0
Omastová Mária	0	0	3	0	0	0	0
Opálková Šišková Alena	0	0	6	0	0	0	1
Račko Dušan	0	0	1	0	0	0	0
Špitálsky Zdenko	0	0	6	0	0	0	0
Spolu	0	1	98	0	0	0	2

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 2019 v zasadacej miestnosti Ústavu polymérov SAV. Kolokvium bolo organizované a vedené Vedeckou radou a pre každé oddelenie bol určený spravodajca 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. Na kolokviu nasledovali po úvodnom prejave vedúceho oddelenia prezentácie nosných tém oddelenia vybranými vedeckými pracovníkmi a prezentáciu uzavrel znova vedúci oddelenia načrtnutím budúceho zamerania. Vzhľadom na nárast počtu pracovníkov zo zahraničia prebehlo celé kolokvium po prvýkrát v anglickom jazyku. Samotné hodnotenie oddelení sa následne uskutočnilo na základe posudkov vypracovaných spravodajcami na zasadnutí Vedeckej rady za prítomnosti vedúcich jednotlivých oddelení. Správy oddelení zároveň obsahovali odporúčania ako optimalizovať efektivitu fungovania jednotlivých oddelení. Na zasadnutí bola tiež vybraná najlepšia prezentácia s názvom „Recent progress with PMCG multicomponent microcapsule for immunoprotection of encapsulated pancreatic islets“, ktorú na kolokviu prezentovala Ing. Lucia Kleščíková, PhD.

Zameranie ústavu pokračovalo v pôvodných témach a zároveň sa na ústave pokračovalo v rozvíjaní nových tém v oblasti bioaplikácií, biokompatibility 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 2019 uspokojivé. Doleuvedená tabuľka dokumentuje vývoj počtu publikácií a citácií za posledných 5 rokov. Rastúci trend v počte CC publikácií a citácií bol v roku 2019 mierne prerušený poklesom ich počtu, na druhej strane je v súčasnom období veľa prác odoslaných v tlači. Na kapacitu tvorivého pracovníka vychádza v roku 2019 1.74 publikácií, kým v roku 2018 to bolo 1.91. Je potrebné zobrať do úvahy, že časť výstupov je produkovaná aj vedeckými pracovníkmi nad 65 rokov vrátane emeritných vedeckých pracovníkov.

Rok	CC/IF publikácie	Monografie a kapitoly v knihách	Citácie
2015	68	3	1817
2016	73	7	1700
2017	74	3	2114
2018	86	3	2173
2019	71	2	2087

Na ústave sa kladie dôraz na formovanie ďalších vedeckých osobností v oddeleniach z mladšej generácie vedeckých pracovníkov a prijímaní nových doktorandov. Okrem finančných odmien za publikácie ústav pravidelne organizuje súťaž o najlepšiu publikáciu mladých vedeckých pracovníkov. Tohto roku sa udelili ceny až za tri kvalitné publikácie, tieto ocenenia získali 1. Ing. Nikola Bugárová, PhD., 2. Mgr. Mária Kováčová a 3. MSc. Gamal Zain.

Vedecká rada Ústavu polymérov SAV organizuje pravidelne semináre vedeckých pracovníkov ústavu ako aj prednášky zahraničných vedcov počas ich návštev ústavu. V roku 2019 mali okrem vedeckých pracovníkov z Ústavu polymérov SAV prednášky aj pozvaní vedci a to Prof. Robert Liska (TU Vienna), Prof. Daewon Sohn (Hanyang University) a Dr. Ján Smrek (University of Vienna). 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 2019 končila pracovná zmluva. Na základe ich vedeckých výstupov a vedecko-organizačných prípadne pedagogických aktivít z hodnotiaceho obdobia, ktoré boli zhrnuté vo formulári 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 2019

Forma	Počet k 31.12.2019				Počet doktorandov po doktorandskej skúške		Počet ukončených doktorantúr v r. 2019					
							Ukončenie z dôvodov					
	celkový počet		z toho novoprijatí						ukončenie úspešnou obhajobou		predčasné ukončenie	
	M	Ž	M	Ž	M	Ž	M	Ž	M	Ž	M	Ž
Denná zo zdrojov SAV	5	9	2	4	3	4	1	1	0	0	0	0
Denná z iných zdrojov	0	0	0	0	0	0	0	0	0	0	0	0
Externá	0	0	0	0	0	1	0	0	0	1	0	0
Spolu	5	9	2	4	3	5	1	1	0	1	0	0
Súhrn	14		6		8		2		1		0	

Uvádzajte len doktorandov organizácie ako externej vzdelávacej inštitúcie.

Riadok „Spolu“ je súčtom troch riadkov nad ním. Každá bunka v „Súhrn“ je súčtom dvoch buniek nad ňou. V stĺpci „Počet doktorandov po doktorandskej skúške“ sa uvádza počet doktorandov, ktorí počas roku 2019 boli aspoň 1 deň doktorandami po doktorandskej skúške. Sú číselne zahrnutí aj v predchádzajúcich stĺpcoch.

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	0	0	0	0	0

3.3. Zoznam doktorandov, ktorí ukončili doktorandské štúdium úspešnou obhajobou

Tabuľka 3c Menný zoznam ukončených doktorandov v roku 2019 úspešnou obhajobou

Meno doktoranda	Forma DŠ	Mesiac, rok nástupu na DŠ	Mesiac, rok obhajoby	Číslo a názov študijného odboru	Meno a organizácia školiteľa	Fakulta udeľujúca vedeckú hodnotu
Ing. Nikola Bugárová	interné štúdium hrazené z prostriedkov SAV	9 / 2015	8 / 2019	4.1.19 makromolekulová chémia	Ing. Mária Omastová DrSc., Ústav polymérov SAV	Fakulta chemickej a potravinárskej technológie STU
Ing. František Ivanič	interné štúdium hrazené z prostriedkov SAV	9 / 2015	8 / 2019	4.1.19 makromolekulová chémia	Prof. Ing. Ivan Chodák DrSc., Ústav polymérov SAV	Fakulta chemickej a potravinárskej technológie STU

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

Tabuľka 3d Menný zoznam ukončených doktorandov v roku 2019 úspešnou obhajobou v nadštandardnej dĺžke štúdia

Meno doktoranda	Forma DŠ	Mesiac, rok nástupu na DŠ	Mesiac, rok obhajoby	Číslo a názov študijného odboru	Meno a organizácia školiteľa	Fakulta udeľujúca vedeckú hodnotu
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3.5. Uplatnenie absolventov doktorandského štúdia

Tabuľka 3e Prehľad uplatnenia absolventov doktorandského štúdia

Počet absolventov PhD. štúdia v roku 2019 (obhajoba leto 2019)	z toho koľkí sa zamestnali vo výskume (SAV, univerzity, rezortné výskumné ústavy)	z toho koľkí sa zamestnali v praxi mimo výskum, kde využívajú svoju kvalifikáciu	z toho koľkí sa zamestnali v praxi, kde nevyužívajú svoju kvalifikáciu	z toho koľkí boli nejaký čas nezamestnaní
2	1	0	0	1

Zoznam interných a externých doktorandov je uvedený v prílohe A.

3.6. Medzinárodné doktorandské štúdium

Tabuľka 3f Počet študentov v medzinárodných programoch doktorandského štúdia

Cotutelle	Co-direction	Iné	Zahraníční doktorandi štátne občianstvo/počet
0	0	0	IRN/3, EGY/2, UKR/2, SRB/1

Zahraníční doktorandi sú doktorandi v dennej alebo externej forme štúdia, ktorí sú občanmi iných krajín.

Doktorandi školení v rámci Cotutelle alebo Co-direction sa do posledného stĺpca nezapočítavajú.

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

Tabuľka 3g Zoznam študijných odborov, na ktoré má ústav uzatvorenú rámcovú dohodu, s uvedením univerzity/vysokej školy a fakulty, kde sa doktorandský študijný program uskutočňuje

Názov študijného odboru (ŠO)	Číslo ŠO	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
technológia makromolekulových látok	5.2.21	technológie STU

Tabuľka 3h 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)	RNDr. Peter Cifra, DrSc. (Prírodovedecká fakulta UK)	Ing. Nikola Bugárová, PhD. (PhD., Fakulta chemickej a potravinárskej technológie STU)
RNDr. Peter Cifra, DrSc. (fyzikálna chémia)	Ing. Igor Lacík, DrSc. (Fakulta chemickej a potravinárskej technológie STU)	Ing. František Ivanič (PhD., Fakulta chemickej a potravinárskej technológie STU)
RNDr. Peter Cifra, DrSc. (makromolekulová chémia)	Ing. Igor Lacík, DrSc. (Univerzita Komenského v Bratislave)	
Mgr. Martin Danko, PhD. (makromolekulová chémia)	Ing. Igor Lacík, DrSc. (Univerzita T. Bati, Zlín, Česká Republika)	
Štefan Chmela, DrSc. (makromolekulová chémia)	Ing. Mária Omastová, DrSc. (Fakulta prírodných vied UCM)	
Prof. Ing. Ivan Chodák, DrSc. (technológia makromolekulových látok)	Ing. Mária Omastová, DrSc. (Slovenská technická univerzita v Bratislave)	
Prof. Ing. Ivan Chodák, DrSc. (odbor v zahraničí)		
Ing. Ivica Janigová, PhD. (technológia makromolekulových látok)		

Mgr. Zuzana Kroneková, PhD. (biofyzika)		
Mgr. Zuzana Kroneková, PhD. (makromolekulová chémia)		
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)		
Mgr. Jaroslav Mosnáček, DrSc. (odbor v zahraničí)		
Mgr. Katarína Mosnáčková, PhD. (makromolekulová chémia)		
Mgr. Katarína Mosnáčková, PhD. (technológia makromolekulových látok)		
Ing. Igor Novák, PhD. (odbor v zahraničí)		
Ing. Mária Omastová, DrSc. (fyzikálna chémia)		
Ing. Mária Omastová, DrSc. (makromolekulová chémia)		
Ing. Mária Omastová, DrSc. (odbor v zahraničí)		
Mgr. Zdenko Špitálsky, PhD. (technológia makromolekulových látok)		

3.8. Údaje o pedagogickej činnosti

Tabuľka 3i Prednášky a cvičenia vedené v roku 2019

PEDAGOGICKÁ ČINNOSŤ	Prednášky		Cvičenia a semináre	
	doma	v zahraničí	doma	v zahraničí
Počet prednášateľov alebo vedúcich cvičení	7	1	4	0
Celkový počet hodín v r. 2019	40	4	479	0

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

Tabuľka 3j Aktivity pracovníkov na VŠ

1.	Počet pracovníkov, ktorí pôsobili ako vedúci alebo konzultanti diplomových a bakalárskych prác	3
2.	Počet vedených alebo konzultovaných diplomových a bakalárskych prác	5
3.	Počet pracovníkov, ktorí pôsobili ako škoolitelia doktorandov (PhD.)	11
4.	Počet školených doktorandov (aj pre iné inštitúcie)	15
5.	Počet oponovaných dizertačných a habilitačných prác	10
6.	Počet pracovníkov, ktorí oponovali dizertačné a habilitačné práce	8
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	0

3.9. Iné dôležité informácie k pedagogickej činnosti

Vedeckí pracovníci Ústavu polymérov SAV sa aktívne podieľajú aj na výchove študentov a doktorandov. V roku 2019 pracovníci ústavu pôsobili pedagogicky ako prednášatelia semestrálnych prednášok pre študentov na Prírodovedeckej fakulte UK, Fakulte chemickej a potravinárskej technológie STU v Bratislave, Univerzite Tomáša Baťu v Zlíne a na Materiálovotechnologickej fakulte STU so sídlom v Trnave.

Na interné doktorandské štúdium boli prijatí šiesti noví doktorandi, Renáta Rusková, Rehab Abdelazeem (Egypt), Yaryna Soyka (Ukrajina), Anastasiia Stepura (Ukrajina), Alireza Joorabloo (Irán) a Mohammadhossein Sharifian (Irán) a doktorandské štúdium ukončili obhajobou dvaja doktorandi, Nikola Bugárová a František Ivanič. Okrem školenia doktorandov ústav viedol aj dve bakalárske práce (Prif UK Bratislava a MFT STU Trnava) a ako spoluškooliteľské pracovisko tri diplomové práce (2 z FCHPT STU Bratislava a 1 z UCM Trnava). Dve študentky z UCM v Trnave pôsobili na ústave ako vedecká pomocná sila. 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 pritiahnúť na ústav aj zahraničných doktorandov a tým prispieť k budovaniu multinárodného a multikultúrneho prostredia medzi mladými začínajúcimi vedeckými pracovníkmi. Príkladom sú aj dvaja doktorandi z Iránu, dve doktorandky z

Ukrajiny a jedna doktorandka z Egypta, ktorí začali svoje doktorandské štúdium na ústave v septembri 2019.

Vedecká rada ústavu dohliada na štúdium doktorandov. Okrem prednášok, ktoré absolvujú na Prírodovedeckej fakulte UK alebo Fakulte chemickej a potravinárskej technológie STU, sa doktorandi zúčastňujú na prednáškach organizovaných Vedeckou radou ako aj Radou mladých vedcov. Uvažuje aj o organizovaní ďalších odborných prednášok zameraných na výuku doktorandov, 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 2019 sa toto hodnotenie konalo v septembri, pričom doktorandi prezentovali výsledky dosiahnuté v priebehu ukončeného akademického roka 2018/2019. Hodnotenie sa opieralo o ústnu prezentáciu a vyjadrenie školiteľov k práci a štúdiu svojich doktorandov. Cieľom tohto hodnotenia bolo zistiť, aké pokroky doktorandi za hodnotené obdobie urobili, posúdiť ich vlastný prínos a prípadne im navrhnúť spôsob ako zefektívniť ich štúdium a výskum. 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 popularizovať vedu predovšetkým v radoch stredoškolských a vysokoškolských študentov organizoval ústav tradične v novembri Deň otvorených dverí. Vo vstupnej hale mali študenti možnosť dozvedieť sa niečo viac o projekte PlasticDanubeFree v rámci budovania ich ekologického povedomia a o mikrokapsulách syntetizovaných za účelom potenciálnej ochrany pankreatických ostrovčekov. Potom sa študenti zúčastnili interaktívnej prednášky o 3D tlači a prednášky zameranej na legislatívne opatrenia proti plastom. Následne navštívili viacero laboratórií, kde mali možnosť oboznámiť sa s rôznymi prístrojmi a metódami vedeckého výskumu. Počas celého podujatia mali študenti možnosť viesť diskusie o rôznych témach týkajúcich sa polymérov s vedeckými pracovníkmi ústavu. Ústav polymérov SAV sa zapojil aj do akcie Európska noc výskumníkov, ktorá sa konala koncom septembra 2019 v budove Starej Tržnice v Bratislave. Tohto roku sa reprezentačný stánok ústavu nazýval Plasty nemusia byť naším nepriateľom. 3. ročník popularizačnej aktivity Nájdi v sebe vedca bol určený pre žiakov 2. stupňa základnej školy a pozostával z troch turnusov v apríli. Žiaci sa dozvedeli o existencii prírodných a syntetických polymérov, o polymerizácii a separácii polymérov ako aj o ich recyklovateľnosti. 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. Ďalej sa prezentovali informácie o vývoji v liečbe cukrovky a biopolyméroch, ktoré boli sprevádzané názornými interaktívnymi ukážkami. Zaujímavé boli aj prezentácie zauzlených foriem molekuly DNA. Počas jarných prázdnin organizoval ústav Jarný vedecký tábor pre žiakov prvého stupňa základných škôl a v júli ústav organizoval Letný vedecký tábor pre žiakov druhého stupňa základných škôl. Ústav bol tiež koordinátorom projektu Letná škola mladých vedcov, ktorý bol finančne podporovaný v rámci výzvy Nadácie ESET 2019: Podpora vedy a vzdelávania.

4. Medzinárodná vedecká spolupráca

4.1. Medzinárodné vedecké podujatia

4.1.1. Medzinárodné vedecké podujatia, ktoré organizácia SAV organizovala v roku 2019 alebo sa na ich organizácii podieľala, s vyhodnotením vedeckého a spoločenského prínosu podujatia

BYPoS 2019, Hotel Marlene, Ošadnica, 40 účastníkov, 25.03.-28.03.2019

8th Bratislava Young Polymer Scientists Workshop 2019

V roku 2019 sa uskutočnila konferencia: Bratislava Young Polymer Scientists Workshop (BYPoS) 2019, ktorá sa začala organizačne zabezpečovať v roku 2018. Tentoraz išlo už o ôsmu konferenciu v tejto konferenčnej sérii, ktorú organizuje Rada mladých vedcov SAV v jeden a pol až dvojročných intervaloch už od roku 2007. Konferencia je zameraná na všetky oblasti makromolekulovej 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 uskutočnila v termíne 25. 3. - 28. 3. 2019 v hoteli Marlene v Ošadnici. Do programu boli zaradené aj príspevky troch pozvaných skúsených prednášateľov. Na 8. ročníku BYPoS boli pozvaní ako domáci prednášateľ Dr. Martin Danko z Ústavu polymérov aj ako zástupca odbornej sekcie 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). Na konferencii sa zúčastnili viacerí mladí slovenskí a zahraniční účastníci, ktorí mali príležitosť nielen prezentovať svoje vedecké 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 pomôcť v ich budúcom vedeckom výskume. Organizátormi konferencie boli Ing. Alena Opáľková - Šišková, PhD., Mgr. Anna Zahoranová, PhD., Mgr. Silvia Podhradská, PhD.

BIMac 2019, 23. Bratislavská medzinárodná konferencia o makromolekulách, Hotel Falkensteiner Bratislava, SR, 35 účastníkov, 30.06.-03.07.2019

V termíne 30. 6. - 3. 7. 2019 sa v hoteli Falkensteiner Bratislava uskutočnil 23. ročník medzinárodnej konferencie Bratislava International Conference on Macromolecules (BIMac) 2019, ktorá sa začala organizovať v roku 2018. Táto konferencia nadväzuje na dlhoročnú tradíciu konferencií, ktorá začala ešte v roku 1968. Tento ročník konferencie bol zameraný na počítačové modelovanie biochemických a biofyzikálnych systémov a javov ako aj mäkkej hmoty s rozmanitými aplikáciami v polymérnej fyzike, biochémií, biofyzike, molekulovej 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 mala zdôrazniť túto významnú úlohu počítačového modelovania a zároveň vytvoriť interdisciplinárne prostredie, kde vedci mohli nadviazať nové kontakty a dať do pozornosti ich najnovšie výsledky a zistenia. Organizátormi konferencie boli Mgr. Zuzana Benková, PhD., Ing. Dušan Račko, PhD., Ing. Peter Čakánek, Mgr. Silvia Podhradská, PhD. a Ing. Alena Opáľková - Šišková, PhD. Konferencia BIMac 2019 bola 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 aj popredné vedecké osobnosti v danej tematike, Prof. M. Natália D. S. Cordeiro z Univerzity v Porte a Prof. Christos N. Likos z Univerzity vo Viedni. V rámci spoločenského programu bola tiež organizovaná prehliadka Bratislavy ukončená spoločnou večerou. Sponzormi konferencie boli vedecké periodiká Computation a Polymers.

4.1.2. Medzinárodné vedecké podujatia, ktoré usporiada organizácia SAV v roku 2020 (anglický a slovenský názov podujatia, miesto a termín konania, meno, telefónne číslo a e-mail zodpovedného pracovníka)

8th International Conference Polymeric Materials in Automotive PMA 2020 and the 24th Slovak Rubber Conference/8. Medzinárodná konferencia polymérnych materiálov v automobilovom priemysle a 24. Slovenská gumárenská konferencia, Kongresové centrum Linder Hotel, Galéria Central v Bratislave, 18.05.-20.05.2020, (Ivan Chodák, 02/ 3229 4340, upolchiv@savba.sk)

POLYMERY 2020, XI. Slovak - Czech conference/POLYMÉRY 2020, XI. Slovensko - Česká konferencia, Kongresové centrum SAV, Zámocká 18, 919 04 Smolenice, 05.10.-08.10.2020, (Martin Danko, 02/ 3229 4353, upoldan@savba.sk)

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
Danko Martin	1	0	0
Chodák Ivan	1	1	0
Lacík Igor	1	0	0
Omastová Mária	3	2	0
Procházka Michal	0	1	0
Spolu	6	4	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 polymérnej divízie (funkcia: člen)

Ing. Igor Novák, PhD.

Society of Plastics Engineers, Antwerpy, 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	Agentúra pre zdravotnícky výskum ČR	1
	Funding scheme SONATA - National Science Center Poland	1
	National Research, Development and Innovation Office Hungary	3
Lacík Igor	Slovenia Research Agency	6
Mosnáček Jaroslav	National Science Center - Poland	1
Omastová Mária	ARRS Grantová agentúra Slovinsko	5
	HRZZ grantová agentúra Chorvátsko	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.**

člen IUPAC-Subcommittee „Modelling of free radical polymerization kinetics and processes“

volený titulárny člen IUPAC Polymérnej divízie

viceprezident Polymérnej divízie IUPAC od roku 2019 na nasledujúce 4 roky

člen Enkapsulačného konzorcia Juvenile Diabetes Research Foundation

Ing. Mária Omastová, DrSc.

národná reprezentantka SR v European Polymer Federation

členka International Organizing Committee EUROFILLERS 2019, Palermo, apríl 2019

členka International Organizing Committee EUPOC Electrospinning techniques – Como – Italy, máj 2019

členka International Advisory board, EPF 2019

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. Koncepcia dlhodobého rozvoja organizácie

5.1. Odporúčania z posledného pravidelného hodnotenia organizácií SAV (akreditácie)

Ústav polymérov SAV bol v poslednej akreditácii za roky 2012-2015 medzinárodným panelom hodnotený ako jeden z dvoch ústavov SAV stupňom A, ktorý znamená významnú pozíciu v medzinárodnom vedeckom priestore.

Medzinárodný panel vo svojich odporúčaníach zdôraznil potrebu:

- identifikácie a posilnenia nosných tém ústavu spolu so zlučovaním vysokého počtu výskumných projektov
- výraznejšieho publikovania výsledkov vo vysoko-impaktovaných časopisoch
- zvýšenia snahy o posilnenie ústavu kvalitnými mladými vedeckými pracovníkmi vrátane získavania zahraničných mladých vedeckých pracovníkov.

5.2. Hlavné body Akčného plánu organizácie a stav ich plnenia

Akčný plán ústavu vychádza z odporúčaní medzinárodného panelu a bol v roku 2017 vypracovaný vedením a Vedeckou radou ústavu s cieľom udržať si vedúce postavenie v slovenskej vede. Ďalšou úlohou vypracovaného Akčného plánu bolo identifikovať slabšie miesta v realizácii výskumných úloh, ktorých odstránenie by mohlo viesť ešte k zvýšeniu kvality vedeckých výstupov a k nastaveniu trvalo udržateľného rozvoja. Aktuálny Akčný plán bol vypracovaný na roky 2018-2022 a obsahuje stratégiu rozvoja na najbližších 5 rokov s dôrazom na zvýšenie kvality vedeckých výstupov, zlepšenie podmienok pre výskum na ústave, stabilizáciu a zlepšenie kvality vedeckých pracovníkov, zvýšenie úrovne vzdelávania na ústave a zlepšenie postavenia v medzinárodnom vedeckom priestore.

V otázke kvality vedeckej práce, zamerania a výstupov sa ústav plánuje zamerať na zníženie fragmentácie vedeckého zamerania a identifikáciu a podporu hlavných nosných vedeckých tém ústavu. Identifikácia kľúčových tém by mala prebiehať na viacerých úrovniach, t.j. excelentný základný výskum vzhľadom na tradíciu ale aj aktuálne “hot topics” a požiadavky partnerských výskumných skupín, a v neposlednom rade výskum smerom k požiadavkám aplikačnej sféry a potrebám spoločnosti. V rámci zlepšenia podmienok na vedu by sa mal ústav zamerať na zabezpečenie potrebného prístrojového vybavenia a zabezpečenie získavania finančnej podpory národnými a medzinárodnými grantovými schémami. V personálnej otázke je stratégia zameraná na potrebu identifikácie excelentných vedeckých pracovníkov pravidelným hodnotením pracovníkov a ich následnej stimulácii, snahe o obrátenie pyramidálnej štruktúry zvýšením podielu doktorandov a post-doktorandov a internacionalizáciu vedeckého tímu na ústave. Cieľom je aj zníženie nehomogénneho príspevku jednotlivých vedeckých pracovníkov a stimulovanie publikovania v špičkových časopisoch a obmedzenie publikovania v časopisoch v 3. a 4. kvartile.

V oblasti personálneho posilnenia mladej vedeckej generácie sa podarilo rozšíriť priestor získavania adeptov na doktorandské štúdium aj na zahraničné univerzity. V rokoch 2019 a 2020 sa otvorilo celkovo deväť nových doktorandských pozícií, z nich sedem zahraničných študentov z Iránu, Ukrajiny a Egyptu. Zvýšením počtu doktorandov v porovnaní s minulými rokmi sa pomohlo dosiahnuť spoluprácu so zahraničnými univerzitami (Irán, UTB Zlín Česká republika), ako aj pokrytie nákladov doktorandských štipendií nad kvótu pridelovanú predsedníctvom SAV presunom financií zo mzdového fondu ústavu. Ďalším spôsobom posilnenia mladej vedeckej generácie sa stalo získavanie post-doktorandov v rámci SAIA a ERASMUS štipendií, štipendií Vyšehradského fondu a podpory mladých vedeckých pracovníkov po úspešnej obhajobe dizertačnej práce pri získavaní post-doktorandských pozícií v zahraničí. Dôležitou súčasťou je tiež hodnotenie mladých vedeckých pracovníkov pri predĺžení pracovnej zmluvy, kde je cieľom podpora mladých vedeckých pracovníkov s vynikajúcimi vedeckými výstupmi a tiež motivácia a usmernenie mladých vedeckých pracovníkov s menej výraznými výsledkami.

Veľká pozornosť sa venovala udržaniu a posilneniu publikačnej činnosti vedeckých pracovníkov ústavu. Ústav čoraz výraznejšie finančne podporuje publikovanie vo vysoko impaktovaných časopisoch a tiež sa významnejšie podporujú prvoautorské práce a práce s korešpondenčným autorom z ústavu. V roku 2020 bude obnovené aj hodnotenie všetkých vedeckých pracovníkov, kde bude

snaha identifikovať a stimulovať vedeckých pracovníkov s výnimočnými vedeckými výstupmi. V roku 2019 bolo uverejnených 71 vedeckých prác, čo znamená priemer 1,74 publikácie na skutočnú kapacitu vedeckých pracovníkov.

V oblasti diseminácie výsledkov je snaha upútať pozornosť firiem využívajúcich najnovšie vedecké poznatky ako aj prezentácia výsledkov vo verejne dostupných médiách. Za týmto účelom vznikla koncom roku 2019 na ústave Rada pre transfer a komunikáciu s firmami a verejnosťou, ktorej hlavnou úlohou bude od januára 2020 zabezpečovať propagáciu ústavu na verejných podujatiach, vytipovanie realizovateľných výstupov, samotné sprostredkovanie komunikácie medzi vedeckými pracovníkmi a firmami, ako aj propagáciu ústavu v médiách.

5.3. Aktualizácia Akčného plánu organizácie v roku 2019

V najbližšom období bude dôležitá implementácia ďalších opatrení uvedených v Akčnom pláne organizácie. Pozornosť vedenia, Vedeckej rady a vedúcich oddelení bude upriamená na identifikáciu nosných tém ústavu a ich podporu naprieč oddeleniami. V súvislosti so zabezpečením excelentného výskumu na Ústave polymérov SAV sa Vedecká rada tiež bude snažiť o vytváranie multidisciplinárnych tímov schopných zapojiť sa do veľkých medzinárodných projektov, ktorých získavanie je veľkou výzvou.

Ďalším nástrojom na zvýšenie kvality vedeckej práce by malo byť v nasledujúcom období zvýšenie prednáškovej činnosti na ústave a oživenie pozvaných prednášok výnimočných domácich a zahraničných osobností vedy. S tým súvisí aj účasť takýchto osobností na konferenciách organizovaných Ústavom polymérov a využitie organizovaných konferencií na zviditeľnenie a propagáciu ústavu.

Vo februári 2020 je naplánované v poradí už tretie stretnutie vedenia a Vedeckej rady s Externou radou riaditeľa. Výstupy z tohto stretnutia budú využité na kritické zhodnotenie plnenia Akčného plánu a jeho prípadnú modifikáciu.

6. Spolupráca s univerzitami/vysokými školami a inými subjektmi v oblasti vedy a techniky, okrem aktivít uvedených v kap. 2, 3, 4

6.1. Spoločné pracoviská organizácie

6.1.1. Spolupráca s univerzitami/VŠ (fakultami)

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

Oblasť spolupráce: Prepojenie nano a textlných technológií s umením

Sídlo spoločného pracoviska (ak je vytvorené):

Začiatok spolupráce: 2016

Zhodnotenie: Spolupráca s ateliérom textilu Vysokej školy výtvarných umení má na Ústave polymérov SAV už štvorročnú tradíciu. Tento rok bola spolupráca venovaná dizajnu interiérových objektov s detailným zameraním na možnosti prenášania a využitia reliefu z kovového kolektora na povrch netkaných textílií pripravovaných v elektrickom poli a tiež využitiu farieb pri elektrostatickom zvlákňovaní. V súčasnosti sa pripravujú aj objekty na pripravovanú výstavu a konferenciu, organizovanú v rámci projektu: Design and innovation, programu spolupráce Interreg SK-AT s nositeľmi projektu: SCD Bratislava a partnermi: MAK Viedeň, AWK University vo Viedni a VŠVU v Bratislave. Výsledkom tohtoročnej spolupráce sú katalóg: NANO-Art colours, druhé vydanie katalógu NANO-Art.

Pozn.: uvádzajte len tie spolupráce, na ktoré má organizácia zmluvu resp. memorandum o zriadení spoločného pracoviska, resp. o vzájomnej spolupráci v konkrétnej oblasti výskumu

6.1.2. Spoločné pracoviská s inými organizáciami SAV

Názov organizácie: Centrum pre využitie pokročilých materiálov SAV

Oblasť spolupráce: Zmluva o spoločnom pracovisku

Sídlo spoločného pracoviska (ak je vytvorené): ÚPo SAV

Začiatok spolupráce: 2019

Zhodnotenie:

Pozn.: uvádzajte len tie spolupráce, na ktoré má organizácia zmluvu resp. memorandum o zriadení spoločného pracoviska, resp. o vzájomnej spolupráci v konkrétnej oblasti výskumu

6.2. Spoločné pracoviská organizácie s inými inštitúciami mimo SAV a VŠ

Názov inštitúcie: ICARST n.o., International Centre for Applied Research and Sustainable Technology

Oblasť spolupráce: Spoločné pracovisko pre výskum trvalo udržateľných plastov

Sídlo spoločného pracoviska (ak je vytvorené): ICARST n.o. a ÚPo SAV

Začiatok spolupráce: 2019

Zhodnotenie:

Pozn.: uvádzajte len tie spolupráce, na ktoré má organizácia zmluvu resp. memorandum o zriadení spoločného pracoviska, resp. o vzájomnej spolupráci v konkrétnej oblasti výskumu

6.3. Spoločné projekty s univerzitami a ostatnými inštitúciami mimo SAV

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

6.4. Iné typy spoločných aktivít s inštitúciami mimo SAV

7. Aplikácia výsledkov výskumu v spoločenskej a hospodárskej praxi

7.1. Výsledky výskumu organizácie aplikované v praxi

Výsledok výskumu: Biologicky degradovateľné bioplasty

Kto využíva výsledok: PANARA s.r.o.

Rok využívania od: 2011

Rok využívania do: 0000

Projekt:

Rok vytvorenia výsledku: 2011

Autori výsledku: Alexy Pavol, Chodák Ivan, Bakoš Dušan, Bugaj Peter, Pavlačková Miroslava, Tomanová Katarína, Benovič František, Plavec Roderik, Mihalík Michal, Botošová Monika

Výsledok výskumu: Polymérne kompozity pre 3D tlač

Kto využíva výsledok: MYMEDIA, s.r.o.

Rok využívania od: 2017

Rok využívania do: 0000

Projekt: VEGA 2/0093/16

Rok vytvorenia výsledku: 2017

Autori výsledku: Špitálsky Zdenko, Kováčová Mária, Ďuriš Vojtech, Vysopal Marek, Svoboda Peter

Výsledok výskumu: Kompozitný sorbent na odstraňovanie kontaminantov z vôd

Kto využíva výsledok: AQUA+TECH SPECIALTIES SA.

Rok využívania od: 2018

Rok využívania do: 0000

Projekt:

Rok vytvorenia výsledku: 2013

Autori výsledku: Novák Ivan, Berek Dušan, Munka Karol, Varga Stanislav, Karácsonyová Monika

7.2. Kontraktový – zmluvný výskum (vrátane zahraničných kontraktov)

Názov/účel kontraktového výskumu: Charakterizácia povrchu sklenených vzoriek

Zadávateľ výskumného kontraktu: Türkiye Sise ve Cam Fabrikalari a.s.

