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Supplementary Materials for

Self-powered textile by hybridizing all-fiber–shaped nanogenerator–solar cell–supercapacitor for wearable electronics

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The PDF file includes:

- fig. S1. XRD pattern of the anodized TiO_2 nanotube arrays on a Ti wire.
- fig. S2. SEM images of pure carbon fiber and Pt-coated carbon fiber.
- fig. S3. *J-V* curve of an F-DSSC based on bare carbon fibers.
- fig. S4. Dependence of an F-DSSC under different incident light angles.
- fig. S5. XRD pattern of the $RuO_2 \bullet xH_2O$.
- fig. S6. CV and GCD curves of an F-SC based on bare carbon fibers.
- fig. S7. V_{OC} outputs of F-TENG network textiles.
- fig. S8. *I-V* curve of three F-DSSCs in series connection.

Other Supplementary Material for this manuscript includes the following:
(available at advances.sciencemag.org/cgi/content/full/2/10/e1600097/DC1)

- movie S1 (.avi format). Flexibility test of Cu-coated EVA tubing.
- movie S2 (.avi format). Stability test of hybridized self-charging power textile.

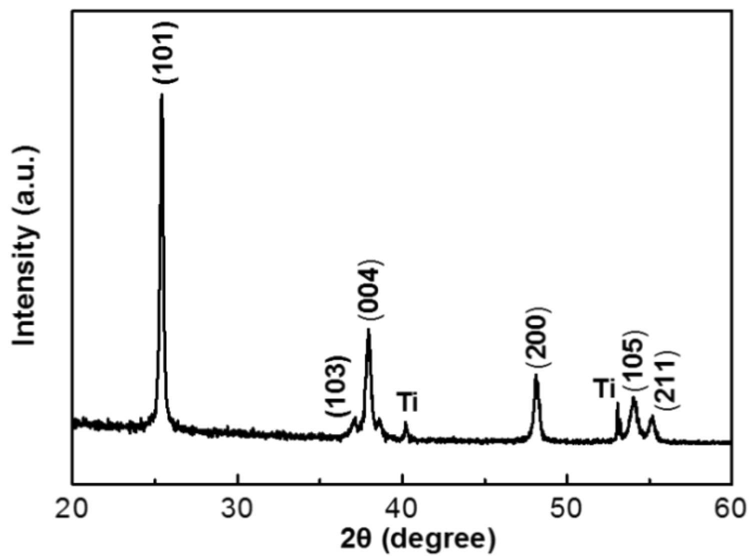

fig. S1. XRD pattern of the anodized TiO_2 nanotube arrays on a Ti wire.

