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

Supplementary Information

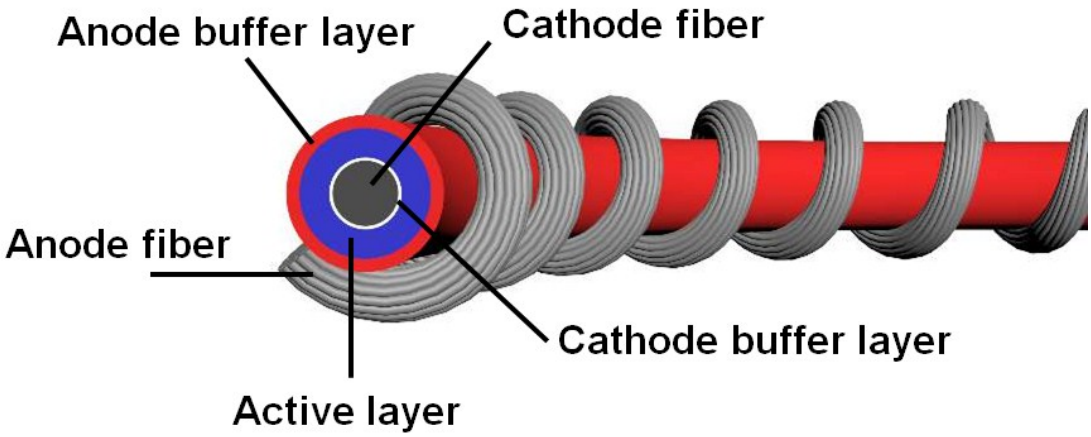

Figure S1. Schematic illustration to the structure of the traditional fiber-shaped polymer solar cells by twisting two fiber electrodes.

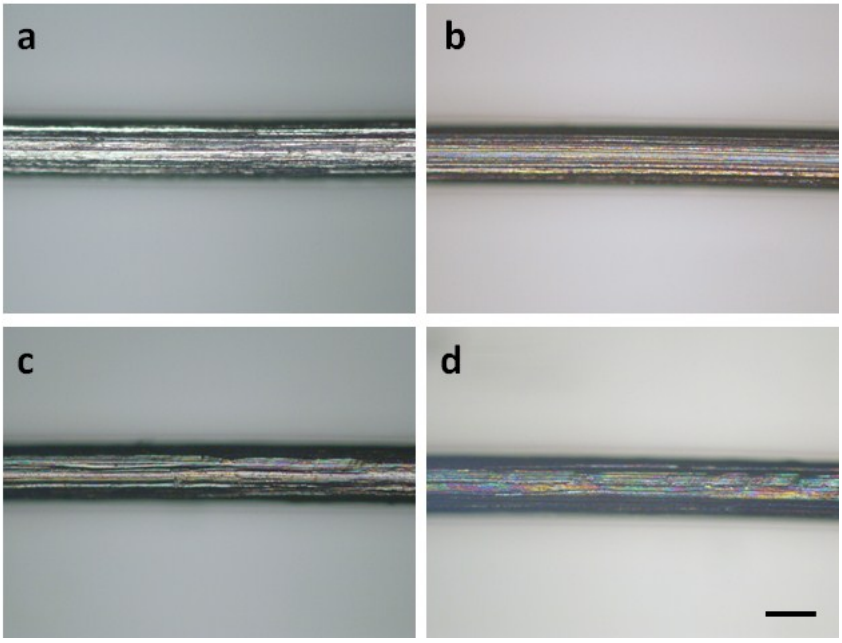

Figure S2. Optical micrographs of different layers coated on the Ti wire. a) Ti wire. b) ZnO nanocrystal layer. c) PTB7:$PC_{71}BM$ layer. d) PEDOT:PSS layer. Scale bar, 100 μm for a-d.

