Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Platinum Nanoworms for Imaging-guided Combined Cancer Therapy in the Second Near-Infrared Window

Qingxi Ma[1], Liang Cheng[2]*, Fei Gong[2], Ziliang Dong[2], Chao Liang[2], Mengyun Wang[3], Liangzhu Feng[2], Yonggang Li[3], Zhuang Liu[2], Can Li[1]*, and Lin He[1]

[1]Bio-X Institutes, Key Laboratory for the Genetics of Developmental and Neuropsychiatric Disorders (Ministry of Education), Shanghai Jiao Tong University, Shanghai 200030, China

[2]Institute of Functional Nano & Soft Materials (FUNSOM), Collaborative Innovation Center of Suzhou Nano Science and Technology, the Jiangsu Key Laboratory for Carbon-Based Functional Materials & Devices, Soochow University, Suzhou, Jiangsu 215123, China.

[3]Department of Radiology the First Affiliated Hospital of Soochow University Suzhou, Jiangsu, 215006, China.

E-mail: lcheng2@suda.edu.cn; lican@live.cn

Calculation of the Photothermal Conversion Efficiency

The photothermal conversion efficiency was calculated according to a previous report[1].

The calculation was according to the following eqution:

$$\eta = \frac{hS(T_{Max} - T_{Surr}) - Q_{Dis}}{I(1 - 10^{-A_{1064}})} \quad \text{(E-1)}$$

Where **η** is the photothermal conversion efficiency

h is heat transfer coefficient;

S is the surface area of the container;

$\mathbf{T}_{Max}$ is the equilibrium temperature;

$\mathbf{T}_{Surr}$ is ambient temperature of the surroundings;

$\mathbf{Q}_{Dis}$ is heat dissipated from light absorbed by the quartz sample cell itself (it was measured independently to be 147.15 mW using a quartz cell containing pure water;

I is incident laser power (0.75 W/cm^2)

$\mathbf{A}_{1064}$ is the optical absorbance of the Pt nanoparticles at 1064nm (1.54)

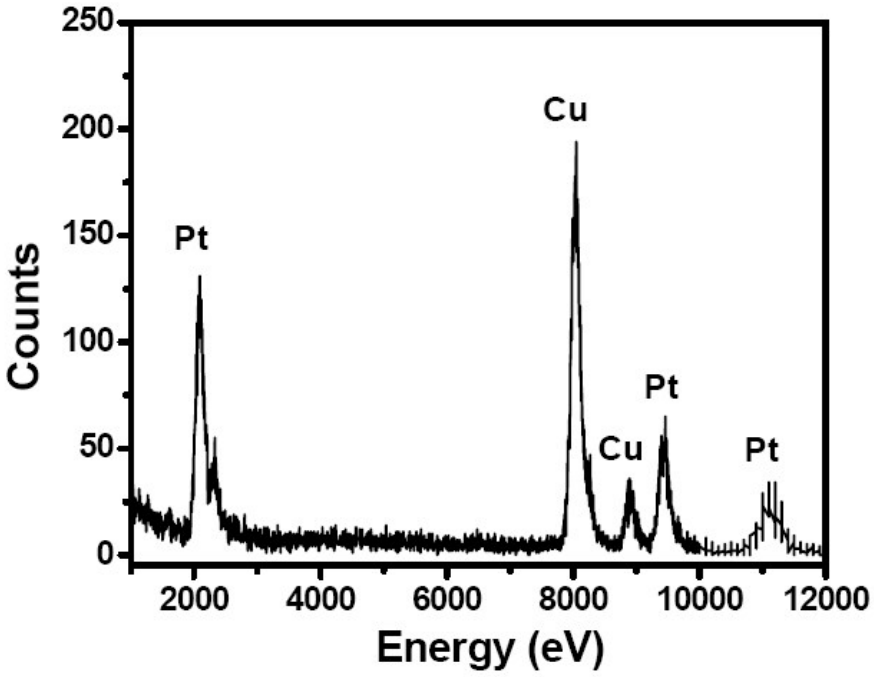
The $\boldsymbol{\tau}_S$ is calculated to be 310.14s according to the linear time data from the cooling stage versus negative natural logarithm of driving force temperature.

