**Current Position**

Associate Professor, Department of Mechanical Engineering, and Materials Science & Engineering Program, University of Colorado, Boulder, CO.

## 1. Education Background

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|---|---|
| 2008 - 2011 | **Postdoctoral Researcher, NREL**, Golden, CO, USA. *Advisor: Dr. Anne Dillon (deceased)* |
| 2004 - 2008 | **Ph.D., Chemistry**, State University of New York (SUNY) at Binghamton, Binghamton, NY, USA. Advisor: *Prof. M. Stanley Whittingham (**2019 Nobel Prize Laureate**)* |
| 2000 - 2003 | **Master**, **Electrochemistry**, Tianjin University, Tianjin, China, Advisor: Dr. *Suwei Yao* |
| *1996 – 2000* | **Bachelor**, Chemical Engineering, Tianjin University, Tianjin, China, Advisor: *Dr. Wei Wang* |

## 2. Academic and Other Employment History

| | |
|---|---|
| 2019 - present | **Associate Professor,** Paul M. Rady Department of Mechanical Engineering and Materials Science & Engineering Program, **University of Colorado Boulder**, Boulder, CO |
| 2019 - 2019 | **Associate Professor,** Department of Mechanical Engineering, **Virginia Tech**, Blacksburg, VA |
| 2018 - 2019 | **Joint Appointment, Renewable and Sustainable Energy Institute**, University of Colorado Boulder, Boulder, CO |
| 2017 - 2019 | **Senior Scientist (V),** Principal Investigator, Chemistry and Nanoscience Center, National Renewable Energy Laboratory (**NREL**), Golden, CO |
| 2014 - 2017 | **Senior Scientist (IV),** Principal Investigator, **NREL**, Golden, CO |
| 2011 - 2014 | **Scientist (III),** Principal Investigator, **NREL**, Golden, CO |

## 3. Honors and Awards

| | |
|---|---|
| 2024 | Frank Moyes Award, CU Boulder, 2024 |
| 2023 | Honored with the Top Innovation award in the 2023 CU Boulder Lab Venture Challenge |
| 2020 | Cambridge Innovation Institute, “Passion and Process in Battery Research: Harnessing Nature's Bounty” |
| 2016-Present | Editorial Advisory Board Member for Sustainable Energy & Fuels |
| 2017-Present | Editor and Board member of the Institute of Engineering and Technology (IET) a Charity registered in England & Wales and Scotland, UK |
| 2018 | NREL news, “Chunmei Ban is Getting Charge Out of Battery Research by Finding Right Chemistry” |

2018 NREL President's Award on research of Operando X-ray Photoelectron Spectroscopy
2018 General Chair of Beyond Li-ion Conference XI, Westlake, OH
2017 NREL Award for Outstanding Contribution
2016 NREL Award for Outstanding Contribution
2015 NREL Award for Outstanding Contribution
2014 FLC Mid-Continent regional award and NREL Innovation and Technology Transfer Awards
2014 Phys Org, "Team bolsters batteries with nanotubes"
2013 General Chair for Beyond Li-ion conference VI, Boulder, CO

## 4. Published Books, Book Chapters, and Edited Volumes

### Books

2021 "Lithium-ion Battery Enabled by Silicon Anodes", **C. Ban**, K. Xu, eds. The Institute of Engineering and Technology, IET, Production

### Chapters in Books

2016 K. E. Hurst, J. M. Luther, **C. Ban**, S. T. Christensen, "Nanomaterials for Energy Applications" In Mansfield, E.; Kaiser, D. L.; Fujita, D.; Van de Voorde, M. (Ed). Metrology and Standardization of Nanomaterials: Protocols and Industrial Innovations; Wiley. 2016

### Special Issue in Journal

2021 "ECS Focus Issue on Energy Storage Research in China" V. Thangadurai, **C. Ban**, et al. Electrochemical Soc. 2021

## 5. Granted Patent and Provisional Patent Application

### Granted Patents:

1. C. Ban, S-B Son, M. Groner, "Coated semiconductor particles and methods of making the same," U.S. application, U.S. Patent No. US 11,038,162, Date of Patent: June 15, 2021.
2. C. Ban, Y. Zhao, S.B. Son, D. Ruddy, P. Parilla, "Magnesium-based methods, systems, and devices", U.S. Patent No. US 10, 490, 872 B2, Date of Patent: Nov. 26, 2019.
3. C. Ban, T. Genett, W. Braunecker and D. Arrelaine, "Materials for flow battery energy storage and methods of using", U.S. Patent No. US: 10, 367, 222 B2, Date of Patent: July 30, 2019.
4. C. Ban, Z. Wu, and A. Dillon, "Method of fabricating electrodes including high-capacity, binder-free anodes for lithium-ion batteries", U.S. Patent No. 9,543,054 B2 (Licensed), Date of Patent: Jan. 10, 2017.

5. C. Ban, T. Gennet, D, Ginley, W. Braunecker, Z. Owczarczyk, "Hybrid radical energy storage device and method of making," U.S. Patent No. 9,324,992 B2, Date of Patent: April 26, 2016.

