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Liquid spreading along a nanostructured superhydrophilic microlane SEUNGHO KIM, HO-YOUNG KIM, Seoul National University — Deposition of functional liquids on solid surfaces is an important step in electronic circuit printing and fabrication of some biochips. Here we show that a liquid drop that gently touches a nanostructured superhydrophilic microlane surrounded by hydrophobic background spreads along the pre-defined pattern, allowing for a facile venue to liquid patterning. We find that different regimes of spreading dynamics occur depending on the lane width and the driving force at the liquid source. For a hydrophilic lane narrower than a critical width, the hemiwicking flow driven by capillarity but resisted by viscosity follows the Washburn law. For relatively wider lanes, on the other hand, the spreading rate is a sensitive function of the hydrostatic pressure at the liquid source, so that different power laws for spreading distance with time are observed. We rationalize the observed power laws with scaling analysis considering the effects of liquid bulk invading the hydrophilic lane.

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