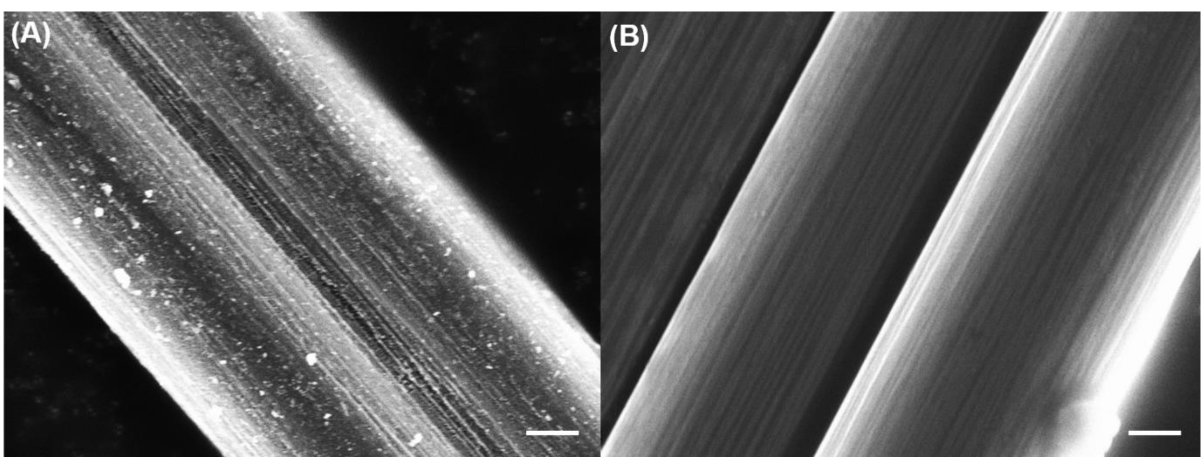

fig. S2. SEM images of pure carbon fiber and Pt-coated carbon fiber. Both of the scale bars are 2 μm.

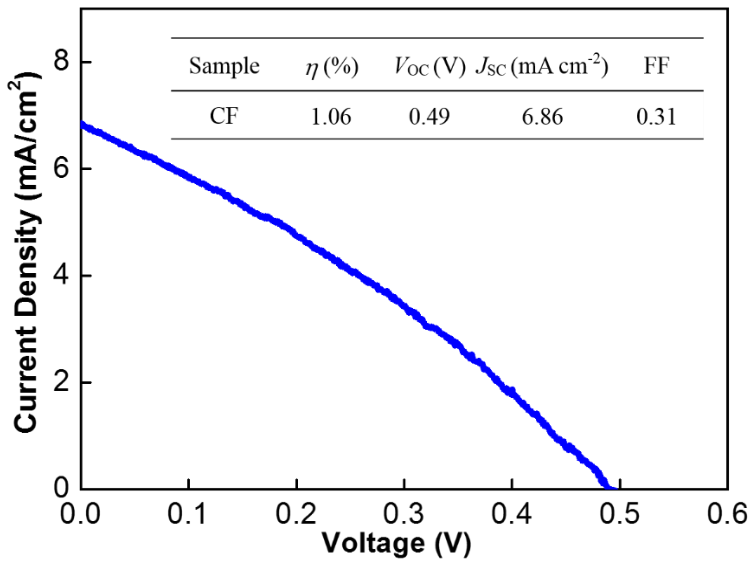

fig. S3. *J-V* curve of an F-DSSC based on bare carbon fibers. Homogeneous dispersed Pt nanoparticles on carbon fiber provide an outstanding electrocatalytic activity for reducing the I_3^- ions. Hence, promising performance of F-DSSC with Pt-coated carbon fiber was obtained and then integrated in self-charging power textile for harvesting solar energy efficiently. However, for the case of F-DSSC with bare carbon fiber as the counter electrode, an overall power conversion efficiency (~1.06%) was restricted by its insufficient catalytic ability. The J-V curves and the corresponding photovoltaic parameters for F-DSSC with bare carbon fiber are shown in fig. S3.

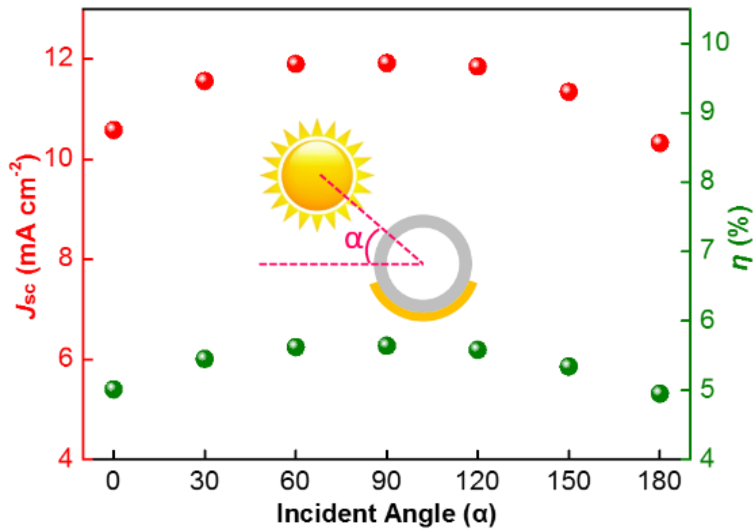

fig. S4. Dependence of an F-DSSC under different incident light angles. The schematic image of measuring the performance of single F-DSSC unit under different incident angles was shown as the inset.

