Supporting Information

Highly stretchable GR/TPU strain sensor based on one-step electrospun fibrous yarns for wearable devices

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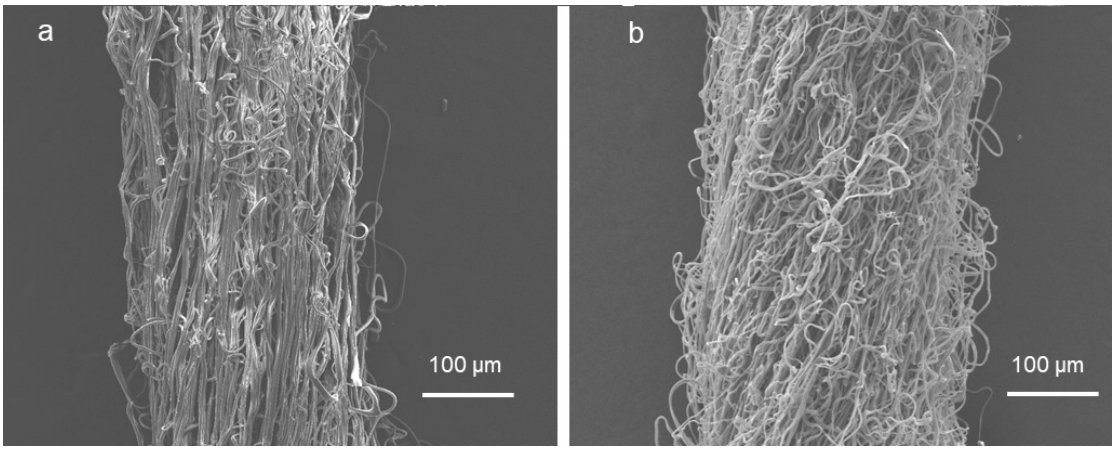

Fig. S1 Morphologies of the samples with (a) 100 r/min, and (b) 120 r/min, respectively.

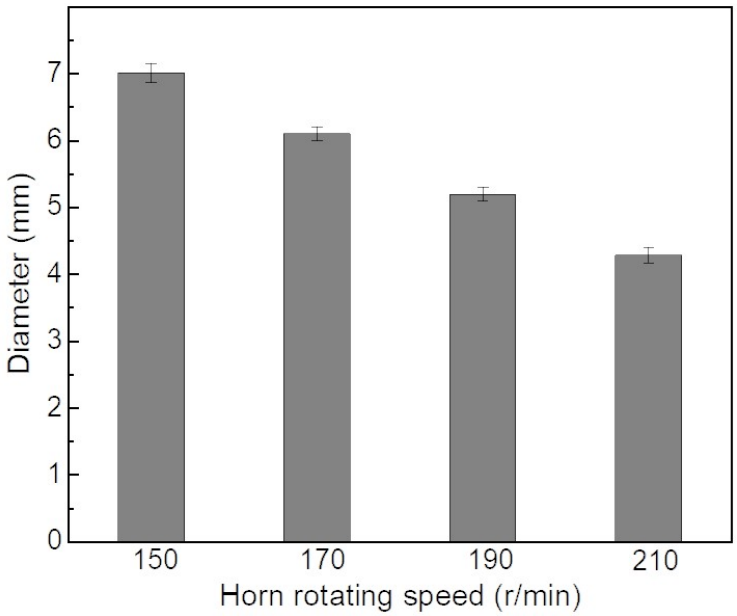

Fig. S2 Relationship between horn rotation speed and fiber yarn diameter size.

Fig. S3 GR/TPU yarns after ultrasonic treatment.

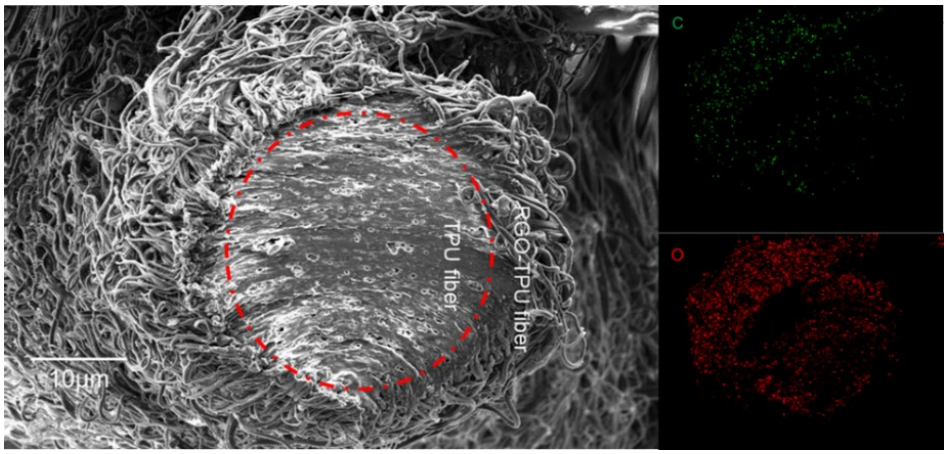

Fig. S4 Cross sectional SEM image of and the energy dispersive spectroscopy (EDS) mapping of 150@GR/TPU fibrous yarn.

