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Supporting Information

Kirigami-Patterned Highly Stretchable Conductors from Flexible Carbon Nanotubes-Embedded Polymer Films

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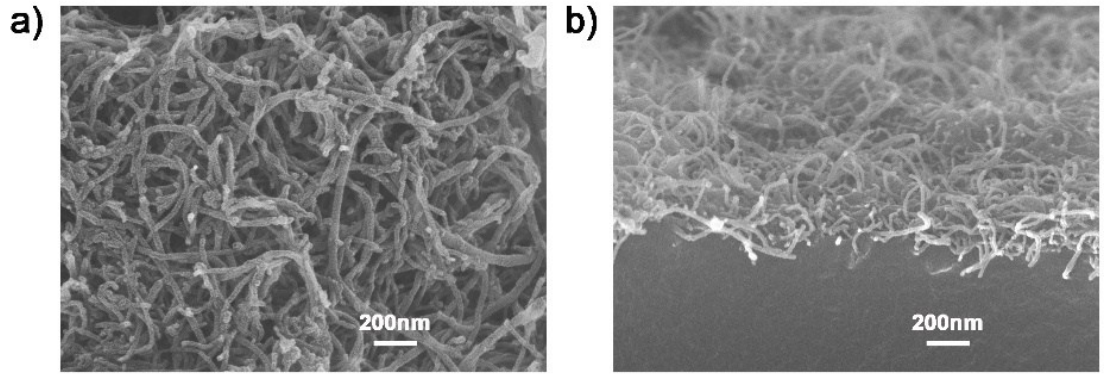

Figure S1. a) The surface and b) cross-section SEM images of the composite film with CNTs coated on the surface of PDMS.

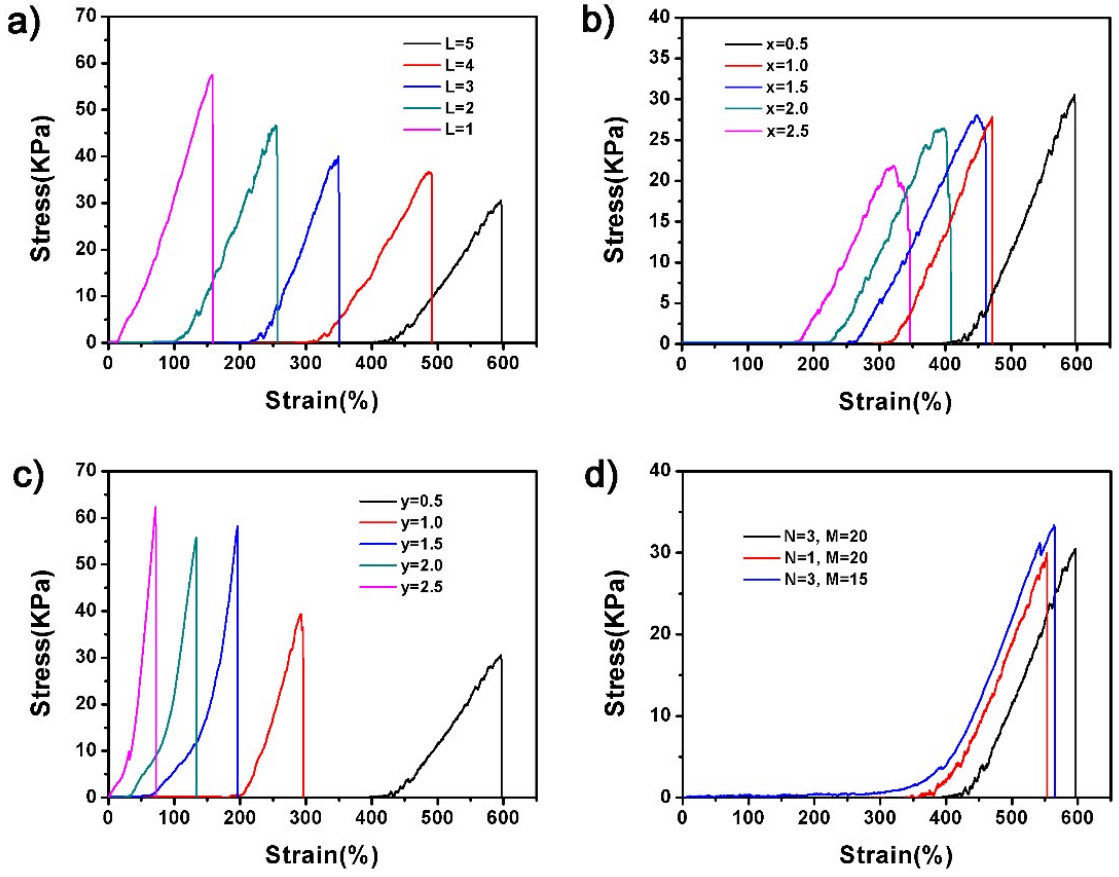

Figure S2. The stress-strain curves of KSCF varying characteristic parameters: a) cut length; b) transverse spacing; c) vertical spacing; d) cut numbers.

