

ALI ROSTAMI

Assistant Professor of Polymer Chemistry

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ACADEMIC PROFILE

Organic chemist and research group leader with expertise in green and sustainable synthesis, mechanochemistry, organocatalysis, heterocyclic chemistry, carbon dioxide fixation, supramolecular sensing, and pharmaceutical/process chemistry. Author or co-author of more than 40 peer-reviewed publications, with extensive experience in research supervision, laboratory development, industrial collaboration, and advanced analytical characterization.

CURRENT APPOINTMENTS

Assistant Professor of Polymer Chemistry at Shomal University 2017 - Present
Shomal, Iran

Quality Control Officer

Natural and Medical Sciences Research Center, University of Nizwa, Oman

Supports quality-management documentation, institutional assessment, evidence systems, and continuous improvement.

2025
Nizwa, Oman

Assistant Professor of Organic Chemistry

Natural and Medical Sciences Research Center, University of Nizwa, Oman

- 1 Established and leads the Synthetic Organic Chemistry Laboratory; supervises undergraduate, graduate, and research staff.
- 2 Conducts research in mechanochemistry, sustainable catalysis, heterocyclic synthesis, CO₂ utilization, and supramolecular sensing.

2017 – 2025
Nizwa, Oman

EDUCATION AND ADVANCED TRAINING

JSPS Postdoctoral Fellow, Organic Chemistry

Nagoya University, Japan

Supervisor: Prof. Eiji Yashima

2013
Japan

Ph.D., Polymer Chemistry

University of Toronto, Canada

Supervisor: Prof. Mark S. Taylor

2007 – 2012
Canada

M.Sc., Organic Chemistry

University of Alberta, Canada

Supervisor: Prof. Frederick G. West

2006
Canada

B.Sc., Chemistry

University of Mazandaran, Iran

Supervisor: Prof. Mahmood Tajbakhsh

2001
Iran

RESEARCH EXPERTISE

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| 3 Mechanochemistry and solvent-minimized organic synthesis | 6 Green catalysis, hydrogen-bond-donor organocatalysis, and CO ₂ fixation |
| 4 Heterocyclic synthesis, nitrile imines, azirines, triazoles, and pyrazolines | 7 Organoboron chemistry and carbon–boron bond functionalization |
| 5 Supramolecular chemistry, anion recognition, and fluorescence sensing | 8 Pharmaceutical, process, and multistep small-molecule synthesis |

ACADEMIC AND PROFESSIONAL EXPERIENCE

Senior Research Scientist

Dalriada Drug Discovery

Bench- and pilot-scale synthesis of small molecules for drug-discovery programs.

06/2020 –
03/2021

Assistant Professor of Chemistry*Shahid Beheshti University, Tehran, Iran*

2012 – 2016

Tehran, Iran

9 Developed the polymer chemistry program; taught undergraduate and graduate chemistry courses; supervised graduate research.

10. Led an industrial ion-exchange membrane project and provided synthetic/process consultancy to pharmaceutical companies.

Research Scientist*Toronto Research Chemicals Inc., Canada*

2006 – 2007

Canada

Bench- and pilot-scale synthesis of pharmaceutical intermediates, impurities, carbohydrates, peptides, and medically relevant compounds.

FUNDED RESEARCH PROJECTS

Mechanochemical Hydroxylation and Nitration of Organoboronic

2025

Compounds: Green and Sustainable Approaches in Converting Organoboron Compounds to Phenols and Nitroarenes*Academic Supervisor, GRG, Oman Research Council, BFP/GRG/CBS/25/141***Green Catalysis: Transforming Carbon Dioxide into Cyclic Carbonates Using Halogen-Free Deep Eutectic Solvents**

2025

*Academic Supervisor, URG, Oman Research Council, BFP/URG/CBS/25/135***Mechanosynthesis of Aryl Halides from Organoboronic Compounds: A Green and Sustainable Approach to Converting Carbon–Boron Bonds into Carbon–Halogen Bonds**

