

ALEXANDER A. SHESTOPALOV

University of Rochester
Department of Chemical Engineering
Rochester, NY 14627

Phone: (585) 276-5434
FAX: (585) 273-1348
alexander.shestopalov@rochester.edu

A. PROFESSIONAL PREPARATION

- 2002 M.S. in Chemistry – Moscow State University, Moscow, Russia (with honors)
2004 PhD in Organic Chemistry – Zelinsky Institute, RAS, Moscow, Russia
Advisors: Prof. Viktor Litvinov and Prof. Alan Katritzky
2009 PhD in Physical Chemistry – Duke University, Durham, NC
Advisor: Prof. Eric Toone

B. APPOINTMENTS AND PROFESSIONAL TRAINING

- 2002-2004 Graduate Student in Chemistry, Zelinsky Institute RAS/University of Florida
2004-2005 Postdoctoral Fellow in Chemistry, University of Florida, Gainesville, FL
2005-2009 Graduate Student in Chemistry, Duke University, Durham, NC
2010-2017 Assistant Prof. of Chemical Engineering, University of Rochester, Rochester, NY
2017-present Associate Prof. of Chemical Engineering, University of Rochester, Rochester, NY
Director of Graduate Studies

C. PROFESSIONAL EXPERTISE

Physical Chemistry, Synthetic Organic Chemistry, Interfacial and Colloidal Science, Interfacial Thermodynamics, Interfacial Engineering and Manufacturing at the Micro- and Nano-Scales

D. CURRENT COLLABORATORS AND AFFILIATIONS

Graduate and Postdoctoral Advisors:

- Ph.D. advisor: Prof. Viktor P, Litvinov, Ph.D. (Zelinsky Institute, Moscow)
Ph.D. advisor: Prof. Eric J. Toone, Ph. D. (Duke University)
Postdoc advisor: Prof. Alan R. Katritzky, Ph. D. (University of Florida)

Graduate and Postdoctoral Advisees:

- Postdoctoral Fellows: Dr. Rui Shen (2010-2013)
PhD Students: Yekaterina Lyubarskaya (graduated 2014) IBM/GlobalFoundries
Jinhai Li (graduated 2015) IBM/GlobalFoundries
Xunzhi Li (graduated 2019) Micron
So Youn Kim (expected 2020)
Nan Liu (expected 2021)
Ruobin Jia (expected 2023)
Fakhraddin Akbari Dourbash (co-adviser, expected 2023)
Patrick Raffaele (expected 2024)
Russel Dent (expected 2024)
MS Students: Jeffrey Shapanka (graduated 2013)
Xiaolei Chu (graduated 2013)
Ryan Green (graduated 2014)
Wenchuan Ma (graduated 2015)
Nan Liu (graduated 2016)

Boya Zhang (graduated 2017)
Robert Harding (graduates 2017)
Peng Zhang (graduated 2018)
Ruobin Jia (graduated 2018)

Collaborators:

Prof. James McGrath (University of Rochester)
Prof. Mitchel Anthamatten (University of Rochester)
Prof. Lewis Rothberg (University of Rochester)
Prof. John Lambropoulos (University of Rochester)
Dr. Stavros Demos (University of Rochester, LLE)
Dr. George Wang (Sandia National Lab)

E. TEACHING EXPERIENCE

CHE 225 Chemical Engineering Thermodynamics 2 (junior level, 4 credits)	2018-current
CHE 225 Chemical Engineering Thermodynamics 1 (junior level, 4 credits)	2017
CHE 225 Chemical Engineering Thermodynamics (junior level, 4 credits)	2010-2016
CHE 492/292 Biointerfaces (graduate/advanced undergraduate, 4 credits)	2011-2016
CHE 487/287 Surface Analysis (graduate/advanced undergraduate, 4 credits)	2017-current

F. SYNERGISTIC ACTIVITIES

- Director of Graduate Studies for the Chemical Engineering Department
- Secondary appointments in UR Materials Science Program and Chemistry Department Materials Cluster
- Summer research experience outreach program including first generation and minority students (UofR, Xerox Fellows).
- High school summer outreach program – “Careers in Engineering” (UofR Pre-college)
- Member of two professional organizations (ACS, AIChE)
- Reviewer for chemistry and materials science journals