**Pending:**

6. K. Smith, S. Shriram, S. Nathaniel, C. Andrew, C. Ban, X. Li, "Methods and Devices for Electrochemical Relithiation of Lithium-ion Batteries," U.S. Patent No. US 11,870,044 B2, issued on: Jan. 14, 2025.
7. C. Ban, S. Hafner, S. Lee, "Solid-State Energy Storage Devices and Methods of Making the Same," U.S. Provisional application, Paten No.:US 11,508,951 B2 Date of Patent: Nov. 22, 2022.
8. C. Ban and S-B Son, "Magnesium metal devices and methods of making the same," U.S. provisional application, U.S. Patent No. US 10,930,928 B2, Date of Patent: Feb. 23, 2021.
9. T. Brooks, T. Adele, C. Ban, C. Melamed, A. Osella, "Ternary Nitride Negative Electrode Based Lithium-Ion Battery", U.S. 12,087,948, Publication Date: 2/04/2021.

**PCT Patent Application:**

10. N. Singstock, C.Ban, E. Flitz, "Electrolyte Compositions for Sodium-based Batteries and Methods of Making the Same", PCT Application No. PCT/US2024/047512, Filing Date: 09/19/2023.
11. W. Zhang, C. Ban, "Improved Solid-State Ionic Conducting Materials and Methods of Making the Same" PCT international Patent Application No: PCT/US2023/065959, Filling Date: 4/19/2023.

**Provisional Patent Application:**

12. Z. Liang, M. Nguyen, C. Ban, "High Areal Capacity Cathodes for Lithium-ion Batteries", Provisional Patent Application No.: 63/512,858, Filing Date: 07/10/2023.
13. W. Zhang, C. Ban, "High-Areal Capacity Anode for Lithium-ion Batteries" Provisional Application No. 63/512,863, Filing Date: 07/10/2023.
14. N. Singstock, C.Ban, Z. Liang, C. Musgrave, "Stable and High Energy Density Hybrid Cathode for Magnesium Ion Batteries", Provisional Patent Application No. 63/499,734, Filling Date: 5/03/2023.

**Patent submitted:**

15. C. Thomas, C. Ban. "Moisture Stable Prussian White for Rechargeable Batteries"

    CU2025-019, 11/13/2024

## 6. Refereed Publications Articles Publications (Corresponding Author *)

**Publications after joining CU Boulder (2019-Present)**

1. M. S. Nafis, Z. Liang, S. Lee, C. Ban*, Structural Engineering Developments in Sulfide Solid-State Electrolytes for Lithium and Sodium Solid-State Batteries, Nano Energy, 110447, (2024). IF: 17.6, CiteScore: 29.3

2. Z. Liang, M. S. Nafis, D. Rodriguez, and C. Ban*, Surface Science and Engineering for Electrochemical Materials, Accounts of Chemical Research 57 (21), 3102-3112 (2024) IF: 18.3, CiteScore: 34.7
3. K.P. LopeZ, M. Ngyue, D.P. McNally, S.R. Neefe, C. Ban*, T. Straub, Pore Wetting and Compaction in Pressure-Driven Distillation: Insights from Impedance Spectroscopy. ACS ES&T Engineering, 2024 December 02. DOI: 10.1021/acsestengg.4c00644 IF: 7.5, CiteScore: 8.5
4. C. Ban*, Synthesis via cation replacement reactions, News & Views, Nature Energy, volume 9, pages 236–237, 2024 IF: 49.8, CiteScore: 79.1
5. Y. Wang, C. Thomas, K. Garman, H. Kim, Z. Chen, M. Chi, C. Ban*, The Key Role of Grain Boundary Dynamics in Revolutionizing the Potential of Solid Electrolytes. Adv. Funct. Mater. 2024, 2404434. https://doi.org/10.1002/adfm.202404434 IF: 19, CiteScore: 27.9
6. Z. Liang, Y.-Y. Wang, B. Pei, S.-B. Son, M. Nguyen, N. R. Singstock, S. Huang, M. Mo, J. Li, M. S. Whittingham, C. Ban*, "3D-Integrated, Multi-Functional Carbon Fibers for Stable, High-Areal-Capacity Batteries", Adv. Energy Mater. 2023, 13, 2301295. https://doi.org/10.1002/aenm.202301295 IF: 27.8, CiteScore: 42.6
7. Y.-Y. Wang, Z. Liang, Z.-C. Liu, S. Liu, C. Ban*, G.-R.Li, X.-P. Gao, "Synergy of Epitaxial Layer and Bulk Doping Enables Structural Rigidity of Cobalt-Free Ultrahigh-Nickel Oxide Cathode for Lithium-Ion Batteries", Adv. Funct. Mater. 2023, 2308152. https://doi.org/10.1002/adfm.202308152. IF: 19, CiteScore: 27.9
8. M. Nguyen, Z. Liang, K. Garman, Y.-Y. Wang, A. Gestos, M. Mo, C. Ban*, "An Electronically Conductive 3D Architecture with Controlled Porosity for LiFePO4 Cathodes", Front. Mater., Volume 10 - 2023 | https://doi.org/10.3389/fmats.2023.1213872. IF: 3.2, CiteScore: 4.7
9. T. R. Nickerson, E. N. Antonio, D. P. McNally, M. F. Toney, C. Ban, A. P. "Straub, Unlocking the Potential of Polymeric Desalination Membranes by Understanding Molecular-Level Interactions and Transport Mechanisms", Chem. Sci., 2023, 14, 751-770, DOI: 10.1039/D2SC04920A IF: 8.6, CiteScore: 15.2
10. Z. Liang, T. Li, H. Chi, J. Ziegelbauer, K. Sun, M. Wang, W. Zhang, T. Liu, Y.-T. Cheng, Z. Chen, X. Gayden, C. Ban*, "Solvent-Free Manufacturing of Lithium-Ion Battery Electrodes via Cold Plasma", Energy & Environmental Materials, 26 August 2022, https://doi.org/10.1002/eem2.12503 IF: 15, CiteScore: 20.5
11. B. Abad, K. Alberi, K. E. Ayers, S. Badhulika, C. Ban, et. al. "The 2022 Applied Physics by Pioneering Women: A Roadmap". Journal of Physics D: Applied Physics, 56(7), 073001.2023, DOI: 10.1088/1361-6463/ac82f9 IF: 3.4, CiteScore: 5.9
12. W. Zhang, SB Son, H Guthrey, C. Ban*, "Mitigation of Rapid Capacity Decay in Silicon-NiMC Full Batteries", Energy Storage Materials, 2022, 29, 111, doi.org/10.1016/j.ensm.2022.03.025 IF: 20.4, CiteScore: 30.4
13. MB Tellekamp, A Osella, KN Heinselman, AC Tamboli, C. Ban*, "Composition dependent electrochemical properties of earth-abundant ternary nitride anodes," APL Materials, 2022, 10(4), 041109, doi.org/10.1063/5.0083998 IF: 6.6, CiteScore: 11.3
14. Z. Liang, C. Ban*, "Strategies to Enable Reversible Magnesium Electrochemistry: From Electrolytes to Artificial Solid-Electrolyte Interphase", Agnewandte Chemie International Edition, 2021, 60 (20), 11036, DOI/10.1002/anie.202006472

