Organic-inorganic hybridisation strategy for synthesizing durable colored superamphiphobic coatings

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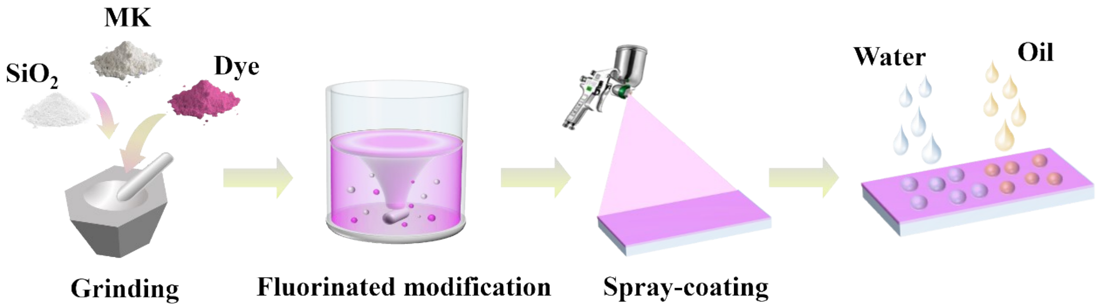

Figure S1. Flow chart for the preparation of superamphiphobic coatings.

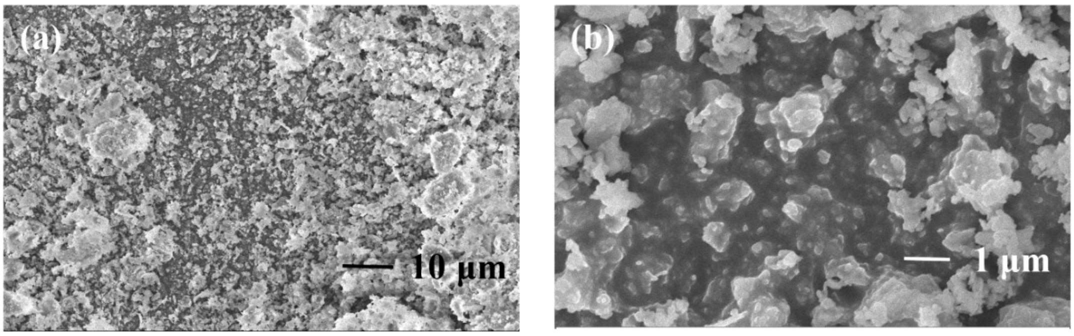

Figure S2. SEM images of the FMS coating mangfied 1000 times and 5000 times.

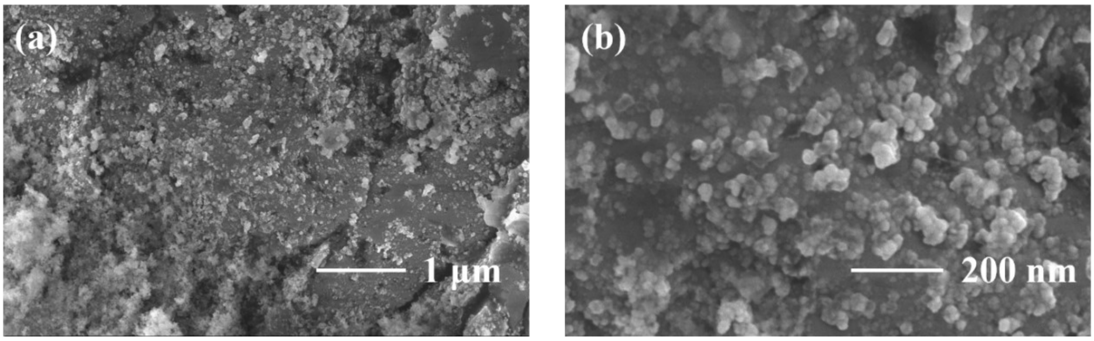

Figure S3. SEM images of the FSS coating mangfied 10000 times and 30000 times.

