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Droplet evaporation on a soluble substrate[1] ALEXANDRA MAILLEUR, CHRISTOPHE PIRAT, JEAN COLOMBANI, Institut Lumière Matière, UMR 5306 Université Lyon 1 - CNRS, Université de Lyon 69622 Villeurbanne, France, CNES COLLABORATION — Stains left by evaporated droplets are ubiquitous in everyday life as well as in industrial processes. Whatever the composition of the evaporating liquid (colloidal suspensions, biological fluids...), the stains are mostly constituted by a deposit at the periphery of the dried drop, similar to a coffee stain (Deegan, 1997). All these studies have been carried with non-reacting solids. In this presentation, we focus on the behavior of a pure-water droplet evaporating on a soluble substrate which is more complex, since three phenomena are strongly interacting: the dissolution of the substrate, the diffusion/convection of the dissolved species into the drop and the evaporation of the liquid. NaCl and KCl single crystals have been chosen for this experimental study as they are fast-dissolving solids. We have observed that the dissolution induces a pinning of the triple line from the beginning of the evaporation, leading to a decrease of the contact angle in time. At the end of the evaporation, a peripheral deposit is always formed, proof of an outward flow inside the drop (coffee-ring effect).

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