Electronic Supplementary Information for

2D End-to-end Carbon Nanotube Conductive Networks in Polymer Nanocomposites: A Conceptual Design to Dramatically Enhance Sensitivities of Strain Sensors

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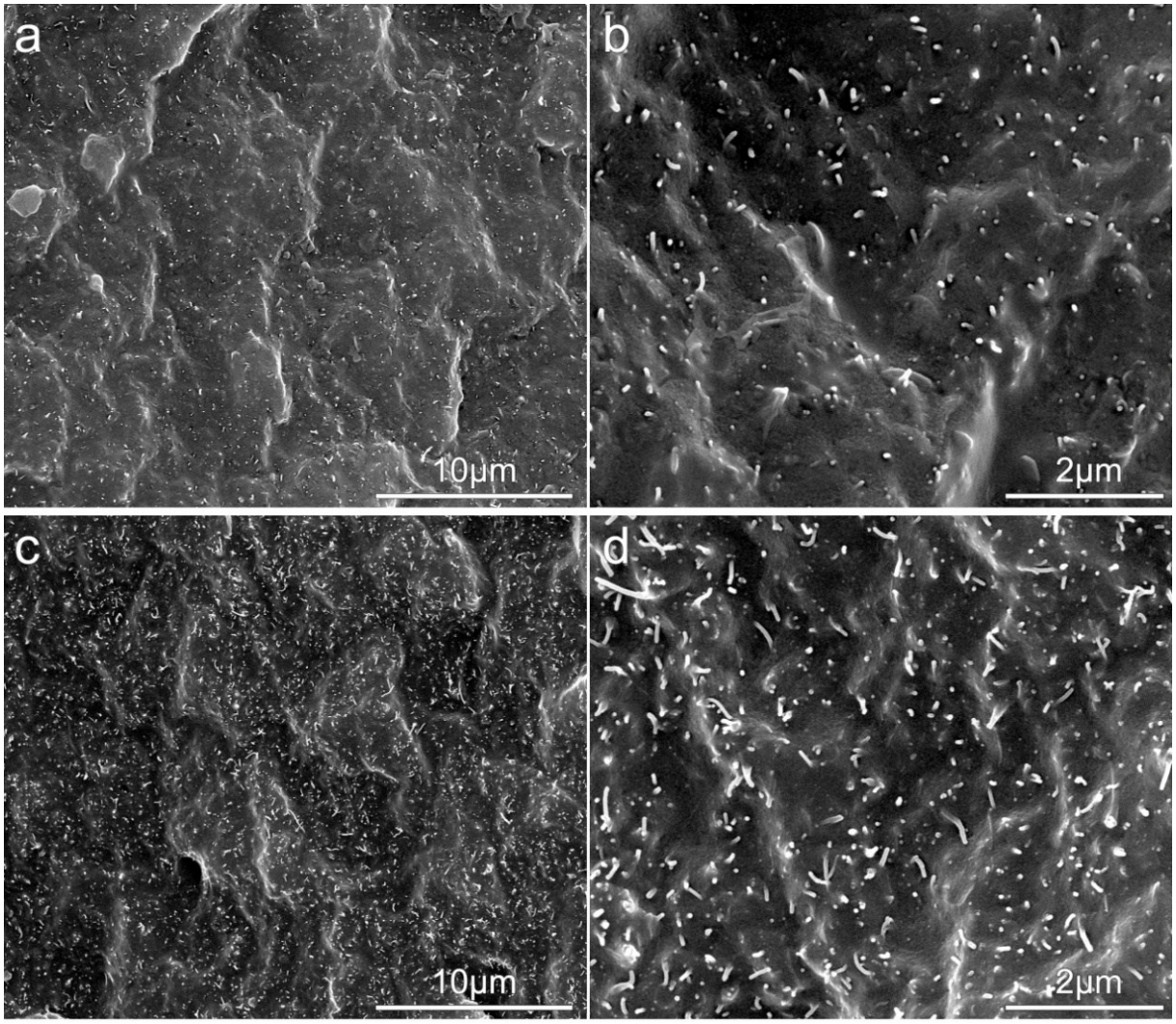

Fig. S1. SEM images of MWCNT-OBC nanocomposites with a MWCNT content of **a,b)** 7.61 vol%, and **c,d)** 8.96%.

