Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Proton Conducting Membranes from Fluorinated Poly(Isoprene)-*block*-Sulphonated Poly(Styrene): Structure and Transport Properties.[1] AKINBODE ISAACS-SODEYE, SAMUEL GIDO, Uni. Massachussetts Amherst, TIANZI HUANG, JIMMY MAYS, Univ. Tennessee Knoxville, GIDO GROUP TEAM[2], MAYS GROUP TEAM[3] — Proton Conducting Membranes used in Fuel Cells typically comprise of ionomers, having hydrophobic backbones and hydrophilic acid bearing side chains. Cell Efficiencies are determined by membrane morphology amongst other factors. Our work is aimed at optimizing the morphology and ultimately properties of our relatively cheaper fluorinated Poly(Isoprene)-block-sulphonated Poly(Styrene) block copolymer ionomer membranes, made from post polymerization modified PS-PI. Samples have been synthesized with two levels of sulphonation of polystyrene units (25mol% and 50mol%), and two counterions (Cesium and proton). Analysis of our membranes has been carried out using SAXS/SANS, Gravimetry, Diffusion Cells and Electrochemical Impedance Spectroscopy. SAXS and SANS data have shown a 63% increase in domain spacing upon soaking the 50mole% Acid form with heavy water for 16hours at 60oC. This sample also had a water uptake value of 595% and an order of magnitude less methanol permeability than Nafion^{TM} 112 at ambient temperature.

[1]Acknowledgement: U.S. Army
[2]Structure_Property Characterisation
[3]Synthesis

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Date submitted: 20 Nov 2006 Electronic form version 1.4