

Supplementary

White Light Powered Antimicrobial Nanoagents for Triple Photothermal, Chemodynamic and Photodynamic Based Sterilization

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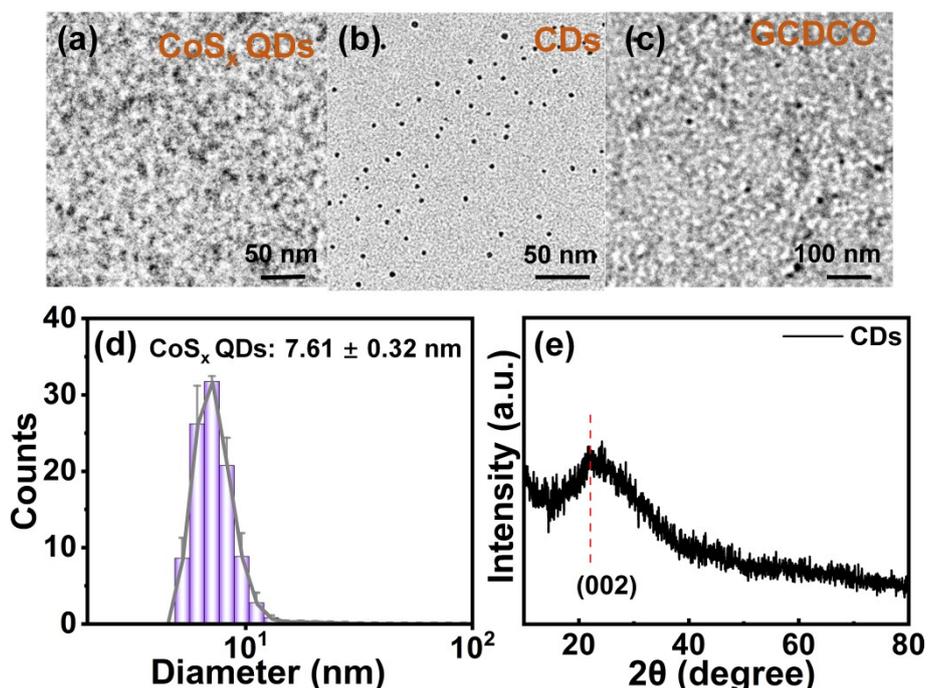


Fig. S1 Nanodevice characterization. TEM images of (a) CoS_x QDs, (b) CDs, (c) GCDCO, (d) Particle size of CoS_x QDs, (e) XRD pattern of CDs.

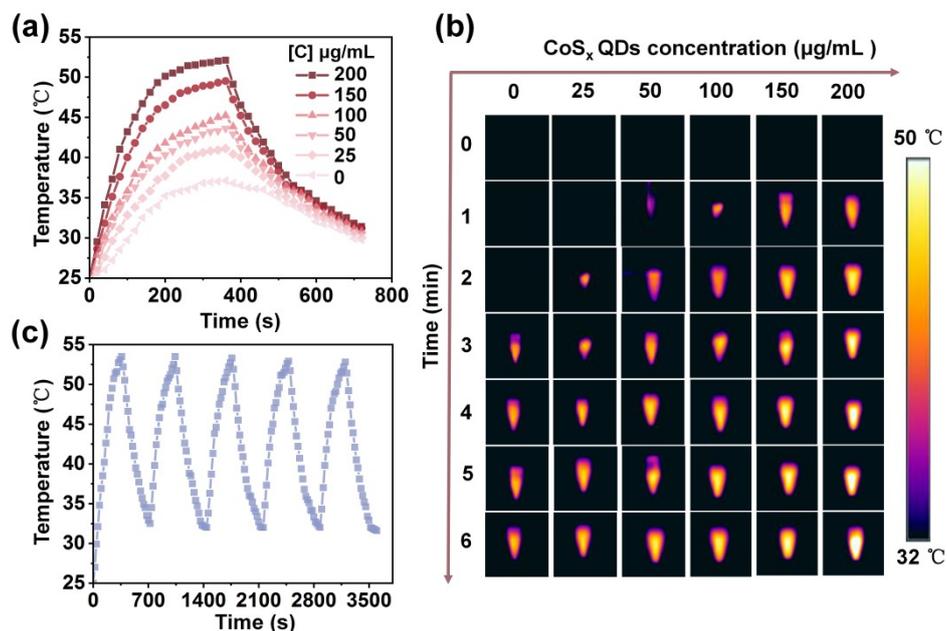


Fig. S2 Photothermal evaluation of CoS_x QDs irradiated by sunlight. (a) Photothermal heating curves of CoS_x QDs solutions with various concentrations irradiated by simulated sunlight. (b) Infrared thermal images of CoS_x QDs solutions at the indicated concentrations and irradiated for different durations. (c) Photothermal stability of CoS_x QDs over 5 on/off cycles of simulated sunlight irradiation (200-2500 nm, 2335

W/cm²).

