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Supporting Information

Flexible and wide pressure range triboelectric sensor array for real-time pressure detection and distribution mapping

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Table S1 Comparison of the performance of C-TENG with various advanced sensors.

Sample	Sensitivity	Measuring range	Response time	Reference
GO paper	17.2 kPa^{-1}	0-20 kPa	75 ms	[1]
Smart textiles	0.77 V Pa^{-1}	0-14 kPa	80 ms	[2]
Expandable microsphere	150 mV Pa^{-1}	< 1 kPa	-	[3]
Convex microarrays	30.2 kPa^{-1}	< 1 MPa	25 ms	[4]
CNT/hydrophobically	0.127 kPa^{-1}	0-50 kPa	0.6 s	[5]
Human skin	0.29±0.02 V kPa^{-1}	<10 kPa	0.1 s	[6]
Elastomer/ionic hydrogel	0.013 kPa^{-1}	1.3-70 kPa	-	[7]
PDMS/MCNT	0.51 V kPa^{-1}	5-450 kPa	0.45 s	[8]
Washable electronic textiles	0.0479 kPa^{-1} (<100 kPa) 0.0186 kPa^{-1} (100-400 kPa)	<650 kPa	-	[9]
Trib-skins	0.29 kPa^{-1}	<25 kPa	-	[10]
Endocardial sensor	1.195 mV mmHg^{-1}	0-350 mmHg	-	[11]
Hydrogel-based sensor	0.05 kPa^{-1}	0-3.27 kPa	150 ms	[12]
MXene-textile	12.095 kPa^{-1} (29-40 kPa) 3.844 kPa^{-1} (< 29 kPa)	0-40 kPa	26 ms	[13]
Epidermis microstructure	25.1 kPa^{-1}	0-2.6 kPa	120 ms	[14]
Core-shell nanofiber mats	0.43 kPa^{-1} (0.01-1.5 kPa) 0.068 V kPa^{-1} (100-700 kPa)	0.01-100 kPa	-	[15]
Weaving constructed sensor	45.7 mV Pa^{-1}	0-710 Pa	< 5 ms	[16]
PVDF-TrFE sponge	0.104 V kPa^{-1} (0.05 to 5 kPa) 0.055 V kPa^{-1} (5 to 60 kPa) 0.049 V kPa^{-1} (60 to 600 kPa)	0.05-600 kPa	< 5 ms	[17]
Silver nanowires/ PDMS electrode	2.94±0.25 kPa^{-1} (0-2 kPa) 0.75±0.06 kPa^{-1} (2-6.7 kPa)	<6.7 kPa	<50 ms	[18]
Polyimide/CNT	11.28 kPa^{-1}	0-61 kPa	50 ms	[19]
PVDF-Ag/ethyl cellulose/conductive fabrics	1.67 V kPa^{-1} (0 to 3 kPa) 0.2 V kPa^{-1} (3 to 32 kPa)	0-32 kPa	-	[20]
PVDF/carbon/PU electronic skin	0.18 V kPa^{-1}	0-175 kPa	-	[21]
ISTSA	0.063 V kPa^{-1}	5-50 kPa	-	[22]
Wireless textile-based sensor	3.88 V kPa^{-1} 0.54 V kPa^{-1}	0.1-4.3 kPa 4.3-9.8 kPa		[23]
Self-Powered Electronic Skin	~10^{3} kPa^{-1}	0.02-30 kPa	8 ms	[24]
Shape-adaptive electronic skin	10.89±0.5 mV kPa^{-1}	80-230 kPa	-	[25]
Wearable, breathable, and washable sensing textile	1.33 V kPa^{-1} 0.32 V kPa^{-1}	1.95-3.13 kPa 3.2-4.61 kPa		[26]
C-TENG	15.6 V MPa^{-1}	0-1.1 MPa	40 ms	This work

