Supporting Information

Flexible and Strong Robust Superhydrophobic Monoliths with Antibacterial Property

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Table S1 Mechanical properties of superhydrophobic elastomer.

	Mechanical properties				
Sample	Tensile strength (MPa)	Elongation at break (%)	Modulus at 100% elongation (MPa)	Hardness (Shore A)	Rebound resilience (%)
silicone	2.1	79.6	—	37	58.5

Cu/silicone	2.5	108.4	2.2	49	53
Co/silicone	2.54	132.0	1.7	50	53
TiO_2/silicoe	4.2	237.2	2.2	52	46
ZnO/silicone	3.4	124.1	2.6	54	51

Fig. S1a shows the relationship between the water-repellency and Cu addition. It is clear that the water contact angle increases with the Cu addition increase, however, with the Cu addition increase, the sliding angle and contact angle hysteresis decreases, which indicates that the more Cu addition, the better water-repellency of the Cu/Silicone blocks. To further quantify the abrasion-resistance of Cu/silicone superhydrophobic elastomer, we plotted the water contact angle, sliding angle, contact angle hysteresis and retention ratio as functions of the abrasion distance as shown in Fig. S1b. The retention ratio $\eta = \frac{m_x}{m_0} \times 100\%$, where m_x refers to the sample mass after a certain distance of friction and m_0 refers to the original sample mass. The sample were loaded under the pressure of 100 g weight with a contact area of 26 cm^2 on sandpaper (SiC, 220 Cw), and the original weight of the sample before abrasion was 17g. As the friction distance increased, the abrasion had no significant effect on the water contact angle, water sliding angle and retention ratio. And after the sample was rubbed by a distance of 4200 cm, the contact angle was still maintained at about 160°, the sliding angle and contact angle hysteresis was less than 10°, and the retention ratio of sample was still up to 98.31%, which shows the extremely high stability and wear resistance of the superhydrophobic Cu/silicone blocks.

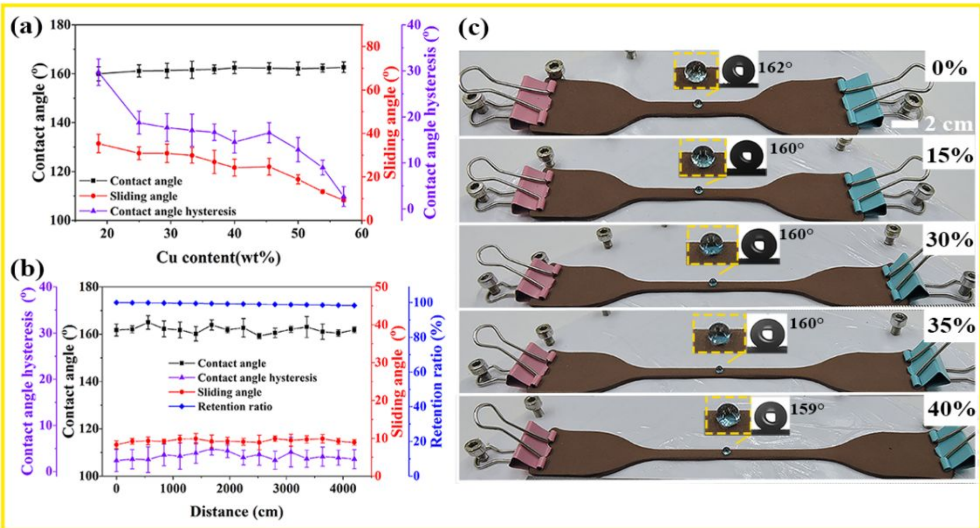


Fig. S1 (a) Relationship between contact angles, sliding angles, contact angle hysteresis and the amount of copper addition; (b) Friction and wear performance test of Cu/silicone; (c) Repellency of water after Cu/silicone is stretched to different lengths.

