Kevin W. Gao

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Education

University of California, Berkeley 2017 – present
Ph.D. Candidate in Chemical Engineering – 4.0/4.0 GPA

California Institute of Technology 2013 – 2017
B.S. Chemical Engineering – 3.9/4.0 GPA

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 electrolyte blend 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 via 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

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, Mandarin Chinese

Publications

1. **K.W. Gao**, X. Yu, R. Darling, N. Balsara. "Swelling of charged gels in ionic solutions and Donnan equilibrium," 2021. In preparation.
2. D. Halat, R. Snyder, S. Sundararaman, B. Abel, Y. Choo, L. Grundy, M. Galluzzo, **K.W. Gao**, M. Gordon, H. Celik, J. Urban, D. Prendergast, G. Coates, N. Balsara, J. Reimer. "Modifying Li^+ and anion diffusivity in polyacetal electrolytes: a PFG-NMR study of ion self-diffusion," 2021. *Chem. Mater.* Under review.
3. R. Snyder, Y. Choo, **K.W. Gao**, D. Halat, S. Sundararaman, B. Abel, L. Grundy, D. Prendergast, J. Reimer, G. Coates, N. Balsara. "Improved Li^+ transport in polyacetal electrolytes: a study of conductivity and current ratio in a series of polyacetals," 2021. *ACS Energy Lett.* Under review.
4. **K.W. Gao** and N. Balsara. "Electrochemical properties of poly(ethylene oxide) electrolytes above the entanglement threshold," 2021. *Solid State Ionics*. Accepted.
5. **K.W. Gao**, W. Loo, R. Snyder, B. Abel, Y. Choo, S. Teixeira, A. Lee, B. Garetz, G. Coates, N. Balsara. "Miscible polyether/poly(ether-acetal) electrolyte blends," *Macromolecules.* 2020. 53, 14, 5728-5739. DOI: 10.1021/acs.macromol.0c00747
6. W. Loo, A. Faraone, L. Grundy, **K.W. Gao,** N. Balsara. "Polymer dynamics in block copolymer electrolytes detected by neutron spin echo," *ACS Macro Lett.* 2020. 9, 5, 639-645. DOI: 10.1021/acsmacrolett.0c00236
7. **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
8. 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
9. 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

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

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