

Electronic Supplementary

## In situ fabrication of a thermally stable and highly porous conductive solar light-driven ZnO-CNT fiber photocatalyst

Muhammad M. Hossain,<sup>a</sup> Hossain Shima,<sup>a</sup> Seungbae Son,<sup>b</sup> Jae R. Hahn,<sup>\*ac</sup>

<sup>a</sup>*Department of Chemistry and Bioactive Material Sciences, Research Institute of Physics and Chemistry, Chonbuk National University, Jeonju 561-756, Republic of Korea*

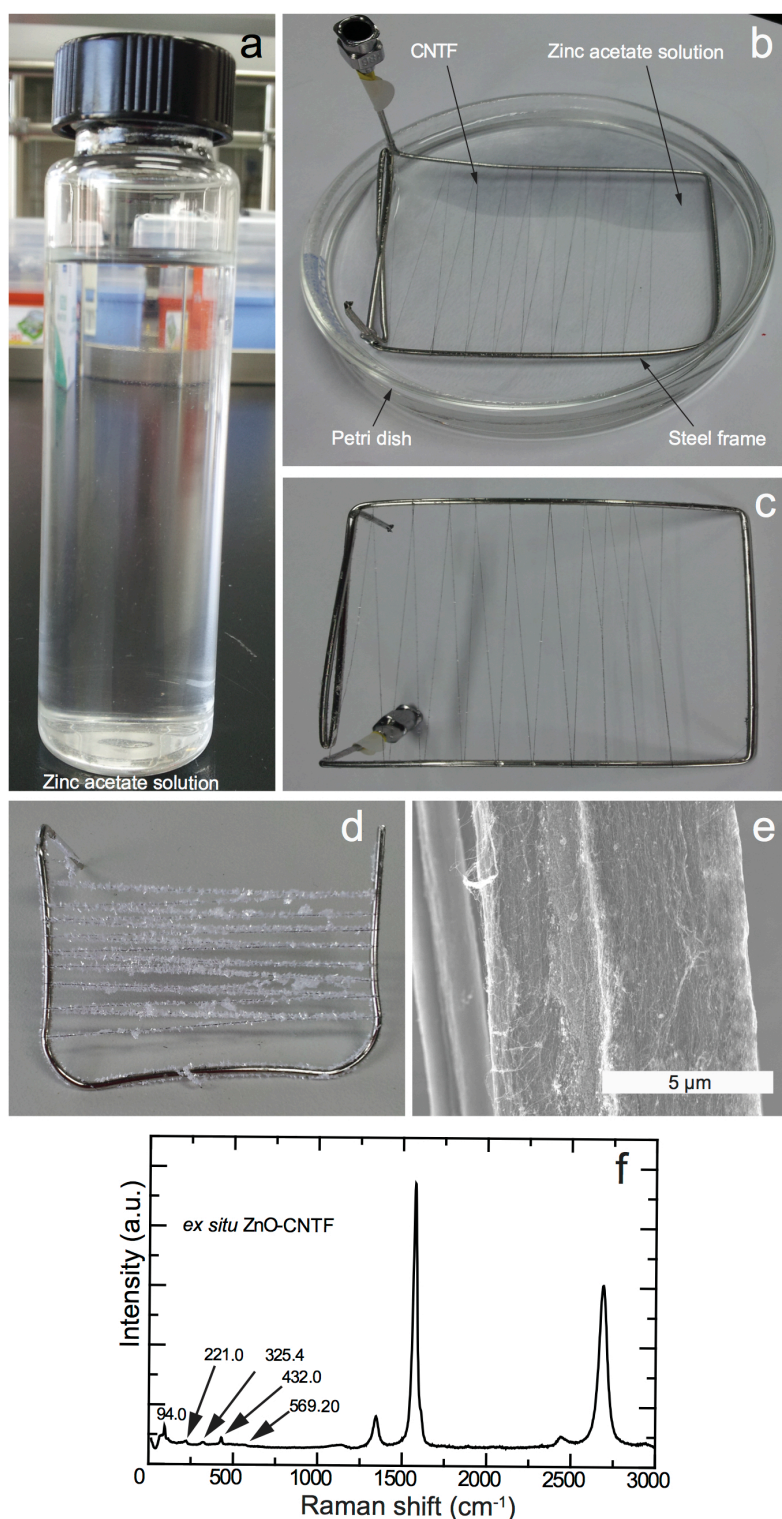
<sup>b</sup>*Jeonju Center, Korea Basic Science Institute, Jeonju 561-756, Republic of Korea*

<sup>c</sup>*Textile Engineering, Chemistry and Science, North Carolina State University 2401 Research Dr. Raleigh, NC 27695-8301, USA*