G. FULL LIST OF PUBLICATIONS

1. “Second Generation Nanoporous Silicon Nitride Membranes for High Toxin Clearance and Small Format Hemodialysis”, Hill, Kayli; Walker, Samuel N.; Salminen, Alec; Chung, Hung L.; Li, Xunzhi; Ezzat, Bahie; Miller, Joshua J.; Des Ormeaux, Jon-Paul S.; Zhang, Jingkai; Hayden, Andrew; Burgin, Tucker; Piraino, Lindsay; May, Marina N.; Gaborski, Thomas R.; Roussie, James A.; Taylor, Jeremy; Di Vincenti, Louis, Jr.; Shestopalov, Alexander A.; McGrath, James L.; Johnson, Dean G.; *Advanced Healthcare Materials*, **2020**, 1900750
2. “Scalable Synthesis of Cholesteric Glassy Liquid Crystals”, Wallace, Jason U.; Shestopalov, Alexander; Kosc, Tanya; Chen, Shaw H.; *Industrial & Engineering Chemistry Research* **2018**, 57(12), 4470-44732018
3. “Modification of Nanoporous Silicon Nitride with Stable and Functional Organic Monolayers”, Xunzhi Li, Dean Johnson, Wenchuan Ma, Henry Chung, Jirachai Getprecharsawas, James L. McGrath, Alexander A. Shestopalov; *Chemistry of Materials*, **2017**, 29(5), 2294-2302
4. “Vapor-Phase Carbenylation of Hard and Soft Material Interfaces”, Xunzhi Li, Wenchuan Ma, Alexander A Shestopalov, *Langmuir*, **2016**, 32, 11386-11394

5. "High-Resolution Organic Light-Emitting Diodes Patterned via Contact Printing", Jinhai Li, Lisong Xu, Ching W Tang, Alexander A. Shestopalov; *ACS Applied Materials and Interfaces*, **2016**, 8, 16809-16815
6. "Urethane-Acrylate Polymers in High-Resolution Contact Printing", Jinhai Li, Lisong Xu, Soyoun Kim, Alexander A. Shestopalov; *Journal of Materials Chemistry C*, **2016**, 4, 4155-4165 (featured on the back cover)
7. "Degradation of organic self-assembled monolayers inside organic photovoltaic devices", Felipe F Angel, Yekaterina Lyubarskaya Y, Alexander A Shestopalov, Ching W Tang; *Organic Electronics*, **2014**, 15, 3624-3631
8. "Structural modifications in bilayered molecular systems lead to predictable changes in their electronic properties", Carleen M Bowers, Minlu Zhang, Yekaterina Lyubarskaya, Ching W Tang, Alexander A Shestopalov; *Advanced Materials Interfaces*, **2014**, 1(2), 1300109
9. "Ultrathin Silicon Membranes for Wearable Dialysis", Dean G. Johnson, Tejas S. Khire, Yekaterina L. Lyubarskaya, Karl J. P. Smith, Jon-Paul S. DesOrmeaux, Jeremy G. Taylor, Thomas R. Gaborski, Alexander A. Shestopalov, Christopher C. Striemer, and James L. McGrath, *Advances in Chronic Kidney Disease*, **2013**, 20(6), 508–515.
10. "Multicomponent inorganic Janus particles with controlled compositions, morphologies, and chemical properties", Yekaterina L. Lyubarskaya, Alexander A. Shestopalov, *ACS Applied Materials and Interfaces*, **2013**, 5, 7323–7329
11. "Multicomponent patterning of indium tin oxide", Carleen M. Bowers, Alexander A. Shestopalov, Robert L. Clark, Eric J. Toone, *Applied Materials and Interfaces*, **2012**, 4(8), 3932 – 3936
12. "A general and efficient cantilever functionalization technique for AFM molecular recognition studies" Carleen M. Bowers, David A. Carlson, Alexander A. Shestopalov, Robert L. Clark, Eric J. Toone, *Biopolymers*, **2012**, 97(10), 761 – 765
13. "Soft Lithographic Functionalization and Patterning Oxide-free Silicon and Germanium", Carleen M. Bowers, Eric J. Toone, Robert L. Clark, Alexander A. Shestopalov, *Journal of Visualized Experiments*, **2011**, 58, 1–7.
14. "A soft-lithographic approach to functionalization and nanopatterning oxide-free silicon", Alexander. A. Shestopalov, Carleen J. Morris, Briana N. Vogen, Amanda Hoertz, Robert L. Clark, Eric J. Toone, *Langmuir*, **2011**, 27(10), 6478 – 6485.
15. "Patterning NHS-terminated SAMs on Germanium", Carleen J. Morris, Alexander A. Shestopalov, Brian H. Gold, Robert L. Clark, and Eric J. Toone, *Langmuir*, **2011**, 27(10), 6486 – 6489.
16. "Inkless Microcontact Printing on SAMs of Boc- and TBS-Protected Thiols", Alexander. A. Shestopalov, Robert L. Clark, Eric J. Toone, *Nano Letters*, **2010**, 10(1), 43 – 46.
17. "Catalytic microcontact printing on chemically functionalized H-terminated silicon", Alexander. A. Shestopalov, Robert L. Clark, Eric J. Toone, *Langmuir*, **2010**, 26(3), 1449 – 1451.
18. "Combinatorial synthesis of substituted thieno[3,2-*b*]pyridines and other annulated heterocycles via New SN2 ->Thorpe-Ziegler ->Thorpe-Guareschi Domino Reactions" Anatoliy M. Shestopalov, Lyudmila A. Rodinovskaya, Alexander A. Shestopalov. *Journal of Combinatorial Chemistry*, **2010**, 12(1), 9 – 12.

