Abstract Submitted
for the DFD06 Meeting of
The American Physical Society

Spin Coating of a Colloidal Suspension YONGLI ZHAO, Mechanical Engineering, University of Iowa, JEFFREY MARSHALL, School of Engineering, University of Vermont — A computational model is presented that utilizes a thin-film finite-difference code together with a discrete-element method for colloidal particles to simulate the transport, collision and adhesion of small particles in a liquid film during a spin coating process. Both van der Waals adhesion and capillary forces on the particles at the gas-liquid interface are considered. Spin coating processes are of particular interest for formation of nanoparticle films, where a controlled concentration distribution of nanoparticles in the final film is desired. The computational model is used to examine the effect of particle collisional forces on particle dispersion in the film during spin coating, as well as aggregate formation and particle adhesion to the substrate surface, as functions of the ratio of particle size to film thickness, the adhesion parameter, the particle concentration, and the Rossby number of the spin coating process.

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Date submitted: 31 Jul 2006 Electronic form version 1.4