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The Effect of Counterions on the Blend Miscibility of Polystyrene with Sulfonated Polystyrene Ionomers NANCY C. ZHOU, Department of Chemical and Biomolecular Engineering, University of Pennsylvania, WESLEY R. BURGHARDT, Department of Chemical and Biological Engineering, Northwestern University, RUSSELL J. COMPOSTO, KAREN I. WINEY, Department of Materials Science and Engineering, University of Pennsylvania — Our previous study probed the miscibility of polystyrene (PS) and sulfonated polystyrene (P(S-SSx)) of differing sulfonation levels (x) and found a narrow window of miscibility. Specifically, the PS:P(S-SSx) blend system becomes completely immiscible at unexpectedly low sulfonation level, x = 2.7 mol%. Here we extend the study of blend miscibility of PS with P(S-SS$_{0.007}$) to include materials neutralized with sodium, barium and zinc cations. These ionomer blends exhibit an upper critical solution temperature (UCST) behavior with an increase in critical temperature as compared to the blend with unneutralized P(S-SS$_{0.007}$). Forward recoil spectrometry (FRES) results indicate that Zn^{++} and Ba^{++} neutralized ionomers are less miscible than Na^{+} when fully neutralized, while the blend miscibility for Na^{+} and Zn^{++} neutralized ionomers behave similarly when partially neutralized. Rheological studies are underway to compliment the blend miscibility studies. These miscibility information gained from PS/P(S-SSx) ionomers blends will serve as a foundation for future ionomer morphology studies.

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