

**Ústav polymérov SAV**



**Správa o činnosti organizácie SAV  
za rok 2014**

Bratislava  
január 2015

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# 1. Základné údaje o organizácii

## 1.1. Kontaktné údaje

**Názov:** Ústav polymérov SAV

**Riaditeľ:** Ing. Igor Lacík, DrSc.

**1. zástupca riaditeľa:** Mgr. Jaroslav Mosnáček, PhD.

**2. zástupca riaditeľa:** Ing. Zuzana Hloušková

**Vedecký tajomník:** Ing. Mária Omastová, DrSc.

**Predseda vedeckej rady:** RNDr. Peter Cífra, DrSc.

**Člen snemu SAV:** neuvedený

**Adresa:** Dúbravská cesta 9, 845 41 Bratislava 45

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**Tel.:** 02/ 3229 4308

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**Názvy a adresy detašovaných pracovísk:**

- **Detašované pracovisko Ústavu polymérov SAV**  
ul. Gen. Svobodu 1069/4, 958 01 Partizánske

**Vedúci detašovaných pracovísk:**

- **Detašované pracovisko Ústavu polymérov SAV**  
Prof. Ing. Ivan Chodák, DrSc.

**Typ organizácie:** Príspevková od roku 1993

## 1.2. Údaje o zamestnancoch

Tabuľka 1a Počet a štruktúra zamestnancov

Štruktúra zamestnancov	K	K		K do 35 rokov		F	P	T
		M	Ž	M	Ž			
<b>Celkový počet zamestnancov</b>	87	32	55	5	21	78	63,6	47,72
<b>Vedeckí pracovníci</b>	46	24	22	1	12	37	36,83	36,83
<b>Odborní pracovníci VŠ</b>	25	5	20	4	9	25	12,09	10,89
<b>Odborní pracovníci ÚS</b>	12	1	11	0	0	12	11,88	0
<b>Ostatní pracovníci</b>	4	2	2	0	0	4	2,8	0

*K – kmeňový stav zamestnancov v pracovnom pomere k 31.12.2014 (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 31.12.2014 (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*

*M, Ž – muži, ženy*

Tabuľka 1b: Štruktúra vedeckých pracovníkov (kmeňový stav k 31.12.2014)

Rodová skladba	Pracovníci s hodnosťou				Vedeckí pracovníci v stupňoch		
	DrSc.	CSc., PhD.	prof.	doc.	I.	IIa.	IIb.
<b>Muži</b>	9	15	3	1	9	12	3
<b>Ženy</b>	2	20	0	0	2	2	18

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

	< 30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	>65
<b>Muži</b>	4	1	7	1	0	1	2	3	5
<b>Ženy</b>	13	7	4	0	1	2	5	3	1

Tabuľka 1d: Priemerný vek zamestnancov organizácie k 31.12.2014

	Kmeňoví zamestnanci	Vedeckí pracovníci	Riešitelia projektov
<b>Muži</b>	48,6	51,0	48,8
<b>Ženy</b>	41,9	36,6	39,9
<b>Spolu</b>	44,4	44,1	43,5

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

V roku 2014 sa skončilo prvé funkčné obdobie riaditeľa Ing. Igora Lacíka, DrSc, ktorý na základe konkurzu uskutočneného na jar 2014 bol od 1.06.2014 opätovne vymenovaný za riaditeľa. Riaditeľ ústavu zároveň vymenoval i nové vedenie, ktorého členmi sa stali:

Mgr. Jaroslav Mosnáček, PhD, - zástupca riaditeľa pre výskum;

Ing. Zuzana Hloušková – zástupca riaditeľa pre ekonomiku;

RNDr. Peter Cifra, DrSc. – predseda vedeckej rady;

Ing. Katarína Csomorová – organizačný tajomník.

V roku 2014 fungoval ústav štvrtý rok s novou organizačnou štruktúrou s piatimi oddeleniami - štyrmi vedeckými a ekonomicko-technickým oddelením. Zjednotenie oddelení postupne začína spĺňať svoj cieľ, najmä čo sa týka zlepšenia spolupráce vo vnútri ústavu a zjednodušenia štruktúry ústavu smerom navonok. V rámci nových oddelení sa podali niektoré projekty, ktoré vychádzajú so spolupráce zjednotených oddelení.

Ústav polymérov SAV pokračoval v riešení štrukturálnych fondov spolufinancovaných z ERDF - POLYFRIEND, PLASTICE a Centrum aplikovaného výskumu nanočastíc. V rámci týchto štrukturálnych fondov ako i v rámci budovania nového Centra materiálového výskumu, v ktorom ústav participuje sa získali nové prístroje, ktoré významne posunú výskum na ústave na vyššiu úroveň a umožnia rozšíriť jeho spoluprácu s domácimi a zahraničnými výskumnými pracoviskami ako aj s firmami. V rámci medzinárodných projektov sa v roku 2014 pokračovalo v riešení ERA-NET projektu APGRAPHEL v spolupráci s dvomi vedeckými inštitúciami z Poľska a Turecka a piatimi firmami zo Slovenska, Poľska a Turecka a riešila sa projektová spolupráca s Katarom.

V roku 2014 sa Ústav polymérov SAV zúčastnil prípravy niekoľkých projektov v rámci Horizont 2020, avšak zatiaľ žiaden z nich nebol podporený pre financovanie. Tieto projekty všeobecne predstavujú kvalitatívny rast pre zúčastnených vedeckých pracovníkov a doktorandov a tiež prispievajú k ekonomickej situácii ústavu. Preto i pre rok 2015 podávanie projektov v rámci nového programu EU pre podporu vedy a výskumu Horizont 2020 bude predstavovať jednu z priorít pre budúci rast ústavu. Okrem toho bolo v novembri podaných celkovo 21 APVV projektov (z toho v 9. je ÚPo nositeľom projektu a v 12. sa zmluvne podieľa na riešení), ktoré budú vyhodnotené v prvej polovici roku 2015, dva projekty spolupráce SAV s Tureckom, resp. Taiwanom, ktoré boli schválené, a tri M-ERA.NET projekty, z ktorých jeden bol schválený na financovanie.

Vedenie Ústavu polymérov zorganizovalo v prvej polovici roka 2014 opätovné stretnutie s predstaviteľmi Ústavu prírodných a syntetických polymérov FCHPT a Katedry organickej chémie PriF UK za účelom zefektívnenia vedeckej ale i vzdelávacej spolupráce. Taktiež sa dohodla možnosť prezentácie doktorandských tém nových trendov v polymérnej chémii študentom chémie na PriF UK v období rozhodovania sa o výbere témy ich bakalárskej práce. Do budúcnosti je potrebné zvážiť akým spôsobom aktívnejšie prezentovať Ústav polymérov medzi študentami oboch škôl a zefektívniť získavanie kvalitných doktorandov z ich radov.

## 2. Vedecká činnosť

### 2.1. Domáce projekty

Tabuľka 2a Počet domácich projektov riešených v roku 2014

ŠTRUKTÚRA PROJEKTOV	Počet projektov		Čerpané financie za rok 2014 (v €)		
	A	B	A		B
			spolu	pre organizáciu	
1. Vedecké projekty, ktoré boli r. 2014 financované VEGA	19	0	116354	-	-
2. Projekty, ktoré boli r. 2014 financované APVV	4	9	136487	-	110752
3. Projekty OP ŠF	0	2	-	-	37437
4. Projekty centier excelentnosti SAV	0	1	-	-	3295
5. Iné projekty (FM EHP, ŠPVV, Vedecko-technické projekty, ESF, na objednávku rezortov a pod.)	0	1	-	-	5148

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

Tabuľka 2b Počet návrhov domácich projektov podaných v roku 2014

Štruktúra projektov	Miesto podania	Organizácia je nositeľom projektu	Organizácia sa zmluvne podieľa na riešení projektu
1. Účasť na nových výzvach APVV r. 2014	-	9	12
2. Projekty výziev OP ŠF podané r. 2014	Bratislava		
	Regióny		

## 2.2. Medzinárodné projekty

### 2.2.1. Medzinárodné projekty riešené v roku 2014

Tabuľka 2c Počet medzinárodných projektov riešených v roku 2014

ŠTRUKTÚRA PROJEKTOV	Počet projektov		Čerpané financie za rok 2014 (v €)		
	A	B	A		B
			spolu	pre organizáciu	
1. Projekty 7. Rámcového programu EÚ	0	1	-	-	-
2. Multilaterálne projekty v rámci vedeckých programov COST, ERANET, INTAS, EUREKA, ESPRIT, PHARE, NATO, ERDF, UNESCO, CERN, IAEA, ESF (European Science Foundation) a iné	2	10	93187	-	83755
3. Projekty v rámci medzivládnych dohôd o vedecko-technickej spolupráci	0	0	-	-	-
4. Bilaterálne projekty	17	1	-	2700	-
5. Podpora medzinárodnej spolupráce z národných zdrojov (MVTS, APVV,...)	5	8	12933	-	26734
6. Iné projekty financované alebo spolufinancované zo zahraničných zdrojov	0	1	-	-	30236

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

### 2.2.2. Medzinárodné projekty v 7. RP EÚ a Horizont 2020 podané v roku 2014

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

	A	B
Počet podaných projektov v 7. RP EÚ		2
Počet podaných projektov Horizont 2020		9

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

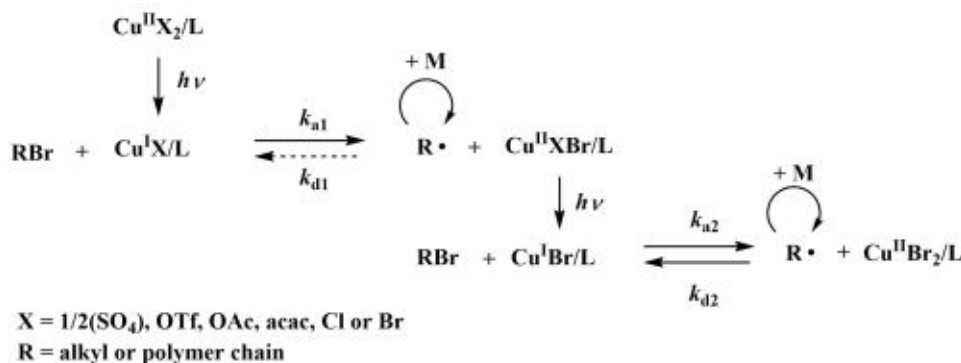
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## 2.3. Najvýznamnejšie výsledky vedeckej práce (maximálne 1000 znakov + 1 obrázok)

### 2.3.1. Základný výskum

#### 1) Radikálová polymerizácia s vratnou deaktiváciou indukovaná fotochemickou redukciou rôznych meďnatých katalyzátorov (J. Mosnáček, A. Andicsová).

Každá zo súčasných techník radikálovej polymerizácie s vratnou deaktiváciou má svoje výhody a nevýhody, z čoho vyplýva aj ich aplikovateľnosť. V roku 2012 sme vyvinuli fotoATRP, ktorá v porovnaní s inými obmenami ATRP je oveľa výhodnejšia z ekonomického i ekologického hľadiska, keďže polymerizáciu možno uskutočniť pri izbovej teplote len s 50-100 ppm katalyzátora a za výrazne kratší čas. FotoATRP, pôvodne uskutočnená s  $\text{CuBr}_2$ , bola v roku 2014 rozšírená na rôzne  $\text{Cu}^{\text{II}}$  katalyzátory, ako sú  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ,  $\text{CuCl}_2$ , triflát meďnatý, acetát meďnatý a acetylacetonát meďnatý. Zistilo sa, že bez ohľadu na typ pôvodne použitého  $\text{Cu}^{\text{II}}$  katalyzátora, po jeho fotochemickej redukcii a následnej reakcii s alkyl bromidom, je katalytický systém  $\text{CuBr}/\text{CuBr}_2$  vytvorený *in situ*, a preto kinetika polymerizácie bola vo všetkých prípadoch rovnaká. Toto zistenie umožňuje použiť pre fotoATRP lacnejší, v prírode dostupný  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ , alebo je možné použiť lepšie rozpustné organické zlúčeniny meď. (Projekt APVV-0109-10:LIVICOP: Živá/kontrolovaná polymerizácia: Optimalizácia polymerizačného procesu pre prípravu dobre definovaných polymérov s cieľovou architektúrou a vlastnosťami.)



English title: **Reversible-deactivation radical polymerization induced by photochemical reduction of various copper catalysts.**

#### Výstupy:

1. MOSNÁČEK, Jaroslav - KUNDYS, A. - ANDICSOVÁ, Anita. Reversible-deactivation radical polymerization of methyl methacrylate induced by photochemical reduction of various copper catalysts. In *Polymers : Open Access Polymer Science Journal*, 2014, vol. 6, p. 2862-2874. (2.505 - IF2013). ISSN 2073-4360.
2. MOSNÁČEK, Jaroslav - ILČÍKOVÁ, Markéta - ANDICSOVÁ, Anita - BORSKÁ, Katarína. Photochemically induced RDRP of methacrylates by PPM amounts of copper catalysts. In *EUPOC 2014 : Precision Polymers: Synthesis, Folding and Function : Gargnano, Italy, 25 - 29 May 2014 : booklet of abstracts.* - Pisa, Italy : University of Pisa, Department of Chemistry & Industrial Chemistry, 2014, p. 43. Prednáška
3. MOSNÁČEK, Jaroslav - ILČÍKOVÁ, Markéta - ANDICS, Anita - BORSKÁ, Katarína. Photopolymerization catalyzed by copper complexes. In *ESPS 2014 : 3rd European Symposium of Photopolymer Science : Vienna, Austria, September 9-12, 2014 : book of abstracts.* - Vienna, Austria : Institute of Applied Synthetic Chemistry, Vienna University of Technology, 2014, p. OP-27. ISBN 978-3-9502992-9-8. Prednáška



## 2) Biokompatibilné poly(2-oxazolíny) s rôznou štruktúrou (J. Kronek, A. Zahoranová, N. Petrenčíková, P. Šrámková, Z. Kroneková, projekt VEGA 2/0151/12)

Kopolyméry 2-etyl-2-oxazolínu a etylénimínu s meniacim sa obsahom kationovej zložky sa pripravili kyslou hydrolyzou poly(2-etyl-2-oxazolínu) použitím rôzneho reakčného času. Pripravené kopolyméry predstavujú polykatióny so zníženou cytotoxicitou v porovnaní s komerčne dostupným polyetylénimínom, čo sa preukázalo *in vitro* na troch rôznych bunkových líniách. Konfokálnou fluorescenčnou mikroskopiou sa potvrdila internalizácia kopolymérov do buniek. Ďalším typom biokompatibilných materiálov boli hydrogély na báze 2-oxazolínov. Na ich prípravu sa použila kationová polymerizácia 2-etyl-2-oxazolínu a 1, $\omega$ -alkylén-2,2'-bis(2-oxazolínmi) s C4-C8 alkylovým reťazcom. V závislosti od dĺžky alkylového spojovníka a hustoty siete sa pripravili hydrogély s rôznymi vlastnosťami (stupeň napučania, porozita, mechanické vlastnosti). Navyše, hydrogély s dlhším alifatickým spojovníkom majú pri rovnakom stupni napučania rádovo vyššiu mechanickú tuhosť. Taktiež sa potvrdila netoxickosť pripravených hydrogélův.

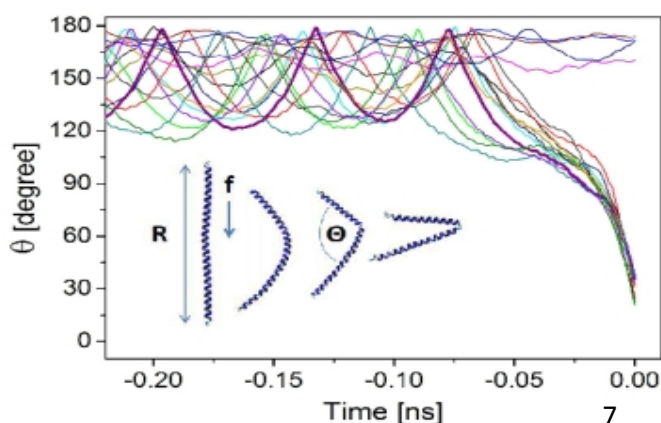
English title: **Biocompatible poly(2-oxazolines) with different structure**

### Výstupy:

1. KRONEK, Juraj. Poly(2-oxazolines) as biomedical materials. In *Encyclopedia of Biomedical Polymers and Polymeric Biomaterials*, Taylor and Francis, 2014, doi.: DOI: 10.1081/E-EBPP-120051263
2. KRONEK, Juraj - KRONEKOVÁ, Zuzana - SHAH, R. - ZAHORANOVÁ, Anna - PAULOVICHOVÁ, E. - PAULOVICHOVÁ, L. - MIKULEC, Marcel - PETRENČIKOVÁ, Nadežda. The effect of structure and functionality on biotolerability of polymers based on 2-oxazolines. In *Polymery 2014 : VIII. česko-slovenská konferencia : Třešť, ČR, 6.- 9.10. 2014 : programová brožura konferencie.* - Praha, ČR : Ústav makromolekulární chemie AV ČR, v.v.i., 2014, p. 30-32. ISBN 978-80-85009-81-1.
3. ZAHORANOVÁ, Anna - KRONEK, Juraj. Poly(2-oxazoline)-based networks: Synthesis and characterization. In *BYPOS : 5th Bratislava Young Polymer Scientists Workshop : Zázrivá, Slovakia, June 16th - 20th, 2014 : workshop book.* - Bratislava : Young Scientists Council of Polymer Institute of the Slovak Academy of Sciences, 2014, p. 79. ISBN 978-80-970923-5-1.

## 3) Kritické vybočenie dlhých alfa-závitníc (P. Palenčár, T. Bleha)

Molekulovo-dynamické simulácie kompresie a ohybu helikálnych polymérov so zahrnutím všetkých atómov poskytli detailné údaje o mechanizme kritického vybočenia (bucklingu)  $\alpha$ -helixov (AH). Namiesto rovnomerného kompresného ohýbania predpovedaného analytickým WLC modelom, v skutočnosti pri bucklingovom prahu dochádza k zlomu v AH závitnici. Tento tzv. kink defekt vzniká lokálnym roztopením závitnice. Simulácie poskytli dôkaz o stochastickej dynamike procesu, o trhaní vodíkových väzieb a iných atomistických detailoch mechanizmu bucklingu. Nájdený mechanizmus helikálneho zlomu možno využiť pri interpretácii ohýbania helixov aj v iných prípadoch ako AH, napríklad pri cyklizácii krátkych DNA molekúl.



Časová závislosť ohýbania  $\alpha$ -helixu dĺžky 83 reziduí pri stlačaní silou 26.25 pN blízkou kritickkej hodnote. Jednotlivé trajektórie sú posunuté vzhľadom na spoločný bucklingový prah určený prudkým poklesom uhla  $\Theta$  a vzdialenosti  $R$  a teda zlomením helixu. V súlade s náhodným charakterom bucklingu štvrtina trajektórií nevedie k zlomeniu závitnice.

English title: **Buckling transition in long alpha-helices.**

#### **Výstupy:**

1. PALENČÁR, Peter - BLEHA, Tomáš. Buckling transition in long alpha-helices. In *Journal of Chemical Physics*, 2014, vol. 141, 174901 - 12 p. (3.122 - IF2013). ISSN 0021-9606.
2. PALENČÁR, Peter - BLEHA, Tomáš. Compression and buckling of stiff helical filaments. In *5th EuCheMS Chemistry Congress: Istanbul, Turkey, Aug.31 - Sept 4, 2014: book of abstracts.* – Turkish Chemical Society, 2014 Part 3 p. 957.

#### **2.3.2. Aplikačný typ**

- 1) **Mikrokapsuly pre alogénnu transplantáciu enkapsulovaných ostrovčekov v predklinickom modeli nehumánnych primátov** (I. Lacík, F. Rázga, L. Uhelská, D. Treľová, A. Mihalová, Z. Kroneková, J. Kronek, V. Némethová, S. Szalai; CDP projekt, JDRF project, project APVV 0486-10)

Predbežné výsledky z implantácie PMCG mikrokapsúl, pripravených polyelektrolytovou komplexáciou medzi alginátom sodným, sulfátom celulózy a poly(metylén-co-guanidínom) do pavianov ukázali na to, že PMCG mikrokapsuly sú tolerované v tomto predklinickom modeli. V spolupráci s University of Illinois at Chicago sme pripravili projekt *Multicomponent microcapsules for allogeneic islet transplantation in a comprehensive, preclinical non-human primate model* pre vstup do Enkapsulačného konzorcia Juvenile Diabetes Research Foundation. Projekt bol schválený a naštartoval v novembri 2014. Jeho hlavnými cieľmi je rozšíriť poznatky v primátoch, pochopiť vzájomnú súvislosť medzi vlastnosťami mikrokapsúl a *in vivo* funkčnosťou a priblížiť súčasný stav v kontrole hladiny cukru v krvi enkapsulovanými ostrovčkami bližšie ku testom v klinike.

English title: **Microcapsules for allogeneic transplantation of encapsulated islets in preclinical model of non-human primates.**

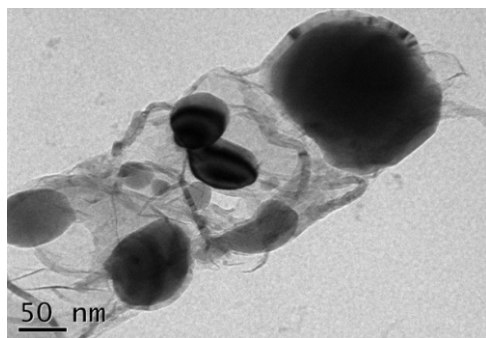
#### **Výstupy:**

1. ROKSTAD, A. M. - LACÍK, Igor - DE VOS, P. - STRAND, B. L. Advanced in biocompatibility and physico-chemical characterization of microspheres for cell encapsulation. In *Advanced Drug Delivery Reviews*, 2014, vol. 67-68, p. 111-130. (12.707 - IF2013). ISSN 0169-409X.
2. VAITHILINGHAM, V. - KOLLÁRIKOVÁ, Gabriela - QI, M. - LARSSON, R. - LACÍK, Igor - FORMO, K. - MARCHESE, E. - OBERHOLZER, J. - GUILLEMIN, G. J. - TUCH, B. E. Beneficial effects of coating alginate microcapsules with macromolecular heparin conjugates - In vitro and In vivo study. In *Tissue engineering : Part A*, 2014, vol. 20, no. 1-2, p. 324-334. (4.254 - IF2013). ISSN 1076-3279.
3. Organizácia 22<sup>nd</sup> International Conference on Bioencapsulation/21<sup>th</sup> Bratislava International Conference on Macromolecules [http://bioencapsulation.net/2014\\_Bratislava/](http://bioencapsulation.net/2014_Bratislava/)

- 2) **Kompozitné sorbenty na odstraňovanie jedovatých kovov z vody** (D. Berek, I. Novák)

Vypracoval sa postup prípravy kompozitných sorbentov na odstraňovanie jedovatých kovov z pitnej vody. Základom sú uhlíkové vlákna získané kontrolovanou karbonizáciou celulózy, na ktoré sú nanosené nanočastice aktívnej látky, hydratovaného oxidu železitého. Originálna štruktúra týchto sorbentov umožňuje využiť veľký účinný povrch nanočastíc aktívnej látky pri zachovaní technologických výhod mikrovlákien, ktoré majú oproti časticovým sorbentom s rovnakým efektívnym priemerom znížený odpor proti toku vody a vyznačujú sa jednoduchosťou manipulácie (filtrácia, sedimentácia). Vyvinuté kompozitné sorbenty s 50 až 300% vyššou účinnosťou ako

špičkový komerčný sorbent nemeckej firmy GEH, a.g. z vody zachytávajú rôzne jedovaté kovy - As, Sb, Hg, Cd, Cr, Ni a Pb, ako aj prírodné a syntetické rádionuklidy. Obzvlášť dôležité je odstraňovanie arzénu z pitnej vody. Arzén v podzemných vodách predstavuje v mnohých krajinách významný ekologický problém a spôsobuje nedostatok nezávadnej pitnej vody.



Typická štruktúra kompozitného sorbenta. Tmavé sú nanočastice hydratovaného  $Fe_2O_3$ .

English title: **Composite sorbents for removal of toxic metals from water**

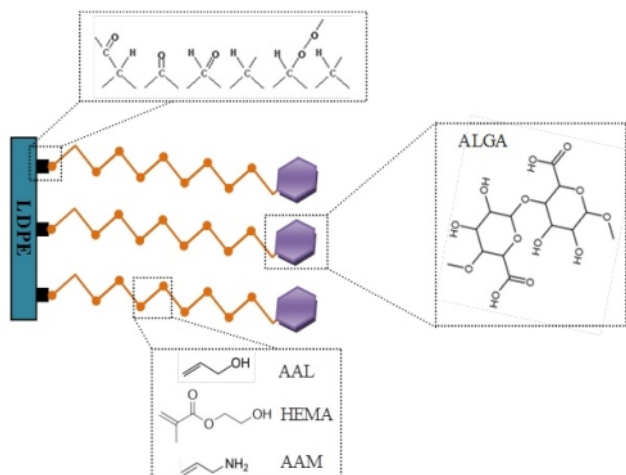
### Výstupy:

1. PP 50017 2014: Spôsob prípravy kompozitného sorbenta na odstraňovanie kontaminantov z vôd; autori NOVÁK, Ivan - BEREK, Dušan - MUNKA, K. - KARÁCSONYOVÁ, M.
2. PP 50077-2014: Spôsob prípravy kompozitného sorbenta na odstraňovanie kontaminantov z vôd (závislá prihláška patentu); autori NOVÁK, Ivan - BEREK, Dušan - MUNKA, K. - VARGA, S. - KARÁCSONYOVÁ, M.

### 3) Fólie polyolefínov s antibakteriálnymi vlastnosťami modifikované mikrovlnovou plazmou. (I. Novák, M. Valentin, J. Prachár)

Fólie polyolefínov (PO, nízko hustotný polyetylén a izotaktický polypropylén) boli povrchovo modifikované účinkom mikrovlnovej plazmy za účelom zabezpečenia antibakteriálnych vlastností. Po povrchovej úprave fólií PO mikrovlnovou plazmou sa tieto očkovali v parách vybraných prekursorov (alylalkohol, alylamín a hydroxyetylmetakrylát). Na povrch očkovaných PO sa následne naviazala kyselina algínová podľa schémy 1. Analýza povrchu upravených PO potvrdila, že algínová kyselina je imobilizovaná na „kefky“ vytvorené očkovaním použitých monomérov. Algínová kyselina, ktorá je fyzikálne naviazaná na očkovaný povrch PO pôsobí bakteriostaticky,

pričom inhibovanie bakteriálneho rastu významne závisí od druhu naviazaného monoméru. Polyaniónový charakter algínovej kyseliny naviazanej na očkovaný PO ovplyvňuje metabolizmus bakteriálnych buniek (*S. aureus* a *E. coli*) pri vytváraní bunkových stien v dôsledku zmeny ich chemického zloženia.



*Mechanizmus naviazanie kyseliny algínovej na „kefky“ vytvorené očkovaním PO vybranými prekursorami účinkom mikrovlnovej plazmy.*

English title: **Polyolefin foils with antibacterial properties modified by microwave plasma.**

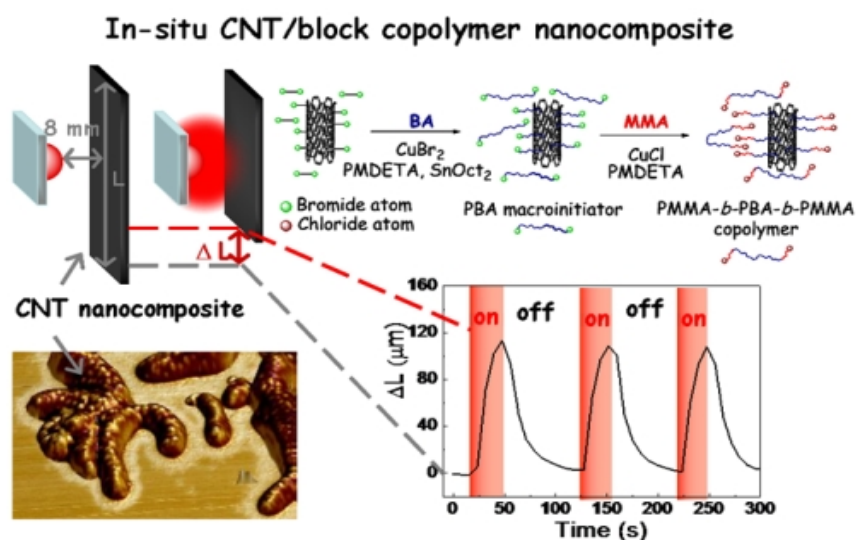
### Výstupy:

1. KARBASSI, E. - ASADINEZHAD, A. - LEHOCKÝ, M. - HUMPOLÍČEK, P. - VESEL, A. - NOVÁK, Igor - SÁHA, P. Antibacterial performance of alginic acid coating on polyethylene film. In *International Journal of Molecular Sciences*, 2014, vol. 15, p. 14684-14696. (2.339 - IF2013). ISSN 1422-0067.
2. LOPEZ-GARCIA, J. - LEHOCKÝ, M. - HUMPOLÍČEK, P. - NOVÁK, Igor. On the correlation of surface charge and energy in non-thermal plasma-treated polyethylene. In *Surface and Interface Analysis*, 2014, vol. 46, p. 625-629. (1.393 - IF2013). ISSN 0142-2421.
3. PRACHÁR, Jozef - NOVÁK, Igor - BORSIG, Eberhard. Možnosti modifikácie povrchu polypropylénu plazmou bariérového vyboja a imobilizácia antibakteriálnych polysacharidov. In *Chemické listy*, 2014, vol. 108, iss. 6, p. 579 - 585. (0.196 - IF2013). ISSN 0009-2770.
4. NOVÁK, Igor - POPELKA, Anton - CHODÁK, Ivan - LEHOCKÝ, M. - VALENTIN, Marian - PRACHÁR, Jozef. Antibacterial treatment of polyethylene by barrier plasma. In *Polyméry 2014: VIII. česko-slovenská konference: Třešť, ČR, 6.- 9.10. 2014: programová brožura konference*. - Praha, ČR: Ústav makromolekulární chemie AV ČR, v.v.i., 2014, p. 66-67. ISBN 978-80-85009-81-1.

### 2.3.3. Medzinárodné vedecké projekty

- 1) **Fotoaktuujúce termoplastické elastómy plnené polymérom očkovanými uhlíkovými nanotrubičkami** (J. Mosnáček, M. Ilčíková; projekt NOMS, spolupráca s Univerzitou Tomáša Batu v Zlíne)

Dobrá dispergácia a homogénna distribúcia uhlíkových nanotrubičiek (CNT) v termoplastických elastómoch (TPE) je kľúčovým faktorom pri príprave fotoaktuujúcich nanokompozitov. V opačnom prípade nedochádza k efektívnemu prenosu energie a fotoaktuačná odozva je významne nižšia. Modifikácia CNT použitím ATRP iniciovanej z povrchu sa uskutočnila za účelom zlepšenia dispergácie nanočastíc a zároveň dosiahnutia preferenčných interakcií alebo dokonca preferenčnej lokalizácie nanočastíc v jednej fáze triblokových TPE. Syntézou triblokových TPE (PMMA-*b*-PBA-*b*-PMMA) v jednom kroku s rastom diblokového kopolyméru (PBA-*b*-PMMA) z povrchu nanočastíc sa pripravil nanokompozit s 1 hm% dobre dispergovaných CNT kompatibilných s matricou. Tento CNT-*g*-PBA-*b*-PMMA/PMMA-*b*-PBA-*b*-PMMA nanokompozit vykazuje v porovnaní s čistou polymérou matricou výrazné zlepšenie viskoelastických vlastností, v rozsahu teplôt od 0 až do 240 °C a je výborným fotoaktuačným materiálom s rýchlou a vratnou odozvou.



English title: **Photoactuation thermoplastic elastomers filled with polymer-grafted carbon nanotubes**

### Výstupy:

1. ILČÍKOVÁ, Markéta - MRLÍK, M. - SEDLÁČEK, T. - CHORVÁT, D. - KRUPA, Igor - ŠLOUF, M. - KOYNOV, K. - MOSNÁČEK, Jaroslav. Viscoelastic and photo-actuation studies of composites based on polystyrene-grafted carbon nanotubes and styrene-b-isoprene-b-styrene block copolymer. In *Polymer : the International Journal for the Science and Technology of Polymers*, 2014, vol. 55, p. 211-218. (3.766 - IF2013). ISSN 0032-3861.
  2. ILČÍKOVÁ, Markéta - MRLÍK, M. - SEDLÁČEK, T. - ŠLOUF, M. - ZHIGUNOV, A. - KOYNOV, K. - MOSNÁČEK, Jaroslav. Synthesis and photoactuating acrylic thermoplastic elastomers containing diblock copolymer-grafted carbon nanotubes. In *ACS Macro Letters*, 2014, vol.3, p. 999-1003. (5.245 - IF2013). ISSN 2161-1653.
  3. ILČÍKOVÁ, Markéta - MOSNÁČEK, Jaroslav - MRLÍK, M. - SEDLÁČEK, T. - CSOMOROVÁ, Katarína - CZANIKOVÁ, Klaudia - KRUPA, Igor. Influence of surface modification of carbon nanotubes on interactions with polystyrene-b-polyisoprene-b-polystyrene matrix and its photo-actuation properties. In *Polymers for Advanced Technologies*, 2014, vol. 25, p. 1293-1300. (1.964 - IF2013). ISSN 1042-7147.
  4. ILČÍKOVÁ, Markéta - MRLÍK, M. - SEDLÁČEK, T. - DOROSHENKO, M. - KOYNOV, K. - DANKO, Martin - MOSNÁČEK, Jaroslav. Tailoring of viscoelastic properties and light-induced actuation performance of triblock copolymer composites through surface modification of carbon nanotubes. Odoslane do *Polymer*, POLYMER-14-2428 (3.766 - IF2013)
  5. MOSNÁČEK, Jaroslav - ILČÍKOVÁ, Markéta - MRLÍK, M. - SEDLÁČEK, T. Covalently modified MWCNT with preferential interactions with one phase of triblock copolymer thermoplastic elastomers. In *Silesian meetings on polymer materials - POLYMAT60*, Zabrze, 30.6-1.7.2014, book of abstracts OC-4, p. 19. Pozvaná prednáška.
  6. MOSNÁČEK, Jaroslav - ILČÍKOVÁ, Markéta - MRLÍK, M. - SEDLÁČEK, T. Synthesis and properties of thermoplastic elastomers based on acrylate block copolymers and their composites. In *CLP'14 : 3rd International Symposium on Controlled/Living Polymerization. From Synthesis to Application : Antalya, Turkey, 1-4 May 2014 : symposium book.* - Istanbul, Turkey :
- 2) **Kinetika radikálovej polymerizácie a stanovenie rýchlostných konštánt so zameraním hlavne na polymerizáciu vo vodnej fáze.** (I. Lacík, A. Chovancová, E. Hipká; BASF projekt, VEGA a APVV0486-10)

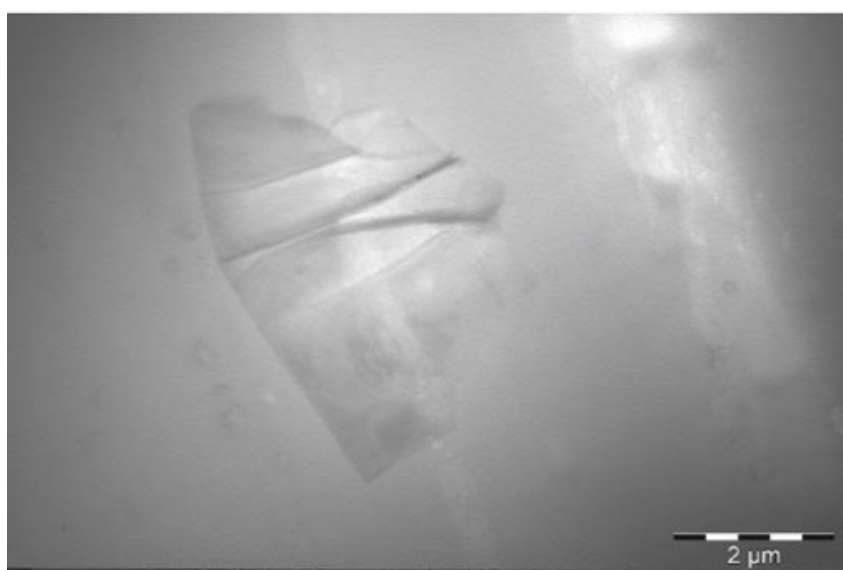
Vodíkovým väzbám a dipolárnym interakciám sa pripisuje významný vplyv na kinetiku radikálovej polymerizácie. Modelovým monomérom pre takéto štúdium je *N*-vinyl pyrrolidón, ktorý je rozpustný vo vode a tiež v rôznych organických rozpúšťadlách. Bola určená rýchlostná konštanta propagácie,  $k_p$ , radikálovej polymerizácie metódou pulznej laserovej polymerizácie v kombinácii s gélovou permečnou chromatografiou (GPC). Vodné prostredie a selektované organické rozpúšťadlá s rôznou intenzitou vodíkových a dipolárných interakcií ukázali, že  $k_p$  hodnota je výraznejšie ovplyvnená v prostredí alkoholov (metanol, *n*-butanol), avšak výrazne menej ako vo vodnej fáze, a v iných rozpúšťadlách sa efekt vplyvu rozpúšťadla nepozoroval. Z týchto výsledkov vyplýva nová informácia, že dipolárne interakcie nemajú významný vplyv na kinetiku polymerizácie. Tiež bola ukončená práca týkajúca sa presnosti stanovenia distribúcie mólových hmotností kyseliny polyakrylovej a polymetakrylovej metódou GPC.

English title: **Kinetics of radical polymerization and determination of rate coefficients with the emphasis on polymerization in aqueous phase**

## Výstupy:

1. UHELSKÁ, Lucia – CHORVÁT, D. – HUTCHINSON, R.A. – SANTANAKRISHNAN, S. – BUBACK, M. – LACÍK, Igor. Radical propagation kinetics of *N*-vinylpyrrolidone in organic solvents studied by pulsed-laser polymerization–size-exclusion chromatography (PLP–SEC). In *Macromol. Chem. Phys.*, 2014, vol. 215, no. 23, p. 2327-2336, (2.451 - IF2013).
  2. LACÍK, Igor – STACH, Marek – KASÁK, Peter – SEMAK, V. – UHELSKÁ, Lucia – CHOVANCOVÁ, Anna – REINHOLD, G. – KILZ, P. – DELAITTRE, G. – CHARLEUX, B. – CHADUC, I. -D'AGOSTO, F. – LANSALOT, M. – GABORIEAU, M. – CASTIGNOLLES, P. – GILBERT R.G. – SZABLAN, Z. - BARNER-KOWOLLIK, CH. – HESSE, P. – BUBACK, M. SEC Analysis of poly(acrylic acid) and poly(methacrylic acid), *Macromol. Chem. Phys.* 2014, DOI: 10.1002/macp.201400339, (2.451 - IF2013).
  3. BARNER-KOWOLLIK, Ch. - BEUERMANN, S. - BUBACK, M. - CASTIGNOLLES, P. - CHARLEUX, B. - COOTE, M. L. - HUTCHINSON, R. A. - JUNKERS, T. - LACÍK, Igor - RUSSELL, G. T. - STACH, Marek - VAN HERK, A. M. Critically evaluated rate coefficients in radical polymerization.- 7. Secondary-radical propagation rate coefficients for methyl acrylate in the bulk. In *Polymer Chemistry*, 2014, vol. 5, p. 204 - 212. (5.368 - IF2013).
  4. HAEHNEL, A. P. - STACH, Marek - CHOVANCOVÁ, Anna - RUEB, J. M. - DELAITTRE, G. – MISSKE, A. M. - LACÍK, Igor - BARNER-KOWOLLIK, Ch. (Meth)acrylic monomers with heteroatom-containing ester sidechains: a systematic PLP-SEC and polymerization study. In *Polymer Chemistry*, 2014, vol. 5, p. 862-873. (5.368 - IF2013).
- 3) Aplikácie polymérnych nanokompozitov s nízkym obsahom grafénu pre elektronické zariadenia** (Z. Špitalský, J. Mosnáček, M. Danko, M. Mičušík; projekt ERA-Net)

Pripravili sa nanokompozity s polyetylén tereftalátom a expandovaným grafitom (EG) alebo grafén oxidom (GO), s nízkym obsahom plniva do 0,4 hm. %, ktoré sa navzájom porovnávali. Z výsledkov vyplynulo, že úroveň distribúcie nanoplňiva do matrice sa výrazne podieľa na štruktúre a výsledných vlastnostiach nanokompozitov. Prítomnosť grafénových častíc urýchľuje kryštalizáciu polyméru. Zároveň sa ukázalo, že *in situ* polymerizácia je účinná metóda na prípravu polymérnych nanokompozitov, pretože sa pri nej zabraňuje reaglomerácii grafénových nanočastíc do väčších blokov, čím sa zlepšujú medzifázové interakcie na rozhraní plnivo – matrica. V prípade GO sú tieto interakcie ešte silnejšie ako u EG v dôsledku prítomnosti funkčných skupín na povrchu grafénu.



