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EDUCATION & PROFESSIONAL TRAINING

Postdoctoral Fellow, Department of Chemistry, University of California Berkeley and Molecular Foundry,
Lawrence Berkeley National Laboratory, Berkeley, CA, USA **01.2009 - 05.2011**
Advisor: Prof. Jean M. J. Fréchet

Ph.D. (Chemistry) Carnegie Mellon University, Pittsburgh, PA, USA **12.2008**
Thesis: Synthesis of Functional Polymers with Controlled Architecture by ATRP of Monomers in the Presence
of Crosslinkers
Advisor: Prof. Krzysztof Matyjaszewski

M.S. (Polymer Chemistry) Fudan University, Shanghai, China **06.2003**

B.S. (Polymer Chemistry) Fudan University, Shanghai, China **06.2000**

APPOINTMENT & RESEARCH EXPERIENCE

Assistant Professor, Department of Chemistry & Biochemistry, University of Notre Dame **07.2011 - present**
Postdoctoral Researcher at UC Berkeley and Lawrence Berkeley National Laboratory **01.2009 - 05.2011**
Research Assistant at Carnegie Mellon University **2004 - 2008**

TEACHING EXPERIENCE

90638 Special Topic on Polymer Chemistry, University of Notre Dame **Fall 2011**
Guest Lecturer for Course "Introduction to Nano" at Carnegie Mellon University **10.2008**
Teaching Assistant for Course "Chemical Analysis Laboratory I" at Carnegie Mellon University **2004 - 2005**
Teaching Assistant for Course "Organic Chemistry" at Fudan University (China) **2000 - 2001**

HONORS & AWARDS

- AkzoNobel Award for Outstanding Graduate Research in Polymer Chemistry, ACS **2010**
- 1st Prize Poster Award at 5th CRP Symposium, 236th ACS National Meeting, Polymer Division **2008**
- Guy C. Berry Graduate Research Award at Carnegie Mellon University **2008**
- Student Research Award at ACS Polymer Group (Pittsburgh Section) **2008**
- Chinese Government Award for Outstanding Self-Financed Students Abroad **2007**
- McWilliams Fellowship at Carnegie Mellon University **2007**
- Eastman Scholarship at Fudan University (China) **2002**
- Fellowship for Honor Student of Shanghai Municipality **2002**
- Du Pont Scholarship at Fudan University (China) **1998**

RESEARCH INTERESTS

- Polymerization techniques, especially controlled radical polymerization
- Synthesis of functional polymers with controlled nanostructures
- High performance liquid chromatography
- Colloidal chemistry
- Plastic electronics for organic light emitting diodes and organic photovoltaics
- Functional polymer catalysts

ACADEMIC SERVICE

Frequent reviewer for Journal of the American Chemical Society, Macromolecules, Biomacromolecules, Chemistry of Materials, Langmuir, Polymer Chemistry, Macromolecular Rapid Communications, Journal of Polymer Science Part A: Polymer Chemistry, Polymer, European Polymer Journal, Progress in Polymer Science, Journal of Macromolecular Science, Part A: Pure and Applied Chemistry

