Supporting Information

Hybrid Cu_2O/TiO_2 Nanocomposites with Enhanced Photocatalytic Antibacterial Activity towards *Acinetobacter Baumannii*

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Table S1 Primers used for gene knockout.

Primer name	Sequence (5' to 3')	Application
RecA-in-FR	AAAATACGGTTATGCGTCTTG	recA amplification
RecA-in-RV	ACCATTGTCGGGTTGTGAA	recA amplification
Km-FR	TGGACAGCAAGCGAACCGGA	Kanamycin amplification
Km-RV	GGTGGCCCTCCTCACGTGC	Kanamycin amplification
RecA-up-FR	TAGGTCAGCTTACAGAGC	Upstream amplification
RecA-down-RV	GTAGCAGATCTATGATGTGC	Downstream amplification
RecA-int-FR	GCACGTGAGGAGGGCCACCTTATA CATGAGTCATAAAACG	Downstream amplification
RecA-int-RV:	TCCGGTTCGCTTGCTGTCCACTCAA AAACCTCAATACTCT	Upstream amplification
Up-RecA-FR	ATGACTTTATCTGGAACGAATGC	Upstream primers used for verification
Km-in-RV	TTCCCGCTTCAGTGACAAC	Upstream primers used for verification
Km-in-FR	ATTCGGCTATGACTGGGC	Downstream primers used for verification
Dw-RecA-RV	GCTTCGCAATTGTACTCTGTGA	Downstream primers used for verification

Table S2 Primers used the vector modification and expression.

Primer name	Sequence (5' to 3')	Application
Apra-FOR	TGAAAAAGGAAGAGTATGTCAT CAGCGGTGGAGTG	apramycin resistance construction
Apra-REV	AACTTGGTCTGACAGTCATGAGC TCAGCCAATCGACTGG	apramycin resistance construction
PWH1266-FOR	CTGTCAGACCAAGTTTACTCATA TATACTTTAGATTGATTTAAAAC T	PWH1266 excluded of ampicillin resistance
PWH1266-REV	ACTCTTCCTTTTTCAATATTATTG AAGCATTTATCAGGG	PWH1266 excluded of ampicillin resistance
RecA-CDS-FOR	AGTCAGGCACCGTGTATGGATGA GAATAAAAGCAAAGCATTACAA GCC	For clone of RecA gene
RecA-CDS-REV	GCCGCCGGCTTCCATTTAGTGGT GATGGTGATGATGCGA	For clone of RecA gene
PWH1266(Apra)-FOR	ACACGGTGCCTGACTGCG	PWH1266 with apra resistance
PWH1266(Apra)-REV	ATGGAAGCCGGCGGC	PWH1266 with apra resistance
check primer FR	ATGTGGGCGTGATGGTTT	Verify the in-fusion vector
check primer RV	GCTTTTCGCCATTCGTATTG	Verify the in-fusion vector

