

# Juraj KRONEK, PhD

**Position:** senior scientific researcher,

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## Education:

- 2007 *Associate Professor (Degree IIa - Slovak scientific equivalent)*,  
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:

- 2017 Visiting professor, Academy of J. Dlugosz, Czestochowa, Poland (1 month),  
2008 Marie-Curie fellowship, Polish Academy of Sciences, Centre of Polymer and Carbon  
Materials, Zabrze, Poland (2 months),  
2005-2006 Marie-Curie fellowship, 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)

## National and 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,
- P.J.Šafarik University, Košice, Slovakia  
Nanoparticles for photodynamic therapy
- Centre of Biosciences, Slovak Academy of Sciences, Bratislava, Slovakia  
Nanoparticles for gene transfer to the brain

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

Participation on 18 Slovak and 14 international projects, among them M.ERA-Net project M2Neural (2014-2017), 5FP EU Tool of Knowledge (2005-2008), 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) Slovak-Czech bilateral project (2014-2015), Slovak-Bulgarian bilateral project (2018-2020), Slovak-Korean bilateral project (2018-2019), Slovak-Austrian bilateral project (2021-2022). co-PI of APVV-19-0487 and APVV-20-0202 national projects.

### **Publications and citations:**

49 papers in WOS/Scopus journals, 6 proceedings in WOS/Scopus journals, 160 presentations at local and international conferences, 3 book chapters, 1 SK patent, 9 invited lectures, ~ 450 cit., h-index = 15.

### **Supervising:**

3 Bc, 1 M.S., 5 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 of synthetic polymers with drugs, polysaccharides, and proteins, vaccine development, immobilization of biomolecules.
- Drug delivery systems including nanoparticles with high loading capacity, 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.
- Polymers for mRNA delivery.

### **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-)
- Member of VEGA Grant Commission (2021-2025).

## 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. Huntošová, V., Datta, S., Lenkavská, L., ...Miškovský, P., Jancura, D. Alkyl Chain Length in Poly(2-oxazoline)-Based Amphiphilic Gradient Copolymers Regulates the Delivery of Hydrophobic Molecules: A Case of the Biodistribution and the Photodynamic Activity of the Photosensitizer Hypericin, *Biomacromolecules*, **2021**, 22, 4199-4216
2. Majerčíková, M., Nádaždy, P., Chorvát, D., Kronekova Z, Kronek, J., Zahoranová, A., Effect of dexamethasone on thermoresponsive behavior of poly(2-oxazoline) diblock copolymers, *Polymers*, **2021**, 13, 1357
3. Paulovičová, E., Kroneková, Z., Paulovičová, L., Majerčíková, M., Kronek, J., Cell-mediated immunoreactivity of poly(2-isopropenyl-2-oxazoline) as promising formulation for immunomodulation, *Materials*, **2021**, 14, 1371
4. Haladjova, E., Smolíček, M., Ugrinova, I., Kronek, J., Rangelov, S., DNA delivery systems based on copolymers of poly (2-methyl-2-oxazoline) and polyethyleneimine: Effect of polyoxazoline moieties on the endo-lysosomal escape, *Journal of Applied Polymer Science*, **2020**, 137, 49400
5. Šišková, A.O., Kozma, E., Opálek, A., Kroneková, Z., Kronek J., Rydz, J., Andicsová, A.E., Diclofenac embedded in silk fibroin fibers as a drug delivery system, *Materials*, **2020**, 13, 3580
6. V. Raus, J. Holos, J. Kronek, J. Mosnacek, Well-Defined Linear and Grafted Poly(2-isopropenyl-2-oxazoline)s Prepared via Copper-Mediated Reversible-Deactivation Radical Polymerization Methods, *Macromolecules*, **2020**, 53, 2077-2087
7. D. Trel'ová, A.R. Salgarella, L. Ricotti, G. Guidetti, A. Cutrone, P. Šrámková, A. Zahoranová, D. Chorvát, Jr., D. Haško, C. Canale, S. Micera, **J. Kronek**, A. Menciasci, I. Lacík, Soft Hydrogel Zwitterionic Coatings Minimize Fibroblast and Macrophage Adhesion on Polyimide Substrates, *Langmuir*, **2019**, 35, 1085-1099,

8. 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.
9. 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-graft-2-(4-dodecyloxyphenyl)-2-oxazoline Copolymer Nanoparticles for Drug Delivery. *Biomacromolecules*, **2018**, 19, 2459-2471.
10. 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.
11. **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.
12. L. Hrdlička, P. Šrámková, J. Prousek, **J. Kronek**. Environmental toxicity study of poly(2-oxazoline)s. *Chemical Papers*, **2018**, 72, 1543-1547.
13. 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.
14. 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.
15. 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.
16. 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.
17. 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.
18. 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.
19. **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.
20. 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.

21. 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.
22. 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.
23. **J. Kronek**, T. Nedelčev, M. Mikulec, A. Kleinová, J. Lustoň. Synthesis of cinnamic acid-derived 4,5-dihydrooxazoles. *Chemical Papers*, **2013**, *67*, 1424-1432.
24. **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.
25. **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.
26. 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.
27. 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.
28. **J. Kronek**, N. Petrencikova, J. Lustoň, 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.
29. 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.
30. **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.
31. 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.
32. **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.
33. 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.
34. 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.

35. 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.
36. 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.
37. 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.
38. 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.
39. 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.
40. 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.
41. J. Lustoň, **J. Kronek**, F. Böhme. Synthesis and polymerization reactions of cyclic imino ethers. I. Ring-opening homopolyaddition of *o*-type hydroxyphenyl-substituted 2-oxazolines. *Journal of Polymer Science. Part A. Polymer Chemistry*, **2006**, *44*, 343-355.
42. 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.
43. **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.
44. **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.
45. 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.
46. J. Lustoň, **J. Kronek**, F. Böhme, H. Komber. Synthesis of bis-2-oxazolines containing inner unsaturation and their hydrolysis to phenylenediacrylic acids. *Designed Monomers and Polymers*, **1999**, *2*, 61-68.
47. 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.
48. **J. Kronek**, J. Lustoň, J. Böhme. Reactions of 2-oxazolines and their utilization. *Chemické listy*, **1998**, *92*, 475-485.
49. **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.