Electronic Supplementary Material (ESI) for Soft Matter.

Supporting Information

Bubbles nucleating on superhydrophobic micropillar arrays under flow

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Micropillar geometry

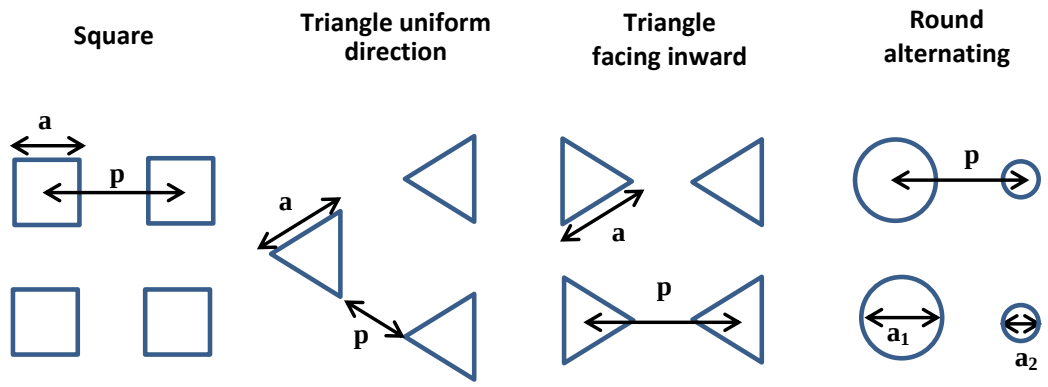

Figure S1. Geometry of micropillars used in this study.

Geometry	Geometry	Arrangement	a (µm)	p (µm)
S1	Square or round	Square array	100 (diameter)	200
	Square or round	Square array	50	200
S3	Square or round	Square array	50	100
S4	Square or round	Square array	25	100
S5	Square or round	Square array	20	40
S6	Square or round	Square array	10	40
S7	Square or round	Square array	10	20
S8	Square or round	Square array	5	20
S9	Triangle	Uniform direction	50 (edge)	100
S10	Triangle	Uniform direction	100	200
S11	Triangle	Facing inward	50 (edge)	100
S12	Triangle	Facing inward	100	200
S13	Alternating round		a_1=50 a_2=25	100
S14	Alternating round		a_1=100 a_2=50	200

Table S1. Dimensions and arrangements of micropillar arrays for each figure.

