Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Mechanical Properties of Sheared Ternary Mixtures RUI TRAVASSO, University of Pittsburgh, GAVIN BUXTON, University of Durham, OLGA KUKSENOK, University of Pittsburgh, KEVIN GOOD, University of Sheffield, ANNA BALAZS, University of Pittsburgh — Using two different simulation techniques, we study structural evolution and mechanical properties in two dimensional ternary mixtures. In particular, we determine the effect of shear on the Young's modulus of the system. We use the mesoscale Lattice Boltzmann technique to simulate the coarsening of ternary mixtures, with and without shear, for different mixture compositions inside the spinodal region. The shear flow strongly affects the system's evolution and leads to domain elongation along the shear direction. These morphologies serve as input to the Lattice Spring Model to study macroscale mechanical properties of the composites. We calculate the Young's modulus as function of the composition of the ternary mixture in both sheared and unsheared cases. We show that the presence of shear significantly enhances (up to 40Young's modulus when the tensile force is applied in the shear direction. In addition, shearing prevents the Young's modulus of the system from decreasing while coarsening.

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Date submitted: 29 Nov 2004 Electronic form version 1.4