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Femtosecond laser scribed superhydrophilic/superhydrophobic self-splitting pattern for one droplet multidetection

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This file contains Supplementary Experimental Section, Figures S1-S14.

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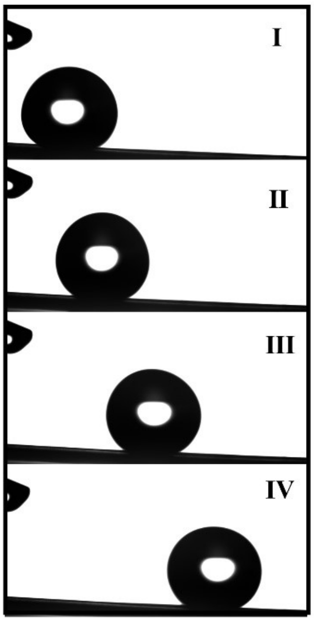

Fig. S1. Droplet rolling process. A small rolling-off angle of ~3 ° of SHB surface.

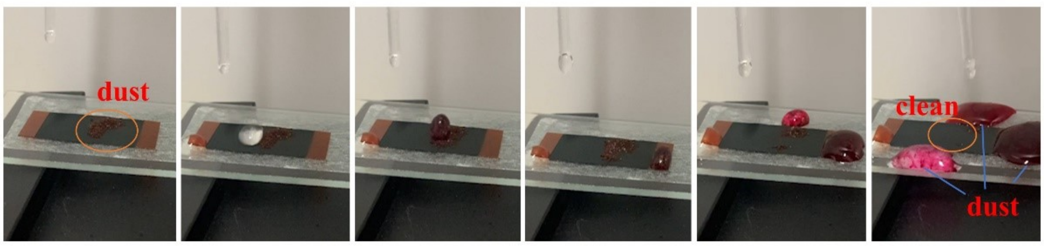

Fig. S2. Self-cleaning ability. The dust on the SHB surface can be easily removed by liquid drops on a slope, showing good self-cleaning ability.

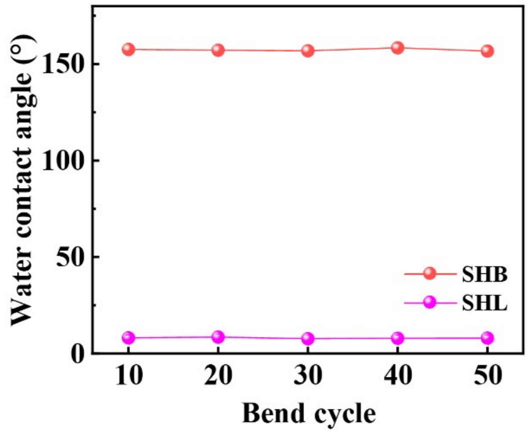

Fig. S3. Bend cycle test. The SHB surface and the SHL surface can hold superwettability when 50 band cycles.

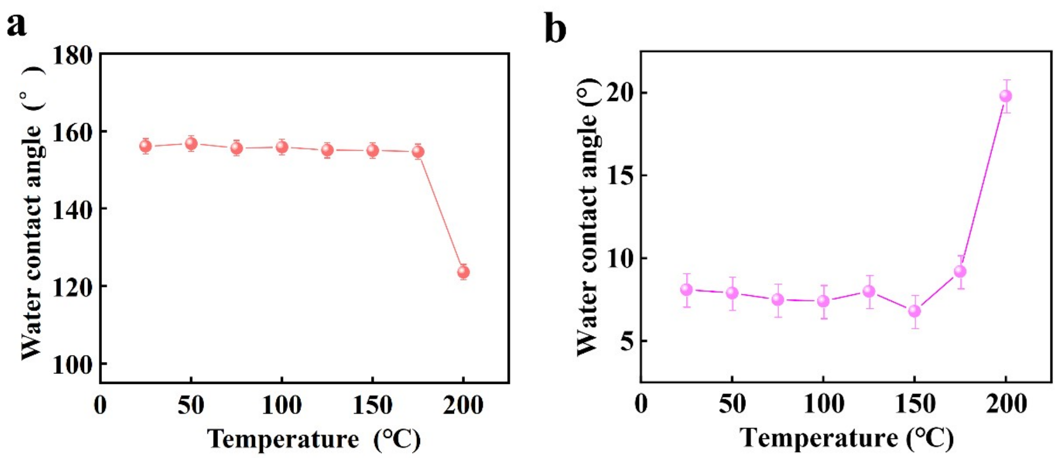

Fig. S4. Temperature stability test. The SHB surface has stable superhydrophobic property before 180 °, and the hydrophobicity decreases rapidly after 180 °; The critical temperature for the stability of the same SHL surface wettability is 180 °.

