Supplementary Materials

Helical ionotropic gel-fiber sensor with omnidirectional strain perception for multidimensional motion correction in adolescent activity assessment

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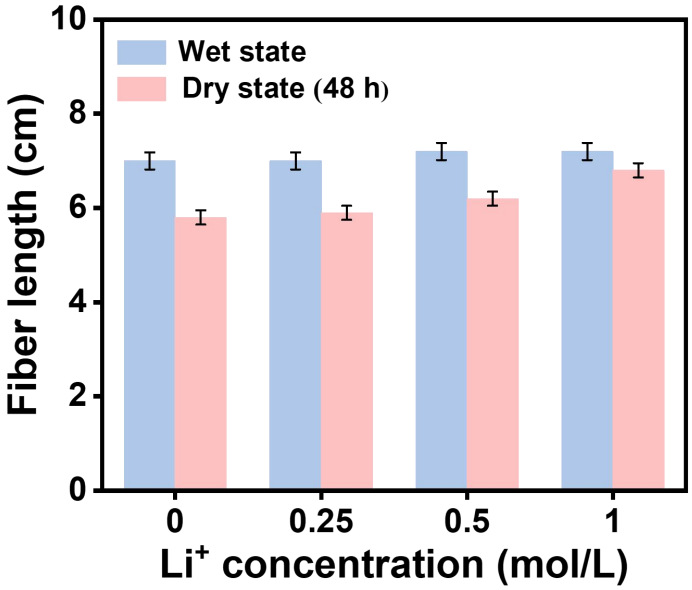

Supplementary Figure 1. Water retention of SACL fiber: the wet length of the gel fiber was compared with the length after drying for 48 h; This method assumes that water loss during drying causes fiber shrinkage, and thus a smaller reduction in length from the wet to dry state indicates better water retention: dry length retained ~85%-87% of the wet length at 0-1 mol/L Li^+.

Supplementary Table 1. Comparable investigates the sensing performances of gel fiber-based sensors in recent literatures

Sensor material	GF	Response Time	Cyclic Stability	Tensile Strength	Elongation at Break	Applications	Ref.
Agar/alginate/CNTs	1.21-1.79	300 ms	1000 cycles of stretching	300 kPa, withstand 1000 times the weight load	TSF can be twisted/ knotted without breaking.	Direction, pressure and angle sensing	This work
Oxidized cellulose nanofibrils	0.8128	144 ms	1000 cycles (100 % strain)	3.55 MPa	1715.66 %	Wearable strain sensor	[1]
Carboxymethyl cellulose	/	400 ms	30 cycles (100 % strain)	1.45-4.32 MPa.	Pre-stretching improves ductility	Joint movements	[2]
Silk fibroin	/	Response stability	Excellent cycle stability	455 MPa.	530 %	Protective/perceptual textiles	[3]
Chitosan/polyacrylic acid-acrylamide/$ZnSO_4$	4.22	Fast response	60 cycles (50 % strain)	150 kPa	1210 %	Physiological signal detection and motion direction recognition	[4]
Poly(vinyl alcohol)/ polyacrylamide	2.32	368 ms	1000 cycles (100 % strain)	268 kPa	2253 %	Motion sensing	[5]
PU@PVA-PEDOT:PSS	0.05	Fast response	2000 cycles (100 % strain)	/	500 %	Smart wearable application	[6]
Lignin/Mxene/Fe^{3+}	0.81~2.80	311 ms	200 cycles (200 % strain)	190 kPa	2139 %	Motion recognition and breathing detection	[7]

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