

## Probing the Electrode-Electrolyte Interface with In-Operando Neutron Scattering

Craig A. Bridges bridgesca@ornl.gov  
Charl Jafta jaftacj@ornl.gov  
Xiaoguang Sun sunx@ornl.gov  
Mariappan Paranthaman paranthamanm@ornl.gov  
William Heller hellerwt@ornl.gov  
Lilin He hel3@ornl.gov  
Grethe Jensen gvjensen@udel.edu  
Gabriel Veith veithgm@ornl.gov  
Shannon Mahurin mahurinsm@ornl.gov  
Sheng Dai dais@ornl.gov

Reactions to form a passivation layer on battery electrode surfaces depend upon the nature of the solvent, salt, temperature, and the presence of impurities such as water. We have developed an approach to investigate the formation of this solid-electrolyte interphase (SEI) layer using in-operando small angle neutron scattering. We recently developed a new in-operando scattering cell which enables us to investigate a wider scattering region quantitatively. We have used this to investigate the impact of different ionic liquid anions on SEI formation through neutron scattering on the EQ-SANS beamline at the SNS. This talk will present the effects of salt anion selection on the interphase formation and microstructure evolution in hard carbon anodes during in-operando cycling.