TEM obrázok kompozitu s grafénom.

English title: **Applications of polymer nanocomposites with low content of graphene in electronic devices.**

**Výstupy:**

1. KRUPA, Igor - PROSTREDNÝ, M. - ŠPITALSKÝ, Zdenko - KRAJČI, Juraj - ALMAADEED, M. A. S. Electrically conductive composites based on an elastomeric matrix filled with expanded graphite as a potential oil sensing material. In Smart Materials & Structures, 2014, vol. 23, art. no. 125020 [9p]. (2.449 - IF2013). (2014 - Current Contents). ISSN 0964-1726.
2. PASZKIEWICZ, S. - SZYMCZYK, A. - ŠPITALSKÝ, Zdenko - MOSNÁČEK, Jaroslav - KWIATKOWSKI, K. - ROSLANIEC, Z. Structure and properties of nanocomposites based on PTT-block-PTMO copolymer and graphene oxide prepared by in situ polymerization. In European Polymer Journal, 2014, vol. 50, p. 69-77. (3.242 - IF2013). (2014 - Current Contents). ISSN 0014-3057.
3. PASZKIEWICZ, S. - NACHMAN, M. - SZYMCZYK, A. - ŠPITALSKÝ, Zdenko - MOSNÁČEK, Jaroslav - ROSLANIEC, Z. Influence of expanded graphite (EG) and graphene oxide (GO) on physical properties of PET based nanocomposites. In Polish journal of chemical technology, 2014, vol.16, no.4, p. 45-50. (0.474 - IF2013). ISSN 1509-8117.
4. PASZKIEWICZ, S. - PAWELEC, I. - SZYMCZYK, A. - ŠPITALSKÝ, Zdenko - MOSNÁČEK, Jaroslav - ROSLANIEC, Z. Hybrid CNT/graphene nanoparticles in polymer nanocomposites based on poly(trimethylene terephthalate) prepared by in situ polymerization. In The 22nd Annual International Conference on Composites/Nano Engineering. - St. Julian, Malta, 2014, doi:10.13140/2.1.1832.0643.

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

Tabuľka 2e Štatistika vybraných kategórií publikácií

<b>PUBLIKAČNÁ A EDIČNÁ ČINNOSŤ</b>	<b>A Počet v r. 2014/ doplňky z r. 2013</b>	<b>B Počet v r. 2014/ doplňky z r. 2013</b>	<b>C Počet v r. 2014/ doplňky z r. 2013</b>
<b>1. Vedecké monografie vydané v domácich vydavateľstvách (AAB, ABB, CAB)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>2. Vedecké monografie vydané v zahraničných vydavateľstvách (AAA, ABA, CAA)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>3. Odborné monografie, vysokoškolské učebnice a učebné texty vydané v domácich vydavateľstvách (BAB, ACB)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>4. Odborné monografie a vysokoškolské učebnice a učebné texty vydané v zahraničných vydavateľstvách (BAA, ACA)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>5. Kapitoly vo vedeckých monografiách vydaných v domácich vydavateľstvách (ABD, ACD)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>6. Kapitoly vo vedeckých monografiách vydaných v zahraničných vydavateľstvách (ABC, ACC)</b>	<b>2 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>7. Kapitoly v odborných monografiách, vysokoškolských učebniciach a učebných textoch vydaných v domácich vydavateľstvách (BBB, ACD)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>8. Kapitoly v odborných monografiách, vysokoškolských učebniciach a učebných textoch vydaných v zahraničných vydavateľstvách (BBA, ACC)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>9. Vedecké a odborné práce v časopisoch evidovaných v Current Contents Connect (CCC) (ADC, ADCA, ADCB, ADD, ADDA, ADDB, CDC, CDCA, CDCB, CDD, CDDA, Cddb, BDC, BDCA, BDCB, BDD, BDDA, Bddb)</b>	<b>66 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>10. Vedecké a odborné práce v časopisoch neevidovaných v CCC (ADE, ADEA, ADEB, ADF, ADFA, ADFB, CDE, CDEA, CDEB, CDF, CDFA, CDFB, BDE, BDEA, BDEB, BDF, BDFA, BDFB)</b>	<b>6 / 1</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>11. Vedecké a odborné práce v zborníkoch vydaných tlačou alebo na CD</b>			
<b>a/ recenzované práce a publikované pozvané príspevky (AEC, AED, AFA, AFB, AFBA, AFBB, BEC, BED)</b>	<b>20 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>b/ nerecenzované práce (AEE, AEF, AFC,</b>	<b>18 / 1</b>	<b>0 / 0</b>	<b>0 / 0</b>



AFD, AFDA, AFDB, BEE, BEF, CEC, CED)			
<b>12. Vydané periodiká evidované v CCC</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>13. Ostatné vydané periodiká</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>14. Vydané alebo editované zborníky z vedeckých podujatí (FAI)</b>	<b>2/0</b>	<b>0/0</b>	<b>0/0</b>
<b>15. Vedecké práce uverejnené na internete (GHG)</b>	<b>1 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>16. Preklady vedeckých a odborných textov (EAJ)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>
<b>17. Heslá v Encyklopédii Beliana a iných encyklopédiách a terminologických slovníkoch (BDA, BDB)</b>	<b>0 / 0</b>	<b>0 / 0</b>	<b>0 / 0</b>

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

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

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

## Tabuľka 2f Ohlasy

<b>OHLASY</b>	<b>A Počet v r. 2013/ doplňky z r. 2012</b>	<b>B Počet v r. 2013/ doplňky z r. 2012</b>
<b>Citácie vo WoS (1.1, 2.1)</b>	1451 / 0	0 / 0
<b>Citácie v SCOPUS (1.2, 2.2)</b>	213 / 0	0 / 0
<b>Citácie v iných citačných indexoch a databázach (9, 10)</b>	0 / 0	0 / 0
<b>Citácie v publikáciách neregistrovaných v citačných indexoch (3, 4)</b>	0 / 0	0 / 0
<b>Recenzie na práce autorov z organizácie (5, 6, 7, 8)</b>	0 / 0	0 / 0

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

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

## 2.5. Aktívna účasť na vedeckých podujatiach

### Tabuľka 2g Vedecké podujatia

<b>Prednášky a vývesky na medzinárodných vedeckých podujatiach</b>	131
<b>Prednášky a vývesky na domácich vedeckých podujatiach</b>	33

## 2.6. Vyžiadané prednášky

### 2.6.1. Vyžiadané prednášky na medzinárodných vedeckých podujatiach

1. CZANIKOVÁ, Klaudia - TORRAS, N. - KRUPA, Igor - OMASTOVÁ, Mária. Elastoméne aktuátory. In *PLASTKO 2014 : sborník příspěvků z konference PLASTKO 2014, 8. - 9. 4. 2014* [elektronický zdroj]. - Zlín, ČR : Universita Tomáše Bati ve Zlíně, 2014, p. [20-28]. ISBN 978-80-7454-335-7. Pozvaná prednáška - OM

2. FLORIÁN, Štefan – NOVÁK, Igor. Investigation of poly (ethylene terphthalate) treated by barrier discharge plasma. Medzinárodná konferencia „Trendy v pokročilých plazmových povrchových úpravách“, 19. – 20.05.2014, Brno, Česká republika. Pozvaná prednáška - NI
3. CHMELA, Štefan – KOLLÁR, Jozef – HRČKOVÁ, Ľudmila. Fluorescence dye-labelled polymers prepared by nitroxide mediated radical polymerization. In Proceedings of the Asian Workshop on Polymer Processing Annual Conference – AWPP 2014, Kenting, Taiwan, 17th – 20th November, 2014. Pozvaná prednáška - CHŠ
4. CHODÁK, Ivan. Environmentally friendly plastics, properties, applications and environmental impact. In *BPPA 14 : International Conference on Bio-Friendly Polymers and Polymer Additives: From Scientific Aspects to Processing and Applications : Budapest, Hungary, 19-21 May, 2014 : program and book of abstracts.* - Budapest, Hungary : Hungarian Academy of Sciences, 2014, p.15. ISBN 978-963-08-9492-0. Pozvaná prednáška - CHI
5. KASÁK, Peter - SOBOLČIAK, Patrik - SEMAK, V. - STACH, Marek - KRONEKOVÁ, Zuzana - HLOUŠKOVÁ, Gabriela - KRUPA, Igor - CHORVÁT, D. - RYCHTER, P. - UHELKÁ, Lucia - LACÍK, Igor. Polyzwitterions: Propagation kinetics, hydrogels, non-biofouling coatings. In *The 2nd CEEP Workshop on Polymer Science : Iasi, Romania : 24 - 5 October, 2014 : proceedings.* - Iasi, Romania : Petru Poni Institute of Macromolecular Chemistry, 2014, p. 4. Pozvaná prednáška – LI
6. KRAJČI, Juraj - CHODÁK, Ivan. Structure of reinforcing filler network determined by electrical conductivity of the polymer/carbon black composite. In *The 2nd CEEP Workshop on Polymer Science : Iasi, Romania : 24 - 25 October, 2014 : proceedings.* - Iasi, Romania : Petru Poni Institute of Macromolecular Chemistry, 2014, p. 9. Pozvaná prednáška - CHI
7. MOSNÁČEK, Jaroslav – ILČÍKOVÁ, Markéta – MRLÍK, M. – SEDLÁČEK, T. Covalently modified MWCNT with preferential interactions with one phase of triblock copolymer thermoplastic elastomers. *Silesian meetings on polymer materials - POLYMAT60, Zabrze, 30.6-1.7.2014, book of abstracts OC-4, p. 19.* Pozvaná prednáška - MJ
8. NOVÁK, Igor - POPELKA, Anton - VALENTIN, Marian - LEHOCKÝ, M. - CHODÁK, Ivan – PRACHÁR, Jozef. Antibacterial modification of polymers by cold plasma. Medzinárodná konferencia „Trendy v pokročilých plazmových povrchových úpravách“, 19. – 20.05.2014, Brno, Česká republika. Pozvaná prednáška - NI
9. RYCHLÝ, Jozef - RYCHLÁ, Lýdia - CHMELA, Štefan - HRONEC, M. Pre-oxidation of polymers on their route to biodegradation. In *BPPA 14 : International Conference on Bio-Friendly Polymers and Polymer Additives: From Scientific Aspects to Processing and Applications : Budapest, Hungary, 19-21 May, 2014 : program and book of abstracts.* - Budapest, Hungary : Hungarian Academy of Sciences, 2014, p. 7. ISBN 978-963-08-9492-0. Pozvaná prednáška - RJ

### 2.6.2. Vyžiadané prednášky na domácich vedeckých podujatiach

1. NOVÁK, Igor - POPELKA, Anton - ŠPITALSKÝ, Zdenko - OMASTOVÁ, Mária - LEHOCKÝ, M. - CHODÁK, Ivan - VALENTIN, Marian - PRACHÁR, Jozef. Anti-bacterial pre-treatment of polyolefins by cold plasma. In *Zborník prednášok z medzinárodnej odbornej konferencie Progresívne technológie pre textil, jeho kvalita bezpečnosť : Žilina, 27. -28. 5. 2014.* - Žilina : VÚTCH - CHEMITEX, spol. s r.o., 2014, [8 s.]. ISBN 978-80-971639-0-7. Pozvaná prednáška – NI
2. OMASTOVÁ, Mária. Polymeric nanocomposites with carbon nanofillers for advanced application. In *BYPOS: 5th Bratislava Young Polymer Scientists Workshop : Zázrivá, Slovakia, June 16th - 20th, 2014 : workshop book.* - Bratislava : Young Scientists Council of Polymer Institute of the Slovak Academy of Sciences, 2014, p. 19-22. ISBN 978-80-970923-5-1. Pozvaná prednáška - MO

### 2.6.3. Vyžiadané prednášky na významných vedeckých inštitúciách

1. BENKOVÁ, Zuzana, Statické a dynamické vlastnosti molekúl vody na rozhraní silikátu pokrytého poly(etylénoxidovými) reťazcami. 12.05.2014. Seminár v Medzinárodnom laserovom centre, Bratislava.

2. DANKO, Martin. On the application of static dimers of mono-substituted derivatives of pyrene yielding excimer like emission for characterization of interactions in polymer matrices. 20.11.2014, Centre of Molecular and Macromolecular Studies, PAN, Poľsko.
3. CHOVANCOVÁ, Anna – HUTCHINSON, R.A. – PREUSSER, C. – HIPKÁ, Eva - LACÍK Igor. Evaluation of AA-co-AAm using calibration of polyAA and polyAAm standards. 14.08.2014, Passau, Nemecko
4. KRONEK, Juraj. Smart polymer transport systems. Bulgarian-Slovak Seminar. October 28 – 29, 2014, Hysaria, Sofia, Bulharsko.
5. KRONEKOVÁ, Zuzana. Biocompatibility of 2-oxazoline polymers with different structure. Bulgarian-Slovak Seminar, October 28 – 29, 2014, Hisarya, Bulharsko.
6. LACÍK, Igor. Diabetes treatment by islets of Langerhans encapsulated in polymeric microcapsules. June 6, 2014, University of Liverpool, UK.
7. LACÍK, Igor. Multicomponent Polyelectrolyte Complex Microcapsules for Immunoprotection of Transplanted Cells. September 3, 2014, NTNU Trondheim, Nórsko.
8. MALÍKOVÁ, Marta. Flammability of smart textiles based on expanded graphite-polymeric nanocomposites. scientific workshop on characterisation of flame retardant textiles and related materials, COST MP1105, 6.10.2014, Dubrovnik, Chorvátsko
9. MOSNÁČEK, Jaroslav. *Photochemically induced reversible deactivation radical polymerization of methyl methacrylate*; prednesená 20.11.2014 na Centre of Molecular and Macromolecular Studies, PAN, Poľsko.
10. NÁMER Pavol. Analýza prežívania, Coxove modely proporciálného rizika, Logistická regresia vo farmakológii - seminár prednášok z bioštatistiky pre farmakológov, marec 2014, Ústav experimentálnej farmakológie a toxikológie SAV, Bratislava
11. OMASTOVÁ, Mária. Carbon nanotubes composites for advanced applications. September 9, 2014, NTUA Atény, Grécko
12. PALENČÁR Peter. Thermodynamic stability, buckling and folding of  $\alpha$ -helices. Pozvaná plenárna prednáška na pravidelný seminár Katedry fyzikální a makromolekulární chemie, 16.04.2014, Přírodovedecká fakulta Univerzita Karlova v Prahe, Česká republika
13. PALENČÁR Peter. Hybrid Monte Carlo Simulations of Star-Branched Polyelectrolytes (Multivalent ions, Poor solvent). Prednáška na výjazdovom seminári Katedry fyzikální a makromolekulární chemie, Přírodovedecké fakulty UK v Prahe, 28.-30. septembra 2014, Patejdlovka, Česká republika.
14. RÁZGA, Filip. Polymérne materiály pre biomedicínske aplikácie, Centrum molekulární biologie a génové terapie. November 3, 2014, Brno, Česká republika.
15. ŠPITALSKÝ, Zdenko. Polymer composites with nanoparticles of graphitic structures. Center for advanced materials. March 16, 2014, Qatar University, Doha, Qatar.
16. UHELSKÁ, Lucia - RÁZGA, Filip - TRELOVÁ, Dušana - NÉMETHOVÁ, Veronika - KRONEKOVÁ, Zuzana - KRONEK, Juraj - RYCHTER, P. - LACÍK Igor. PMCG microcapsules: the latest experience. CDP meeting 2-6.09.2014 Trondheim, Nórsko

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

## **2.7. Patentová a licenčná činnosť na Slovensku a v zahraničí v roku 2014**

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

Na Slovensku - počet patentov: 2

Číslo PV: 288062

Mená autorov: Berek Dušan

Názov vynálezu: Spôsob separácie viaczložkových polymérových systémov

Majiteľ / spolumajiteľ:

Číslo PV: SR 288165.

Mená autorov: Berek Dušan, WEI, Yun - BEIJING, CN – WANG, Chong

Názov vynálezu: Spôsob prípravy a použitia poly(2-hydroxy propyl metakrylát)ovej chromatografickej fázy viazanej na silikagéli

Majiteľ / spolumajiteľ:

### **2.7.2. Prihlásené vynálezy**

Na Slovensku - počet patentov: 5

Číslo PV: PÚV 5014-2014

Mená autorov: Capek Ignác

Názov vynálezu: Spôsob prípravy kompozitnej polymérovej subnanometrovej disperzie na báze akrylamidu.

Majiteľ / spolumajiteľ:

Číslo PV: PCT/SK2014/050008

Mená autorov: Lukáč Ivan, Husár Branislav, Kósa Csaba, Fáryová Janka

Názov vynálezu: Method for cross-linking of polymer films.

Majiteľ / spolumajiteľ:

Číslo PV: PP 50017-2014

Mená autorov: Berek Dušan, Novák Ivan, Munka K., Karacsonyová, M

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

Majiteľ / spolumajiteľ:

Číslo PV: 25/14 3.1

Mená autorov: Rázga Filip, Némethová Veronika

Názov vynálezu: Enhanced specificity and selectivity of antisense systems for cancer therapy: targeted inhibition of causal fusion genes,

Majiteľ / spolumajiteľ:

Číslo PV: 26/14 3.1

Mená autorov: Rázga Filip, Némethová Veronika

Názov vynálezu: Immune-inertness: Morpholino-modified surfaces of materials for in vivo biomedical applications

Majiteľ / spolumajiteľ:

### **2.7.3. Predané licencie**

### **2.7.4. Realizované patenty**

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

Tabuľka 2h Experti hodnotiaci národné projekty

Meno pracovníka	Typ programu/projektu/výzvy	Počet hodnotených projektov
Chmela Štefan	VEGA	2
Chodák Ivan	SAIA	1
	VEGA	1
Mosnáček Jaroslav	VEGA	1
Rychlá Lýdia	VEGA	1
Rychlý Jozef	VEGA	3

## 2.9. Účast' na spracovaní hesiel do encyklopédie Beliana

Počet autorov hesiel: 0

## 2.10. Iné informácie k vedeckej činnosti.

Hodnotenie organizačných útvarov ústavu Vedeckou radou sa už po štvrtýkrát uskutočnilo formou dvojdnového kolokvia, ktoré sa tentokrát konalo v prvej polovici decembra 2014 v kongresovom centre SAV na Smolenickom zámku. V priebehu tohto kolokvia malo každé zo štyroch oddelení priestor na prezentáciu vedeckej, vedecko-organizačnej, popularizačnej a inej činnosti uskutočnenej v priebehu roku 2014. Kolokvium bolo organizované a vedené Vedeckou radou ústavu a pre každé oddelenie boli určení dvaja vnútroústavní hodnotitelia, pričom jedným z nich pre každé oddelenie bol mladý vedecký pracovník, ktorý v roku 2013, resp. 2012 obhájil titul PhD. Podkladom pre hodnotenie oddelení bol písomný materiál štruktúrovaný podľa zásad definovaných Vedeckou radou. Cieľom hodnotenia bolo získať komplexný prehľad jednak o činnosti jednotlivých oddelení a zároveň o príspevku vedeckých a vedeckotechnických pracovníkov do výstupov oddelení v kontexte posledných troch rokov. Pri vyhodnotení kolokvia sa dospelo k názoru, že kolokvium spĺňa účel monitorovania a získania celkového prehľadu o výstupoch organizačných útvarov i jednotlivcov a bude sa takouto formou hodnotenia pokračovať i v ďalších rokoch.

Zameranie ústavu pokračuje v tradičných témach popri rozvíjaní nových tém hlavne v oblasti bioaplikácií polymérov a nanotechnológiách. Tematický profil pracoviska je v štyroch základných oblastiach reflektujúcich tematiku štyroch oddelení: syntéza a modifikácia polymérov, biomateriály a bioaplikácie, polymérne kompozity a 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 celkovo uspokojivé. Doleuvedená Tabuľka dokumentuje vývoj počtu publikácií a citácií za posledných 5 rokov. V budúcnosti by sa mali formovať ďalšie vedúce osobnosti tímov z mladšej generácie vedeckých pracovníkov, ktorí by mali postupne významnejšie prispievať k počtu publikácií a zastúpiť odchádzajúcu silnú generáciu starších vedeckých pracovníkov.

Rok	CC publikácie	Kapitoly v knihách	Citácie WOS, Scopus
2010	51	3	876
2011	44	4	1015
2012	62	2	1307
2013	48	2	1296
2014	65	2	1664

Vedecká rada organizuje semináre vedeckých pracovníkov ústavu a pravidlom sú i vedecké prednášky zahraničných hostí organizované ad-hoc v priebehu ich návštev ústavu prevažne v rámci projektovej spolupráce. Inicioval sa i cyklus pravidelných pozvaných prednášok zahraničných vedeckých osobností; v aktívnejšej organizácii tohto cyklu sa bude pokračovať v r. 2015.

V roku 2014 sa po druhýkrát uskutočnilo hodnotenie mladých vedeckých pracovníkov, ktorým končila v roku 2014 zmluva. Základom pre hodnotenie bol vyplnený formulár s doterajšími výstupmi a vedecko-organizačnými aktivitami a krátka prezentácia doterajších najvýznamnejších výsledkov a plánovaného budúceho zamerania. Cieľom hodnotenia je selekcia mladých vedeckých pracovníkov na základe ich vedeckých výsledkov a schopností samostatne pracovať a rozvíjať výskum. Malo by viesť k zamestnávaniu kvalitnejších vedeckých pracovníkov, ktorí budú schopní rozvíjať výskum na ÚPo SAV a zvyšovať jeho konkurencieschopnosť a povedomie doma i v zahraničí.

Hodnotenie sa v roku 2014 po prvýkrát rozšírilo i na vedeckých pracovníkov nad 40 rokov za účelom vytvorenia konkurenčného prostredia pre VP. V rámci tohto hodnotenia sa bral do úvahy komplexný prínos každého VP k rozvoju pracoviska na základe odovzdaného formuláru.

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

#### 3.1. Údaje o doktorandskom štúdiu

Tabuľka 3a Počet doktorandov v roku 2014

Forma	Počet k 31.12.2014				Počet ukončených doktorantúr v r. 2014					
	Doktorandi				Ukončenie z dôvodov					
	celkový počet		z toho novoprijatí		ukončenie úspešnou obhajobou		predčasné ukončenie		neúspešné ukončenie	
	M	Ž	M	Ž	M	Ž	M	Ž	M	Ž
<b>Interná zo zdrojov SAV</b>	6	9	1	3	1	1	0	1	0	0
<b>Interná z iných zdrojov</b>	0	0	0	0	0	0	0	0	0	0
<b>Externá</b>	1	1	0	1	0	0	0	0	0	0
<b>Spolu</b>	7	10	1	4	1	1	0	1	0	0
<b>Súhrn</b>	17		5		2		1		0	

#### 3.2. Zmena formy doktorandského štúdia

Tabuľka 3b Počty preradení

Z formy	Interná z prostriedkov SAV	Interná z prostriedkov SAV	Interná z iných zdrojov	Interná z iných zdrojov	Externá	Externá
<b>Do formy</b>	Interná z iných zdrojov	Externá	Interná z prostriedkov SAV	Externá	Interná z prostriedkov SAV	Interná z iných zdrojov
<b>Počet</b>	0	0	0	0	0	0

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

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

Meno doktoranda	Forma DŠ	Mesiac, rok nástupu na DŠ	Mesiac, rok obhajoby	Číslo a názov študijného odboru	Meno a organizácia školiteľa	Fakulta udeľujúca vedeckú hodnotu
Ing. Dušana Treľová	interné štúdium hradené z prostriedkov SAV	9 / 2009	8 / 2014	4.1.19 makromolekulová chémia	Ing. Igor Lacík DrSc., Ústav polymérov SAV	Fakulta chemickej a potravinárskej technológie STU
Ing. Marian Valentin	interné štúdium hradené z prostriedkov SAV	9 / 2010	8 / 2014	4.1.19 makromolekulová chémia	Ing. Igor Novák PhD., Ústav polymérov SAV	Fakulta chemickej a potravinárskej technológie STU

Zoznam interných a externých doktorandov je uvedený v Prílohe A.

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

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

Názov študijného programu (ŠP)	Názov študijného odboru (ŠO)	Číslo ŠO	Univerzita/vysoká škola a fakulta
	fyzikálna chémia	4.1.18	Fakulta chemickej a potravinárskej technológie STU Prírodovedecká fakulta UK
Makromolekulová chémia	makromolekulová chémia	4.1.19	Fakulta chemickej a potravinárskej technológie STU
	technológia makromolekulových látok	5.2.21	Fakulta chemickej a potravinárskej technológie STU

Tabuľka 3e Účasť na pedagogickom procese

Menný prehľad pracovníkov, ktorí boli menovaní do odborových komisií študijných programov doktorandského štúdia	Menný prehľad pracovníkov, ktorí pôsobili ako členovia vedeckých rád univerzít, správnych rád univerzít a fakúlt	Menný prehľad pracovníkov, ktorí získali vyššiu vedeckú, pedagogickú hodnotu alebo vyšší kvalifikačný stupeň
doc. Ing. Dušan Berek, DrSc. (analytická chémia)	prof. Ing. Tomáš Bleha, DrSc. (Fakulta chemickej a potravinárskej technológie STU)	Ing. Dušana Treľová, PhD. (PhD., Fakulta chemickej a potravinárskej technológie STU)
prof. Ing. Tomáš Bleha, DrSc. (fyzikálna chémia)	Ing. Igor Lacík, DrSc. (Univerzita T. Bati, Zlín, Česká Republika)	Ing. Marian Valentin, PhD. (PhD., Fakulta chemickej a potravinárskej technológie STU)
prof., RNDr. Ignác Capek, DrSc. (technológia makromolekulových látok)		
RNDr. Peter Cifra, DrSc. (makromolekulová chémia)		

Mgr. Martin Danko, PhD. (technológia makromolekulových látok)		
Štefan Chmela, DrSc. (makromolekulová chémia)		
prof. Ing. Ivan Chodák, DrSc. (technológia makromolekulových látok)		
Ing. Ivica Janigová, PhD. (technológia makromolekulových látok)		
Ing. Igor Lacík, DrSc. (makromolekulová chémia)		
Mgr. Jaroslav Mosnáček, PhD. (technológia makromolekulových látok)		
Ing. Igor Novák, PhD. (odbor v zahraničí)		
Ing. Mária Omastová, DrSc. (makromolekulová chémia)		
Ing. Lýdia Rychlá, DrSc. (fyzikálna chémia)		
Ing. Jozef Rychlý, DrSc. (makromolekulová chémia)		

### 3.5. Údaje o pedagogickej činnosti

Tabuľka 3f Prednášky a cvičenia vedené v roku 2014

PEDAGOGICKÁ ČINNOSŤ	Prednášky		Cvičenia a semináre	
	doma	v zahraničí	doma	v zahraničí
Počet prednášateľov alebo vedúcich cvičení	9	1	1	0
<b>Celkový počet hodín v r. 2014</b>	77	2	84	0

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

Tabuľka 3g Aktivity pracovníkov na VŠ

1.	Počet pracovníkov, ktorí pôsobili ako vedúci alebo konzultanti diplomových a bakalárskych prác	3
2.	Počet vedených alebo konzultovaných diplomových a bakalárskych prác	3
3.	Počet pracovníkov, ktorí pôsobili ako školitelia doktorandov (PhD.)	11
4.	Počet školených doktorandov (aj pre iné inštitúcie)	20
5.	Počet oponovaných dizertačných a habilitačných prác	6
6.	Počet pracovníkov, ktorí oponovali dizertačné a habilitačné práce	2
7.	Počet pracovníkov, ktorí pôsobili ako členovia komisií pre obhajoby DrSc. prác	6
8.	Počet pracovníkov, ktorí pôsobili ako členovia komisií pre obhajoby PhD. prác	12
9.	Počet pracovníkov, ktorí pôsobili ako členovia komisií, resp. oponenti v inauguračnom alebo habilitačnom konaní na vysokých školách	1



### 3.6. Iné dôležité informácie k pedagogickej činnosti

Vedeckí pracovníci Ústavu polymérov sa aktívne podieľajú aj na výchove študentov a doktorandov. V roku 2014 pracovníci ústavu pôsobili pedagogicky ako prednášatelia semestrálnych prednášok a seminárov pre študentov na Prírodovedeckej fakulte UK, Fakulte chemickej a potravinárskej technológie STU v Bratislave, Materiálovo-technickej fakulte STU v Trnave a na Fakulte priemyselných technológií TU AD v Púchove. Do riešenia parciálnych vedeckých problémov sa v pozícii VPS zapojili aj študenti bakalárskeho stupňa, čo je dobrým predpokladom pre ich následné získanie na PhD štúdium. Vedecká výchova doktorandov pokračovala úspešne aj v poslednom roku. Pracovisko bolo i v roku 2014 akreditované v troch odboroch pri Fakulte chemickej a potravinárskej technológie STU v Bratislave: Makromolekulová chémia, Technológia makromolekulových látok a Fyzikálna chémia, a pri Prírodovedeckej fakulte UK v Bratislave v odbore Fyzikálna chémia. V roku 2014 sme získali štyroch nových doktorandov zo slovenských univerzít. Nepodarilo sa nám zatiaľ získať doktorandov z iných krajín EU, pre ktorých platia rovnaké podmienky pri nástupe ako u domácich doktorandov. Na doktorandské štúdium bola prijatá záujemkyňa z Thajska, ktorej doktorandské štúdium by malo byť financované z Thajskej univerzity. Z dôvodu dlhšieho vybavovania všetkých potrebných dokumentov by mala nastúpiť až od marca 2015.

Vedeckí pracovníci ústavu prispievajú k výchove doktorandov aj ako prednášatelia v prednáškových kurzoch a ako vedúci dizertačných prác doktorandov. V rámci Vedeckej rady ÚPo pokračovali diskusie o skvalitnení prípravy doktorandov, kde sa predpokladá zorganizovanie ďalších odborných prednášok a prehĺbenie vedomostí zapojením pracovníkov ústavu a pozvaných hostí ako prednášateľov do špeciálnych kurzov pre doktorandov. Vedenie ústavu a Vedecká rada kladú veľký dôraz na kvalitnú prípravu PhD študentov, ktorej súčasťou sú každoročné hodnotenia doktorandov v septembri, keď po každom uzavretom akademickom roku štúdiá prezentujú dosiahnuté výsledky. Motiváciou v tomto štádiu prípravy je vyhodnotenie najlepších doktorandov za posledný akademický rok, ktorí získajú pravidelnú mesačnú finančnú prémie k štipendiu. Doktorandské štúdium obhajobou dizertačných prác ukončili dvaja doktorandi. Dvaja doktorandi ukončili štvorročné doktorandské štúdiu bez získania PhD titulu, pričom požiadali o možnosť dodatočného spísania a odovzdania písomnej dizertačnej práce k jej následnej obhajobe.

V roku 2014 sme zorganizovali pre širokú verejnosť a pre študentov stredných a vysokých škôl Deň otvorených dverí, ktorý sa stretol s veľkým záujmom. Počas tohto podujatia bola zriadená Polymérna čajovňa, v ktorej stredoškólači a vysokoškólači diskutovali s kolegami z nášho ústavu Ing. Šiškovou, PhD., Ing. Mičušíkom, PhD. a Mgr. Kronekom, PhD. o rôznych témach týkajúcich sa polymérov. Okrem Polymérnej čajovne mali návštevníci možnosť zistiť viac o polyméroch i pracovisku pri návštevách oddelení ústavu a malých prezentáciách vo vstupnej hale.

## 4. Medzinárodná vedecká spolupráca

### 4.1. Medzinárodné vedecké podujatia

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

BYPoS 2014- 5th Bratislava Young Polymer Scientists workshop, Hotel Havrania, Zázrivá, 40 účastníkov, 16.06.-20.06.2014

5<sup>th</sup> Bratislava Young Polymer Scientists Workshop BYPoS

Už po piatykrát Rada mladých vedcov pri Ústave polymérov SAV zorganizovala workshop mladých, šikovných a nádejných vedcov z Rakúska, Čiech, Nemecka, Grécka, Maďarska, Talianska, Poľska, Slovenska a Kanady. Tento ročník BYPoSu bol vsadený do krásneho oravského prostredia. Konferencia sa konala 16.–20.06.2014 v horskom hoteli Havrania v Zázrivej s výhľadom na jednu z najkrajších prírodných panorám Slovenska.

Pozvanie organizačného výboru na úvodné prednášky prijali Dr. Mária Omastová z Ústavu polymérov SAV, Dr. Grażyna Adamus z CPCM Poľskej akadémie vied, prof. Srećko Valić z University of Rijeka, Chorvátsko, prof. Robin Hutchinson z Queen's University v Kanade a v neposlednom rade Dr. Martin Hrubý z ÚMCH AV ČR. Podrobnejšie informácie o prednáškach nájdete na [www.polymer.sav.sk/bypos](http://www.polymer.sav.sk/bypos).

Pozvaní prednášatelia otvorili svojimi prednáškami jednotlivé sekcie konferencie a navodili atmosféru profesionality a vedeckého ovzdušia. Okrem piatich pozvaných prednášok odznelo 35 prezentácií doktorandov a mladých vedcov a to v oblastiach syntéza, modifikácia a charakterizácia polymérov, polymérne zmesi, kompozity a spracovanie polymérov, inteligentné polyméry a biopolyméry, bio-aplikácie polymérov, stabilita a degradácia polymérov a fyzika polymérov. Posledná sekcia zahŕňala teóriu, modelovanie a simulácie polymérov. Kvalita prezentácií bola tak, ako po iné roky veľmi vysoká, pričom sa nezabudlo aj na zábavu, spoznávanie a nadväzovanie nových kontaktov. Účastníci mali možnosť sa zregenerovať počas výletu na Oravský hrad a počas spoločných večerov pri slovenskej ľudovej hudbe. K večernému programu a skvelej zábave prispel aj riaditeľ Ústavu polymérov Dr. Igor Lacík svojou excelentnou hrou na fujare. Do programu konferencie boli zaradené aj semináre na tému:

„Creating effective (and interesting) visual aids to support your technical messages; Tips for creating effective visual aids for technical presentations will be offered; Powerpoint slides put together too quickly or as an afterthought can be dull and detract from spoken words; Effective visual aids help guide presentations and reinforce main messages“ pod vedením Pauly Klink z Kanady, ktorá poskytla cenné rady a návrhy ako zaujať publikum svojou prezentáciou a ako klamať telom.

Celková vedecká, ale aj spoločenská atmosféra a reakcie účastníkov opäť utvrdili v tom, že námaha a čas spojené s organizovaním 5. ročníka Byposu boli investované dobre a dodali organizačnému výboru hnaciu silu na prípravu ďalšieho, tentokrát zimného, už šiesteho ročníka workshopu.

International Seminar on Elastomers, Hotel Park Inn, Bratislava, Slovenská republika, 100 účastníkov, 24.08.-28.08.2014

14<sup>th</sup> International Seminar on Elastomers ISE'14

Ústav polymérov sa podieľal na organizovaní konferencie International Seminar of Elastomers 2014 – ISE'14. Konferencia sa konala v bratislavskom hoteli Park Inn Danube od 24. do 28.

augusta 2014. Hlavnými organizátormi podujatia boli prof. Rudolf Schuster (Lanxess, Nemecko) a prof. Ing. Ivan Chodák, DrSc. z Ústavu polymérov Slovenskej akadémie vied. Predsedníčkou lokálneho vedeckého výboru bola Ing. Mária Omastová, DrSc.

Významným hosťom a plenárnym prednášateľom bol prof. M. Gerspacher z Nemecka, ktorý predniesol prednášku s názvom Sadze - dôležitý materiál pre technológiu pneumatík. Sadze sú najviac používaným plnivom pri výrobe všetkých druhov pneumatík, je preto dôležité vedieť o ich štruktúre a vlastnostiach všetky detaily, aby sa pripravil kompozit požadovaných vlastností. Výskum elastomérov má za sebou dlhú a úspešnú históriu. Počas niekoľkých desiatok rokov sa dosiahli významné pokroky v oblasti chémie, fyziky a výroby elastomérov. Zložitosť základných problémov, ako sú flexibilita gúm, termodynamika kaučukových zmesí, mechanizmus sieťovania, vhodnosť a kombinácia plnív, sú aj v dnešnej dobe náročné otázky, ktoré nie sú plne pochopené. Niektoré z nich sa už vyriešili, ale niektoré zostávajú otvorené a nové sa objavujú. Medzinárodný seminár o elastoméroch sa v predchádzajúcich trinástich úspešných ročníkoch etabloval ako významné svetové fórum v oblasti gumárenského výskumu a aplikácií a ISE'14 v tejto tradícii úspešne pokračoval.

Vedci z oblasti materiálového výskumu, odborníci z priemyslu a študenti diskutovali problémy chémie a fyziky elastomérov a získavali z prezentácií kolegov najnovšie poznatky z tejto oblasti. Seminár bol tento rok zameraný na nedávne pokroky v oblasti výskumu elastomérov, termoplastických elastomérov, ale aj prípravy ich zmesí a všetkých druhov plnív. Dôležité miesto v prezentáciách si našli elastomérne nanokompozity, nové metódy testovania elastomérov, a pozornosť sa venovala aj výskumu stability a životnosti týchto materiálov. Diskutoval sa aj udržateľný rozvoj a environmentálne aspekty.

Štvordňové stretnutie odborníkov prebiehalo prednáškami v dvoch paralelných sekciách. Celkovo na podujatí odznelo okrem jednej hlavnej pozvanej plenárnej prednášky ďalších 12 hlavných a 36 krátkych prednášok. Počas konferencie sa konala aj posterová sekcia. Celkovo sa konferencie zúčastnilo 110 odborníkov zo 17 krajín. Participovali na nej jednak zástupcovia firiem ako aj akademickí a vedeckí pracovníci z mnohých vysokých škôl. Z prezentovaných prednášok a postrov Ústav polymérov vydal Zborník abstraktov, ktorý má 209 strán.

## XXII. medzinárodná konferencia o bioenkapsulácii, Hotel Park Inn, Bratislava, Slovenská republika, 120 účastníkov, 17.09.-19.09.2014

### 22<sup>nd</sup> International Conference on Bioencapsulation

V dňoch 17.–19. septembra 2014 zorganizoval Ústav polymérov SAV v spolupráci s Bioencapsulation Research Group 22nd International Conference on Bioencapsulation, ktorá bola zároveň 21th Bratislava International Conference on Macromolecules. Využitie princípov enkapsulácie pre biomedicínske a biotechnologické aplikácie v SAV ako aj dlhodobý aktívny kontakt s Bioencapsulation Research Group (vedená prof. Denisom Ponceletom) boli základom toho, že organizáciou tohtoročnej konferencie bol poverený Ústav polymérov SAV (chairman Ing. Igor Lacík, DrSc.). Konferencie sa zúčastnilo 120 účastníkov z celého sveta, ktorí sa počas 3 dní mali možnosť oboznámiť s novými poznatkami v 5 sekciách: (1) inovatívne postupy v mikroenkapsulácii, (2) enkapsulácia pankreatických ostrovčiekov a iné biomedicínske aplikácie, (3) materiály vhodné na enkapsuláciu, (4) aplikácie v potravinárstve, poľnohospodárstve, životnom prostredí a biotechnológii, a (5) rôzne technológie a procesy. Konferencie sa zúčastnilo aj niekoľko vystavovateľov prezentujúcich hlavne nové enkapsulačné technológie.

