

**Numerical simulation of droplet breakup, splitting and sorting in microfluidic device.** / T. Chekifi, B. Dennai, R. Khelifaoui. / Nano Studies. – 2015. – # 11. – pp. 19-28. – eng.

Droplet in microfluidic is applied to lab-on-a-chip devices for biomedical testing and synthesis, droplets of water-in-oil are produced by flow focusing technique; an obstacle configuration is used to split the droplet. The finite volume numerical method was applied to solve the Navier–Stokes equations in conjunction with the Volume of Fluid (VOF) approach for interface tracking of the commercial code FLUENT. Numerical simulations were carried out for different flow conditions. The effects of some parameters on the droplet motion were investigated to find the optimal conditions for droplet breakup. The numerical results show that the main channel width, the surface tension, the contact angle and the capillary number of continuous phase play an important role on the droplet generation. The computation also demonstrates that an obstacle configuration can be used to split droplet, where the latter are sorted in the end of the main channel. It also demonstrates that the volume of fluid method is an effective way to simulate the generation of droplets in flow focusing configuration. Fig. 5, Ref. 37.

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