Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Influence of Plasticizer on Ion Aggregation in Single-ion Polymer Conductors HANQING ZHAO, DAN KING, PAUL PAINTER, RALPH COLBY, JAMES RUNT, Penn State University — In this study, we add a miscible small molecule plasticizer to a polyester copolymer ionomer. The latter is synthesized from oligomeric polyethylene oxide (molecular weight = 600) separated by the lithium salt of 85 percent sulfonated dimethyl isophthalate units. Materials with different plasticizer contents are systematically investigated by FTIR spectroscopy, X-ray scattering and dielectric spectroscopy. Decreased Tg and a corresponding Increase in cation mobility are expected in these plasticized systems. Ionic conductivity depends on both the number of ions and their mobility, which in turn depends on the relationship between ion states (free ions, ion pairs and ion aggregates). With FTIR, we characterize and quantify the ionic structures in order to investigate how their ratio changes with plasticizer content. X-ray scattering reveals the change in ion aggregation. Further, dielectric spectroscopy is used to study ion conductivity and polymer dynamics of these materials.

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Date submitted: 26 Nov 2011 Electronic form version 1.4