Supporting Information for:

Lower Critical Solution Temperature Phase Behavior of Poly(n-butyl methacrylate) in Ionic Liquid Mixtures

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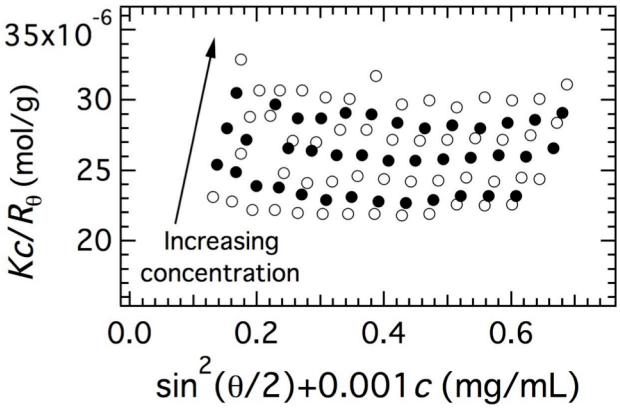

Figure S1. Example Zimm plot for PnBMA-40 in 100% [BMIm][TFSI] at 25 °C, for seven concentrations spaced roughly evenly between 14–58 mg/mL. Data points from each concentration are alternately open and filled in to distinguish concentrations. Scattering is independent of angle.

