Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Electronic Supplementary Information

Superamphiphobic aluminum surfaces that maintain robust stability after undergoing severe chemical and physical damages

Jiaqi Chen[1], Mengying Long[1], Shan Peng*, Xiaojun Yang, and Wenli Deng*

College of Materials Science and Engineering, South China University of Technology, Guangzhou 510640, P. R. China

Wushan Road, Tianhe District, Guangzhou 510640, P.R. China.
Tel: (+86)020-22236708

E-mail: pengshan5213@163.com
wldeng@scut.edu.cn

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[1] These authors contributed equally to this work.

Table S1
Atomic concentration of various surfaces

Treatment/composition (atom%)	C	O	F	Al	Si
NP surface	/	60.77	/	39.23	/
MS surface	/	7.05	/	92.95	/
H-NP-0 surface	/	59.57	/	40.43	/
H-NP-12 surface	/	61.32	/	38.68	/
H-NW-16 surface	/	60.56	/	39.44	/
PDES modified H-NW-16 surface	12.20	44.96	10.91	29.20	2.73

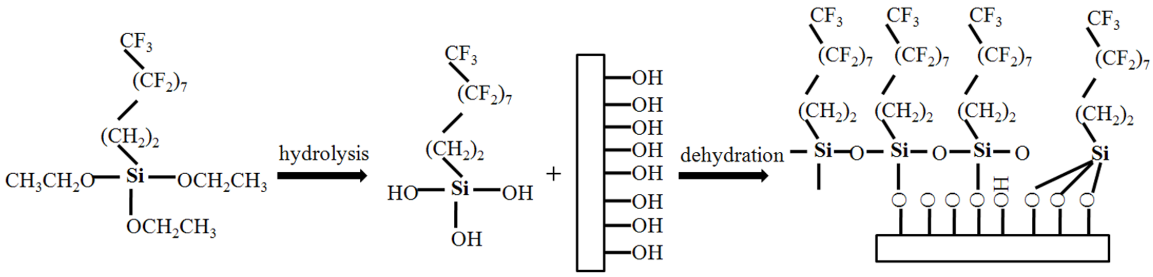

Fig. S1. The self-assembly processes of the PDES layer on the as-prepared surface.

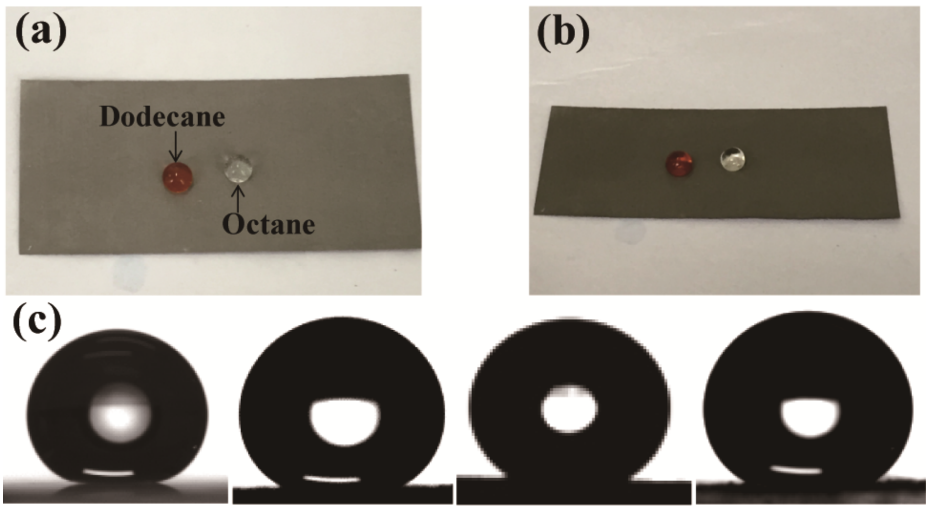

Fig. S2. The top-view (a) and side-view (b) photographs of the dodecane, and octane drops on the superamphipobic H-NW-16 surfaces. (c) CA shapes of the water, hexadecane, dodecane and octane drops on the surface.