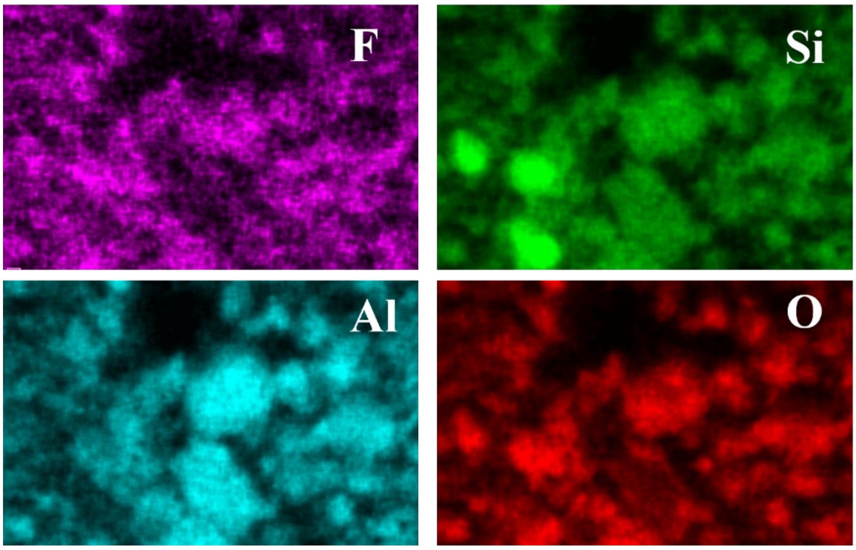

Figure S4. EDS image of FMSS coating.

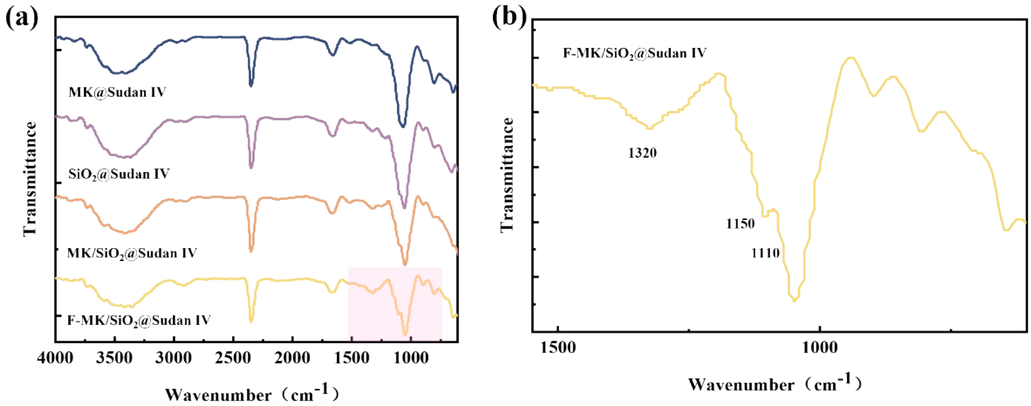

Figure S5. (a) FTIR spectra. (b) Partial amplification diagram of F-MK/SiO_2@Sudan IV.

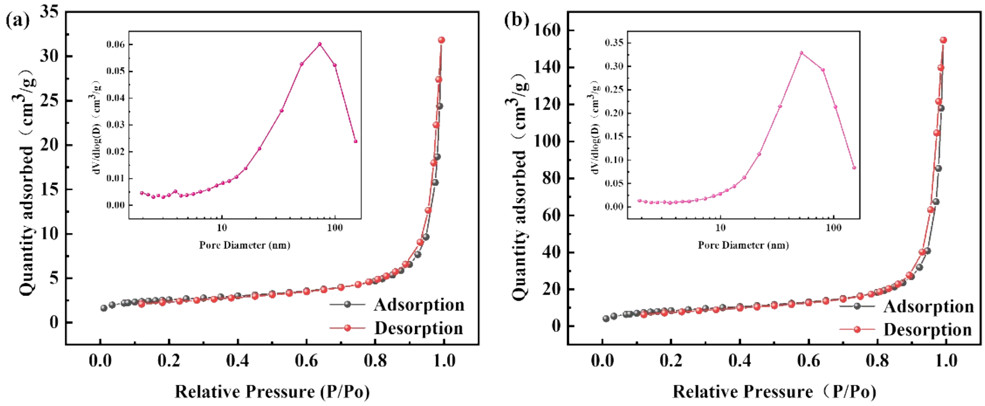

Figure S6. N_2 adsorption-desorption hysteresis curve and pore volume curve of (a) MK powder (b)FMSS powder.

