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**Lyotropic Phase Behavior of Concentrated Solutions of Diblock Copolymers in an Ionic Liquid** PETER M. SIMONE, Department of Chemistry, University of Minnesota, Minneapolis, MN, TIMOTHY P. LODGE, Department of Chemistry and Department of Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, MN — Concentrated solutions of three different poly((1,2-butadiene)-*b*-ethylene oxide) (PB-PEO) diblock copolymers in the ionic liquid 1-butyl-3-methylimidazolium hexafluorophosphate [BMIM][PF<sub>6</sub>] were prepared, and the lyotropic phase behavior of the ordered copolymer nanostructures was investigated via small angle x-ray scattering (SAXS). The three copolymers contained PB blocks of the same length (9 kDa), and different length PEO blocks (3, 4, and 6 kDa). At moderately high concentrations (50-80 wt% polymer) all three of the block copolymers adopted a lamellar morphology, while at very high concentrations (80-95 wt% polymer) the two block copolymers with lower PEO weight fractions formed hexagonally packed cylinders. For lower concentrations (<40-50 wt% polymer), a broadening of the SAXS peaks indicated a loss of long-range order in the copolymer nanostructure.

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