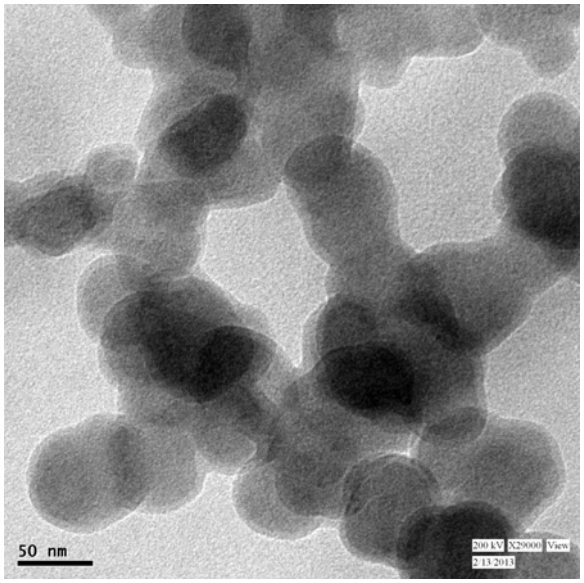
Electronic Supplementary Material (ESI) for RSC Advances.

(a)



(b)

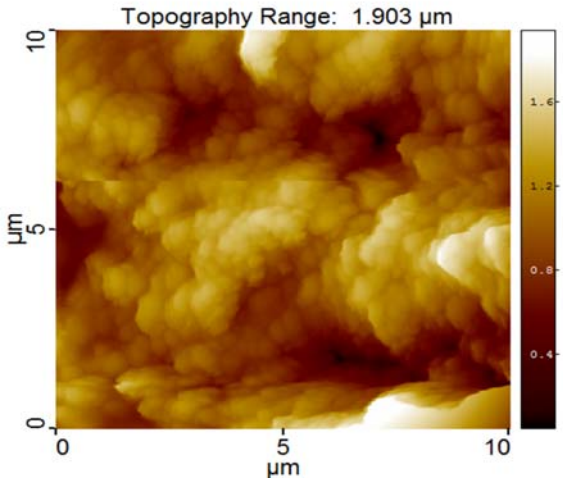


Figure S1. a) TEM image of camphor soot particles. b) AFM image of plain PDMS/camphor soot composite film

Table S1. The testing conditions for sand abrasion and corresponding static contact angle (WCA) for the tested samples.

Sl . no	Hight (cm)	WCA (Degree)	$E_{impinged}$ (J) x10^{-9}	$I_{velocity}$ (Km/h)
1	10	172±0.5	8.3	5.1
2	20	169±0.4	16.8	7.2
3	30	167±0.5	25.1	8.8
4	40	166±0.4	33.5	10.2
5	50	165±0.5	41.9	11.3
6	60	165±0.5	50.3	12.4
7	70	164±0.6	58.6	13.4

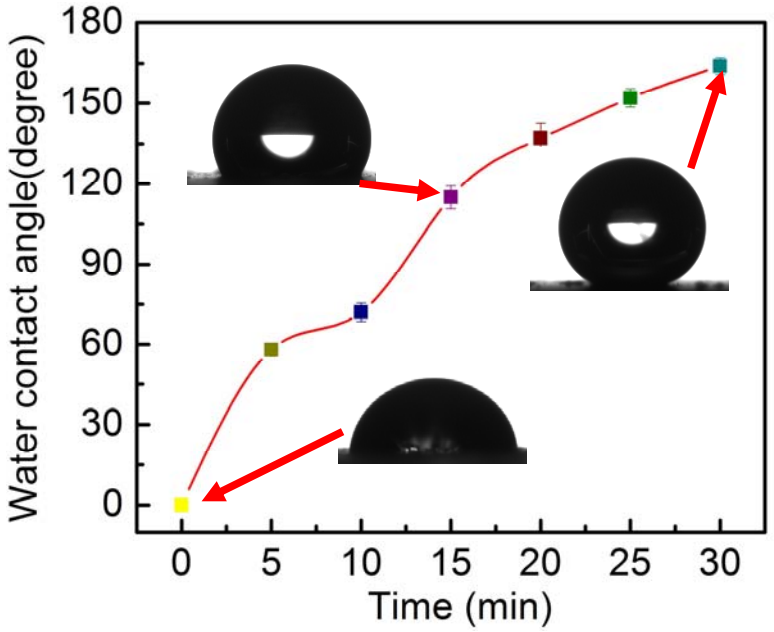


Figure S2. The variation of water CA on the O_2 plasma treated surface along with the healing time at 125 °C.