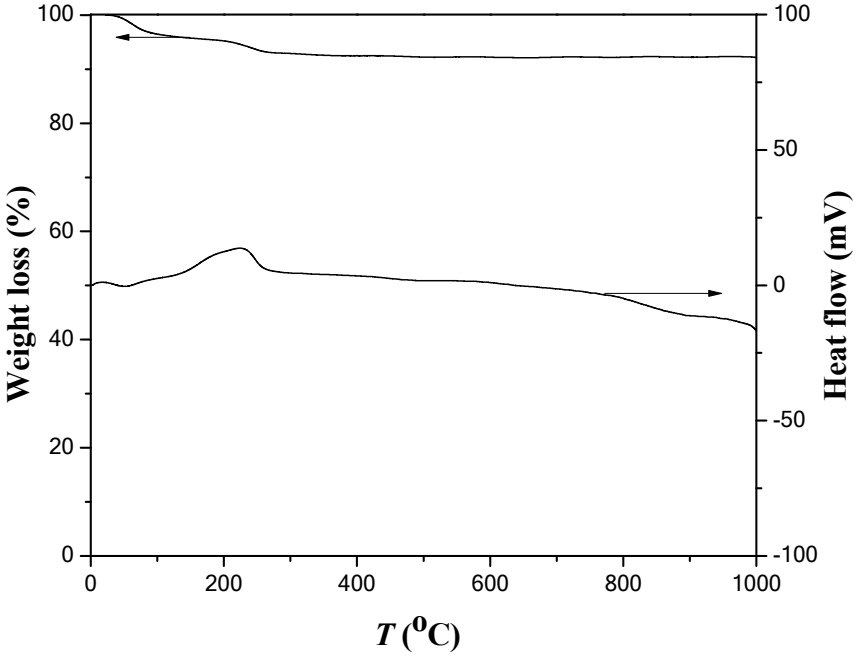


Figure S1. TG-DTA curve of 5.0%Cu_2O/TiO_2 sample in N_2 atmosphere.

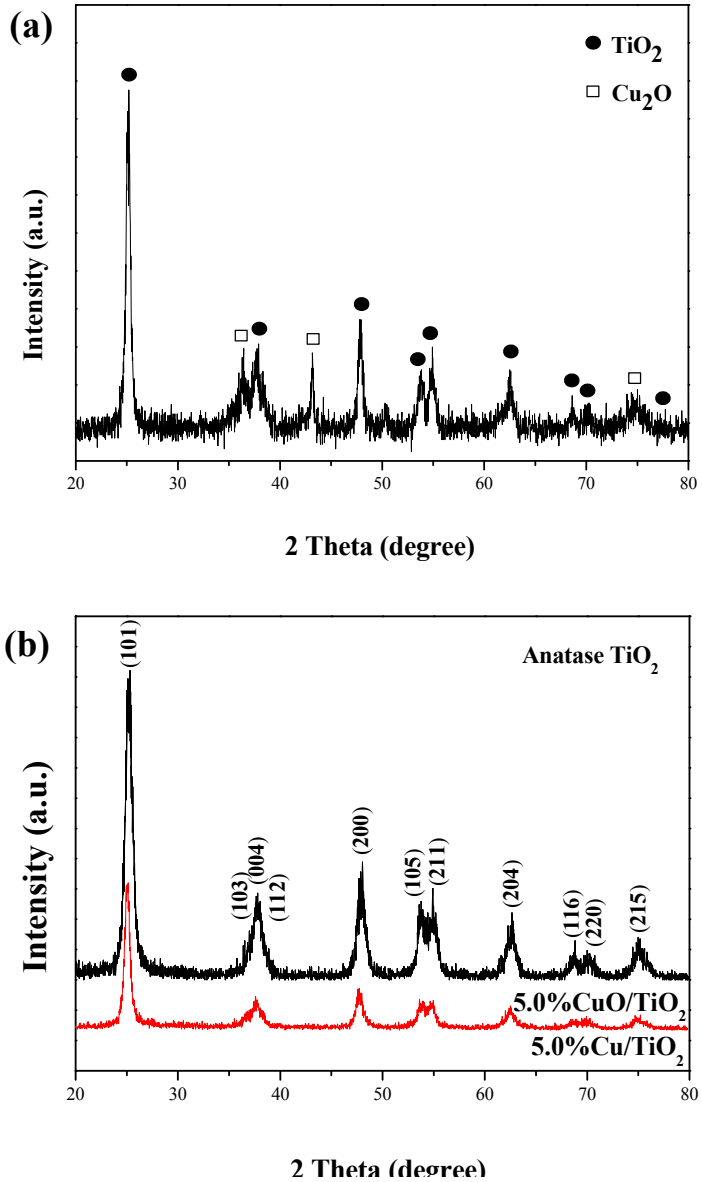


Figure S2. XRD patterns of (a) 30.0%Cu_2O/TiO_2 and (b) 5.0%Cu/TiO_2 and 5.0%CuO/TiO_2 samples.