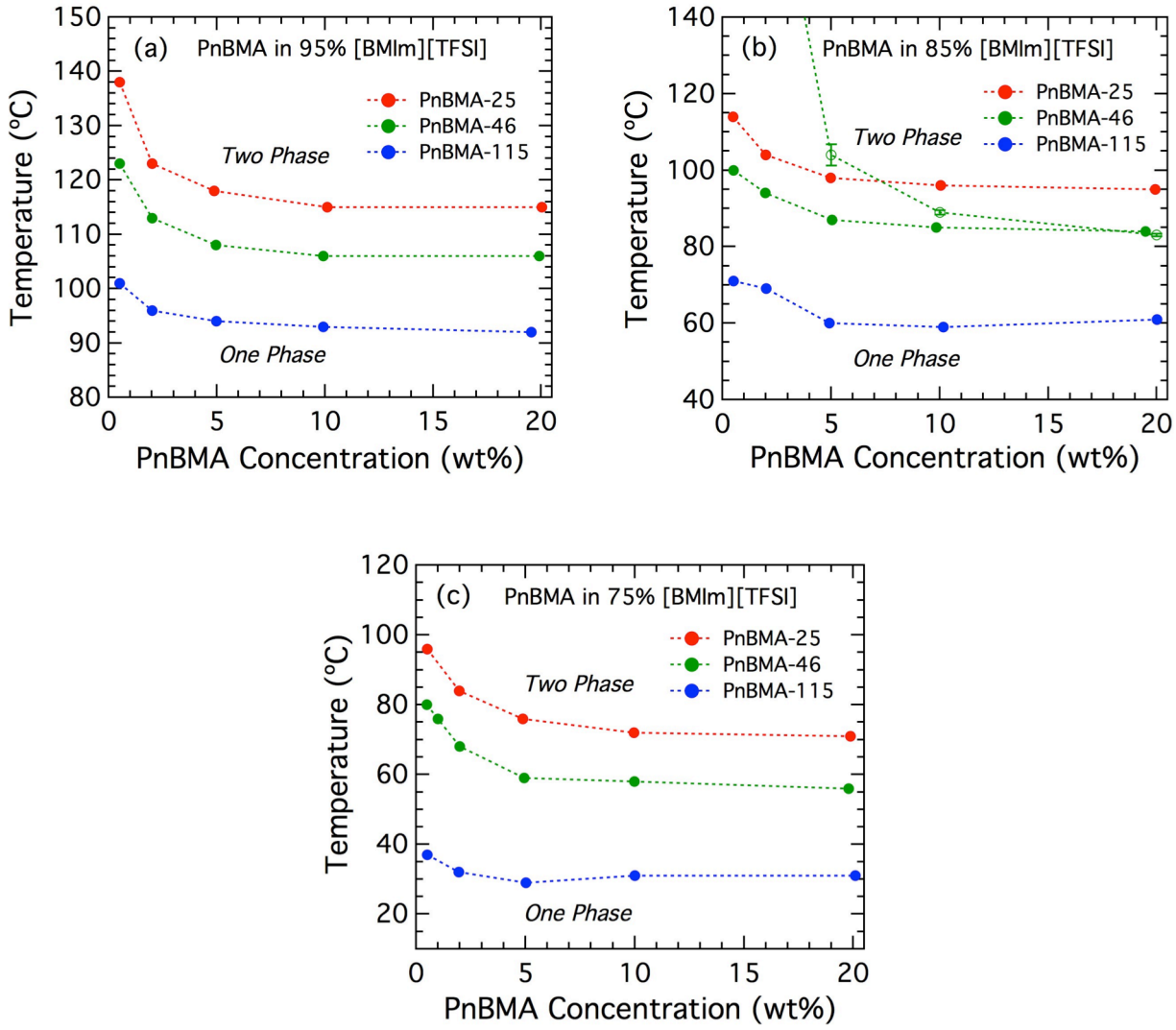

Figure S2. Phase diagrams for PnBMA of various molecular weights in **(a)** 95% [BMIm][TFSI], **(b)** 85% [BMIm][TFSI], and **(c)** 75% [BMIm][TFSI]. The solid symbols represent cloud point temperatures, and the open symbols represent spinodal temperatures. The dashed lines are guides for the eye.

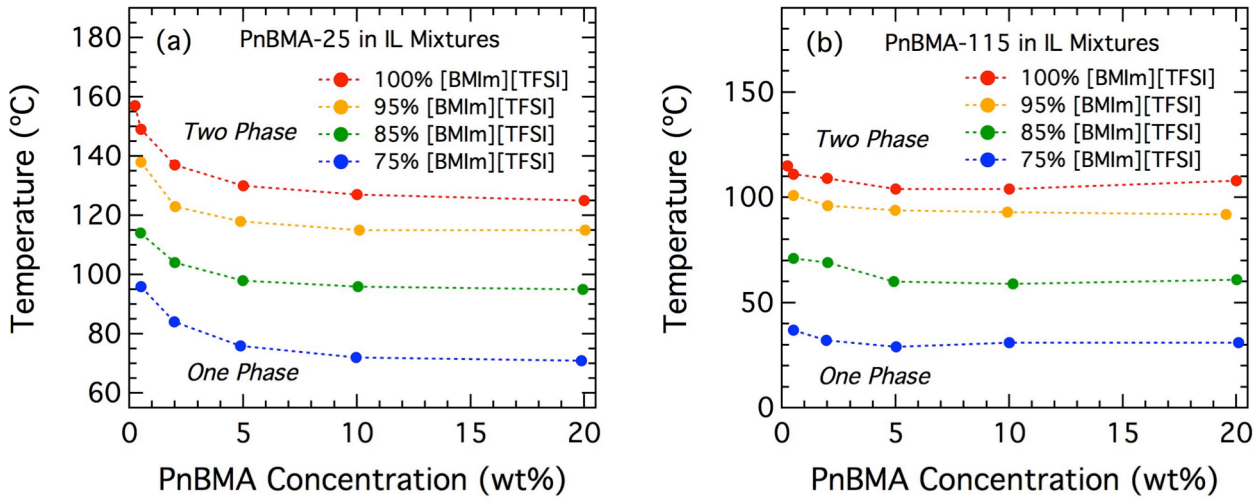

Figure S3. Phase diagrams for **(a)** PnBMA-25 and **(b)** PnBMA-115 in mixtures of [BMIm][TFSI] and [EMIm][TFSI]. The solid symbols represent cloud point temperatures, and the dashed lines are guides for the eye.