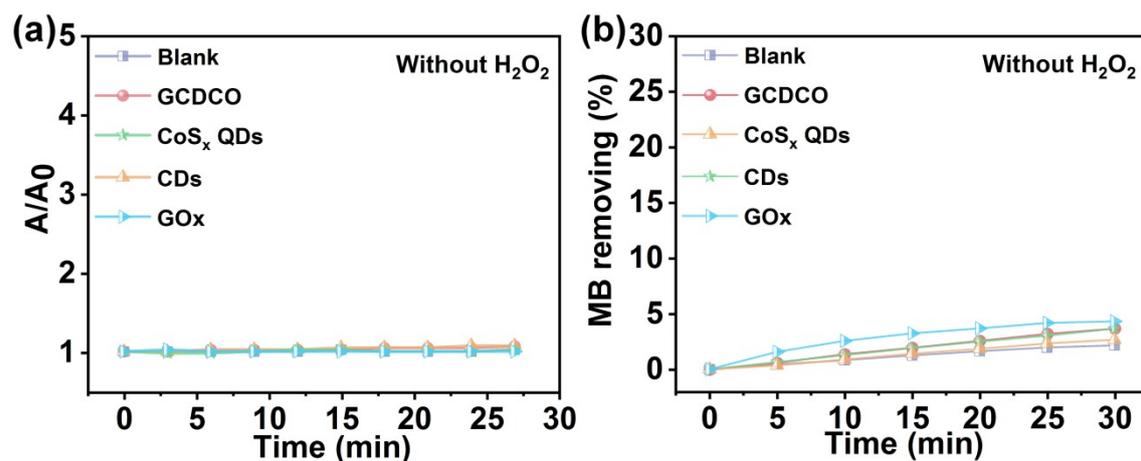


Fig. S3 (a) A/A_0 of different DAB reaction systems at different time without H₂O₂. (b) Degradation of MB of different reaction systems without H₂O₂ at different time.

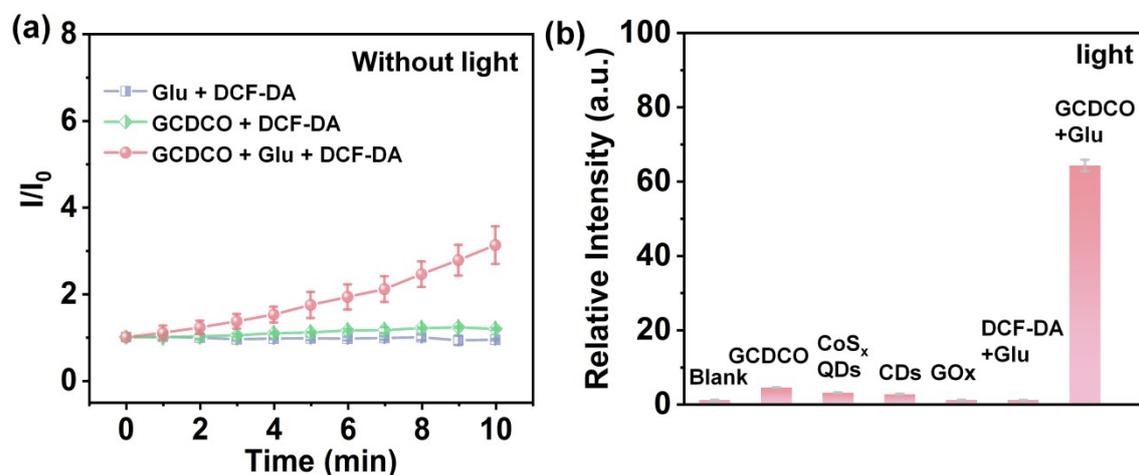


Fig. S4 ROS production from GCDCO. (a) Time-dependent fluorescence changes without cold-light irradiation (400-800 nm, 91 mW/m²). (b) The relative intensity of different reaction systems with cold-light irradiation at 10 min.