Table S2

Contact angles and sliding angles of various liquids when positioned onto H-NW-16 and H-NP-12 surfaces

Liquid	Surface tension/ mN m^{-1} (20 °C)	H-NW-16 surface with coating		H-NP-12 surface with coating	
		CA (°)	SA (°)	CA (°)	SA (°)
Water	72	169 ± 2	~0	169 ± 2	~0
Glycerol	50	160 ± 2	2 ± 1	159 ± 2	4 ± 1
Ethylene Glycol	48	157 ± 2	3 ± 2	157 ± 2	4 ± 1
CH_2I_2	46	156 ± 2	3 ± 1	155 ± 2	6 ± 2
Rapeseed oil	35	154 ± 2	4 ± 1	152 ± 1	8 ± 2
Hexadecane	27	154 ± 2	4 ± 1	152 ± 2	22 ± 1
Dodecane	25	152 ± 2	6 ± 1	150 ± 1	30 ± 2
Octane	21	151 ± 2	12 ± 1	148 ± 2	N/A

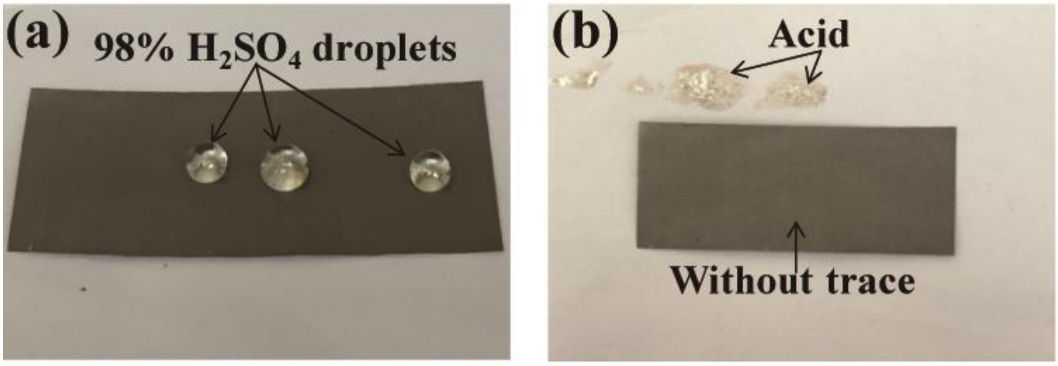

Fig. S3. The superamphiphobic H-NW-16 surfaces could repel 98% concentrated sulfur acid drops without trace.

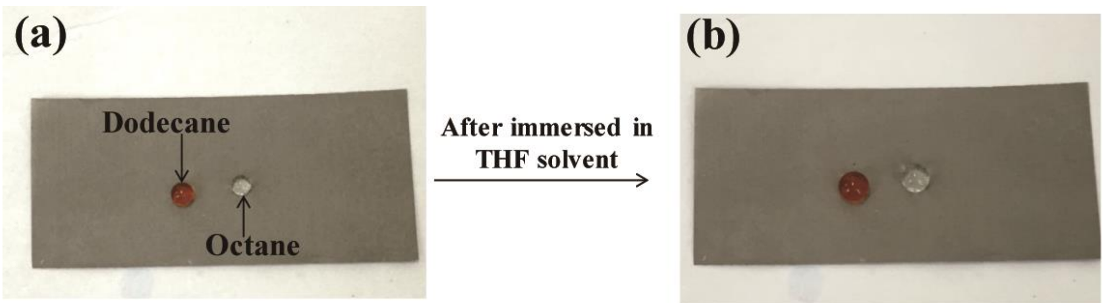

Fig. S4. The superamphiphobic surfaces kept its super-liquid-repellency without change after immersed into THF solvent.

