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:PC71BM layer. d) PEDOT:PSS layer. Scale bar, 100 \( \mu \)m 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. $I_{sc}/I_{sc0}$ and $\eta/\eta_0$ 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:PC71BM 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$^2$.\(^a\)

<table>
<thead>
<tr>
<th>Solvent</th>
<th>$V_{oc}$ (V)</th>
<th>$J_{sc}$ (mA/cm$^2$)</th>
<th>FF (%)</th>
<th>PCE (Avg.) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB</td>
<td>0.48</td>
<td>7.31</td>
<td>45.73</td>
<td>1.60 (1.47)</td>
</tr>
<tr>
<td>DCB</td>
<td>0.41</td>
<td>6.87</td>
<td>40.23</td>
<td>1.13 (0.96)</td>
</tr>
<tr>
<td>CB:DIO</td>
<td>0.49</td>
<td>7.42</td>
<td>44.55</td>
<td>1.62 (1.53)</td>
</tr>
<tr>
<td>DCB:DIO</td>
<td>0.43</td>
<td>6.95</td>
<td>42.40</td>
<td>1.27 (1.09)</td>
</tr>
<tr>
<td>CB:DIO with methanol</td>
<td>0.47</td>
<td>7.57</td>
<td>46.22</td>
<td>1.64 (1.52)</td>
</tr>
</tbody>
</table>

\(^a\) 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$^2$.\(^a\)

<table>
<thead>
<tr>
<th>Thickness (μm)</th>
<th>$V_{oc}$ (V)</th>
<th>$J_{sc}$ (mA/cm$^2$)</th>
<th>FF (%)</th>
<th>PCE (Avg.) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>0.48</td>
<td>7.32</td>
<td>45.62</td>
<td>1.60 (1.52)</td>
</tr>
<tr>
<td>140</td>
<td>0.47</td>
<td>6.83</td>
<td>47.10</td>
<td>1.51 (1.40)</td>
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<tr>
<td>180</td>
<td>0.48</td>
<td>5.79</td>
<td>47.43</td>
<td>1.32 (1.21)</td>
</tr>
<tr>
<td>210</td>
<td>0.48</td>
<td>5.46</td>
<td>47.47</td>
<td>1.24 (1.09)</td>
</tr>
<tr>
<td>250</td>
<td>0.48</td>
<td>4.89</td>
<td>46.03</td>
<td>1.08 (0.93)</td>
</tr>
</tbody>
</table>

\(^a\) 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/cm².\(^a\)

<table>
<thead>
<tr>
<th>Interval (mm)</th>
<th>Voc (V)</th>
<th>Jsc (mA/cm²)</th>
<th>FF (%)</th>
<th>PCE (Avg.) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>0.49</td>
<td>6.60</td>
<td>48.04</td>
<td>1.55 (1.41)</td>
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<tr>
<td>1.0</td>
<td>0.50</td>
<td>7.19</td>
<td>45.51</td>
<td>1.63 (1.49)</td>
</tr>
<tr>
<td>1.5</td>
<td>0.49</td>
<td>6.77</td>
<td>48.12</td>
<td>1.59 (1.43)</td>
</tr>
<tr>
<td>2.0</td>
<td>0.48</td>
<td>6.35</td>
<td>45.87</td>
<td>1.39 (1.28)</td>
</tr>
<tr>
<td>2.5</td>
<td>0.45</td>
<td>5.65</td>
<td>44.40</td>
<td>1.12 (0.97)</td>
</tr>
</tbody>
</table>

\(^a\) The average values were calculated over five devices.