

Electronic Supplementary Information

Ag@CuO nanohybrids synthesis and their photo-enhanced bactericidal effect through concerted Ag ion release and reactive oxygen species generation

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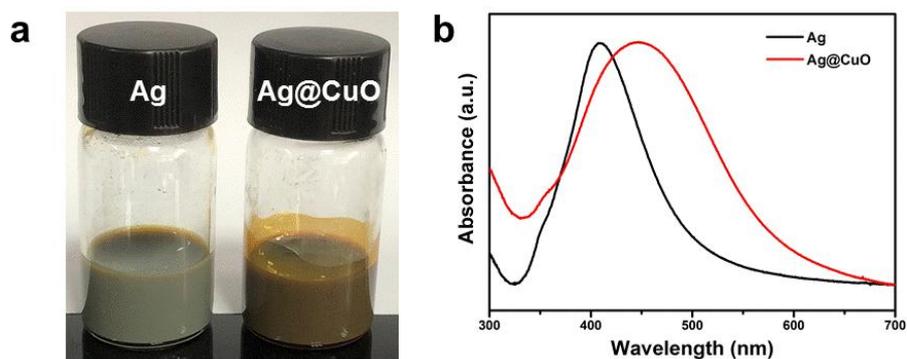


Fig. S1 (a) Color photographs of colloidal solution of Ag seeds nanoparticles and Ag@CuO hybrid nanostructures. (b) The corresponding UV-vis absorption spectra of the Ag seeds and Ag@CuO hybrid colloidal solutions.

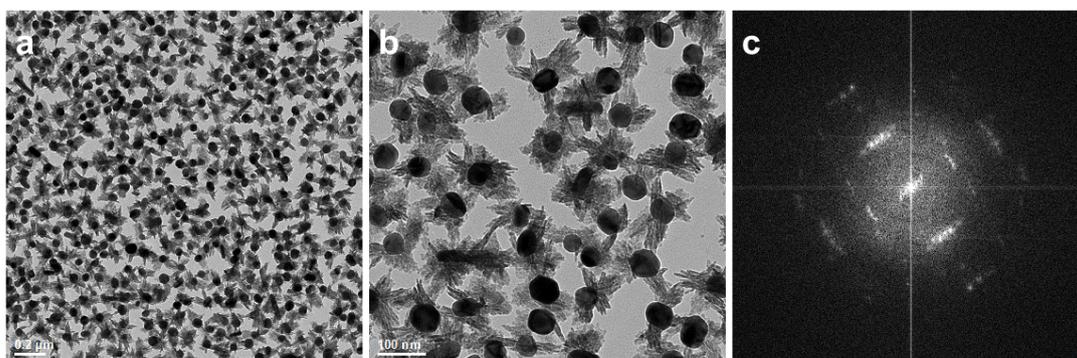


Fig. S2 (a-b) TEM images of Ag@CuO hybrid nanoparticles at different magnifications, and (c) the selected area electron diffraction pattern.

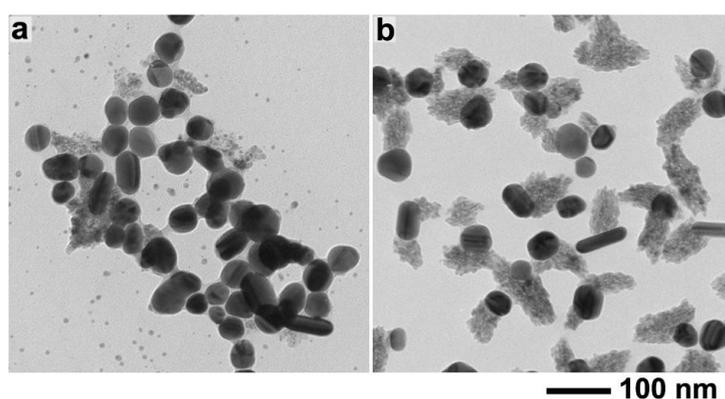


Fig. S3 TEM images of Ag@CuO hybrid nanostructures prepared in the presence of 0.11 M of PVP with different molecular weights: (a) PVP-10 (10 kg mol^{-1}) and (b) PVP-1300 (1300 kg mol^{-1}).