The **hS** was calculated to be 0.0135 W/℃ according to the following eqution:

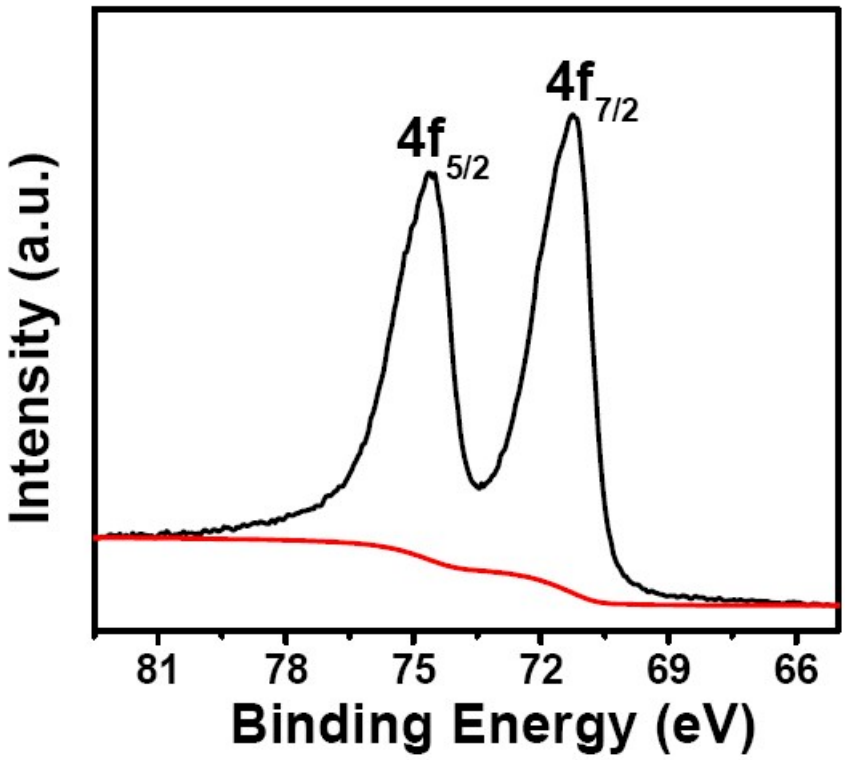
$$hS = \frac{\sum_i m_i C_{p,i}}{\tau_S} \quad \text{(E-2)}$$

Finally, the photothermal conversion efficiency, η was calculated to be 38.9 % by substituting **hS** in to equation E-1.

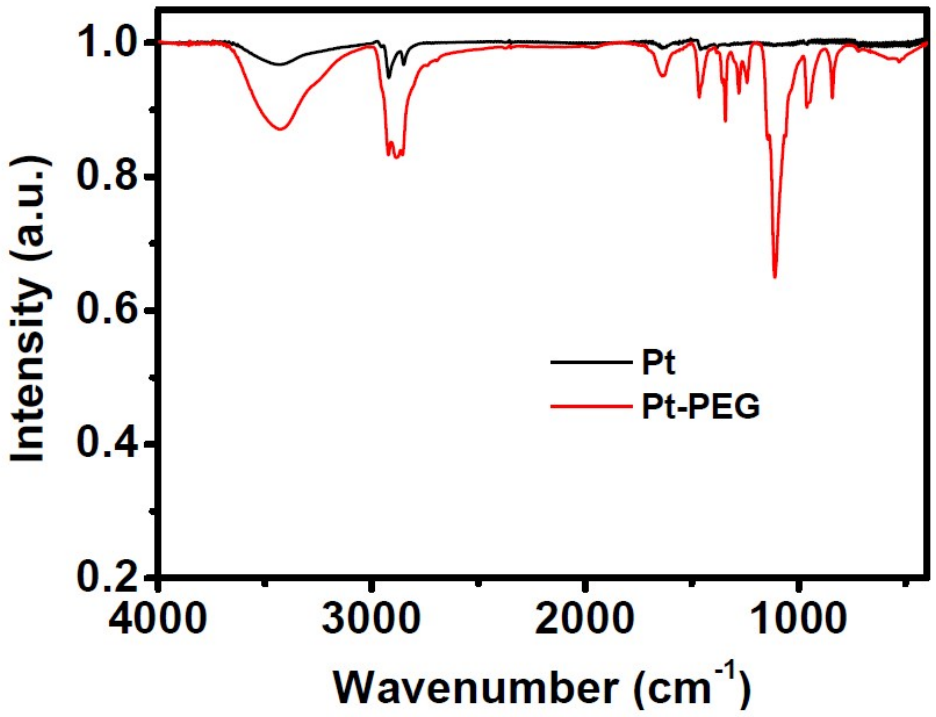
[1] Chen Y, Cheng L, Dong Z, Chao Y, Lei H, Zhao H, et al. Degradable vanadium disulfide nanostructures with unique optical and magnetic functions for cancer theranostics. Angew. Chem. Int. Ed. 2017;129:13171-6.



