

Abstract Submitted  
for the DFD11 Meeting of  
The American Physical Society

**Making micro soccer balls: Spherical macro-clusters of colloidal particles by droplet evaporation on superhydrophobic surfaces** ALVARO MARIN, Physics of Fluids, University of Twente, ARTURO SUSARREY-ARCE, HAN GARDENIERS, Mesoscale Chemical Systems, University of Twente, DETLEF LOHSE, Physics of Fluids, University of Twente — Imagine a clean capillary droplet evaporating in a fakir state on a superhydrophobic micro-structured surface. When the superhydrophobicity is robust enough, the droplet will always remain on top of the micro-structure and the droplet will retain its spherical shape until its “death.” Very often one can observe the remains of the impurities within the droplet left on top of the structure at the end of the process. In this work, instead of using clean liquid droplets, we use dilute colloidal dispersion droplets of monodisperse polymer micro-spheres (sizes from 0.2 to  $2\mu m$ ). The colloidal dispersion droplet retains its spherical shape during its whole life, even when the whole solution has been evaporated. The remaining object consist on a spherical-shaped massive cluster of particles with diameters ranging from a few tens of microns up to several hundreds of microns, depending on the amount of micro-particles present in the solution and on the final packing fraction. We will discuss on the different observed packing fractions, particle arrangements and their governing parameters. Additionally some predictions will also be introduced.

Alvaro Marin  
University of Twente

Date submitted: 27 Jul 2011

Electronic form version 1.4