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Structure and Thermodynamics of Block Copolymers Doped with Ionic Liquids J.M. VIRGILI, N.P. BALSARA, R.A. SEGALMAN, University of California, Berkeley — Incorporation of ionic liquids into block copolymers is of interest for applications such as high temperature fuel cell membranes and polymer processing. These applications take advantage of ionic liquids' attractive physiochemical properties, such as low vapor pressure and high thermal stability. We investigate the structure and thermodynamics of poly(styrene-*b*-2-vinylpyridine) (PS-PVP) block copolymers doped with an ionic liquid consisting of imidazole and bis(trifluoromethanesulfonyl)amide (HFTSI). Using small angle X-ray scattering (SAXS), we demonstrate that increased ionic liquid doping leads to swelling of lamellar nanodomains in a symmetric PS-PVP block copolymer. At high ionic liquid loadings, we observe break up of the lamellar domains into hexagonally perforated lamellae. We characterize the effect of ionic liquid loading on the order-disorder transition (ODT) temperature of PS-PVP. We observe depression of the PS-PVP ODT temperature with increasing loading of the ionic liquid.

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