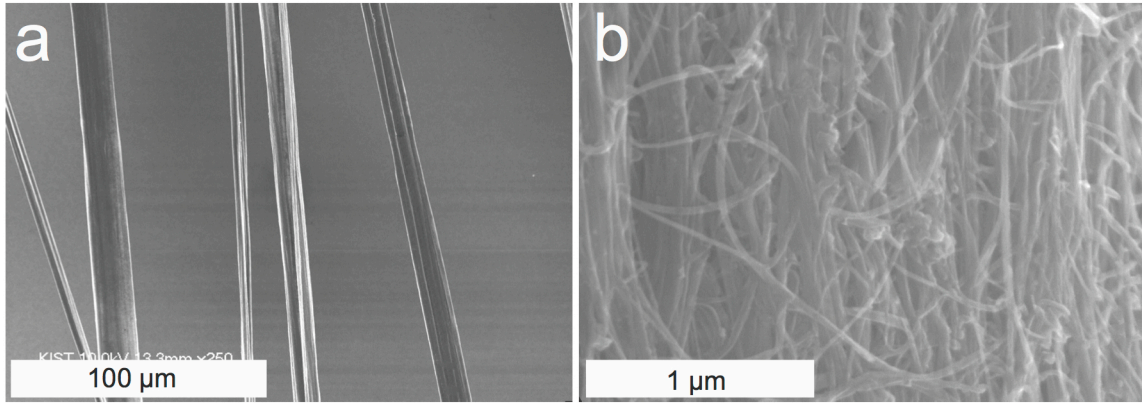
\* Corresponding authors

Jae R. Hahn

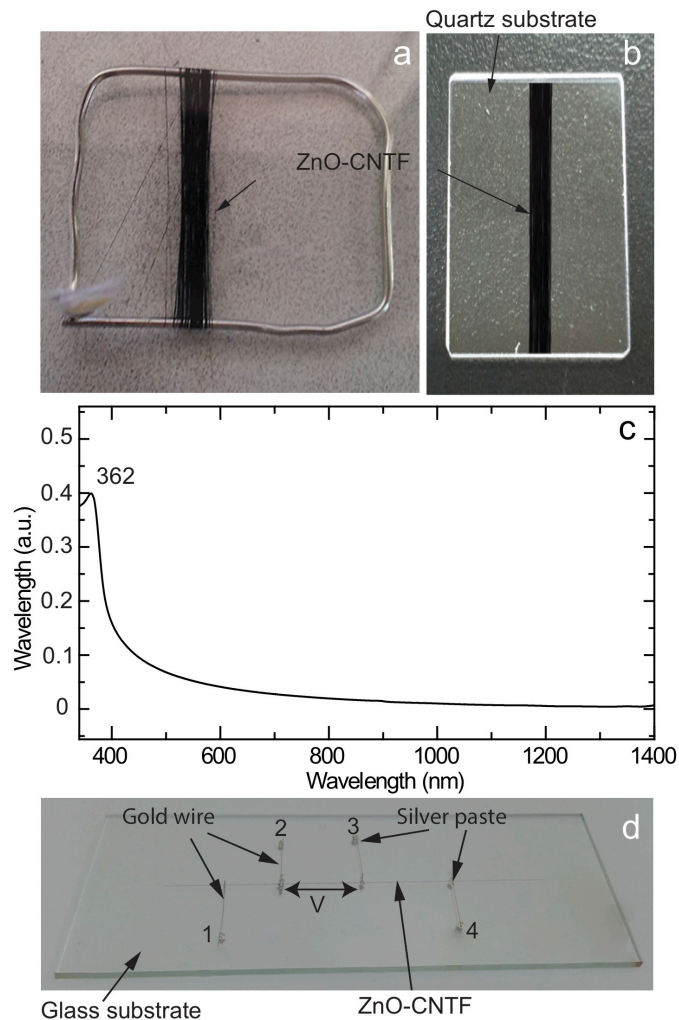
Phone: +82-63-270-3410; Fax: +82-63-270-3408; jr\_hahn@jbnu.ac.kr



