

Kevin W. Gao

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Education

University of California, Berkeley 2017 – 2022
Ph.D. Chemical Engineering – 4.0/4.0 GPA

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

Experience

Tesla Fremont, CA
Senior Cell Engineer, In House Cell Development 2026 – present

- Drive key engineering decisions across teams to move new cells from concept to mass production
- Lead cross-functional teams through design, qualification, and ramp to successful cell launch

Sonocharge Energy Mountain View, CA
Senior Scientist, Battery R&D 2025 – 2026

- Built multi-physics acousto-electrochemical-thermal 2D models in Python (PyBaMM) to quantify and predict how acoustics influence lithium-ion battery cycle life, degradation, and electrolyte motion
- Designed and tested custom cylindrical cells with external vendor to meet acoustics criterion

Blue Current Hayward, CA
Staff Battery Scientist, Anode R&D 2024 – 2025
Senior Battery Scientist, Anode R&D 2022 – 2024

- Developed solid state silicon anodes, polymer binders, formulations; characterized materials, assembled full cells, designed test protocols, analyzed cell performance, and uncovered failure modes
- Led anode active material testing with major automotive manufacturer, reducing cell resistance by >40% and securing the company's first multiyear joint research agreement (>\$5 million funding)
- Built and deployed an EIS equivalent-circuit fitting tool that became standard company-wide workflow
- Worked closely with external software vendor to build in-house battery data management system

University of California, Berkeley Berkeley, CA
PhD Student (Advisor: Professor Nitash P. Balsara) 2017 – 2022

- Characterized ion transport and phase behavior in polymer electrolytes for lithium battery applications
- First demonstration of a miscible polymer blend electrolyte (two distinct polymers and a lithium salt) via neutron scattering experiments
- Analyzed large data sets of transport parameters in poly(ethylene oxide) electrolytes, quantified uncertainty propagation, modeled concentration gradients via Newman's concentrated solution theory
- Helped develop a new thermodynamic model for swelling of charged polymeric gels in ionic solutions, extending classical Donnan equilibrium to include enthalpic and elastic contributions

Massachusetts Institute of Technology Cambridge, MA
Summer Research Fellow (Advisor: Professor Klavs F. Jensen) 2016

- Developed a reaction optimization strategy using a MINLP algorithm that reduced experiments needed for optimization by >55%

Skills

Programming: MATLAB, Python, C

Software: Igor Pro, Arbin, Bio-Logic, Neware

Laboratory: CV, EIS, SEM, PSD, DSC, TGA, SANS/SAXS, glovebox, cell assembly

Languages: English, Mandarin Chinese

Publications

1. N. Shah, L. He, **K.W. Gao**, N. Balsara. "Thermodynamics and phase behavior of poly(ethylene oxide)/poly(methyl methacrylate)/salt blend electrolytes studied by small angle neutron scattering," *Macromolecules*. 2023. 56 (7). DOI: 10.1021/acs.macromol.2c02533
2. J. Lee*, **K.W. Gao***, N. Shah, C. Kang, R. Snyder, B. Abel, L. He, S. Teixeira, G. Coates, N. Balsara. "Relationship between ion transport and phase behavior in acetal-based polymer blend electrolytes studied by electrochemical characterization and neutron scattering," *Macromolecules*. 2022. 55 (24). DOI: 10.1021/acs.macromol.2c01724
3. X. Yu, X. Jiang, M. Seidler, N. Shah, **K.W. Gao**, S. Chakraborty, I. Villaluenga, N. Balsara. "Nanostructured ionic separator formed by block copolymer self-assembly: a gateway for alleviating concentration polarization in batteries," *Macromolecules*. 2022. 55 (7). DOI: 10.1021/acs.macromol.2c00193
4. **K.W. Gao**, D. Halat, C. Fang, A. Mistry, J. Newman, N. Balsara. "The transference number," *Energy Environ. Mater.* 2022. 5 (2). DOI: 10.1002/eem2.12359
5. **K.W. Gao**, X. Yu, R. Darling, J. Newman, N. Balsara. "Increased Donnan exclusion in charged polymer networks at high salt concentrations," *Soft Matter*. 2022. 18 (2). DOI: 10.1039/D1SM01511G
6. D. Halat, R. Snyder, S. Sundararaman, Y. Choo, **K.W. Gao**, Z. Hoffman, B. Abel, L. Grundy, M. Galluzzo, M. Gordon, H. Celik, J. Urban, D. Prendergast, G. Coates, N. Balsara, J. Reimer. "Modifying Li⁺ and anion diffusivity in polyacetal electrolytes: a pulse-field-gradient NMR study of ion self-diffusion," *Chem. Mater.* 2021. 33, 13. DOI: 10.1021/acs.chemmater.1c00339
7. 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: conductivity and current ratio in a series of polyacetals," *ACS Energy Lett.* 2021. 6. DOI: 10.1021/acsenergylett.1c00594
8. **K.W. Gao** and N. Balsara. "Electrochemical properties of poly(ethylene oxide) electrolytes above the entanglement threshold," *Solid State Ion.* 2021. 364. DOI: 10.1016/j.ssi.2021.115609
9. **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). DOI: 10.1021/acs.macromol.0c00747
10. 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). DOI: 10.1021/acsmacrolett.0c00236
11. **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. DOI: 10.1002/pol.20190073
12. 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. DOI: 10.1039/C8RE00032H
13. 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," *Review of Scientific Instruments*. 2014. 85. DOI: 10.1063/1.4898176

Activities

- Assistant Coach, Born to Run CA Track Club
- Four-year starter, 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