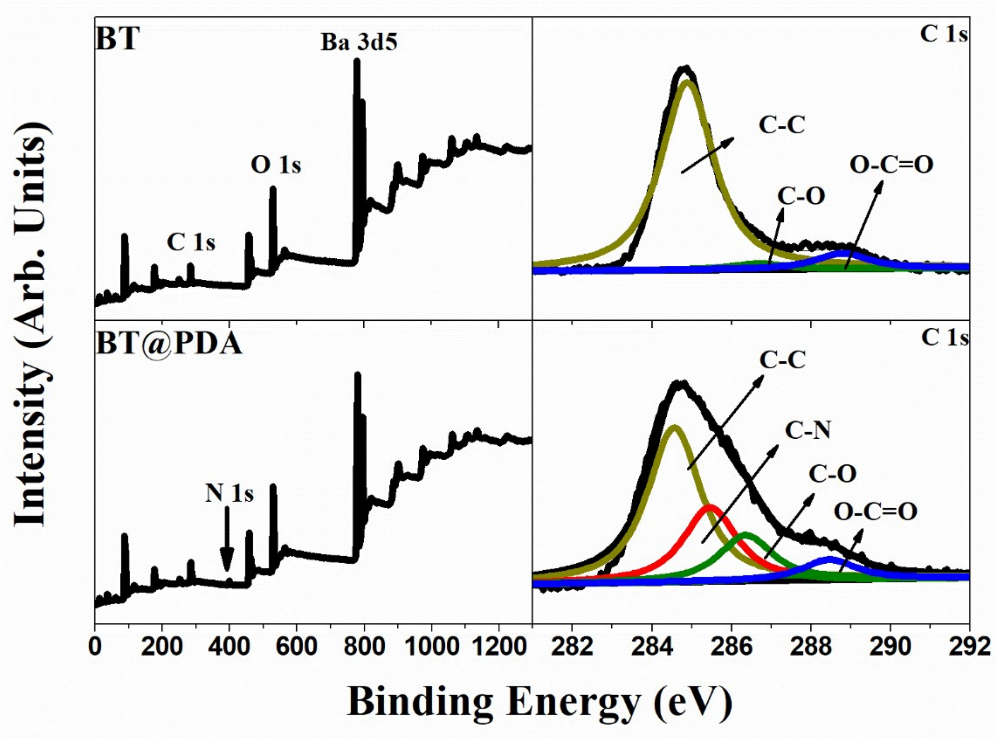

Fig. S1 XPS wide range and high-resolution C 1s spectrum of BT and BT@PDA nanoparticles.

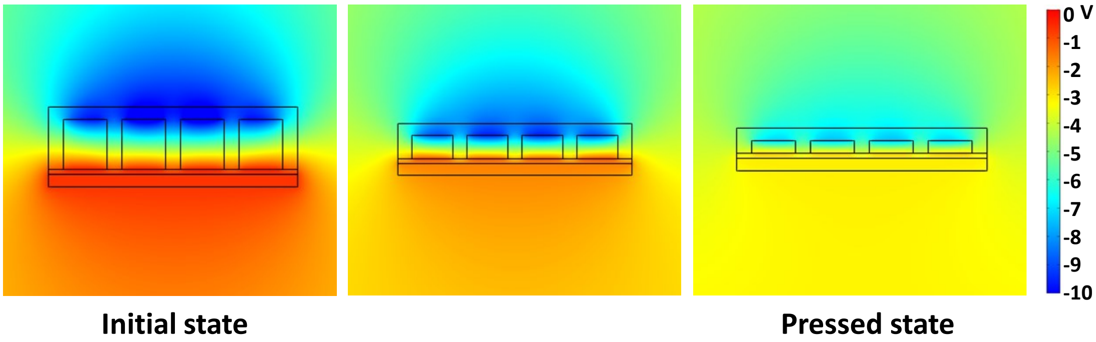

Fig. S2 Numerically calculated potential distribution of C-TENG at different deformations by using COMSOL software.

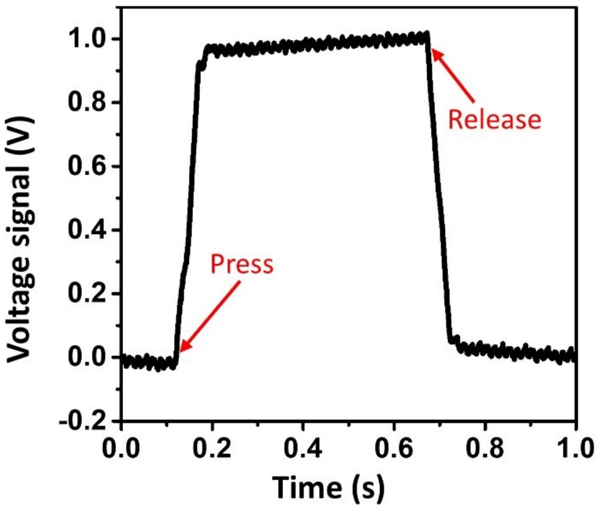

Fig. S3 Response time of a single C-TENG.

