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Using Self Consistent Field Theory on Polymeric Mixtures KIER VON KONIGSLOW, CHUL PARK, RUSSELL THOMPSON, University of Waterloo — The ability to predict the solubility of a particular solvent in a polymer fluid is essential to the production of polymer foams. For the past 40 years, the primary model employed to this end has been an expansion of Flory-Huggins lattice fluid theory developed by Sanchez and Lacombe (S-L theory). S-L theory, while useful in the uniform limit, is limited to homogeneous systems. Self-Consistent Field Theory (SCFT), which has long been in use in polymer physics, is a mean-field theory capable of modeling the equilibrium behaviour of both homogeneous and inhomogeneous systems. We are investigating whether SCFT, applied to polymer-solvent mixtures, is in agreement with SL-theory in the homogeneous limit. Should this prove successful, we hope to use SCFT to model more general mixtures, including inhomogeneous nanocellular polymer foam systems.

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