ELECTRONIC SUPPORTING INFORMATION

One-dimensional hierarchical composite materials based on ZnO nanowires and blend nanofibers

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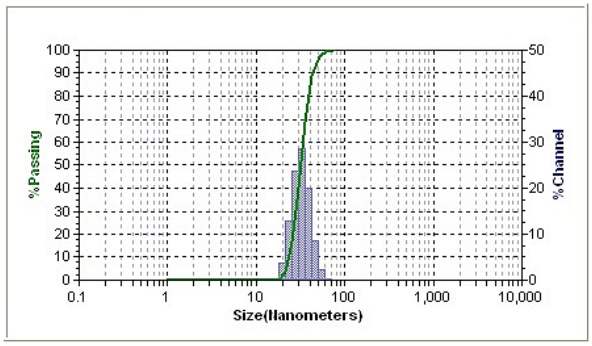
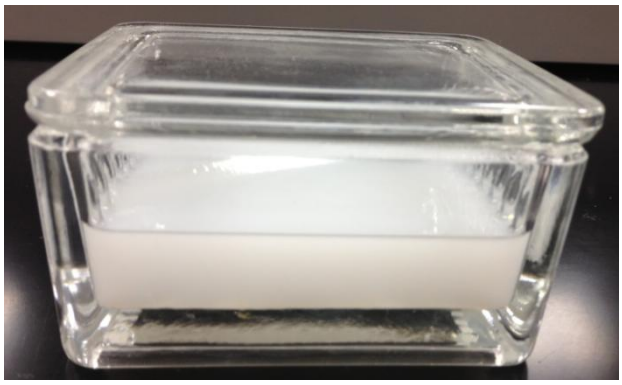
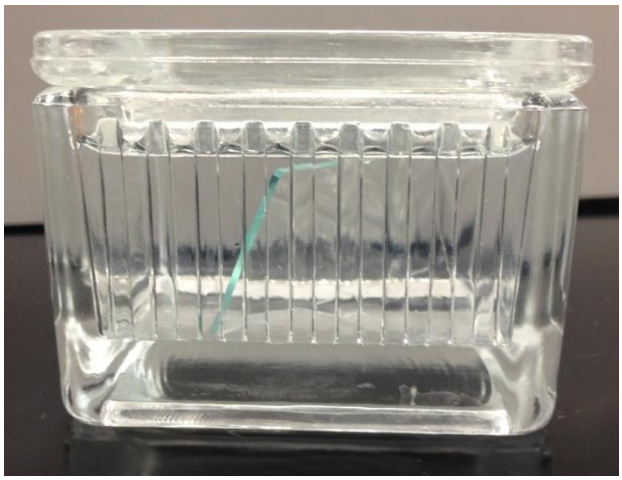


S1. Size distribution of the ZnO nanocrystals in the seed solution

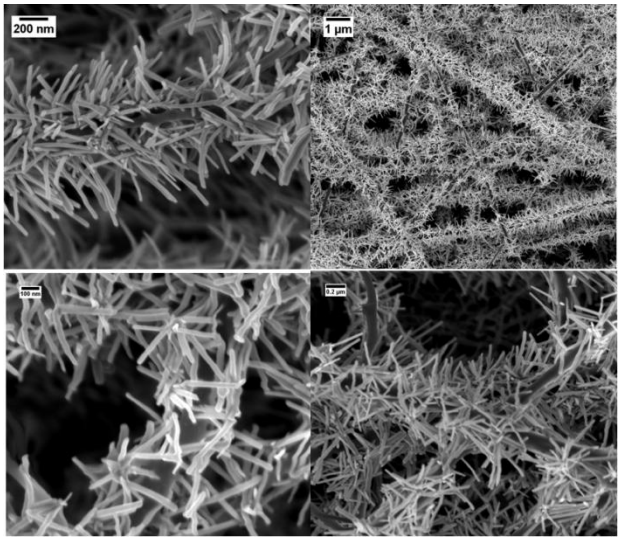
S2. Image of the electrospun nanofibers after heat treatment



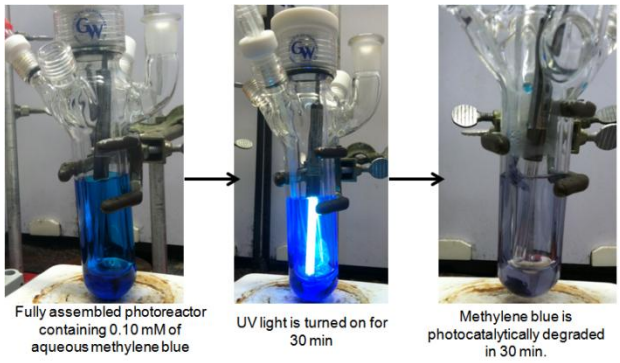
S3. Images of the glass slides containing electrospun nanofibers in ZnO seed solution