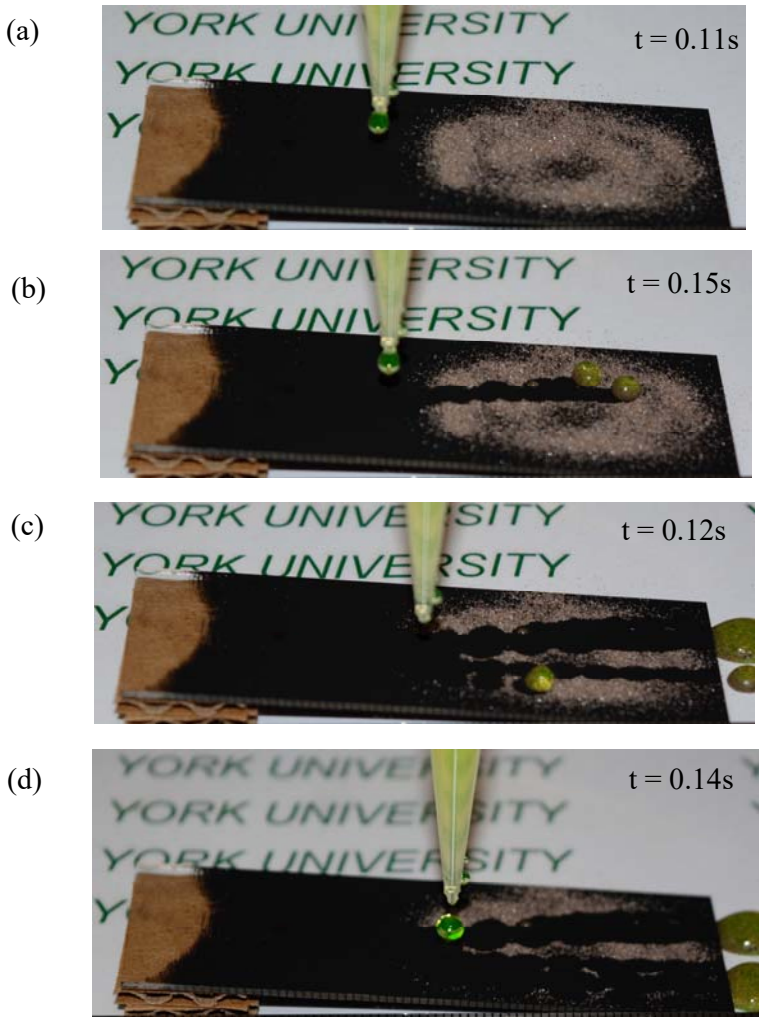
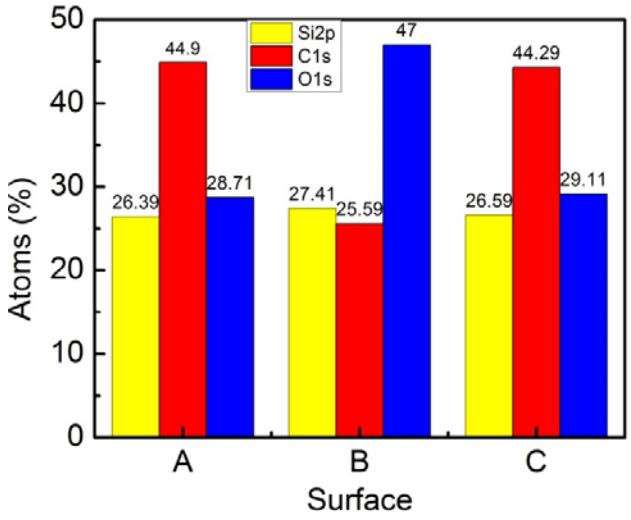


Figure S3. Time lapse snap shots for self-cleaning effect of plasma treated PDMS/camphor soot composite surface healed by heating (at TA= 4.6^0).

