Supplementary Information

Smart fabrics with liquid metal reinforced PU/CNT/MXene multilayers structure for constructing multifunctional sensors and wearable electronics

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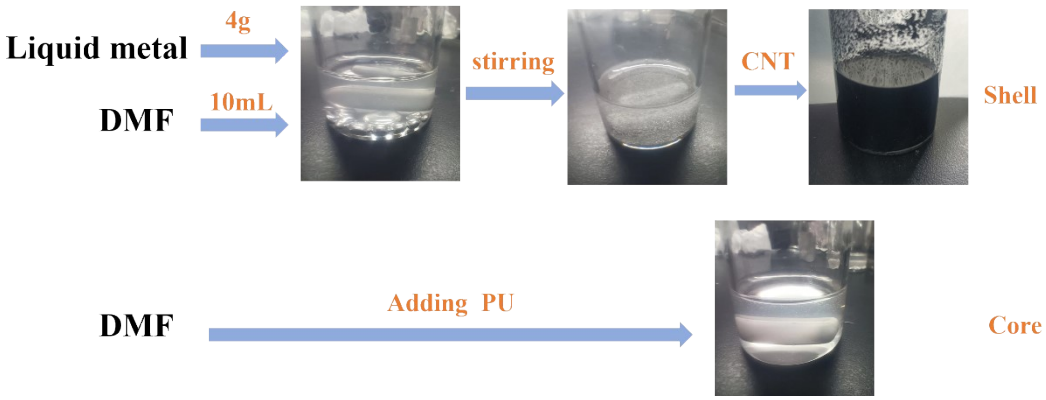

Fig. S1. Schematic diagram of the method of preparation of the spinning solution. It includes the preparation process of the outer liquid metal carbon nanotube dispersion and the preparation method of the inner PU.

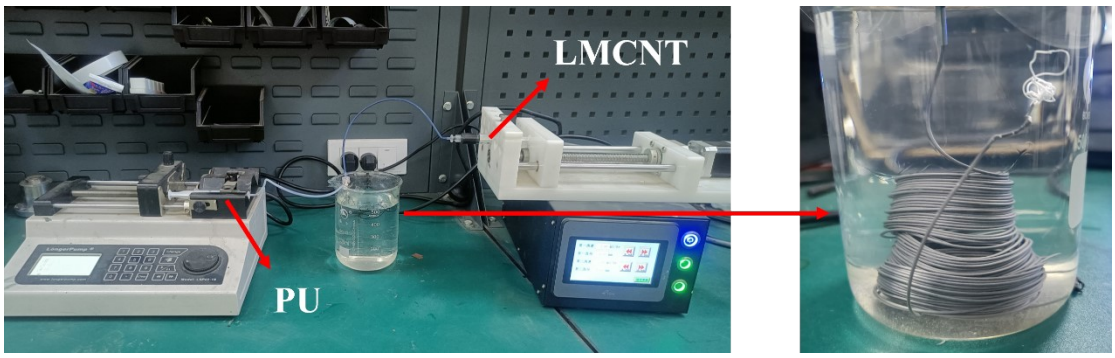

Fig. S2 Diagram of the wet spinning experimental setup. It consists of spinning device, coagulation bath.

