

Electronic Supplementary Material

808 nm NIR-triggered *Camellia* sapogenin/curcumin based antibacterial upconversion nanoparticles for synergistic photodynamic-chemical combined therapy

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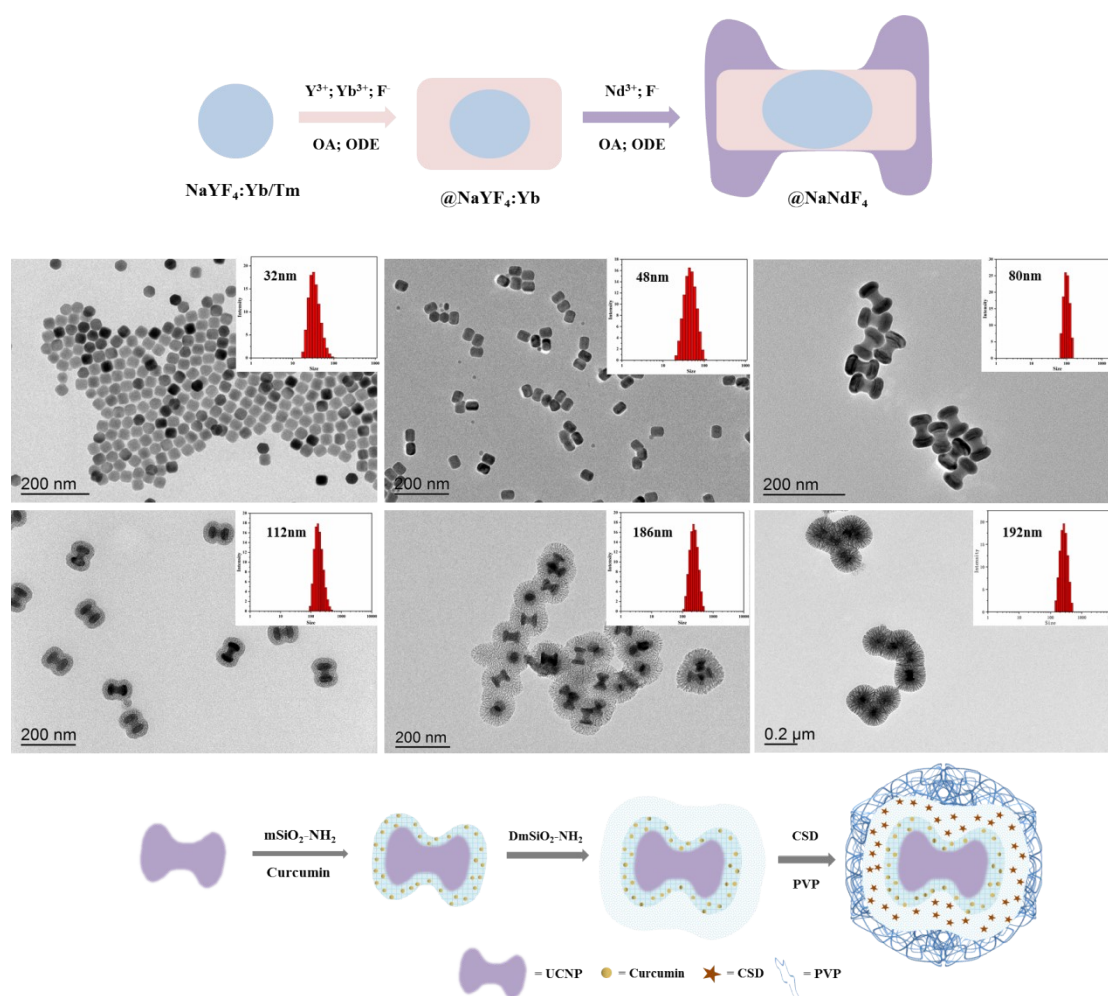


Fig. S1 Schematic of the synthesis of $\text{NaYF}_4:\text{Yb/Tm}@ \text{NaYF}_4:\text{Yb}@ \text{NaNdF}_4$ (UCNP) and $\text{UCNP}@ \text{mSiO}_2(\text{Cur})@ \text{DmSiO}_2(\text{CSD})@ \text{PVP}$ nanoparticles. The inset is the corresponding size distribution.