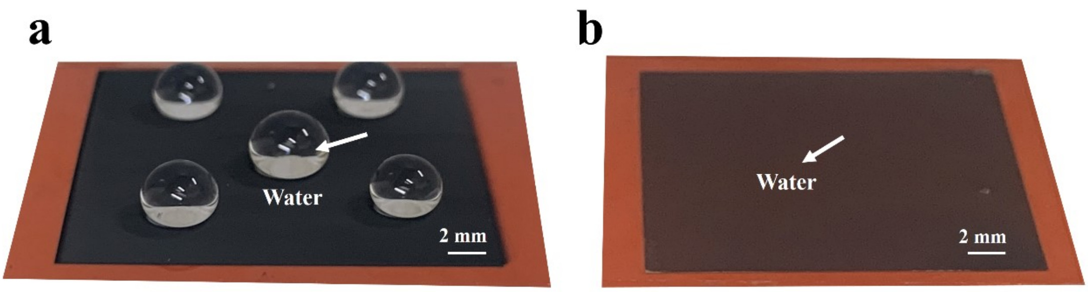

Fig. S5. Homogeneity wettability of SHB surface and SHL surface. Drops at five locations on the 25x25 mm large-area SHB surface show the same contact angle; SHL surface droplets spread rapidly and wet the entire surface, indicating the homogeneity of the laser machined surface.

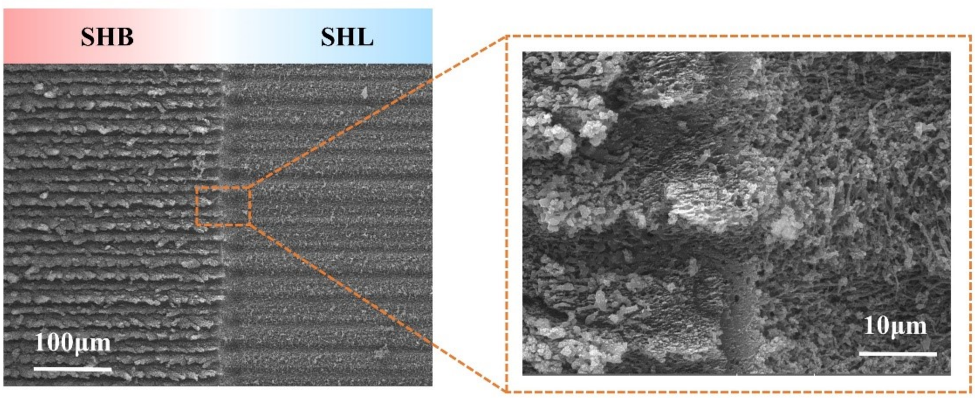

Fig. S6. The SEM image of interface surface. In order to observe and compare the rough structure of superhydrophobic surface and superhydrophilic surface more clearly, the picture is the SEM image taken at the interface.

