Electronic Supplementary Material (ESI) for Nanoscale.

Supporting information

Spatially Branched Hierarchical ZnO Nanorod-TiO_2 Nanotube Arrays Heterostructures for Versatile Photocatalytic and Photoelectrocatalytic Applications: Towards Intimate Integration of 1D-1D Hybrid Nanostructures

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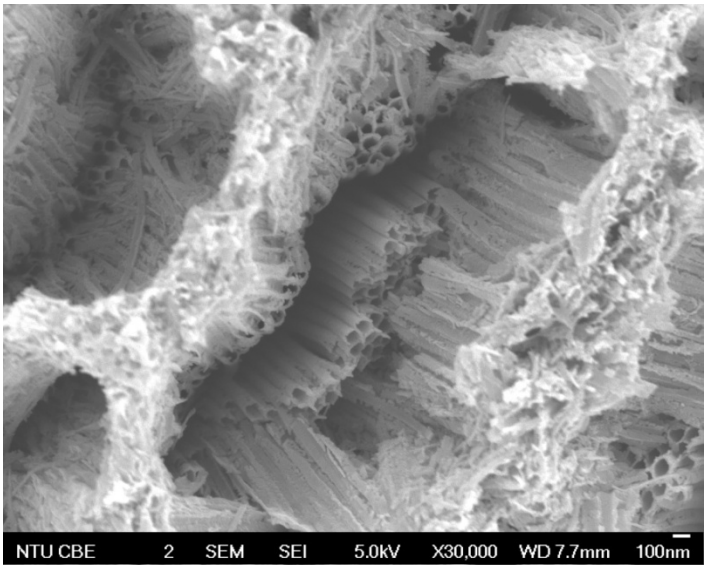

Figure S1. Panoramic FESEM image of TNTAs prepared by conventional one-step anodization strategy.

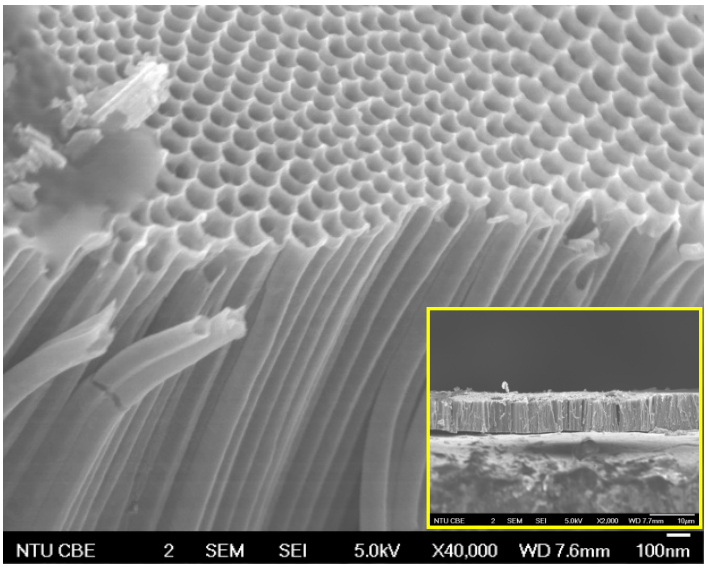

Figure S2. Cross-sectional FESEM image of NP-TNTAs.

