

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**Resolving the Puzzle of Two Glass Transitions in Miscible Polymer Blends** JACEK DUDOWICZ, University of Chicago, JACK DOUGLAS, NIST, KARL FREED, University of Chicago — The existence of two glass transitions has widely been observed in experiments for miscible polymer blends. Qualitative explanations postulate models of local concentration enhancements (depletions) of component 1 (2) in the neighborhood of a chain of species 1 (2). The occurrence of two glass transition temperatures is analyzed and explained by using a merger of three statistical mechanical theories: the generalized entropy theory for glass-formation in binary homopolymer blends, the lattice cluster theory for the thermodynamics of binary polymer blends, and Kirkwood-Buff theory for concentration fluctuations in binary mixtures. Specific computations of glass transition temperatures are provided for blends of semi-flexible linear chains with varying stiffness.

Karl Freed  
University of Chicago

Date submitted: 08 Nov 2013

Electronic form version 1.4