PEER-REVIEWED PUBLICATIONS

1. H. Gao*, Development of Star Polymers as Unimolecular Containers for Nanomaterials, *Macromol. Rapid Commun.* **2012**, *33*, 722. (* Corresponding author)
2. M. Makrocka-Rydzik; A. Wypych; K. Szpotkowski; M. Kozak; S. Jurga; **H. Gao**; H. Y. Cho; K. Matyjaszewski, Structural Studies of Poly(butyl acrylate)-Poly(ethylene oxide) Miktoarm Star Polymers, *Polymer* **2011**, *52*, 5513
3. A. Nese; N. V. Lebedeva; G. Sherwood; S. Averick; Y. Li; **H. Gao**; L. Peteanu; S. S. Sheiko; K. Matyjaszewski, pH-Responsive Fluorescent Molecular Bottlebrushes Prepared by Atom Transfer Radical Polymerization, *Macromolecules* **2011**, *44*, 5905
4. E. v. Ruymbeke; E. B. Muliawan; D. Vlassopoulos; **H. Gao**; K. Matyjaszewski, Melt rheology of star polymers with large number of small arms, prepared by crosslinking poly(*n*-butyl acrylate) macromonomers via ATRP, *Eur. Polym. J.* **2011**, *47*, 746
5. **H. Gao**, D. A. Poulsen, B. Ma, D. A. Unruh, X. Zhao, J. E. Millstone, J. M. J. Fréchet, Site Isolation of Emitters within Crosslinked Polymer Nanoparticles for White Electroluminescence, *Nano Lett.*, **2010**, *10*, 1440
6. V. Rodionov,* **H. Gao**,* S. Scroggins, D. A. Unruh, A. Avestro, J. M. J. Fréchet, Easy Access to A Family of Polymer Catalysts from Modular Star Polymers, *J. Am. Chem. Soc.* **2010**, *132*, 2570 (* equal contribution)
7. H. Y. Cho, **H. Gao**, A. Srinivasan, J. Hong, S. A. Bencherif, D. J. Siegwart, H.-j. Paik, J. O. Hollinger, K. Matyjaszewski, Rapid Cellular Internalization of Multifunctional Star Polymers Prepared by Atom Transfer Radical Polymerization, *Biomacromolecules* **2010**, *11*, 2199
8. W. V. Camp, **H. Gao**, F. E. Du Prez, K. Matyjaszewski, Effect of Crosslinker Multiplicity on the Gel Point in ATRP, *J. Polym. Sci., Part A: Polym. Chem.* **2010**, *48*, 2016
9. **H. Gao**, K. Matyjaszewski, Modular Approaches to Star and Miktoarm Star Polymers by ATRP of Cross-Linkers, *Macromol. Symp.* **2010**, *291-292*, 12
10. **H. Gao**, K. Min, K. Matyjaszewski, Gelation in ATRP Using Structurally Different Branching Reagents: Comparison of Inimer, Divinyl and Trivinyl Cross-linkers, *Macromolecules* **2009**, *42*, 8039
11. **H. Gao**, P. Polanowski, K. Matyjaszewski, Gelation in Living Copolymerization of Monomer and Divinyl Cross-Linker: Comparison of ATRP Experiments with Monte Carlo Simulations, *Macromolecules* **2009**, *42*, 5925

12. S. A. Bencherif, **H. Gao**, A. Srinivasan, D. J. Siegwart, J. O. Hollinger, N. R. Washburn, K. Matyjaszewski, Cell-Adhesive Star Polymers Prepared by ATRP, *Biomacromolecules* **2009**, *10*, 1795
13. **H. Gao**, K. Matyjaszewski, High-Yield Synthesis of Uniform Star Polymers-Is Controlled Radical Polymerization Always Needed? *Chem. Eur. J.* **2009**, *15*, 6107
14. **H. Gao**, K. Matyjaszewski, Synthesis of Functional Polymers with Controlled Architecture by CRP of Monomers in the Presence of Cross-linkers: From Stars to Gels, *Prog. Polym. Sci.* **2009**, *34*, 317
15. S. Ohno, **H. Gao**, B. Cusick, T. Kowalewski, K. Matyjaszewski, Methacryloyl and/or Hydroxyl End-Functional Star Polymers Synthesized by ATRP using the Arm-First Method, *Macromol. Chem. Phys.* **2009**, *210*, 421
16. K. Min, **H. Gao**, J. A. Yoon, W. Wu, T. Kowalewski, K. Matyjaszewski, One-Pot Synthesis of Hairy Nanoparticles by Emulsion ATRP, *Macromolecules* **2009**, *42*, 1597
17. W. Li, **H. Gao**, K. Matyjaszewski, Influence of Initiation Efficiency and Polydispersity of Primary Chains on Gelation during Atom Transfer Radical Copolymerization of Monomer and Cross-Linker, *Macromolecules* **2009**, *42*, 927
18. B.-S. Kim, **H. Gao**, A. A. Argun, K. Matyjaszewski, P. T. Hammond, All-Star Polymer Multilayers as pH-Responsive Nanofilms, *Macromolecules* **2009**, *42*, 368
19. D. J. Siegwart, J. K. Oh, **H. Gao**, S. A. Bencherif, F. Perineau, A. K. Bohaty, J. O. Hollinger, K. Matyjaszewski, Biotin-, Pyrene-, and GRGDS-Functionalized Polymers and Nanogels via ATRP and End Group Modification, *Macromol. Chem. Phys.* **2008**, *209*, 2180
20. **H. Gao**, A. Miasnikova, K. Matyjaszewski, Effect of Cross-linker Reactivity on Experimental Gel Points during ATRcP of Monomer and Cross-linker, *Macromolecules* **2008**, *41*, 7843
21. H. Dong, M. Zhu, J. A. Yoon, **H. Gao**, R. Jin, K. Matyjaszewski, One-Pot Synthesis of Robust Core/Shell Gold Nanoparticles, *J. Am. Chem. Soc.* **2008**, *130*, 12852
22. **H. Gao**, K. Matyjaszewski, Synthesis of Low Polydispersity Miktoarm Star Copolymers via A Simple "Arm-First" Method: Macromonomers as Arm Precursors, *Macromolecules* **2008**, *41*, 4250
23. **H. Gao**, W. Li, K. Matyjaszewski, Synthesis of Polyacrylate Networks by ATRP: Parameters Influencing Experimental Gel Points, *Macromolecules* **2008**, *41*, 2335
24. **H. Gao**, K. Matyjaszewski, Synthesis of Star Polymers by A New "Core-First" Method: Sequential Polymerization of Cross-linker and Monomer, *Macromolecules* **2008**, *41*, 1118
25. **H. Gao**, K. Min, K. Matyjaszewski, Determination of Gel Point during Atom Transfer Radical Copolymerization with Cross-linker, *Macromolecules* **2007**, *40*, 7763
26. **H. Gao**, K. Matyjaszewski, "Arm-First" Method As A Simple and General Method for Synthesis of Miktoarm Star Copolymers, *J. Am. Chem. Soc.* **2007**, *129*, 11828
27. **H. Gao**, K. Min, K. Matyjaszewski, Synthesis of 3-Arm Star Block Copolymers by Combination of "Core-first" and "Coupling-onto" Methods Using ATRP and Click Reactions, *Macromol. Chem. Phys.* **2007**, *208*, 1370
28. **H. Gao**, K. Matyjaszewski, Synthesis of Molecular Brushes by "Grafting Onto" Method: Combination of ATRP and Click Reactions, *J. Am. Chem. Soc.* **2007**, *129*, 6633
29. K. Min, **H. Gao**, K. Matyjaszewski, Use of Ascorbic Acid as Reducing Agent for Synthesis of Well-Defined Polymers by ARGET ATRP, *Macromolecules* **2007**, *40*, 1789
30. **H. Gao**, K. Matyjaszewski, Low Polydispersity Star Polymers with Core Functionality by Cross-linking Macromonomers Using Functional ATRP Initiators, *Macromolecules* **2007**, *40*, 399
31. **H. Gao**, S. Ohno, K. Matyjaszewski, Low Polydispersity Star Polymers via Cross-Linking Macromonomers by ATRP, *J. Am. Chem. Soc.* **2006**, *128*, 15111

