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Characterization of PEO-b-P(STFSILi) as a Single-Ion Block Copolymer Electrolyte for Lithium Batteries ADRIANA ROJAS, Univ of California - Berkeley, SEBNEM INCEOGLU, Lawrence Berkeley National Laboratory, NITASH BALSARA, Univ of California - Berkeley — Block copolymers containing a poly(ethylene oxide) (PEO) ion-conducting block and a polystyrene (PS) structural block mixed with lithium bis(trifluoromethanesulfonyl)imide (LiTFSI) salt have been studied in the past as solid electrolytes for lithium batteries. However, transport of these ionic species result in concentration gradients during battery operation, and the energy expended by this process is inefficient. In other words, these electrolyte systems have low cation transference numbers. A single-ion block copolymer electrolyte has been synthesized where the TFSI anion of LiTFSI is covalently bound to the PS backbone. Li can dissociate from the immobilized anion, enabling the conduction of Li ions with a theoretical transference number of unity. AC impedance spectroscopy and small angle X-ray scattering are used to determine charge transport and morphological properties of these PEO-b-P(STFSILi) block copolymers over a range of molecular weights.

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