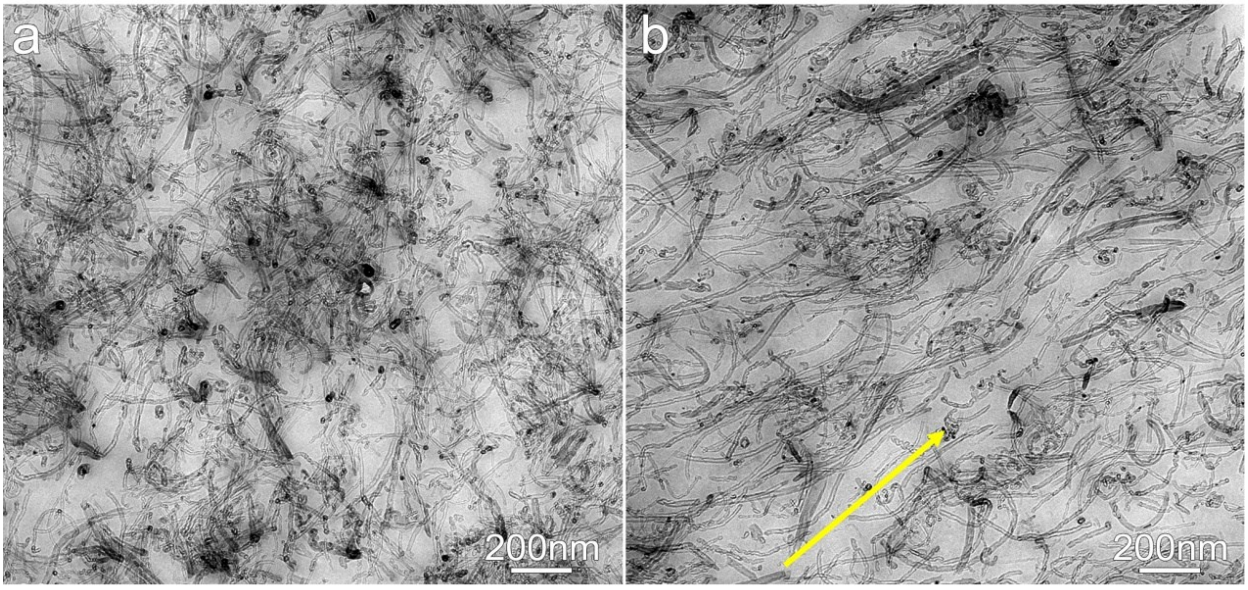

Fig. S2. TEM images of MWCNT-OBC nanocomposites with a MWCNT content of 8.96 vol% **(a)** without and **(b)** with aligned MWCNT structures.

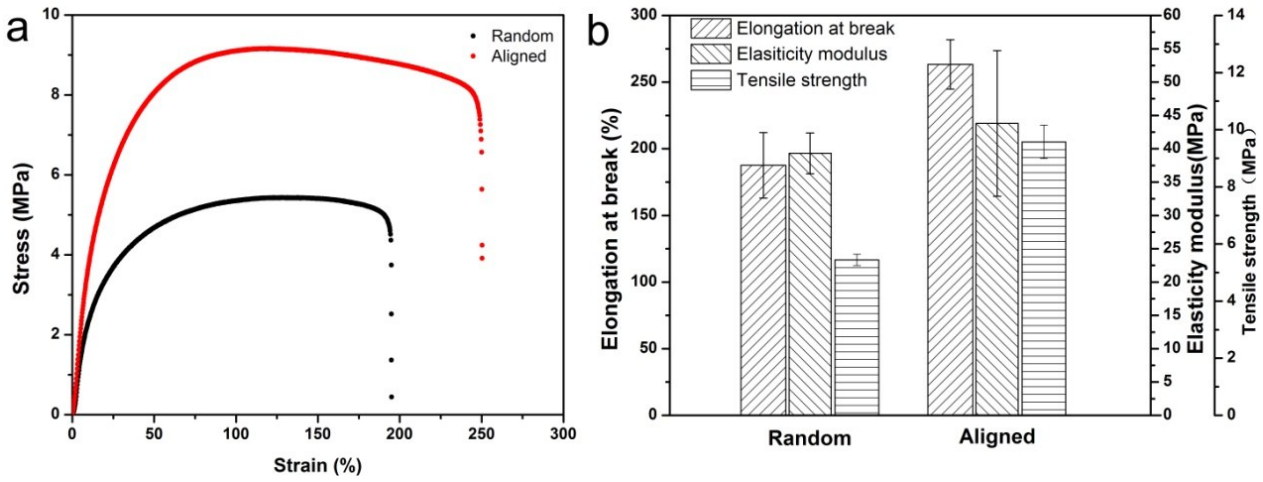

Fig. S3. **(a)** Stress-strain curves; and **(b)** the elongation at break, elasticity modulus and tensile strength of R-7.61 and A-7.61.