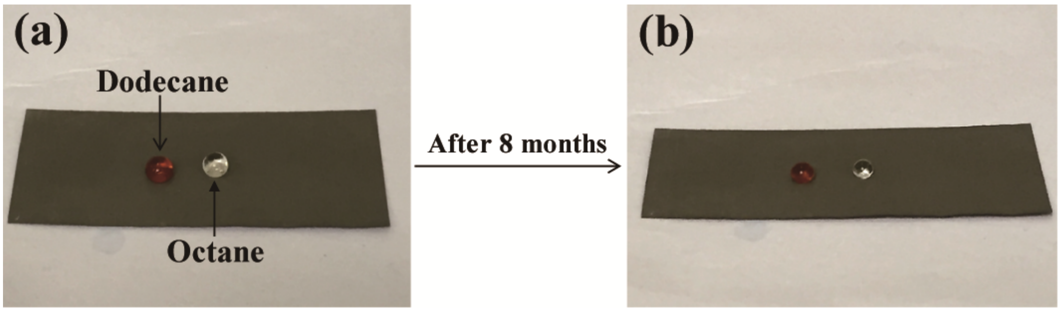

Fig. S5. The superamphiphobic surfaces maintained no change for dodecane and octane drops before and after air-stored for 8 months.

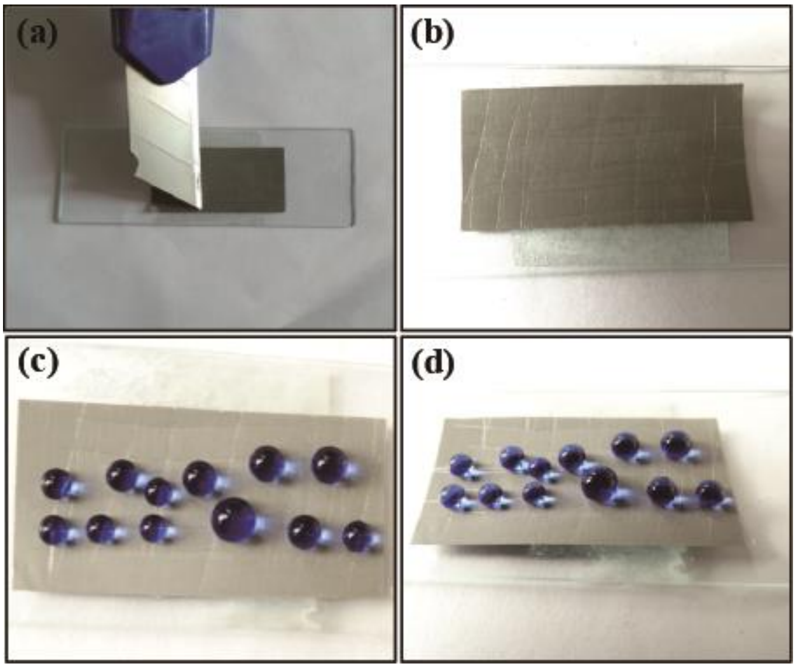

Fig. S6. The superamphiphobic H-NW-16 surfaces still maintained excellent super-water-repellency after being scratched for many times by a sharp blade.

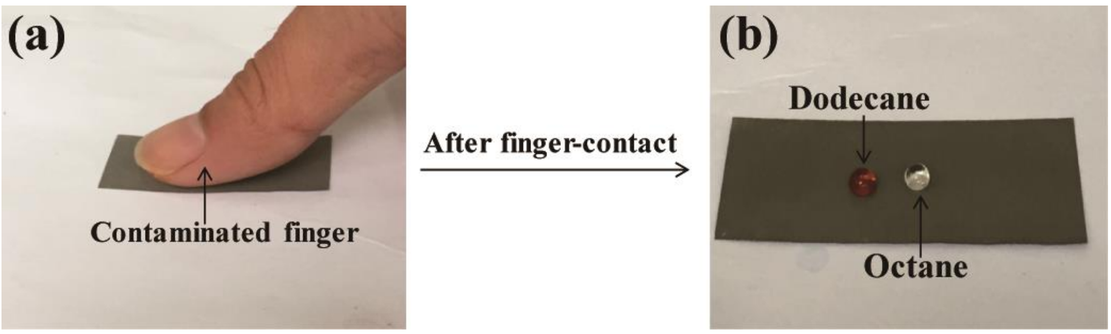

Fig. S7. The superamphiphobic surfaces still maintained superamphiphobicity for dodecane and octane after being contacted by a contaminated hand.