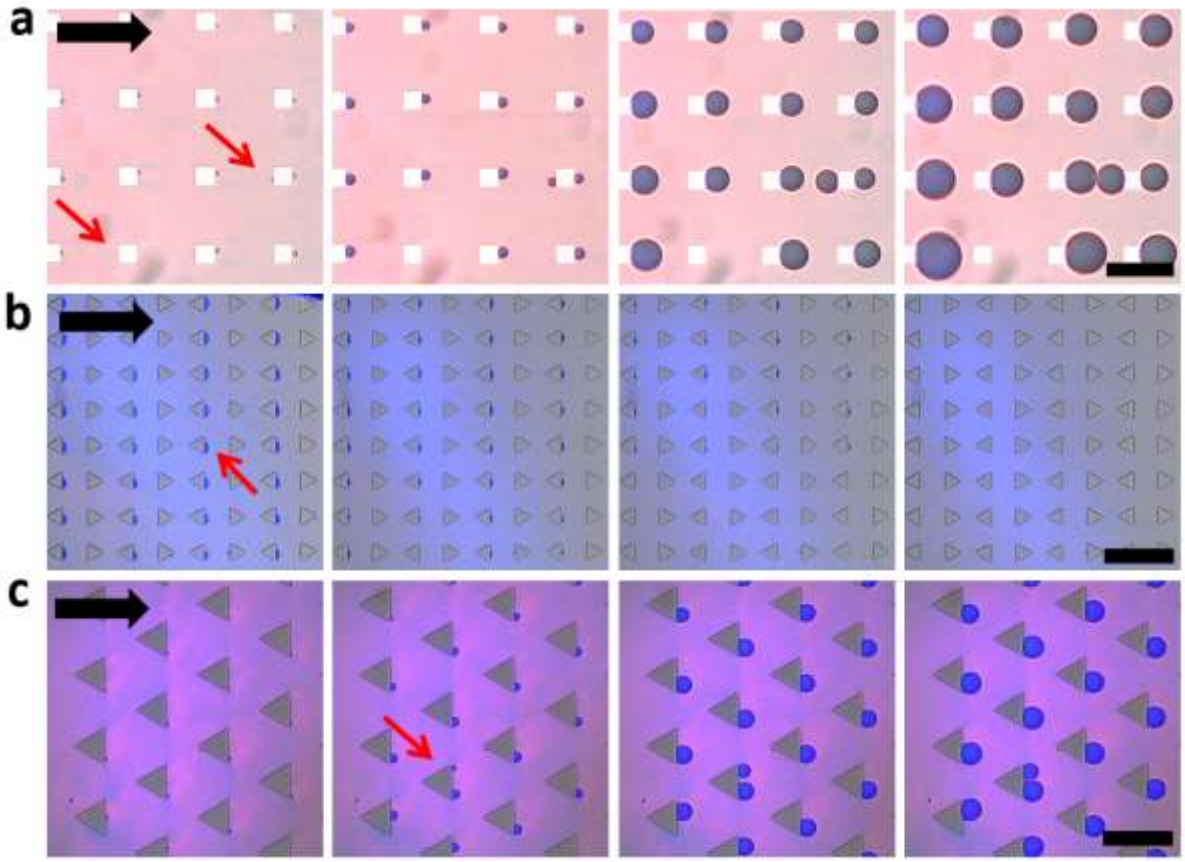

Figure S2. Three scenarios, occasionally observed during bubble nucleation cycles: a) two bubbles nucleating at the same pillar or no nucleation occurring, b) bubbles nucleating, followed by shrinkage until dissolution c) two bubbles nucleating behind the same pillar. Scale bars correspond to 200 µm.

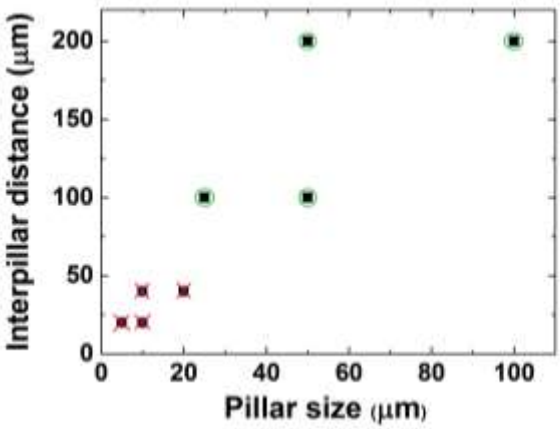

Figure S3. Nucleation depending on micropillar size and arrangement for micropillars (round or square cross sections) in a square arrangement. Nucleation is indicated by green circles, implying uniform nucleation behind at least 90 % of the micropillars examined for flow rate in the range of 3-39 μm/s .