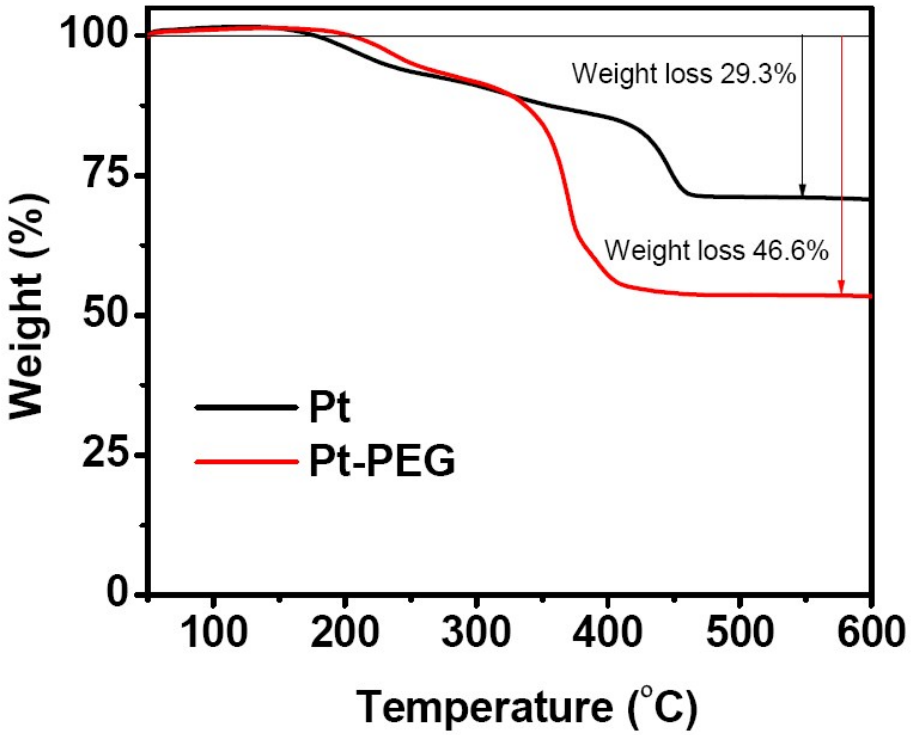
Supporting Figure S1. EDX spectrum of the synthesized Pt nanoworms.



