Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supplementary Information

Large-scale Fabrication of Translucent and Repairable Superhydrophobic Spray Coatings with Remarkable Mechanical, Chemical Durability and UV Resistance

Danfeng Zhi[1], Yao Lu[2], Sanjayan Sathasivam[2], Ivan P. Parkin[2], Xia Zhang[1,2 *]

[1] National & Local Joint Engineering Research Center for Applied Technology of Hybrid Nanomaterials, Henan University, Kaifeng 475004, P.R. China. *E-mail: xia.zhang@ucl.ac.uk

[2] Department of Chemistry, University College London, 20 Gordon Street, London, WC1H 0AJ, UK.

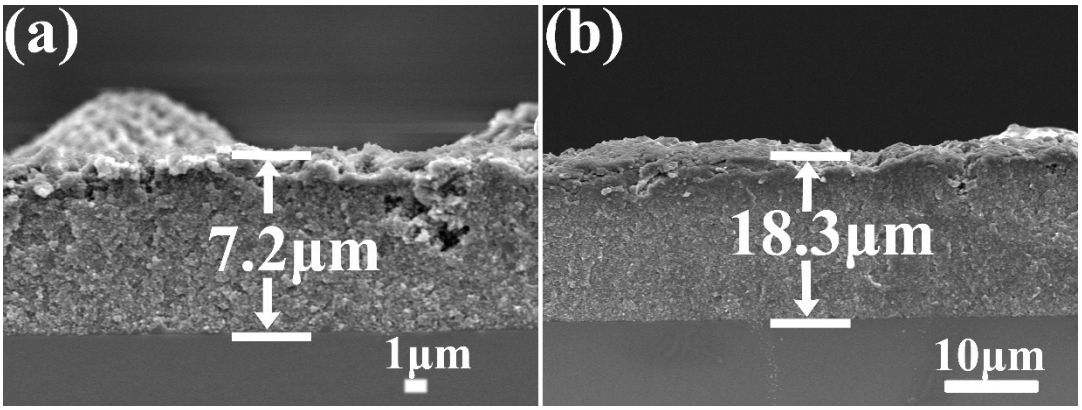

Figure S1. Coating thickness for (a) SiO_2/PU (b) SiO_2/epoxy resin on glass substrate.

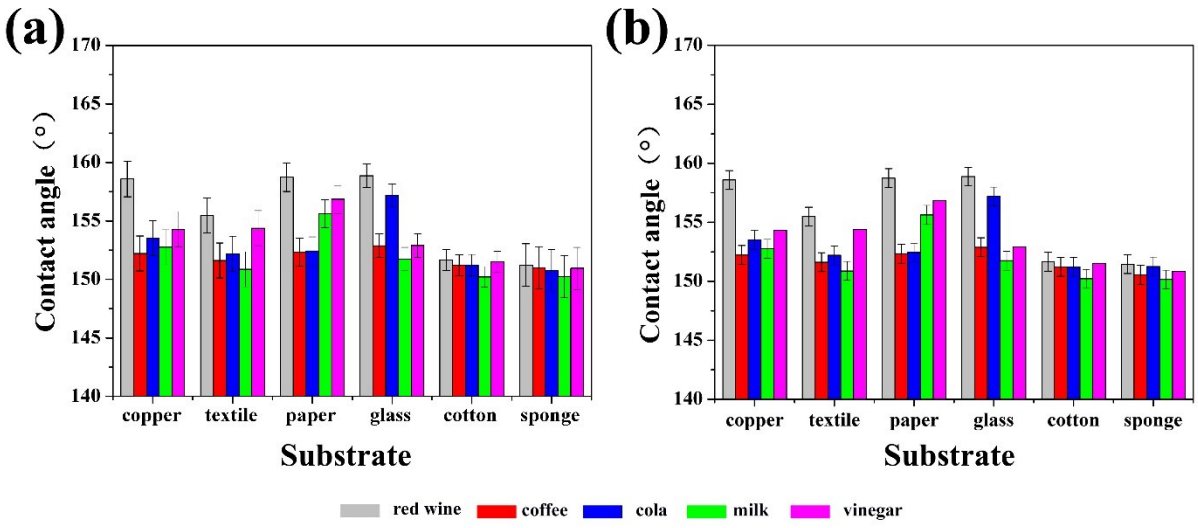

Figure S2. (a) Contact angles of different droplets on different substrates that were coated with (a) SiO_2/PU and (b) SiO_2/epoxy resin, respectively.

