

Advancing contact lines in presence of colloids.

E. Rio^{*†}, G. Berteloot^{*}, A. Daerr^{*}, F. Lequeux^{**} and L. Limat^{*}

^{*} Laboratoire Matière et Systèmes Complexes, UMR 7057 of CNRS, Université Paris 7, 10 rue Alice Domont et Léonie Duquet, 75013 Paris, France.

^{**} Laboratoire de Physicochimie des Polymères et des Milieux Dispersés, UMR 7615 of CNRS, ESPCI, 10 rue Vauquelin, 75231 Paris Cedex 05, France.

[†] Laboratoire de Physique des Solides, UMR 8502 of CNRS, Université Paris-Sud, Batiment 510, 91405 Orsay cedex, France.

Specific technics for coating a solid with colloids (flow coating, spin coating...) often involves an advancing moving contact line that leaves behind a film progressively evaporating. We have investigated the interaction between wetting and colloids on a simple experiment: a drop of colloid is pushed at constant speed over a solid. Depending on the drop velocity V and on the colloid concentration c , different behaviours are observed. At low c or high V , the contact line remains stationary. At high c or low V , a stick-slip motion of the contact line is observed. This induces irregularities of the colloid deposition, explored by transmission electron microscopy. We have investigated these phenomena varying drop speed, colloid concentration, evaporation conditions, particle size and proposed a simple physical model of the stick-slip appearance and of its properties.

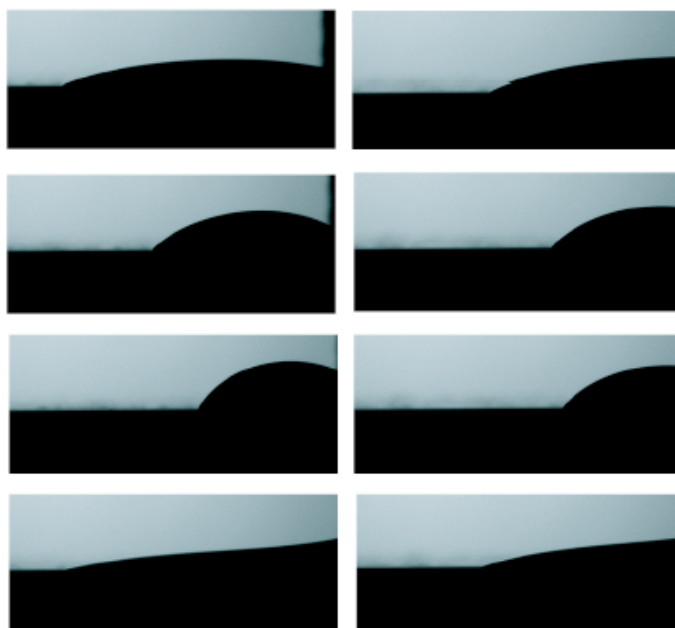


Figure: Stick-slip motion of the interface observed on a drop of colloids pushed on a moving glass-plate while evaporating (in fact, the glass plate is pushed below the drop maintained static).

References:

E. Rio, A. Daerr, F. Lequeux, and L. Limat *Moving Contact Lines of a Colloidal Suspension in the Presence of Drying*. *Langmuir* (2006), **22**, 3186-3191