Otvorenia konferencie sa zúčastnil predseda SAV prof. Jaromir Pastorek, DrSc. a Dr. Albert Hwa, vedecký projektový manažér JDRF. Konferencia sa konala pod záštitou Ministerstva zdravotníctva SR, Ústavu polymérov SAV, neinvestičného fondu Cukrovka n.f. Hlavnými sponzormi konferencie boli Bioencapsulation Research Group, ktorá poskytla na základe kvality príspevkov granty umožňujúce účasť hlavne doktorandov a mladých vedcov na konferencii. Juvenile Diabetes

Research Foundation (JDRF) <http://jdrf.org/about-jdrf/> sponzorovala sekciu venovanú enkapsulácii pankreatických ostrovčekov, čo umožnilo účasť niekoľkých členov enkapsulačného konzorcia JDRF. Členom tohto konzorcia je vďaka nedávno získanému projektu aj tím Ing. Igora Lacíka, DrSc. z Ústavu polymérov SAV v spolupráci s UIC Chicago. Konferenciu podporili aj firmy Procter & Gamble a CentralChem. Poďakovanie za organizáciu a úspešný priebeh konferencie patrí prof. Denisovi Ponceletovi na strane BRG, tímu Oddelenia pre výskum biomateriálov Ústavu polymérov SAV a Dr. Silvii Podhradskej z Ústavu polymérov SAV na strane hostiteľskej organizácie, ako aj zamestnancom hotela Holiday Inn v Bratislave za vytvorenie profesionálnej a priateľskej atmosféry.

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

1. 6<sup>th</sup> International Conference Polymeric Materials in Automotive & 22nd Slovak Rubber Conference/VI. medzinárodná konferencia o polymérnych materiáloch v automobilovom priemysle 2015, Hotel Bonbón - Bratislava, Slovenská republika, 13.04.-16.04.2015, (Ivan Chodák, 02/ 3229 4340, upolchiv@savba.sk)
2. EUPOC 2015 Conducting polymeric materials /EUPOC 2015 Vodivé polymérne materiály, Palazzo Feltrinelli Lake Garda, Gargnano, Taliansko, 24.05.-28.05.2015, (Mária Omastová, 02/ 3229 4312, upolmaom@savba.sk)

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

Tabuľka 4a Programové a organizačné výbory medzinárodných konferencií

Typ výboru	Programový	Organizačný	Programový i organizačný
Počet členstiev	9	6	7

## **4.2. Členstvo a funkcie v medzinárodných orgánoch**

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

doc. Ing. Dušan Berek, DrSc.

Medzinárodný vedecký výbor Sympózií o separačných vedách (funkcia: tajomník)  
 Central European Group of Separation Sciences (funkcia: člen Riadiaceho výboru)  
 Trvalý vedecký výbor konferencie „Polychar“ (sídlo Denton, TX, USA) (funkcia: člen trvalého vedeckého výboru konferencií)

Mgr. Peter Kasák, PhD.

Bioadhesive Research Group a COST TD0906 (funkcia: člen)

Mgr. Juraj Kronek, PhD.

Spoločné poľsko-slovenské laboratórium SYNADPOL (funkcia: koordinátor)

Ing. Igor Lacík, DrSc.

Associate Member IUPAC (funkcia: člen)  
Bioencapsulation research Group (funkcia: člen)  
European Association for the Studies of Diabetes (funkcia: člen)  
IUPAC Subcommittee Modeling of Polymerization Kinetics and Processes (funkcia: člen)

Mgr. Jaroslav Mosnáček, PhD.

Americká chemická spoločnosť (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)

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

Tabuľka 4b Experti hodnotiaci medzinárodné projekty

Meno pracovníka	Typ programu/projektu/výzvy	Počet hodnotených projektov
Bleha Tomáš	člen hodnotiaceho panelu REA EC Brussels pri posudzovaní projektov MSC	7
Danko Martin	National Science Center (Narodowe Centrum Nauki – NCN), Poľsko	2
Chodák Ivan	National Research Foundation of South Africa	1
Kroneková Zuzana	National Science Centre (Narodowe Centrum Nauki – NCN), Poľsko	1
Mosnáček Jaroslav	National Science Centre (Narodowe Centrum Nauki – NCN), Poľsko	2
Omastová Mária	Slovinská výskumná agentúra – 2 kolo	6

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

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

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

**5. Vedná politika**

Účast' ústavu na rozvoji vednej politiky sa realizovala a realizuje cez člena SKVH Ing. Igora Lacíka, DrSc. a zastúpením pracovníkov ústavu v Sneme SAV, v Rade riaditeľov II. Oddelenia vied a ďalších komisiách SAV a mimo SAV, ako aj v komisiách grantovej agentúry VEGA.

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

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

- 1) **Názov univerzity/vysokej školy a fakulty:** Prírodovedecká fakulta UK  
**Druh spolupráce (spoločné pracovisko alebo iné):** Chemický ústav-neformálna spolupráca, spoločné výsledky a publikácie  
**Začiatok spolupráce:** 2010  
**Zameranie:** spektrálna charakterizácia organických molekúl v roztokoch a polymérových maticiach pre aplikácie vo fotonike a senzorike  
**Zhodnotenie:** Spolupráca v roku 2014 vyústila do komplexnej fotofyzikálnej charakterizácie derivátov kumarínov s fenylsemikarbazidovým mostíkom. V časopise v Spectrochimica Acta, A bola publikovaná spoločná práca.
- 2) **Názov univerzity/vysokej školy a fakulty:** Fakulta chemickej a potravinárskej technológie STU  
**Druh spolupráce (spoločné pracovisko alebo iné):** spoločné pracovisko  
**Začiatok spolupráce:** 2008  
**Zameranie:** výskum biodegradovateľných plastov  
**Zhodnotenie:** V rámci Spoločného pracoviska, ktoré pracuje od roku 2008, sa v roku 2014 hlavná činnosť zamerala na aplikáciu výsledku chráneného patentovou prihláškou PP 26-2011 „Biologicky degradovateľná polymérna kompozícia so zlepšenými vlastnosťami“. Na základe úspešného vyhodnotenia v rámci podania PCT prihlášky v roku 2012 sa v r. 2014 podala prihláška Európskeho patentu a prihlášky patentu v USA, Kanade, Singapúre, Indii, Japonsku a Číne. Pomerne zdĺhavé boli rokovania na rozličných úrovniach jednak so spoluautormi FCHPT STU, predpokladaným výrobcom granulátu slovenskou firmou Panara, poskytovateľom finančného krytia patentov CVTI a ďalšími subjektami. Ďalším okruhom činnosti boli rokovania s patentovými úradmi, kde bolo potrebné vysvetliť námietky voči niektorým častiam patentu. Rokovania s väčšinou subjektov stále prebiehajú a nie sú zďaleka uzavreté. Intenzívna činnosť umožňuje predpokladať, že v priebehu roka 2015 by sa mohla začať výroba granulátu na komerčnej úrovni. Pokračoval výskum v predmetnej oblasti.
- 3) **Názov univerzity/vysokej školy a fakulty:** Fakulta chemickej a potravinárskej technológie STU  
**Druh spolupráce (spoločné pracovisko alebo iné):** Ústav organickej chémie -neformálna spolupráca, spoločné výsledky a publikácie  
**Začiatok spolupráce:** 2010  
**Zameranie:** spektrálna charakterizácia organických molekúl pre aplikácie vo fotonike  
**Zhodnotenie:** Spolupráca v roku 2013 vyústila do komplexnej fotofyzikálnej charakterizácie derivátov bitiofénov substituovaných s rôznymi karbonylmi. Boli publikované 2 práce v SCI časopisoch.
- 4) **Názov univerzity/vysokej školy a fakulty:** Materiálovotechnologická fakulta STU v Trnave  
**Druh spolupráce (spoločné pracovisko alebo iné):** Ústav výrobných technológií -bilaterálny projekt s názvom „Výskum vlastností vybraných typov adhézných spojov“  
**Začiatok spolupráce:** 2012  
**Zameranie:** Skúmanie prípravy a vlastností hybridných spojov kovových substrátov  
**Zhodnotenie:** v roku 2014 boli študované povrchové vlastnosti vybraných typov adhezív a kovových materiálov na báze ocele. Preskúmali sa vlastnosti hybridných spojov kovov pripravených kombináciou ich lepenia a zvarovania vzhľadom na celkovú pevnosť spojov.

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

### 1) Zadávateľ, odberateľ, zmluvný partner: VÚTCH-Chemitex s.r.o. Žilina

**Názov aplikácie/objekt výskumu:** Hodnotenie parametrov elektrovodivých nanosólov

**Začiatok spolupráce:** 2012

**Stručný opis aplikácie/výsledku:** Predmetom výskumu bolo laboratórne overenie vlastností a parametrov elektrovodivého nanosólu a laboratórne overenie vlastností modifikovaných vybraných textilných materiálov upravených elektrovodivým nanosólom.

**Zhodnotenie (uviesť i finančný efekt z aplikácie v € pre organizáciu SAV):** Projekt bol zo strany zadávateľa vyhodnotený ako úspešný a viedol k podaniu spoločného APVV projektu rámci výzvy v roku 2014. Objem získaných prostriedkov v tomto roku bol 5 450 €

## 6.3. Iná činnosť využiteľná pre potreby spoločenskej praxe

- 1) Výroba a predaj elektricky vodivých adhezív Gravipol Electro (dodané firme Optaglio, Rěž, ČR, SOS Electronic, Košice) a lepenie UZ meničov pre firmu Ecoson, spol. S r.o., Nové Mesto n. Váhom (Novák Igor a kol.). Prínos pre Úpo v roku 2014: 7 560.00 €
- 2) Odborné konzultácie a merania povrchových a adhézných vlastností kovového substrátu/occele s polymérnym nánosom pre firmu MMT, spol. s r.o., Martin.

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

### 7.1. Spoločné pracoviská s aplikačnou sférou

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

1) **Názov kontraktu:** Určenie rýchlostných konštánt radikálovej polymerizácie vodorozpustných monomérov so špeciálnym dôrazom na nabité a ionizovateľné monomer. (Determination of rate coefficients of water-soluble monomers with special emphasis on charged/ionizable monomers).

**Partner(i):** BASF SE Ludwigshafen (Nemecko), Institute of Physical Chemistry, Göttingen (Nemecko), Queen's University, Kingston (Kanada), ETH Zürich (Švajčiarsko)

**Začiatok spolupráce** (v súlade s podpísaným kontraktom): 2004

**Ukončenie spolupráce** (ak ide o spoluprácu v krátkom období): 2015

**Objem získaných prostriedkov v bežnom roku (€):** 30000

**Stručný opis výstupu/výsledku:** Boli určené rýchlostné konštanty radikálovej polymerizácie a mechanizmus polymerizácie vo vodnej fáze.

**Zhodnotenie:** Dlhotrvajúca spolupráca s firmou BASF SE v Nemecku je prejavom potreby získať nové poznatky ohľadne polymerizácie vodorozpustných monomérov, pričom získané poznatky sú dôležité pre túto oblasť z pohľadu základného výskumu (práca je v oblasti, ktorá doteraz nie je preskúmaná, pretože je založená na doteraz nepublikovaných individuálnych rýchlostných konštantách radikálovej polymerizácie pre jednotlivé monoméry) ako aj z pohľadu prepojenia s aplikáciami pri modelovaní procesov a produktov v polymérnom reakčnom inžinierstve

2) **Názov kontraktu:** New materials for adhesive polymers in dental composites

**Partner(i):** IVOCLAR VIVADENT, AG. Schaan, Liechtenstein.

**Začiatok spolupráce** (v súlade s podpísaným kontraktom): 2013

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

**Objem získaných prostriedkov v bežnom roku (€):** 24367

**Stručný opis výstupu/výsledku:** Štúdium kinetiky polymerizácie a kopolymerizácie s metylmetakrylátom nových monomérov určených pre adhezíva aplikované do “self-etching” dentálnych výplňových kompozitov. Vypracovanie výskumnej správy.

**Zhodnotenie:** Zachovanie kontinuity spolupráce s Ivoclar Vivadent bolo vedeckým ako aj finančným prínosom pre ÚPo.

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

1) Spolupráca s firmou MMT, spol. s r.o., Martin sa týkala zvýšenia adhézie náteru (primeru) na báze akrylátov ku kovovému substrátu. Na základe výsledkov skúmania uvedenej problematiky bola vypracovaná výskumná správa: NOVÁK, Igor – CHODÁK, Ivan: Skúmanie povrchových a adhézných vlastností substrátov v adhéznom spoji kov (železo) – základná a vrchná farba, výskumná správa, 18.11.2014. (Novák Igor, Chodák Ivan)

## 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
prof. Ing. Ivan Chodák, DrSc.	Ministerstvo školstva SR	člen štátnej skúšobnej komisie pre študijný odbor Polymérne materiály, 0120 Plasty a kaučuk (FCHPT STU)
Ing. Igor Lacík, DrSc.	Ministerstvo školstva SR	člen Slovenskej komisie pre vedecké hodnosti SKVH

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

**Názov expertízy:** člen technickej komisie 39 PLASTY

**Adresát expertízy:** Slovenský ústav technickej normalizácie

**Spracoval:** Ing. Igor Novák, PhD.

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

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

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



## 9. Vedecko-organizačné a popularizačné aktivity

### 9.1. Vedecko-popularizačná činnosť

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

Tabuľka 9a Vedecko-popularizačná činnosť pracovníkov organizácie SAV

Meno	Spoluautori	Typ <sup>1</sup>	Názov	Miesto zverejnenia	Dátum alebo počet za rok
Mgr. Zuzana Benková, PhD.		PB	Zasimulujme si	Deň otvorených dverí, ÚPo SAV	14.11.2014
Mgr. Martin Danko, PhD.		PB	Polymérna kaviareň	Deň otvorených dverí, ÚPo SAV	14.11.2014
prof. Ing. Ivan Chodák, DrSc.		PB	Bio/eko/plasty – exit z doby plastovej...?	CVTI Bratislava	21.5.2014
Mgr. Jozef Kollár, PhD.		PB	Polymérne farbičky	Deň otvorených dverí, ÚPo SAV	14.11.2014
Mgr. Jozef Kollár, PhD.		EX	Polymérne farbičky	Deň otvorených dverí, ÚPo SAV	14.11.2014
Mgr. Juraj Kronek, PhD.		iné	Farebné do modra	Galéria ÚLUV	25.9.2014
Mgr. Juraj Kronek, PhD.		PB	Polymérna kaviareň	Deň otvorených dverí, ÚPo SAV	14.11.2014
Mgr. Juraj Kronek, PhD.	Kroneková Zuzana, Šrámková Petra	PB	Polyméry pre zdravie	Deň otvorených dverí, ÚPo SAV	14.11.2014
Mgr. Juraj Kronek, PhD.	Kroneková Zuzana, Šrámková Petra	EX	Polyméry pre zdravie	Deň otvorených dverí, ÚPo SAV	14.11.2014
Ing. Igor Lacík, DrSc.		PB	Ako môže Ústav polymérov zjednodušiť život cukrovkárom?	Vedecká kaviareň SAVinci, Bratislava	4.03.2014
Ing. Igor Lacík, DrSc.		TL	Liečba cukrovky na dosah?	Quark, str. 8-9	2014
Ing. Igor Lacík, DrSc.		PB	Možný spôsob liečby diabetu: enkapsulované ostrovčeky (alebo čo máme nové po 2 rokoch)	pre DIAZIL združenie diabetikov Žiliny	25.11.2014
Ing. Igor Lacík, DrSc.		PB	Nové spôsoby liečenia diabetu: enkapsulované ostrovčeky.	Bratislavský deň diabetikov, KD Ružinov	18.10.2014
Ing. Igor Lacík, DrSc.	Rázga Filip, Uhelská Lucia	TV	Prelomová liečba cukrovky	<a href="http://www.rtvs.sk/televizia/program/detail/4173/spravy-rtvs/archiv?date30.10.2014">http://www.rtvs.sk/televizia/program/detail/4173/spravy-rtvs/archiv?date30.10.2014</a>	30.10.2014
Ing. Igor Lacík, DrSc.	Uhelská Lucia, Treľová Dušana	IN	Liečba cukrovky enkapsulovanými ostrovčkami.	SITA, internetová reportáž teraz.sk, <a href="http://www.teraz.sk/teraz-tv/veda-tu-a-teraz-cukrovka-lacik/102377-clanok.html">http://www.teraz.sk/teraz-tv/veda-tu-a-teraz-cukrovka-lacik/102377-clanok.html</a>	19.10.2014

Mgr. Pavol Námer		PB	Zasimulujme si	Noc výskumníka, stánok ÚPo SAV pre verejnosť, Stará Trznica Bratislava	26.9.2014
Ing. Igor Novák, PhD.	Valentín Marian, Prachar Jozef	EX	Prezentácia nízkoteplotnej plazmy a elektrovodivého adhezíva Gravipol Electro	Deň otvorených dverí, ÚPo SAV	14.11.2014
Ing. Igor Novák, PhD.	Valentín Marian, Prachar Jozef	PB	Prezentácia nízkoteplotnej plazmy a elektrovodivého adhezíva Gravipol Electro	Deň otvorených dverí, ÚPo SAV	14.11.2014
Ing. Filip Rázga, PhD.	Lacík Igor	TL	Nádej na liečbu cukrovky typu I	Zem a vek, str. 85	2014
Ing. Filip Rázga, PhD.	Uhelská Lucia	TV	Objevili lék na cukrovku?	<a href="http://www.barrandov.tv/video/25849-nase-zpravy-25-10-2014">http://www.barrandov.tv/video/25849-nase-zpravy-25-10-2014</a>	3.11.2014
Ing. Filip Rázga, PhD.	Uhelská Lucia	TV	Vedia ako vyliečiť cukrovku	<a href="http://velkenoviny.joj.sk/noviny-archiv/2014-10-24-velke-noviny-tv-joj.html">http://velkenoviny.joj.sk/noviny-archiv/2014-10-24-velke-noviny-tv-joj.html</a>	24.10.2014
Ing. Filip Rázga, PhD.	Vnuková Dominika, Némethová Veronika	PB	Polyméry pre protinádorovú terapiu a liečbu cukrovky	Noc výskumníka, stánok ÚPo SAV pre verejnosť, Stará trznica	26.9.2014
Ing. Filip Rázga, PhD.	Vnuková Dominika, Némethová Veronika	EX	Polyméry pre protinádorovú terapiu a liečbu cukrovky	Noc výskumníka, stánok ÚPo SAV pre verejnosť, Stará trznica	26.9.2014
Ing. Alena Šišková, PhD.		PB	Polymérna kaviareň	Deň otvorených dverí, ÚPo SAV	14.11.2014
Ing. Igor Novák, PhD.	Žigo Ondrej, Valentín Marian	TL	Využitie plastov v automobilovej výrobe	Chemagazín, roč. 24, č. 6, 2014, s. 12-13	1
Ing. Igor Novák, PhD.	Žigo Ondrej, Valentín Marian, Prachar Jozef	TL	Polyméry pri výrobe automobilov.	Strojárstvo Strojírenství roč. 18 (11), (2014), s. 6-7.	1

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

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

Tabuľka 9b Súhrnné počty vedecko-popularizačných činností organizácie SAV

Typ	Počet	Typ	Počet	Typ	Počet
prednášky/besedy	13	tlač	4	TV	3
rozhlas	0	internet	1	exkurzie	4
publikácie	0	multimediálne nosiče	0	dokumentárne filmy	0
iné	1				

## 9.2. Vedecko-organizačná činnosť

Tabuľka 9c Vedecko-organizačná činnosť

Názov podujatia	Domáca/ medzinárodná	Miesto	Dátum konania	Počet účastníkov
BYPoS 2014- 5th Bratislava Young Polymer Scientists workshop	medzinárodná	Hotel Havrania, Zázrivá, Slovenská republika	16.06.-20.06.2014	40
International Seminar on Elastomers	medzinárodná	Hotel Park Inn, Bratislava, Slovenská republika	24.08.-28.08.2014	100
XXII. medzinárodná konferencia o bioenkapsulácii	medzinárodná	Hotel Park Inn, Bratislava, Slovenská republika	17.09.-19.09.2014	120

## 9.3. Účasť na výstavách

Názov výstavy: 41. medzinárodná poľnohospodárska a potravinárska výstava Agrokomplex 2014

Miesto konania: stánok SAV, výstavisko Agrokomplex, Nitra

Dátum: 8.2014

Zhodnotenie účasti:

Názov výstavy: 16. medzinárodná zdravotnícka výstava Slovmedica 2014

Miesto konania: stánok SAV, výstavisko Incheba Expo, Bratislava

Dátum: 8.2014

Zhodnotenie účasti:

Názov výstavy: 35. medzinárodný veľtrh Coneco Racioenergia 2014

Miesto konania: stánok SAV, výstavisko Incheba Expo, Bratislava

Dátum: 3.2014

Zhodnotenie účasti:

Názov výstavy: 21. medzinárodný veľtrh strojov, nástrojov, zariadení a technológií

Miesto konania: stánok Slovenskej zväračskej spoločnosti, výstavisko Agrokomplex, Nitra

Dátum: 5.2014

Zhodnotenie účasti:

Názov výstavy: 12. medzinárodná výstava kameňopriemyslu a geológie Kamenár 2014

Miesto konania: výstavisko Expo Center, a.s., stánok SAV, Trenčín

Dátum: 6.3.2014

Zhodnotenie účasti:

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

Tabuľka 9d Programové a organizačné výbory národných konferencií

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

## 9.5. Členstvo v redakčných radách časopisov

doc. Ing. Dušan Berek, DrSc.

Current Analytical Chemistry (Pakistan) (funkcia: člen edičnej rady)  
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. Zuzana Hloušková

ChemZi (funkcia: člen redakčnej rady)

prof. Ing. Ivan Chodák, DrSc.

Open Macromolecules Journal, Bentham (funkcia: člen redakčnej rady)  
Plasty a kaučuk (ČR) (funkcia: člen edičnej rady)

Ing. Igor Lacík, DrSc.

Frontiers in Biomaterials (funkcia: review editor )  
Chemical Industry and Chemical Engineering Quarterly (Srbsko a Čierna Hora) (funkcia: člen international advisory board)

Mgr. Jaroslav Mosnáček, PhD.

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)

## 9.6. Činnosť v domácich vedeckých spoločnostiach

doc. Ing. Dušan Berek, DrSc.

Slovenkej chemickej spoločnosti (funkcia: čestný člen)  
Slovenský národný komitét chémie pre IUPAC (funkcia: podpredseda)  
výbor odborných skupín Polyméry a Chromatografia SCHS (funkcia: člen)

Mgr. Martin Danko, PhD.

SCHS (funkcia: člen 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. Mária Omastová, DrSc.

SCHS (funkcia: predsedníčka)

SCHS (funkcia: podpredsedníčka výboru odbornej skupiny Polyméry)

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

V r. 2014 Ústav polymérov SAV organizoval a spoluorganizoval 4 medzinárodné vedecké podujatia:

- 5<sup>th</sup> Bratislava Young Polymer Scientists Workshop BYPoS (5. Bratislavský workshop mladých vedcov so zameraním na celú oblasť polymérnej chémie), 16.-20. jún 2014; Hotel Havrania – Zázrivá (zodpovedný pracovník: Podhradská Silvia)
- International Seminar on Elastomers ISE 2014, 24.-28. august, 2014, Hotel Park Inn Bratislava (zodpovedný pracovník: Chodák Ivan)
- 22<sup>nd</sup> International Conference on Bioencapsulation & 21<sup>th</sup> Bratislava International Conference on Macromolecules, 17.-19. september 2014, Hotel Holiday Inn Bratislava (zodpovedný pracovník: Lacík Igor)
- International Conference on Bio-Friendly Polymers and Polymer Additives: From Scientific Aspects to Processing and Applications BPPA14, 19.-21. máj 2014, Research Centre for Natural Sciences of the Hungarian Academy of Sciences in Budapest (zodpovedný pracovník: Mosnáček Jaroslav)

Ústav polymérov SAV pokladá za významné vedecko-popularizačné aktivity v rôznych médiách v zmysle súčasných trendov SAV. Propagácia sa v roku 2014 týkala mnohých vystúpení formou tlače, rozhlasu, televízie, internetu, osobných stretnutí a pod. Projekty a celková činnosť ústavu boli opäť úspešne prezentované na Noci výskumníka v Starej tržnici, v rámci Týždňa vedy a techniky a tiež v rôznych diskusných stretnutiach s odbornou a laickou verejnosťou. Ústav polymérov SAV bol zviditeľnený i vďaka oceneniu Mgr. Zdenka Špitalského, PhD. z Literárneho fondu za II. miesto Prémie za výnimočný vedecký ohlas na jedno dielo 2014 v kategórii prírodné a lekárske vedy. V spolupráci s chemickou firmou BASF Slovensko je ústav spolupropagátorom akcie Future city (<http://chemgeneration.com/sk/futurecity.html>), ktorej cieľom je stimulovať mladú generáciu k štúdiu chémie. Práca na téme liečby cukrovky je propagovaná cez neinvestičný fond Cukrovka n.f. ([www.cukrovkanf.sk](http://www.cukrovkanf.sk)). Zameranie a výsledky riešenia projektu POLYFRIEND, financovaného z RDRF sú propagované cez webstránku ([www.polymer.sav.sk/polyfriend](http://www.polymer.sav.sk/polyfriend)).

## 10. Činnosť knižnično-informačného pracoviska

### 10.1. Knižničný fond

Tabuľka 10a Knižničný fond

<b>Knižničné jednotky spolu</b>		<b>10 962</b>
z toho	knihy a zviazané periodiká	<b>10 811</b>
	audiovizuálne dokumenty	<b>0</b>
	elektronické dokumenty (vrátane digitálnych)	<b>0</b>
	mikroformy	<b>0</b>
	iné špeciálne dokumenty - dizertácie, výskumné správy	<b>146</b>
Počet titulov dochádzajúcich periodík		<b>3</b>
z toho zahraničné periodiká		<b>1</b>
Ročný prírastok knižničných jednotiek		<b>12</b>
v tom	kúpou	<b>5</b>
	darom	<b>7</b>
	výmenou	<b>0</b>
	bezodplatným prevodom	<b>0</b>
Úbytky knižničných jednotiek		<b>0</b>
Knižničné jednotky spracované automatizovane		<b>0</b>

### 10.2. Výpožičky a služby

Tabuľka 10b Výpožičky a služby

<b>Výpožičky spolu</b>		<b>874</b>
z toho	odborná literatúra pre dospelých	<b>874</b>
	výpožičky periodík	<b>22</b>
	prezenčné výpožičky	<b>0</b>
MVS iným knižniciam		<b>4</b>
MVS z iných knižníc		<b>1</b>
MMVS iným knižniciam		<b>0</b>
MMVS z iných knižníc		<b>0</b>
Počet vypracovaných bibliografií		<b>0</b>
Počet vypracovaných rešerší		<b>188</b>

### 10.3. Používatelia

Tabuľka 10c Užívatelia

Registrovaní používatelia	<b>56</b>
Návštevníci knižnice spolu (bez návštevníkov podujatí)	<b>70</b>

### 10.4. Iné údaje

Tabuľka 10d Iné údaje

On-line katalóg knižnice na internete ( 1=áno, 0=nie)	<b>0</b>
Náklady na nákup knižničného fondu v €	<b>1312,99</b>

### 10.5. Iné informácie o knižničnej činnosti

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## **11. Aktivity v orgánoch SAV**

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

### **11.2. Členstvo v Predsedníctve SAV a vo Vedeckej rade 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. Igor Lacík, DrSc.

- Komisia SAV pre ekonomické otázky (člen)

- Komisia SAV pre medzinárodnú vedecko-technickú spoluprácu (člen)

Mgr. Jaroslav Mosnáček, PhD.

- Komisia SAV pre infraštruktúru a štrukturálne fondy (člen)

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

Ing. Mária Omastová, DrSc.

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



## 12. Hospodárenie organizácie

### 12.1. Výdavky PO SAV

Tabuľka 12a Výdavky PO SAV (v €)

V ý d a v k y	Skutočnosť k 31.12.2014 spolu	v tom:			
		zo ŠR od zriad'ovateľ a	z vlastných zdrojov	z iných zdrojov	z toho: ŠF EÚ
<b>Výdavky spolu</b>	2 019 862,24	1 176 187,00	0,00	0,00	0,00
<b>Bežné výdavky</b>	1 989 437,55	1 169 267,00	0,00	0,00	0,00
<b>v tom:</b>					
mzdy (610)	887 013,13	630 956,00	182 790,13	73 267,00	0,00
poistné a príspevok do poisťovni (620)	307 441,55	207 945,00	73 687,37	25 809,18	0,00
tovary a služby (630)	614 246,71	231 513,00	113 209,00	0,00	0,00
z toho: časopisy	0,00	0,00	0,00	0,00	0,00
VEGA projekty	116 354,00	116 354,00	0,00	0,00	0,00
MVTS projekty	80 150,00	80 150,00	0,00	0,00	0,00
CE	3 295,00	3 295,00	0,00	0,00	0,00
vedecká výchova	6 080,00	6 080,00	0,00	0,00	0,00
bežné transfery (640)	98 853,00	98 853,00	0,00	0,00	0,00
z toho: štipendiá	98 853,00	98 853,00	0,00	0,00	0,00
transfery partnerom projektov	0,00	0,00	0,00	0,00	0,00
<b>Kapitálové výdavky</b>	30 424,69	6 920,00	14 057,27	9 447,42	9 447,42
<b>v tom:</b>					
obstarávanie kapitálových aktív	30 424,69	6 920,00	14 057,27	9 447,42	9 447,42
kapitálové transfery	0,00	0,00	0,00	0,00	0,00
z toho: transfery partnerom projektov	0,00	0,00	0,00	0,00	0,00

## 12.2. Príjmy PO SAV

Tabuľka 12b Príjmy PO SAV (v €)

P r í j m y	Skutočnosť k 31.12.2014 spolu	v tom:	
		rozpočtové	z mimorozp. zdrojov
<b>Príjmy spolu</b>	1 883 917,00	1 176 187,00	707 730,06
<b>Nedaňové príjmy</b>	1 883 917,00	1 176 187,00	707 730,06
<b>v tom:</b>			
príjmy z prenájmu	27 819,54	0,00	27 819,54
príjmy z predaja výrobkov a služieb	206 432,63	0,00	206 432,63
iné	0,00	0,00	0,00
<b>Granty a transfery (mimo zdroja 111)</b>	473 477,89	0,00	473 477,89
<b>v tom:</b>			
<b>tuzemské</b>	365 092,28	0,00	365 092,28
<b>z toho: APVV</b>	296 216,04	0,00	296 216,04
<b>iné</b>	68 876,84	0,00	68 876,84
zahraniczne	108 385,01	0,00	108 385,01
z toho: projekty rámcového programu EÚ	0,00	0,00	0,00
iné	0,00	0,00	0,00

## 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 ostrovčekov

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

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

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

### 15.1. Domáce ocenenia

#### 15.1.1. Ocenenia SAV

##### **Bleha Tomáš**

Zlatá medaila SAV

Oceňovateľ: Predsedníctvo SAV

Opis: ocenenie, ktoré menovanému dňa 14.01.2014 udelilo P SAV za celoživotné vedecké dielo v oblasti vedy o polyméroch, špeciálne fyzikálnej chémie makromolekúl

##### **Chodák Ivan**

Zlatá medaila SAV

Oceňovateľ: Predsedníctvo SAV

Opis: ocenenie, ktoré menovanému dňa 14.01.2014 udelilo P SAV za jeho prínos v oblasti výskumu plastov, predovšetkým polymérnych zmesí a kompozitov, k rozvoju poznania v oblasti modifikácie polymérnych materiálov, so snahou aplikovať získané poznatky v praxi a využiť ich aj pri vysokoškolskej výuke

##### **Rychlý Jozef**

Významná osobnosť SAV 2014

Oceňovateľ: Predsedníctvo SAV

Opis: ocenenie Významná osobnosť SAV 2014 pri príležitosti životného jubilea 28.05.2014

#### 15.1.2. Iné domáce ocenenia

##### **Berek Dušan**

Päť slovenských prihlášok patentov z r.2014 s najvyšším komerčným potenciálom

Oceňovateľ: Konferencia NITT SK 2014

Opis: Patentová prihláška PP 50017-2014:Spôsob prípravy kompozitného sorbenta na odstraňovanie kontaminantov z vôd autorov NOVÁK, Ivan - BEREK, Dušan - MUNKA, K. – KARÁCSONYOVÁ, M. bola zaradená medzi päť slovenských prihlášok patentov z r. 2014 s najvyšším komerčným potenciálom na Na Konferencii NITT SK 2014 „Transfer technológií na Slovensku a v zahraničí“, ktorá sa konala v Centre vedecko-technických informácií SR dňa 8.10.2014

##### **Berek Dušan**

tretie miesto v kategórii Technológia za riešenie Spôsobu prípravy kompozitného sorbenta na odstraňovanie kontaminantov z vôd

Oceňovateľ: na 20. Medzinárodnej výstave vodného hospodárstva AQUA 2014

Opis: tretie miesto v kategórii Technológia za riešenie Spôsobu prípravy kompozitného sorbenta na odstraňovanie kontaminantov z vôd na 20. Medzinárodnej výstave vodného hospodárstva AQUA 2014, Trenčín, 10.-12.06.2014

##### **Hloušková Zuzana**

čestný člen Slovenskej chemickej spoločnosti

Oceňovateľ: SCHS

Opis: výročné zasadanie SCHS, december 2014

## **Špitálsky Zdenko**

prémia Literárneho fondu

Oceňovateľ: Literárny fond

Opis: za výnimočný vedecký ohlas na jedno dielo v kategórii prírodné a lekárske vedy za rok 2014 - II. miesto za dielo: ŠPITALSKÝ, Zdenko - TESIS, D. - PAPAGELIS, K. - GALIOTIS, C. Carbon nanotube-polymer composites: Chemistry, processing, mechanical and electrical properties. In Progress in Polymer Science : an International Review Journal, 2010, vol. 35, p. 357 - 401. (23.753 - IF2009)

## **15.2. Medzinárodné ocenenia**

### **Novák Igor**

- 2nd prize Molecules Best Paper Award

Oceňovateľ: ocenenie prestížneho open-access časopisu Molecules

Opis: Novák Igor, Popelka Anton - spoluautori publikácie „Polysaccharides coatings on medical-grade PVC: A probe into surface characteristics and the extent of bacterial adhesion.“ In Molecules, 2010, vol. 15, p. 1007 – 102 - 2nd prize Molecules Best Paper Award ocenenie prestížneho open-access časopisu Molecules, 2014

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

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

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

V r. 2014 pretrvávali nejasnosti ohľadne postupu transformácie SAV spojené aj s reštrukturalizáciou. Táto situácia bola zhoršená i avizovaným likvidačným krátením rozpočtu SAV a čiastočne s tým spojené i nezhody vo vedení SAV. Celé to vyústilo do odvolania predsedu SAV v decembri 2014. Medzi hlavnými argumentmi odvolania bol spôsob rokovania predsedu SAV s predstaviteľmi štátu o rozpočte a nedostatočná komunikáciu vo vnútri akadémie. Veľmi ťažko sa v danej situácii orientuje a plánuje dlhodobá vízia ústavov. Treba dúfať, že pod novým vedením sa v roku 2015 situácia zmení, transformácia naberie konkrétnejšie kontúry a postupne sa v budúcich rokoch dosiahne i uspokojivý konsenzus vo financovaní SAV. Veríme, že sa proces transformácie zvládne prehľadne a v dostatočnom predstihu a tiež s dostatočne definovaným prechodným obdobím, aby sa ústavy mali čas na nové podmienky pripraviť.

Za posledné roky sa nám podarilo vytvoriť pomerne kvalitné podmienky z pohľadu infraštruktúry, avšak rozvoj ústavu (a SAV), ďalšie financovanie, kvalita projektov a kvalita výstupov je kriticky podmienená kvalitou ľudských zdrojov. Veríme, že jednou zo základných naplnených priorít bude vytvorenie podmienok pre podporu a udržanie mladej generácie kvalitných vedeckých pracovníkov pre budúcnosť SAV.

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

Ing. Katarína Csomorová, 02/ 3229 4307  
Ing. Zuzana Hloušková, 02/ 3229 4328  
Ing. Angela Kleinová, 02/ 3229 4368  
Mgr. Monika Majerčíková, 02/ 3229 4319  
Ing. Mária Omastová, DrSc., 02/ 3229 4312  
Ing. Nadežda Petrenčíková, 02/ 3229 4371  
Mgr. Zdenko Špitálsky, PhD., 02/ 3229 4325

**Riaditeľ organizácie SAV:**

.....  
Ing. Igor Lacík, DrSc.