Začiatok spolupráce: 2019

Ukončenie spolupráce: trvá

Finančný prínos pre organizáciu (€): 1630

Názov/účel kontraktového výskumu: Charakterizácia vstupných polymérov a hydrogélových mikrokapsúl pre klinickú transplantáciu enkapsulovaných buniek (R&D servis)

Zadávateľ výskumného kontraktu: Otsuka Pharmaceutical Factory, Inc., Japan

Začiatok spolupráce: 2019

Ukončenie spolupráce: trvá

Finančný prínos pre organizáciu (€): 35820

Názov/účel kontraktového výskumu: Určenie kinetických parametrov a modelovanie polymerizačných procesov (R&D servis)

Zadávateľ výskumného kontraktu: BASF SE, Germany

Začiatok spolupráce: 2019

Ukončenie spolupráce: trvá

Finančný prínos pre organizáciu (€): 30000

Názov/účel kontraktového výskumu: 1ks vzorky pomocou infračervenej spektroskopie
Zadávateľ výskumného kontraktu: Václav Doskočil, Jihlava, ČR
Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 100

Názov/účel kontraktového výskumu: Analýza uhlíkových sedimentov
Zadávateľ výskumného kontraktu: NAFTA a.s.
Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 80

Názov/účel kontraktového výskumu: Analýzy XPS
Zadávateľ výskumného kontraktu: Elektrotechnický ústav SAV
Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 345

Názov/účel kontraktového výskumu: Charakterizácia alginátov
Zadávateľ výskumného kontraktu: Beta 02 Technologies Ltd., Izrael
Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 3600

Názov/účel kontraktového výskumu: Lepenie UZ meničov na nerezový substrát
Zadávateľ výskumného kontraktu: ECOSON, s.r.o.
Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 5014

Názov/účel kontraktového výskumu: Lepidlo Elektropol Blister
Zadávateľ výskumného kontraktu: SOS Eletronic, s.r.o.
Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 1085

Názov/účel kontraktového výskumu: Merania na kónickom kalorimetri
Zadávateľ výskumného kontraktu: KINGSPAN a.s., Hradec Králové, ČR
Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 347

Názov/účel kontraktového výskumu: Merania na kónickom kalorimetri a charakterizácia povrchov materiálov
Zadávateľ výskumného kontraktu: Univ. T. Bati v Zlíne, ČR
Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 1863

Názov/účel kontraktového výskumu: Merania XPS
Zadávateľ výskumného kontraktu: Fakulta matematiky, fyziky a informatiky UK

Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 240

Názov/účel kontraktového výskumu: Merania XPS
Zadávateľ výskumného kontraktu: Lekárska fakulta UK
Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 180

Názov/účel kontraktového výskumu: Merania XPS
Zadávateľ výskumného kontraktu: STU Bratislava, FCHPT
Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 300

Názov/účel kontraktového výskumu: Merania XPS
Zadávateľ výskumného kontraktu: Univ. of Natural Res. Vienna
Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 120

Názov/účel kontraktového výskumu: Meranie vzoriek DMA
Zadávateľ výskumného kontraktu: Aerospace a Advanced Composites
Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 556

Názov/účel kontraktového výskumu: Pokrývanie vzoriek Mg zliatin
Zadávateľ výskumného kontraktu: RHP - Technology
Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 1000

Názov/účel kontraktového výskumu: Stanovenie molekulových charakteristík SAM vzoriek
Zadávateľ výskumného kontraktu: Volkswagen Slovakia, a.s.
Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 900

Názov/účel kontraktového výskumu: Stanovenie obsahu NCO väzieb v 4 vzorkách a merania XPS
Zadávateľ výskumného kontraktu: VIPO a.s. Partizánske
Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 540

Názov/účel kontraktového výskumu: Testovanie ENVI Plast
Zadávateľ výskumného kontraktu: Necker, s.r.o.
Začiatok spolupráce: 2019
Ukončenie spolupráce: 2019
Finančný prínos pre organizáciu (€): 200

Názov/účel kontraktového výskumu: Testy horľavosti a biologickej nezávadnosti komerčného ochranného prípravku

Zadávateľ výskumného kontraktu: NanoFusion EU, Praha, ČR

Začiatok spolupráce: 2019

Ukončenie spolupráce: 2019

Finančný prínos pre organizáciu (€): 1010

7.3. Iné formy aplikácie výsledkov výskumu v spoločenskej a hospodárskej praxi

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. v odbore Makromolekulová chémia	predseda
Ing. Igor Lacík, DrSc.	Ministerstvo zdravotníctva SR	člen Vedeckej rady
	Komisia pre obhajoby DrSc. v odbore Makromolekulární chemie ČR	člen
	Ministerstvo školstva, vedy, výskumu a športu SR	člen Slovenskej komisie pre vedecké hodnosti SKVH – podskupina odborov vedy a techniky: chemické vedy
	Komisia pre obhajoby DrSc. v odbore biofyzika	člen
Mgr. Jaroslav Mosnáček, DrSc.	Komisia pre obhajoby DrSc. v odbore Makromolekulární 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	53	tlač	15	TV	2
rozhlas	4	internet	16	exkurzie	0
publikácie	1	multimediálne nosiče	0	dokumentárne filmy	1
iné	10				

9.2. Vedecko-organizačná činnosť

Tabuľka 9b Vedecko-organizačná činnosť

Názov podujatia	Domáca/ medzinárodná	Miesto	Dátum konania	Počet účastníkov
71. Zjazd chemikov	domáca	Starý Smokovec	09.09.-13.09.2019	330
BYPoS 2019	medzinárodná	Hotel Marlene, Ošadnica	25.03.-28.03.2019	40
BIMac 2019, 23. Bratislavská medzinárodná konferencia o makromolekulách	medzinárodná	Hotel Falkensteiner Bratislava, SR	30.06.-03.07.2019	35

9.3. Účasť na výstavách

Názov výstavy: Festival Expo Conference: Touch the Future

Miesto konania: Industrial Palace and outdoor, Praha, CZ, 10.9. - 11.9.2019

Dátum: 10.9.2019

Zhodnotenie účasti: Na výstave Touch the Future v Prahe prezentoval Ústav polymérov SAV diela, ktoré vznikli pod hlavičkou NANO-Art. Šperky a interiérové doplnky vyrobené z plastového odpadu technológiou elektrostatického zvlákňovania mali veľký úspech. Svedčí o tom aj veľký záujem o spoluprácu zo strany módnych návrhárov a dizajnérov.

Názov výstavy: 46. medzinárodná poľnohospodárska a potravinárska výstava Agrokomplex

Miesto konania: Nitra, 22.8. - 25.8.2019

Dátum: 22.8.2019

Zhodnotenie účasti: Výstava v Stánku ÚPo SAV pozostávala zo súboru vybraných špeciálnych adhezív, biodegrauateľných polymérnych materiálov, polymérnych materiálov spracovaných 3D tlačou a umeleckých artefaktov spracovaných elektrostatickým zvlákňovaním. Získali sa užitočné poznatky a kontakty pre budúcu spoluprácu.

Názov výstavy: Bratislava Mini Market Faire - Najväčšia svetová prehliadka inovácií, kreativity a dômyselnosti

Miesto konania: Stará tržnica, Bratislava

Dátum: 15.11.2019

Zhodnotenie účasti: Na výstave Bratislava Mini Market Faire Ústav polymérov SAV vystavoval interiérové doplnky a miniatúry, ktoré boli vyrobené pomocou elektrostatického zvlákňovania roztokov PET. ÚPo SAV sa na tomto podujatí zúčastnil s odkazom ako kreatívne spracovať plastový odpad a vdýchnuť plastu nový život - "plast nemusí byť náš nepriateľ!"

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
Benková Zuzana	0	0	1
Čakánek Peter	0	1	0
Chodák Ivan	0	1	0
Opálková Šišková Alena	0	2	0
Podhradská Silvia	0	2	0
Račko Dušan	0	0	1
Zahoranová Anna	0	1	0
Spolu	0	7	2

9.5. Členstvo v redakčných radách časopisov

Mgr. Zuzana Benková, PhD.

MDPI Computation (funkcia: editorka špeciálneho čísla)

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. Alena Opálková Šišková, PhD.

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

Ing. Dušan Račko, PhD.

Frontiers in Molecular Biophysics (funkcia: review editor)
Frontiers in Physics (funkcia: review editor)
Frontiers in Physiology (funkcia: review editor)
MDPI Computation (funkcia: guest editor)
MDPI Polymers - sekcia Biopolymers (funkcia: guest editor)

Mgr. Zdenko Špitálsky, PhD.

MDPI Processes špec. číslo: Preparation and Characterization of Hybrid Nanocomposites
(funkcia: guest editor)

9.6. Činnosť v domácich vedeckých spoločnostiach

Ing. Nikola Bugárová, PhD.

Mladí vedci SAV (funkcia: členka vedenia)
Rada mladých vedcov ÚPo SAV (funkcia: členka vedenia)

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.

Slovenský národný komitét IUPAC (funkcia: člen)

Ing. Alena Opálková Šišková, PhD.

SNMT - Spoločnosť pre nové materiály a technológie (funkcia: hospodár)

RNDr. Michal Procházka, PhD.

Mladí vedci SAV (funkcia: predseda)
Odborná skupina Polyméry pri SCHS (funkcia: člen výboru)
Slovenská chemická spoločnosť (funkcia: člen predsedníctva)

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 2019 týkala mnohých vystúpení formou tlače, rozhlasu, televízie, internetu, osobných stretnutí a podobne. Výsledky vedeckej a výskumnej činnosti ústavu ako aj zameranie riešených projektov boli prezentované pre širokú verejnosť aj tento rok na Európskej noci výskumníkov, Dni otvorených dverí či Víkende so SAV. Deti a mládež mali príležitosť dozvedieť sa viac o vlastnostiach polymérnych materiálov a o činnosti Ústavu polymérov SAV na sérii podujatí s názvom Nájdi v sebe vedca, ďalej na Jarnom vedeckom tábore, Letnom vedeckom tábore a na Letnej škole mladých vedcov. Aplikovaný výskum ústav prezentoval na výstave Agrokomplex. V roku 2019 organizoval ústav dve vedecké konferencie; 8. ročník konferencie Bratislava Young Polymer Scientists BYPoS 2019 (25.3.-28.3, Oščadnica) a 23. ročník konferencie Bratislava International Conference on Macromolecules BIMac 2019 (30.6.-3.7, Bratislava).

V roku 2019 pokračovala aj spolupráca medzi Ústavom polymérov SAV (Ing. Alena Opálková-Šišková, PhD.) a ateliérom textilu na Vysokej škole výtvarných umení vo využití moderných technológií pre dizajn úžitkového umenia. Z tejto spolupráce boli tiež publikované dva katalógy; NANO-Art a NANO-Art colours.

K zviditeľneniu Ústavu polymérov SAV medzi širokou verejnosťou tiež prispeli viaceré ocenenia, ktoré získali vedeckí pracovníci ústavu. Ing. Mária Omastová, DrSc. získala Pribinov kríž I. triedy - ocenenie prezidenta SR Andrej Kisku pri príležitosti 26. výročia vzniku Slovenskej republiky. Ing. Igor Lacík, DrSc. postúpil až do finále ESET Science Award 2019 v kategórii Výnimočná vedecká osobnosť. Vo výročnej správe Ministerstva zdravotníctva SR za rok 2018 pre oblasť vedy, výskumu a inovácií (vydaná v apríli 2019) bol Výskum antibakteriálnych polymérnych kompozitov na báze uhlíkových kvantových bodiek vedený Mgr. Zdenkom Špitálskym, PhD. zaradený ako Excelentný biomedicínsky spot. Cenu za najlepší poster získala Ing. Markéta Ilčíková, PhD. na konferencii 4th International Conference on Rheology and Modeling of Materials v Maďarsku a Ing. Angela Kleinová na 71. zjazde chemikov vo Vysokých Tatrách. Cenu za tretiu najlepšiu prezentáciu na konferencii BYPos v Oščadnici získal MSc. Gamal Zain a na Celoslovenskej študentskej vedeckej konferencii získala študentka Petra Maxiánová pod vedením Ing. Anity Andicsovej-Eckstein, PhD. 2. miesto za najlepšiu prednášku.

V roku 2019 bol vydaný aj nový leták Ústavu polymérov SAV.

Práca na téme liečby cukrovky je propagovaná cez neinvestičný fond Cukrovka n.f. (www.cukrovkanf.sk). Významná je aj spolupráca s chemickou firmou BASF.

10. Činnosť knižnično-informačného pracoviska

10.1. Knižničný fond

Tabuľka 10a Knižničný fond

Knižničné jednotky spolu		8161
z toho	knihy a zviazané periodiká	8158
	audiovizuálne dokumenty	0
	elektronické dokumenty (vrátane digitálnych)	5
	mikroformy	0
	iné špeciálne dokumenty - dizertácie, výskumné správy	150
	Rukopisy, vzácne tlače	0
Počet titulov dochádzajúcich periodík		1
z toho zahraničné periodiká		0
Ročný prírastok knižničných jednotiek		5
v tom	kúpou	5
	darom	0
	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)		431
v tom z r. 1	prezenčné výpožičky	11
	absenčné výpožičky	420
v tom z r. 1	odborná literatúra pre dospelých	431
	výpožičky periodík	11
MVS iným knižniciam		2
MVS z iných knižníc		2
MMVS iným knižniciam		0
MMVS z iných knižníc		0
Počet vypracovaných bibliografií		0
Počet vypracovaných rešerší		215

10.3. Používatelia

Tabuľka 10c Používatelia

Registrovaní používatelia	47
Návštevníci knižnice spolu (bez návštevníkov podujatí)	230

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 €	584

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)

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

Mgr. Martin Danko, PhD.

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

Mgr. Jaroslav Mosnáček, DrSc.

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

12. Hospodárenie organizácie

12.1. Výdavky organizácie

Tabuľka 12a Výdavky organizácie (skutočnosť k 31. 12. 2019 v €)

Typ organizácie (RO,PO)		Zdroje, z ktorých sa kryli jednotlivé výdavky			
Výdavky	Spolu	kapitola SAV (111)	iné štátne a verejné zdroje	ostatné zdroje	% krytia z kapitoly SAV
1. Bežné výdavky	2699573,55	1603432,82	477941,95	618198,78	59,33
z toho: mzdy (610)	1175504,28	967871,43	122741,59	84891,26	82,33
vedecká výchova štipendiá (640)	107619,00	107619,00*	0,00	0,00	100,00
poistné a príspevok do poisťovní (620)	392665,11	322141,01	43242,67	27281,43	82,04
tovary a služby (630)	929996,13	205801,38	221482,69	502712,06	21,75
transfery partnerom projektov (640)	93789,03	0,00	90475,00	3314,03	0,00
2. Kapitálové výdavky	58798,14	55852,05	0,00	2946,09	94,98
z toho: obstarávanie kapitálových aktív	58798,14	55852,05	0,00	2946,09	94,98
kapitálové transfery	0,00	0,00	0,00	0,00	0,00

* Položka obsahuje aj hodnotu presunutých prostriedkov za doktorandov, ktorí boli prijatí nad stanovený limit.

12.2. Zdroje financovania organizácie

Tabuľka 12b Zdroje financovania organizácie (skutočnosť k 31. 12. 2019 v €)

Typ organizácie (RO,PO)		Z toho kategórie			
Zdroje	Spolu	Kapitálové zdroje	zdroje na mzdy (610)	zdroje na odvody do poisťovní (620)	zdroje na transfery partnero m projektov
1. kapitola SAV (111)	1663328,05	55852,05	967871,43	322141,01	317463,56
z toho: VEGA	94066,00	14500,00	0,00	0,00	79566,00
MVTS výskumné projekty	84671,00	12430,00	0,00	0,00	72241,00
MVTS podpora	0,00	0,00	0,00	0,00	0,00
SASPRO/MOREPRO	0,00	0,00	0,00	0,00	0,00
Vydávanie časopisov	0,00	0,00	0,00	0,00	0,00
Vedecká výchova (štipendiá)	108259,00	0,00	0,00	0,00	108259,00
OTAS (630)	86319,61	28922,05	0,00	0,00	57397,56
2. ŠF EÚ vr. fin. zo ŠR	330336,25	0,00	0,00	0,00	330336,25
3. medzinárodné grantové projekty	168684,81	0,00	0,00	0,00	168684,81
z toho: H2020					
4. iné štátne a verejné zdroje (spolu)	137601,84	0,00	0,00	0,00	137601,84
z toho: APVV					
podpora z kapitoly MŠVVaŠ SR (stimuly)					
5. ostatné zdroje	165983,71	0,00	0,00	0,00	165983,71
z toho: príjmy z prenájmu	15592,00				15592,00
príjmy z podnikateľskej činnosti	0,00	0,00	0,00	0,00	0,00
príjmy z expertnej činnosti a služieb	150391,71	0,00	0,00	0,00	150391,71

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 ostrovčiekov

Opis: Neinvestičný fond Cukrovka n.f. s cieľom získať prostriedky najmä na:

- podporu výskumu a všetkých aktivít spojených s liečbou cukrovky transplantáciou pankreatických ostrovčiekov, 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

Okrem rôznych činností Ústavu polymérov SAV spomenutých v predchádzajúcich kapitolách stoja za zmienku aj aktivity prinášajúce nezanedbateľný finančný príjem pre ústav z iných ako grantových zdrojov. Tieto aktivity pozostávali z rôznych meraní, analýz, charakterizácií, testov a iných servisných činností realizovaných pre domáce a zahraničné firmy ako aj vysokoškolské pracoviská.

15. Vyznamenania, ocenenia a ceny udelené pracovníkom organizácie v roku 2019

15.1. Domáce ocenenia

15.1.1. Ocenenia SAV

15.1.2. Iné domáce ocenenia

Bugárová Nikola

Ocenenie za najlepšiu publikáciu pre vedca do 35 rokov, 1. miesto

Oceňovateľ: VR ÚPo SAV

Eckstein Anita

Cena za najlepšiu prednášku na Celoslovenskej študentskej vedeckej konferencii Aplikované prírodné vedy 2019

Oceňovateľ:

Opis: Cena za prednášku P. Maxiánová, Z. Tokárová, A. Eckstein: Príprava potenciálnych fotochemicky aktívnych iniciátorov pre polymerizačné reakcie

Kleinová Angela

Diplom SCHS za najlepšiu posterovú prezentáciu na 71. zjazde chemikov, 9.9.-13.9. 2019, Vysoké Tatry

Oceňovateľ: SCHS

Opis: Poster autorského kolektívu M. Mičušík, A. Kleinová, M. Procházka, S. Podhradská, A. Rabayová, G. Bodor, M. Omastová. Chemická analýza plastového odpadu pomocou FTIR a XPS zo zberu uskutočneného pozdĺž Dunaja v Bratislave

Kováčová Mária

Ocenenie za najlepšiu publikáciu pre vedca do 35 rokov, 2. miesto

Oceňovateľ: VR ÚPo SAV

Lacík Igor

Finalista ESET Science Award 2019, kategória Výnimočná vedecká osobnosť

Oceňovateľ: ESET

Omastová Mária

Pribinov kríž I. triedy

Oceňovateľ: Prezident SR Andrej Kiska

Špitálsky Zdenko

Excelentný biomedicínsky spot

Oceňovateľ: Výročná správa MZ SR za rok 2018 pre oblasť vedy, výskumu a inovácií

Opis: Výskum antibakteriálnych polymérnych kompozitov na báze uhlíkových kvantových bodiek

Zain Gamal

Cena za najlepšiu prezentáciu na konferencii BYPoS, 25.3.-28.3. 2019 Oščadnica, 3. miesto

Oceňovateľ: Rada mladých vecov pri ÚPo SAV

Opis: Cena za poster G. Zain, J. Mosnáček: Photochemically induced atom transfer radical polymerization of Tulipalin A.

Zain Gamal

Ocenenie za najlepšiu publikáciu pre vedca do 35 rokov, 3. miesto

Oceňovateľ: VR ÚPo SAV

15.2. Medzinárodné ocenenia

Ilčíková Markéta

Best Poster Award of 4th International Conference on Rheology and Modeling of Materials, 7.-11.10. 2019, Miskolc, Hungary

Oceňovateľ:

Opis: Poster autorov M. Ilčíková, M. Maslowski, M. Zygo, M. Mrlik, J. Mosnáček, J. Pietrasik: PMMA/SAN blends with graphene oxide polymer hybrids: Investigation of compatibility by melt rheology

Špitálsky Zdenko

Publikácia zaradená medzi Editors collection: RSC Advances v kategóriách Photodynamic Therapy a Graphene

Oceňovateľ: Royal Society of Chemistry

Opis: Publikácia autorského kolektívu: Z.M. Marković, S.P. Jovanović, P.Z. Mašković, M. Danko, M. Mičušík, V.B. Pavlović, D.D. Milivojvić, A. Kleinová, Z. Špitalský, B.M. Todorović Marković, RSC Adv, 2018, 8, 22876-22886

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)

Dňa 16.4.2019 sme z Úradu SAV obdržali oficiálnu žiadosť pani Mgr. Svetluši Surovej, PhD. o poskytnutie informácií o cestovných náhradách vyúčtovaných počas projektu SASPRO. Tie jej boli na základe zákona č. 211/2000 Z. z. o slobodnom prístupe k informáciám v znení neskorších predpisov (Zákon o slobode informácií) poskytnuté v elektronickej forme dňa 13.5.2019. Informáciu o zaslaní týchto podkladov sme postúpili aj pani Ing. Zuzane Hrabovskej-Palíkovej zo SASPRO, pričom riešenie tejto kauzy je už v kompetencii Úradu SAV.

17. Problémy a podnety pre činnosť SAV

Za posledné roky sa na ústave 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. Nová navrhovaná mzdová reforma však vyzdvihuje stabilizáciu počtu zamestnancov na SAV pred ich kvalitou, tým že neberie do úvahy špecifiká jednotlivých ústavov a tým vedie k obmedzovaniu voľnosti riaditeľov uskutočňovať aktívnu personálnu politiku vzhľadom na dané špecifiká svojho ústavu. Navrhovaná reforma sa tak snaží riešiť personálny problém len niekoľkých „vyskočených ústavov“ s možným negatívnym dopadom na ústav, ktoré sú aktívne v napĺňaní odporúčaní akreditačnej komisie a svojich externých rád. Závislosť financovania od aktuálneho počtu zamestnancov s možnosťou len minimálneho odmeňovania za ich výkon môže však viesť k odchodu tých najkvalitnejších vedeckých pracovníkov a problém ich náhrady novými vedeckými pracovníkmi, vzhľadom na nízky záujem o vedeckú kariéru absolventov VŠ na Slovensku a nízke tarifné platy, za ktoré nie je možné získať kvalitných ľudí zo zahraničia. Nakoniec reforma, ktorá má stabilizovať počet zamestnancov, zamedzením ich prepúšťania, môže viesť práve k opačnému efektu – znižovaniu stavu z dôvodu odchodu vedeckých pracovníkov. V tomto prípade však budú odchádzať tí kvalitnejší, čo môže viesť k znižovaniu kvality výskumu na Slovensku. Cieľom mzdovej reformy by mala byť práve vyššia kvalita výskumu a mzdová reforma by mala teda viesť k postupnému zvyšovaniu podielu výkonového financovania. Ústavom by mala zostať zachovaná aj možnosť zamestnať po odchode samostatných a vedúcich zamestnancov do dôchodku kvalitných mladých vedeckých pracovníkov bez toho, aby prišli takýmto omladzovaním o časť financií.

Na ústave je cítiť celkový pokles záujmu čerstvých absolventov VŠ na Slovensku o PhD štúdium. Na druhej strane je snaha tento deficit kompenzovať doktorandmi zo zahraničia (Srbsko, Irán, Egypt, Ukrajina). Na jednej strane je tento stav pozitívny z hľadiska budovania medzinárodného prostredia na ústave, na druhej strane tu hrozí nedostatok mladých postdoktorandov vychovaných ústavom za predpokladu návratu zahraničných študentov po ukončení ich PhD štúdia domov. Vo vyspelých západných krajinách práve postdoktorandi sú preferovaní vo firmách, pretože majú potenciál prispievať inováciami a taktiež bežne zabezpečujú prepojenie výskumu na univerzitách/výskumných inštitúciách s priemyslom. Na Slovensku je bohužiaľ v súčasnosti situácia opačná, t.j. firmy väčšinou preferujú zamestnávať absolventov po druhom stupni VŠ štúdia, pretože absolventov PhD štúdia berú ako „overeducated“, čo má za následok minimálny záujem o PhD štúdium ako aj slabé prepojenie výskumu s priemyslom.

Ústav polymérov SAV sa snaží naplno využívať rôzne možnosti získavania postdoktorandov z domáceho aj zahraničného prostredia napr. cez agentúru SAIA a program ERASMUS, cez ktoré prišlo pracovať na ústav v roku 2019 na dobu minimálne jedného mesiaca viacero postdoktorandov alebo študentov z rôznych krajín sveta. Keďže zahraničných doktorandov a postdoktorandov hlavne zo štátov, ktoré nie sú členmi EU pribúda celoplošne na celej SAV, ústav by privítal, keby sa etablovanie týchto pracovníkov riešilo na úrovni SAV a nie v rámci jednotlivých ústavov. Takéto riešenie sa javí byť efektívnejšie a jednoduchšie.

Na Ústave polymérov SAV by bola vítaná väčšia súčinnosť predsedníctva SAV s jednotlivými ústavmi. Javí sa ako 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. Zuzana Benková, PhD., 02/ 3229 4314

Mgr. Zuzana Huljaková, 02/ 3229 4326

Ing. Angela Kleinová, 02/ 3229 4368

Mgr. Juraj Kronek, PhD., 02/ 3229 4366

Mgr. Monika Majerčíková, 02/ 3229 4319

Mgr. Jaroslav Mosnáček, DrSc., 02/ 3229 4353

Mgr. Zdenko Špitálsky, PhD., 02/ 3229 4325 (4322, 4330, 4306)

Riaditeľ organizácie SAV

Predseda vedeckej rady

.....
Mgr. Jaroslav Mosnáček, DrSc.

.....
Mgr. Juraj Kronek, PhD.

Prílohy

Príloha A

Zoznam zamestnancov a doktorandov organizácie k 31.12.2019

Zoznam zamestnancov podľa štruktúry

	Meno s titulmi	Úväzok (v %)	Ročný prepočítaný úväzok
Vedúci vedeckí pracovníci DrSc.			
1.	Ing. Josef Bartoš, DrSc.	80	0.80
2.	RNDr. Peter Cifra, DrSc.	100	1.00
3.	Prof. Ing. Ivan Chodák, DrSc.	100	1.00
4.	Ing. Igor Lacík, DrSc.	100	1.00
5.	Mgr. Jaroslav Mosnáček, DrSc.	100	1.00
6.	Ing. Mária Omastová, DrSc.	70	0.70
7.	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. Markéta Ilčíková, PhD.	100	0.00
7.	Ing. Ivica Janigová, PhD.	100	1.00
8.	Mgr. Jozef Kollár, PhD.	100	1.00
9.	Mgr. Juraj Kronek, PhD.	100	1.00
10.	Mgr. Zuzana Kroneková, PhD.	100	1.00
11.	Ing. Matej Mičušík, PhD.	100	1.00
12.	Mgr. Katarína Mosnáčková, PhD.	100	1.00
13.	Ing. Igor Novák, PhD.	20	0.20
14.	Falko Pippig, PhD.	100	1.00
15.	Ing. Dušan Račko, PhD.	100	1.00
16.	Mgr. Zdenko Špitálsky, PhD.	100	1.00
Vedeckí pracovníci			
1.	Ing. Katarína Borská, PhD.	100	0.90
2.	Ing. Nikola Bugárová, PhD.	100	0.49
3.	Ing. Gabriela Hloušková, PhD.	100	0.00

4.	Ing. Anna Chovancová, PhD.	100	1.00
5.	Ing. Daniela Johec Mošková, PhD.	60	0.00
6.	Ing. Lucia Kleščíková, PhD.	100	1.00
7.	Ing. Jaroslav Kuliček, PhD.	100	0.00
8.	Ing. Daniela Moravčíková, PhD.	100	0.00
9.	Ing. Alena Opálková Šišková, PhD.	100	1.00
10.	Mgr. Michal Pelach, PhD.	100	0.70
11.	Mgr. Silvia Podhradská, PhD.	10	0.81
12.	RNDr. Michal Procházka, PhD.	100	1.00
13.	Ing. Michaela Sedničková, PhD.	100	0.00
14.	Mgr. Petra Šrámková, PhD.	100	0.00
15.	Ing. Helena Švajdlenková, PhD.	100	1.00
Odborní pracovníci s VŠ vzdelaním (výskumní a vývojoví zamestnanci)			
1.	Ing. Róbert Balogh	10	0.10
2.	Ing. Zuzana Cseriová	100	1.00
3.	Ing. Peter Čakánek	10	0.10
4.	PharmDr. Faeze Dorchei	10	0.10
5.	Ing. Eva Dušička	10	0.10
6.	RNDr. Agnesa Fiedlerová	80	0.80
7.	Ing. Ana Hološ	10	0.10
8.	Ing. Ľudmila Hrčková	30	0.30
9.	Mgr. Zuzana Huljaková	100	0.50
10.	MSc. Alireza Joorabloo	10	0.02
11.	Ing. Angela Kleinová	100	1.00
12.	Mgr. Igor Koreň	20	0.20
13.	Mgr. Mária Kováčová	10	0.10
14.	Mgr. Monika Majerčíková	100	1.00
15.	Ing. Monika Majerčíková	10	0.10
16.	Ing. Ľuboš Matis	100	0.61
17.	Mgr. Veronika Némethová, PhD.	10	0.00
18.	Ing. Zuzana Nógellová	100	1.00
19.	MSc. Hamed Peidayesh	100	1.00
20.	Ing. Renáta Rusková	10	0.04
21.	MSc. MohammadHossein Sharifian	10	0.02
22.	MSc. Yaryna Soyka	10	0.02

23.	MSc. Anastasiia Stepura	10	0.68
24.	MSc. Gamal Zain	10	0.10
Odborní pracovníci ÚSV			
1.	Andrea Balážová	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	0.00
Ostatní pracovníci			
1.	Peter Kečkės	40	0.35
2.	Apostol Todorov Nedelčev	40	0.40
3.	Zuzana Ondrušová	100	1.00
4.	Daniela Pírová	100	1.00

Zoznam zamestnancov, ktorí odišli v priebehu roka

	Meno s titulmi	Dátum odchodu	Ročný prepočítaný úväzok
Vedúci vedeckí pracovníci DrSc.			
1.	Štefan Chmela, DrSc.	25.9.2019	0.43
Vedeckí pracovníci			
1.	Ing. František Ivanič	30.8.2019	0.07
2.	Ing. Miroslava Lukešová, PhD.	31.8.2019	0.00
3.	Ing. Marta Malíková, PhD.	6.4.2019	0.00
4.	Ing. Dušana Treľová, PhD.	30.11.2019	0.95
5.	Ing. Lucia Uhelská, PhD.	31.8.2019	0.26
6.	Mgr. Anna Zahoranová, PhD.	31.8.2019	0.71
Odborní pracovníci s VŠ vzdelaním (výskumní a vývojoví zamestnanci)			

1.	Ing. Katarína Csomorová	8.5.2019	0.75
2.	Ing. Gerhard Grueber	30.6.2019	0.56
3.	Mgr. Maroš Smolíček	31.8.2019	0.16
Odborní pracovníci ÚSV			
1.	Viera Bombová	31.5.2019	0.47
Ostatní pracovníci			
1.	Peter Kečkész	31.12.2019	0.35

Zoznam doktorandov

	Meno s titulmi	Škola/fakulta	Študijný odbor
Interní doktorandi hrazení z prostředkov SAV			
1.	Mgr. Rehab Abd-Elazeem	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
2.	Ing. Róbert Balogh	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 Dušička	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.	Mgr. Alireza Joorabloo	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.	Ing. Renáta Rusková	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
11.	Mgr. MohammadHossein Sharifian	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
12.	Yaryna Soyka	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
13.	Anastasiia Stepura	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
14.	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 hradených z iných zdrojov</i>
Externí doktorandi
<i>organizácia nemá externých doktorandov</i>

Zoznam zamestnancov prijatých do jedného roka od získania PhD.

	Meno s titulmi	Dátum obhajoby	Dátum prijatia	Úväzok (v %)
1.	Ing. Nikola Bugárová, PhD.	21.8.2019	22.8.2019	100

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.) Funkčné polyméry pre prípravu vysoko-účinných materiálov. (*Advanced Functional Polymers toward the Fabrication of High-performance Materials.*)

Zodpovedný riešiteľ: Martin Danko
Trvanie projektu: 1.1.2019 / 31.12.2021
Evidenčné číslo projektu: MAD SAV - PAV
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 1 - Poľsko: 1
Čerpané financie: -

Dosiahnuté výsledky:

Voľnoradikálovou polymerizáciou alfa-metylén-gama-butyrolaktónu (MBL, monomér z obnoviteľných zdrojov) je možné pripraviť stabilný a húževnatý polymetakrylát s laktónovým cyklom, nerozpustný vo väčšine organických rozpúšťadiel okrem DMSO, DMF alebo DMAc. Reakciou tohto materiálu s diamínmi dochádza k otvoreniu kruhu a vzniku sieťovaných akrylamidových štruktúr. Postupnou hydrolýzou zvyšných laktónov sa z čisto organického materiálu získa gél schopný viazať ako vodu, tak aj organické rozpúšťadlá v závislosti od stupňa presietenia a hydrolýzy. Voľnoradikálovou kopolymerizáciou MBL a 2-izopropenyl-2-oxazolínu je možné zvýšiť jednak rozpustnosť (napučiavanie v prípade sietí) vo vode a jednak funkcionalitu.

2.) Katiónové 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: -

Dosiahnuté výsledky:

Druhý rok spoločného bilaterálneho projektu bol zameraný na prípravu nových typov katiónových poly(2-oxazolínov) kontrolovanou hydrolýzou poly(2,4-dimethyl-2-oxazolínov) s chirálnym atómom uhlíka v hlavnom reťazci.

Výstupy:

SMOLÍČEK, Maroš - HALADJOVA, Emi - KRONEKOVÁ, Zuzana - DORCHEI, Faeze - TRELOVÁ, Dušana - KLEŠČÍKOVÁ, Lucia - LACÍK, Igor - RANGELOV, Stanislav - KRONEK, Juraj. Cationic poly(2-oxazolines) for biomedical applications. In Polymers 2019 : 19th Symposium : book of abstracts. - Burgas, Bulgaria : Institute of Polymers - BAS, 2019, p. 26

3.) Dobre definované funkčné polyméry. (*Well-Defined Functional Polymers.*)

Zodpovedný riešiteľ: Jaroslav Mosnáček
Trvanie projektu: 1.1.2019 / 31.12.2021
Evidenčné číslo projektu: MAD SK-HU
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 1 - Maďarsko: 1
Čerpané financie: -

Dosiahnuté výsledky:

V rámci projektu sa študovala príprava častíc na báze Tulipalínu A pomocou emulznej polymerizácie a amfifilných nanoštruktúr pomocou fotopolymerizáciou indukovaného samosporadúvania.

