

Abstract Submitted  
for the DFD15 Meeting of  
The American Physical Society

**Evaporation of multi-component mixtures and shell formation in spray dried droplets** PEDRO VALENTE, ÍRIS DUARTE, TIAGO PORFIRIO, MÁRCIO TEMTEM, Hovione Farmacência SA — Drug particles where the active pharmaceutical ingredient (APIs) is dispersed in a polymer matrix forming an amorphous solid dispersion (ASD) is a commonly used strategy to increase the solubility and dissolution rate of poorly water soluble APIs. However, the formation and stability of an amorphous solid dispersion depends on the polymer/API combination and process conditions to generate it. The focus of the present work is to further develop a numerical tool to predict the formation of ASDs by spray drying solutions of different polymer/API combinations. Specifically, the evaporation of a multi-component droplet is coupled with a diffusion law within the droplet that minimizes the Gibbs free energy of the polymer/API/solvents system, following the Flory-Huggins model. Prior to the shell formation, the evaporation of the solvents is modelled following the simplified approach proposed by Abramzon & Sirignano (1989) which accounts for the varying relative velocity between the droplet and the drying gas. After shell formation, the diffusion of the solvents across the porous shell starkly modifies the evaporative dynamics.

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Date submitted: 31 Jul 2015

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