

# KIMBERLY A. SEE

Assistant Professor of Chemistry  
Division of Chemistry and Chemical Engineering  
California Institute of Technology

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## POSITIONS

**Current** **Assistant Professor of Chemistry**, Division of Chemistry and Chemical Engineering  
California Institute of Technology, Pasadena, CA

**2014 - 2017** **St. Elmo Brady Future Faculty Postdoctoral Fellow**, Department of Chemistry  
University of Illinois at Urbana-Champaign, Urbana, IL

## EDUCATION

**2014** **University of California**, Santa Barbara, CA  
Ph.D. in Chemistry  
Advisors: Professors Ram Seshadri and Galen Stucky  
Thesis title: *Hybrid Architectures for Next Generation Batteries*

**2009** **Colorado School of Mines**, Golden, CO  
B.S. in Chemistry, *cum laude*

## RESEARCH EXPERIENCE

**2014 - 2017** **St. Elmo Brady Future Faculty Postdoctoral Fellow** University of Illinois, Urbana-Champaign, IL  
Advisor: Prof. Andrew A. Gewirth  
*Characterization of the bulk and surface speciation in Mg and Zn battery electrolytes*

**2011-2014** **Graduate student researcher** University of California, Santa Barbara, CA  
Advisors: Profs. Ram Seshadri and Galen D. Stucky  
*Synthesis and characterization of materials for use in the Li-S battery; development and understanding of Ca-based battery systems; investigation of charge storage mechanisms in organic electrode materials*

**2013, Oct-Nov** **Visiting researcher** University of Cambridge, Cambridge, UK  
Advisor: Prof. Clare P. Grey  
*In-situ <sup>7</sup>Li NMR during the discharge of a Li-S battery to evaluate the behavior of the discharge products and gain a fundamental understanding of the discharge mechanism*

**2010-2011** **R&D Chemist I** NuSil Technology, Carpinteria, CA  
*Synthesis, characterization, and development of silicone materials for application in photonics devices and implantable inks*

**2009-2010** **Graduate student researcher** University of Colorado, Boulder, CO  
Advisor: Prof. Gordana Dukovic  
*Synthesis and characterization of oxy(nitride) photocatalytic nanocrystals*

**2008-2010** **Undergraduate research intern** National Renewable Energy Lab, Golden, CO  
Advisors: Drs. John Turner and Todd Deutsch  
*Characterization of thin film CuGaSe<sub>2</sub> for photoelectrochemical water splitting and development of photo-assisted electrodeposition of catalytic Pt clusters*

## AWARDS AND RECOGNITIONS

**2020** Packard Fellowship for Science and Engineering

**2019** VW/BASF Science Award Electrochemistry

**2019** Beckman Young Investigator Award

**2019** Kavli Fellow, selected by the National Academy of Sciences

**2018** The Electrochemical Society Toyota Young Investigator Award

**2017** The Electrochemical Society Battery Division Postdoctoral Associate Research Award

**2017 - 2019** Research Corporation Scialog Fellow, Advanced Energy Storage Program

**2014 - 2017** UIUC St. Elmo Brady Future Faculty Postdoctoral Fellowship

**2012 - 2014** NSF ConvEne IGERT Fellowship

**2013** UCSB Outstanding Service to K-12 Education Outreach Program

**2009** CSM Engineering Days Engineer: Chemistry

## PATENTS

1. Kimberly A. Robb (See), Andrew J. Martinolich, "Solid State Ion Conduction in ZnPS<sub>3</sub>," application filed January 10, 2020 (#16/740,035).