15. Son S-B, C. Ban*. "Surface modification for silicon anodes." in Lithium-Ion Batteries Enabled by Silicon Anodes Ed. Ban C; Xu K. 2021. 277-313.
16. P. Albertus, V. Anadan, C. Ban, et. al. “Challenges for and Pathways toward Li-Metal-Based All-Solid-State Batteries”, ACS Energy Lett. 2021, 6, 4, 1399, DOI/ /10.1021/acsenergylett.1c00445
17. C. Stetson, Y. Yin, A. Norman, S.P. Harvey, M. Schnabel, C. Ban, C.S.Jiang, S. C. DeCaluwe, M. Al-Jassim, “Evolution of Solid Electrolyte Interphase and Active Materials in the Silicon Wafer Model System”, J. Power, Sources, 2021, 482, 228946, DOI/10.1016/j.jpowsour.2020.228946
18. Y. Yin, C. Jiang, H. Guthrey, C. Xiao, N. Seitzman, C. Ban*, M. Al-Jassim, “Improved Stability and Cyclability of Ceramic Solid Electrolyte by Coating Polymer”, J. Electrochemical Society, 2020, 167 (2), 020519, DOI /10.1149/1945-7111/ab68c7
19. S. Herle, C. Ban et al. “Challenges for and Pathway Toward Solid-State Batteries”, Technical Report, Oak Ridge National Lab, Oak Ridge, TN. 2020, ORNL/TM-2020/1747
20. Y.Qi, C. Ban*, S. Harris, A New General Paradigm for Understanding and Preventing Li Metal Penetration through Solid Electrolytes”, Joule, 2020, 4(12) 2599, DOI/10.1016/j.joule.2020.10.009
21. D. Dang, Y. Wang, M. Wang, J. Hu, C. Ban, Y.T. Cheng, “Lithium Substituted Poly(acrylic acid) as a Mechanically Robust Bonder for Low-Cost Silicon Microparticle Electrodes”, ACS Applied Energy Materials, 2020, 3(11), 10940, doi.org/10.1021/acsaem.0c01923
22. S. Harvey, A. Burrell, E. Arca, C. Ban, K. Periyapperuma, C. Pozo-Gonzalo, T. Pathirana, P. C. Howlett, “High Current Cycling in a Superconcentrated Ionic Liquid Electrolyte to Promote Uniform Li Morphology and a Uniform LiF-Rich Solid Electrolyte Interphase”, ACS Applied Materials & Interfaces, 2020, 12(37), doi.org/10.1021/acsami.0c09074
23. X. Li, F. Dogan, Y. Lu, C. Antunes, Y. Shi, A. Burrell, C. Ban*, “Fast Determinization of Lithium Content in Spent Cathodes for Direct Battery Recycling”, Advanced Sustainable System, 2020, 4(8), 2000073, doi.org/10.1002/adsu.202000073
24. M. Schnabel, S. P Harvey, E. Arca, C. Stetson, G. Teeter, C. Ban, P. Stradins, “Surface SiO2 Thickness Controls Uniform-to-Localized Transition in Lithiation of Silicon Anodes for Lithium-Ion Batteries”, ACS Applied Materials & Interfaces, 2020, 12(24), 27017, doi.org/10.1021/acsami.0c03158
25. J. Liu, T. Yoon, C. Ban, M. Al-Jassim, “Microstructure Study on Initial Lithiation/Delithiation Cycle of Crystalline Silicon Wafer—ADDENDUM”, Microscopy and Microanalysis, 2020, 26(1), 183, doi.org/10.1017/S1431927619015290
26. Y Yin, E Arca, L Wang, G Yang, M Schnabel, L Cao, C Xiao, H Zhou, P Liu, J. Nanda, G. Teeter, B. Eichhorn, K. Xu, A. Burrell, C. Ban, “Nonpassivated Silicon Anode Surface”, ACS Applied Materials & Interfaces 2020, 12 (23), 26593-26600
27. K. Periyapperuma, E. Arca, S. Harvey, C. Ban, A. Burrell, D.R. MacFarlane, C. Pozo-Gonzalo, M. Forsyth, P. Howlett, “Towards High Rate Li Metal Anodes: enhanced performance at high current density in a superconcentrated ionic liquid” J. Mater. Chem., 2020, A, 8, 3547-3579, DOI/10.1039/C9TA12004A

