Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Electronic Supplementary Information (ESI) for Recyclable EGaIn/TPU sheath–core fibres for superelastic electronics and sensing applications

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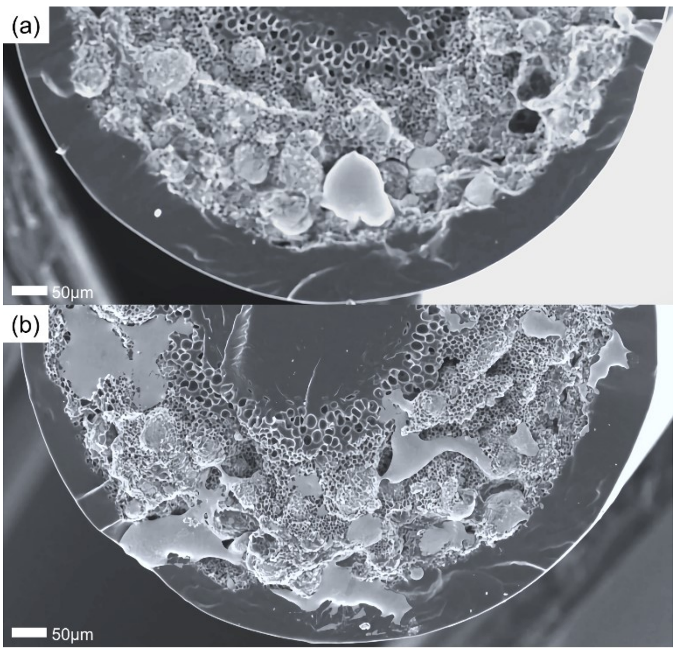

Figure S1. Enlarged SEM images of the partial cross-section of the (a) initial insulated TET fibre and (b) the conductive TET fibre after mechanical sintering.

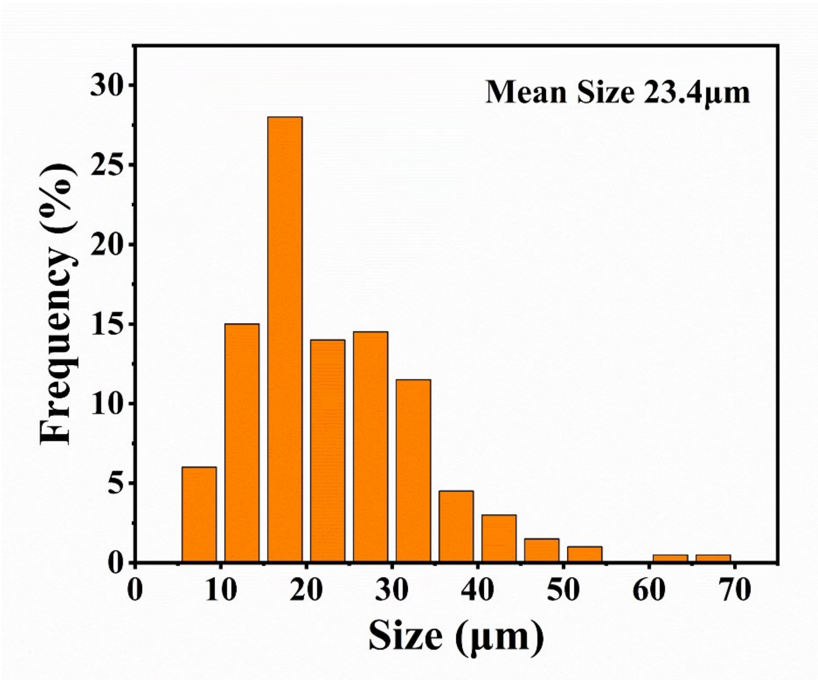

Figure S2. Distribution of the particle size of EGaIn in TET fibre, the average particle size is 23.4μm.