## PUBLICATIONS

- Forrest A. L. Laskowski, Steven H. Stradley, Michelle D. Qian, and **Kimberly A. See**, "Mg Anode Passivation Caused by Reaction of Dissolved Sulfur in Mg-S Batteries," submitted.
- Skyler D. Ware, Charles J. Hansen, John-Paul Jones, John Hennessey, Ratnakumar V. Bugga, and **Kimberly A. See**, "Reactivity of Li Metal in Li-S Batteries with Concentrated Solvate Electrolytes at Elevated Temperature," submitted.
- 29. Andrew J. Martinolich, Skyler D. Ware, Brian C. Lee, and **Kimberly A. See**, "From Solid Electrolyte to Zinc Cathode: Vanadium Substitution in ZnPS<sub>3</sub>," *J. Phys. Mater.* Accepted. [DOI]
- 28. Seong Shik Kim and **Kimberly A. See**, "Activating Mg Electrolytes through Chemical Generation of Free Chloride," *ACS Appl. Mater. Interfaces*, **2021**, 13, 671-680. [DOI]
- 27. Andrew J. Martinolich<sup>†</sup>, Joshua J. Zak<sup>†</sup>, David N. Agyeman-Budu, Seong Shik Kim, Nicholas H. Bashian, Ahamed Irshad, S. R. Narayan, Brent C. Melot, Johanna Nelson Weker, and **Kimberly A. See**, "Controlling Covalency and Anion Redox Potentials through Anion Substitution in Li-rich Chalcogenides," *Chem. Mater.* **2021**, 31, 378-391 (<sup>†</sup> contributed equally). [DOI]
- 26. Jacob D. Bagley, Deepan Kishore Kumar, **Kimberly A. See**, Nai-Chang Yeh, "Selective Formation of Pyridinic-Type Nitrogen-doped Graphene and Its Application in Lithium-Ion Battery Anodes," *RSC Advances* **2020**, 10, 39562-39571. [DOI]
- 25. Julia M. Stauber, Josef Schwan, Xinglong Zhang, Jonathan C. Axtell, Dahee Jung, Brendon J. McNicholas, Paul H. Oyala, Andrew J. Martinolich, Jay R. Winkler, **Kimberly A. See**, Thomas F. Miller III, Harry B. Gray, Alexander M. Spokoyny, "A Super-Oxidized Radical Cationic Icosahedral Boron Cluster," *J. Am. Chem. Soc.* **2020**, 142, 12948-12953. [DOI]
- 24. Nicholas H. Bashian, Molleigh B. Preefer, JoAnna Milam-Guerrero, Joshua J. Zak, Charlotte Sendi, Suha Ahsan, Rebecca Vincent, Ralf Haiges, **Kimberly A. See**, Ram Seshadri, and Brent C. Melot, "Understanding the Role of Crystallographic Shear on the Electrochemical Behavior of Niobium Oxyfluorides," *J. Mat. Chem. A* **2020**, 8, 12623-12632. [DOI]
- 23. Charles J. Hansen<sup>†</sup>, Joshua J. Zak<sup>†</sup>, Andrew J. Martinolich, Jesse S. Ko, Nicholas H. Bashian, Farnaz Kaboudvand, Anton Van der Ven, Brent C. Melot, Johanna Nelson Weker, and **Kimberly A. See**, "Multielectron, Cation and Anion Redox in Lithium-Rich Iron Sulfide Cathodes," *J. Am. Chem. Soc.* **2020**, 142, 6737-6749 (<sup>†</sup> contributed equally). [DOI]
- 22. Xiaomei Zeng, Andrew J. Martinolich, **Kimberly A. See**, and Katherine T. Faber, "Dense Garnet-Type Electrolyte with Coarse Grains for Improved Air Stability and Ionic Conductivity," *J. Energy Storage* **2020**, 27, 101128. [DOI]
- 21. Seong Shik Kim, Sarah C. Bevilacqua, and **Kimberly A. See**, "Conditioning-Free Electrolyte by Minor Addition of Mg(HDMS)<sub>2</sub>," *ACS Appl. Mater. Interfaces* **2019**, 12, 5226-5233. [DOI]
  - An invited contribution to the *Young Investigator Forum Issue*.
- 20. Sarah C. Bevilacqua, Kim H. Pham, and **Kimberly A. See**, "The Effect of Electrolyte Solvent on Redox Processes in Mg-S Batteries," *Inorg. Chem.* **2019**, 58, 10472-10482. [DOI]
  - An invited contribution in the *Celebrating the Year of the Periodic Table: Emerging Investigators in Inorganic Chemistry* special issue (<https://pubs.acs.org/toc/inocaj/58/16>).
- 19. Andrew J. Martinolich, Cheng-Wei Lee, I-Te Lu, Sarah C. Bevilacqua, Molleigh B. Preefer, Marco Bernardi, André Schleife, and **Kimberly A. See**, "Solid State Divalent Ion Conductivity in ZnPS<sub>3</sub>," *Chem. Mater.* **2019**, 31, 3652-3661. [DOI]
  - Selected as the cover for 2019's Issue 10 of *Chem. Mater.* (<https://pubs.acs.org/toc/cmater/31/10>).