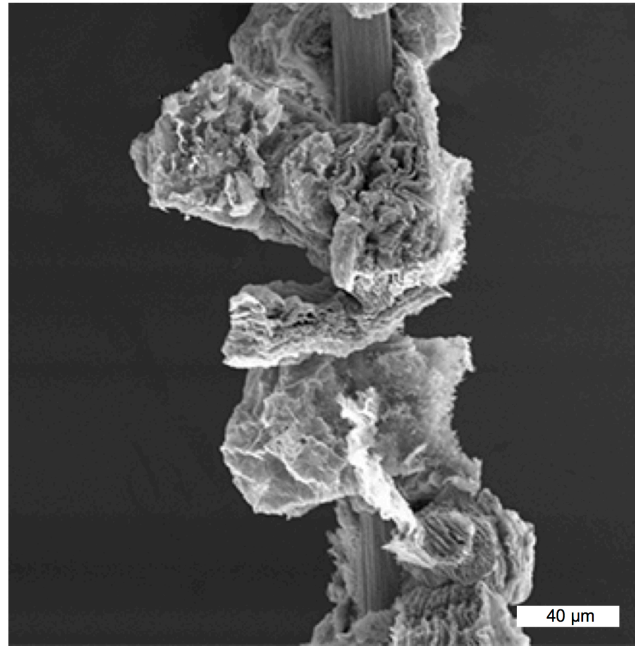
**Figure S1.** (a) A solution of zinc acetate dihydrate (60 mg/mL). (b) Pristine CNTFs mounted on a steel frame, which was immersed in a Petri dish containing a zinc acetate dihydrate solution. (c) CNTFs mounted on the steel frame were taken out of the solution after recrystallization. (d) A CNTF mounted on steel frame immersed in the solution of zinc acetate for a long time. Many crystals grew on the CNTF. (e) ZnO nanoparticles deposited on the CNTF surface by an *ex situ* process (*ex situ*-fabricated ZnO-CNTF composite). (f) Raman spectra of the ZnO-CNTF composite fabricated *ex situ*.



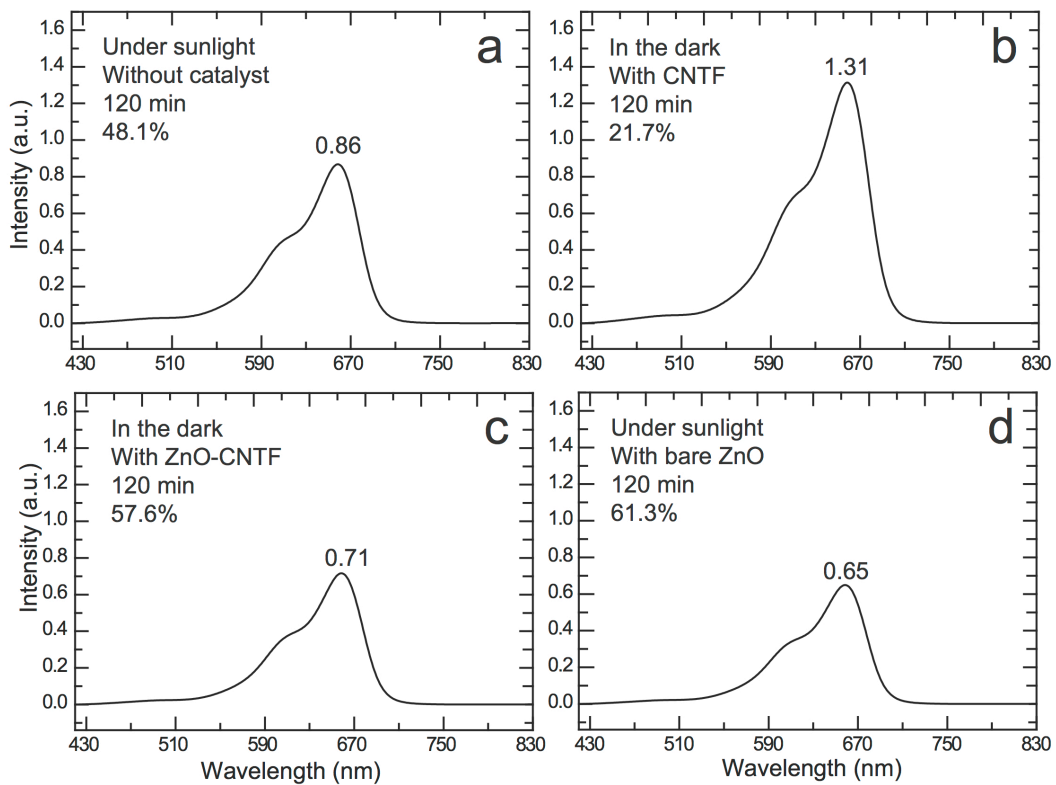
**Figure S2.** (a) and (b) FE-SEM images of a pristine CNTF.



**Figure S3.** (a) Photograph of a ZnO-CNTF composite mounted on a steel frame. (b) Photograph of the ZnO-CNTF composite transferred to a quartz glass substrate. (c) UV-visible absorption spectrum of pure ZnO nanoparticles. (d) Electrical connection for measurement of electrical conductivity of the ZnO-CNTF composite on a glass substrate.



**Figure S4.** FE-SEM image of ZnO-CNT fiber obtained after using 12-cycle degradation.



**Figure S5.** UV-visible absorption spectra of MB solutions obtained at various conditions for 120 min. (a) Under the direct sunlight without catalysis. (d) In the dark with CNTF. (c) In the dark with ZnO-CNTF. (d) Under the direct sunlight with bare ZnO.