4.) Prediktívna štúdia bioaktívnych materiálov získaných elektrostatickým zvlákňovaním v podmienkach kompostovania. (*Predictive study under composting conditions of bioactive materials obtained by electrospinning.*)

Zodpovedný riešiteľ: Alena Opálková Šišková
Trvanie projektu: 1.1.2019 / 31.12.2021
Evidenčné číslo projektu: MAD
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 1 - Poľsko: 1
Čerpané financie: -
Podpora medzinárodnej spolupráce z národných zdrojov: 280 €

Dosiahnuté výsledky:

Projekt začal v januári 2019 a počas hodnoteného obdobia boli elektrostatickým zvlákňovaním pripravené netkané textílie s vybranými aktívnymi molekulami ako diklofenak (pre využitie v medicíne) alebo nisin (pre využitie v potravinárstve) a to v rôznych koncentráciách. Základnými polymermi, ktoré boli použité pri zvlákňovaní ako nosiče aktívnych molekúl boli dobre definované polyméry, ktorých proces biodegradácie a kompostovania je už dobre popísaný v literatúre ako napr.: PCL, Ecoflex, Ecovio. Pripravené produkty boli následne kompletne ocharakterizované dostupnými technikami a tiež je testovaná ich antibakteriálna aktivita rôznymi metodikami a to kvôli neschopnosti detekovať efektivitu aktívnej molekuly zakapsulovanej do štruktúry vlákien. Táto neschopnosť bola v literatúre popísaná a doporučuje sa využitie iných metodík, ktoré sa v súčasnosti snažíme implementovať.

Keďže v dostupných literárnych prameňoch je uvedené, že proces biodegradácie a čas degradácie závisí okrem parametrov degradačných podmienok aj na spôsobe výroby a na tvare vzoriek, boli pripravené NT z vyššie uvedených polymérov práve za účelom štúdia degradácie NT pripravených elektrostatickým zvlákňovaním. Pričom príprava bola časovo náročná vzhľadom na množstvo potrebné na štúdium degradácie v rôznych podmienkach. V súčasnosti sa u partnerov pracuje na degradácii v morskej vode a tiež v enzymatickom médiu.

Výstupy:

1. RYDZ, Joanna - OPÁLKOVÁ ŠIŠKOVÁ, Alena - ECKSTEIN ANDICSOVÁ, Anita. Scanning Electron Microscopy and Atomic Force Microscopy: Topographic and Dynamical Surface Studies of Blends, Composites, and Hybrid Functional Materials for Sustainable Future. In Advances in

- Materials Science and Engineering, 2019, vol. 2019, no. 6871785. (1.399 - IF2018). ISSN 1687-6822.
2. RYDZ, Joanna - OPÁLKOVÁ ŠIŠKOVÁ, Alena - ECKSTEIN ANDICSOVÁ, Anita. Microscopic Techniques in Materials Science: Current Trends in the Area of Blends, Composites, and Hybrid Materials. In Advances in Materials Science and Engineering, 2019, vol. 2019, no. 9072958. (1.399 - IF2018). ISSN 1687-6822
3. OPÁLKOVÁ ŠIŠKOVÁ, Alena - RYDZ, Joanna - KLEINOVÁ, Angela - ECKSTEIN ANDICSOVÁ, Anita. Cellulose-based delivery systems for the agricultural use to reduce the environmental burden. In BIOPOL 2019: 7th International Conference on Biobased and Biodegradable Polymers: proceedings- Stockholm, Sweden: KTH Vetenskap och Konst, 2019, p 1.16, [2] p.
5. OPÁLKOVÁ ŠIŠKOVÁ, Alena - RYDZ, Joanna - SIKORSKA, Wanda - ECKSTEIN ANDICSOVÁ, Anita. Electrospinning, an attractive fibers production technique. In 2. Strategický seminár na podporu spolupráce medzi akadémiou-univerzitami-priemyslom - Bratislava, Slovensko: Spoločnosť pre nové materiály a technológie (SNMT), 2019, p. 29. ISBN 978-80-570-1324-2.

Programy: Medziústavná dohoda

5.) 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:

Pripravili sa vodivé hybridy polypyrol a disulfidu volfrámu. Výsledná vodivosť kompozitov prekročila vodivosť základných komponentov. Ramanova spektroskopia a XPS výsledky preukázali prítomnosť kompaktnej PPy vrstvy na povrchu častíc. Na základe tohto výsledku sa dá predpokladať, že stratégia, ako zvýšiť kompozitnú vodivosť, je založená na príprave polypyrolu v prítomnosti nerozpustnej zložky (substrát, nosič, templát) s vysokým špecifickým povrchom, ktorý slúži na ukladanie PPy reťazcov. Týmto spôsobom by frakcia usporiadanej polymérnej fázy dominovala nad globulárnou fázou. Tento koncept je ilustrovaný v predloženej štúdii o dvojrozmernej šablóne sulfidu wolfrámu. Rovnako je však použiteľná pre substráty s akýmkoľvek inými rozmermi, pričom rozhodujúcim parametrom je veľký merný povrch častíc. Elektrokatalytická aktivita WS₂ v reakcii prípravy vodíka klesala so zvyšujúcim sa množstvom PPy na povrchu, pokrytie PPy blokuje aktívne miesta, napriek zlepšenej vodivosti. Po fyzickom zmiešaní vodivého polyméru s WS₂ sa však preukázalo významné zvýšenie aktivity pravdepodobne kvôli vyššej dostupnosti protónov v dôsledku kapacitných procesov nabíjania, ktoré predchádzali vývoju vodíka.

Výstupy:

1. JEVREMOVIĆ, Anka - BOBER, Patrycja - MIČUŠÍK, Matej - KULIČEK, Jaroslav - ACHARYA, Udit - PFLEGER, Jiří - MILOJEVIĆ-RAKIĆ, Maja - KRAJIŠNIK, Danina - TRCHOVÁ, Miroslava - STEJSKAL, Jaroslav - ĆIRIĆ-MARJANOVIĆ, Gordana. Synthesis and characterization of polyaniline/BEA zeolite composites and their application in nicosulfuron adsorption. In Microporous and Mesoporous Materials, 2019, vol. 287, p. 234-245. (4.182 - IF2018). ISSN 1387-1811. Typ:

ADCA

2. MINISY, Islam M. - GAVRILOV, Nemanja - ACHARYA, Udit - MORÁVKOVÁ, Zuzana - UNTERWEGER, Christoph - MIČUŠÍK, Matej - FILIPPOV, Sergey K. - KREDATUSOVÁ, Jana - PAŠTI, Igor A. - BREITENBACH, Stefan - ĆIRIĆ-MARJANOVIĆ, Gordana - STEJSKAL, Jaroslav - BOBER, Patrycja. Tailoring of carbonized polypyrrole nanotubes core by different polypyrrole shells for oxygen reduction reaction selectivity modification. In Journal of Colloid and Interface Science, 2019, vol. 551, p. 184-194. (6.361 - IF2018). ISSN 0021-9797. Typ: ADCA

3. STEJSKAL, Jaroslav - ACHARYA, Udit - BOBER, Patrycja - HAJNÁ, Milena - TRCHOVÁ, Miroslava - MIČUŠÍK, Matej - OMASTOVÁ, Mária - PAŠTI, Igor - GAVRILOV, Nemanja. Surface modification of tungsten disulfide with polypyrrole for enhancement of the conductivity and its impact on hydrogen evolution reaction. In Applied Surface Science, 2019, vol. 492, p. 497-503. (5.155 - IF2018). (2019 - Current Contents, WOS, SCOPUS). ISSN 0169-4332. Typ: ADCA

Programy: COST

6.) 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: 1 - Španielsko: 1
Čerpané financie: COST: 4430 €

Dosiahnuté výsledky:

V rámci projektu pripravené nanovláknenné vrstvy elektrostatickým zvlákňovaním z roztoku poly(?-kaprolaktónu) (PCL) ako nosiča bioaktívnej molekuly (v našom prípade sodná soľ diklofenaku) bol študovaný vplyv rozpúšťadla a aplikovaného vysokého napätia na aktivitu diklofenaku. Pre získanie požadovaných informácií sme využili EPR zariadenie, ktoré nám poskytlo jasný dôkaz, že liečivo uvoľňujúce sa z PCL nanovláknien ostáva stále v aktivite.

Výstupy:

1. ECKSTEIN ANDICSOVÁ, Anita - DANKO, Martin - MOSNÁČEK, Jaroslav.

Amphiphilic nanoparticles as vehicles for drug distribution. In The 10th Conference on Green Chemistry and Nanotechnologies in Polymeric Materials: abstracts : GCNPM 2019 [elektronický zdroj]. - Riga, Latvia : Latvian State Institute of Wood Chemistry, 2019, [1] p.

7.) Multifunkčná sieť pre nanouhlíkové kompozitné materiály. (Multi-Functional Nano-Carbon Composite Materials Network.)

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: 3797 €

Dosiahnuté výsledky:

Ukončili sme prácu ohľadne elektrospínovaného etylénvinyl acetátu v prítomnosti uhlíkových nanotrubičiek, táto práca bola opublikovaná v Polymers pod názvom „Electrospinning of ethylene vinyl acetate/carbon nanotube nanocomposite fibers.“. Spolu s tureckými kolegami sme študovali a pomocou XPS popísali tepelne spracované kompozity na báze polyakrylonitrilu a grafén oxidu. Štúdia bola akceptovaná časopisom Journal of Nanoscience and Nanotechnology a pod názvom „Thermally Treated Graphene Oxide/Polyacrylonitrile Based Electrospun Carbon Nanofiber Precursor“ by mala byť publikovaná v roku 2020.

Výstupy:

1. OMASTOVÁ, Mária - ČÍKOVÁ, Eliška - MIČUŠÍK, Matej. Electrospinning of ethylene vinyl acetate/carbon nanotube nanocomposite fibers. In Polymers : Open Access Polymer Science Journal, 2019, vol. 11, no. 3, art.no. 550, [13] p. (3.164 - IF2018). ISSN 2073-4360. Typ: ADCA
2. M. Omastová, E. Číková M. Mičušík. Electrospinning of ethylene vinyl acetate/ multiwall carbon nanotubes fibers. COST Action CA15107 spring meeting “Multi-functional Nano-Carbon Composite Materials Network“ March 21th - 22th, 2019, Aveiro, Portugal. V: Mičušík
3. M. Mičušík, J. Kulíček, P. Gemeiner, M. Omastová. Multi-walled carbon nanotubes/polypyrrole composites with different surfactants. COST Action CA15107 MultiComp Autumn Prague meeting 2019, September 12th - 13th, 2019, Prague, Czech republic. V: Mičušík

8.) Európska sieť chemikálií a materiálov na báze furánu pre udržateľný rozvoj. (*European network of furan based chemicals and materials for a Sustainable development.*)

Zodpovedný riešiteľ:	Jaroslav Mosnáček
Trvanie projektu:	1.11.2019 / 30.11.2023
Evidenčné číslo projektu:	COST CA18220
Organizácia je koordinátorom projektu:	nie
Koordinátor:	University of Aveiro
Počet spoluriešiteľských inštitúcií:	39 - Rakúsko: 2, Belgicko: 2, Bulharsko: 1, Cyprus: 1, Česko: 1, Nemecko: 2, Dánsko: 2, Španielsko: 2, Fínsko: 1, Francúzsko: 2, Veľká Británia: 1, Grécko: 1, Švajčiarsko: 2, Írsko: 1, Island: 1, Taliansko: 2, Litva: 2, Luxembursko: 1, Malta: 1, Holandsko: 2, Poľsko: 1, Portugalsko: 1, Rumunsko: 2, Srbsko: 2, Slovinsko: 2, Švédsko: 1

Čerpané financie:

-

Dosiahnuté výsledky:

Zatiaľ nie sú.

9.) Európske fórum pre pokročilé postupy (*European Forum for Advanced Practices*)

Zodpovedný riešiteľ:	Silvia Podhradská
Trvanie projektu:	1.4.2019 / 31.3.2023
Evidenčné číslo projektu:	COST CA18136
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	COST: 785 € MVTs: 1870 €

Dosiahnuté výsledky:

Projekt mal zatiaľ iba kick-off stretnutie 1.4.2019 v Bruseli, kde sa stretli všetci riešitelia a dohodli sa na jednotlivých krokoch naplňovania projektu. Predstavený bol proces COST projektu, jeho financovanie a priebeh. Zvolil sa manažérsky výbor a jeho interné pravidlá. Zvolený bol aj predseda a podpredseda. Nasledovala práca v skupinách a určenie cieľov projektu.

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 für Polymerforschung Mainz (RP), Uni. Vienna (Luca Tubiana)
Počet spoluriešiteľských inštitúcií:	2 - Rakúsko: 1, Nemecko: 1
Čerpané financie:	COST: 3700 €

Dosiahnuté výsledky:

V rámci COST EUTOPIA sme sa aktívne zapájali do vytvárania platformy na skúmanie topologických polymérov. V rámci aktivít COST EUTOPIA sme sa zúčastnili dvoch zjazdov výboru COST v Trente v Taliansku a San Sebastián v Španielsku, jednej letnej školy v Benátkach a jednej krátkej vedeckej misie vo Švajčiarsku. V rámci vedeckých sekcií počas stretnutí sme prezentovali 3 prednášky a 1 vývesku. Nadviazali sa spolupráce s dvoma zahraničnými pracoviskami, a začali sme spísať jednu spoluautorskú prácu v rámci spolupráce COST.

Výstupy:

1. RAČKO, Dušan – BENEDETTI, Fabrizio – DORIER, Julien – GOUNDAROULIS, Dimos – STASIAK, Andrzej. Chromatin Loop Extrusion and Chromatin Unknotting. - The 1st EUTOPIA COST Action Meeting, ECT* Villa Tambosi, Trento, Italy, 4.-9. February 2019, Prednáška
2. RUSKOVÁ, Renáta - RAČKO, Dušan. Computer simulations of DNA and chromatin: DNA trefoil in confinement. - 4D Epigenome, Palazzo Cavalli-Franchetti – S.Marco, 2842, 30124 Venice, Italy, 3-5 Október 2019, Výveska
3. RAČKO, Dušan – STASIAK, Andrzej. Introducing supercoiling into models of chromosome structure: From mechanic towards entropic loop extrusion - EUTOPIA-2, CFM/DIPC, Donostia-San Sebastián, 3.-8.11.2019, Prednáška
4. BLEHA, Tomáš - CIFRA, Peter. Force-displacement relations at compression of dsDNA macromolecules. In EUTOPIA Second Annual Meeting 2019: abstracts: Eutopia-2: Second meeting of the European Topology interdisciplinary Initiative. - San Sebastian, Spain: Materials Physics Center, 2019, Prednáška P.C.

11.) Európska sieť multidisciplinárneho výskumu na zlepšenie močových stentov (*European Network of multidisciplinary research to Improve the Urinary Stents*)

Zodpovedný riešiteľ: Zdenko Špitálsky
Trvanie projektu: 1.6.2018 / 30.9.2021
Evidenčné číslo projektu: COST CA16217
Organizácia je koordinátorom projektu: nie
Koordinátor: Jesus Uson Minimally Invasive Surgery Centre
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: -

Dosiahnuté výsledky:

Uhlíkové kvantové bodky fungujú na princípe fotodynamickej terapie a sú schopné produkovať reaktívne formy kyslíka. Materiál sa otestoval fyzikálno-chemickými metódami, testami biokompatibility, antibakteriálnych vlastností a taktiež na cytotoxicitu, proliferáciu a hemolýzu. Prebiehajú aj experimenty s rezistentnými typmi baktérií, získaných priamo od pacientov. Tento materiál má vysoko selektívny účinok na bakteriálne bunky a bez známkov cytotoxicity a hemolýzy. Môže slúžiť ako výborná prevencia v boji proti vzniku antibiotickej rezistencie.

Programy: Bilaterálne - iné

12.) Kinetika propagácie monoméru akrylátu sodného študovaná pomocou SP-PLP-EPR. (*Propagation kinetics of sodium acrylate monomer studied by SP-PLP-EPR.*)

Zodpovedný riešiteľ: Eva Dušička
Trvanie projektu: 1.9.2019 / 31.12.2019
Evidenčné číslo projektu: áno
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 1 - Nemecko: 1
Čerpané financie: DAAD Nemecko: 3600 €

Dosiahnuté výsledky:

Projekt bol získaný doktorandkou E. Dušička z nemeckej nadácie DAAD, ktorá na jeho základe absolvovala 3-mesačný pobyt v Goettingen University. Získané dáta použitím SP-PLP-EPR metódy budú slúžiť na stanovenie rýchlostných konštánt propagácie, terminácie a prenosu v polymerizácii akrylátu sodného, významného nabitého monoméru v akrylátovej chémii, ktoré zatiaľ nie sú kinetickej komunite vo svete k dispozícii.

13.) Nové polymérne kompozity na báze MXénov a uhlíkových nanoplínv. (*New polymeric composites with MXene and carbon based nanofillers*)

Zodpovedný riešiteľ: Matej Mičušík
Trvanie projektu: 1.8.2019 / 31.7.2022
Evidenčné číslo projektu: APVV- SK-BY-RD-19-0011
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských 0
inštitúcií:
Čerpané financie: APVV: 16330 €

Dosiahnuté výsledky:

Pripravili sa MXény z MAX fázy Ti_3C_2Al pomocou odleptania Al. Pripravené MXény sa charakterizovali pomocou XPS. Na prvom spoločnom stretnutí s bieloruským partnerom sme načrtli prípravu rôznych typov MAX fáz, ktoré by sa dali následne použiť na prípravu nových typov MXénov. Išlo by napríklad o prípravu MXénov dopovaných chrómom. Tieto potom použijeme na prípravu kompozitov pre elektromagnetické tienenie.

Výstupy:

1. PROCHÁZKA, Michal - PROCHÁZKOVÁ, Simona - ŠLOUF, Miroslav - OVODOK, Evgeni - POZNYAK, Sergey - ANISKEVICH, Andrey - MIČUŠÍK, Matej - OMASTOVÁ, Mária. Study of MXene nanoparticles aging. In MXene at the Frontier of the 2D Materials World : Beilstein nanotechnology Symposium 2019 : abstracts. - Mainz, Germany : Beilstein, 2019, p. 52. Typ: AFG

14.) Supervinutie vyvolané transkripciou v 4D usporiadaní genómu. (*Transcription induced supercoiling in 4D genome organization.*)

Zodpovedný riešiteľ: Dušan Račko
Trvanie projektu: 11.8.2019 / 25.8.2019
Evidenčné číslo projektu: STSM 44913 / CA 17139
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských 1 - Švajčiarsko: 1
inštitúcií:
Čerpané financie: SAV: 2050 €

Dosiahnuté výsledky:

V rámci projektu sa absolvovala jedna stáž na Univerzite v Lausanne vo Švajčiarsku, počas ktorej sa sformulovali princípi mechanizmu entropického vytlačania slučiek chromaínu pri usporadúvaní štruktúry chromaínu, ktoré sa následne simulovali a začali sme spisovať jednu spoluautorskú prácu na túto problematiku.

Výstupy:

1. Dušan Račko, Andrzej Stasiak: Introducing supercoiling into models of chromosome structure: From mechanic towards entropic loop extrusion, EUTOPIA-2, CFM/DIPC, Donostia-San Sebastián, 3.-8.11.2019 prednáška
2. Pripravovaná publikácia: D. Račko, A. Stasiak: "Entropic competition between supercoiled and relaxed portions of TADs is able to drive chromatin loop extrusion."

Programy: European Regional Development Fund (ERDF)

15.) 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 koordinátorom projektu:	nie
Koordinátor:	Univerzita prírodných zdrojov a života vo Viedni – Odbor vody-atmosféry a životného prostredia (BOKU)
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	ERDF: 28600 € Podpora medzinárodnej spolupráce z národných zdrojov: 3797 €

Dosiahnuté výsledky:

Pokračovali sme s analýzou plastového odpadu pomocou infračervenej spektroskopie (FTIR) a röntgenovej fotoelektrónovej spektroskopie (XPS) a významnejšie sme implementovali aj optickú mikroskopiu z projektu zakúpeným digitálnym mikroskopom Leica DVM6.

Na určenie možného dopadu plastov na riečne ekosystémy sme uskutočnili aj vypierací experiment, kedy sme v trepačke miešali po dobu jedného mesiaca niektoré kusy plastového odpadu a následne sa snažili analyzovať prítomnosť nízkomolekulových látok a mikroplastov vo vode. GPC-MS analýza neukázala významný nárast nebezpečných látok, ktoré boli na úrovni ng/l, čo je výrazne pod zdravotnými limitmi pre dané organické látky. Avšak v prípade polystyrénovej peny a zdegradovanej PET fľaše sa detekoval zvýšený obsah antimónu (150-230 µg/l) nad odporúčaný limit pre pitnú vodu (5 µg/l). V týchto dvoch prípadoch sa aj pomocou mikro-FTIR a digitálnej mikroskopie pozorovali vo vode mikročastice o veľkosti niekoľko desiatok mikrometrov. Túto štúdiu ešte rozširujeme o DSC merania, kde sa pokúsime určiť, či a ako rýchlo môže v dunajskej vode dochádzať k hydrolýze PET fľaše.

Výstupy:

Pripravili sa správy z jednotlivých zberov plastov, správa za druhý rok riešenia a niekoľko výstupov v rámci propagácie a diseminácie projektu, novinové články, príspevky v časopisoch.

1. MIČUŠÍK, Matej - KULIČEK, Jaroslav - KLEINOVÁ, Angela - PROCHÁZKA, Michal - PODHRADSKÁ, Silvia - RABAYOVÁ, Alexandra - BODOR, Gabriel - OMASTOVÁ, Mária. Chemical analysis of plastic waste in and along the Danube - Bratislava sampling. In Sardinia 2019 - 17th International Waste Management and Landfill Symposium : symposium book and proceedings [elektronický zdroj]. - Padova, Italy : CISA Publisher, 2019, 2, d12, [1] p. ISBN 978-88-626501-44. ISSN 2282-0027. Názov z obrazovky. Požaduje sa Adobe Acrobat Reader DC. Dostupné na internete: <www.eurowaste.it>. Typ: AFG.

2. MIČUŠÍK, Matej - KULIČEK, Jaroslav - KLEINOVÁ, Angela - PROCHÁZKA, Michal - PODHRADSKÁ, Silvia - OMASTOVÁ, Mária - OBERSTEINER, Gudrun. Chemical analysis of plastic waste in and along the Danube river - Donau-Auen sampling. In Sardinia 2019 - 17th International Waste Management and Landfill Symposium : symposium book and proceedings [elektronický zdroj]. - Padova, Italy : CISA Publisher, 2019, 3, d12, [1] p. ISBN 978-88-626501-44. ISSN 2282-0027. Názov z obrazovky. Požaduje sa Adobe Acrobat Reader DC. Dostupné na internete: www.eurowaste.it Typ. AFG.

3. MIČUŠÍK, Matej - KLEINOVÁ, Angela - PROCHÁZKA, Michal - PODHRADSKÁ, Silvia - RABAYOVÁ, Alexandra - BODOR, Gabriel - OMASTOVÁ, Mária. Chemická analýza plastového odpadu pomocou FTIR a XPS zo zberu uskutočneného pozdĺž Dunaja v Bratislave. In ChemZi: Zborník abstraktov: 71. Zjazd chemikov, 9-13 september 2019, Vysoké Tatry, Horný Smokovec, Slovensko. - Bratislava : Slovenská chemická spoločnosť, 2019, 2019, roč. 15, č. 1, s. 215-216. ISSN

1336-7242. Typ: AFH

4. OMASTOVÁ, Mária – MIČUŠÍK, Matej – PODHRADSKÁ, Sivia. PlasticFreeDanube - Odpad z makro plastov v a pozdĺž Dunaja. In ChemZi: Slovenský časopis o chémii pre chemické vzdelávanie, výskum a priemysel, 2019, roč. 15, č. 1, s. 14-15. ISSN 1336-7242. Typ: GII

Programy: ERANET

16.) Kompozitný systém pre energeticky aktivované tepelné izolácie integráciou tepelnej zadrže a fotovoltaickej tvorby tepla pre energeticky úsporné stavby. (*Energy Activated External Thermal Insulation Composite System - integration of thermal storage and photovoltaics for energy-efficient buildings.*)

Zodpovedný riešiteľ: Ivan Chodák
Trvanie projektu: 1.10.2019 / 30.9.2022
Evidenčné číslo projektu: M-ERA.NET Call 2018
Organizácia je koordinátorom projektu: nie
Koordinátor: Technical University Lodz
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: ERANET: 6025 €

Dosiahnuté výsledky:

Uskutočnilo sa stretnutie kľúčových riešiteľov, kde sa prebrali aspekty projektu na celú dobu riešenia. Obstarali sa základné materiály vhodné pre zmenu fázových stavov v predpokladanom teplotnom rozmedzí. Dohodla sa predbežná spolupráca s Ústavom materiálov a mechaniky strojov SAV ohľadom možnosti využitia vyvinutého postupu pre prípravu penového hliníka.

17.) Európske partnerstvo pre zlepšené kompozity. (*European Partnership for Improved Composites.*)

Zodpovedný riešiteľ: Matej Mičušík
Trvanie projektu: 1.9.2019 / 31.8.2022
Evidenčné číslo projektu: M-ERA.NET Call 2018
Organizácia je koordinátorom projektu: nie
Koordinátor: SYNPO, a.s. Pardubice
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: ERANET: 8333 €

Dosiahnuté výsledky:

Slovenská skupina je zodpovedná za testovanie a charakterizáciu pripravených nanoštruktúr a ich modifikáciu (WP5). V prvých mesiacoch sa zatiaľ charakterizovali niektoré uhlíkové plnivé a ich povrchové modifikácie pomocou XPS. Momentálne ešte prebieha optimalizácia organickej modifikácie, po ktorej bude nasledovať príprava a charakterizácia samotných kompozitov.

Výstupy:

1. PROCHÁZKA, Michal - PROCHÁZKOVÁ, Simona - STEPURA, Anastasiia - KOPECKÁ, Kateřina - ŠPAČEK, Vladimír - OMASTOVÁ, Mária. Advanced epoxy composites filled with novel 2D nanomaterial MXenes. In ChemZi : Zborník abstraktov: 71. Zjazd chemikov, 9-13 september 2019, Vysoké Tatry, Horný Smokovec, Slovensko. - Bratislava : Slovenská chemická spoločnosť, 2019, roč. 15, č. 1, s. 165. ISSN 1336-7242. Typ: AFH

18.) 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:	0
Čerpané financie:	ERANET: 24966 €

Dosiahnuté výsledky:

V prvej časti štúdia sme sa venovali starnutiu plnív, ktoré sa použijú pre prípravu kompozitov na báze epoxidov. Starnutie grafén oxidu bolo sledované jednak vo forme prášku a jednak ako suspenzia vo vodnom roztoku. Grafén sa študoval vo forme prášku, podobne MXény. Použili sme metódu XPS a v spolupráci s IMC Praha aj TEM a EDX analýzu.

Pre našu experimentálnu prácu potrebujeme mať MXény s vyššou koncentráciou vo vodnej fáze, preto po delaminácii sa MXénová suspenzia pripravila následným odstredovaním s koncentráciou 0,5 mg/ml. Pre niektoré aplikácie je potrebné zmeniť rozpúšťadlo, vypracovala sa metodika transferu tohto plniva z vodnej fázy do acetónu, prípadne iného organického rozpúšťadla. V ďalšej etape sa začala prípravou epoxy/MXénových kompozitov. Ako matricu sme použili Epoxy CHS-EPOXY 200 V 55 (Synpo Pardubice) s príslušným tvrdidlom. Pripravili sa kompozity s rôznym obsahom plniva. V nasledujúcom období budeme pokračovať v ich charakterizácii pomocou rôznych fyzikálno-chemických metód.

Pripravil sa kompozitný materiál novým spôsobom, a to nastriekaním vrstvy MXénu na PET fólie. Vodný roztok MXenes sa nastriekal v niekoľkých vrstvách na PET fóliu, ktorá bola pred prípravou opracovaná plazmou. Okrem merania elektrickej vodivosti sa povrch týchto materiálov charakterizoval meraním kontaktných uhlov. Výsledky ukázali, že plazmové ošetrenie znižuje hodnotu nameraných hodnôt kontaktných uhlov cca. dvakrát, čo je dôkazom pomerne hydrofilného povrchu.

Výstupy:

1. OMASTOVÁ, Mária - PROCHÁZKA, Michal - ANISKEVICH, Andrey - GOGOTSI, Oleksiy - ZELENIAKIENE, Daiva - MIČUŠÍK, Matej. Surface characterization of 2D nanoparticles for composite preparation. In ECASIA 19 : 18th European Conference on Applications of Surface and Interface Analysis : abstract booklet [elektronický zdroj]. - Dresden, Germany : Technical University Dresden, 2019, p. 399. Názov z obrazovky. Požaduje sa Adobe Acrobat Reader DC. Typ: AFG
2. PROCHÁZKA, Michal - PROCHÁZKOVÁ, Simona - STEPURA, Anastasiia - KOPECKÁ, Kateřina - ŠPAČEK, Vladimír - OMASTOVÁ, Mária. Advanced epoxy composites filled with novel 2D nanomaterial MXenes. In ChemZi : Zborník abstraktov: 71. Zjazd chemikov, 9-13 september 2019, Vysoké Tatry, Horný Smokovec, Slovensko. - Bratislava : Slovenská chemická spoločnosť, 2019, 2019, roč. 15, č. 1, s. 165. ISSN 1336-7242. Typ: AFH
3. OMASTOVÁ, Mária - PROCHÁZKA, Michal - MIČUŠÍK, Matej - PROCHÁZKOVÁ, Simona - MISIURA, Andrii - GOGOTSI, Oleksiy - ZELENIAKIENE, Daiva - ANISKEVICH, Andrey. MXene-based polymeric composites. In ChemZi : Zborník abstraktov: 71. Zjazd chemikov, 9-13 september 2019, Vysoké Tatry, Horný Smokovec, Slovensko. - Bratislava : Slovenská chemická spoločnosť, 2019, 2019, roč. 15, č. 1, s. 78-79. ISSN 1336-7242. Typ: AFH
4. PROCHÁZKA, Michal - PROCHÁZKOVÁ, Simona - ŠLOUF, Miroslav - OVODOK, Evgeni - POZNYAK, Sergey - ANISKEVICH, Andrey - MIČUŠÍK, Matej - OMASTOVÁ, Mária. Study of MXene nanoparticles aging. In MXene at the Frontier of the 2D Materials World : Beilstein nanotechnology Symposium 2019: abstracts. - Mainz, Germany : Beilstein, 2019, p. 52. Typ: AFG

5. KOPECKÁ, Kateřina - ŠPAČEK, Vladimír - OMASTOVÁ, Mária - PROCHÁZKA, Michal. Quality of MXene dispersion in various polymeric systems. In MXene at the Frontier of the 2D Materials World: Beilstein nanotechnology Symposium 2019: abstracts. - Mainz, Germany : Beilstein, 2019, p. 47. Typ: AFG

Programy: Iné

19.) Charakterizácia polymérov a mikrokapsúl. (*Characterization of polymers and microcapsules.*)

Zodpovedný riešiteľ: Igor Lacík
Trvanie projektu: 1.1.2017 / 31.12.2020
Evidenčné číslo projektu: R & D kontrakt
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 1 - Japonsko: 1
Čerpané financie: Otsuka Pharmaceutical Factory Inc.: 32000 €

Dosiahnuté výsledky:

Jedná sa o servisný kontrakt zameraný na charakterizáciu polymérov, mikrokapsúl a podmienok pre enkapsuláciu pankreatických ostrovčekov v polyelektrolytovom type mikrokapsúl vyvíjanom danou firmou pre klinickú fázu testovania. Ústav polymérov SAV sa stal jedným zo zásadných kontraktorov pre firmu Otsuka v module charakterizácie mikrokapsúl.

20.) 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 / 31.8.2020
Evidenčné číslo projektu: 2-SRA-2018-521-S-B
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 3 - Česko: 1, Nórsko: 1, USA: 1
Čerpané financie: JDRF: 320000 €

Dosiahnuté výsledky:

Získala sa široká sada výsledkov, ktoré viedli ku niekoľkým záverom. Zistili sme, že mólová hmotnosť a zloženie PMCG polykatiónu zásadne ovplyvňujú stabilitu a fibrotické obrastanie multikomponentných PMCG mikrokapsúl po intraperitoneálnej implantácii do imunokompetentných C57BL/6 myší. Tiež sme zaviedli modifikáciu povrchu vytvorených mikrokapsúl polykatiónmami na základe kvaternizovaného chitozánu a dextránu, čo vedie k rôznej odozve v in vivo prostredí po transplantácii do myší v závislosti od typu polykatiónu. Transplantácia mikrokapsúl do malého omenta a peritoneálnej kavity niekoľkých primátov vedie k rôznej miere obrastania a nestability a zatiaľ sa nám nepodarilo identifikovať mikrokapsuly vhodné pre transplantáciu do primátov. Tento cieľ je zásadný pre ďalšie obdobie pre prázdne mikrokapsuly ako aj pre mikrokapsuly s enkapsulovanými ostrovčkami izolovanými z primátov. Súčasnou kritickou fázou projektu sú vysoké náklady na primáty a nízka korelácia výsledkov v myšiach s výsledkami v primátoch.

Výstupy:

1. BITAR, C. M.E. - MARKWICK, K. E. - TREĽOVÁ, D. - KRONEKOVÁ, Z. - PELACH, M. - SELERIERA, C.M.O. - DIETRICH, J. - LACÍK, I. - HOESLI, C.A. Development of a microchannel emulsification process for pancreatic beta cell encapsulation. In Biotechnol. Bioeng. 2019, May 26:e2851, doi: 10.1002/btpr.2851.
2. LACÍK, Igor. Multicomponent alginate-based microcapsule design for immunoprotection of transplanted pancreatic islets in diabetes treatment. In 1st International Conference PSPM : Precisely Structured Polymer Materials : book of abstracts. - Lodz, Poland : Polish Academy of Sciences, Lodz Division, 2019,
3. KLEŠČÍKOVÁ, Lucia - TREĽOVÁ, Dušana - RAUS, V. - UHELSKÁ, Lucia - KRONEKOVÁ, Zuzana - KRONEK, Juraj - PELACH, Michal - DORCHEI, Faeze - HEYDARI, Abolfazl - RIOS, P. - MCGARRIGLE, J. - WANG, Y. - ROKSTAD, A.M. - OBERHOLZER, J. - LACÍK, Igor. Multicomponent polyelectrolyte complex-based microcapsule for immunoprotection of transplanted pancreatic islets. In Polymers in Medicine 2019 : pmm - 83rd Prague Meeting on macromolecules : book of abstracts and programme. - Prague, Czech Republic : Institute of Macromolecular Chemistry CAS, 2019, p. 65.