32. **H. Gao**, K. Matyjaszewski, Synthesis of Miktoarm Star Polymers via ATRP Using the "In-Out" Method: Determination of Initiation Efficiency of Star Macroinitiators, *Macromolecules* **2006**, *39*, 7216
33. **H. Gao**, K. Min, K. Matyjaszewski, Characterization of Linear and 3-Arm Star Block Copolymers by Liquid Chromatography at Critical Conditions, *Macromol. Chem. Phys.* **2006**, *207*, 1709 (invited cover feature article)
34. **H. Gao**, K. Matyjaszewski, Synthesis of Star Polymers by a Combination of ATRP and the "Click" Coupling Method, *Macromolecules* **2006**, *39*, 4960
35. **H. Gao**, K. Matyjaszewski, Structural Control in ATRP Synthesis of Star Polymers Using the Arm-First Method, *Macromolecules* **2006**, *39*, 3154
36. K. Min, **H. Gao**, K. Matyjaszewski, Development of an ab Initio Emulsion Atom Transfer Radical Polymerization: From Microemulsion to Emulsion, *J. Am. Chem. Soc.* **2006**, *128*, 10521
37. J. K. Oh, C. Tang, **H. Gao**, N. V. Tsarevsky, K. Matyjaszewski, Inverse Miniemulsion ATRP: A New Method for Synthesis and Functionalization of Well-Defined Water-Soluble/Cross-Linked Polymeric Particles, *J. Am. Chem. Soc.* **2006**, *128*, 5578
38. **H. Gao**, G. Louche, B. S. Sumerlin, N. Jahed, P. Golas, K. Matyjaszewski, Gradient Polymer Elution Chromatographic Analysis of α,ω -Dihydroxypolystyrene Synthesized via ATRP and Click Chemistry, *Macromolecules* **2005**, *38*, 8979
39. **H. Gao**, N. V. Tsarevsky, K. Matyjaszewski, Synthesis of Degradable Miktoarm Star Copolymers via Atom Transfer Radical Polymerization, *Macromolecules* **2005**, *38*, 5995
40. **H. Gao**, D. J. Siegwart, N. Jahed, T. Sarbu, K. Matyjaszewski, Characterization of α,ω -Dihydroxypolystyrene by Gradient Polymer Elution Chromatography and Two-dimensional Liquid Chromatography, *Designed Monomers and Polymers* **2005**, *8*, 533
41. K. Min, **H. Gao**, K. Matyjaszewski, Preparation of Homopolymers and Block Copolymers in Miniemulsion by ATRP Using Activators Generated by Electron Transfer (AGET), *J. Am. Chem. Soc.* **2005**, *127*, 3825
42. **H. Gao**, W. Yang, K. Min, L. Zha, C. Wang, S. Fu, Thermosensitive Poly(*N*-isopropylacrylamide) Nanocapsules with Controlled Permeability, *Polymer* **2005**, *46*, 1087
43. **H. Gao**, C. Wang, W. Yang, S. Fu, Preparation of A Water-Soluble Fluorescent Polymer, *J. Macromol. Sci., Pure Appl. Chem.* **2004**, *A41*, 357
44. **H. Gao**, Y. Zhao, S. Fu, B. Li, M. Li, Preparation of A Novel Polymeric Fluorescent Nanoparticles, *Colloid Polym. Sci.* **2002**, *280*, 653
45. L. Zha, **H. Gao**, W. Yang, X. Jiang, S. Fu, Polymer Nanoparticles for Drug Delivery, *Polymer Bulletin-Chinese* **2002**, *59*, 24

