

Supplementary Information

Supporting Information is included:

Experimental Section,

Supplementary Figure Legends (Fig. S1-S2).

Experimental Section

Preparation of the green bristlegrass bristle:

The green bristlegrass sample was picked in the Beihang University campus. We washed it in deionized water, and then dried in room temperature for follow study.

Characterization of the microstructure of bristle:

The structure of the bristle was observed by scanning electron microscope (SEM, Quanta FEG 250, FEI, America) at 10 kV with gold plating.

Water Collection and Observation:

In order to clearly observe the behaviors of water droplets, the bristle placed on a holder was put in a chamber of sample. Fog generated by a YC-E350 ultrasonic humidifier (Beijing YADU Science and Technology Co., Ltd., China) was introduced into the sample chamber. The behaviors of water droplets were recorded by the optical contact angle meter system (OCA40 Micro, Dataphysics Instruments GmbH, Germany) with time scale. Time zero was chosen to be the frame in which gathered droplets began to visually appear.

Figure S1

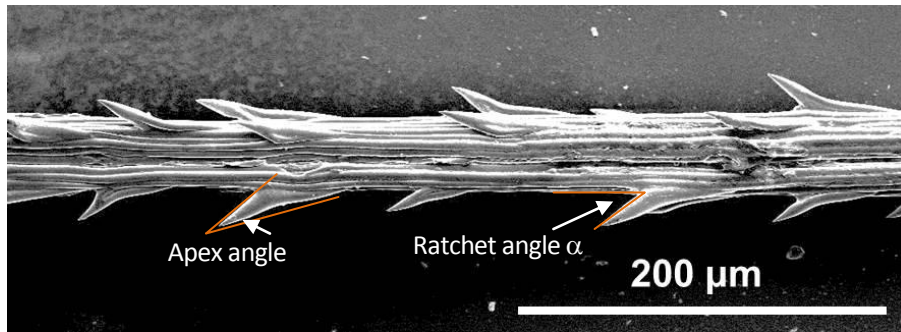


Figure S1 SEM images of the green bristlegrass with aligned micro-grooves and oriented barbs on it. The barbs grow orientedly towards the top in a certain degree to base, similar to ratchet with $\alpha = \sim 42^\circ - 44^\circ$. The barb also has a conical structure (apex angle $23^\circ - 26^\circ$), and the length is $\sim 23 - 31 \mu\text{m}$, while the bottom length connected with green bristlegrass bristle is $\sim 20 - 50 \mu\text{m}$.

Figure S2

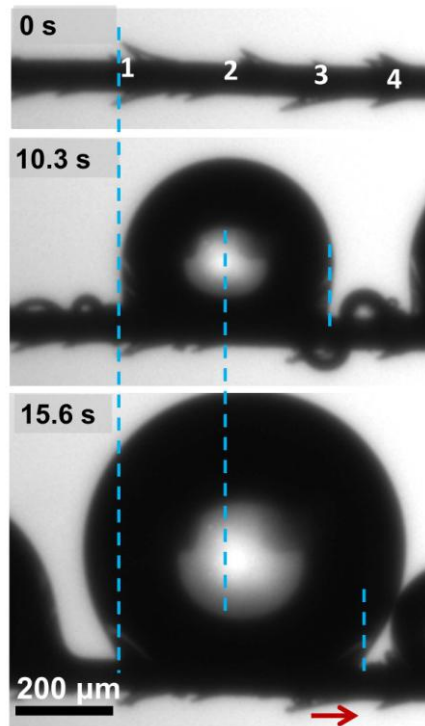


Figure S2. Droplet grows on the bristle. We can see with the droplet growing bigger in 15.6 s, while the left side of the drop stands still, the right side steps over the barb 1,2,3 and near to barb 4. The droplet presents an asymmetric growing state (see vertical dash lines), which realizes droplet coalescence directionally from top to the bottom (see arrow).