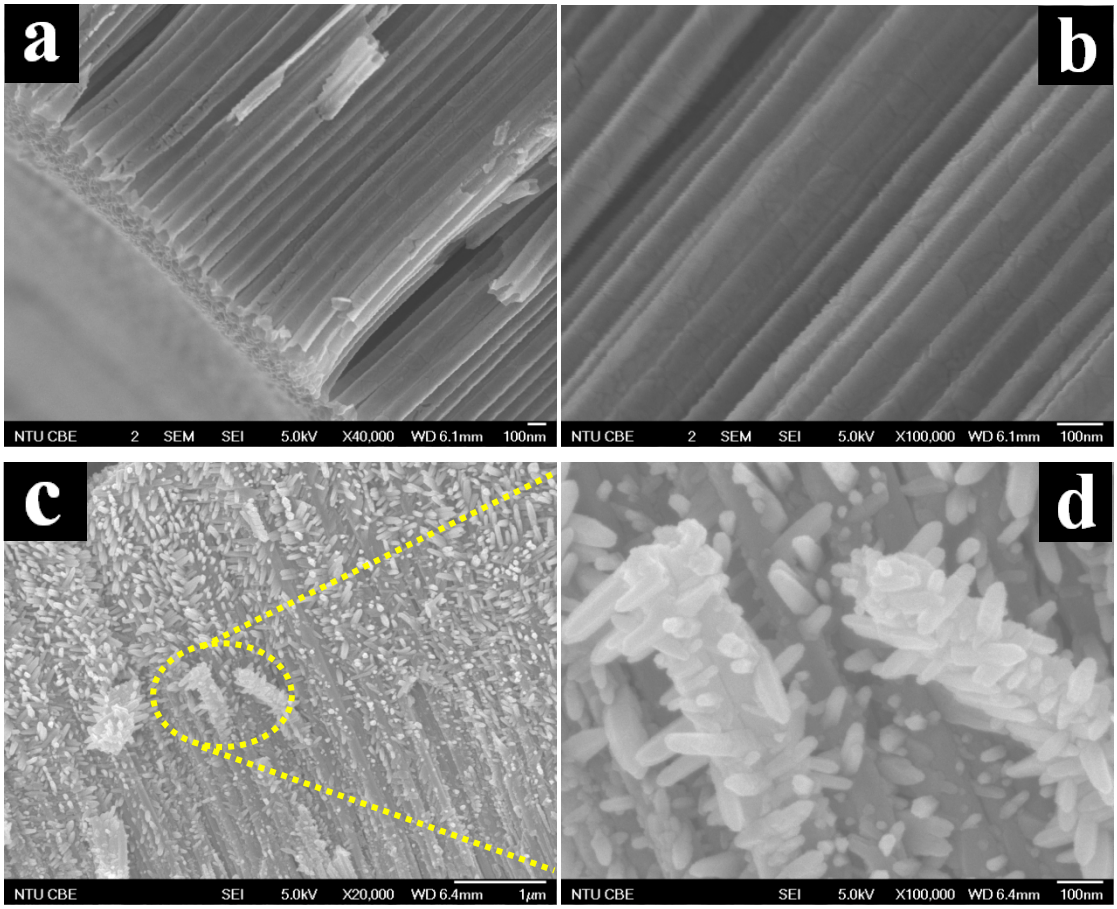

Figure S3. Cross-sectional FESEM images of (a & b) NP-TNTAs and (c & d) spatially branched hierarchical ZnO/NP-TNTAs heterostructure.

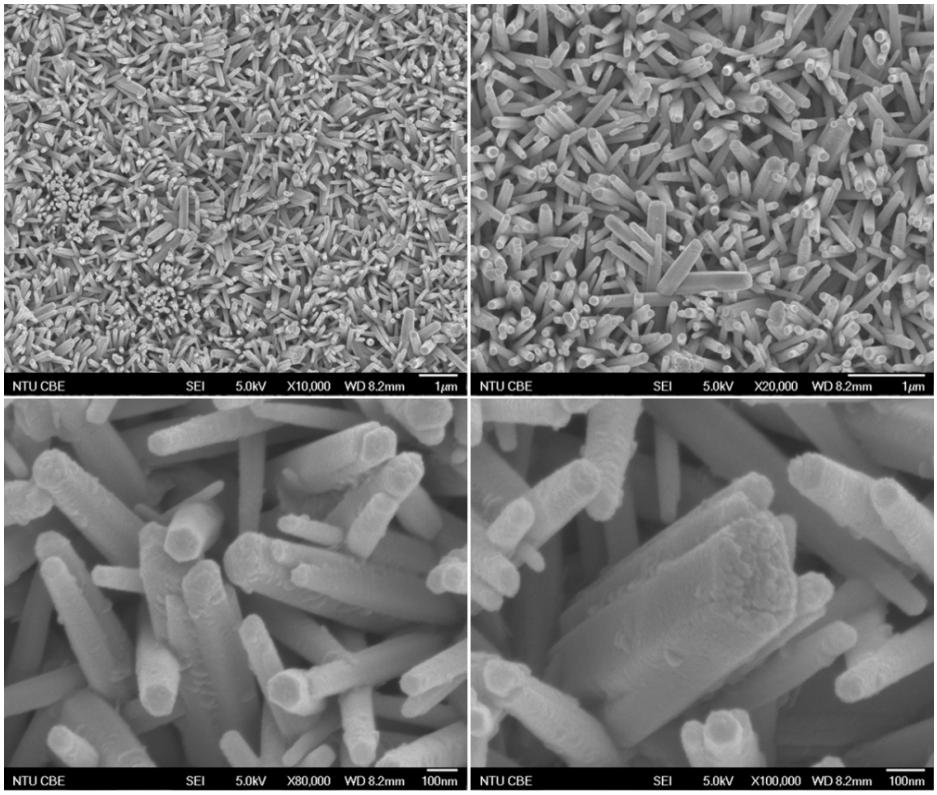

Figure S4. FESEM images of pure ZnO NRs film deposited on Ti foil.

