

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Colloid-Polymer Demixing in the Protein Limit: A Simulation Study¹ BEN LU, ALAN R. DENTON, North Dakota State University — Mixtures of hard colloidal particles and nonadsorbing polymers can exhibit entropy-driven demixing into colloid-rich and colloid-poor phases. The classic Asakura-Oosawa-Vrij (AOV) model idealizes the polymers as effective spheres that are mutually noninteracting but impenetrable to the colloids. Here the AOV model is adapted to the protein limit by assuming the polymers to be (1) penetrable to the smaller colloids (or nanoparticles) and (2) polydisperse in size (radius of gyration). Using Gibbs ensemble Monte Carlo simulation, we explore the influence of the colloid-polymer penetration energy profile on the demixing instability and polymer size distribution. Structural and thermodynamic properties (radial distribution functions, osmotic pressures, and demixing phase diagrams) are computed and compared with predictions of density-functional theory.²

¹Supported by National Science Foundation grant DMR-0204020.

²M. Schmidt and M. Fuchs, *J. Chem. Phys.* **117**, 6308 (2002).

Ben Lu
North Dakota State University

Date submitted: 30 Nov 2006

Electronic form version 1.4