Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Jamming of Confined Colloids in Aqueous and Non-polar Media PRASAD SARANGAPANI, PETER HOFFMANN, Y. ELAINE ZHU, Dept of Chemical and Biomolecular Engineering, University of Notre Dame — We contrast the jamming behavior of confined colloidal particles suspended in either aqueous or non-polar media. The systems we explore are: 1) colloidal poly(methyl methacrylate) (PMMA) suspended in non-polar media and 2) Synthetic poly(*N*-isopropylpolyacrylamide) (PNIPAM) microgel in aqueous media. We examine the effects of volume fraction and film thickness on the structure and rheological properties of both systems. By using a home-built microrheometer integrated with confocal microscopy, we visualize the packing configuration and mobility of confined colloids simultaneously during shear force measurements. For the PNIPAM system, our results show that confinement induces the formation of three-dimensional tenuous PNIPAM aggregates. By applying large shear amplitude, the reorganization of colloidal gel structure is also observed. For the hard-sphere PMMA system, we observe glass-like behavior as gap spacing approaches 10-15 particle layers. Upon applying large shear amplitude, the 'melting' of glassy PMMA thin films is observed.

Prasad Sarangapani

Date submitted: 10 Nov 2006 Electronic form version 1.4