Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Transport of Water in Semicrystalline Block Copolymer Membranes DANIEL HALLINAN, ONYEKACHI OPARAJI, Florida State Univ — Poly(styrene)-block-poly(ethylene oxide) (PS-*b*-PEO) is a semicrystalline block copolymer (BCP) with interesting properties. It is mechanically tough, amphiphilic, and has a polar phase. The mechanical toughness is due to the crystallinity of PEO and the high glass transition temperature of PS, as well as the morphological structure of the BCP. The polymer has high CO_2, water, and salt solubility that derive from the polar PEO component. Potential applications include CO_2 separation, water purification, and lithium air batteries. In all of the aforementioned applications, water transport is an important parameter. The presence of water can also affect thermal and mechanical properties. Water transport and thermal and mechanical properties of a lamellar PS-*b*-PEO copolymer have been measured as a function of water activity. Water transport can be affected by the heterogeneous nature of a semicrystalline BCP. Therefore, Fourier transform infrared - attenuated total reflectance (FTIR-ATR) spectroscopy has been employed, because water transport and polymer swelling can be measured simultaneously. The effect of BCP structure on transport has been investigated by comparing water transport in PS-*b*-PEO to a PEO homopolymer. The crystalline content of the PEO and the presence of glassy PS lamellae will be used to explain the transport results.

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Date submitted: 04 Nov 2015 Electronic form version 1.4