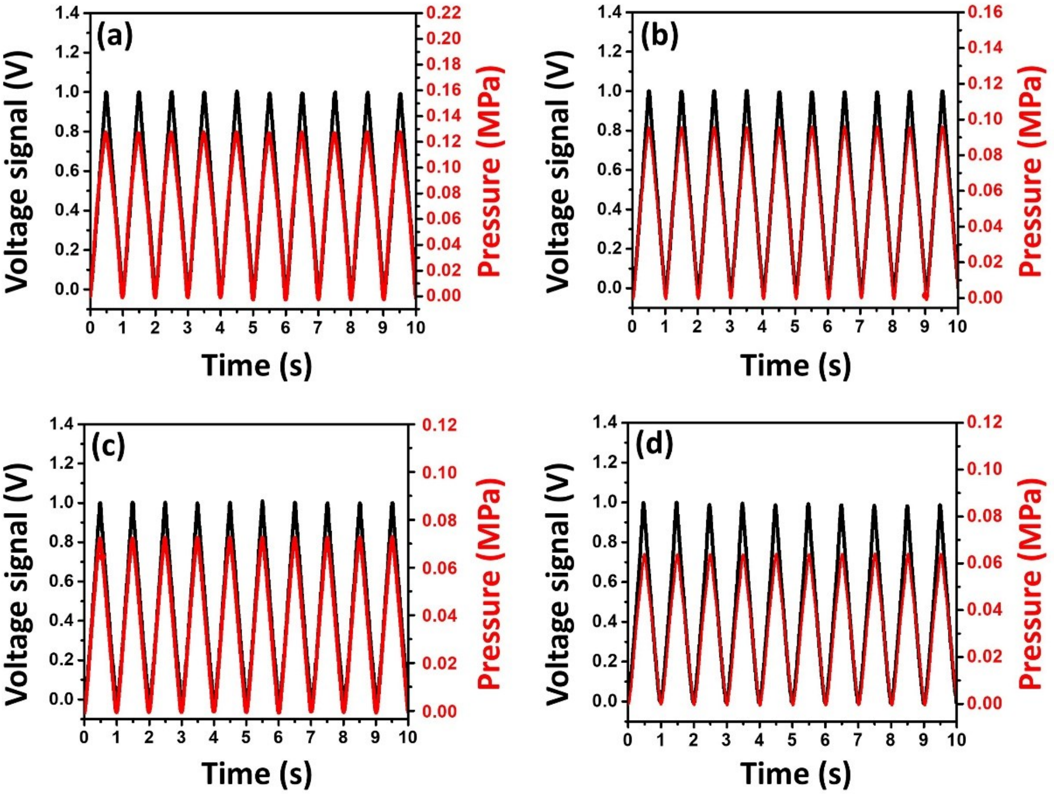

Fig. S4 V_{oc} values of C-TENG with cuboids of (a) 9, (b) 16, (c) 25, and (d) 36 under different pressures.

