Department of Materials Science and Engineering Seminar Series 2025

Emerging Battery Chemistries for Mobility Applications

Yulin Gao

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Venue: EA-06-05

Abstract

Battery technology plays an integral role in the electrification of transport systems and renewable energy adoption, which are becoming increasingly important as means to mitigate global climate change and energy crises. This thesis explores emerging chemistries that have the potential to address the issues of energy and power density, safety, longevity and price that current state-of-the-art lithium-ion batteries face. The first work showcases wood-derived carbon as a sustainable anode host for aqueous zinc-ion batteries, with its distinctive porous structure leading to improved longevity and outstanding high power performance. The next two works focus on high energy density lithium sulfur batteries, demonstrating the use of an interfacial modification approach and a mixed-conducting metal organic framework catalyst to improve performance and cycle stability. Overall, these works establish strategies for the improvement of such emerging chemistries, bringing them closer towards commercialisation.

Biography

Yulin received his master's degree in Materials Science and Engineering from Imperial College London. He is currently a Senior Principal Engineer at ST Engineering Land Systems in charge of energy storage, and a PhD candidate in the Department of Materials Science and Engineering under the supervision of Prof. John Wang. His research focuses on new battery chemistries for mobility applications and improving readiness for commercialisation.

Please join us!

HOST: Asst Prof Zhi Di