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Sliding motion of an oscillating drop driven by ac electrowetting on inclined plane JIWOO HONG, SEUNGJUN LEE, BONCHULL KOO, Department of Mechanical Engineering, POSTECH, YOUNG KWEON SUH, Department of Mechanical Engineering, Dong-A University, KWAN HYOUNG KANG, Department of Mechanical Engineering, POSTECH — When a drop is placed on an inclined solid plane, the drop can stick to or slide along the solid surface due to an opposition between the gravitational force and the pinning force from contact angle hysteresis. Here we demonstrate that sessile drops of sizes below the capillary length can be mobilized through drop oscillation induced by ac electrowetting at low frequency on a low inclined solid plane. The effects of ac frequency on the sliding condition and terminal sliding velocity are investigated. At resonant frequency, drops reach maximum terminal sliding velocities. Varying the applied voltage at a fixed frequency, we find the threshold voltage for a sliding drop and the empirical relationship between the applied voltage and terminal sliding velocity. Using the relationship between drop size and frequency, we can selectively slide drops of a specific size along an inclined plane.

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