

ADVANCED ENERGY MATERIALS

Supporting Information

for *Adv. Energy Mater.*, DOI: 10.1002/aenm.201301750

Weaving Efficient Polymer Solar Cell Wires into Flexible
Power Textiles

*Zhitao Zhang, Zhibin Yang, Zhongwei Wu, Guozhen Guan,
Shaowu Pan, Ye Zhang, Houpu Li, Jue Deng, Baoquan Sun,
and Huisheng Peng**

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Optical micrograph was obtained from Olympus BX51. The structures were characterized by scanning electron microscopy (Hitachi FE-SEM S-4800 operated at 1 kV). J–V curves were recorded by a Keithley 2400 Source Meter under the illumination (100 mW/cm^2) of simulated AM 1.5 solar light by a solar simulator (Oriel-Sol3A 94023 A equipped with a 450W Xe lamp and an AM1.5 filter).

When a bare Ti wire without the growth of aligned titania nanotubes was treated by the TiCl_4 solution, the photoelectric conversion efficiency had been very low, e.g., 0.05%. The aligned titania nanotubes had enhanced the electron transport to mainly increase the J_{SC} value (Figure S6). Note that the wire-shaped PSC also worked without the use of PCBM in the photoactive layer, i.e., the produced electrons were directly transported through the aligned MWCNTs. Figure S7 shows a typical J-V curve with an energy conversion efficiency of appropriately 0.35%.

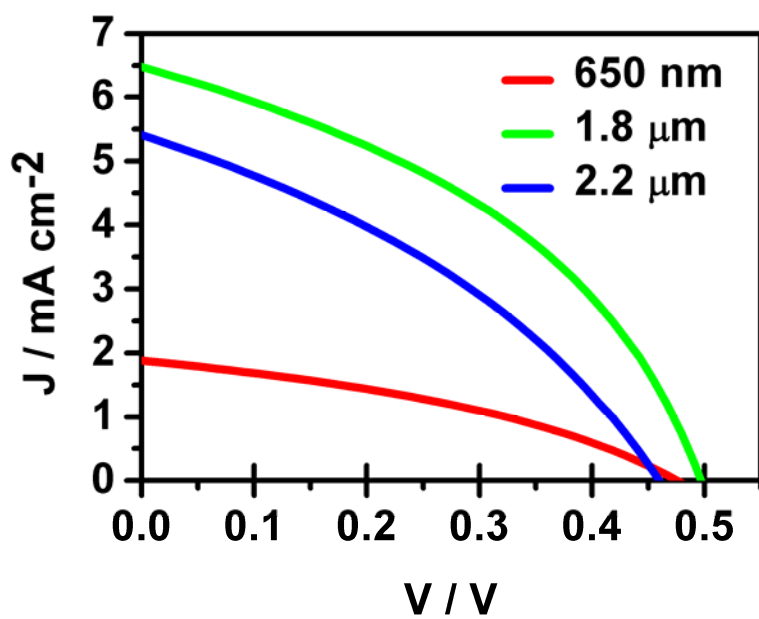


Figure S1. J-V curves of wire-shaped PSCs with increasing lengths of TiO₂ nanotubes.

