

Abstract Submitted
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Controlling the pinning of a receding contact line in a flow coating process. JOEL DE CONINCK, University of Mons — Capillary flow coating is a simple and effective technique to print and assemble ordered nanoparticle-based structures over patterned surfaces. The technique makes use of a nanoparticle suspension confined between two plates. Solvent evaporation and sliding movement of the top plate induce an internal flow that leads to the accumulation of nanoparticles at the bottom receding contact line and to their deposition on the bottom plate. Nevertheless, a comprehensive understanding of the process remains elusive, and in this respect the dynamics of wetting at the receding contact line is known to play a critical role. With the help of large-scale molecular dynamics simulations, we investigate the dynamic contact angle at the receding contact line as well as contact-line pinning on substrate heterogeneities. We develop a model to predict the pinning time of a receding contact line as a function of the displacement speed of the top plate on both chemical and topographical heterogeneities. Confirmation of the dynamic nature of contact-line pinning and justification of the contact line settling time allow us to better describe the time evolution of the receding angle in presence of heterogeneities.

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