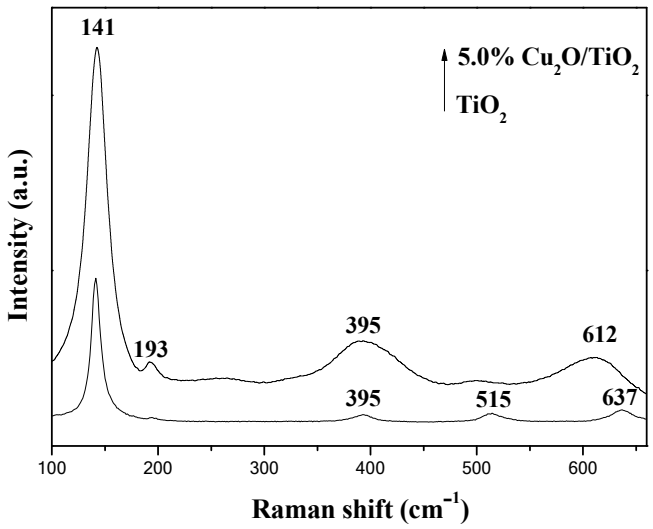
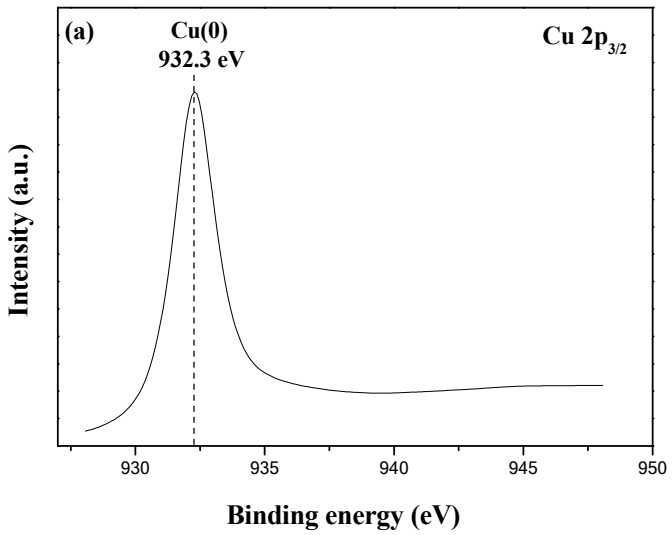


Figure S3. Raman spectra of different samples.



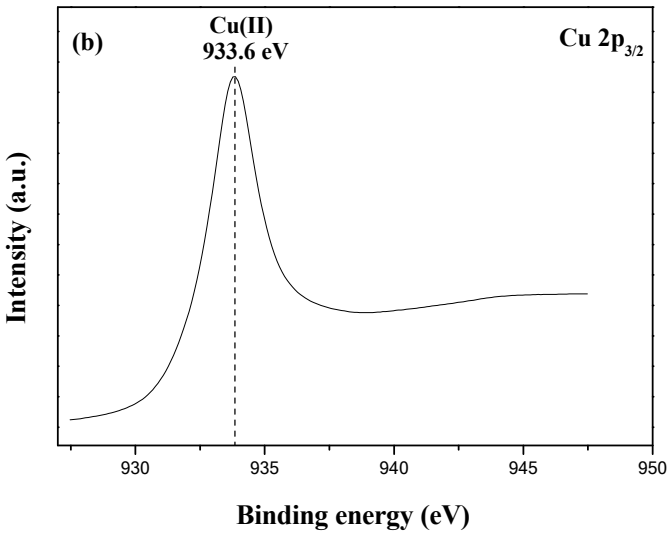


Figure S4. XPS spectra of (a) 5.0%Cu/TiO_2 and (b) 5.0%CuO/TiO_2 samples.