(a)



(b)

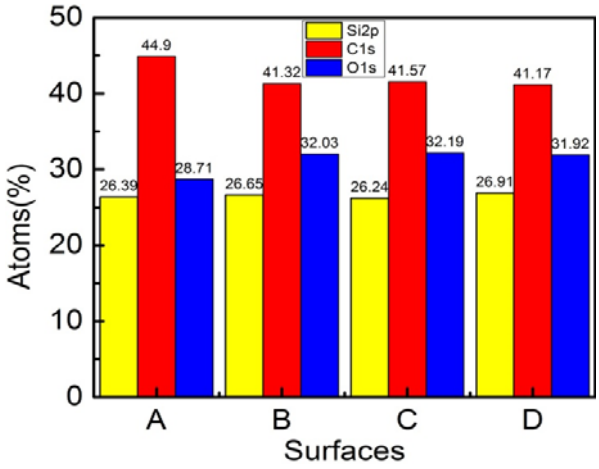


Figure S4. a) Atomic percentage of Si2p, C1s and O1s in A: PDMS/Camphor soot composite surface, B: Plasma treated PDMS/Camphor soot composite surface, C: same surface healed by heat. b) Atomic percentage of Si2p, C1s and O1s in A: PDMS/Camphor soot composite surface, B: 1M HNO_3 solution treated PDMS/Camphor soot composite surface, C: same surface healed by heat, D: Healed by THF and heat

