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Dynamics of Sulfonated Polystyrene Ionomers by Dielectric Relaxation Spectroscopy ALICIA CASTAGNA, The Pennsylvania State University, WENQIN WANG, KAREN WINEY, University of Pennsylvania, JAMES RUNT, The Pennsylvania State University — Broadband dielectric spectroscopy was used to investigate the dynamics of sulfonated polystyrene (SPS) ionomers, in both the acid and neutralized form. This study seeks to elucidate the role of counter ion type (Zn, Na, and Cs), degree of sulfonation (9 and 6%), and ion cluster morphology on the relaxation phenomena of SPS. Degree of neutralization and ion type have been found to significantly impact the breadth and time scale of the segmental relaxation process. High temperature relaxation processes, tentatively proposed to arise from Maxwell-Wagner-Sillars interfacial polarization and a hydrogen bonding relaxation, have also been identified. Bands in the sulfonate stretching region of FTIR spectra reveal information about ion coordination in the local aggregate environment. A combination of scanning transmission electron microscopy imaging and X-ray scattering confirmed the presence of homogeneously distributed, nearly monodisperse spherical ionic aggregates in the polymer matrix.

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