

Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Droplet formation and storage using immiscible two liquids in a micro-channel with transverse micro-ribs JIHOON KIM, DOYOUNG BYUN, YOUNGHUN GWAK, Konkuk University, JONGIN HONG, Imperial College London — Such a transition in the micro-channel with micro-ribs was also studied, which may be significant in designing super-hydrophobic micro-channel. An in-depth study of the wetting transition in micro-channel with micro-ribs is carried out to scrutinize the condition of the wetting transition. And based on the optimized condition for the wetting transition, we investigate the flow characteristics of two immiscible liquids in the micro-channel in order to generate and storage the droplet. When the interface of immiscible liquids moves across the cavity between two neighboring micro-ribs, the oil phase may replace the water in the cavity, isolating the water phase in a corner of the cavity and forming a droplet. The isolated water volume directly affects the droplet size, which is determined by the speed of the interface, the geometry of the micro-ribs, and physical properties of the fluids, such as viscosity and surface tension. For the formation of uniform droplets without any daughter droplets, the synchronization of both contacts on the top of the forward micro-rib and the bottom of the cavity must be considered to find for optimal condition.

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Date submitted: 07 Aug 2009

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