Borui Zhang, Ph.D.

Senior Research Associate

Pittsburgh, PA 15220

+1 (513) 593-6148

https://www.linkedin.com/in/borui-zhang-7a8988105/

borui8844@gmail.com

About me

9 years' experience in polymer, organic synthesis, and materials chemistry. Highly trained and analytical Ph.D. in Organic & Polymer Chemistry; expertise in polymers synthesis and development of functional materials.

Skill

Polymer synthesis and characterization

Experimental data analysis

Independent research

Professional writing

Interpersonal communication

(*)[The skill scale is from 0 (Fundamental Awareness) to 6 (Expert).]

Education

2010-2014 B.Sc in Chemistry — NORTHWEST UNIVERSITY
Xi'an, China, GPA 3.5/5.0

2014-2019 Ph.D. in Polymer & Organic Chemistry — MIAMI UNIVERSITY
Novel Dynamic Materials Tailored by Macromolecular Engineering

Experience

2019.10-Now Senior Research Associate — Allegheny Health Network, Pittsburgh, PA
Supporting the scientific research of the Allegheny General Hospital on the bioconjugation and biomaterial projects.
▷ Developing the fentanyl vaccine and opioid vaccine using PET-RAFT and ATRP methods.
▷ Working on hydrophilic and hydrophobic protein polymers. Grafting the polymers from the surface of the protein in the buffer solution to functionalize the proteins.

2019.12-Now Invited English Editor — Journal of Functional Polymers
Assisting the Journal of Functional Polymers in polishing the titles, abstracts, and graphic abstracts of the new forthcoming manuscripts.

2014-2019 Ph.D. Research — Miami University, Oxford, Ohio
Provided scientific support as the chemical manager and research assistant in the laboratory; manage research on six major projects to create and optimize polymeric materials using free radical polymerization, RAFT and ATRP. Partner with materials engineering and technology specialists to characterize, analyze, and evaluate key material features and applications. Train and mentor 70 undergrads in advanced lab techniques, organic chemistry principles, scientific recordkeeping, and data analysis and reporting. Supervise students on both group and independent projects.
Key Achievements :
▷ Published 8 papers on major professional journals with high impact factors; achieved 150 citations to date.
▷ Finished 6 projects and developed at least 6 new classes of elastomeric and self-healing polymeric materials based on dynamic bonds.
▷ Dig out the mechanism of thermally driven thiol-Michael chemistry systematically for the first time.
▷ Focused on exploit the impact of macromolecular architectures on the performance of the dynamic polymeric materials.
▷ Grasped the skills of NMR, GPC, DCS, DMA, FTIR, Instron and Rheology to analyze the mechanical properties of polymers.
▷ Designed an entirely new project and wrote the proposal, with emphasis on optimizing the performance of polymer donors for all-polymer solar cells by utilizing polythiophene conjugated photosensitive dyes.
▷ Won 2018-2019 Graduate Students' Achievement Award by Miami University Fund.

2010-2014 Undergraduate Research — Northwest University, Xi'an, China
Collaborated with two professors to synthesize and characterize the monomethine cyanine dyes with quinoline nucleus. Studied the design, synthesis, and application of novel xanthene fluorescent probes.
Key Achievements :
▷ 2012 China National Scholarship (No: 201247788). Ranking 5/150 students in College of Chemistry & Materials Science.
▷ Spearheaded an initiative to secure a patent entitled "Synthetic methods and applications of dual D-π-A monomethine cyanine dyes". (Patent No: 201310458986.2).
▷ Evaluated the application of a probe used to identify the detection mechanism of ions in cell/cellular imaging, as part of a research project for the China National College Students Innovative & Entrepreneurial Training Program.
▷ As team leader, drafted thesis proposal and application reports; organized group discussions to facilitate project progress and documentation. Earned an award from the university based on research achievements.

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Technical Proficiencies

Organic Chemistry	Organic Synthesis, Mechanisms, Synthetic Route Design, NMR, Method Development & Optimization, Chromatography, FTIR, UV-Vis, MALDI Mass Spectrometry HPLC
Polymer Chemistry	Free Radical Polymerization, RAFT Polymerization, PET-RAFT, ATRP, Post Polymerization, Crosslinked Polymer Materials, Self-Healing Materials, Shape Memory Materials, Small Molecule Simulation, GPC, TEM
Mechanistic Tests	TGA, DSC, Instron, Rheology, Stress Relaxation and Creep Test, Malleability Test DMA
Computer Skills	Endnote, SciFinder, ChemDraw, Microsoft Office Suite, GraphPad, KaleidaGraph Photoshop, TopSpin, Python

Publications

[1]. Borui Zhang, Jun Ke, Jafer R. Vakil, Sean C. Cummings, Zachary Digby, Jessica Sparks, Zhijiang Ye, Mehdi B Zanjani, Dominik Konkolewicz. Dual-Dynamic Interpenetrated Networks Tuned through Macromolecular Architecture. *Polym. Chem.*, 2019.