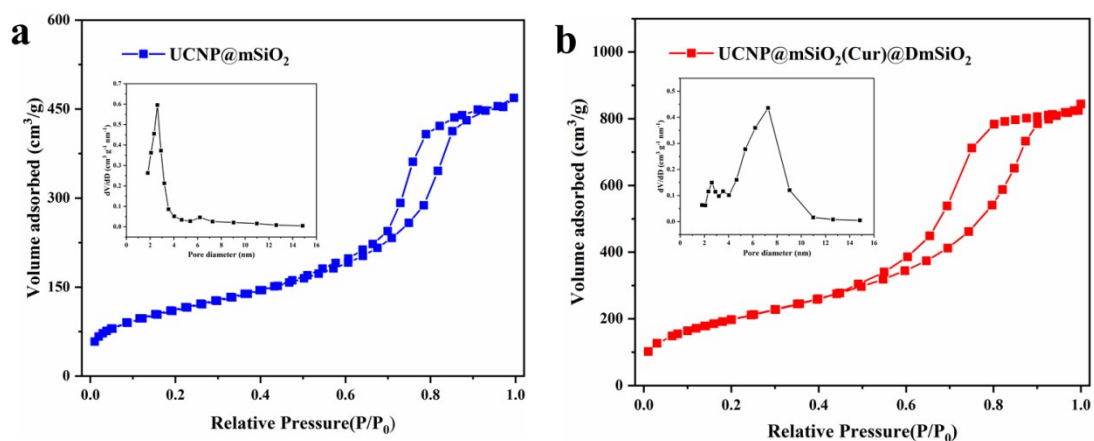


Fig. S2 Nitrogen adsorption/desorption isotherm and the pore-size distribution curve (inset) of UCNP@mSiO₂ and UCNP@mSiO₂(Cur)@DmSiO₂.

