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Nanostructured Polymer Electrolytes OMOLOLA ODUSANYA, University of California, Berkeley, MOHIT SINGH, Lawrence Berkeley National Laboratory, NITASH BALSARA, University of California, Berkeley — We present results on work on polystyrene-b-polyethyleneoxide copolymer electrolyte membranes. The volume fraction of the ethylene oxide block is 0.38 and molecular weight of each block is 36 kg/mol and 25 kg/mol respectively for the polystyrene and ethyleneoxide blocks. These electrolytes were made by doping with lithium bis(trifluoromethylsulfonyl)imide salt with the ratio of Li ion / ethylene oxide units ranging from 0.02 to 0.1. The salt/polymer samples were pressed into 1.0mm thick and 4.0 mm ID pellets in an air-free environment and measurements were made from 80^oC to 120^oC. Transmission Electron Microscopy and Small Angle X-ray Scattering experiment results indicate that our samples have a perforated hexagonal morphology. Conductivity results using AC impedance spectroscopy show that we are able to achieve values of ~ 0.0001 S/cm, well within the theoretical upper limit expected for these samples while maintaining a high mechanical integrity of about 0.1GPa as determined from rheology. Achieving the combination of high conductivity with mechanical strength, which we observe in our results, has been a major problem in the battery research community.

Omolola Odusanya
University of California, Berkeley

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