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Predicting the Solution Morphology of a Sulfonated Block Copolymer in Binary Solvent Mixtures PHILIP GRIFFIN, GRACE SALMON, JAMIE FORD, KAREN WINEY, University of Pennsylvania — The physicochemical properties of solvent-casted block copolymer films are highly dependent on the microscopic morphology of the solutions from which they are cast. In order to achieve macroscopically homogenous polymer solutions, binary or higher-degree solvent mixtures are often required, which introduces additional complexity in understanding the molecular level interactions that control block copolymer self-assembly in solution. Using small angle x-ray scattering, we have explored the solution morphology in ternary blends of a sulfonated pentablock copolymer in select binary solvent mixtures over a range of solvent compositions and polymer concentrations. We have found that the solution morphologies in these ternary blends depend strongly on the composition of the solvent mixture. Furthermore, we demonstrate that the solvent-composition-dependent morphologies can be accurately predicted by quantifying the polymer/solvent interactions using Hansen solubility parameters. These studies are an important step toward developing a complete and predictive understanding of the solution morphology of complex polymer/solvent mixtures.

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