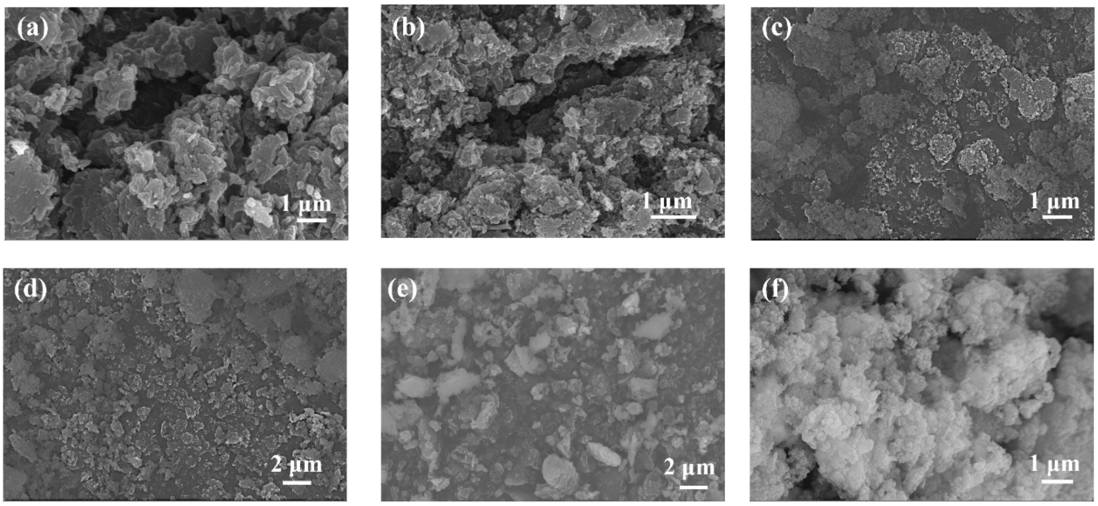

Figure S7. SEM images of (a)FMSS-0.1; (b)FMSS-0.2; (c) FMSS-0.3 (d)FMSS-0.8; (e)FMSS-0.9; (f)FMSS-1.0.

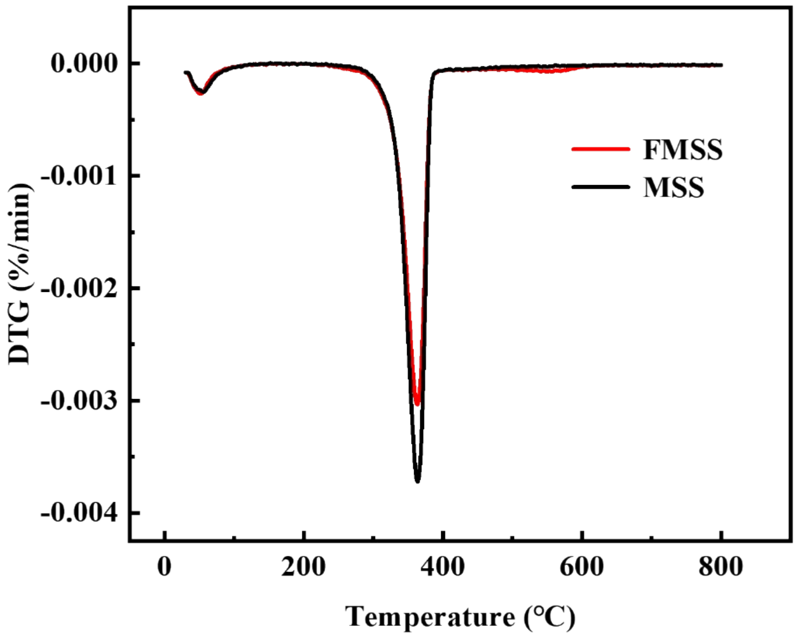

Figure S8. DTG curves for diverse samples of the FMSS and MSS coating.