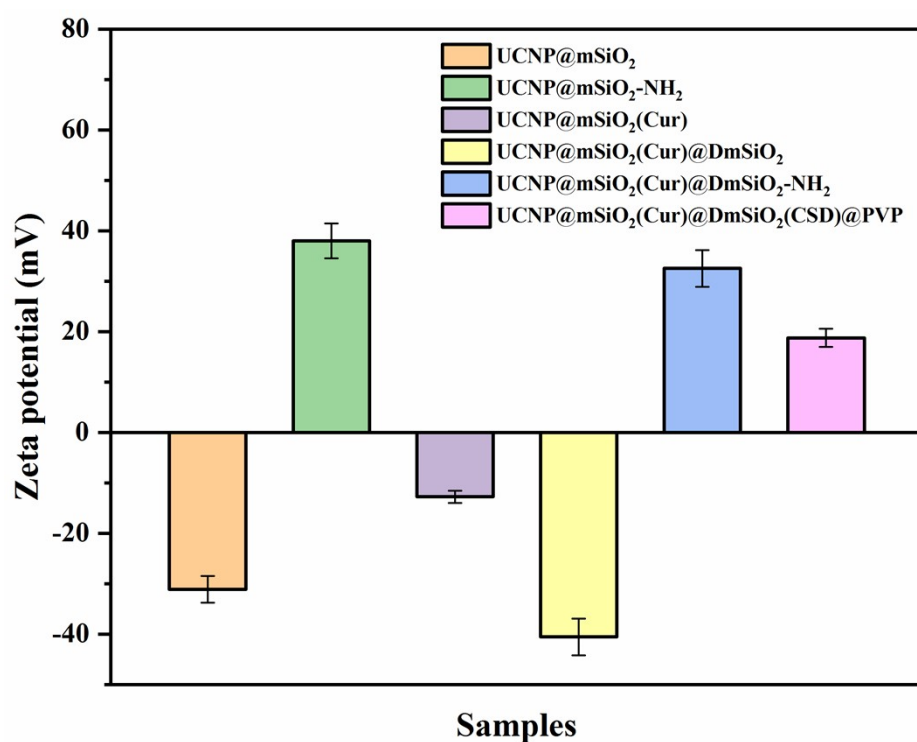


Fig. S3 Zeta potential of the nanoparticles in synthesis.

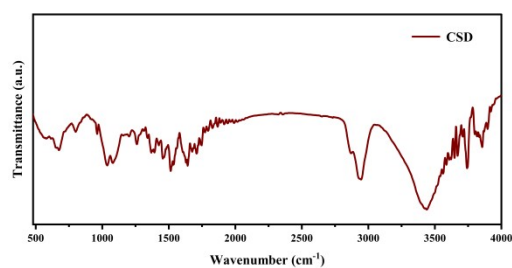


Fig. S4 FT-IR spectra of CSD (KBr).

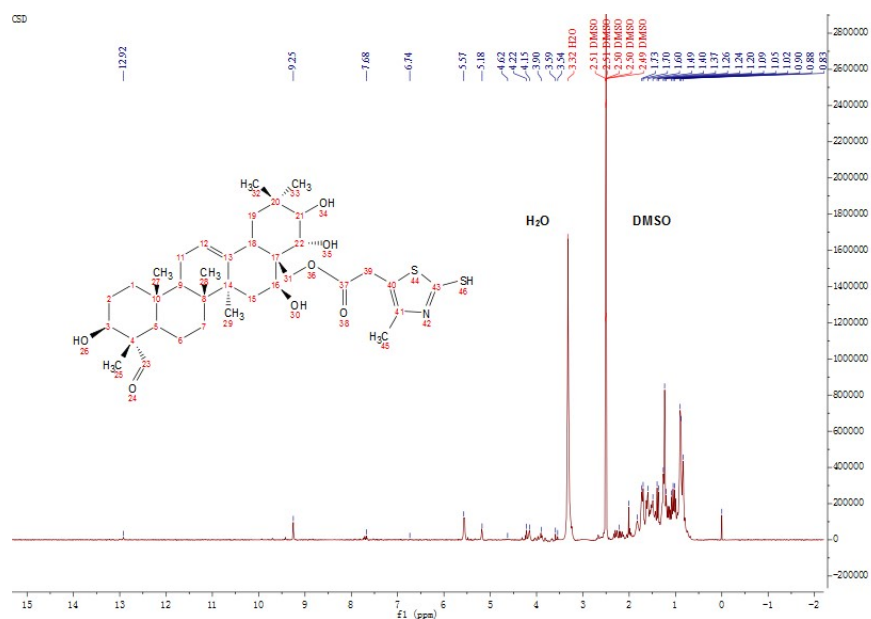


Fig. S5 ^1H NMR spectra of CSD in DMSO-d_6 .