28. W. Fang, Y. Tang, C. Ban, Q. Kang, R. Qiao, W. Tal, "Atomic Layer Deposition in Porous Electrodes: A Pore-Scale Modeling Study", Chemical Engineering Journal, 2019, 378, DOI /10.1016/j.cej.2019.122099.
29. C. Stetson, Y. Yan, C.S. Jiang, S. DeCaluwe, M. Al-Jassim, N. Neale, C. Ban*, A. Burrell, "Temperature-Dependent Solubility of Solid Electrolyte Interphase on Silicon Electrodes", ACS Energy Letters, 2019, 4, DOI /10.1021/acsenergylett.9b02082
30. J. Liu, T. Yoon, C. Ban, M. Al-Jassim, "Microstructure Study on Initial Lithiation/Delithiation Cycle of Crystalline Silicon Wafer", Microscopy and Microanalysis, 2019, 25, DOI /10.1017/S143192761901122X
31. D. P. Finegan, A. Vamvakeros, L. Cao, C. Tan, T. M.M. Heenan, S. Demi, M. D. Michiel, K. Smith, P. R. Shearing, C. Ban*, "Spatially Resolving Lithiation Using X-ray Diffraction Computed Tomography", 2019, Nano Letter,19 (6), DOI /10.1021/acs.nanolett.9b00955
32. J. M. Wallas, B. C. Welch, Y. Wang, J. Liu, S. E. Hafner, R. Qiao, T. Yoon, Y-T Cheng, S. M. George, C. Ban*, "Spatial Molecular Layer Deposition of Ultrathin Polyamide to Stabilize Silicon Anodes in Lithium-Ion Batteries", ACS Applied Energy Materials, 2019, 2(6). DOI/10.1021/acsaem.9b00326
33. S. Hafner; H. Guthrey; S-H Lee, C. Ban*, "Synchronized electrospinning and electrospraying technique for manufacturing of all-solid-state lithium-ion batteries" Journal of Power Sources, 2019, 431, 17. DOI/10.1016/j.jpowsour.2019.05.008
34. T. Yoon, C. Xiao, J. Liu, Y. Wang, S-B. Son, A. Burrell, C. Ban*, "Electrochemically Induced Fractures in Crystalline Silicon Anodes", Journal of Power Sources, 2019, 425(15), 44. DOI:/10.1016/j.jpowsour.2019.03.105. DOI/10.1016/j.jpowsour.2019.03.105
35. C. Stetson, T. Yoon, J. Coyle, W. Nemeth, M. Young, A. Norman, S. Pylypenko, C. Ban, C.S. Jiang, M. Al-Jassim, A. Burrell, "Three-Dimensional Electronic Resistivity Mapping of Solid Electrolyte Interphase on Si Anode Materials", Nano Energy, 2019, 55, 477. DOI/10.1016/j.nanoen.2018.11.007