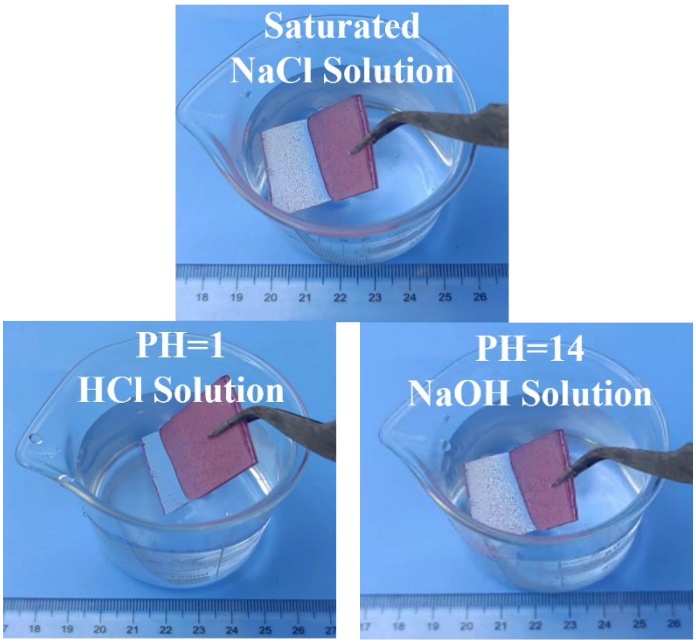

Figure S9. Silver mirror phenomenon of the FMSS 0.5 surface immersed in hydrochloric acid solution at pH = 1, sodium hydroxide solution at pH = 14, and saturated sodium chloride solution.

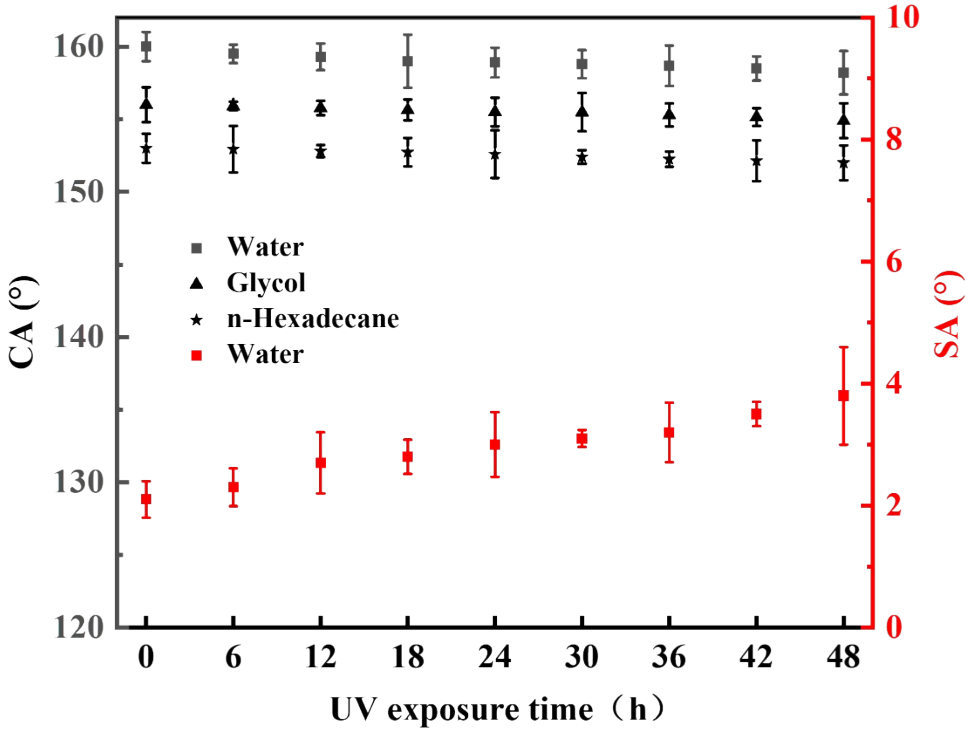

Figure S10. Contact angles and slide angle after continuous UV irradiation for 48 h.

