

# Juraj KRONEK, PhD

**Position:** principal scientific researcher,

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## Education:

- 2007 *Scientific degree IIa (equivalent Associate Professor)*,  
Slovak Academy of Sciences, Polymer Institute, Bratislava, Slovak Republic,
- 2001 *PhD., Macromolecular chemistry*, Slovak Academy of Sciences, Polymer Institute,  
Bratislava, Slovak Republic, “*Synthesis and polymerization of functional derivatives of 2-oxazolines*”, (Jozef Lustoň, PhD)
- 1997 *M.S., Organic chemistry*, Comenius University, Faculty of Natural Sciences, Bratislava,  
Slovak Republic, “*Synthesis of functional cyclic imino ethers and their intermediates*”  
(Jozef Lustoň, PhD)

## Professional Experience:

- 2011 Slovak Academy of Sciences, Polymer Institute, Bratislava, Slovak Republic,  
Principal Research Scientist, Deputy of Department for Biomaterials Research,
- 2003-2011 Slovak Academy of Sciences, Polymer Institute, Bratislava, Slovak Republic,  
Head of Department of Monomer Synthesis,
- 2001-2002 Slovak Academy of Sciences, Polymer Institute, Bratislava, Slovak Republic,  
Research Fellow,
- 1997-2001 Slovak Academy of Sciences, Polymer Institute, Bratislava, Slovak Republic,  
Doctoral Study,

## International experience:

- 2008 Polish Academy of Sciences, Centre of Polymer and Carbon Materials, Zabrze, Poland (2  
months),
- 2005-2006 Polish Academy of Sciences, Centre of Polymer and Carbon Materials, Zabrze, Poland  
(10 months),
- 2002-2003 Institute of Polymer Research Dresden e. V., Germany (9 months)

## International cooperation:

- Institute of Polymer Research, Dresden in polymer chemistry of 2-oxazolines,  
Polymer modification and compatibilization, photochemistry of monomers and polymers,
- Centre of Polymer and Carbon Materials, Polish Academy of Sciences, Zabrze, Poland  
Stimuli sensitive polymers for controlled transport and delivery of drugs.
- Institute of Polymers, Bulgarian Academy of Sciences, Sofia, Bulgaria,  
Thermosensitive polymers and copolymers on 2-oxazoline chemistry.
- Charles University, Faculty of physics and mathematics, Prague, Czech republic,  
Synthesis and characterization of liquid-crystalline poly(ester-amides).
- Institute of Macromolecular Chemistry, Academy of Sciences of Czech Republic, Prague, Czech  
Republic.  
Poly(2-oxazolines) for hydrogel technology and polymer conjugates.
- Centre of Polymeric Systems, T. Bata University Zlin, Czech Republic  
Hydrogels for Biomedical applications

- TU Wurzburg, Germany  
Amphiphilic copolymers vs. self-assembly in aqueous solutions,
- Scuola Superiore Snt Anna, Pontedera (PI), Italy  
Thin hydrogel layers as coatings for functional implants,

### **Participation on the projects:**

Participation on 13 Slovak and 11 international projects, among them M.ERA-Net project M2Neural (2014-2017), coordinator of Slovak-Polish Joint Research Project (2007-2009), Slovak-Polish Joint Research Project (2009-2011), Project of Bilateral Slovak-Polish Cooperation (2010-2011), Project of Bilateral Slovak-Polish Cooperation (2012-2013),

### **Publications and citations:**

40 papers in WOS/Scopus journals, 4 proceedings in WOS/Scopus journals, 120 presentations at local and international conferences, 3 book chapters, 1 SK patent, 6 invited lectures, 180 cit., h-index = 9.

