Supporting Information

A multi-functional light-driven actuator with an integrated temperature-sensing function based on a carbon nanotube composite

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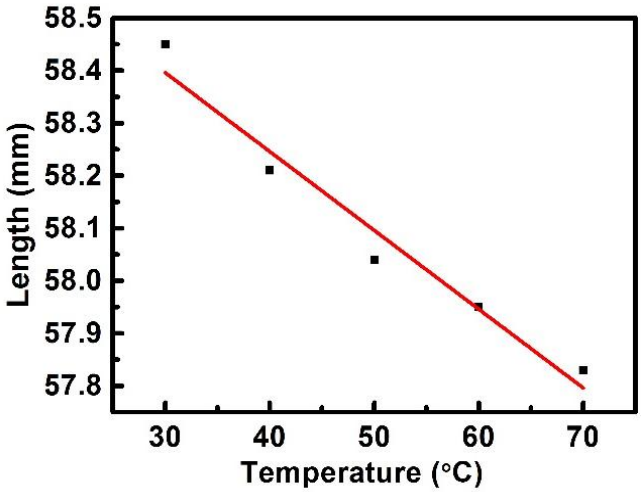

Fig. S1. Length change of the MC film as a function of temperature.

Fig. S2. Optical photo of the flexible and self-supporting CNT-MC film.

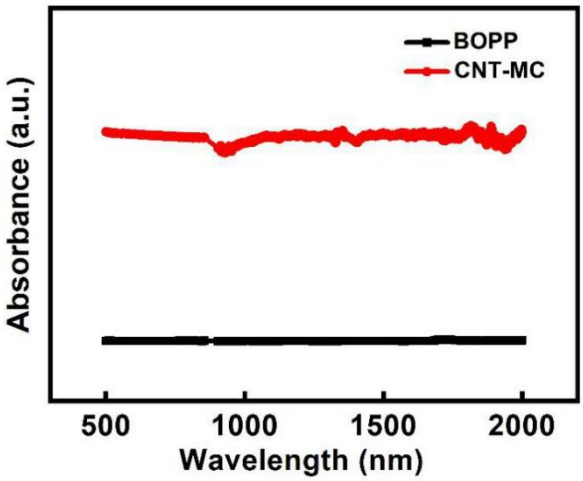

Fig. S3. Absorbance spectra of the CNT-MC film and BOPP film in the wavelength range from 500 to 2000 nm.

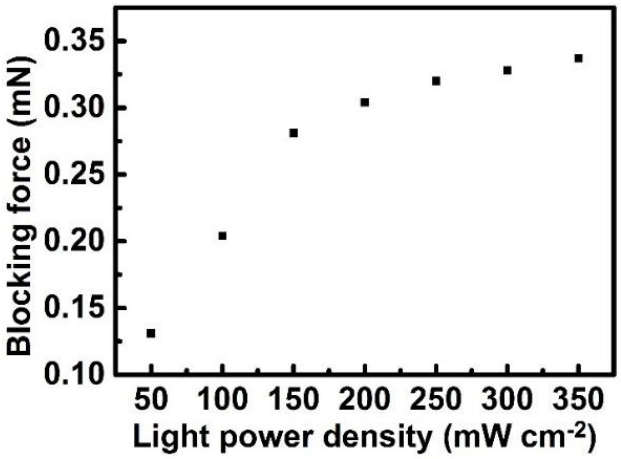

Fig. S4. Blocking force of the CNT-MC/BOPP actuator as a function of light power density.

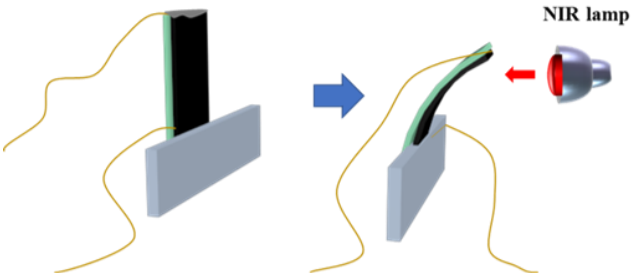

Fig. S5. Schematic diagram of testing the sensing performance of the CNT-MC/BOPP actuator

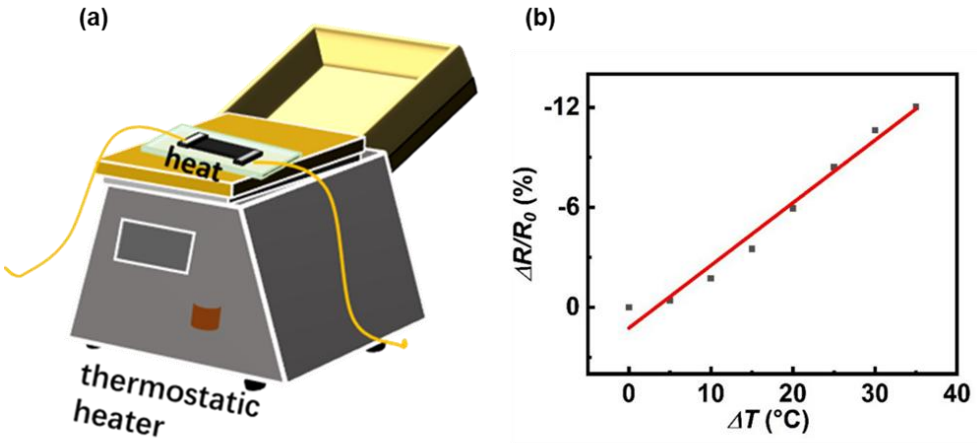

Fig. S6. (a)Schematic diagram of tesing the sensing performance of device on a thermostatic heater; (b) Relative resistance change of the CNT-MC film as a function of temperature change.