19. "New Convenient Four-Component Synthesis of 6-Amino-2,4-dihydropyrano[2,3-*c*]pyrazol-5-carbonitriles and One-Pot Synthesis of 6'-Aminospiro[(3*H*)-indol-3,4'-pyrano[2,3-*c*]pyrazol]-(1*H*)-2-on-5'-carbonitriles" Yuri M. Litvinov, Alexander A. Shestopalov, Lyudmila A. Rodinovskaya, Anatoliy M. Shestopalov. *Journal of Combinatorial Chemistry*, **2009**, *11*(5), 914 – 919.
20. "Microwave-assisted synthesis of substituted fluoroazines using $\text{KF}\cdot 2\text{H}_2\text{O}$ ", Anatoliy M. Shestopalov, Alexander E. Fedorov a, Liudmila A. Rodinovskaya, Alexander A. Shestopalov, Andrei A. Gakh, *Tetrahedron Letters*, **2009**, *50*(37), 5257 – 5259.
21. "One-Step Synthesis of Substituted 3,5-Dicyanospiro-4-(piperidine-4')-1*H*,4*H*-dihydropyridine-2-thiolates and 2,6-Diamino-3,5-dicyanospiro-4-[(piperidine-4') or (2'-oxoindole-3')] -4*H*-thiopyrans", Anatoliy M. Shestopalov, Alexander A. Shestopalov, Lyudmila A. Rodinovskaya, Anna V. Gromova, Phosphorus, *Sulfur and Silicon and the Related Elements*, **2009**, *184*(5), 1100-1114.
22. "Synthesis of 3-cyano-2-fluoropyridines", Anatoliy M. Shestopalov, Ludmila A. Rodinovskaya, Alexander E. Fedorov , Victor E. Kalugin, Kirill G. Nikishin , Alexander A. Shestopalov, Andrei A. Gakh, *Journal of Fluorine Chemistry*, **2009**, *130*, 236–240.
23. "One-Pot Synthesis of Diverse 4-Di(tri)fluoromethyl-3-cyanopyridine-2(1*H*)-thiones and Their Utilities in the Cascade Synthesis of Annulated Heterocycles", Lyudmila A. Rodinovskaya, Anatoliy M. Shestopalov, Anna V. Gromova, and Alexander A. Shestopalov, *Journal of Combinatorial Chemistry*, **2008**, *10*, 313–322.
24. "Versatile three-component synthesis of 2'-amino-1,2-dihydrospiro[(3*H*)-indole-3,4'-(4'*H*)-pyran]-2-ones" Valeriy Yu. Mortikov, Yuri M. Litvinov, Alexander A. Shestopalov, Lyudmila A. Rodinovskaya, Anatoliy M. Shestopalov. *Russian Chemical Bulletin*, **2008**, *57*(11), 2373 – 2380.
25. "Inkless Microcontact Printing on Self-Assembled Monolayers of Fmoc-Protected Amino thiols", Alexander A. Shestopalov, Robert L. Clark, Eric J. Toone, *Journal of the American Chemical Society*, **2007**, *129*, 13818–13819.
26. "Preparation of chiral cyclopropanes with a carbohydrate fragment from levoglucosenone", Alexander V. Samet, Anatoliy M. Shestopalov, Dmitriy N. Lutov, Lyudmila A. Rodinovskaya, Alexander A. Shestopalov, Victor V. Semenov; *Tetrahedron Asymmetry*, **2007**, *18*, 1986–1989.
27. "Selective Peptide Chain Extension at the C-terminus of Aspartic and Glutamic Acids Utilizing *N*-protected (α -aminoacyl)benzotriazoles", Alan R. Katritzky, Ekaterina Todadze, Alexander A. Shestopalov, Janet Cusido, Parul Angrish; *Chemical Biology and Drug Design*, **2006**, *68*, 42–47.
28. "Selective Peptide Chain Extension at the N-terminus of Aspartic and Glutamic Acids Utilizing 1-(*N*-protected- α -aminoacyl)benzotriazoles", Alan R. Katritzky, Ekaterina Todadze, Janet Cusido, Parul Angrish and Alexander A. Shestopalov; *Chemical Biology and Drug Design*, **2006**, *68*, 37–41.
29. "Substituted 4-(3-Cyanopyridin-2-ylthio)acetoacetates: New Convenient Reagents for the Synthesis of Heterocycles" Lyudmila A. Rodinovskaya, Anatoliy M. Shestopalov, Anna V. Gromova, Alexander A. Shestopalov, *Synthesis*, **2006**, *14*, 2357–2370.