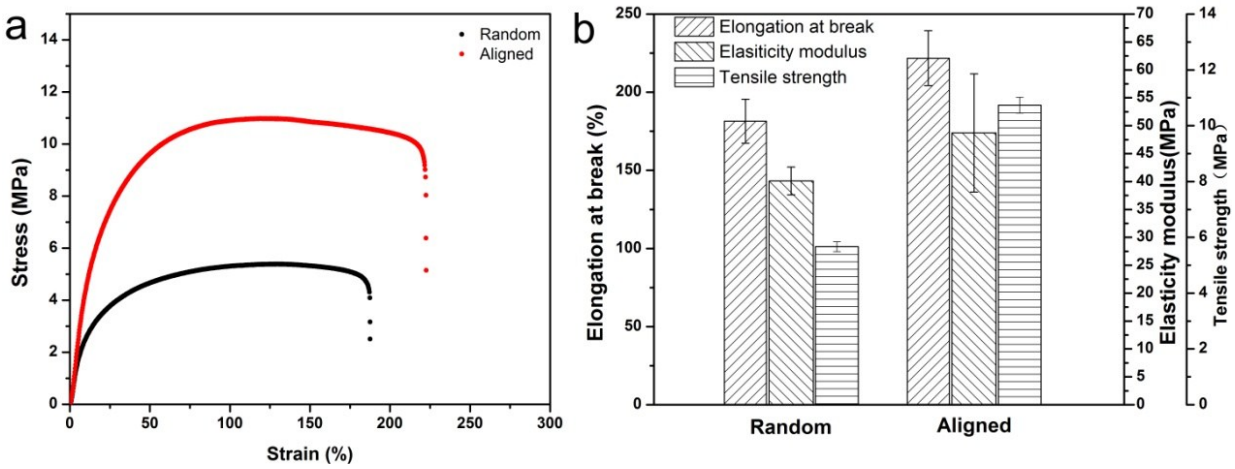

Fig. S4. **(a)** Stress-strain curves and **(b)** the elongation at break, elasticity modulus and tensile strength of R-8.96 and A-8.96

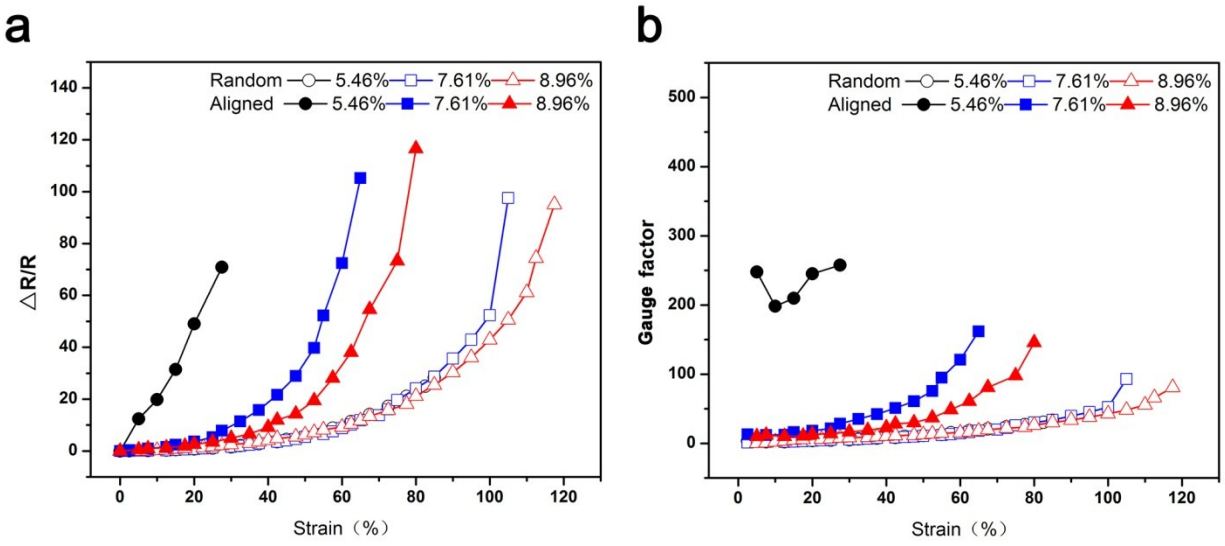

Fig. S5. **a)** Relative resistance change of the MWCNT-OBC nanocomposites with different MWCNT contents versus the applied strain; and **b)** Gauge factors of the MWCNT-OBC nanocomposites with different MWCNT contents versus the applied strain.