### **Supervising:**

2 Bc, 1 M.S., 4 PhD.

### **Research Interests:**

- Tailor-made polymers, living and controlled polymerizations, star and hyperbranched polymers, polymer gels and hydrogels,
- Stimuli responsive properties, photochemistry of polymers, amphiphilic (co)polymers,
- Reactive processing and surface treatment of polymers, synthesis of functional polymers by modification and functionalization of polymers,
- Biocompatible and biodegradable polymers, polymers for bioapplications,
- Synthesis of bioconjugates containing synthetic polymers, polysaccharides, and proteins, vaccine development, immobilization of biomolecules.
- Drug delivery systems including high loading capacity nanoparticles, enhanced stability of naturally derived drugs, and controlled release.
- Immunoprotection of cells, macro- and microdevices with biocompatible polymers and hydrogels.
- Biocompatible and non-biofouling polymer and hydrogel coatings for neural electrodes.

### **Grants, Memberships and Awards:**

- The award “The best publication of young scientists of Slovak Academy of sciences for years 1998-2002” in section Life sciences granted by Presidium of Slovak Academy of Sciences,
- The award “Young Scientist of the Slovak Republic for the year 2001” awarded by the Union of Slovak Societies for Science and Technology and Union of Slovak Journalist,
- Participation on the Grant of 6FP European Commission ToK ”NANOSTIM” at Centre of Polymer and Carbon Materials, Polish Academy of Sciences, Gliwice, Poland (2005-2006).
- Member of Slovak chemical Society, Deputy Head of Polymer Division ( 2014-)
- Head of Scientific Board of the Polymer Institute SAS (2018-)
- Member of International Society of Biomedical Polymers and Polymeric Biomaterials (ISBPPB, 2015-)

## Papers:

### a) Book chapters:

1. **J. Kronek**, E. Paulovičová, L. Paulovičová, Z. Kroneková, J. Lustoň. Biocompatibility and Immunocompatibility assessment of poly(2-oxazolines). In Practical Applications in Medical Engineering, Ed. A. O. Andrade, A. A. Pereira, E. L. M. Naves a A.B. Soares, InTech Open, Rijeka, Croatia, **2013**, chapter 11, p. 257-284.
2. A. Zahoranová, **J. Kronek**. Hydrogels based on poly(2-oxazolines) for pharmaceutical applications, In *Handbook of Polymers for Pharmaceutical Technologies*, Ed. V. Kumar, Wiley-Scrivener, 2015, Vol. 4, p. 231-258.
3. **J. Kronek**. Poly(2-oxazolines) as biomedical materials. *Encyclopedia of Biomedical Polymers and Polymeric Biomaterials*. CRC, Taylor and Francis, New York, USA, **2015**, p. 6031-6047.