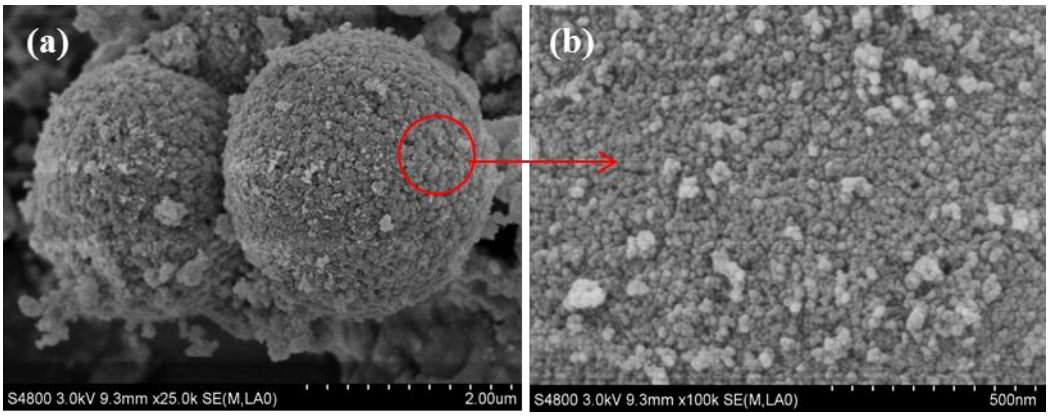


Figure S5. (a) FESEM image of 5.0%Cu_2O/TiO_2 sample with (b) enlarged image.

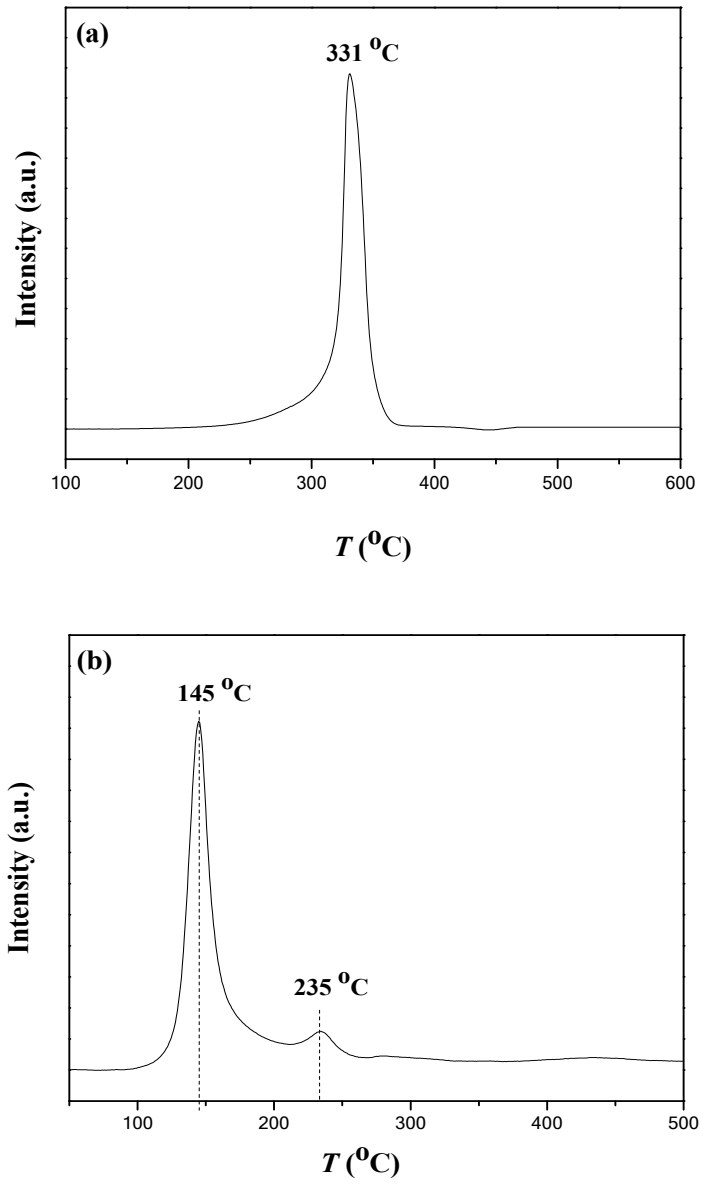


Figure S6. H_2-TPR profiles of (a) Cu_2O and (b) 5.0%CuO/TiO_2 calcined at 400 °C.