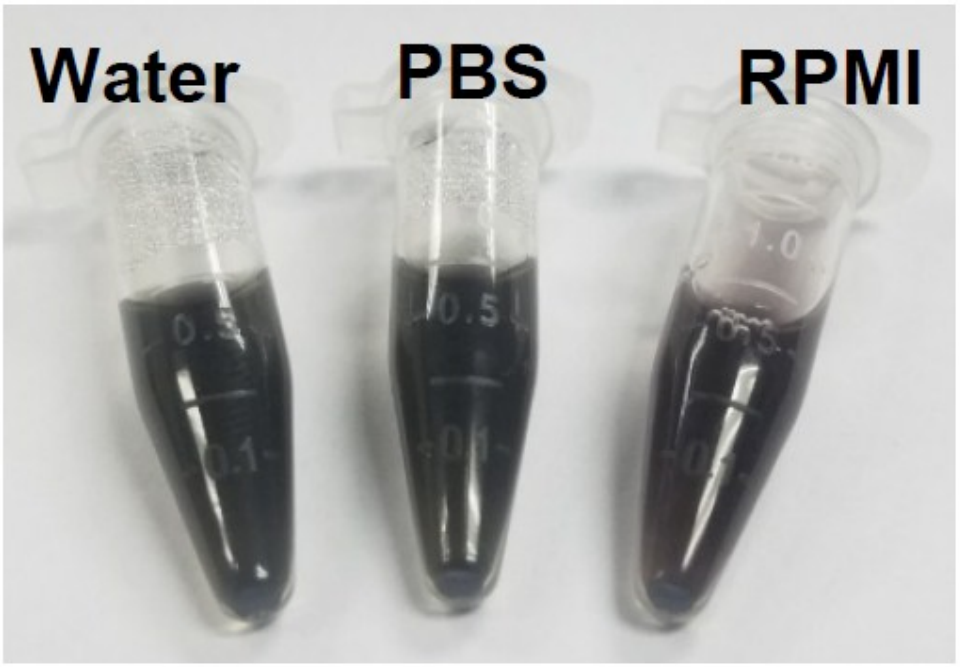
Supporting Figure S2. XPS spectra of the Pt nanoworms.



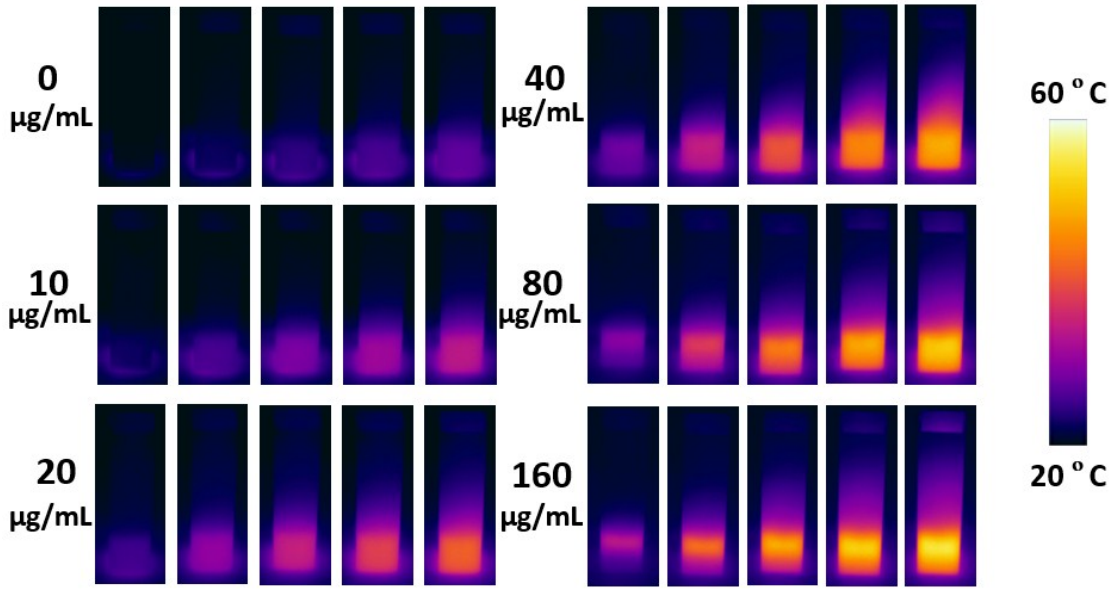
Supporting Figure S3. FTIR spectrum of Pt and Pt-PEG nanoworms.



