Synergistic photothermal and photodynamic therapy to promote bacteria-infected wound healing using ZnO@PDA/Ag-integrated waterborne polyurethane films

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Photothermal conversion efficiency (η) of ZP and ZPA

To this aim, 1 mL of the ZP and ZPA was exposed under 808 nm (1 W cm^{-2}) for 10 min. Then, the temperature was recorded every 30 s in the cooling phase for 10 min. Detailed calculation was given as following:

$$\eta = \frac{hs\,(Tmax - Tsurr\,) - Q_{\mathrm{o}}}{I\,(1 - 10^{-\mathrm{A}808}\,)}$$

Where, h is the heat transfer coefficients, S represents the surface area of the container, $Tmax - Tsurr$ is the difference between the maximum temperature of the NPs after laser irradiation and surrounding temperature, resulting the η value, Q_o is the heat associated with the light absorbance of the solvent, I indicates laser power density. A^{808} refer to the absorbance of ZP or ZPA at the wavelength of 808 nm. The time constant heat transfer (τs) was calculated by linear time data versus –Ln(θ) from the cooling phase, as follows:

$$\tau s = \frac{t}{-\,Ln(\theta)}$$

The θ value was measured by the following equation:

$$\theta = \frac{T - Tmin}{\mathrm{T}max - \ \mathrm{T}min}$$

Where, T indicates the temperature in each time point. Then, hs was measured by the following equation:

$$hs = \frac{m_{\mathrm{i}}c_{\mathrm{i}}}{\tau s}$$

Where, m_i represents the weight of ZP and ZPA, and c_i refer to the heat capacity of solvent which is 4.2 J $g^{-1}k^{-1}$. Afterward, deionized water (solvent) (1 mL) was exposed under 808nm

laser for 10 min. Then, the temperature was determined in the cooling phase and all the above-mentioned processes repeated for solvent. Q_o represents the heat associated with the light absorbance of the solvent per second. It was measured by the following equation:

$$Q_o = hs(Tmax,water - Tsurr)$$

Tmax,water–Tsurr, was obtained between the maximum temperature of deionized water and the surrounding temperature.

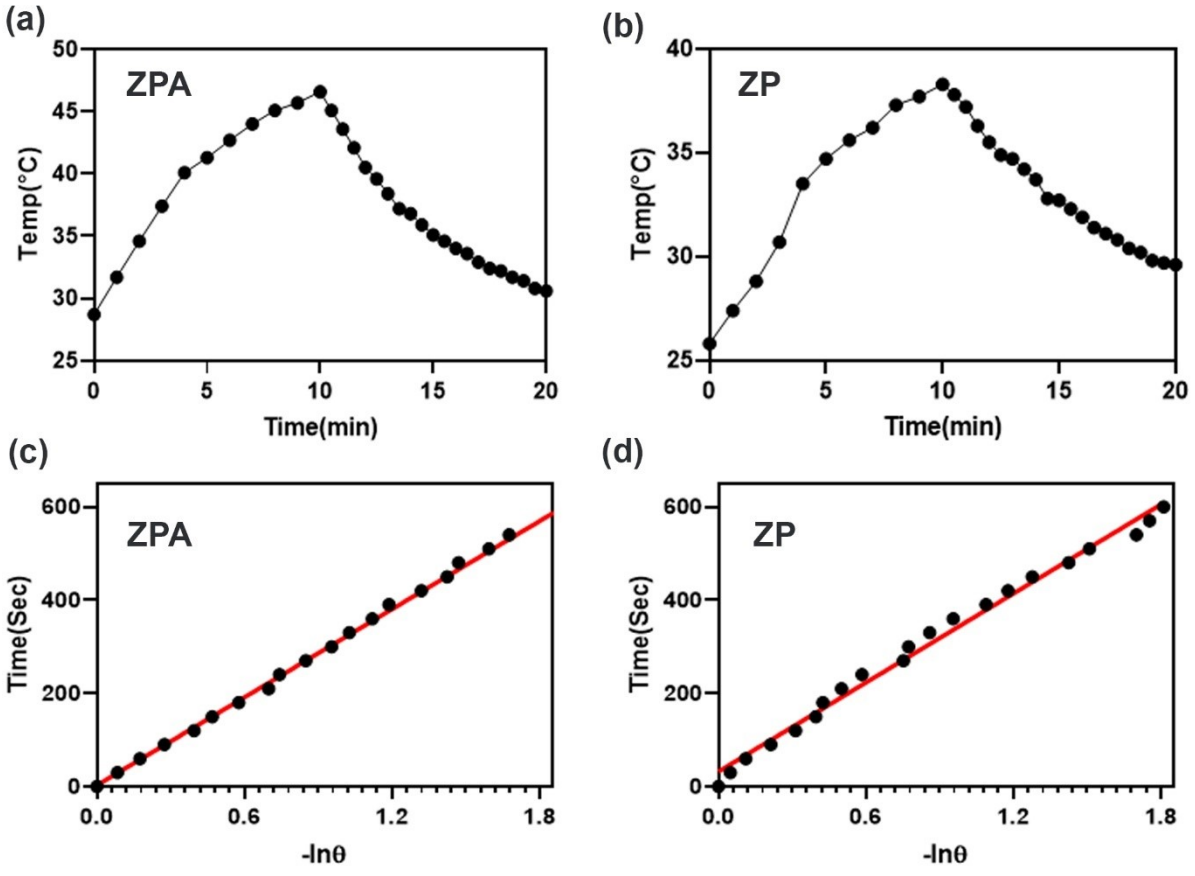

Figure S1: (a), (b) Temperature curves of ZPA and ZP nanoparticles through single on/off cycles under laser irradiation (10 min, 808 nm, 1.0 W/cm^2, concentration: 125 μg/mL). (c) , (d) Graphs of cooling time against the negative natural logarithm of the temperature driving force during the cooling

73 phase, along with the associated linear fit curve.
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