## Prior to Caltech

18. Kim Ta, **Kimberly A. See**, and Andrew A. Gewirth, "Elucidating Zn and Mg Electrodeposition Mechanisms in Nonaqueous Electrolytes for Next-Generation Metal Batteries," *J. Phys. Chem. C* **2018**, 122, 13790-13796. [DOI]
17. Minjeong Shin, Heng-Liang Wu, Badri Narayanan, **Kimberly A. See**, Rajeev S. Assary, Lingyang Zhu, Richard T. Haasch, Shuo Zhang, Zhengchen Zhang, Larry A. Curtiss, and Andrew A. Gewirth, "Effect of the Hydrofluoroether

- Cosolvent Structure in Acetonitrile-based Solvate Electrolytes on Li<sup>+</sup> Solvation Structure and Li-S Battery Performance," *ACS Appl. Mater. Interfaces* **2017**, 9, 39357-39370. [DOI]
16. **Kimberly A. See**, Yao-Min Liu, Yeyoung Ha, Christopher J. Barile, and Andrew A. Gewirth, "Effect of Concentration on the Electrochemistry and Speciation of the Magnesium Aluminum Chloride Complex Electrolyte Solution," *ACS Appl. Mater. Interfaces* **2017**, 9, 35729-35739. [DOI]
  15. **Kimberly A. See**, Margaret A. Lumley, Galen D. Stucky, Clare P. Grey, and Ram Seshadri, "Reversible Capacity of Conductive Carbon Additives at Low Potentials: Caveats for Testing Alternative Anode Materials for Li-Ion Batteries," *J. Electrochem. Soc.* **2017**, 164, A327-A333. [DOI]
  14. Heng-Liang Wu, Minjeong Shin, Yao-Min Liu, **Kimberly A. See**, and Andrew A. Gewirth, "Thiol-Based Electrolyte Additives for High-Performance Lithium-Sulfur Batteries," *Nano Energy* **2017**, 32, 50-58. [DOI]
  13. **Kimberly A. See**<sup>†</sup>, Heng-Liang Wu<sup>†</sup>, Kah Chun Lau, Mingjeong Shin, Lei Cheng, Mahalingam Balasubramanian, Kevin G. Gallagher, Larry A. Curtiss, and Andrew A. Gewirth, "Effect of Hydrofluoroether Cosolvent Addition on Li Solvation in Acetonitrile-Based Solvate Electrolytes and Its Influence on S Reduction in a Li-S Battery," *ACS Appl. Mater. Interfaces* **2016**, 8, 34360-34371 († contributed equally). [DOI]
  12. Albert L. Lipson, Sang-Don Han, Baofei Pan, **Kimberly A. See**, Andrew A. Gewirth, Chen Liao, John T. Vaughey, and Brian J. Ingram, "Practical Stability Limits of Magnesium Electrolytes," *J. Electrochem. Soc.* **2016**, 163, A2253-A2257. [DOI]
  11. **Kimberly A. See**, Karena W. Chapman, Lingyang Zhu, Kamila M. Wiaderek, Olaf J. Borkiewicz, Christopher J. Barile, Peter J. Chupas, and Andrew A. Gewirth, "The Interplay of Al and Mg Speciation in Advanced Mg Battery Electrolyte Solutions," *J. Am. Chem. Soc.* **2016**, 138, 328-337. [DOI]
  10. Hongmei Zeng, Deyu Liu, Yichi Zhang, **Kimberly A. See**, Young-Si Jun, Guang Wu, Jeffrey A. Gerbec, Xiulei Ji, and Galen D. Stucky, "Nanostructured Mn-Doped V<sub>2</sub>O<sub>5</sub> Cathode Material Fabricated from Layered Vanadium Jarosite," *Chem. Mater.* **2015**, 27, 7331-7336. [DOI]