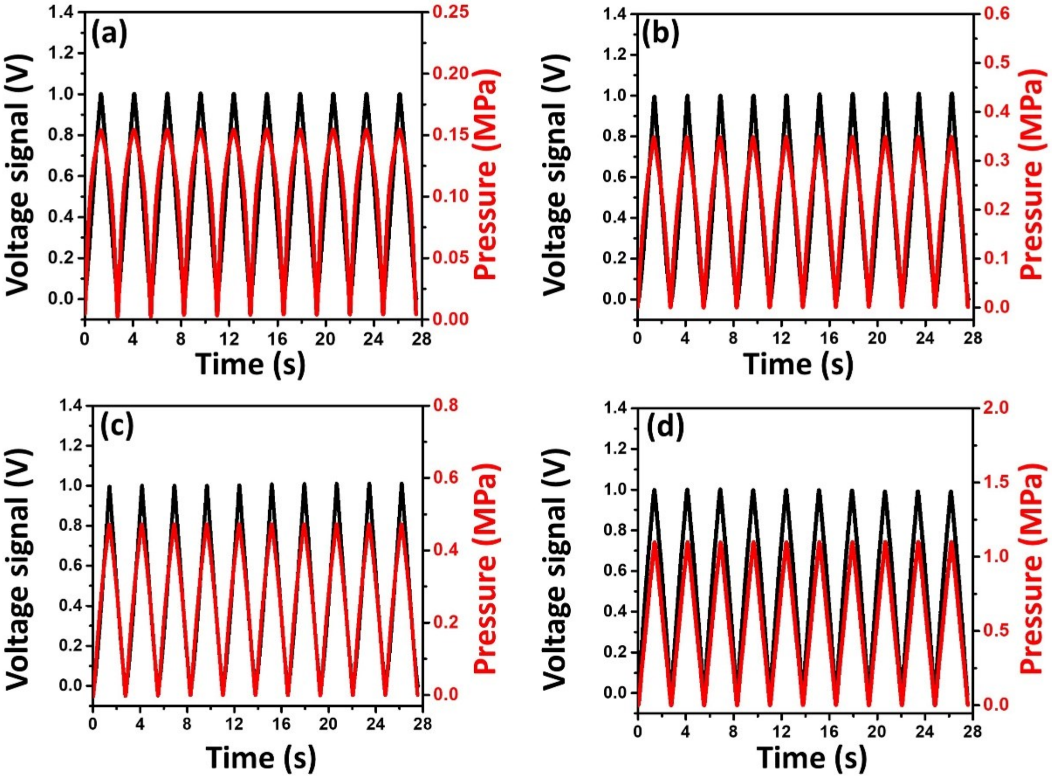

Fig. S5 V_{oc} values of C-TENG with different Young's moduli of (a) 0.09 MPa, (b) 0.55 MPa, (c) 0.94 MPa, and (d) 2.63 MPa as a function of the pressure.

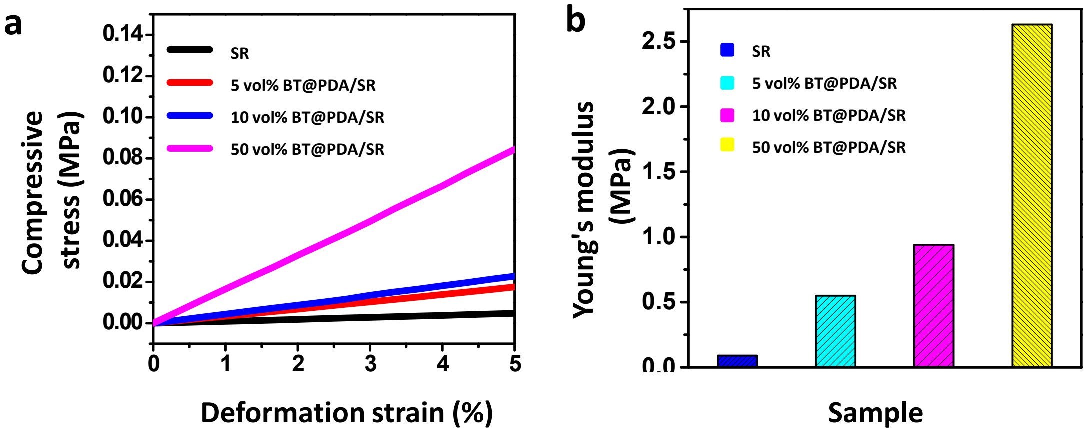

Fig. S6 (a) Stress-strain curves with strain lower than 5% and (b) Young's modulus of SR composites filled with different contents of BT@PDA nanoparticles.

