

Abstract Submitted
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Electric field control of a fluid transfer between freely suspended and sessile droplets SUHWAN CHOI, ALEXEI SABELIEV, North Carolina State University — This work explores direct fluid transfer between microdroplets using liquid bridges stabilized by an ac electric field. Experiments are performed with freely and sessile microdroplets of pure glycerol and water with dye. The droplets are placed along electric field directions in a cell with parallel plate electrodes filled with silicone oil. The electrical conductivity of droplets is changed from 1 to 200 $\mu\text{S}/\text{cm}$ by adding dye solutions. Liquid bridges interconnecting two microdroplets can be created using an alternating electric field from 0.3 to 0.7 kV/mm with a frequency of 10.3 kHz. For such bridging fluid can be transferred through the liquid bridge from one droplet to another due to the pressure difference. The process is recorded using a CCD camera. The fluid flowrates in the range from ~ 100 to 10 nL/s are recorded with different electric fields and liquid conductivity. We propose that the manipulation of the liquid bridge will be the method in which small fluid volumes are dispensed.

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