21.) Rýchlostné konštanty a modelovanie pre polymerizačné procesy: ko- a terpolymerizačné štúdie vo vode, alkoholoch a ich zmesiach. (*Kinetic coefficients and models for polymerization processes: co- and terpolymerization studies in water, alcohols and their mixtures.*)

Zodpovedný riešiteľ:	Igor Lacík
Trvanie projektu:	1.7.2019 / 30.6.2022
Evidenčné číslo projektu:	R & D kontrakt
Organizácia je koordinátorom projektu:	áno
Koordinátor:	Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií:	2 - Kanada: 1, Nemecko: 1
Čerpané financie:	BASF SE Ludwigshafen: 30000 €

Dosiahnuté výsledky:

Tento projekt je súčasťou dlhodobej spolupráce s BASF SE v Nemecku ohľadne kinetiky a modelovania radikálovej polymerizácie, ktorý nadväzuje na predchádzajúci 3-ročný projekt ukončený v r. 2018. Základnou tézou projektu je rozpoznanie kinetiky a mechanizmu terpolymerizácie akrylátových a metakrylátových monomérov vo vode, v zmesi voda-etanol a etanol, ktoré sa týkajú jedného z produktov BASF. V poslednom období sme sa tiež venovali rôznym oblastiam, ktoré zahrňovali spresnenie PLP-SEC metodiky v spolupráci s Dr. A. Nikitinom z Ruskej akadémie vied, homopolymerizáciu a kopolymerizáciu kationových monomérov od individuálnych rýchlostných konštánt až po modelovanie zloženia kopolymérov, konverzie a distribúcie mólových hmotností, a polymerizácie kyseliny akrylovej v bloku a v roztoku jej saturovaného analógu kyseliny propiónovej v prepojení na 3D simuláciu. Všetky tieto výsledky predstavujú nové poznatky v daných oblastiach výskumu.

Výstupy:

1. NIKITIN, A.N. - LACÍK, I. - 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. In Macromolecules 2019, 52(1), 55-71.
2. HABÁNKOVÁ, E. - NIKITIN, A. N. - LACÍK, I. Propagation Rate Coefficient for Acrylic Acid Polymerization in Bulk and in Propionic Acid by PLP-SEC Method. In Polym Chem, 2019, 10, 5870-5870
3. EZENWAJIAKU, I.H. - CHOVANCOVÁ, A. - LISTER, K. - LACÍK, I. - HUTCHINSON, R.A.

Experimental and Modeling Investigation of Radical Homopolymerization of 2-(Methacryloyloxyethyl) Trimethylammonium Chloride in Aqueous Solution. In Macromol. React. Eng. 2019, v tlači, doi: 10.1002/mren.201900033.

22.) Testovanie multikomponentných PMCG mikrokapsúl v NHP predklinickom modeli.
(*Testing of multicomponent PMCG microcapsules in the NHP pre-clinical model.*)

Zodpovedný riešiteľ: Igor Lacík
Trvanie projektu: 1.1.2018 / 31.8.2019
Evidenčné číslo projektu:
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: JDRF: 134000 €

Dosiahnuté výsledky:

Tento projekt poskytuje podporné financie k JDRF projektu pre predklinické experimenty s multikomponentnými mikrokapsulami dizajnovanými pre enkapsuláciu pankreatických osotrvčiekov v makakoch, ktoré sú finančne veľmi náročné. Tieto testy sa iniciovali v roku 2019 a plánujú pokračovať v roku 2020. Nedávno získané výsledky poukazujú na dôležitosť mólovej hmotnosti a interakcií polykatiónovej zložky mikrokapsuly pre stabilitu a biokompatibilitu mikrokapsúl v makakoch.

Programy: Horizont 2020

23.) Externé faktory v n-propanole uväzneného v silikátoch. (*External factors in silica confined n-propanol.*)

Zodpovedný riešiteľ: Josef Bartoš
Trvanie projektu: 1.1.2019 / 31.12.2019
Evidenčné číslo projektu: EUSMI E181200215
Organizácia je koordinátorom projektu: nie
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 1 - Španielsko: 1
Čerpané financie: -
Podpora medzinárodnej spolupráce z národných zdrojov: 3797 €

Dosiahnuté výsledky:

V úzkom kontexte s dvomi domácimi projektami VEGA 2/0030/16 a APVV 16-0369 sa pokračovalo v štúdiu relaxačnej dynamiky prototypového polárneho protického média: n-propanolu (n-PrOH) uväzneného vo vybratej tj. nemodifikovanej regulárnej MCM-41 matici pomocou širokopásmovej dielektrickej spektroskopie (BDS). Detailne sa vyšetril vplyv externých parametrov spojených s úpravou MCM-41 matrice tj. podmienky dehydratácie sušením ako aj s prípravou meraných vzoriek prázdnej MCM-41 matrice a rôzne naplnených n-PrOH/MCM-41 systémov tj. podmienky plnenie matrice a BDS kondenzátora vo vzdušnej a internej (N₂) atmosfére. Zistilo sa, že v prvom prípade je atmosféra pri plnení kritickým faktorom BDS odozvy, zatiaľčo dynamika hlávnej relaxácie je od nej prakticky nezávislá. Na druhej strane, pre najoptimálnejšie podmienky úpravy a prípravy uväznených

n-PrOH/MCM-41, N2 systémov, spektrálne chovanie a extrahovaná dynamika sú veľmi závislé do stupňa plnenia. V prípade tzv. podplneného systému BDS spectra majú monomodálnu formu a pomalšiu dynamiku, saturovaný a tzv. preplnený systém vykazujú bimodálny tvar s dvomi odlišnými dynamikami. Tieto empirické nálezy indikujú existenciu dvoch odlišných dynamických fáz, ktoré sú pripísané tzv. “interface” a “interphase” oblasti v relatívnej blízkosti povrchu pórov a tzv. “core” oblasti v centre pórov. Táto interpretácia je silne podporená našimi ESR nálezmi silnej dynamickej heterogeneity v saturovanom n-PrOH/MCM-41, N2-systéme.

Výstupy:

1. ŠVAJDLENKOVÁ, Helena - ARESE-IGOR, Silvia - KLEINOVÁ, Angela - ALEGRÍA, Angel - BARTOŠ, Josef. Confined short-chain alkanol in MCM-41 by BDS: Effects of matrix treatments and pore filling. In EUSMI: Annual Meeting 2019: Collection of abstracts. - Ancona, Italy: SoftComp, 2019, [1] p.
2. BARTOŠ, Josef - ŠVAJDLENKOVÁ, Helena - ALEGRÍA, A. - ARRESE-IGOR, S. EUSMI proposal report E181200215

24.) 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:	0
Čerpané financie:	EU: 11400 € Podpora medzinárodnej spolupráce z národných zdrojov: 2945 €

Dosiahnuté výsledky:

MXén typ Ti3C2 sa pripravil selektívnym odleptaním hliníkovej vrstvy z MAX fázy Ti3AlC2 v roztoku HF, prípadne použitím LiF + HCl. Pretože táto reakcia je exotermická, roztok sa miešal a ochladil v ľadovom kúpeli. Následne sa roztok miešal pri konštantnej teplote 35 ° C počas 24 hodín. Získaný materiál bol potom premytý pomocou deionizovanej (DI) vody a nasledovalo niekoľkonásobné odstredovanie, kým nebolo pH supernatantu takmer neutrálne (pH 6). Úplná delaminácia pripraveného MXénu bola získaná opätovnou dispergáciou sedimentu v DI a ultrazvukom počas a nasledovala ďalšia centrifugácia XPS analýza potvrdila odleptanie hliníkovej vrstvy z MAX. fázy Ti3AlC2. Intenzita Al signálu klesla z 12,9 at.% na 0 at.%. Výsledky tiež ukázali čiastočné odstánenie oxidovaných častí MXénu, ktoré boli v MAX fáze vo väčšom množstve, 23,8 at.% (signál O1s). Po syntéze sa tento signál zníži na 9,9 at.%. Zvyšujúci sa signál pre fluór a chlór ukazuje dekoráciu povrchu MXénu týmito atómami a skupinami ako sú OH a FX.

Na prípravu kompozitov s polymetylmetakrylátom (PMMA) sa pelety rozpustili v acetóne, po ich rozpustení sa pridal sa prášok MXénu. Nasledovalo zahusťovanie roztoku, aby sa znížila sedimentácia MXénu. Pripravený kompozit sa nalial na Petriho misku s teflónovou fóliou a po odparení zvyškového rozpúšťadla bol kompozit sušený vo vákuovej sušiarňi pri 35 °C. Následne sa kompozit lisoval do formy fólií. Boli pripravené vzorky s obsahom MXénu od 2,5 hm.% do 10 hm.%. Merania BDS ukázali zvýšenie vodivosti so zvyšujúcim sa obsahom MXénu, kompozity s obsahom MXénu do 5 hm.%. Kompozity s vyšším obsahom MXénu dosiahli vodivosť rádovo 10-9 S/cm. Čistý film MXénu mal vodivosť okolo 10-3 S/cm. Po konzultácii s projektovým partnerom z Drexler Univerzity sme zdokonalili proces delaminácie MXénových vrstiev, kedy sa dosiahne vyššia vodivosť plniva, preto MXény majú potenciál vytvoriť kompozitné materiály s vyššou elektrickou

vodivosťou.

Účastníci projektu z UPo vykonali podľa plánu niekoľko pobytov na partnerských inštitúciách (secondment) a taktiež na našom pracovisku na projekte pracovali kolegovia z partnerských inštitúcií. V máji 2019 sme zorganizovali výročné stretnutie riešiteľov projektu Nano2Day. Prof. Y. Gogotsi v rámci tohto stretnutia a návštevy Bratislavy predniesol pre širokú odbornú verejnosť prednášku *Discovery of New Two-Dimensional Materials*.

Výstupy:

1. OMASTOVÁ, Mária - PROCHÁZKA, Michal. Nové 2D materiály - MXeny ich vlastnosti a aplikácie v polymérnych kompozitoch. In ChemZi : Slovenský časopis o chémii pre chemické vzdelávanie, výskum a priemysel, 2018, roč. 14, č. 2, s. 52-53. ISSN 1336-7242. Typ: GII
2. OMASTOVÁ, Mária - PROCHÁZKA, Michal - PROCHÁZKOVÁ, Simona - STEPURA, Anastasiia - GOGOTSI, Oleksiy - MIČUŠÍK, Matej. Polymeric composite with 2D nanoparticles MXenes. In MXene at the Frontier of the 2D Materials World : Beilstein nanotechnology Symposium 2019 : abstracts. - Mainz, Germany : Beilstein, 2019, p. 51. Typ: AFG
3. ANISKEVICH, Andrey - ZELENIAKIENE, Daiva - OMASTOVÁ, Mária - MISHNAEVSKY, Leon Jr. - GOGOTSI, Oleksiy. Multifunctional polymer composites doped with MXenes nanoparticles for advanced applications. In MXene at the Frontier of the 2D Materials World : Beilstein nanotechnology Symposium 2019 : abstracts. - Mainz, Germany: Beilstein, 2019, p. 37. Typ: AFG
4. ANISKEVICH, Andrey. MXene-based polymeric composites. In ChemZi : Zborník abstraktov: 71. Zjazd chemikov, 9-13 september 2019, Vysoké Tatry, Horný Smokovec, Slovensko. - Bratislava : Slovenská chemická spoločnosť, 2019, 2019, roč. 15, č. 1, s. 78-79. ISSN 1336-7242. Typ: AFG
5. PROCHÁZKA, Michal - PROCHÁZKOVÁ, Simona - MIČUŠÍK, Matej - GOGOTSI, O. - OMASTOVÁ, Mária. Composites with novel 2D nanoparticles MXenes. In EUROFILLERS 2019 : POLYMER BLENDS : 50 years of Polymer Research at the University of Palermo : in honour of retirement of Prof. Francesco Paolo La Mantia [elektronický zdroj]. - Palermo, Italy : University of Palermo, 2019, [2] p. Názov z obrazovky. Požaduje sa Adobe Acrobat Reader DC(EUROFILLERS 2019 : POLYMER BLENDS : 50 years of Polymer Research at the University of Palermo : in honour of the retirement of Prof. Francesco Paolo La Mantia). Typ: AFG

Programy: JRP

25.) 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:

Riešenie projektu je zamerané na prípravu nových typov perovskitových solárnych článkov (PSC). Doposiaľ pripravované PSC však nie sú ekologické, pretože obsahujú toxické kovy, ako napríklad Pb. Preto vyvíjame PSC na báze Sn aby sa znížil obsah Pb. Najprv sa syntetizovalo 11 rôznych prekursorov perovskitu zvýšením množstva Pb(SCN)₂ z 0 na 0,5 M v CH(NH₂)₂SnI₃. Potom sa

vyrobili PSC a porovnali sa ich vlastnosti. Skenovacia elektrónová mikroskopia potvrdila, že správne množstvo $\text{Pb}(\text{SCN})_2$ homogenizuje veľkosť zŕn perovskitovej vrstvy a znižuje množstvo dier. Kryštalizácia a optická absorpcia každej perovskitovej vrstvy sa študovali röntgenovou difrakčnou analýzou a UV-Vis spektroskopiou. Nami pripravené elektródy sa poskytli kórejskému partnerovi pre zostavenie solárneho článku. Charakteristiky PSC sa skúmajú meraním prúdovej hustoty a napätia pri osvetlení AM 1,5G 100 mW/cm². PSC na báze Sn s 0,25M $\text{Pb}(\text{SCN})_2$ vykazujú vysokú účinnosť 8,4 %, čo je výrazne vyššia hodnota ako účinnosť PSC (1,6 %) bez Sn. Vypočítaná koncentrácia $\text{PbCH}_3\text{NH}_3\text{PbI}_3$ je 0,37 g/ml, zatiaľ čo koncentrácia $\text{CH}(\text{NH}_2)_2\text{SnI}_3$ obsahujúca $\text{Pb}(\text{SCN})_2$ je 0,08 g/ml. Tieto výsledky naznačujú, že je možné vyrábať ekologicky prijateľnejšie PSC s dobrou účinnosťou.

Výstupy:

1. ERDOGAN, Nursev - BOUZZIANI, Asmae - PARK, Jongee - MIČUŠÍK, Matej - KIM, Soo Young - MAJKOVÁ, Eva - OMASTOVÁ, Mária - OZTURK, Abdullah. Synthesis and enhanced photocatalytic activity of nitrogen-doped triphasic TiO_2 nanoparticles. In Journal of Photochemistry and Photobiology. A: Polymer chemistry, 2019, vol. 377, p. 92-100. (3.261 - IF2018). ISSN 1010-6030. Typ: ADCA
2. OMASTOVÁ, Mária - IWAN, Agnieszka - SUBAIR, Riyas - NÁDAŽDY, Vojtech - MIČUŠÍK, Matej - JERGEL, Matej - ŠIFFALOVIC, Peter - MAJKOVÁ, Eva. Perovskitové solárne články. In ChemZi : Zborník abstraktov: 71. Zjazd chemikov, 9-13 september 2019, Vysoké Tatry, Horný Smokovec, Slovensko. - Bratislava: Slovenská chemická spoločnosť, 2019, roč. 15, č. 1, s. 162. ISSN 1336-7242. Typ: AFH
3. OMASTOVÁ, Mária - MIČUŠÍK, Matej - PROCHÁZKA, Michal - STEPURA, Anastasiia - ZELENIAKIENE, Daiva - ANISKEVICH, Andrey. Surface properties of 2D nanoparticles. Book of abstract SURFINT-SREN VI, Progress in Applied Surface, Interface and Thin Film Science Solar Renewable Energy News VI. Florence, Italy 2019, s 117-119. ISBN 978-80-223-4811-9. Typ: AFG

Domáce projekty

Programy: VEGA

1.) 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:	SAV: 4037 €

Dosiahnuté výsledky:

V rámci dokončenia systematického štúdia uviaznutých apolárnych médií sa finalizovalo kombinované vyšetrenie reprezentatívneho cyklického alkánu tj. cyklohexánu v sérii piatich silikagelových (SG) matric pomocou DSC a ESR techník. Odhalil sa minoritný vplyv strednej veľkosti pórov a zásadný majoritný efekt chemického zloženia povrchu pórov, ktorý poukazuje na kľúčovú rolu vzájomných interakcií medzi tromi komponentami uviaznutého systému: organické medium-anorganická matrica-mikroskopická próba.

V pokračujúcej etape systematického vyšetrovania modelového polárneho protického média: n-propanolu (n-PrOH) v objemovom a rôznych priestorovo-limitovaných stavoch v sérii SiO₂ matric pomocou ESR techniky sa k predošlým trom neregulárnym nemodifikovaným SG 60,100 a 300-SIL matriciam s rôznou strednou veľkosťou pórov $D_{pore} = 6,10$ a 30 nm pridala jedna neregulárna modifikovaná SG100-C4 matrica kvôli vyšetreniu vplyvu chemického zloženia povrchu pórov matrice. Zistilo sa, že ESR odozva spinovej sondy TEMPO korektne odráža vplyv geometrických a chemických pórov matrice. Zo vzájomného porovnania efektov v tomto polárnom médiu oproti niekoľkým apolárnym médiám ako n-undekán, n-hexadakán a cyklohexán je zmena (redukcia) dynamiky nižšia v dôsledku eliminácie nežiadúcej interakcie polárnej spinovej sondy s nemodifikovaným (polárnym) povrchom SG matrice.

Výstupy:

1. LUKEŠOVÁ, Miroslava - ŠVAJDLENKOVÁ, Helena – REUTER, Daniel - VALIČ, Srečko - LOIDL, Alois - BARTOŠ, Josef*. Spin probe interaction and mobility in confined cyclohexane: Effects of pore size and pore surface composition of silica gel matrices. Chem. Phys. Letters 735, 136756, (2019)
2. BARTOŠ, Josef - ŠVAJDLENKOVÁ, Helena - LUKEŠOVÁ, Miroslava - ŠAUŠA, Ondrej. ESR and PALS characterization of bulk vs. confined organics in inorganic matrices. In XIth EFEP 2019 Conference: book of abstracts. Bratislava: Vydavateľstvo SCHK, 2019, p3, [1] p. ISBN 978-80-8208-020-2.

2.) 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 koordinátorom projektu:	áno
Koordinátor:	Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 6571 €

Dosiahnuté výsledky:

Pokračovalo sa v molekulovo-dynamických simuláciách uhlíkových nanorúrok pokrytých poly(etylénoxidovými) (PEO) reťazcami a ich interakcií s peptidmi rôznej afinity k vode. Získal sa nový pohľad na tieto interakcie. Zároveň sa začali pripravovať systémy dvoch protiláhlých povrchov, z ktorých je jeden pokrytý vrstvou PEO reťazcov a na druhom je naviazaný peptid. Tieto povrchy sa budú k sebe približovať pôsobením vonkajšej sily a bude sa študovať charakter vzájomných interakcií medzi povrchmi. Tiež sa pripravujú testovacie výpočty silikátového povrchu pokrytého PEO reťazcami s voľným peptidom.

Výstupy:

1. BENKOVÁ, Zuzana - ČAKÁNEK, Peter - D. S. CORDEIRO, M. Natália. Interactions of poly(ethylene oxide) coated carbon nanotubes with peptides. In BIMac 2019 – 23rd Bratislava International Conference on Macromolecules: Book of abstracts. - Bratislava, Slovakia, 2019, CL-2, 25. Prednáška
2. ČAKÁNEK, Peter - BENKOVÁ, Zuzana - D. S. CORDEIRO, M. Natália. Molecular dynamics simulations of carbon nanotubes covered by poly(ethylene oxide) and their interactions with peptides. In BIMac 2019 – 23rd Bratislava International Conference on Macromolecules: Book of abstracts. - Bratislava, Slovakia, 2019, P-4, 62. Výveska
3. BENKOVÁ, Zuzana - D. S. CORDEIRO, M. Natália. Wetting behavior of PEO-grafted silica surface in presence of free homopolymers. In BIMac 2019 – 23rd Bratislava International Conference

on Macromolecules: Book of abstracts. - Bratislava, Slovakia, 2019, P-11, 73. Výveska

4. BENKOVÁ, Zuzana - D. S. CORDEIRO, M. Natália. Conformational behavior of end-grafted PEO chains as potential protection layer against protein adsorption. In BIMac 2019 – 23rd Bratislava International Conference on Macromolecules: Book of abstracts. - Bratislava, Slovakia, 2019, P-12, 75. Výveska

5. BENKOVÁ, Zuzana - ČAKÁNEK, Peter - D. S. CORDEIRO, M. Natália. Interactions of peptides with poly(ethylene oxide) grafted onto carbon nanotubes. In CPBCI 2019 – Chemistry, Physics and Biology of Colloids and Interfaces: Book of abstracts. - Eger, Hungary, 2019, P2, 70. Výveska

6. ČAKÁNEK, Peter - BENKOVÁ, Zuzana - D. S. CORDEIRO, M. Natália. Interactions between poly(ethylene oxide) grafted on carbon nanotubes and peptides studied by molecular dynamics. In BYPoS 2019 – Bratislava Young Polymer Scientist Conference: Book of abstracts. – Ošadnica, Slovakia, 2019, 46. Prednáška

3.) 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 inštitúcií:	0
Čerpané financie:	SAV: 5257 €

Dosiahnuté výsledky:

Elasticita dsDNA molekúl bola vyšetrovaná molekulovými simuláciami a krivky sila-predĺženie ($f - r$) boli získané v podmienkach za konštantnej sily (Gibbsov súbor), alebo konštantného predĺženia (Helmholtz). Špeciálne sme sa venovali oblasti kompresie a slabých síl, ktoré nie sú pokryté molekulovým experimentom. Potvrdilo sa, že simulácie použitím vektorového Gibbsovho súboru neposkytujú kompresné chovanie polymérov. Použitím skalárneho Gibbsovho protokolu sme dosiahli kvalitatívne správne chovanie DNA pri kompresii pokiaľ boli použité kvadratické priemery predĺženia. Ďalej, bolo osvetlené známe obmedzenie populárneho vzťahu Marko-Siggia pri malých silách. Naopak, funkcie $f - r$ zo simulácií pri konštantnej dĺžke ako aj novonavrhnutý vťah poskytli realistický obraz o elasticite DNA cez širokú škálu negatívnych aj pozitívnych síl. Rozdiely v popise kompresných funkcií $f - r$ pri rôznych použitých prístupoch podporujú názor, že elastická odozva DNA molekúl môže byť silne závislá od špecifik experimentálneho prístupu a druhu zostrednenia meraných vlastností.

Výstupy:

BLEHA, Tomáš – CIFRA, Peter., Journal of Chemical Physics, 2019, vol. 151, art.no. 014901 (2.997 - IF2018).

BLEHA, Tomáš - CIFRA, Peter. Force-displacement relations at compression of dsDNA macromolecules. In EUTOPIA Second Annual Meeting 2019: abstracts : Eutopia-2: Second meeting of the European Topology interdisciplinary Initiative. - San Sebastian, Spain : Materials Physics Center, 2019, Prednáška P.C.

BLEHA, Tomáš - CIFRA, Peter. Force/displacement relations at compression of DNA macromolecules. In BIMac 2019: Computational and Experimental Approach to Polymers in Biomedical and Soft Matter: 23rd Bratislava International Conference on Macromolecules : programme and abstracts book [elektronický zdroj]. - Bratislava : Polymer Institute of Slovak Academy of Sciences, 2019, p. 41. ISBN 978-80-89841-10-3. Prednáška P.C.

4.) **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: SAV: 19692 €

Dosiahnuté výsledky:

Pripravili sme fluorescenčné alginátové gély komplexáciou alginátu s kvantovými bodkami získanými z L-cysteínu a kys. citrónovej alebo nízkomolekulovým fluorofórom 5-oxo-2,3-dihydro-5H-[1,3]-thiazolo[3,2-a]pyridine-3,7-dicarboxylic acid (TPDCA), ktorý je ich kľúčovou zložkou. Interakciu alginátu s karboxylovými skupinami potvrdila FTIR. Naopak zmenu fluorescenčných vlastností voľného vs. viazaného fluorofóru nemožno prisúdiť interakcii s alginátom, ale iba jeho agregácii v géli. Reologické štúdie poukázali na vysokú elasticitu gélu a jeho tixotropné vlastnosti a obnoviteľnosť.

Vlastnosti polyelektrolytových hydrogélů sú kombináciou lipofilných vlastností polymérneho reťazca a hydrofilných vlastností vďaka vysokej asociácii nabitých častí reťazca s vodou. Pripravili sa hydrogély kationových polymetakrylátových (ko)polymérov, v ktorých sa nízkomolekulový Cl⁻ protiión difúziou vymenil za lipofilný dodecylsulfátový alebo perfluorooktanoátový anión. Výmenou dochádza k zmršťovaniu gélov a aj k strate tvarovej uniformity v dôsledku vypudzovania najmä voľnej neasociovej vody. Tým dochádza k miernemu nárastu podielu vody, ktorá je viazaná v blízkosti polymérneho reťazca (nezamrzajúca voda). Výmena aniónov nie je vratná.

Kopolymerizácia hydrolyzovaného gama-metyl-alfa-metylén-gama-butyrolaktónu a akrylamidu v prítomnosti sieťovadla poskytuje hydrogél so superabsorpčnými vlastnosťami vo vodných roztokoch. Stupeň napučievania, rýchlosť difúzie ako aj mechanické vlastnosti hydrogélů sa sledovali pri rôznych vonkajších podmienkach. Stimuli-senzitívny charakter hydrogélů sa prejavil pri zmene teploty, pH ako aj iónovej sily pufovacieho roztoku. Prešetril sa taktiež vplyv výmeny kationu pri procese otvárania butyrolaktónovej štruktúry. Výmena sodíkového kationu za draslíkový má len minimálny vplyv na absorpčné vlastnosti hydrogélů, avšak predstavuje ekologicky vhodnejší materiál.

Výstupy:

1. KOLLÁR, Jozef - MRLÍK, Miroslav - MORAVČÍKOVÁ, Daniela - IVÁN, Béla - MOSNÁČEK, Jaroslav. Effect of monomer content and external stimuli on properties of renewable Tulipalin A-based superabsorbent hydrogels. In European Polymer Journal, 2019, vol. 115, p. 99-106. (3.621 - IF2018). Typ: ADCA
2. DANKO, Martin - KRONEKOVÁ, Zuzana - MRLÍK, Miroslav - OSICKA, Josef - YOUSAF, Ammar bin - MIHÁLOVÁ, Andrea - TKÁČ, Ján - KASÁK, Peter. Sulfobetaines meet carboxybetaines: Modulation of thermo- and ion-responsivity, water structure, mechanical properties, and cell adhesion. In Langmuir, 2019, vol. 35, no. 5, p. 1391-1403. (3.683 - IF2018). ISSN 0743-7463. Typ: ADCA
3. KASÁK, Peter - DANKO, Martin - ZAVAHIR, Sifani - MRLÍK, Miroslav - XIONG, Yuan - YOUSAF, Ammar Bin - LAI, Wing-Fu - KRUPA, Igor - TKÁČ, Ján - ROGACH, Andrey L. Identification of molecular fluorophore as a component of carbon dots able to induce gelation in a fluorescent multivalent-metal-ion-free alginate hydrogel. In Scientific Reports, 2019, vol. 9, art.no. 15080, [11] p. (4.011 - IF2018). (2019 - Current Contents, WOS, SCOPUS). ISSN 2045-2322. Typ:

ADCA

4. DANKO, Martin. Ring-opening polymerization towards functional polyesters (polymers and fluorescence). In BYPoS : conference book. - Bratislava : Young Scientist Council of Polymer Institute SAS, 2019, p. 26-28. ISBN 978-80-89841-09-7. Typ: AFB
5. DANKO, Martin - MRLÍK, M. - ZAHAVIR, S. - ROGACH, A.L. - KASÁK, Peter. Fluorescent metal-ion-free alginate hydrogel crosslinked by molecular fluorophore. In 9th International Colloids Conference. - Oxford : Elsevier, 2019, p. 035, [1] p. Názov z obrazovky. Požaduje sa Adobe Acrobat Reader DC. Dostupné na internete: <<https://elsevier.conference/services.net/secureProgramlogin.asp?conferenceID=4283>>. Typ: AFG
6. DANKO, Martin - KRONEKOVÁ, Zuzana - MRLÍK, Miroslav - OSIČKA, Jozef - KASÁK, Peter. Modulation of thermo- and ion responsiveness, water state, mechanical properties and cell adhesion of sulfobetaine and carboxybetaine copolymers and hydrogels. In ChemZi: Zborník abstraktov: 71. Zjazd chemikov, 9-13 september 2019, Vysoké Tatry, Horný Smokovec, Slovensko. - Bratislava: Slovenská chemická spoločnosť, 2019, 2019, roč. 15, č. 1, s. 105-106. ISSN 1336-7242. Typ: AFH
7. BALOGH, Róbert - ECKSTEIN ANDICSOVÁ, Anita - DANKO, Martin. New donor-acceptor small molecules with oxadiazole spacer as a semiconducting materials. In BYPoS: conference book. - Bratislava: Young Scientist Council of Polymer Institute SAS, 2019, p. 62. ISBN 978-80-89841-09-7. Typ: AFH
8. BALOGH, Róbert - ECKSTEIN ANDICSOVÁ, Anita - DANKO, Martin. Thiazolo[5.4-D]thiazole based small molecules with oxadiazole spacer as an electron transport materials for organic light emitting diodes. In BIMac 2019: Computational and Experimental Approach to Polymers in Biomedical and Soft Matter: 23rd Bratislava International Conference on Macromolecules : programme and abstracts book [elektronický zdroj]. - Bratislava : Polymer Institute of Slovak Academy of Sciences, 2019, p. 54-55. ISBN 978-80-89841-10-3. Názov z obrazovky. Typ: AFH
9. BALOGH, Róbert - ECKSTEIN ANDICSOVÁ, Anita - DANKO, Martin. Nové donor-akceptorové zlúčeniny pre svetloemitujúce diódy. In ChemZi : Zborník abstraktov: 71. Zjazd chemikov, 9-13 september 2019, Vysoké Tatry, Horný Smokovec, Slovensko. - Bratislava: Slovenská chemická spoločnosť, 2019, 2019, roč. 15, č. 1, s. 99-100. ISSN 1336-7242. Typ: AFH

5.) 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:	SAV: 6752 €

Dosiahnuté výsledky:

Syntéza série thiazolo[5.4-d]thiazolových derivátov bola ukončená a charakterizovaná. Zlúčeniny boli poskytnuté na testovanie v modelových zariadeniach kvôli získaniu doplňujúcich informácií o využiteľnosti týchto derivátov. Príprava nových fotoiniciátorov na báze naftalén mono- a diimidov bola optimalizovaná a študovali sa ich fyzikálno-chemické vlastnosti, ako je rozpustnosť (DMF, DMSO, Anizol), absorbančia a schopnosť zabudovať sa do výsledného polymérneho reťazca ako terminálna skupina. Zabudovanie pripravených fotoaktívnych derivátov bolo potvrdené vo všetkých prípadoch kde bola prítomná bromoizobutyratev funkčná skupina pomocou GPC. Polyméry pripravené pomocou fotoATRP prebiehali kontrolovane. Výsledky sa sumarizujú do diplomovej

práci Petry Maxiánovej a následne do článku.

Výstupy:

1. BONDAREV, Dmitrij - BORSKÁ, Katarína - ŠORAL, Michal - MORAVČÍKOVÁ, Daniela - MOSNÁČEK, Jaroslav. 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, 2019, vol. 161, p. 122-127. (3.771 - IF2018).
2. ZAIN, Gamal - BONDAREV, Dmitrij - DOHÁŇŠOVÁ, Jana - MOSNÁČEK, Jaroslav. Oxygen-tolerant photochemically induced atom transfer radical polymerization of the renewable monomer Tulipalin A. In ChemPhotoChem, 2019, vol. 3, iss. 11, p. 1138-1145. (2019 - Current Contents, WOS).
3. BALOGH, Róbert - ECKSTEIN ANDICSOVÁ, Anita - DANKO, Martin. New donor-acceptor small molecules with oxadiazole spacer as a semiconducting materials. In BYPoS : conference book. - Bratislava : Young Scientist Council of Polymer Institute SAS, 2019, p. 62. ISBN 978-80-89841-09-7.
4. BALOGH, Róbert - ECKSTEIN ANDICSOVÁ, Anita - DANKO, Martin. Thiazolo[5.4-D]thiazole based small molecules with oxadiazole spacer as an electron transport materials for organic light emitting diodes. In BIMac 2019: Computational and Experimental Approach to Polymers in Biomedical and Soft Matter: 23rd Bratislava International Conference on Macromolecules : programme and abstracts book [elektronický zdroj]. - Bratislava : Polymer Institute of Slovak Academy of Sciences, 2019, p. 54-55. ISBN 978-80-89841-10-3.
5. BALOGH, Róbert - ECKSTEIN ANDICSOVÁ, Anita - DANKO, Martin. Nové donor-akceptorové zlúčeniny pre svetloemitujúce diódy. In ChemZi: Zborník abstraktov: 71. Zjazd chemikov, 9-13 september 2019, Vysoké Tatry, Horný Smokovec, Slovensko. - Bratislava: Slovenská chemická spoločnosť, 2019, 2019, roč. 15, č. 1, s. 99-100. ISSN 1336-7242.
6. TOKÁROVÁ, Zita – KAMIL, Tokár - ECKSTEIN, Anita. Bis(5,4-d)thiazoles with furane core. In Applied natural sciences 2019: conference proceedings of the The 7th International Scientific Conference: book of abstracts. p. 47. - Trnava: University of SS. Cyril and Methodius in Trnava, 2019. ISBN 978-80-572-0011-6.
7. MAXIANOVÁ, Petra – ECKSTEIN ANDICSOVÁ, Anita - TOKÁROVÁ, Zita – MOSNÁČEK, Jaroslav – Novel photo-active initiators for ATRP. In Applied natural sciences 2019: conference proceedings of the The 7th International Scientific Conference: book of abstracts. p. 119. - Trnava: University of SS. Cyril and Methodius in Trnava, 2019. ISBN 978-80-572-0011-6.

