UC RIVERSIDE UNIVERSITY OF CALIFORNIA | Mechanical Engineering

ME 250 SEMINAR

Dendrites and Pits vs Needles and Canyons: The Quest to Create Uniform Lithium Electro-Deposition and Dissolution

Commercial adoption of lithium metal anodes within battery devices would change the energy storage landscape. Unfortunately, lithium electro-deposition and dissolution occurs in a heterogeneous manner. This nonideal behavior leads to capacity loss, power density depletion, and safety concerns. Shockingly, very little is even known about this heterogeneity and what fundamental parameters can be tuned to control or prevent dendrite growth. Therefore, this talk focuses on our laboratory's quest to create homogeneous lithium electro-deposition and dissolution. This talk includes 3 parts: 1) interpreting the specific voltage and current 'fingerprints' of lithium metal anodes that indicate the presence of 'dendrites' and 'pits', 2) an in-depth look at why non-uniform dissolution/deposition (dendrites and pits) degrade the performance of batteries using lithium metal anodes and 3) results on our newly invented Rapid Oxidation and Reduction (ROAR) treatment for Li metal anodes could help make Li metal anodes a commercial reality.

THURSDAY, OCTOBER 22, 2020 | ZOOM | 11:00 AM - 11:50 AM

Kevin N. Wood

Kevin N. Wood is an assistant professor of mechanical engineering at San Diego State University. He obtained his Ph.D. in Materials Science from the Colorado School of Mines in 2014. Before joining SDSU, Dr. Wood was a researcher at both the National Renewable Energy Laboratory in Golden Colorado and the University of Michigan in Ann Arbor. His laboratory focuses on designing and developing novel characterization methods for operando/in-situ analysis with the goal of clearly understanding reasons for failure, inefficiency and poor performance across a range of systems. Dr. Wood's research interests are in the areas of batteries, fuel cells, electrochemistry, corrosion prevention and medical devices.