As shown in fig. S4, no obvious change of photovoltaic parameters can be observed under incident light angles varying from 60^o to 120^o. However, for the case of incident light angle under extremely condition, namely 0 and 180^o, the issue of insufficient incident light area was emerged since some part of PVA surface was coated with opaque Cu for fabricating the F-TENG. Lower performance of *J*sc (~10.4 mA cm^{-2}) and η (~4.85%) was obtained under such extremely incident light angles. High conversion efficiency of F-DSSC can be obtained only when the incident light comes from the side of tubing without depositing Cu. This problem can be solved by replacing the Cu to transparent conductive oxide, e.g. indium tin oxide (ITO), so that the transparent tubing could obtain for receiving the incident light from all directions.

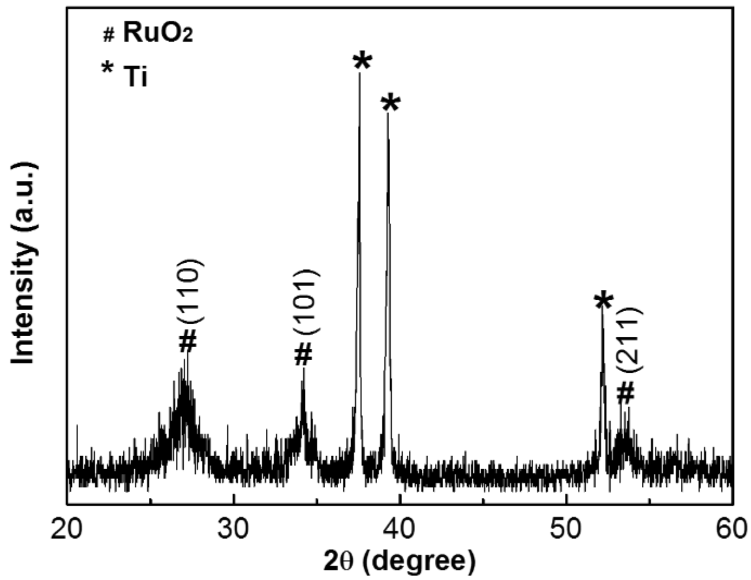

fig. S5. XRD pattern of the RuO_2•xH_2O.

