

Abstract Submitted
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Interaction of a contact line with nanometric steps¹ THIERRY ONDARCUHU, CEMES-CNRS, Toulouse, AGNES PIEDNOIR, LPMCN, University of Lyon 1 — In order to study the interaction of a contact line with nanometric steps, we investigated the dewetting of polystyrene films on terraced surfaces such as alumina or graphite (T. Ondarcuhu, A. Piednoir NanoLett 5 (2005) 1744-1750). We observed that, for steps heights larger than a critical value, the hole is asymmetric: the contact line is blocked by downwards steps whereas it passes through upwards steps with no interaction. This behavior is explained by simple macroscopic considerations based on the equilibrium contact angle. For steps smaller than this critical value, the contact line is insensitive to the steps: the hole grows symmetrically as on a homogeneous surface. Statistics with various polystyrene over a large number of steps on alumina showed that the critical step height is about 3 times the radius of gyration of the polymer. This indicates that a simple “macroscopic” description remains valid down to dimensions of the order of the diameter of one single molecular chain. This result has also important implication for the study of contact angle hysteresis.

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