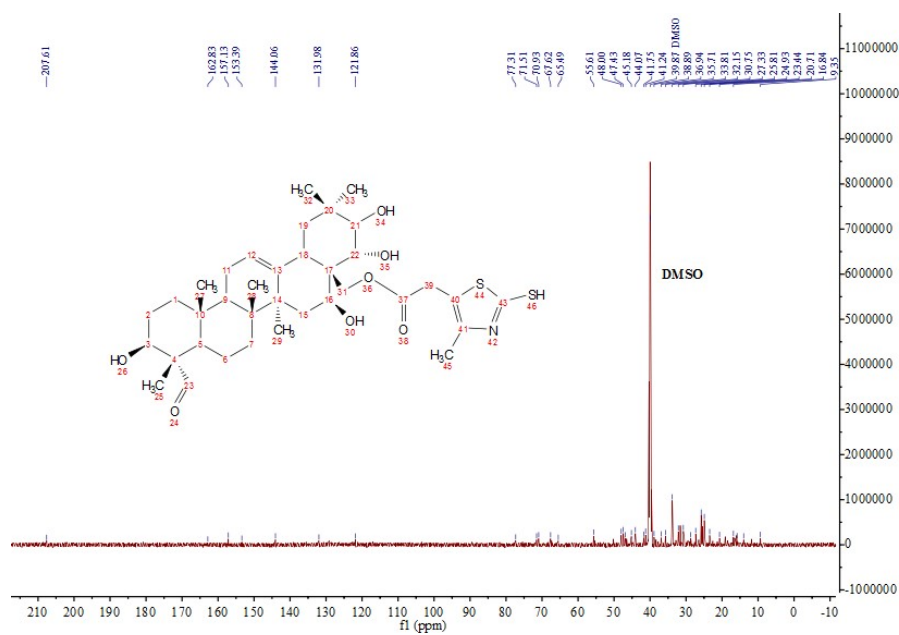


Fig. S6 ^{13}C NMR spectra of CSD in DMSO-d_6 .

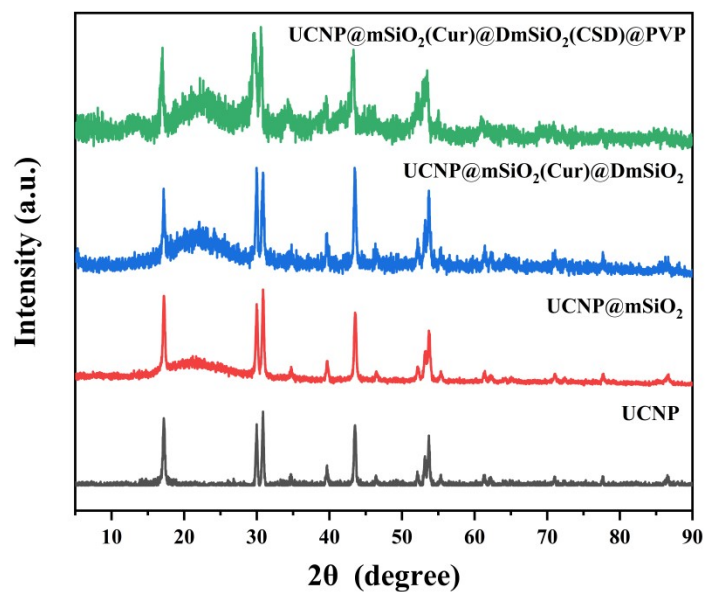


Fig. S7 X-ray pattern of the UCNP, UCNP@mSiO₂, UCNP@mSiO₂(Cur)@DmSiO₂ and UCNP@mSiO₂(Cur)@DmSiO₂(CSD)@PVP.

