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Ionic Conductivity Trends with Molecular Weight in PEO and PEO-Based Solid Polymer Electrolytes ALEXANDER TERAN, SCOTT MULLIN, NISITA WANAKULE, Univeristy of California at Berkeley, ASHOUTOSH PANDAY, Lawrence Berkeley National Laboratory, NITASH BALSARA, University of California at Berkeley — Poly(ethylene oxide) based polymer electrolytes with lithium bis(trifluoromethane)sulfonamide (LiTFSI) salt remain one of the most promising class of solid polymer electrolyte for rechargeable lithium metal batteries. Among those, poly(styrene-*b*-ethyleneoxide) (SEO) doped with LiTFSI has been shown to exhibit acceptable levels of conductivity while possessing a sufficiently high modulus to suppress the growth of dendrites. The purpose of this study is to explore the molecular weight dependence on conductivity for the PEO/LiTFSI system to which previous studies have alluded, but never quantified, and contrast this with the observed molecular weight dependence of SEO reported in previous work. Conductivities were measured using AC impedance spectroscopy over a broad range of temperatures and molecular weights beyond those reported in the literature.

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