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The Effects of Branching and Deuterium Labeling on Polymer Blend Miscibility[1] JEFFREY DEFELICE, Dartmouth College, JULIA HIGGINS, Imperial College, JANE LIPSON, Dartmouth College — Local structural or chemical changes made to one component of a polymer blend can have a significant impact on miscibility. In this talk we will focus on several blends involving linear and 4-arm star polystyrene (PS), both hydrogenous and deuterated, and poly(vinylmethylether) (PVME). We consider the effect of the structural change on the miscibility of PS/PVME, then turn to the added effect of deuterium labeling, both on this blend and for isotopic PS mixtures. Using our Locally Correlated Lattice (LCL) model we are able to identify trends in the physical properties of pure components, such as: free volume, thermal expansion coefficient, and cohesive energy density. We find that branching and labeling, both independently and cumulatively, affect pure component properties. Our ability to correlate structural and chemical changes with trends in physical properties leads to predictions about the compatibility of pure components, and thus their blend miscibility.

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