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**Morphology, Modulus, and Ionic Conductivity of a Triblock Terpolymer/Ionic Liquid Electrolyte Membrane** LUCAS D. MCINTOSH, TIMOTHY P. LODGE, University of Minnesota — A key challenge in designing solid polymer electrolytes is increasing bulk mechanical properties such as stiffness, without sacrificing ionic conductivity. Previous work has focused on diblock copolymers, where one block is a stiff, glassy insulator and the other is a flexible ion conductor. Disadvantages of these systems include difficulty in achieving network morphologies, which minimize dead-ends for ion transport, and the necessity to operate below both the  $T_g$  of the glassy block and the order-disorder temperature. We have investigated the triblock terpolymer poly[isoprene-*b*-(styrene-*co*-norbornenylethyl styrene)-*b*-ethylene oxide] because it self-assembles into a triply-continuous network structure. SAXS and TEM revealed the bulk morphology of INSO to be disordered but strongly correlated after solvent casting from dichloromethane. This apparent disordered network structure was retained after chemical crosslinking and addition of the ionic liquid 1-ethyl-3-methylimidazolium bis(trifluoromethylsulfonyl)amide. Impedance spectroscopy confirmed the expected conductivity for ions confined to continuous PEO channels. The mechanical response before and after crosslinking showed an increase in the material modulus.

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