2025

*Academic Supervisor, URG, Oman Research Council, BFP/URG/CBS/25/167***Hydrogen-Bond Donors–Phenols as an Effective Binary Organocatalytic Platform for Carbon Dioxide Fixation of Epoxides**

2023

*Academic Supervisor, GRG, Oman Research Council, BFP/GRG/EI/23/171***Synthesis, Biological Evaluation, and Molecular Modeling of Novel Acyl-Substituted Pyrazolines and 1,2,4-Triazoles: Towards the Discovery of Anti-Inflammatory and Anticancer Drugs**

2023

*Principal Investigator, RG, Oman Research Council, BFP/RGP/CBS/23/104***Design and Synthesis of Novel Metal- and Halide-Free Catalytic Systems for the Chemical Fixation of CO₂**

2022

*Academic Supervisor, GRG, Oman Research Council, BFP/GRG/CBS/22/167***Carbon Dioxide and Isocyanate Organocatalysis: A Sustainable Approach to Converting Greenhouse Gases and Toxic Compounds into Chemical Feedstocks**

2018

*Principal Investigator, RG, Oman Research Council, BFP/RGP/EI/18/021***Multidentate Squaramide-Based Transmembrane Anion Transporters: A Step Toward Cystic Fibrosis Treatment***Principal Investigator, RG, Oman Research Council***HONORS AND AWARDS**

University of Nizwa Employee Award

2026

*University of Nizwa***Oman National Research Award / Best Publication Award**

2025

Oman National Research Award / Best Publication Award

2024

Japan Society for the Promotion of Science (JSPS) Postdoctoral Fellowship

2013

Iranian Center of Excellence (Bonyad Melli Nokhbegan): Member and Young Scientist Award Recipient**University of Toronto Ph.D. Fellowship and Graduate Student Travel Grant****University of Alberta J. Gordin Kaplan Award****Dean's Honors List**

2001

University of Mazandaran

Highest GPA among approximately 80 graduating students.

TEACHING AND RESEARCH SUPERVISION

University of Nizwa

Courses taught:

11. **CHEM243** – Special Topics (*Fall 2017*)
12. **CHEM265L** – Organic Chemistry I Lab – three sections (*Spring 2019*)
13. **CHEM605** – Synthetic Methodologies and Advanced Stereochemistry (*Fall 2018*)
14. **CHEM711** – Advanced Organometallic Chemistry (*Spring 2023*)

15. **CHEM399** – Polymer Chemistry (*Fall 2022*)
16. **CHEM604** – Catalysis in Organic Synthesis (*Spring 2024*)
17. **CHEM604L** – Catalysis in Organic Synthesis Lab (*Spring 2024*)
18. **CHEM605L** – Synthetic Methodologies and Advanced Stereochemistry Lab (*Fall 2018*)

Undergraduate and graduate organic chemistry teaching and research supervision.

Shahid Beheshti University

General Chemistry; Organic Chemistry I–III; Polymer Chemistry; Advanced Organic Chemistry; Organic Synthesis; Polymer Synthesis; Polymer Properties.

University of Toronto and University of Alberta

Graduate Teaching Assistant in general and organic chemistry.

Research Supervision

Supervised projects in CO₂ fixation, organocatalysis, mechanochemistry, polymer synthesis, pharmaceutical intermediates, Nazarov cyclization, and biodegradable polymers.

PROFESSIONAL SERVICE AND LEADERSHIP

Scientific Organizer

2016

Polymer Characterization Workshop, Shahid Beheshti University

President

2004 – 2005

Organic Chemistry Division, Chemistry Graduate Student Society, University of Alberta

Reviewer

The Journal of Organic Chemistry, European Journal of Organic Chemistry, ChemCatChem, RSC Advances, Advanced Synthesis and Catalysis, and other peer-reviewed chemistry journals

Quality Control Officer

2025 – Present

Natural and Medical Sciences Research Center, University of Nizwa

Nizwa, Oman

SELECTED PEER-REVIEWED PUBLICATIONS

Selected publications from a record of more than 40 peer-reviewed articles.

