Electronic Supplementary Material (ESI) for Biomaterials Science.

Supporting Information

Multifunctional theranostic nanosystems enabling photothermal-chemo combination therapy of triple-stimuli-responsive drug release with magnetic resonance imaging

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Experimental Section

To evaluate the photothermal conversion efficiency, the temperature change of the FPCH NPs aqueous dispersion (100 μg mL^{-1}) was recorded as a function of time under continuous irradiation from the 808 nm laser with a power density of 2 W cm^{-2} until the solution reached a steady-state temperature. The photothermal conversion efficiency (η) was calculated using **Equation 1** as described by in a previous report:

$$\eta = \frac{hA\Delta T_{max} - Q_s}{I(1 - 10^{-A\lambda})} \qquad (1)$$

Herein, $\Delta T_{max} = T_{max} - T_{Surr}$, T_{max} is the equilibrium temperature, T_{Surr} is the ambient temperature of the surroundings, I is the incident laser power, $A\lambda$ is the absorbance of the

FPCH NPs at 808 nm, Q_s is the heat associated with the light absorbance of the solvent, *h* is the heat transfer coefficient and *A* is the surface area of the container. *hA* can be calculated as followed **Equation 2:**

$$\tau_s = \frac{m_D C_D}{hA} \quad (2)$$

where τ_s is the sample system time constant, m_D is the mass of solvent, and C_D is the heat capacity of the solvent. τ_s is the sample system time constant.

In order to obtain the τ_s, herein ϑ was introduced (**Equation 3**), which was defined as the ratio of ΔT to ΔT_{max}.

$$\theta = \frac{\Delta T}{\Delta T_{max}} \quad (3)$$

τ_s can be determined by applying the linear time data from the cooling period versus $-Ln\vartheta$. (Figure S3,S4) Substituting *hA* value into **Equation 1,** the η of FPCH NPs be calculated to be 36.2 %.

Supplementary Figures

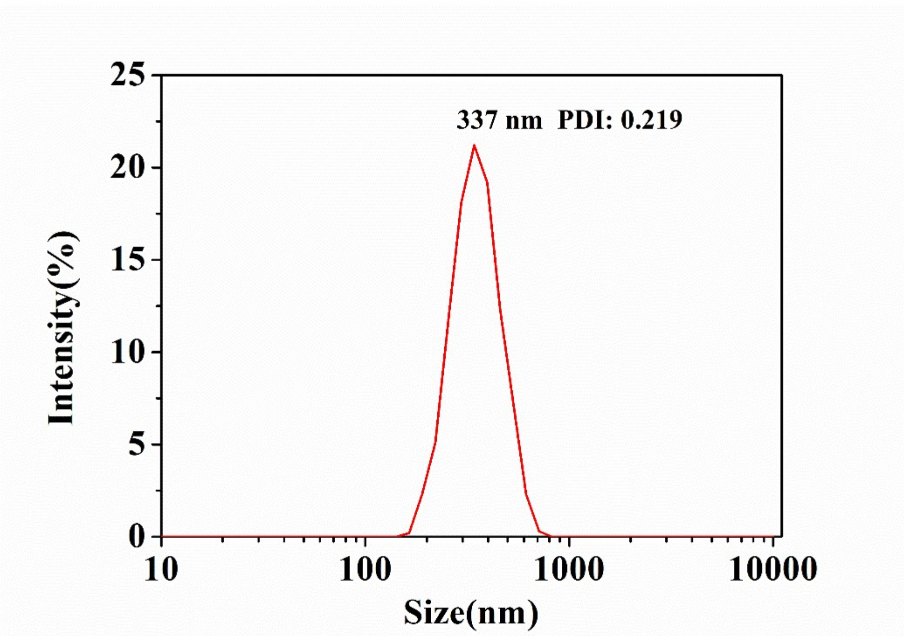

Figure S1 Size distribution curves (determined from DLS) of FPCH-DOX NPs.