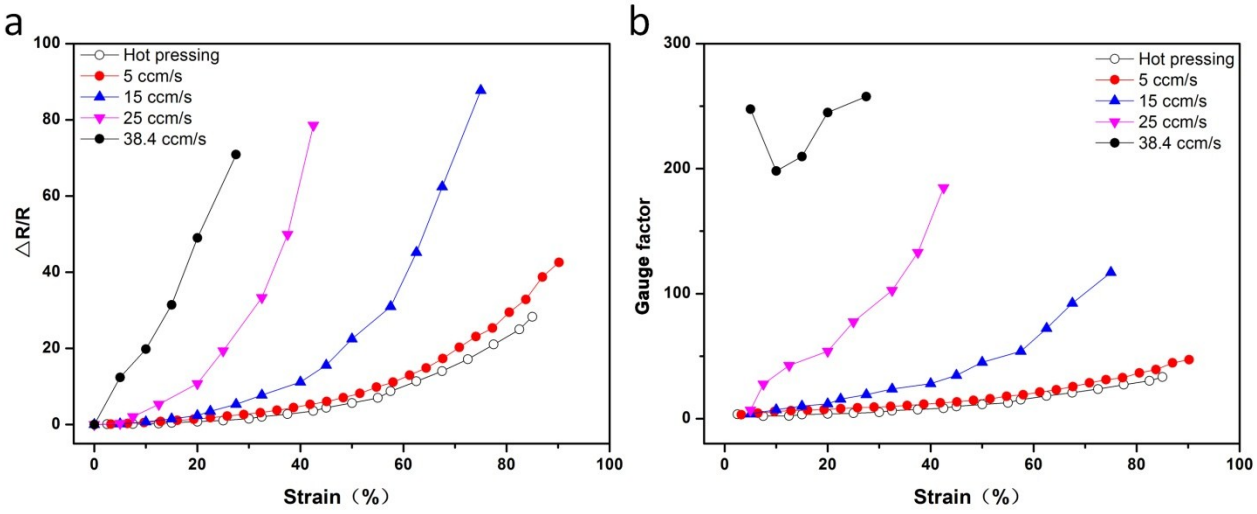

Fig. S6 Strain sensing characterizations. **a)** Relative change in electrical resistance of 5.46 vol% composites prepared with different injection speeds versus the applied strain; and **b)** GFs of 5.46 vol% composites prepared with different injection speeds versus the applied strain.

Table S1. R values for MWCNT-OBC nanocomposites with different contents of MWCNT.

CNT content [vol%]	R [random]	R [aligned]
5.46	1.01	1.40
7.61	0.96	1.61
8.96	1.06	1.88

Table S2. Summary of the performance of recently reported flexible and stretchable strain sensors based on elastomer-CNTs.

Materials	Sensing mechanisms	Durability	Flexibility/ Stretchability	Sensitivity (GF) at 5% strain	Linearity	Ref
OBC-CNT	piezoresistance	Yes	Stretchable [300%]	248	linear	This work
Ecoflex-CNT	piezoresistance	Yes	Stretchable [1380%]	＜2.5	linear	25
PDMS-CNT	piezoresistance	Yes	Stretchable [280%]	0.82	2 linear regions	22
Ecoflex-CNT	piezoresistance	Yes	Stretchable [900%]	0.4	Nonlinear	28
PDMS-CNT	piezoresistance	not proven	Flexiable [15%]	0.2	Nonlinear	10
PU-CNT	piezoresistance	Yes	Stretchable [400%]	4	Nonlinear	29
TPU-CNT-CB	piezoresistance	Yes	Stretchable [200%]	5	Nonlinear	31
PDMS-CNT	piezoresistance	Yes	Stretchable [200%]	-	Unavailable	51
Ecoflex-CNT	capacitance	Yes	Stretchable [150%]	0.5	linear	52
Silicone-CNT	capacitance	Yes	Stretchable [100%]	0.99	linear	53
PDMS-CNT	capacitance	Yes	Stretchable [300%]	1	linear	11

Notes and references

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