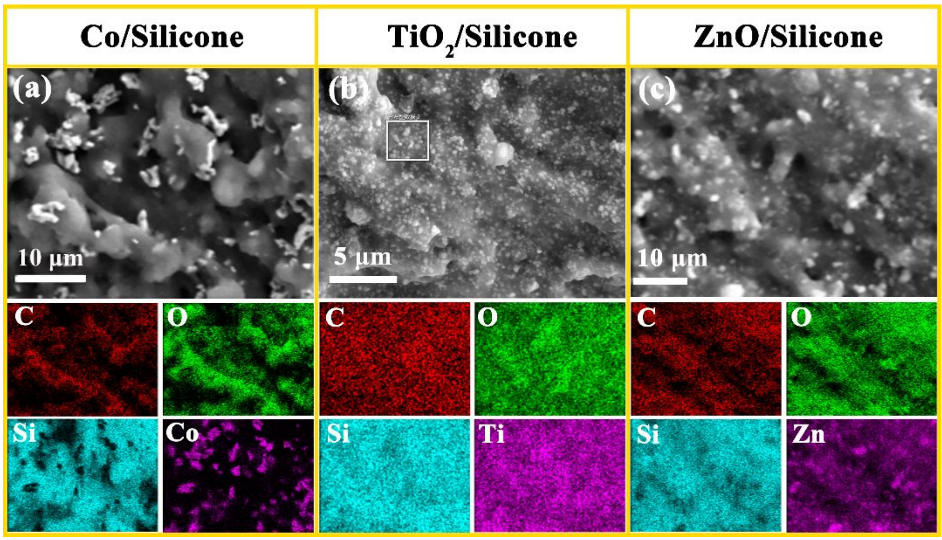
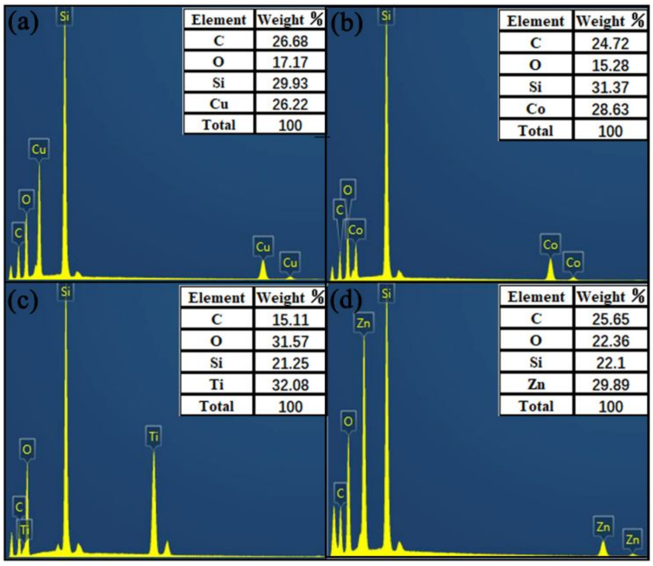


Fig. S2 SEM image and element distribution mapping of the Co/silicone, TiO_2/silicone and ZnO/silicone.



Element	Weight %
C	26.68
O	17.17
Si	29.93
Cu	26.22
Total	100

Element	Weight %
C	24.72
O	15.28
Si	31.37
Co	28.63
Total	100

Element	Weight %
C	15.11
O	31.57
Si	21.25
Ti	32.08
Total	100

Element	Weight %
C	25.65
O	22.36
Si	22.1
Zn	29.89
Total	100

Fig. S3 EDS images and the atom percent of elements in the four types composite monoliths. (a) Cu/silicone; (b) Co/silicone; (c) TiO_2/silicone; (d) ZnO/silicone.

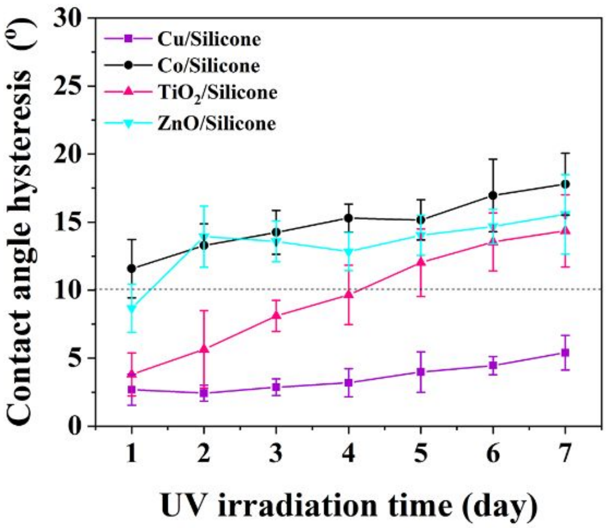


Fig. S4 Water contact angle hysteresis of the obtained monoliths as a function of UV irradiation time.

