Supporting Information

Robust superhydrophobic silicone/epoxy functional coating with excellent chemical stability and self-cleaning ability

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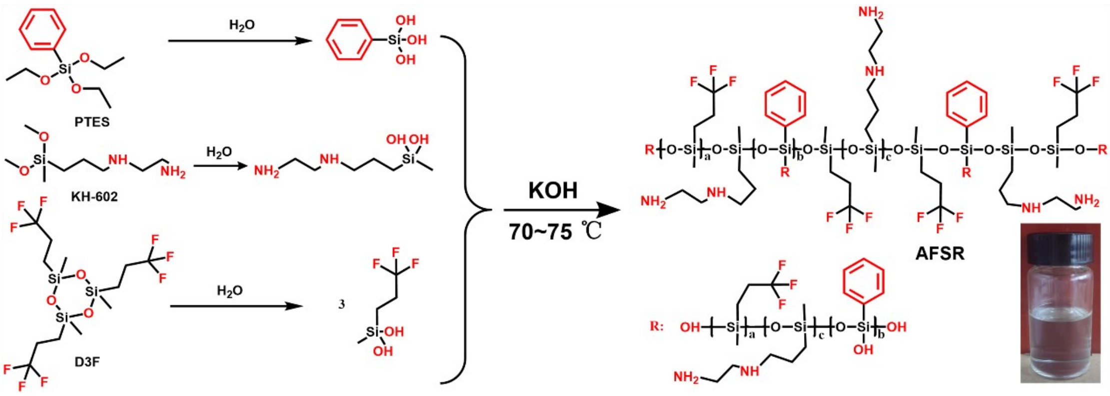

Figure S1. Synthesis of functional AFSR via hydrolytic condensation of D3F, KH-602, and PTES. The inset is an image of the target product, which has good transparency properties.

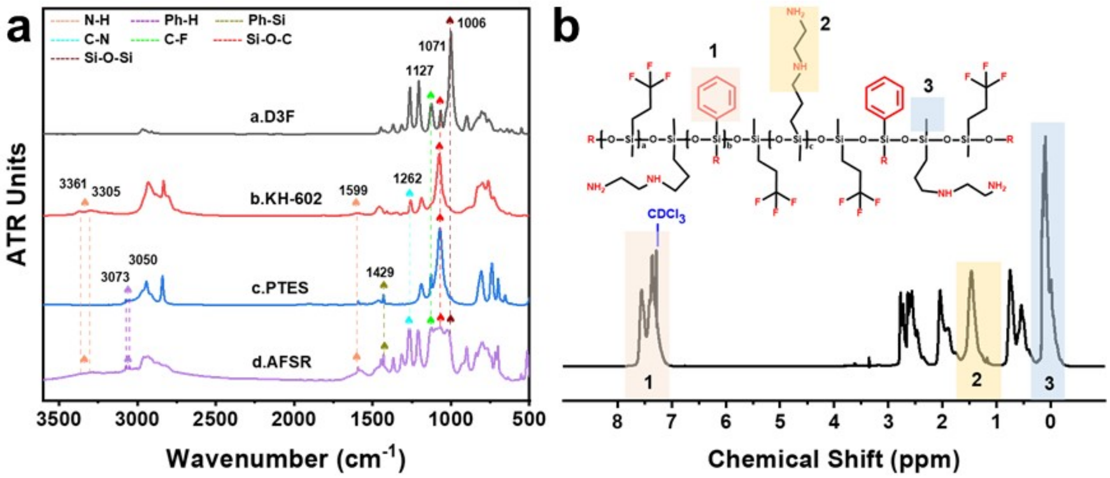

Figure S2. (a) The ATR-FTIR spectra of AFSR and organic silicone monomer, and (b) ^{1}H-NMR spectra of AFSR.

