Hierarchical carbon nanotubes/SiO₂ nanoparticle network induced superhydrophobic and conductive coating for wearable strain sensors with superior sensitivity and ultra-low detection limit

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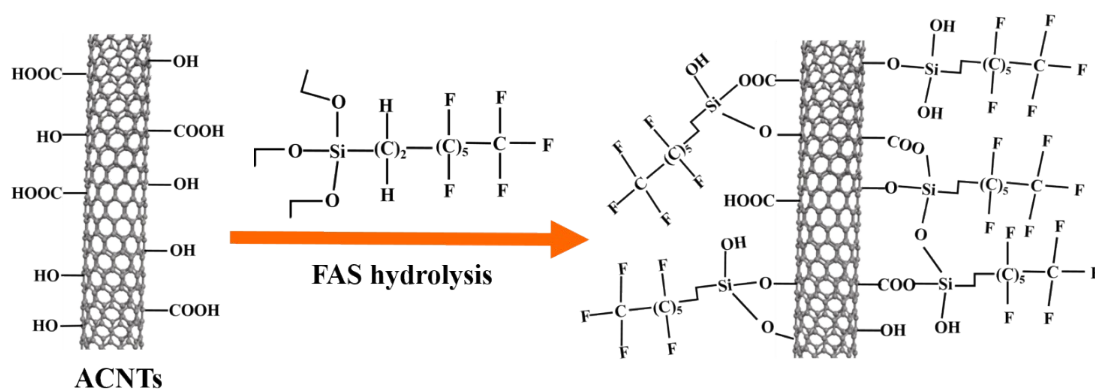Fig. S1 The photograph of the watering can used for spraying coating

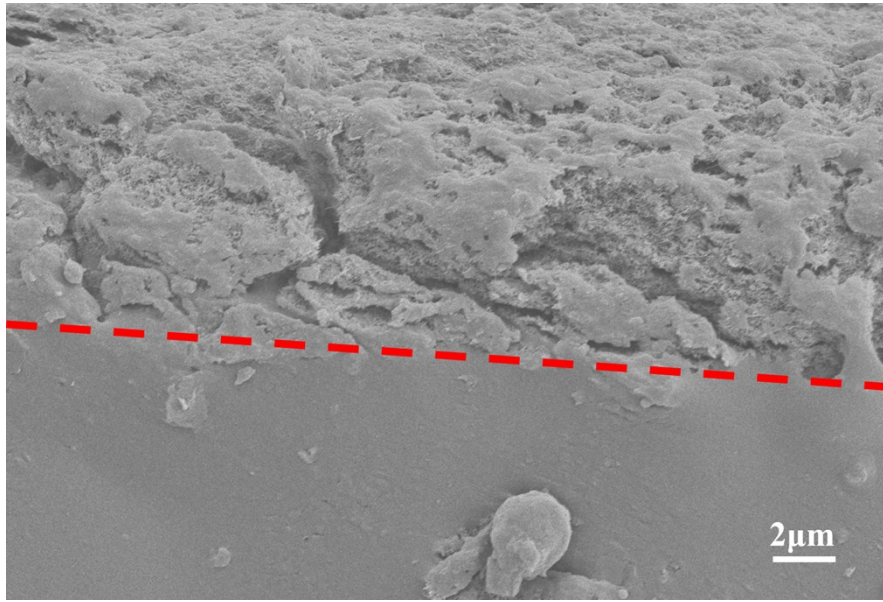**Fig. S2** Schematic diagram of the mechanism of carbon nanotubes fluorinated by FAS.

