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A recipe for making micro soccer balls

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Abstract

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 microspheres (sizes from 0.2 to $2\mu m$). The colloidal dispersion droplet retains its spherical shape during its whole life, even when the whole liquid 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. I will discuss on the different observed packing fractions, particle arrangements and their governing parameters. Additionally some predictions will also be introduced.