  9. **Kimberly A. See**, Stephan Hug, Katharina Schwinghammer, Margaret A. Lumley, Yonghao Zheng, Jaya M. Nolt, Galen D. Stucky, Fred Wudl, Bettina V. Lotsch,\* and Ram Seshadri,\* "Lithium Charge Storage Mechanisms for Cross-Linked Triazine Networks and Their Porous Carbon Derivatives," *Chem. Mater.* **2015**, 27, 3821-3829. [DOI]
  8. Kristin M. Ø. Jensen, Xiaohao Yang, Josefa Vidal Laveda, Wolfgang G. Zeier, **Kimberly A. See**, Marco D. Michiel, Brent C. Melot, Serena A. Corr, and Simon J. L. Billinge, "X-ray Diffraction Computed Tomography for Structural Analysis of Electrode Materials in Batteries," *J. Electrochem. Soc.* **2015**, 162, A1310-A1314. [DOI]
  7. **Kimberly A. See**, Michal Leskes, John M. Griffin, Sylvia Britto, Peter D. Matthews, Alexandra Emly, Anton Van der Ven, Dominic S. Wright, Andrew J. Morris,\* Clare P. Grey,\* and Ram Seshadri,\* "Ab initio Structure Search and in situ <sup>7</sup>Li NMR Studies of Discharge Products in the Li-S Battery System," *J. Am. Chem. Soc.* **2014**, 136, 16368-16377. [DOI]
  6. David Vonlanthen, Pavel Lazarev, **Kimberly A. See**, Fred Wudl, and Alan J. Heeger, "A Stable Polyaniline-Benzoquinone-Hydroquinone Supercapacitor," *Adv. Mater.* **2014**, 26, 5095-5100. [DOI]
  5. **Kimberly A. See**, Young-Si Jun, Jeffrey A. Gerbec, Johannes K. Sprafke, Fred Wudl, Galen D. Stucky, and Ram Seshadri, "Sulfur-functionalized Mesoporous Carbons as Sulfur Hosts in Li-S Batteries: Increasing the Affinity of Polysulfide Intermediates to Enhance Performance," *ACS Appl. Mater. Interfaces* **2014**, 6, 10908-10916. [DOI]
  4. Kyoung Hwan Kim, Young-Si Jun, Jeffrey A. Gerbec, **Kimberly A. See**, Galen D. Stucky, Hee-Tae Jung, "Sulfur Infiltrated Mesoporous Graphene-Silica Composite as a Polysulfide Retaining Cathode Material for Lithium-Sulfur Batteries," *Carbon* **2014**, 69, 543-551. [DOI]
  3. Jihee Park, Young-Si Jun, Woo-ram Lee, Jeffrey A. Gerbec, **Kimberly A. See**, and Galen D. Stucky, "Bimodal Mesoporous Titanium Nitride/Carbon Microfibers as Efficient and Stable Electrocatalysts for Li-O<sub>2</sub> Batteries," *Chem. Mater.* **2013**, 25, 3779-3781. [DOI]
  2. **Kimberly A. See**, Jeffrey A. Gerbec, Young-Si Jun, Fred Wudl, Galen D. Stucky, and Ram Seshadri, "A High Capacity Calcium Primary Cell Based on the Ca-S System," *Adv. Energy Mater.* **2013**, 8, 1056-1061. [DOI]
  1. Luke A. Connal, Nathaniel A. Lynd, Maxwell J. Robb, **Kimberly A. See**, Se Gyu Jang, Jason M. Spruell, and Craig J. Hawker, "Mesostructured Block Copolymer Nanoparticles: Versatile Templates for Hybrid Inorganic/Organic Nanostructures," *Chem. Mater.* **2012**, 24, 4036-4042. [DOI]