Table S1 Dimensions and geometry of the cut patterns in details.

variable	classification	L(mm)	x (mm)	y (mm)	N	M
L	$KSCF_{L1}$	1	0.5	0.5	3	20
	$KSCF_{L3}$	3	0.5	0.5	3	20
	$KSCF_{L5}$	5	0.5	0.5	3	20
x	$KSCF_{x0.5}$	5	0.5	0.5	3	20
	$KSCF_{x1.5}$	5	1.5	0.5	3	20
	$KSCF_{x2.5}$	5	2.5	0.5	3	20
y	$KSCF_{y0.5}$	5	0.5	0.5	3	20
	$KSCF_{y1.5}$	5	0.5	1.5	3	20
	$KSCF_{y2.5}$	5	0.5	2.5	3	20
N	$KSCF_{N1}$	5	0.5	0.5	1	20
	$KSCF_{N2}$	5	0.5	0.5	2	20
	$KSCF_{N3}$	5	0.5	0.5	3	20
M	$KSCF_{M10}$	5	0.5	0.5	3	10
	$KSCF_{M15}$	5	0.5	0.5	3	15
	$KSCF_{M20}$	5	0.5	0.5	3	20

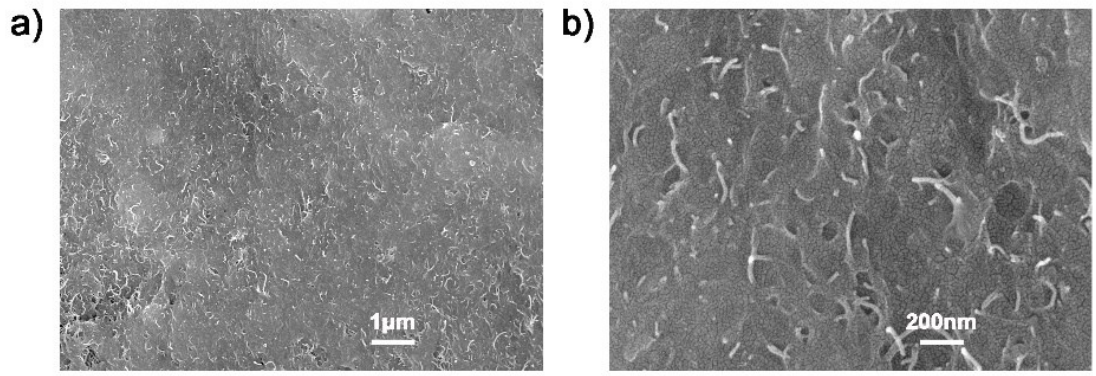

Figure S3. a) The surface and b) cross-section SEM images of the O-KSCF film stretched to 380% strain.

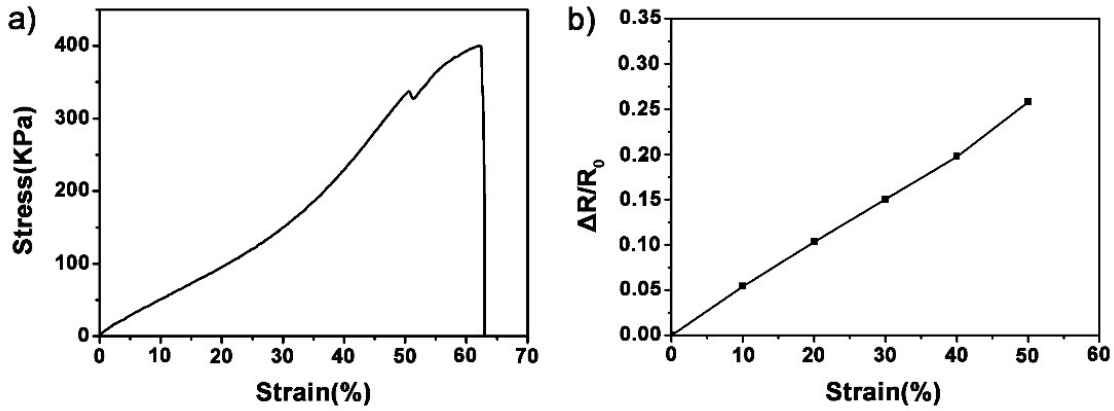

Figure S4. a) the stress-strain curve of a flat CNTs/PDMS film; b) the normalized resistance change as a function of tensile strain.