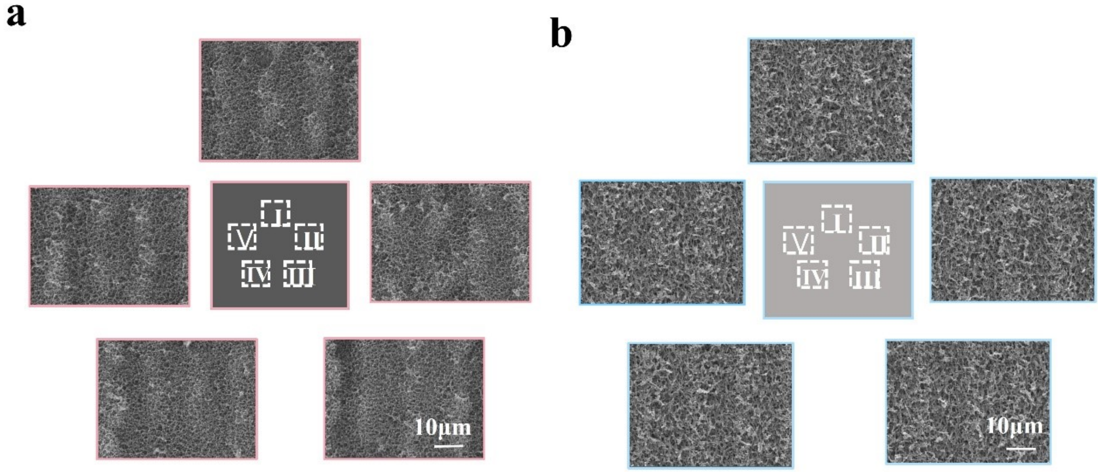

Fig. S7. The SEM imagine of SHB surface and SHL surface. SEM characterization was carried out at five different positions on the SHB surface and SHL surface respectively, a and b can observe the same rough structure at different positions on the two surfaces, indicating the homogeneity of the micro-nano structure.

Element	Atomic%
C K	64.15
N K	11.11
O K	24.74

Fig. S8. The chemical composition of original PI film.

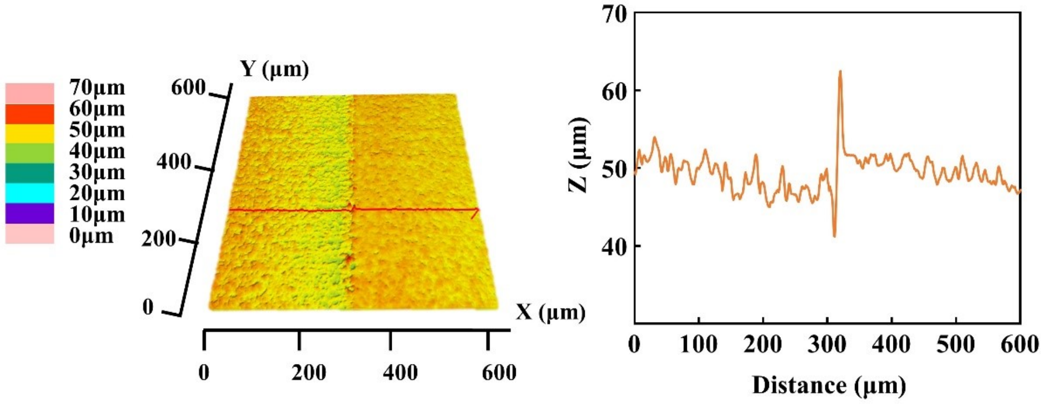

Fig. S9. LCM characterization. Through LCM characterization test on the interface of superhydrophobic surface and superhydrophilic surface, obvious roughness contrast can be seen.

Fig. S10. Composite pattern with different parameters. To test the influencing factors of droplet self-splits, we prepared different SHL radius patterns, in which the stripe spacing of each pattern is from 0.1mm to 1.0 mm.

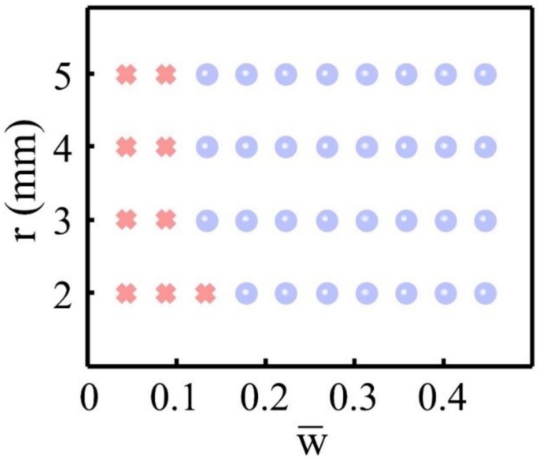

Fig. S11. The result of the droplet self-splitting. A droplet with a volume of 6 μL drops at a height of 6 cm.