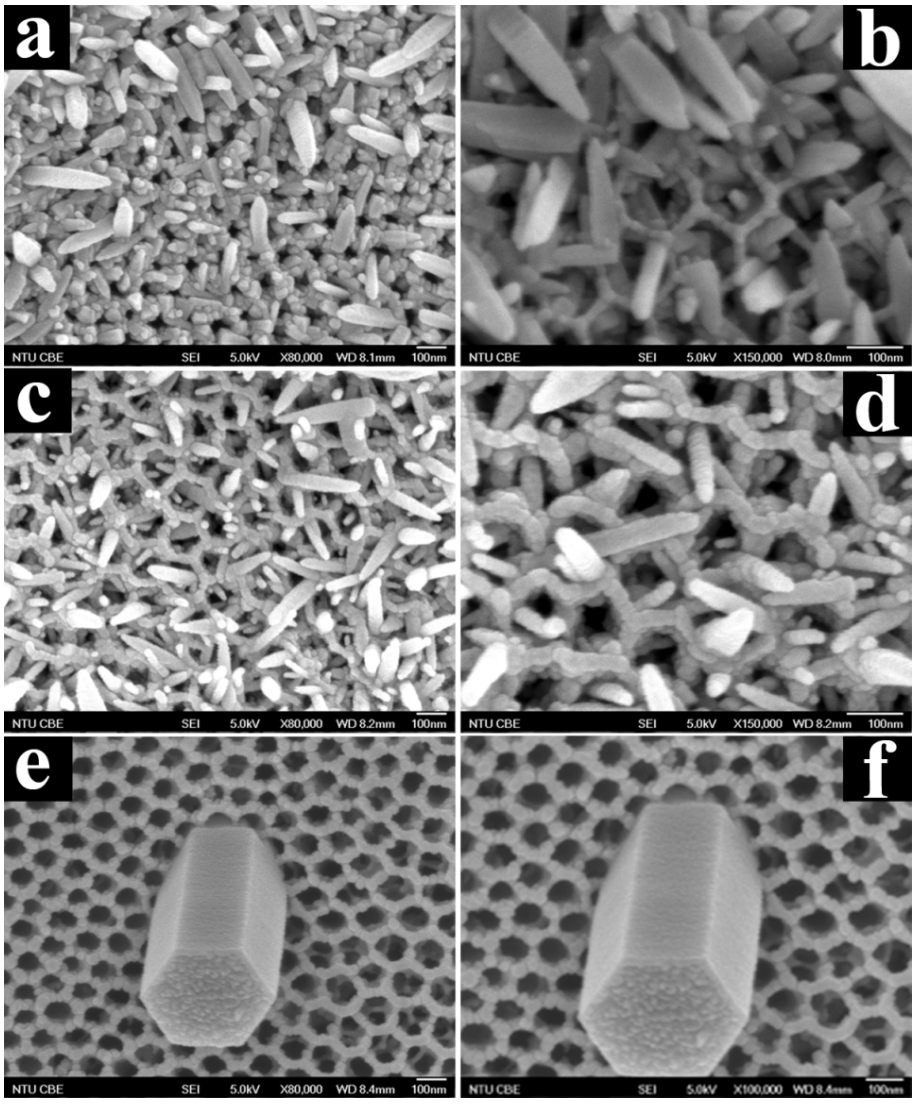

Figure S5. FESEM images of ZnO/NP-TNTAs heterostructures prepared with varied deposition time, (a & b) 500 s, (c & d) 1000 s, (e & f) 2500 s.

