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Spreading Process of a Drop in Electrowetting KWAN HYOUNG
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Hyojadong, Pohang — Spreading process of a conducting drop by electric field is called the electrowetting, which is derived by the electrical force concentrated on the three-phase contact line (TCL). During the spreading process, the shape of the drop changes dynamically, and the transient behavior of the drop becomes more complicated due to the contact line friction and the capillary force acting on TCL. In the present work, the shape mode equations are developed to describe the dynamic evolution of the shape of the drop. The small deformation from spherical shape and the weak viscosity of the liquid are assumed to apply the domain perturbation method. The normal stress balance and the dynamical contact angle model are unified as single boundary condition, which distinguishes our method from others. The electrical, capillary, and contact line friction forces concentrated on the TCL are approximated by using the delta function. The derived shape mode equations show a relatively good agreement with experiments.

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