Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

**An evaporation model of colloidal suspension droplets**[1] SILVANA SARTORI, Mechanical and Aerospace Engineering Department, UCSD (California), AMABLE LIÑÁN, Escuela Técnica Superior de Ingenieros Aeronáuticos, UPM (Madrid, Spain), JUAN C. LASHERAS, Mechanical and Aerospace Engineering Department, UCSD (California) — Colloidal suspensions of polymers in water or other solvents are widely used in the pharmaceutical industry to coat tablets with different agents. These allow controlling the rate at which the drug is delivered, taste or physical appearance. The coating is performed by simultaneously spraying and drying the tablets with the colloidal suspension at moderately high temperatures. The spreading of the coating on the pills surface depends on the droplet Webber and Reynolds numbers, angle of impact, but more importantly on the rheological properties of the drop. We present a model for the evaporation of a colloidal suspension droplet in a hot air environment with temperatures substantially lower than the boiling temperature of the carrier fluid. As the liquid vaporizes from the surface, a compacting front advances into the droplet faster than the liquid surface regresses, forming a shell of a porous medium where the particles reach their maximum packing density. While the surface regresses, the evaporation rate is determined by both the rate at which heat is transported to the droplet surface and the rate at which liquid vapor is diffused away from it. This regime continues until the compacting front reaches the center of the droplet, at which point the evaporation rate is drastically reduced.

[1]Funded by Pfizer Inc.

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Date submitted: 10 Aug 2009 Electronic form version 1.4