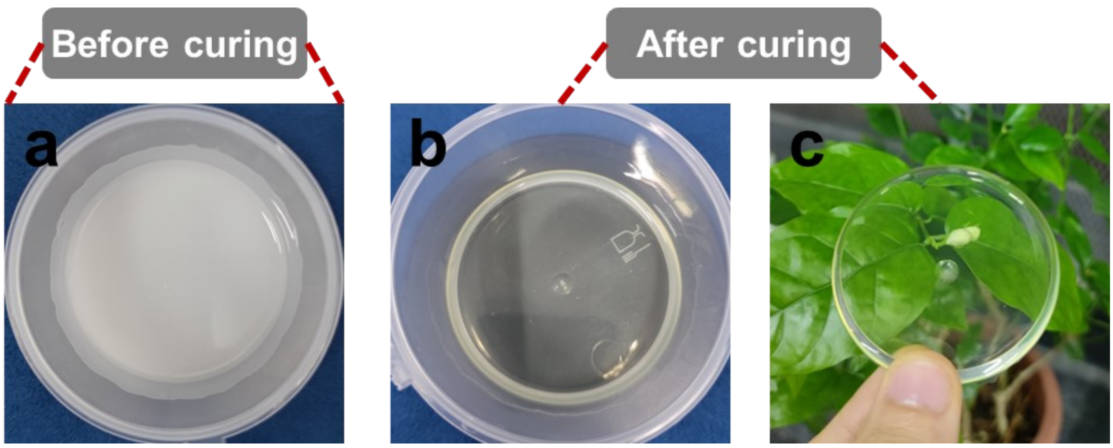

Figure S3. Visual changes before and after AFSR and EP crosslinking curing reactions. (a) Before curing uniform opaque milky white colloid. (b) After curing hard and highly transparent polymer (AFSR/EP). (c) A picture of a transparent polymer at the front of the plant after curing.

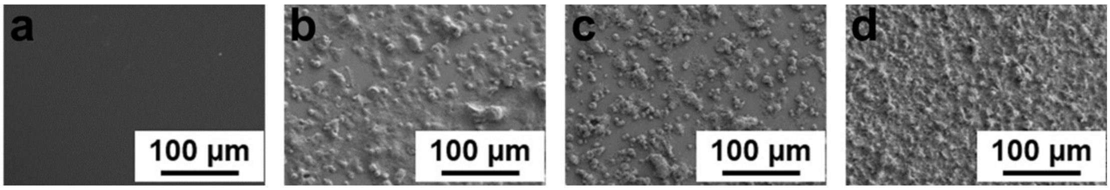

Figure S4. (a) FE-SEM images of AFSR/EP@n-SiO_2 coatings with different content of n-SiO2 particles at 100 μm scale. a) n-SiO_2 = 0 wt%, b) n-SiO_2 = 3 wt%, c) n-SiO_2 = 4 wt%, and d) 5 wt %, respectively.

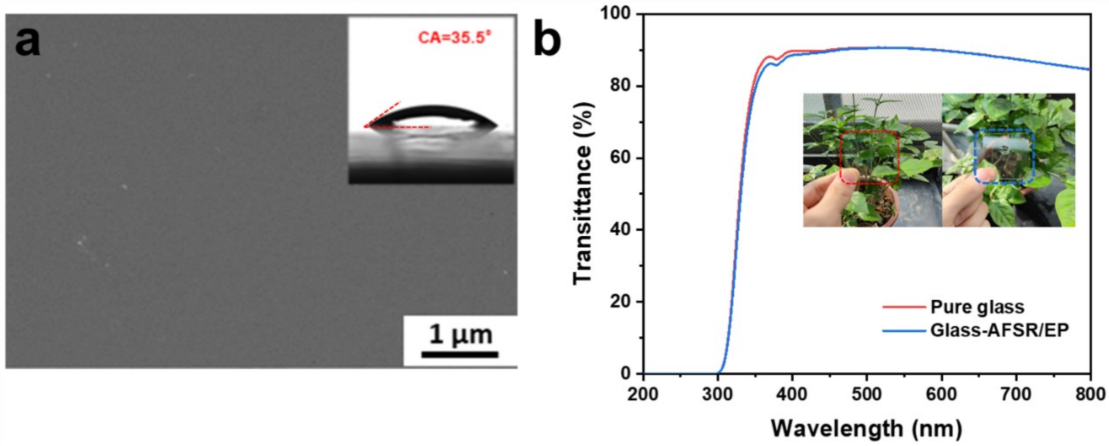

Figure S5. (a) FE-SEM images of pure glass, and (b) transmittance curves of pure glass and hydrophobic coating with AFSR/EP at different wavelengths, insets of (b) are the optical photos of pure glass and hydrophobic coating with AFSR/EP at the front of the plant.

