Supplementary Information

Fabrication of a Waterborne, Superhydrophobic, Self-Cleaning, Highly Transparent and Stable Surface

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1. Detail Characterizations

Scanning Electron Microscopy (HITACHITM3030) was performed to representation surface morphology the surface morphologies of the superhydrophobic coatings and solar thermal pigment were observed with scanning electron microscopy at an acceleration voltage of 5.0 kV. An energy-dispersive spectrometer (BRUKER QUANTAX 70) attached to the SEM instrument was used to analyze element compositions of the transparent superhydrophobic surface. The total specific surface area was calculated according to Brunauer-Emmett-Teller (BET) (JW-BK132F, Beijing) model while the pore diameter distribution was calculated by applying Barrett-Joyner-Halenda (BJH) method to the N_2 desorption data. The X-ray photoelectron spectroscopy (XPS, ESCALAB 250Xi) was used to analyzed the chemical components of the surface. The Atomic force microscopy (AFM, Bruker Dimension ICON) was used to analyzed the surface roughness. The transmittance and reflection spectra of this surface on glass slides in visible light were performed using a Transmittance analyzer (HitachiU-4100).

2. Results and discussion

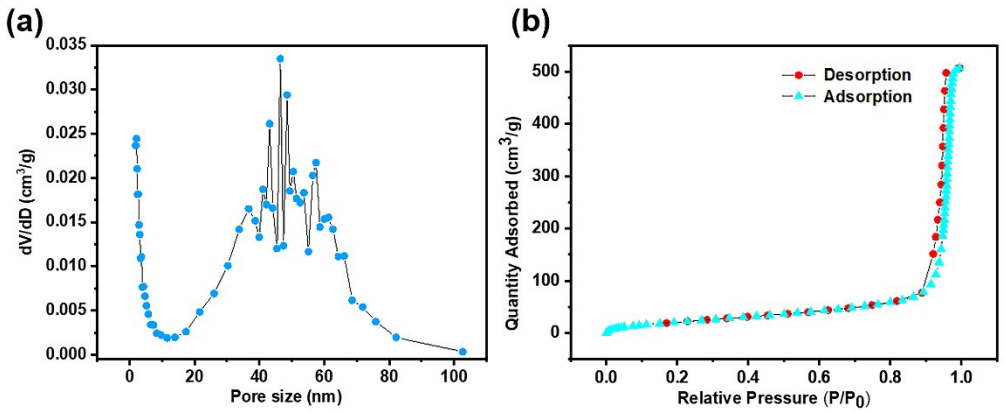

Fig. S1 (a) The pore size of decorated hydrophobic SiO_2 nanoparticles. (b) The desorption and adsorption image of decorated hydrophobic SiO_2.

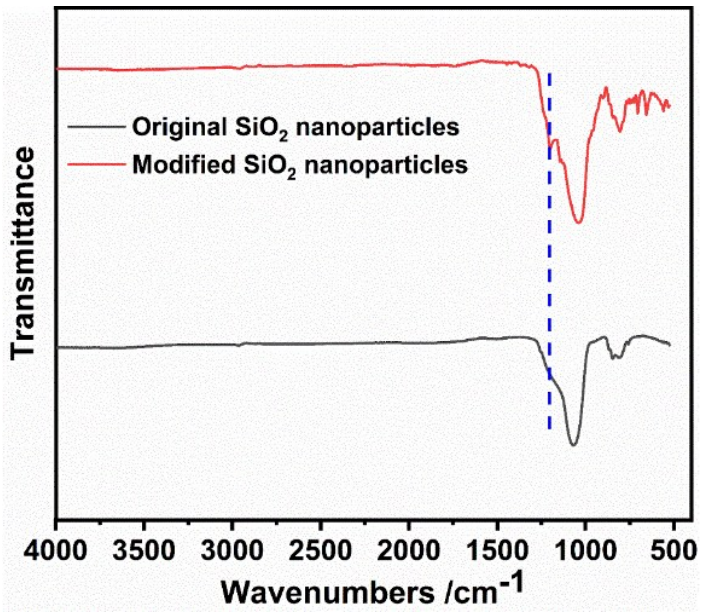

Fig. S2 Comparison of infrared spectra between modified silica nanoparticles and original silica nanoparticles

