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Elucidating the effects of blending and salt-doping in A-B/A polymer blends for lithium-ion battery electrolytes MELODY MORRIS, THOMAS H. EPPS, III, Univ of Delaware — Block polymer (BP) electrolytes are promising materials for improving lithium-ion battery performance and stability by decoupling ionic conductivity, modulus, and thermal properties. To potentially increase ion mobility in the conducting domains, A-B block polymers were blended with A homopolymers and doped with a series of lithium salts. The homopolymer distribution in the BP electrolyte was determined via neutron reflectivity, leveraging the contrast between deuterated homopolymer and non-deuterated BP; a series of homopolymer molecular weights was employed to access both wet brush and dry brush regimes. The homopolymer distributions were correlated to the conductivity (measured by AC impedance spectroscopy) and glass transition temperature (determined by differential scanning calorimetry) to elucidate the effects of the blended homopolymer on physical and transport properties. Various lithium salts were used to establish the effect of the counterion on both the homopolymer and lithium ion distribution. These combined efforts allow us to tease out the complex interplay between lithium salt counterions, homopolymers, BPs, and their relative distributions in BP electrolytes.

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