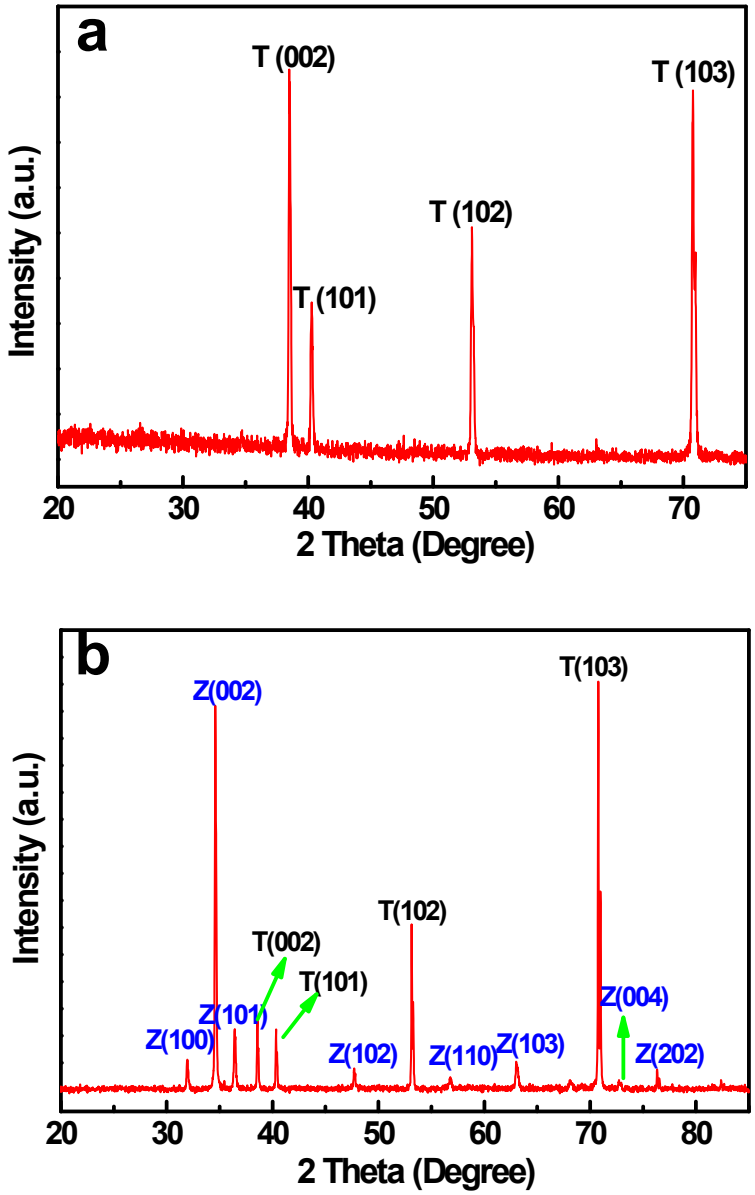

Figure S6. XRD patterns of (a) NP-TNTAs before calcination and (b) blank ZnO NRs film deposited on Ti foil. (T: Ti foil, Z: ZnO)