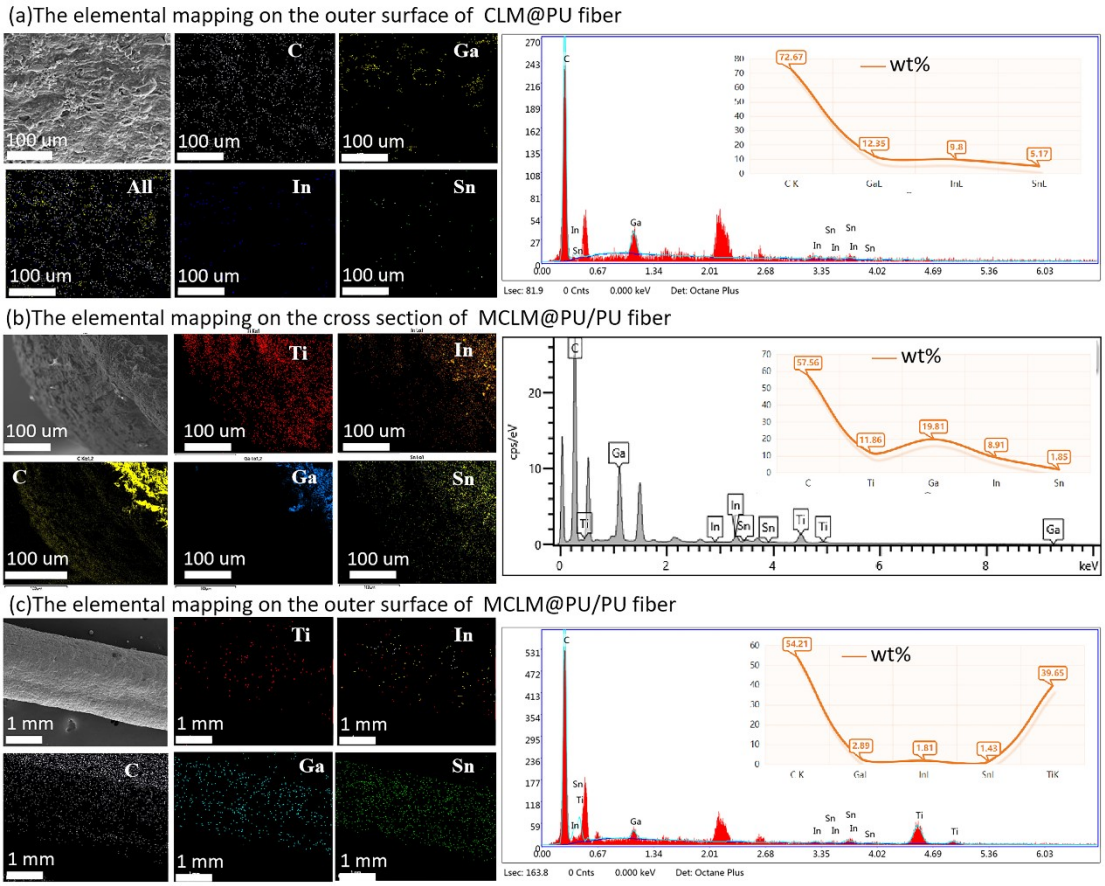

Fig. S3 The elemental mapping on the cross section and outer surface of CLM@PU fiber and MCLM@PU/PU fiber.

Fig. S4. Spinning needles with different inner diameters.

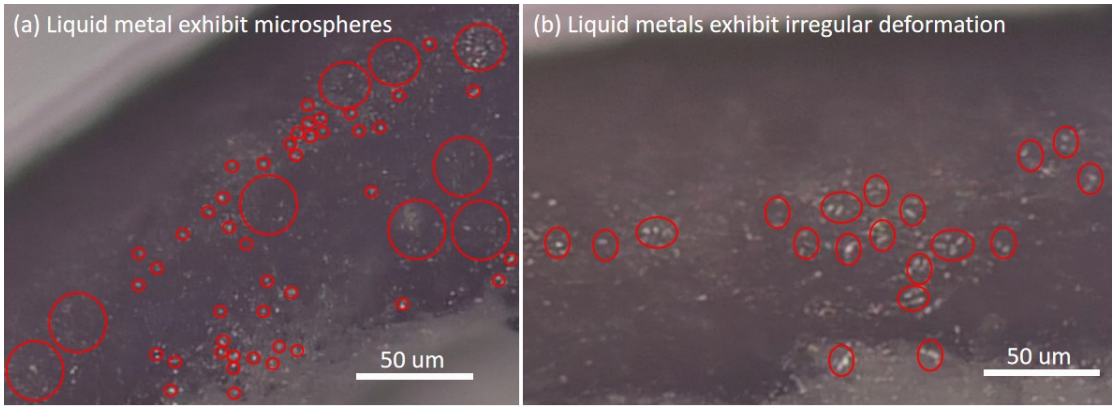

Fig. S5 Morphological changes of single fibres in different states of stretching using microscopic analysis. (Black is the colour of carbon nanotubes and silver-grey is the colour of liquid metal. The silver-grey liquid metal in the unstretched state is uniformly distributed in the form of microspheres, while the liquid metal in the stretched state shows irregular deformation or even ellipsoidal shape)

