

Abstract Submitted
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Generation of Single, Monodisperse Compound Droplets¹ JAMES BLACK, G. PAUL NEITZEL, Georgia Institute of Technology — Compound, nanoliter-scale droplets consisting of an aqueous inner phase surrounded by an oil encapsulant are of interest in a lab-on-a-chip process that levitates the droplets between a pair solid surfaces using thermocapillarity. The application requires a droplet with an oil-layer of sufficient thickness to permit the use of the levitation method, although not so thick as to impede effective combining and mixing of the contents of merged droplets. In an apparatus designed to produce single compound droplets, a piezoelectric diaphragm generates a pressure pulse from a voltage waveform input to eject a droplet. In the method presented, oil is allowed to flow into the water nozzle with the pressure pulse ejecting both fluids as a compound droplet. Experiments were performed to demonstrate how changes in water pressure affect compound droplet water/oil volume ratio.

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