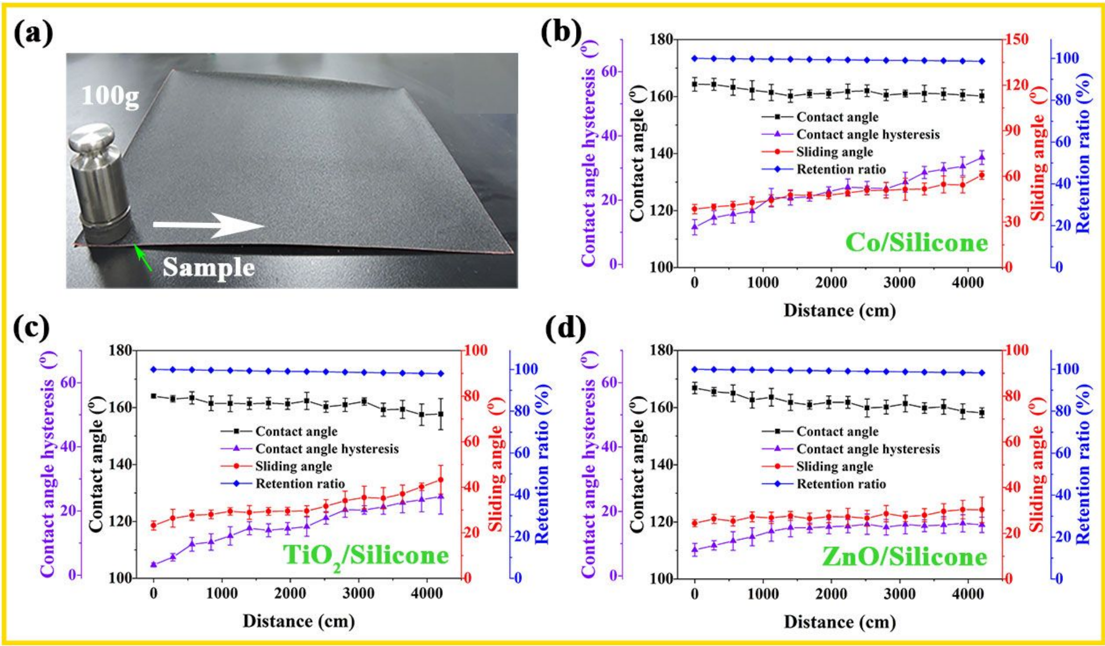


Fig. S5 Durability of the superhydrophobic monoliths. (a) Optical image. Relationship between contact angle, sliding angle, contact angle hysteresis, retention ratio and abrasion distance of Co/silicone (b), TiO_2/silicone (c), ZnO/silicone (d).