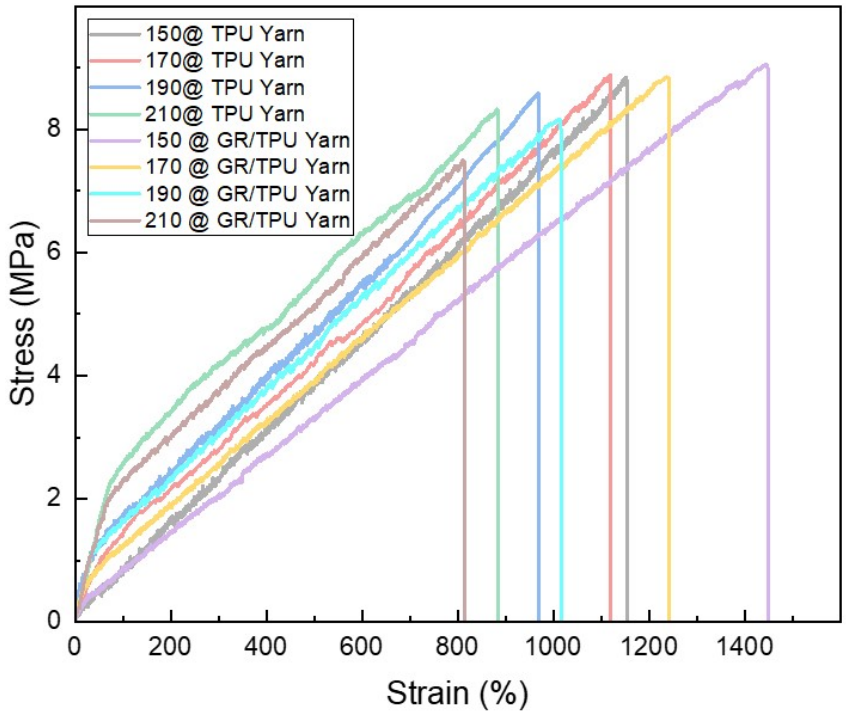

Fig. S5 Typical stress-strain curves of the fibrous yarns.

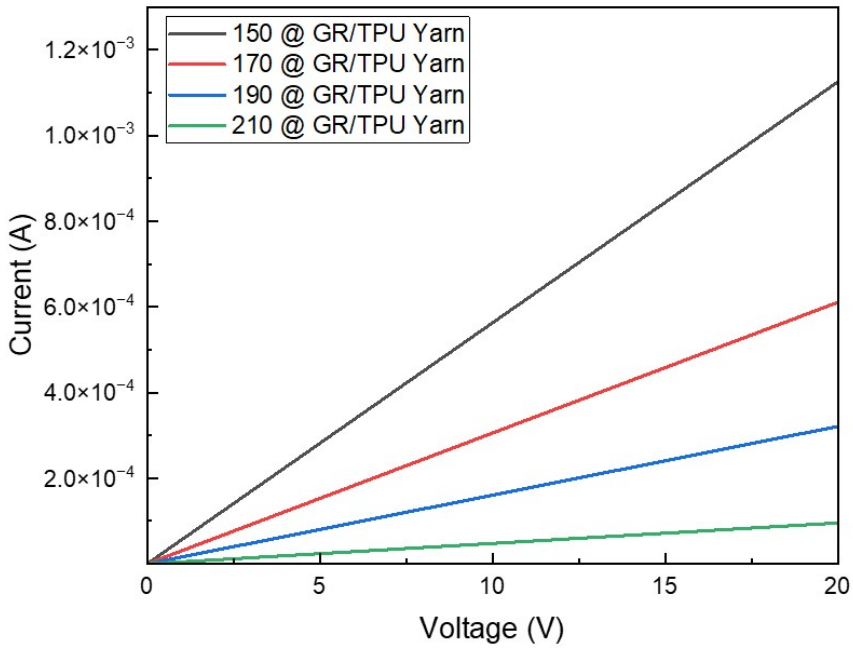

Fig. S6 I-V curves of GR/TPU yarns at different horn rotating speed.