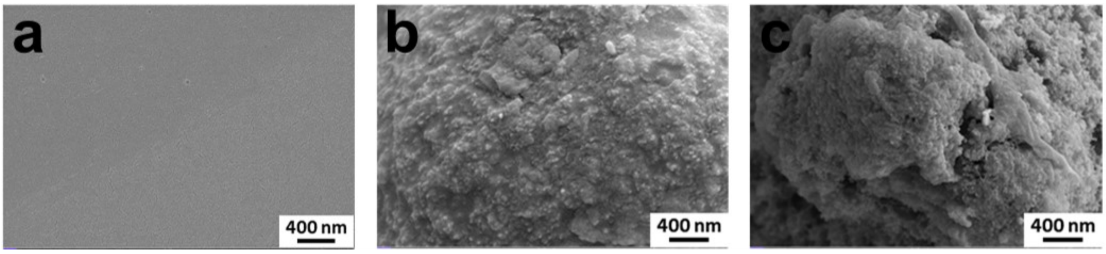

Figure S6. FE-SEM images of (a) n-SiO_2 = 0 wt%, (b) n-SiO_2 = 3 wt%, and (c) n-SiO_2 = 4 wt%.

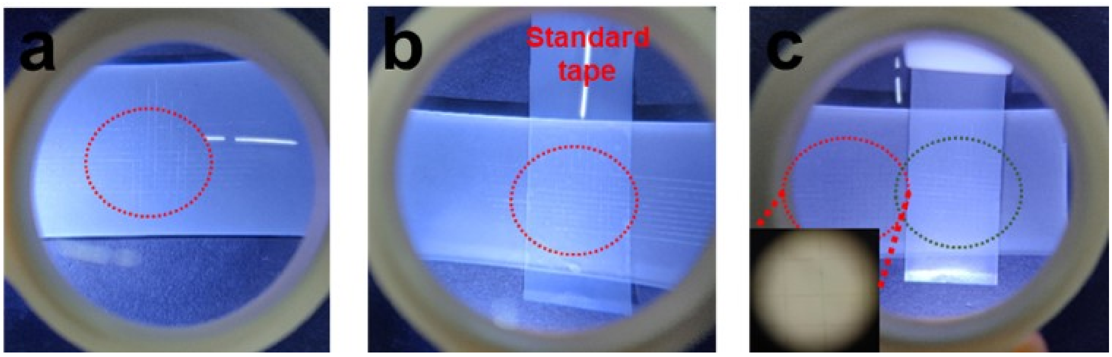

Figure S7. Optical picture of paint film adhesion test. (a) After the knife cut. (b) Standard tape attachment. (c) After the coating has been tested for standard adhesive tape.

Figure S8. Optical image: Air pocket formed by micron and nanometre rough structure in liquid.

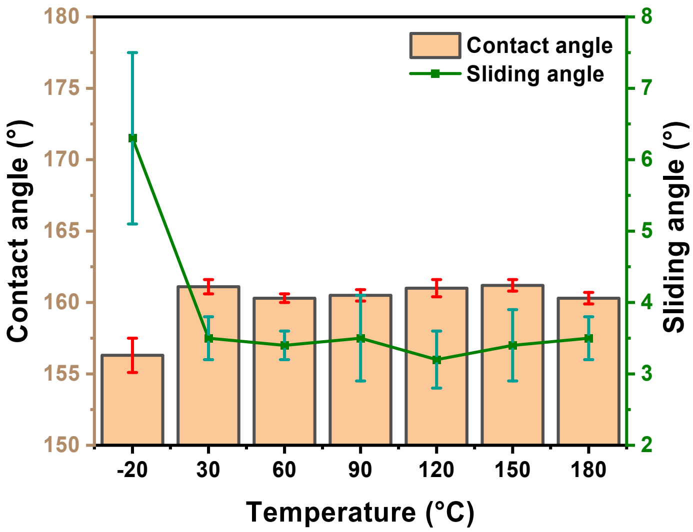

Figure S9. Variation of the CA and SA under different testing conditions of temperature treatment.