### b) Papers in WOS/Scopus databases:

1. A.R. Salgarella, A. Zahoranová, P. Šrámková, M. Majerčíková, E. Pavlowa, R. Luxenhofer, J. Kronek, I. Lacík, L. Ricotti. Investigation of drug release modulation from poly(2-oxazoline) micelles through ultrasound. *Scientific Reports*, **2018**, 8, art. No. 9893.
2. S. Datta, A. Jutková, P. Šrámková, L. Lenkavská, H. Huntošová, D. Chorvát, P. Miškovský, D. Jancura, **J. Kronek**. Unravelling the Excellent Chemical Stability and Bioavailability of Solvent Responsive Curcumin-Loaded 2-Ethyl-2-oxazoline-grad-2-(4-dodecyloxyphenyl)-2-oxazoline Copolymer Nanoparticles for Drug Delivery. *Biomacromolecules*, **2018**, 19, 2459-2471.
3. R.R. Palem, S.D: Ganesh, N. Saha, **J. Kronek**, P. Saha. 'Green' synthesis of silver polymer Nanocomposites of poly (2-isopropenyl-2- oxazoline-co- N-vinylpyrrolidone) and its catalytic activity. *Journal of Polymer Research*, **2018**, 25, art. no. 152.
4. **J. Kronek**, J. Nedbal, H. Valentová, M. Neubert, I. Janigová, N. Petrenčíková, P. Šrámková, K. Csomorová, L. Petra. Thermal stability and structural anisotropy of semiaromatic poly(ester amides) from aromatic bis(2-oxazolines) and aliphatic dicarboxylic acids. *Polymer Testing*, **2018**, 68, 1-7.
5. L. Hrdlička, P. Šrámková, J. Prousek, **J. Kronek**. Environmental toxicity study of poly(2-oxazoline)s. *Chemical Papers*, **2018**, 72, 1543-1547.
6. A. Zahoranová, M. Mrlík, K. Tomanová, **J. Kronek**, R. Luxenhofer. ABA and BAB Triblock Copolymers Based on 2-Methyl-2-oxazoline and 2-n-Propyl-2-oxazoline: Synthesis and Thermoresponsive Behavior in Water. *Macromolecular Chemistry and Physics*, **2017**, 218, art. No. 1700031.
7. M. Sedničková, D. Johec-Mošková, I. Janigová, **J. Kronek**, L. Jankovič, M. Šlouf, I. Chodák. Properties of natural rubber composites with structurally different clay intercalable surfactants. *Journal of Polymer Research*, **2017**, 24, art. no. 105.
8. P. Šrámková, A. Zahoranová, Z. Kroneková, A. Šišková, **J. Kronek**, Poly(2-oxazoline) hydrogels by photoinduced thiol-ene "click" reaction using different dithiol crosslinkers. *Journal of Polymer Research*, **2017**, 24, art. no. 82.
9. Z. Kroneková, M. Mikulec, N. Petrenčíková, E. Paulovičová, L. Paulovičová, V. Jančinová, R. Nosál, P.S. Reddy, G.D. Shimoga, D.Chorvát Jr., **J. Kronek**. *Ex vivo* and *in vivo* studies on the cytotoxicity and immunomodulative properties of poly(2-isopropenyl-2-oxazoline) as a new type of biomedical polymer. *Macromolecular Bioscience*, **2016**, 16, 1200-1211.
10. A. Zahoranová, Z. Kroneková, M. Zahoran, D. Chorvát, I. Janigová, **J. Kronek**. Poly(2-oxazoline) hydrogels crosslinked with aliphatic bis(2-oxazoline)s: Properties, cytotoxicity, and cell cultivation. *Journal of Polymer Science. Part A. Polymer Chemistry*, **2016**, 54, 1548-1559.
11. R. Shah, Z. Kroneková, A. Zahoranová, L. Roller, N. Saha, P. Saha, **J. Kronek**. *In vitro* study of partially hydrolyzed poly(2-ethyl-2-oxazolines) as materials for biomedical applications, *Journal of Materials Science: Materials for Medicine*, **2015**, 26, 157.