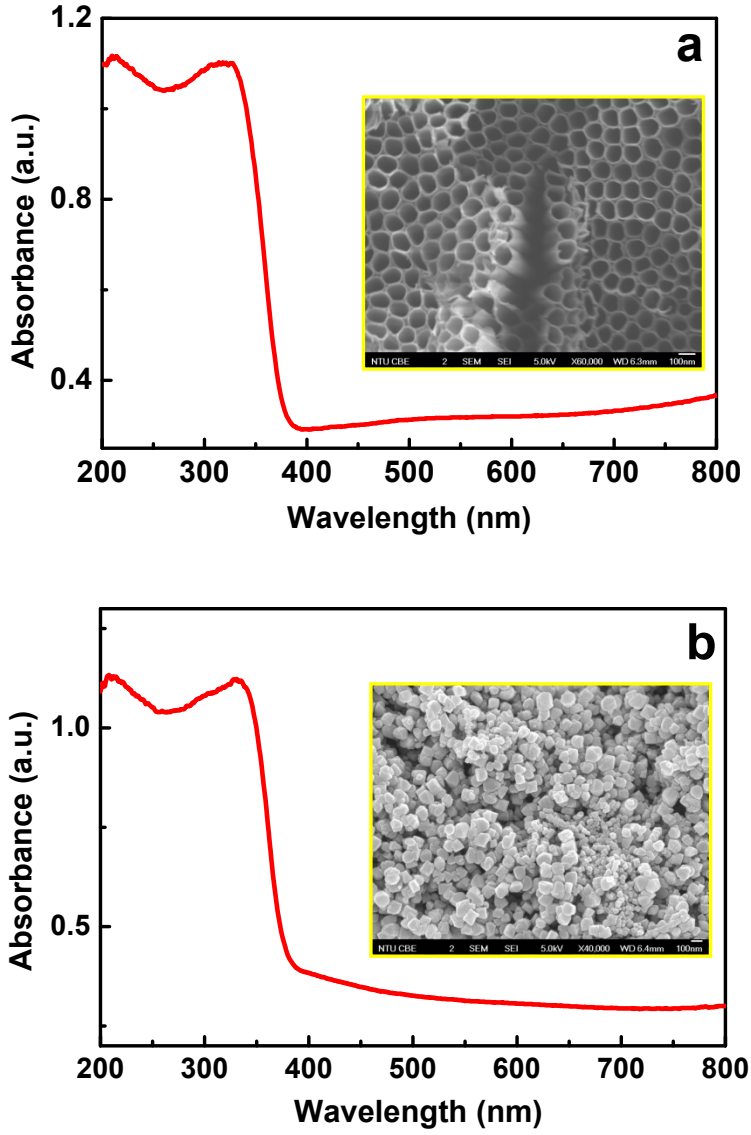

Figure S7. UV-vis diffuse reflectance spectra (DRS) of (a) TNTAs and (b) TiO_2 particulate film on Ti foil with corresponding FESEM images in the inset, respectively.

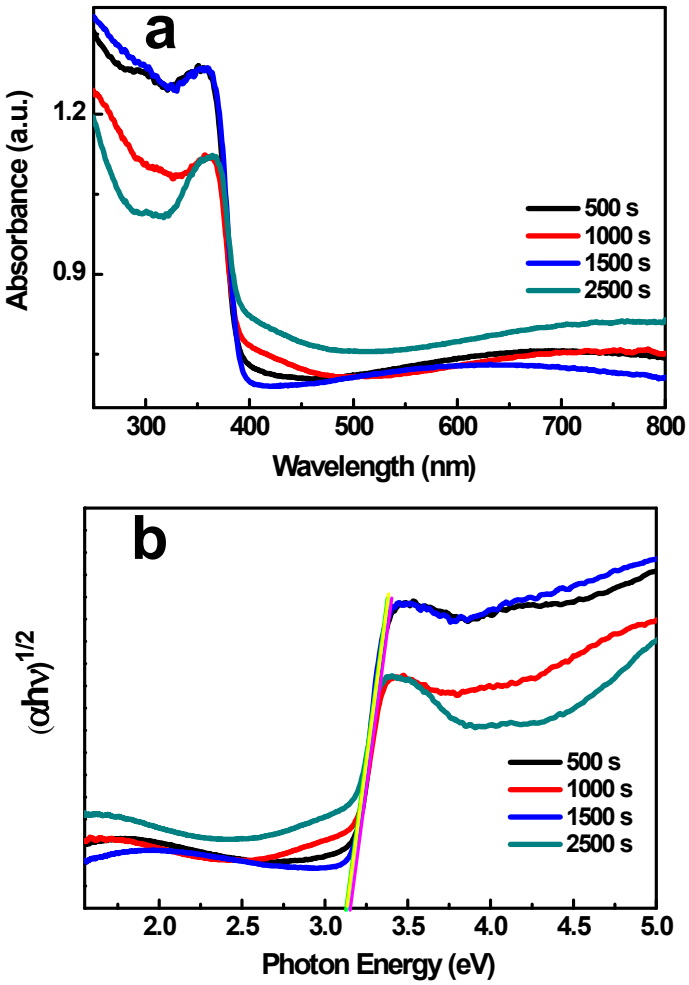

Figure S8. (a) UV-vis diffuse reflectance spectra (DRS) of ZnO/NP-TNTAs heterostructures prepared with varied deposition time and (b) the plot of transformed Kubellka-Munk function *versus* the energy of light.

