Electronic Supplementary Information

Solar-Driven Broad Spectrum Fungicides Based on Monodispersed Cu_7S_4 Nanorods with Strong Near-Infrared Photothermal Efficiency

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Table S1 Reaction conditions for Cu_7S_4 with different morphologies

	Precursor		Temperature		DDT[a]
	HS_2CNBut_2	$Cu(NO_3)_2 \cdot 3H_2O$	T_1 (°C)	T_R(°C)	
Recipe for nanoplates (Previous work)	**43.1 mg**	0.1 mmol	205	190	**0.08 mL**
urrent work	**2.1 mg**	0.1 mmol	205	190	**0 mL**

[a] DDT: dodecanethiol

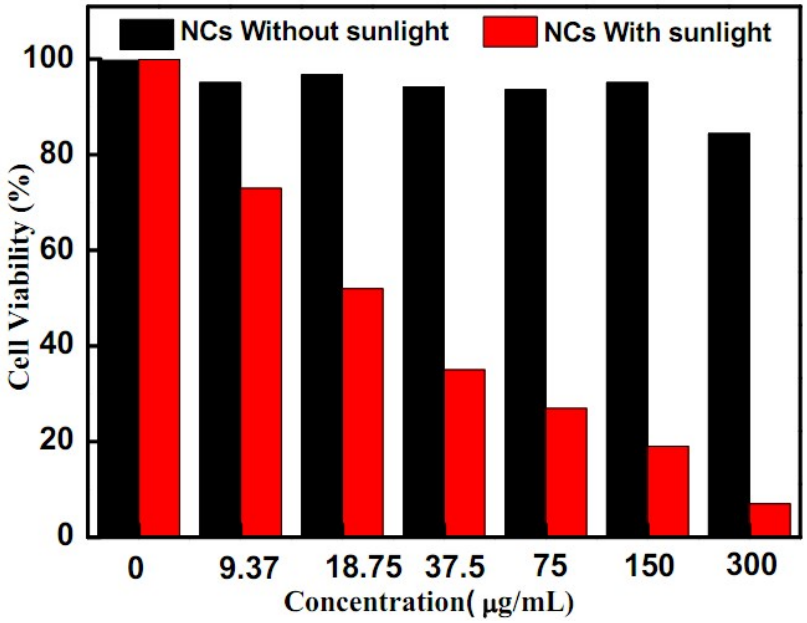

Fig. S1. Cytotoxicity of Cu_7S_4 NCs in the absence and presence of the simulated sunlight irradiation at different concentrations (9.37, 18.75, 37.5, 75, 150, 300 μg/mL) in HeLa cell lines after incubation for 24 h. The power density of the simulated sunlight was 1.0 W/cm^2. The irradiation time was 5 min.

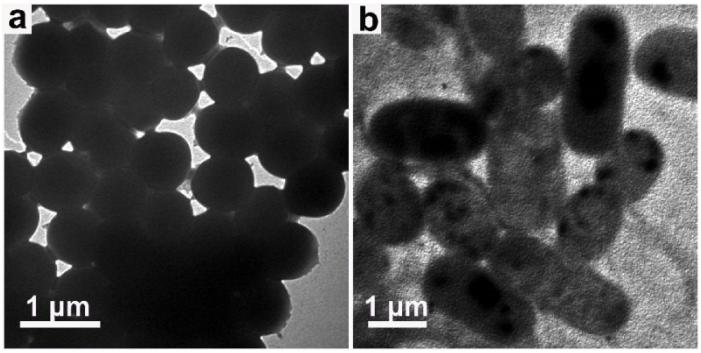

Fig. S2. TEM images of *S. aureus* (a) and *E. coli* (b).

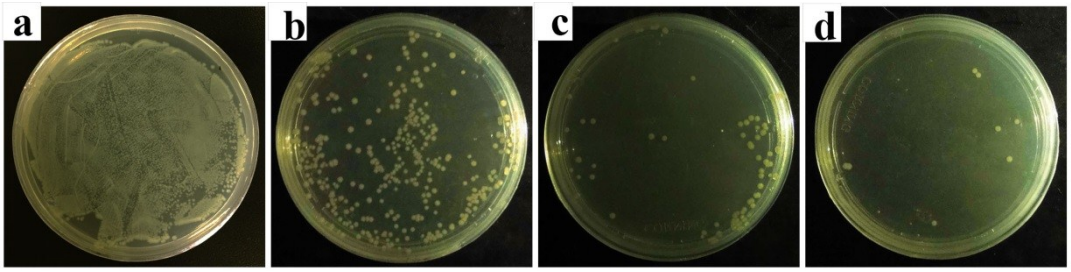

Fig. S3. Photographs of *E. coli* bacteria for viable count. All the *E. coli* bacteria were cultured in agar plates and incubated for 24 h before counting. The concentration of bacterium seeds (50 μL) for each plate is as follows. (a) The original concentration of *E. coli*; (b-d) the solution of (a) was diluted by 10^3 (b), 10^4 (c), and 10^5 (d) times.