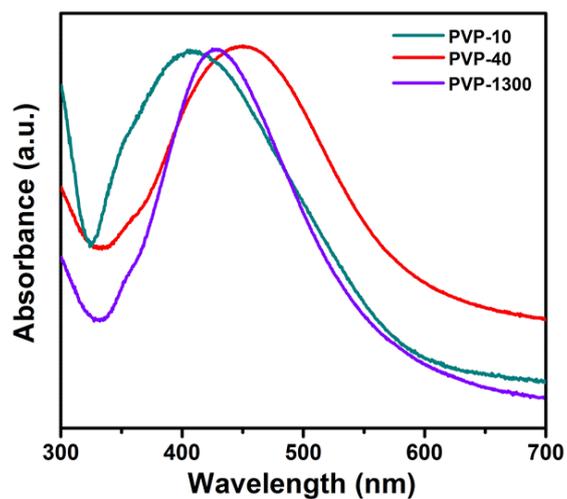


Fig. S4 UV-vis spectra of Ag@CuO nanohybrids with different PVP molecular weights.

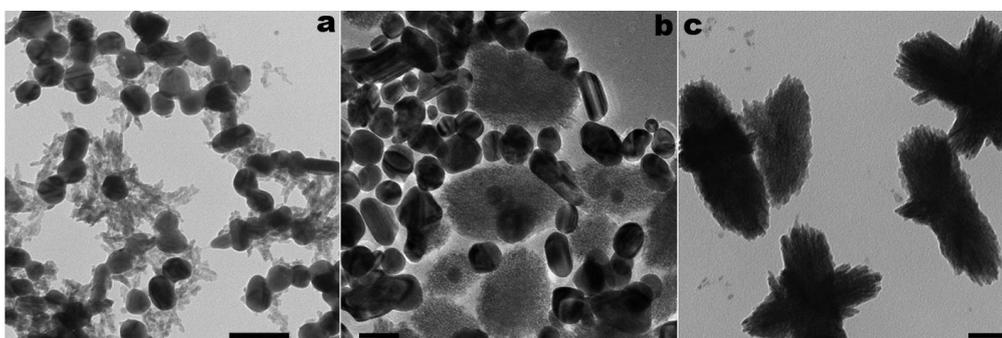


Fig. S5 TEM images of Ag@CuO hybrid nanoparticles prepared in the presence of different concentrations of PVP-40 at (a) 8 mM and (b) 0.44 M PVP-40. (c) TEM image of CuO NPs. Scale bar: 100 nm.

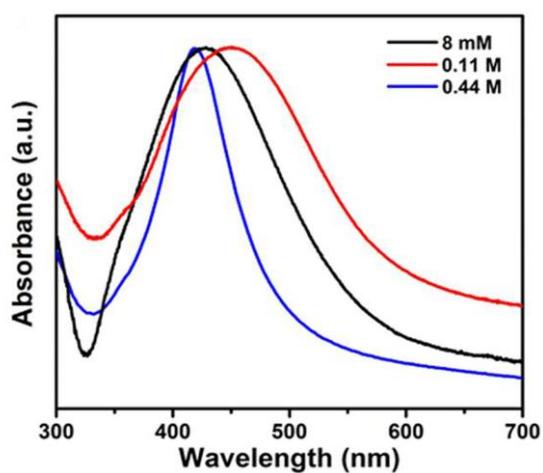


Fig. S6 UV-vis spectra of Ag@CuO hybrid nanoparticles with different PVP-40 concentrations.

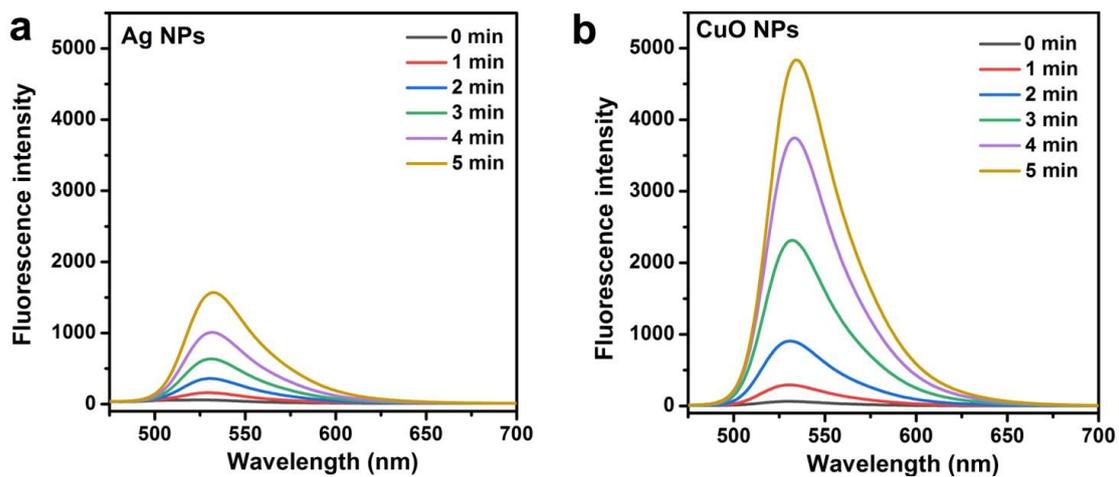


Fig. S7 Photoluminescence spectra of DCF after different period of AM 1.5G light exposure in the presence of (a) Ag and (b) CuO NPs.

