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Failure of Batteries with Block Copolymer Electrolytes and Lithium Metal Anodes NITASH BALSARA, Univ of California - Berkeley, DIDIER DEVAUX, Lawrence Berkeley National Laboratory, KATHERINE HARRY, Univ of California - Berkeley, DILWORTH PARKINSON, Lawrence Berkeley National Laboratory, RODGER YUAN, Univ of California - Berkeley, DANIEL HALLINAN, Florida A&M UniversityFlorida State University, ALASTAIR MACDOWELL, Lawrence Berkeley National Laboratory — Solid block copolymer electrolytes are promising candidates for the development of high performance rechargeable batteries comprising a lithium metal anode due to their chemical stability toward lithium and their mechanical resistance to dendrite growth. The application of a solid polystyrene-b-poly(ethylene oxide) (SEO) block copolymer electrolyte in lithium symmetric cells permits to study the formation and growth of lithium dendrites by a non-destructive tool, hard X-ray microtomography. All solid-state batteries comprising a Li metal anode, a SEO electrolyte layer and a composite cathode were assembled and cycled. The cathode contains lithium iron phosphate as active material, SEO electrolyte as binder, and carbon black. Hard X-ray microtomography enables to visualize the microstructural changes at the Li/SEO and SEO/cathode interfaces to get insight on the battery failure mechanisms.

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