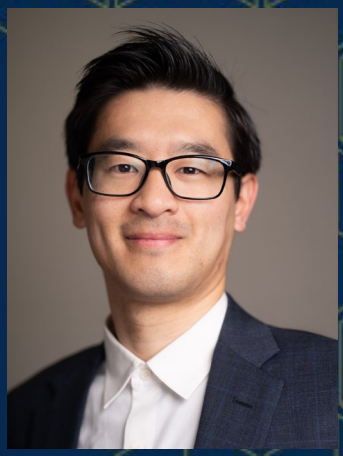
Materials Science and Engineering Department

Winter Seminar Series



Linking Battery Materials Processing and Performance With Non-Destructive Techniques

Prof. Wesley Chang
Department of Mechanical Engineering and Mechanics
Drexel University

January 31, 2024
11AM-12PM | Hill Seminar Room (LeBow 240)

Rechargeable lithium-ion batteries undergo dynamic electrochemical, chemical and structural changes during manufacturing, operation, and failure. Here, I discuss recent developments in usingacoustic waves of ultrasonic frequencies to characterize structural changes in lithium-ion batteries and beyond. Accurate measurements of battery sound speed enable quantification of battery stiffness, which is an intrinsic mechanical property of the battery. Multimodal imaging in both time and frequency domains enables decoupling of different failure modes, including lithium metal deposition, gas formation, and solid-state electrolyte void formation. Currently, we are exploring the use of battery ultrasound to investigate the mechanisms of electrolyte wetting and cell formation of lithium metal batteries.

Prof. Chang is an Assistant Professor in the Department of Mechanical Engineering and Mechanics, and a Faculty Affiliate in the Department of Materials Science and Engineering, at Drexel University. Prof. Chang completed his B.S. (2014) and M.S. (2016) in Chemical Engineering at Stanford, and his Ph.D. (2021) in Mechanical Engineering and Materials Science at Princeton. After completing his doctoral thesis, he continued working on lithium metal batteries as a Postdoc at Columbia University funded by General Motors (2021 – 2022). He spent the following year (2022 – 2023) as the Beckman Postdoctoral Fellow at Caltech, where he worked on lithiummediated electrochemical ammonia synthesis. He is the recipient of the Electrochemical Society F.M. Becket Fellowship and the Arnold O. Beckman Postdoctoral Fellowship. Outside of academia, he has previously worked in the battery industry and management consulting for energy and utilities, and regularly serves as a technical advisor to energy-focused startup companies and investment firms.
https://research.coe.drexel.edu/mem/changlab/about-wes/

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