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A synthetic jet produced by electrowetting-driven bubble/droplet oscillations[1] SUNG HEE KO, KWAN HYOUNG KANG, Pohang Univ. Sci. and Tech. — Electrowetting is a technique to electrically control the wettability of a droplet and bubble which are submerged in another immiscible fluid. If an ac electric signal is applied in electrowetting, then a time-periodic electrical force is exerted on the three-phase contact line, and the interface of a bubble shows regular periodic motions. We present that a synthetic liquid jet is generated by electrowetting-actuated oscillation of a bubble which is submerged in water. The jet velocity is greatest at particle frequencies. Measurement of oscillation amplitudes by a high-speed camera reveals that those frequencies correspond to the natural frequency of oscillations. The jet velocity which is measured by a PIV technique is shown to be in general proportional to oscillation amplitude. A similar jet flow is also observed for an oil droplet. The jet is conjectured to be produced by the steady-streaming process of the oscillatory viscous boundary layer formed at the bubble surface.

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