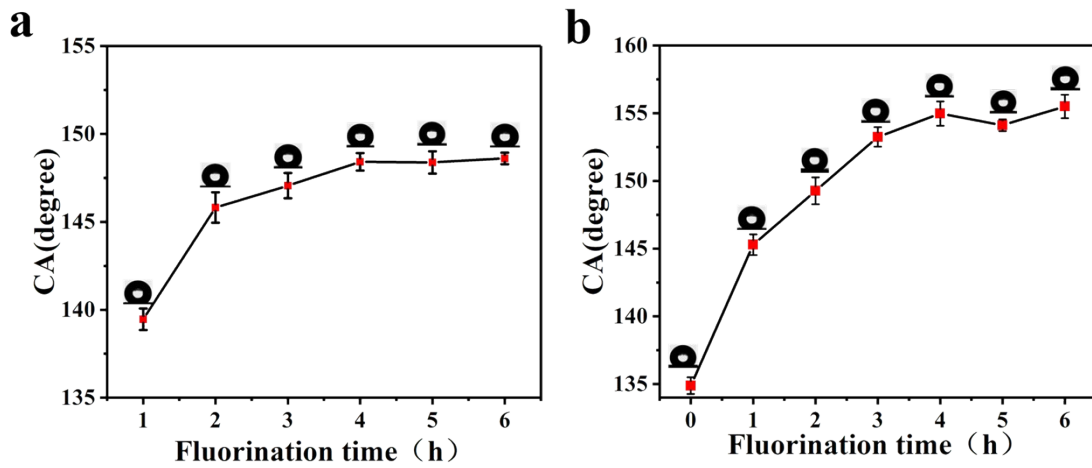**Fig.S3** SEM image of cross section for the coating showing the thickness.

