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Supporting Information

Multi-Channel Wearable Fiber Sensors with High Sensitivity for Limb Motion Recognition

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Supplementary Figures

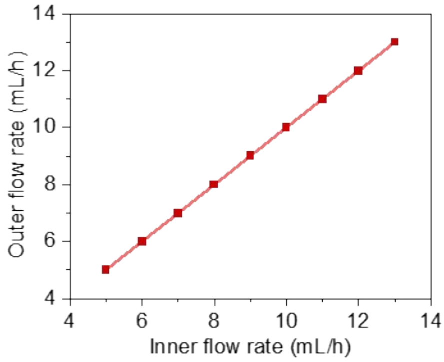

Figure S1. PU fiber was prepared by microfluidic method with different flow rate range.

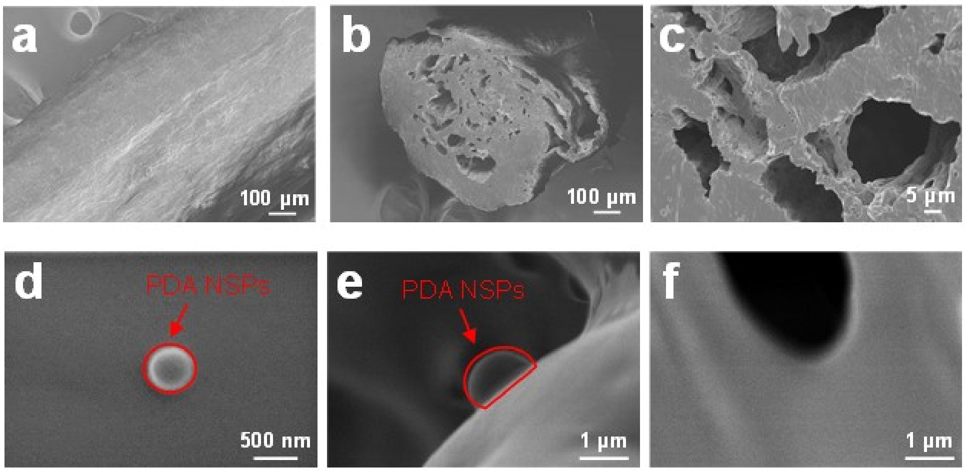

Figure S2. The SEM images of the PU fibers doped with PDA NSPs. a) PU fibers from the longitudinal surface. (b, c) Radial cross-section of PU fibers under different magnifications. (d-f) Radial cross sections of doped (d, e) PDA NSPs and (f) undoped PU fibers.

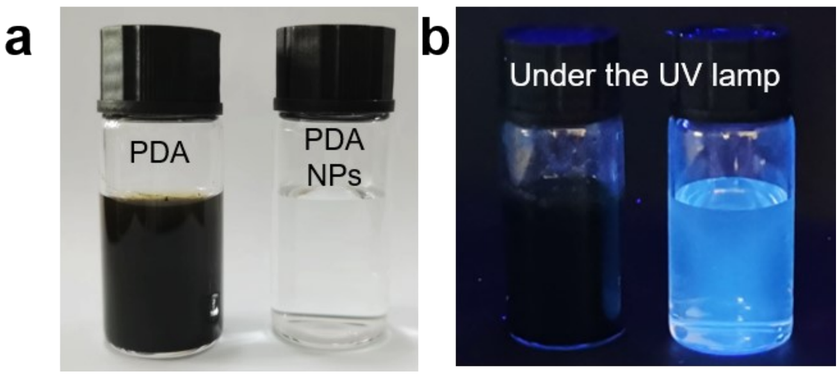

Figure S3. Fluorescent images of PDA and PDA NSPs under UV excitation.

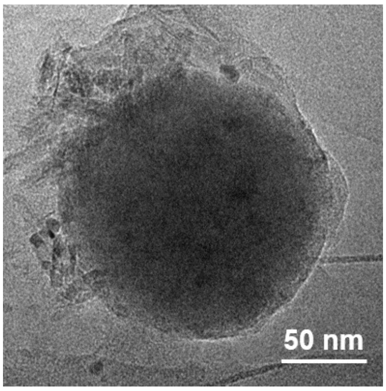

Figure S4. The TEM image of PDA NSPs.

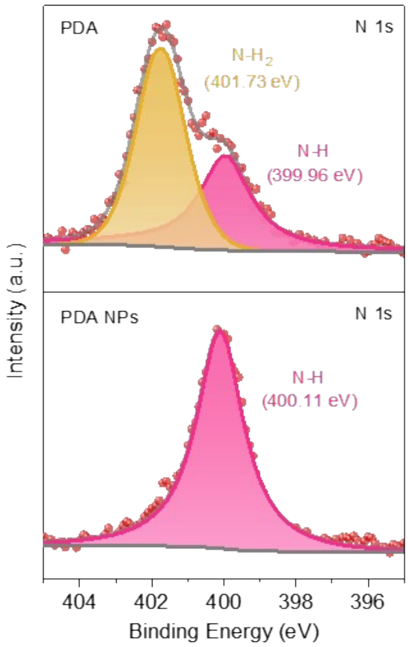

Figure S5. XPS signals of the N 1 s regions for PDA and PDA NSPs.