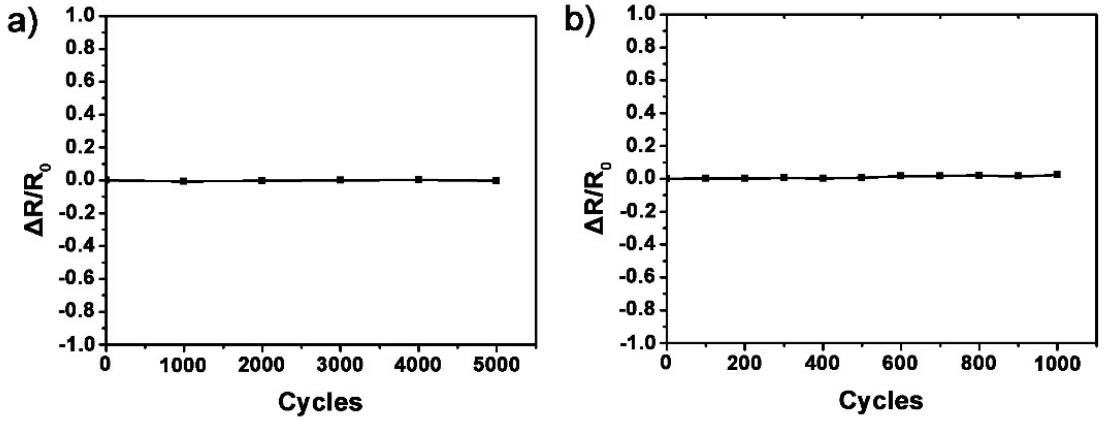

Figure S5. Normalized resistance of the O-KSCF as a function of a) the bending cycles at 180^{o} and b) the twisting cycles at 360^{o}.

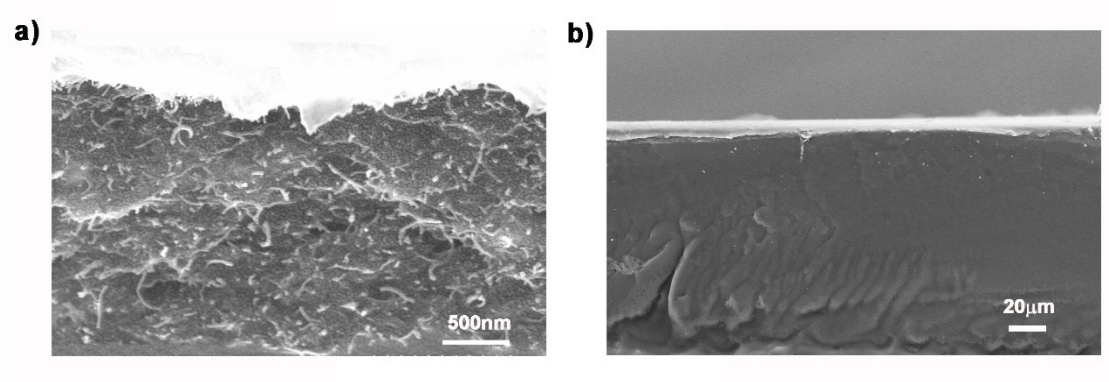

Figure S6. The thickness of CNT layer and PDMS film.

Table S2 Mechanical and electrical properties of kirigami-patterned stretchable conductors compared with other patterned conductors.

pattern	**materials**	**structured method**	**elongation**	**initial conductivity**	**resistance variations**
serpentine [1]	graphene	photolithography and reactive ion etching patterns	106%	4 layers: ~ 480 Ω/sq	no noticeable changes
wavy [2]	carbon nanotube	pre-strain	100%	211 Ω/sq	4.1%
porous aerogel [3]	copper nanowire	freeze-drying	60%	0.29 S/cm	19.5%
nanomesh [4]	gold	grain boundary lithography and pre-strain	160%	20~30 Ω/sq	150%
honeycomb [5]	gold	lithography	50%	0.055 Ω/mm^2	~600%
sponge [6]	metal	commercial PU	40–45%	1.55~8.67Ω/sq	negligible changes
kirigami (our work)	carbon nanotube	laser cutting	430%	13.05 Ω/sq	<20%

References

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