Fig.S4 Contact angle (CA) of samples as a function of fluorination time. (a) Without addition of SiO_2. (b) With the addition of SiO_2 possessing the weight percentage of 25 wt%.
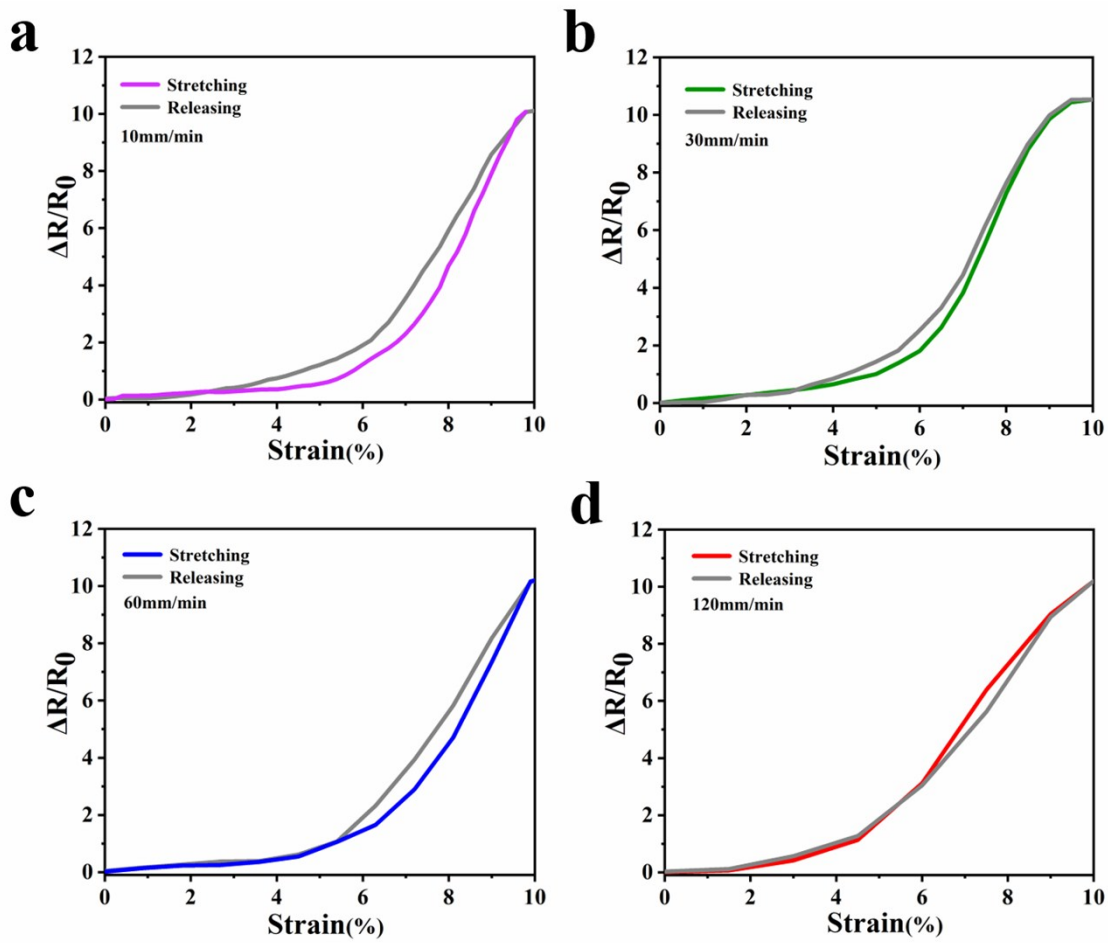
Fig.S5 The graphs of $\Delta R/R_0$ vs strain for the different strain rates. (a) 10mm/min, (b) 30mm/min, (c) 60mm/min, (d) 120mm/min.
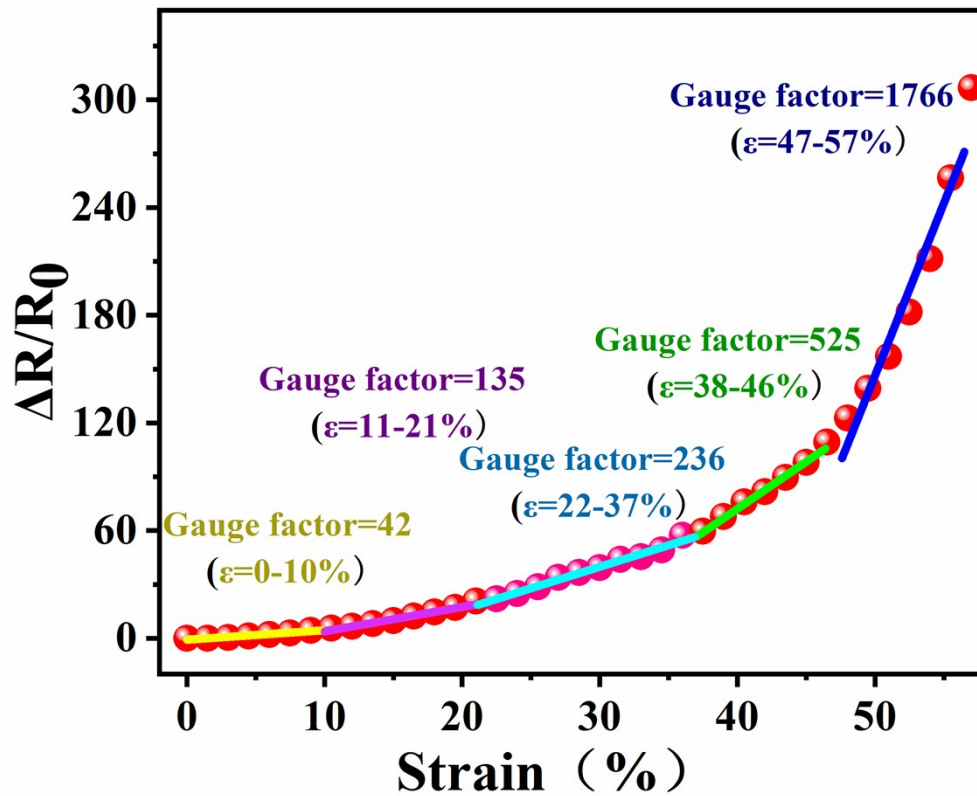
Fig.S6 Gauge factors of the FCNTs/SiO$_2$ strain sensor under different strain regions