## PRESENTATIONS

### Invited Oral Presentations – Technical

2020 November	<b>Materials Science and Engineering</b> , <i>Georgia Tech, Atlanta, GA</i>
2020 October	<b>Hard Matter Seminar</b> , <i>University of Illinois Urbana-Champaign, IL</i>
2020 June	<b>Telluride Science Summer Lectureship Series</b> , <i>virtual seminar.</i>
2020 February	<b>The Minerals, Metals &amp; Materials Society (TMS) Meeting</b> , <i>San Diego, CA</i>
2020 February	Department of Chemistry & Biochemistry, <i>California State University, Northridge, CA</i>
2020 February	Department of Chemistry, <i>Colorado School of Mines, Golden, CO</i>
2020 January	<b>Materials Research Outreach Program Symposium</b> , <i>University of California, Santa Barbara, CA</i>
2020 January	Department of Chemistry, <i>University of Southern California, Los Angeles, CA</i>
2019 November	<b>Science Award Electrochemistry &amp; Science Dialogue</b> , <i>Wolfsburg, Germany</i>
2019 August	<b>American Chemical Society National Fall Meeting</b> , ENFL division, <i>San Diego, CA</i>
2019 August	<b>American Chemical Society National Fall Meeting</b> , PHYS division, <i>San Diego, CA</i>
2019 June	Department of Chemistry and Biochemistry, <i>University of Oregon</i>
2019 March	Department of Chemistry and Biochemistry, <i>University of Texas at El Paso</i>
2018 November	Department of Chemistry and Biochemistry, <i>California State University, Los Angeles, CA</i>
2018 October	<b>Materials Development for Automotive Propulsion</b> , <i>Physizkzentrum Bad Honnef, Germany</i>
2018 July	<b>Molecular Chemistry in Electrochemical Energy Storage</b> , <i>Telluride, CO</i>
2017 October	<b>S. California Electrochemical Energy Storage Association Meeting</b> , <i>UC Santa Barbara, CA</i>
2017 October	<b>Electrochemical Society Conference</b> , <i>National Harbor, MD</i>
2017 May	<b>Canadian Chemistry Conference</b> , <i>Toronto, Ontario, Canada</i>
2017 May	<b>Materials &amp; Interfaces Seminar</b> , <i>Weizmann Institute of Science, Rehovot, Israel</i>
2017 January	Division of Chemistry and Chemical Engineering, <i>California Institute of Technology</i>
2017 January	Department of Chemistry, <i>Colorado State University</i>
2016 December	Department of Chemical Engineering and Materials Science, <i>University of Minnesota</i>
2016 December	Department of Chemistry, <i>Columbia University</i>
2016 December	Department of Chemistry & Chemical Biology, <i>Cornell University</i>
2016 December	Department of Chemistry, <i>University of Wisconsin-Madison</i>
2016 December	Department of Chemistry, <i>University of Minnesota</i>
2016 November	Department of Chemistry & Biochemistry, <i>The Ohio State University</i>
2016 July	<b>STFC Batteries Meeting</b> , <i>The Cosener's House, Abingdon, UK</i>
2015 March	<b>Invited Seminar</b> , <i>University of Michigan, Ann Arbor, MI</i>
2014 Feb.	<b>Materials Research Outreach Program Symposium</b> , <i>University of California, Santa Barbara, CA</i>
2012 June	<b>Materials for Catalysis and Energy Applications</b> , <i>Chalmers University, Gothenburg, Sweden</i>