12. **J. Kronek**, N. Petrenčíková, M. Mikulec, K. Borská, D. Christova. Structure analysis and thermosensitive properties of copolymers prepared from 2-ethyl-2-oxazoline and 2-(4-aminophenyl)-2-oxazoline. *Polymer Bulletin*, **2015**, 72, 1081-1094.
13. L. Jankovič, **J. Kronek**, J. Madejová, V. Hronský. (9,10-Dihydroxyoctadecyl)ammonium: A Structurally Unique Class of Clay Intercalable Surfactants, *European Journal of Inorganic Chemistry*. **2015**, 2841-2850.
14. E. Rollerová, J. Jurčovičová, A. Mlynarčíková, I. Sadloňová, D. Bilaničová, L. Wsolová, A. Kiss, J. Kovryznich, **J. Kronek**, F. Ciampor, I. Vavra, S. Scsuková. Delayed adverse effects of neonatal exposure to polymeric nanoparticle poly(ethylene glycol)-*block*-polylactide methyl ether on hypothalamic–pituitary–ovarian axis development and function in Wistar rats. *Reproduction Toxicology*, **2015**, 57, 165-175.
15. A. Popelka, **J. Kronek**, I. Novák, A. Kleinová, M. Mičušík, M. Špírková, M. Omastová. Surface modification of low-density polyethylene with poly(2-ethyl-2-oxazoline) using a low-pressure plasma treatment. *Vacuum*, **2014**, 100, 53-56.
16. **J. Kronek**, T. Nedelčev, M. Mikulec, A. Kleinová, J. Lustoň. Synthesis of cinnamic acid-derived 4,5-dihydrooxazoles. *Chemical Papers*, **2013**, 67, 1424-1432.
17. **J. Kronek**, E. Paulovičová, L. Paulovičová, Z. Kroneková, J. Lustoň. Immunomodulatory efficiency of poly(2-oxazolines). *Journal of Materials Science: Materials for Medicine*. **2012**, 23, 1457–1464.
18. **J. Kronek**, J. Lustoň, A. Kleinová, I. Janigová. Synthesis and polymerization reactions of cyclic imino ethers. 5: naphthalene unit-containing poly(ether amide)s. *Polymers for Advanced Technologies*, **2012**, 23, 1057-1065.
19. J. Lustoň, **J. Kronek**, A. Kleinová, I. Janigová, H. Valentová, J. Nedbal. Synthesis and polymerization reactions of cyclic imino ethers. 6. Polymers with a biphenyl structure. *Journal of Polymer Science. Part A, Polymer Chemistry*, **2012**, 50, 3936–3943.
20. A. Dworak, B. Trzebicka, A. Kowalczyk, A. Utrata-Wesolek, W. Walach, M. Libera, **J. Kronek**. Thermosensitive star polymers - synthesis and properties. *Polimery*, **2012**, 57, 441–448.
21. **J. Kronek**, N. Petrencikova, J. Luston, M. Mikulec, Z. Kroneková. Thermosensitive copolymers of 2-ethyl-2-oxazoline and 2-(4-aminophenyl)-2-oxazoline. *Abstracts of Papers of the American Chemical Society* **2012**, 243-244.
22. A. Kowalczyk, **J. Kronek**, K. Bosowska, B. Trzebicka, A. Dworak. Star poly(2-ethyl-2-oxazoline)s - synthesis and thermosensitivity. *Polymer International*, **2011**, 60, 1001–1009.
23. **J. Kronek**, Z. Kroneková, J. Lustoň, E. Paulovičová, L. Paulovičová, B. Mendrek. *In vitro* bio-immunological and cytotoxicity studies of poly(2-oxazolines). *Journal of Materials Science: Materials for Medicine*. **2011**, 22, 1725–1734.
24. A. Popelka, **J. Kronek**, I. Novák, M. Mičušík, I. Chodák. Modification of LDPE surface by poly(2-Ethyl-2-oxazoline) using low-temperature plasma. *Chemické Listy*, **2011**, 105, s367-s369.
25. **J. Kronek**, J. Lustoň, Z. Kroneková, E. Paulovičová, P. Farkaš, N. Petrenčíková, L. Paulovičová, I. Janigová. Synthesis and bioimmunological efficiency of poly(2-oxazolines) containing a free amino group. *Journal of Materials Science: Materials for Medicine*, **2010**, 21, 879-886.
26. J. Lustoň, **J. Kronek**, I. Janigová. Synthesis and Polymerization Reactions of Cyclic Imino Ethers. 4. Aromatic Poly(ester amide)s of the AA+BB Type on the Basis of 2-Oxazolines. *Journal of Macromolecular Science, Part. A: Pure and Applied Chemistry*, **2010**, 47, 716–724.
27. P. Farkaš, J. Korcová, **J. Kronek**, S. Bystrický. Preparation of synthetic polyoxazoline based carrier and *Vibrio cholerae* O-specific polysaccharide conjugate (vaccine). *European Journal of Medicinal Chemistry*, **2010**, 45, 795-799.