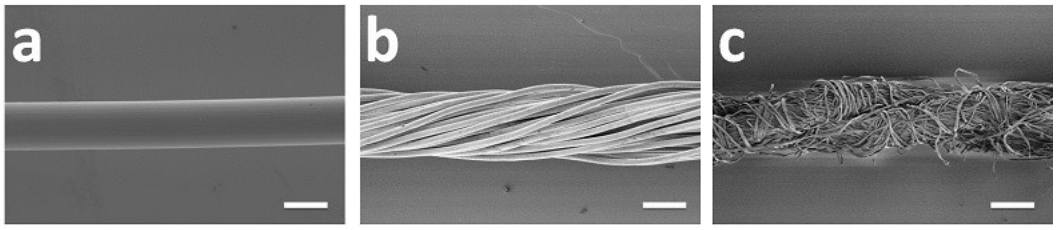

Figure S3. a), b) and c) Scanning electron microscopy (SEM) images of the modified cathode fiber, Ag-plated nylon yarn, and cotton thread, respectively. Scale bars, 100 μm.

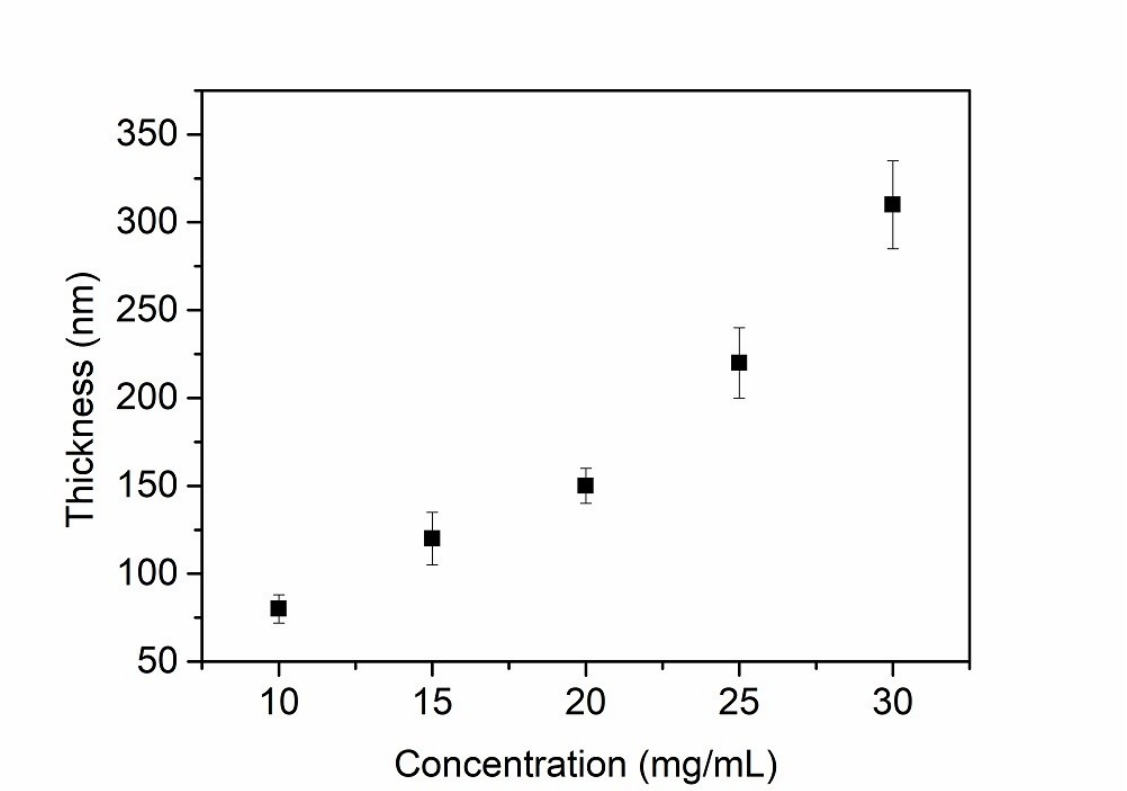

Figure S4. Thicknesses of active layers on the fiber devices derived from different PTB7:$PC_{71}BM$ concentrations.