**Publications prior to joining CU Boulder (2002-2019)**

36. S-B. Son, C. Lei, T. Yoon, A. Cresce, M. Groner, J. Liu, S. E. Hafner, K. Xu, and **C. Ban***, "Interfacially Induced Cascading Failure in Graphite-Silicon Composite Anodes", ***Advanced Science,*** 2018, 1801007. DOI/10.1002/advs.201801007
37. S-B. Son, T. Gao, S. Harvey, K. Steirer, A. Stokes, C. Wang, K. Xu, and **C. Ban***, "An Artificial Interphase Enables Reversible Magnesium Chemistry in Carbonate Electrolytes", ***Nature Chemistry***, 2018, 10, 532. DOI/10.1038/s41557-018-0019-6
38. K. Wood, K.X. Steirer, S. Hafner, **C. Ban**, S. Santhanagopalan, S.H. Lee, G. Teeter, "Operando X-ray Photoelectron Spectroscopy of Solid Electrolyte Interphase Formation and Evolution in $Li_2S$-$P_2S_5$ Solid-state Electrolytes***", Nature Communications,*** 9 (1), 2018, 2490.
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41. T. Evans, D.M. Piper, H. Sun, T. Porcell, S.C. Kim, S.S. Han, Y.S. Choi, C. Tian, D. Nordlund, M. Doeff, **C. Ban**, S.J. Cho, K.H. Oh, S.H. Lee, "In Situ Engineering of the Electrode-Electrolyte Interface for Stabilized Overlithiated Cathodes", ***Advanced Materials,*** 2017, 1604549, DOI/10.1002/adma.201604549
42. **C. Ban*,** S. M. George, "Molecular Layer Deposition for Surface Modification in Li-ion Batteries", Review, ***Advanced Materials Interface***, 2016, 29(10), 1600762, DOI/10.1002/admi.201600762
43. D. M. Piper, Y. Lee, S-B. Son, T. Evans, F. Lin, D. Nordlund, X Xiao, S. M. George, S.H. Lee, **C. Ban*,** "Cross-linked aluminum dioxybenxene coating for stabilization of silicon electrodes", ***Nano Energy,*** 2016, 22, 202, DOI/10.1016/j.nanoen.2016.02.021.
44. D. Asakura, E. Hosono, Y. Nanba, H. Zhou, J. Okabayashi, **C. Ban**, P. Glans, J. Guo, T. Mizokawa, G. Chen, A. J. Achkar, D. G. Hawthron, T. Z. Regier, and H. Wadati, "Material/element-dependent fluorescence-yield modes on soft X-ray absorption spectroscopy of cathode materials for Li-ion batteries" ***AIP Advances*** 2016, 6, 035105.
45. X. Li, C. A. Wolden, **C. Ban**, Y. Yang, "Facial synthesis of lithium sulfide nanocrytals for use in advanced rechargeable batteries" ***ACS Applied Materials Interfaces***, 2015, 7(51):28444-51 DOI/10.1021/acsami.5b09367
46. A. M.Wise, **C. Ban*,** J. N. Weker, S. Misra1, A. S. Cavanagh, Z. Wu, Z. Li, M. S. Whittingham, K. Xu, S. M. George, and M. F. Toney "The effect of Al2O3 coating on stabilizing LiNi0.4Mn0.4Co0.2O2 cathodes" ***Chemistry Materials,*** 2015, 27 (17), 6146, DOI/10.1021/acs.chemmater.5b02952
47. Y. Ma, J. M. Martinez De La Hoz, I. Angarita, J. M. Berrio-Sanchez, L. Benitez, J. M. Seminario, S-B Son, S-H. Lee, S. M. George, **C. Ban** and P. Balbuena, "structure and Reactivity of Alucone-Coated Films on Si and LixSiy Surface", ***ACS Applied Materials Interfaces***, 2015, 7 (22), pp 11948–11955, DOI/10.1021/acsami.5b01917
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61. **C. Ban**, B. Kappes, Q Xu, C. Engtrakul, C .V. Ciobanu, A. *C*. Dillon and Y Zhao, "Lithiation of silica through partial reduction" ***Applied Physics Letters*** 100, 243905 2012
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## 7. Presentations

Invited Presentation at International Conferences and Universities (2019-Present, after joining CU Boulder)

### 2024 Invited Presentations

1. **Invited Distinguished Speaker, Department of Mechanical and Aerospace Engineering**
   *"Developing Battery Materials via Interface Science and Engineering"*
   **Date:** September 27, 2024

2. **International Battery Association (IBA) 2024, Halifax, Canada**
   *"Fluorine-Free Sodium-Ion Electrolytes for Sodium-Ion Batteries"*
   **Date:** September 8-13, 2024
3. **PRiME (The Electrochemical Society) 2024, Honolulu, HI**
   *"Advancing Sodium-Ion Battery Electrolyte Technologies through Multidisciplinary Approaches"*
   **Date:** October 6-11, 2024
4. **14th International Conference on Ceramic Materials and Components for Energy and Environmental Systems, Budapest, Hungary**
   *"Exploring Electrolyte and Electrolyte-Electrode Interface for Long-Life Cycling Sodium-Ion Batteries"*
   **Date:** August 18-22, 2024
5. **48th International Conference and Exposition on Advanced Ceramics and Composites, Daytona Beach, FL**
   *"Surface/Grain Boundary Engineering for Garnet Solid-State Electrolyte"*
   **Date:** January 29 - February 2, 2024
6. **Award Talk at 13th Global Young Investigator Forum, Daytona Beach, FL**
   *"The Role of Grain Boundaries in the Ion and Electron Transport Properties of Solid Lithium-Ion Electrolytes"*
   **Date:** January 29-30, 2024

### 2023 Invited Presentations

7. **Lindsay Lecture Series, Chemical Engineering Department, Texas A&M University**
   *"Powering the Future: Unlocking Innovations through Multidisciplinary Approaches and Team Building for Advancing Energy Storage Solutions"*
   **Date:** November 29, 2023
8. **244th Electrochemical Society (ECS) Meeting, Gothenburg, Sweden**
   *"Engineering the Mechanical Properties of Solid-State Electrolytes via Ion Implantation to Improve Electrochemical Performance"*
   **Date:** October 8-12, 2023
9. **ACS Spring 2023 Meeting, Indianapolis, IN**
   *"Electrolyte for Sulfur-Based Cathodes in Beyond-Lithium Metal Batteries"*
   **Date:** March 26-30, 2023
10. **ACS Fall 2023 Meeting, San Francisco, CA**
    *"Tailoring Interphase Structure for Electrode and Solid-State Electrolytes"*
    **Date:** August 13-17, 2023
11. **AVS 23rd International Conference on Atomic Layer Deposition (ALD 2023), Seattle, WA**
    *"Nanoscale Surface Engineering for Battery Electrode and Solid Ionic Electrolytes"*
    **Date:** August 23-26, 2023
12. **International Battery Association Conference 2023, Austin, TX**
    *"Surface/Grain Engineering for Suppressing Lithium Dendrite Propagation"*
    **Date:** March 5-10, 2023