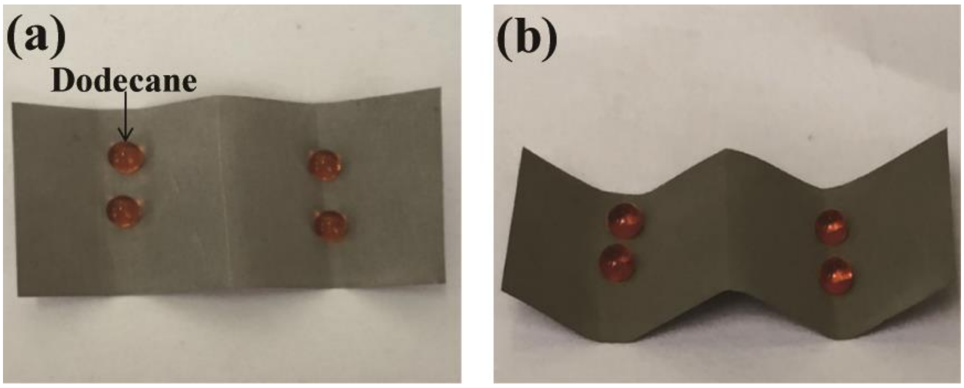

Fig. S8. The superamphiphobic surfaces presented excellent bendable property without changing superoleophobicity toward dodecane.

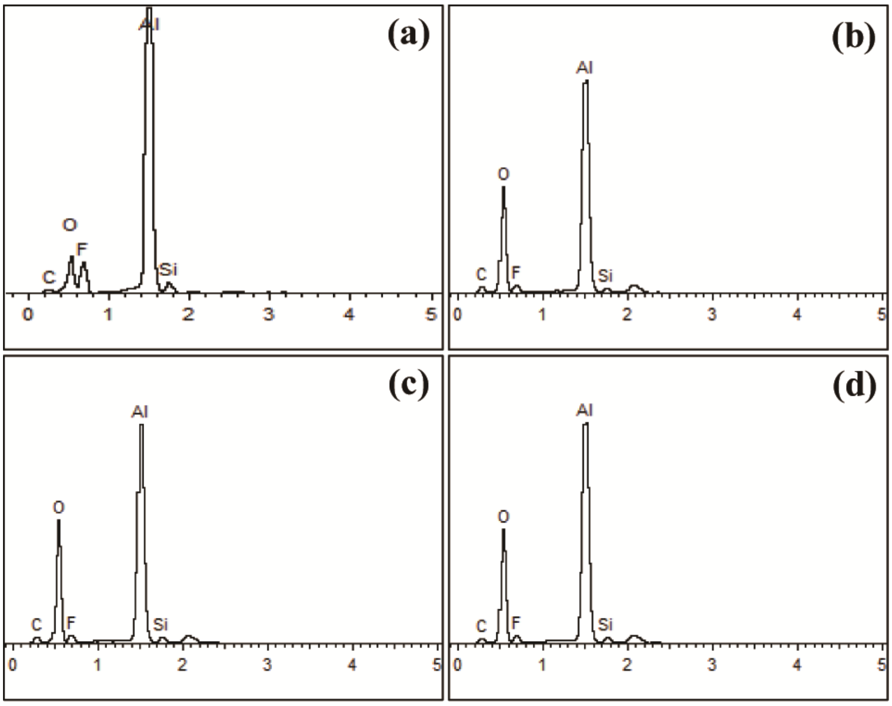

Fig. S9. The EDS spectrums of the superamphiphobic H-NW-16 surfaces before (a), and after being peeled by adhesive tape for 10 (b), 20 (c), and 30 (d) times, respectively.