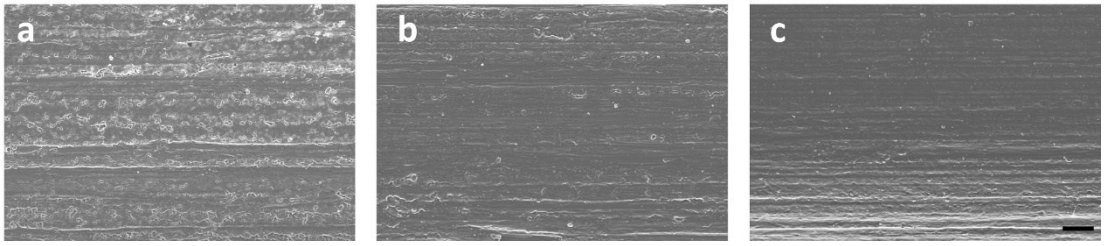

Figure S5. SEM images of the active layers derived from the concentrations of PTB7:$PC_{71}BM$ blend solutions at (a) 10 mg/mL, (b) 20 mg/mL and (c) 30 mg/mL. Scale bar, 10 μm.

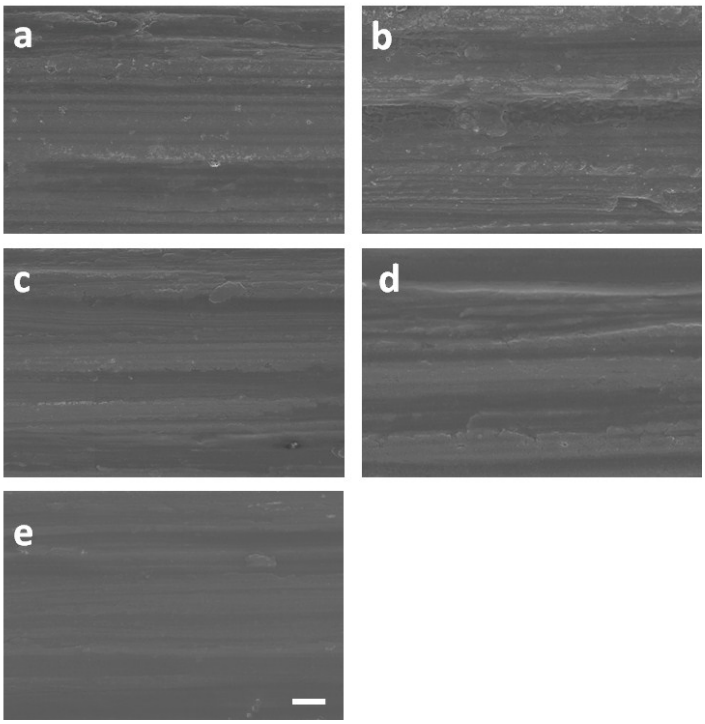

Figure S6. SEM images of the active layers derived from CB (a), DCB (b), CB:DIO (c), DCB:DIO (d) and CB:DIO after methanol treatment (e). Scale bar, 2 μm.

