Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Viscoelastic and poroelastic effects in the wetting dynamics of soft gels by liquids. LAURENT LIMAT, JULIEN DERVAUX, MATTHIEU ROCHE, Laboratoire MSC, Matiere et Systemes Complexes, UMR 7057 of CNRS and Univ Paris Diderot, Paris, France, MENGHUA ZHAO, Labs MSC and SIMM, CNRS, Univ Paris Diderot and ESPCI, Paris, France, TETSUHARU NARITA, FRANCOIS LEQUEUX, Laboratoire SIMM, Science et Ingenierie de la Matiere Molle, UMR 7615 of CNRS and ESPCI, Paris, France — We have developed experiments and modeling of elastowetting dynamics on soft gels. First, wetting is very sensitive to the thickness of the gel, when deposited on a rigid basis. We reconsidered Long et al approach, and extended it to finite depth. This yields a new scaling law, at low thickness, for dynamic contact angle, in very good agreement with experiment but not consistent with recent approachs assuming Neuman triangle to hold even in the dynamics. In a second step, we examined solvent migration in the bulk of the gel, and showed that poroelasticity is an essential ingredient to understand old unsolved issues (hysteresis on elastomers by Extrand and Kumagai), as well as recent puzzling measurements (long life footprints left by drops). Our calculations lead to ridges at the contact lines evolving logarithmically with time, with a very strong infuence on wetting properties of soft materials, and with possible applications to biophysics.

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Date submitted: 28 Jul 2017 Electronic form version 1.4