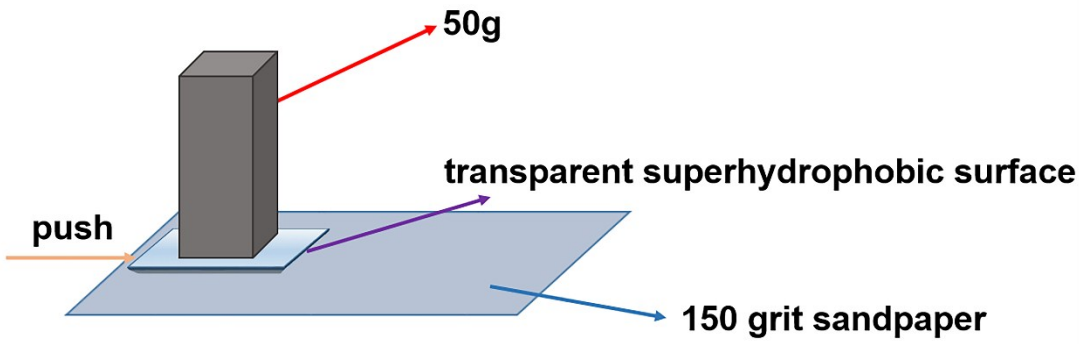

Fig.S3 Schedule of sandpaper abrasion test

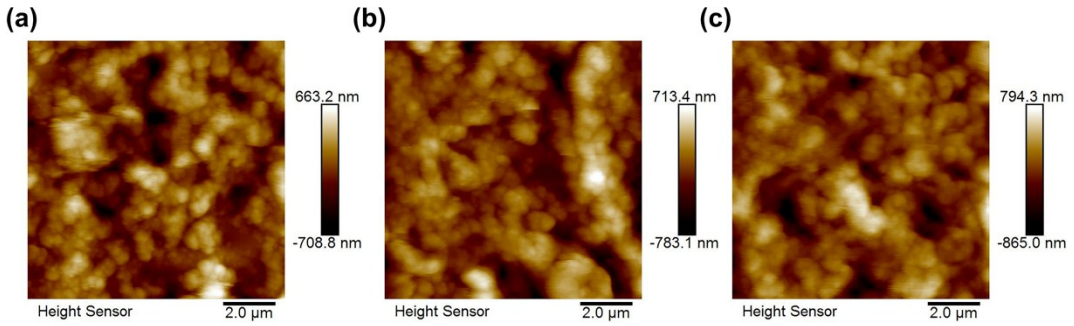

Fig. S4 AFM image of different spray layers: (a) 120 layers, (b) 160 layers, (c) 200 layers

Table S1. The thickness corresponding to different spraying layers

Thickness (μm)	10	25	31	35	45	56	59	64	76	85	95	112	127	143
Layers	10	20	40	60	80	100	120	140	160	180	200	220	240	260