19. Al-Harrasi, A.; Rostami, A.; Al-Jassasi, M.; Yazdani, H. Metformin-Based Bio-Inspired Organocatalysts for CO₂ Fixation of Terminal/Internal Epoxides. *ChemPlusChem* **2026**, *91*, e70201. <https://doi.org/10.1002/cplu.70201>
20. Yazdani, H.; Rostami, A.; Al-Harrasi, A. Metal–Organic Frameworks and Covalent Organic Frameworks as Catalysts and Photocatalysts for the Synthesis of Cyclic Carbonates from CO₂ and Epoxides. *ChemNanoMat* **2025**, *11*, e202500266. <https://doi.org/10.1002/cnma.202500266>
21. Yazdani, H.; Lotfi Nosood, Y.; Rostami, A.; Fattahi Ghahnavieh, N.; Anwar, M. U.; Al-Harrasi, A. Synthesis of Thioxothiazolidinone and Iminothiazolidinone Derivatives via Dicyano Epoxide-Based Multicomponent Reactions in Green Media. *Eur. J. Org. Chem.* **2025**, *28*, e202500199. <https://doi.org/10.1002/ejoc.202500199>
22. Al-Shidhani, S.; Takallou, A.; Lotfi Nosood, Y.; Al-Siyabi, M.; Christensen, J. B.; Pakari Shalmani, P.; Almaani, A.; Rostami, A.; Al-Harrasi, A. Synthesis of Benzouracils and Carbamates from Chloroacetamides through Carbon–Carbon Bond Cleavage. *Org. Biomol. Chem.* **2025**, *23*, 1841–1845. <https://doi.org/10.1039/D4OB01858C>
23. Lotfi Nosood, Y.; Fattahi Ghahnavieh, N.; Takallou, A.; Rostami, A.; Ebrahimi, A.; Anwar, M. U.; Al-Harrasi, A. Microwave-Assisted [3 + 2] Cycloaddition Reactions of Dicyanoepoxides with Benzyldene Meldrum's Acids. *Org. Biomol. Chem.* **2025**, *23*, 4084–4089. <https://doi.org/10.1039/D4OB01702A>
24. Avula, S. K.; Ullah, S.; Ebrahimi, A.; Rostami, A.; Halim, S. A.; Khan, A.; Anwar, M. U.; Gibbons, S.; Csuk, R.; Al-Harrasi, A. Dihydrofolate Reductase Inhibitory Potential of 1 H-Indole-Based Meldrum-Linked 1 H-1,2,3-Triazoles as New Anticancer Derivatives: In Vitro and In Silico Studies. *Eur. J. Med. Chem.* **2025**, *283*, 117174. <https://doi.org/10.1016/j.ejmech.2024.117174>
25. Ebrahimi, A.; Fattahi Ghahnavieh, N.; Anwar, M. U.; Al-Harrasi, A.; Rostami, A. A One-Pot Two-Step Three-Component Stereoselective Mechanochemistry of Ester-Functionalized Multisubstituted Δ^2 -Pyrazolines and Their Application in the Detection of Fluoride Ions. *ACS Sustainable Chem. Eng.* **2024**, *12*, 13750–13762. <https://doi.org/10.1021/acssuschemeng.4c01790>