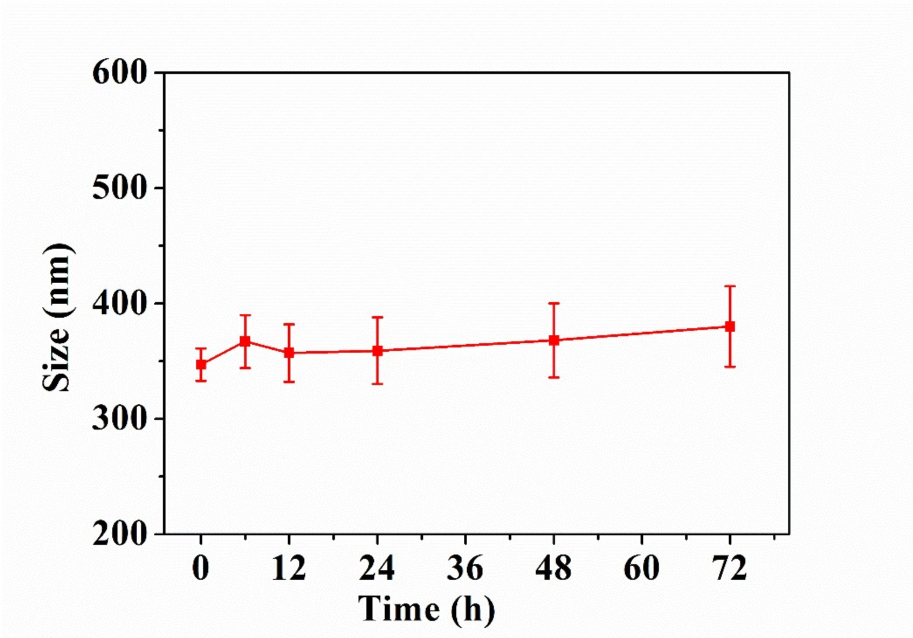

Figure S2 DLS measured size changes of FPCH-DOX NPs incubated in PBS.

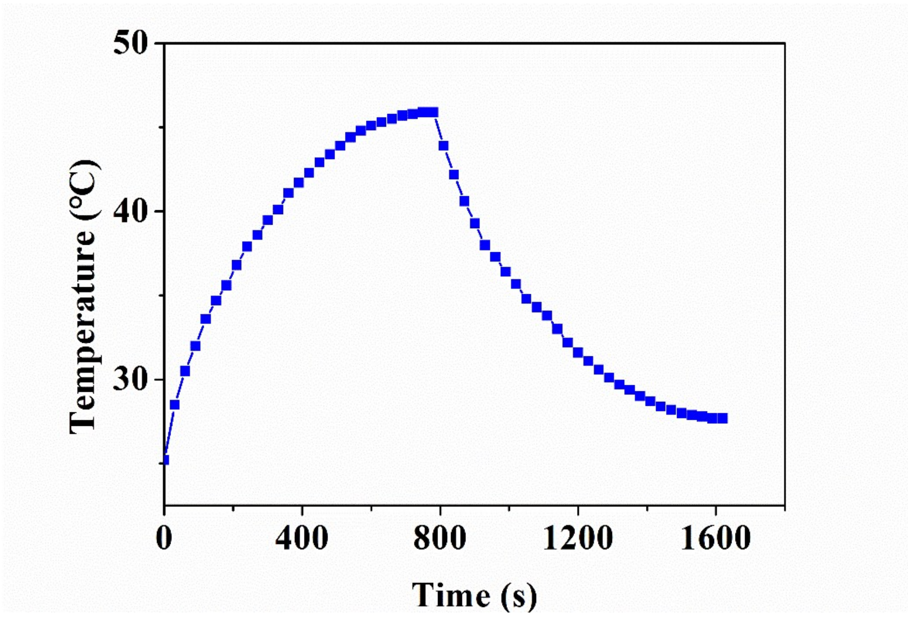

Figure S3 Photothermal effect of FPCH NPs under 808 nm laser irradiation (2 W cm^{-2}) until reaching a steady temperature and then the laser was shut off.

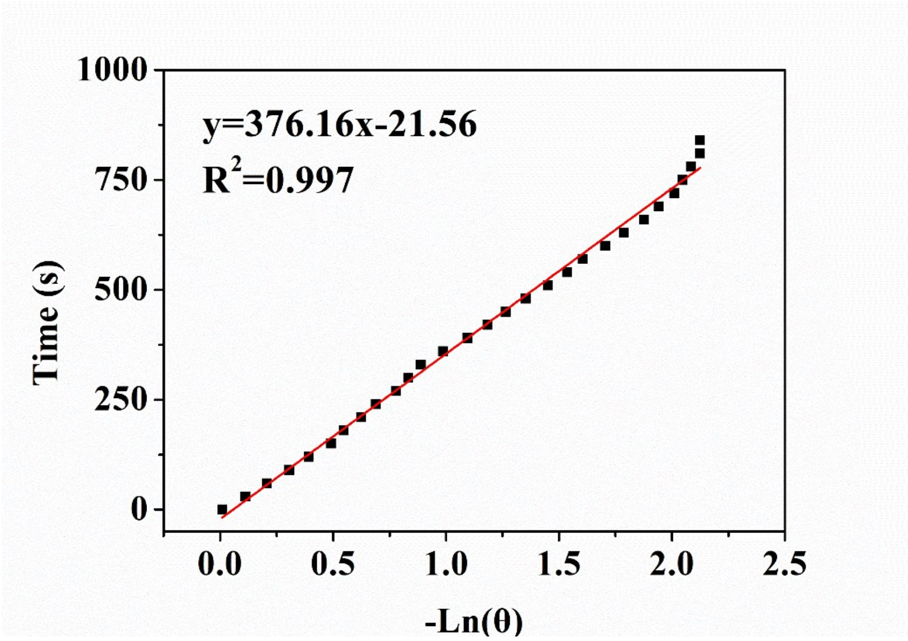

Figure S4 Linear time data from the cooling period versus negative natural logarithm of driving force temperature.