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Ionic Conductivity of Nanostructured Block Copolymer Electrolytes in the Low Molecular Weight Limit ALEXANDER TERAN, RODGER YUAN, University of California, Berkeley, INNA GUREVITCH, Lawrence Berkeley National Laboratory, NITASH BALSARA, University of California, Berkeley — Nanostructured block copolymer electrolytes containing an ion-conducting block and a modulus-strengthening block are of interest for applications in solid-state lithium metal batteries. Previous work using symmetric polystyrene-block-poly(ethylene oxide) mixed with a lithium salt has demonstrated that the ionic conductivity increases with increasing molecular weight of the poly(ethylene oxide) block in the high molecular weight regime due to an increase in the width of the conducting channel. Our current study extends the previous work to the low molecular weight limit. Small angle X-ray scattering, differential scanning calorimetry, and ac impedance spectroscopy experiments help identify the opposing forces influencing the conductivity in these materials. We also examine the annealing process for these materials, whose ion transport characteristics are well known to be influenced by sample preparation and thermal history. The conductivity appears to be influenced by the conductive channel width as well as the glass transition temperature of the insulating block, which also plays an important role in the annealing process.

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