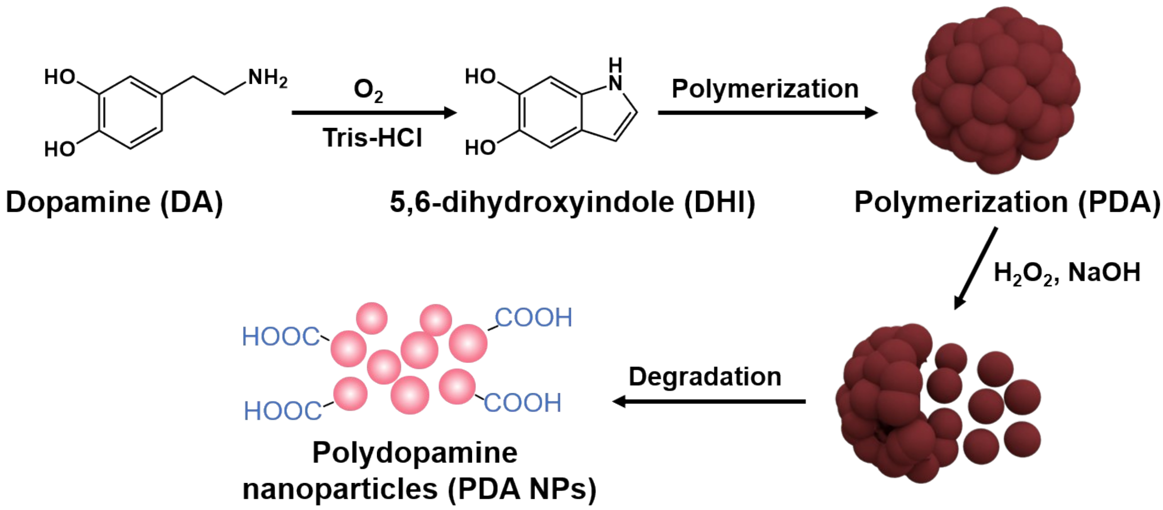

Figure S6. The formation mechanism of PDA and PDA NSPs.

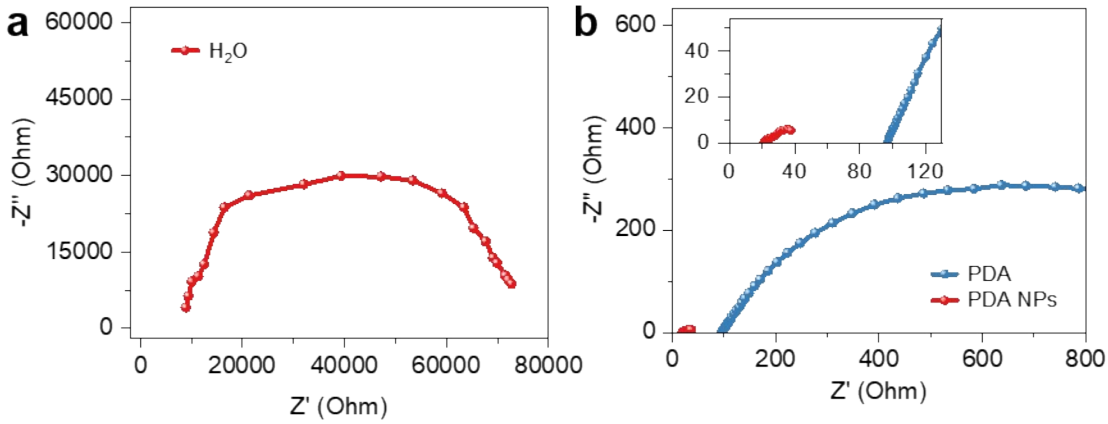

Figure S7. (a) Impedance of deionized water; (b) Impedance of PDA and PDA NSPs solutions.

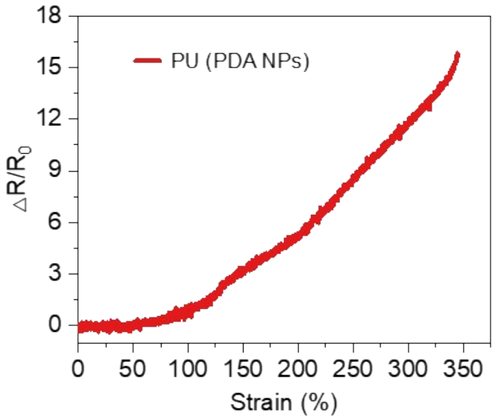

Figure S8. Relative resistance variation of PU fibers along with increasing strain measured by tension meter and electrometer 6514.