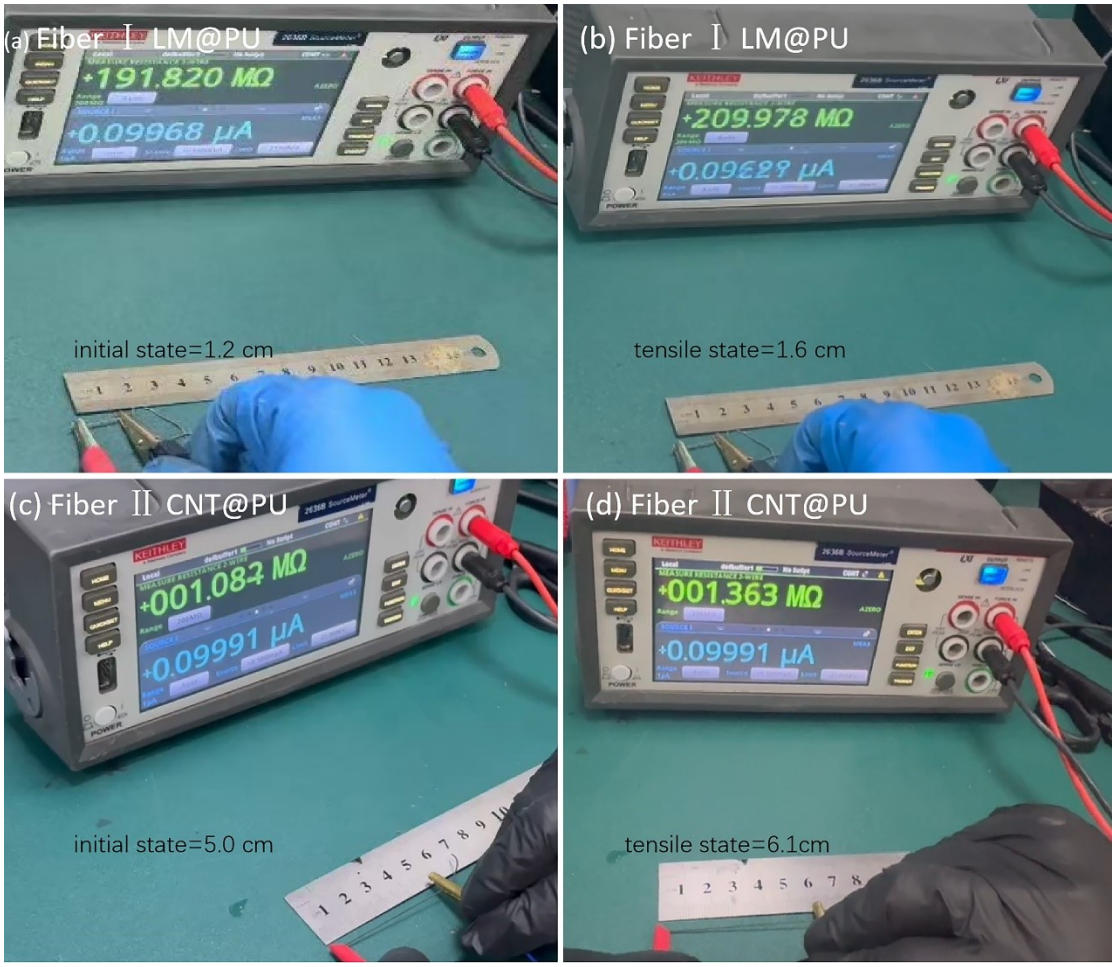

Fig. S6 Variation of fiber resistance from the initial state to the stretched state (fibre I consists of polyurethane and liquid metal interlayer, fibre II consists of carbon nanotubes and polyurethane)