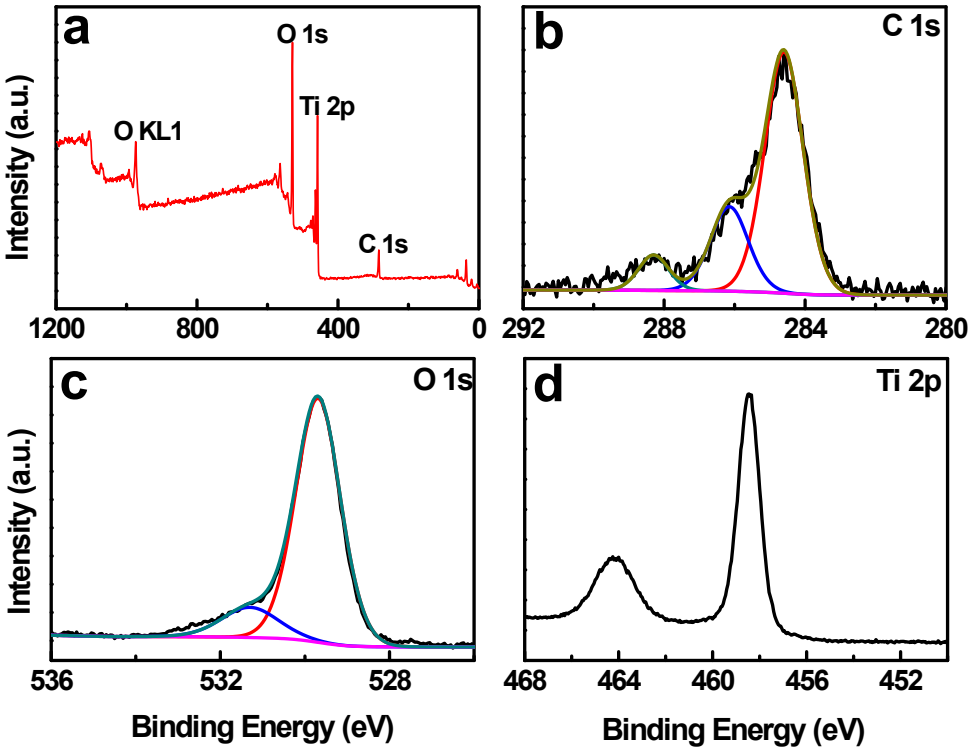

Figure S9. (a) Survey XPS spectrum and high-resolution spectra of (b) C 1s, (c) O 1s, and (d) Ti 2p for blank NP-TNTAs substrate.