Fig. S7 Resistance value of 150@GR/TPU fibrous yarn with a length of 1cm.

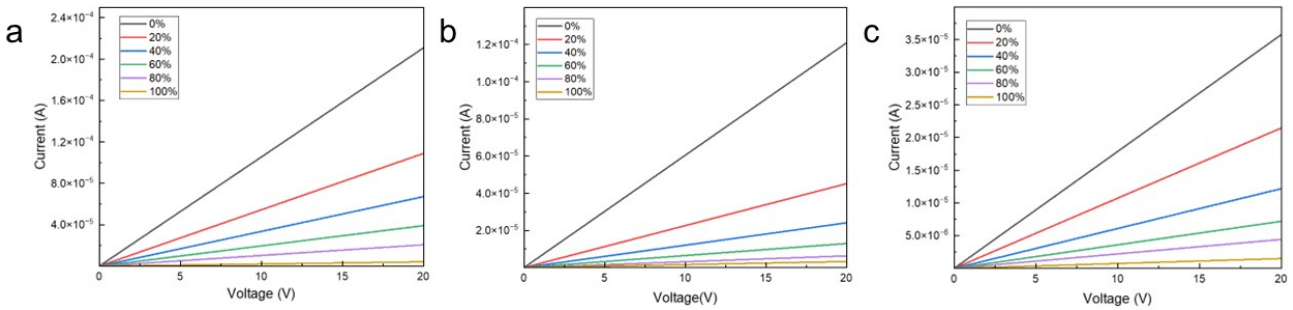

Fig. S8 I-V curves of (a) 170@GR/TPU yarns, (b) 190@GR/TPU yarns and (c) 210@GR/TPU yarns under 0%-100% static strains.

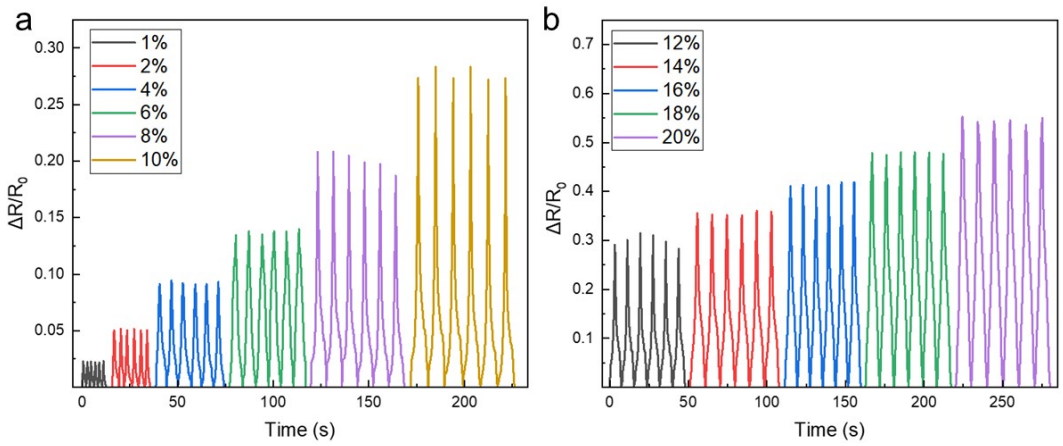

Fig. S9 I-V curves of 150@GR/TPU yarns under different dynamic low strains.