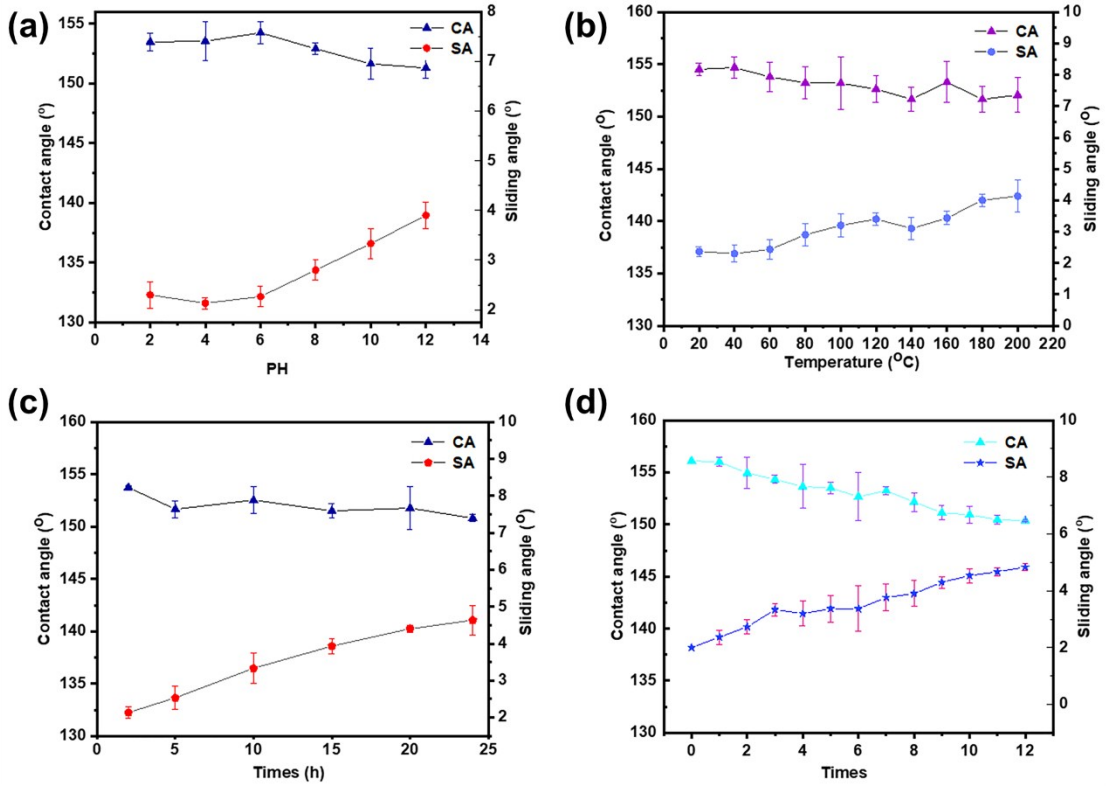

Fig.S5 Trend of surface contact angle (CA) and sliding angle (SA) under different test conditions: (a) CAs and SAs on the surface after treatment in the pH range of 2-12. (b) CAs and SAs of the surface after treatment at 20-200 °C for 2 h. (c) CAs and SAs of the surface after treatment at 150 °C and heating for 2-24 h. (d) CAs and SAs on the surface after treatment by 150-grit sandpaper and abrasion with 50 g weight load.

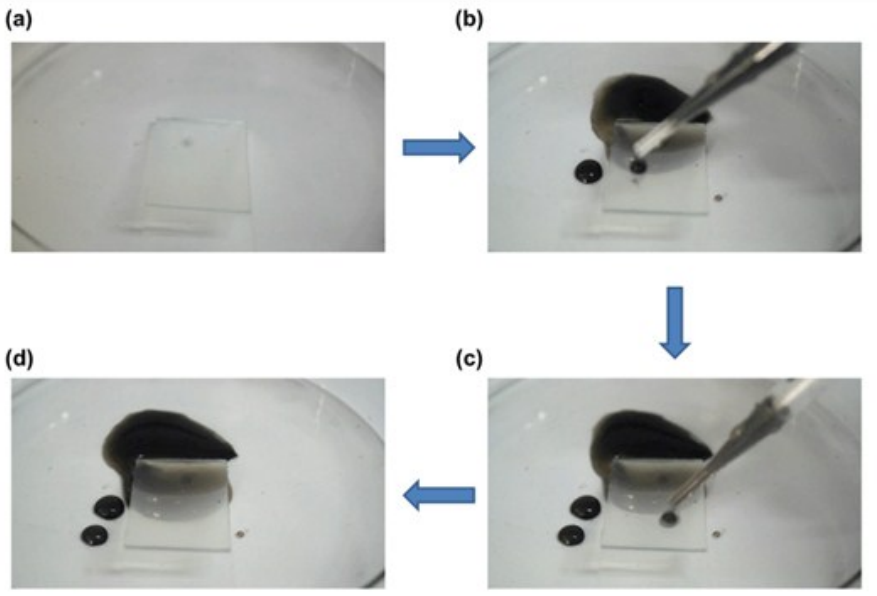

Fig.S6 (a) Uncontaminated surface, (b) muddy water just started to drip on the surface, (c) muddy water rolled off the surface without adhesion, (d) surface was not contaminated

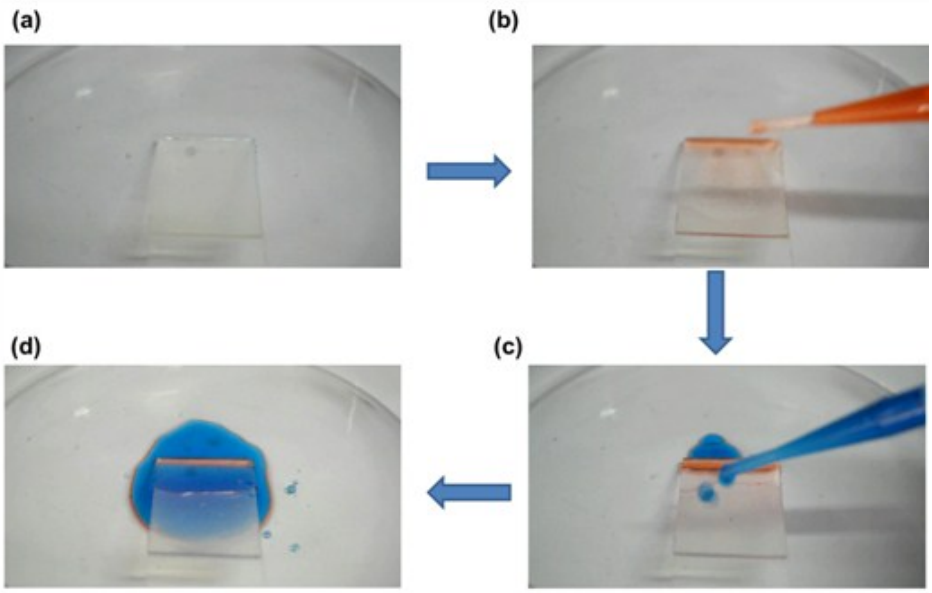

Fig.S7 (a) Uncontaminated surface, (b) surface contaminated with oil (hexane), (c) dropped water on oil-contaminated surface, (d) the oil on the surface was removed.