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Electronic Supplementary Information

**Nanocoating of natural cellulose fibers with conjugated polymer:
hierarchical polypyrrole composite materials**

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1. Experimental Details

a) Preparation of PPy-titania bi-coated cellulose sheet. A titania-coated cellulose sheet (prepared by using the surface sol-gel process, see Ref. 2) was used as the substrate of PPy deposition process (described in the manuscript) instead of pure filter paper. The PPy deposition was carried out under the same experimental conditions as described in the manuscript.

b) Electron Microscopy. The specimens for electron microscopy observation were prepared as follows: a small piece of the sample cellulose sheet was dispersed in 2-propanol by grinding combined with ultrasonic treatment, the dispersion was dropped onto silicon wafer (for SEM) or siliconoxide-coated gold grid (for TEM), and then dried in air at room temperature. FE-SEM micrographs were obtained using a Hitachi S-5200 instrument at an acceleration voltage of 25.0 kV. TEM measurements were conducted on a JEOL JEM-2000 microscope at accelerating voltage of 120 kV.

2. Photos of Water Droplets on Nanocoated Cellulose Sheets

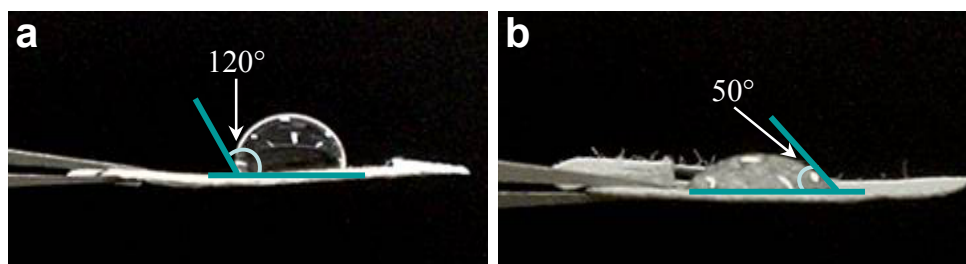


Fig. S1 Photos of water droplets on titania-coated cellulose sheet (a) and PPy-titania bi-coated cellulose sheet (b).

3. PPy-Coated Titania Nanotubes

a) Preparation. A small piece of titania nanotube sheet (see Ref. 2a) was added into the filtered polymerization solution of pyrrole which was obtained by the above described procedure. The deposition of PPy was proceeded for 2h, and the sheet turned deep gray. The PPy-coated titania nanotubes were then collected by centrifugation. The product was thoroughly washed with 2-propanol *via* repeated centrifugation-redispersion cycles.

b) Characterization. Morphologies of the obtained PPy-coated titania nanotubes were observed by FE-SEM and TEM. The results are shown in Fig. S2.

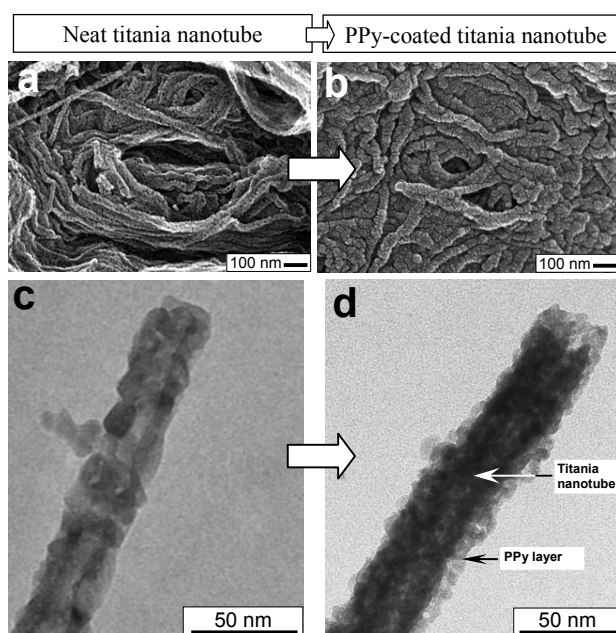


Fig. S2 (a) FE-SEM image of the titania (anatase) nanotube assemblies obtained by calcination of titania-coated cellulose sheet. (b) FE-SEM image of the PPy-coated titania nanotube assemblies. (c) TEM image of an individual neat titania nanotube. (d) TEM image of an individual PPy-coated titania nanotube.