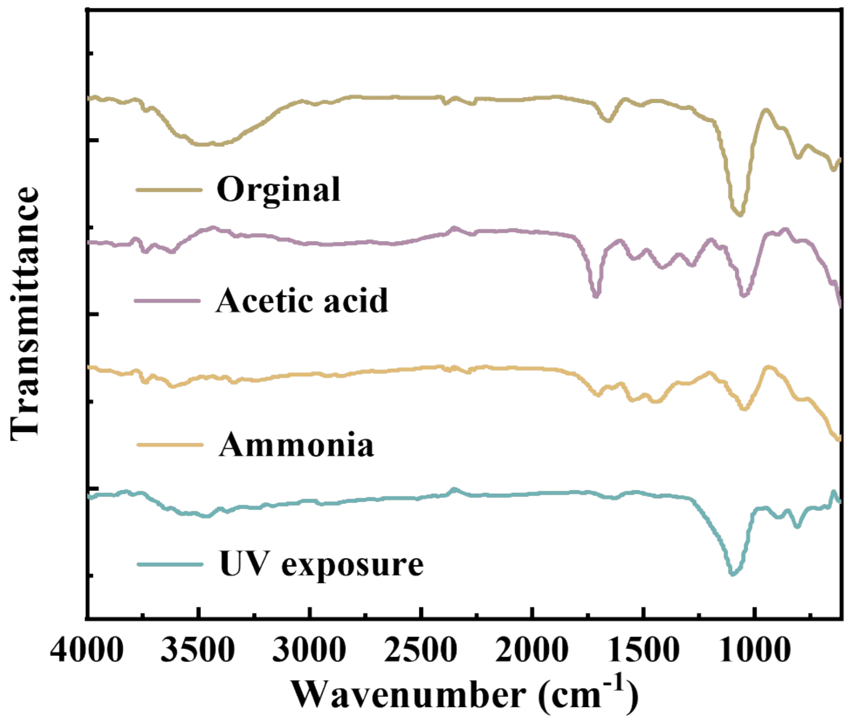

Figure S11. FTIR spectra of MSS coating exposed to different environments.

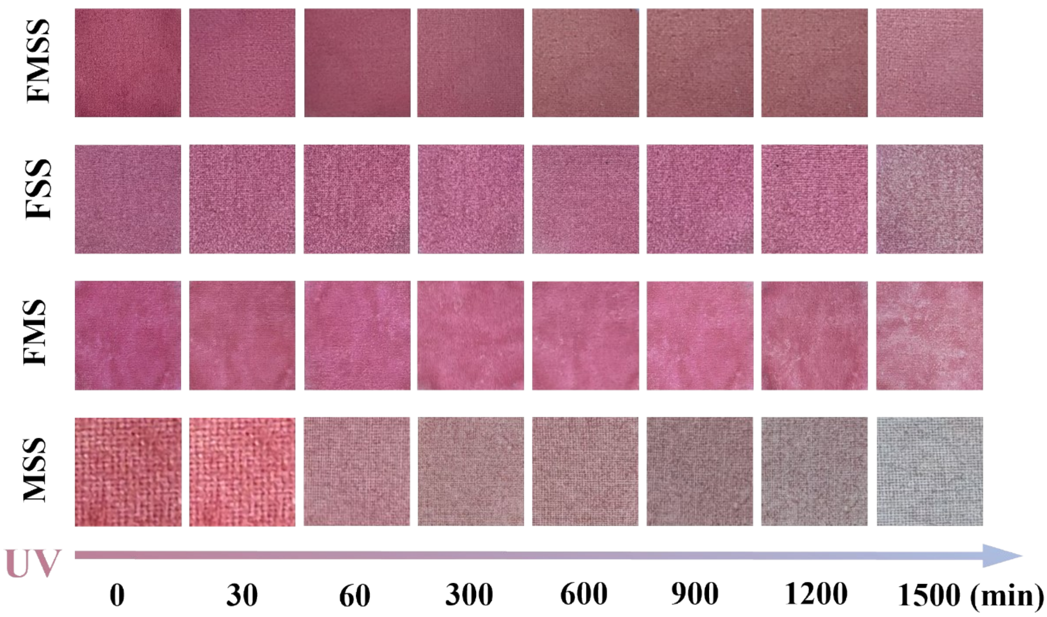

Figure S12. Optical photographs of colour change of FMSS, FSS, FMS, MSS coatings after UV irradiation.

