Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Cross-linking of Ordered Pluronic/Ionic Liquid Blends for Solid Polymer Electrolytes DANIEL MIRANDA, CRAIG VERSEK, MARK TUOMINEN, JAMES WATKINS, THOMAS RUSSELL, University of Massachusetts, Amherst — Ion gels were fabricated by cross-linking PPO-PEO-PPO triblock copolymers swollen in a room temperature ionic liquid (IL). The copolymers are modified by esterification to replace the terminal hydroxyl endgroups with methacrylate endgroups. This allows the copolymer/IL blends to be cross-linked by a UV cure, forming a gel. The strong interaction of the IL with the PEO block suppresses PEO crystallization which is necessary for good ion conduction. In addition, the interaction between the IL and PEO is strongly selective for PEO, strengthening microphase separation. Despite this, the low molecular weight copolymers remain disordered in the melt even when blended with the IL. However, high molecular weight copolymers are capable of microphase separating into highly ordered block copolymer morphologies. This difference allows the effect of microphase separation on ion transport to be studied. The effect of block copolymer composition is also studied, by varying the PEO fraction of the copolymer. The resultant gels show high ionic conductivity and solid-like behavior, indicating that these materials may be effective as solid polymer electrolytes.

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Date submitted: 11 Nov 2011 Electronic form version 1.4