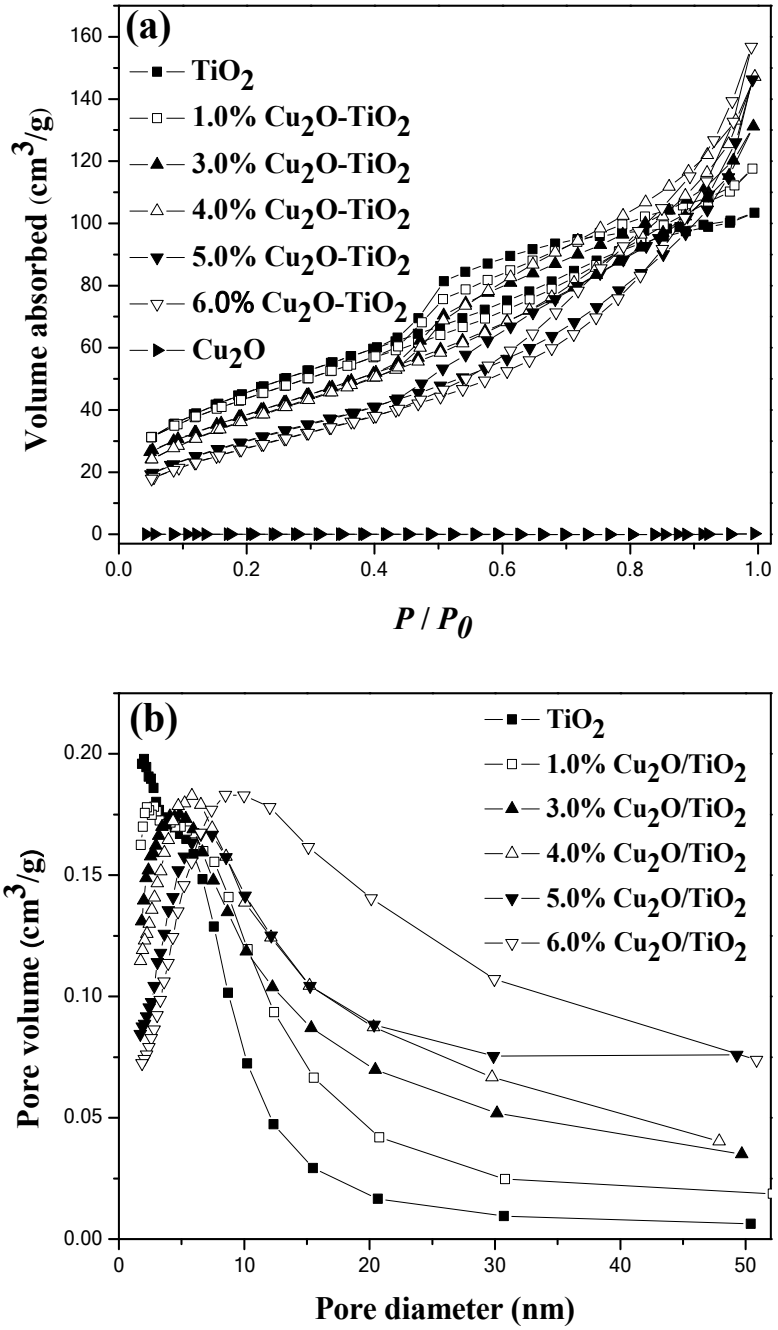


Figure S7. (a) N_2 adsorption-desorption isotherms and (b) curves of pore size distribution for different samples.

