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Conduction, Ion Association and Dynamics in Polyethylene Oxide-based Polyester Ionomers[1] DANIEL FRAGIADAKIS, SHICHEN DOU, RALPH COLBY, JAMES RUNT, Penn State University — A series of single-ion conducting PEO-based polyester copolymers is synthesized, containing different amounts of ionic sulfonate groups covalently attached to the polymer chains. The dynamics of the polymer chains and the mobile lithium cations is investigated using dielectric relaxation spectroscopy. A physical model of electrode polarization is employed to decompose dc conductivity into the contributions of mobile ion concentration and ion mobility, and the physical meaning of these parameters and relation to literature results on similar systems is discussed. The segmental and local dynamics of the polymer chains is studied. We investigate both the modification of the dynamics due to the presence of the ionic groups, as well as the relation of chain motion to ion transport.

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