[2]. Mehdi B. Zanjani, Borui Zhang, Ballal Ahammed, Joseph P. Chamberlin, Progyateg Chakma, Dominik Konkolewicz, and Zhijiang Ye. Macromol. *Theory Simul.*, 2019, 1900008.

[3]. Borui Zhang, Isuru M. Jayalath, Jen Ke, Jessica L Sparks, C. Scott Hartley, and Dominik Konkolewicz. Chemically fueled covalent crosslinking of polymer materials. *Chem. Commun.*, 2019, 55, 2086–2089.

[4]. Borui Zhang, Progyateg Chakama, Max P. Shulman, Jun Ke, Zachary A. Digby, and Dominik Konkolewicz. Probing the Mechanism of Thermally Driven Thiol-Michael Dynamic Covalent Chemistry. *Org. Biomol. Chem.*, 2018, 16, 2725-2734.

[5]. Lanying Wang, Mengqi Yan, Borui Zhang, Junlong Zhao, Wenting Deng, Wenxia Lin and Li Guan. Approach to Introducing Substituent on the Dipole Conjugate Chain: The D-π-A Methine Chain Electrophilic Substitution. *Org. Lett.*, 2018, 20, 60–63.

[6]. Progyateg Chakama, Luiz Henrique Rodrigues Possarle, Zachary A. Digby, Borui Zhang, Jessica L. Sparks, and Dominik Konkolewicz. Dual Stimuli Responsive Self-healing and Malleable Materials based on Dynamic Thiol- Michael Chemistry. *Polym. Chem.*, 2017, 8, 6534-6543.

[7]. Elizabeth M. Foster, Erin E. Lensmenyer, Borui Zhang, Progyateg Chakma, Jacob A. Flum, Jeremy J. Via, Jessica L. Sparks, and Dominik Konkolewicz. Effect of Polymer Network Architecture, Enhancing Soft Materials Using Orthogonal Dynamic Bonds in an Interpenetrating Networks. *ACS Macro Lett.* 2017, 6, 495-499.

[8]. Borui Zhang, Zachary A. Digby, Jacob A. Flum, Progyateg Chakma, Justin M. Saul, Jessica L. Sparks, and Dominik Konkolewicz. Dynamic Thiol-Michael Chemistry for Thermoresponsive Rehealable and Malleable Network. *Macromolecules* 2016, 49, 6871-6878.

[9]. Borui Zhang, Zachary A. Digby, Jacob A. Flum, Elizabeth M. Foster, Jessica L. Sparks, and Dominik Konkolewicz. Self-Healing, Malleable and Creep Limiting Materials using both Supramolecular and Reversible Covalent Linkages. *Polym. Chem.*, 2015, 6, 7368-7372.

[10]. Yile Fu, Borui Zhang, Shu Wang, and Lanying Wang. Efficient One-Pot Three-Component Synthesis of Monomethine Cyanine Dyes with Quinoline Nucleus and Their Spectral Properties. *Bull. Korean Chem. Soc.* 2013, 34, 489-494.

Awards and Patents

2019	2018-2019 Graduate Students' Achievement Award by Miami University Fund
2017	Miami University Graduate School's Travel Award
2014	China National College Students Innovative & Entrepreneurial Training Program's Honor Award
2013	Patent: Synthetic methods and applications of dual D-π-A monomethine cyanine dyes. (No:201310458986.2)
2012	China National Scholarship (No: 201247788)

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Presentations

2019 2019 Dayton ACS Poster session and SAMPE Midwest Research Symposium, OH April 11, 2019

Poster presentation: Chemically Fueled Covalent Crosslinking of Polymer Materials.

2019 ACS National Meeting & Expo, Orlando, Fl March 31-April 4, 2019

Poster presentation: Probing the Mechanism of Thermally Driven Thiol-Michael Dynamic Covalent Chemistry.

Poster presentation: Chemically Fueled Covalent Crosslinking of Polymer Materials.

2017 The 254th American Chemical Society National Meeting & Exposition, Washington, DC August 20-24, 2017

Oral Presentation: Dynamic Thiol–Michael Chemistry for Thermoresponsive Rehealable and Malleable Networks.

Poster Presentation: Self-Healing, Malleable and Creep Limiting Materials using both Supramolecular and Reversible Covalent Linkages.

2017 Polymer Initiative of Northeast Ohio (PiNO), Cleveland, OH June 9, 2017

Poster Presentation: Dynamic Thiol-Michael Chemistry for Thermoresponsive Rehealable and Malleable Networks.

2016 The 47th Central Regional Meeting of the American Chemical Society, Covington, KY May 18-21, 2016

Oral Presentation: Self-Healing, Malleable and Creep Limiting Materials using both Supramolecular and Reversible Covalent Linkages.

2015 MS&T15: Materials Science & Technology Conference and Exhibition, Columbus, OH October 4-8, 2015

Poster Presentation: Self-Healing, Malleable and Creep Limiting Materials using both Supramolecular and Reversible Covalent Linkages.