26. Avula, S. K.; Ullah, S.; Halim, S. A.; Khan, A.; Anwar, M. U.; Csuk, R.; Al-Harrasi, A.; Rostami, A. Meldrum-Based-1 H-1,2,3-Triazoles as Antidiabetic Agents: Synthesis, In Vitro α -Glucosidase Inhibition Activity, Molecular Docking Studies, and In Silico Approach. *ACS Omega* **2023**, *8*, 24901–24911. <https://doi.org/10.1021/acsomega.3c01291>
27. Kianmehr, E.; Bari, B.; Jafarzadeh, M.; Rostami, A.; Golshani, M.; Foroumadi, A. Reaction of Imidazo[1,2-a]pyridines with Coumarin-3-carboxylic Acids: A Domino Michael Addition/Decarboxylation/Oxidation/Annulation. *New J. Chem.* **2022**, *46*, 19455–19459. <https://doi.org/10.1039/D2NJ02706B>
28. Rostami, A.; Ebrahimi, A.; Al-Jassasi, M.; Mirzaei, S.; Al-Harrasi, A. 2-Picolinic Acid as a Naturally Occurring Hydrogen Bond Donor for the Preparation of Cyclic Carbonates from Terminal/Internal Epoxides and CO₂. *Green Chem.* **2022**, *24*, 9069–9083. <https://doi.org/10.1039/D2GC02146C>
29. Rostami, A.; Ebrahimi, A.; Sakhaee, N.; Golmohammadi, F.; Al-Harrasi, A. Microwave-Assisted Electrostatically Enhanced Phenol-Catalyzed Synthesis of Oxazolidinones. *J. Org. Chem.* **2022**, *87*, 40–55. <https://doi.org/10.1021/acs.joc.1c01686>
30. Ebrahimi, A.; Rezazadeh, M.; Khosravi, H.; Rostami, A.; Al-Harrasi, A. An Aminopyridinium Ionic Liquid: A Simple and Effective Bifunctional Organocatalyst for Carbonate Synthesis from Carbon Dioxide and Epoxides. *ChemPlusChem* **2020**, *85*, 1587–1595. <https://doi.org/10.1002/cplu.202000367>
31. Rostami, A.; Ebrahimi, A.; Husband, J.; Anwar, M. U.; Csuk, R.; Al-Harrasi, A. Squaramide–Quaternary Ammonium Salt as an Effective Binary Organocatalytic System for Oxazolidinone Synthesis from Isocyanates and Epoxides. *Eur. J. Org. Chem.* **2020**, *2020*, 1881–1895. <https://doi.org/10.1002/ejoc.202000153>
32. Sedghi, R.; Javadi, H.; Heidari, B.; Rostami, A.; Varma, R. S. Efficient Optical and UV–Vis Chemosensor Based on Chromo Probes–Polymeric Nanocomposite Hybrid for Selective Recognition of Fluoride Ions. *ACS Omega* **2019**, *4*, 16001–16008. <https://doi.org/10.1021/acsomega.9b02098>
33. Rostami, A.; Mahmoodabadi, M.; Ebrahimi, A. H.; Khosravi, H.; Al-Harrasi, A. An Electrostatically Enhanced Phenol as a Simple and Efficient Bifunctional Organocatalyst for Carbon Dioxide Fixation. *ChemSusChem* **2018**, *11*, 4262–4268. <https://doi.org/10.1002/cssc.201802028>
34. Karami, Z.; Zohuriaan-Mehr, M. J.; Rostami, A. Biobased Diels–Alder Engineered Network from Furfuryl Alcohol and Epoxy Resin: Preparation and Mechano-Physical Characteristics. *ChemistrySelect* **2018**, *3*, 40–46. <https://doi.org/10.1002/slct.201702387>
35. Rostami, A.; Sadeh, E.; Ahmadi, S. Exploration of Tertiary Aminosquaramide Bifunctional Organocatalyst in Controlled/Living Ring-Opening Polymerization of L-Lactide. *J. Polym. Sci. Part A: Polym. Chem.* **2017**, *55*, 2483–2493. <https://doi.org/10.1002/pola.28641>
36. Karami, Z.; Nademi, F.; Zohuriaan-Mehr, M. J.; Rostami, A. An Efficient Fully Bio-Based Reactive Diluent for Epoxy Thermosets: 2-[(Oxiran-2-ylmethoxy)methyl]furan versus a Petroleum-Based Counterpart. *J. Appl. Polym. Sci.* **2017**, *134*, 44957. <https://doi.org/10.1002/app.44957>
37. Karami, Z.; Zohuriaan-Mehr, M. J.; Rostami, A. Bio-Based Thermo-Healable Non-Isocyanate Polyurethane Diels–Alder Network in Comparison with Its Epoxy Counterpart. *J. CO₂ Util.* **2017**, *18*, 294–302. <https://doi.org/10.1016/j.jcou.2017.02.009>
38. Daneshfar, Z.; Rostami, A. Cellulose Sulfonic Acid as a Green, Efficient, and Reusable Catalyst for Nazarov Cyclization of Unactivated Dienones and Pyrazoline Synthesis. *RSC Adv.* **2015**, *5*, 104695–104707. <https://doi.org/10.1039/C5RA19773B>
39. Emamgholizadeh, A.; Rostami, A. A.; Omrani, A.; Rostami, A. Performance of EP/PpPDA and EP/PpPDA/SiO₂ Nanocomposite on Corrosion Inhibition of Steel in Hydrochloric Acid Solution. *Prog. Org. Coat.* **2015**, *82*, 7–16. <https://doi.org/10.1016/j.porgcoat.2014.12.007>
40. Emamgholizadeh, A.; Omrani, A.; Rostami, A. A.; Rostami, A. Corrosion Protection of Steel 316 Using Coatings Based on Epoxy and Poly(p-phenylenediamine)–SiO₂ Nanocomposite. *Chem. Eng. Commun.* **2015**, *202*, 1389–1396. <https://doi.org/10.1080/00986445.2014.938807>
41. Rostami, A.; Omrani, A.; Hamedian, N. Flower-Like Morphology of Poly(m-aminobenzoic Acid) Deposited at a Glassy Carbon Surface in the Presence of Silica Nanoparticles: Electropolymerization and Characterization. *Monatsh. Chem.* **2013**, *144*, 1775–1782. <https://doi.org/10.1007/s00706-013-1063-y>
42. Omrani, A.; Rostami, A.; Ravari, F.; Ehsani, M. The Relationship between Composition and Electrical Properties of Brass Covered by a Nanocomposite Coating of Glycerol Diglycidyl Ether: An EIS and DMTA Study. *Prog. Org. Coat.* **2013**, *76*, 360–366. <https://doi.org/10.1016/j.porgcoat.2012.10.002>
43. Rostami, A.; Guerin, G.; Taylor, M. S. Structure–Activity Relationships for Anion-Responsive Poly(squaramides): Support for an Analyte-Induced Noncovalent Polymer Cross-Linking Mechanism. *Macromolecules* **2013**, *46*, 6439–6450. <https://doi.org/10.1021/ma401263q>
44. Rostami, A.; Taylor, M. S. Polymers for Anion Recognition and Sensing. *Macromol. Rapid Commun.* **2012**, *33*, 21–34. <https://doi.org/10.1002/marc.201100528>
45. Rostami, A.; Wei, C. J.; Guerin, G.; Taylor, M. S. Anion Detection by a Fluorescent Poly(squaramide): Self-Assembly of Anion-Binding Sites by Polymer Aggregation. *Angew. Chem. Int. Ed.* **2011**, *50*, 2059–2062. <https://doi.org/10.1002/anie.201006884>