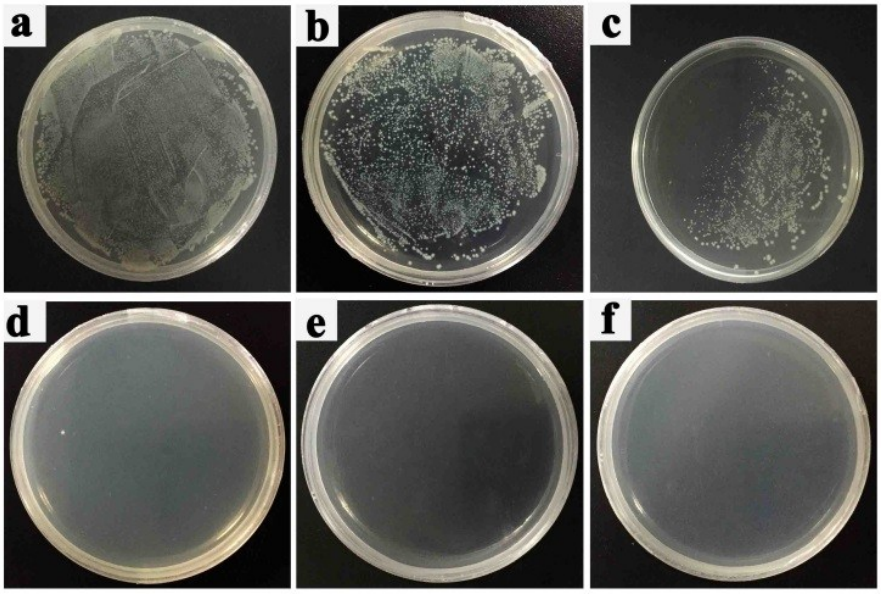

Fig. S4. Photothermal anti-bacteria efficiency of Cu_7S_4 NCs on *E. coli* with the simulated sunlight irradiation for (a) 0, (b) 0.5, (c) 1, (d) 2, (e) 3, and (f) 4 min. The Cu_7S_4 NCs (500 μL, 300 μg/mL) and bacteria (200 μL, 10^7 CFU/mL) were mixed into PBS to afford a total volume of 2 mL solution and then irradiated with the simulated sunlight (1.0 W/cm^2) for desired time. After irradiation, 50 μL of the bacterium suspension was cultured in the agar plate and incubated at 37 °C for 24 h before photographing and counting.

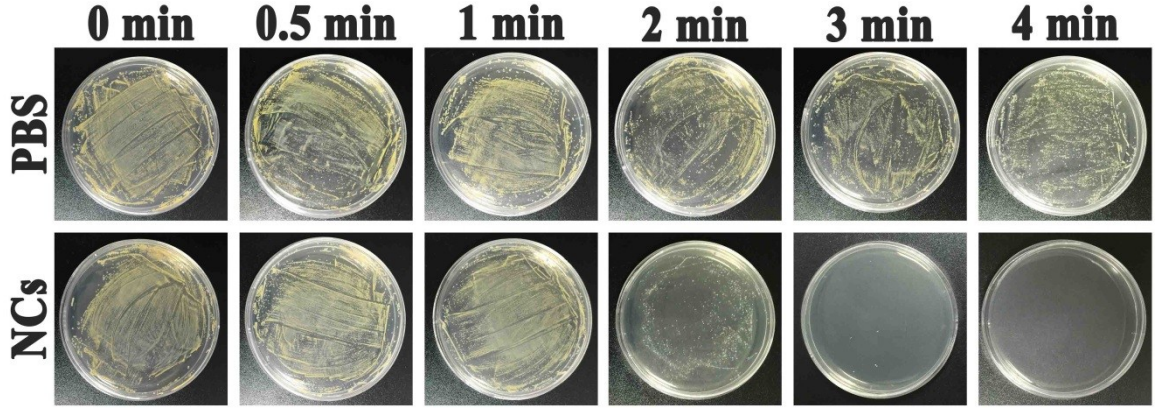

Fig. S5. Photothermal anti-bacteria efficiency of Cu_7S_4 NCs on *S. aureus* with the simulated sunlight irradiation for 0, 0.5, 1, 2, 3, and 4 min, respectively. The Cu_7S_4 NCs (500 μL, 300 μg/mL) and bacteria (200 μL, 10^7 CFU/mL) were mixed into PBS to afford a total volume of 2 mL solution and then irradiated with the simulated sunlight (1.0 W/cm^2) for desired time. After irradiation, 50 μL of the bacterium suspension was cultured in the agar plate and incubated at 37 °C for 24 h before photographing and counting.

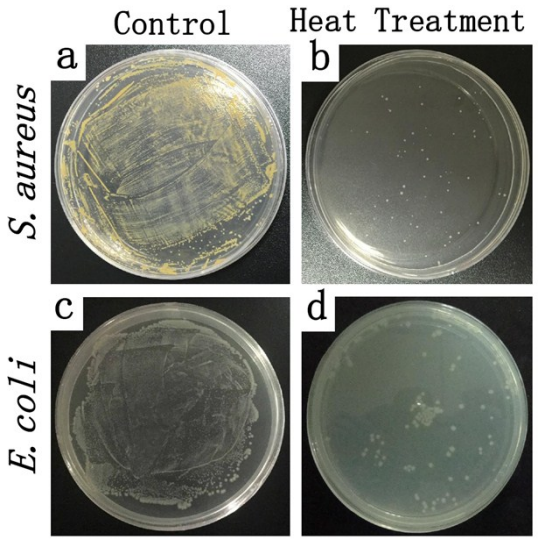

Fig. S6. Evaluation of photothermal anti-bacteria efficiency by heat-treatment for 4 min in the absence of Cu_7S_4 NCs. The control group (a, c): without heat treatment; the heat-treatment group (b, d): the bacteria samples were treated with heat under 70 °C for 4 min.

Detailed procedures: bacterium solution (200 μL, 10^7 CFU/mL) was mixed into PBS buffer to afford a total volume of 2 mL. For the heat-treatment group, the prepared suspensions were further treated with heat. Then, for both control and experimental groups, 50 μL of the bacterium suspension was cultured in the agar plate and incubated at 37 °C for 24 h before photographing and counting.