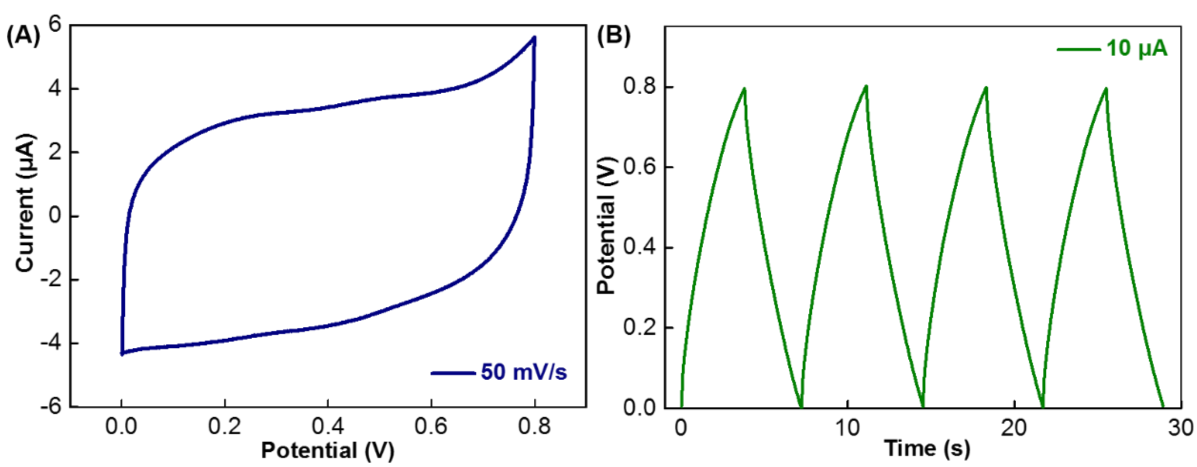

fig. S6. CV and GCD curves of an F-SC based on bare carbon fibers. (**A**) Cyclic voltammograms (CV) curve under the scanning rate of 50 mV/s and (**B**) galvanostatic charging/discharging (GCD) under current density of 10 μA of a single fiber based supercapacitor based on bare carbon fibers.

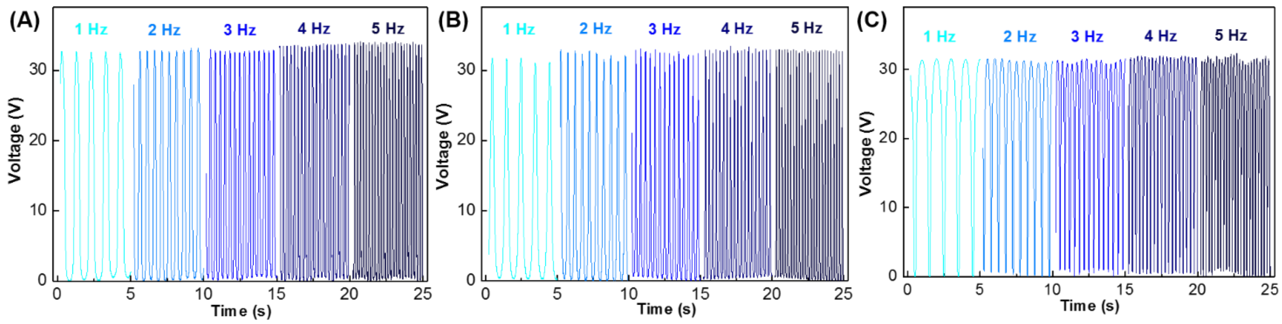

fig. S7. V_{OC} outputs of F-TENG network textiles. The open-circuit voltage outputs of F-TENG network textiles with knitting patterns of (**A**) 1×1, (**B**) 3×3 and (**C**) 5×5 nets at the frequencies ranging from 1 to 5 Hz.

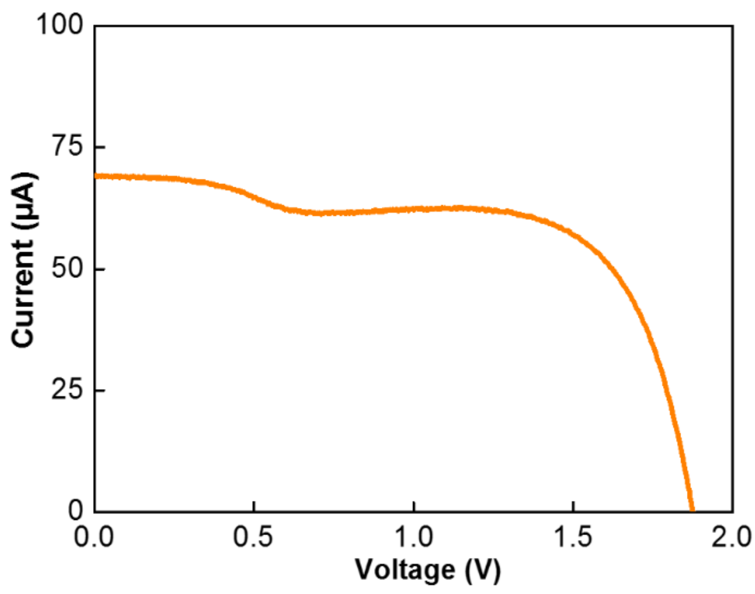

fig. S8. *I-V* curve of three F-DSSCs in series connection.