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How neutron diffraction helps to understand ionic conduction in solids

Tuesday, December 10, 2019 3:00 PM (30 minutes)

The advent of solid-state batteries has spawned a recent increase in interest in lithium conducting solid electrolytes, especially in the lithium thiophosphates. However, often the underlying principles governing the ionic transport are not known.

In this presentation, we will discuss two of our recent approaches to understand the underlying structures of some ionic conductors and optimizing their ionic conductivities in order to identify an ideal solid electrolyte for SSBs. First, we will show how neutron diffraction studies help to elucidate the diffusion pathways in the solid electrolyte $\text{Li}_{10}\text{GeP}_2\text{S}_{12}$ and how neutron diffraction is used to corroborate the existence of inductive effects. Second, we will show our recent attempts to understand the ionic conduction principles in the lithium argyrodites $\text{Li}_6\text{PS}_5\text{X}$. Using neutron diffraction, the lithium substructure is probed and influenced by structural disorder.

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