

Supporting Information

Vertically-aligned ZnO@ZnS nanorod chip with improved photocatalytic activity for antibiotics degradation

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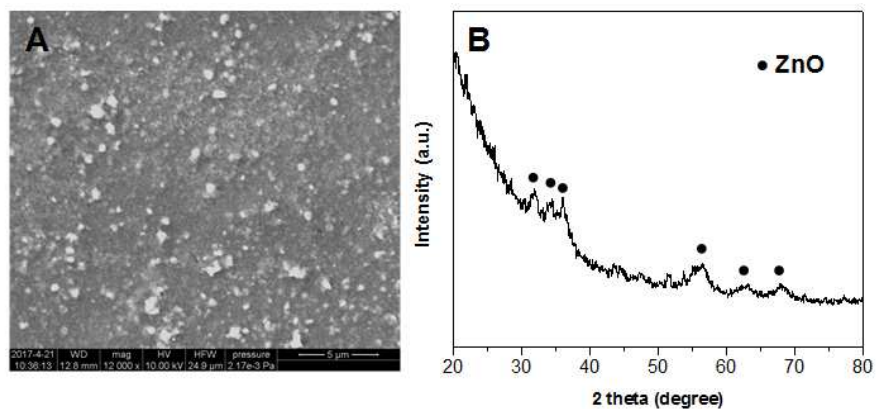


Figure S1. (A) SEM image of the ZnO seed. (B) XRD pattern of the ZnO seed.

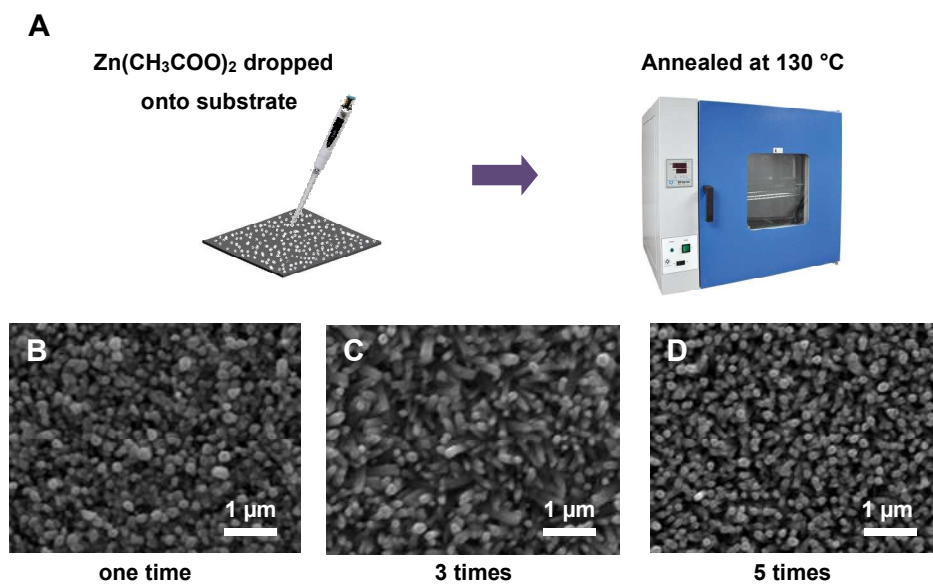


Figure S2. (A) Schematic procedure for the synthesis of ZnO seed. (B-D) ZnO nanorod arrays prepared using different repeated times of dropping and annealing process.