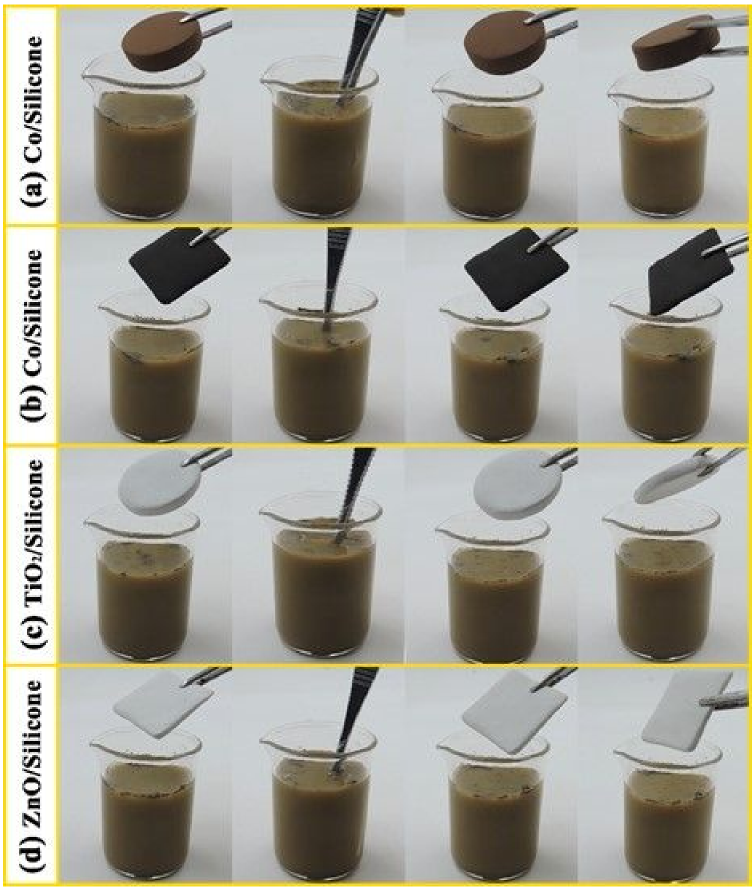


Fig. S6 Self-cleaning properties of the obtained composite monoliths.

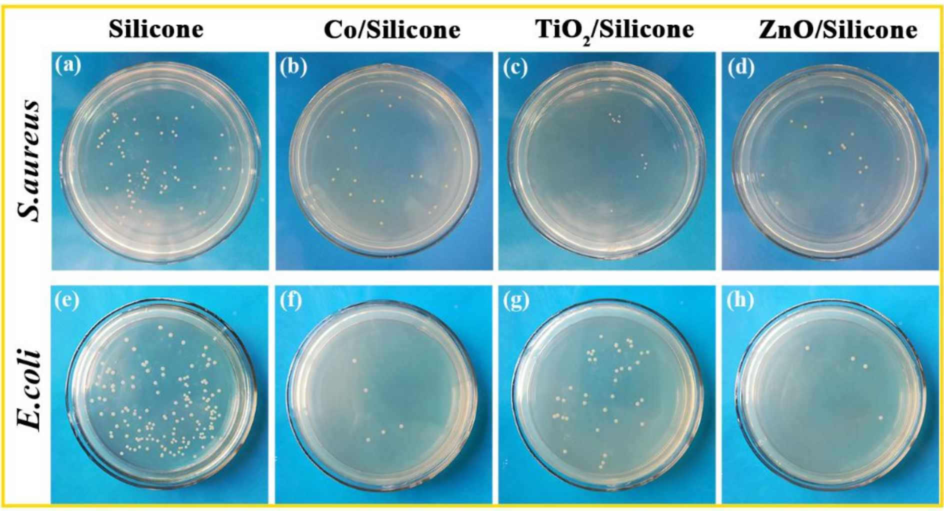


Fig. S7 Antibacterial adhesion test of silicone, Co/silicone, TiO_2/silicone, ZnO/silicone.

Video Captions

Video S1

The Cu/silicone maintains the superhydrophobicity after being folded, twisted and can return to its original shapes.

Video S2

The Cu/silicone monolith was pressed by a Newton meter at ~270 N, and monolith surface can sustain the water-repellent property after the pressure.

Video S3

The Cu/silicone monolith can maintain the water-repellent properties after being penetrated by a needle for many times.

Video S4

Durable superhydrophobicity test. The Cu/silicone surface sustained its water-repellent property after damaged by a knife-scratch.

Video S5

Extremely low temperature test. The sample was dipped into liquid nitrogen for about 10 s and then removed, and the low temperature could not destroy the water-repellent property.

Video S6

Water droplet bouncing on the stretched surface.

Video S7

Water flows out of the superhydrophobic tube after being folded.

Video S8

The obtained monoliths were dipped and then removed from the mud to test their self-cleaning properties.