Exponent®
Engineering & Scientific Consulting

Wahid Zaman, Ph.D.

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Professional Profile

Dr. Zaman is a mechanical engineer with specialties in novel Li-ion battery technologies, especially in Li metal and solid-state battery chemistries. His expertise ranges from processing battery materials to employing various characterization tools to understand the battery operation and failure modes. He has extensive experience in diagnosing battery materials (structural degradation, performance decay) by coupling in-depth electrochemical analysis with advanced imaging and spectroscopic techniques.

Dr. Zaman has vast expertise in experimental designs for in-situ and in-operando characterization of Li-ion batteries, particularly for synchrotron-based X-ray tomography (XCT), X-ray diffraction (XRD), and X-ray Photoelectron Spectroscopy (XPS) techniques. He has broad experience in characterizing materials using scanning electron microscopy (SEM), focused ion beam (FIB), and atomic force microscopy (AFM). He also has hands-on expertise in advanced deposition methods, including e-beam deposition and magnetron sputtering.

Prior to joining Exponent, Dr. Zaman's PhD research was focused on understanding the transport phenomena and interfacial chemo-mechanics of solid-state Li metal batteries. In addition, he also carried out morphological studies on novel 2-dimensional materials for energy storage and desalination applications. His research efforts provide a critical assessment of operating conditions and processing-structure-function relationships in novel energy storage technologies. Dr. Zaman's prior research experience includes developing scalable gas-separation membranes from functionalized nanofibers.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Vanderbilt University, 2022

M.S., Applied Engineering, Georgia Southern University, 2016

B.S., Mechanical Engineering, Bangladesh University of Eng and Tech, 2012

Languages

Bengali

Publications

W. Zaman, K. Hatzell, "Processing and manufacturing of next-generation Lithium-based all solid-state batteries", Current Opinion in Solid State & Materials Science, 2022, 26 (4), 101003.

M. Dixit, B. Vishnugopi, W. Zaman, P. Kenesei, J. Almer. J. Park, P. Mukherjee, K. Hatzell,

“Polymorphism of Garnet Solid Electrolytes and Its Implications on Grain Level Chemo-Mechanics, Nature Materials, 2022, https://doi.org/10.1038/s41563-022-01333-y.

W. Zaman, R. Matsumoto, M. Thompson, Y. Liu, Y. Bootwala, M. Dixit, S. Nemsak, E. Crumlin, M. Hatzell, P. Cummings, K. Hatzell, “In situ investigation of water on MXene interfaces”, Proceedings of the National Academy of Sciences, 2021, 118 (49), e2108325118.

W. Zaman, N. Hortance, M. Dixit, V. De Andrade, K. Hatzell, “Visualizing percolation and ion transport in hybrid solid electrolytes for Li-metal batteries”, Journal of Materials Chemistry A, 2019, 7, 23914-23921.

M. Dixit, W. Zaman, N. Hortance, S. Vujic, B. Harkey, F. Shen, X. Chen, N. Balke, K. Hatzell, “Nanoscale mapping of extrinsic interfaces in hybrid solid electrolytes”, Joule, 2019, 4(1), 207-221.

Presentations

W. Zaman, K. Hatzell, “Interfacial Evolutions in All Solid-state Batteries”, 1st E&I International Forum, 2021, Tokyo, Japan.

W. Zaman, N. Hortance, M. Dixit, V. De Andrade, K. Hatzell, “Tracking percolation and transport pathways in hybrid solid electrolytes for all solid-state batteries”, 2019, Electrochemical Society Meeting, Atlanta, GA, 2019.

W. Zaman, M. Dixit, M. Hatzell, K. Hatzell, “Water adsorption on ion-intercalated MXene studied with Ambient Pressure XPS”, ICACC, Daytona Beach, FL, 2019

W. Zaman, M. Dixit, F. Shen, K. Hatzell, “Effect of pore Connectivity on Li dendrite propagation within garnet ceramic electrolytes”, ICACC, Daytona Beach, FL, 2019