Supplementary material

Facile fabrication of an F-POSS polymer based liquid-repellent Cu mesh with excellent durability and self-cleaning performance

Guanzhou Luo[a], Li Wang[b,*], Xinying Li[a], Kai Yang[a], Yongle Luo[c], Shouping Xu[a], Pihui Pi[a,*], Xiufang Wen[a,*]

[a]*School of Chemistry and Chemical Engineering, Guangdong Provincial Key Lab of Green Chemical Product Technology, South China University of Technology, Guangzhou 510640, China*

[b]*South China Institute of Environmental Sciences, The Ministry of Environment Protection of PRC, Guangzhou 510655, China*

[c]*Guangdong safety production technology center Co. Ltd. Guangzhou 510500*

*Corresponding author: Tel: +86-20-87112057-804;

Email address: wangli@scies.org, phpi@scut.edu.cn, xfwen@scut.edu.cn.

Supporting Information

Supporting Information contains:

Supplementary Discussions

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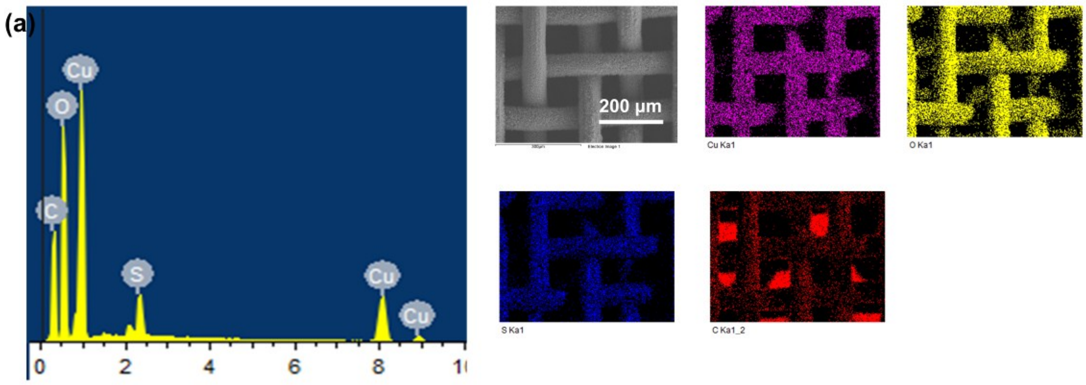
Supplementary Discussions

The determination of the ratios of OVPOSS and FMA.

PETMP was acts as the effect of thiol-ene photoinduced crosslinking, and both the OVPOSS and FMA play important roles in the formation of the F-POSS-OM surface. Theoretically, 1 mole OVPOSS can react with 8 mole FMA, and we decided the ratios according the molar ratio of the functional groups. When the reaction groups of OVPOSS was more than FMA (molar ratio 1:4), the obtained Cu mesh can repel water, but can be wetted by oil. When the reaction groups of OVPOSS was less than FMA (molar ratio 1:12), the mechanical property of obtained Cu mesh got weaken, and it could be wetted by blended oil after slight destruction (Fig. S12).



Element	Cu	O	C	S
Atomic %	10.73	38.53	48.85	1.89

Fig. S1. EDS spectrum and EDS mapping of (a) the OM.

