Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Homogeneous deposition of particles on hydrogels by absorption FRANÇOIS BOULOGNE, Paris Diderot University, FRANÇOIS INGREMEAU, Princeton University, JULIEN DERVAUX, LAURENT LIMAT, Paris Diderot University, HOWARD STONE, Princeton University — A drying drop containing solid particles, such as coffee, leaves a ring stain resulting from the accumulation of the particles near a contact line. In many industrial applications such as printing, coating or biological microtechnologies, these inhomogeneities must be avoided. To suppress the coffee stain effect, different strategies have been developed.In the present work, we propose to substitute the drying by absorption in hydrogels to extract the solvent of a colloidal drop. We study the deposition mechanisms of micrometer-sized particles on the surface of swelling hydrogels. To the best of our knowledge, we show for the first time that the particle deposition on these gels is homogeneous. Using fluorescence microscopy coupled with particle tracking techniques, we record the flow field inside the droplet and analyze the particle deposition mechanism. We rationalize our findings with a theoretical model for the absorption and the particle deposition dynamics that enables the measurement of the diffusion coefficient in the gels.

François Boulogne
Paris Diderot University

Date submitted: 31 Jul 2016 Electronic form version 1.4