

**Texas Tech University  
Department of Chemical Engineering  
Seminar Series**



**Jacqueline Maslyn**  
PhD Candidate  
UC Berkeley

### **Block Copolymer Electrolytes for Lithium Metal Batteries**

#### **Abstract**

Energy storage beyond fossil fuels is a key component of a carbon-neutral energy landscape, and batteries have an important role to play. As lithium-ion batteries approach their theoretical specific energy limits, new chemistries, such as lithium metal anodes, must be investigated. However, the irreversible morphology changes during plating and stripping of lithium metal, or the “lithium dendrite problem”, is a significant barrier to the viability of lithium metal as an anode. Mechanically rigid electrolytes have been predicted to suppress the growth of lithium dendrites, but finding an electrolyte with the necessary ion-conducting, mechanical, and other properties to reversibly plate and strip lithium at commercially relevant rates is not trivial. Block copolymers allow us to combine domains of lithium-ion-conducting polymers with domains of mechanically reinforcing polymers to form an electrolyte that performs better than the sum of its parts.

I will discuss lithium ion transport through these microstructured electrolyte membranes, as well as show visualizations of the morphology of electrodeposited lithium acquired through X-ray tomography. These visualizations are used to calculate an experimentally measured current density on planar and non-planar lithium electrodes to inform our understanding of dendrite growth. These results will lead to more intelligent modeling, design, and engineering of solid electrolytes for next-generation lithium metal batteries.

#### **Bio**

Jacqueline Maslyn is a 5th year Ph.D. candidate in Chemical Engineering at UC Berkeley advised by Prof. Nitash Balsara. Her current research centers around connecting lithium ion transport in solid block copolymer electrolytes to their macroscopic lithium plating behavior as observed by synchrotron X-ray tomography. She received her B.S. in Chemical Engineering from Caltech in 2015.

**Friday, March 6<sup>th</sup>  
Livermore 101  
3:00 pm**