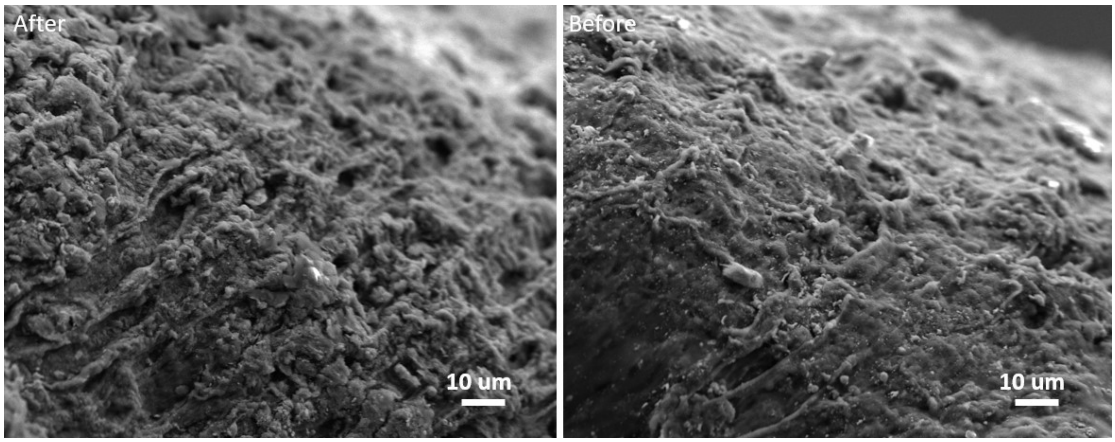

Fig S7 The SEM of fiber surface before and after long cycle

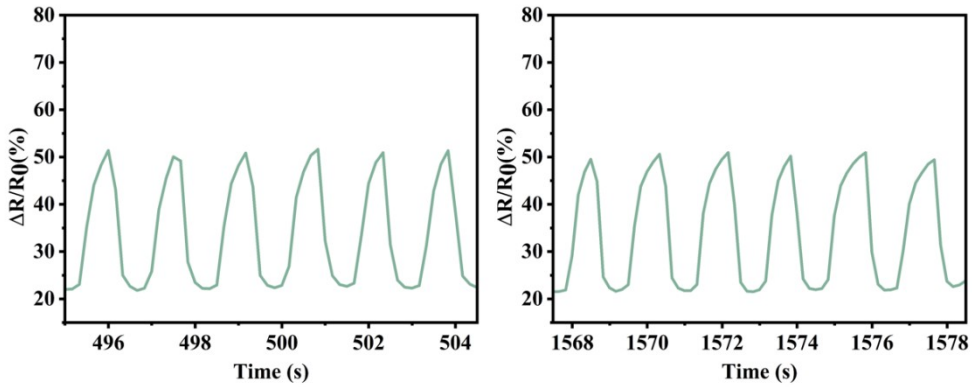

Fig. S8. The stability of the sensor by showing signal amplification for 495-504 s and the 1568-1578 s of signal.

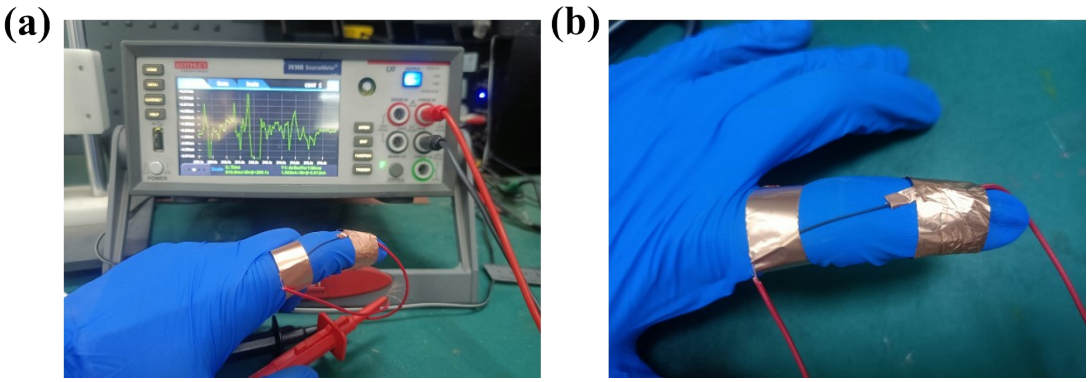

Fig. S9. (a) Strain fiber sensing performance test setup. (b) Detail of a strain fiber encapsulated in a finger.

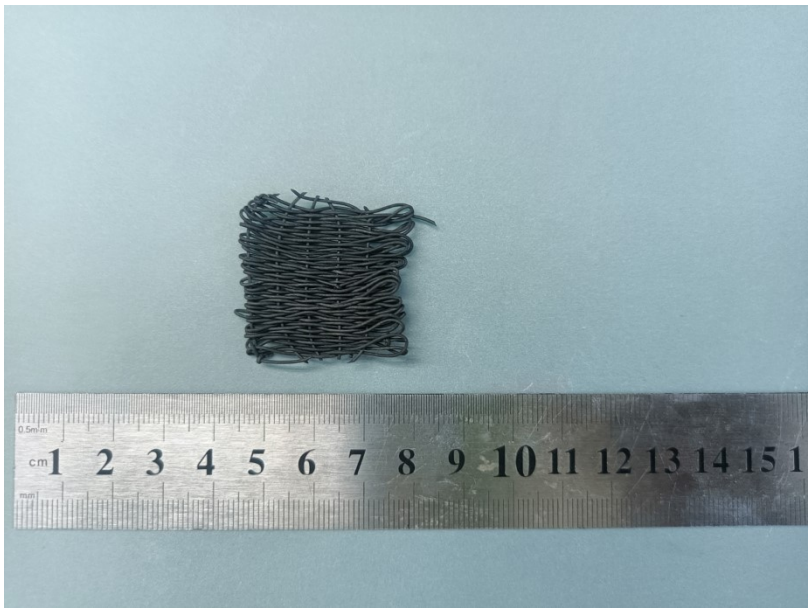

Fig. S10. (a) Fabrics woven from PU/LMCNT/MXene fibers.

