Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Dynamic contact angle at the advancing contact line on an accelerating vertical rod TAKAHIRO ITO, KENTA YOKOI, Nagoya University, KENJI KATOH, TATSURO WAKIMOTO, Osaka City University , YASUFUMI YAMAMOTO, Kansai University, YOSHIYUKI TSUJI, Nagoya University — The motion of the contact line is a critical boundary condition for the prediction of the interface geometry in the wetting or dewetting processes. The estimation of the contact angle is essential to predict the motion of the contact line, since, following the previous theories, the contact angle can be expressed by the parameters including the velocity of the contact line. However, most of the previous theories are based on the assumption of the steady state. In this study, the dynamic contact angle is investigated both experimentally and numerically for a transient state in which a vertical glass rod penetrating the free surface of the test liquid (ethylene glycol) is submerged into the liquid with acceleration motion. The experimentally measured contact angle was smaller than those obtained in the steady state for the corresponding contact line velocity. The deviation is found to increase with the acceleration of the rod. Numerical simulation showed the acceleration term affects only the surface profiles for x / l_s $>10^{-2}$ with x the distance from the rod surface and l_s the Laplace length. This indicates that the inertia effect would not responsible for the deviation of the dynamic contact angle.

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Date submitted: 30 Jul 2015 Electronic form version 1.4