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Electrowetting-driven spreading and jumping of drops in oil JIWOO HONG, SANG JOON LEE, Department of Mechanical Engineering, Pohang University of Science and Technology (POSTECH) — Electrowetting-based practical applications include digital microfluidics, liquid lenses, and reflective displays. Most of them are performed in water/oil system, because oil medium reduces the contact-angle hysteresis and prevents drop evaporation. In this study, the effects of drop volume, oil viscosity, and applied voltage on the dynamic behaviors of spreading drops, such as transition of spreading pattern and response time, are investigated. Interestingly, jumping phenomena of drops are observed in oil when the applied voltage is turned off after reaching the electrowetted equilibrium radius of drops. A numerical model to predict the transient behavior of jumping drops is formulated based on the phase-field method. The numerical results for the transient deformation of jumping drops show quantitative agreement with the experimental results.

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