Figure S10. Superhydrophobic image of coated sample: coated cardboard after being sprayed and left at room temperature for 24 h.

Table S1. Comparison of the mechanical robustness and physicochemical stability of our coatings with that of the literature reported superhydrophobic coating.

substrate	method	mechanical robustness	UV irradiation	chemical durability			ref
				acidic	alkali	saline	
glass	spraying	CA: 152.6°, SA: 9.6° after 250cm 100 # sandpaper abrasion under 200 g	30W CA: 153.2° SA:6.3° after exposure for 32 days	HCl, pH = 1 CA: 151.3°, SA:11.3° after immersion for 24 h	KOH, pH = 14 CA: 152.2°, SA:8.7° after immersion for 24 h	NaCl, 10 wt % CA: 153.2° SA:6.3° after immersion for 48 h	this work
glass	template	CA＜150°, SA~ * after 2250cm 220 # sandpaper abrasion under 9.8 kPa	40 W CA~ 160° SA~* after exposure for 7 days	*, pH =1 CA~160°, SA~* after immersion for 12 h	*, pH =13 CA~160°, SA~* after immersion for 12 h	NaCl, 10 wt % CA~153°, SA~* after immersion for 4 h	5
glass	spraying	CA＜150°, SA~ * after 80 cycles of 220 # sandpaper abrasion under 1000 g	NA	NA	NA	NA	7
glass	dip + annealing	CA~150°, SA~ 16 after 1200cm of 1200 # sandpaper abrasion under 50 g	20W CA: 152° SA:6.5° after exposure for 30 days	*, pH = 1 CA~152°, SA~11.8° after immersion for 24 h	*, pH = 14 CA~ 151°, SA~15.0° after immersion for 24 h	NA	8
copper	electrodeposition	NA	NA	H_2SO_4, pH =1 CA~152°, SA~4* after immersion for 13 h	NaOH, pH =13 CA~155°, SA~3 after immersion for 13 h	NaCl, 3.5 wt % CA~130°, SA~3° after immersion for 13 h	24
glass	spraying	NA	15W CA~ 145° SA~* after exposure for 30 days	*, pH =1 CA~155°, SA~* after immersion for 72 h	*, pH =14 CA~154°, SA~* after immersion for 72 h	NA	45
glass	drop-cast	NA	NA	HCl, pH =1 CA~155°, SA~* after immersion for 5 h	*, pH =13 CA~155°, SA~* after immersion for 5 h	NA	50
glass	spraying	CA~ 152°, SA~ 9.7° after 700cm 800 # sandpaper abrasion under 50 g	1kW CA~ 153° SA~4.8° after exposure for 2 days	HCl, pH = 2 CA~154°, SA~5° after immersion for 1 h	NaOH, pH = 13 CA~153°, SA~8° after immersion for 1 h	NaCl, 3.5 wt % CA~152°, SA~9° after immersion for 1 h	62
polycarbonate	template	CA~150°, SA~ 15 after 30cm of 1000 # sandpaper abrasion under 26kPa	NA	10% HCl CA~150°, SA~10.0° after immersion for 200 min	10% KOH CA ~150°, SA~10.0° after immersion for 200 min	NA	64
glass	dip-coating	NA	NA	HCl, pH = 3 CA~149, SA＜5° after immersion for 72 min	NaOH, pH = 9 CA~134, SA＜10° after immersion for 60 min	NA	65
steel	electrostatic spraying	CA＜150°, SA~ * after 1350cm * # sandpaper abrasion under 2000 g	60 W CA~ 152° SA~* after exposure for 2 days	*, pH =2 CA~155°, SA~* after immersion for 4 h	*, pH =12 CA~154°, SA~* after immersion for 4 h	NaCl, 10 wt % CA~153°, SA~* after immersion for 4 h	66
glass	spin-coating	CA ~146°, SA~ * after three cycles sandpaper abrasion under 0.52 kPa	NA	H_2SO_4, pH =1 CA ~145°, SA~* after immersion for 10 min	*, pH =14 CA~145°, SA~* after immersion for 10 min	NA	67

a) *: Data that are not listed explicitly in the literature; b) NA: not available