6.) 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:	SAV: 6054 €

Dosiahnuté výsledky:

Podstata výsledkov spočívala v príprave rozličných typov termoplastického škrobu (TPS) a jeho zmesí s polymérnymi matricami. Tieto materiály sa podrobne charakterizovali z rôznych hľadísk a získané výsledky sa interpretovali na základe zmien pohyblivosti zložiek zmesí stanovených metódou NMR. K najzaujímavejším poznatkom možno zaradiť dôkaz kryštalizácie močoviny v úlohe

plastifikátora pri jej vyššej koncentrácii v TPS.

Výstupy:

1. IVANIČ, František - KOVÁČOVÁ, Mária - CHODÁK, Ivan. The effect of plasticizer selection on properties of blends poly(butylene adipate-co-terephthalate) with thermoplastic starch. In European Polymer Journal, 2019, vol. 116, p. 99-105. (3.621 - IF2018). ISSN 0014-3057.
2. MOSNÁČKOVÁ, Katarína - ŠLOSÁR, Miroslav - KOLLÁR, Jozef - JANIGOVÁ, Ivica - OPÁLKOVÁ ŠIŠKOVÁ, Alena - CHMELA, Štefan - SIKORSKA, Wanda - PERĐOCHOVÁ, Dagmara - GÁLISOVÁ, Ivana - ALEXÝ, Pavol - CHODÁK, Ivan - MOSNÁČEK, Jaroslav. Ageing of plasticized poly(lactic acid)/poly(3-hydroxybutyrate)/carbon black mulching films during one season of sweet pepper production. In European Polymer Journal, 2019, vol. 114, p. 81-89. (3.621 - IF2018). ISSN 0014-3057.
3. ŠOLTÝS, Alojz - HRONSKÝ, Viktor - ŠMÍDOVÁ, Natália - OLČÁK, Dušan - IVANIČ, František - CHODÁK, Ivan. Solid-state ¹H and ¹³C NMR of corn starch plasticized with glycerol and urea. In European Polymer Journal, 2019, vol. 117, p. 19-27. (3.621 - IF2018). ISSN 0014-3057.

7.) Príprava a štúdium polymérnych gélov s využitím v ochrane kultúrneho dedičstva.
(*Preparation and study of polymer gels for protection of cultural heritage.*)

Zodpovedný riešiteľ: Juraj Kronek
Trvanie projektu: 1.1.2019 / 31.12.2022
Evidenčné číslo projektu: VEGA 1/0602/19
Organizácia je koordinátorom projektu: nie
Koordinátor: FCHPT STU Bratislava
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: SAV: 2688 €

Dosiahnuté výsledky:

V uplynulom období sa pripravili kopolyméry z 2-etyl-2-oxazolínu a 2-butenyl-2-oxazolínu v rôznych pomeroch. Taktiež sa pripravili prvé typy hydrogélův tiol-énovou reakciou s rôznymi ditiolmi a sledovali sa ich reologické vlastnosti. Ďalším typom hydrogélův boli tenké hydrogélóvé vrstvy získané radiačným sieťovaním. V súčasnosti sa pripravuje publikácia zahrňujúca prípravu tenkých hydrogélóvých vrstiev na báze poly(2-oxazolínův).

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 koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: SAV: 17617 €

Dosiahnuté výsledky:

Prvé polyméry poly(2-izopropenyl-2-oxazolínu) (PIPOx-u) s rôznou dĺžkou reťazca a úzkou disperzitou boli pripravené metódou kontrolovanej ATRP polymerizácie. In vitro experimenty týchto

polymérov ukázali celkovo nízke hodnoty toxicity týchto polymérov, ktoré však boli závislé od dĺžky reťazca. Začali sme sa venovať charakterizácii biologickej aktivity týchto polymérov a ich kolokalizácie v bunkách. Po konjugácii PIPOx-u s liečivami sa ukázalo, že polymérny nosič znižuje toxicitu naviazaného liečiva, ktoré si po uvoľnení zachováva protirakovinové účinky. Získané výsledky boli prezentované na viacerých konferenciách.

Výstupy:

1. DATTA, S. - PETRENČÍKOVÁ, Nadežda - ŠRÁMKOVÁ, Petra - KRONEKOVÁ, Zuzana - JUTKOVÁ, A. - JANCURA, D. - KRONEK, Juraj. Gradient copolymers from aliphatic and aromatic 2-oxazolines for drug delivery. POLY 147. In 257th ACS National Meeting: graphical abstracts. - Orlando, USA: ACS Division of Polymer Chemistry, 2019.
2. KRONEKOVÁ, Zuzana - MAJERČÍKOVÁ, Monika - PAULOVÍČOVÁ, Ema - PAULOVÍČOVÁ, Lucia - KRONEK, Juraj. Poly(2-isopropenyl-2-oxazoline) for immunotherapeutical applications. In Polymers 2019: 19th Symposium : book of abstracts. - Burgas, Bulgaria : Institute of Polymers - BAS, 2019, p. 78.
3. MAJERČÍKOVÁ, Monika - RAUS, Vladimír - KRONEK, Juraj - KRONEKOVÁ, Zuzana. Biological activity of poly(2-isopropenyl-2-oxazoline). In ChemZi : Zborník abstraktov: 71. Zjazd chemikov, 9-13 september 2019, Vysoké Tatry, Horný Smokovec, Slovensko. - Bratislava : Slovenská chemická spoločnosť, 2019, roč. 15, č. 1, s. 203.
4. MAJERČÍKOVÁ, Monika - JANIGOVÁ, Ivica - CHORVÁT, Dušan Jr. - SATRAPINSKÝ, Leonid - KRONEK, Juraj - KRONEKOVÁ, Zuzana - ZAHORANOVÁ, Anna. Temperature-induced formation of microparticles from poly(2-oxazolines)s with incorporated dexamethasone. In BYPoS : conference book. - Bratislava : Young Scientist Council of Polymer Institute SAS, 2019, p. 36.
5. ZAHORANOVÁ, Anna - MAJERČÍKOVÁ, Monika - KRONEKOVÁ, Zuzana - KRONEK, Juraj. Poly(2-oxazoline) block copolymers: from temperature driven self/assembly to triggerable drug carriers. In BIMac 2019: Computational and Experimental Approach to Polymers in Biomedical and Soft Matter : 23rd Bratislava International Conference on Macromolecules : programme and abstracts book - Bratislava: Polymer Institute of Slovak Academy of Sciences, 2019, p. 44-45.

9.) Mikroštruktúra a sorpčné vlastnosti uhlíkových vlákien pripravených karbonizáciou celulóзовých prekurzorov (*Microstructure and the sorption properties of the carbon fibres prepared by the carbonizing cellulose precursors.*)

Zodpovedný riešiteľ:	Igor Matko
Zodpovedný riešiteľ v organizácii SAV:	Helena Švajdenková
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:	SAV: 1043 €

Dosiahnuté výsledky:

V sérii MPCF s charakteristickým povrchom 1 – 1500 m²g⁻¹ (BET metóda) a veľkosťou pórov pod 1 nm (PALS) sa stanovili sorpčné vlastnosti vody pomocou termogravimetrie. MPCF s absorbovanou vodou v póroch a na povrchu boli analyzované DSC a PALS. Ukázalo sa, že schopnosť absorpcie vody vláknami nie je daná iba povrchom, ale aj inými faktormi.¹

Projekt úzko spolupracuje aj s medzinárodnou skupinou Dr. T. Kavetského (PL, UA) v oblasti

biosenzorov na charakterizácii rôznych typov matric ako nosičov enzýmov, okrem iného aj uhlíkových vlákien. V prípade biosenzorov na báze laccase, sa študovalo ako závisia biosenzorické vlastnosti od štruktúry polymérnej matrice. Pripravili sa matrice z epoxidovaného ľanového oleja (ELO), s rôznym zastúpením reaktívneho rozpúšťadla bisfenol A diglycidyléter (RD) a pridaním 3 mol. % fotoiniciátora. Na základe swellingu a PALS sa zistilo, že polymérna matrica s vysokou hustotou siete a veľkým voľným objemom má lepšie senzorké vlastnosti.²

Štúdia CF vlákien ako nosičov laccase a ich biosenzorické vlastnosti sú v procese úprav pre publikovanie.

Bola opublikovaná štúdia o CF ako nosičov častíc aktívnych substancií, kde ako príklad nanosenia nano- a mikročastíc na povrchu uhlíkovej matrice bol uvedený kompozit CF- $\text{Fe}(\text{OH})_3 \cdot (\text{H}_2\text{O})_n$.³

Výstupy:

1. MAŤKO, Igor – ŠAUŠA, Ondrej – ČECHOVÁ, Katarína – NOVÁK, Ivan – ŠVAJDLENKOVÁ, Helena – BEREK, Dušan – PECZ, Michal. Porous carbon fibers prepared from cellulose. J. Therm. Anal. Calorim., 2019, 138, 1997-2004.
2. KAVETSKYY, Taras – SMUTOK, Oleh – DEMIKOV, Olha – KASETAITE, Sigita – OSTRAUSKAITE, Jolita – ŠVAJDLENKOVÁ, Helena – ŠAUŠA, Ondrej – ZUBRYTSKA, Khrystyna – HOIVANOVYCH, Natalia – GONCHAR, Mykhailo. Dependence of operational parameters of laccase-based biosensors on structure of photocross-linked polymers as holding matrixes. Eur. Polym. J., 2019, 115, 391-398.
3. NOVÁK, Ivan – ŠAUŠA, Ondrej – MAŤKO, Igor – BILGIN, Esra-Simsek – BEREK, Dušan. Microporous carbon fibers prepared by carbonization of cellulose as carriers of particles of active substances. Chem. Papers, 2019, <https://doi.org/10.1007/s11696-019-00972-x>

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	áno
koordinátorom projektu:	
Koordinátor:	Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 3066 €

Dosiahnuté výsledky:

Pokračovalo sa v prácach súvisiacich s modifikáciou natívneho škrobu očkovaním kyselinou polymliečnou, stearovou a olejovou, a taktiež acetyláciou. V prípade acetylácie sa využila reakcia s acetanhydridom za vzniku acetylovaného škrobu, ktorý sa následne analyzoval prostredníctvom FTIR, TGA a DSC analýzy. V ďalšom kroku po optimalizácii podmienok budú škrobové materiály acetylované do rôznych stupňov s hlavným cieľom zredukovať množstvo aktívnych hydroxylových skupín fungujúcich ako iniciačné centrá v procese iniciácie polymerizácie. Týmto spôsobom by škrob acetylovaný do rôznych stupňov mal byť očkovaný rôzne dlhými polylaktidovými reťazcami. Pre očkovanie polymliečnou kyselinou bola zvolená aniónová polymerizáciu s otvorením kruhu katalyzovaná kovalentnými zlúčeninami cínu. Pre dosiahnutie rôznych dĺžok naočkovaných reťazcov PLA bolo použité 0,5 – 20 hm.% kukuričného škrobu s disperziou MW naočkovaných PLA reťazcov v rozmedzí 2-20kDa. V prípade karboxylových kyselín boli na očkovanie použité kyseliny olejová a stearová, ktorých prítomnosť bola potvrdená FTIR a TGA analýzou. Cieľom bolo zvýšenie homogenity škrobových zmesí s polymérnymi matricami ako napr. PLA kde sa v prvej etape stanovovali teploty gelácie pre optimálne nastavenie podmienok termoplastifikácie.

Výstupy:

1. MOSNÁČKOVÁ, Katarína - ŠLOSÁR, Miroslav - KOLLÁR, Jozef - JANIGOVÁ, Ivica - OPÁLKOVÁ ŠIŠKOVÁ, Alena - CHMELA, Štefan - SIKORSKA, Wanda - PERĐOCHOVÁ, Dagmara - GÁLISOVÁ, Ivana - ALEXY, Pavol - CHODÁK, Ivan - MOSNÁČEK, Jaroslav. Ageing of plasticized poly(lactic acid)/poly(3-hydroxybutyrate)/carbon black mulching films during one season of sweet pepper production. In European Polymer Journal, 2019, vol. 114, p. 81-89. (3.621 - IF2018). ISSN 0014-3057. Typ: ADCA
2. IVANIČ, František - KOVÁČOVÁ, Mária - CHODÁK, Ivan. The effect of plasticizer selection on properties of blends poly(butylene adipate-co-terephthalate) with thermoplastic starch. In European Polymer Journal, 2019, vol. 116, p. 99-105. (3.621 - IF2018). ISSN 0014-3057. Typ: ADCA
3. MOSNÁČKOVÁ, Katarína - IVANIČ, František - KLEINOVÁ, Angela - CHODÁK, Ivan. Effect of plasticizer on mechanical properties of thermoplastic starch blends. In 2. strategický seminár na podporu spolupráce medzi akadémiou-univerzitami-priemyslom [elektronický zdroj]. - Bratislava, Slovensko : Spoločnosť pre nové materiály a technológie (SNMT), 2019, p. 21. ISBN 978-80-570-1324-2. Názov z obrazovky. Požaduje sa Adobe Acrobat Reader DC(2. strategický seminár na podporu spolupráce medzi akadémiou-univerzitami-priemyslom). Typ: AFH
4. PODHRADSKÁ, Silvia - PEIDAYESH, Hamed - MOSNÁČKOVÁ, Katarína - JOCHEC MOŠKOVÁ, Daniela - JANKOVIČ, Ľuboš - CHODÁK, Ivan. Properties of poly(epsilon-caprolactone)/clay nanocomposites. In BYPoS : conference book. - Bratislava : Young Scientist Council of Polymer Institute SAS, 2019, p. 72. ISBN 978-80-89841-09-7.(BYPoS 2019 : Bratislava Young Polymer Scientists conference). Typ: AFH
5. MOSNÁČKOVÁ, Katarína - ŠLOSÁR, Miroslav - KOLLÁR, Jozef - OPÁLKOVÁ ŠIŠKOVÁ, Alena - CHODÁK, Ivan - CHMELA, Štefan - MOSNÁČEK, Jaroslav. Effect of ageing on physical properties of poly(lactic acid)/(3-hydroxybutyrate)/carbon black mulching films. In BIOPOL 2019 : 7th International Conference on Biobased and Biodegradable Polymers: proceedings [elektronický zdroj]. - Stockholm, Sweden : KTH Vetenskap och Konst, 2019, p 1.37, [2] p. Typ: AFG
6. MOSNÁČKOVÁ, Katarína - CHODÁK, Ivan - CHMELA, Štefan - KLEINOVÁ, Angela - ALEXY, Pavol. Biodegradable polymer blends based on thermoplastic starch. In 5th World Congress on Materials Science & Engineering : book of abstracts. - Madhapur, India : Scientific Future Group, 2019, p. 52. Dostupné na internete: <<http://worldmaterialsconference.com/2019/>>. Typ: AFG
7. MOSNÁČKOVÁ, Katarína - KOLLÁR, Jozef - HUANG, Yi-Shen - HUANG, Chih-Feng - MOSNÁČEK, Jaroslav. Synthesis routes of functionalized nanoparticles. In Polymer Composites with Functionalized Nanoparticles : Synthesis, Properties, and Applications. 1. - Amsterdam : Elsevier B.V., 2019, p. 1-46. ISBN 978-012814-064-2. Typ: ABC

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 koordinátorom projektu:	áno
Koordinátor:	Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	SAV: 14894 €

Dosiahnuté výsledky:

Metódou elektrostatického zvlákňovania sa pripravili kompozity na báze etylénvinylacetátového polyméru (EVA) a uhlíkových nanotrubičiek (MWCNT). Použil sa kopolymér EVA s 34 hm.%. vinylacetátu, pretože jeho roztok je možné elektrostaticky zvlákňovať pri laboratórnej teplote bez ďalšieho zahrievania. Homogénna disperzia MWCNT v roztoku polyméru sa získala pridaním kompatibilizátora PyChol. Kompozitné vlákňité nanoštruktúry sa získajú vtedy, ak koncentrácia MWCNT v roztoku pre zvlákňovanie je nižšia ako 3 hm. %. Prítomnosť MWCNT vo vnútri vlákien bola potvrdená analýzou TEM. Použitím analytických metód, ako sú XPS a FTIR bola overená prítomnosť kompatibilizátora PyChol v pripravených netkaných textíliách. XPS analýza ďalej ukázala, že prítomnosť MWCNT zvyšuje stabilitu kopolyméru EVA, ktorý podlieha oxidácii etylénovej časti počas procesu zvlákňovania. Tepelná stabilita kompozitov EVA/MWCNT sa zvýšila v porovnaní s čistými EVA vláknami, čo potvrdili merania TGA. Elektrostatickým zvlákňovaním boli pripravené netkané textílie na báze tragantovej gumy a polyvinylpyrrolidónu.

Výstupy:

1. MARTÍN-ALFONSO, J.E. - ČÍKOVÁ, Eliška - OMASTOVÁ, Mária. Development and characterization of composite fibers based on tragacanth gum and polyvinylpyrrolidone. In Composites Part B: Engineering, 2019, vol. 169, p. 79-87. (6.864 - IF2018). ISSN 1359-8368. Typ: ADCA
2. OMASTOVÁ, Mária - ČÍKOVÁ, Eliška - MIČUŠÍK, Matej. Electrospinning of ethylene vinyl acetate/carbon nanotube nanocomposite fibers. In Polymers : Open Access Polymer Science Journal, 2019, vol. 11, no. 3, art.no. 550, [13] p. (3.164 - IF2018). ISSN 2073-4360. Typ: ADCA
3. GEMEINER, Peter - KULIČEK, Jaroslav - SYROVÝ, Tomáš - HÁZ, Aleš - KHUNOVÁ, Viera - HATALA, Michal - MIKULA, Milan - HVOJNÍK, Matej - GÁL, Lukáš - JABLONSKÝ, Michal - OMASTOVÁ, Mária. Screen-printed PEDOT: PSS/halloysite counter electrodes for dye-sensitized solar cells. In Synthetic Metals, 2019, vol. 256, art. no. 116148, [10] p. (2.870 - IF2018). ISSN 0379-6779. Typ: ADCA
4. OMASTOVÁ, Mária. Polymeric composite nanofibers prepared by electrospinning for advanced application. In 7th International Seminar on Modern Polymeric Materials for Environmental Applications including Special Session Recnet Advances in Polymer Nanocomposites and Hybrid materials: Kraków, 15-17 May, 2019 : book of abstracts. - Kraków, Poland : Cracow University of Technology, 2019, p. 24-25. Typ: AFE. Pozvaná prednáška.

12.) 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 koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: SAV: 6395 €

Dosiahnuté výsledky:

Častice GO sa pokryli nanočasticami Fe₃O₄ a zabudovali sa do termoplastickej elastomérskej matrice (poly(trimethylene terephthalate)-block-poly(tetramethylene oxide) copolymer) in-situ polymerizáciou. U kompozitov sa pozorovalo superparamagnetické správanie pri teplote miestnosti. Okrem toho sme sa ďalej venovali výskumu biologických účinkov uhlíkových kvantových bodiek, alebo ich fotokatalytických účinkov.

Výstupy:

1. TOSIC, Jelena - STANOJEVIC, Zeljka - VIDICEVIC, Sasenka - ISAKOVIC, Aleksandra - CIRIC, Darko - MARTINOVIC, Tamara - KRAVIC-STEVOVIC, Tamara - BUMBASIREVIC, Vladimir - PAUNOVIC, Verica - JOVANOVIĆ, Svetlana - TODOROVIC-MARKOVIC, Biljana - MARKOVIĆ, Zoran M. - DANKO, Martin - MIČUŠÍK, Matej - ŠPITÁLSKY, Zdenko - TRAJKOVIC, Vladimir. Graphene quantum dots inhibit T cell-mediated neuroinflammation in rats. In *Neuropharmacology*, 2019, vol. 146, p. 95-108. (4.367 - IF2018). ISSN 0028-3908. Typ: ADCA
2. PREKODRAVAC, Jovana - VASILJEVIĆ, Bojana - MARKOVIĆ, Zoran M. - JOVANOVIĆ, Dragana - KLEUT, Duška - ŠPITÁLSKY, Zdenko - MIČUŠÍK, Matej - DANKO, Martin - BAJUK-BOGDANOVIĆ, Danica - TODOROVIC-MARKOVIC, Biljana. Green and facile microwave assisted synthesis of (metal-free) N-doped carbon quantum dots for catalytic applications. In *Ceramics International*, 2019, vol. 45, no. 14, p. 17006-17013. (3.450 - IF2018). (2019 - Current Contents, WOS, SCOPUS). ISSN 0272-8842. Typ: ADCA
3. Szymczyk, A., Paszkiewicz, S., Typek, J., Špitálský, Z., Janowska, I., Żołnierkiewicz, G., Guskos, N. Magnetic Properties of Poly(trimethylene terephthalate)-block-Poly(tetramethylene oxide) Copolymer Nanocomposites Reinforced by Graphene Oxide-Fe₃O₄ Hybrid Nanoparticles, (2019) *Physica Status Solidi (A) Applications and Materials Science*, art. no. 1900402.

Programy: APVV

13.) 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. Merali sa mechanické vlastnosti a prah priepustnosti mikrokapsúl v závislosti od prítomnosti buniek a vystavenia imobilizačných systémov procesným podmienkam. V súčasnosti sa tieto výsledky pripravujú pre publikáciu.

14.) 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: 30379 €

Dosiahnuté výsledky:

Elasticita dsDNA molekúl bola vyšetrovaná molekulovými simuláciami a krivky sila-predĺženie ($f - r$) boli získané v podmienkach za konštantnej sily (Gibbsov súbor), alebo konštantného predĺženia (Helmholtz). Špeciálne sme sa venovali oblasti kompresie a slabých síl, ktoré nie sú pokryté molekulovým experimentom. Potvrdilo sa, že simulácie použitím vektorového Gibbsovho súboru neposkytujú kompresné chovanie polymérov. Použitím skalárneho Gibbsovho protokolu sme dosiahli kvalitatívne správne chovanie DNA pri kompresii pokiaľ boli použité kvadratické priemery predĺženia. Ďalej, bolo osvetlené známe obmedzenie populárneho vzťahu Marko-Siggia pri malých silách. Naopak, funkcie $f - r$ zo simulácií pri konštantnej dĺžke ako aj novonavrhnutý vťah poskytl realistický obraz o elasticite DNA cez širokú škálu negatívnych aj pozitívnych síl. Rozdiely v popise kompresných funkcií $f - r$ pri rôznych použitých prístupoch podporujú názor, že elastická odozva DNA molekúl môže byť silne závislá od špecifik experimentálneho prístupu a druhu zostrednenia meraných vlastností.

Výstupy:

BLEHA, Tomáš – CIFRA, Peter., Journal of Chemical Physics, 2019, vol. 151, art.no. 014901 (2.997 - IF2018).

BLEHA, Tomáš - CIFRA, Peter. Force-displacement relations at compression of dsDNA macromolecules. In EUTOPIA Second Annual Meeting 2019: abstracts : Eutopia-2: Second meeting of the European Topology interdisciplinary Initiative. - San Sebastian, Spain : Materials Physics Center, 2019, Prednáška P.C.

BLEHA, Tomáš - CIFRA, Peter. Force/displacement relations at compression of DNA macromolecules. In BIMac 2019: Computational and Experimental Approach to Polymers in Biomedical and Soft Matter: 23rd Bratislava International Conference on Macromolecules : programme and abstracts book [elektronický zdroj]. - Bratislava : Polymer Institute of Slovak Academy of Sciences, 2019, p. 41. ISBN 978-80-89841-10-3. Prednáška P.C.

15.) Biotechnologická príprava bioplastov na báze PHA s programovaným uvoľňovaním biopolyméru a možnosti jeho využitia. (*Biotechnological preparation of bioplastics based on PHA with programmable releasing of biopolymer and application possibilities.*)

Zodpovedný riešiteľ:	Martin Danko
Trvanie projektu:	1.7.2019 / 30.6.2023
Evidenčné číslo projektu:	APVV-18-0420
Organizácia je	áno
koordinátorom projektu:	
Koordinátor:	Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií:	1 - Slovensko: 1
Čerpané financie:	APVV: 11612 €

Dosiahnuté výsledky:

Projekt začal v júli 2019, uskutočnilo sa stretnutie kľúčových riešiteľov, kde sa dohodol rámcový postup riešenia na celé obdobie projektu a naplánovali sa práce do konca prvého roka riešenia a dohodla sa príprava publikácií v prvom roku riešenia. V tomto roku sa obstarali potrebné chemikálie, predovšetkým dva modelové produkty PHB (práškový PHB najvyššej čistoty a kopolymér PHB s malým obsahom valerátu, ktoré sa predbežne charakterizovali. Pre testovanie molekulových charakteristík nových PHB polymérov sa optimalizovali podmienky GPC chromatografie s modelovým komerčným PHB. Vhodným pre charakterizáciu polyesterov PHB, PLA a ich zmesí je trifluoroetanol ako eluent s prídavkom trifluóroctanu draselného.

Výstupy:

1. MOSNÁČKOVÁ, Katarína - IVANIČ, František - KLEINOVÁ, Angela - CHODÁK, Ivan. Effect of plasticizer on mechanical properties of thermoplastic starch blends. In 2. strategický seminár na

podporu spolupráce medzi akadémiou-univerzitami-priemyslom [elektronický zdroj]. - Bratislava, Slovensko: Spoločnosť pre nové materiály a technológie (SNMT), 2019, p. 21. ISBN 978-80-570-1324-2. Názov z obrazovky. Typ: AFH

16.) 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 koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 43000 €

Dosiahnuté výsledky:

Všetky získané keratíny ako plnivo biologického pôvodu pre polylaktid boli testované na prítomnosť primárnych amino skupín, ktoré najlepšie slúžia ako iniciačné miesto pri polymerizácii s otvorením kruhu laktidu. Jednoznačne keratíny pripravené bázičkou hydrolýzou vykazujú vyššiu koncentráciu -NH₂. Pre ďalšie reakcie sa vybrali tieto vzorky. Ako horšia polymerizácia, tak aj inhibičný účinok rastu mikroorganizmov a plesní v zmesiach kyslo katalyzovaných keratínov a PLA ukázala ich nevhodnosť pre tieto experimenty. Pri roztokových polymerizáciach laktidu sa optimalizovali podmienky pre zmes 5 hm% koiniciátora keratínu a TBD ako najúčinnnejšieho katalyzátora. Podobne boli tieto keratíny použité na polymerizácie v komore Plastografu Brabender s obsahom 5 hm% keratínu ku laktidu. V rovnakom zariadení a za podobných podmienok boli polymerizácie uskutočnené aj s uhlíkovými sadzami, kde sa po optimalizácii získali hybridné PLA materiály s rôzne dlhými reťazcami polylaktidu v rozmedzí molekulových hmotností 3-10 kDa. Modifikované častice boli následne analyzované prostredníctvom FTIR-ATR a Ramanovou spektroskopiou, ktoré potvrdili prítomnosť naočkovaného polylaktidu. Modifikované častice budú následne použité pre prípravu kompozitných materiálov s PLA za účelom dosiahnutia lepšej homogenity výsledného materiálu čo by sa malo výrazne ovplyvniť mechanické vlastnosti.

Výstupy:

1. MOSNÁČKOVÁ, Katarína - ŠLOSÁR, Miroslav - KOLLÁR, Jozef - JANIGOVÁ, Ivica - OPÁLKOVÁ ŠIŠKOVÁ, Alena - CHMELA, Štefan - SIKORSKA, Wanda - PERĐOCHOVÁ, Dagmara - GÁLISOVÁ, Ivana - ALEX, Pavol - CHODÁK, Ivan - MOSNÁČEK, Jaroslav. Ageing of plasticized poly(lactic acid)/poly(3-hydroxybutyrate)/carbon black mulching films during one season of sweet pepper production. In European Polymer Journal, 2019, vol. 114, p. 81-89. (3.621 - IF2018). ISSN 0014-3057. Typ: ADCA
2. DANKO, Martin. Ring-opening polymerization towards functional polyesters (polymers and fluorescence). In BYPoS : conference book. - Bratislava : Young Scientist Council of Polymer Institute SAS, 2019, p. 26-28. ISBN 978-80-89841-09-7. Typ: AFB
3. MOSNÁČKOVÁ, Katarína - ŠLOSÁR, Miroslav - KOLLÁR, Jozef - OPÁLKOVÁ ŠIŠKOVÁ, Alena - CHODÁK, Ivan - CHMELA, Štefan - MOSNÁČEK, Jaroslav. Effect of ageing on physical properties of poly(lactic acid)/(3-hydroxybutyrate)/carbon black mulching films. In BIOPOL 2019: 7th International Conference on Biobased and Biodegradable Polymers: proceedings [elektronický zdroj]. - Stockholm, Sweden : KTH Vetenskap och Konst, 2019, p. 1.37, [2] p. Typ: AFG
4. MOSNÁČKOVÁ, Katarína - CHODÁK, Ivan - CHMELA, Štefan - KLEINOVÁ, Angela - ALEX, Pavol. Biodegradable polymer blends based on thermoplastic starch. In 5th World Congress on Materials Science & Engineering: book of abstracts. - Madhapur, India: Scientific Future Group, 2019, p. 52. Dostupné na internete: <<http://worldmaterialsconference.com/2019/>>. Typ: AFG

5. DANKO, Martin - MRLÍK, M. - ZAHAVIR, S. - ROGACH, A.L. - KASÁK, Peter. Fluorescent metal-ion-free alginate hydrogel crosslinked by molecular fluorophore. In 9th International Colloids Conference. - Oxford: Elsevier, 2019, p. 035, [1] p. Názov z obrazovky. Požaduje sa Adobe Acrobat Reader DC. Dostupné na internete:

<<https://elsevier.conference/services.net/secureProgramlogin.asp?conferenceID=4283>>. Typ: AFG

6. MOSNÁČKOVÁ, Katarína - IVANIČ, František - KLEINOVÁ, Angela - CHODÁK, Ivan. Effect of plasticizer on mechanical properties of thermoplastic starch blends. In 2. strategický seminár na podporu spolupráce medzi akadémiou-univerzitami-priemyslom [elektronický zdroj]. - Bratislava, Slovensko: Spoločnosť pre nové materiály a technológie (SNMT), 2019, p. 21. ISBN 978-80-570-1324-2. Názov z obrazovky. Požaduje sa Adobe Acrobat Reader DC(2. strategický seminár na podporu spolupráce medzi akadémiou-univerzitami-priemyslom). Typ: AFH

7. DANKO, Martin - KRONEKOVÁ, Zuzana - MRLÍK, Miroslav - OSIČKA, Jozef - KASÁK, Peter. Modulation of thermo- and ion responsiveness, water state, mechanical properties and cell adhesion of sulfobetaine and carboxybetaine copolymers and hydrogels. In ChemZi : Zborník abstraktov: 71. Zjazd chemikov, 9-13 september 2019, Vysoké Tatry, Horný Smokovec, Slovensko. - Bratislava : Slovenská chemická spoločnosť, 2019, 2019, roč. 15, č. 1, s. 105-106. ISSN 1336-7242. Typ: AFH

17.) 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 koordinátorom projektu:	áno
Koordinátor:	Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 10874 €

Dosiahnuté výsledky:

Na základe získaných výsledkov sa v konečnej fáze pripravil päťúrovňový experiment, ktorý umožnil vytvoriť optimalizovanú receptúru pre nové tavné lepidlo pre použitie pre lepenie papiera, predovšetkým pri väzbe kníh. Podstanú časť práce predstavovala syntéza modifikátora adhézie, pričom v poslednom polroku sa vypracoval postup pre očkovanie ozonizovaného prekursora kyselinou akrylovou v jednom kroku počas miešania všetkých komponentov receptúry. Doplnujúce výsledky spočívali v podrobnom prešetrení termickej stability tavného lepidla prídavkom nového modifikátora adhézie.

Výstupy:

1. PAVLINEC, Jiří - NOVÁK, Igor - RYCHLÝ, Jozef - KLEINOVÁ, Angela - NÓGELLOVÁ, Zuzana - PREŤO, Jozef - VANKO, Vladimír - ŽIGO, Ondrej - CHODÁK, Ivan. Hot melt adhesives prepared by grafting of acrylic and crotonic acids onto metallocene ethylene -octene copolymers. In Journal of Plastic Film and Sheeting, 2019, vol. 35, no. 3, p. 239-259. (IF 1.71). ISSN 8756-0879. Uverejnené v r 2018 a dostupné elektronicky, v tlačenej forme vyšlo až v r. 2019

Odoslané do tlače

1. Rychlý Jozef, Rychlá Lyda, Novák Igor, Vanko Vladimír, Preťo Jozef, Chodák Ivan* Thermooxidative stability of hot melt adhesives based on metallocene polyolefins grafted with polar acrylic acids moieties, Polymer Testing (IF-3,05)

2. Pavlinec J., Novák I., Kleinová A., Nógellová Z., Preťo J., Vanko V., Chodák I. Investigation of hot-melt adhesives based on metallocene etylene-propylene copolymer, Kautschuk, Gummi,

Kunststoffe.

ÚŽITKOVÝ VZOR, PODANÁ PRIHLÁŠKA. Skúšobné teliesko na stanovenie adhézneho pevnosti tavného lepidla k substrátu v trhavom stroji. Prihlasovateľ / majiteľ Ústav polymérov SAV; VIPO a.s. Partizánske Pôvodcovia Chodák Ivan, Novák Igor, Pavlinec Juraj, Rychlý Jozef, Vanko Vladimír, Preťo Jozef, Hudec Ivan. Číslo prihlášky 96-2019. Dátum podania 28.06.2019

PATENTOVÁ PRIHLÁŠKA. Spôsob prípravy aditíva pre zvýšenie polaritu tavných lepidiel. Prihlasovateľ/ majiteľ Ústav polymérov SAV, VIPO a.s. Pôvodcovia Chodák Ivan, Novák Igor, Pavlinec Juraj, Rychlý Jozef, Vanko Vladimír, Preťo Jozef, číslo prihlášky PP50034-2019. Dátum podania 29.07.2019.