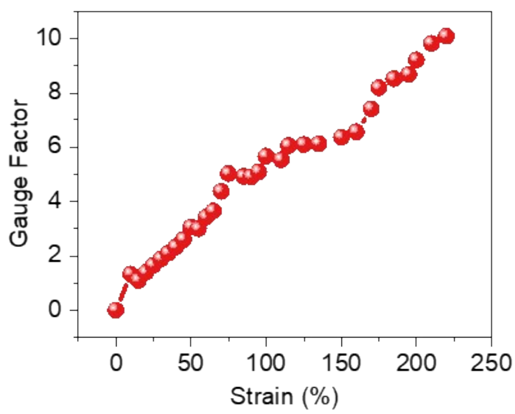

Figure S9. Calculated gauge factor of the fibrous strain sensor under strains from 0% to 250%.

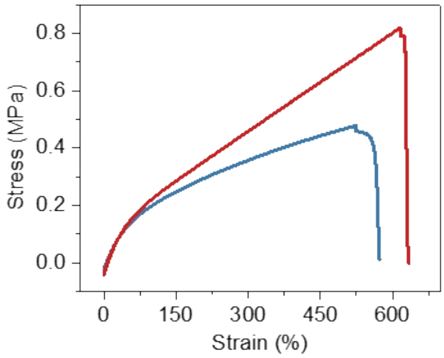

Figure S10. Stress-strain curve of PU fibers under stress of 2.7 N.

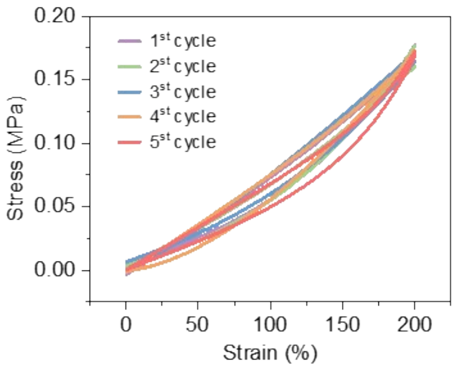

Figure S11. The tensile cycle test under 200% stretching.

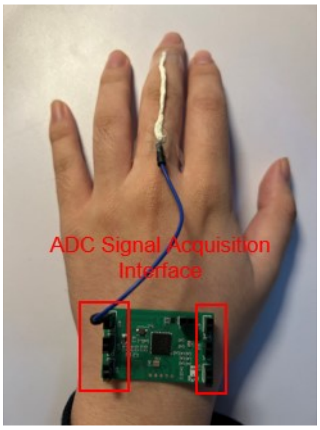

Figure S12. The fiber sensor devices are electrically connected during the demonstration of the integrated wearable system.

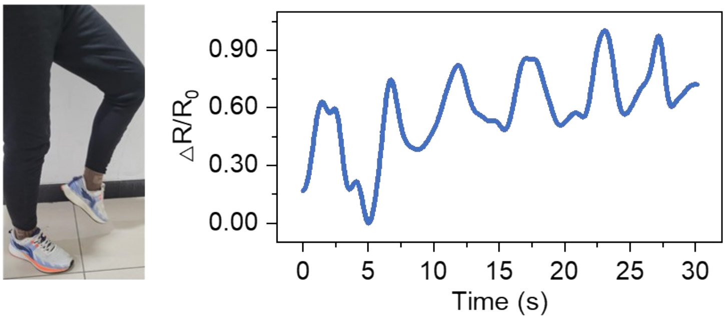

Figure S13. Physical depiction and real-time resistance of flexible fiber sensors worn during normal walking.

Supplementary Tables

Table S1. Comparison of materials, preparation methods, strain response range, advantages, limitations and applications of different flexible strain sensors.

Matrix	Preparation method	Strain response range (%)	Advantage	Limitation	Applications	Refs.
PDA / NBR / CB film	Straightforward dissolving-coating method	180	Predictive cyclic strain-sensing behavior	PDA is opaque and has agglomeration phenomenon.	Body joints	[26]
TPU/BNNs film	Electrostatic spinning	100	Excellent thermal stability	No specific application scenario is proposed.	As the skin protector	[21]
PU/AgNW fiber	Capillary tube method	274	Innovative preparation method	Small strain range	Large and subtle human motions detection.	[27]
New PU/CNTs fiber	Electrostatic spinning	700	High strain resolution and large detection range	Preparation process is complicated and the cost is high.	Monitor health-related physiological signals.	[10]
Alginate/PEDOT: PSS fiber	Microfluidic spinning	100	Explain the working principle of microfluidic.	Lack of concrete practical application		[28]
g-PDA film	Spray printing PDA functional ink		High output power	Power generation depends on ambient humidity.	Ambient humidity sensing, power supply	[38]
TPU/MWCNT fiber	wet spinning process	310	High sensitivity and stretchability	The strain range is limited, and the performance decreases significantly when the strain exceeds 100%.	Detection human motions	[22]
PU/PDA NSPs fiber	Microfluidic method	600	Simple and controllable production method and highly dispersible fiber	Precision detection needs further research.	Gestures detection, and limb motion recognition.	This work