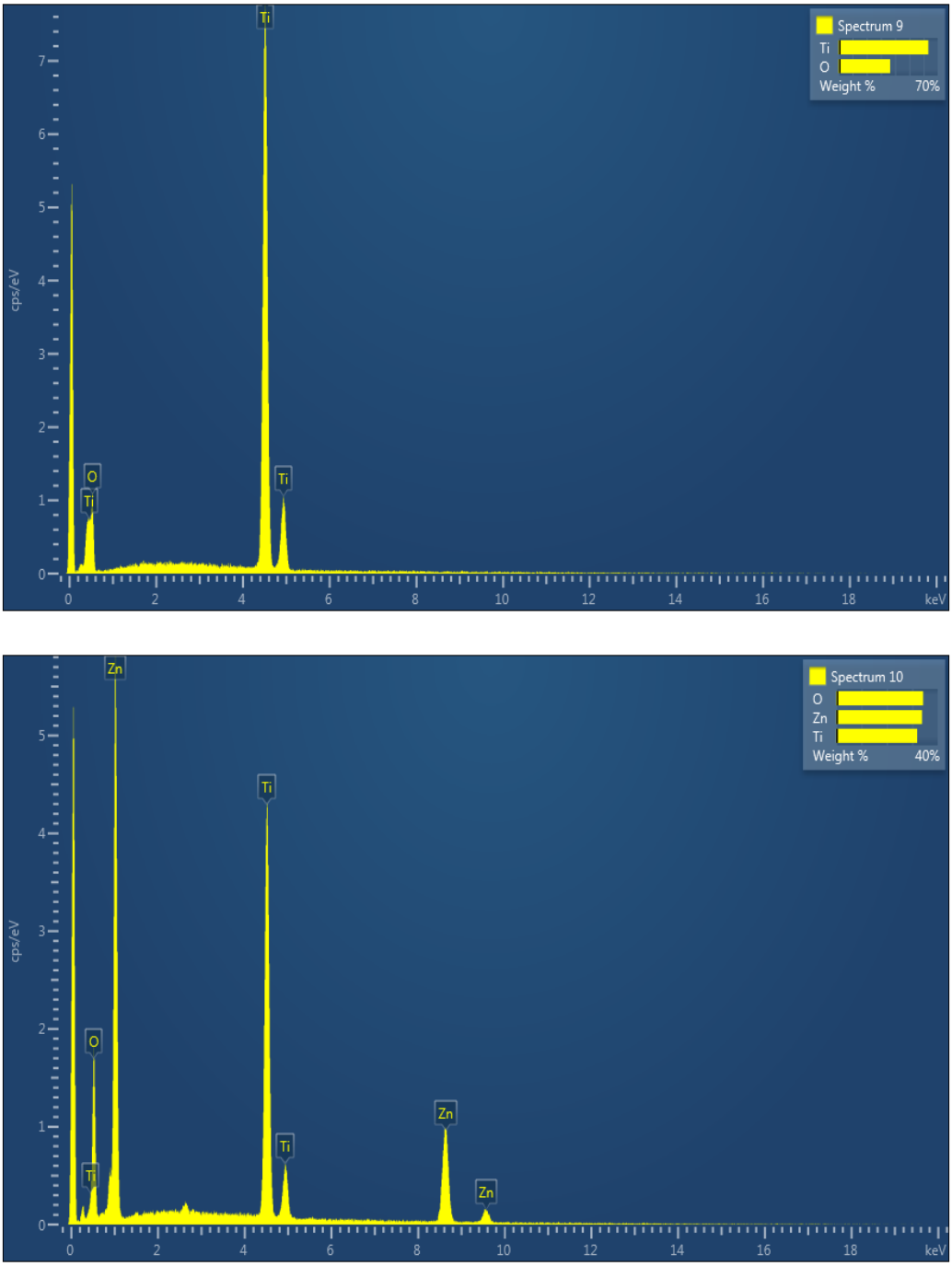

Figure S10. EDX results of blank NP-TNTAs and spatially branched hierarchical ZnO/NP-TNTAs heterostructure.

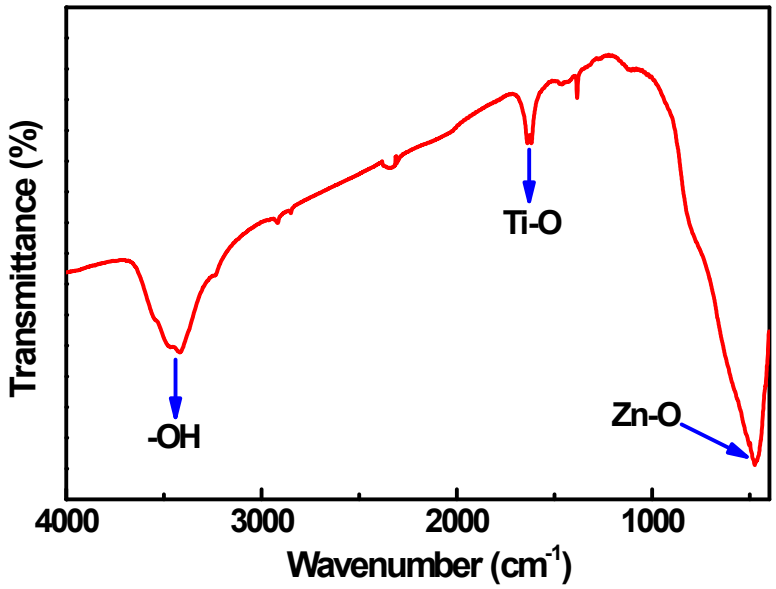

Figure S11. FTIR spectrum of ZnO/NP-TNTAs heterostructure.

