

Abstract Submitted
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Influence of Binding Strength on the Structure of Supramolecular Polymer-Surfactant Complexes MANESH GOPINADHAN, Department of Chemical Engineering, Yale University, EVAN BEACH, PAUL ANASTAS, Department of Chemistry, Yale University, CHINEDUM OSUJI, Department of Chemical Engineering, Yale University — Specific interactions between small molecule species and host binding sites on a polymer chain can be used to engineer supramolecular complexes which display liquid crystalline order. In particular, hydrogen bonding interactions represent a flexible platform for the creation of graft-copolymer like structures by the reversible, specific association of small molecules with complementary sites on the polymer backbone. We use hydrogen bonding between the imidazole termination of mesogenic species and the carboxylic acid groups of poly(acrylic acid) to form side-chain liquid crystalline polymers in solution and in the melt state. We investigate their phase behavior and binding using a combination of calorimetry (DSC), x-ray scattering (SAXS), infrared spectroscopy (FTIR) and optical microscopy. We find that there is a critical interaction strength and critical stoichiometry required for the formation of a liquid crystalline mesophase in these systems. The manipulation of the binding equilibria via temperature makes for an interesting class of stimuli responsive materials in solution and in the melt state.

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