

## **The effects of the elastic sidewall on the droplet generation in the microchannel**

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The effects of the elastic deformation of the polydimethylsiloxane (PDMS) are investigated during the droplet generation in a microchannel with the main width of 50 $\mu$ m. From the experimental results, the elastic wall will increase the size of the droplet comparing with those in the rigid microchannel under the same flow rates of the liquids. The positions of the soft wall also have obvious influence for the droplet emerging, including the size of the droplet and the polydispersity of the size, that is, while the elastic thin walls exist on the downstream of the main channel (which is far away from the droplet emerging part), the polydispersity of the droplet sizes will be reduced effectively. In order to get the multiple characteristics of the droplet generation, such as the deformation of the elastic sidewall, the pressure drop through the droplet and the velocity around the droplet, from which the process of elastic walls' effects can be explained, the computational fluid method is involved. The simulation results show the fine consistency with the experiments and the difference of the velocity around the droplet could be the reason of the soft walls' effects to the droplet.

**Keywords:** Elastic wall, Droplet generation, Microchannel