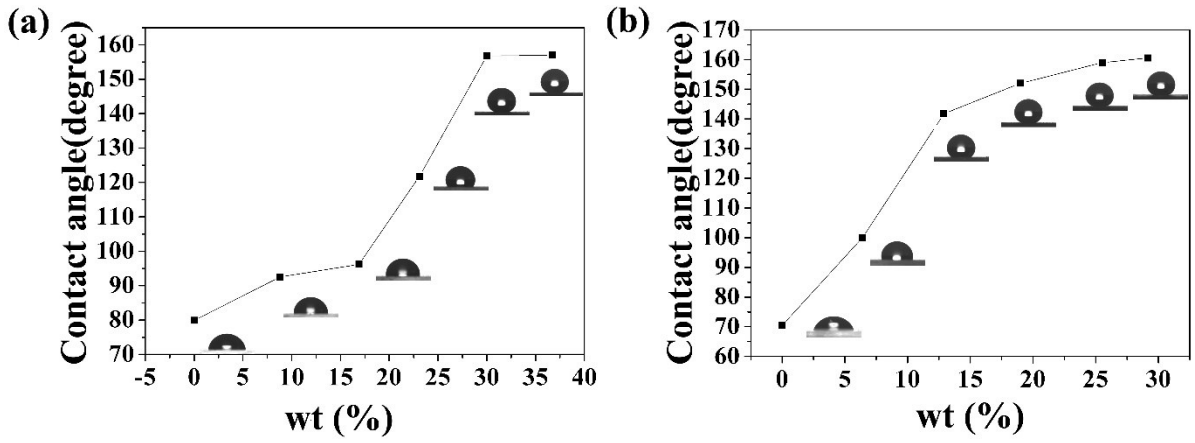

Figure S3. The relationship between water contact angle and the mass fraction of SiO_2 nanoparticles in (a) PU and (b) epoxy resin, respectively.

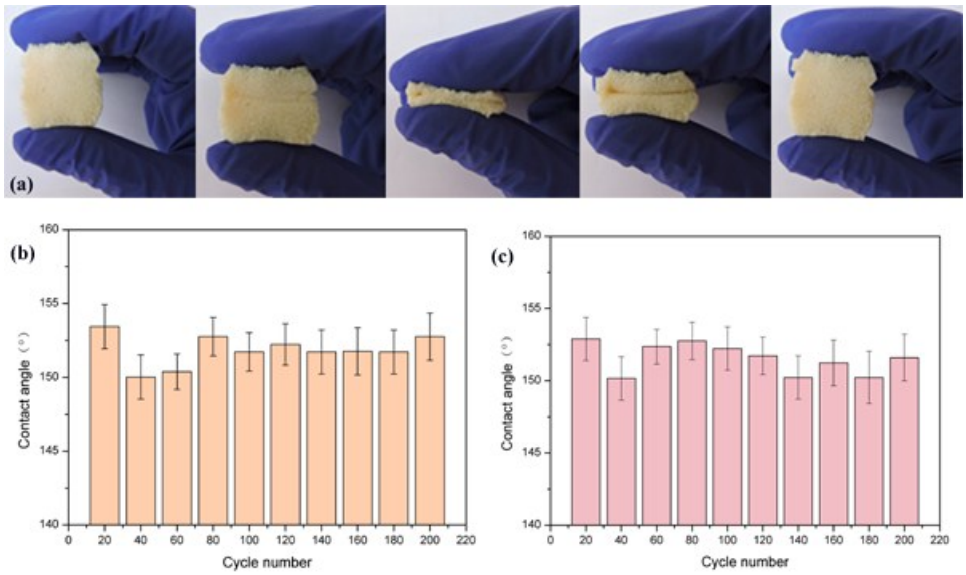

Figure S4. (a) The evolution process of the compression–release test. The change in the contact angle with recycle numbers (b) SiO_2/PU and (c) SiO_2/epoxy resin.

Fig. S4 presents the variation in the contact angle with compression–release cycles of the SiO_2/polymer coatings. It can be seen that after 200 times of compression and release processes, the

coating still retained superhydrophobic state with contact angle larger than 150°, suggesting the coating has good mechanical durability.

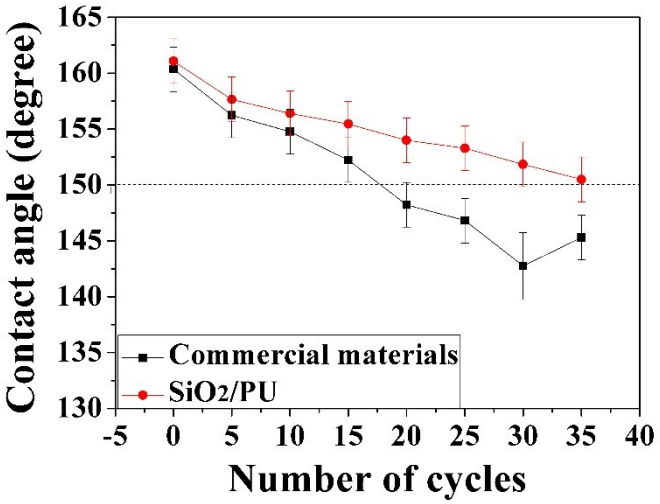

Figure S5. The relationship between water contact angle and sandpaper abrasion cycles for as prepared SiO_2/PU coating and the commercial coating.

