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Understanding Thermodynamics and Surface Dynamics of Pom-pom Branched Polystyrene SEWOO YANG, The University of Akron, DAVID T. WU, Colorado School of Mines, ZHANG JIANG, SURESH NARAYANAN, Argonne National Laboratory, MARK D. FOSTER, The University of Akron — We have studied the effect of varying the relative length of the central linear portion of the pom-pom chain on the size of a single chain and on the bulk thermodynamics of blends of the pom-pom branched polystyrenes (PS) with linear analogs. A novel set of pom-pom PS with well-defined molecular architecture was synthesized anionically. The value of the interaction parameter contribution apart from the isotopic labeling for binary blends of linear and branched chains, measured using small angle neutron scattering, increased with a growing disparity in hydrodynamic volumes except for the case of the star polymer. Key aspects of these results are consistent with the predictions of a Gaussian Field Theory. We also investigated surface dynamics of films of pom-pom PS using x-ray photon correlation spectroscopy. Speckle patterns of films of the pom-pom PS of thickness ($\sim$ 100 nm) were measured at temperatures above T_g of the bulk chains and both the scattering of a single pattern analyzed and time correlation performed to obtain correlation functions. The temperature dependence for the q-dependent relaxation time was determined and estimates of the surface tensions of the different polymers derived from the static structure factors.

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