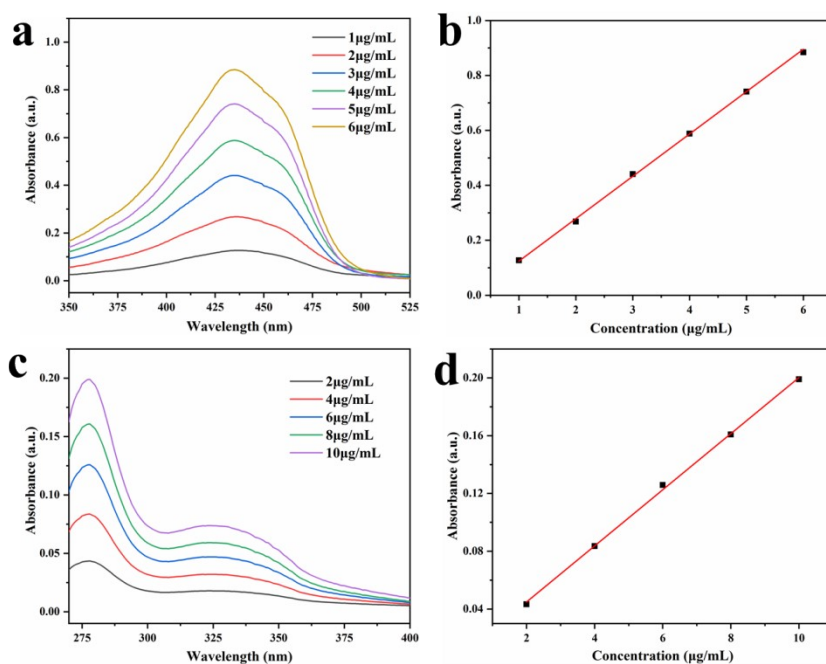


Fig. S8 UV-Vis absorption spectra of curcumin and CSD solution with different concentrations.

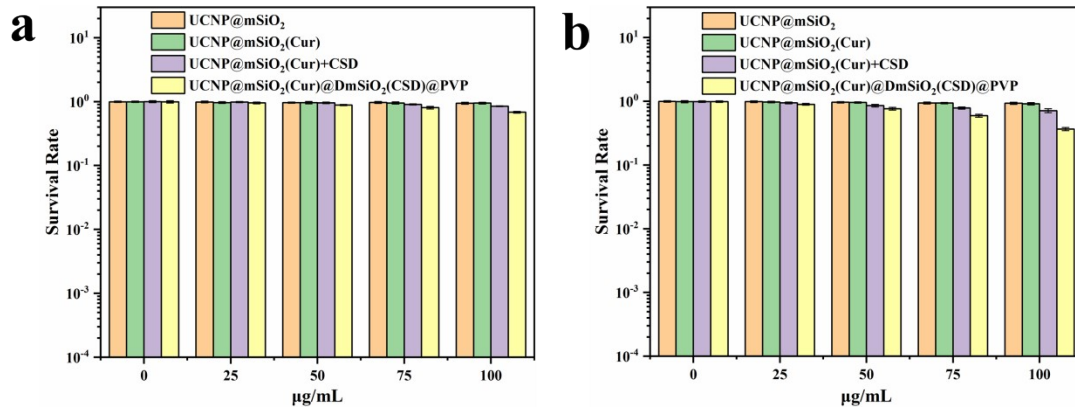


Fig. S9 The survival rate of *E. coli* (a) and *S. aureus* (b) treated with UCNP@mSiO₂, UCNP@mSiO₂(Cur), UCNP@mSiO₂(Cur) + CSD and UCNP@mSiO₂(Cur)@DmSiO₂(CSD)@PVP at different concentration (0-100 µg mL⁻¹) in dark.

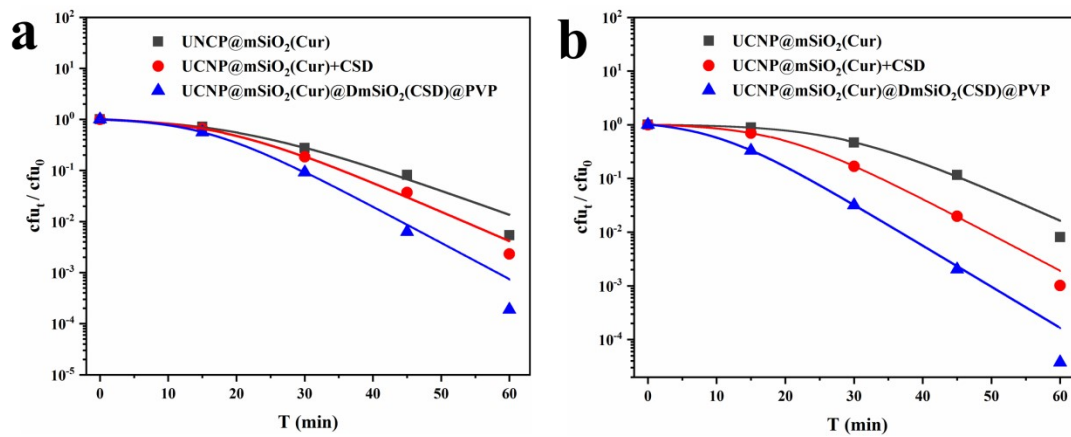


Fig. S10 Evaluation of the experimental data by Eq. (1). solid: experimental values, lines: fitted by Eq. (1).