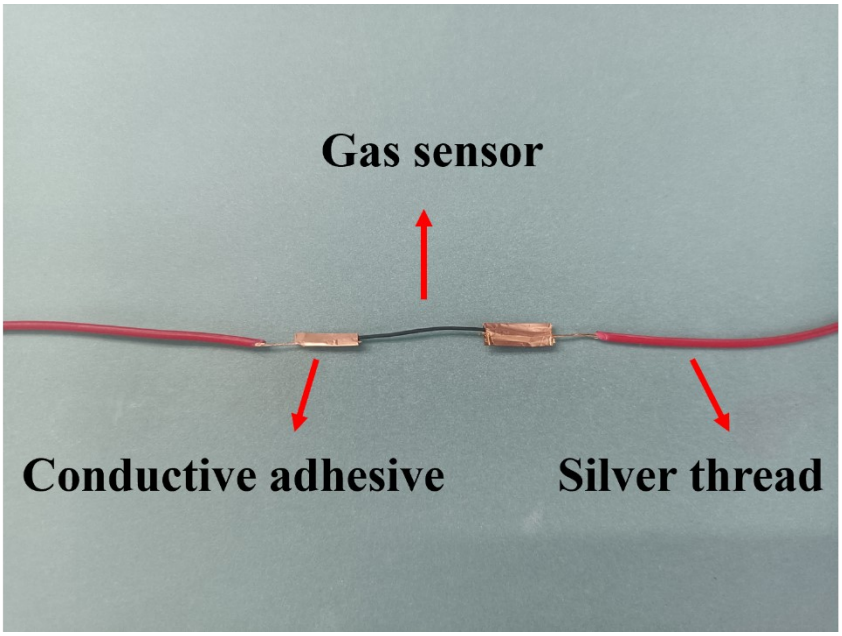

Fig. S11. (a) Strain fiber sensing performance test setup. (b) Detail of a strain fiber encapsulated in a finger.

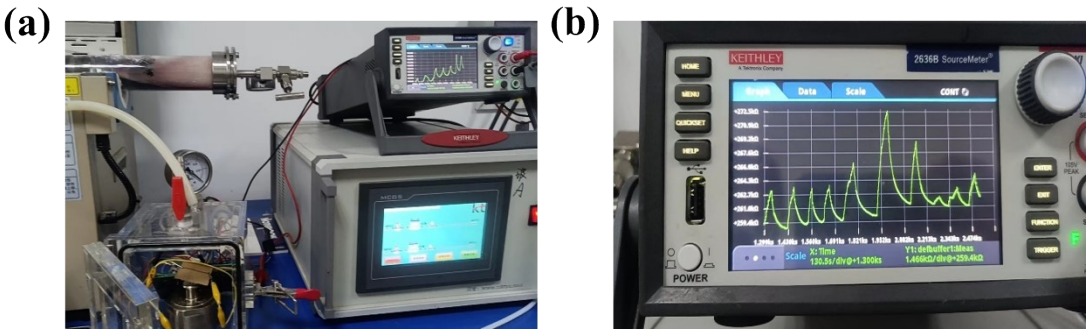

Fig. S12. (a) Strain fiber gas sensing performance test set. (b) Digital source meter displaying the gas response curve.

Table S1: Table of electromechanical properties compared to other fiber-based sensors.

Materials	Gauge factor	Response time/ Recovery time	Strain	Functions	Ref
GNP/PU	3.5	140 ms/90 ms	30%	Strain sensor	[1]
MXene liquid crystals	--	286 ms/642 ms	--	Pressure sensor	[2]
Conductive hydrogel	--	--	1000%	Strain/Temperature /Humidity sensor	[3]
CNTs/TPU	300	300 ms	120%	Strain sensor	[4]
P(AA-co-AM)/MXene	0.98	49 ms/66 ms	300%	Strain sensor	[5]
LM/CNT/PU	14	--	400%	Strain sensor	[6]
LiCl-FP	2.84	550 ms/539 ms	100%	Self-powered strain sensor	[7]
GR@TPU	46.19	--	140%	Strain sensor	[8]
MNR/PANI/ PA	13.8	--	250%	Strain sensor	[9]
PU/MCLM@ PU/Mxene	1.1367	120 ms/150 ms	200%	Strain/Pressure/Gas sensor;Thermotherapy device	This Work

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