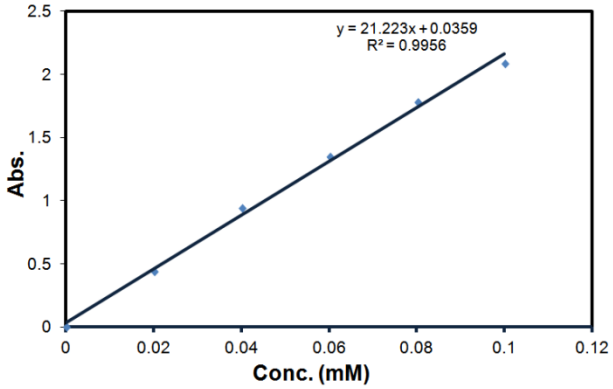
S4. Image of the glass slides in growth solution



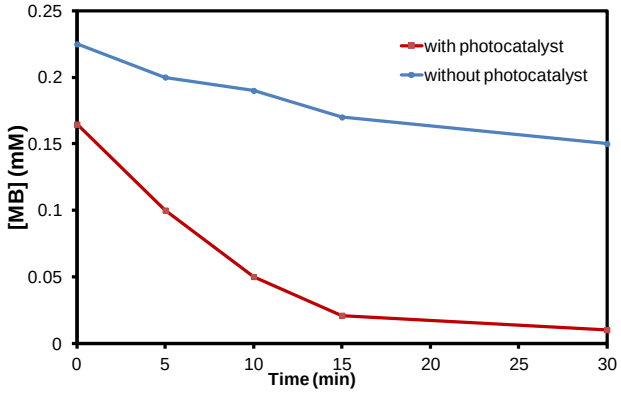
S5. High resolution SEM images showing the underlying nanofiber formation



S6. Photocatalytic degradation of methylene blue in 30 min in the presence of the composite material



S7. Calibration curve showing the linear relationship between the absorption at 664 nm and the concentration of MB



S8. MB concentration change as a function of time with and without the nanofibers under UV irradiation

S9. Experimental Details

Materials. Cellulose acetate (CeAc, M_w~50,000), polyvinyl acetate(PVAc, M_w~500,000), polyethylene glycol (PEG, M_w~300), N,N-dimethylformamide (DMF, anhydrous, 99.8%), 2,2'-azobis(2-methylpropionitrile) (AIBN, 98%), zinc acetate dihydrate (ACS reagent, ≥ 98%), triethylamine (≥ 99.5 %), zinc nitrate hexahydrate (reagent grade 98%), hexamethylenetetramine ($C_6H_{12}N_4$, ACS reagent, ≥99.0%), methylene blue (dye content, ≥8%) isopropyl alcohol (C_3H_8O, anhydrous, 99.5%), and ethanol (99%) were purchased from Sigma-Aldrich. Premium microscope glass slides were procured from Fisher Scientific.

Characterization. Morphology of the materials was investigated using a JEOL JSM 6060 LV field emission scanning electron microscope (FESEM). The samples were coated with 5-10 nm Au layer before the SEM imaging. Crystal structures were analyzed using a Shimadzu XRD-6100 X-ray Diffractometer with Cu Kα radiation, employing a scanning rate of 0.02° s^{-1} within the range of 2θ=4°-64°, operating at 40 kV and 33 mA (1320 Watt). Thermogravimetric analysis (TGA) were carried out using a Mettler Toledo 851 with a TSO 801RO robotic arm. The samples were heated from 40 °C to 600 °C at a rate of 10 °C/min under a nitrogen atmosphere at a flow rate of 40 mL/min. UV-Vis transmittance of the samples was studied using a Varian Cary 50 UV-Vis Spectrophotometer in the wavelength range of 280-480 nm and a scan rate of 300 nm/min. Photoluminescence (PL) studies were performed at room temperature using a dual-scanning micro-plate Jasco FP-6500 spectrofluorometer (version 1.08.02) with the Spectra Manager Software using the excitation wavelength at 325 nm. All characterizations and measurements were carried out with the electrospun nanofibers immobilized on glass microscope slides. Image J Program was used to calculate the diameters and length of the fibers and nanowires which were averaged over 20 measurements.