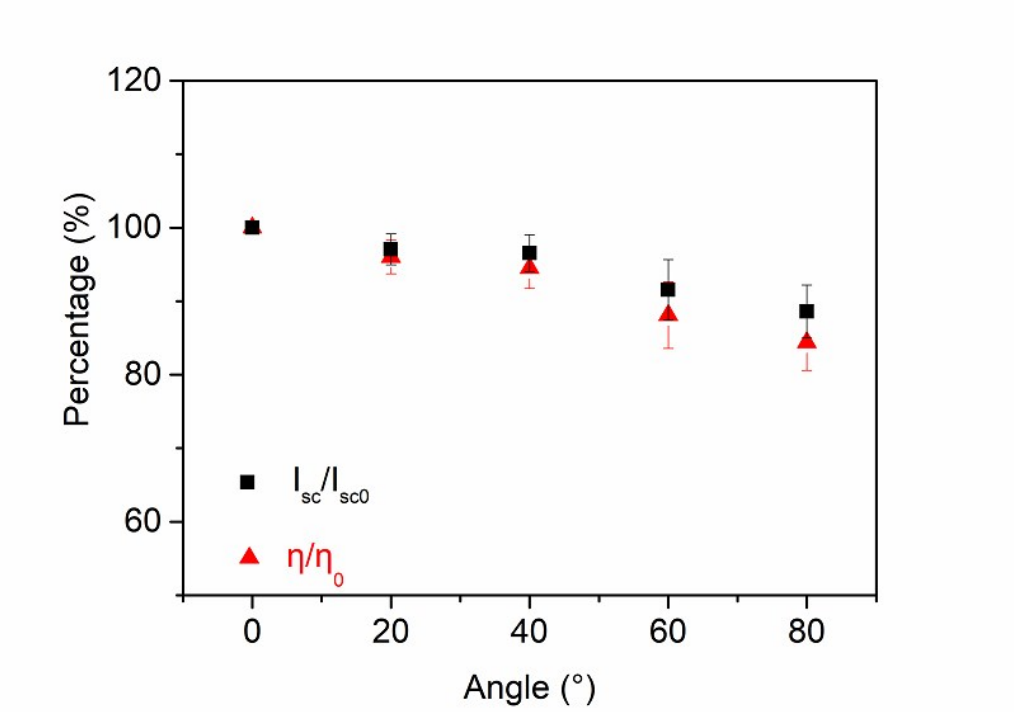

Figure S7. Photovoltaic performance of the polymer solar cell textile at different bending angles. Isc/Isc_0 and η/η_0 denoted the photocurrent and PCE of the textile device after and before bending, respectively.

Figure S8. Photograph of the Ag-plated nylon yarn.

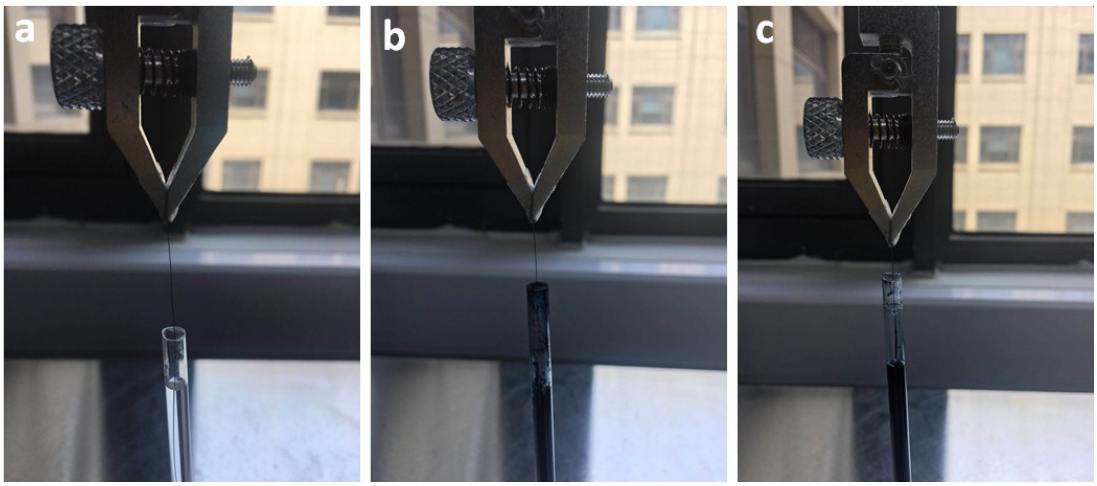

Figure S9. Photograph of the fiber dip-coating in ZnO precursor solution (a), PTB7:$PC_{71}BM$ solution (b) and PEDOT:PSS solution (c).

