Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supporting Information

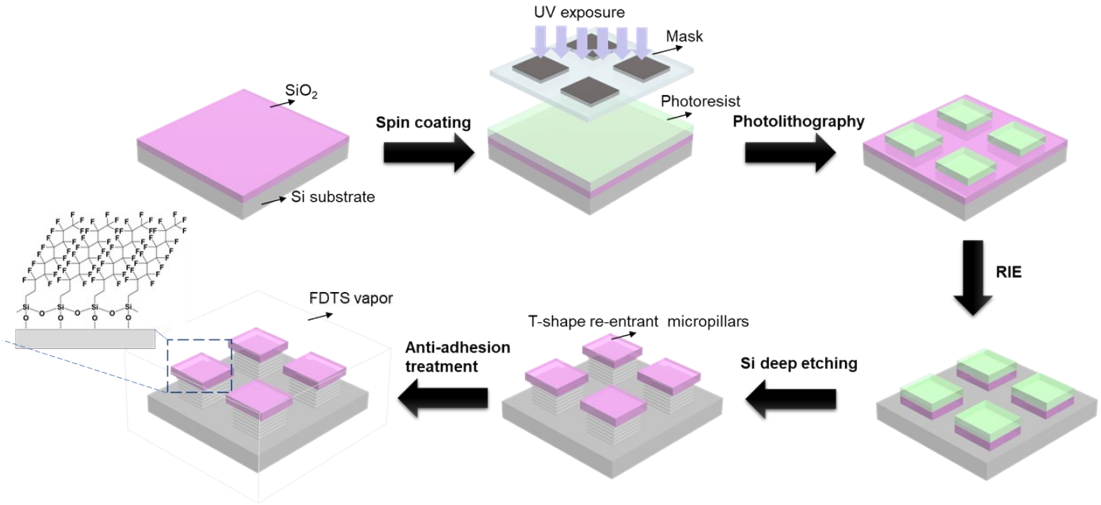

Fig. S1 Illustration of fabrication process. Schematic images of the fabrication process of the T-shape overhang microcolumns featured with two parts of re-entrant curvatures for better stabilization of Cassie state, including the SiO_2 cap segment and the re-entrant Si pillar segment.

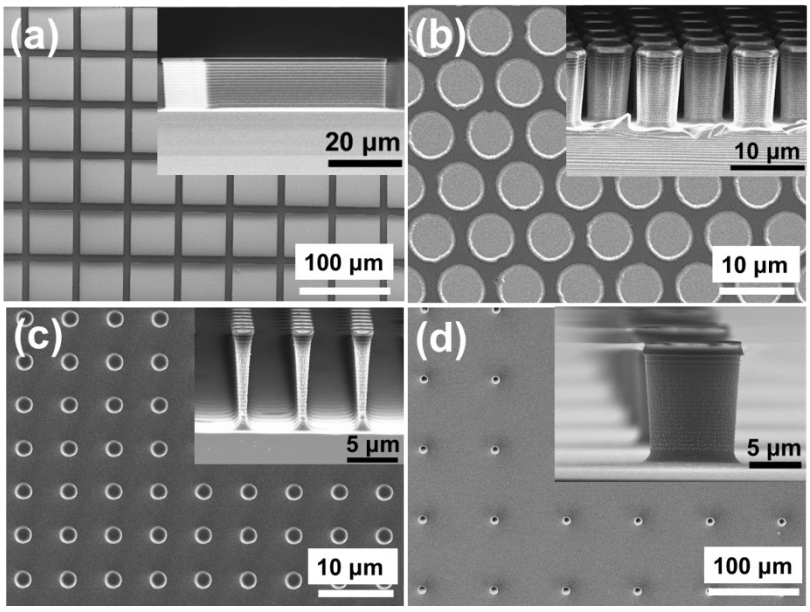

Fig. S2 SEM images of overhang columns with different shapes and areas fractions. (a) Square columns with f = 69.4%, l = 50 μm and d = 10 μm and circular columns with various area fraction of (b) 53.6%, (c) 10.5% and (d) 1.2%. The insets are the corresponding cross-sectional SEM images.

