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Structure and ionic conductivity of block copolymer electrolytes over a wide salt concentration range MAHATI CHINTAPALLI, THAO LE, UC Berkeley, NAVEEN VENKATESAN, UC Santa Barbara, JACOB THELEN, ADRIANA ROJAS, NITASH BALSARA, UC Berkeley — Block copolymer electrolytes are promising materials for safe, long-lasting lithium batteries because of their favorable mechanical and ion transport properties. The morphology, phase behavior, and ionic conductivity of a block copolymer electrolyte, SEO mixed with LiTFSI was studied over a wide, previously unexplored salt concentration range using small angle X-ray scattering, differential scanning calorimetry and ac impedance spectroscopy, respectively. SEO exhibits a maximum in ionic conductivity at twice the salt concentration that PEO, the homopolymer analog of the ion-containing block, does. This finding is contrary to prior studies that examined a more limited range of salt concentrations. In SEO, the phase behavior of the PEO block and LiTFSI closely resembles the phase behavior of homopolymer PEO and LiTFSI. The grain size of the block copolymer morphology was found to decrease with increasing salt concentration, and the ionic conductivity of SEO correlates with decreasing grain size. Structural effects impact the ionic conductivity-salt concentration relationship in block copolymer electrolytes. SEO: polystyrene-*block*-poly(ethylene oxide); also PS-PEO LiTFSI: lithium bis(trifluoromethanesulfonyl imide

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