Supporting Information

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Method 1: Preparation of hierarchical flower-like TiO_2 nanoparticles

The hierarchical flower-like TiO2 nanoparticles were synthesized based on a typical template-free solvothermal method. In the process, anhydrous ethanol (45 ml) and glycerol (15 ml) were mixed in a volume ratio of 3:1 by magnetic stirring at room temperature. And then, TBT (3 ml) were added into drop by drop and stirring for 10 min. The mixture was transferred to stainless-steel autoclaves lined with Teflon, which were sealed and maintained at 180 ℃ for 24 hours. After cooling to room temperature naturally, white sediments were collected through centrifuged at 7000 rpm for 5 min and washed with anhydrous ethanol for 4 times. After Completely drying at 60 ℃, the products were calcined in the air at 450 ℃ for 2 hours. The hierarchical flower-like TiO2 nanoparticles were prepared for next work.

Method 2: Mechanical stability experiments

For sandpaper abrasion test, the samples were moved for 10 cm along the ruler with an external force under a load of 200g weight on a sandpaper (600 mesh) and then returned back. This was one abrasion cycle. The contact angles (CAs) and roll-off angles (RAs) of water and n-octane, quality loss of samples was measured every 20 abrasion cycles. To maintain roughness, the sandpaper was replaced by a new one every 50 abrasion cycles.

For scratching test, the surfaces of samples, which were held in a hand, were scratched repeatedly with a sharp knife. For water-resistant flushing test, the flow water at 0.2 MPa impacted on the surfaces of the sample from a vertical distance of 30 cm for 15 min.

Method 3: Chemical stability experiments

The 98% H_2SO_4 was diluted to 0.1 $mol{\cdot}L^{-1}$ with deionized water. And 40 g NaOH were added in deionized water at a constant volume of 100 ml. Subsequently, the glass slides with superamphiphobic coating were completely immersed into H2SO4 solution (pH=1), NaOH solution(pH=14), saturated NaCl solution(pH=7) and boiling water for 3 h. The variations of CAs and RAs of water and n-octane were measured.

Liquids	Surface energy (mN/m) (20 ℃)	CAs on the surface of sample (°)
Water	72.1	162 ± 1
Glycerol	63.6	158 ± 2
Rapeseed oil	35.7	156 ± 1
1,2-Dichloroethane	35.43	155 ± 1
Crude oil	35	155 ± 3
Toluene	28.4	154 ± 2
n-Hexadecane	25.7	153 ± 1
n-Octane	21.6	151 ± 1

Table S1. The surface energy of various liquids and contact angles (CAs) on the surface of sample.

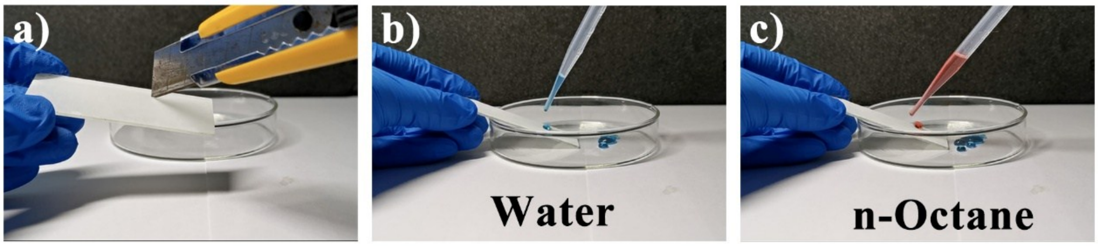

Fig S1. a) The scratching test of superamphiphobic coating. b) and c) After scratching test, the liquid repellency with water and n-octane.

Fig S2. The water-resistant flushing test of superamphiphobic coating.

