Methods section

Surfaces structures consisting of micropillars were fabricated on silicon substrates. We first make a template of the structure on a photoresist film coated on Si by photolithography. The template in the photoresist was then transferred to the Si underneath by Reactive Ion Etching. We characterized the three-dimensional structure of the textures by scanning electron microscopy (SEM). To make the surface hydrophobic, we silanized them by perfluorooctyl trichlorosilane (C8H4Cl3F13Si) vapor. In brief, we put the substrate into a chamber, in which a small glass beaker containing liquid C8H4Cl3F13Si was placed. Thereafter the chamber was vacuum pumped to about 10^{-1} torr overnight to allow the trichlorosilane group of the C8H4Cl3F13Si molecules to react with the silanol group of the silicon. In this study, substrates were used within two weeks after silanization. Water droplets of 1μL were placed onto the sample surface gently from top at a room condition via a volume controlled syringe. The Cassie configuration is always encountered first in such case and it can be pinned to this state even if the state is metastable [1-2]. Therefore, it can be predicted that water droplets sitting on the micropillared surfaces is in a Cassie state in our experiments. The volume of water droplets was then increased slowly while the droplet profiles were observed and recorded by a high speed camera operating at 400 frames per second. To eliminate the evaporation role on the tiny droplet, the time duration of whole volume increasing process is well controlled within 15 seconds. From the captured images, information of the contact angle and contact radius could be extracted.

1. J. Bico, C. Marzolin and D. Quere, *Europhys. Lett.* 1999, **47**, 220-226.

2. N. A. Patankar, *Langmuir.* 2003, **19**, 1249-1253.