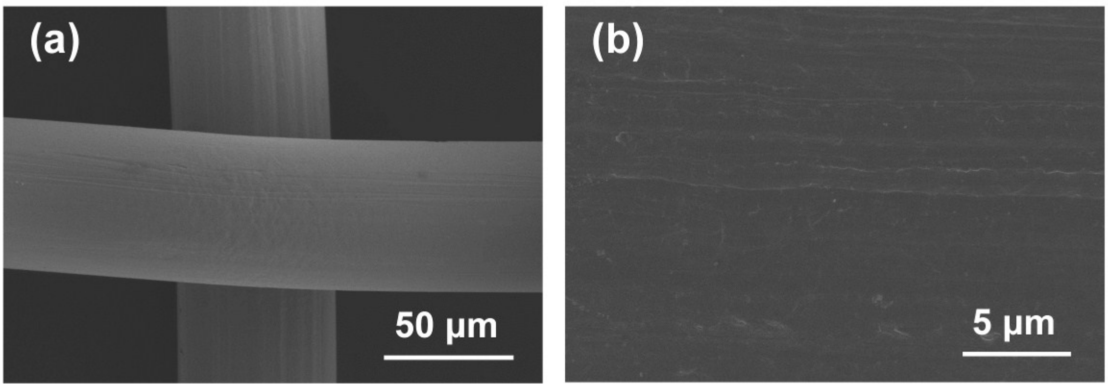


Fig. S2. SEM image of the Cu mesh. (b) High magnification images of morphology on the Cu mesh.

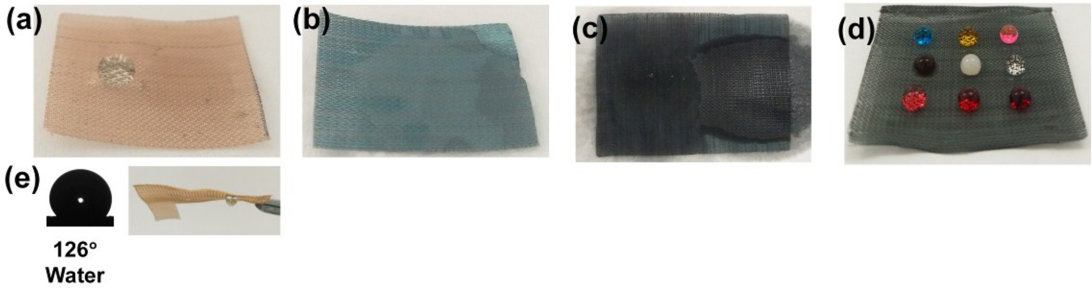


Fig. S3. Photograph of droplets on the surface of (a) Cu mesh, (b) OM, (c) SH-OM and (d) F-POSS-OM. From Top to bottom and left to right, the droplets in image (d) is water, glycerol, glycol, vinegar, milk, blended oil, n-Hexadecane, n-tetradecane and n-dodecane. (e) Static water contact angle on the surface of Cu mesh and the photograph of water droplet adhered to the surface even at 180° tilt.

Fig. S4. (a) Photograph of 100 cm-height impact tests.

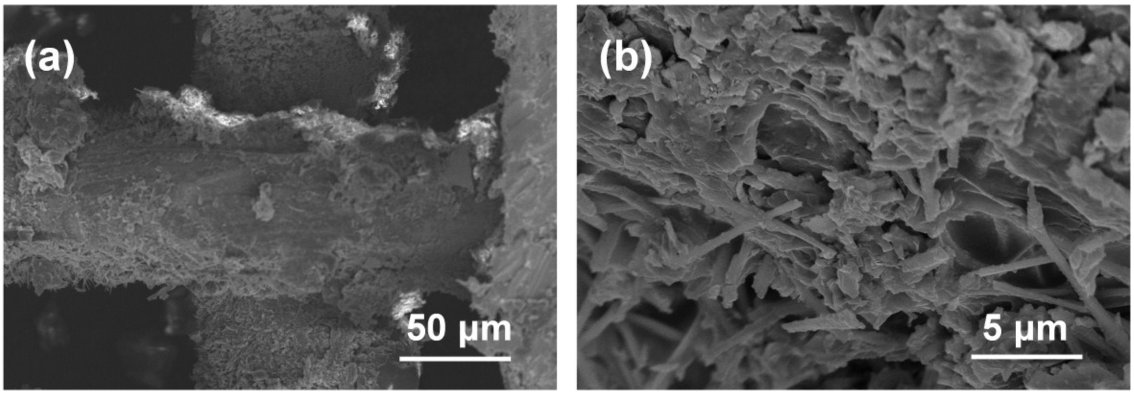


Fig. S5. SEM image of (a) the F-POSS-OM surface after 500-cycle abrasion treatment. (b) High magnification images of morphology on the F-POSS-OM after 500-cycle abrasion treatment.

