

Abstract Submitted
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Polysiloxane-graft-PEG/Phosphonium Ionomer Morphology and Ion Transport MICHAEL O'REILLY, University of Pennsylvania, SIWEI LIANG, JOSHUA BARTELS, JAMES RUNT, RALPH COLBY, Pennsylvania State University, KAREN WINEY, University of Pennsylvania — A series of random polysiloxane-based copolymer single ion conductors with phosphonium and polyethylene glycol side chains have been synthesized at various compositions and counterions. Morphology is investigated via X-ray scattering, and reveals microphase separation on extremely small length scales. Despite the low molecular weight of the PEG side chain, polysiloxane and PEG assemble into microdomains with covalently bound phosphonium cations at the interface. Exceptionally low glass transition temperatures in these microphase separated ionomers allow for high ionic mobility for both bulky, charge delocalized counterions as well as small, electronegative counterions. Morphology interpretation is complemented by measurement of ion transport properties via dielectric relaxation spectroscopy.

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