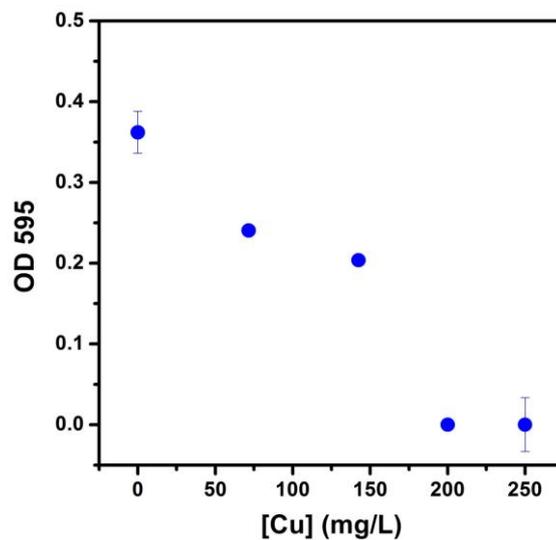


Fig. S8 Antibacterial activities of CuO NPs at different concentrations against *E. Coli*, evaluated by measuring suspension optical density at 595 nm.

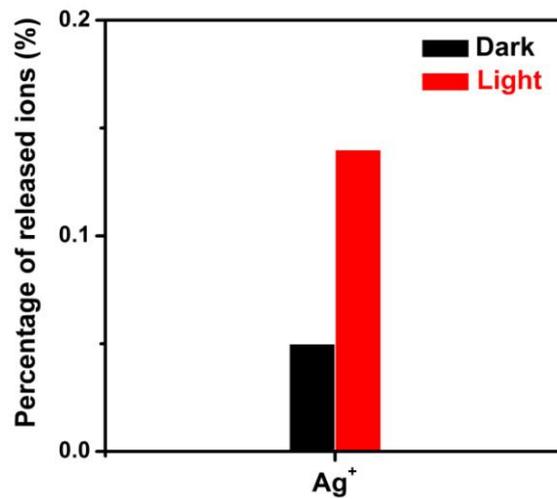


Fig. S9 The percentage of release of ions in Ag NPs under dark and light conditions.

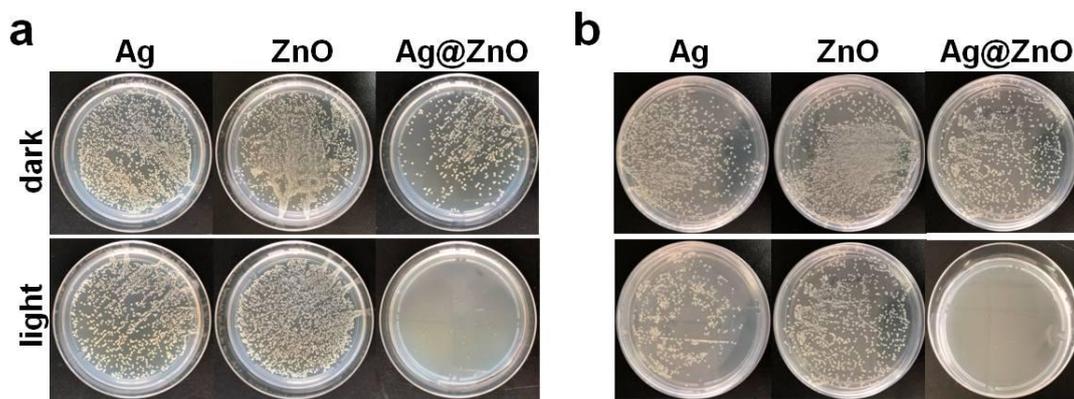


Fig. S10 (a) Photographs of *E. coli* bacterial colonies formed on LB agar plates with various NPs (Ag and ZnO concentration at 1.3 and 6.1 mg L⁻¹, respectively) performed in the dark or under light exposure for 10 min. (b) Photographs of *S. aureus* bacterial colonies formed on LB agar plates with various NPs (Ag and ZnO concentration at 2.6 and 12.2 mg L⁻¹, respectively) performed in the dark or under light exposure for 10 min.