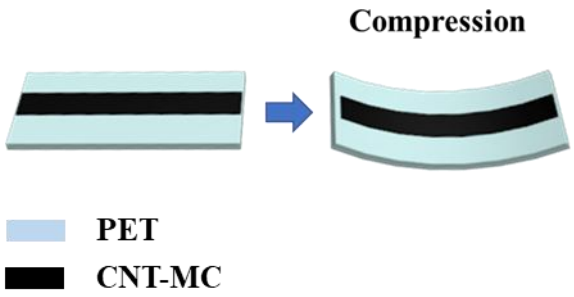

Fig. S7. Schematic diagram of the strain test for the CNT-MC film.

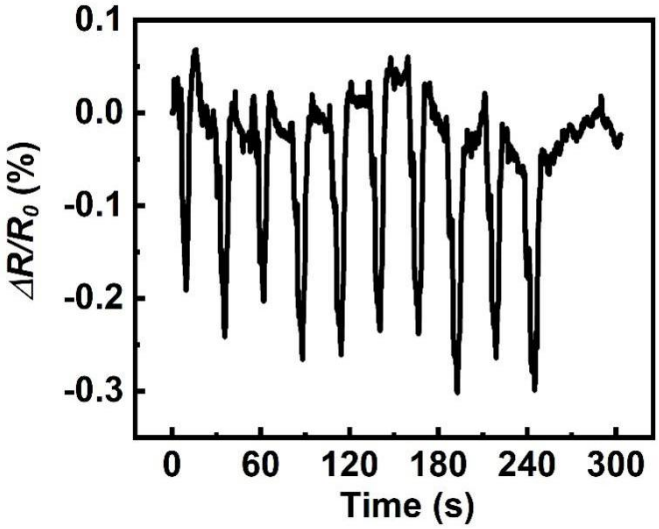

Fig. S8. The relative resistance change of CNT-MC film under strain.

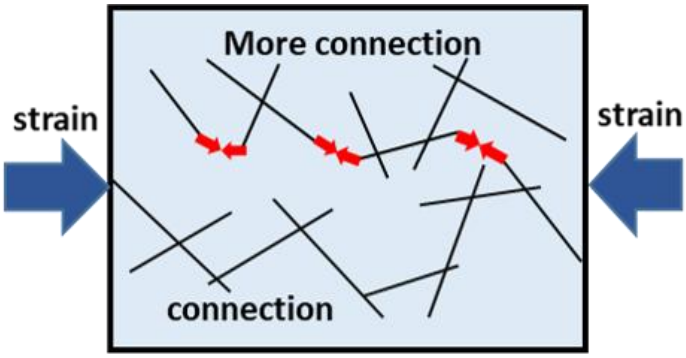

Fig. S9. Schematic diagram of the mechanism of strain induced resistance change.

Figure. S10. Optical photos of the tests for the CNT-MC film as a temperature sensor.

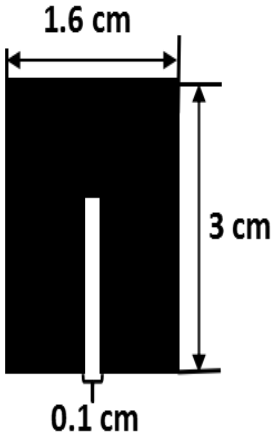

Fig. S11. Dimensions of one CNT-MC/BOPP actuator in the intelligent gripper.

Table. S1 Actuation performance of CNT-based actuators.

Material	Size	Curvature	Ref.
CNT-MC/BOPP	2.5 cm×0.5 cm	1.03 cm^{-1}	Our work
SWCNT-poly(N-isopropylacrylamide)/ low density polyethylene	5 cm×0.5 cm	0.62 cm^{-1}	Nano Lett. 2011, 11, 3239.
Polycarbonate/CNT	2.5 cm in diameter	0. 4 cm^{-1} in diameter	Nat. Commun. 2014, 5, 2983.
ACNT/paraffin wax	2 cm×0.4 cm	1.48 cm^{-1}	J. Am. Chem. Soc. 2016, 138, 225.
CNT–boron nitride–epoxy	6 cm ×1 cm	1.04 cm^{-1}	Composites, Part B 2014, 62, 256.
CNTs/polyvinylidenefluoride	4 cm×0.5 cm	0.6 cm^{-1}	Macromol. Mater. Eng. 2020, 2000502