DREXEL UNIVERSITY
Materials Science and Engineering
College of Engineering

Department of Materials Science and Engineering,

Candidacy Exam

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Alkali Metal Dendrite Suppression with Interface Engineering and Its Implications in Beyond Li-ion Batteries

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Abstract

Lithium-ion batteries play an important role in our day-to-day lives by revolutionizing the way we work and communicate through portable electronics like cell phones and laptops. The surging demand for more energy-demanding applications such as electric vehicles, grid storage, etc. has led the scientific community to look for ways to further increase the energy density of batteries. One of the options is replacing graphite anode with alkali metal anode, which could increase energy density of batteries by at least 30%. However, challenges like dendritic formation and high reactivity of lithium metal with organic electrolytes thwart the practical lithium metal-based battery application. Interface engineering of the metal anode was one of the approaches developed to mitigate the challenges. In this seminar, I will be presenting the importance to revisit the metal anode system, a detailed mechanism of dendrite formation, and finally, different interface engineering approaches to prevent the dendritic formation.