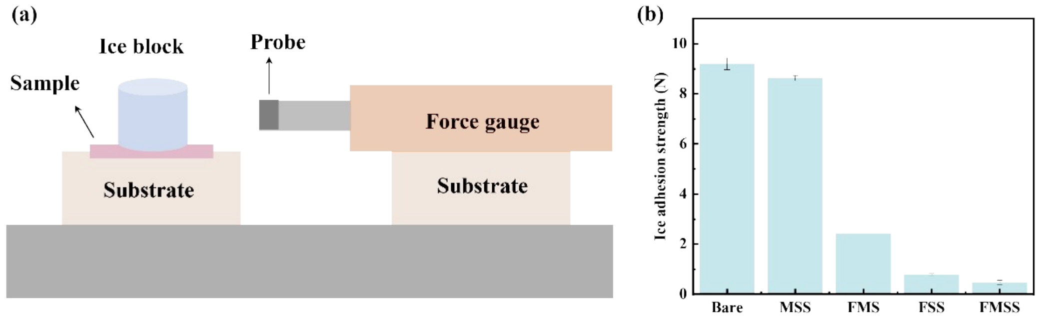

Figure S13. (a) Schematic diagram for testing ice adhesion. (b)Diagram for ice adhesion .

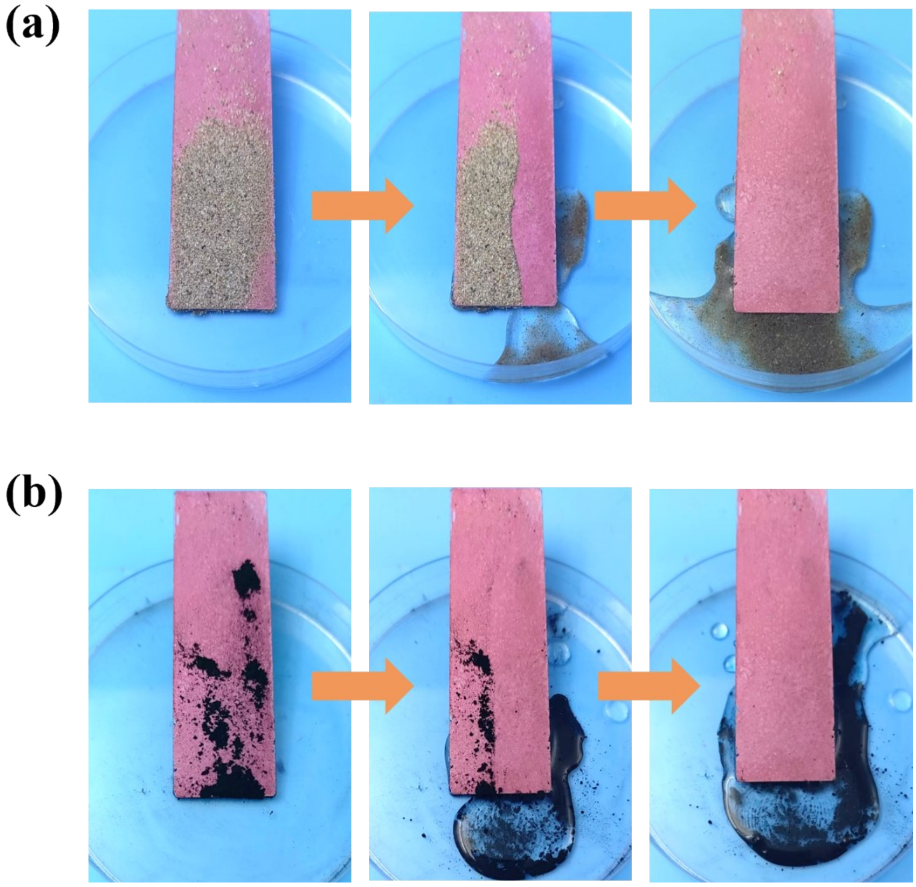

Figure S14. Self-cleaning of glycol (a) hydrophobic sand; (b) carbon black.