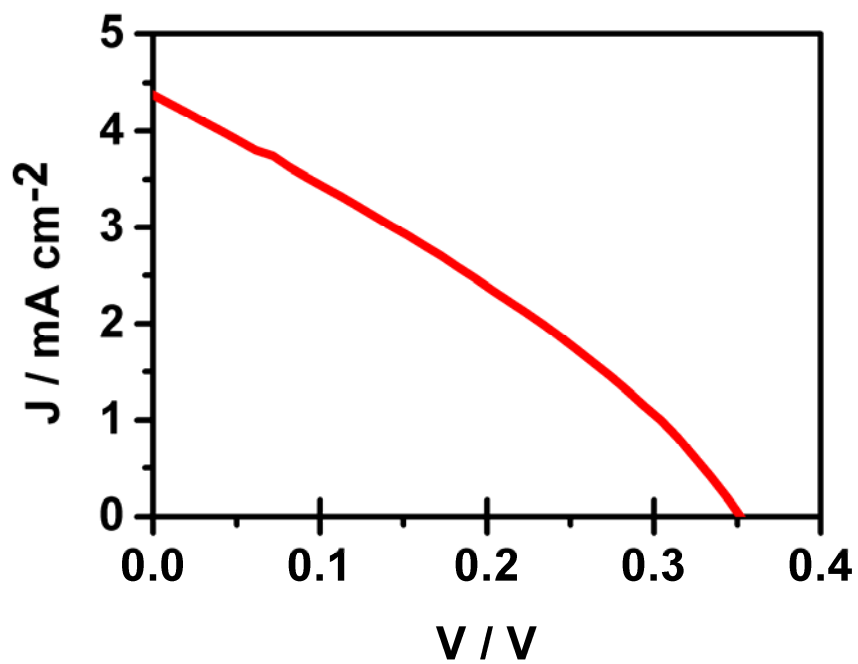


Figure S2. J-V curve of a wire-shaped PSC with the silver wire as the fiber electrode before bending.

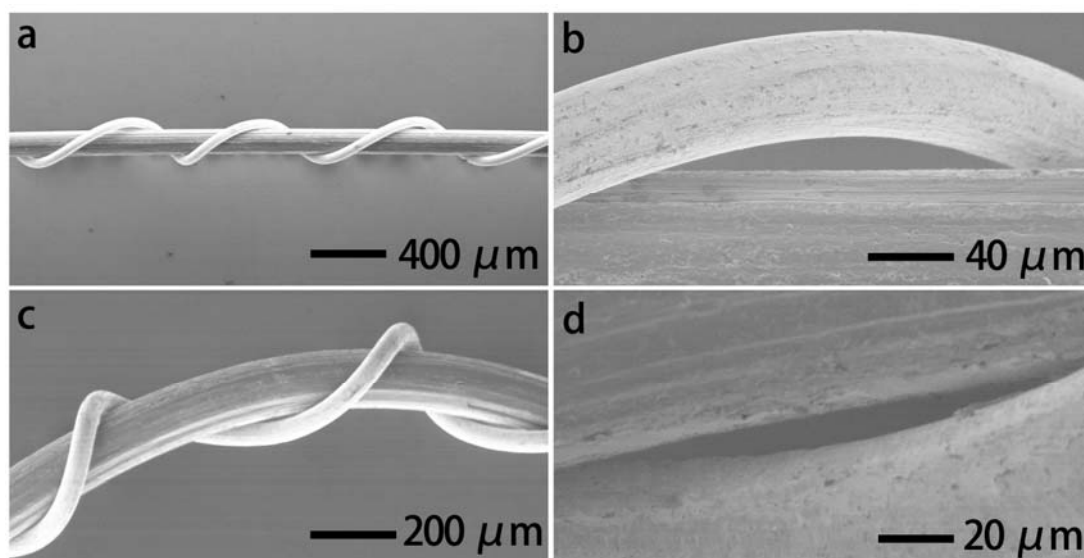


Figure S3. **a** and **b.** The twisted, wire-shaped PSC with a silver wire as a fiber electrode before bending at low and high magnifications, respectively. **c** and **d.** The twisted, wire-shaped PSC with the silver wire as the electrode after bending at low and high magnifications, respectively.

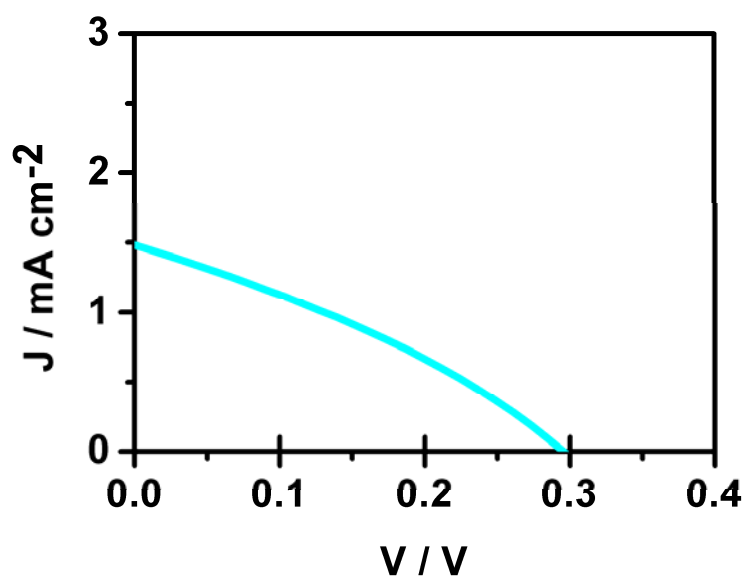


Figure S4. J-V curve of the wire-shaped PSC with the silver wire as the fiber electrode after bending.

