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Receding Contact Line on a Soft Gel: Dip-Coating Geometry Investigation TADASHI KAJIYA, Max Plank Institute for Polymer Research, PHILIPPE BRUNET, LAURENT ROYON, ADRIAN DAERR, MATHIEU RECEVEUR, LAURENT LIMAT, MSC, UMR 7057 CNRS, Univ. Paris Diderot —
We investigated the behavior of a liquid contact line receding on a soft gel surface (SBS-paraffin). To realize a well-defined geometry with an accurate control of velocity, a dip-coating setup was implemented. As the elastic modulus of the gel is small enough, a significant deformation takes place near the contact-line, which in turn influences the wetting behaviour. Depending on the translation velocity, the contact line exhibits different regimes of motions. Continuous motions are observed at high and low velocities, meanwhile two types of stick-slip motions, periodic and erratic, appear at intermediate velocities. We conjecture that the observed transitions could be explained in terms of the competition between different frequencies, i.e., the frequency f of the strain field variation induced by the contact line motion and the frequency $f_{cross} = 1/\tau_{gel}$ related to the material relaxation. Finally, we propose a qualitative modeling which predicts the existing range of the stick-slip regimes. Therein, we consider the continuous spectrum associated with the surface deformation that ranges from the meniscus size to the elasto-capillary length: $1/l_{cap} < 1/l < 1/l_e$.

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