46. Rostami, A.; Colin, A.; Li, X. Y.; Chudzinski, M. G.; Lough, A. J.; Taylor, M. S. N,N'-Diarylsquaramides: General, High-Yielding Synthesis and Applications in Colorimetric Anion Sensing. *J. Org. Chem.* **2010**, 75, 3983–3992. <https://doi.org/10.1021/jo100104g>
47. Song, D.; Rostami, A.; West, F. G. Domino Electrocyclization/Azide-Capture/Schmidt Rearrangement of Dienones: One-Step Synthesis of Dihydropyridones from Simple Building Blocks. *J. Am.Chem. Soc.* **2007**, 129, 12019–12022. <https://doi.org/10.1021/ja071041z>
48. Rostami, A.; Wang, Y.; Arif, A. M.; McDonald, R.; West, F. G. Intramolecular Azide Trapping of the Nazarov Intermediate: Formation of Peroxy-Bridged Indolizidinones via a Deep-Seated Rearrangement and Aerobic Oxidation. *Org. Lett.* **2007**, 9, 703–706. <https://doi.org/10.1021/ol070053m>
49. Tajbakhsh, M.; Hosseinzadeh, R.; Lasemi, Z.; Rostami, A. Solvent-Free Conversion of Alcohols into Iodides with NaI Supported on KSF Clay. *Synth. Commun.* **2005**, 35, 2905–2911. <https://doi.org/10.1080/00397910500297347>