30. "One-step synthesis of substituted 2-amino-5-oxo-4,5-dihydropyrano[3,2-*c*]chromenes", Aleksandr A. Shestopalov, Lyudmila A. Rodinovskaya, Anatoliy M. Shestopalov, Viktor P. Litvinov, *Russian Chemical Bulletin (International Edition)*, **2005**, 54(4), 992.
31. "A convenient synthesis of chiral 1,2,4-oxadiazoles from *N*-protected (α -aminoacyl)benzotriazoles", Alan R. Katritzky, Aleksandr A. Shestopalov, Kazuyuki Suzuki, *ARKIVOC*, **2005**, vii, 36.
32. "One-step synthesis of 3-cyano-6-methyl-4-thienyl-5,6,7,8-tetrahydro[1,6]naphthyridine-2(1*H*)-thiones and annulated heterocyclic systems on their basis", Aleksandr A. Shestopalov, Anna V. Gromova, Lyudmila A. Rodinovskaya, Kiril G. Nikishin, Viktor P. Litvinov, Anatoliy M. Shestopalov, *Russian Chemical Bulletin (International Edition)*, **2004**, 53(10), 2352.
33. "Single-step synthesis of substituted 7-aminopyrano[2,3-*d*]pyrimidines", Aleksandr A. Shestopalov, Lyudmila A. Rodinovskaya, Anatoliy M. Shestopalov, and Viktor P. Litvinov, *Russian Chemical Bulletin (International Edition)*, **2004**, 53(10), 2342.
34. "A New Convenient Preparation of Thiol Esters Utilizing *N*-Acylbenzotriazoles", Alan R. Katritzky, Aleksandr A. Shestopalov, Kazuyuki Suzuki, *Synthesis*, **2004**, 11, 1806–1813.
35. "One-step synthesis of substituted 4,8-dihydropyrano[3,2-*b*]pyran-4-ones", Aleksandr A. Shestopalov, Lyudmila A. Rodinovskaya, Anatoliy M. Shestopalov, and Viktor P. Litvinov, *Russian Chemical Bulletin (International Edition)*, **2004**, 53(3), 724–725.
36. "Cross-condensation of derivatives of cyanoacetic acid and carbonyl compounds 2. One-pot synthesis of substituted 2-amino-7-methyl-5-oxo-4,5-dihydropyrano[4,3-*b*]pyrans in ethanol and ionic liquid [bmim][PF₆]", Anatoliy M. Shestopalov, Sergey G. Zlotin, Aleksandr A. Shestopalov, Valeriy Yu. Mortikov, and Lyudmila A. Rodinovskaya, *Russian Chemical Bulletin (International Edition)*, **2004**, 53(3), 573–579.
37. "A Convenient One-Pot Synthesis of Substituted 1,1-Dicyanocyclopropanes from Sulfonium Salts, Malononitrile, and Carbonyl Compounds", Aleksandr A. Shestopalov, Lyudmila A. Rodinovskaya, Anatoliy M. Shestopalov, Sergey G. Zlotin, and Vladimir Nesterov, *Synlett*, **2003**, 15, 2309–2312.
38. "Cyclization of α -Oxo-oximes to 2-Substituted Benzoxazoles", Alan R. Katritzky, Zuoquan Wang, C. Dennis Hall, Novruz G. Akhmedov, Aleksandr A. Shestopalov, and Peter J. Steel, *Journal of Organic Chemistry*, **2003**, 68(23), 9093-9099.
39. "Structure elucidation of [1,3]oxazolo[4,5-*e*][2,1]benzisoxazole and naphtho[1,2-*d*][1,3]- and phenanthro[9,10-*d*]oxazoles using gradient selected gHMBC, gHMQC and gHMQC-TOCSY NMR techniques", Alan R. Katritzky, Novruz G. Akhmedov, Zuoquan Wang, Vitaly A. Roznyatovsky, Aleksandr A. Shestopalov, and C. Dennis Hall, *Magnetic Resonance in Chemistry*, **2003**, 41, 908–920.
40. "Cross-condensation of derivatives of cyanoacetic acid and carbonyl compounds. Part 1: Single-stage synthesis of 10-substituted 6-amino-spiro-4-(piperidine-4')-2*H*,4*H*pyrano[2,3-*c*]pyrazole-5-carbonitriles", Anatoliy M. Shestopalov, Yuliya M. Emel'yanova, Aleksandr A. Shestopalov, Lyudmila A. Rodinovskaya, Zuhra I. Niazimbetova, and Dennis H. Evans, *Tetrahedron*, **2003**, 59, 7491–7496.
41. "One-Step Synthesis of Substituted 6-Amino-5-cyanospiro-4-(piperidine-4')-2*H*,4*H*-dihydropyrazolo[3,4-*b*]pyrans", Anatoliy M. Shestopalov, Yuliya M. Emel'yanova,