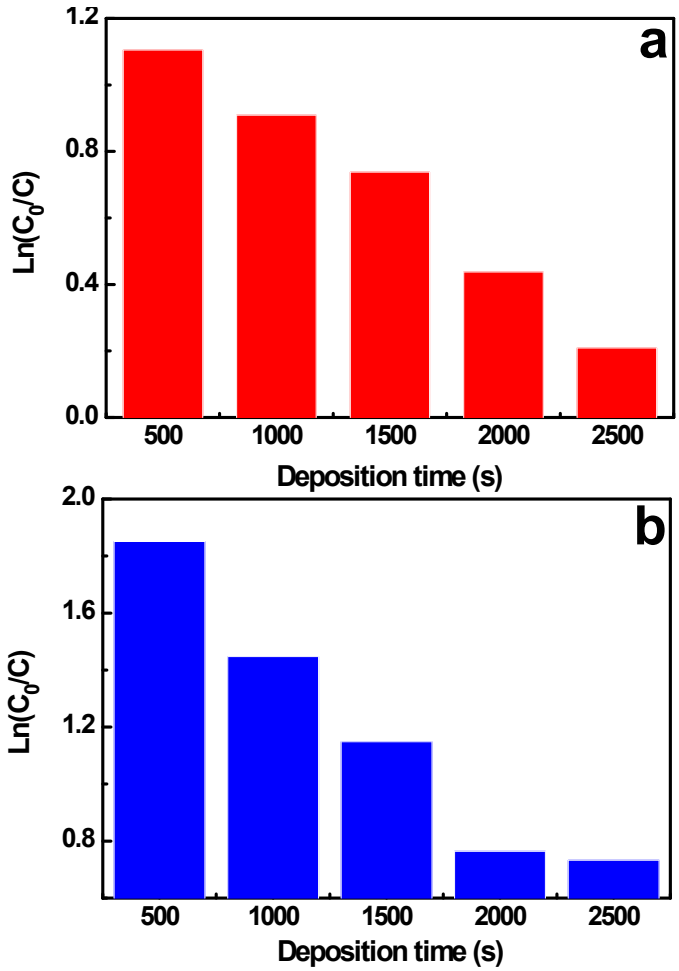

Figure S12. (a) Photocatalytic and (b) photoelectrocatalytic performances of ZnO/NP-TNTAs heterostructure prepared with varied deposition time toward photocatalytic degradation of RhB under UV light irradiation.

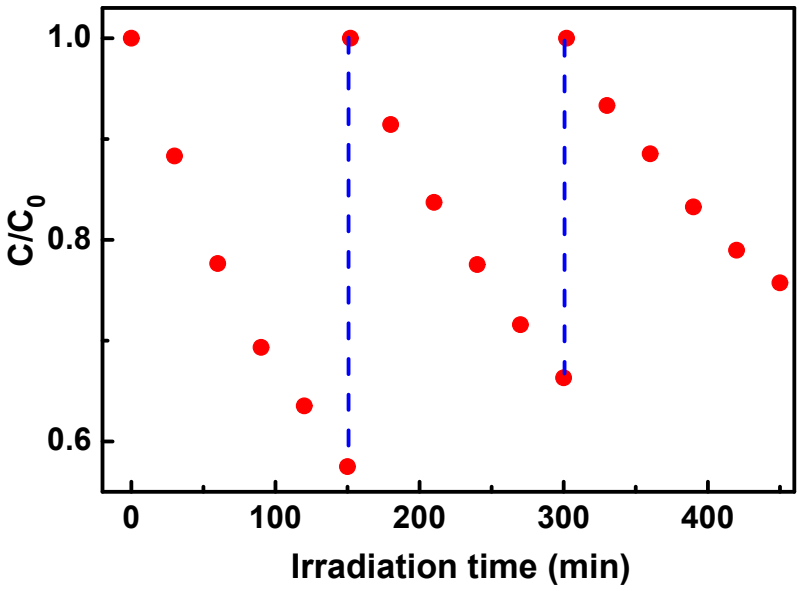

Figure S13. Stability of pure ZnO NRs film toward photocatalytic degradation of RhB under UV light irradiation.

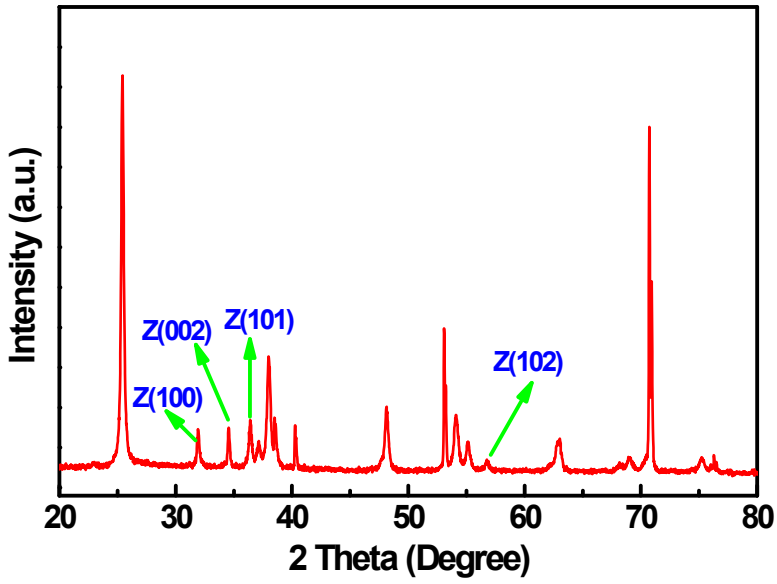

Figure S14. XRD pattern of ZnO/NP-TNTAs heterostructure after photocatalytic reactions.