Supporting Information

Experimental Section

Fabrication of the photovoltaic wire incorporated with titanium dioxide nanoparticles is summarized as below. (1) A layer of TiO_2 nanoparticle film was coated onto the CNT fiber with lengths from 1 to 4 cm by immersing them into the TiO_2 colloid (TPP3, purchased from Dalian Heptachroma Solartech Co., Ltd.). The TiO_2 nanoparticle-coated CNT fibers were heated to 100 ^oC for 5 min to remove the solvent. The thickness of TiO_2 layer was about 5 μm after one cycle, and the above process was repeated to produce the desired thickness. (2) The resulting TiO_2 nanoparticle-coated CNT fiber was sintered at 500 ^oC for 60 min in air. (3) The sintered fiber was immersed into the N719 dye solution in acetonitrile and tert-butanol (volume ratio of 1/1) with a concentration of 0.3 mM after being cooled to 120 ^oC. (4) The CNT/TiO_2/N719 composite fiber was twined with another bare CNT fiber which functioned as counter electrode, and the two electrodes were then fixed on glass using indium by an ultrasonic soldering mate (USM-V, Kuroda Techno Co., Ltd.). (5) The redox electrolyte containing 0.1 M LiI, 0.05 M I_2, 0.6 M dimethyl-3-n-propyl-imidazolium iodide, and 0.5 M 4-tertbutyl-pyridine in dehydrated acetonitrile was dropped onto the assembled fiber solar cell prior to the characterization.

Fabrication of the photovoltaic wire incorporated with TiO_2 nanotubes is summarized as below. Highly aligned TiO_2 nanotubes were grown on the titanium wire by electrochemical anodization in 0.25 wt% NH_4F/ethylene glycol solution containing 1 vol% H_2O at a voltage of 60 V and residence time of 8h. The growth was realized in a two-electrode electrochemical cell with titanium wire (diameter of 127 μm and purity of 99.9%) and platinum wire as anode and cathode, respectively. The resulting wires were washed with deionized water to remove the electrolyte, followed by annealing at 500 ^oC in air for 1h to produce the anatase TiO_2. The annealed wires were immersed in 0.04 M $TiCl_4$ solution at 70 ^oC for 30 min, and then rinsed with de-ionized water, followed by annealing again at 450 ^oC for 30 min. After being cooled to 120 ^oC, the TiO_2 nanotube-modified titanium wires were immersed into a 0.3 mM N719 solution in alcohol and isopropanol with a volume ratio of 1/1. Finally, the dye-absorbed working electrode was twined with a CNT fiber. Prior to characterization, the electrolyte containing 0.1 M LiI, 0.05 M I_2, 0.6 M dimethyl-3-n-propyl-imidazolium iodide, and 0.5 M 4-tert butyl-pyridine in dehydrated acetonitrile was filled into the assembled cell. The wire solar cell can also be packaged into a flexible plastic capillary to meet various applications.

