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Contact angle and interface geometry immediately after rapid initiation of the contact line motion TAKAHIRO ITO, Chubu University, KENJI KATOH, TATSURO WAKIMOTO, Osaka City University — The dynamic contact angle on non-smoothed surface generally shows different variation from that expected by the theory (eg, Cox, J. Fluid Mech., 1985). One plausible mechanism for such deviation can be the local stick-slip motion of the contact line. In this study a model is developed to describe interface deformation induced by the rapid initiation of the contact line motion. The model is based on the balance of the normal stress on the surface under the Stokes approximation. The local surface stress is modified from the expression by Huh et al (J Colloid Int Sci, 1971). The contact line velocity is replaced with 'characteristic velocity' in order to take the lag of the time development of the local velocity relative to the contact line speed. The finite speed of the transfer of the interface deformation is also modeled. These modifications are combined with the conventional Hoffman-Tanner-Voinov relation for the dynamic contact angle and the contact line speed. The results obtained with the developed model shows good agreement with the experimental results.

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