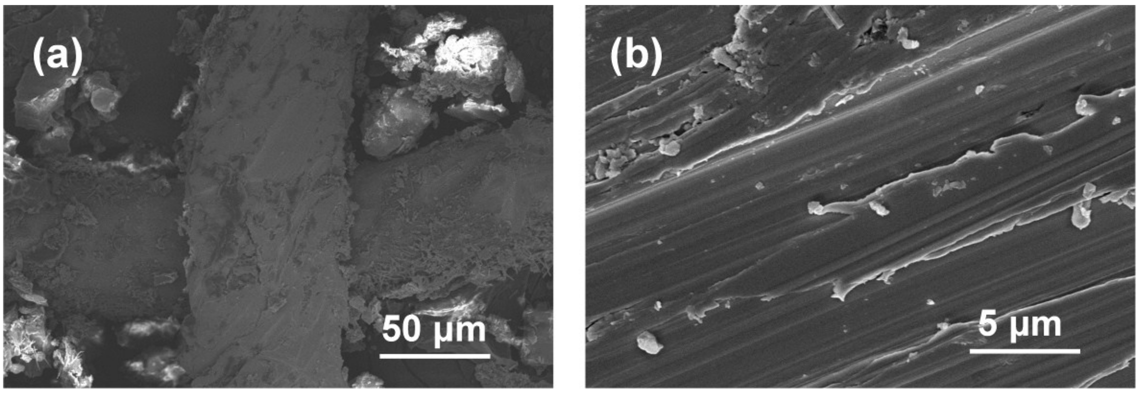


Fig. S6. SEM image of (a) the F-POSS-OM surface after 800-cycle abrasion treatment. (b) High magnification images of morphology on the F-POSS-OM after 800-cycle abrasion treatment.

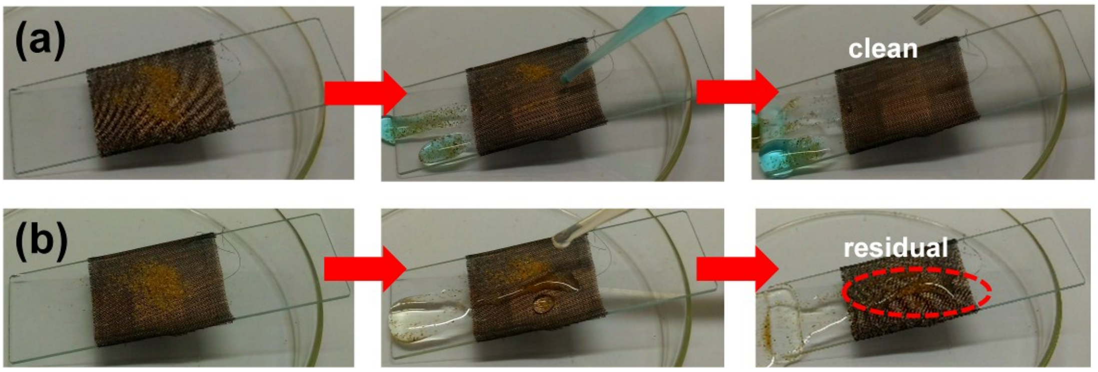


Fig. S7. Photograph showing the self-cleaning ability of (a) water and (b) blended oil after 800-cycle abrasion treatment.