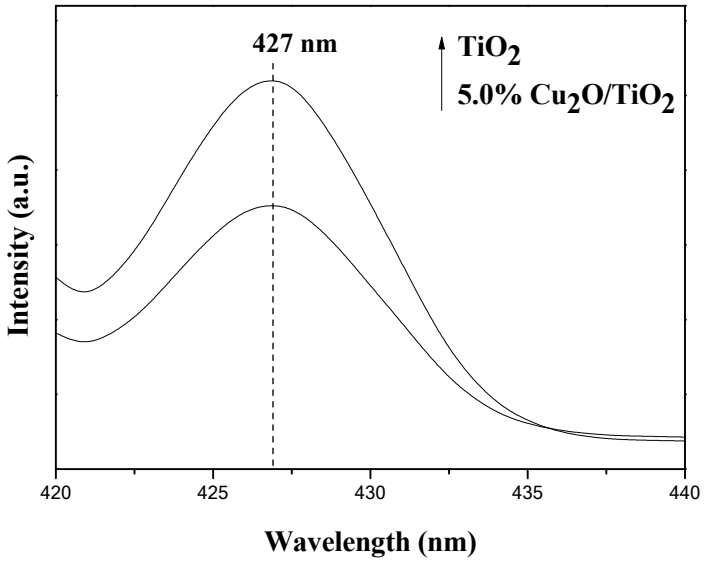


Figure S8. PL spectra of different samples. Excitation wavelength = 410 nm.

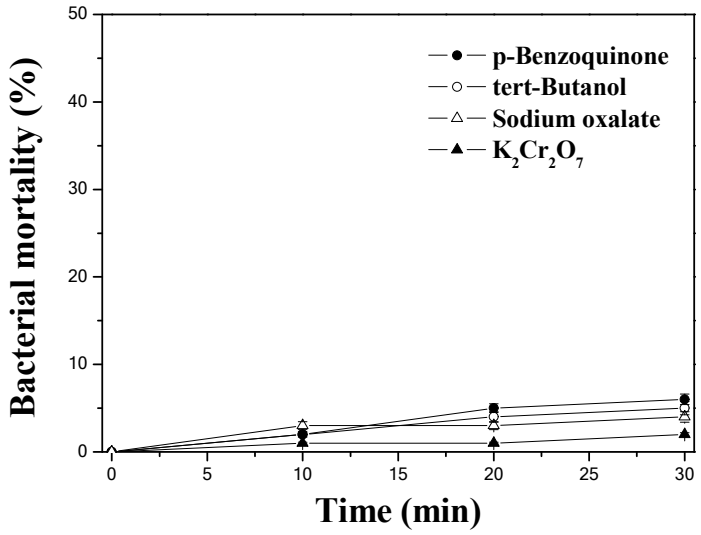


Figure S9. Antibacterial activities of different scavengers under visible light irradiations. Test conditions: 15.0 mL 10^8 cfu/ml (0.5 MFC) A. *baumannii* (ATCC 19606), T = 25 °C, one 300 W Xe lamp ($\lambda > 420$ nm).