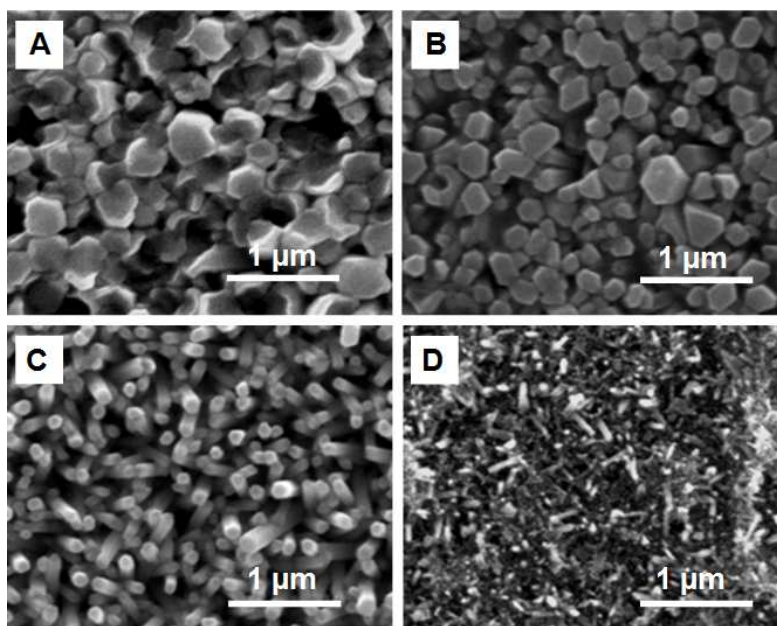


Figure S3. The ZnO nanorod arrays prepared using different reaction concentration of $\text{Zn}(\text{NO}_3)_2$ and HMTA: (A) 150 mM, (B) 100 mM, (C) 50 mM, (D) 10 mM.

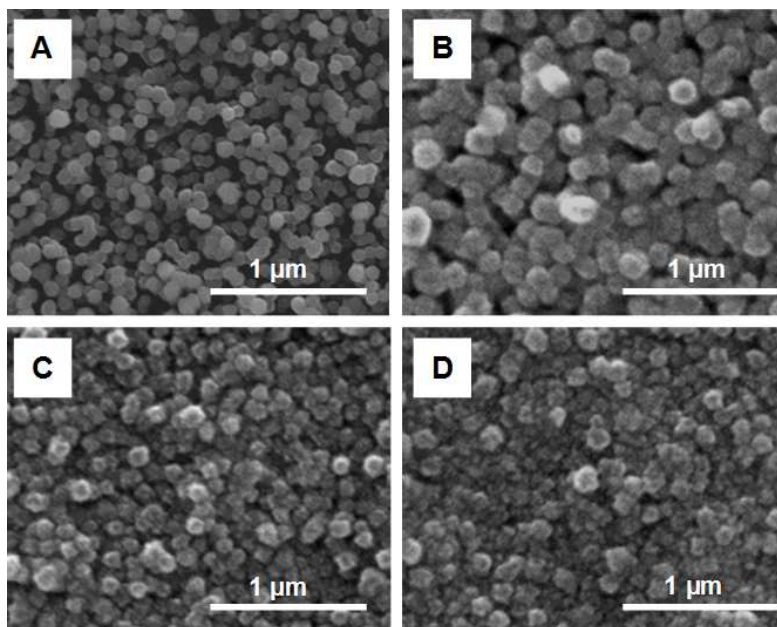


Figure S4. The ZnO@ZnS nanorod arrays prepared with 30 mM TAA using different reaction time: (A) 2 h, (B) 4 h, (C) 6 h, (D) 8 h.

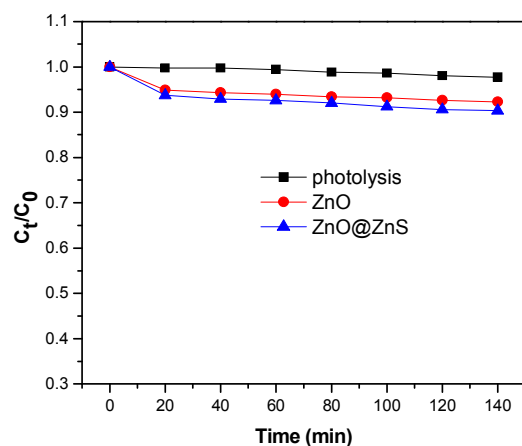


Figure S5. The photolysis of TC, and adsorption (without light irradiation) of TC by ZnO and ZnO@ZnS NAs chip.