BOOK CHAPTERS

1. **H. Gao**, W. Li, K. Min, K. Matyjaszewski, Gelation in Atom Transfer Radical Copolymerization with A Divinyl Cross-linker, in *ACS Symp. Ser.* **2009**, *Vol. 1023*, 203
2. N. V. Tsarevsky, K. Min, N. Jahed, **H. Gao**, K. Matyjaszewski, Degradable Polymers and Materials – Principles and Practice, in *ACS Symp. Ser.* **2006**, *Vol. 939*, 184
3. B. S. Sumerlin, N. V. Tsarevsky, **H. Gao**, P. Golas, G. Louche, R. Y. Lee, K. Matyjaszewski, Click Functionalization of Well-Defined Copolymers Prepared by Atom Transfer Radical Polymerization, in *ACS Symp. Ser.* **2006**, *Vol. 944*, 140

PATENTS

1. K. Matyjaszewski, **H. Gao**, J. Spanswick, Preparation of Functional Star Macromolecules with Low Polydispersity, PCT Int. Appl. **2010**, WO 2010111708.

CONFERENCE PRESENTATIONS

1. Access Functional Polymers with Branched Architectures by Atom Transfer Radical Polymerization of Crosslinker and Inimer, *242nd ACS National Meeting*, Aug 28-Sep 1, 2011, Denver, CO, US (invited talk)
2. Synthesis and Application of Functional Polymers with Controlled Nanostructures, *240th ACS National Meeting*, Aug 22-26, 2010, Boston, MA, US (2010 AkzoNobel Awardee talk)
3. Application of Nanoparticle Encapsulated Chromophores for Site Isolation of Emitters in Light Emitting Devices, *239th ACS National Meeting*, Mar 21-25, 2010, San Francisco, CA, US (invited talk)
4. Preparation of Self-Healing Polymeric Nanogels Using Disulfide/Thiol Exchange, *239th ACS National Meeting*, Mar 21-25, 2010, San Francisco, CA, US
5. Precisely Controlling the Architecture of Nanoscale Polymeric Materials by Copolymerization of Cross-linkers, *236th ACS National Meeting*, Aug 17-21, 2008, Philadelphia, PA, US (invited talk)
6. Synthesis of Low Polydispersity Miktoarm Star Copolymers by Using a Simple "Arm-First" Method, *236th ACS National Meeting*, Aug 17-21, 2008, Philadelphia, PA, US
7. Structure Control of Branched Polymers during Copolymerization of Vinyl Monomer and Divinyl Cross-linker, *235th ACS National Meeting*, Apr 6-10, 2008, New Orleans, LA, US (invited talk)
8. Exploring Nanostructures of Functional Polymers by Copolymerization of Multivinyl Cross-linkers, Student Night for ACS Polymer Group (Pittsburgh), Mar 18, 2008, Duranti's Restaurant, Pittsburgh, PA, US (2008 Student Research Awardee talk)
9. Synthesis of Functional Polymers with Complex Architectures by Combination of ATRP and Click Reactions, *234th ACS National Meeting*, Aug 19-23, 2007, Boston, MA, US
10. Synthesis Functional Star Polymers with Low Polydispersity by A Novel "Arm-First" Method, *Polymers (East) Gordon Research Conference*, June 17-22, 2007, South Hadley, MA, US
11. High Yield Synthesis of Star Polymers with Low Polydispersity by Crosslinking Macromonomers in ATRP, *233rd ACS National Meeting*, March 25-29, 2007, Chicago, IL, US
12. Preparation of Degradable Miktoarm Star Copolymers via ATRP by "In-Out" Method, *230th ACS National Meeting*, Aug 28-Sept 1, 2005, Washington D.C., US
13. HPLC and 2-Dimensional Chromatography of Complex Polymers Synthesized by ATRP, *230th ACS National Meeting*, Aug 28-Sept 1, 2005, Washington D.C., US