18.) 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: 9610 €

Dosiahnuté výsledky:

V poslednej fáze projektu sme sa zamerali na modifikáciu komerčných ako aj syntetizovaných WO₃. Okrem samotnej prípravy, môže ovplyvniť kryštalografickú fázu tiež dopujúci prvok. Za týmto účelom bola hydrotermálnou metódou pripravená séria nanočastíc na báze oxidu volfrámu s dopovaným chrómom WO₃-Cr. Dopujúci prvok môže mať pozitívny efekt na zníženie prevádzkových teplôt pri detekcii stopových koncentrácií plyných biomarkerov. Vznik oxidu volfrámu ako aj prítomnosť chrómu bol potvrdený pomocou XPS. Niektoré WO₃-Cr vzorky sa následne modifikovali s polymérnymi ligandami, u ostatných sa pomocou Ramanovej spektroskopie analyzovala kryštalografická fáza s ohľadom na rozdielnu teplotu prípravy.

Výstupy:

1. KOLLÁR, Jozef - MRLÍK, Miroslav - MORAVČÍKOVÁ, Daniela - IVÁN, Béla - MOSNÁČEK, Jaroslav. Effect of monomer content and external stimuli on properties of renewable Tulipalin A-based superabsorbent hydrogels. In European Polymer Journal, 2019, vol. 115, p. 99-106. (3.621 - IF2018).
2. IVANČO, Ján - HALAHOVETS, Yuriy - BENKOVIČOVÁ, Monika - MIČUŠÍK, Matej - KOLLÁR, Jozef - KOSTIUK, Dmytro - HOLOŠ, Ana - MOSNÁČEK, Jaroslav. Response of alumina resistance to trace concentrations of acetone vapors at room temperature. In Journal of Electrical Engineering, 2019, vol. 70, no. 7S, p. 122-126. (0.636 - IF2018).
3. KUTALKOVA, Erika - MRLÍK, Miroslav - ILČÍKOVÁ, Markéta - OSICKA, Josef - SEDLÁČIK, Michal - MOSNÁČEK, Jaroslav. Enhanced and tunable electrorheological capability using surface initiated atom transfer radical polymerization modification with simultaneous reduction of the graphene oxide by silyl-based polymer grafting. In Nanomaterials-Basel, 2019, vol. 9, no. 2, art.no. 308, [15] p. (4.034 - IF2018).
4. MOSNÁČKOVÁ, Katarína - KOLLÁR, Jozef - HUANG, Yi-Shen - HUANG, Chih-Feng - MOSNÁČEK, Jaroslav. Synthesis routes of functionalized nanoparticles. In Polymer Composites with Functionalized Nanoparticles: Synthesis, Properties, and Applications. 1. - Amsterdam: Elsevier B.V., 2019, p. 1-46.

5. BENKOVIČOVÁ, Monika - HOLOŠ, Ana - NÁDAŽDY, Peter - HALAHOVETS, Yuriy - KOTLÁR, Mário - KOLLÁR, Jozef - ŠIFFALOVÍČ, Peter - JERGEL, Matej - MAJKOVÁ, Eva - MOSNÁČEK, Jaroslav - IVANČO, Ján. Tailoring the interparticle distance in Langmuir nanoparticle films. In Physical Chemistry Chemical Physics, 2019, vol. 21, p. 9553-9563.

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

Zodpovedný riešiteľ:	Ľuboš Jankovič
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: 25400 €

Dosiahnuté výsledky:

V hodnotenom období sa riešenie zameralo na fyzikálnu a biologickú charakterizáciu pripravených alkylfosfóniových solí, ktoré sa využívajú na organomodifikáciu vrstevnaných silikátov. V predchádzajúcom období sa pripravila séria trimetylalkylfosfónium-bromidov s dĺžkou alkylového reťazca C2 až C20, pričom termické vlastnosti fosfóniových solí výrazne závisia od dĺžky alkylového reťazca, kde trimetylfosfónium-bromid má výrazne vyššiu termickú stabilitu ako ostatné deriváty. Testy in vitro cytotoxicity tiež preukázali závislosť IC50 hodnôt od dĺžky alkylového reťazca. IC50 hodnoty klesali (toxicita sa zvyšovala) s rastúcou dĺžkou alkylového reťazca. Zároveň sa ukázalo, že toxicita trimetylalkylfosfóniových solí je porovnateľná s trimetylalkylamóniovými soľami s rovnakou dĺžkou alkylového reťazca.

Vybrané typy modifikovaných fílov sa zamiešali do polymérov v koncentráciách od 1 do 10 hm. %. Ako prvá polymérna matrica sa použil polybutylén-adipát-co-tereftalát ako biodegradovateľný polyester. Premerali sa mechanické vlastnosti, ktoré ale vykazovali väčšinou mierne zníženie pevnostných charakteristík.

Výstupy:

1. CHODÁK, Ivan - JOCHEC MOŠKOVÁ, Daniela - JANIGOVÁ, Ivica - JANKOVIČ, Ľuboš - KRONEK, Juraj - OMASTOVÁ, Mária. Properties of poly(epsilon-caprolactone)/clay nanocomposites. In EUROFILLERS 2019 : POLYMER BLENDS : 50 years of Polymer Research at the University of Palermo : in honour of retirement of Prof. Francesco Paolo La Mantia [elektronický zdroj]. - Palermo, Italy : University of Palermo, 2019, [2]. Typ: AFG
2. PODHRADSKÁ, Silvia - PEIDAYESH, Hamed - MOSNÁČKOVÁ, Katarína - JOCHEC MOŠKOVÁ, Daniela - JANKOVIČ, Ľuboš - CHODÁK, Ivan. Properties of poly(epsilon-caprolactone)/clay nanocomposites. In BYPoS : conference book. - Bratislava : Young Scientist Council of Polymer Institute SAS, 2019, p. 72. ISBN 978-80-89841-09-7. Typ: AFG
3. JANKOVIČ, Ľuboš - KRONEK, Juraj - MADEJOVÁ, Jana - HRONSKÝ, Viktor. Intercalation of montmorillonite with functionalized surfactant. In EUROCLAY 2019. International conference on clay science and technology, 1st-5th July 2019, Sorbonne Université, Paris, France : book of abstracts. - Paris, France, 2019, p. 322.

20.) 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-14-0753
Organizácia je koordinátorom projektu: nie
Koordinátor: Chemický ústav SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 2950 €

Dosiahnuté výsledky:

Preštudoval sa vplyv rôznych faktorov na kontrolu redukcie grafén oxidu v prítomnosti terciárnych amínov a počas radikálovej polymerizácie s prenosom atómu.

21.) DARLINK: Vysokoselektívna liečba nádorových ochorení: komplexy endogénnych lipoproteínov s DARPini 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: 14091 €

Dosiahnuté výsledky:

V treťom roku riešenia projektu sme pokračovali v štúdiu gradientových kopolymérov na báze 2-oxazolínov ako nosičov protirakovinových liečiv. Pripravili sa nové typy gradientových kopolymérov so symetrickou štruktúrou analogickou trojblokovým kopolymérom typu BAB. Zistili sme, že takáto architektúra poskytuje nanočastice s vyššou enkapsulačnou kapacitou. Taktiež sme zistili, že nanočastice zložené z gradientových kopoly(2-oxazolínov) obsahujúce hypericín sú schopné poskytovať fotodynamickú terapiu pri použití modelových rakovinových bunkových línií.

Výstupy:

1. DATTA, S. - PETREŇČÍKOVÁ, Nadežda - ŠRÁMKOVÁ, Petra - KRONEKOVÁ, Zuzana - JUTKOVÁ, A. - JANCURA, D. - KRONEK, Juraj. Gradient copolymers from aliphatic and aromatic 2-oxazolines for drug delivery. POLY 147. In 257th ACS National Meeting : graphical abstracts. - Orlando, US : ACS Division of Polymer Chemistry, 2019.
2. KRONEK, Juraj - JEONG, Jiwon - KRONEKOVÁ, Zuzana - DATTA, Shuhashis - JANCURA, Daniel - SOHN, Daewon. Synthesis of gradient copolymers based on one-pot cationic copolymerization of aliphatic and aromatic 2-oxazolines. In Annual Fall Meeting. - Jeju : The Polymer Society of Korea, 2019, 2019, vol. 44, no.2, p. 40.

22.) Syntéza a charakterizácia hybridných polymérnych systémov pre odchyťovanie 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 koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 3900 €

Dosiahnuté výsledky:

V druhom roku riešenia bilaterálneho projektu sa uskutočnili plánované cesty kórejského partnera na Slovensku a slovenského partnera v Seoule na Hanyang Univerzite. V rámci pobytu bola prezentovaná pozvaná prednáška na Kongrese kórejskej polymérnej spoločnosti.

Výstupy:

1. KRONEK, Juraj - JEONG, Jiwon - KRONEKOVÁ, Zuzana - DATTA, Shuhashis - JANCURA, Daniel - SOHN, Daewon. Synthesis of gradient copolymers based on one-pot cationic copolymerization of aliphatic and aromatic 2-oxazolines. In Annual Fall Meeting. - Jeju : The Polymer Society of Korea, 2019, vol. 44, no.2, p. 40.
2. JIWON, Jeong - KRONEK, Juraj - KRONEKOVÁ, Zuzana - SOHN, Daewon. Characteristics of oxazoline based gradient and block copolymers by Langmuir-Blodgett method. In Annual Fall Meeting. - Jeju : The Polymer Society of Korea, 2019, 2019, vol. 44.

23.) 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 koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 1 - Slovensko: 1
Čerpané financie: APVV: 26133 €

Dosiahnuté výsledky:

Hlavným cieľom projektu bolo prispieť k identifikácii kľúčových faktorov ovplyvňujúcich funkčnosť transplantovaných enkapsulovaných ostrovčekov a pochopenie príčin vedúcich k úspešnému alebo neúspešnému výsledku v in vivo experimentoch. Tento projekt prispel k poznatkom, ktoré sú užitočné pre ďalší vývoj konkrétne nami vyvíjaných PMCG mikrokapsúl zložených z alginátu sodného (SA), sodného sulfátu celulózy (SCS) a poly(metylén-ko-kyanoguanidínu) (PMCG), ako aj všeobecne iných typov hydrogélových mikrokapsúl. Poukázali sme na dôležitosť štandardizovaných vlastností polymérov, kvôli čomu sme pristúpili k využitiu GMP-kvality SA a nami syntetizovaných a charakterizovaných PMCG a SCS polymérov. Táto podmienka spolu s nastavením procesu prípravy mikrokapsúl viedli k úspešným experimentom v diabetických myšiach a konzistentne k

mikrokapsulám, ktoré vykazovali minimálne obrastanie fibrotickým tkanivom a dostatočnú stabilitu v myšom zvieracom modeli. Zatiaľ sa nám však nepodarilo prísť na príčinu nedostatočnej stability a biokompatibility mikrokapsúl v predklinickom modeli primátov. Projekt bol po ukočení hodnotený ako vynikajúci.

Výstupy:

1. BITAR, C. M.E. - MARKWICK, K. E. - TREĽOVÁ, D. - KRONEKOVÁ, Z. - PELACH, M. - SELERIERA, C.M.O. - DIETRICH, J. - LACÍK, I. - HOESLI, C.A. Development of a microchannel emulsification process for pancreatic beta cell encapsulation. Biotechnol. Bioeng. 2019, May 26:e2851.

24.) MICROPAN: Cílený dizajn hydrogélových mikrokapsúl pre imunitnú ochranu pankreatických ostrovčiek v liečbe cukrovky. (*Rational design of hydrogel microcapsules for immunoprotection of transplanted pancreatic islets in diabetes treatment.*)

Zodpovedný riešiteľ: Igor Lacík
Trvanie projektu: 1.7.2019 / 30.6.2023
Evidenčné číslo projektu: APVV-18-0480
Organizácia je áno
koordinátorom projektu:
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských 2 - Slovensko: 2
inštitúcií:
Čerpané financie: APVV: 18833 €

Dosiahnuté výsledky:

Projekt sa v úvodnej fáze venoval štúdiu vplyvu géľujúcich iónov a prostredia, v ktorom sa mikrokapsuly nachádzajú (pufre a médium), na vlastnosti mikrokapsúl.

Výstupy:

1. LACÍK, I. Multicomponent alginate-based microcapsule design for immunoprotection of transplanted pancreatic islets in diabetes treatment, International Conference on Precisely Structured Polymer Materials (PSPM 2019), Lodz, Poľsko, 27.10.-30.10.2019, pozvaná prednáška.

25.) 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 áno
koordinátorom projektu:
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských 0
inštitúcií:
Čerpané financie: APVV: 52010 €

Dosiahnuté výsledky:

Optimalizovali sa podmienky fotoATRP v prítomnosti limitovaného množstva vzduchu pre monomér z obnoviteľných zdrojov, alfa-metylén-gamma-butyrolaktón, v DMSO a DMF ako rozpúšťadlách. Preštudoval sa vplyv prídavku rôznych terciárnych amínov na veľkosť indukčnej periódy a kinetiku polymerizácie. Zo študovaných terciárnych amínov mal najvýraznejší vplyv na indukčnú periódu ako i na kinetiku polymerizácie trietylamin. Pokračovalo sa v optimalizácii fotoATRP v prítomnosti uhlíkových nanotrubičiek a výsledky sa porovnali s ARGET ATRP. Zistilo sa, že zatiaľčo pri ARGET

dochádza už pri koncentrácii CNT na úrovni 0.5 hmot.% k spomaleniu až úplnému zastaveniu polymerizácie, pri fotoATRP sa sleduje polymerizácia stále kinetiku prvého rádu. Uskutočnili sa i prvé experimenty miniemulznej fotoATRP butyl (met)akrylátu v prítomnosti vzduchu ako i prietokovej fotoATRP.

Výstupy:

1. ZAIN, Gamal - BONDAREV, Dmitrij - DOHÁŇŠOVÁ, Jana - MOSNÁČEK, Jaroslav. Oxygen-tolerant photochemically induced atom transfer radical polymerization of the renewable monomer Tulipalin A. In ChemPhotoChem, 2019, vol. 3, iss. 11, p. 1138-1145. (2019 - Current Contents, WOS).
2. ZYGO, Monika - LIPINSKA, Magdalena - LU, Zhao - ILČÍKOVÁ, Markéta - BOCKSTALLER, Michael R. - MOSNÁČEK, Jaroslav - PIETRASIK, Joanna. New type of montmorillonite compatibilizers and their influence on viscoelastic properties of ethylene propylene diene and methyl vinyl silicone rubbers blends. In Applied Clay Science, 2019, vol. 183, art.no. 105359, [12] p. (3.890 - IF2018).
3. BONDAREV, Dmitrij - BORSKÁ, Katarína - ŠORAL, Michal - MORAVČÍKOVÁ, Daniela - MOSNÁČEK, Jaroslav. 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, 2019, vol. 161, p. 122-127. (3.771 - IF2018).
4. KUTALKOVA, Erika - MRLIK, Miroslav - ILČÍKOVÁ, Markéta - OSICKA, Josef - SEDLACIK, Michal - MOSNÁČEK, Jaroslav. Enhanced and tunable electrorheological capability using surface initiated atom transfer radical polymerization modification with simultaneous reduction of the graphene oxide by silyl-based polymer grafting. In Nanomaterials-Basel, 2019, vol. 9, no. 2, art.no. 308, [15] p. (4.034 - IF2018).
5. MRLIK, Miroslav - ILČÍKOVÁ, Markéta - OSICKA, Josef - KUTALKOVA, Erika - MINARIK, Antonin - VESEL, Alenka - MOSNÁČEK, Jaroslav. Electrorheology of SI-ATRP-modified graphene oxide particles with poly(butyl methacrylate): effect of reduction and compatibility with silicone oil. In RSC Advances, 2019, vol. 9, no. 3, p. 1187-1198. (3.049 - IF2018).
6. MOSNÁČKOVÁ, Katarína - KOLLÁR, Jozef - HUANG, Yi-Shen - HUANG, Chih-Feng - MOSNÁČEK, Jaroslav. Synthesis routes of functionalized nanoparticles. In Polymer Composites with Functionalized Nanoparticles : Synthesis, Properties, and Applications. 1. - Amsterdam : Elsevier B.V., 2019, p. 1-46.

26.) 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: 6478 €

Dosiahnuté výsledky:

V rámci projektu sa zosyntetizovali molekuly na báze tiazolo [5,4-d]tiazolu, ktoré sú potencionálne polovodiče s malou molekulovou hmotnosťou. Pripravené makromolekuly majú strategicky zvolené akceptorové a donorové jednotky. Akceptorová časť molekuly tvorí tiazolo[5,4-d]tiazol, ku ktorému sú pripojené substituované fenylové jadrá ako donorová jednotka cez 1,3,4-oxadiazolové linkery za

účelom budovania malých molekúl. Vytýčené deriváty boli pripravené Huisgenovou cykloadíciou z chloridu kyseliny tiazolo[5,4-d]tiazolu a príslušného tetrazolu. Výsledné štruktúry boli ocharakterizované a poskytnuté na štúdium kinetiky rastu na 2D substrátoch.

Výstupy:

1. BALOGH, Róbert - ECKSTEIN ANDICSOVÁ, Anita - DANKO, Martin. New donor-acceptor small molecules with oxadiazole spacer as a semiconducting materials. In BYPoS: conference book. - Bratislava: Young Scientist Council of Polymer Institute SAS, 2019, p. 62. ISBN 978-80-89841-09-7.
2. BALOGH, Róbert - ECKSTEIN ANDICSOVÁ, Anita - DANKO, Martin. Thiazolo[5.4-D]thiazole based small molecules with oxadiazole spacer as an electron transport materials for organic light emitting diodes. In BIMac 2019: Computational and Experimental Approach to Polymers in Biomedical and Soft Matter: 23rd Bratislava International Conference on Macromolecules: programme and abstracts book [elektronický zdroj]. - Bratislava: Polymer Institute of Slovak Academy of Sciences, 2019, p. 54-55. ISBN 978-80-89841-10-3.
3. BALOGH, Róbert - ECKSTEIN ANDICSOVÁ, Anita - DANKO, Martin. Nové donor-akceptorové zlúčeniny pre svetloemitujúce diódy. In ChemZi: Zborník abstraktov: 71. Zjazd chemikov, 9-13 september 2019, Vysoké Tatry, Horný Smokovec, Slovensko. - Bratislava: Slovenská chemická spoločnosť, 2019, 2019, roč. 15, č. 1, s. 99-100. ISSN 1336-7242.

27.) GONanoplatform: Grafénová nanoplatforma na detekciu rakoviny. (*Graphene-based nanoplatform 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: 11334 €

Dosiahnuté výsledky:

2D častice grafén-oxidu (GO) boli pripravené a modifikované magnetickými nanočasticami a protilátkou. Základné charakteristiky GO, ako je stupeň oxidácie, veľkosť nanočastíc a exfoliácia, boli študované fyzikálnou a chemickou analýzou, XPS, transmisnou elektrónovou mikroskopiou (TEM), energeticky disperznou röntgenovou analýzou (EDX) a atómovou silovou mikroskopiou (AFM). Protilátka špecifická pre karbónovú anhydrázu IX (CA IX) bola naviazaná amidickou väzbou na poly-L-lyzín modifikované magnetické nanočastice, ktoré boli opäť konjugované na platformu GO prostredníctvom amidickej väzby. Pripravená platforma založená na GO bola použitá na štúdiu zameranú na hypoxické rakovinové bunky použitím imunofluorescencie.

Výstupy:

1. BUGÁROVÁ, Nikola - ŠPITÁLSKY, Zdenko - MIČUŠÍK, Matej - BODIK, Michal - ŠIFFALOVICH, Peter - KONERACKÁ, Martina - ZÁVIŠOVÁ, Vlasta - KUBOVČÍKOVÁ, Martina - KAJANOVÁ, Ivana - ZAŤOVIČOVÁ, Miriam - PASTOREKOVÁ, Silvia - ŠLOUF, Miroslav - MAJKOVÁ, Eva - OMASTOVÁ, Mária. A multifunctional graphene oxide platform for targeting cancer. In Cancers, 2019, vol. 11, iss. 6, art. no. 753, [19] p. (6.162 - IF2018). Typ: ADCA
2. KAJANOVÁ, Ivana - ZAŤOVIČOVÁ, Miriam - BUGÁROVÁ, Nikola - ŠPITÁLSKY, Zdenko - MIČUŠÍK, Matej - BODIK, Michal - ŠIFFALOVICH, Peter - KONERACKÁ, Martina - ZÁVIŠOVÁ, Vlasta - KUBOVČÍKOVÁ, Martina - ŠLOUF, Miroslav - MAJKOVÁ, Eva - OMASTOVÁ, Mária - PASTOREKOVÁ, Silvia. Graphene oxide nanoplatform for targeting cancer cells via carbonic anhydrase is expressed in response to stresses in tumor microenvironment. In Twelfth Symposium

on Catecholamines and Other Neurotransmitters in Stress : Smolenice Castle, Slovakia, June 15 - 19, 2019. - Bratislava : Institute of Experimental Endocrinology, Biomedical Research Center, SAS and Slovak Cancer Research Foundation, 2019, p. 34. Typ: AFH.

3. MIČUŠÍK, Matej - BUGÁROVÁ, Nikola - BODIK, Michal - ŠIFFALOVIC, Peter - KOLLÁR, Jozef - OMASTOVÁ, Mária. 2D materials as nanoplatforms for cancer detection. In EPF 2019 : European Polymer Congress : abstract book. - Heraclion, Greece : Department of Chemistry, University of Crete, 2019, p. 216. Typ: AFG.

4. BUGÁROVÁ, Nikola - BODIK, Michal - KÁLOSI, Anna - ANNUŠOVÁ, Adriana - ŠIFFALOVIC, Peter - KAJANOVÁ, Ivana - KOLLÁR, Jozef - ŠPITÁLSKY, Zdenko - MIČUŠÍK, Matej - OMASTOVÁ, Mária. Biomodified nanoplatforms for cancer targeting. In 16th European Conference on Organized Films : abstract book. - Paris, France : Université Paris Descartes, 2019, o-24, [1] p. Dostupné na internete: <<http://ecof16.sciencesconf.org>>. Typ: AFG

5. BUGÁROVÁ, Nikola - BODIK, Michal - ŠIFFALOVIC, Peter - MIČUŠÍK, Matej - ZÁVIŠOVÁ, Vlasta - KONERACKÁ, Martina - ZAŤOVIČOVÁ, Miriam - PASTOREKOVÁ, Silvia - OMASTOVÁ, Mária. 2D platformy na výskum rakoviny. In ChemZi : Zborník abstraktov: 71. Zjazd chemikov, 9-13 september 2019, Vysoké Tatry, Horný Smokovec, Slovensko. - Bratislava : Slovenská chemická spoločnosť, 2019, 2019, roč. 15, č. 1, s. 77-78. ISSN 1336-7242. Typ: AFH. Pozvaná prednáška.

6. OMASTOVÁ, Mária. Smart 2D nanoplatforms for advanced application. In KOLOKVIUM 2019 : vnútroústavná konferencia 28. Kolokvium - 4.2. - 8.2. 2019 : program a abstrakty. - Praha, ČR : Ústav makromolekulární chemie AV ČR, 2019, p. G1 [1] s. Typ: AFE Pozvaná prednáška.

28.) 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 Pechánová
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: 6155 €

Dosiahnuté výsledky:

V rámci projektu sme pokračovali v príprave biokompatibilných kopolymérnych nanočastíc (Np) so zosieťovaným hydrofóbnym jadrom a hydrofilným vonkajším obalom. Kvôli možnosti modifikovateľnosti povrchu pripravených polymérnych nanočastíc bol použitý ako jeden z monomérov ω -metylén- ω -butyrolaktón (MBL). Tento cyklický monomér sa v bázičkom prostredí otvára a poskytuje OH funkčnú skupinu, ktorá je ďalej funkcionalizovateľná. Polymérne častice sa pripravili voľnoradikálovou kopolymerizáciou vo vodnom prostredí z N-dodecylmetakrylamidu (DMAm), poly(etylén glykol) monometakrylátu (PEG, $M_n \sim 360$ g mol⁻¹) a MBL v pomere 6:7:1. V prípade kedy sa použili tie isté pomery ako pri Np pripravené z DMAm:VP:PEG, získali sa častice s distribúciou podľa počtu ~ 253 nm s distribúciou PDI $\sim 0,036$ a zeta potenciálom -19,9 mV.

Podarilo sa zvýšiť podiel MBL zložky v polymérnych časticiach aby sa zefektívnila ich možná povrchová modifikácia. Aby povrch nanočastíc bolo možné modifikovať, laktónový kruh bol v bázičkom prostredí (2g NaOH, 8 ml voda) otvorený a získali sa reaktívne funkčné skupiny - alkohol

a karboxylová kyselina. Distribúcia veľkosti častíc po otvorení laktónového kruhu sa zvýšila na ~360 nm s úzkou distribúciou (PDI ~ 0.08). Stabilita koloidného systému určená zo zeta potenciálu bola v priemere -15 mV. Naplnenie modifikovaných polymérnych nanočastíc bolo testované v každej fáze pomocou modelového liečiva – kurkumínu. Na základe minuloročných skúseností pre enkapsuláciu bioaktívnych zlúčenín bol použitý 4 hmot.% acetónový roztok. Veľkosť naplnených častíc, morfológia a celkové množstvo enkapsulovaného kurkumínu je ešte predmetom vyhodnocovania.

Výstupy:

1. ECKSTEIN ANDICSOVÁ, Anita - DANKO, Martin - MOSNÁČEK, Jaroslav. Amphiphilic nanoparticles as vehicles for drug distribution. In The 10th Conference on Green Chemistry and Nanotechnologies in Polymeric Materials: abstracts: GCNPM 2019 [elektronický zdroj]. - Riga, Latvia : Latvian State Institute of Wood Chemistry, 2019, [1] p.
2. ECKSTEIN ANDICSOVÁ, Anita - DANKO, Martin - MOSNÁČEK, Jaroslav. Amphiphilic block copolymers as a drug transporters. In POLY 2019: Frontiers in polymer science: abstract book. - Budapest, Hungary: Elsevier, 2019, [P2, 105].

29.) 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	nie
koordinátorom projektu:	
Koordinátor:	Medzinárodné laserové centrum, Bratislava
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	APVV: 1500 €

Dosiahnuté výsledky:

Ciele projektu boli nastavené tak, aby umožnili priemyselnému partnerovi projektu, Chemko a.s. Slovakia, uskutočniť úpravu existujúcich procesov výroby drevoplastu a fenolformaldehydových živíc, spojenú so zavedením lignínu, ako jednej z hlavných výrobných surovín v oboch výrobných procesoch. Úlohou projektu bolo aplikovať laboratórne poznatky perspektívne do výrobných praxe a späťne overovať výsledky výroby v exaktných laboratórnych podmienkach. V počiatočných fázach projektu sa vykonala detailná sumarizujúca charakteristika jednotlivých zložiek tvoriacich fenolformaldehydové živice a drevoplastové kompozity s využitím lignínu. Medzi tieto komponenty patria surový lignín, spracovaný lignín a chemické komponenty pre výrobu živíc a drevoplastu. Medzi medziprodukty prípravy boli zaradené fragmentovaný a metylovaný lignín - monoméry výsledného polymérneho reťazca fenolformaldehydovej živice. V rámci nasledujúcich fáz projektu prebehla detailná sumarizujúca charakterizácia eventúálnych produktov výroby fenolformaldehydových živíc s využitím lignínu, resp. drevoplastových kompozitov s využitím lignínu a na parametre výroby ovplyvňujúce makroparametre drevoplastového kompozitu s využitím lignínu, resp. makroparametre drevoplastového kompozitu s využitím lignínu.

Najdôležitejšími výsledkami bolo pripravenie nových receptúr na rezolovú živicu na báze depolymerizovaného topoľového lignínu, ktorá zodpovedá kvalitatívnym požiadavkám, kladeným na živicu, určenú na výrobu brezových preglejovaných dosiek a receptúra na drevoplastový kompozit zahŕňajúci lignín, ktorý sa svojimi kvalitatívnymi vlastnosťami signifikantne neodlišuje od vzoriek drevoplastových kompozitov pripravených bez prídavku lignínu. Na našom ústave sme najmä pripravovali preglejované dosky a následne vykonávali ťahové skúšky podľa normy STN EN 314. Taktiež sme testovali mechanické vlastnosti pripravených fenokolov a drevoplastov pomocou

nanoindentačnej analýzy.

Výstupy:

1. Hulkó, G., Ondrejko, K., Bartalský, L., Belavý, C. 2003-2019. Distributed Parameter Systems Blockset for Simulink - DPS Blockset for Simulink - Upgrade. Program CONNECTIONS of The MathWorks – Third-party software product of The MathWorks Company. Natick. Available on www.dpscontrol.sk.

30.) 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 záverečnej fáze riešenia projektu sme predovšetkým zamerali na in vitro hodnotenie neurotoxicity a imunotoxicity vybraných nanočastíc. Ako experimentálne modely boli vybrané ľudská histiocytická lymfómová bunková línia (U937) a ľudská leukemická monocytová bunková línia (THP-1). Prešetrila sa metabolická aktivita rôznych bunkových kompartmentov (mitochondriálny dýchací reťazec, lyzozómy, de novo syntéza DNA) ako aj integrita cytoplazmatickej membrány (analýza LDH, stanovenie pro-zápalového potenciálu nanočastíc). Pomocou DLS sa stanovila veľkosť, distribúcia, a zeta potenciál strieborných a medených nanočastíc. Testovala sa taktiež prevencia potenciálnych negatívnych účinkov testovaných nanočastíc pomocou prírodných látok s antioxidačnými, protirakovinovými a protizápalovými vlastnosťami.

Výstupy:

1. KOLLÁR, Jozef - MRLÍK, Miroslav - MORAVČÍKOVÁ, Daniela - IVÁN, Béla - MOSNÁČEK, Jaroslav. Effect of monomer content and external stimuli on properties of renewable Tulipalin A-based superabsorbent hydrogels. In European Polymer Journal, 2019, vol. 115, p. 99-106. (3.621 - IF2018). ISSN 0014-3057.
2. KOLLÁR, Jozef - MOSNÁČEK, Jaroslav - KASÁK, Peter. Betaine-based materials - preparation and their tunable properties. In 9th International Colloids Conference : book of abstracts. - Oxford : Elsevier, 2019, sC.33, [1] p. Názov z obrazovky. Požaduje sa Adobe Acrobat Reader DC. Dostupné na internete: <https://elsevier.conference/services.net/autorlogin.asp?conferenceID=4283&language=en-uk>.
3. KOLLÁR, Jozef - HRČKOVÁ, Ľudmila - MOSNÁČEK, Jaroslav. The effect of processing parameters on the preparation of bioderived polymeric nanoparticles. In ChemZi : Zborník abstraktov: 71. Zjazd chemikov, 9-13 september 2019, Vysoké Tatry, Horný Smokovec, Slovensko. - Bratislava : Slovenská chemická spoločnosť, 2019, roč. 15, č. 1, s. 200. ISSN 1336-7242.

31.) 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: 21722 €

Dosiahnuté výsledky:

V rámci systematického štúdia modelového polárneho protického média: n-propanolu (n-PrOH) v objemovom a rôzne priestorovo-limitovaných stavoch v sérii SiO₂ matric pomocou ESR techniky sa k predošlým trom nemodifikovaným neregulárnym SG 60, 100 a 300-SIL matriciam s rôznou strednou veľkosťou pórov ako aj k jednej modifikovanej neregulárnej SG100-C4 matici pridala ďalšia nemodifikovaná regulárna MCM-41 matrica kvôli detailnému vyšetreniu vplyvu morfológie a chemického zloženia povrchu pórov matrice. Zistilo sa, že ESR odozva spinovej sondy TEMPO dramaticky odráža vplyv obidvoch faktorov parametrov pórov matrice. V tomto momente je však stále neobjasnený význam chemického povrchu originálnej regulárnej MCM-41 matrice, ktorý bude adresovaný zmenou pôvodne hydrofilného charakteru povrchu pórov na hydrofóbny pomocou vhodnej chemickej modifikácie.

Konečne, zahájilo sa kombinované DSC, ESR a PALS vyšetrovanie iného polárneho protického média: t-butanolu (t-BuOH) v objemovom stave ako aj uväznenom stave za použitia nemodifikovanej MCM-41 matrice.

Sumarizovali sa napočítané výsledky na systéme PVME/voda a v ďalšom kroku sa robili simulácie DMSO/voda za účelom odhalenia mechanizmu pôsobenia DMSO ako kryostatika. Na stretnutí na FÚ 18.11.2019 sa vytýčili ďalšie simulácie v oblasti okolo 2 % DMSO vo vode

Výstupy:

1. BARTOŠ, Josef * - ŠVAJDLENKOVÁ, Helena – ŠAUŠA, Ondrej Molecular probe dynamics and free volume heterogeneity in n-propanol confined in regular MCM-41 matrix by ESR and PALS, RSC Advances, RA-ART-11-2019-009495 F – prijaté
2. RAČKO, Dušan - S. Capponi - F. Alvarez - J. Colmenero: The Free Volume In A Polymer Water Mixture: Poly (Vinyl Methacrylate) Case. XXXIII Bratislava International Conference on Macromolecules BIMac2019, Falkensteiner Hotel, Pilarikova 5, 811 03 Bratislava, 30. June-3. July 2019, Slovakia, V / poster

32.) MoSence: 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: 11000 €

Dosiahnuté výsledky:

Spísala sa rozsiahla publikácia ohľadne oxidácie exfoliovaného MoS₂ v EtOH/H₂O roztokoch. Ukázali sme, že zvyšovaním počiatočnej koncentrácie MoS₂ nad určitú hranicu dochádza k oxidácii a k tvorbe MoOx nanočastíc. Následný pokles pH spolu s nárastom obsahu SO₄²⁻ indikuje oxidáciu niekoľko-vrstvového MoS₂ smerom k nestechiometrickým MoOx nanočasticiam. Navyše znížené pH spôsobuje aglomeráciu a následnú sedimentáciu MoS₂ častíc, čo významne znižuje ich výťažok. Podrobne sme pomocou fyzikálno-chemických metód popísali túto transformáciu MoS₂-MoOx a určili sme koncentračný prah pre počiatočnú koncentráciu MoS₂ s hodnotou 10 mg ml⁻¹, kedy nastáva táto oxidačná transformácia. Navyše sme pomocou XPS a UV-vis štúdie potvrdili stabilitu MoS₂ vodných koloidov pri pH 7.2 a koncentrácii 1mg ml⁻¹, kedy nedochádza k oxidácii MoS₂ ani po niekoľkých mesiacoch. Táto stabilita je veľmi dôležitá pre ďalšie experimenty súvisiace s povrchovou modifikáciou MoS₂ nanočastíc.

