

Abstract Submitted
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Charge transport and glassy dynamics in poly(ethylene oxide) based phosphonium ionomers.¹ CIPRIAN IACOB, HSIN-JUNG YU, Department of Materials Science and Engineering, The Pennsylvania State University, University Park, PA 16802 USA, VICTORIA LUMSARGIS, Department of Chemistry, The Pennsylvania State University, University Park, PA 16802 USA, JING-HAN HELEN WANG, QUAN CHEN, RALPH COLBY, JAMES RUNT, Department of Materials Science and Engineering, The Pennsylvania State University, University Park, PA 16802 USA — We use broadband dielectric spectroscopy to investigate ionic conduction and dielectric response, and X-ray scattering to investigate morphology of poly(ethylene oxide) based phosphonium ionomers with varying ion content. Two models of electrode polarization are used to separate ionic conductivity of the ionomers into number density of conducting ions and their mobility and calculate the dc conductivity from components of electrode polarization. Ion mobility is coupled to polymer segmental motion (α -relaxation), as these are observed to share similar Vogel temperatures. Ionomers with higher ion content impart higher static dielectric constant than those with lower ion content. From temperature activated plots of static dielectric constant, there is more ionic aggregation in ionomers with higher ion content (affecting dc conductivity), consistent with X-ray scattering, which shows much stronger ionic aggregate peaks for the ionomers with higher ion content.

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