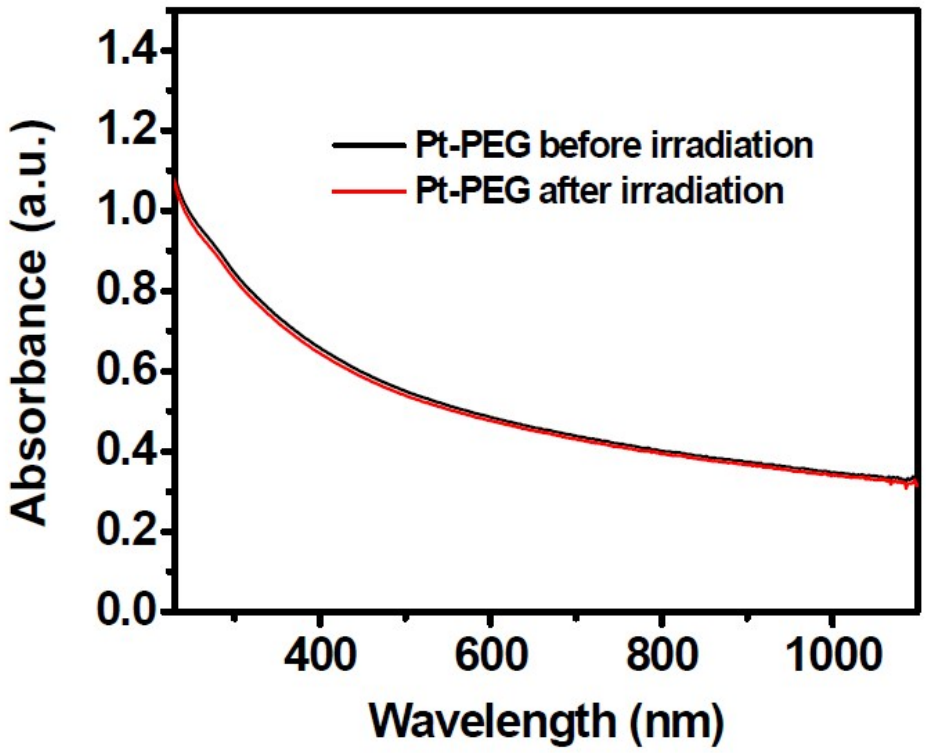
Supporting Figure S4. TGA spectra of Pt and Pt-PEG nanoworms.



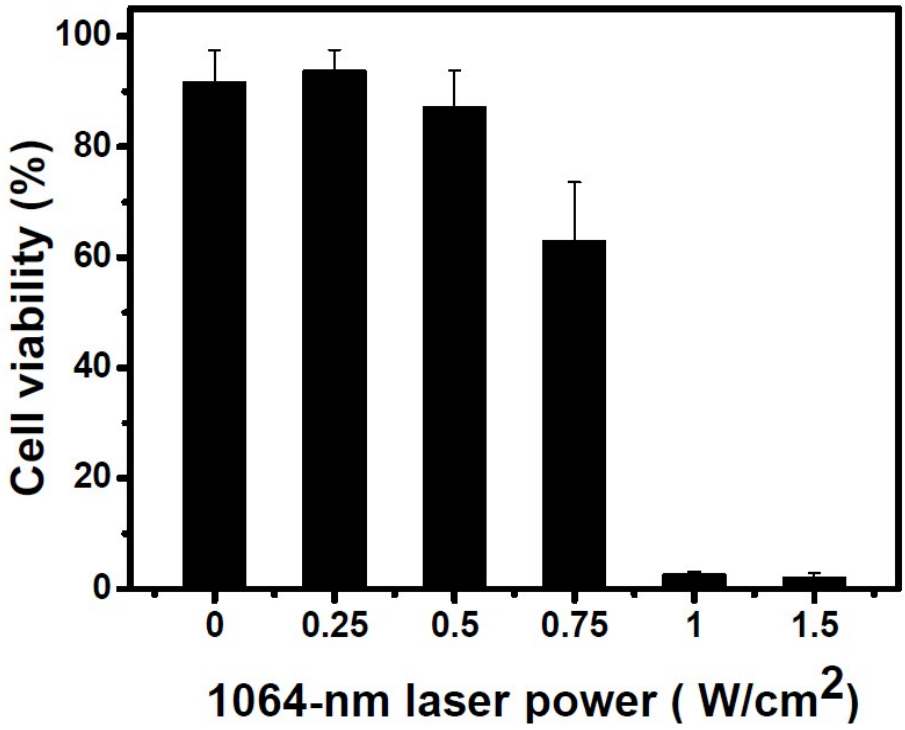
Supporting Figure S5. Photographs of the Pt-PEG nanoworms in water (left), PBS (middle) and RPMI culture medium containing 10% FBS (right) after 24 hours' standing.