### 2022 Invited Presentations

13. **Materials Science & Engineering Distinguished Seminar, Binghamton University**
    *"Surface Engineering for Improved Electrochemical Storage"*
14. **NSF/TSRC Workshop: Materials Chemistry in Electrochemical Energy Storage**
    *"Surface Modification of $Li_7La_3Zr_2O_{12}$ for Lithium Dendrite Suppression"*
    **Date:** September 26-30, 2022
15. **Keynote Speaker at the 6th International Forum on Cathode & Anode Materials for Advanced Batteries**
    *"Failure Mechanism in Silicon-Anode Lithium-Ion Batteries"*
16. **ACS Fall 2022 Meeting**
    *"Investigation of the Rapid Capacity Decay in Silicon-Based Full Batteries"*
17. **46th International Conference and Exposition on Advanced Ceramics and Composites**
    *"Garnet Solid Electrolytes"*

### 2021 Invited Presentations

18. **240th Electrochemical Society (ECS) Fall Meeting**
    *"Fast Determination of Lithium Content and Failure Mechanism for Aged Lithium-Ion Battery Electrodes"*
19. **2021 Atomic Layer Deposition Annual Meeting**
    *"Molecular Layer Deposition for Electrochemical Materials"*
20. **Keynote Presentation at 240th Electrochemical Society (ECS) Fall Meeting**
    *"A Proposed Solution to Li Dendrite Penetration into Solid Electrolytes"*
21. **NanoEngineering Department Distinguished Seminar Series, UC San Diego**

### 2020 Invited Presentations

22. **MRS Fall Meeting**
    *"Artificial Solid-Electrolyte Interphase for Reversible Magnesium Electrochemistry"*
23. **Mechanical Engineering Distinguished Seminar Series, School of Mines**
24. **MRS Fall Meeting**
    *"Stability and Evolution of Solid Electrolyte Interphase on Lithium-Ion Anodes"*
25. **ECS PRiME Meeting**
    *"Fast Determination of Lithium Content and Failure Mechanism for NMC Cathodes"*
26. **International Battery Seminar & Exhibit**
    *"Simultaneously Electrospinning and Electrospraying Technique for Manufacturing of All-Solid-State Lithium-Ion Batteries"*
27. **NSF CBET Energy Storage Workshop**
    *"Magnesium Electrochemistry in Nonaqueous Electrolytes"*
28. **Atomic Layer Deposition Annual Meeting**
    *"Molecular Layer Deposition for Stabilization of Electrochemical Materials"*

### 2019 Invited Presentations

29. **MRS Fall Meeting, Boston, MA**
    *"A Facile Approach to Detect Lithium Content in Spent Lithium-Ion Battery Materials"*

30. **ACS Fall National Meeting, San Diego, CA**
    *"Interface Science and Engineering for Stabilizing Electrochemical Materials"*

Selected Invited Presentation at International Conferences (prior to joining CU Boulder, 2010-2018)

1. C. Ban, 2018 Materials Research Society (MRS) Fall Meeting, Boston, MA: Scalable Surface Modification Techniques for Electrochemical Materials
2. C. Ban, 2018 Materials Research Society (MRS) Spring Meeting, Phoenix, Arizona: Effect of Surface Modification on Surface Chemistry and Electrochemistry of Silicon-Based Anode Materials
3. C. Ban, 2018 Annual Merit Review Meeting, Department of Energy: Surface Chemistry of Solid Electrode Interface in Silicon Anodes
4. C. Ban, 2017 Lithium Battery Materials & Battery Safety, Washington D.C.: Promises and Challenges of Silicon-Based Anode Materials for Lithium-ion Batteries
5. C. Ban, 2017, Beyond Lithium-ion Symposium-10, IBM Research-Almaden: Surface modification for Magnesium metal for Magnesium metal-based batteries
6. C. Ban, International Battery Seminar & Exhibit 2017, Fort Lauderdale, FL, 2017: Reversible Magnesium chemistry in nitrile-and carbonate-electrolytes
7. C. Ban, 51st American Chemical Society¹s Midwest Regional Meeting (ACS-MWRM), Manhattan, KS, 2016: Structural evolution of lithium-ion electrodes during battery cycling
8. C. Ban, 2016, Department of Chemical and Biomolecular Engineering at University of Maryland: Surface modification for nanoscale silicon electrode materials
9. C. Ban, 11$^{th}$ U.S.-China Electric Vehicle and Battery Technology Meeting, Denver, Colorado, 2016: Development of silicon anode for high-energy Li-ion batteries
10. C. Ban, 2016, Department of Chemical and Materials Engineering at University of Kentucky: Surface modification for Silicon-based alloy materials
11. C. Ban, 249th ACS National Meeting, Denver, Colorado, 2015: Investigation of atomic/molecular layer deposition coatings for Li-ion electrode
12. C. Ban, International Battery Association and Pacific Power Source Symposium Joint Meeting 2015: Molecular Layer Deposition Coatings for Silicon Anodes
13. C. Ban, 40th Annual symposium AVS, East Lansing, Michigan, 2014: Surface modification of silicon anodes for advanced Li-ion batteries
14. C. Ban, 247$^{th}$ ACS National Meeting, 2014, Dallas, Texas: Understand the effect of conformal coatings on electrochemical performance and interfacial chemistry of Si anodes
15. C. Ban, THERMEC' 2013, Las Vegas, USA: Atomic Layer Deposition for Stabilization of Si Anodes for Lithium-ion Batteries
16. C. Ban, Materials Research Society 2012 Fall Meeting, Boston, MA: Atomic Layer Deposition of Al2O3 for Highly Improved Performance in Li-ion Battery Electrodes
17. C. Ban, 2012 Energy Materials Nanotechnology, Las Vegas: Effects of Al2O3 coating for Performance of Li-ion Battery Electrodes