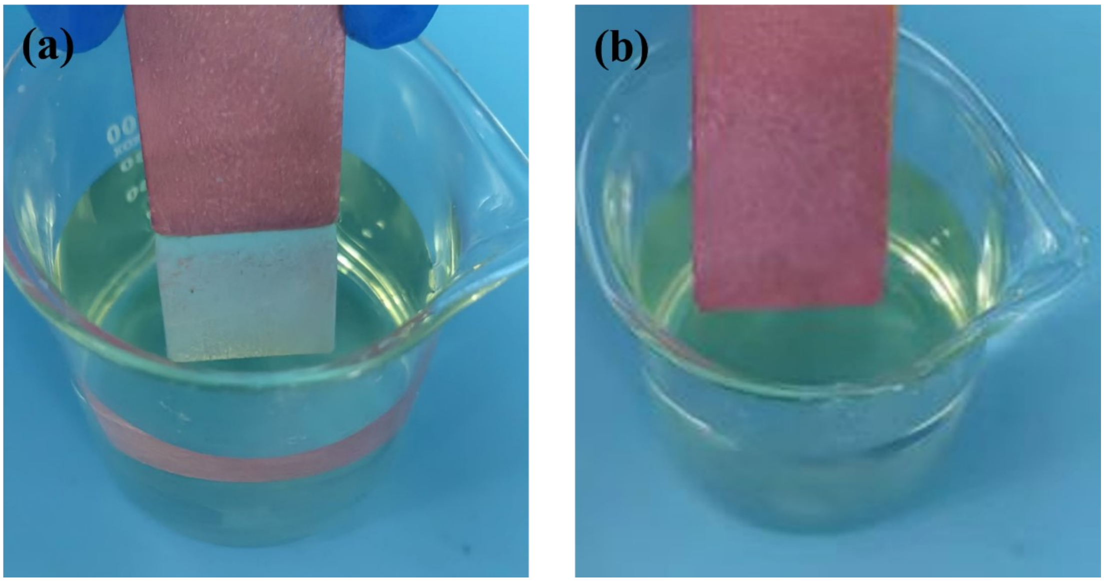

Figure S15. Images of the coating before and after immersion in colza oil.

Figure S16. Images of colorful superamphiphobic coating sprays different color letters.

Table S1. The static contact angle (CA) and slide angle (SA) of drops with different surface tension (γ) were measured for characterizing the wetting behavior.

Liquid	**γ ($mN \cdot m^{-1}$)**	**CA (°)**	**SA (°)**
Water	72.1	160±1	2.1±0.3
Glycerol	64	156±1.2	4.5±0.5
Glycol	47.3	155±1	N/A
Colza oil	32	154±0.5	N/A
n-Hexadecane	27.5	153±1	N/A

Table S2. Contact angle test of different work after UV irradiation.

Materials	UV irradition time	UV Watt	Water Contact angle	Oil Contact angle	Ref
ABR, Palygorskite and n-hexadecyltrimethoxysilane (HDTMS) and tetraethoxysilane (TEOS)	0.5 h	200 w	163.2°±0.7°	/	[1]
sodium tungstate dihydrate ($Na_2WO_4 \cdot 2H_2O$), Oxalic acid dihydrate ($H_2C_2O_4 \cdot 2H_2O$) sodium dodecyl benzene sulfonate (SDBS) , PFDTES	72 h	20 w	151.2°±0.8°	146°±1.6°	[2]
Hollow glass microspheres (HGMs), TiO2, octyltriethoxysilane (OTES), tetraethyl orthosilicate (TEOS)	96 h	8 w	＞150°	/	[3]
Iron nitrate nonahydrate ($Fe(NO_3)_3 \cdot 9H_2O$)，urea ($CO(NH_2)_2$)，sodium dodecyl sulfonate (SDS)，	12 h	8 w	150°	/	[4]
Polydimethylsiloxane (PDMS) pre-polymer (Sylgard 184 Industrial Elastomer Base), Yak hairs	70 h	/	＞150°	/	[5]
This work	48 h	40 w	157.8°±1.5°	154.1°±1.2°	/

Movie 1 Water jet on the surface of the sample.

[1] Y. J. Zhang, J. P. Zhang, A. Q. Wang, *J. Mater. Chem. A* **2016**, 4, 901.
[2] W. Si, S. C. Wang, Z. T. Yu, X. Dai, M. L. Guo, Z. G. Guo, *Chem. Eng. J.* **2024**, 492, 10.
[3] H. Y. Wu, Y. Y. Wang, S. Liu, C. S. Peng, *J. Mater. Eng. Perform.* **2023**, DOI: 10.1007/s11665-023-09060-412.
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[5] E. Pakdel, W. J. Xie, J. F. Wang, S. Kashi, J. Sharp, Q. Zhang, R. J. Varley, L. Sun, X. G. Wang, *Chem. Eng. J.* **2022**, 433, 13.