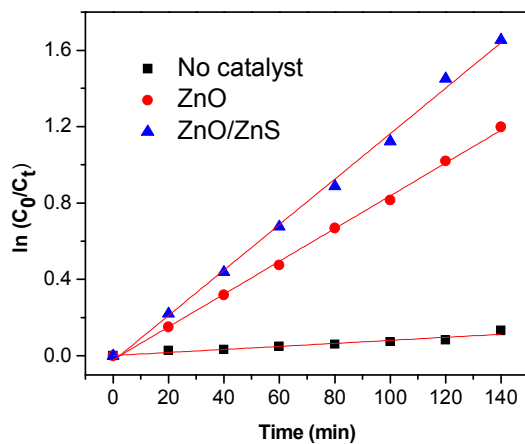


Figure S6. Kinetic curves for TC degradation over the ZnO and ZnO@ZnS NAs chip.

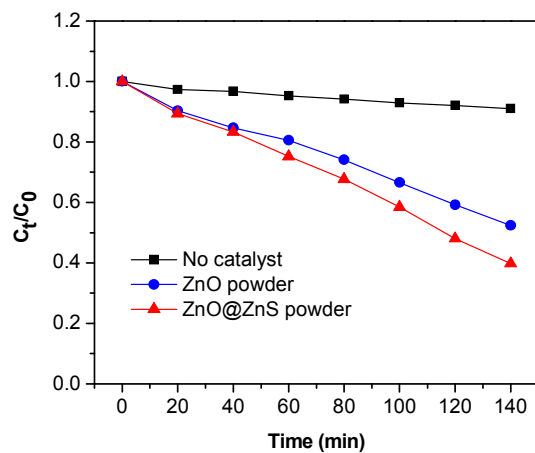


Figure S7. The photocatalytic degradation of tetracycline using the powder ZnO nanorods and powder ZnO@ZnS catalyst.

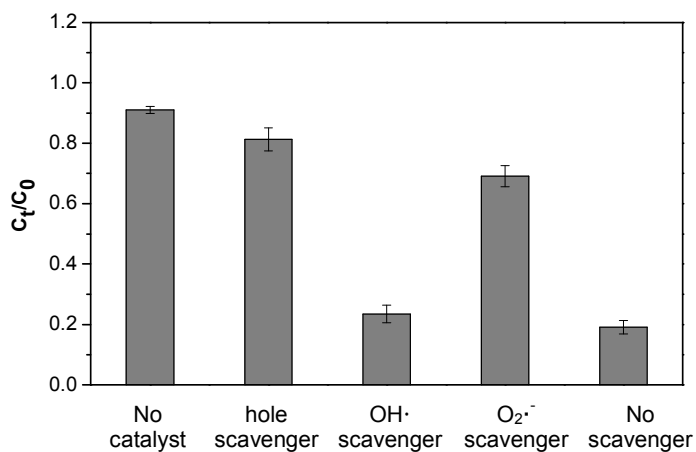


Figure S8. The photocatalytic degradation of tetracycline over the as-prepared chip in the presence of different scavengers under light irradiation. N₂ purging (superoxide anion radical scavenger), disodium ethylenediaminetetraacetate (Na₂-EDTA, hole scavenger) and tert-butanol (hydroxyl radical scavenger).

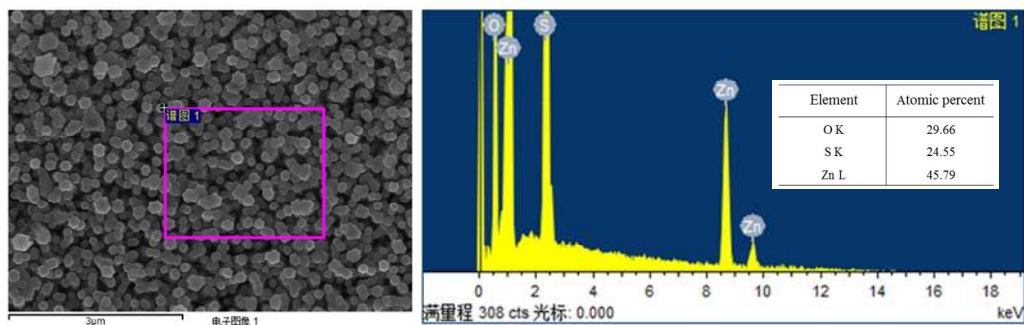


Figure S9. The EDS spectrum of the ZnO@ZnS NAs, which confirmed the presence of all expected elements.