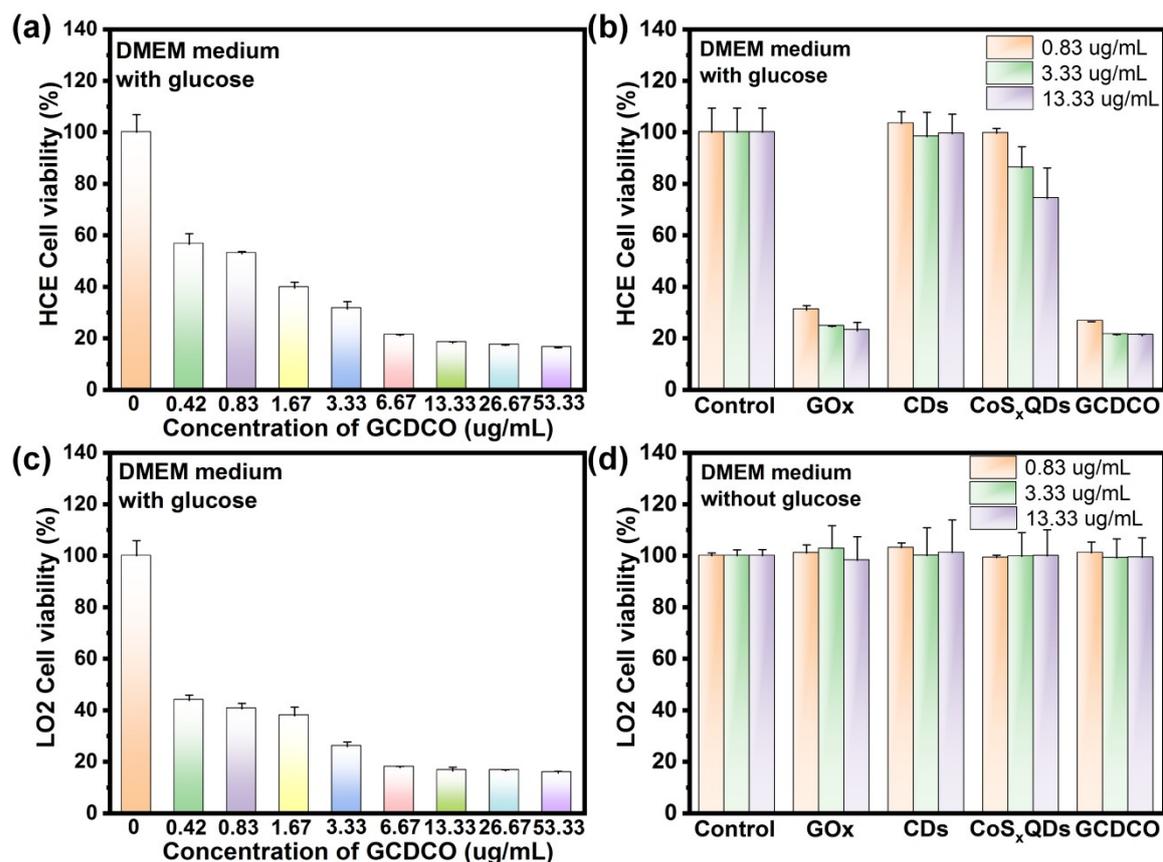


Fig. S5. Cell viability of HCE cells (a) and LO2 cells (c) incubated with various GCDCO at different concentration (0-53.33 $\mu\text{g/mL}$) for 6 h. (b) Cell viability of HCE cells treated with GOx, CDs, CoS_x QDs and GCDCO at concentrations of 0.83, 3.33 and 13.33 $\mu\text{g/mL}$. (d) Cell viability of LO2 cells treated with GOx, CDs, CoS_x QDs and GCDCO at concentrations of 0.83, 3.33 and 13.33 $\mu\text{g/mL}$ in absence of glucose.

