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Salt Doping in PEO Containing Block Copolymers: Counterion and Concentration Effects[1] WEN-SHIUE YOUNG, THOMAS EPPS, University of Delaware — Salt-doped poly(ethylene oxide)-based block copolymers are promising candidates for lithium battery polymer electrolytes, which require high ionic conductivities and adequate mechanical integrity. We studied the phase behavior of poly(styrene-b-ethylene oxide) block copolymers doped with various lithium salts over a range of [EO]:[Li] ratios. Small-angle X-ray scattering, transmission electron microscopy, and differential scanning calorimetry experiments were used to characterize the phase behavior of our samples. Specimens were prepared in an argon atmosphere and rigorously dried to reduce the effects of moisture uptake on phase behavior. We found that we can tune the copolymer microstructure by varying the lithium counterion as well as the salt doping ratio. Using strong segregation theory, we estimated an effective interaction parameter for the salt-doped copolymers, which varies linearly with salt concentration, where the slope is influenced by the nature of the counterion.

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