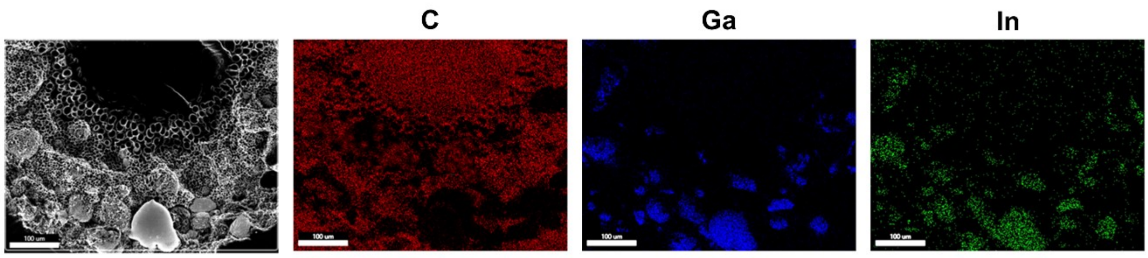

Figure S3. EDS images of partial cross-section.

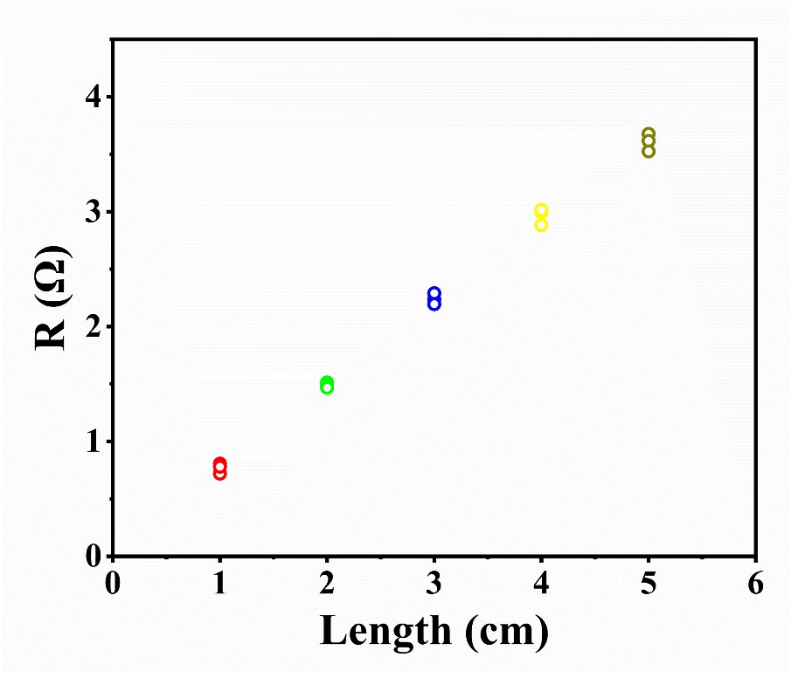

Figure S4. Resistance of TET fibres as a function of length, three samples were measured in each length.

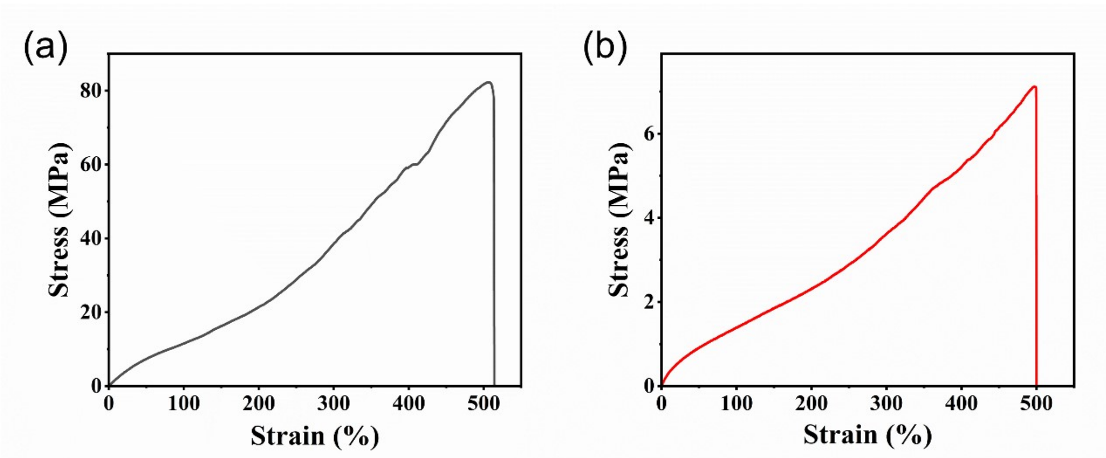

Figure S5. Stress-strain curves of TPU wire(a), TET fibre(b).