18. C. Ban, International Battery Association-Pacific Power Source Symposium, 2012, Hawaii: Electrochemical and In-situ Structural Study of Coated Li[NMC]$O_2$ Cathodes for Durable High-voltage Cycling
19. C. Ban, 10X Advanced Battery R&D, 2012, Santa Clara, CA: Improving Electrochemical Performance of Li-ion Electrodes via Advanced Surface Modification
20. C. Ban, Materials Research Society 2011 Spring Meeting, San Francisco, CA: Carbon Nanotube Functionalized Li-ion Electrodes for Enhanced Rate Capability and Durability; Coating electrode materials by atomic layer deposition for Li-ion batteries
21. C. Ban, APS March Meeting 2011, Dallas, Texas: (1) Charge-Driven Structural Transformation and Valence Versatility of Boron Sheets in Magnesium Borides; (2) Electronic structure of lithium borocarbide as a cathode material for a rechargeable Li-ion battery: First-principles calculation
22. C. Ban, 5th International Conference on Polymer Batteries and Fuel Cells, August 2011, Argonne, Illinois, USA. "Atomic Layer Deposition Coating form Improved Electrical Energy Storage"
23. C. Ban, Materials Research Society 2010 Fall Meeting, Boston, CA: (1) Electrochemical and Structural Evaluation of the Effect of SWNTs on a $LiNi_{0.4}Mn_{0.4}Co_{0.2}O_2$ Cathode; (2) Atomic Layer Deposition Coatings Improve Electrode Architectures for Lithium-ion Batteries
24. C. Ban, 218th ECS Meeting, October, 2010, Las Vegas, NV: High-Capacity and High-Rate Anodes for Li-Ion Batteries
25. C. Ban, Materials Research Society 2010 Spring Meeting, San Francisco, CA: Effect of Surface Coatings on Electrochemical Behavior of Li-ion Materials
26. C. Ban, Materials Research Society 2009 Fall Meeting, Boston, Massachusetts: Nanostructured $Fe_3O_4$-SWNT Electrode

## 8. Education

### 8.1. Courses Taught at CU Boulder(2020-Present)

| | |
|---|---|
| Chemistry MCEN 1024 (3 credits, undergraduate student class, 68 students) | Fall 2024 |
| Chemistry MCEN 1024 (3 credits, undergraduate student class, 53 students) | Spring 2023 |
| Chemistry MCEN 1024 (3 credits, undergraduate student class, 62 students) | Fall 2023 |
| Chemistry MCEN 1024 (3 credits, undergraduate student class, 45 students) | Fall 2023 |
| Chemistry MCEN 1024 (3 credits, undergraduate student class, 50 students) | Fall 2022 |
| Characterization for Energy Materials (3 credits, graduate student class) | Spring 2022 |
| Chemistry MCEN 1024 (3 credits, undergraduate student class, 120 students) | Fall 2021 |
| Characterization for Energy Materials (3 credits, graduate student class) | Spring 2021 |
| Chemistry MCEN 1024 (3 credits, undergraduate student class) | Fall 2020 |
| Characterization for Energy Materials (3 credits, graduate student class) | Spring 2020 |

### 8.2. Individual Student Guidance at CU Boulder (2019-Present)

Ph.D. Students Advised at CU Boulder

| | |
|---|---|
| Caitlyn Komar | 2024-Present |
| Cindy Wong | 2024-Present |
| Dakota Rodriguez | 2023-Present |
| Mohammad Sufiyan Nafis | 2023-Present |
| Evan Flitz | 2022-Present |
| Kaitlin Garman | 2022-Present |
| Charlotte Thomas | 2020-Present |
| Jackson Pope | 2020-Present |
| Martin Nguyen | 2020-Present |
| Dylan McNally | 2020-2022 |

International PhD Students Supervised at CU Boulder

2023 Supervised one PhD student (Shakked Schwartz) from Israel, who has been awarded the Prof. Rahamimoff Travel Grants for Young Scientists.

Postdoctoral Researchers Advised at CU Boulder

| | |
|---|---|
| Zhiming Liang | 2020-Present |
| Nicholas Singstock | 2022-2024 |
| Yangyang Wang | 2022-2024 |
| Wei Zhang | 2020-2022 |
| Yikai Wang | 2019-2020 |

### 8.3. Individual Student Guidance at NREL (2012-2019)

Visiting PhD Students Mentored at NREL

| | |
|---|---|
| Daniela M. Piper | 2012-2015 |
| Isaac Scott | 2012-2015 |
| Xuemin Li | 2015-2017 |
| Leonardo Gomex-Ballesteros | 2016-2016 |
| Jasmine Melissa Wallas, | 2016-2018 |

Master Student Advised at NREL

Simon Elnicki Hafner (achieved the Outstanding Graduate for Research Award at CU Boulder in 2019) 2017-2019