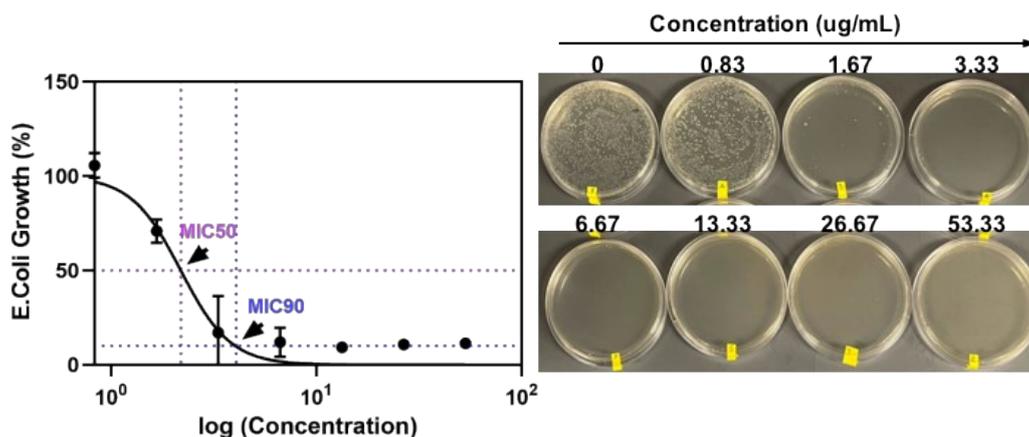


Fig. S6. Minimum inhibitory concentration (MIC) for different concentrations of GCDCO nanoagents for 12 h.

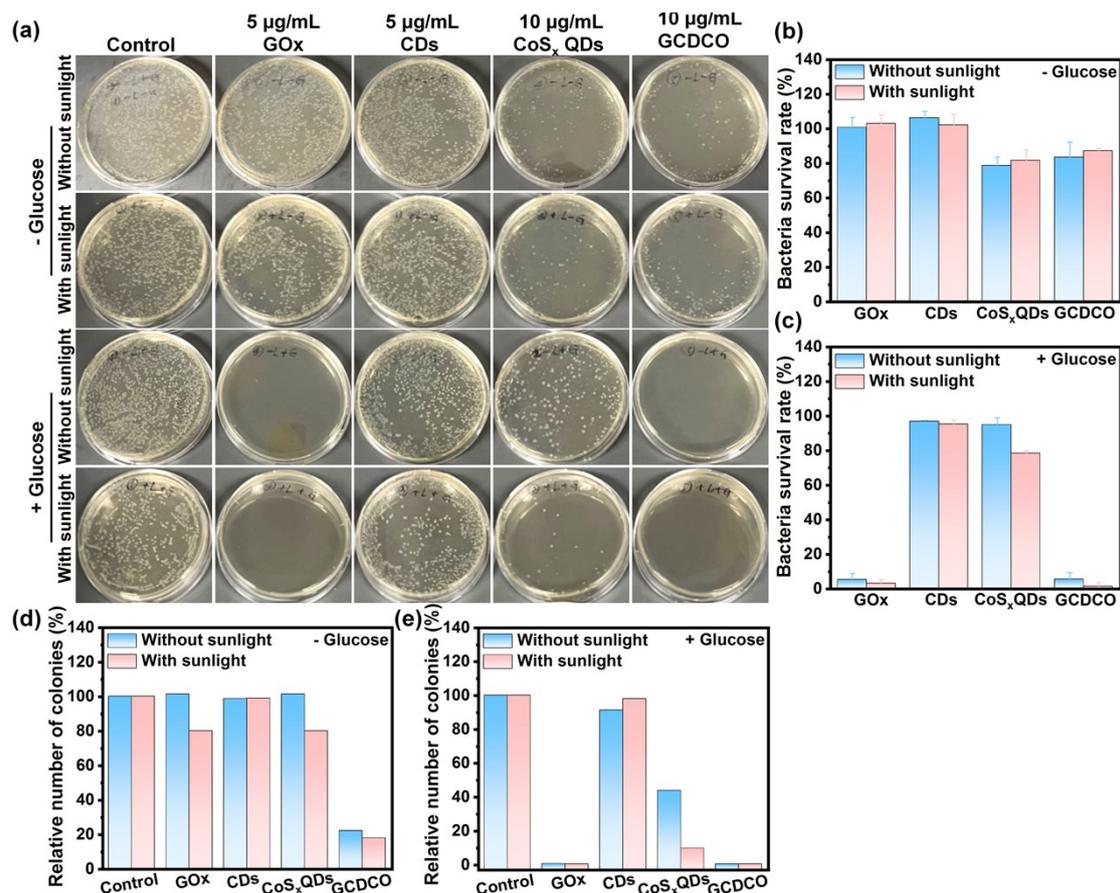


Fig. S7. Antibacterial characterization of *E. coli* *in vitro*. (a) Photographs of survived bacterial colonies of *E. coli* without sunlight and with sunlight treatment in the absence and presence of glucose. Corresponding antibacterial activity of GOx (5 $\mu\text{g/mL}$), CDs (5 $\mu\text{g/mL}$), CoS_x QDs (10 $\mu\text{g/mL}$) and GCDCO (10 $\mu\text{g/mL}$) without sunlight and with sunlight treatment in the absence (b) and presence of glucose (c) measured by OD values of bacteria dispersion. Corresponding antibacterial activity of GOx, CDs, CoS_x QDs and GCDCO without sunlight and with sunlight treatment in the absence (d) and presence of glucose (e) measured by bacteria counting.