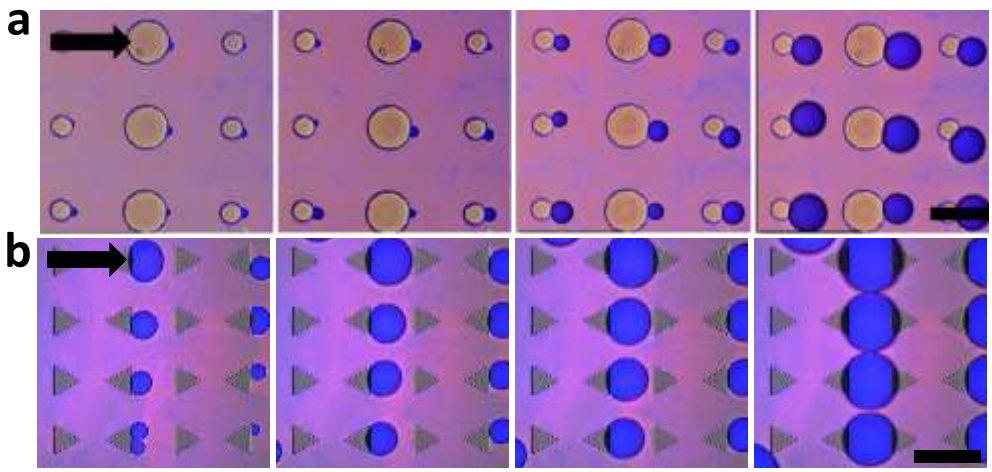

Figure S4. Nucleation of bubbles behind micropillars of (a) alternating size (100 and 50 μm in diameter) and (b) triangular micropillars facing inwards (edge length 100 μm). Scale bar corresponds to: 200 μm. Flow rate corresponds to 18 $\mu m \cdot s^{-1}$

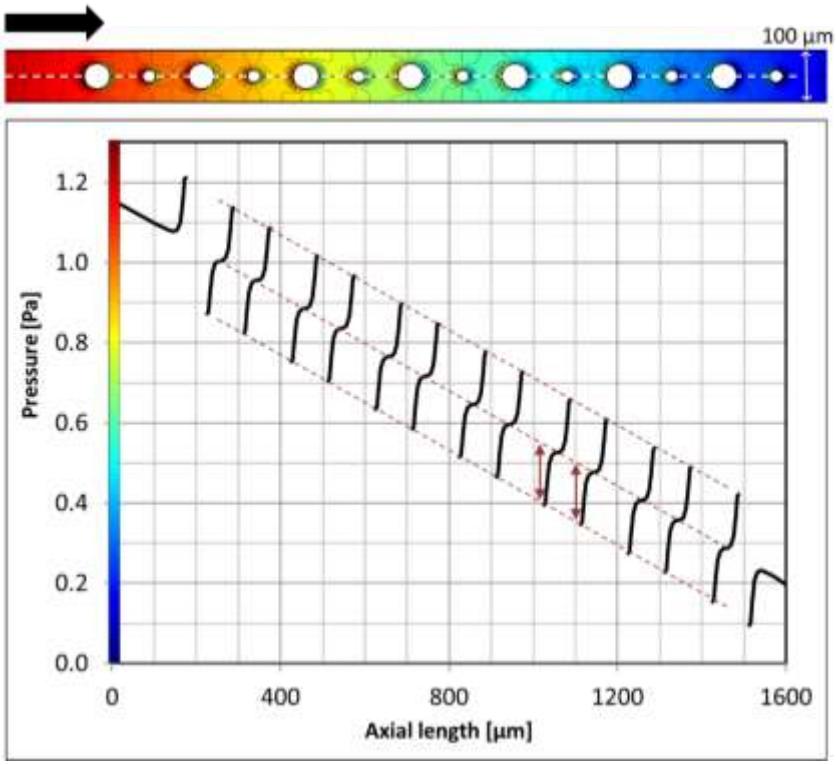

Figure S5. Top: Pressure distribution at the bottom of a microchannel equipped with circular micropillars with alternating diameter (50 µm and 25 µm and interpillar distance of 100 µm) for an average flow velocity of u=0.01 m/s. Color legend is provided in the graph below.
Bottom: Pressure profile along the symmetry-line shown in the graph above (white-dashed). The gaps refer to the positions of the pillars. The double arrows indicate the local pressure drop behind a large (left) and a small (right) pillar. In order to show the overall linear behavior straight dashed lines (dark red) are included as guides to the eye. The vertical distance between adjacent lines is 0.15 Pa.