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Engineering & Scientific Consulting

Hayley Hirsh, Ph.D., P.E.

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Professional Profile

Dr. Hirsh specializes in materials characterization, battery science/technology, and electrochemistry. She has extensive experience with the synthesis and characterization of electrode materials for multiple battery technologies including Li-ion and primary batteries (Li/CFx), as well as batteries with novel electrolytes such as ether-based and liquified-gas.

Dr. Hirsh leverages this experience to assess the quality, performance, and failure, of batteries in a broad spectrum of applications.

Prior to joining Exponent, Dr. Hirsh completed her Ph.D. in NanoEngineering at the University of California, San Diego (UCSD) where her research primarily focused on the synthesis and characterization of electrode materials in sodium-ion batteries for grid storage applications. She specialized in lab and synchrotron-based characterization techniques such as X-ray diffraction (XRD), X-ray absorption spectroscopy (XAS), and tomography.

Academic Credentials & Professional Honors

Ph.D., Nanoengineering, University of California, San Diego, 2021

M.S., Nanoengineering, University of California, San Diego, 2018

B.S., Materials Science and Engineering, Cornell University, 2016

Licenses and Certifications

Professional Engineer Metallurgical, California, #2048

Prior Experience

Graduate student researcher, UCSD, 2016-2016

Undergraduate researcher, Cornell University, 2014-2016

Venture capital summer associate, Orbimed, 2014

X-ray imaging research intern, Varian Medical Systems, 2013

Publications

H. S. Hirsh, B. Sayahpour, A. Shen, W. Li, B. Lu, E. Zhao, M. Zhang, Y. S. Meng, "Role of Electrolyte in Stabilizing Hard Carbon as an Anode for Sodium-Ion Batteries", *Energy Storage Materials*, 42,78-87 (2021).

H. S. Hirsh, Y. Li, J. H Cheng, R. Shimizu, M. Zhang, E. Zhao, Y. S. Meng, "The Negative Impact of Transition Metal Migration on Oxygen Redox Activity of Layered Cathode Materials for Na-Ion Batteries", *Journal of the Electrochemical Society*, 168, 040539 (2021).

H. S. Hirsh, Y. Li, D. H. S. Tan, M. Zhang, E. Zhao, and Y. S. Meng, "Sodium-Ion Batteries Paving the Way for Grid Energy Storage", *Advanced Energy Materials*, 10, 2001274. (2020).

H. Hirsh, M. Olguin, H. Chung, Y. Li, S. Bai, D. Feng, D. Wang, M. Zhang, Y. S. Meng. "Meso-Structure Controlled Synthesis of Sodium Iron-Manganese Oxides Cathode for Low-Cost Na-Ion Batteries", *Journal of The Electrochemical Society*, 166, A2528–A2535 (2019).

J. Star-Lack, D. Shedlock, D. Swahn, D. Humber, A. Wang, H. Hirsh, G. Zentai, D. Sawkey, I. Kruger, M. Sun, E. Abel, G. Virshup, M. Shin, R. Fahrig, "A piecewise-focused high DQE detector for MV imaging", *Medical Physics*, 42, 5084 (2015).

Presentations

Hayley S Hirsh, Baharak Sayahpour, Ashley Shen, Weikang Li, Enyue Zhao, Shirley Meng. Role of Electrolyte in Stabilizing the Solid Electrolyte Interface of Hard Carbon as an Anode for Sodium-Ion Batteries. Oral Presentation, 239th The Electrochemical Society Meeting, Virtual, 2021.

Hayley S Hirsh, Minghao Zhang, Hyeseung Chung, Yixuan Li, Ying Shirley Meng. Meso-Structure Controlled Synthesis of Sodium Iron-Manganese Oxides for Na-Ion Batteries. Poster, International Battery Materials Association, La Jolla, CA, 2019.