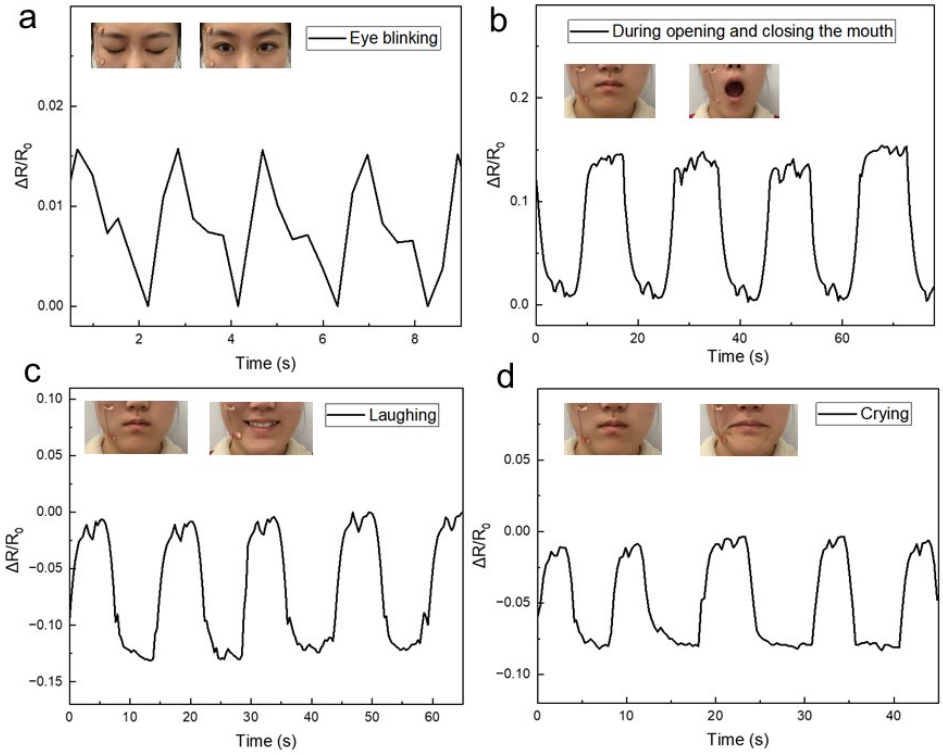

Fig. S10 (a) Sensors placed on the skin near the eyes during blinking change over time $\Delta R/R_0$ response. Sensors attached to the skin near the mouth when opening-closing (b), laughing (c), and crying (d) $\Delta R/R_0$ response.

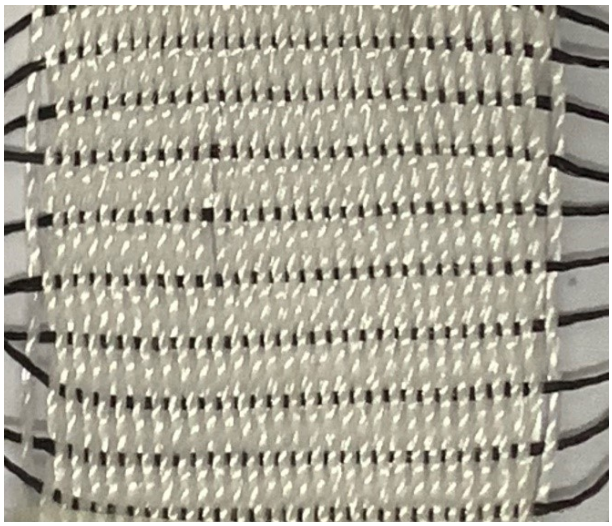

Fig. S11 Textile (strain sensor arrays) based on 150@GR/TPU fibrous yarns.

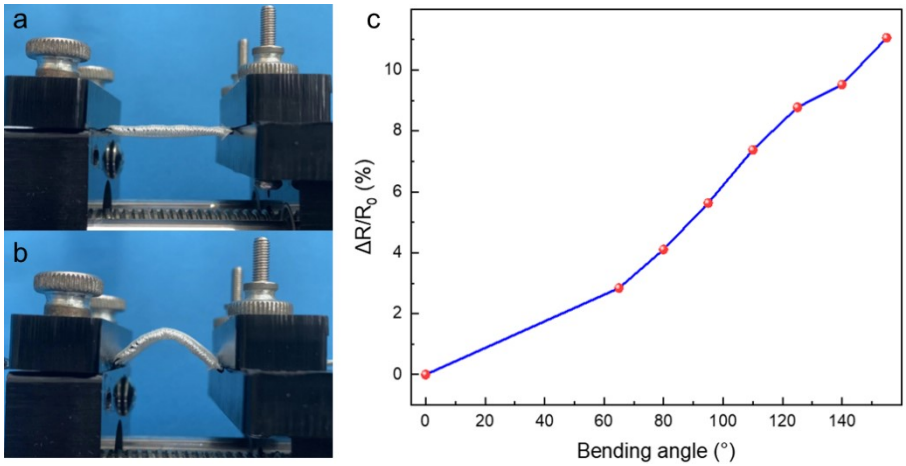

Fig. S12 Photographs of the side (a) and (b) side bends of the strain sensor. (b) Relative resistance change of strain sensors at different bending angles.

Table S1. Comparison of sensing capabilities between the current and other reported fabric-based sensors.

Sample	Strain	Cycling stability	Cost	Ref.
Ecoflex rubber/ carbonized natural yarn	130%	>100	High	[18]
AgNWs/ POE nanofiber composite yarn	63%	>4500	High	[35]
Graphene fiber core/polymer shell	16%	>200	Low	[52]
GR/PVDF/PU	10%	>6000	Low	[51]
GR/silk fabric	10%	>2500	Low	[40]
GR/TPU yarn	140%	>10000	Low	This work