### Invited Oral Presentations – Non-technical meetings

2019 February	<b>Break Through on the Road –The Caltech Campaign</b> , <i>Los Angeles, CA</i>
2018 November	<b>CCE Chair's Council Meeting</b> , <i>Pasadena, CA</i>
2018 October	<b>Resnick Sustainably Institute Advisory Council Meeting</b> , <i>Pasadena, CA</i>

### Oral Presentations

2019 September	<b>European Congress and Exhibition on Advanced Materials &amp; Processes</b> , <i>Stockholm, Sweden</i>
2016 March	<b>American Chemical Society Spring Meeting</b> , <i>San Diego, CA</i>
2015 December	<b>Pacificchem</b> , <i>Honolulu, HI</i>
2014 April	<b>Materials Research Society Spring Meeting</b> , <i>San Francisco, CA</i>
2013 April	<b>American Chemical Society Spring Meeting</b> , <i>New Orleans, LA</i>
2012 November	<b>Materials Research Society Fall Meeting</b> , <i>Boston, MA</i>

### Selected Poster Presentations

2019 September	<b>Israeli-American Kavli Frontiers of Science Symposium</b> , <i>Jerusalem, Israel</i> (invited contr.)
2018 February	<b>Gordon Research Conference: Batteries</b> , <i>Ventura, CA</i>
2016 July	<b>Gordon Research Conference: Solid State Chemistry</b> , <i>Colby-Sawyer College, New London, NH</i>
2016 June	<b>18<sup>th</sup> International Meeting on Lithium Batteries</b> , <i>Chicago, IL</i>
2016 February	<b>Gordon Research Conference: Batteries</b> , <i>Ventura, CA</i>
2014 March	<b>Gordon Research Conference: Batteries</b> , <i>Ventura, CA</i>
2013 July	<b>North American Solid State Chemistry Conference</b> , <i>Oregon State University, Corvallis, OR</i>
2013 Feb.	<b>Materials Research Outreach Program Symposium</b> , <i>University of California, Santa Barbara, CA</i>
2012 March	<b>Gordon Research Conference: Batteries</b> , <i>Ventura, CA</i>
2012 February	<b>International Workshop on Advanced Materials</b> , <i>Ras Al Khaimah Center for Advanced Materials, United Arab Emirates</i>

## AFFILIATIONS AND MEMBERSHIPS

<b>Service</b>	Co-organizer for the 2020 Telluride Science Research Center Workshop “Molecular Chemistry in Electrochemical Energy Storage” Co-organizer for the 2019 European Congress and Exhibition on Advanced Materials and Processes (EUROMAT) Symposium “Batteries: From Materials to Cell” Co-organizer for Spring 2019 Materials Research Society (Phoenix, AZ) Symposium “Next-Generation Intercalation Batteries” Co-organizer for Spring 2018 ACS National Meeting (New Orleans, LA) Symposium “Innovative Chemistry and Materials for Electrochemical Energy Storage”
<b>Advisory Boards</b>	Early Career Advisory Board for <i>Chemical Reviews</i>
<b>Professional Societies</b>	American Chemical Society Materials Research Society Electrochemical Society

## COMMUNITY INVOLVEMENT

<b>Caltech</b>	Keynote speaker and lab tour host for Wilson Middle School (2020) Host for Sierra Madre Middle School lab tour (2019) Outreach with Marshall Fundamental High School (hosted by the Agapie group) Pinhead Institute Punk Scientist (outreach for K-12 and community members in Telluride, CO)
<b>UIUC</b>	Retreat for Graduate Women in Chemistry Planning Committee Retreat for Graduate Women in Chemistry, Invited Speaker and Mentor Women Chemists Committee’s Girls Day Camp, Volunteer
<b>UCSB</b>	Partnerships for Research and Education in Materials, Materials Science Ambassador Graduate Students for Diversity in Science, Scheduling Chair Solar car workshop through the Materials Research Laboratory (MRL), Volunteer Buckyball and “It’s a Materials World” workshop through the MRL, Volunteer