**Prílohy**  
**Príloha A**

**Zoznam zamestnancov a doktorandov organizácie k 31.12.2014**

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

	<b>Meno s titulmi</b>	<b>Úväzok (v %)</b>	<b>Ročný prepočítaný úväzok</b>
<b>Vedúci vedeckí pracovníci DrSc.</b>			
1.	Ing. Josef Bartoš, DrSc.	100	1.00
2.	Doc. Ing. Dušan Berek, DrSc.	20	0.28
3.	Prof. Ing. Tomáš Bleha, DrSc.	40	0.40
4.	Prof., RNDr. Ignác Capek, DrSc.	100	1.00
5.	RNDr. Peter Cifra, DrSc.	100	1.00
6.	Štefan Chmela, DrSc.	100	1.00
7.	Prof. Ing. Ivan Chodák, DrSc.	100	1.00
8.	Ing. Igor Lacík, DrSc.	100	1.00
9.	Ing. Mária Omastová, DrSc.	100	1.00
10.	Ing. Lýdia Rychlá, DrSc.	60	0.70
11.	Ing. Jozef Rychlý, DrSc.	60	0.70
<b>Samostatní vedeckí pracovníci</b>			
1.	Mgr. Zuzana Benková, PhD.	100	1.00
2.	Mgr. Martin Danko, PhD.	100	1.00
3.	Ing. Ivica Janigová, PhD.	100	1.00
4.	Mgr. Peter Kasák, PhD.	100	0.00
5.	Mgr. Jozef Kollár, PhD.	100	1.00
6.	Ing. Csaba Kósa, PhD.	100	1.00
7.	Mgr. Juraj Kronek, PhD.	100	1.00
8.	Ing. Igor Krupa, PhD.	100	0.00
9.	Ing. Matej Mičušík, PhD.	100	1.00
10.	Mgr. Jaroslav Mosnáček, PhD.	100	1.00
11.	Ing. Igor Novák, PhD.	100	1.00
12.	Ing. Dušan Račko, PhD.	100	0.58
13.	Ing. Filip Rázga, PhD.	100	1.00
14.	Mgr. Zdenko Špitálsky, PhD.	100	1.00
<b>Vedeckí pracovníci</b>			
1.	Ing. Katarína Borská, PhD.	100	1.00
2.	Ing. Klaudia Czaniková, PhD.	100	0.50
3.	Ing. Anita Eckstein, PhD.	100	0.48
4.	Ing. Gabriela Hloušková, PhD.	100	0.00
5.	Ing. Markéta Ilčíková, PhD.	100	0.23

6.	Ing. Daniela Johec Mošková, PhD.	80	0.93
7.	Mgr. Zuzana Kroneková, PhD.	100	1.00
8.	Ing. Marta Malíková, PhD.	50	0.50
9.	Ing. Andrea Matsuo, PhD.	100	1.00
10.	Ing. Andrea Mihálová, PhD.	60	0.45
11.	Ing. Daniela Moravčíková, PhD.	100	1.00
12.	Mgr. Katarína Mosnáčková, PhD.	100	0.63
13.	Mgr. Peter Palenčár, PhD.	100	0.50
14.	Mgr. Silvia Podhradská, PhD.	100	1.00
15.	Ing. Michaela Sedničková, PhD.	100	0.88
16.	Ing. Alena Šišková, PhD.	100	1.00
17.	Ing. Helena Švajdlenková, PhD.	100	0.75
18.	Ing. Dušana Treľová, PhD.	100	1.00
19.	Ing. Lucia Uhelská, PhD.	100	1.00
20.	Ing. Marian Valentin, PhD.	100	0.40
21.	Ing. Ondrej Žigo, PhD.	100	1.00
<b>Odborní pracovníci s VŠ vzdelaním</b>			
1.	Ing. Katarína Csomorová	100	1.00
2.	Ing. Eliška Číková	10	0.03
3.	Ing. Slávka Ďurkáčová	10	0.03
4.	RNDr. Agnesa Fiedlerová	100	1.00
5.	Ing. Zuzana Hloušková	100	1.00
6.	Ing. Ľudmila Hrčková	100	1.00
7.	Ing. Martina Hudáková	10	0.02
8.	Ing. Anna Chovancová	10	0.18
9.	Ing. Angela Kleinová	100	1.00
10.	Mgr. Igor Koreň	20	0.20
11.	Ing. Jaroslav Kuliček	20	0.10
12.	Ing. Miroslava Lukešová	10	0.10
13.	Ing. Eva Macová	100	1.00
14.	Mgr. Monika Majerčíková	100	1.00
15.	Mgr. Pavol Námer	10	0.10
16.	Mgr. Veronika Némethová	10	0.62
17.	Ing. Zuzana Nógellová	100	1.00
18.	Ing. Nadežda Petrenčíková	100	1.00
19.	Mgr. Jozef Prachár	10	0.10
20.	Ing. Szabolcs Szalai	10	0.03
21.	Ing. Mária Šivová	100	1.00
22.	Mgr. Petra Šrámková	10	0.10
23.	Ing. Jana Tabačiarová	10	0.10

24.	Ing. Dominika Vnuková	10	0.10
25.	Mgr. Anna Zahoranová	10	0.10
<b>Odborní pracovníci ÚSV</b>			
1.	Katarína Cinová	100	1.00
2.	Nadežda Danková	100	1.00
3.	Alena Ďurišová	100	1.00
4.	Eva Hipká	100	1.00
5.	Ivona Hrodeková	100	1.00
6.	Sidónia Kalinová	100	1.00
7.	Jozef Kandráč	80	0.80
8.	Viera Karlíková	100	1.00
9.	Marcela Kimličková	100	1.00
10.	Zuzana Kuželová	100	1.00
11.	Marta Mitošinková	100	1.00
12.	Iveta Nestarcová	100	1.00
<b>Ostatní pracovníci</b>			
1.	Peter Kečkíš	40	0.40
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
<b>Vedúci vedeckí pracovníci DrSc.</b>			
1.	Doc. Ing. Dušan Berek, DrSc.	31.12.2014	-
2.	Prof. Ing. Tomáš Bleha, DrSc.	31.12.2014	-
3.	Ing. Lýdia Rychlá, DrSc.	31.12.2014	-
<b>Samostatní vedeckí pracovníci</b>			
1.	Ing. Csaba Kósa, PhD.	31.12.2014	-
<b>Vedeckí pracovníci</b>			
1.	Maria Lorena Romina Falco, PhD.	30.9.2014	0.75
2.	Ing. Juraj Krajčí, PhD.	28.2.2014	0.17
3.	Ing. Andrea Matsuo, PhD.	31.12.2014	-
4.	Ing. Anton Popelka, PhD.	31.8.2014	0.00
5.	Mgr. Patrik Sobolčiak, PhD.	31.8.2014	0.00
<b>Odborní pracovníci s VŠ vzdelaním</b>			
1.	Ing. Ján Kratochvíla	31.8.2014	0.07
2.	Mgr. Marcel Mikulec	31.8.2014	0.07
3.	Ing. Jana Sasová	31.5.2014	0.04
<b>Odborní pracovníci ÚSV</b>			
1.	Janka Fáryová	31.1.2014	0.08



## Zoznam doktorandov

	Meno s titulmi	Škola/fakulta	Študijný odbor
<b>Interní doktorandi hradení z prostriedkov SAV</b>			
1.	Ing. Eliška Číková	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
2.	Ing. Slávka Ďurkáčová	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
3.	Ing. Anna Chovancová	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
4.	Ing. Ján Kratochvíla	Fakulta chemickej a potravinárskej technológie STU	5.2.21 technológia makromolekulových látok
5.	Ing. Jaroslav Kuliček	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
6.	Ing. Miroslava Lukešová	Fakulta chemickej a potravinárskej technológie STU	4.1.18 fyzikálna chémia
7.	Mgr. Marcel Mikulec	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
8.	Mgr. Pavol Námer	Fakulta chemickej a potravinárskej technológie STU	4.1.18 fyzikálna chémia
9.	Ing. Veronika Némethová	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
10.	Mgr. Jozef Prachár	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
11.	Ing. Szabolcs Szalai	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
12.	Mgr. Petra Šrámková	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
13.	Ing. Jana Tabačiarová	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
14.	Ing. Dominika Vnuková	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
15.	Mgr. Anna Zahoranová	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
<b>Interní doktorandi hradení z iných zdrojov</b>			
<i>organizácia nemá interných doktorandov hradených z iných zdrojov</i>			
<b>Externí doktorandi</b>			
1.	Ing. Martina Hudáková	Fakulta chemickej a potravinárskej technológie STU	4.1.19 makromolekulová chémia
2.	Ing. Michal Lacko	Fakulta chemickej a potravinárskej technológie STU	5.2.21 technológia makromolekulových látok

## Príloha B

### Projekty riešené v organizácii

#### Medzinárodné projekty

#### Programy: Medziakademická dohoda (MAD)

##### 1.) Syntéza, molekulová charakterizácia a čistenie blokových kopolymérov.

*(Synthesis, molecular characterization and purification of block polymers.)*

**Zodpovedný riešiteľ:** Dušan Berek  
**Trvanie projektu:** 1.1.2013 / 31.12.2014  
**Evidenčné číslo projektu:** MAD  
**Organizácia je koordinátorom projektu:** Áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Francúzsko: 1  
**Čerpané financie:** mobilita

##### Dosiahnuté výsledky:

Vykonali sme rad meraní blokových kopolymérov PS-blok-poly(etylén oxid) pomocou našej metódy kvapalinovej chromatografie pri limitných podmienkach desorpcie. Tvorila, spolu s výsledkami získanými v Marseille podklad troch spoločných publikácií (dve z nich sú v tlači).

##### **Výstupy:**

1. ROLLET, M. - PELLETIER, B. - ALTOUNIAN, A. - BEREK, Dušan - MARIA, S. - BEAUDOIN, E. - GIGMES, D. Separation of parent homopolymers from polystyrene-b-poly(ethylene oxide)-b-polystyrene triblock copolymers by means of liquid chromatography. 1. Comparison of different methods. In *Analytical Chemistry*, 2014, vol. 86, p. 2694-2702. (5.825 - IF2013). ISSN 0003-2700.

##### 2.) Štúdium povrchových vlastností vybraných funkcionalizovaných polyolefínov.

*(Study of surface properties of selected functionalized polyolefins.)*

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

##### Dosiahnuté výsledky:

Skúmali sa povrchové vlastnosti izotaktického polypropylénu (iPP) a nízko hustotného polyetylénu (LDPE) očkovaného kyselinou akrylovou a maleínanhydridom. Merali sa povrchové energie uvedených polyolefínov v tavenine pri teplote 200°C v argóne pričom pre kyselinu akrylovú boli pre očkovaný iPP a LDPE zistené vyššie hodnoty povrchovej energie ako pre maleínanhydrid. Hodnoty povrchových energií kopolymérov očkovaných kyselinou akrylovou a maleínanhydridom získané meraním v tavenine boli porovnané s výsledkami meraní týchto parametrov pri laboratórnej teplote určením kontaktných uhlov sady testovacích kvapalín s rozdielnou polaritou. Zistilo sa pritom, že rozdiely v hodnotách povrchových energií oboch kopolymérov boli pre LDPE aj iPP vyššie ako v pri meraní v tavenine.

### 3.) **Príprava a elektrické vlastnosti vodivých polymérnych kompozitov a nanokompozitov.**

*(Preparation and electrical properties of conducting polymer composites and nanocomposites.)*

**Zodpovedný riešiteľ:** Mária Omastová  
**Trvanie projektu:** 1.1.2012 / 31.12.2016  
**Evidenčné číslo projektu:** -  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Česko: 1  
**Čerpané financie:** mobilita

#### **Dosiahnuté výsledky:**

Prípravili sa koloidné disperzie polypyrol-nanočastice striebra jednostupňovou oxidáciou pyrolu s dusičnanom strieborným v roztokoch poly (N-vinylpyrolidónu) alebo poly(vinyl alkoholu), ktoré boli použité ako stabilizátory. Veľkosť častíc sa pohybovala v rozmedzí 300 - 400 nm a nebola závislá od koncentrácie stabilizátora. Častice boli zložené z dvojčastíc polypyrol-striebro. Koloidy boli stabilné po dobu najmenej stoviek dní. Kompozitné polypyrol-strieborné koloidy sa testovali ako vodivé atramenty na Univerzite v Pardubiciach tlačením na PET fólie. Takto pripravené polymérne filmy boli stabilné, ale ich vodivosť bola nízka, rádovo  $10^{-5}$  až  $10^{-4}$  S cm<sup>-1</sup>, a teda príspevok striebra k vodivosti je nepodstatný, pretože jeho obsah je nižší ako perkolačný prah. Avšak kompozitné PPy-strieborné koloidy dosiahli významne lepšie filmotvorné vlastnosti než koloidy bez striebra.

#### **Výstupy:**

1. OMASTOVÁ, Mária - BOBER, P. - MORÁVKOVÁ, Z.- PEŘINKA, N. - KAPLANOVÁ, M. - SYROVÝ, T. - HROMÁDKOVÁ, J. - TRCHOVÁ, M. - STEJSKAL, J. Towards conducting inks: Polypyrrole-silver colloids. In *Electrochimica Acta*, 2014, vol. 122, p. 296-302. (4.086 - IF2013). ISSN 0013-4686

### 4.) **Senzory pre kvapaliny a plyny na báze elektricky vodivých kompozitov polymér/uhlíkové nanotrubičky.**

*(Sensors for liquids and vapours based on electric conductive polymer/carbon nanotubes composites.)*

**Zodpovedný riešiteľ:** Mária Omastová  
**Trvanie projektu:** 1.1.2013 / 31.12.2014  
**Evidenčné číslo projektu:** MAD - bilaterálny  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Nemecko: 1  
**Čerpané financie:** mobilita

#### **Dosiahnuté výsledky:**

Prípravili sa kompozity na báze styrén-butadiénového kaučuku, maleinizovaného styrén-etylén-butylén- styrénu a jeho amfifilnej formy plnené ako uhlíkovými nanotrubičkami, tak sadzami. Sledovanie ich kvapalinových a plynových senzoričných vlastností voči rozpúšťadlám s podobným parametrom rozpustnosti k použitej matici potvrdili vhodnosť použitia materiálov ako senzorov najmä na detekciu prítomnosti toluénu, tetrahydrofuránu, chloroformu a n-hexánu i pri nízkej koncentrácii.

## Výstupy:

1. TABAČIAROVÁ, Jana - MIČUŠÍK, Matej - PIONTECK, J. – KRAJČI, J. - OMASTOVÁ, Mária. Elastomer/carbon nanotubes composites as liquid and gas sensors. In ICSM 2014 : Synthetic Metals Guiding the Future : Turku, Finland, 30 Jun- 5 Jul 2014 : abstracts. - Turku, Finland : University of Turku, 2014, p. 135.
2. TABAČIAROVÁ, Jana - MIČUŠÍK, Matej – KULIČEK, Jaroslav - PIONTECK, J. - OMASTOVÁ, Mária. Elastomer/carbon nanotubes composites for liquid and gas sensing. In ISE '14 : 14th International Seminar on Elastomers : Bratislava, Slovakia, August 24th - 28th, 2014 : book of abstracts. - Bratislava, Slovakia : Polymer Institute of SAS, 2014, p. 169-171. ISBN 978-80-970923-6-8.
3. TABAČIAROVÁ, Jana - MIČUŠÍK, Matej – PIONTECK, J. - OMASTOVÁ, Mária. Elastomer/carbon nanotubes composites as prospective sensing materials. In BYPOS : 5th Bratislava Young Polymer Scientists Workshop : Zázrivá, Slovakia, June 16th - 20th, 2014 : workshop book. - Bratislava : Young Scientists Council of Polymer Institute of the Slovak Academy of Sciences, 2014, p. 37. ISBN 978-80-970923-5-1.

## 5.) Charakterizácia chromatograficky zložitých polymérov pokročilými metódami kvapalinovej chromatografie: MD-SEC a LC LCD.

*(Characterization of chromatographically-complex polymers by advanced liquid chromatography methods: MD-SEC and LC LCD.)*

**Zodpovedný riešiteľ:** Alena Šišková  
**Trvanie projektu:** 1.1.2013 / 31.12.2014  
**Evidenčné číslo projektu:** MAD  
**Organizácia je** áno  
**koordinátorom projektu:**  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Argentína: 1  
**Čerpané financie:** mobilita

### Dosiahnuté výsledky:

V druhom roku riešenia bola vyvíjaná metóda na spracovávanie dát a analýzu frakcií získaných pomocou kvapalinovej chromatografie s využitím trojnásobnej detekcie: DRI, UV, LSD. Na overenie matematického modelu predikcie molekulovej štruktúry vzoriek navrhnutého v Santa Fé boli tieto vzorky separované pomocou kvapalinovej chromatografie pri limitných podmienkach desorpcie (LC LCD), vylučovacou chromatografiou (SEC) a sekvenčnou dvojdimenzionálnou kvapalinovou chromatografiou (S2D LC) v laboratóriu kvapalinovej chromatografie na ÚPo.

### Výstupy:

1. ŠIŠKOVÁ, Alena - YOSSEN, M. - BRANDOLINI, M. C. - VEGA, J. R. Characterization of complex polymer systems by advanced methods of liquid chromatography with multiple detection. In YES 2014 : Fifth Young European Scientists Workshop : Crocow, Poland, September 7-11, 2014 : book of abstracts. - Crocow, Poland : Jagiellonian University, 2014, p. 45.
2. ŠIŠKOVÁ, Alena - MACOVÁ, Eva - VEGA, J. R. - BEREK, Dušan. The study of the sample recovery in the liquid chromatography of complex polymer systems. In ISC 2014 : 30th International Symposium on Chromatography : Communicating Separation Science for the Future : Salzburg, Austria, September 14-18, 2014 : book of abstracts [elektronický zdroj]. - Innsbruck, Austria : carpemedia GbR, 2014, p080-FFTU.
3. VEGA, J. R. - ŠIŠKOVÁ, Alena - CLEMENTI, L. A. - BEREK, Dušan - MEIRA, G. R. Data treatment in sequenced two-dimensional liquid chromatography. In ISC 2014 : 30th International Symposium on Chromatography : Communicating Separation Science for the Future : Salzburg, Austria, September 14-18, 2014 : book of abstracts [elektronický zdroj]. - Innsbruck, Austria : carpemedia GbR, 2014, p254-SFTU.

## Programy: COST

### 6.) Dlhodobý udržateľný retardant horenia pre textil a príbuzné materiály na báze nanočastíc nahradzujúcich konvenčné chemické látky.

*(Sustainable flame retardancy for textiles and related materials based on nanoparticles substituting conventional chemicals. )*

**Zodpovedný riešiteľ:** Mária Omastová  
**Trvanie projektu:** 1.5.2012 / 31.5.2016  
**Evidenčné číslo projektu:** MP1105  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** Centre for Materials Science and Engineering (CSME), University Gent, Gent, Belgium  
**Počet spoluriešiteľských inštitúcií:** 19 - Fínsko: 2, Francúzsko: 2, Veľká Británia: 3, Taliansko: 3, Litva: 3, Poľsko: 2, Portugalsko: 4  
**Čerpané financie:** Podpora medzinárodnej spolupráce z národných zdrojov: 4 000 €

#### Dosiahnuté výsledky:

Vodivé textílie boli pripravené nánosom polymérnej povrchovej vrstvy obsahujúcej expandovaný grafit. Sledované boli tri rôzne druhy textílií (bavlna, polyester, zmes bavlna /polyester v pomere 1/1). Vodivosť, termostabilita a horľavosť boli merané pred aj po vypieraní textílií v detergente. Metódou TGA sa zistilo, že aj po vypieraní je PES termicky najstabilnejší. Horľavosť textílií bola meraná kónickým kalorimetrom. Stanovené boli parameter ako rýchlosť uvoľňovania tepla, čas do vznietenia, celková spotreba kyslíka, množstvo uvoľneného dymu a pod. Vypočítaný parameter MARHE má pre textíliu bavlna/PES najvyššie hodnoty.

#### Výstupy:

1. MICUŠÍK, Matej – MOSNÁČKOVÁ, Katarína – MALÍKOVÁ, Marta – OMASTOVÁ, Mária: Surface Properties and Morphology of Conductive Textiles Modified by Polypyrrol. In 7th ITD&DC: Dubrovnik, 5.-8.10.2014, p. 87, ISBN: 978-953-7105-54-9
2. MALÍKOVÁ, Marta - ŠPITALSKÝ, Zdenko – ŽIAČKOVÁ, K. – ŠESTÁK, J. – OMASTOVÁ, Mária: Flammability of Smart Textiles Based on Expanded Graphite-Polymeric Nanocomposites. In COST MP1105 Workshop: Dubrovnik, 7.10.2014, p. 12
3. MOSNÁČKOVÁ, Katarína – MICUŠÍK, Matej – CHEHIMI M. M. – OMASTOVÁ, Mária: Stability and Surface Properties of Conductive Textiles. In COST MP1105 Workshop: Dubrovnik, 7.10.2014, p. 18.

### 7.) Európska vedecká sieť pre umelé svaly.

*(European scientific network for artificial muscles.)*

**Zodpovedný riešiteľ:** Mária Omastová  
**Trvanie projektu:** 8.12.2011 / 7.12.2014  
**Evidenčné číslo projektu:** MP1003  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** University of Pisa, Pisa, Italy  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** Podpora medzinárodnej spolupráce z národných zdrojov: 4 000 €

#### Dosiahnuté výsledky:

V rámci projektu sa rozvíjalo štúdium materiálov na báze elastomérov a uhlíkových nanotrubičiek.

Tieto materiály prejavili foto-aktuálne správanie po ožiarení svetelnými diódami a je ich možné použiť ako umelé svaly.

#### **Výstupy:**

1. OMASTOVÁ, Mária. Elastomer/carbon nanotubes actuators. In Book of Scientific programme & list of demos EAP Workshop: Electromechanically Active Polymer (EAP), transducers & artificial muscles. 25 -26 November 2014 Queen Mary University of London, Octagon library. p. 26-27.
2. OMASTOVÁ, Mária - CZANIKOVÁ, Klaudia - MIČUŠÍK, Matej. Actuators based on carbonnanotubes carbonnanotubes and elastomeric matrix. In EuroEAP 2014 : 4th international conference on Electromechanically Active Polymer (EAP) tranducers & artificial muscles : Linkoping, Sweden, 10-11 June 2014 : book of abstracts. - Linkoping, Sweden: Linkoping University, 2014, p. 40.

### **8.) Inovatívne aplikácie vlákien z regenerovanej celulózy.**

*(Innovative application of regenerated wood cellulose fibers.)*

**Zodpovedný riešiteľ:** Alena Šišková  
**Trvanie projektu:** 1.5.2013 / 31.5.2017  
**Evidenčné číslo projektu:** MVTS - COST MP 1205  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** SP Wood Technology Sweden  
**Počet spoluriešiteľských inštitúcií:** 1 - Švédsko: 1  
**Čerpané financie:** Podpora medzinárodnej spolupráce z národných zdrojov: 4 667 €

#### **Dosiahnuté výsledky:**

Identifikoval sa najvýhodnejší postup prípravy filmov z mikrokryštalickej celulózy z roztoku v iónových kvapalinách a v koagulačnom činidle. Následne sa nám podarilo filmy chemicky modifikovať aktívnou látkou v tomto prípade pesticídom, a to za účelom kontrolovaného uvoľňovania aktívnej látky do pôdy a tým zabezpečenia vhodných podmienok pre rast plodiny a súčasne prispieť k ochrane ŽP.

#### **Výstupy:**

1. ŠIŠKOVÁ, Alena - ECKSTEIN ANDICSOVÁ, Anita - OPÁLEK, A. Targeted modification of films and electrospun fiber mats for control release systems used in agriculture. In BYPOS : 5th Bratislava Young Polymer Scientists Workshop : Zázrivá, Slovakia, June 16th - 20th, 2014 : workshop book. - Bratislava : Young Scientists Council of Polymer Institute of the Slovak Academy of Sciences, 2014, p. 65. ISBN 978-80-970923-5-1.
2. ŠIŠKOVÁ, Alena - ECKSTEIN ANDICSOVÁ, Anita - OROVČÍK, Ľ. - RYCHTER, P. Modification of films and electrospun mats for control release systems used in agriculture. In BiPoCo 2014 : 2nd International Conference on Bio-based Polymers and Composites : Visegrád, Hungary, August 24-28, 2014 : proceedings. - Budapest, Hungary : Budapest University of Technology and Economics, 2014, non p.
3. ŠIŠKOVÁ, Alena - ECKSTEIN ANDICSOVÁ, Anita - OPÁLEK, A - RYCHTER, Piotr. Fibrous materials prepared by electrospinning for controlled release systems used in agriculture. In Agricultural applications of Electrospinning & Electrospinning of Agricultural Products : COST MP1206 Workshop, Vienna, Austria, 6.10. - 7.10. 2014 : agenda & abstract collestion. - Vienn, Austria : CEST Kompetenzzentrum fur Electrochemische Oberflachentechnologie, 2014, p. 1.
4. ŠIŠKOVÁ, Alena - ECKSTEIN ANDICSOVÁ, Anita - OPÁLEK, A. - RYCHTER, P. Functional materials from renewable sources produced by electrospinning technique. In Chemia - nadzieje i marzenia : 57 Zjazd naukowy polskiego towarzystwa chemicznego i stowarzyszenia inzynierow i technikow przemyslu chemicznego : materiały zjazdowe streszczenia. - Lodz, Poland : Uniwersytet Lodzki, 2014, s02-P40.

## Programy: 7RP

### 9.) Rozriešenie segmentálnej relaxačnej dynamiky v oligomérnych 1,4-poly(izoprén)och.

*(Resolution of the segmental relaxation dynamics in oligomeric 1,4-poly(isoprene)s.)*

**Zodpovedný riešiteľ:** Josef Bartoš  
**Trvanie projektu:** 1.1.2013 / 31.12.2014  
**Evidenčné číslo projektu:** ESMI/MVTS E130100330  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** Forschungszentrum Juelich, GmbH  
**Počet spoluriešiteľských inštitúcií:** 1 - Španielsko: 1  
**Čerpané financie:** Podpora medzinárodnej spolupráce z národných zdrojov: 3400 €

#### Dosiahnuté výsledky:

Kombinované termodynamické a dynamické štúdium série piatich oligomérnych 1,4-poly(izoprén)ov (1,4-PIP) s molekulovou hmotnosťou  $M=800, 1\ 100, 2\ 700, 4\ 270$  and  $10\ 500$  g/mol v čistom, nedopovanom a dopovanom stave s malým prídavkom nízkomolekulovej látky 2,2,6,6 – tetramethyl - piperidine - 1- oxyl ( TEMPO ) bolo vykonané použitím nízko-teplotnej DSC a BDS techniky so zameraním na rozriešenie komplexných BDS spektier od segmentálneho a normálového relaxačného procesu. Termodynamická charakterizácia pomocou DSC techniky odhalila malý záporný posun v teplote sklovitého prechodu v dopovaných systémoch vzhľadom na čisté matrice v dôsledku plastifikačného efektu. Detailné dynamické štúdium použitím BDS v širokom frekvenčnom rozsahu  $10^{-2} - 10^9$  Hz ukázalo veľmi slabý efekt polárnej komponenty TEMPO na normálový relaxačný mód, ale veľmi výrazný intenzifikačný a mierny urýchľovací efekt na segmentálny relaxačný mód. Nadväzne, BDS spektrá boli analyzované v termínoch fenomenologickej Havriliak - Negami (HN) relaxačnej funkcie pre segmentálny mód a mikroskopického Rouseho modelu pre normálový mód s cieľom kompletného popisu a interpretácie komplexných BDS spektier.

#### **Výstupy:**

1. BARTOŠ, Josef - ŠVAJDLENKOVÁ, Helena - ARRESE- IGOR, S. - ALEGRÍA, A. Resolution of the segmental dynamics in a series of oligomeric 1,4-poly(isoprene)s by selective effect of polar small molecular organic compound. In ESMI Science day :Annual Meeting 2014 : Heraclion, Greece, 29. May 2014 : collection of abstract. - Heraclion, Greece : European Soft Matter Infrastructure, 2014, p. non page.
2. BARTOŠ, Josef - ŠVAJDLENKOVÁ, Helena - ARRESE-IGOR, S. - ALEGRIA, A. Resolving the segmental dynamics in oligomeric 1,4-poly(isoprene)s by selective effect of polar small molecule organic compound. In BDS 2014 : 8th International Conference on Broadband Dielectric Spectroscopy and its Applications : Wisla, Poland, September 14-19, 2014 : programme and book of abstracts. - Katowice, Poland : Institute of Physics, Universty of Silesia in Katowice, 2014, p. O-49. ISBN 978-83-8012-276-5.

## Programy: Multilaterálne – iné

### 10.) Biologické adhezíva: od biológie ku biomimetike.

*(Biological adhesives: from biology to biomimetics.)*

**Zodpovedný riešiteľ:** Peter Kasák  
**Trvanie projektu:** 1.1.2011 / 31.12.2014  
**Evidenčné číslo projektu:** TD0906  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** Université de Mons

**Počet spoluriešiteľských** 0

**inštitúcií:**

**Čerpané financie:** Podpora medzinárodnej spolupráce z národných zdrojov: 1 667 €

**Dosiahnuté výsledky:**

Pripravovali sa polyméry so svetlom prepínateľnými vlastnosťami a využívali sa na rôzne interacie s DNA a baktériami.

### **11.) The Chicago Diabetes Project: Globálna spolupráca pre funkčnú liečbu cukrovky.**

*(The Chicago Diabetes Project: Global collaboration for a functional cure.)*

**Zodpovedný riešiteľ:** Igor Lacík

**Trvanie projektu:** 1.5.2007 /

**Evidenčné číslo projektu:**

**Organizácia je** nie

**koordinátorom projektu:**

**Koordinátor:** University of Illinois, Chicago

**Počet spoluriešiteľských** 5 - Austrália: 1, Švajčiarsko: 1, Taliansko: 1, Nórsko: 1, USA: 1

**inštitúcií:**

**Čerpané financie:** mobilita

**Dosiahnuté výsledky:**

Získanie informácie o rôznych charakteristikách mikrokapsúl, zavedenie experimentálnych techník pre ich charakterizáciu, celkovo zlepšený pohľad na mikrokapsule v línii polyméry – mikrokapsule – proces enkapsulácie – charakterizácia – testovanie in vitro a čiastočne in vivo. Organizácia bioenkapsulačnej konferencie.

**Výstupy:**

1. OKSTAD, A. M.- LACÍK, Igor - DE VOS, P. - STRAND, B. L. Advanced in biocompatibility and physico-chemical characterization of microspheres for cell encapsulation. In Advanced Drug Delivery Reviews, 2014, vol. 67-68, p. 111-130. (12.707 - IF2013).

2. VAITHILINGHAM, V. - KOLLÁRIKOVÁ, Gabriela - QI, M. - LARSSON, R. - LACÍK, Igor - FORMO, K. - MARCHESE, E. - OBERHOLZER, J. - GUILLEMIN, G. J. - TUCH, B. E. Beneficial effects of coating alginate microcapsules with macromolecular heparin conjugates - In vitro and In vivo study. In Tissue engineering : Part A, 2014, vol. 20, no. 1-2, p. 324-334. (4.254 - IF2013).

3. Organizácia 22nd International Conference on Bioencapsulation/21th Bratislava International Conference on Macromolecules [http://bioencapsulation.net/2014\\_Bratislava/](http://bioencapsulation.net/2014_Bratislava/)

### **12.) Určenie rýchlostných konštánt radikálovej polymerizácie vodorozpusťných monomérov so špeciálnym dôrazom na nabité a ionizovateľné monoméry.**

*(Determination of rate coefficients of water-soluble monomers with special emphasis on charged/ionizable monomers.)*

**Zodpovedný riešiteľ:** Igor Lacík

**Trvanie projektu:** 1.6.2004 / 31.5.2015

**Evidenčné číslo projektu:** projekt BASF AG, Ludwigshafen, Nemecko

**Organizácia je** áno

**koordinátorom projektu:**

**Koordinátor:** Ústav polymérov SAV

**Počet spoluriešiteľských** 2 - Kanada: 1, Nemecko: 1

**inštitúcií:**

**Čerpané financie:** 30 000 €



### **Dosiahnuté výsledky:**

Rýchlostné konštanty radikálovej polymerizácie, mechanizmus polymerizácie vo vodnej fáze špeciálne pre N-vinylpyrolidón polymerizovaný vo vodnej a organickej fáze, rôzne akryláty a metakryláty, kopolyméry akrylamidu a kyseliny akrylovej, a s tým súvisiacich SEC stanovení mólvej hmotnosti vodorozpustných homopolymérov a kopolymérov so záporným a aj kladným nábojom.

### **Výstupy:**

1. UHELSKÁ, Lucia – CHORVÁT, D. – HUTCHINSON, R.A. – SANTANAKRISHNAN, S. – BUBACK, M. – LACÍK, Igor. Radical propagation kinetics of N -vinylpyrrolidone in organic solvents studied by pulsed-laser polymerization–size-exclusion chromatography (PLP–SEC). In Macromolecular Chemistry and Physics, 2014, vol. 215, no. 23, p. 2327-2336, (2.451 - IF2013).

2. LACÍK, Igor – STACH, Marek – KASÁK, Peter – SEMAK, V. – UHELSKÁ, Lucia – CHOVANCOVÁ, Anna – REINHOLD, G. – KILZ, P. – DELAITTRE, G. – CHARLEUX, B. – CHADUC, I. -D'AGOSTO, F. – LANSALOT, M. – GABORIEAU, M. – CASTIGNOLLES, P. - GILBERT R.G. – SZABLAN, Z. - BARNER-KOWOLLIK, CH. – HESSE, P. – BUBACK, M. SEC Analysis of poly(acrylic acid) and poly(methacrylic acid), Macromolecular Chemistry and Physics 2014, DOI: 10.1002/macp.201400339, (2.451 - IF2013).

3. BARNER-KOWOLLIK, Ch. - BEUERMANN, S. - BUBACK, M. - CASTIGNOLLES, P. - CHARLEUX, B. - COOTE, M. L. - HUTCHINSON, R. A. - JUNKERS, T. - LACÍK, Igor - RUSSELL, G. T. - STACH, Marek - VAN HERK, A. M. Critically evaluated rate coefficients in radical polymerization.- 7. Secondary-radical propagation rate coefficients for methyl acrylate in the bulk. In Polymer Chemistry, 2014, vol. 5, p. 204 - 212. (5.368 - IF2013).

4. HAEHNEL, A. P. - STACH, Marek - CHOVANCOVÁ, Anna - RUEB, J. M. - DELAITTRE, G. – MISSKE, A. M. - LACÍK, Igor - BARNER-KOWOLLIK, Ch. (Meth)acrylic monomers with heteroatom-containing ester sidechains: a systematic PLP-SEC and polymerization study. In Polymer Chemistry, 2014, vol. 5, p. 862-873. (5.368 - IF2013).

### **13.) Nano-vlákná pripravené elektrostatickým zvlákňovaním pre pre bio- nšpirované kompozitné materiály a ich inovatívne priemyselné aplikácie.**

*(Electrospun nano-fibres for bio-inspired composite materials and innovative industrial applications.)*

**Zodpovedný riešiteľ:** Mária Omastová  
**Trvanie projektu:** 1.5.2012 / 31.5.2017  
**Evidenčné číslo projektu:** MVTS - COST MP 1206  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** Kemyk, 7000 Eisenstadt  
**Počet spoluriešiteľských inštitúcií:** 0

**Čerpané financie:** Podpora medzinárodnej spolupráce z národných zdrojov: 4 000 €

### **Dosiahnuté výsledky:**

Na pracovisku sa zaviedla metóda elektrostatického zvlákňovania a v rámci projektu sa začalo s prípravou nanovláknien z polymérnych materiálov, ktoré sú rozpustné vo vode. Zámerom je príprava vodivých nanovláknien pre aplikácie ako senzory a medicínske použitie.

### **14.) Nové materiály a zariadenia na báze vodivých polymérov a ich kompozitov.**

*(New materials and devices based on conducting polymers and their composites.)*

**Zodpovedný riešiteľ:** Mária Omastová  
**Trvanie projektu:** 1.1.2013 / 31.12.2014

**Evidenčné číslo projektu:** Danube projekt, BMBF  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** Brandenburg University of Technology Cottbus–Senftenberg  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** Podpora medzinárodnej spolupráce z národných zdrojov: 4 000 €

**Dosiahnuté výsledky:**

Metódou „layer-by-layer“ nanášaním sa pripravili zlaté elektródy dekorované Mn-Cu nanočasticami. Nanášali sme nanokoloidy Mn-Cu v iónovej kvapaline 1-etyl-3-metylimidazólium tetrafluoroborát (EMIMBF<sub>4</sub>). Optimalizoval sa postup nanášania a najstabilnejšie elektródy sa dosiahli pri nanosení štvorvrstvy polyanilín→polystyrén sulfonát→nanokoloid Mn-Cu v EMIMBF<sub>4</sub>→polystyrén sulfonát. Nanieslo sa 1-5 cyklov takýchto štvorvrstiev a následne sa sledovala elektrochemická odozva pomocou cyklickej voltametrie. Takto pripravené elektródy by sa dali použiť na neenzymatickú detekciu glukózy.

**Výstupy:**

1. KULIČEK, Jaroslav - MIČUŠÍK, Matej - ŠPITALSKÝ, Zdenko - GEMEINER, P. - ŠVORC, E. - OMASTOVÁ, Mária. Multiwall carbon nanotubes and graphite oxide polypyrrole composites in solar cell application. In BYPOS : 5th Bratislava Young Polymer Scientists Workshop : Zázrivá, Slovakia, June 16th - 20th, 2014 : workshop book. - Bratislava : Young Scientists Council of Polymer Institute of the Slovak Academy of Sciences, 2014, p. 51. ISBN 978-80-970923-5-1.

**Programy: Bilaterálne – iné**

**15.) Charakterizácia uväznených organických systémov pomocou externých prób.**

*(External probe characterization of the confined organics.)*

**Zodpovedný riešiteľ:** Josef Bartoš  
**Trvanie projektu:** 1.1.2014 / 31.12.2015  
**Evidenčné číslo projektu:** DAAD-SAV 2014  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** Experimental Physik V, CEKM, Universität Augsburg, Nemecko  
**Počet spoluriešiteľských inštitúcií:** 1 - Nemecko: 1  
**Čerpané financie:** mobilita

**Dosiahnuté výsledky:**

V rámci realizácie DAAD 2014-15 grantu sa zahájilo systematické vyšetrovanie troch organických médií tj. n-hexadekánu (n-HXD) a 2-propanolu (2-PrOH) ako aj 1-propanolu (1-PrOH) v objemovom (bulk) stave ako aj priestorovo-obmedzených (uväznených) stavoch série silikagélov s rôznou veľkosťou pórov pomocou ESR a DSC technik. Spektrálne a dynamické parametre spinovej sondy TEMPO v oboch stavoch zmienených médií sa porovnali s termodynamickými, tj. teplotnými a entalpickými, parametrami týchto systémov. Zistilo sa, že dynamika molekulárnej próby je veľmi silne zpomalená po priestorovom obmedzení média a odhalili sa nové empirické korelácie napr. medzi existenciou bimodálneho ESR spektra a fázovou premenou n-hexadekánu. Na základe komplexnej analýzy ESR a DSC dát v spojení s ďalšími relevantnými experimentálnymi a teoretickými údajmi z literatúry sa uzavrelo, že toto spomalenie súvisí so špecifickou interakciou spinovej sondy TEMPO so silanolovými skupinami na povrchu SG matric. Tento záver je priebežne verifikovaný pomocou dvoch polárnych médií 2-PrOH a 1-PrOH s vyššou afinitiou k povrchu SG matric v porovnaní s nepolárnym n-HXD.

### **Výstupy:**

1. LUKEŠOVÁ, Miroslava - ŠVAJDLENKOVÁ, Helena - VALIČ, S. - SIPPEL, P. - MACOVÁ, Eva - BEREK, Dušan - BARTOŠ, Josef. Spin probe dynamics and phase transition study of bulk N-hexadecane and A series of pore confined N-hexadecane/silica gel systems. In BYPOS : 5th Bratislava Young Polymer Scientists Workshop : Zázrivá, Slovakia, June 16th - 20th, 2014 : workshop book. - Bratislava : Young Scientists Council of Polymer Institute of the Slovak Academy of Sciences, 2014, p. 59. ISBN 978-80-970923-5-1.

2. LUKEŠOVÁ, Miroslava - ŠVAJDLENKOVÁ, Helena - SIPPEL, P. - MACOVÁ, Eva - BEREK, Dušan - LOIDL, A. - BARTOŠ, Josef. Spin probe dynamics of n-Hexadecane in confined geometry. In European Physical Journal B, b140689 - prijaté

### **16.) Teoretické a experimentálne štúdium polymérnych vrstiev zakotvených na povrchoch ako ochrana proti adsorpcii proteínov.**

*(Theoretical and experimental study of polymer layers confined on surfaces as a protection against polymer adsorption.)*

**Zodpovedný riešiteľ:** Zuzana Benková  
**Trvanie projektu:** 1.4.2013 / 30.4.2015  
**Evidenčné číslo projektu:** SK-PT-0015-12  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** mobilita

#### **Dosiahnuté výsledky:**

Charakterizácia povrchov použitím experimentálnych techník (AFM, SIMS, FFS).

### **17.) (Ko)-polymerizácia s otvorením kruhu butyrolaktónových monomérov.**

*(Ring-opening (co)-polymerization of butyrolactone based monomers.)*

**Zodpovedný riešiteľ:** Martin Danko  
**Trvanie projektu:** 1.1.2013 / 31.12.2015  
**Evidenčné číslo projektu:** bilaterálny slovensko-poľský  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Poľsko: 1  
**Čerpané financie:** mobilita

#### **Dosiahnuté výsledky:**

Bolo uskutočnených niekoľko kopolymerizácií alfa-metylén-gamma-butyrolaktónu (Tulipalín A) s epsilon-kaprolaktónom polymerizáciou s otvorením kruhu aniónovým a katiónovým mechanizmom. Pri laboratórnej teplote homopolymerizácia prakticky neprebíhala, kopolymerizáciou sa zabudovalo do kopolyméru do 6% Tulipalínu. Transesterifikačnými reakciami aktívnych polymérnych reťazcov sa podiel zakopolymerizovaného Tulipalínu zvyšoval. Pri zvýšenej teplote na 80°C a viac sa objavuje vznik nekontrolovanej radikálovej polymerizácie exo-dvojitej väzby Tulipalínu.

### **Výstupy:**

1. DANKO, Martin - RIECKA, M. - MOSNÁČEK, Jaroslav. Copolymers of gamma-lactones prepared by ring-opening polymerization. In EUPOC 2014 : Precision Polymers: Synthesis, Folding and Function :

**18.) Charakterizácia polymérov citlivých na vonkajšie podnety s rôznou topológiou pomocou vodnej gélovej permeačnej chromatografie.**

*(Characterization of stimuli sensitive polymers with different topology by aqueous gel permeation chromatography.)*

**Zodpovedný riešiteľ:** Juraj Kronek  
**Trvanie projektu:** 1.1.2013 / 31.12.2015  
**Evidenčné číslo projektu:** bilaterálny slovensko-poľský  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Poľsko: 1  
**Čerpané financie:** mobilita

**Dosiahnuté výsledky:**

Získali sa molekulárne charakteristiky hviezdicového pH senzitivného polyméru.

**19.) LCP BLENDS: Multifázové systémy obsahujúce kvapalnokryštalické polyméry.**

*(Study of liquid-crystalline polymers and their composites. )*

**Zodpovedný riešiteľ:** Juraj Kronek  
**Trvanie projektu:** 1.1.2014 / 31.12.2015  
**Evidenčné číslo projektu:** APVV-SK-CZ-2013-0234  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 0 €

**Dosiahnuté výsledky:**

Projekt bol schválený, ale v uplynulom roku nebol financovaný v dôsledku krátenia financií pre APVV agentúru.

