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Properties of Polyelectrolytes in an Ionic Liquid JOHN HARNER, DAVID HOAGLAND — In solvents such as water, polyelectrolyte properties depend strongly on ionic strength, reflecting the ability of free ions to screen electrostatic interactions. At high ionic strength, polyelectrolytes remaining soluble behave similarly to neutral polymers. What happens to polyelectrolyte properties in an ionic liquid? A series of polyelectrolytes were dissolved in [EMIM][EtSO4] (ethyl-methyl-imidazolium ethylsulfate) and studied by viscometry as well as static and dynamic light scattering. Both scattering approaches show that sodium polystyrene sulfonate is more swollen in aqueous 0.1M NaBr than in [EMIM][EtSO4]. Furthermore, classical polyelectrolyte effects (fast and slow mode, increased reduced viscosity with dilution) are absent in the ionic liquid. Lastly, variably quaternized polyvinylpyridine exhibits no evidence of coil expansion as charge density increases. We conclude macroion charges are fully screened in ionic liquids.

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