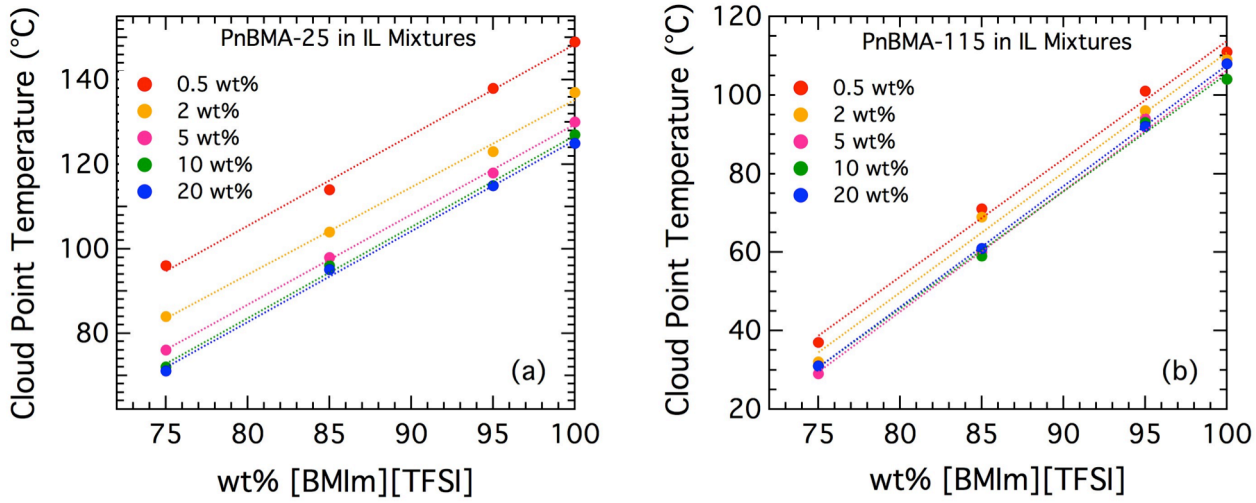

Figure S4. Cloud point temperatures as a function of ionic liquid composition for several concentrations of **(a)** PnBMA-25 and **(b)** PnBMA-115. The dotted lines are linear fits.

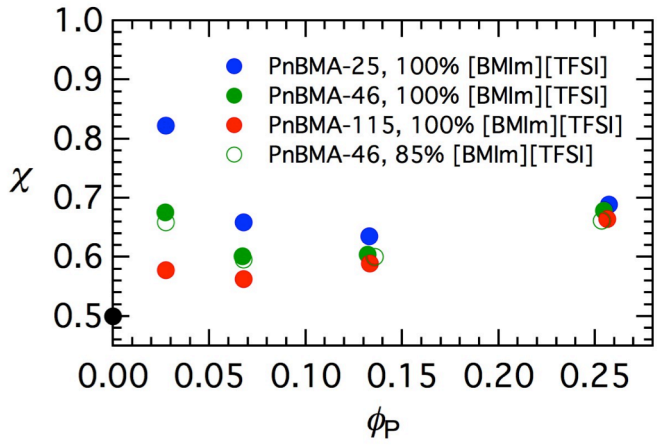

Figure S5. Values of χ determined using eq 3 as a function of PnBMA concentration. Solutions were all measured roughly at their theta temperatures (90 °C for solutions in 100% [BMIm][TFSI] and 40 °C for solutions in 85% [BMIm][TFSI]), so the value of χ in the limit of zero concentration is about 0.5 for all of the samples (black symbol). For concentrations *lower* than c^*, the values of χ are anomalously high, and increase monotonically as the PnBMA molecular weight decreases. The molecular weight dependence can be explained by c^* decreasing with molecular weight. Thus, it is underscored that eq 3 should only used to describe polymer solutions above their critical concentrations.