Table S1 Comparison of the gauge factor FCNTs/SiO$_2$ strain sensor with coating based strain sensors under different strain range

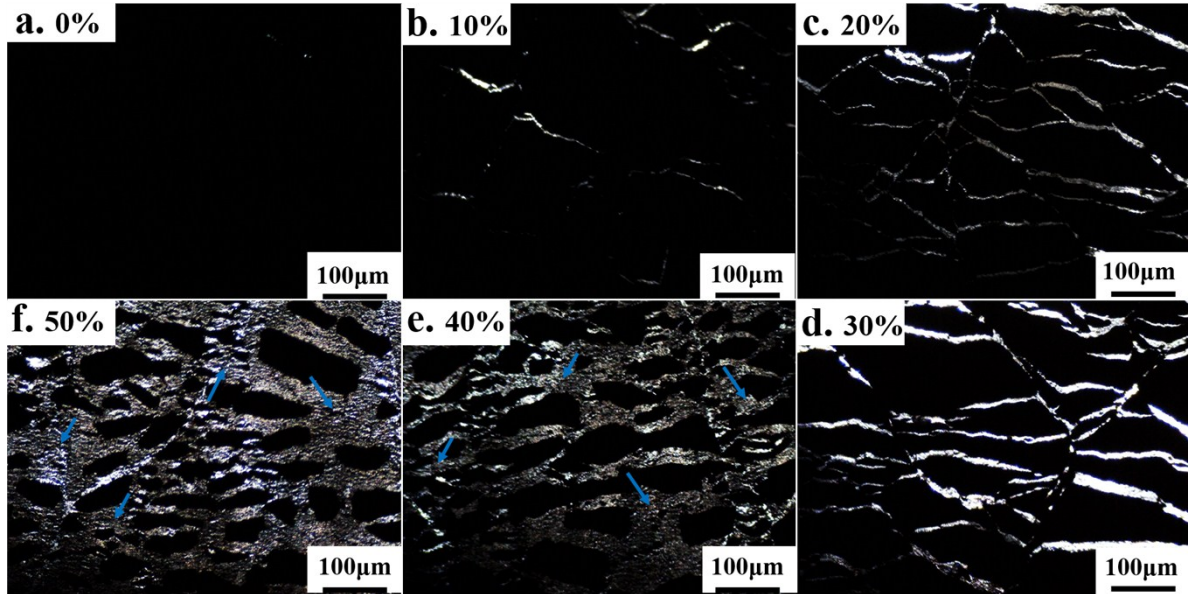| No.	Sensors	Gauge Factor under different strain range	Reference
1	MWCNT/TPE coating	15.6 (ε: 0–6%), 8.1(ε:15–50%), 5.4(ε: 55–76%)	Ref. 1
2	SWCNTs/PDMS sensor	161(ε: 0–2%), 9.8(ε: 2–15%), 0.58(ε: 15–150%)	Ref. 2
3	Graphite/silk fiber sensor	1450 (ε: 0–15%)	Ref. 3
4	Graphene/PU coating	86.8(ε: 0–50%)	Ref. 4
5	Fish scale-like rGO/tape film	16.2(ε: 0–60%), 150(ε: 60-82%)	Ref. 5
6	Graphene/PVP coating	3500(ε:0–5%),600(ε:5–25%)	Ref. 6
7	P(VDF-TrFE)/Ag nanowires sensor	5.3(ε: 0–25%)	Ref. 7
8	**FCNTs/SiO$_2$ coating**	**42(ε: 0–10%), 135(ε: 11-21%), 236(ε: 22–37%), 525(ε: 38–46%), 1766(ε: 47–57%)**	**This work**