Výstupy:

1. BODIK, Michal - ANNUŠOVÁ, Adriana - HAGARA, Jakub - MIČUŠÍK, Matej - OMASTOVÁ, Mária - KOTLÁR, Mário - CHLPÍK, Juraj - CIRÁK, Július - ŠVAJDLENKOVÁ, Helena - ANGUŠ, Michal - ROLDÁN, Alicia Marín - VEIS, Pavel - JERGEL, Matej - MAJKOVÁ, Eva - ŠIFFALOVICH, Peter. An elevated concentration of MoS₂ lowers the efficacy of liquid-phase exfoliation and triggers the production of MoOx nanoparticles. In Physical Chemistry Chemical Physics, 2019, vol. 21, no. 23, p. 12396-12405. (3.567 - IF2018). ISSN 1463-9076. Typ: ADCA
2. MIČUŠÍK, Matej - BODIK, Michal - BUGÁROVÁ, Nikola - ŠIFFALOVICH, Peter - OMASTOVÁ, Mária. MS-IN-1769 2D nanoplatforms for cancer detection. In Microscopy 2019 : Imaging Principles of Life 2019 : Czech-BioImaging Annual Scientific Conference. - Lednice na Moravě : Czech BioImaging, 2019, p. 26. Typ: AFE. Pozvaná prednáška
3. MIČUŠÍK, Matej - BUGÁROVÁ, Nikola - BODIK, Michal - ŠIFFALOVICH, Peter - KOLLÁR, Jozef - OMASTOVÁ, Mária. 2D materials as nanoplatforms for cancer detection. In EPF 2019 : European Polymer Congress : abstract book. - Heraclion, Greece : Department of Chemistry, University of Crete, 2019, p. 216. Typ: AFG.
4. BUGÁROVÁ, Nikola - BODIK, Michal - KÁLOSI, Anna - ANNUŠOVÁ, Adriana - ŠIFFALOVICH, Peter - KAJANOVÁ, Ivana - KOLLÁR, Jozef - ŠPITÁLSKY, Zdenko - MIČUŠÍK, Matej - OMASTOVÁ, Mária. Biomodified nanoplatforms for cancer targeting. In 16th European Conference on Organized Films: abstract book. - Paris, France: Université Paris Descartes, 2019, o-24, [1] p. Dostupné na internete: <<http://ecof16.sciencesconf.org>>. Typ: AFG
5. MIČUŠÍK, Matej - BUGÁROVÁ, Nikola - BODIK, Michal - ŠIFFALOVICH, Peter - OMASTOVÁ, Mária. Surface chemistry, morphology and bioimaging of bioconjugated MoS₂ nanoplatforms. In ECASIA 19: 18th European Conference on Applications of Surface and Interface Analysis : abstract booklet [elektronický zdroj]. - Dresden, Germany : Technical University Dresden, 2019, p. 426. Názov z obrazovky. Požaduje sa Adobe Acrobat Reader DC. Typ: AFG
6. KÁLOSI, Anna - LABUDOVÁ, Martina - ANNUŠOVÁ, Adriana - BENKOVIČOVÁ, Monika - KOLLÁR, Jozef - JERGEL, Matej - ŠIFFALOVICH, Peter - MAJKOVÁ, Eva. Partial Zwitterionic Coating on MoS₂ Nanoplatforms for Non-Specific Cellular Uptake Regulation. In GRAPHENE 2019 : Abstracts Book. - Rome, Italy : Phantoms Foundation, 2019, p. 388.

33.) 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 organizácii SAV: Jaroslav Mosnáček
Trvanie projektu: 1.10.2018 / 30.6.2022
Evidenčné číslo projektu: APVV-17-0300
Organizácia je koordinátorom projektu: nie
Koordinátor: Chemický ústav SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: APVV: 5903 €

Dosiahnuté výsledky:

Vlastnosti polyelektrolytových hydrogélů sú kombináciou lipofilných vlastností polymérneho reťazca a hydrofilných vlastností vďaka vysokej asociácie nabitých častí reťazca s vodou. Pripravili sa hydrogély kationových polymetakrylátových (ko)polymérov, v ktorých sa nízkomolekulový Cl⁻ protiión difúziou vymenil za lipofilný dodecylsulfátový alebo perfluorooktanoátový anión. Výmenou dochádza k zmršťovaniu gélov a aj k strate tvarovej uniformity v dôsledku vypudzovania najmä voľnej neasociovej vody. Tým dochádza k miernemu nárastu podielu vody, ktorá je viazaná v blízkosti polymérneho reťazca (nezamrzajúca voda). Výmena aniónov je nevratná.

Výstupy:

1. BERTÓK, Tomáš - LORENCOVÁ, Lenka - HRONČEKOVÁ, Štefánia - GAJDOŠOVÁ, Veronika - JÁNĚ, Eduard - HÍREŠ, Michal - KASÁK, Peter - KAMAN, Ondrej - SOKOL, Roman - BELLA, Vladimír - ECKSTEIN ANDICSOVÁ, Anita - MOSNÁČEK, Jaroslav - VIKARTOVSKÁ, Alica, Welwardová - TKÁČ, Ján. Advanced impedimetric biosensor configuration and assay protocol for glycoprofiling of a prostate oncomarker using Au nanoshells with a magnetic core. In Biosensors and Bioelectronics, 2019, vol. 131, p. 24-29. (9.518 - IF2018).
2. BERTÓK, Tomáš - LORENCOVÁ, Lenka - HRONČEKOVÁ, Štefánia - GAJDOŠOVÁ, Veronika - JÁNĚ, Eduard - HÍREŠ, Michal - KASÁK, Peter - KAMAN, Ondrej - SOKOL, Roman - BELLA, Vladimír - ECKSTEIN ANDICSOVÁ, Anita - MOSNÁČEK, Jaroslav - VIKARTOVSKÁ, Alica, Welwardová - TKÁČ, Ján. Synthesis and characterization of Au nanoshells with a magnetic core and betaine derivatives. In MethodsX, 2019, vol. 6, p.1999-2012.

Programy: Vnútroústavné

34.) Hydrogél na báze chitozánů a cyklodextrínu vytvorený click reakciou pre 3D bunkovú enkapsuláciu. (*Chitosan-cyclodextrin-based hydrogel formed by click reaction for 3D cell encapsulation.*)

Zodpovedný riešiteľ: Abolfazl Heydari
Trvanie projektu: 1.1.2019 / 31.12.2019
Evidenčné číslo projektu:
Organizácia je koordinátorom projektu: áno
Koordinátor: Ústav polymérov SAV
Počet spoluriešiteľských inštitúcií: 0
Čerpané financie: 0

Dosiahnuté výsledky:

V rámci riešeného projektu boli syntetizované a charakterizované kvarternizované, sulfonované ako aj karboxylované chitozány a chitozány a tiež dva merkpto- a karboxy-?-cyklodextríny. Následne sa sledoval vplyv chemického zloženia, mólovej hmotnosti a nábojovej hustoty na vznik hydrogélů a jeho výsledné vlastnosti. Niektoré syntetizované polyméry boli tiež použité ako transportné systémy liečiv.

Výstupy:

1. JAVANBAKHT, S. - HEMMATI, A. - HEYDARI, A. - NAMAZI, H. Facile preparation of carboxymethylcellulose-coated 5-fluorouracil@MOF-5 nano-hybrid as a bio-nanocomposite carrier for the anticancer oral delivery. In International Journal of Biological Macromolecules, prijaté.

Programy: Štrukturálne fondy EÚ Výskum a inovácie

35.) Vybudovanie Centra pre využitie pokročilých materiálov Slovenskej akadémie vied.
(*Creation of Centre for Advanced Materials Application of the Slovak Academy of Sciences.*)

Zodpovedný riešiteľ:	Pavol Šajgalík
Zodpovedný riešiteľ v organizácii SAV:	Jaroslav Mosnáček
Trvanie projektu:	1.7.2019 / 30.6.2023
Evidenčné číslo projektu:	projekt štrukturálnych fondov, kód projektu v ITMS2014+: 313021T081
Organizácia je koordinátorom projektu:	nie
Koordinátor:	Úrad Slovenskej akadémie vied
Počet spoluriešiteľských inštitúcií:	0
Čerpané financie:	EU: 15000 €

Dosiahnuté výsledky:

Kontrolované sa redukoval grafén oxid počas z povrchu iniciovanej radikálovej polymerizácie s prenosom atómu. Výsledné hybridné materiály z rôznym stupňom vodivosti sa študovali v elektoreologických suspenziách ako aj pri kompozitných termoplastických elastoméroch vratne reagujúcich na svetlo.

Výstupy:

1. MOSNÁČKOVÁ, Katarína - KOLLÁR, Jozef - HUANG, Yi-Shen - HUANG, Chih-Feng - MOSNÁČEK, Jaroslav. Synthesis routes of functionalized nanoparticles. In Polymer Composites with Functionalized Nanoparticles: Synthesis, Properties, and Applications. 1. - Amsterdam: Elsevier B.V., 2019, p. 1-46.

2. KOLLÁR, Jozef - DANKO, Martin – PIPPIG, Falko – MOSNÁČEK, Jaroslav.* Functional Polymers And Polymeric Materials From Renewable Alpha-Unsaturated Gamma-Butyrolactones. Frontiers Chemistry, Vol. 7, art.no. 845, 8 pages (2019), IF2017 = 3.782

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

- ABC01 BENKOVÁ, Zuzana** - CORDEIRO, M. Natália D. S. Coating of nanoparticles in aqueous solutions: Insights from molecular dynamics simulations. In Aqueous phase adsorption: theory, simulations, and experiments. - Boca Raton : Taylor & Francis, CRC Press, 2019, p. 135-155. ISBN 978-1-138-57521-9.
- ABC02 MOSNÁČKOVÁ, Katarína - KOLLÁR, Jozef - HUANG, Yi-Shen - HUANG, Chih-Feng - MOSNÁČEK, Jaroslav**. Synthesis routes of functionalized nanoparticles. In Polymer Composites with Functionalized Nanoparticles : Synthesis, Properties, and Applications. 1. - Amsterdam : Elsevier B.V., 2019, p. 1-46. ISBN 978-012814-064-2.

ADCA Vedecké práce v zahraničných karentovaných časopisoch – impaktovaných

- ADCA01 BALTA, Zeynep - SIMSEK, Esra Bilgin** - BEREK, Dušan. Facile synthesis of flake-like Bi₂WO₆/carbon fiber heterojunction catalysts with enhanced photoactivity under visible light illumination. In Optik : International Journal for Light and Electron Optics, 2019, vol. 183, p. 38-46. (2018: 1.914 - IF, Q3 - JCR, 0.404 - SJR, Q2 - SJR, karentované - CCC). (2019 - Current Contents). ISSN 0030-4026.
- ADCA02 BALTA, Zeynep** - SIMSEK, Esra Bilgin - BEREK, Dušan. Solvothermal synthesis of WO₃/TiO₂/carbon fiber composite photocatalysts for enhanced performance under sunlight illumination. In Photochemistry and Photobiology, 2019, vol. 95, p. 1331-1338. (2018: 2.338 - IF, Q3 - JCR, 0.806 - SJR, Q2 - SJR, karentované - CCC). (2019 - Current Contents). ISSN 0031-8655.
- ADCA03 BARTOŠ, Josef** - ŠAUŠA, Ondrej - ŠVAJDLENKOVÁ, Helena - MAŤKO, Igor - ČECHOVÁ, Katarína. Bulk and confined n-alkanes: n-undecane in unmodified vs. modified silica gels by positron annihilation lifetime spectroscopy and electron spin resonance techniques. In Journal of Non-Crystalline Solids, 2019, vol. 511, p. 1-9. (2018: 2.600 - IF, Q1 - JCR, 0.689 - SJR, Q1 - SJR, karentované - CCC). (2019 - Current Contents, WOS, SCOPUS). ISSN 0022-3093.
- ADCA04 BEKHTA, Pablo** - SEDLIAČIK, Ján - KAČÍK, František - NOSHCHENKO, Gregory - KLEINOVÁ, Angela. Lignocellulosic waste fibers and their application as a component of urea-formaldehyde adhesive composition in the manufacture of plywood. In European Journal of Wood and Wood Products, 2019, vol. 77, no. 4, p. 495-508. (2018: 1.901 - IF, Q1 - JCR, 0.584 - SJR, Q1 - SJR, karentované - CCC). (2019 - Current Contents). ISSN 0018-3768.
- ADCA05 BENKOVIČOVÁ, Monika** - HOLOŠ, Ana - NÁDAŽDY, Peter - HALAHOVETS, Yuriy - KOTLÁR, Mário - KOLLÁR, Jozef - ŠIFFALOVÍČ, Peter - JERGEL, Matej - MAJKOVÁ, Eva - MOSNÁČEK, Jaroslav - IVANČO, Ján. Tailoring the interparticle distance in Langmuir nanoparticle films. In Physical Chemistry Chemical Physics, 2019, vol. 21, p. 9553-9563. (2018: 3.567 - IF, Q1 - JCR, 1.310 - SJR, Q1 - SJR, karentované - CCC). (2019 - Current Contents). ISSN 1463-9076.
- ADCA06 BERTÓK, Tomáš - LORENCOVÁ, Lenka - HRONČEKOVÁ, Štefánia - GAJDOŠOVÁ, Veronika - JÁNÉ, Eduard - HÍREŠ, Michal - KASÁK, Peter - KAMAN, Ondrej - SOKOL, Roman - BELLA, Vladimír - ECKSTEIN ANDICSOVÁ, Anita - MOSNÁČEK, Jaroslav - VIKARTOVSKÁ, Alica, Welwardová - TKÁČ, Ján**. Advanced impedimetric biosensor configuration and assay protocol for glycoprofiling of a prostate oncomarker using Au nanoshells with

- a magnetic core. In Biosensors and Bioelectronics, 2019, vol. 131, p. 24-29. (2018: 9.518 - IF, Q1 - JCR, 2.553 - SJR, Q1 - SJR, karentované - CCC). (2019 - Current Contents). ISSN 0956-5663.
- ADCA07 BLEHA, Tomáš** - CIFRA, Peter. Force-displacement relations at compression of dsDNA macromolecules. In Journal of Chemical Physics, 2019, vol. 151, art.no. 014901, [10]p. (2018: 2.997 - IF, Q2 - JCR, 1.159 - SJR, Q1 - SJR, karentované - CCC). (2019 - Current Contents). ISSN 0021-9606.
- ADCA08 BODIK, Michal** - ANNUŠOVÁ, Adriana - HAGARA, Jakub - MIČUŠÍK, Matej - OMASTOVÁ, Mária - KOTLÁR, Mário - CHLPÍK, Juraj - CIRÁK, Július - ŠVAJDLENKOVÁ, Helena - ANGUŠ, Michal - ROLDÁN, Alicia Marín - VEIS, Pavel - JERGEL, Matej - MAJKOVÁ, Eva - ŠIFFALOVÍČ, Peter. An elevated concentration of MoS₂ lowers the efficacy of liquid-phase exfoliation and triggers the production of MoO_x nanoparticles. In Physical Chemistry Chemical Physics, 2019, vol. 21, no. 23, p. 12396-12405. (2018: 3.567 - IF, Q1 - JCR, 1.310 - SJR, Q1 - SJR, karentované - CCC). (2019 - Current Contents). ISSN 1463-9076.
- ADCA09 BONDAREV, Dmitrij - BORSKÁ, Katarína - ŠORAL, Michal - MORAVČÍKOVÁ, Daniela - MOSNÁČEK, Jaroslav**. 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, 2019, vol. 161, p. 122-127. (2018: 3.771 - IF, Q1 - JCR, 1.039 - SJR, Q1 - SJR, karentované - CCC). (2019 - Current Contents). ISSN 0032-3861.
- ADCA10 BRNDIAROVÁ, Jana - ŠIFFALOVÍČ, Peter - HULMAN, Martin - KÁLOSI, Anna - BODIK, Michal - SKÁKALOVÁ, V. - MIČUŠÍK, Matej - MARKOVIČ, Zoran M. - MAJKOVÁ, Eva - FRÖHLICH, Karol. Functionalized graphene transistor for ultrasensitive detection of carbon quantum dots. In Journal of Applied Physics, 2019, vol. 126, no. 214303. (2018: 2.328 - IF, Q2 - JCR, 0.746 - SJR, Q2 - SJR, karentované - CCC). (2019 - Current Contents). ISSN 0021-8979.
- ADCA11 BUDIMIR, Milica** - MARKOVIČ, Zoran - JOVANOVIĆ, Dragana - VUJISIĆ, Miloš - MIČUŠÍK, Matej - DANKO, Martin - KLEINOVÁ, Angela - ŠVAJDLENKOVÁ, Helena - ŠPITÁLSKY, Zdenko - TODOROVIČ MARKOVIČ, Biljana. Gamma ray assisted modification of carbon quantum dot/polyurethane nanocomposites: structural, mechanical and photocatalytic study. In RSC Advances, 2019, vol. 9, p. 6278-6286. (2018: 3.049 - IF, Q2 - JCR, 0.807 - SJR, Q1 - SJR, karentované - CCC). (2019 - Current Contents). ISSN 2046-2069.
- ADCA12 ČECHOVÁ, Katarína - MAŤKO, Igor - RUSNÁK, Jaroslav - ŠVAJDLENKOVÁ, Helena - KLBIK, Ivan - LAKOTA, Ján** - ŠAUŠA, Ondrej**. Microstructural free volume and dynamics of cryoprotective DMSO-water mixtures at low DMSO concentration. In RSC Advances, 2019, vol. 9, no. 59, p. 34299-34310. (2018: 3.049 - IF, Q2 - JCR, 0.807 - SJR, Q1 - SJR, karentované - CCC). (2019 - Current Contents). ISSN 2046-2069.
- ADCA13 ČÍŽOVÁ, Alžbeta** - CSOMOROVÁ, Katarína - RYCHLÝ, Jozef - BYSTRICKÝ, Slavomír. Stability of cationic and amphoteric derivatives of mannan from the yeast Candida albicans. In Carbohydrate Polymers, 2019, vol. 207, p. 440-446. (2018: 6.044 - IF, Q1 - JCR, 1.377 - SJR, Q1 - SJR, karentované - CCC). (2019 - Current Contents, WOS, SCOPUS). ISSN 0144-8617.
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 2. [1.1] WANG, J.F. - WANG, X. - ZHAN, T.Y. - ZHANG, Y.L. - LV, C. - HE, Q. - FANG, L. - LU, X.N. Preparation of hydro-thermal surface-densified plywood inspired by the stiffness difference in "sandwich structure" of wood. In CONSTRUCTION AND BUILDING MATERIALS. ISSN 0950-0618, JUL 20 2018, vol. 177, p. 83-90., Registrované v: WOS
- ADMB02 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. (2017: Q4 - JCR). ISSN 2157-846X. Dostupné na internete: <www.nature.com/biomedeng>.
- Citácie:
1. [1.1] DESAI, T.A. - TANG, Q.Z. Islet encapsulation therapy - racing towards the finish line?. In NATURE REVIEWS ENDOCRINOLOGY. ISSN 1759-5029, NOV 2018, vol. 14, no. 11, p. 630-632., Registrované v: WOS
 2. [1.1] VLAHOS, A.E. - SEFTON, M.V. Muted fibrosis from protected islets. In NATURE BIOMEDICAL ENGINEERING. ISSN 2157-846X, NOV 2018, vol. 2, no. 11, p. 791-792., Registrované v: WOS
- ADMB03 CAPEK, Ignác. Preparation and functionalization of gold nanoparticles. In Journal of Surface Science and Technology, 2013, vol. 29, no. 3-4, p. 1-18. (2012: 0.137 - SJR). (2013 - SCOPUS). ISSN 0970-1893.
- Citácie:
1. [1.1] GHASEMI, A. - RABIEE, N. - AHMADI, S. - HASHEMZADEH, S. - LOLASI, F. - BOZORGOMID, M. - KALBASI, A. - NASSERI, B. - DEZFULI, A.S. - AREF, A.R. - KARIMI, M. - HAMBLIN, M.R. Optical assays based on colloidal inorganic nanoparticles. In ANALYST. ISSN 0003-2654, JUL 21 2018, vol. 143, no. 14, p. 3249-3283., Registrované v: WOS
- ADMB04 CZANIKOVÁ, Klaudia - ŠPITÁLSKY, Zdenko - KRUPA, Igor - OMASTOVÁ, Mária. Electrical and mechanical properties of ethylene vinyl acetate based composites. In Materials Science Forum, 2012, vol. 714, p. 193 - 199. ISSN 0255-5476.
- Citácie:
1. [1.2] VOLOTSKOY, A.N. - YURKIN, Y.V. - CHERKASOV, V.D. - AVDONIN, V.V.

- The influence of modified additives on dynamic properties of polymeric materials based on ethylene-vinyl acetate. (2018) Materials Science Forum, 945 MSF, p. 498-504., Registrované v: Scopus*
- ADMB05 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. (2014: 0.237 - SJR). (2015 - SCOPUS, WOS). ISSN 0277-786X.
- Citácie:
1. [1.1] *TRINH, Q.H. - HOSSAIN, M.M. - KIM, S.H. - MOK, Y.S. Tailoring the wettability of glass using a double-dielectric barrier discharge reactor. In HELIYON. JAN 2018, vol. 4, no. 1., Registrované v: WOS*
- ADMB06 LACÍK, Igor. Current status on immunoprotection of transplanted islets: Focus on islet microencapsulation. In Micro and Nanosystems, 2013, vol. 5, no. 3, p. 168 - 176. (2012: 0.180 - SJR). (2013 - SCOPUS). ISSN 1876-4029.
- Citácie:
1. [1.1] *ERNST, A.U. - WANG, L.H. - MA, M.L. Islet encapsulation. In JOURNAL OF MATERIALS CHEMISTRY B. ISSN 2050-750X, NOV 14 2018, vol. 6, no. 42, p. 6705-6722., Registrované v: WOS*
- ADMB07 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. [1.1] *AHMED, M.M.M. - IMAE, T. - HILL, J.P. - YAMAUCHI, Y. - ARIGA, K. - SHRESTHA, L.K. Defect-free exfoliation of graphene at ultra-high temperature. In COLLOIDS AND SURFACES A-PHYSICOCHEMICAL AND ENGINEERING ASPECTS. ISSN 0927-7757, FEB 5 2018, vol. 538, p. 127-132., Registrované v: WOS*
- ADMB08 PISSIS, P. - GEORGOUSIS, G. - PANDIS, C. - GEORGIOPOULOS, P. - KYRITSIS, A. - KONTOU, E. - MÍČUŠÍK, 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. (2014: 0.275 - SJR). (2015 - SCOPUS). ISSN 1877-7058.
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1. [1.1] *HAMDI, K. - ABOURA, Z. - HARIZI, W. - KHELLIL, K. Improvement of the electrical conductivity of carbon fiber reinforced polymer by incorporation of nanofillers and the resulting thermal and mechanical behavior. In JOURNAL OF COMPOSITE MATERIALS. ISSN 0021-9983, MAY 2018, vol. 52, no. 11, p. 1495-1503., Registrované v: WOS*
2. [1.1] *NARONGTHONG, J. - DAS, A. - LE, H.H. - WIESSNER, S. - SIRISINHA, C. An efficient highly flexible strain sensor: Enhanced electrical conductivity, piezoresistivity and flexibility of a strongly piezoresistive composite based on conductive carbon black and an ionic liquid. In COMPOSITES PART A-APPLIED SCIENCE AND MANUFACTURING. ISSN 1359-835X, OCT 2018, vol. 113, p. 330-338., Registrované v: WOS*
- ADMB09 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. [1.1] *JUNG, H.W. - YANG, M.K. - SU, R.C. Purification, characterization, and gene cloning of an Aspergillus fumigatus polyhydroxybutyrate depolymerase used*

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2. [1.1] SHEN, W. - ZHANG, G.H. - GE, X.M. - LI, Y.L. - FAN, G.D. Effect on electrospun fibres by synthesis of high branching polylactic acid. In ROYAL SOCIETY OPEN SCIENCE. ISSN 2054-5703, SEP 2018, vol. 5, no. 9., Registrované v: WOS

- ADMB10 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. - CROMPVOETS, 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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1. [1.1] CRESTA, V. - ROMANO, G. - KOLPAK, A. - ZALAR, B. - DOMENICI, V. Nanostructured Composites Based on Liquid-Crystalline Elastomers. In POLYMERS. ISSN 2073-4360, JUL 2018, vol. 10, no. 7., Registrované v: WOS

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. (2011: 0.370 - IF, 0.151 - SJR). (2012 - INSPEC, SCOPUS). ISSN 1335-3632.

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1. [1.1] FAINER, N.I. - PLEKHANOV, A.G. - MAKSIMOVSKY, E.A. - RUMYANTSEV, Y.M. Synthesis of Hydrogenated Silicon Oxycarbonitride from a Gas Mixture of Methyltris(Diethylamino)Silane, Nitrogen, and Oxygen. In GLASS PHYSICS AND CHEMISTRY. NOV 2018, vol. 44, no. 6, p. 607-615., Registrované v: WOS

2. [1.1] HE, W.Q. - CHEN, L.X. - XU, T.T. - PENG, F. Borazine-type single source precursor with vinyl to SiBCN ceramic. In JOURNAL OF THE CERAMIC SOCIETY OF JAPAN. APR 2018, vol. 126, no. 4, p. 253-259., Registrované v: WOS

3. [1.1] KHATAMI, Z. - BOSCO, G.B.F. - WOJCIK, J. - TESSLER, L.R. - MASCHER, P. Influence of Deposition Conditions on the Characteristics of Luminescent Silicon Carbonitride Thin Films. In ECS JOURNAL OF SOLID STATE SCIENCE AND TECHNOLOGY. 2018, vol. 7, no. 2, p. N7-N14., Registrované v: WOS

4. [1.1] KHATAMI, Z. - WILSON, P.R.J. - WOJCIK, J. - MASCHER, P. On the origin of white light emission from nanostructured silicon carbonitride thin films. In JOURNAL OF LUMINESCENCE. APR 2018, vol. 196, p. 504-510., Registrované v: WOS

***AEC Vedecké práce v zahraničných recenzovaných vedeckých zborníkoch, monografiách**

- AEC01 NOVÁK, Igor - CHODÁK, Ivan - SEDLIAČIK, Ján - VANKO, Vladimír - MATYAŠOVSKÝ, Ján - ŠIVOVÁ, Mária. Pre-treatment of beech wood by cold

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Citácie:

1. [1.1] ZIGON, J. - PETRIC, M. - DAHLE, S. *Dielectric barrier discharge (DBD) plasma pretreatment of lignocellulosic materials in air at atmospheric pressure for their improved wettability: a literature review. In HOLZFORSCHUNG. ISSN 0018-3830, NOV 2018, vol. 72, no. 11, p. 979-991., Registrované v: WOS*

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

AECA01 CAMPO, E. M. - ROIG, J. - ROEDER, B. - WENN, D. - MAMOJKA, B. - OMASTOVÁ, Mária - TERENTJEV, E. M. - ESTEVE, J. Nano opto-mechanical systems NOMS as a proposal for tactile displays. In Nano-Opto-Mechanical Systems (NOMS) : Proceedings of SPIE. - Bellingham, USA : SPIE - Int. Soc. Opt. Engineering, 2011, vol. 8107, art.n. 8107OH - p.1-10. ISBN 978-0-81948-717-9. ISSN 0277-786X.

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1. [1.1] WHITE, T.J. *Photomechanical effects in liquid crystalline polymer networks and elastomers. In JOURNAL OF POLYMER SCIENCE PART B-POLYMER PHYSICS. ISSN 0887-6266, MAY 1 2018, vol. 56, no. 9, p. 695-705., Registrované v: WOS*

AECA02 NOVÁK, Igor - JURKOVIČ, Peter - MATYAŠOVSKÝ, Ján - SYSEL, Petr - ŠPÍRKOVÁ, Milena - ŠOLTĚS, Ladislav. Key elements on surface properties of polyimide copolymers. In Key engineering materials. Volume I. Current state of the art on novel materials. - Toronto : Apple Academic Press, 2014, p. 63-69. ISBN 978-1-926895-73-4.

Citácie:

1. [3.1] SABET, MAYSA M. - TAMER, M. TAMER - OMER, AHMED M. *Hyaluronan: Biological function and medical applications. (Book Chapter 10). In A.K. Haghi et al. eds. APPLIED CHEMISTRY AND CHEMICAL ENGINEERING. Volume 2. Principles, Methodology, and Evaluation Methods. Oakwile, Waretown: Apple Academic Press, 2018, p. 139-156. ISBN 978-1-77188-558-4*

AECA03 NOVÁK, Igor - JURKOVIČ, Peter - MATYAŠOVSKÝ, Ján - ŠOLTĚS, Ladislav. New types of ethylene copolymers on the base nanocomposite. In Key engineering materials. Volume I. Current state of the art on novel materials. - Toronto : Apple Academic Press, 2014, p. 125-132. ISBN 978-1-926895-73-4.

Citácie:

1. [3.1] SABET, MAYSA M. - TAMER, M. TAMER - OMER, AHMED M. *Hyaluronan: Biological function and medical applications. (Book Chapter 10). In A.K. Haghi et al. eds. APPLIED CHEMISTRY AND CHEMICAL ENGINEERING. Volume 2. Principles, Methodology, and Evaluation Methods. Oakwile, Waretown: Apple Academic Press, 2018, p. 139-156. ISBN 978-1-77188-558-4*

***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] CHAWLA, P. - TRIVEDI, S. - PANDEY, K. - TRIPATHI, M. *Dielectric Studies of [PEO: CH3COOLi]: Graphite System Synthesized by Hot Press and*

Solution Cast Technique. In PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES INDIA SECTION A-PHYSICAL SCIENCES. ISSN 0369-8203, JUN 2018, vol. 88, no. 2, p. 187-193., Registrované v: WOS
2. [1.1] LIU, C.Z. - MEI, C.T. - WANG, K. - JIANG, M. - CHEN, W.M. - LIU, B. Carbon Black Filled Shell of High Density Wood-Polyethylene Composites to Balance the Antistatic Properties and Mechanical Properties. In BIORESOURCES. ISSN 1930-2126, 2018, vol. 13, no. 3, p. 6356-6369., Registrované v: WOS

AFC Publikované príspevky na zahraničných vedeckých konferenciách

- AFC01 MATYAŠOVSKÝ, Ján - SEDLIAČIK, Ján - ŠMIDRIAKOVÁ, Mária - NOVÁK, Igor - JURKOVIČ, Peter - DUCHOVIČ, Peter. Lowering of formaldehyde emission from wood based panels by modification of polycondensation adhesives with natural fillers, additives and activators. In Annals of Warsaw University of Life Sciences - SGGW : Forestry and Wood Technology, 2017, no.98, p. 76-82. ISSN 1898-5912.

Citácie:

1. [1.1] IHAAT, V. - LUBKE, H. - RUSS, A. - PAZITNY, A. - BORUVKA, V. WASTE AGGLOMERATED WOOD MATERIALS AS A SECONDARY RAW MATERIAL FOR CHIPBOARDS AND FIBREBOARDS PART II. PREPARATION AND CHARACTERISATION OF WOOD FIBRES IN TERMS OF THEIR REUSE. In WOOD RESEARCH. ISSN 1336-4561, 2018, vol. 63, no. 3, p. 431-442., Registrované v: WOS

***AFHA Abstrakty príspevkov z medzinárodných vedeckých konferencií poriadaných v SR**

- AFHA01 BAŇASOVÁ, Mária - VALACHOVÁ, Katarína - RYCHLÝ, Jozef - PRIESOLOVÁ, Elena - NAGY, Milan - JURÁNEK, Ivo - ŠOLTÉS, Ladislav. Scavenging and chain-breaking activity of bucillamine on free-radical-mediated degradation of high-molar-mass hyaluronan. In ChemZi : slovenský časopis o chémii pre chemické vzdelávanie, výskum a priemysel, 2011, roč. 7, č.13, s. 205-206. ISSN 1336-7242.(VEGA č. 2/0083/09 : Energetický metabolismus mozgu sledovaný pomocou magnetickej rezonancie ako podklad pre štúdium mechanizmov hypoxicko-ischemického poškodenia mozgu novorodenca. VEGA č. 2/0011/11 : Štúdium pôsobenia reaktívnych foriem kyslíka a dusíka na vysokomolekulový hyalurónan, synoviocyty a chondrocyty. VEGA č. 2/0081/11 : Štúdium mechanizmov a možností skorej detekcie embryofetálneho poškodenia v dôsledku intrauterinnej a perinatálnej hypoxie. Zjazd chemikov : IYC 2011. International Year of Chemistry. Medzinárodný rok chémie).

Citácie:

1. [3.1] SABET, MAYSA M. - TAMER, M. TAMER - OMER, AHMED M. Hyaluronan: Biological function and medical applications. (Book Chapter 10). In A.K. Haghi et al. eds. APPLIED CHEMISTRY AND CHEMICAL ENGINEERING. Volume 2. Principles, Methodology, and Evaluation Methods. Oakwile, Waretown: Apple Academic Press, 2018, p. 139-156. ISBN 978-1-77188-558-4

GHG Práce zverejnené spôsobom umožňujúcim hromadný prístup

- GHG01 HURAN, Jozef - BOHÁČEK, Pavol - SHVETSOV, V.N. - KOBZEV, A.P. - KLEINOVÁ, Angela - SASINKOVÁ, Vlasta - BALALYKIN, Nikolay I. - SEKÁČOVÁ, Mária - ARBET, Juraj. Amorphous silicon carbide thin films deposited by plasma enhanced chemical vapor deposition at different temperature for hard environment applications. In 21st International Symposium on Plasma Chemistry : Cairns (Australia) 2013 [elektronický zdroj], <http://www.ispc->

conference.org/ispcproc/ispc21/ID180.pdf.