**20.) Nové inteligentné kopolyméry na báze cyklických iminoéterov.**

*(New stimuli-responsive copolymers based on cyclic iminoethers.)*

**Zodpovedný riešiteľ:** Juraj Kronek  
**Trvanie projektu:** 1.1.2012 / 31.12.2014  
**Evidenčné číslo projektu:**  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Bulharsko: 1  
**Čerpané financie:** mobilita

**Dosiahnuté výsledky:**

Polyméry obsahujúce aromatický fluorifór boli analyzované z hľadiska in vitro cytotoxicity. Potvrďilo sa, že aromatický fluorifór nachádzajúci sa ako koncová skupina nemá vplyv na netoxickosť polymérneho reťazca.

## 21.) (Bio)polymers and bioinspired materials for biomedicine.

*(Bio)polyméry a bio-inšpirované polyméry pre biomedicínu.)*

**Zodpovedný riešiteľ:** Igor Lacík  
**Trvanie projektu:** 1.1.2014 / 31.12.2015  
**Evidenčné číslo projektu:** APVV-SK-CZ-2013-0206  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 0 €

### Dosiahnuté výsledky:

Projekt bol schválený, ale v uplynulom roku nebol financovaný v dôsledku krátenia financií pre APVV agentúru.

## 22.) Antibakteriálne vlastnosti polymérov modifikovaných nízkoteplotnou plazmou.

*(Antibacterial properties of polymers modified by low-temperature plasma.)*

**Zodpovedný riešiteľ:** Igor Novák  
**Trvanie projektu:** 1.1.2014 / 31.12.2016  
**Evidenčné číslo projektu:** -  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Česko: 1  
**Čerpané financie:** mobilita

### Dosiahnuté výsledky:

V roku 2014 sme skúmali povrchové, adhézne vlastnosti a chemické zloženie fólií polymliečnej kyseliny a izotaktického polypropylénu modifikovaných bariérovým a rádiovýbojovým výbojom a následne očkovaných kyselinou akrylovou a alylamínom. Získané výsledky boli spracované do dizertačnej a diplomovej práce a sú pripravené na publikovanie vo vybraných impaktovaných časopisoch.

## 23.) Štúdium povrchových a adhézných vlastností polyimidu a jeho kopolymérov.

*(Study of surface and adhesive properties of polyimide and its copolymers.)*

**Zodpovedný riešiteľ:** Igor Novák  
**Trvanie projektu:** 1.1.2012 / 31.12.2016  
**Evidenčné číslo projektu:** -  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Česko: 1  
**Čerpané financie:** mobilita

### Dosiahnuté výsledky:

Skúmali sa synteticky pripravené PIS blokované kopolyméry obsahujúce PDMS bloky s rôznou dĺžkou s rôznou dĺžkou reťazcov. Vzorky PIS kopolymérov boli kondicionované 24h pri teplote

100°C a pre vzorku s 5 hm.% PDMS (bloky PDMS s Mn = 2000 g/mol) v PIS kopolyméri sa zistilo 75%-né pokrytie povrchu kopolyméru reťazcami PDMS, pre PIS kopolymér s kratšími reťazcami PDMS (bloky PDMS s Mn = 1000 g/mol) sa zistilo 50%-né pokrytie povrchu kopolyméru PDMS. Pre vzorky PIS kopolymérov kondicionované pri teplote 30°C bol zistený výraznejší rozdiel v pokrytí povrchu, pričom sa pre PDMS s Mn = 2000 g/mol sa zistilo 60%-né pokrytie povrchu kopolyméru a pre PDMS s Mn = 1000 g/mol iba 40%-né pokrytie povrchu PIS kopolyméru.

#### **24.) Farbivami modifikované uhlíkové nanotrubičky pre optotepelnú aktuáciu nanokompozitov.**

*(Dye-labelled carbon nanotubes for optothermal actuation of nanocomposites.)*

**Zodpovedný riešiteľ:** Mária Omastová  
**Trvanie projektu:** 1.1.2013 / 31.12.2015  
**Evidenčné číslo projektu:** SK-FR-2013-0033  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Francúzsko: 1  
**Čerpané financie:** APVV: 2 600 €

##### **Dosiahnuté výsledky:**

Keďže agentúra APVV uvolnila finančné prostriedky až v polovici októbra 2014, v projekte sa iba začalo s prípravou modifikovaných CNT, kde je potrebná niekoľkostupňová syntéza. Doplnila sa literárna rešerš z danej oblasti.

#### **25.) Fotovoltaické a senzorické vlastnosti grafénu a uhlíkových nanotrubičiek funkcionalizovaných plazmou a chemicky.**

*(Photovoltaic and sensor properties of plasma and chemical functionalized graphene and carbon nanotubes.)*

**Zodpovedný riešiteľ:** Mária Omastová  
**Trvanie projektu:** 1.12.2014 / 30.11.2017  
**Evidenčné číslo projektu:** SAS - TŮB?TAK JRP 2014 /2  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Turecko: 1  
**Čerpané financie:** APVV: 2 083 €

##### **Dosiahnuté výsledky:**

V prvej etape projektu sa pripravili uhlíkové nanotrubičky modifikované rôznym množstvom polypyrolu a začalo sa s modifikáciou polytiofénom.

#### **26.) Vysoko výkonné senzory na báze vodivých polymérov a kompozitov.**

*(High performance sensors on the base of conducting polymers and composites.)*

**Zodpovedný riešiteľ:** Mária Omastová  
**Trvanie projektu:** 1.1.2013 / 31.12.2014  
**Evidenčné číslo projektu:** APVV SK-GR-0029-11

**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** APVV: 2 650 €

**Dosiahnuté výsledky:**

Kompozity na báze polyvinylfluoridovej matrice (PVDF) a rôznym obsahom uhlíkových nanotrubičiek (MWCNT) boli študované pomocou meraní AC a DC vodivosti, vypočítaná hodnota perkolačného prahu bola 1.21 hm.%. Pripravené vzorky sa skúmali ako senzory, aplikáciou jedoosovej deformácie ťahom a meral sa prúd prechádzajúci vzorkou. Pozdĺžna deformácia teliesok sa monitorovala veľmi presne slaserovým extenziometrom. Výsledky ukázali, že tieto materiály sa môžu použiť ako snímače deformácie. V ďalšom kroku sa skúmali elastoméne kompozity na báze kaučuku a vodivých sadzí. Štúdium ukázalo, že podobne ako v predchádzajúcom prípade tieto materiály je možné použiť ako snímače deformácie.

**Výstupy:**

1. GEORGOUSIS, G. - PANDIS, C. - KALAMIOTIS, A. - GEORGIPOULOS, P. - KYRITSIS, A. - KONTOU, E. - PISSIS, P. - MICUŠÍK, Matej - CZANIKOVÁ, Klaudia - KULIČEK, Jaroslav - OMASTOVÁ, Mária. Strain sensing in polymer/carbon nanotube composites by electrical resistance measurement. In Composites: Part B, 68 (2015), p. 162–169.

2. KULIČEK, Jaroslav - MOSNÁČKOVÁ, Katarína - MICUŠÍK, Matej - OMASTOVÁ, Mária - CHATZIMANOLIS-MOUSTAKAS, Ch. - PISSIS, P. Humidity sensors based on poly(methyl methacrylate)/carbon nanotubes nanocomposites. In Polymery 2014 : VIII. česko-slovenská konferencie : Třešť, ČR, 6.- 9.10. 2014 : programová brožura konferencie. - Praha, ČR : Ústav makromolekulární chemie AV ČR, v.v.i., 2014, p. 57-58. ISBN 978-80-85009-81-1

**27.) Polymér-keramické nanokompozity pre vložené kondenzátory.**

*(Polymer-ceramic nanocomposites for embedded capacitors - NanoEmbedded.)*

**Zodpovedný riešiteľ:** Zdenko Špitálsky  
**Trvanie projektu:** 1.1.2013 / 31.12.2014  
**Evidenčné číslo projektu:** SK-PT-0021-12  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 1 - Portugalsko: 1  
**Čerpané financie:** APVV: 2 600 €

**Dosiahnuté výsledky:**

Pripravili sa polymérne kompozity s CCTO u ktorých sa potvrdila vysoká permitivita. Zároveň boli testované ich mechanické vlastnosti.

**Výstupy:**

1. TEIXEIRA, S. S. - GRAÇA, M. P. F. - DIONISIO, M. - ILČÍKOVÁ, Markéta - MOSNÁČEK, Jaroslav - ŠPITÁLSKÝ, Zdenko - KRUPA, Igor - COSTA, L. C. Self-standing elastomeric composites based on lithium ferrites and their dielectric behaviour. In Journal of Applied Physics. 12/2014; 116(22):224102

2. AMARAL, F. - GRACA, M. P. - SANTOS, J. - ŠPITÁLSKÝ, Zdenko - ILČÍKOVÁ, Markéta - CZANIKOVÁ, Klaudia - MOSNÁČEK, Jaroslav. Polymer-ceramic nanocomposites for embedded capacitors. In Proceedings of the 5th International Conference on Nanotechnology: Fundamentals and Applications : Prague, Czech Republic, August 11-13, 2014. - Prague, Czech Republic, 2014, paper no. 302.

3. ŠPITALSKÝ, Zdenko - CZANIKOVÁ, Klaudia - ILČÍKOVÁ, Markéta - MOSNÁČEK, Jaroslav - JOCHEC MOŠKOVÁ, Daniela - AMARAL, F. - GRACA, M. P. - SANTOS, J. Polymer-ceramic nanocomposites for embedded capacitors. In ISE '14 : 14th International Seminar on Elastomers : Bratislava, Slovakia, August 24th - 28th, 2014 : book of abstracts. - Bratislava, Slovakia : Polymer Institute of SAS, 2014, p. 192-193. ISBN 978-80-970923-6-8.

## **Programy: European Regional Development Fund (ERDF)**

### **28.) Vývoj inovatívnych postupov pre udržateľné plasty v Strednej Európe.**

*(Innovative value chain development for sustainable plastics in Central Europe. )*

**Zodpovedný riešiteľ:** Ivan Chodák  
**Trvanie projektu:** 1.4.2011 / 31.3.2014  
**Evidenčné číslo projektu:** 3CE368 P1  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** National Institute of Chemistry, Ljubljana  
**Počet spoluriešiteľských inštitúcií:** 14 - Taliansko: 3, Poľsko: 2, Slovensko: 4, Slovinsko: 5  
**Čerpané financie:** MŽP: 35 755 €  
Podpora medzinárodnej spolupráce z národných zdrojov: 1 000 €

#### **Dosiahnuté výsledky:**

V rámci projektu Plastics sa dokončili práce rozbehnuté v posledných troch rokoch. Uzavrela sa prípadová štúdia charakterizácie zmesi pre výrobu biodegradovateľných obalov pre vajička. Podstatná časť prác spočívala v stanovení rozsahu fyzikálneho starnutia počas skladovania výrobkov po tvarovaní a vplyvu starnutia na mechanické vlastnosti, najmä čo sa týka húževnatosti. Ukázalo sa, že nova kompozícia podlieha fenoménu fyzikálneho starnutia v oveľa menšej miere v porovnaní s oboma základnými polymérmi, ktoré tvoria zmes.

V rámci projektu sa zaviedol systém certifikácie biodegradovateľných materiálov v spolupráci v nemeckou firmou DIN CERTCO, kde Ústav polymérov bude pôsobiť ako konzultačné pracovisko pre Slovensko a okolité krajiny. V tomto zmysle sa podpísala s partnerom Zmluva o spolupráci s vymedzením činností.

V rámci rozširovania kontaktov s firmami sa urobilo množstvo propagačnej práce pri školeniach firiem, organizovaní seminárov a prezentáciách prednášok pre širokú odbornú i laickú verejnosť na tému biodegradovateľné kompostovateľné plasty.

#### **Výstupy:**

1. CHODÁK, Ivan. Environmentally friendly plastics, properties, applications and environmental impact. In BPPA 14 : International Conference on Bio-Friendly Polymers and Polymer Additives: From Scientific Aspects to Processing and Applications : Budapest, Hungary, 19-21 May, 2014 : program and book of abstracts. - Budapest, Hungary : Hungarian Academy of Sciences, 2014, p.15. ISBN 978-963-08-9492-0. Pozvaná prednáška.

2. JANIGOVÁ, Ivica - ALEXY, P. - CHODÁK, Ivan. Thermal properties of aged polylactic acid/polyhydroxybutyrate blends. In Crystallising Ideas : The Role of Chemistry : international conference on Pure and Applied Chemistry : Mauritius, 23-27 June 2014. - Réduit, Mauritius : University of Mauritius, Department of Chemistry, 2014, p. 97.



## 29.) POLYFRIEND - Moderné ekologicky nezávadné polyméry.

(POLYFRIEND - Advanced bio-friendly polymers.)

<b>Zodpovedný riešiteľ:</b>	Jaroslav Mosnáček
<b>Trvanie projektu:</b>	1.10.2012 / 30.9.2014
<b>Evidenčné číslo projektu:</b>	HUSK/1101/1.2.1/0209 ERDF
<b>Organizácia je koordinátorom projektu:</b>	áno
<b>Koordinátor:</b>	Ústav polymérov SAV
<b>Počet spoluriešiteľských inštitúcií:</b>	1 - Maďarsko: 1
<b>Čerpané financie:</b>	63 187 € Podpora medzinárodnej spolupráce z národných zdrojov: 3 000 €

### Dosiahnuté výsledky:

Pripravili sa polypropylénové a polyetylénové filmy obsahujúce nové syntetizované hypervetvené stabilizátory a testovala sa termická a fotochemická stabilita týchto filmov. Nové stabilizátory vykazovali stabilizačnú účinnosť porovnateľnú s komerčnými stabilizátormi avšak boli výrazne menej vymývané z polymérnych filmov, čo je významný výsledok vzhľadom na súčasné požiadavky pre materiály aplikovateľné v poľnohospodárstve a v obalovej technike, najmä pri obaloch pre potraviny. Študovala sa taktiež fotochemická, hydrolytická a biotická degradácia biodegradovateľných fólií na báze poly(L-laktidu) a poly(hydroxybutyrátu) v laboratórnych podmienkach ako i pri ich priamej aplikácii ako mučovacích fólií. Ukázalo sa že pri aplikácii týchto materiálov v raálnych podmienkach dochádzalo po 3 mesiacoch k rozsiahlej degradácii, napriek tomu, že biodegradácia v laboratórnych podmienkach i po 6 mesiacoch bola minimálna. Preštudovali sa nové typy superabsorbérov - hydrogélom tvorených kopolymérmi akrylamidu so sodnou soľou 2-(2-hydroxy)akrylovej kyseliny. Porovnaním s hydrogélmi na báze kopolyméru akrylamidu so sodnou soľou akrylovej kyseliny, ktoré sa komerčne bežne používajú ako pôdne kondicionéry sa zistilo, že nové vyvinuté hydrogély majú výrazne vyššiu absorpčnú schopnosť.

### **Výstupy:**

1. RYCHLÝ, Jozef - MATISOVÁ-RYCHLÁ, Lýdia - CSOMOROVÁ, Katarína. Degradation of plastics from the ResinKit as a model for the selection of polymers for artworks. Assessment by nonisothermal thermogravimetric analysis and chemiluminometry. In Polymer Degradation and Stability, 2014, vol. 102, p. 105 - 111. (2.633 - IF2013). ISSN 0141-3910.
2. RYCHLÝ, Jozef - RYCHLÁ, Lýdia - FIEDLEROVÁ, Agnesa - CHMELA, Štefan - HRONEC, M. Thermally and UV initiated degradation of polypropylene in the presence of 2,5 bis(2-furylmethylene) cyclopentanone and heterogeneous distribution of hydroxides assessed by non-isothermal chemiluminescence in nitrogen. In Polymer Degradation and Stability, 2014, vol. 108, p. 41-47. (2.633 - IF2013). ISSN 0141-3910.
3. RYCHLÝ, Jozef - RYCHLÁ, Lýdia - STLOUKAL, P. - KOUTNÝ, M. - PEKAŘOVÁ, S. - VERNEY, V. - FIEDLEROVÁ, Agnes. UV initiated oxidation and chemiluminescence from aromatic aliphatic copolyesters and polylactic acid. In Polymer Degradation and Stability, 2013, vol. 98, p. 2556-2563.
4. BORSKÁ, Katarína - DANKO, Martin - MOSNÁČEK, Jaroslav. Fotodegradácia a fotochemické sieťovanie polylaktidu. In Chemické listy, 2014, roč. 108, s. 1030-1039. (0.196 - IF2013). ISSN 0009-2770.
5. KASZA, G. - MOSNÁČKOVÁ, Katarína - NÁDOR, A. - OSVÁTH, Z. - STUMPHAUSER, T. - SZARKA, G. - CZANIKOVÁ, Klaudia - RYCHLÝ, Jozef - CHMELA, Štefan - IVÁN, B. - MOSNÁČEK Jaroslav. Synthesis of hyperbranched poly(ethyleneimine) based antioxidants as biofriendly polymer additives and investigation of their efficiency in stabilization of polyolefins. Odoslaný do European Polymer Journal. EUROPOL-S-14-01273.

6. RYCHLÝ, Jozef – MOSNÁČKOVÁ, Katarína – RYCHLÁ, Lyda – FIEDLEROVÁ, Agnes – KASZA, G. – NÁDOR, A. – OSVÁTH, Z. – STUMPHAUSER, T. – SZARKA, G. – CZANIKOVÁ, Klaudia – CHMELA, Štefan – IVÁN, B. - MOSNÁČEK Jaroslav. Comparison of the UV stabilisation effect of commercially available processing stabilizer Irganox HP 136 with Irganox 1010 and synthesized hyperbranched phenolic antioxidants. *Odoslaný do Polymer Degradation and Stability*. PDST-D-14-00795, IF2013 = 2.633.
7. RYCHLÝ, Jozef - RYCHLÁ, Lýdia - CHMELA, Štefan - HRONEC, M. Pre-oxidation of polymers on their route to biodegradation. In *BPPA 14 : International Conference on Bio-Friendly Polymers and Polymer Additives: From Scientific Aspects to Processing and Applications* : Budapest, Hungary, 19-21 May, 2014 : program and book of abstracts. - Budapest, Hungary : Hungarian Academy of Sciences, 2014, p. 7. ISBN 978-963-08-9492-0.
8. KOLLÁR, Jozef - MRLÍK, M. - MORAVČÍKOVÁ, Daniela - MOSNÁČEK, Jaroslav - LACÍK, Igor. Superabsorbent hydrogels based on renewable monomer Tulipan A. *Asian Workshop on Polymer Processing 2014*, November 17-20, Kenting, Taiwan, book of abstracts [elektronický zdroj].
9. BORSKÁ, Katarína - MOSNÁČEK, Jaroslav - DANKO, Martin. Irradiation studies of biodegradable polyesters doped with benzil. In *BPPA 14 : International Conference on Bio-Friendly Polymers and Polymer Additives: From Scientific Aspects to Processing and Applications* : Budapest, Hungary, 19-21 May, 2014 : program and book of abstracts. - Budapest, Hungary : Hungarian Academy of Sciences, 2014, p. 41. ISBN 978-963-08-9492-0.
10. DANKO, Martin - LIBISZOWSKI, J. - BEREK, Dušan - MACOVÁ, Eva - DUDA, A. Controlled synthesis and characterization of the well-defined multiblock poly(L-lactide) - poly(epsilon-caprolactone) copolymers. In *BPPA 14 : International Conference on Bio-Friendly Polymers and Polymer Additives: From Scientific Aspects to Processing and Applications* : Budapest, Hungary, 19-21 May, 2014 : program and book of abstracts. - Budapest, Hungary : Hungarian Academy of Sciences, 2014, p. 29. ISBN 978-963-08-9492-0.
11. FALCO, M. L. - MOSNÁČKOVÁ, Katarína - PAPAJOVÁ, Eva - DANKO, Martin - MOSNÁČEK, Jaroslav. Polymers biodegradation in soil. In *BPPA 14 : International Conference on Bio-Friendly Polymers and Polymer Additives: From Scientific Aspects to Processing and Applications* : Budapest, Hungary, 19-21 May, 2014 : program and book of abstracts. - Budapest, Hungary : Hungarian Academy of Sciences, 2014, p. 21. ISBN 978-963-08-9492-0.
12. CHMELA, Štefan - CZANIKOVÁ, Klaudia - MOSNÁČKOVÁ, Katarína - MOSNÁČEK, Jaroslav - KASZA, G. - NÁDOR, A. - SZABÓ, Á. - SZABÓ, Z. - SZARKA, G. - IVÁN, B. New types of phenolic polymeric/oligomeric stabilizer and their testing in PE and PP photo-oxidation. In *BPPA 14 : International Conference on Bio-Friendly Polymers and Polymer Additives: From Scientific Aspects to Processing and Applications* : Budapest, Hungary, 19-21 May, 2014 : program and book of abstracts. - Budapest, Hungary : Hungarian Academy of Sciences, 2014, p. 45. ISBN 978-963-08-9492-0.
13. KOLLÁR, Jozef - MRLÍK, M. - MORAVČÍKOVÁ, Daniela - MOSNÁČEK, Jaroslav - LACÍK, Igor. Novel poly(acrylamide-co-2-hydroxyethylacrylate) hydrogels with superabsorbent properties. In *BPPA 14 : International Conference on Bio-Friendly Polymers and Polymer Additives: From Scientific Aspects to Processing and Applications* : Budapest, Hungary, 19-21 May, 2014 : program and book of abstracts. - Budapest, Hungary : Hungarian Academy of Sciences, 2014, p. 34. ISBN 978-963-08-9492-0.
14. KOLLÁR, Jozef - MRLÍK, M. - MORAVČÍKOVÁ, Daniela - MOSNÁČEK, Jaroslav - LACÍK, Igor. Superabsorbent hydrogels based on renewable monomer Tulipalin A. In *EUPOC 2014 : Precision Polymers: Synthesis, Folding and Function* : Gargnano, Italy, 25 - 29 May 2014 : booklet of abstracts. - Pisa, Italy : University of Pisa, Department of Chemistry & Industrial Chemistry, 2014, p. 39.
15. MORAVČÍKOVÁ, Daniela - KOLLÁR, Jozef - MRLÍK, M. - MOSNÁČEK, Jaroslav - LACÍK, Igor. The synthesis and properties of tulipalin- based hydrogels. In *BPPA 14 : International Conference on Bio-Friendly Polymers and Polymer Additives: From Scientific Aspects to Processing and Applications* : Budapest, Hungary, 19-21 May, 2014 : program and book of abstracts. - Budapest, Hungary : Hungarian

Academy of Sciences, 2014, p. 53. ISBN 978-963-08-9492-0.

16 MOSNÁČEK, Jaroslav - IVÁN, B. Advanced bio-friendly polymers - POLYFRIEND. In BPPA 14 : International Conference on Bio-Friendly Polymers and Polymer Additives: From Scientific Aspects to Processing and Applications : Budapest, Hungary, 19-21 May, 2014 : program and book of abstracts. - Budapest, Hungary : Hungarian Academy of Sciences, 2014, p.1. ISBN 978-963-08-9492-0.

17. MOSNÁČEK, Jaroslav - ILČÍKOVÁ, Markéta - ANDICSOVÁ, Anita - BORSKÁ, Katarína. Photochemically induced RDRP of methacrylates by PPM amounts of copper catalysts. In EUPOC 2014 : Precision Polymers: Synthesis, Folding and Function : Gargnano, Italy, 25 - 29 May 2014 : booklet of abstracts. - Pisa, Italy : University of Pisa, Department of Chemistry & Industrial Chemistry, 2014, p. 43.

18. MOSNÁČEK, Jaroslav - KOLLÁR, Jozef - MORAVČÍKOVÁ, Daniela - MRLÍK, M. Copolymers from a renewable monomer Tulipalin A. In BiPoCo 2014 : 2nd International Conference on Bio-based Polymers and Composites : Visegrád, Hungary, August 24-28, 2014 : proceedings. - Budapest, Hungary : Budapest University of Technology and Economics, 2014, non p.

19. FALCO, M. L. - PAPAJOVÁ, Eva - DANKO, Martin - MOSNÁČEK, Jaroslav. Respirometric study of polymer biodegradation in soil. In BYPOS : 5th Bratislava Young Polymer Scientists Workshop : Zázrivá, Slovakia, June 16th - 20th, 2014 : workshop book. - Bratislava : Young Scientists Council of Polymer Institute of the Slovak Academy of Sciences, 2014, p. 55. ISBN 978-80-970923-5-1.

## **Programy: ERANET**

### **30.) M2 Neural: Multifunkčné materiály na rozhraní neurónových systémov.**

*(M2Neural: Multifunctional Materials for advanced Neural interfaces.)*

**Zodpovedný riešiteľ:** Igor Lacík  
**Trvanie projektu:** 1.11.2014 / 30.10.2017  
**Evidenčné číslo projektu:**  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** Superiore Sant'Anna  
**Počet spoluriešiteľských inštitúcií:** 1 - Taliansko: 1  
**Čerpané financie:** 0 €

#### **Dosiahnuté výsledky:**

V prvých dvoch mesiacoch riešenia projektu sa pripravil súhrn kľúčových špecifikácií, ktorý predstavuje míľnik M1 v projekte.

#### **Výstupy:**

Kick-off stretnutie projektu v novembri 2014.

### **31.) Aplikácia polymérnych nanokompozitov s nízkym obsahom grafenu v elektronických zariadeniach.**

*(Applications of polymer nanocomposites with low content of graphene in electronic devices.)*

**Zodpovedný riešiteľ:** Zdenko Špitálsky  
**Trvanie projektu:** 1.1.2012 / 31.12.2014  
**Evidenčné číslo projektu:** ID 794 (NT-ERA-Net)  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** West Pomerian University, Szczecin  
**Počet spoluriešiteľských inštitúcií:** 7 - Poľsko: 4, Turecko: 3

**Čerpané financie:** PSAV: 48 000 €

**Dosiahnuté výsledky:**

V roku 2014 sme sa zamerali na modifikáciu nanoplňiva za účelom zlepšenia bariérových vlastností pripravených kompozitov, resp. modifikáciou nanoplňiva magnetickými nanočasticami pre elektro-magnetické vlastnosti.

**Výstupy:**

1. PASZKIEWICZ, S. - SZYMCZYK, A. - ŠPITALSKÝ, Zdenko - MOSNÁČEK, Jaroslav - KWIATKOWSKI, K. - ROSLANIEC, Z. Structure and properties of nanocomposites based on PTT-block-PTMO copolymer and graphene oxide prepared by in situ polymerization. In European Polymer Journal, 2014, vol. 50, p. 69-77. (3.242 - IF2013). ISSN 0014-3057.
2. PASZKIEWICZ, S. - NACHMAN, M. - SZYMCZYK, A. - ŠPITALSKÝ, Zdenko - MOSNÁČEK, Jaroslav - ROSLANIEC, Z. Influence of expanded graphite (EG) and graphene oxide (GO) on physical properties of PET based nanocomposites. In Polish journal of chemical technology, 2014, vol.16, no.4, p. 45-50. (0.474 - IF2013). ISSN 1509-8117.
3. MALÍKOVÁ, Marta - ŠPITALSKÝ, Zdenko - ŽIAČKOVÁ, K. - ŠESTÁK, J. - OMASTOVÁ, Mária. Flammability of smart textiles based on expanded graphite-polymeric nanocomposites. In Characterisation of Flame Retardant Textiles and Related Materials : COST MP1105 FLARETEX: Dubrovnik, Croatia, 7th October 2014: programme & abstracts. - Zagreb, Croatia: University of Zagreb, 2014, p. 12.
4. PASZKIEWICZ, S. - PAWELEC, I. - SZYMCZYK, A. - ŠPITALSKÝ, Zdenko - MOSNÁČEK, Jaroslav - ROSLANIEC, Z. Hybrid CNT/graphene nanoparticles in polymer nanocomposites based on poly(trimethylene terephthalate) prepared by in situ polymerization. In The 22nd Annual International Conference on Composites/Nano Engineering. - St. Julian, Malta, 2014, doi:10.13140/2.1.1832.0643.

**Programy: Iné**

**32.) Nové materiály prechádzajúce fázovou premenou so zlepšeným prestupom tepla.**

*(New Phase Change Materials with improved heat transfer properties.)*

**Zodpovedný riešiteľ:** Zdenko Špitálsky  
**Trvanie projektu:** 1.11.2011 / 31.3.2015  
**Evidenčné číslo projektu:** NPRP No. : 4 – 465 – 2 -173  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** Qatar University  
**Počet spoluriešiteľských inštitúcií:** 1 - Katar: 1  
**Čerpané financie:** 30 236 €

**Dosiahnuté výsledky:**

V roku 2014 sme sa zamerali predovšetkým na sledovanie stability a tepelné prenosy pripravených kompozitov.

**Výstupy:**

1. KRUPA, Igor - NÓGELLOVÁ, Zuzana - ŠPITALSKÝ, Zdenko - JANIGOVÁ, Ivica - BOH, B. - SUMIGA, B. - KLEINOVÁ, Angela - KARKRI, M. - ALMAADEED, M. A. Phase change materials based on high-density polyethylene filled with microencapsulated paraffin wax. In Energy Conversion and Management, 2014, vol. 87, p. 400-409. (3.590 - IF2013). ISSN 0196-8904.
2. SARI-BEY, S. - FOIS, M. - KRUPA, Igor - IBOS, L. - BENYOUCEF, B. - CANDAU, Y. Thermal characterization of polymer matrix composites containing microencapsulated paraffin in solid or liquid state. In Energy Conversion and Management, 2014, vol. 78, p. 796-804. (3.590 - IF2013). ISSN 0196-8904.
3. NÓGELLOVÁ, Zuzana - KRUPA, Igor - ŠPITALSKÝ, Zdenko - CSOMOROVÁ, Katarína - JANIGOVÁ, Ivica - MALÍKOVÁ, Marta - ŽIGO, Ondrej - ALMAADEED, M. A. Ali. Termické a mechanické vlastnosti zmesí vysokohustotného polyetylénu a enkapsulovaného parafínového vosku. In Chemické listy, 2014, roč. 108, č. 8, s. 787-788. (0.196 - IF2013). ISSN 0009-2770.

4. NÓGELLOVÁ, Zuzana - KRUPA, Igor - JANIGOVÁ, Ivica - CSOMOROVÁ, Katarína - KRATOCHVÍLA, Ján - ŠPITALSKÝ, Zdenko - ALMAADEED, M. A. Kompozity nízko-hustotného polyetylénu s parafrínovým voskom. In PLASTKO 2014 : zborník príspevkov z konferencie PLASTKO 2014, 8. - 9. 4. 2014 [elektronický zdroj]. - Zlín, ČR : Universita Tomáše Bati ve Zlíně, 2014, p. 265-267. ISBN 978-80-7454-335-7.

## Projekty národných agentúr

### Programy: VEGA

#### 1.) Štruktúrálna-dynamická charakterizácia objemových a priestorovo limitovaných sklotvorných a kryštalizujúcich materiálov pomocou ESR techniky.

*(Structure-dynamic characterization of bulk and space-limited glass-forming and crystallizing materials by means of ESR technique.)*

**Zodpovedný riešiteľ:** Josef Bartoš  
**Trvanie projektu:** 1.1.2012 / 31.12.2015  
**Evidenčné číslo projektu:** 2/0017/12  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 3 800 + 60 €

#### Dosiahnuté výsledky:

Kombinované vyšetrenie série modelového elastomérov 1,4-poly(izoprén)u (1,4-PIP) tj. dvoch oligomérov a jedného polyméru s molekulovými hmotnosťami  $8 \times 10^2$ ,  $4.3 \times 10^3$  a  $8 \times 10^5$  g/mol pomocou ESR a PALS techník odhalilo niekoľko koincidiencií medzi charakteristickými ESR a PALS teplotami, ktoré indikujú spoločný pôvod zmien v rotačno-dynamickom molekulovej spinovej sondy TEMPO resp. anihilačnom procese atomickej orto-pozitroniovej (o-Ps) próby. Naše empirické pravidlá o strednej dobe života o-Ps pri dvoch charakteristických ESR teplotách spinovej sondy TEMPO tj. prechodu z pomalého do rýchleho režimu pri T50G a akcelerácia v rýchlym režime pri TX1fast:  $\tau_3(T50G) \propto \text{const.1}$ ,  $\tau_3(TX1fast) \propto \text{const.2}$  nájdené v sérii nízko- a vysokomolekulových látok boli ďalej potvrdené aj pre sériu organických matric rovnakej chemickej štruktúry tj. nezávislosť príslušných lokálnych voľných objemov spojených s daným prechodom pri T50G a TX1fast od dĺžky reťazca 1,4-PIPU v danom intervale molekulových hmotností. Navyše, odhalila sa úzka koincidencia medzi charakteristickými ESR a PALS teplotami urýchlením dynamiky v oblasti pomalého režimu pod T50G a zmenou vo voľno-objemovom distribučnom parametri z PALS dát od nemeckých partnerov, ktorá poukazuje na veľmi úzky súvis medzi zmenou dynamiky spinovej sondy a lokálneho voľného objemu v sklovitom stave 1,4-PIP matric. Všetky tieto nálezy poukazujú na spoločného pôvodcu príslušných zmien v dynamike molekulovej sondy a anihilácii atomickej próby.

#### **Výstupy:**

1. BARTOŠ, Josef - ŠVAJDLENKOVÁ, Helena - LUKEŠOVÁ, Miroslava - YU, Y. - KRAUSE-REHBERG, R. Molecular dynamics and free volume in organic glass-formers: A series of oligomer and polymer 1,4-poly(isoprene)s. In Chemical Physics Letters, 2014, vol. 602, p. 28-33. (1.991 - IF2013). ISSN 0009-2614.

## 2.) Dvojdimenziálna kvapalinová chromatografia komplexných polymérových systémov. (Two-dimensional liquid chromatography of complex polymer systems.)

**Zodpovedný riešiteľ:** Dušan Berek  
**Trvanie projektu:** 1.1.2012 / 31.12.2014  
**Evidenčné číslo projektu:** 2/0001/12  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 4 707 €

### Dosiahnuté výsledky:

V hodnotenom období sme sa venovali rozšíreniu aplikácií kvapalinovej chromatografie pri limitných podmienkach entalpických interakcií, osobitne kvapalinovej chromatografie pri limitných podmienkach desorpcie, LC LCD na ďalšie blokové kopolyméry a na multikomponentové polymérové systémy. Osobitnú pozornosť sme venovali identifikácii systému na LC LCD separáciu blokových kopolymérov polystyrén (PS)-blok-poly(metyl akrylát) a PS-blok-poly(metyl metakrylát) (PMMA) pripravených v pracovnej skupine Š. Chmelu (J. Kollár) a polykaprolaktón (PCL)-blok-poly(laktid) pripravených v pracovnej skupine J. Mosnáčeka (M. Danko). Testovali sme využiteľnosť našej LC LCD metódy na separáciu cyklického a lineárneho PCL zo Španielska, poly(2-vinyl pyridín)(P2VP)-blok-PMMA z Pakistanu, a hviezdovitých P2VP s dvoma a tromi vetvami z Taiwanu. Ukázalo sa, že dodané blokové kopolyméry obsahujú identifikovateľné množstvo materských homopolymérov, ale cyklické i hviezdovité polyméry nie sú definované a obsahujú veľa lineárnych makromolekúl, čo znemožnilo ich kvantitatívnu analýzu. Do problematiky, ktorá tvorila náplň tohoto VEGA projektu patrí aj spolupráca zahrnutá do projektov medziakademickej spolupráce SAV s partnermi v zahraničí ako aj nezmluvná medzinárodná spolupráca. V rámci MAD projektu s CONICET, Santa Fe, Argentína: „Charakterizácia chromatograficky zložitých polymérov pokročilými metódami kvapalinovej chromatografie: MD-SEC a LC LCD“ sme ukončili GPC merania polystyrénových modelov, do ktorých boli pridané malé množstvá PS kontaminantu s inou mólovou hmotnosťou. V rámci projektu MAD spolupráce SAV-CNRS, Francúzsko: „Syntéza, molekulová charakterizácia a čistenie blokových kopolymérov“ sme vykonali rad meraní blokových kopolymérov PS-b-PMA a PMA-b-PS pripravených v Marseille ako aj blokových kopolymérov PnBA-b-PMMA pripravených na University Pau, F. Cieľom bolo rozšíriť aplikačnú oblasť metódy LC LCD a presvedčiť zahraničných partnerov o potenciáli metódy tak, aby metódu – podobne ako AMU Marseille – zaviedli na svojich pracoviskách. Pokračovali sme v neformálnej spolupráci s prof. R. Mehtom z Univerzity Patiala, India, v rámci ktorej sme merali mólové hmotnosti a disperzity tam pripravených vzoriek poly(laktidov), ako aj poly(etylén)- a poly(propylén karbonát)ov pomocou GPC v CHCl<sub>3</sub> a CH<sub>2</sub>Cl<sub>2</sub>.

Pokračovala spolupráca s FÚ SAV (O. Šauša) v oblasti aplikácie spektroskopie doby života (anihilácie) pozitronia (PALS) na meranie kavít v silikagéloch a na štúdium chovania sa malých molekúl uväznených v póroch silikagélu. Podobne sme spolupracovali so skupinou J. Bartoša, pre ktorú sme zabezpečili vzorky pórovitých skiel plnených roztokmi stabilných voľných radikálov TEMPO v cetáne a v izopropylalkohole.

### **Výstupy:**

1. **BEREK, Dušan.** Molecular characterization of synthetic polymers by means of liquid chromatography. In Physical Chemistry of Macromolecules. Macro to Nanoscales. - Toronto : Apple Academic Press, 2014, chapter. 11, p. 221-331. ISBN 978-1-926895-64-2.

2. ROLLET, M. - PELLETIER, B. - ALTOUNIAN, A. - BEREK, Dušan - MARIA, S. - BEAUDOIN, E. - GIGMES, D. Separation of parent homopolymers from polystyrene-b-poly(ethylene oxide)-b-polystyrene triblock copolymers by means of liquid chromatography.1. Comparison of different methods. In Analytical Chemistry, 2014, vol. 86, p. 2694-2702. (5.825 - IF2013). ISSN 0003-2700.

3. SINGLA, P - MEHTA, R - BEREK, Dušan - UPADHYAY, S N. Ring opening polymerization of lactide in a monomode microwave using stannous octoate and dibutyltin dimethoxide catalysis. In Journal of Macromolecular Science : Part A: Pure & Applied Chemistry, 2014, vol. 51, iss. 4, p. 350 - 361. (0.740 - IF2013). ISSN 1060-1325.

### 3.) Simulácie skladania a agregácie polypeptidov.

*(Simulations of folding and aggregation in polypeptides.)*

**Zodpovedný riešiteľ:** Tomáš Bleha  
**Trvanie projektu:** 1.1.2012 / 31.12.2015  
**Evidenčné číslo projektu:** 2/0079/12  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 3 798 €

#### Dosiahnuté výsledky:

Molekulovo-dynamické simulácie kompresie a ohybu helikálnych polymérov so zahrnutím všetkých atómov poskytli detailné údaje o mechanizme kritického vybočenia (bucklingu)  $\alpha$ -helixov (AH). Namiesto rovnomerného ohýbania závitnice predpovedaného analytickým WLC modelom, v skutočnosti pri kritickej sile v nej dochádza k zlomu. Tento tzv. kink defekt vzniká lokálnym roztopením AH závitnice. Simulácie poskytli dôkaz o stochastickej dynamike procesu, o trhaní vodíkových väzieb a o iných atomistických detailoch mechanizmu bucklingu. Nájdený mechanizmus helikálneho zlomu možno využiť pri interpretácii ohýbania a mechanických vlastností aj u iných helikálnych (bio)polymérov, napríklad pri cyklizácii krátkych DNA molekúl.

#### **Výstupy:**

1. PALEŇČÁR, Peter - BLEHA, Tomáš. Buckling transition in long alpha-helices. In Journal of Chemical Physics, 2014, vol. 141, p. 174901 - 12 p. ISSN 0021-9606.

### 4.) Kompozitné a smart nanočastice a nanomateriály: príprava, modifikácia a kolektívne vlastnosti.

*(Composite and smart nanoparticles and nanomaterials: preparation, modification and collective properties.)*

**Zodpovedný riešiteľ:** Ignác Capek  
**Trvanie projektu:** 1.1.2014 / 31.12.2017  
**Evidenčné číslo projektu:** 2/0040/14  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 3 860 €

#### Dosiahnuté výsledky:

Závislosť rýchlosti polymerizácie akrylamidu od konverzie je popísaná krivkou so štyrmi rýchlostnými intervalmi. Rýchlosť polymerizácie prudko stúpala s koncentráciou monoméru s

reakčným poriadkom ca. 1.4. Variácia rýchlosti polymerizácie s konverziou a monomérom sa diskutovala v zmysle rôznych typov iniciujúcich radikálov, gel efektu a účasti monoméru v iniciačnom stupni.