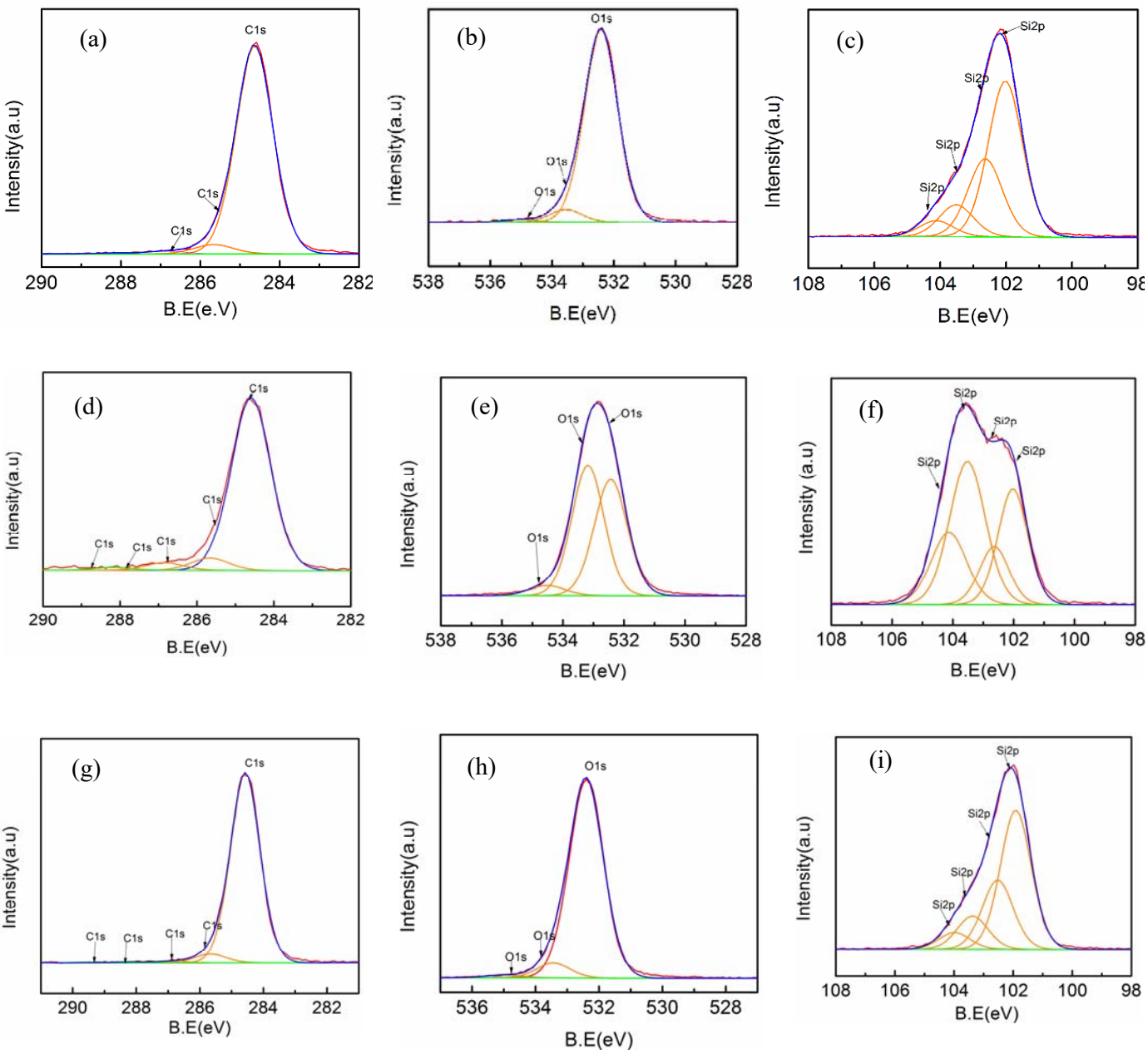


Figure S5. a) C1s spectra. b) O1s spectra. c) Si2p spectra of PDMS/camphor soot composite films, d) C1s spectra. e) O1s spectra. f) Si2p spectra of Plasma etched PDMS/camphor soot composite films, g) C1s spectra. h) O1s spectra. i) Si2p spectra of Plasma etched PDMS/camphor soot composite film healed by heat

Table S2 Atomic percentage of C1s, O1s and Si2p peaks of PDMS/camphor soot composite films, Plasma etched PDMS/camphor soot composite film healed by heat, Plasma etched PDMS/camphor soot composite films

	PDMS Composite film			**Plasma etched PDMS Composite film**			**Plasma etched PDMS Composite film healed by heat**		
Name	***Peak BE***	***FWHM eV***	***Atomic %***	***Peak BE***	***FWHM eV***	***Atomic %***	***Peak BE***	***FWHM eV***	***Atomic %***
Si2p3	102.0	1.23	83.03	102.0	1.15	40.08	101.9	1.23	80.56
Si2p1	102.6	1.23	0.00	102.6	1.15	0.00	102.5	1.23	0.00
Si2p3	103.5	1.23	16.97	103.5	1.39	59.92	103.3	1.23	19.44
Si2p1	104.1	1.23	0.00	104.1	1.39	0.00	103.9	1.23	0.00
	PDMS Composite film			**Plasma etched PDMS Composite film**			**Plasma etched PDMS Composite film healed by heat**		
Name	***Peak BE***	***FWHM eV***	***Atomic %***	***Peak BE***	***FWHM eV***	***Atomic %***	***Peak BE***	***FWHM eV***	***Atomic %***
C1s	284.6	1.09	93.38	284.5	1.20	87.39	284.5	1.09	93.62
C1s	285.6	1.15	4.51	285.6	1.15	5.93	285.6	1.15	4.66
C1s	286.8	1.16	1.34	286.8	1.16	3.69	286.8	1.16	0.89
C1s	288.1	1.15	0.54	288.1	1.15	1.39	288.1	1.15	0.54
C1s	289.5	1.16	0.24	289.5	1.16	1.59	289.5	1.16	0.28
	PDMS Composite film			**Plasma etched PDMS Composite film**			**Plasma etched PDMS Composite film healed by heat**		
Name	***Peak BE***	***FWHM eV***	***Atomic %***	***Peak BE***	***FWHM eV***	***Atomic %***	***Peak BE***	***FWHM eV***	***Atomic %***
O1s	532.4	1.27	92.55	532.4	1.27	45.74	532.2	1.27	91.98
O1s	533.5	1.23	5.96	533.1	1.23	49.95	533.0	1.23	6.64
O1s	535.0	1.37	1.48	534.5	1.37	4.30	534.5	1.37	1.38

