Efficient photocatalytic core/shell of titanate nanowire/rGO

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Figure S1

Figure S1. Photocatalytic workstation.

1. SEM images and EDS spectra of the specimens



Figure S2. SEM images and EDS spectra of (a1,a2) TiO2 NWs, (b1,b2) TiO2/GO NWs, and (c1,c2) TiO2/rGO NWs.

1. SAED pattern of the specimens



Figure S3. Structural and elemental characterization of the specimens SAED pattern.

1. FTIR spectra of the specimens



Figure S4. FT-IR spectra of the specimens.

1. Raman spectra of the specimens



Figure S5. Raman spectra of the specimens.

1. XPS of the specimens



Figure S6. (a) XPS survey spectra; XPS spectra of (b) O 1s, and (c) Ti 2p.

1. UV-Vis spectra of the NWs

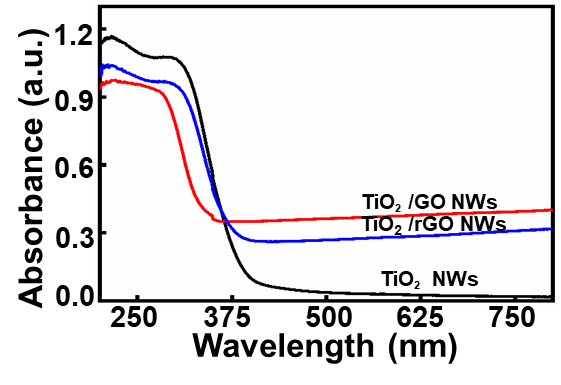


Figure S7. UV-Vis absorption spectra for GO-Titanate NFs, rGO-Titanate NFs, and Titanate NFs.

1. Hyperspectroscopy of the specimens



Figure S8. Hyperspectroscopy for rGO flakes, rGO-Titanate NFs, and Titanate NFs.

1. Nitrogen adsorption–desorption isotherm of the specimens



Figure S9. Nitrogen adsorption–desorption isotherm of the specimens

1. Adsorption spectra of the degraded MB solution under visible and UV light irradiation



Figure S10. Absorption spectra of degraded MB aqueous solutions as catalyzed by the specimens under visible (a-c) and UV (d-f) light irradiation in different periods: (a)(c) TiO2 NWs, (b)(d) TiO2/GO NWs, and (c)(f) TiO2/rGO NWs.

1. Photocatalytic mechanism



Figure S11. Photocatalytic mechanism.

**References**

1. D. Ma, X. Li, Y. Guo, Y. Zeng, Acta Photonica Sinica 2017, 46, 1216002.
2. E. Kusiak-Nejman, A. W. Morawski, Applied Catalysis B: Environmental 2019, 253, 179.
3. H. Ding, S. Zhang, J. Chen, X. Hu, Z. Du, Y. Qiu, D. Zhao, Thin Solid Films2015, 584, 29.
4. A. Shaikh, S. P. Mishra, P. Mohapatra, S. Parida, Journal of Nanoparticle Research 2017, 19, 206.
5. T.-F. Yeh, J.-M. Syu, C. Cheng, T.-H. Chang, H. Teng, Advanced Functional Materials2010, 20, 2255.