Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

In-depth Analysis of Proton Mobilities in Sulfonated Block Copolymers MOON JEONG PARK, SUN JU LEE, SUNG YEON KIM, Department of Chemistry, Division of Advanced Materials Science (WCU), Pohang University of Science and Technology (POSTECH) — Polymer electrolytes are an important component of a wide variety of electrochemical devices such as battery, fuel cell, and chemical sensor owing to their ability to provide a pathway for ion transport between electrodes. Considerable efforts have been devoted to a subject of ion transport mechanisms in polymer electrolytes since the ion mobility in the polymer electrolytes plays a central role in determining the efficiency of the devices. In present study, we carried out an in-depth analysis of proton mobilities in model ionic block copolymers. The system of interests is a series of sulfonated poly(styrene-b-methylbutylene) (PSS-b-PMB) copolymers. Dilute solutions of PSS-b-PMB copolymers in methanol, which indicate highly uniform spherical ionic micelles, were examined yields. In particular, on virtue of the self-assembly nature of block copolymers, the system revealed well-defined ionic PSS domains with different thickness ranging from 3.0 to 7.8 nm. The proton transport in PSS-PMB copolymers was found to be facilitated by the decrease in the ionic domain sizes, which was rationalized by the different proximity of acid groups at the surfaces of ionic domains.

Moon Jeong Park
Dept of Chemistry, Division of Advanced Materials Science (WCU),
Pohang University of Science and Technology (POSTECH)

Date submitted: 28 Nov 2011 Electronic form version 1.4