**Výstupy:**

1. CAPEK, Ignác. On photoinduced polymerization of acrylamide. In *Designed Monomers and Polymers*, 2014, vol. 17, no. 4, p. 356-363. (2.210 - IF2013).

**5.) Štrukturálne prechody stiesnených semiflexibilných makromolekúl.**

*(Structural transitions of confined semi-flexible macromolecules.)*

**Zodpovedný riešiteľ:** Peter Cifra  
**Trvanie projektu:** 1.1.2012 / 31.12.2015  
**Evidenčné číslo projektu:** 2/0093/12  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 7 514 €

**Dosiahnuté výsledky:**

Prechod stesnaní makromolekúl v kanáloch vo forme úzkych pásikov ku kanálom s bežnejším obdĺžnikovým profilom: Vyšetřili sme prednedávnom navrhnuté linearizačné experimenty s výhodnou analýzou v tenkých pásikových kanáloch (Battacharya et al., *Europhysics Letters* 2014, 106, 18004) použitím Monte Carlo simulácií. Zvýšené natiahnutie reťazcov v takýchto kanáloch spôsobené zvýšeným vylúčeným objemom v dvojrozmernom systéme sa podstatne znižuje prechodom ku zatiaľ experimentálne dostupným kanálom v tvare štrbiny. V úzkych pásikových kanáloch sme potvrdili typický režim charakteristický pre dvojrozmerné systémy. Rozšírením kanálu v smere kolmom na plochu pásika, teda prechodom ku štrbinovému kanálu, sa znižuje výhodné natiahnutie reťazcov a pre menej ohybné reťazce nie príliš dlhé reťazce pozorujeme Gaussovský režim. Pseudoidealita reťazcov je podporená nezávisle z kriviek natiahnutia, zmenami natiahnutia so zmenou tuhosti reťazcov, z porovnania predpovedaných a pozorovaných hraníc režimu v konkrétnom vyšetřovanom systéme a zo správania štruktúrneho faktoru reťazcov. Správanie v hranatom kanáli sa pozoruje ak kanál-pásik (pôvodne hrúbky jedného monoméru) dosiahne hrúbku väčšiu ako približne 10nm. Takáto maximálna hrúbka prúžkového kanálu pre zachovanie výhody tohoto usporiadania je veľmi malá a má dopad na realizáciu DNA linearizačných experimentov v nanofluidných zariadeniach. Táto analýza má však aj širšie implikácie pre stesnané polyméry.

**Výstupy:**

1. BENKOVÁ, Zuzana - NÁMER, Pavol – CIFRA, Peter. From stripe to slab confinement for DNA linearization in nanochannels. In *Soft Matter*, prijaté

**6.) Fotochemicky aktívne systémy a značky pre polymérny výskum.**

*(Photochemically active systems and probes for polymer research.)*

**Zodpovedný riešiteľ:** Martin Danko  
**Trvanie projektu:** 1.1.2013 / 31.12.2016  
**Evidenčné číslo projektu:** 2/0112/13  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV



**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 8 773 €

**Dosiahnuté výsledky:**

Spektrálne sa charakterizovali deriváty fluorescenčného kumarínu s fenyľ-semikarbazónovým mostíkom a rôznymi elektrón-akceptornými substituentami na fenyle. V excitovanom stave je vysoko polárny komplex s vnútromolekulovým prenosom náboja (ICT) stabilizovaný polárnymi rozpúšťadlami. Pre silne elektrón-akceptorný substituent –NO<sub>2</sub> bola pozorovaná tvorba TICT stavu s nízkym kvantovým výt'azkom fluorescencie v polárnych rozpúšťadlách, čo môže byť využité na sensorické vlastnosti. Dipól-dipólová interakcia tohto derivátu vedie k tvorbe H-agregátov, ktoré vykazujú fluorescenciu.

Donor-akceptor-donorné deriváty s centrálnym tetrafluórfenylovým akceptorom boli charakterizované v roztokoch a polymérnych matriciach. Tieto centrosymetrické deriváty vykazovali nižšiu hyperpolarizovateľnosť, ale citel'né zvýšenie druhej polarizovateľnosti.

**Výstupy:**

1. KULHÁNEK, J. - BUREŠ, F. - PYTELA, O. - PIPPIG, F. - DANKO, Martin - MIKYSEK, T. - PADĚLKOVÁ, Z. - LUDWIG, M. Quadrupolar D-pí-A-pí-D chromophores with central tetrafluorobenzene acceptor and two peripheral N,N-dimethylamino and methoxy donors. In Journal of Fluorine Chemistry, 2014, vol. 181, p. 15 - 23. (1.952 - IF2013). ISSN 0022-1139.

2. CIGÁŇ, M. - DANKO, Martin - DONOVALOVÁ, J. - GAŠPAR, J. - STANKOVIČOVÁ, H. - GÁPLOVSKÝ, A. - HRDLOVIČ, Pavol. 3-(7-dimethylamino)coumarin N-phenylsemicarbazones in solution and polymer matrices: Tuning their fluorescence via para-phenyl substitution. In Spectrochimica Acta Part A - Molecular and Biomolecular Spectroscopy, 2014, vol. 126, p. 36 - 45. (2.129 - IF2013). ISSN 1386-1425.

**7.) Mikro- a nanovlákná z prírodných zdrojov na báze sacharidov a bielkovín pripravené elektrostatickým zvlákňovaním.**

*(Micro- and nanofibers from natural resources on the base of sacharides and proteins prepared by electrospinning.)*

**Zodpovedný riešiteľ:** Anita Eckstein  
**Trvanie projektu:** 1.1.2014 / 31.12.2016  
**Evidenčné číslo projektu:** 2/0142/14  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 2 497 €

**Dosiahnuté výsledky:**

Na ÚPo sa úspešne zaviedla metodika elektrostatického zvlákňovania so širokým využitím pre zvlákňovanie roztokov prírodných ako aj syntetických polymérnych roztokov. Identifikovali sa vhodné rozpúšťadlá pre celulózu a hodváb a študovala sa fyzikálna a chemická modifikácia elektrostaticky zvláknených vrstiev fluorescenčnými farbivami ako aj liečivami. V prípade liečiv sa stanovovala efektívna doba uvoľňovania liečiva zo štruktúry vlákien hodvábu.

**Výstupy:**

1. ŠIŠKOVÁ, Alena - OPÁLEK, A. - ECKSTEIN ANDICSOVÁ, Anita. Controlled release system based on the silk carriers produced by electrospinning. In Nice 2014 : 2nd International Conference Bioinspired and Biobased Chemistry & Materials : program & abstracts. - Nice, France : IUPAC, 2014, p. 65.

2. ŠIŠKOVÁ, Alena - ECKSTEIN ANDICSOVÁ, Anita - OPÁLEK, A. - RYCHTER, P. Functional materials from renewable sources produced by electrospinning technique. In Chemia - nadzbieje i marzenia :

## 8.) Relaxačné a časovo závislé efekty pri deformácii viacfázových systémov na báze polymérnej matrice.

*(Relaxation and time dependent effects at deformation of multiphase systems with polymeric matrix.)*

**Zodpovedný riešiteľ:** Ivan Chodák  
**Trvanie projektu:** 1.1.2014 / 31.12.2017  
**Evidenčné číslo projektu:** 2/0108/14  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 8 671 €

### Dosiahnuté výsledky:

V prvom roku riešenia sa podstatná časť kapacity venovala prehĺbeniu poznatkov týkajúcich sa súvislostí medzi elektrickými a mechanickými vlastnosťami polymérnych kompozitov plnených elektrovodivým plnivom. Hlavným zameraním bolo štúdium cyklických deformácií, súvisiacich s Payneovým efektom. Získali za výsledky, ktoré sa prezentovali na konferenciách a pripravujú sa publikácie.

Začali sa tiež práce zamerané na sledovanie vplyvu rýchlosti deformácie a teploty na mechanické vlastnosti zmesí elastomérov s krehkými termoplastami, ktoré nevykazujú medzu klzu.

### Výstupy:

1. KRAJČI, Juraj - ŠPITALSKÝ, Zdenko - CHODÁK, Ivan. Relationship between conductivity and stress-strain curve of electroconductive composite with SBR or polycaprolactone matrices. In European Polymer Journal, 2014, vol. 55, p. 135-143. (3.242 - IF2013). ISSN 0014-3057.
2. KRAJČI, Juraj - CHODÁK, Ivan. Vzťahy medzi mechanickou deformáciou a elektrickou vodivosťou kompozitov. In Chemické listy, 2014, roč. 108, č. 7, s. 646-652. (0.196 - IF2013). ISSN 0009-2770.
3. OLČÁK, D. – VRÁBEL, P. – KOVALÁKOVÁ, M. – CHODÁK, Ivan – ALEXYS, P. High-resolution solid state NMR study of annealed and plasticized Poly(L-lactide) acid. Expres Polymer Letters - odoslaný.
4. KRAJČI, Juraj - CHODÁK, Ivan. Structure of reinforcing filler network determined by electrical conductivity of the polymer/carbon black composite. In The 2nd CEEP Workshop on Polymer Science : Iasi, Romania : 24 - 25 October, 2014 : proceedings. - Iasi, Romania : Petru Poni Institute of Macromolecular Chemistry, 2014, p. 9. Pozvaná prednáška.
5. CHODÁK, Ivan - KRAJČI, Juraj. Structure of reinforcing carbon black network determined by electrical conductivity of the vulcanized rubber mixture. Book of abstracts 11th Fall Rubber Colloquium, Hannover, 26 - 28 November 2014, p. 13.

## 9.) Vymedzenie podmienok degradácie najmenej stabilných polymérov používaných v umeleckých artefaktoch vplyvom svetla, tepla a za prístupu vlhkosti a kyslíka.

*(Specification of degradation conditions for the least stable polymers used in the museum artefacts and the effect of light, heat, humidity and oxygen.)*

**Zodpovedný riešiteľ:** Ivica Janigová  
**Trvanie projektu:** 1.1.2012 / 31.12.2014  
**Evidenčné číslo projektu:** 1/0147/12  
**Organizácia je koordinátorom projektu:** áno

**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 3 798 €

**Dosiahnuté výsledky:**

Výsledky štúdia termickej a termooxidačnej stability celulózy a jej derivátov (metyl, etyl, hydroxyetyl a nitro) metódami DSC, TGA a chemiluminiscencie ukázali výraznú závislosť degradácie vzoriek od rýchlosti ohrevu. S klesajúcou rýchlosťou ohrevu dochádza pri všetkých sledovaných materiáloch k poklesu teplôt rozkladu a k zmene charakteru rozkladných kriviek ako dôsledok dlhšieho termického namáhania. Kyslík pôsobí ako katalyzátor pri akcelerácii degradácie celulózy a jej derivátov, čo sa prejaví poklesom teploty degradácie jednotlivých vzoriek okrem nitrocelulózy, ktorá obsahuje dostatok kyslíkatých zlúčenín v štruktúre a preto sa teplota rozkladu prakticky nemení. Chemiluminiscencia s vysokou citlivosťou monitoruje radikálové reakcie počas degradácie ako je disproporcionácia sekundárnych peroxylových radikálov, ktoré sa môžu tvoriť len na uhlíku C6 glukopyranózovej jednotky a terminácia alkyl radikálov. Simultánna tvorba karboxylovej kyseliny a vody vedie k heterolytickému štiepeniu C-O-C väzieb spájajúcich glukopyranózové jednotky. Porovnanie údajov získaných z klasických metód termickej analýzy (DSC a TGA) a chemiluminiscencie v prostredí kyslíka ukázalo vzájomnú koreláciu výsledkov. Rýchlosť degradácie závisí od reaktivity uhlíka naviazaného na uhlíku C6 - nitrocelulóza > hydroxyetylcelulóza > etylcelulóza > metylcelulóza > celulóza.

**Výstupy:**

1. JANIGOVÁ, Ivica - RYCHLÝ, Jozef - CSOMOROVÁ, Katarína - RYCHLÁ, Lýdia. Degradácia derivátov celulózy v kyslíku a dusíku. In Polymery 2014 : VIII. česko-slovenská konferencia : Tréšť, ČR, 6.-9.10. 2014 : programová brožúra konferencie. - Praha, ČR : Ústav makromolekulární chemie AV ČR, v.v.i., 2014, p. 71-73. ISBN 978-80-85009-81-1.

**10.) Biodegradovateľné polyméry a ich využitie v oblasti pôdohospodárstva a obalových aplikáciách.**

*(Biodegradable polymers for agricultural applications and food packaging.)*

**Zodpovedný riešiteľ:** Jozef Kollár  
**Trvanie projektu:** 1.1.2014 / 31.12.2016  
**Evidenčné číslo projektu:** 2/0167/14  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 7 088 €

**Dosiahnuté výsledky:**

V spolupráci s katedrou zeleninárstva SPU v Nitre sa otestovala mulčovacia fólia na báze PLA-PHB (poly(lactic acid) poly(3-hydroxybutyrate)). Fólia bola použitá na mulčovanie papriky počas vegetačného obdobia. Polymérne vzorky boli priebežne odoberané z rôznych častí fólie, čo má simulovať vplyv svetla na degradáciu polyméru. V rámci pokusu sme overovali vplyv biodegradovateľnej mulčovacej fólie na úrodu a obsah vitamínu C a celkových karotenoidov v zeleninovej paprike (odroda Pikant). Obsah oboch kvalitatívnych zložiek bol sledovaný v technologickej (konzumnej) ale i botanickej zrelosti. Jednotlivé vzorky sa podrobili testom mechanických vlastností. Mechanické vlastnosti boli merané na prístroji Instron a taktiež boli študované zmeny v dynamických moduloch prostredníctvom DMTA analýzy. Povrchové zmeny analyzovaných fólií boli sledované prostredníctvom ATR-FTIR analýzy. Počas prírodného starnutia sa pozorovali výrazne poklesy v pevnosti a predĺžení a nárast Youngovho modulu, čo

súvisí s výrazným fyzikálnym starnutím materiálu počas troch mesiacoch expozície. Najvýraznejšie zmeny boli pozorované v prípade fólií zakopaných v zemi v dôsledku mikrobiálnej aktivity pôdy. Najmenšie poklesy v pevnosti a predĺžení boli sledované v prípade fólií vystavených priamej slnečnej expozícii s minimálnym povrchovým pôsobením pôdnej mikroflóry.

#### **Výstupy:**

1. CHMELA, Štefan – KOLLÁR, Jozef - HRČKOVÁ Ľudmila. Fluoresce dye-labelled polymers prepared by nitroxide mediated radical polymerization. In Asian workshop on polymer processing 2014, November 17-20, 2014, Kenting, Taiwan, book of abstracts [elektronický zdroj].
2. KOLLÁR, Jozef - MRLÍK, M. - MORAVČÍKOVÁ, Daniela - MOSNÁČEK, Jaroslav - LACÍK, Igor. Superabsorbent hydrogels based on renewable monomer Tulipan A. Asian Workshop on Polymer Processing 2014, November 17-20, Kenting, Taiwan, book of abstracts [elektronický zdroj].
3. HRČKOVÁ, Ľudmila - KOLLÁR, Jozef - CHMELA, Štefan - MACOVÁ, Eva - ŠIŠKOVÁ, Alena - BEREK, Dušan. Príprava blokových kopolymérov nitroxidmi riadenou kontrolovanou radikálovou polymerizáciou. In Chemické listy, 2014, roč. 108, č. 8, s. 787. (0.196 - IF2013). ISSN 0009-2770.
4. KOLLÁR, Jozef - MRLÍK, M. - MORAVČÍKOVÁ, Daniela - MOSNÁČEK, Jaroslav - LACÍK, Igor. Novel poly(acrylamide-co-2-hydroxyethylacrylate) hydrogels with superabsorbent properties. In BPPA 14 : International Conference on Bio-Friendly Polymers and Polymer Additives: From Scientific Aspects to Processing and Applications : Budapest, Hungary, 19-21 May, 2014 : program and book of abstracts. - Budapest, Hungary : Hungarian Academy of Sciences, 2014, p. 34. ISBN 978-963-08-9492-0.
5. KOLLÁR, Jozef - MRLÍK, M. - MORAVČÍKOVÁ, Daniela - MOSNÁČEK, Jaroslav - LACÍK, Igor. Superabsorbent hydrogels based on renewable monomer Tulipalin A. In EUPOC 2014 : Precision Polymers: Synthesis, Folding and Function : Gargnano, Italy, 25 - 29 May 2014 : booklet of abstracts. - Pisa, Italy : University of Pisa, Department of Chemistry & Industrial Chemistry, 2014, p. 39.
6. MORAVČÍKOVÁ, Daniela - KOLLÁR, Jozef - MRLÍK, M. - MOSNÁČEK, Jaroslav - LACÍK, Igor. The synthesis and properties of tulipalin- based hydrogels. In BPPA 14 : International Conference on Bio-Friendly Polymers and Polymer Additives: From Scientific Aspects to Processing and Applications : Budapest, Hungary, 19-21 May, 2014 : program and book of abstracts. - Budapest, Hungary : Hungarian Academy of Sciences, 2014, p. 53. ISBN 978-963-08-9492-0.

### **11.) Modifikované polymérne povrchy pre využitie v biomedicíne.**

*(Modified polymer surfaces for biomedical application.)*

**Zodpovedný riešiteľ:** Juraj Kronek  
**Trvanie projektu:** 1.1.2012 / 31.12.2014  
**Evidenčné číslo projektu:** 2/0151/12  
**Organizácia je** áno  
**koordinátorom projektu:**  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 10 983 €

#### **Dosiahnuté výsledky:**

V poslednom roku riešenia sa pripravili hydrogély s termosenzitívnymi vlastnosťami a kontrolovanými mechanickými vlastnosťami. Taktiež sa študoval vplyv funkčných skupín na cytotoxicitu poly(2-oxazolínov).

#### **Výstupy:**

1. NOVÁK, Igor - POPELKA, Anton - VALENTIN, Marian - CHODÁK, Ivan - ŠPÍRKOVÁ, M. - TÓTH, A. - KLEINOVÁ, Angela - SEDLIAČIK, J. - LEHOCKÝ, M. - MARÔNEK, M. Surface behavior of polyamide 6 modified by barrier plasma in oxygen and nitrogen. In International journal of polymer analysis and characterisation, 2014, vol. 19, no. 1, p. 31-38.

2. KRONEK, Juraj - PETREŇČÍKOVÁ, Nadeřda - MIKULEC, Marcel - BORSKÁ, Katarína - CHRISTOVA, D. Structure analysis and thermosensitive properties of copolymers prepared from 2-ethyl-2-oxazoline and 2-(4-aminophenyl)-2-oxazoline, Polymer Bulletin, POBU-D-13-00665, v tlači

## 12.) Hydrogely modifikované peptidmi pre zlepšenie imunologickej ochrany enkapsulovaných buniek.

*(Hydrogels modified by peptides for improvement of immunological protection of encapsulated cells.)*

**Zodpovedný riešiteľ:** Zuzana Kroneková  
**Trvanie projektu:** 1.1.2012 / 31.12.2014  
**Evidenčné číslo projektu:** 2/0163/12  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 3 987 €

### Dosiahnuté výsledky:

V uplynulom roku sa pokračovalo v príprave dvoch typov afinitných peptidov, a to MCP-1 a RGD. Spomenuté afinitné peptidy sa pripravili Fmoc syntézou na pevnom podklade. MCP-1 afinitný peptid bol následne inkorporovaný do alginátových hydrogélů a boli porovnané vlastnosti modifikovaných a nemodifikovaných hydrogélů. Zistil sa pozitívny účinok prítomného peptidu na vychytávanie cytokínů v porovnaní s nemodifikovaných hydrogélů.

### **Výstupy:**

1. ROKSTAD, A. M. A. - LACÍK, Igor - DE VOS, P. - STRAND, B. L. Advanced in biocompatibility and physico-chemical characterization of microspheres for cell encapsulation. In Advanced Drug Delivery Reviews, 2014, vol. 67-68, p. 111-130. (12.707 - IF2013). ISSN 0169-409X.

## 13.) Kinetika a bioaplikácie zwitteriónových polymérov.

*(Kinetics and bioapplications of zwitterionic polymers.)*

**Zodpovedný riešiteľ:** Igor Lacík  
**Trvanie projektu:** 1.1.2014 / 31.12.2014  
**Evidenčné číslo projektu:** 2/0198/14  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 10 734 €

### Dosiahnuté výsledky:

Stanovenie rýchlostných konštánt propagácie sulfobetaínů (práca v príprave), štúdium kinetiky relevantných monomérov s nabitými skupinami, vývoj metodiky PLP-SEC.

### **Výstupy:**

1. LACÍK, Igor - STACH, Marek - KASÁK, Peter - SEMAK, V. - UHELKÁ, Lucia - CHOVANCOVÁ, Anna - REINHOLD, G. - KILZ, P. - DELAITTRE, G. - CHARLEUX, B. - CHADUC, I. - D'AGOSTO, F. - LANSALOT, M. - GABORIEAU, M. - CASTIGNOLLES, P. - GILBERT R.G. - SZABLAN, Z. - BARNER-KOWOLLIK, CH. - HESSE, P. - BUBACK, M. SEC Analysis of poly(acrylic acid) and poly(methacrylic acid). In Macromol. Chem. Phys. 2014, DOI: 10.1002/macp.201400339, (2.451 - IF2013)

**14.) Oxidačné a hydrolytické starnutie celulózy ako dôležitý faktor zmien ich horľavosti.**  
(*Oxidative and hydrolytic ageing of cellulose derivatives as an important factor of flammability changes.*)

**Zodpovedný riešiteľ:** Marta Malíková  
**Trvanie projektu:** 1.1.2014 / 31.12.2016  
**Evidenčné číslo projektu:** 2/0161/14  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 2 089 €

**Dosiahnuté výsledky:**

V rámci projektu sme metódami DSC, TG a chemiluminiscencie začali štúdium termickej a termooxidačnej stability dvoch typov nitrocelulózy s rôznym obsahom dusíka z firmy Synthesia, a.s., Pardubice, Česká republika. Okrem rôznej atmosféry (N<sub>2</sub>, O<sub>2</sub>) počas merania nás zaujímal aj vplyv rôznej rýchlosti ohrevu na termické charakteristiky jednotlivých vzoriek. Podľa predpokladu nižšia termická stabilita sa prejavila pri nitrocelulóze s vyšším obsahom dusíka. Zároveň s nárastom rýchlosti ohrevu sa teploty rozkladu posúvajú k vyšším hodnotám. Horľavosť nitrocelulózy bola meraná kónickým kalorimetrom.

**15.) Skúmanie povrchových, adhézných a antibakteriálnych vlastností vybraných medicínálnych polymérov upravených nízkoteplotnou plazmou.**

(*Investigation of surface, adhesive and antibacterial properties of selected medicinal polymers modified by low-temperature plasma.*)

**Zodpovedný riešiteľ:** Igor Novák  
**Trvanie projektu:** 1.1.2014 / 31.12.2016  
**Evidenčné číslo projektu:** 2/0199/14  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 4 336 €

**Dosiahnuté výsledky:**

Preskúmala sa povrchová modifikácia oboch polymérnych materiálov, iPP a PLA, účinkom povrchovej bariérovej plazmy ako aj objemovej RF plazmy určením kontaktných uhlov sady testovacích kvapalín s rôznou polaritou a stanovením hodnôt povrchových energií a ich disperzných a polárnych zložiek. Ako procesné plyny boli použité vzduch a argón, pričom sa skúmali chemické a fyzikálne zmeny, ktoré nastali následkom plazmovej modifikácie v oboch procesných plynch. Preskúmali sa tiež zmeny adhézných vlastností plazmou upravených iPP a PLA a rovnako aj po očkovaní alylamínom. Okrem chemického zloženia iPP a PLA boli určené fyzikálne zmeny s použitím AFM analýzy, ktoré na povrchu oboch skúmaných polymérov po modifikácii plazmou nastali. Následne sa študovali možnosti očkovania alylamínu na polymérne povrchy upravené bariérovou a RF plazmou a určili sa povrchové energie a ich zložky pre oba očkované polyméry. Antibakteriálne vlastnosti plazmou očkovaného iPP a PLA s vybranými GP a GN bakteriálnymi kmeňmi Staphylococcus aureus a Escherichia coli budú stanovené začiatkom roka 2015.

**Výstupy:**

1. LÓPEZ-GARCÍA, J. - LEHOČKÝ, M. - HUMPOLÍČEK, P. - NOVÁK, Igor. On the correlation of surface charge and energy in non-thermal plasma-treated polyethylene. In Surface and Interface Analysis, 2014, vol. 46, p. 625-629. (1.393 - IF2013). ISSN 0142-2421.
2. KARBASSI, E. - ASADINEZHAD, A. - LEHOČKÝ, M. - HUMPOLÍČEK, P. - VESEL, A. - NOVÁK, Igor - SÁHA, P. Antibacterial performance of alginic acid coating on polyethylene film. In International Journal of Molecular Sciences, 2014, vol. 15, p. 14684-14696. (2.339 - IF2013). ISSN 1422-0067.
3. NOVÁK, Igor - POPELKA, Anton - VALENTIN, Marian - CHODÁK, Ivan - ŠPÍRKOVÁ, M. - TÓTH, A. - KLEINOVÁ, Angela - SEDLIAČIK, J. - LEHOČKÝ, M. - MARÔNEK, M. Surface behavior of polyamide 6 modified by barrier plasma in oxygen and nitrogen. In International Journal of Polymer Analysis and Characterisation, 2014, vol. 19, no. 1, p. 31-38. (1.487 - IF2013). ISSN 1023-666X.

**16.) Polymérne nanokompozity a hybridy a ich aplikácie ako senzory a aktuátory.**

*(Polymeric nanocomposites and hybrids and their applications as sensors and actuators.)*

**Zodpovedný riešiteľ:** Mária Omastová  
**Trvanie projektu:** 1.1.2014 / 31.12.2017  
**Evidenčné číslo projektu:** 2/0149/14  
**Organizácia je** áno  
**koordinátorom projektu:**  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských** 0  
**inštitúcií:**  
**Čerpané financie:** 14 865 €

**Dosiahnuté výsledky:**

Pripravila sa séria nanokompozitov, ktoré boli testované ako senzory plynov a kvapalín. Testovali sa rôzne vplyvy, ako hrúbka senzoru, vzdialenosť kontaktov, koncentrácia vodivého plniva, teplota a pod.

**Výstupy:**

1. OMASTOVÁ, Mária - BOBER, P. - MORÁVKOVÁ, Z. - PEŘINKA, N. - KAPLANOVÁ, M. - SYROVÝ, T. - HRMÁDKOVÁ, J. - TRCHOVÁ, M. - STEJSKAL, J. Towards conducting inks: Polypyrrole-silver colloids. In Electrochimica Acta, 2014, vol. 122, p. 296-302. (4.086 - IF2013). ISSN 0013-4686.
2. OMASTOVÁ, Mária - MIČUŠÍK, Matej - FEDORKO, P. - PIONTECK, J. - KOVÁŘOVÁ, J. - CHEHIMI, M. M. The synergy of ultrasonic treatment and organic modifiers for tuning the surface chemistry and conductivity of multiwalled carbon nanotubes. In Surface and Interface Analysis, 2014, vol. 46, p. 940-944. (1.393 - IF2013). ISSN 0142-2421.
3. VALENTOVÁ, H. - ILČÍKOVÁ, Markéta - CZANIKOVÁ, Klaudia - ŠPITALSKÝ, Zdenko - ŠLOUF, M. - NEDBAL, J. - OMASTOVÁ, Mária. Dynamic mechanical and dielectric properties of ethylene vinyl acetate/carbon nanotube composites. In Journal of Macromolecular Science : Part B: Physics, 2014, vol. 53, no. 3, p. 496-512. (0.619 - IF2013). ISSN 0022-2348.
4. WINTER, A. D. - LARIOS, E. - ALAMGIR, F. M. - JAYE, Ch. - FISCHER, D. A. - OMASTOVÁ, Mária - CAMPO, E. M. Thermo-active behavior of ethylene-vinyl acetate. I. Multiwall carbon nanotube composites examined by in situ near-edge X-ray absorption fine-structure spectroscopy. In Journal of Physical Chemistry C, 2014, vol. 118, p. 3733-3741. (4.835 - IF2013). ISSN 1932-7447.

## 17.) Nanoštrukturované polyméry a nanoštruktúra v polyméroch.

*(Nanostructured polymers and polymer nanostructure.)*

**Zodpovedný riešiteľ:** Dušan Račko  
**Trvanie projektu:** 1.1.2013 / 31.12.2016  
**Evidenčné číslo projektu:** 2/0068/13  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 1 445 €

### Dosiahnuté výsledky:

V uplynulom roku sme v rámci projektu študovali vlastnosti hviezdicových polymérov v podmienkach stesnania. Modelovaný bol prípad hviezdicovej DNA. DNA molekuly existujú v mnohých zaujímavých konformáciách, ako katenáty, uzly, sklbované reťazce, ale aj hviezdy, ktoré vznikajú v procese transkripcie. Pri štúdiu DNA sa jednotlivé typy molekúl separujú, napríklad v mikrofluidných zariadeniach alebo, klasickejšie, chromatograficky. Náš model reprezentoval prípad štvorramennej DNA spojenej tzv. Holliday junction v elektroforetickej živici. Pri pohybe EF médiom sa ramená usporiadajú podobne pohybu chobotnice. Relaxácia molekuly je hnaná koncentráciou spolu naskladaných ramien. Tento efekt bude slabší v prípade tuhších reťazcov. Relaxácia postupuje po ramenách od branching point.

### **Výstupy:**

1. RAČKO, Dušan. The free volume of condensed phases confined in a nanopore as seen by computer simulations and compared to PALS. In Acta Physica Polonica A, 2014, vol. 125, no. 3, p. 785-788. (0.604 - IF2013). ISSN 0587-4246.
2. RAČKO, Dušan. Arm retraction and escape transition in semi-flexible star polymer under cylindrical confinement. Journal of Physical Chemistry –odoslané

## 18.) Grafénové polymérne nanokompozity pre environmentálne monitorovanie.

*(Graphene containing polymer nanocomposites for environmental monitoring.)*

**Zodpovedný riešiteľ:** Zdenko Špitálsky  
**Trvanie projektu:** 1.1.2012 / 31.12.2015  
**Evidenčné číslo projektu:** 2/0119/12  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 9 910 €

### Dosiahnuté výsledky:

Pripravila sa séria kompozitov, ktoré boli testované na senzoriku na motorový olej alebo ropu s veľmi rýchlou odozvou. Testovali sa rôzne vplyvy, ako hrúbka senzoru, vzdialenosť kontaktov, koncentrácia vodivého plniva, teplota a pod.

### **Výstupy:**

1. KRUPA, Igor - PROSTREDNÝ, M. - ŠPITALSKÝ, Zdenko - KRAJČI, J. - ALMAADEED, M.A.S., Electrically conductive composites based on an elastomeric matrix filled with expanded graphite as a potential oil sensing material. In Smart Materials and Structures, vol. 23 (12), 2014, 125020



**19.) Mechanizmus a kinetika radikálovej polymerizácie vo vodnej fáze: rýchlostné konštanty propagácie pre kationové monoméry.**

*(Mechanism and kinetics of radical polymerization in aqueous phase: rate constants of propagation for cationic monomers.)*

**Zodpovedný riešiteľ:** Lucia Uhelská  
**Trvanie projektu:** 1.1.2012 / 31.12.2014  
**Evidenčné číslo projektu:** 2/0160/10  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 3 439 €

**Dosiahnuté výsledky:**

Pomocou gélovej permeačnej chromatografie sa definovali podmienky na určenie distribúcie mólových hmotností kationových kopolymérov a homopolymérov. Získali sa rýchlostné konštanty radikálovej polymerizácie vodorozpusťných substituovaných akrylamidov. Vzhľadom na správanie sa kationových polymérov, ktoré zatiaľ nie je objasnené, je veľmi zložité získať základné dáta týkajúce sa kinetiky homopolymerizácie.

**Výstupy:**

1. UHELSKÁ, Lucia – CHORVÁT, D. – HUTCHINSON, R.A. – SANTANAKRISHNAN, S. – BUBACK, M. – LACÍK, Igor. Radical propagation kinetics of N -vinylpyrrolidone in organic solvents studied by pulsed-laser polymerization–size-exclusion chromatography (PLP–SEC). In Macromol. Chem. Phys. 2014, vol. 215, no. 23, p. 2327-2336 (2,451- IF2013).
2. HAEHNEL, A. P. - STACH, Marek - CHOVANCOVÁ, Anna - RUEB, J. M. - DELAITTRE, G. – MISSKE, A. M. - LACÍK, Igor - BARNER-KOWOLLIK, Ch. (Meth)acrylic monomers with heteroatom-containing ester sidechains: a systematic PLP-SEC and polymerization study. In Polymer Chemistry, 2014, vol. 5, p. 862-873. (5.368 - IF2013).

**Programy: APVV**

**20.) Imobilizačné techniky pre prípravu biokatalyzátorov na priemyselnú produkciu prírodných aróm.**

*(Immobilization techniques for preparation of biocatalysts for industrial production of natural flavours.)*

**Zodpovedný riešiteľ:** Marek Bučko  
**Zodpovedný riešiteľ v organizácii SAV:** Igor Lacík  
**Trvanie projektu:** 1.5.2011 / 31.10.2014  
**Evidenčné číslo projektu:** APVV-0302-10  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:**  
**Počet spoluriešiteľských inštitúcií:** 3 - Slovensko: 3  
**Čerpané financie:** APVV: 7 842 €

### **Dosiahnuté výsledky:**

Vyhodnotenie rozdielov medzi imobilizačnými maticami na báze polyelektrolytových mikrokapsúl a komerčných polyvinylalkoholových hydrogéllov.

### **Výstupy:**

1. SCHENKMAYEROVÁ, A. - BUČKO, M. - GEMEINER, P. - TREŤOVÁ, Dušana - LACÍK, Igor - CHORVÁT, D. Jr. - AČAI, P. - POLAKOVIČ, M. - LIPTÁK, L. - REBROŠ, M. - ROSENBERG, M. - ŠTEFUCA, V. - NEDĚLA, V. - TIHLAŘÍKOVÁ, E. Physical and bioengineering properties of polyvinyl alcohol lens-shaped particles versus spherical polyelectrolyte complex microcapsules as immobilisation matrices for a whole-cell Baeyer-Villiger monooxygenase. In Applied Biochemistry and Biotechnology, 2014, vol. 174, p. 1834-1849. (1.687 - IF2013)

## **21.) Fotoaktívne hybridné nanomateriály s luminiscenčnými a antimikrobiálnymi vlastnosťami.**

*(Photoactive hybrid nanomaterials with luminescent and antimicrobial properties.)*

**Zodpovedný riešiteľ:** Juraj Bujdák  
**Zodpovedný riešiteľ v organizácii SAV:** Martin Danko  
**Trvanie projektu:** 1.7.2012 / 31.12.2015  
**Evidenčné číslo projektu:** APVV-0291-11  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:**  
**Počet spoluriešiteľských inštitúcií:** 3 - Slovensko: 3  
**Čerpané financie:** APVV: 14 188 €

### **Dosiahnuté výsledky:**

Spektrálne sa charakterizovali deriváty fluorescenčného kumarínu s fenyľ-semikarbazónovým mostíkom a rôznymi elektrón-akceptorými substituentami na fenyle. V excitovanom stave je vysoko polárny komplex s vnútramolekulovým prenosom náboja (ICT) stabilizovaný polárnymi rozpúšťadlami. Pre silne elektrón-akceptorý substituent –NO<sub>2</sub> bola pozorovaná tvorba TICT stavu s nízkym kvantovým výtťažkom fluorescencie v polárnych rozpúšťadlách, čo môže byť využité na senzorické vlastnosti. Dipól-dipólová interakcia tohto derivátu vedie k tvorbe H-agregátov, ktoré vykazujú fluorescenciu.

Donor-akceptor-donorné deriváty s centrálnym tetrafluórfenylovým akceptorom boli charakterizované v roztokoch a polymérnych maticiach. Tieto centrosymetrické deriváty vykazovali nižšiu hyperpolarizovateľnosť, ale citel'né zvýšenie druhej polarizovateľnosti.

### **Výstupy:**

1. DANKO, Martin - KASÁK, Peter - HRDLOVIČ, Pavol. On the application of static dimers of mono-substituted derivatives of pyrene yielding excimer like emission for characterization of interactions in polymer matrices. In Polymery 2014 : VIII. česko-slovenská konferencie : Třeřř, ČR, 6.- 9.10. 2014 : programová brožura konferencie. - Praha, ČR : Ústav makromolekulární chemie AV ČR, v.v.i., 2014, p. 19-21. ISBN 978-80-85009-81-1.

## **22.) Biodekorované kompozitné magnetické nanočastice: Príprava, kolektívne vlastnosti a ich aplikácie.**

*(Biodecorated composite magnetic nanoparticles: Preparation, collective properties and applications.)*

**Zodpovedný riešiteľ:** Ignác Capek  
**Trvanie projektu:** 1.7.2012 / 31.12.2015  
**Evidenčné číslo projektu:** APVV-0125-11

**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 2 - Slovensko: 2  
**Čerpané financie:** APVV: 23 234 €pre ÚPo (celkove 39 847 €)

**Dosiahnuté výsledky:**

Vypadávanie nanočastíc z roztoku sa dosiahlo enkapsuláciou vyzrážaných nanoagregátov zlata stabilizátorom. So vzrastom koncentrácie soli a stabilizátora sa pripravili menšie častice s vyššou koncentráciou zlata.

**23.) Nanoštruktúra v makromolekulových systémoch indukovaná stesnaním.**

*(Nanostructure in macromolecular systems induced by confinement.)*

**Zodpovedný riešiteľ:** Peter Cifra  
**Trvanie projektu:** 1.7.2012 / 31.12.2015  
**Evidenčné číslo projektu:** APVV-0451-11  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** APPV: 31 077.50 €

**Dosiahnuté výsledky:**

Molekulovo-dynamické simulácie kompresie a ohybu helikálnych polymérov so zahrnutím všetkých atómov poskytli detailné údaje o mechanizme kritického vybočenia (bucklingu)  $\alpha$ -helixov (AH). Namiesto rovnomerného kompresného ohýbania predpovedaného analytickým WLC modelom, v skutočnosti pri bucklingovom prahu dochádza k zlomu v AH závitnici. Tento tzv. kink defekt vzniká lokálnym roztopením závitnice. Simulácie poskytli dôkaz o stochastickej dynamike procesu, o trhaní vodíkových väzieb a iných atomistických detailoch mechanizmu bucklingu. Nájdený mechanizmus helikálneho zlomu možno využiť pri interpretácii ohýbania helixov aj v iných prípadoch ako AH, napríklad pri cyklizácii krátkych DNA molekúl.

**Výstupy:**

1. PALENČÁR, Peter - BLEHA, Tomáš. Buckling transition in long alpha-helices. In Journal of Chemical Physics, 2014, vol. 141, 174901 - 12 p. (3.122 - IF2013). ISSN 0021-9606.
2. RAČKO, Dušan. The free volume of condensed phases confined in a nanopore as seen by computer simulations and compared to PALS. In Acta Physica Polonica A, 2014, vol. 125, no. 3, p. 785-788. (0.604 - IF2013). ISSN 0587-4246.

**24.) Technológia prípravy tenkých vrstiev karbidu kremíka: Výskum a vývoj technológií prípravy tenkých vrstiev karbidu kremíka pre aplikácie v solárnych článkoch a v tenkovrstvových súčiastkách.**

*(Silicon carbide thin film technologies: Research and development of silicon carbide thin film technologies for application in solar cells and thin film devices.)*

**Zodpovedný riešiteľ:** Jozef Huran  
**Zodpovedný riešiteľ v organizácii SAV:** Angela Kleinová  
**Trvanie projektu:** 1.10.2013 / 31.12.2016  
**Evidenčné číslo projektu:** APVV-0443-12

**Organizácia je** nie  
**koordinátorom projektu:**  
**Koordinátor:**  
**Počet spoluriešiteľských** 0  
**inštitúcií:**  
**Čerpané financie:** APVV: 4 717 €  
**Dosiahnuté výsledky:**

V uplynulom roku sa využila technika FTIR na charakterizáciu materiálov upravených nanosením vrstiev karbidu kremíka. Následne sa získané výsledky zloženia povrchovej vrstvy využili na optimalizáciu prípravy.