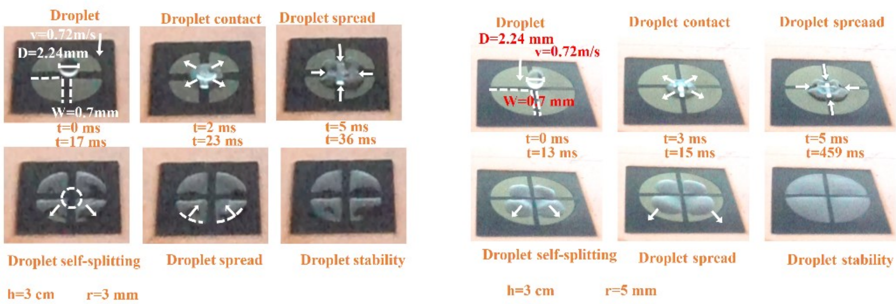

Fig. S12. Droplet self-splitting process. The droplet splits itself when the SHL pattern radius is 3 mm and 5 mm respectively. The droplet splits rapidly on the 3 mm radius pattern, and spreads on the surface when it is 5 mm radius pattern, which is affected by the hydrophilic area. To better compare the self-splitting effect, the matching of the droplet diameter and the SHL pattern size is equally important.

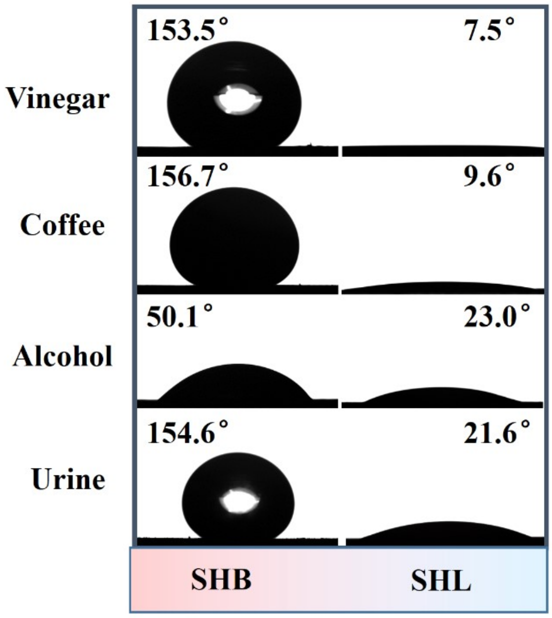

Fig. S13. Contact angle photos of various droplets. Test the contact angle between SHB surface and SHL surface for different kinds of droplet splitting

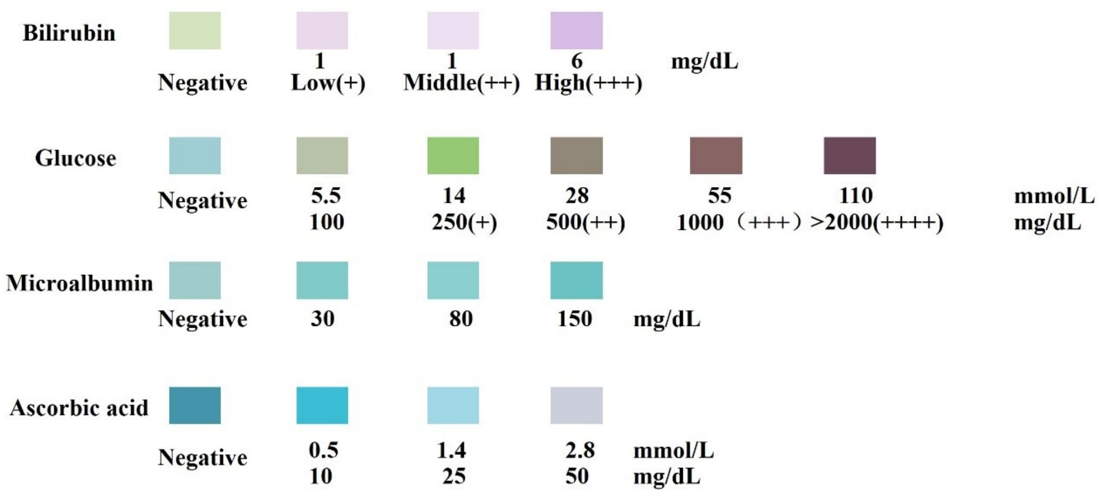

Fig. S14. The standard coloristic card.