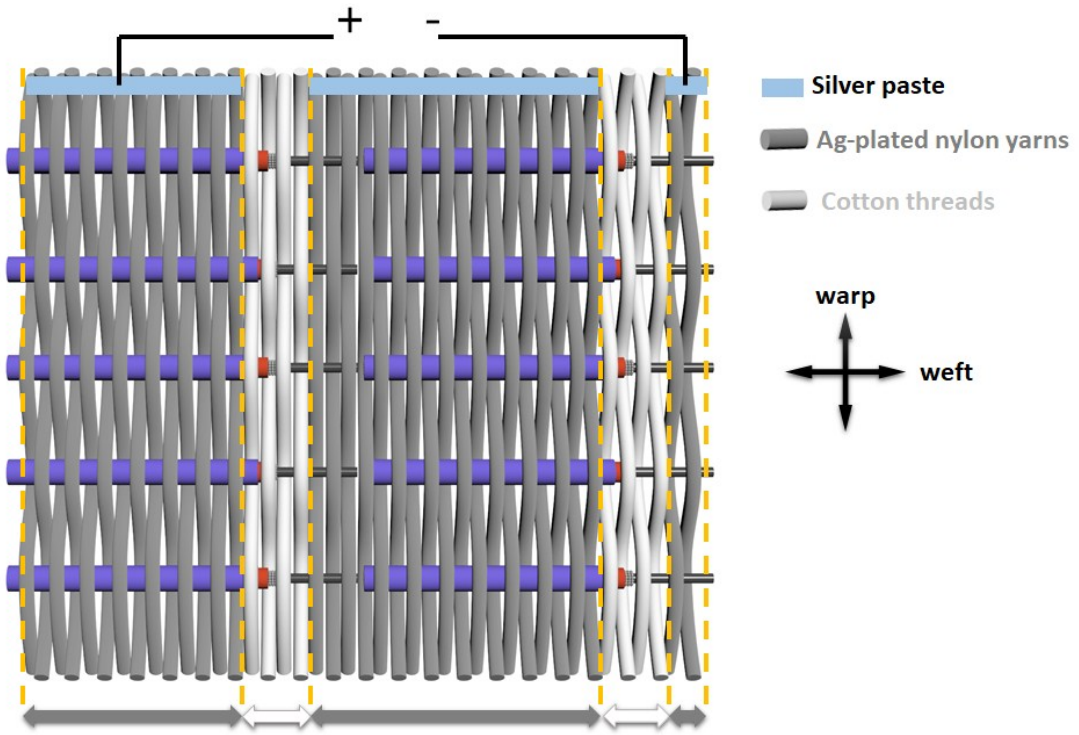

Figure S10. Schematic illustration to the weaving structure of the photovoltaic textile.

Table S1. Photovoltaic parameters of the polymer solar cell textile module with active layers prepared from different solvents under the illumination of AM 1.5 G, 100 mW/cm^2 [a].

Solvent	*V*oc (V)	*J*sc (mA/cm^2)	FF (%)	PCE (Avg.) (%)
CB	0.48	7.31	45.73	1.60 (1.47)
DCB	0.41	6.87	40.23	1.13 (0.96)
CB:DIO	0.49	7.42	44.55	1.62 (1.53)
DCB:DIO	0.43	6.95	42.40	1.27 (1.09)
CB:DIO with methanol treatment	0.47	7.57	46.22	1.64 (1.52)

[a)] The average values were calculated over five devices.

Table S2. Photovoltaic parameters of the polymer solar cell textile module woven from anode fibers (Ag-plated nylon yarns) with different thicknesses under the illumination of AM 1.5 G, 100 mW/cm^2 [a].

Thickness (μm)	*V*oc (V)	*J*sc (mA/cm^2)	FF (%)	PCE (Avg.) (%)
100	0.48	7.32	45.62	1.60 (1.52)
140	0.47	6.83	47.10	1.51 (1.40)
180	0.48	5.79	47.43	1.32 (1.21)
210	0.48	5.46	47.47	1.24 (1.09)
250	0.48	4.89	46.03	1.08 (0.93)

[a)] The average values were calculated over five devices.

Table S3. Photovoltaic parameters of the polymer solar cell textile module woven from anode fibers (Ag-plated nylon yarns) with different intervals under the illumination of AM 1.5 G, 100 mW/cm^2 [a].

Interval (mm)	***V*oc (V)**	***J*sc (mA/cm^2)**	**FF (%)**	**PCE (Avg.) (%)**
0.5	0.49	6.60	48.04	1.55 (1.41)
1.0	0.50	7.19	45.51	1.63 (1.49)
1.5	0.49	6.77	48.12	1.59 (1.43)
2.0	0.48	6.35	45.87	1.39 (1.28)
2.5	0.45	5.65	44.40	1.12 (0.97)

[a)] The average values were calculated over five devices.