Undergraduate Students Advised at NREL

Michael Deck (DoE SULI Intern, Binghamton University, awarded the 1st Place SULI intern Poster Award) 2017

Catherine Haslam (DoE SULI Intern, University of Michigan, awarded the 2nd Place SULI intern Poster Award) 2016

Esther Chan (DoE SULI Intern, University of California, San Diego) 2015

Postdoctoral Research Advised at NREL

Yanli Yin 2017-2019
Lei Cao 2017-2019
Taeho Yoon 2017-2019
Manuel Schnabel 2018-2019
Xuemin Li 2017-2019
Maria Helena Ambrosio Zanin (Awarded from Brazil-United States Consortium for Innovation on Nanotechnology, Energy and Materials) 2016-2017
Seoung-Bum Son 2014-2017

Visiting College Teacher Mentored at NREL

Kenneth A. Walz (Madison Area Technical College) 2010-2010

### 8.4. Undergraduate and K-12 Education (2020-Present)

**Undergraduate Education**

| | |
|---|---|
| 2023 | Supervised one undergraduate student (Dakota Rodriguez) awarded from the STROBE (NSF Science and Technology Center) summer undergraduate research program. |
| 2024 | Supervised Kangmin Kim, under Summer Program for Undergraduate Research at College of engineering and applied science CU Boulder |

**K-12 Education**

| | |
|---|---|
| 2023-Present | Triple E Fair; We host one of 18 exhibits to demonstrate electrochemical batteries working mechanism for the 7th grade students from Thornton. Colorado on April 7th, 2023, for an immersive engineering experience. |
| 2015-2018 | Role model in Girls and Science, Denver Museum of Science & Nature, Denver, CO |

## 9. Service Activities

### 9.1. Service Activities for Paul M. Rady Department of Mechanical Engineering at CU Boulder

- Member, Department of Paul M. Rady Department of Mechanical Engineering Graduate Committee (2023-Present)

- Lead of Fundamental Topic (Materials) Preliminary Exam for all PhD students at Paul M. Rady Department of Mechanical Engineering (2023)
- Member, Materials Science & Engineering Program Executive Committee (2022-2023)
- Committee member of Primary Unit Evaluation Committee (PUEC), Paul M Rady Department of Mechanical Engineering (2022-2023)
- Member, Department of Paul M. Rady Department of Mechanical Engineering Graduate Committee (2019-2021)
- Member, Materials Science & Engineering Program Graduate Program Committee (2020-2021)
- Member, Materials Science & Engineering Program Executive Committee (2021-2022)
- Committee member, Paul M Rady Department of Mechanical Engineering faculty search committee (2021-2022)

### 9.2. Service Activities for Materials Science & Engineering Program at CU Boulder

Member, Materials Science & Engineering Program Graduate Program Committee (2024-2025)

Member, Materials Science & Engineering Program Graduate Program Committee (2020-2021)

Member, Materials Science & Engineering Program Executive Committee (2021-2022)

### 9.3. Service Activities for College of Applied Engineering and Science at CU Boulder

Committee Member, Faculty Searching Committee for College of Engineering and Applied Sciences (2021-2022)

### 9.4. Professional Membership

2012-present Professional Memberships: Electrochemical Society; Materials Research Society; American Chemical Society,

### 9.5. International Meetings and Conferences Organized

2022 Co-chair for 241st ECS meeting, May 29-June 2, 2022, A02 "Lithium-ion Batteries", Vancouver, BC, Canada

2021 Lead chair for 239 ECS meeting with the 18th International Meeting on Chemical Sensor May 30-June 3, 2021, Chicago, Symposium "Lithium-ion Batteries"

2018 General Chair and co-organizer for "2018 Beyond Li-Ion Symposium XI", Westlake, OH

2016 Organizer, US-China Electric Vehicle and Battery Technology Meeting, Denver, CO

2013 General Chair and co-organizer for "2013 Beyond Li-Ion Symposium VI", Boulder, CO; and

### 9.6. Journal Editorship (2020-Present)

| | |
|---|---|
| 2022-Present | Editorial board member in Batteries |
| 2022-Present | Editorial board member in Frontiers in Energy Research |
| 2017-Present | Board member and Editor for "The Institute of Engineering and Technology (IET)", a Charity registered in England & Wales and Scotland, UK, 2017-present. |
| 2016-Present | Editorial Advisory Board Member for "Sustainable Energy & Fuels." |
| 2021-2022 | Editor in ECS Focus Issue on Energy Storage Research in China |

### 9.7. Reviewer and panelist (2019-Present)

Served as a reviewer for various peer-reviewed journals including Science; Nature Chemistry, Nature Materials; Joule; Angewandte Chemie; Chemistry of Materials; Chemical Reviews; Chemical Physics; Advanced Materials, Advanced Energy Materials; Advanced Functional Materials; Energy & Environmental Science; Journal of the Materials Research Society; Journal of the Electrochemical Society; ACS Applied Materials and Interfaces; ACS Applied Energy; Journal of Physical Chemistry Letters; Energy Storage Materials

### 9.8. Proposal/Program Reviewer (2019-Present)

I served as a review panelist for several funding agencies, including the National Science Foundation, the Department of Energy, the Office of Science, Basic Energy Sciences, the Small Business Innovation Research program, the Research Corporation for Science Advancement, the Bipartisan Infrastructure Law (BIL), the Qatar National Research Fund, and the Israel Science Foundation.