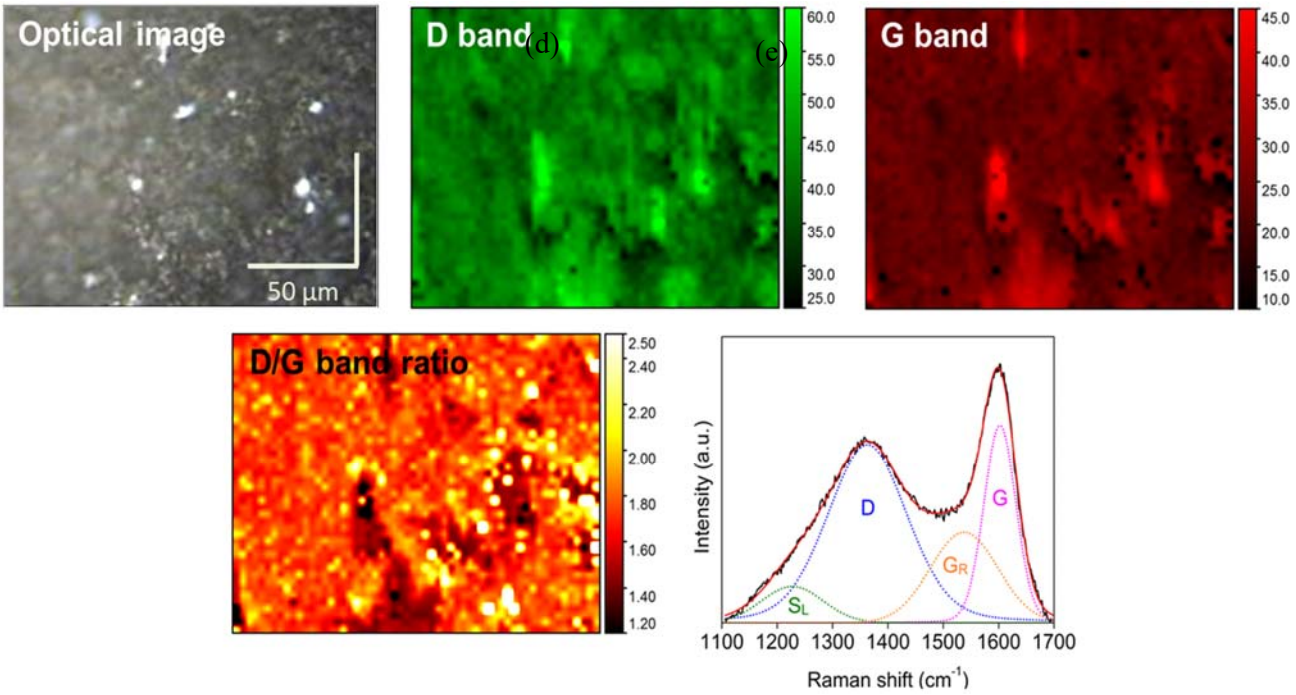


Figure S6. Chemical maps generated through Raman spectroscopy of Plain PDMS/camphor soot composite film. a) Optical CCD image. b) *D* band (mapping region: 1350-1365 cm^{-1}). c) *G* band (mapping region: 1537-1540 cm^{-1}). d) *D/G* band ratio. e) Raman spectral acquisition at 514 nm (from 1100 to 1700 cm^{-1})