**Výstupy:**

1. HURAN, J. - BALALYKIN, N.I. - FESHCHENKO, A.A. - KOBZEV, A.P. - KLEINOVÁ, Angela - SASINKOVÁ, V. - HRUBČÍN, L. Transmission photocathodes based on stainless steel mesh coated with deuterated diamond like carbon films. In Nuclear Instruments and Methods in Physics Research A. Accelerators, Spectrometers, Detectors and Associated Equipment, 2014, vol. 753, p. 14-18.

**25.) Gumárenské zmesi s novými netradičnými plnivami pre špeciálne aplikácie.**

*(Rubber compounds with new types of fillers for special applications.)*

**Zodpovedný riešiteľ:** Ivan Chodák  
**Trvanie projektu:** 1.10.2013 / 30.9.2016  
**Evidenčné číslo projektu:** APVV-0694-12  
**Organizácia je** nie  
**koordinátorom projektu:**  
**Koordinátor:** Fakulta chemickej a potravinárskej technológie STU, Bratislava  
**Počet spoluriešiteľských** 0  
**inštitúcií:**  
**Čerpané financie:** APVV: 14 952 €  
**Dosiahnuté výsledky:**

Cieľom projektu APVV je sledovanie možností ovplyvnenia vlastností gumárenských zmesí prídavkom nových plnív, dosiaľ v gumárenskom priemysle nevyužívaných vôbec, alebo len v malej miere a pre obmedzený okruh aplikácií. V prvom roku riešenia sa pozornosť venovala dvom témam, a to plnivám, ktoré môžu slúžiť ako mäkké magnety s využitím kompozitov pre senzory a plnivám na báze obnoviteľných zdrojov s predpokladom získania nových vlastností výsledných zmesí. V prvom prípade sa zmesi pripravené na FChPT STU charakterizovali metódou dielektrickej spektroskopie. Keďže poznatky o použití uvedenej metódy pre daný účel sú pomerne strohé, preverili sa viaceré zmesi a pozornosť sa zamerala na princípy pre detailnejšiu interpretáciu výsledkov.

Druhou oblasťou bolo použitie bioplastov z obnoviteľných zdrojov, najmä škrobu a lignínu. Pre prvé plnivo sa ďalej rozvíjala originálna metóda pre prípravu termoplastického škrobu in situ počas miešania zmesí, s ktorou sa experimentovalo už dávnejšie, ale výskum sa utlmil. V súčasnosti sa zdá, že tento postup je nádejný pre prípravu nových kompozitov s kaučukovou maticou.

**Výstupy:**

1. POČAROVSKÝ, P. - CHODÁK, Ivan - ŠIVOVÁ, Mária - JOCHEC MOŠKOVÁ, Daniela - SEDNIČKOVÁ, Michaela. The influence of surface-active chemicals on physico-mechanical properties of natural rubber with lignin as bio-filler. In ISE '14 : 14th International Seminar on Elastomers : Bratislava, Slovakia, August 24th - 28th, 2014 : book of abstracts. - Bratislava, Slovakia : Polymer Institute of SAS, 2014, p. 144-145. ISBN 978-80-970923-6-8.

## 26.) Organóily a ich kompozity s polymérmí.

(*Organoclay and their polymer composites.*)

**Zodpovedný riešiteľ:** Peter Komadel  
**Zodpovedný riešiteľ v organizácii SAV:** Ivan Chodák  
**Trvanie projektu:** 1.5.2011 / 31.10.2014  
**Evidenčné číslo projektu:** APVV-0362-10  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:**  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** APVV: 21 248 €

### Dosiahnuté výsledky:

V rámci projektu APVV sa podrobne študovali nanokompozity s polymérovou maticou na báze organomodifikovaných silikátov ako prekursorov nanoplíniv. Ako matrice sa použili štyri rozličné polyméry, a to LDPE, polyamid-6, polykaprolaktón a prírodný kaučuk. Testovala sa možnosť charakterizácie plnív meraním reologických parametrov. Táto metóda umožňuje podstatne rýchlejšie a aj presnejšie stanovenie znášanlivosti plniva s maticou, keďže testovanie sa primárne robí v disperzii vo vhodnom rozpúšťadle, takže príprava vzoriek nevyžaduje časovo náročnejšie zamiešanie v tavenine. Týmto spôsobom je možné priamo pozorovať stupeň exfoliácie konkrétnej modifikácie povrchu plniva v danom rozpúšťadle ako dôsledku termodynamickej znášanlivosti, pričom správanie sa testovaného plniva v konkrétnom polyméri sa odhadne na základe porovnania parametrov rozpustnosti rozpúšťadla a polyméru, keďže by malo platiť, že konkrétny polymér zodpovedá rozpúšťadlu, ktoré má rovnaký alebo čo najbližší parameter rozpustnosti. Tento predpoklad sa plne potvrdil vykonanými testami, keď reologické parametre v disperzii plniva v rozpúšťadle korelovali s údajmi XRD a TEM, stanovenými v nanokompozite polymérnej matrice s tým istým plnivom. Na základe týchto experimentov je možné jednak relatívne jednoducho posúdiť vhodnosť určitej modifikácie nanoplñiva pre vytvorenie optimálnej štruktúry plniva v konkrétnom polyméri a jednak do istej miery interpretovať konečnú morfológiu nanokompozitu ako superpozíciu dôsledku termodynamických vplyvov spôsobených znášanlivosťou zložiek na jednej strane a mechanického pôsobenia síl počas miešania (efektívnosť, resp. intenzita pôsobenia mechanickej sily v priebehu miešania a tendencia k tvorbe agregátov a aglomerátov počas chladnutia taveniny) na strane druhej.

Do tlače sa odoslala jedna publikácia a na konferenciách sa prezentovalo niekoľko príspevkov.

### **Výstupy:**

1. JOCHEC MOŠKOVÁ, Daniela - JANIGOVÁ, Ivica - NÓGELLOVÁ, Zuzana - JANKOVIČ, L. - KOMADEL, P. - ŠLOUF, M. - CHODÁK, Ivan. Characterization of filler reinforcing structure in polymer – clay nanocomposites and its prediction by rheological measurements. odoslané do Appl. Polym. Sci. v 12/2014
2. JANKOVIČ, L. - JOCHEC MOŠKOVÁ, Daniela - MADEJOVÁ, J. - CHODÁK, Ivan - KOMADEL, P. Effect of two organophilic modifiers on properties of organoclay-polymer nanocomposites. In MECC2014. 7th mid-european clay conference, Dresden, Germany, 16-19 september 2014 : programme and abstractbook. - Dresden, Germany : Deutsche Ton- und Tonmineralgruppe e.V. (DTTG), 2014, p. 252.
3. CHODÁK, Ivan - PODHRADSKÁ, Silvia - ŠIVOVÁ, Mária - OMASTOVÁ, Mária. Nanocomposites with polymeric matrix preparation, properties, applications. In ISE '14 : 14th International Seminar on Elastomers : Bratislava, Slovakia, August 24th - 28th, 2014 : book of abstracts. - Bratislava, Slovakia : Polymer Institute of SAS, 2014, p. 146. ISBN 978-80-970923-6-8.
4. JOCHEC MOŠKOVÁ, Daniela - JANIGOVÁ, Ivica - CHODÁK, Ivan. Phenomenon of physical ageing of blends of polylactic acid and polyhydroxybutyrate. In BiPoCo 2014 : 2nd International Conference on

**27.) Využitie biofonických nanotechnológií k štúdiu mechanizmov bunkovej smrti s cieľom zvýšenia citlivosti detekcie a selektivity liečby nádorov.**

*(Towards increased sensitivity of cancer detection and selectivity of cancer treatment: biophotonic nanotechnology applications.)*

**Zodpovedný riešiteľ:** Juraj Kronek  
**Trvanie projektu:** 1.7.2012 / 31.12.2015  
**Evidenčné číslo projektu:** APVV-0242-11  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:** Prírodovedecká fakulta UPJŠ Košice  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** APVV: 7 616 €

**Dosiahnuté výsledky:**

Získali sa nové amfifilné častice na báze cholesterolu a dextransu, ktoré sa použili na modifikáciu syntetického LDL. Taktiež sa pripravili variácie obsahujúce kombináciu cholesterol/syntetický polymér. Uvedené nanočasti budú využité na fotodynamickú terapiu pri liečbe rakoviny.

**Výstupy:**

1. CAVARGA, I. - BILCIK, B. - VYBOR, P. - ZASKVAROVA, M. - CHORVAT, D. - KASAK, Peter - MLKVY, P. - MATEASIK, A. - CHORVATOVA, A. - MISKOVSKY, P. Photodynamic effect of hypericin after topical application in the ex ovo quail chorioallantoic membrane model. In *Planta Medica* vol.

**28.) Progresívne polymérne technológie v biomedicíne: Polymérne mikrokapsule pre imunitnú ochranu transplantovaných pankreatických ostrovčekov v liečbe cukrovky.**

*(Advanced polymer technologies in biomedicine: Polymer microcapsules for immunoprotection of transplanted pancreatic islets in diabetes treatment.)*

**Zodpovedný riešiteľ:** Igor Lacík  
**Trvanie projektu:** 1.5.2011 / 31.10.2014  
**Evidenčné číslo projektu:** APVV-0486-10  
**Organizácia je koordinátorom projektu:** áno  
**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 8 - Nórsko: 3, Slovensko: 2, USA: 3  
**Čerpané financie:** APPV: 37 117 € pre ÚPo (celkove 60 313 €)

**Dosiahnuté výsledky:**

Zásadným výsledkom je získanie poznatkov, ktoré slúžili ako podklad a viedli k príprave a získaniu projektu financovanom JDRF, ktorý bol naštartovaný v novembri 2014.

**Výstupy:**

1. ROKSTAD, A. M. A. - LACÍK, Igor - DE VOS, P. - STRAND, B. L. Advanced in biocompatibility and physico-chemical characterization of microspheres for cell encapsulation. In *Advanced Drug Delivery Reviews*, 2014, vol. 67-68, p. 111-130. (12.707 - IF2013)

2. VAITHILINGHAM, V. - KOLLÁRIKOVÁ, Gabriela - QI, M. - LARSSON, R. - LACÍK, Igor - FORMO, K. - MARCHESE, E. - OBERHOLZER, J. - GUILLEMIN, G. J. - TUCH, B. E. Beneficial effects

of coating alginate microcapsules with macromolecular heparin conjugates - In vitro and In vivo study. In Tissue engineering : Part A, 2014, vol. 20, no. 1-2, p. 324-334. (4.254 - IF2013)

3. Organizácia 22nd International Conference on Bioencapsulation/21th Bratislava International Conference on Macromolecules [http://bioencapsulation.net/2014\\_Bratislava/](http://bioencapsulation.net/2014_Bratislava/)

4. RÁZGA Filip - NÉMETHOVÁ Veronika - MATVEJOVÁ M. - LACÍK Igor. Production of ca-alginate microspheres using buchi encapsulator B-395 pro. XXII International Conference on Bioencapsulation, Bratislava, Slovakia, September 17-19, 2014: Book of contributions, p. 154-155.

5. NÉMETHOVÁ Veronika - LACÍK Igor - RÁZGA Filip. Vibration technology for microencapsulation: The restrictive role of viscosity. Biotechnology and Bioengineering, odoslané.

## 29.) Nanoštruktúrne materiály pre senzorku.

*(Nanostructured materials for sensorics.)*

**Zodpovedný riešiteľ:** Peter Lobotka  
**Zodpovedný riešiteľ v organizácii SAV:** Matej Mičušík  
**Trvanie projektu:** 1.7.2012 / 31.12.2015  
**Evidenčné číslo projektu:** APVV-0593-11  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:**  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** APVV: 16 960 €

### Dosiahnuté výsledky:

Pripravili sa a charakterizovali pomocou UV-Vis rôzne kovové nanočastice pripravené na Elektrotechnickom ústave naprašovaním na povrch iónových kvapalín. Pokračovalo sa v charakterizácii senzorkých vlastností kompozitov na báze elastomérnych matric a uhlíkových plnív (uhlíkové nanotrubičky, sadze, expandovaný grafit) ako potencionálnych senzorov na detekciu priemyselných rozpúšťadiel ako n-hexán, toluén, tetrahydrofurán a pod. Zaujímavé výsledky sa dosiahli aj v prípade kompozitov s amfifílnou matricou, kde sa zaznamenala dobrá odozva na detekciu relatívnej vlhkosti.

Metódou „layer-by-layer“ nanášaním sa pripravili zlaté elektródy dekorované Cu nanočasticami. Nanášali sa nanokoloidy v iónovej kvapaline a takto pripravené elektródy by sa dali použiť na neenzymatickú detekciu glukózy.

### Výstupy:

1. OMASTOVÁ, Mária - MIČUŠÍK, Matej - FEDORKO, P. - PIONTECK, J. - KOVÁŘOVÁ, J. - CHEHIMI, M. M. The synergy of ultrasonic treatment and organic modifiers for tuning the surface chemistry and conductivity of multiwalled carbon nanotubes. In Surface and Interface Analysis, 2014, vol. 46, p. 940-944. (1.393 - IF2013). ISSN 0142-2421.

## 30.) Živá/kontrolovaná polymerizácia: Optimalizácia polymerizačného procesu pre prípravu dobre definovaných polymérov s cieľovou architektúrou a vlastnosťami - LIVICOP.

*(Living/controlled polymerizations: Optimization of polymerization process toward well defined polymers with targeted architecture and properties – LIVICOP.)*

**Zodpovedný riešiteľ:** Jaroslav Mosnáček  
**Trvanie projektu:** 1.5.2011 / 31.10.2014  
**Evidenčné číslo projektu:** APVV-0109-10  
**Organizácia je koordinátorom projektu:** áno

**Koordinátor:** Ústav polymérov SAV  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** APVV: 45 058 €pre ÚPo (celkove 47 214 €)

**Dosiahnuté výsledky:**

Pripravili sa polystyrene-block-poly(L-laktid) diblokové kopolyméry dvomi prístupmi, t.j. predĺžením polystyrénu alebo predĺžením poly(L-laktidu). V rámci vývoja LC LCD sa identifikoval vysokoselektívny systém pre separáciu materských homopolymérov z kopolymérov polystyrene-blok-poly(L-laktid) pomocou kvapalinovej chromatografie pri limitných podmienkach desorpcie, LC LCD. V rámci vývoja nových techník radikálovej polymerizácie s vratnou aktiváciou, sa vyvinula photochemicky indukovaná radikálová polymerizácia s prenosom atómu v DMSO použitím rôznych zlúčenín medi ako katalyzátorov a v prítomnosti limitovaného množstva vzduchu.

**Výstupy:**

1. LUKÁČ, Ivan – HUSÁR, Branislav – KÓSA, Csaba, - FÁRYOVÁ, Janka: Method for cross-linking of polymer films. Medzinárodná prihláška patentu PCT/SK2014/050008.
2. BEREK, Dušan. Molecular characterization of synthetic polymers by means of liquid chromatography. In Physical Chemistry of Macromolecules. Macro to Nanoscales. - Toronto : Apple Academic Press, 2014, chapter. 11, p. 221-331. ISBN 978-1-926895-64-2.
3. ILČÍKOVÁ, Markéta - MRLÍK, M. - SEDLÁČEK, T. - CHORVÁT, D. - KRUPA, Igor - ŠLOUF, M. - KOYNOV, K. - MOSNÁČEK, Jaroslav. Viscoelastic and photo-actuation studies of composites based on polystyrene-grafted carbon nanotubes and styrene-b-isoprene-b-styrene block copolymer. In Polymer : the International Journal for the Science and Technology of Polymers, 2014, vol. 55, p. 211-218. (3.766 - IF2013). ISSN 0032-3861.
4. ILČÍKOVÁ, Markéta - MRLÍK, M. - SEDLÁČEK, T. - ŠLOUF, M. - ZHIGUNOV, A. - KOYNOV, K. - MOSNÁČEK, Jaroslav. Synthesis and photoactuating acrylic thermoplastic elastomers containing diblock copolymer-grafted carbon nanotubes. In ACS Macro Letters, 2014, vol.3, p. 999-1003. (5.245 - IF2013). ISSN 2161-1653.
5. ILČÍKOVÁ, Markéta - MOSNÁČEK, Jaroslav - MRLÍK, M. - SEDLÁČEK, T. - CSOMOROVÁ, Katarína - CZANIKOVÁ, Klaudia - KRUPA, Igor. Influence of surface modification of carbon nanotubes on interactions with polystyrene-b-polyisoprene-b-polystyrene matrix and its photo-actuation properties. In Polymers for Advanced Technologies, 2014, vol. 25, p. 1293-1300. (1.964 - IF2013). ISSN 1042-7147.
6. MOSNÁČEK, Jaroslav – KUNDYS, A. - ANDICSOVÁ, Anita. Reversible-deactivation radical polymerization of methyl methacrylate induced by photochemical reduction of various copper catalysts. In Polymers : Open Access Polymer Science Journal, 2014, vol. 6, no. 10, p. 2862-2874. (2.505 - IF2013).
7. SINGLA, P. - MEHTA, R. - BEREK, Dušan - UPADHYAY, S. N. Ring opening polymerization of lactide in a monomode microwave using stannous octoate and dibutyltin dimethoxide catalysis. In Journal of Macromolecular Science : Part A: Pure & Applied Chemistry, 2014, vol. 51, iss. 4, p. 350 - 361. (0.740 - IF2013). ISSN 1060-1325.
8. ROLLET, M. - PELLETIER, B. - ALTOUNIAN, A. - BEREK, Dušan - MARIA, S. - BEAUDOIN, E. - GIGMES, D. Separation of parent homopolymers from polystyrene-b-poly(ethylene oxide)-b-polystyrene triblock copolymers by means of liquid chromatography.1. Comparison of different methods. In Analytical Chemistry, 2014, vol. 86, p. 2694-2702. (5.825 - IF2013). ISSN 0003-2700.
9. LUKÁČ, Ivan - KÓSA, Csaba - HUSÁR, Branislav. 1,4-Bisbenzil: Visible-light- and heat-assisted crosslinking of polystyrene films. In Macromolecular Chemistry and Physics, 2014, vol. 215, p. 171 - 176. (2.451 - IF2013). ISSN 1022-1352.
10. ILLEKOVÁ, E. - MACOVÁ, Eva - MAJERNÍK, V. - MAŤKO, I. - ŠAUŠA, O. Anomalous thermal expansion of thin cetane layer solidified at the inner surface of confining nanoporous silica gel. In Journal of Thermal Analysis and Calorimetry, 2014, vol. 116, p. 753-758. (2.206 - IF2013). ISSN 1388-6150.



11. ŠAUŠA, O. - MAJERNÍK, V. - ILLEKOVÁ, E. - MACOVÁ, Eva - BEREK, Dušan. Thermal expansion of free-volume in hexadecane confined in the silica gel nanopores. In *Acta Physica Polonica A*, 2014, vol. 125, no. 3, p. 798-800. (0.604 - IF2013). ISSN 0587-4246.
12. ILČÍKOVÁ, Markéta - MRLÍK, M. - ŠPITALSKÝ, Zdenko - MICUŠÍK, Matej - CSOMOROVÁ, Katarína - SASINKOVÁ, V. - KLEINOVÁ, Angela - MOSNÁČEK, Jaroslav. A battle for the tertiary amine: reduction of graphene oxide as a competitive process to catalysis of atom transfer radical polymerization. In *RSC Advances* 2015, vol. 5, p. 3370-3376. (3.708 - IF2013)
13. KÓSA, Csaba - SEDLACIK, M. - FIEDLEROVÁ, Agnesa - CHMELA, Štefan - BORSKÁ, Katarína - MOSNÁČEK, Jaroslav. Photochemically crosslinked poly(?-caprolactone) with accelerated hydrolytic degradation. Odoslané do *European Polymer Journal*. EUROPOL-S-14-01393.
14. BEREK, Dušan. Molecular characterization of complex polymer systems by means of unconventional liquid chromatography methods. In *PLASTKO 2014: Zlín, Czech Republic, 8th - 9th April, 2014*, sborník 15 strán.
15. HRČKOVÁ, Ludmila - CHMELA, Štefan - KOLLÁR, Jozef - ŠIŠKOVÁ, Alena - MACOVÁ, Eva - BEREK, Dušan. Nitroxidom riadená syntéza blokových kopolymérov. In *PLASTKO 2014: Zlín, Czech Republic, 8th - 9th April, 2014*, sborník 6 strán.
16. DANKO, Martin - RIECKA, M. - MOSNÁČEK, Jaroslav. Copolymers of gamma-lactones prepared by ring-opening polymerization. In *EUPOC 2014 : Precision Polymers: Synthesis, Folding and Function : Gargnano, Italy, 25 - 29 May 2014 : booklet of abstracts.* - Pisa, Italy : University of Pisa, Department of Chemistry & Industrial Chemistry, 2014, p. 59.
17. HRČKOVÁ, Ludmila - KOLLÁR, Jozef - CHMELA, Štefan - MACOVÁ, Eva - ŠIŠKOVÁ, Alena - BEREK, Dušan. Příprava blokových kopolymérov nitroxidmi riadenou kontrolovanou radikálovou polymerizáciou. In *Chemické listy*, 2014, roč. 108, č. 8, s. 787. (0.196 - IF2013). ISSN 0009-2770.
18. KÓSA, Csaba - FIEDLEROVÁ, Agnesa - MOSNÁČEK, Jaroslav - CHMELA, Štefan - JANIGOVÁ, Ivica. Polycaprolactone, photochemical changes in the presence of benzophenone. In *ESPS 2014 : 3rd European Symposium of Photopolymer Science : Vienna, Austria, September 9-12, 2014 : book of abstracts.* - Vienna, Austria : Institute of Applied Synthetic Chemistry, Vienna University of Technology, 2014, p. PO-49. ISBN 978-3-9502992-9-8.
19. KÓSA, Csaba - FIEDLEROVÁ, Agnesa - MOSNÁČEK, Jaroslav - CHMELA, Štefan - JANIGOVÁ, Ivica. Polycaprolactone, photochemical changes in the presence of benzophenone. In *BiPoCo 2014 : 2nd International Conference on Bio-based Polymers and Composites : Visegrád, Hungary, August 24-28, 2014 : proceedings.* - Budapest, Hungary : Budapest University of Technology and Economics, 2014, non p.
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21. LUKÁČ, Ivan - KÓSA, Csaba - HUSÁR, Branislav. Photoperoxidation of bisbenzils as a tool for crosslinking of polystyrene. In *ESPS 2014 : 3rd European Symposium of Photopolymer Science : Vienna, Austria, September 9-12, 2014 : book of abstracts.* - Vienna, Austria : Institute of Applied Synthetic Chemistry, Vienna University of Technology, 2014, p. OP-18. ISBN 978-3-9502992-9-8.
22. MORAVČÍKOVÁ, Daniela - KOLLÁR, Jozef - MRLÍK, M. - LACÍK, Igor - MOSNÁČEK, Jaroslav. The synthesis of superabsorbent hydrogels based on hydrolyzed alpha-methylene-gamma-butyrolactone. In *Polymery 2014 : VIII. česko-slovenská konference : Třešť, ČR, 6.- 9.10. 2014 : programová brožura konference.* - Praha, ČR : Ústav makromolekulární chemie AV ČR, v.v.i., 2014, p. 86-87. ISBN 978-80-85009-81-1.
23. MOSNÁČEK, Jaroslav - ILČÍKOVÁ, Markéta - ANDICSOVÁ, Anita - BORSKÁ, Katarína. Photochemically induced RDRP of methacrylates by PPM amounts of copper catalysts. In *EUPOC 2014 : Precision Polymers: Synthesis, Folding and Function : Gargnano, Italy, 25 - 29 May 2014 : booklet of abstracts.* - Pisa, Italy : University of Pisa, Department of Chemistry & Industrial Chemistry, 2014, p. 43.

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25. ŠIŠKOVÁ, Alena - YOSSEN, M. - BRANDOLINI, M. C. - VEGA, J. R. Characterization of complex polymer systems by advanced methods of liquid chromatography with multiple detection. In YES 2014 : Fifth Young European Scientists Workshop : Crocow, Poland, September 7-11, 2014 : book of abstracts. - Crocow, Poland : Jagiellonian University, 2014, p. 45.
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27. ŠIŠKOVÁ, Alena - ECKSTEIN ANDICSOVÁ, Anita - OROVČÍK, L. - RYCHTER, P. Modification of films and electrospun mats for control release systems used in agriculture. In BiPoCo 2014 : 2nd International Conference on Bio-based Polymers and Composites : Visegrád, Hungary, August 24-28, 2014 : proceedings. - Budapest, Hungary : Budapest University of Technology and Economics, 2014, non p.
28. ŠIŠKOVÁ, Alena - MACOVÁ, Eva - VEGA, J. R. - BEREK, Dušan. The study of the sample recovery in the liquid chromatography of complex polymer systems. In ISC 2014 : 30th International Symposium on Chromatography : Communicating Separation Science for the Future : Salzburg, Austria, September 14-18, 2014 : book of abstracts [elektronický zdroj]. - Innsbruck, Austria : carpemedia GbR, 2014, p080-FFTU.
29. ŠIŠKOVÁ, Alena - MACOVÁ, Eva. Utilization of the solvents barrier effect to separate themore-component environmentally friendly polymer systems. In ISC 2014 : 30th International Symposium on Chromatography : Communicating Separation Science for the Future : Salzburg, Austria, September 14-18, 2014 : book of abstracts [elektronický zdroj]. - Innsbruck, Austria : carpemedia GbR, 2014, p079-FFMO.
30. ŠIŠKOVÁ, Alena - OPÁLEK, A. - ECKSTEIN ANDICSOVÁ, Anita. Controlled release system based on the silk carriers produced by electrospinning. In Nice 2014 : 2nd International Conference Bioinspired and Biobased Chemistry & Materials : program & abstracts. - Nice, France : IUPAC, 2014, p65.
31. ŠIŠKOVÁ, Alena - MACOVÁ, Eva - OPÁLEK, A. - RYCHTER, P. - ECKSTEIN ANDICSOVÁ, Anita. Preparation of functional materials from well characterized biodegradable co-polyesters for application in agriculture. In Nice 2014 : 2nd International Conference Bioinspired and Biobased Chemistry & Materials : program & abstracts. - Nice, France : IUPAC, 2014, p66.
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33. BEREK, Dušan. L14 size exclusion chromatography – a blessing and curse of polymer science and technology. In 20th International Symposium on Separation Sciences – ISSS 2014, Prague, Czech Republic, 30.8. – 2.9. 2014, Book of proceedings p. 29.
34. CHMELA, Štefan – KOLLÁR, Jozef – HRČKOVÁ, Ľudmila. Fluorescence dye-labelled polymers prepared by nitroxide mediated radical polymerization. In Proceedings of the Asian Workshop on Polymer Processing Annual Conference – AWPP 2014, Kenting, Taiwan, 17th – 20th November, 2014, invited lecture.
35. ŠIŠKOVÁ, Alena - MACOVÁ, Eva. Study of separation of the particular components of commercially available eco-friendly polymer systems. In BYPOS : 5th Bratislava Young Polymer Scientists Workshop : Zázrivá, Slovakia, June 16th - 20th, 2014 : workshop book. - Bratislava : Young Scientists Council of Polymer Institute of the Slovak Academy of Sciences, 2014, p. 63. ISBN 978-80-970923-5-1.
36. ŠIŠKOVÁ, Alena - ECKSTEIN ANDICSOVÁ, Anita - OPÁLEK, A. Targeted modification of films and electrospun fiber mats for control release systems used in agriculture. In BYPOS : 5th Bratislava Young Polymer Scientists Workshop : Zázrivá, Slovakia, June 16th - 20th, 2014 : workshop book. - Bratislava :

### 31.) Karbonická anhydráza IX ako funkčný komponent nádorovej progresie: úloha v epitelovo - mezenchýmovej tranzícii a v prenose medzibunkových signálov.

*(Carbonic anhydrase IX as a functional component of cancer progression: the role in epithelial-mesenchymal transition and intercellular signaling.)*

**Zodpovedný riešiteľ:** Silvia Pastoreková  
**Zodpovedný riešiteľ v organizácii SAV:** Igor Lacík  
**Trvanie projektu:** 1.7.2012 / 31.12.2015  
**Evidenčné číslo projektu:** APVV-0658-11  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:**  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** APVV: 19 153 €

#### **Dosiahnuté výsledky:**

Našli sa podmienky prípravy a charakterizácie stabilných chitozánových submikrónových častíc, ktoré budú po modifikácii protilátkou cieleňé na CA IX. Tiež sa zdokonalila metodika merania dynamickým rozptylom svetla.

#### **Výstupy:**

1. MESÁROŠOVÁ, M. - KOZICS, K. - BÁBELOVÁ, A. - SEDLÁČKOVÁ, E. - PASTOREK, M. - VNUKOVÁ, Dominika - BULIAKOVÁ, B. - RÁZGA, Filip - GÁBELOVÁ, A. The role of reactive oxygen species in the genotoxicity of surface-modified magnetite nanoparticles. In Toxicology Letters : official journal of EUROTOX, 2014, vol. 226, p. 303 - 313. (3.355 - IF2013).

2. NĚMETHOVÁ, Veronika - VNUKOVÁ, Dominika - BULIAKOVÁ, B. - GÁBELOVÁ, A. - ZÁVIŠOVÁ, V. - KONERACKÁ, M. - ČIAMPOR, F. - LACÍK, Igor - RÁZGA, Filip. The impact of coating on size and colloidal stability of magnetite nanoparticles. In XXII International Conference on Bioencapsulation : 21st Bratislava International Conference on Macromolecules : Bratislava, Slovakia, September 17-19, 2014 : book of contributions. - Bioencapsulation Research Group, 2014, p. 130-131.

3. VNUKOVÁ, Dominika - RÁZGA, Filip - NĚMETHOVÁ, Veronika - LACÍK, Igor. Factors that influence the size and colloidal stability of chitosan sub-micron particles. In XXII International Conference on Bioencapsulation : 21st Bratislava International Conference on Macromolecules : Bratislava, Slovakia, September 17-19, 2014 : book of contributions. - Bioencapsulation Research Group, 2014, p. 176-177.

### 32.) Príprava nanoštrukturovaných filmov, ich integrácia s biorozpoznávacími elementami a ich následné využitie.

*(Preparation of nanostructured interphases, their integration with bioelements and subsequent use.)*

**Zodpovedný riešiteľ:** Ján Tkáč  
**Zodpovedný riešiteľ v organizácii SAV:** Jaroslav Mosnáček  
**Trvanie projektu:** 1.7.2012 / 31.12.2015  
**Evidenčné číslo projektu:** APVV-0282-11  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:**

**Počet spoluriešiteľských** 0

**inštitúcií:**

**Čerpané financie:** APVV: 4 076 €

**Dosiahnuté výsledky:** Zosyntetizovali a aplikovali sa deriváty lipoovej kyseliny s zwitteriónovým charakterom na báze sulfo- a karboxybetaínov, ktoré po príprave monovrstiev znižujú nešpecifickú adsorpciu proteínov a zvyšujú selektivitu detekcie. **Výstupy:** 1. KLUKOVA L. - BERTOK T. - PETRIKOVA M. - SEDIVA A. - MISLOVICOVA D. - KATRLIK J. - VIKARTOVSKA A. - FILIP J. - KASÁK Peter - ANDICSOVÁ-ECKSTEIN Anita - MOSNÁČEK Jaroslav - LUKÁČ J. - ROVENSKY J. – IMRICH R. - TKAC, J. Glycoprofiling as a novel tool in serological assays of systemic sclerosis: A comparative study with three bioanalytical methods. In Analytica Chimica Acta, 2015, vol. 853, p. 555-562.

**Programy: Štrukturálne fondy EÚ Výskum a vývoj**

### **33.) Reinžiniering produktového portfólia VIPO, a.s.**

*(Adjusting the product portfolio of VIPO.)*

**Zodpovedný riešiteľ:** Ivan Chodák

**Trvanie projektu:** 1.2.2010 / 30.6.2014

**Evidenčné číslo projektu:** 26220220091 OP VaV-2009/2.2/03-SORO

**Organizácia je** nie

**koordinátorom projektu:**

**Koordinátor:** VIPO a.s., Partizánske

**Počet spoluriešiteľských** 0

**inštitúcií:**

**Čerpané financie:** MF SR: 4 188 €

**Dosiahnuté výsledky:**

Aktivity v rámci projektu spočívali predovšetkým v riešení úpravy povrchov niektorých materiálov vo forme fólií pre zvýšenie adhézie voči drevu. Pre zvýšenie hydrofilnosti polymérnych fólií, najmä na báze PVC a LDPE sa použila plazma, ako aj pre porovnanie niektoré konvenčné postupy pre povrchovú oxidáciu materiálov. V dôsledku organizačných nejasností zo stranu ASFEU pracovná kapacita na projekte bola relatívne nízka.

**Výstupy:**

1. NOVÁK, Igor - VALENTIN, Marian - PRACHÁR, Jozef - MIČUŠÍK, Matej - CHODÁK, Ivan - OMASTOVÁ, Mária. Increase of adhesion in adhesive joint PVC-polyurethane adhesive- Middle density fiberboard. In Chemické listy, 2014, roč. 108, č. 8, s. 788. (0.196 - IF2013). ISSN 0009-2770

2. NOVÁK, Igor - CHODÁK, Ivan - KRUPA, Igor - VALENTIN, Marian - PRACHÁR, Jozef. Investigation of mechanical, electrical and thermal properties of EVA-based composites. In ISE '14 : 14th International Seminar on Elastomers: Bratislava, Slovakia, August 24th - 28th, 2014 : book of abstracts. - Bratislava, Slovakia : Polymer Institute of SAS, 2014, p. 172-173. ISBN 978-80-970923-6-8.

### **34.) Výskum aplikačného potenciálu obnoviteľných a recyklovaných materiálov a informačných technológií v gumárenskom priemysle.**

*(Research on application potential of renewable and recycled materials and information technologies in rubber industry.)*

**Zodpovedný riešiteľ:** Ivan Chodák

**Trvanie projektu:** 1.7.2012 / 31.5.2015

**Evidenčné číslo projektu:** 828524, kód výzvy OPVaV-2011/2.2/07-SORO

**Organizácia je** nie

**koordinátorom projektu:**

**Koordinátor:** VIPO a.s., Partizánske  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** 33 249 €  
**Dosiahnuté výsledky:**

Pokročilo sa v skúmaní možnosti zavedenia termoplastického škrobu ako zložky do gumárenských zmesí. Na modelových zmesiach sa overilo, že škrob pôsobí vysoko pozitívne aj na mechanické vlastnosti zmesi na báze SBR, keď pevnosť v ťahu sa zvýšila až trojnásobne a predĺženie o 50 %. Pritom prídavok natívneho škrobu viedol k zníženiu oboch parametrov. Uzavrela sa charakterizácia kvality gumovej drviny vypracovaním postupu stanovenia kvality kaučuku a obsahu plnív v neznámej vzorke drviny metódou TGA.

**Výstupy:**

1. ORAVCOVÁ, Andrea - CHODÁK, Ivan - ORAVEC, J. - PREŤO, J. - HRONKOVIČ, J. - KŇAZEOVÁ, A. Effect of starch modification on mechanical and vulcanizing properties of natural rubber blends. In PLASTKO 2014 : sborník príspevků z konferencie PLASTKO 2014, 8. - 9. 4. 2014 [elektronický zdroj]. - Zlín, ČR : Universita Tomáše Bati ve Zlíně, 2014, p. [384-387]. ISBN 978-80-7454-335-7. Výveska
2. ORAVEC, J. - PRETO, J - CHODÁK, Ivan – ORAVCOVÁ, Andrea – KŇAZEOVÁ, A. Natural Rubber Composition Containing Cor Starch based Fillers. Book of abstracts 11th Fall Rubber Colloquium, Hannover 26 - 28 November 2014 p. 97.
3. HRONKOVIČ, J. - PREŤO, J. - TRNOVEC, J. - GAŽOVIČ, P. - VEREŠ, J. - CHODÁK, Ivan. The rubber crumb processing in rubber compound. In ISE '14 : 14th International Seminar on Elastomers : Bratislava, Slovakia, August 24th - 28th, 2014 : book of abstracts. - Bratislava, Slovakia : Polymer Institute of SAS, 2014, p. 159-161. ISBN 978-80-970923-6-8.
4. ORAVEC, J. - PREŤO, J. - MELUŠ, P. - ORAVCOVÁ, Andrea - KŇAZEOVÁ, A. - CHODÁK, Ivan. Application of biopolymer fillers into natural rubber blends. In ISE '14 : 14th International Seminar on Elastomers : Bratislava, Slovakia, August 24th - 28th, 2014 : book of abstracts. - Bratislava, Slovakia : Polymer Institute of SAS, 2014, p. 182-184. ISBN 978-80-970923-6-8.
5. PREŤO, J. - HRONKOVIČ, J. - ORAVEC, J. - HUDEC, I. - CHODÁK, Ivan. Influence of calcium lignosulfonate on the properties of rubber blends. In ISE '14 : 14th International Seminar on Elastomers : Bratislava, Slovakia, August 24th - 28th, 2014 : book of abstracts. - Bratislava, Slovakia : Polymer Institute of SAS, 2014, p. 190-191.

**Programy: Centrá excelentnosti SAV**

**35.) Centrum Excelentnosti pre Funkcionalizované viacfázové materiály – FUN-MAT.**  
(*Center of Excellence for Functionalized Multiphase Materials – FUN-MAT.*)

**Zodpovedný riešiteľ:** Marián Krajčí  
**Zodpovedný riešiteľ v organizácii SAV:** Jaroslav Mosnáček  
**Trvanie projektu:** 1.8.2011 / 31.12.2014  
**Evidenčné číslo projektu:**  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:**  
**Počet spoluriešiteľských inštitúcií:** 5 - Slovensko: 5  
**Čerpané financie:** MVTS: 3 295 €  
**Dosiahnuté výsledky:**

Pripravili sa kompozity s uhlíkovými nanotrubičkami cielene modifikovanými pre dosiahnutie

preferenčných interakcií s jednou fázou triblokových kopolymérov s vlastnosťami termoplastických elastomérov. Takáto modifikácia viedla k zlepšeniu viskoelastických vlastností. V závislosti od modifikácie tieto materiály vykazovali rôzne fotoaktivačné vlastnosti. Kovalentná modifikácia karbonyl železa zlepšila stabilitu magnetoreologických suspenzií. Zavedenie grafén oxidu do polyesterov výrazne ovplyvnilo ich mechanické a dielektrické vlastnosti. V rámci vývoja nových techník radikálovej polymerizácie s vratnou aktiváciou, sa vyvinula photochemicky indukovaná radikálová polymerizácia s prenosom atómu v DMSO použitím rôznych zlúčenín medi ako katalyzátorov.