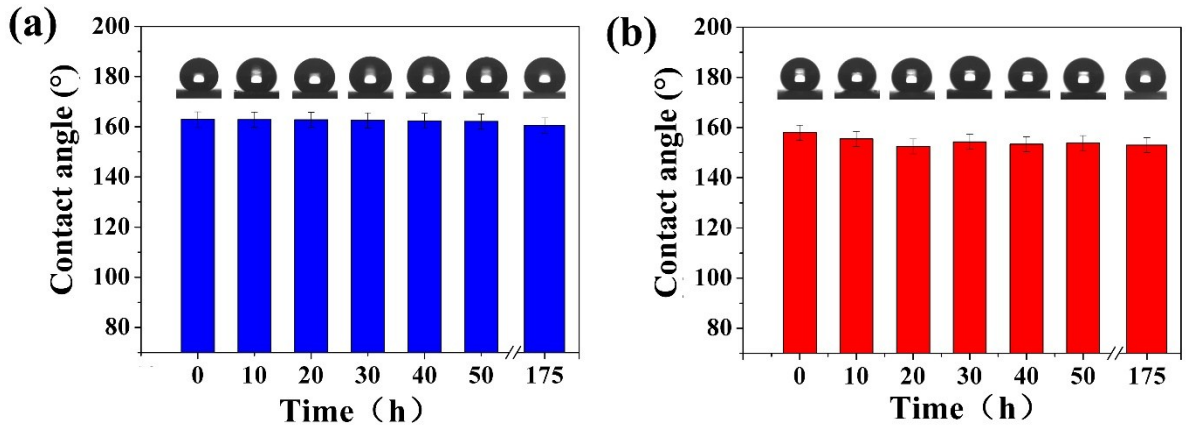

Figure S6. Contact angle of coating (a) SiO_2/PU and (b) SiO_2/epoxy resin as a function of UV irradiation time.

Table S1. XPS of element content of SiO_2/PU coatings under different conditions.

	C	N	O	Si
PU	53.32%	2.16%	44.53%	0%
SiO_2/PU	26.32%	1.25%	60.25%	12.18%
After O_3 treated	17.81%	1.92%	67.39%	12.87%
After healing	25.91%	1.32%	61.03%	11.74%

Table S2. XPS of element content of SiO_2/epoxy resin under different conditions.

	C	O	Si
Epoxy	56.54%	43.45%	0%
SiO_2/Epoxy resin	27.73%	63.65%	8.62%
After O_3 treated	15.32%	76.33%	8.35%
After healing	26.18%	65.95%	7.85%

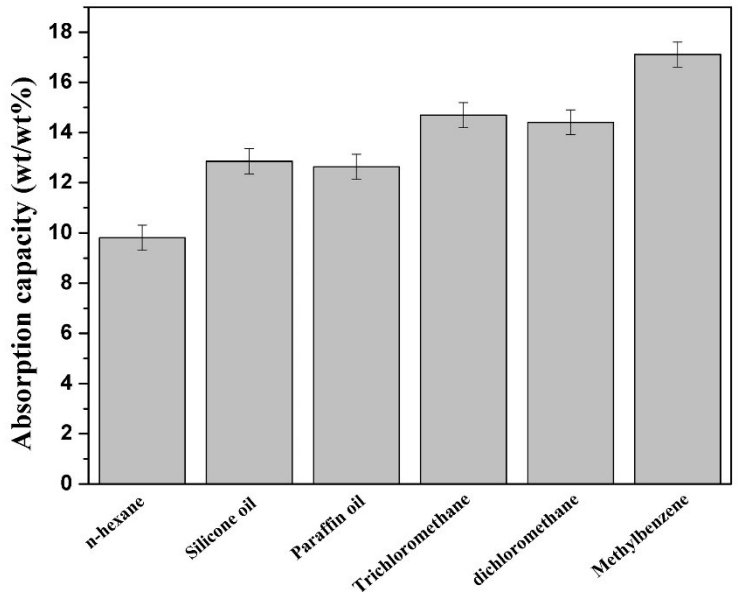

Figure S7. Absorption capacity of the superhydrophobic SiO_2/PU sponge for different oils and organic solvents. The absorption capacity shows the weight of each solvent that can be collected in the sponge per gram of sponge.

Movie Captions

Movie 1

Formation of Liquid marbles. This movie demonstrates water droplets can be stabilized by adsorbed SiO_2 particles at gas−liquid interfaces.

Movie 2 and Movie 3

Durable superhydrophobicity test. The coating surface sustained its water-repellent property after damaged by knife-scratch, finger-wipe and adhesive tape peel. The filter paper coated by SiO_2/PU

Movie 4

Self-cleaning property. The dust can be easily taken away by water flow.

Movie 5

Self-cleaning property of the SiO_2/PU coating polluted by oil.

Movie 6

Video showing the continuous separation process of oil from water.