Citácie:

1. [1.1] MARVI, Z. - XU, S. - FOROUTAN, G. - OSTRIKOV, K. - LEVCHENKO, I. *Plasma-deposited hydrogenated amorphous silicon films: multiscale modelling reveals key processes. In RSC ADVANCES. 2017, vol. 7, no. 31, p. 19189-19196., Registrované v: WOS*
2. [1.1] VAN LAAR, J.H. - BISSETT, H. - BARRY, J.C. - VAN DER WALT, I.J. - CROUSE, P.L. *Deposition of SiC/Si coatings in a microwave plasma-assisted spouted bed reactor. In JOURNAL OF THE EUROPEAN CERAMIC SOCIETY. APR 2018, vol. 38, no. 4, p. 1197-1209., 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 teoretickej a fyzikálnej chémie

Mgr. Juraj Kronek, PhD.

Názov semestr. predmetu: Makromolekulová chémia

Počet hodín za semester: 6

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

Mgr. Jaroslav Mosnáček, DrSc.

Názov semestr. predmetu: Pokročilé materiály a technológie

Počet hodín za semester: 4

Názov katedry a vysokej školy: Univerzita T. Bati, Zlín, Česká Republika, Fakulta chemickotechnologická

Semestrálne cvičenia:

Mgr. Zuzana Benková, PhD.

Názov semestr. predmetu: Počítačové modelovanie, interakcie a reaktivita

Počet hodín za semester: 4

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

Ing. Alena Opálková Šišková, PhD.

Názov semestr. predmetu: Pokročilé materiály

Počet hodín za semester: 3

Názov katedry a vysokej školy: Slovenská technická univerzita v Bratislave, Materiálovotechnická fakulta v Trnave

Semináre:

Mgr. Zuzana Benková, PhD.

Názov semestr. predmetu: Počítačové modelovanie, interakcie a reaktivita

Počet hodín za semester: 2

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

Terénne cvičenia:

Ing. Anita Eckstein, PhD.

Názov semestr. predmetu: Príprava fotoaktívnych derivátov pre optoelektroniku - vedenie študentky na technickej výpomoci: Marcela Gašparová UCM Trnava 4.roč.

Počet hodín za semester: 60

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

Ing. Anita Eckstein, PhD.

Názov semestr. predmetu: Príprava fotoiniciátorov a ich aplikácia pre fotoATRP- vedenie študentky na technickej výpomoci : Petra Maxiánová UCM Trnava-4.roč.

Počet hodín za semester: 300

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

Ing. Anita Eckstein, PhD.

Názov semestr. predmetu: Štúdium nových fotoaktívnych derivátov pre fotoATRP-vedenie SAIA štipendistky Soheily Behzadi z Iránu

Počet hodín za semester: 60

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

Mgr. Jaroslav Mosnáček, DrSc.

Názov semestr. predmetu: Vedenie študenta v rámci SAIA - Serhii Jakushchenko z Ukrajiny

Počet hodín za semester: 20

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

Mgr. Jaroslav Mosnáček, DrSc.

Názov semestr. predmetu: Vedenie študentky v rámci projektu ERASMUS - Marlena Ostrysz z Poľska

Počet hodín za semester: 30

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

Individuálne prednášky:

RNDr. Peter Cifra, DrSc.

Názov semestr. predmetu: Fyzika polymérov

Počet hodín za semester: 2

Názov katedry a vysokej školy: Fakulta chemickej a potravinárskej technológie STU, ÚPo SAV

Prof. Ing. Ivan Chodák, DrSc.

Názov semestr. predmetu: Fyzika polymérov pre doktorandov

Počet hodín za semester: 4

Názov katedry a vysokej školy: Fakulta chemickej a potravinárskej technológie STU, ÚPSP

Mgr. Jozef Kollár, PhD.

Názov semestr. predmetu: Základy makromolekulovej chémie: príprava študentov stredných škôl na medzinárodnú chemickú olympiádu

Počet hodín za semester: 6

Názov katedry a vysokej školy: Prírodovedecká fakulta UK, Ústav polymérov SAV

Ing. Igor Lacík, DrSc.

Názov semestr. predmetu: Makromolekulová chémia - prednášky pre doktorandov

Počet hodín za semester: 2

Názov katedry a vysokej školy: Fakulta chemickej a potravinárskej technológie STU, ÚPo SAV

Ing. Mária Omastová, DrSc.

Názov semestr. predmetu: Fyzika makromolekulových látok

Počet hodín za semester: 2

Názov katedry a vysokej školy: Fakulta chemickej a potravinárskej technológie STU, ÚPo SAV

Mgr. Zdenko Špitálsky, PhD.

Názov semestr. predmetu: Fyzika polymérov pre doktorandov

Počet hodín za semester: 2

Názov katedry a vysokej školy: Fakulta chemickej a potravinárskej technológie STU, ÚPo SAV

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
Austrália					Dmitrij Bondarev	31
Belgicko					Jaroslav Mosnáček	2
Bielorusko					Matej Mičušík	4
					Mária Omastová	4
					Michal Procházka	4
Bulharsko	Juraj Kronek	5			Zdenko Špitálsky	5
	Zuzana Kroneková	5				
Česko	Ivica Janigová	4	Juraj Kronek	1	Monika Majerčíková	1
	Jaroslav Mosnáček	10	Juraj Kronek	2	Matej Mičušík	2
			Juraj Kronek	1	Jaroslav Mosnáček	1
			Igor Lacík	2	Jaroslav Mosnáček	16
			Igor Novák	2	Jaroslav Mosnáček	16
					Katarína Mosnáčková	1
					Katarína Mosnáčková	5
					Mária Omastová	2
					Michal Procházka	1
					Michal Procházka	1
					Michal Procházka	1
					Michal Procházka	30
					Zdenko Špitálsky	2
					Helena Švajdlenková	1

					Anna Zahoranová	4
Francúzsko					Abolfazl Heydari	53
					Igor Lacík	6
Kanada					Anna Chovancová	30
Katar					Martin Danko	32
					Martin Danko	30
					Jozef Kollár	30
					Jaroslav Mosnáček	30
Maďarsko	Jaroslav Mosnáček	4			Dmitrij Bondarev	5
Nemecko					Eva Dušička	30
					Igor Lacík	4
					Igor Lacík	3
Poľsko	Katarína Borská	5			Ivan Chodák	2
	Martin Danko	5			Zdenko Špitálsky	2
	Anita Eckstein	5				
	Jaroslav Mosnáček	5				
	Alena Opálková Šišková	5				
Portugalsko					Zuzana Benková	30
					Peter Čakánek	30
Rakúsko					Matej Mičušík	1
					Jaroslav Mosnáček	1
					Mária Omastová	1
					Silvia Podhradská	1
					Helena Švajdlenková	1
					Helena Švajdlenková	1
					Helena Švajdlenková	1
					Helena Švajdlenková	1
					Helena	1

					Švajdlenková	
					Helena Švajdlenková	1
					Helena Švajdlenková	1
					Helena Švajdlenková	1
					Helena Švajdlenková	1
Španielsko	Josef Bartoš	17			Anita Eckstein	4
	Helena Švajdlenková	17			Alena Opáľková Šišková	4
Švajčiarsko					Dušan Račko	15
Taliansko	Michal Procházka	6				
Ukrajina					Michal Procházka	62
					Anastasiia Stepura	15
USA	Igor Lacík	8			Lucia Kleščíková	6
					Igor Lacík	11
					Dušana Treľová	6
Počet vyslaní spolu	14	101	5	8	57	587

(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
Bielorusko					Hanna Maltanova	28
Česko					Martin Cvek	4
India					Kajal Ghosal	30
Irán					Soheila Behzadi	181
					Zohreh Mehri	122
Litva					Gediminas Monastyrechis	7
Maďarsko	Tímea Stumphäuser	4				
	Zsófia Osváth	4				
Poľsko	Bartłomiej	7			Agnieszka	5

	Kost				Leszczyńska	
	Joanna Rydz-Pawlak	5			Anna Tryba	60
	Malgorzata Baško	7			Marlena Ostrysz	81
	Marta Musiol	5			Monika Zygo	60
	Marta Socka	7			Szczepan Bednarz	5
	Wanda Sikorska	5				
Rumunsko					Coprih Tugui	26
Srbsko					Zoran M. Marković	30
Turecko					Elif Kaymazlar	81
Ukrajina					Andrii Misinko	90
					Serhii Yakushchenko	51
Počet prijatí spolu	8	44			16	861

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

Krajina	Názov konferencie	Meno pracovníka	Počet dní
Belgicko	COST CA 18136	Silvia Podhradská	3
	COST CA18125	Igor Lacík	2
Bulharsko	Polymers 2019	Juraj Kronek	5
		Zuzana Kroneková	5
Česko	Career in Polymers	Gamal Zain	3
	Kolokvium 2019	Mária Omastová	4
	Mikroskopia 2019	Matej Mičušík	3
	MultiComp 2019	Matej Mičušík	3
	PM 2019	Lucia Kleščíková	5
		Dušana Treľová	5
	Technology Days 2019	Matej Mičušík	1
Francúzsko	ECOF16	Nikola Bugárová	6
Grécko	EPF 2019	Ana Hološ	10
		Mária Kováčová	10
		Matej Mičušík	8
		Jaroslav Mosnáček	6
		Helena Švajdlenková	10
Kórejská ľudovodemokratická republika	Fall Meeting 2019	Juraj Kronek	7
		Zuzana Kroneková	7
Kosovo	ISCMP 2019	Ana Hološ	5
Lotyšsko	GCNPM 2019	Anita Eckstein	5
		Ivan Chodák	6

Maďarsko	CPBCI 2019	Zuzana Benková	5
		Peter Čakánek	5
	Frontiers 2019	Peter Cifra	5
		Anita Eckstein	5
		Abolfazl Heydari	4
		Jaroslav Mosnáček	5
		Falko Pippig	5
Malta	COST CA16217	Mária Kováčová	4
Nemecko	Beilstein Symposium	Mária Omastová	4
		Michal Procházka	4
	ECASIA 2019	Matej Mičušík	6
		Mária Omastová	5
	ESBP 2019	Ivan Chodák	5
	IWPRES	Eva Dušička	4
		Anna Chovancová	4
		Igor Lacík	4
Poľsko	MPM 2019	Mária Omastová	4
	MPMEA 2019	Mária Omastová	4
	PSPM 2019	Igor Lacík	4
		Gamal Zain	4
	WCMM 2019	Igor Novák	4
	WSE 2019	Igor Novák	4
Portugalsko	COST CA15107	Matej Mičušík	4
Rakúsko	ERF 2019	Ivan Chodák	2
Španielsko	Eutopia 2	Peter Cifra	6
		Dušan Račko	6
	ICC 2019	Martin Danko	5
		Jozef Kollár	5
	Mat Sci 2019	Jaroslav Mosnáček	5
		Katarína Mosnáčková	5
	TNT 2019	Mária Kováčová	7
Švédsko	Biopol 2019	Katarína Mosnáčková	5
		Alena Opáľková Šišková	5
Taliansko	Eurofillers 2019	Ivan Chodák	6
		Mária Omastová	6
		Zdenko Špitálsky	6
	EUSMI 2019	Josef Bartoš	10
	IWML Sardinia 2019	Mária Omastová	7
		Michal Procházka	7
	SURFINT-SREN VI	Mária Omastová	6
USA	ACS 2019	Juraj Kronek	8
Veľká Británia	Microencaps. TS	Faeze Dorchei	4
Spolu	39	64	332

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

Skratky použité v tabuľke C:

ACS 2019 - ACS Symposium 2019

Beilstein Symposium - MXene at the Frontier of the 2D Materials World. Beilstein Nanotechnology Symposium

Biopol 2019 - 7th International Conference on Biobased and Biodegradable Polymers

Career in Polymers - Career in Polymers 2019
COST CA 18136 - Kick-off meeting projektu COST CA 18136
COST CA15107 - Multi-functional nano-carbon composite materials
COST CA16217 - New Coatings in Urinary Stents : workshop
COST CA18125 - COST ACtion CA18125
CPBCI 2019 - Chemistry, Physics and Biology of Colloids and Interfaces
ECASIA 2019 - 18th European Conference on Applications of Surface and Interface Analysis
ECOF16 - European Conference on Organized Films
EPF 2019 - European Polymer Congress 2019
ERF 2019 - European Rubber Forum 2019
ESBP 2019 - 10th European Symposium on Biopolymers
Eurofillers 2019 - Eurofillers 2019 Polymer Blends
EUSMI 2019 - EUSMI 2019 Annual Meeting
Eutopia 2 - Second Meeting of the European Topology Interdisciplinary Initiative
Fall Meeting 2019 - Annual Fall Meeting 2019 of The Polymer Society of Korea
Frontiers 2019 - 6th International Symposium Frontiers in Polymer Science
Frontiers 2019 - 6th Interational Symposium Frontiers in Polymer Science 2019
GCNPM 2019 - Green Chemistry and Nanotechnology in Polymeric Materials
ICC 2019 - 9th International Colloids Conference
ISCMP 2019 - Joint Science Congress of Materials and Polymers
IWML Sardinia 2019 - 17th International Waste Management and Landfill Symposium
IWPRES - 13th International Workshop on Polymer reaction Engineering
Kolokvium 2019 - 28. Kolokvium 2019 - Ústav makromolekulární chemie AV ČR v.v.i.
Mat Sci 2019 - 5th World Congress on Materials Science and Engineering
Microencaps. TS - 11th Microencapsulation Training School
Mikroskopie 2019 - Mikroskopie 2019
MPM 2019 - 7th International Seminar on Modern Polymeric Materials for Environmental Applications
MPMEA 2019 - 7th International Seminar on Modern Polymeric Materials for Environmental Applications
MultiComp 2019 - MultiComp Autumn Prague meeting 2019
PM 2019 - Polymers in Medicine 2019
Polymers 2019 - 19th Symposium Polymers 2019
PSPM 2019 - Precisely Structured Polymer Materials
SURFINT-SREN VI - Progress in Applied Surface, Interface and Thin Film Science 2019
Technology Days 2019 - Technology Days ve vývojovém a výrobním centru elektronové mikroskopie Thermo Fisher Scientific v Brně
TNT 2019 - Trends in NanoTechnology
WCMM 2019 - 4th International Conference on Wood Composites Modification and Machining
WSE 2019 - 3rd International Scientific Conference Wood-Science-Economy

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

Meno	Spoluautori	Typ¹	Názov	Miesto zverejnenia	Dátum alebo počet za rok
Ing. Róbert Balogh		PB	Cestou necestou - putovanie prírodou pod mikroskopom - ukážky	Nájdí v sebe vedca - 3.ročník, akcia určená pre druhý stupeň ZŠ, ÚPo SAV	3.4.2019
Ing. Róbert Balogh		PB	Prezentácia ÚPo SAV	Deň otvorených dverí ÚPo SAV	7.11.2019
Ing. Róbert Balogh		PB	Prezentácia ÚPo SAV	Európska noc výskumníkov, Stará tržnica Bratislava	27.9.2019
Ing. Róbert Balogh		PB	Prítomnosť škrobu v potravinách - ukážka	Jarný tábor na ÚMMS SAV	26.2.2019
Ing. Róbert Balogh		PB	Putovanie po laboratóriu	Nájdí v sebe vedca - 3.ročník, akcia určená pre druhý stupeň ZŠ, ÚPo SAV	17.4.2019
Ing. Róbert Balogh	projekt Veda je život	IN	Spôsob, ako sa k elektrickej energii dostaneme ekologickejšie a lacnejšie	www.youtube.com/watch?v=uLqE68oc2cE	10.4.2019
Mgr. Zuzana Benková, PhD.		PB	Dlhá cesta od atómu až k plastom	Nájdí v sebe vedca - 3.ročník, akcia určená pre druhý stupeň ZŠ, ÚPo SAV	3.4.2019
Mgr. Zuzana Benková, PhD.		PB	Noc úspešných žien	KC Dunaj Bratislava	25.2.2019
Mgr. Zuzana Benková, PhD.		iné	Organizácia akcie	Deň otvorených dverí ÚPo SAV	7.11.2019
RNDr. Dmitrij Bondarev, PhD.		PB	Prezentácia ÚPo SAV	Európska noc výskumníkov, Stará tržnica Bratislava	27.9.2019
Ing. Peter Čakánek		PB	Ako nám v športe pomôžu nanotrubičky - ukážky	Nájdí v sebe vedca - 3.ročník, akcia určená pre druhý stupeň ZŠ, ÚPo SAV	3.4.2019
Ing. Peter Čakánek		PB	Podme si zasimulovať	Nájdí v sebe vedca - 3.ročník, akcia určená pre druhý stupeň ZŠ, ÚPo SAV	17.4.2019
Ing. Eva Dušička		PB	Hydrogély pre život	Nájdí v sebe vedca - 3.ročník, akcia určená pre druhý stupeň ZŠ, ÚPo SAV	17.4.2019
Ing. Eva Dušička		PB	Príprava polymérnych kapsúl - ukážka	Jarný tábor na ÚMMS SAV	28.2.2019
Ing. Anita Eckstein, PhD.		PB	Plasty nemusia byť naším nepriateľom	Európska noc výskumníkov, Stará tržnica Bratislava	27.9.2019
Ing. Anita Eckstein, PhD.		PB	Plasty okolo nás	Nájdí v sebe vedca - 3. ročník, akcia určená pre druhý stupeň ZŠ, ÚPo SAV	3.4.2019
Ing. Anita Eckstein,		PB	Plasty okolo nás	Nájdí v sebe vedca -	10.4.2019

PhD.				3.ročník, akcia určená pre druhý stupeň ZŠ, ÚPo SAV	
Ing. Anita Eckstein, PhD.		PB	Plasty okolo nás - ukážka výroba slizu - demonštrácia výroby syntetického polyméru	Nájdí v sebe vedca - 3.ročník, akcia určená pre druhý stupeň ZŠ, ÚPo SAV	17.4.2019
Viera Karlíková		PB	Prezentácia projektu PlasticFreeDanube	Deň otvorených dverí ÚPo SAV	7.11.2019
Ing. Angela Kleinová		PB	Prezentácia projektu PlasticFreeDanube	Deň otvorených dverí ÚPo SAV	7.11.2019
Ing. Angela Kleinová		PB	Prezentácia projektu PlasticFreeDanube	Európska noc výskumníkov, Stará tržnica Bratislava	27.9.2019
Ing. Angela Kleinová	Martin Nosko, Miroslav Hain, Matúš Pleva, Alena Šišková	IN	Ako zlepšiť analýzy kriminalistických dôkazov	http://vedanadosah.cvtsr.sk/ako-zlepsit-analyzy-kriminalistickych-dokazov	31.1.2019
Mgr. Mária Kováčová		PB	Ako môže niečo ničiť baktérie iba dotykom?	Science Slam - Nová Cvernovka Bratislava	27.2.2019
Mgr. Mária Kováčová		PB	Polymérny mikrosvet	Nájdí v sebe vedca - 3.ročník, akcia určená pre druhý stupeň ZŠ, ÚPo SAV	17.4.2019
Mgr. Mária Kováčová		PB	Polymérny mikrosvet - ukážky	Nájdí v sebe vedca - 3.ročník, akcia určená pre druhý stupeň ZŠ, ÚPo SAV	10.4.2019
Mgr. Mária Kováčová		PB	Prezentácia mikroskopie	Deň otvorených dverí ÚPo SAV	7.11.2019
Mgr. Zuzana Kroneková, PhD.		PB	Biomateriály pre medicínu	SAV Stage - Technologický festival IXPO, Tyršovo nábrežie Bratislava	28.4.2019
Ing. Igor Lacík, DrSc.		PU	Enkapsulované ostrovčeky ako možná forma kontroly hladiny cukru u diabetikov,	Dia šlabikár. Ed. Herzeg a kol., 2019, s. 334-335, ISBN 978-80-973473-0-7	2019
Ing. Igor Lacík, DrSc.		RO	Nočná pyramída - nočná talkshow so zaujímavými hosťami - hosť Igor Lacík	RTVS - Nočná pyramída	16.1.2019
Ing. Igor Lacík, DrSc.		TL	Ostrovčeky nádeje	Slovenka, 2019, roč. 71, č. 47, s. 52-53	25.11.2019
Ing. Igor Lacík, DrSc.		PB	Polymeric biomaterials for immunoprotection of pancreatic islets in diabetes treatment	Life Science Innovation Day, Bratislava	22.5.2019
Ing. Igor Lacík, DrSc.		RO	Relácia Akadémia - Host' Igor Lacík	Rádio Devín	30.8.2019
Ing. Monika Majerčíková		PB	Teplo-citlivé polyméry - ukážka	Jarný tábor na ÚMMS SAV	27.2.2019
Ing. Matej Mičušík, PhD.		IN	Ako pripraviť vodivé materiály na báze uhlíkových nanočastíc?	www.vedanadosah.sk	11.3.2019
Ing. Matej Mičušík, PhD.		TV	Obchodníkom sa nepáči zálohovanie PET fliaš, chcú ho	www.ta3.com/live.html	24.2.2019

			odložiť		
Ing. Matej Mičušík, PhD.		PB	Prezentácia projektu PlasticFreeDanube	Deň otvorených dverí ÚPo SAV	7.11.2019
Ing. Mária Omastová, DrSc.		IN	Aktuality - Vedecká perspektíva mikropplastov v prírode a spoločnosti	https://www.sav.sk/index.php?doc=services-news&source_no=20&news_no=8085	11.2.2019
Ing. Mária Omastová, DrSc.		IN	Aktuality - Vysoké štátne vyznamenanie pre Katarínu Zavackú a Máriu Omastovú	https://www.sav.sk/index.php?lang=sk&doc=services-news&source_no=20&news_no=8037	9.1.2019
Ing. Mária Omastová, DrSc.		TV	Chemici M. Omastová a V. Milata o Benovi Feringovi a molekulových strojoch	Štúdio TA3	8.9.2019
Ing. Mária Omastová, DrSc.		PB	Prezentácia projektu PlasticFreeDanube	Deň otvorených dverí ÚPo SAV	7.11.2019
Ing. Mária Omastová, DrSc.		PB	Prezentácia projektu PlasticFreeDanube	Európska noc výskumníkov, Stará tržnica Bratislava	27.9.2019
Ing. Mária Omastová, DrSc.		PB	Projekt PlasticFreeDanube	Projekt Odpad z makropplastov v a pozdĺž Dunaja - stretnutie zúčastnených strán, ÚPo SAV	13.3.2019
Ing. Mária Omastová, DrSc.		TL	Volajú po dohode na boj s plastami	Denník N 14	7.3.2019
Ing. Mária Omastová, DrSc.	autorka Mária Babinská	RO	Dunaj bez plastov	Rádio Regina Západ	14.3.2019
Ing. Mária Omastová, DrSc.	Filip Minich, Denisa Gdovinová	TL	Žijeme v dobe plastovej - rozhovor	týždeň, 2019, roč. 3, s. 15-16	14.1.2019
Ing. Mária Omastová, DrSc.	moderuje Rastislav Šimášek	RO	Akadémia - hosť Ing. Mária Omastová, DrSc.	Rádio Devín, www.rtvs.sk/radio/arc/hiv/11309	16.3.2019
Ing. Mária Omastová, DrSc.	V. Milata	IN	Nositel Nobelovej ceny za chémiu na Slovensku	www.aktuality.sav.sk	26.8.2019
Ing. Alena Opálková Šišková, PhD.		iné	NanoArt	Bratislava Mini Maker Faire - Najväčšia svetová prehliadka inovácií, kreativity a dômyselnosti, Stará tržnica Bratislava	15.11.2019
Ing. Alena Opálková Šišková, PhD.		PB	NanoArt	Life Science Innovation Day, Bratislava	22.5.2019
Ing. Alena Opálková Šišková, PhD.		PB	O recyklácii, alebo ako z PET fľaše vyrobiť pavučinu - ukážky	Nájdí v sebe vedca - 3.ročník, akcia určená pre druhý stupeň ZŠ, ÚPo SAV	3.4.2019
Ing. Alena Opálková Šišková, PhD.		PB	O recyklácii, alebo ako z PET fľaše vyrobiť pavučinu -	Nájdí v sebe vedca - 3.ročník, akcia určená pre druhý stupeň ZŠ,	10.4.2019

			ukážky	ÚPo SAV	
Ing. Alena Opálková Šišková, PhD.		PB	Plasty nemusia byť naším nepriateľom	Európska noc výskumníkov, Stará tržnica Bratislava	27.9.2019
Ing. Alena Opálková Šišková, PhD.		PB	Polyméry okolo nás, ukážky elektrostatického zvlákňovania, recyklácia PET fliaš	Deň otvorených dverí ÚPo SAV	7.11.2019
Ing. Alena Opálková Šišková, PhD.	M. Nosko, V. Čavojová	IN	Nájdí v sebe vedca: Vyhodnotenie dotazníkov spokojnosti	www.sa.sk/idex.php?doc=services-news&source_no=20&news_no=8302	18.6.2019
Ing. Alena Opálková Šišková, PhD.	Silvia Podhradská	IN	Konferencia BYPoS pre mladých polymérnych vedcov v Ošadnici	https://www.sav.sk/index.php?lang=sk&doc=services-news&source_no=20&news_no=8190	15.4.2019
Ing. Juraj Pavlinec, PhD.		IN	Opustil nás zakladateľ Ústavu polymérov SAV	www.aktuality.sav.sk	20.6.2019
Falko Pippig, PhD.		iné	Prezentácia ÚPo SAV	Deň otvorených dverí ÚPo SAV	7.11.2019
Falko Pippig, PhD.		PB	Prezentácia ÚPo SAV	Európska noc výskumníkov, Stará tržnica Bratislava	27.9.2019
Falko Pippig, PhD.		PB	Prezentácia ÚPo SAV	Rakúsko-slovenská kooperačná burza, Žiar nad Hronom	29.10.2019
Mgr. Silvia Podhradská, PhD.		IN	Ústav polymérov v bežeckých teniskách	https://www.sav.sk/index.php?lang=sk&doc=services-news&source_no=20&news_no=8185	12.4.2019
RNDr. Michal Procházka, PhD.		PB	Prezentácia projektu PlasticFreeDanube	Deň otvorených dverí ÚPo SAV	7.11.2019
RNDr. Michal Procházka, PhD.		PB	Prezentácia projektu PlasticFreeDanube	Európska noc výskumníkov, Stará tržnica Bratislava	27.9.2019
RNDr. Michal Procházka, PhD.		IN	SAV predstaví prvý Science Slam, ktorým chce spopularizovať vedu	https://www.teraz.sk/slovensko/sav-predstavi-prvy-science-slam-ktor/380662-clanok.html	26.2.2019
RNDr. Michal Procházka, PhD.		IN	SAV predstaví unikátny formát popularizácie vedy	http://pravdive.eu/news/98091/sav-predstavi-unikatny-format-popularizacie-vedy	9.2.2019
RNDr. Michal Procházka, PhD.		IN	Vedci k veci	http://vedanadosah.cvti.sk/vedci-k-veci	17.2.2019
RNDr. Michal Procházka, PhD.		IN	Vedci verejnosti predstavujú prvý Science Slam SAV	https://www.dobrenoviny.sk/c/154898/vedci-verejnosti-predstavuju-prvy-science-slam-sav	8.2.2019

Ing. Renáta Rusková		PB	Počítačové simulácie	Deň otvorených dverí ÚPo SAV	7.11.2019
Mgr. Zdenko Špitálsky, PhD.		PB	Prednáška o 3D tlači polymérov	Deň otvorených dverí ÚPo SAV	7.11.2019
Mgr. Zdenko Špitálsky, PhD.		PB	Prezentácia ÚPo SAV	Meeting Slovenského plastikárskeho klastra Nitra	23.5.2019
Ing. Helena Švajdlenková, PhD.		iné	Prezentácia ÚPo SAV	Deň otvorených dverí ÚPo SAV	7.11.2019
Ing. Helena Švajdlenková, PhD.		PB	Prezentácia ÚPo SAV	Európska noc výskumníkov, Stará tržnica Bratislava	27.9.2019
Mgr. Anna Zahoranová, PhD.		PB	Čo skrývajú gumové medvedíky - ukážky	Nájdí v sebe vedca - 3.ročník, akcia určená pre druhý stupeň ZŠ, ÚPo SAV	17.4.2019
Mgr. Anna Zahoranová, PhD.		PB	Čo ukrývajú gumové medvedíky - ukážky	Nájdí v sebe vedca - 3.ročník, akcia určená pre druhý stupeň ZŠ, ÚPo SAV	3.4.2019
Mgr. Anna Zahoranová, PhD.		PB	Čo ukrývajú gumové medvedíky - ukážky	Nájdí v sebe vedca - 3.ročník, akcia určená pre druhý stupeň ZŠ, ÚPo SAV	10.4.2019
Mgr. Anna Zahoranová, PhD.		PB	Moja kariérna cesta - panelová diskusia	Naštartuj svoju kariéru : workshop pre doktorandov UK organizovaný Euraxess a SAIA, Vedecký park UK Bratislava	12.4.2019
Mgr. Anna Zahoranová, PhD.	Monika Hucáková	PB	Mladí vedci opäť v blízkosti školských lavíc - Roadshow Mladých vedcov po školách Slovenska	https://www.sav.sk/index.php?lang=sk&doc=services-news&source_no=20&news_no=8206	23.4.2019
MSc. Gamal Zain		PB	Prezentácia ÚPo SAV	Noc výskumníkov, Stará tržnica Bratislava	27.9.2019
Ing. Róbert Balogh		PB	Prítomnosť škrobu v potravinách, ukážky	Letná škola mladých vedcov, 15.- 19.7. 2019	0
Ing. Nikola Bugárová, PhD.		TL	Čo dokáže tuha	Quark, 2019, roč. XXV, č. 8, s.40	0
RNDr. Agnesa Fiedlerová	E. Borsig, A. Ujhelyiová, V. Milata	TL	Zelená chémia	ChemZi, roč.15, č.1 (2019), s. 8	0
Ing. Igor Lacík, DrSc.		DO	ESET Science Award - finalista Výnimočná vedecká osobnosť	www.youtube.com/watch?v=CbuZoj246-M	0
Ing. Igor Lacík, DrSc.		PB	Liečba cukrovky transplantáciou enkapsulovaných pankreatických ostrovčekov	DIA stretnutie rodičov a detí ohľadne diabetu, 26.-28.4. 2019, Kubíková Belá	0
Ing. Igor Novák, PhD.		TL	Polymérne konštrukčné materiály	Plastics Production, roč. 14, č. 2, (2019), s. 72-73	0
Ing. Igor Novák, PhD.	Štěpán Florián	TL	Aplikácia polymérnych	Plastics Production, roč. 14, č.1 (2019), s.	0

			konštrukčných materiálov pri výrobe automobilov	46-47	
Ing. Mária Omastová, DrSc.		IN	Polovica sveta má v tele mikoplasty - rozhovor	www.greenmagazine.sk	0
Ing. Mária Omastová, DrSc.		TL	Štátne vyznamenania pre vedkyne	Akadémia Správy SAV, 2019, roč. 55, č. 1, s. 23	0
Ing. Mária Omastová, DrSc.	Erik Mihalko, Simona Ďord'ová	TL	Plastový odpad je globálny problém, ktorý ohrozuje životné prostredie - rozhovor	Green MAGAZINE, roč. 3, marec 2019, s. 12-15 ISSN 2585-7193	0
Ing. Mária Omastová, DrSc.	M. Mičušík, S. Podhradská	TL	PlasticFreeDanube - Odpad z makro plastov v a pozdĺž Dunaja	ChemZi, roč. 15, č. 1 (2019), s. 14-15	0
Ing. Mária Omastová, DrSc.	Michal Procházka	TL	Nové 2D materiály - MXeny ich vlastnosti a aplikácie v polymérnych kompozitoch	ChemZi, roč. 14, č. 2, (2018), s. 52-53	0
Ing. Alena Opálková Šišková, PhD.		iné	Koordinátor akcie Jarný vedecký tábor pre deti prvého stupňa ZŠ	22.2.-26.2. 2019 ÚPo SAV, ÚMMS SAV	0
Ing. Alena Opálková Šišková, PhD.		iné	Koordinátor akcie Nájdi v sebe vedca - 3. ročník určený pre žiakov druhého stupňa ZŠ	3., 10., 17.4. 2019, ÚPo SAV	0
Ing. Alena Opálková Šišková, PhD.		iné	Koordinátor projektu Letná škola mladých vedcov	15.7.-15.7. 2019, ÚPo SAV	0
Ing. Alena Opálková Šišková, PhD.		TL	Leta škola mladých vedcov	Akadémia Správy SAV, 2019, roč. 55, č.4, s. 24	0
Ing. Alena Opálková Šišková, PhD.		iné	NanoArt	Festival Expo: Touch the Future, 10.-11.9. 2019, Industrial Palace Praha	0
Ing. Alena Opálková Šišková, PhD.		iné	Organizátor akcie Letný vedecký tábor pre deti druhého stupňa ZŠ	22.7.-26.7. 2019, ÚPo SAV	0
Ing. Alena Opálková Šišková, PhD.		PB	Prezentácia ÚPo SAV, Gravipol	72nd International Welding Conference, 7.-12.6. 2019, Bratislava	0
Ing. Alena Opálková Šišková, PhD.	M. Nosko, A. Zahoranová	TL	Vedcami zatiaľ len cez prázdniny	Quark: magazín pre vedu a techniku, roč. 25, č. 4 (2019), s. 40	0
Ing. Alena Opálková Šišková, PhD.	M. Nosko, M. Kusý, P. Šugár	IN	2. Strategický seminár pre podporu spolupráce medzi akadémiou, univerzitami a priemyslom	Veda na dosah, CVTI, vedanadosah.cvti.sk/tlacove-spravy/425	0
Ing. Alena Opálková Šišková, PhD.	S. Podhradská	TL	8. ročník medzinárodnej konferencie mladých polymérnych vedcov BYPoS	ChemZi, 2019, roč. 15, č. 1, s. 17	0

RNDr. Michal Procházka, PhD.		TL	Science Slam v réžii Mladých vedcov SAV - rozhovor	Akadémia Správy SAV, 2019, roč. 55, č. 2, s. 21	0
Ing. Dušan Račko, PhD.		iné	Chromatin Loop Extrusion and Chromatin Unknotting	Víkend so SAV, Primaciálne námestie Bratislava, 21.-22.6. 2019	0
Mgr. Zdenko Špitálsky, PhD.		PB	Prezentácia aplikovaného výskumu ÚPo SAV	Trendy v plastikárskom priemysle, Demänová 19.-20. 11. 2019	0

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