Table S1 Modeling kinetic parameters of *E. coli* and *S. aureus* inactivation

Samples	k (min ⁻¹)		L (min)	
	<i>E.coli</i>	<i>S. aureus</i>	<i>E.coli</i>	<i>S. aureus</i>
UCNP@mSiO ₂ (Cur)	0.112±0.004	0.132±0.004	21.21±0.37	28.95±0.22
UCNP@mSiO ₂ (Cur) +CSD	0.133±0.002	0.155±0.003	18.87±0.14	19.62±0.16
UCNP@mSiO ₂ (Cur) @DmSiO ₂ (CSD) @PVP	0.164±0.002	0.176±0.004	15.93±0.13	10.57±0.14

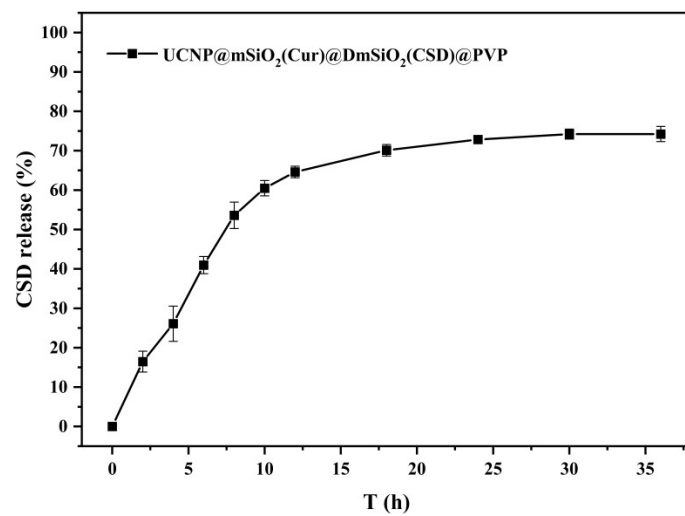


Fig. S11 CSD release curve of UCNP@mSiO₂(Cur)@DmSiO₂(CSD)@PVP nanoparticles.

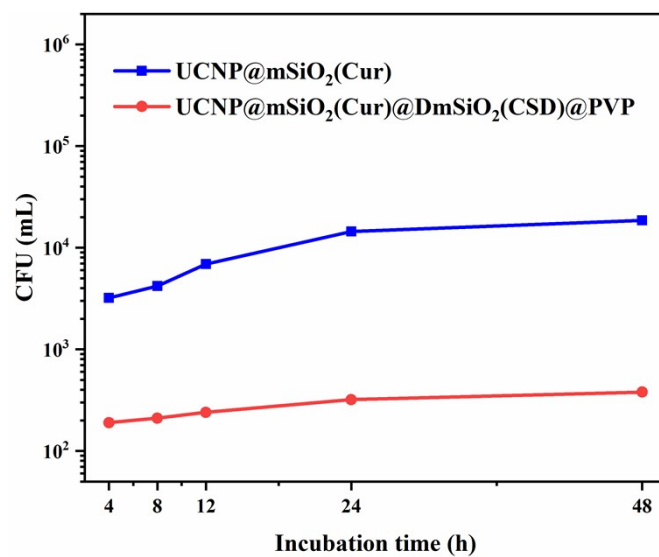


Fig. S12 The bacterial inactivation ability to *S. aureus* after incubation with SBF.