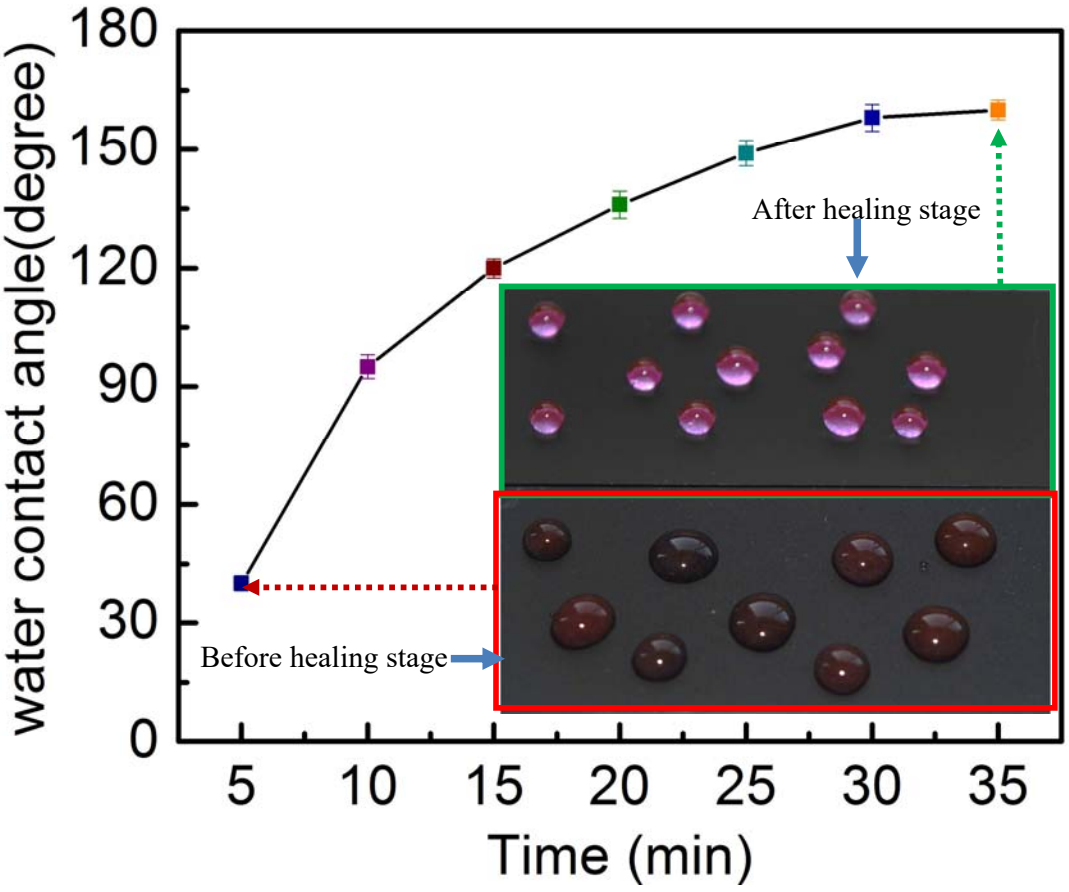
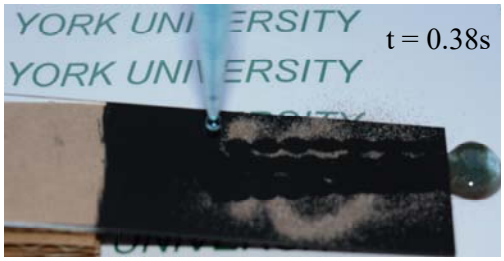


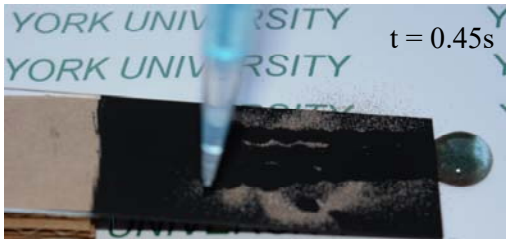
Figure S7. The variation of water CA on the 1 M Nitric acid solution treated surface along with the healing time at 50 °C. Inset images shows the shape of droplets before healing and after healing stage

(a)

(b)



