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**Anion Conduction in PEO-Functionalized Polyphosphazene Ionomers** JOSHUA BARTELS, ANDREW HESS, HARRY ALLCOCK, RALPH COLBY, JAMES RUNT, Penn State University — A series of novel polyphosphazene ionomers with short chain poly(ethylene oxide) (PEO) moieties, bound ammonium cations, and free iodide anions were previously synthesized. Ion dynamics during anion conduction of the ionomers were studied by dielectric relaxation spectroscopy (DRS). These polyphosphazenes provide interesting conductive materials to study because of their low glass transition temperature, high segmental mobility, and high ion content. Analysis of DRS results provides static dielectric constant, conducting ion mobility, and conducting ion content for the materials. An increase in the length of the alkyl group extending from the polymer-bound ammonium cation increases conductivity and conducting ion concentration due to new steric interactions weakening ion-ion associations that restrict segmental mobility. By placing ether oxygens in the short alkyl group a large increase in conductivity and a decrease in the glass transition temperature is observed due to strong associations between the cation and ether oxygen lone pairs.

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