

Kevin W. Gao

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Education

University of California, Berkeley

2017 – present

Ph.D. Candidate in Chemical Engineering

California Institute of Technology

2013 – 2017

B.S. Chemical Engineering (Process Systems) – 3.9/4.0 GPA

Research Experience

Graduate Student, University of California, Berkeley

2017 – present

Advisor: Professor Nitash P. Balsara

- Lab safety coordinator and affiliate at Lawrence Berkeley National Lab
- Studying the thermodynamics and ion transport of polymer blends for lithium battery applications via neutron scattering experiments and electrochemical techniques
- First demonstration of a miscible polymer blend electrolyte made up of poly(ethylene oxide), poly(1,3,6-trioxocane), and a lithium salt
- Synthesized hybrid organic-inorganic block copolymer electrolytes, characterized their ion transport properties, and determined their microstructure with x-ray scattering experiments

Summer Undergraduate Research Fellow, Massachusetts Institute of Technology

2016

Advisor: Professor Klavs F. Jensen

- Developed a reaction optimization strategy via on-demand synthesis in microliter droplets
- Implemented a MINLP algorithm that reduced experiments needed for optimization by 57%

Undergraduate Research Fellow, California Institute of Technology

2014 – 2015

Advisor: Professor Brian M. Stoltz

- Synthesized and characterized intermediates for the total synthesis of jorumycin

Intern, Los Alamos National Laboratory: P-24 Plasma Physics

2012 – 2013

Advisor: Dr. Thomas P. Intrator

- Adapted design and constructed a fiber optic-positioning trigger to detect flux rope light emission

Teaching Experience

Graduate Student Instructor, University of California, Berkeley

CBE154 – Chemical Engineering Laboratory (Spring Semester 2019-20)

CBE162 – Process Dynamics and Controls (Fall Semester 2018-19)

Teaching Assistant, California Institute of Technology

ChE101 – Chemical Reaction Engineering (Winter Term 2016-17)

ChE9 – Chemical Synthesis and Characterization Engineering Lab (Spring Term 2015-2016)

Ch3a – Introduction to Chemistry Lab (Fall Term 2015-2016, Winter Term 2015-16)

Skills

Programming: MATLAB, Python, C, HTML, CSS

Software: Microsoft Office, EC-Lab, Igor, ChemDraw, MestReNova

Laboratory: DSC, EIS, GPC, NMR, SANS, SAXS, TGA, rheology, glovebox, cell assembly, schlenk line

Languages: English, Chinese

Publications

1. **K.W. Gao**, W. Loo, R. Snyder, B. Abel, Y. Choo, A. Lee, S. Teixeira, B. Garetz, G. Coates, N. Balsara. "Miscible polymer blend electrolytes," *Macromolecules*. 2020. Submitted.
2. W. Loo, A. Faraone, L. Grundy, **K.W. Gao**, N. Balsara. "Polymer dynamics in block copolymer electrolytes detected by neutron spin echo," *ACS Macro Letters*. 2020. Submitted.
3. **K.W. Gao**, X. Jiang, Z. Hoffman, G. Sethi, S. Chakraborty, N. Balsara. "Optimizing the monomer structure of polyhedral oligomeric silsesquioxane for ion transport in hybrid organic-inorganic block copolymers," *J. Polym. Sci.* 2020. 58, 363-371. DOI: 10.1002/pol.20190073
4. L. Baumgartner, C. Coley, B. Reizman, **K.W. Gao**, K. Jensen. "Optimum catalyst selection over continuous and discrete process variables with a single droplet microfluidic reaction platform," *React. Chem. Eng.* 2018. 3, 301-311. DOI: 10.1039/C8RE00032H
5. J. Sears, T. Intrator, Y. Feng, H. Swan, J. Klarenbeek, **K.W. Gao**. "Investigating the momentum balance of a plasma pinch: An air-side stereoscopic imaging system for locating probes," *Rev. Sci. Instrum.* 2014. 85, 103509. DOI: 10.1063/1.4898176

Posters and Presentations

1. "Lithium ion transport in polymer electrolytes," poster at *Batteries Gordon Research Conference*. 2020. Ventura, CA.
2. "The effect of chemical structure on the morphology, ion transport, and modulus of hybrid inorganic-organic diblock copolymer electrolytes," talk at *American Physical Society Meeting*. 2019. Boston, MA.
3. "A novel chemical reaction optimization strategy via on-demand synthesis in microliter droplets," talk at *Summer Undergraduate Research Fellowship Seminar*. 2016. Greenwich, CT.
4. "Towards the iridium catalyzed generation of all-carbon quaternary chiral centers," talk at *Summer Undergraduate Research Fellowship Seminar*. 2014. Pasadena, CA.
5. "A Faraday rotation diagnostic for Z pinch experiments," poster at *Los Alamos National Laboratory Student Symposium*. 2012. Los Alamos, NM.

Activities

- Co-founder of Ultra Seltzer of America | ultraseltzer.org
- Chemical engineering liaison for Berkeley Energy & Resources Collaborative (BERC)
- Member of Tau Beta Pi, AIChE, APS
- Four-year starter for Caltech's Men's Soccer Team

Awards and Honors

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| 2017 | National Defense Science & Engineering Graduate Fellowship |
| 2014 | Samuel and Berta Spalter Summer Undergraduate Research Fellowship |
| 2013 | United States National Chemistry Olympiad Top 20 Study Camp Finalist |
| | Los Alamos National Lab Foundation \$20,000 Gold Scholarship |
| | J. Robert Oppenheimer Scholarship in Memory of Nicholas C. Metropolis |
| | National Merit Scholarship |