Supporting information

A biodegradable and near-infrared light-activatable photothermal nanoconvertor for bacterial inactivation

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Fig. S1 SEM image of CTN.

Fig. S2 XPS spectra of (a) TMB and (b) CTN.

Fig. S3 (a) Absorption spectra of CTN (60 μg mL⁻¹) in MES buffer (pH 3). (b) Absorption spectra of CTN (60 μg mL⁻¹) in MES buffer (pH 4).
Fig. S4 TEM images of CTN in MES buffer (pH 7) at 0 h (a), 1 h (c), 3h (c) and 12h (d).

Fig. S5 Mass spectrometry (ES+) analysis after degradation of CTN. Insert showed the degradation solution (1) and the solution added with Fe^{2+} and H_{2}O_{2} (2).
Fig. S6 (a) Temperature change of CTN (100 μg ml⁻¹) with different light wavelengths (600, 808 and 900 nm). (b) Temperature change of CTN (100 μg ml⁻¹) with NIR irradiation (0.106, 0.132 and 0.272 W cm⁻²).

Fig. S7 (a) The photothermal effect of different concentrations of CTN in MES buffer (pH 5) under 900 nm laser irradiation (0.272 W cm⁻²). (b) Thermal images of CTN in MES buffer (pH 5) under 900 nm laser irradiation (0.272 W cm⁻², 5 min). (c) “On–off” temperature change of CTN solution in MES buffer (pH 5) under 900 nm laser irradiation (0.272 W cm⁻²). (d) Liner cooling time data versus –Ln (θ) vs negative natural logarithm of driving force temperature with τₙ = 168.4225 s.

Fig. S8 (a) Photographic images of the colonies of *E. coli* and *B. subtilis* treated by CTN (60 μg mL⁻¹) in MES buffer (pH 7) at different times. The corresponding bacterial viabilities of (b) *E. coli* and (c) *B. subtilis* treated with CTN (60 μg mL⁻¹) in MES buffer (pH 7) under 900 nm laser irradiation (0.272 W cm⁻²) for different times.
**Fig. S9** (a) Photographic images of the colonies of *E. coli* and *B. subtilis* treated by CTN (100 μg mL⁻¹) in MES buffer (pH 7) at different times. The corresponding bacterial viabilities of (b) *E. coli* and (c) *B. subtilis* treated with CTN (100 μg mL⁻¹) in MES buffer (pH 7) under 900 nm laser irradiation (0.272 W cm⁻², 5 min) for different times.

**Fig. S10** (a) Photographic images of the colonies of *E. coli* and *B. subtilis* treated with different concentrations of CTN in MES buffer (pH 5). The corresponding bacterial viabilities of (b) *E. coli* and (c) *B. subtilis* treated with different concentrations of CTN in MES buffer (pH 5) with or without 900 nm laser irradiation (0.272 W cm⁻², 5 min).
Fig. S11 (a) Photographic images of the colonies of *E. coli* and *B. subtilis* treated by CTN (60 μg mL⁻¹) in MES buffer (pH 5) at different times. The corresponding bacterial viabilities of (b) *E. coli* and (c) *B. subtilis* treated with CTN (60 μg mL⁻¹) in MES buffer (pH 5) under 900 nm laser irradiation (0.272 W cm⁻²) for different times.

Fig. S12 (a) Photographic images of the colonies of *E. coli* and *B. subtilis* treated by CTN (100 μg mL⁻¹) in MES buffer (pH 5) at different times. The corresponding bacterial viabilities of (b) *E. coli* and (c) *B. subtilis* treated with CTN (100 μg mL⁻¹) in MES buffer (pH 5) under 900 nm laser irradiation (0.272 W cm⁻², 5 min) for different times.

Fig. S13 MTT assay of HeLa cells incubated with different concentrations of CTN.