Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Studies of Particle Packings in Mixtures of Pharmaceutical Excipients[1] CRAIG BENTHAM, Pfizer, Sandwich, Kent UK, MEENAKSHI DUTT, University of Cambridge, BRUNO HANCOCK, Pfizer, Groton, CT USA, JAMES ELLIOTT, University of Cambridge — Pharmaceutical powder blends used to generate tablets are complex multicomponent mixtures of the drug powder and excipients which facilitate the delivery of the required drug. The individual constituents of these blends can be noncohesive and cohesive powders. We study the geometric and mechanical characteristics of idealized mixtures of excipient particle packings, for a small but representative number of dry noncohesive particles, generated via gravitational compaction followed by uniaxial compaction. We discuss particle packings in 2- and 3- component mixtures of microcrystalline cellulose (MCC) & lactose and MCC, starch & lactose, respectively. We have computed the evolution of the force and stress distributions in monodisperse and polydisperse mixtures comprised of equal parts of each excipient; comparisons are made with results for particles packings of pure blends of MCC and lactose. We also compute the stress-strain relations for these mixtures. In order to obtain insight into details of the particle packings, we calculate the coordination number, packing fraction, radial distribution functions and contact angle distributions for the various mixtures. The numerical experiments have been performed on spheroidal idealizations of the excipient grains using Discrete Element Method simulations (Dutt et al., 2004 to be published).

[1]Special acknowledgements to Pfizer for funding

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Date submitted: 19 Mar 2013 Electronic form version 1.4