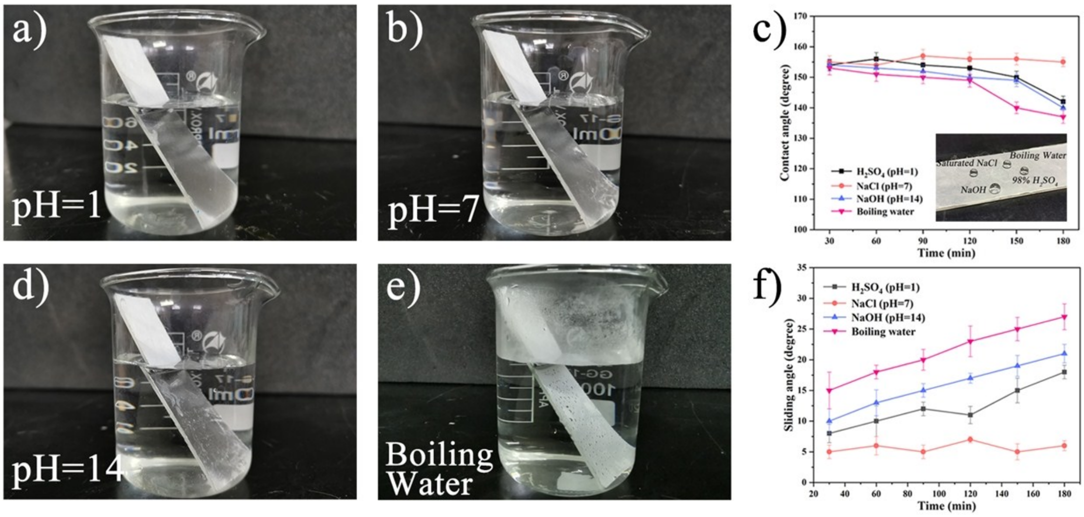

Fig S3. a), b), d) and e) show the images of glass shields with superamphiphobic coating submersion in different environment including pH=1 (a), pH=7 (b), pH=14 (d) and boiling water (e) after 3 hours. c) and f) show the dependency of n-octane contact angle and sliding angle (degree) of submersion time (min), respectively.

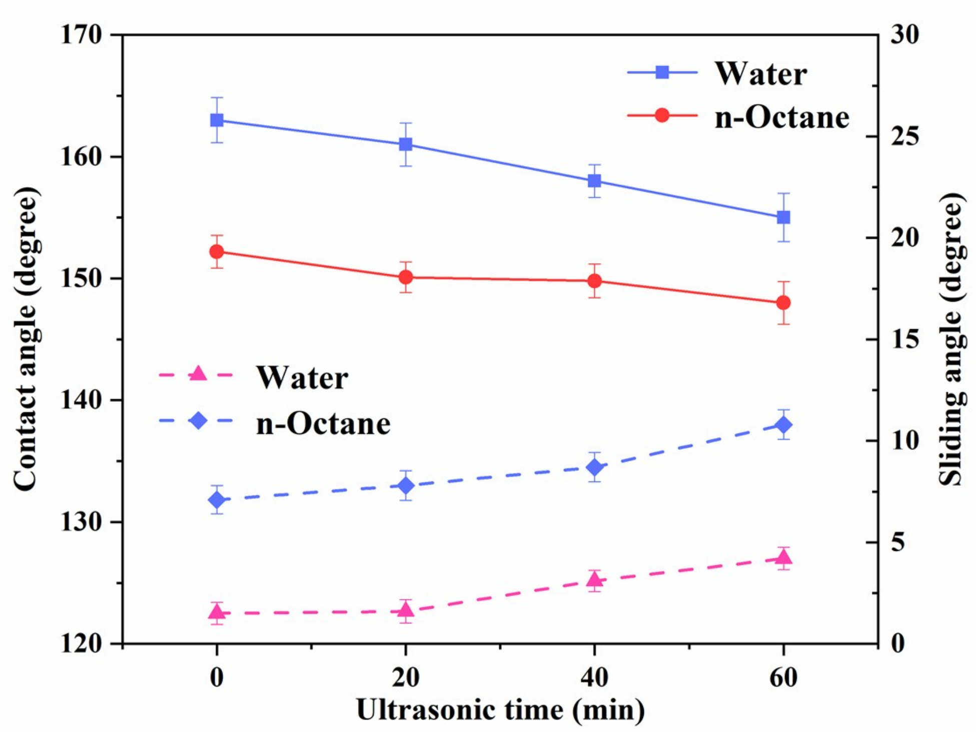

Fig S4. The dependency of n-octane contact angle and sliding angle (degree) of ultrasonic time (min), respectively.

Movie 1 The process of sandpaper abrasion test of superamphiphobic coating.

Movie 2 The process of scratching test of superamphiphobic coating.

Movie 3 The process of water-resistant flushing test superamphiphobic coating.

Movie 4 The process of the anti-flipping experiment in different liquids.