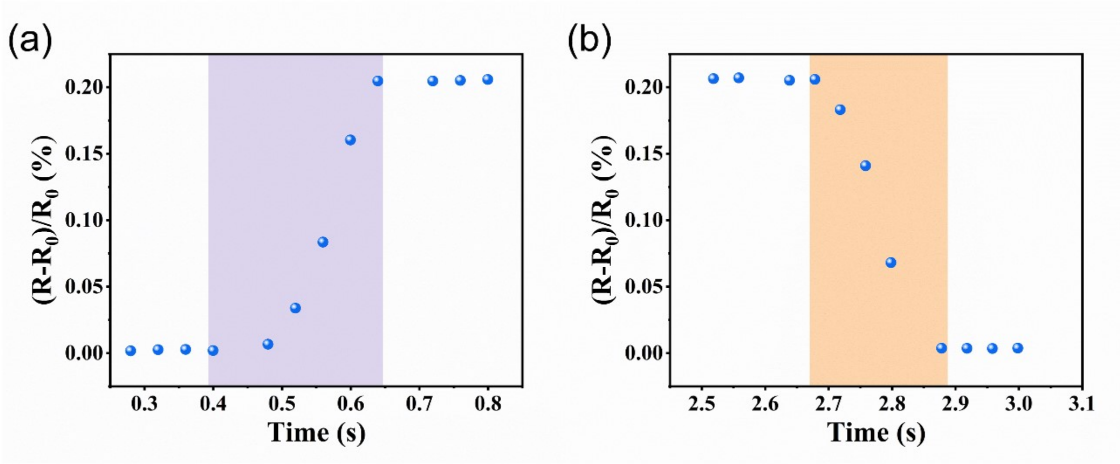

Figure S6. Partial enlargement of the response and recovery time of TET fibre at 1% strain. (a) Response time is approximately 240 ms. (b) Recovery time is approximately 200 ms.

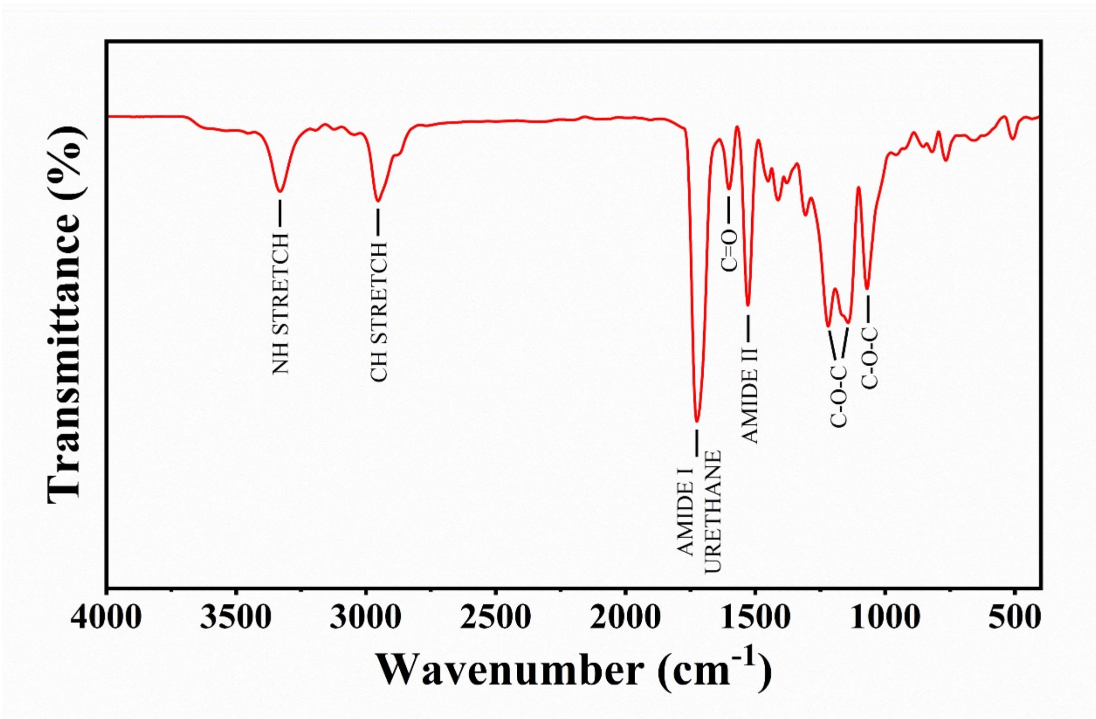

Figure S7. The ATR-FTIR transmission curves of the TPU wire.