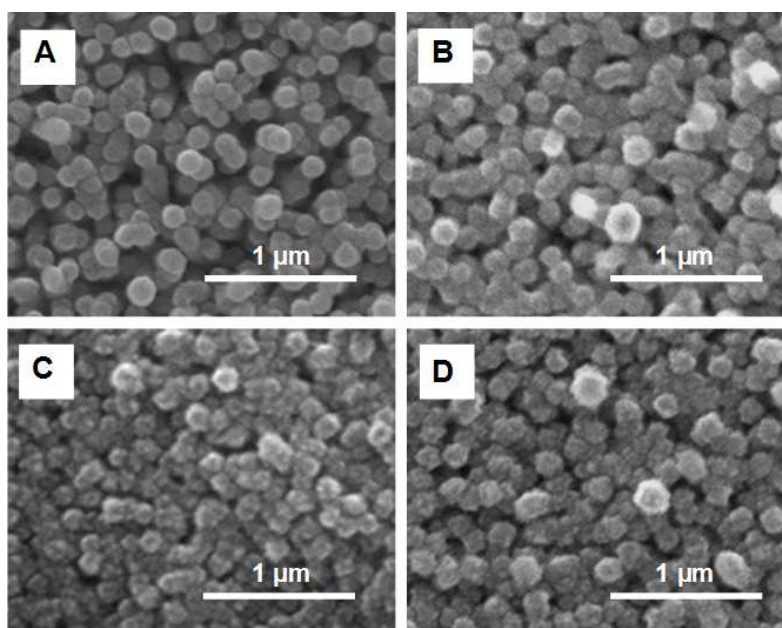


Figure S10. The ZnO/ZnS nanorod arrays prepared using different reaction concentration of TAA: (A) 20 mM, (B) 30 mM, (C) 40 mM, (D) 50 mM.

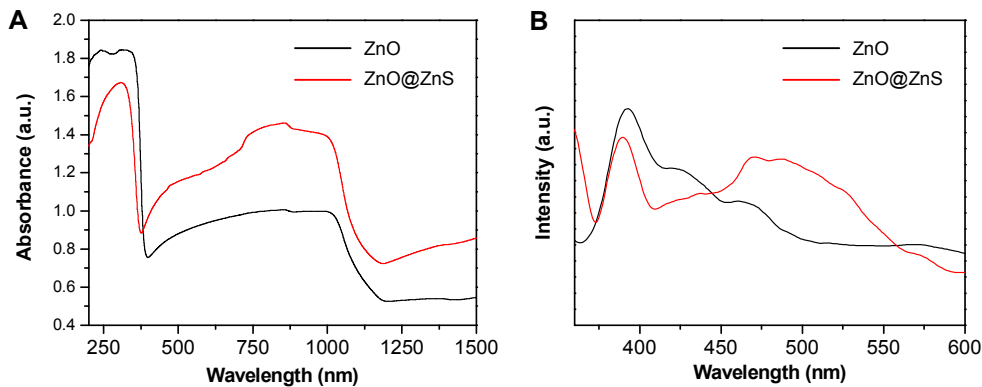


Figure S11. Optical properties of the ZnO and ZnO@ZnS nanorod. (A) UV-visible diffuse reflectance spectra; and (B) PL spectra.