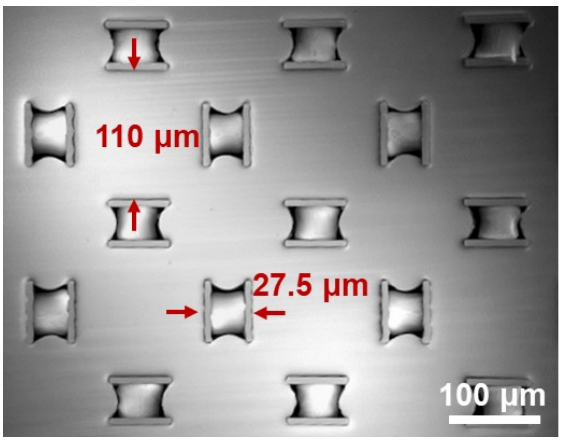

Fig. S3 The microscope image of the water droplets after disturbance on a designed bi-parallel-channel re-entrant surface with different channel width (110 μm and 27.5 μm). The liquid surface with larger intervals (110 μm) collapsed and turned into fully wetted Wenzel state, while the sections with smaller intervals (27.5 μm) providing a larger upward Laplace force still maintain air bubbles trapped in the channels.

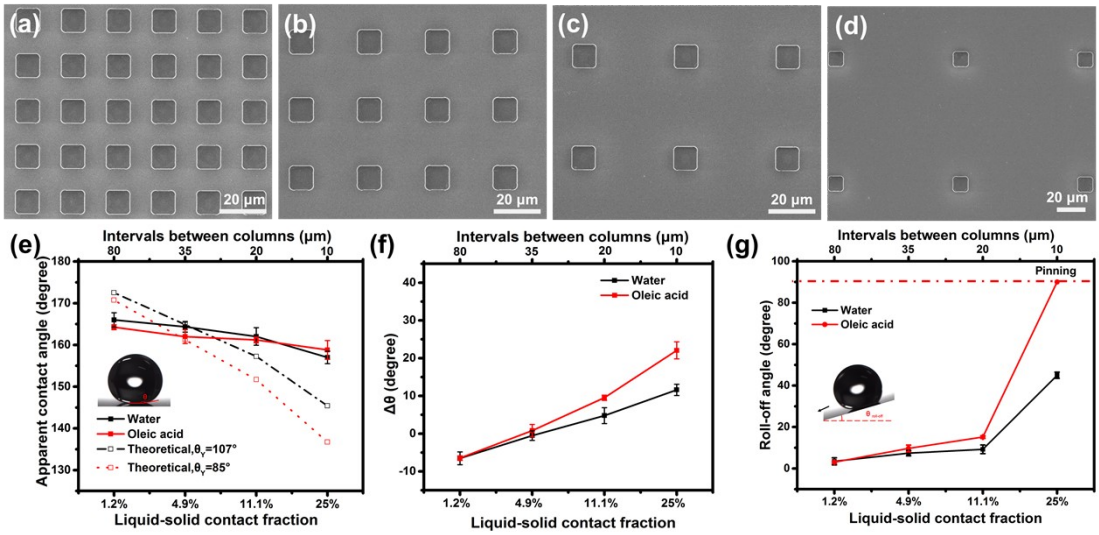

Fig. S4 Effects of channel intervals and area fractions on contact angles and roll-off angles. SEM images of overhang square columns with l = 10 μm and various area fractions of (a) 25% (d = 10 μm), (b) 11.1% (d = 30 μm), (c) 4.9% (d = 45 μm) and (d) 1.2% (d = 80 μm). (e) Actual (θ_{actual}) and Cassie's theoretical (θ_{Cassie}) apparent contact angles, (f) differences between θ_{actual} and θ_{Cassie} and (g) roll-off angles of water and oleic acid droplet on the overhang square columns with l = 10 μm and various intervals of 10 μm (f = 25%), 30 μm (f = 11.1%), 45 μm (f = 4.9%) and 80 μm (f = 11.1%).

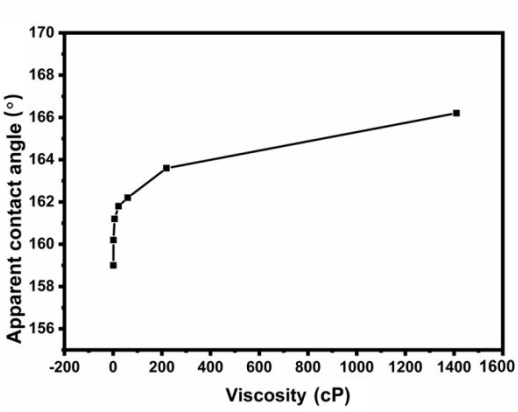

Fig. S5 Effects of viscosity on contact angles. Apparent contact angles of various liquid droplets with similar surface energy and different viscosity on the super-amphiphobic surface with square columns (d = 10 μm and l = 10 μm).