Table S3
Atomic concentration of the superamphiphobic H-NW-16 surface before and after the peeling tests

Treatment/composition (atom%)	C	O	F	Al	Si
As-prepared	12.20	44.96	10.91	29.20	2.73
Peeled 10 times	11.99	45.56	10.31	29.57	2.57
Peeled 20 times	10.59	50.33	8.26	29.04	1.78
Peeled 30 times	9.58	52.15	6.90	30.03	1.34

Table S4
Atomic concentration of the superamphiphobic H-NW-16 surface before and after the abrasion tests

Treatment/composition (atom%)	C	O	F	Al	Si
As-prepared	11.57	44.33	11.91	29.20	2.99
Abraded 10 times	10.88	45.12	10.55	30.90	2.55
Abraded 20 times	10.60	48.06	9.89	29.56	1.89
Abraded 30 times	6.64	56.19	5.74	30.54	0.89

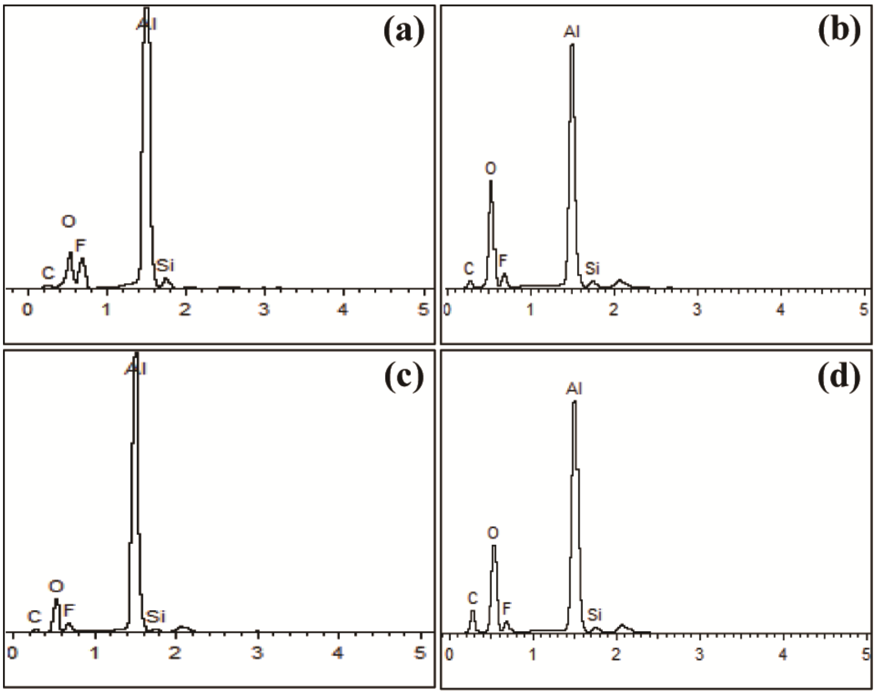

Fig. S10. The EDS spectrums of the superamphiphobic H-NW-16 surfaces before (a), and after abraded for 10 (b), 20 (c), and 30 (d) times, respectively.

Video S1 recorded the multiple scratching treatments on the superamphiphobic H-NW-16 surface with a sharp blade.

Video S2 recorded the superior non-wetting ability of the superamphiphobic H-NW-16 surface even after scratched for many times.

Video S3 recorded the bendable property of the superamphiphobic H-NW-16 surface.

Video S4 recorded the multiple peeling process of the superamphiphobic H-NW-16 surface.

Video S5 recorded the abrasion process of the superamphiphobic H-NW-16 surface.