Fig.S7 Images under optical microscope of surface morphology of FCNTs/SiO$_2$ coatings under different strain during stretching. (a) 0%, (b) 10%, (c) 20 %, (d) 30%, (e) 40% and (f) 50%.
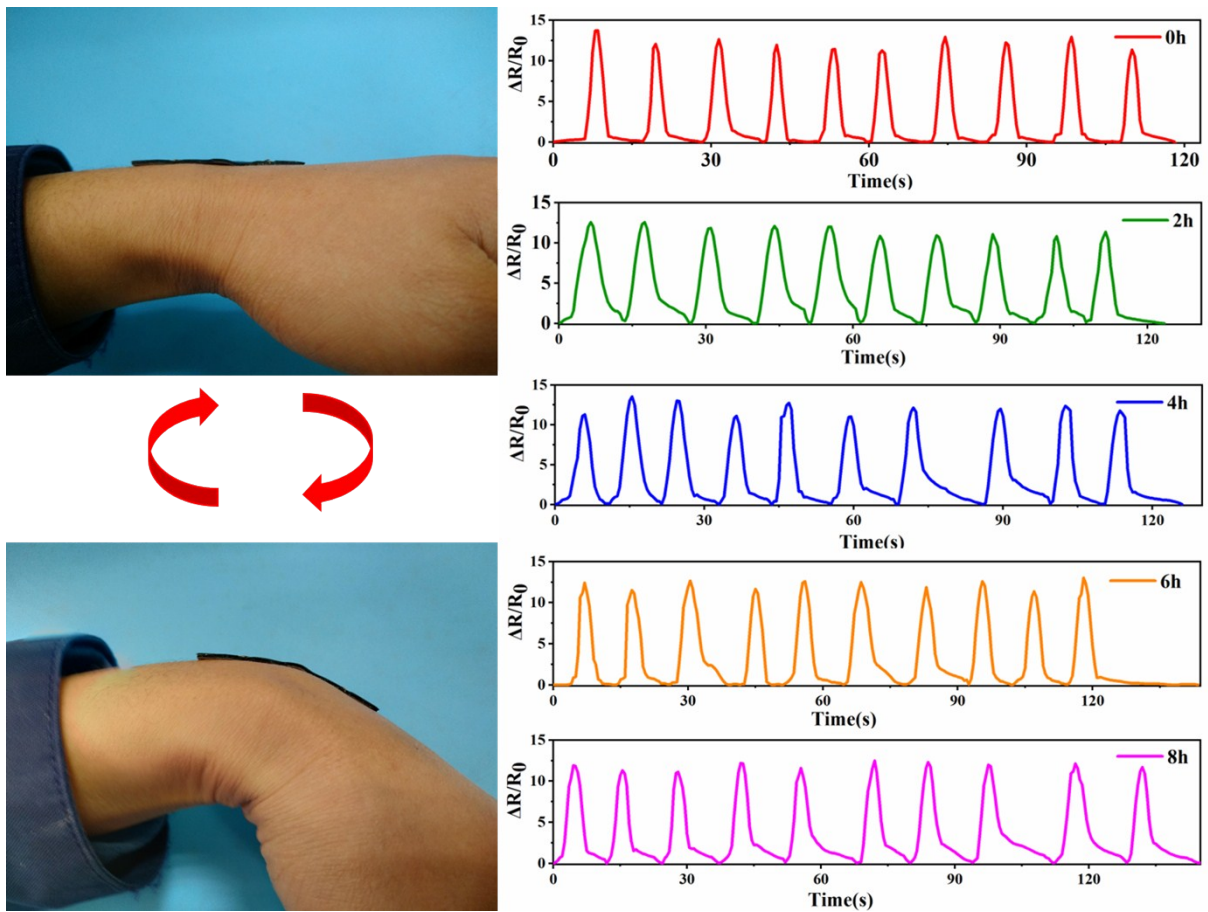

Fig.S8 The wrist bending test of the sensor after immersed in an acid solution of pH=1 for different times of 0h,2h,4h,6h,8h.

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