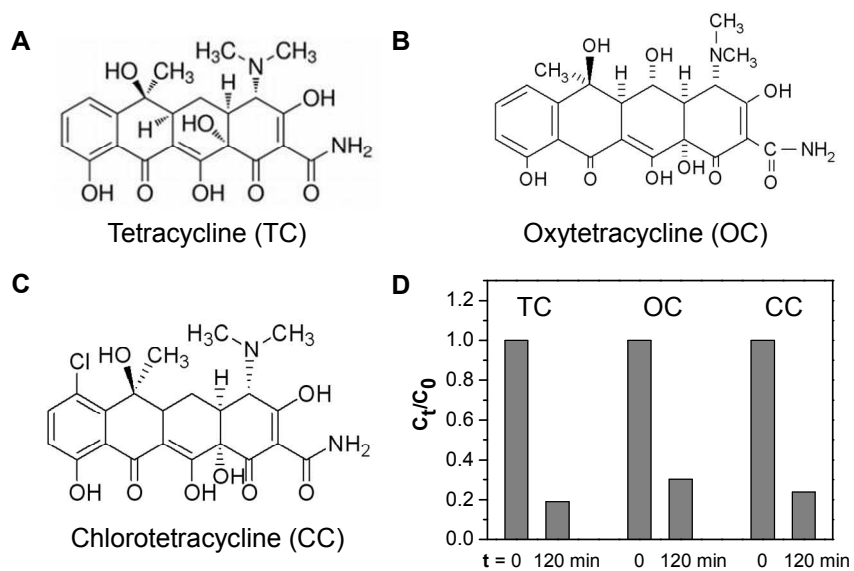


Figure S12. The chemical structure of representative antibiotics: (A) Tetracycline, (B) Oxytetracycline, and (C) Chlorotetracycline. (D) The photocatalytic degradation of representative antibiotics by ZnO@ZnS NAs after 120 min irradiation.

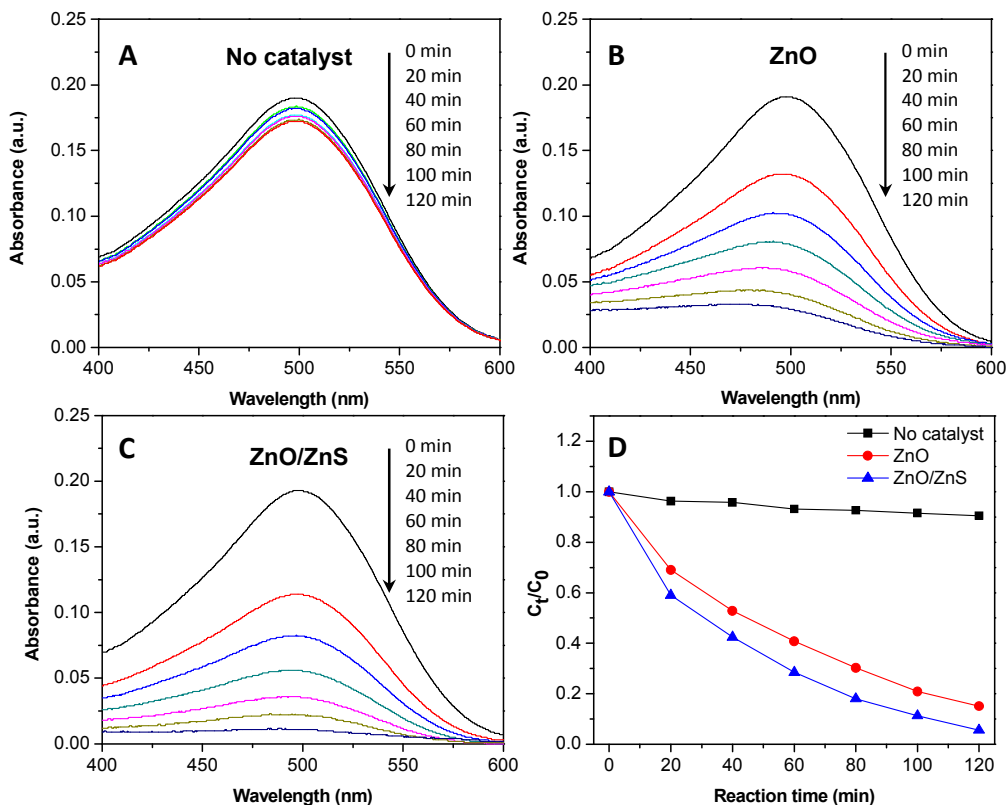


Figure S13. Light-induced photodegradation of CR as a function of irradiation time: visible absorption spectra showing (A) CR self-degradation, (B) degradation by ZnO nanorods, and (C) degradation by ZnO/ZnS nanorods. (D) C_t/C_0 as a function of degradation time.



Figure S14. Photographs of water contact angle measurements on the surfaces of: (A) Si substrate, (B) ZnO nanorod array, and (C) ZnO@ZnS nanorod array. The results showed that the obtained array substrates are highly hydrophilic.