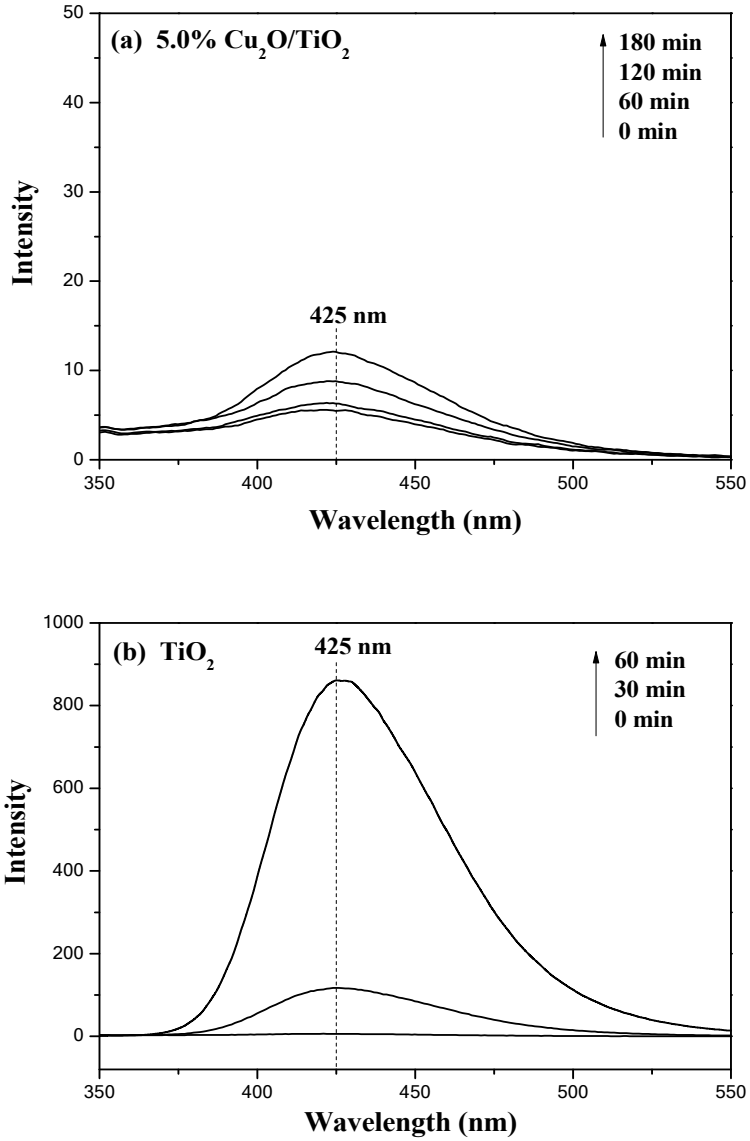


Figure S10. •OH-trapping PL spectra of (a) 5.0%Cu_2O/TiO_2 and (b) TiO_2 samples. Test conditions: 100 mL 0.83 g/L terephthalic acid solution, 0.10 g catalyst, 300 W Xe lamp ($\lambda > 420$ nm), $T = 25$ °C, excitation wavelength = 315 nm.

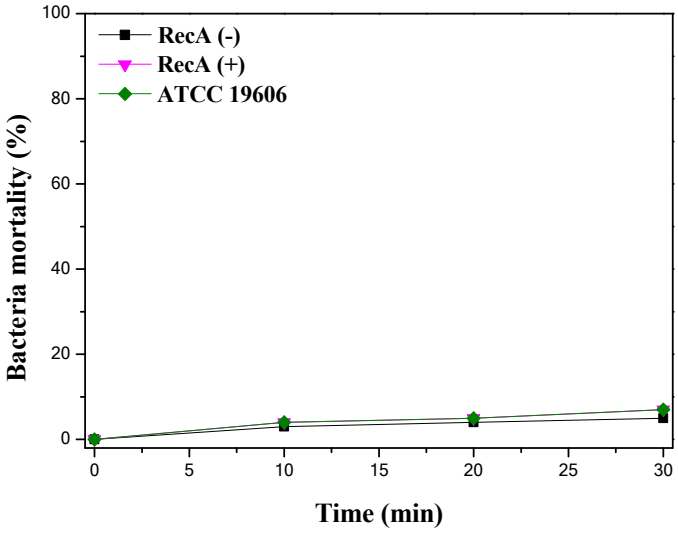


Figure S11. Survival of different gene manipulation strains RecA(-), RecA(+) and wild type strain ATCC 19606 were treated with 5.0%Cu_2O/TiO_2 catalyst in the dark.

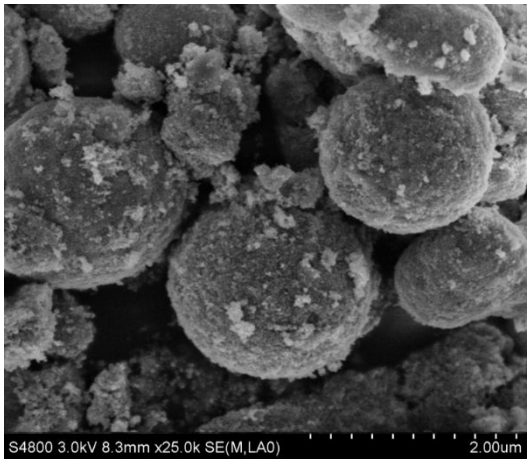


Figure S12. FESEM image of 5.0%Cu_2O/TiO_2 sample after being stirred in bacteria suspension for 2 h.