Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Internal dynamics of a model concentrated emulsion VINOTHAN MANOHARAN, JOHN C. CROCKER, Department of Chemical and Biomolecular Engineering, University of Pennsylvania — Foams and concentrated emulsions—glassy systems in which the volume fraction ϕ of the bubbles or droplets exceeds the close-packed threshold—display unique relaxation behavior due to intermittent and inhomogeneous structural rearrangements. The rearrangements are caused by diffusion of fluid from small to large droplets, which leads to variations in the local stress. Unfortunately in most of these systems the large refractive index mismatch prevents direct microscopic observation of the internal dynamics of the rearrangements. Furthermore, the concomitantly large density mismatch leads to changes in ϕ over time, thus limiting the timescale of dynamical measurements. We report the results of real-space, microscopic experiments on model concentrated emulsions ($\phi > 0.7$) in which the continuous and dispersed phases are both index- and density-matched. We characterize the internal dynamics by measuring the spatial and temporal correlations between the motion of embedded tracer particles.

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Date submitted: 07 Dec 2004 Electronic form version 1.4