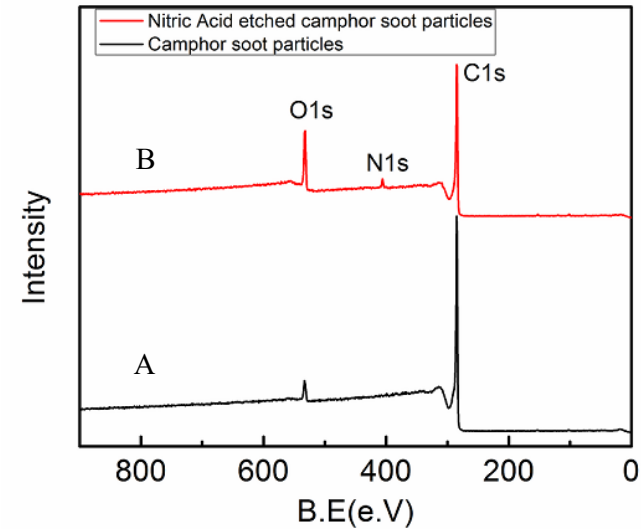
(c)



(d)

Figure S8. Time lapse snap shots for self-cleaning effect of Nitric acid solution treated PDMS/camphor soot composite surface healed by THF (at TA = 7.3^0).

(a)



(b)

Peaks Position	Si2p Rel. At%	C1s Rel. At%	O1s Rel. At%	N1s Rel. At%
A	0.51	94.36	5.13	
B	0.93	81.53	2.81	14.74

Figure S9. a) XPS spectra of Camphor soot particles and Nitric acid etched camphor soot particles. b) Atomic percentage of Si2p, C1S and O1s of A: Camphor soot particles, B: Nitric acid etched camphor soot particles

