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Wetting Transition Phenomena in Groove-based Superhydrophobic Microchannels with Engineering Parameters JIHOON KIM, DOYOUNG BYUN, Konkuk University, JONGIN HONG, Imperial Collage, HOON CHEOL PARK, Konkuk University — We investigated an effect of groove-based superhydrophobic microchannels on a wetting transition from the Cassie-Baxter state to the Wenzel state. Microscale grooves including vertical and overhang structures, on channel walls have been introduced to control an energy barrier between two states. We fabricated groove-based superhydrophobic microchannels by using PDMS-based multilayer soft lithography. Interestingly, air-solid-liquid contact menisci on different grooves were sustained or collapsed depending on engineering parameters, such as the ratio of pitch to width and the shape of the features. If the groove is deep and wide, the transition time of each meniscus increases. It should also be noted that the flow velocity (or Reynolds number) is of importance to maintain a stable interface. Therefore, we observed wetting transition phenomena in differently grooved microchannels and determined pressure distribution by a micro-particle image velocimetry (μ-PIV) technique. Both the transition time and pattern were related to the flow rate in the microchannel as well as the pressure distribution of each interface.

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