Aleksandr A. Shestopalov, Lyudmila A. Rodinovskaya, Zukhra I. Niazimbetova, and Dennis H. Evans, *Organic Letters*, **2002**, 4(3), 423–425.

Literature Reviews

42. “Synthesis of Ring Fluorinated Pyridines”, Anatoliy M. Shestopalov, Alexander A. Shestopalov, Lyudmila A. Rodinovskaya, Anna V. Gromova, in *Fluorinated Heterocyclic Compounds: Synthesis, Chemistry and Applications*; John Wiley & Sons, Inc, **2009**, 243-271 (chapter6).
43. “Synthesis and reactions of fluorinated nicotinonitriles”, Anatoliy M. Shestopalov,; Lyudmila A. Rodinovskaya, Alexander A. Shestopalov, Anna V. Gromova, , Alexander E. Fedorov, Andrey A. Gakh, In: *Fluorinated Heterocycles*; AA Gakh, KL Kirk, Eds.; ACS Symposium Series 1003; Oxford University Press/American Chemical Society: Washington, DC, **2009**, 263-280.
44. “Seven-membered and larger heterocyclic rings containing phosphorus”, Anatoliy M. Shestopalov, Alexander A. Shestopalov, in *Comprehensive Heterocyclic Chemistry III*, AR Katritzky, CA Ramsden, EFV Scriven and RJK Taylor, Eds.; Elsevier: Oxford, **2008**, 14, 901-944 (chapter 17).
45. “Multicomponent Reactions of Carbonyl Compounds and Derivatives of Cyanoacetic Acid: Synthesis of Carbo- and Heterocycles”, Anatoliy M. Shestopalov, Alexander A. Shestopalov, Lyudmila A. Rodinovskaya, *Synthesis*, **2008**, 1, 1-25.

Patents

46. “Methods for Depositing A Monolayer On A Substrate”, AA Shestopalov, JL McGrath, X Li, *US Patent application number 9,899,212*, **February 20, 2016**