

The droplet dispensing in immiscible fluids by electric charge concentration

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Dispensing tiny droplets with chemical or biological materials is the crucial process in numerous practical applications, such as biological array, drug-delivery, and digital microfluidics. The manipulation with demanded size of droplets is the main issue of dispensing tiny droplets. Furthermore, capability of dispensing charged droplets on the immiscible fluids could bring out more utilities. In this work, we demonstrate the droplet dispensing in immiscible fluids by means of electrical charge concentration (ECC). The droplet is generated by electric force caused by electric induction between the surface of droplet and the immiscible fluid. The relationship between the operating conditions and the parameters, such as gap, applied voltage, and flow rate, is established. Also the size distribution of droplets is analyzed by controlling the aforementioned parameters. In addition, manipulation and particle encapsulation of the charged droplet dispensed by ECC method are demonstrated.