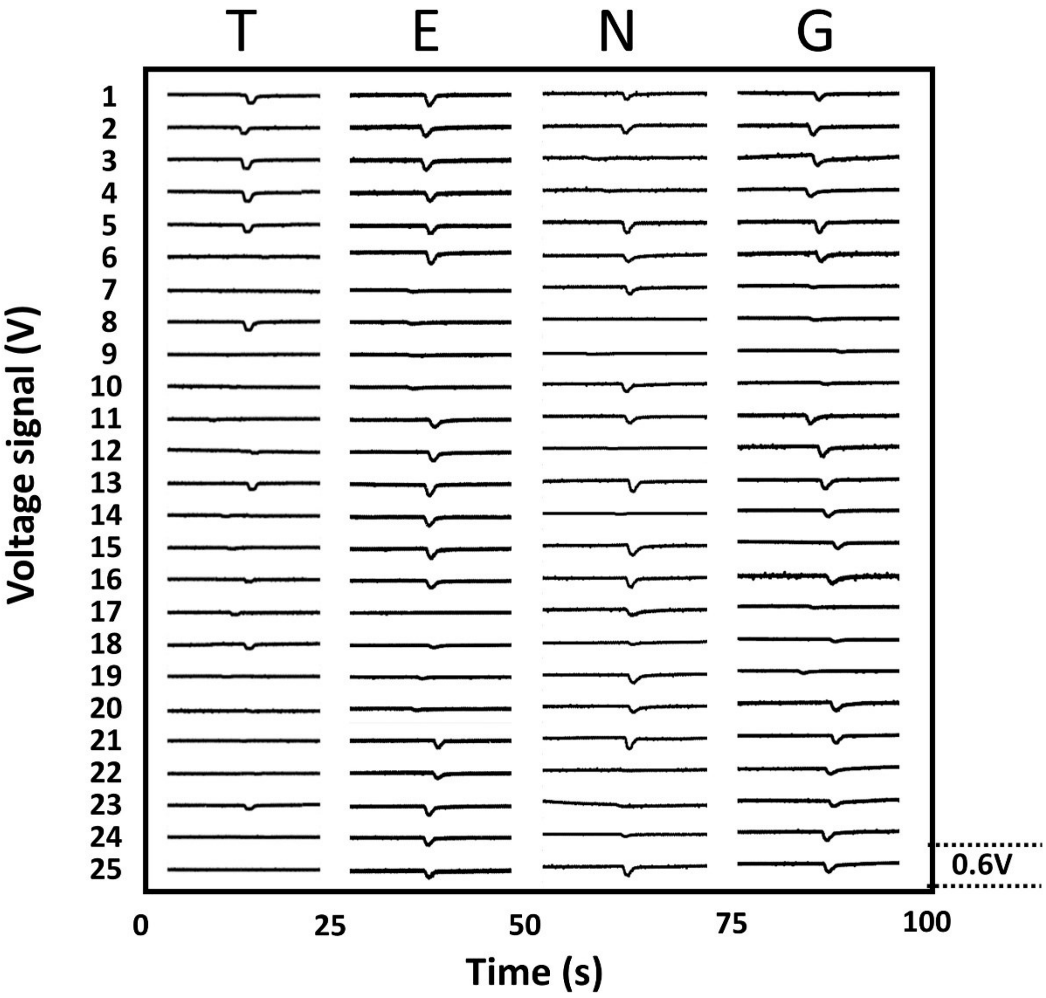

Fig. S7 Measured output voltages of C-TENG with cuboids height of 3 mm under acrylic sheets with “T”, “E”, “N”, and “G” shape at deformation of 1.5 mm.

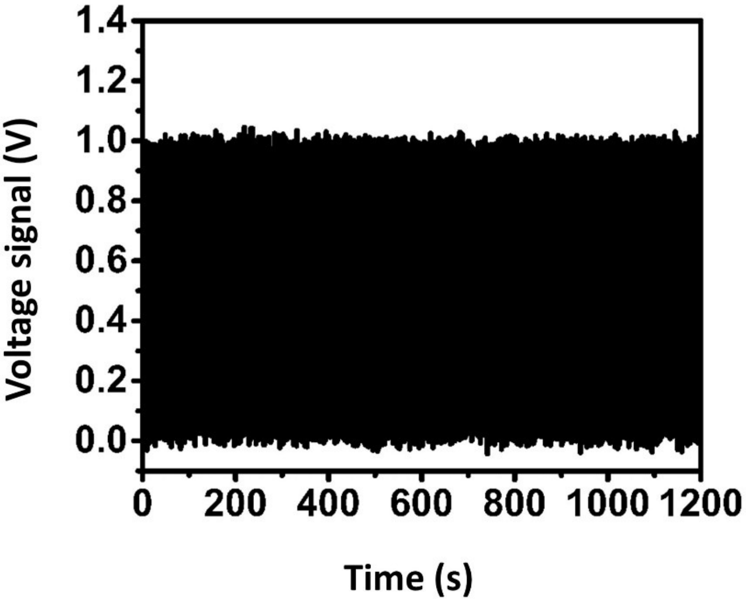

Fig. S8 Stability and durability of the C-TENG under around 1200 s working time.

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