



Contribution ID: 858

Type: Oral Presentation

Analyzing uncertainties of the instability of the anode /electrolyte interface in solid state batteries

Tuesday, 14 May 2024 11:40 (15 minutes)

Modern batteries must meet stringent performance standards to qualify for use in technological solutions that seek to address current global environmental challenges. Such batteries should exhibit high energy densities, fast charging, and long cycle lives while maintaining a high degree of safety. Solid-state batteries (SSBs) exploit high-capacity anode materials such as Lithium or Sodium metal and are expected to deliver high standards that meet the stringent needs of long-range electric vehicles and large-scale renewable energy storage. However, stability in these devices presents important challenges. The interface anode/electrolyte interface is home to structural imperfections that lead to heterogeneous stripping and plating during cell cycling, significantly reducing cell capacity and compromising cell safety. Although numerous studies have attempted to shed light on the root causes of inhomogeneous electrochemical processes at metals anodes in SSBs, the detailed atomistic processes that lead to ubiquitous dendrites growth in metal anodes are not well elucidated. Critically lacking is the detailed understanding of the thermodynamic driving forces that lead to such degradation at the atomistic level.

We analyze the forward propagation of the imperfection parameters that are susceptible to highly defeat the stability of the anode/electrolyte interface. The imperfections in inputs are parametrized as random variable and Monte Carlo method and sensitivity analysis approaches allow a better understanding of Lithium plating and stripping behaviors.

Acceptance of the Terms & Conditions

[Click here to agree](#)

Student Awards

Country

Saudi Arabia

Porous Media & Biology Focused Abstracts

References

Conference Proceedings

I am not interested in having my paper published in the proceedings

Primary authors: DIA, Ben Mansour (CPG, KFUPM); Dr NDJAWA, Guy Olivier (King Fahd University of Petroleum and Minerals)

Presenter: DIA, Ben Mansour (CPG, KFUPM)

Session Classification: MS19

Track Classification: (MS19) Elastic, electrical, and electrochemical processes and properties in porous media