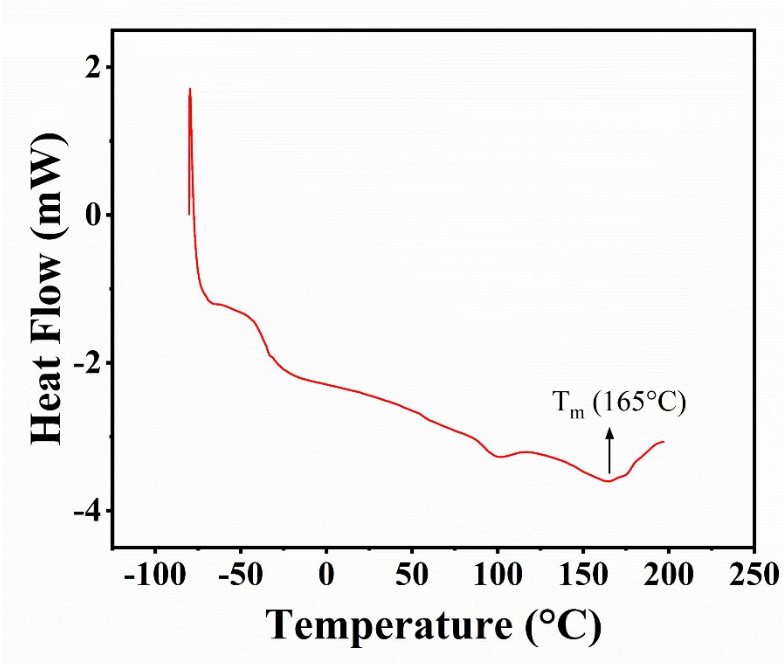

Figure S8. DSC curve of the TPU wire. The melting point of the TPU wire used in this work is 165°C.

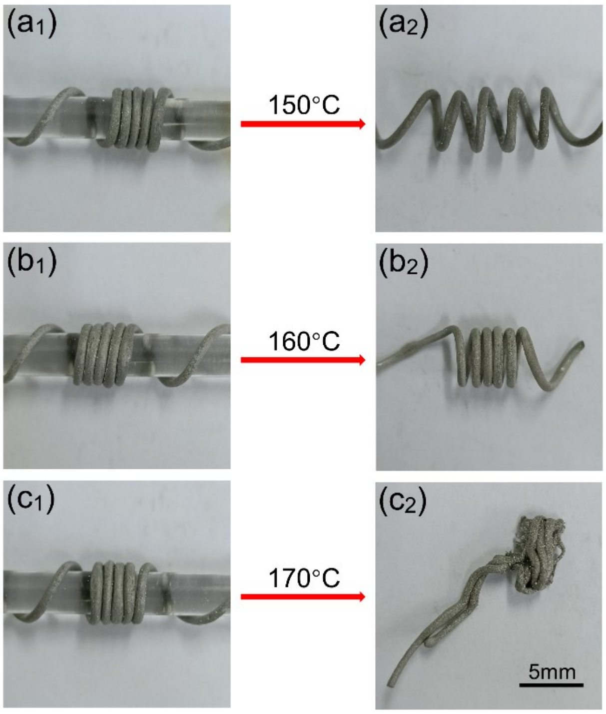

Figure S9. Photographs of TET fibres (a1-a2) before and after thermoforming at a temperature of 150°C. (b1-b2) Before and after thermoforming at 160°C. (c1-c2) Before and after thermoforming at 170°C.