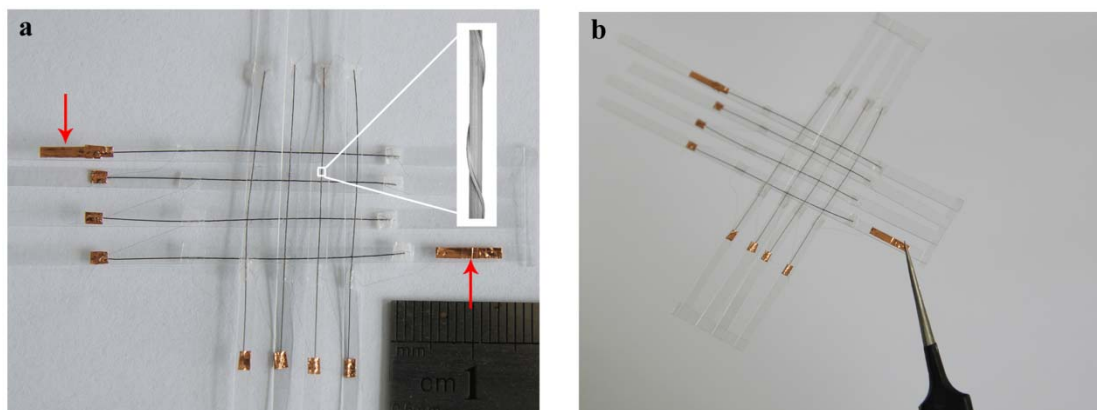


Figure S5. Photographs on a PSC textile being woven from wire-shaped PSCs. The red arrows show two fiber electrodes.

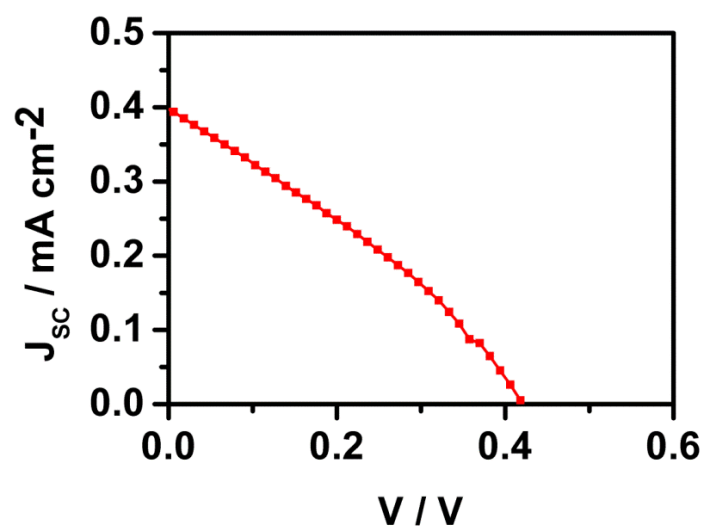


Figure S6. Typical J-V curve of the wire-shaped PSC by directly treating a bare Ti wire with TiCl_4 solution.

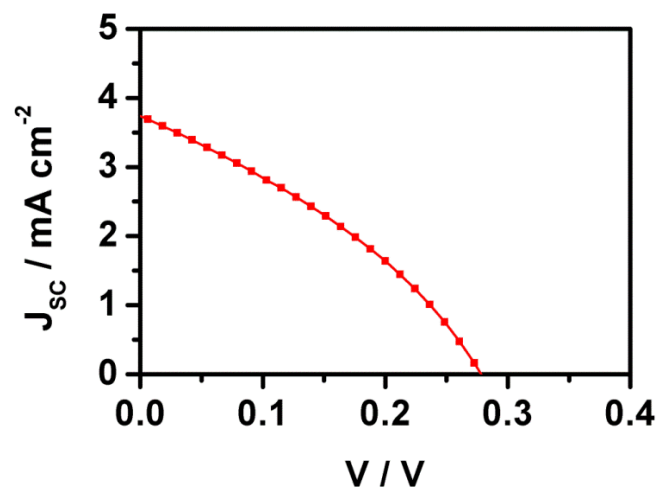


Figure S7. Typical J-V curve of the wire-shaped PSC without PCBM.