28. A. Popelka, I. Novák, **J. Kronek**, A. Kleinová, I. Chodák. Polyethylene surface modified by poly(oxazolines) and by coplanar barrier discharge plasma. *Chemické Listy*, **2009**, *103*, s121.
  29. Cs. Kosa, J. Mosnáček, A. Bílešová, P. Kasák, **J. Kronek**, M. Danko, J. Kollár. Synthesis, oxidation and photophysical properties of novel derivatives of acyclic aromatic amines. *Collections of Czech Chemical Communications*, **2007**, *72*, 1255-1268.
  30. J. Lustoň, **J. Kronek**. Synthesis and polymerization reactions of cyclic imino ethers. II. Preparation of novel hyperbranched polymers from AB<sub>2</sub> monomers of 2-oxazoline type with nonequivalent B units. *Polymer Engineering and Science*, **2007**, *47*, 1272–1280.
  31. V. Langer, E. Scholtzová, D. Gyepesová, J. Lustoň, **J. Kronek**. 2-(2-Oxazolin-2-yl)benzene-1,4-diol: X-ray and density functional theory studies. *Acta Crystallographica, Section C – Crystal Structures Communications*, **2007**, *C63*, o187- o189.
  32. J. Lustoň, **J. Kronek**, O. Markus, I. Janigová, F. Böhme. Synthesis and polymerization reactions of cyclic imino ethers. 3. Poly(ester amide)s of the AA+BB type on the basis of 2-oxazolines. *Polymers for Advanced Technology*, **2007**, *18*, 165–172.
  33. V. Langer, D. Gyepesová, E. Scholtzová, J. Lustoň, **J. Kronek**, M. Kooš. 2-(4-hydroxyphenyl)-4,4-dimethyl-2-oxazoline: X-ray and density functional theory study. *Acta Crystallographica, Section C – Crystal Structures Communications*, **2006**, *C62*, 416-418.
  34. J. Lustoň, **J. Kronek**, F. Böhme. Synthesis and polymerization reactions of cyclic imino ethers. I. Ring-opening homopolyaddition of ab-type hydroxyphenyl-substituted 2-oxazolines. *Journal of Polymer Science. Part A. Polymer Chemistry*, **2006**, *44*, 343-355.
  35. V. Langer, M. Kooš, D. Gyepesová, M. Sládkovičová, J. Lustoň, **J. Kronek**. Three isomeric forms of hydroxyphenyl-2-oxazoline: 2-(2'-hydroxyphenyl)-2-oxazoline, 2-(3'-hydroxyphenyl)-2-oxazoline and 2-(4'-hydroxyphenyl)-2-oxazoline. *Acta Crystallographica, Section C – Crystal Structures Communications*, **2005**, *C61*, o602–o606.
  36. **J. Kronek**, J. Lustoň, F. Böhme. New materials with high pi conjugation by reaction of 2-oxazoline containing phenols with polyamidines and in organic base. *Macromolecular Symposia*, **2002**, *187*, 427-435.
  37. **J. Kronek**, J. Lustoň, F. Böhme, H. Komber. Azo-group labelled polyesters by end-capping with 2-oxazoline derivatives - Photochemical properties. *Macromolecular Symposia*, **2001**, *170*, 301-310.
  38. J. Lustoň, **J. Kronek**, F. Böhme, H. Komber. Azo-group labelled polyesters by end-capping with 2-oxazoline derivatives - Preparation. *Macromolecular Symposia*, **2001**, *164*, 105-115.
  39. J. Lustoň, **J. Kronek**, F. Böhme, H. Komber. Synthesis of bis-2-oxazolines containing inner unsaturation and their hydrolysis to phenylenediacyric acids. *Designed Monomers and Polymers*, **1999**, *2*, 61-68.
  40. T. Huber, F. Böhme, H. Komber, **J. Kronek**, J. Lustoň, D. Voigt, B. Voit. New hyperbranched poly(ether amide)s via nucleophilic ring opening of 2-oxazoline-containing monomers. *Macromolecular Chemistry and Physics*, **1999**, *200*, 126-133.
  41. **J. Kronek**, J. Lustoň, J. Böhme. Reactions of 2-oxazolines and their utilization. *Chemické listy*, **1998**, *92*, 475-485.
  42. **J. Kronek**, J. Lustoň, J. Böhme. Synthesis of 2-oxazolines as efficient reagents in organic synthesis and monomers for macromolecular chemistry. *Chemické listy*. **1998**, *92*, 175-185.
- c) **Patents:**
1. **J. Kronek**, J. Rychlý, K. Vizárová, S. Kirschnerová, S. Katuščák. Prípravok na predĺženie životnosti starého papiera/Agent for lifetime extension of old paper. SK patent, SK-287799, 2011.