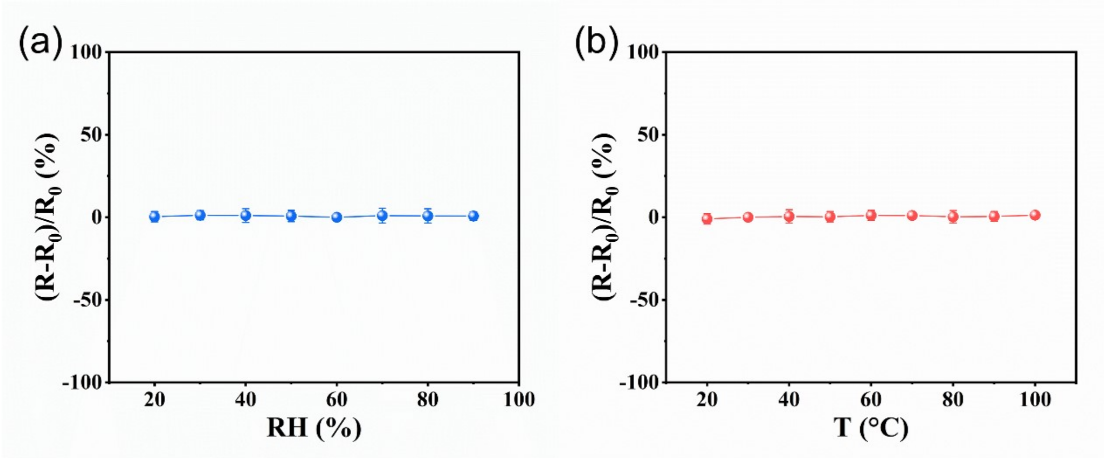

Figure S10. Relative resistance changes of TET fibre under the (a) wide temperature and (b) high humidity ranges.

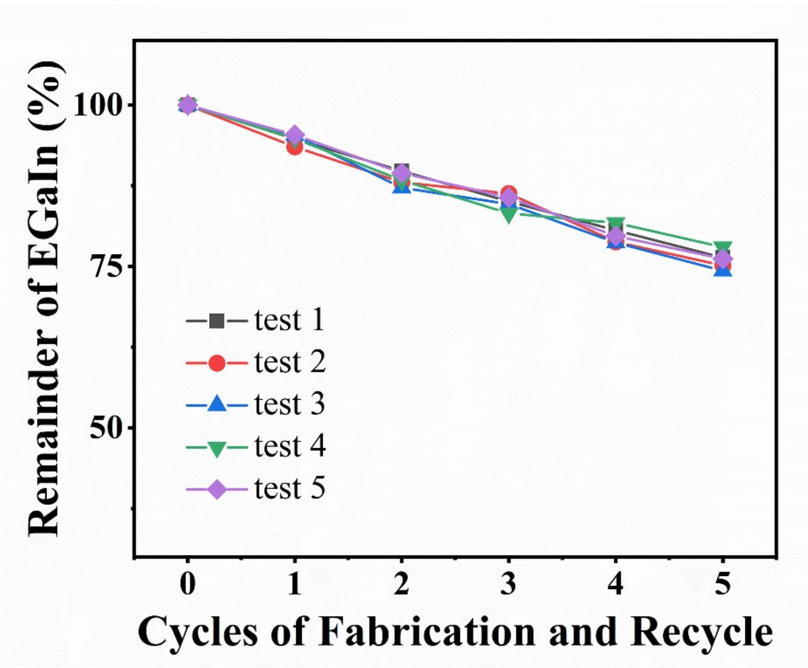

Figure S11. Detailed data of the five cycles of fabrication-recycle.

Table S1. Detailed data of the particle size distribution of EGaIn in TET fibre.

Diameter (μm)	Frequency (%)	Diameter (μm)	Frequency (%)
5-10	6	35-40	4.5
10-15	15	40-45	3
15-20	28	45-50	1.5
20-25	14	50-55	1
25-30	14.5	60-65	0.5
30-35	11.5	65-70	0.5

Table S2. Detailed information of reports compared with this work.

Devices	Strain (%)	Q	References
a 3D helical Cu/PU fibre	100	10000	66
a coiled CNT/nylon fibre	150	0.1	63
a LM sheath-core fibre	200	50	59
a coiled CNT/rubber fibre	400	1.8	62
Helical copper nanowire	700	1.8	64
a buckled CNT/SEBS fibre	800	65.1	36
a supercoiled spandex@CNT fibre	1000	238	69
Hierarchical CNT/rubber fibres	1320	264	68
a Ag Nanoparticle/PDMS fibre	1536	30.7	65
a biomimetic PE/AgNW Tendril	2000	271.4	61