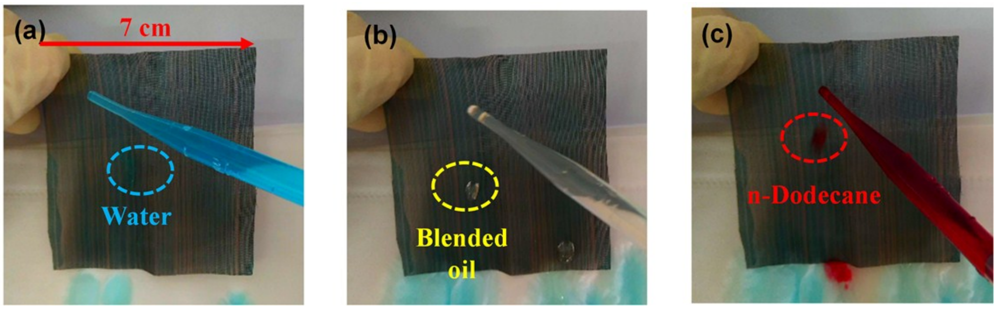


Fig. S8. Photograph of larger samples (7 cm by 7 cm) showing liquid-repellency.

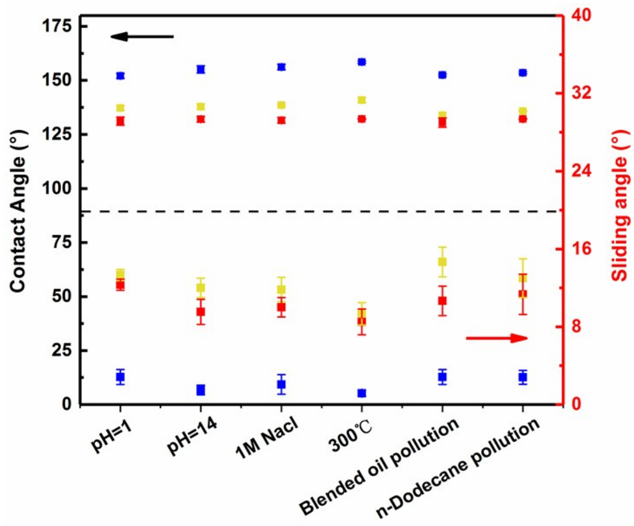


Fig. S9. Contact angle and Sliding angle of water (blue line), blended oil (yellow line) and n-dodecane (red line) after different treatment.

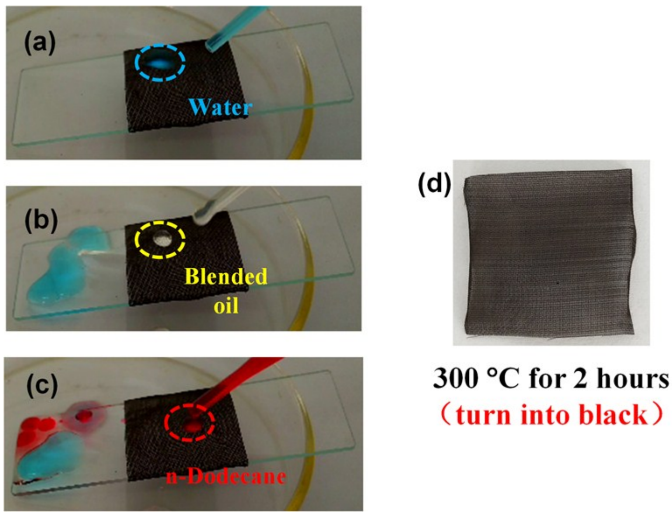


Fig. S10. The rolling of (a) water, (b) blended oil and (c) n-dodecane on the surface of F-POSS-OM after 300 °C for 2h. And the Photograph of F-POSS-OM turning into black (d).