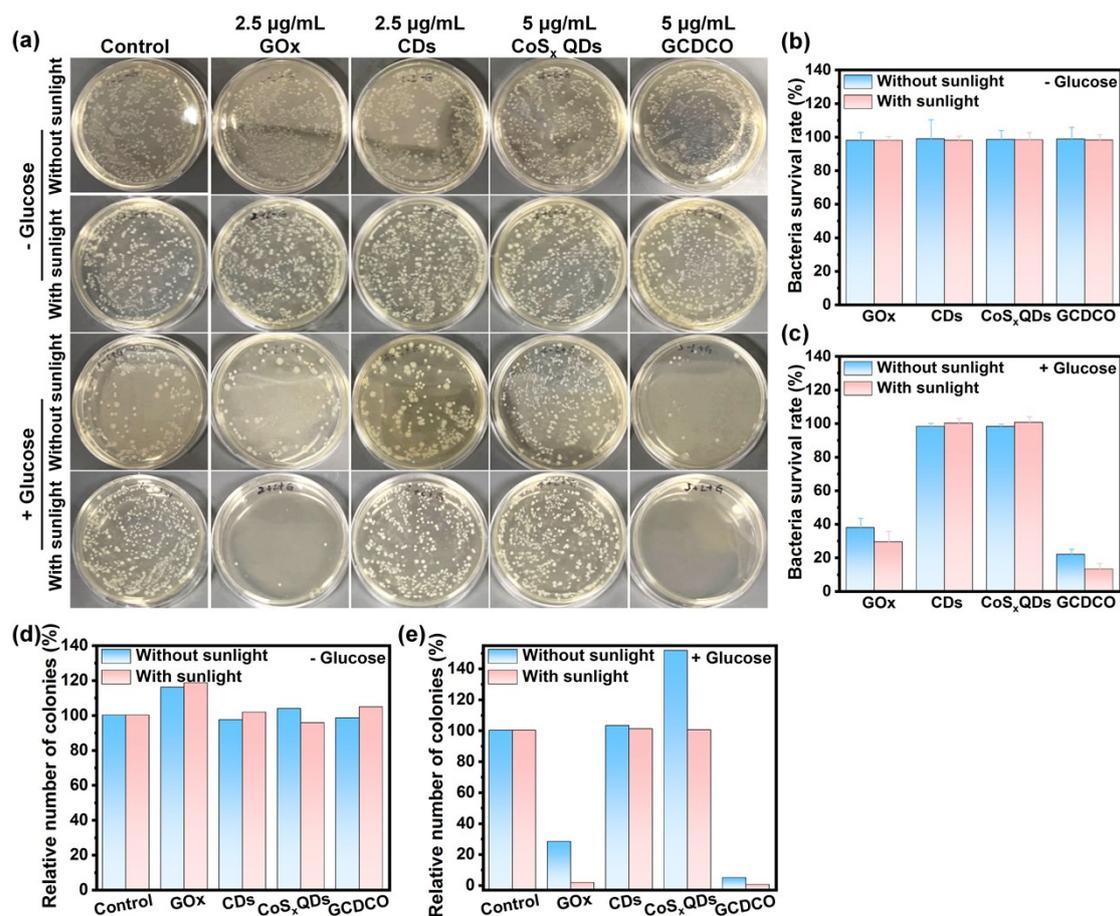


Fig. S8. Antibacterial characterization of *E. coli* in vitro. (a) Photographs of survived bacterial colonies of *E. coli* without sunlight and with sunlight treatment in the absence and presence of glucose. Corresponding antibacterial activity of GOx (2.5 µg/mL), CDs (2.5 µg/mL), CoS_x QDs (5 µg/mL) and GCDCO (5 µg/mL) without sunlight and with sunlight treatment in the absence (b) and presence of glucose (c) measured by OD values of bacteria dispersion. Corresponding antibacterial activity of GOx, CDs, CoS_x QDs and GCDCO without sunlight and with sunlight treatment in the absence (d) and presence of glucose (e) measured by bacteria counting.

Table S1 Elemental analysis

Sample	Atomic conc. (%)	
	S 2p	Co 2p
GCDCO	1.38	0.47
CoS _x QDs	0.81	0.39