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Mixed-salts effect on the ionic conductivity of PEO-containing block copolymers WEN-SHIUE YOUNG, ALLEN SCHANTZ, THOMAS EPPS, University of Delaware — Salt-doped poly(ethylene oxide)-based block copolymers have attracted significant interest, as nanoscale ordered structures offer ideal platforms for the design of electrolytes for lithium battery membranes. However, the room temperature conductivities of these polymer electrolyte membranes are too low for many applications due to the crystallization of the PEO or the PEO:salt complex. In this study, a mixed-salt system, $LiClO_4$/LiTFSI, was adopted to decrease the crystallinity of PEO:salt complex and improve the relative conductivity at room temperature. Small-angle X-ray scattering and transmission electron microscopy were used to determine the microstructures of the copolymer electrolytes, while differential scanning calorimetry and AC impedance studies were used to examine the crystallinities of PEO:salt complexes and ionic conductivities of electrolyte membranes. Our results show that the 50%-50% $LiClO_4$/LiTFSI-doped PS-PEO with [EO]:[Li]=6:1 has no crystalline phase above room temperature and exhibits a higher conductivity than corresponding $LiClO_4$-doped and LiTFSI-doped PS-PEOs at low temperatures.

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