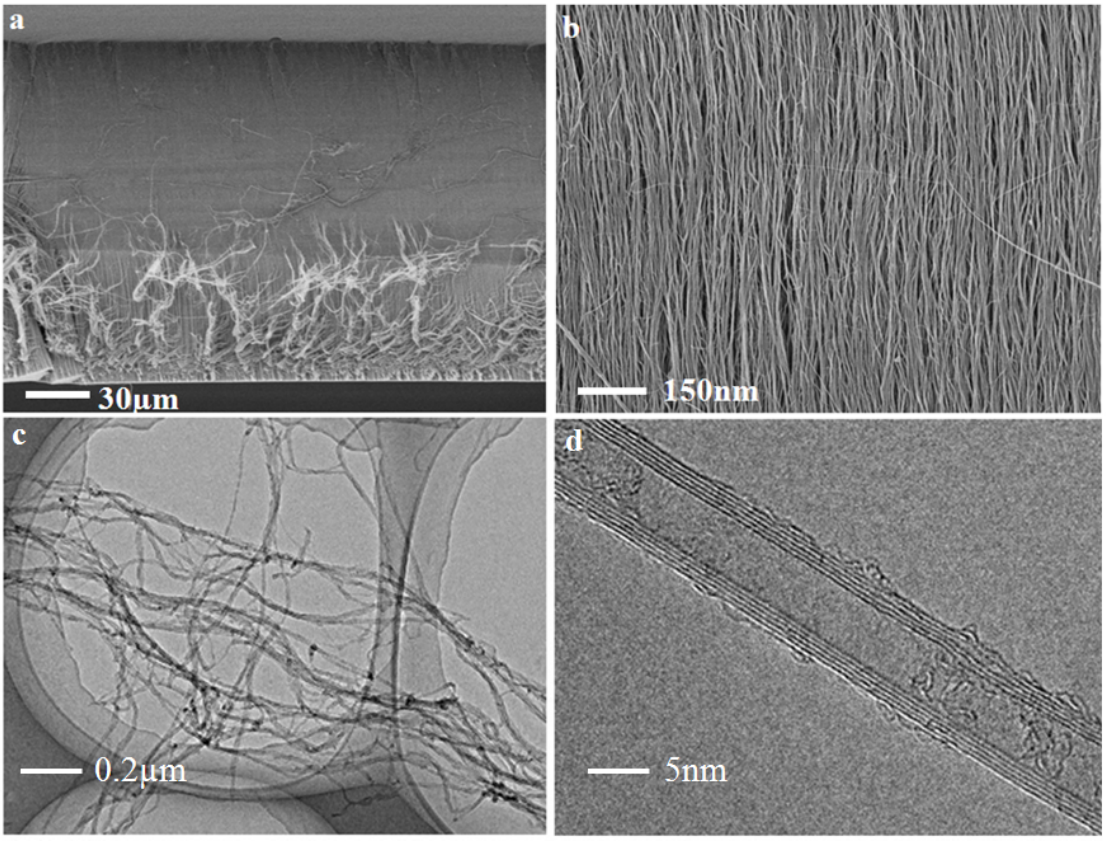

Figure S1. Scanning electron microscopy (SEM) and transmission electron microscopy (TEM) images of the CNT. **a** and **b.** SEM images of a spinnable CNT array at low and high magnifications, respectively. **c.** TEM image of the CNTs at low magnification. **d.** High-resolution TEM image of a CNT.

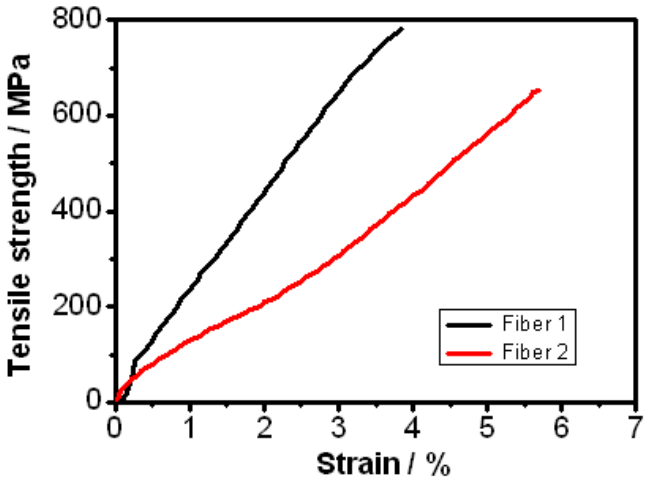

Figure S2. Stress-strain curves of two typical CNT fibers.

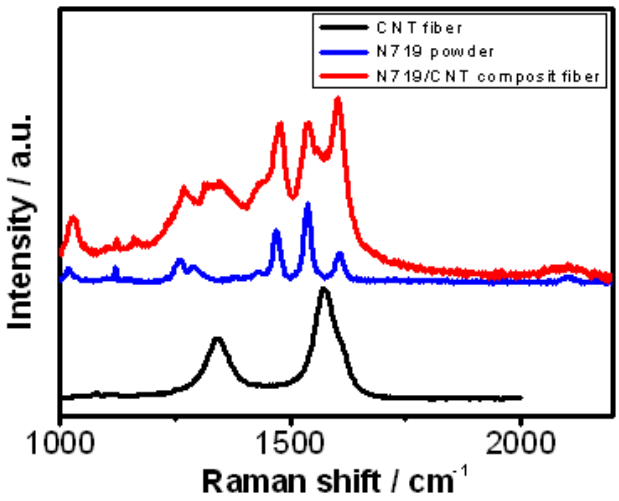

Figure S3. Raman spectra of pure CNT fiber, N719 powder, and CNT/N719 composite fiber.