#### **Výstupy:**

1. ILČÍKOVÁ, Markéta - MRLÍK, M. - SEDLÁČEK, T. - CHORVÁT, D. - KRUPA, Igor - ŠLOUF, M. - KOYNOV, K. - MOSNÁČEK, Jaroslav. Viscoelastic and photo-actuation studies of composites based on polystyrene-grafted carbon nanotubes and styrene-b-isoprene-b-styrene block copolymer. In Polymer : the International Journal for the Science and Technology of Polymers, 2014, vol. 55, p. 211-218. (3.766 - IF2013). ISSN 0032-3861.
2. ILČÍKOVÁ, Markéta - MRLÍK, M. - SEDLÁČEK, T. - ŠLOUF, M. - ZHIGUNOV, A. - KOYNOV, K. - MOSNÁČEK, Jaroslav. Synthesis and photoactuating acrylic thermoplastic elastomers containing diblock copolymer-grafted carbon nanotubes. In ACS Macro Letters, 2014, vol.3, p. 999-1003. (5.245 - IF2013). (2014 - Current Contents). ISSN 2161-1653.
3. ILČÍKOVÁ, Markéta - MOSNÁČEK, Jaroslav - MRLÍK, M. - SEDLÁČEK, T. - CSOMOROVÁ, Katarína - CZANIKOVÁ, Klaudia - KRUPA, Igor. Influence of surface modification of carbon nanotubes on interactions with polystyrene-b-polyisoprene-b-polystyrene matrix and its photo-actuation properties. In Polymers for Advanced Technologies, 2014, vol. 25, p. 1293-1300. (1.964 - IF2013). ISSN 1042-7147.
4. MOSNÁČEK, Jaroslav - KUNDYS, A. - ANDICSOVÁ, Anita. Reversible-deactivation radical polymerization of methyl methacrylate induced by photochemical reduction of various copper catalysts. In Polymers : Open Access Polymer Science Journal, 2014, vol. 6, no. 10, p. 2862-2874. (2.505 - IF2013).
5. MRLÍK, M. - ILČÍKOVÁ, Markéta - SEDLÁČEK, M. - MOSNÁČEK, Jaroslav - PEER, P. - FILIP, P. Cholesteryl-coated carbonyl iron particles with improved anti-corrosion stability and their viscoelastic behaviour under magnetic field. In Colloid and Polymer Science, 2014, vol. 292, p. 2137-2143. (2.410 - IF2013). ISSN 0303-402X.
6. VALENTOVÁ, H. - ILČÍKOVÁ, Markéta - CZANIKOVÁ, Klaudia - ŠPITALSKÝ, Zdenko - ŠLOUF, M. - NEDBAL, J. - OMASTOVÁ, Mária. Dynamic mechanical and dielectric properties of ethylene vinyl acetate/carbon nanotube composites. In Journal of Macromolecular Science : Part B: Physics, 2014, vol. 53, no. 3, p. 496-512. (0.619 - IF2013). ISSN 0022-2348.
7. BORSKÁ, Katarína - DANKO, Martin - MOSNÁČEK, Jaroslav. Fotodegradácia a fotochemické sieťovanie polylaktidu. In Chemické listy, 2014, roč. 108, s. 1030-1039. (0.196 - IF2013). ISSN 0009-2770.
8. PASZKIEWICZ, S. - SZYMCZYK, A. - ŠPITALSKÝ, Zdenko - MOSNÁČEK, Jaroslav - KWIATKOWSKI, K. - ROSLANIEC, Z. Structure and properties of nanocomposites based on PTT-block-PTMO copolymer and graphene oxide prepared by in situ polymerization. In European Polymer Journal, 2014, vol. 50, p. 69-77. (3.242 - IF2013). ISSN 0014-3057.
9. PASZKIEWICZ, S. - NACHMAN, M. - SZYMCZYK, A. - ŠPITALSKÝ, Zdenko - MOSNÁČEK, Jaroslav - ROSLANIEC, Z. Influence of expanded graphite (EG) and graphene oxide (GO) on physical properties of PET based nanocomposites. In Polish journal of chemical technology, 2014, vol.16, no.4, p. 45-50. (0.474 - IF2013). ISSN 1509-8117.
10. MORAVČÍKOVÁ, Daniela - KOLLÁR, Jozef - MRLÍK, M. - LACÍK, Igor - MOSNÁČEK, Jaroslav. The synthesis of superabsorbent hydrogels based on hydrolyzed alpha-methylene-gamma-butyrolactone. In Polymery 2014 : VIII. česko-slovenská konferencia : Třešť, ČR, 6.- 9.10. 2014 : programová brožura konferencie. - Praha, ČR : Ústav makromolekulární chemie AV ČR, v.v.i., 2014, p. 86-87. ISBN 978-80-85009-81-1.
11. MOSNÁČEK, Jaroslav - ILČÍKOVÁ, Markéta - ANDICSOVÁ, Anita - BORSKÁ, Katarína. Photochemically induced RDRP of methacrylates by PPM amounts of copper catalysts. In EUPOC 2014 :

Precision Polymers: Synthesis, Folding and Function : Gargnano, Italy, 25 - 29 May 2014 : booklet of abstracts. - Pisa, Italy : University of Pisa, Department of Chemistry & Industrial Chemistry, 2014, p. 43.

12. MOSNÁČEK, Jaroslav - ILČÍKOVÁ, Markéta - MRLÍK, M. - SEDLÁČEK, T. Synthesis and properties of thermoplastic elastomers based on acrylate block copolymers and their composites. In CLP'14 : 3rd International Symposium on Controlled/Living Polymerization. From Synthesis to Application : Antalya, Turkey, 1-4 May 2014 : symposium book. - Istanbul, Turkey : Istanbul Technical University, 2014, p. 144-145.

13. MOSNÁČEK, Jaroslav - ILČÍKOVÁ, Markéta - ANDICS, Anita - BORSKÁ, Katarína. Photopolymerization catalyzed by copper complexes. In ESPS 2014 : 3rd European Symposium of Photopolymer Science : Vienna, Austria, September 9-12, 2014 : book of abstracts. - Vienna, Austria : Institute of Applied Synthetic Chemistry, Vienna University of Technology, 2014, p. OP-27. ISBN 978-3-9502992-9-8.

## Programy: Iné projekty

### 36.) Centrum aplikovaného výskumu nových materiálov a transferu technológií.

*(Centre for applied research of new materials and technology transfer.)*

**Zodpovedný riešiteľ:** Jaromír Pastorek  
**Zodpovedný riešiteľ v organizácii SAV:** Mária Omastová  
**Trvanie projektu:** 1.9.2013 / 31.8.2015  
**Evidenčné číslo projektu:** kód ITMS projektu 262 402 200 88  
**Organizácia je koordinátorom projektu:** nie  
**Koordinátor:**  
**Počet spoluriešiteľských inštitúcií:** 0  
**Čerpané financie:** P SAV: 5 148 €

#### Dosiahnuté výsledky:

Laboratórium využitia nanomateriálov sa zameralo na výskum a vývoj nanočastíc a nanočasticových súborov a na výskum a vývoj nanokompozitov. V rámci pripravovaného projektu UPo SAV pripravilo sériu polymérnych materiálov so zlepšenými vlastnosťami a rozšírenou škálou aplikácií ako senzory plynov, ktoré sú založené na dobrej disperzii rôznych typov nanočastíc v polymérnych maticiaciach.

#### **Výstupy:**

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2. [1.1] LUM, M.A. - BALABURSKI, G.M. - MURPHY, M.E. - BLACK, A.R. - BLACK, J.D. Heat shock proteins regulate activation-induced proteasomal degradation of the mature phosphorylated form of protein Kinase C. In *JOURNAL OF BIOLOGICAL CHEMISTRY*. ISSN 0021-9258, SEP 20 2013, vol. 288, no. 38, p. 27112-27127., WOS
3. [1.1] CHENG, W.W. - FU, H.L. - FENG, F. - MA, C. - LI, J.N. - CHEN, S.Y. - WANG, H. Efficacy of lentiviral-mediated transfection of hTSHR in poorly differentiated thyroid carcinoma cell line. In *NUCLEAR MEDICINE AND BIOLOGY*. ISSN 0969-8051, MAY 2013, vol. 40, no. 4, p. 576-580., WOS
4. [1.1] DASH, T.K. - KONKIMALLA, V.B. Nanof formulations for delivery of biomolecules: focus on liposomal variants for siRNA delivery. In *CRITICAL REVIEWS IN THERAPEUTIC DRUG CARRIER SYSTEMS*. ISSN 0743-4863, 2013, vol. 30, no. 6, p. 469-493., WOS

ADEA03 000459-142638

- MOUČKA, R. - MRAVČÁKOVÁ, Miroslava - VILČÁKOVÁ, J. - OMASTOVÁ, Mária - SÁHA, P. Electromagnetic absorption efficiency of polypropylene/montmorillonite/polypyrrole nanocomposites. In *Materials and Design*, 2011, vol. 32, p. 2006 - 2011. (1.694 - IF2010). ISSN 0261-3069.

Ohlasy:

1. [1.1] ZAHEDI, M. - TABARSA, T. - ASHORI, A. - MADHOUSHI, M. - SHAKERI, A. A comparative study on some properties of wood plastic composites using canola stalk, Paulownia, and nanoclay. In JOURNAL OF APPLIED POLYMER SCIENCE. ISSN 0021-8995, AUG 5 2013, vol. 129, no. 3, p. 1491-1498., WOS
2. [1.1] WANG, Y. - HUANG, Y. - WANG, Q.F. - HE, Q. - ZONG, M. Preparation of graphene/BaFe<sub>12</sub>O<sub>19</sub>-Ni<sub>0.8</sub>Zn<sub>0.2</sub>Fe<sub>2</sub>O<sub>4</sub> nanocomposite and its microwave absorbing properties. In JOURNAL OF SOL-GEL SCIENCE AND TECHNOLOGY. ISSN 0928-0707, AUG 2013, vol. 67, no. 2, p. 344-350., WOS
3. [1.1] FAISAL, M. - KHASIM, S. Broadband electromagnetic shielding and dielectric properties of polyaniline-stannous oxide composites. In JOURNAL OF MATERIALS SCIENCE-MATERIALS IN ELECTRONICS. ISSN 0957-4522, JUL 2013, vol. 24, no. 7, p. 2202-2210., WOS
4. [1.1] KHANJANZADEH, H. - PIRAYESH, H. - SALARI, A. Long term hygroscopic characteristics of polypropylene based hybrid composites with and without organo-modified clay. In EUROPEAN JOURNAL OF WOOD AND WOOD PRODUCTS. ISSN 0018-3768, MAR 2013, vol. 71, no. 2, p. 211-218., WOS
5. [1.1] OYHARCABAL, M. - OLINGA, T. - FOULC, M.P. - LACOMME, S. - GONTIER, E. - VIGNERAS, V. Influence of the morphology of polyaniline on the microwave absorption properties of epoxy polyaniline composites. In COMPOSITES SCIENCE AND TECHNOLOGY. ISSN 0266-3538, JAN 24 2013, vol. 74, p. 107-112., WOS
6. [1.1] DEVI, D.S.P. - BIPINBAL, P.K. - JABIN, T. - KUTTY, S.K.N. Enhanced electrical conductivity of polypyrrole/polypyrrole coated short nylon fiber/natural rubber composites prepared by in situ polymerization in latex. In MATERIALS & DESIGN. ISSN 0261-3069, JAN 2013, vol. 43, p. 337-347., WOS

ADEA04 000460-142672

- ROKSTAD, A. M. - BREKKE, O.-L. - STEINKJER, B. - RYAN, L. - KOLLÁRIKOVÁ, Gabriela - STRAND, B.t L. - SKJAK-BRAEK, G. - LACÍK, Igor - ESPEVIK, T. - MOLLNES, T. E. Alginate microbeads are complement compatible, in contrast to polycation containing microcapsules, as revealed in a human whole blood model. In *Acta biomaterialia*, 2011, vol. 7, p. 2566 - 2578. (4.822 - IF2010). ISSN 1742-7061.

Ohlasy:

1. [1.1] KINGSLEY, D.M. - DIAS, A.D. - CHRISEY, D.B. - CORR, D.T. Single-step laser-based fabrication and patterning of cell-encapsulated alginate microbeads. In BIOFABRICATION. ISSN 1758-5082, DEC 2013, vol. 5, no. 4., WOS
2. [1.1] GASPERINI, L. - MANIGLIO, D. - MIGLIARESI, C. Microencapsulation of cells in alginate through an electrohydrodynamic process. In JOURNAL OF BIOACTIVE AND COMPATIBLE POLYMERS. ISSN 0883-9115, SEP 2013, vol. 28, no. 5, p. 413-425., WOS
3. [1.1] SANTOS, E. - PEDRAZ, J.L. - HERNANDEZ, R.M. - ORIVE, G. Therapeutic cell encapsulation: Ten steps towards clinical translation. In JOURNAL OF CONTROLLED RELEASE. ISSN 0168-3659, AUG 28 2013, vol. 170, no. 1, p. 1-14., WOS
4. [1.1] CAPONE, S.H. - DUFRESNE, M. - RECHEL, M. - FLEURY, M.J. - SALSAC, A.V. - PAULLIER, P. - DAUJAT-CHAVANIEU, M. - LEGALLAIS, C. Impact of alginate composition: from bead mechanical properties to encapsulated HepG2/C3A cell activities for in vivo implantation. In PLOS ONE. ISSN 1932-6203, APR 25 2013, vol. 8, no. 4., WOS
5. [1.1] ABBAH, S.A. - LIU, J. - GOH, J.C.H. - WONG, H.K. enhanced control of in vivo bone formation with surface functionalized alginate microbeads incorporating heparin and human bone morphogenetic protein-2. In TISSUE ENGINEERING PART A. ISSN 1937-3341, FEB 2013, vol. 19, no. 3-4, p. 350-359., WOS
6. [1.1] ACARREGUI, A. - ORIVE, G. - PEDRAZ, J.L. - HERNANDEZ, R.M. Therapeutic applications of encapsulated cells. In IMMOBILIZATION OF ENZYMES AND CELLS, 3RD EDITION. ISSN 1064-3745, 2013, vol. 1051, p. 349-364., WOS
7. [1.2] TUCH, B.E. - VAITHILINGAM, V. Microencapsulation for human islet transplantation. (2013) *Micro and Nanosystems*, 5 (3), p. 162-167., Scopus

## ADEB Vedecké práce v zahraničních nekarentovaných časopisech neimpaktovaných

ADEB01 000461-118865

- BUBENÍKOVÁ, S. - LACÍK, Igor - BAKOŠ, D. - VODNÁ, L. Chitosan polyelectrolyte complexes for use in tissue engineering and drug delivery. In *Materials Science Forum*, 2007, vol. 539 - 543, p. 577 - 582. ISSN 0255-5476.

Ohlasy:

1. [1.1] PENICHE, H. - REYES-ORTEGA, F. - AGUILAR, M.R. - RODRIGUEZ, G. - ABRADELO, C. - GARCIA-FERNANDEZ, L. - PENICHE, C. - SAN ROMAN, J. Thermosensitive macroporous cryogels functionalized with bioactive chitosan/bemiparin nanoparticles. In *MACROMOLECULAR BIOSCIENCE*. ISSN 1616-5187, NOV 2013, vol. 13, no. 11, p. 1556-1567., WOS

ADEB02 000462-172579

- CAPEK, Ignác. On the hybride inverse-emulsion polymerization of acrylamide. In *Polymer - Plastics Technology & Engineering*, 2005, vol. 44, no. 4, p. 539 - 555. ISSN 0360-2559.

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1. [1.1] MALLAKPOUR, S. - ZADEHNAZARI, A. Thermoplastic vinyl polymers: From macro to nanostructure. In *POLYMER-PLASTICS TECHNOLOGY AND ENGINEERING*. ISSN 0360-2559, NOV 14 2013, vol. 52, no. 14, p. 1423-1466., WOS
2. [1.1] WANG, G.X. - LU, M. - HOU, Z.H. - LI, J. - ZHONG, M. - WU, H. Controlled/living copolymerization of styrene and acrylamide in DMF with Fe/TMEDA complex as catalyst. In *JOURNAL OF POLYMER SCIENCE PART A-POLYMER CHEMISTRY*. ISSN 0887-624X, JUL 1 2013, vol. 51, no. 13, p. 2919-2924., WOS

ADEB03 000463-172692

- DWORAK, A. - TRZEBICKA, B. - KOWALCZUK, A. - UTRATA-WESOLEK, A. - WALACH, W. - LIBERA, M. - KRONEK, Juraj. Termoczułe polimery gwiazdziste - synteza i wlasciwosci. In *Polimery*, 2012, tom. 57, nr. 6, p. 441 - 448. ISSN 0032-2725.

Ohlasy:

1. [1.1] KURZEPA, K. - ROZYCKI, K. - BOCHYNSKA, M. - KONOP, M. - URBANCZYK-LIPKOWSKA, Z. - LIPKOWSKI, A.W. Molecular scaffolds for three-dimensional cell and tissue cultures. In *POLIMERY*. ISSN 0032-2725, SEP 2013, vol. 58, no. 9, p. 663-669., WOS

ADEB04 000464-142645

- JANIGOVÁ, Ivica - LEDNICKÝ, F.- JOCHEC MOŠKOVÁ, Daniela - CHODÁK, Ivan. Nanocomposites with biodegradable polycaprolactone matrix. In *Macromolecular Symposia*, 2011, vol. 301, p. 1-8. ISSN 1022-1360.

Ohlasy:

1. [1.1] LUDUENA, L.N. - VAZQUEZ, A. - ALVAREZ, V.A. Effect of the type of clay organo-modifier on the morphology, thermal/mechanical/impact/barrier properties and biodegradation in soil of polycaprolactone/clay nanocomposites. In *JOURNAL OF APPLIED POLYMER SCIENCE*. ISSN 0021-8995, JUN 5 2013, vol. 128, no. 5, p. 2648-2657., WO
2. [1.1] MONTEIRO, M.S.S.B. - CHAVEZ, F.V. - SEBASTIAO, P.J. - TAVARES, M.I.B. H-1 NMR relaxometry and X-ray study of PCL/nevirapine hybrids. In *POLYMER TESTING*. ISSN 0142-9418, MAY 2013, vol. 32, no. 3, p. 553-566., WOS
3. [1.1] SAYYAR, S. - MURRAY, E. - THOMPSON, B.C. - GAMBHIR, S. - OFFICER, D.L. - WALLACE, G.G. Covalently linked biocompatible graphene/polycaprolactone composites for tissue engineering. In *CARBON*. ISSN 0008-6223, FEB 2013, vol. 52, p. 296-304., WOS
4. [1.2] RAY, S.S. Environmentally friendly polymer nanocomposites: Types, processing and properties. (2013) *Environmentally Friendly Polymer Nanocomposites: Types, Processing and Properties*, p. 1-488., Scopus

ADEB05 000465-076433

- KRIPOTOU, S- - APEKIS, L- - RAPTI, Ch- - VARTZELI - NIKAKI, K- - PISSIS, P- - MRAVČÁKOVÁ, Miroslava - OMASTOVÁ, Mária. Thermal transitions of polypropylene in blends and composites with polypyrrole and polypyrrole/montmorillonite. In *International Journal of Polymeric Materials*, 2007, vol. 56, p. 865-884. ISSN 0091-4037.

Ohlasy:

1. [1.2] RAMESAN, M.T. Preparation and properties of Fe<sub>3</sub>O<sub>4</sub>/polypyrrole/poly(pyrrole-co-acrylamide) nanocomposites. (2013) *International Journal of Polymeric Materials and Polymeric Biomaterials*, 62 (5), p. 277-283, Scopus

ADEB06 000466-012289

- NOVÁK, Igor - FLORIÁN, Štefán. Investigation of hydrophilicity of polyethylene modified by electric discharge in the course of aging. In *Journal of Materials Science Letters*, 2001, vol. 20, p. 1289-1291. (0.496 - IF2000). ISSN 0261-8028.

Ohlasy:

1. [1.1] AWAJA, F. - GILBERT, M. - NAEBE, M. - KELLY, G. - FOX, B. - BRYNOLF, R. - PIGRAM, P.J. Ageing of surface treated thermoplastic polyolefins. In *POLYMER DEGRADATION AND STABILITY*. ISSN 0141-3910, SEP 2013, vol. 98, no. 9, p. 1699-1704., WOS

ADEB07 000467-133884

- OMASTOVÁ, Mária - MIČUŠÍK, Matej - FEDORKO, P. - CHEHIMI, M. M. - PIONTECK, J. Effect of surface modification of multiwall carbon nanotubes on their electrical and surface properties. In *Materials Science Forum*, 2010, vol. 636 - 637, p. 676 - 681. ISSN 0255-5476.

Ohlasy:

1. [1.2] SUÁREZ, G.- JANG, B.K.- AGLIETTI, E.F.- SAKKA, Y. Fabrication of dense ZrO<sub>2</sub>/CNT composites: Influence of bead-milling treatment. (2013) *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science*, 44 (9), p. 4374-4381., Scopus

ADEB08 000468-119553

- TAVMAN, I. - CECEN, V. - OZDEMIR, I. - TURGUT, A. - KRUPA, Igor - OMASTOVÁ, Mária - NOVÁK, Igor. Preparation and characterization of highly electrically and thermally conductive polymeric nanocomposites. In *Archives of Materials Science*, 2008, vol. 29, no. 1 - 2, p. 77 - 83. ISSN 1734-9885.

Ohlasy:

1. [1.2] BOUCHARD, J.- CAYLA, A.- DEVAUX, E.- CAMPAGNE, C. Electrical and thermal conductivities of multiwalled carbon nanotubes-reinforced high performance polymer nanocomposites. (2013) *Composites Science and Technology*, 86, p. 177-184., Scopus

ADEB09 000469-184181

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

Ohlasy:

1. [1.1] JEAN, Y.C. - VAN HORN, J.D. - HUNG, W.S. - LEE, K.R. Perspective of positron annihilation spectroscopy in polymers. In *MACROMOLECULES*. ISSN 0024-9297, SEP 24 2013, vol. 46, no. 18, p. 7133-7145., WOS

## **ADFA Vedecké práce v domácich nekarentovaných časopisoch impaktovaných**

ADFA01 000470-179262

- HURAN, J. - VALOVIČ, A. - KUČERA, M. - KLEINOVÁ, Angela - KOVÁČOVÁ, E. - BOHÁČEK, P. - SEKÁČOVÁ, M. Hydrogenated amorphous silicon carbon nitride films prepared by PECVD

technology: properties. In *Journal of Electrical Engineering*, 2012, vol. 65, p. 333-335. (0.370 - IF2011). (2012 - INSPEC, SCOPUS). ISSN 1335-3632.

Ohlasy:

1. [1.1] GANGOPADHYAY, U. - JANA, S. - DAS, S. - GHOSH, P. - MONDAL, A. In JOURNAL OF RENEWABLE AND SUSTAINABLE ENERGY. MAY 1 2013, vol. 5, no. 3., WOS

### **AEE Vedecké práce v zahraničných nerecenzovaných vedeckých zborníkoch (aj konferenčných), monografiách**

AEE01 000471-133925

- 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.

Ohlasy:

1. [1.1] MAITI, S. - SHRIVASTAVA, N.K. - KHATUA, B.B. Reduction of percolation threshold through double percolation in melt-blended polycarbonate/acrylonitrile butadiene styrene/multiwall carbon nanotubes elastomer nanocomposites. In POLYMER COMPOSITES. ISSN 0272-8397, APR 2013, vol. 34, no. 4, p. 570-579., WOS

### **AFC Publikované príspevky na zahraničných vedeckých konferenciách**

AFC01 000003-114688

- ISKROVÁ, M. - MAJERNÍK, V. - ILLEKOVÁ, E. - ŠAUŠA, O. - BEREK, Dušan - KRIŠTIÁK, J. Free volume seen by positronium in bulk and confined molecular liquid. In *Materials Science Forum. Vol. 607: Positron and Positronium Chemistry. 9th International Workshop, May 11-15, 2008, China.* - Zurich : Trans Tech Publications LTD, 2009, p. 235-237. ISSN 0255-5476.

Ohlasy:

1. [1.1] BARTOS, J. - SVAJDLENKOVA, H. - ZALESKI, R. - EDELMANN, M. - LUKESOVA, M. Spin probe dynamics in relation to free volume in crystalline organics by means of ESR and PALS: n-Hexadecane. In PHYSICA B-CONDENSED MATTER. ISSN 0921-4526, 2013, vol. 430, pp. 99-105., WOS

## **Príloha D**

### **Údaje o pedagogickej činnosti organizácie**

#### Semestrálne prednášky:

prof. Ing. Tomáš Bleha, DrSc.

Názov semestr. predmetu: Teória a technológia spracovania plastov

Počet hodín za semester: 13

Názov katedry a vysokej školy: Materiálovotechnologická fakulta STU v Trnave, 1. Ročník inžinierskeho štúdia

prof., RNDr. Ignác Capek, DrSc.

Názov semestr. predmetu: Technológia prípravy materiálov

Počet hodín za semester: 20

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

RNDr. Peter Cifra, DrSc.

Názov semestr. predmetu: Makromolekulová chémia

Počet hodín za semester: 16

Názov katedry a vysokej školy: Prírodovedecká fakulta UK, 4-5 ročník

prof. Ing. Ivan Chodák, DrSc.

Názov semestr. predmetu: Fyzika polymérov – vybrané state

Počet hodín za semester: 6

Názov katedry a vysokej školy: Fakulta chemickej a potravinárskej technológie STU, Ústav prírodných a syntetických polymérov

Mgr. Juraj Kronek, PhD.

Názov semestr. predmetu: Makromolekulová chémia

Počet hodín za semester: 6

Názov katedry a vysokej školy: Prírodovedecká fakulta UK, 4-5 ročník

#### Semestrálne cvičenia:

Mgr. Pavol Námer

Názov semestr. predmetu: Fyzika

Počet hodín za semester: 84

Názov katedry a vysokej školy: Slovenská technická univerzita v Bratislave, 1.ročník štúdia

#### Semináre:

#### Terénne cvičenia:

#### Individuálne prednášky:

prof. Ing. Ivan Chodák, DrSc.

Názov semestr. predmetu: prednášky pre doktorandov

Počet hodín za semester: 4

Názov katedry a vysokej školy: Fakulta chemickej a potravinárskej technológie STU, odbor Makromolekulová chémia

Mgr. Juraj Kronek, PhD.

Názov semestr. predmetu: Nové trendy v chémii polymérov

Počet hodín za semester: 2

Názov katedry a vysokej školy: Prírodovedecká fakulta UK, pre študentov 2. ročníka  
Prírodovedeckej fakulty UK v štúdiom odbore Chémia

Mgr. Jaroslav Mosnáček, PhD.

Názov semestr. predmetu: Nové trendy v organickej chémii

Počet hodín za semester: 2

Názov katedry a vysokej školy: Prírodovedecká fakulta UK, pre študentov 2. ročníka  
Prírodovedeckej fakulty UK v štúdiom odbore Chémia

Ing. Igor Novák, PhD.

Názov semestr. predmetu: Povrchové a adhézne vlastnosti polymérnych materiálov a Skúmanie  
vlastností špeciálnych adhezív na spájanie kovových substrátov lepením

Počet hodín za semester: 4

Názov katedry a vysokej školy: Materiálovotechnologická fakulta STU v Trnave, pre 4. ročník  
štúdia

Ing. Igor Novák, PhD.

Názov semestr. predmetu: Povrchové vlastnosti modifikovaných polymérov pre doktorandov

Počet hodín za semester: 2

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

Ing. Mária Omastová, DrSc.

Názov semestr. predmetu: prednášok pre doktorandov

Počet hodín za semester: 2

Názov katedry a vysokej školy: Fakulta chemickej a potravinárskej technológie STU, odbor  
Makromolekulová chémia

Mgr. Zdenko Špitálsky, PhD.

Názov semestr. predmetu: Elektricky vodivé polymérne kompozity

Počet hodín za semester: 2

Názov katedry a vysokej školy: Fakulta chemickej a potravinárskej technológie STU, pre  
doktorandov - odbor Makromolekulová chémia



**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
Argentína			Dušan Berek	13		
Belgicko					Juraj Kronek	1
					Igor Lacík	1
Brazília	Dušan Berek	14				
Bulharsko	Juraj Kronek	6				
	Zuzana Kroneková	6				
Česko	Ivica Janigová	10	Dušan Berek	5	Klaudia Czaniková	1
	Mária Omastová	7	Dušan Berek	7	Angela Kleinová	3
			Klaudia Czaniková	184	Igor Lacík	1
			Ivan Chodák	3	Marta Malíková	1
			Matej Mičušík	2	Marta Malíková	2
			Veronika Némethová	1	Igor Novák	1
			Peter Palenčár	183	Igor Novák	2
			Filip Rázga	1	Mária Omastová	1
					Peter Palenčár	1
					Filip Rázga	1
					Zdenko Špitálsky	1
					Marian Valentin	1
Francúzsko	Dušan Berek	7	Zuzana Benková	6	Jozef Rychlý	6
			Dušan Berek	11		
Grécko			Josef Bartoš	4		
			Jaroslav Kuliček	7		
			Miroslava Lukešová	14		
			Matej Mičušík	7		
			Mária Omastová	7		
			Helena Švajdlenková	4		
Chorvátsko			Miroslava Lukešová	27		
India			Zuzana Benková	10		
Katar			Markéta Ilčíková	316		
			Peter Kasák	365		

			Igor Krupa	365		
			Zdenko Špitálsky	15		
Lichtenštajsko					Štefan Chmela	3
					Juraj Pavlinec	3
Maďarsko			Klaudia Czaničková	1		
			Maria L.R.Falco	5		
			Štefan Chmela	1		
			Jaroslav Mosnáček	1		
			Jaroslav Mosnáček	2		
Nemecko			Josef Bartoš	29		
			Ignác Capek	14		
			Anna Chovancová	2		
			Anna Chovancová	2		
			Jaroslav Kuliček	22		
			Jaroslav Kuliček	3		
			Miroslava Lukešová	27		
			Miroslava Lukešová	29		
			Matej Mičušík	8		
			Mária Omastová	11		
			Mária Omastová	7		
			Helena Švajdlenková	27		
			Helena Švajdlenková	29		
			Jana Tabačiarová	19		
			Jana Tabačiarová	18		
			Jana Tabačiarová	13		
			Anna Zahoranová	20		
Nórsko			Zuzana Kroneková	6		
			Igor Lacík	6		
			Filip Rázga	6		
			Lucia Uhelská	6		
Poľsko	Martin Danko	10				
	Slávka Ďurkáčová	10				
	Juraj Kronek	5				
	Jaroslav Mosnáček	8				

Portugalsko			Zuzana Benková	28		
			Jaroslav Mosnáček	8		
			Katarína Mosnáčková	8		
			Zdenko Špitálsky	8		
Rakúsko			Helena Švajdlenková	92	Ivan Chodák	2
					Ivan Chodák	1
					Igor Lacík	1
					Filip Rázga	1
Rumunsko			Igor Lacík	3		
			Marian Valentin	3		
Slovinsko			Ivan Chodák	2		
			Silvia Podhradská	5		
Španielsko			Josef Bartoš	26		
			Helena Švajdlenková	26		
Švajčiarsko			Dušan Račko	158		
Švédsko			Mária Omastová	1		
Taiwan	Štefan Chmela	12				
	Jozef Kollár	12				
Taliansko			Juraj Kronek	4		
			Igor Lacík	5		
			Igor Lacík	4		
USA			Lucia Uhelská	40	Dušan Berek	8
Veľká Británia			Igor Lacík	5		
			Marta Malíková	1		
			Mária Omastová	4		
			Alena Šišková	4		
			Lucia Uhelská	5		
<b>Počet vyslaní spolu</b>	<b>12</b>	<b>107</b>	<b>71</b>	<b>2311</b>	<b>22</b>	<b>43</b>

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

Krajina	D r u h d o h o d y					
	MAD, KD, VTS		Medziústavná		Ostatné	
	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní	Meno pracovníka	Počet dní
Argentína			Falco L.	243		
Česko	Bober M. P.	5	Shah R.	13	Kubies D.	2
	Morávková Z.	5			Lehotský M.	2
	Stejskal J.	5			Zmeškal O.	2
	Trchová M.	5				
Francúzsko	Autisier L.	3	Cehimi M.	4		
	Maria S.	3	Saad A.	4		
Grécko			Koutsoumpis S.	6		
			Moustakas Ch.	6		
			Pandis Ch.	7		
Kanada			Hutchinson R.	92		
			Rooney T.	92		
Maďarsko			Györgyi S. E.	5		
Nemecko	Ehlers D.	14				
	Liebscher M.	13				
	Pionteck J.	6				
	Schulze U.	6				
Poľsko	Basko M.	5	Kundys A.	91		
	Lipowska D.	7	Rychter P.	122		
	Otulakowski L.	7	Sawicki P.	30		
	Socka M	5	Szymczyk A.	1		
Portugalsko			Amaral P.	6		
			Santos J.	6		
Rumunsko	Cazacu M.	7				
	Racles C.	7				
Taiwan	Liou Ying-Shian	14				
	Tsiang Chien-Chao	14				
	Tsiang Chien-Chao	4				
	Tsiang Chien-Chao	4				
	Yeh Cheng-Yang	14				
	You Ruo-Chi	14				
	Zhang Zhao-You	14				
<b>Počet prijatí spolu</b>	<b>23</b>	<b>181</b>	<b>16</b>	<b>728</b>	<b>3</b>	<b>6</b>

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

<b>Krajina</b>	<b>Názov konferencie</b>	<b>Meno pracovníka</b>	<b>Počet dní</b>
Argentína	GIRSU 2014	Maria L. R. Falco	4
Brazília	14 <sup>th</sup> Latin American Symposium on Polymers	Dušan Berek	5
Bulharsko	Challenges in the Development of Smart Multifunctio	Juraj Kronek	2
		Zuzana Kroneková	2
Česko	66. Sjezd chemických společností	Ludmila Hrčková	4
		Zuzana Nógellová	4
		Igor Novák	4
		Mária Omastová	4
	Fibers for Progress	Mária Omastová	4
	Plastko 2014	Dušan Berek	3
		Ludmila Hrčková	2
		Andrea Matsuo	1
		Zuzana Nógellová	2
		Igor Novák	2
		Mária Omastová	3
		Marian Valentin	2
	Polymery 2014	Pavol Hrdlovič	4
		Ivica Janigová	4
		Csaba Kósa	4
		Juraj Kronek	4
		Jaroslav Kuliček	4
		Igor Lacík	4
		Daniela Moravčíková	4
		Jaroslav Mosnáček	4
		Veronika Némethová	4
		Igor Novák	4
		Filip Rázga	4
		Lýdia Rychlá	4
		Jozef Rychlý	4
		Dušana Treľová	4
		Dominika Vnuková	4
	Statistical Mechanics of Liquids	Peter Cifra	6
	Trendy v pokročilých povrchových úpravách	Igor Novák	2
Fínsko	ICSM 2014	Jana Tabačiarová	7
	ICSM 2014	Mária Omastová	7
Grécko	30 <sup>th</sup> Pan-Hellenic Conference on Solid-State Physic	Mária Omastová	5
Chorvátsko	7 <sup>th</sup> Int. Textile Clothing & Design Conference	Marta Malíková	4
		Mária Omastová	4
Maďarsko	2 <sup>nd</sup> I C on BiPoCo	Ivan Chodák	2
		Csaba Kósa	5
		Alena Šišková	5
		Petra Šrámková	5
		Anna Zahoranová	5
	IC on Bio-friendly Polymers and Polymer Additives	Katarína Borská	4

		Martin Danko	4
		Maria L. R. Falco	3
		Štefan Chmela	4
		Ivan Chodák	4
		Jozef Kollár	4
		Igor Lacík	3
		Daniela Moravčíková	4
		Jaroslav Mosnáček	4
		Lýdia Rychlá	4
		Jozef Rychlý	4
Maurícius	ICPAC 2014	Ivica Janigová	8
		Marta Malíková	8
Nemecko	11th Fall Rubber Colloquium	Ivan Chodák	3
	4th XPS workshop	Mária Omastová	4
	PolyMerTec 2014	Ivan Chodák	4
Poľsko	Silesian Meetings on Polymer Materials POLYMAT 60	Igor Lacík	3
	BDS 2014	Josef Bartoš	3
	Silesian Meetings on Polymer Materials POLYMAT 60	Jaroslav Mosnáček	3
	US-Poland workshop...	Peter Cifra	4
		Pavol Námer	4
	V4 Workshop on Advanced Materials	Zdenko Špitálsky	4
	YES 2014	Alena Šišková	7
Rakúsko	30 <sup>th</sup> International Symposium on Chromatography	Alena Šišková	5
	Agricultural Applications of Electrospinning...	Eliška Číková	2
	CECP 2014	Martin Danko	5
	ESPS 2014	Štefan Chmela	4
		Jaroslav Mosnáček	4
	Graphene Winter School	Martin Danko	6
		Jaroslav Mosnáček	6
		Zdenko Špitálsky	6
Rumunsko	2 <sup>nd</sup> CEEP Workshop	Ivan Chodák	3
		Igor Lacík	3
		Marian Valentin	3
Švédsko	EuroEAP 2014	Mária Omastová	2
Taiwan	AWPP 2014	Štefan Chmela	4
		Jozef Kollár	4
Taliansko	EUPOC 2014	Martin Danko	5
	EUPOC 2014	Jozef Kollár	5
		Jaroslav Mosnáček	5
Thajsko	IUPAC World Polymer Congress – MACRO 2014	Igor Lacík	10
Turecko	3 <sup>rd</sup> International Symposium on Controlled/Living P	Jaroslav Mosnáček	5
	3 <sup>rd</sup> IS on Controlled/Living Polymerization	Juraj Kronek	5
	5 <sup>th</sup> EUCHEM Chemistry Congress	Tomáš Bleha	6
	Thermam 2014	Igor Novák	6
USA	American Physical Society Meeting 2014	Peter Cifra	10
		Dušan Račko	8
	Spring ACS Meeting	Dušan Berek	5
Veľká Británia	COST MP1105 workshop on Flammability...	Marta Malíková	2
<b>Spolu</b>	<b>44</b>	<b>92</b>	<b>391</b>

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

Skratky použité v tabuľke C:

ICSM 2014 - 22nd International Conference on the Science and Technology of Synthetic Metals ICSM 2014  
IUPAC World Polymer Congress – MACRO 2014 - IUPAC World Polymer Congress – MACRO 2014  
Silesian Meetings on Polymer Materials POLYMAT 60 - Silesian Meetings on Polymer Materials POLYMAT 60  
11th Fall Rubber Colloquium - 11th Fall Rubber Colloquium  
14th Latin American Symposium on Polymers - 14th Latin American Symposium on Polymers  
2nd CEEP Workshop - 2nd CEEP Workshop: Polymer Science – a powerful tool for highly specialized functional materials  
2nd I C on BiPoCo - 2nd International Conference on Bio-based Polymers and Composites BiPoCo  
30th International Symposium on Chromatography - 30th International Symposium on Chromatography  
30th Pan-Hellenic Conference on Solid-State Physic - 30th Pan-Hellenic Conference on Solid-State Physics  
3rd International Symposium on Controlled/Living P - 3rd International Symposium on Controlled/Living Polymerization from synthesis to application  
3rd IS on Controlled/Living Polymerization - 3rd International Symposium on Controlled/Living Polymerization from synthesis to application  
4th XPS workshop - 4th XPS workshop Fundamentals and Applications on Surface Analysis  
5th EUCHEM Chemistry Congress - 5th EUCHEM Chemistry Congress  
66. Sjezd chemických společností - 66. Sjezd chemických společností  
7th Int. Textile Clothing & Design Conference - 7th International Textile Clothing & Design Conference  
Agricultural Applications of Electrospinning... - Agricultural Applications of Electrospinning and Electrospinning of Agricultural Products  
American Physical Society Meeting 2014 - American Physical Society Meeting 2014  
AWPP 2014 - Asian Workshop on Polymer Processing AWPP 2014  
BDS 2014 - 8th I C on Broadband Dielectric Spectroscopy and its Applications BDS 2014  
CECP 2014 - Central European Conference on Photochemistry CECP 2014  
Challenges in the Development of Smart Multifunctio - Challenges in the Development of Smart Multifunctional Polymer Materials and Perspectives for their Biomedical Applications  
COST MP1105 workshop on Flammability... - COST MP1105 workshop on Flammability Regulation for Upholstered Furniture  
ESPS 2014 - 3rd European Symposium on Photopolymer Sciences ESPS 2014  
EUPOC 2014 - EUPOC 2014 Precision Polymers: Synthesis, Folding and Function  
EuroEAP 2014 - EuroEAP 2014  
Fibers for Progress - Fibers for Progress  
GIRSU 2014 - International Symposium on Solid Waste Management GIRSU 2014  
Graphene Winter School - Graphene Winter School  
IC on Bio-friendly Polymers and Polymer Additives - International Conference on Bio-friendly Polymers and Polymer Additives  
ICPAC 2014 - The International Conference on Pure and Applied Chemistry (ICPAC 2014)  
ICSM 2014 - 22nd International Conference on the Science and Technology of Synthetic Metals ICSM 2014  
Plastko 2014 - Plastko 2014  
PolyMerTec 2014 - PolyMerTec 2014  
Polymery 2014 - Polymery 2014  
Silesian Meetings on Polymer Materials POLYMAT 60 - Silesian Meetings on Polymer Materials POLYMAT 60  
Spring ACS Meeting - Spring ACS Meeting  
Statistical Mechanics of Liquids - Statistical Mechanics of Liquids  
Thermam 2014 - Thermam 2014 – International Conference on Thermophysical and Mechanical Properties of Advanced Materials  
Trendy v pokročilých povrchových úpravách - Trendy v pokročilých povrchových úpravách  
US-Poland workshop... - US-Poland workshop on Thermodynamics of complex fluids and interfaces  
V4 Workshop on Advanced Materials - V4 Workshop on Advanced Materials  
YES 2014 - Young European Scientists Conference YES 2014