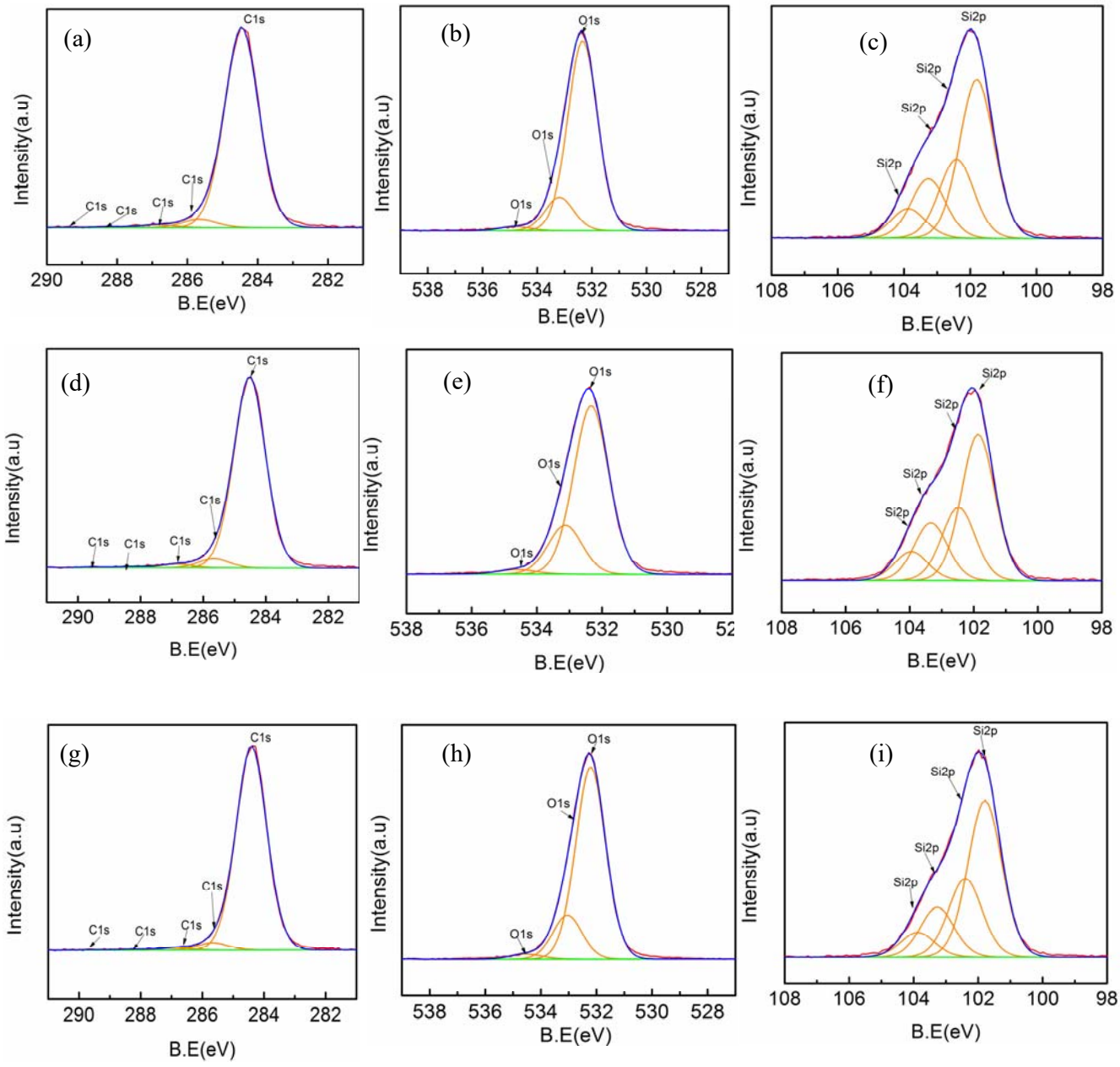


Figure S10. a) C1s spectra. b) O1s spectra. c) Si2p spectra of 1M HNO_3 solution treated PDMS/camphor soot composite films, d) C1s spectra. e) O1s spectra. f) Si2p spectra of 1M HNO_3 solution treated PDMS/camphor soot composite films healed by heat, g) C1s spectra. h) O1s spectra. i) Si2p spectra of 1M HNO_3 solution treated PDMS/camphor soot composite film healed by THF and heat.

Table S3. Atomic percentage of C1s, O1s and Si2p peaks of 1M HNO_3 solution treated PDMS/camphor soot composite films, and PDMS/camphor soot composite film healed by both THF and heat.

	PDMS Composite film etched in 1M Nitric acid			**Nitric acid etched PDMS Composite film healed by heat**			**Nitric acid etched PDMS Composite film healed by THF and heat**		
Name	***Peak BE***	***FWHM eV***	***Atomic %***	***Peak BE***	***FWHM eV***	***Atomic %***	***Peak BE***	***FWHM eV***	***Atomic %***
Si2p3	101.8	1.23	72.76	101.8	1.23	71.70	101.8	1.23	75.79
Si2p1	102.4	1.23	0.00	102.4	1.23	0.00	102.4	1.23	0.00
Si2p3	103.3	1.23	27.24	103.3	1.23	28.30	103.3	1.23	24.21
Si2p1	103.8	1.23	0.00	103.9	1.23	0.00	103.8	1.23	0.00
	PDMS Composite film etched in 1M Nitric acid			**Nitric acid etched PDMS Composite film healed by heat**			**Nitric acid etched PDMS Composite film healed by THF and heat**		
Name	***Peak BE***	***FWHM eV***	***Atomic %***	***Peak BE***	***FWHM eV***	***Atomic %***	***Peak BE***	***FWHM eV***	***Atomic %***
C1s	284.5	1.13	94.14	284.5	1.19	93.00	284.5	1.16	94.84
C1s	285.6	1.15	3.87	285.6	1.15	4.25	285.6	1.15	3.42
C1s	286.8	1.16	1.37	286.8	1.16	1.77	286.8	1.16	1.13
C1s	288.1	1.15	0.39	288.1	1.15	0.61	288.1	1.15	0.41
C1s	289.5	1.16	0.23	289.5	1.16	0.37	289.5	1.16	0.19
	PDMS Composite film etched in 1M Nitric acid			**Nitric acid etched PDMS Composite film healed by heat**			**Nitric acid etched PDMS Composite film healed by THF and heat**		
Name	***Peak BE***	***FWHM eV***	***Atomic %***	***Peak BE***	***FWHM eV***	***Atomic %***	***Peak BE***	***FWHM eV***	***Atomic %***
O1s	532.3	1.27	83.58	532.3	1.27	76.19	532.3	1.27	79.98
O1s	533.1	1.23	14.43	533.1	1.23	21.53	533.0	1.23	17.68
O1s	534.8	1.37	1.99	534.6	1.37	2.27	534.5	1.37	2.34