SELECTED PRESENTATIONS

Towards Sustainability: CO₂ Fixation and Greener Synthesis Methods through Mechanochemical and Microwave Approaches	2024
<i>Oral presentation, 38th Philippine Chemistry Congress, Davao, Philippines</i>	Davao, Philippines
Electrostatically Enhanced Phenol as a Simple and Efficient Bifunctional Organocatalyst for Chemical Fixation of Heterocumulenes	2022
<i>Poster presentation, BOSS 2022 Congress, 3–8 July 2022</i>	Belgium
Structure–Activity Relationships in Squaramide-Catalyzed Ring-Opening Polymerization of Lactide	2016
<i>Poster, Macro 2016, Istanbul, Türkiye</i>	Istanbul, Türkiye
Dihydropyridones, Indolizidinones, and Polysquaramides: Amides from Organic Synthesis to Supramolecular and Polymer Chemistry	2012
<i>19th Iranian Seminar on Organic Chemistry</i>	
Poly(squaramide), an Anion-Responsive Polyamide: Polymer Synthesis, Sensory, Structural, and Morphological Properties	2011
<i>Gordon Research Conference</i>	
Poly(squaramide): A Turn-On Fluorescent Anion Chemosensor	2010
<i>Canadian Chemical Society Conference, Toronto</i>	Toronto, Canada
Azide Trapping of the Nazarov Intermediate: Novel Route to Complex Azacycles	2005
<i>Banff Symposium on Organic Chemistry</i>	

TECHNICAL EXPERTISE

Synthetic methods

50. Multistep organic synthesis
51. Mechanochemistry
52. Microwave-assisted synthesis
53. Air- and moisture-sensitive chemistry
54. Schlenk and glovebox techniques
55. Small- and pilot-scale synthesis

Software and databases

ChemDraw, Microsoft Office, SciFinder, Reaxys/Beilstein, VNMR, Windows, and macOS

Purification and characterization

Extraction, flash/column chromatography, recrystallization, distillation, single-crystal growth, 1D/2D NMR, IR, GC–MS, LC–MS, HPLC, GPC, MALDI-TOF, HRMS, fluorescence spectroscopy, DLS, TEM, and circular dichroism

SELECTED GRADUATE RESEARCH SUPERVISION

Anseh Janghani	2016
<i>A concise total synthesis of (±)-rivaroxaban, M.Sc.</i>	
Hormoz Khosravi	2016
<i>Squaramide-catalyzed carbon dioxide fixation, M.Sc.</i>	
Firoozeh Gandomkar	2016
<i>Synthesis, purification, and identification of pregabalin and levofloxacin impurities, M.Sc.</i>	
Elaheh Sadeh	2016
<i>Tertiary aminosquaramide organocatalysts for controlled/living ring-opening polymerization of L-lactide, M.Sc.</i>	