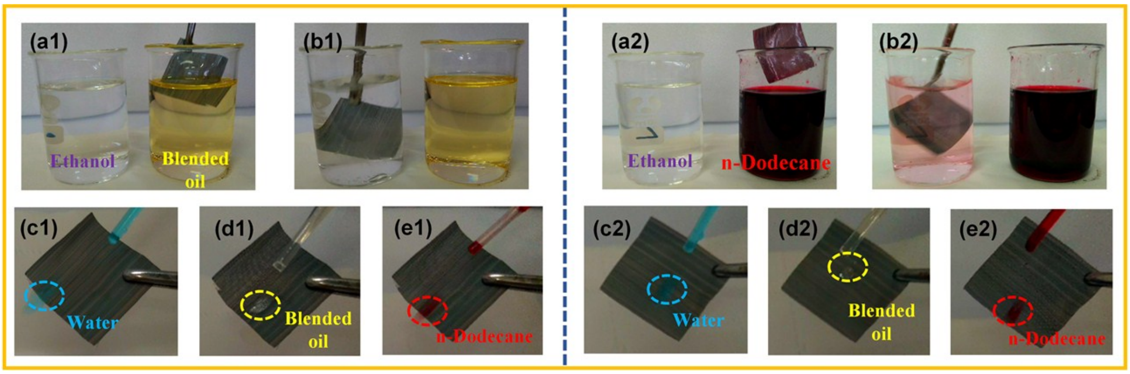


Fig. S11. The process of removing oil pollution (a1, b1, a2 and b2). And The rolling of (c1, c2) water, (d1, d2) blended oil and (e1, e2) n-dodecane on the surface of F-POSS-OM after removing containments.

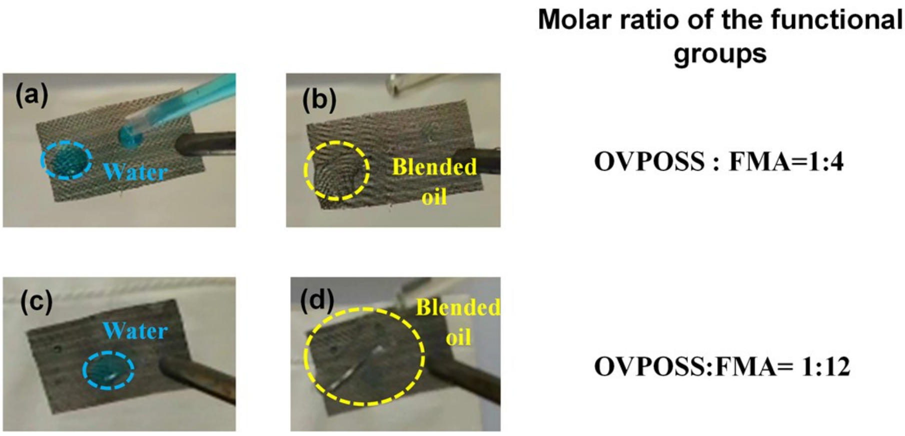


Fig. S12. The photograph of F-POSS-OM with different molar ratio of OVPOSS and FMA. (a, c) the repelling to water and (b, d) the partly wetting by blended oil.

Table S1. Comparison between some liquid-repellent materials with different sliding angles.

Water	Glycerol	Glycol	Vinegar	Milk	Blended oil	n-Hexadeane	n-Dodecane	Reference
3 ± 1°	*	*	8 ± 2 °	15 ± 2°	*	*	*	[1]
2°	*	3°	5°	7°	*	8°	*	[2]
~ 3°	~ 6°	~7°	~7.5°	~ 3°	~ 13°	17°	*	[3]
~2°	~ 3°	*	*	~ 5°	*	*	*	[4]
~ 5.2°	~7.0°	*	*	*	*	~ 26 °	*	[5]
2 ± 1°	4 ± 1°	*	*	*	14 ± 1°	17 ± 1°	*	[6]
~ 3°	~ 6°	~ 5°	*	*	~ 10°	~ 18°	~ 20°	[7]
~1 °	4.4 °	2.6°	4.6°	2.1°	11.7°	7.8°	10.9°	Our work

*：no specific value in article

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