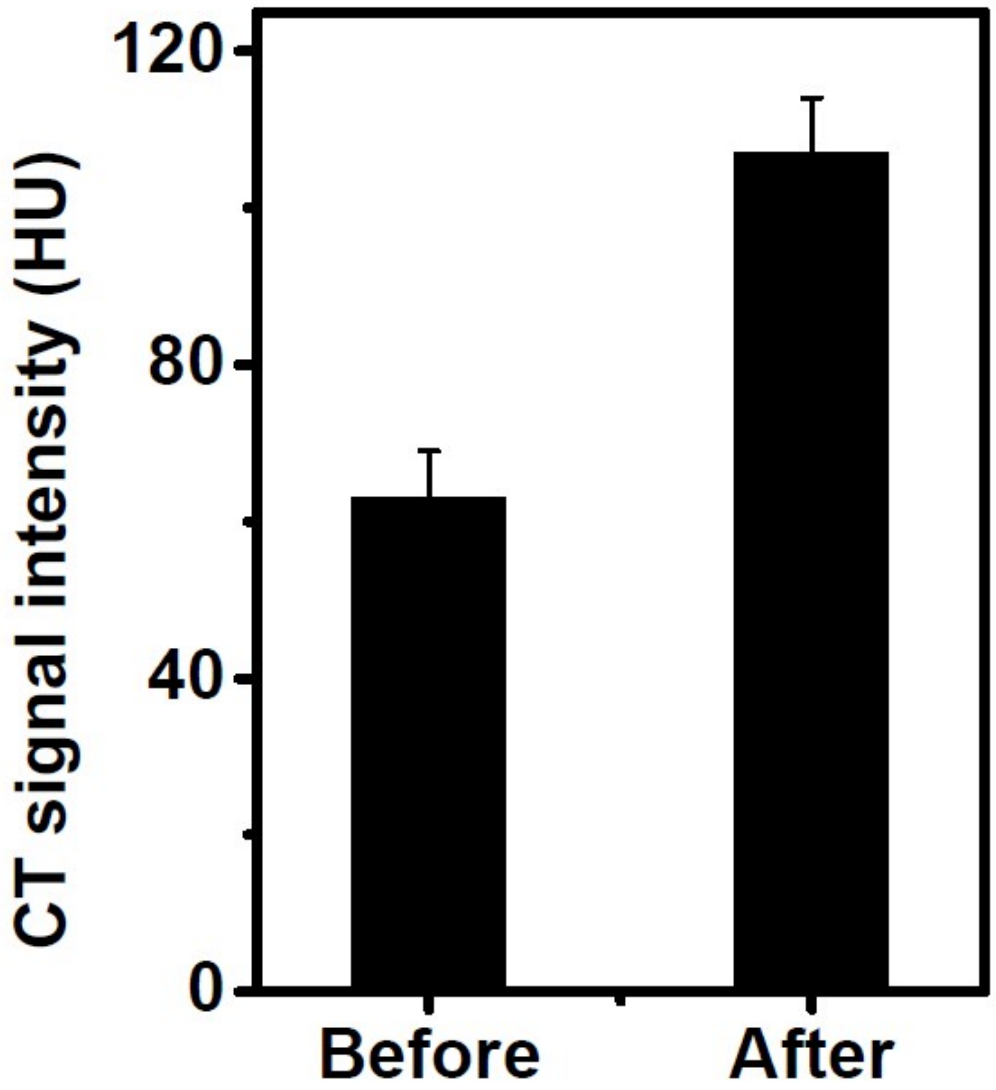
Supporting Figure S6. FTIR images of the Pt-PEG nanoworms at different concentrations (0-160 μg/mL) irradiated with the 1064-nm laser at the power density of 0.75 W/cm^2 for 5 min.



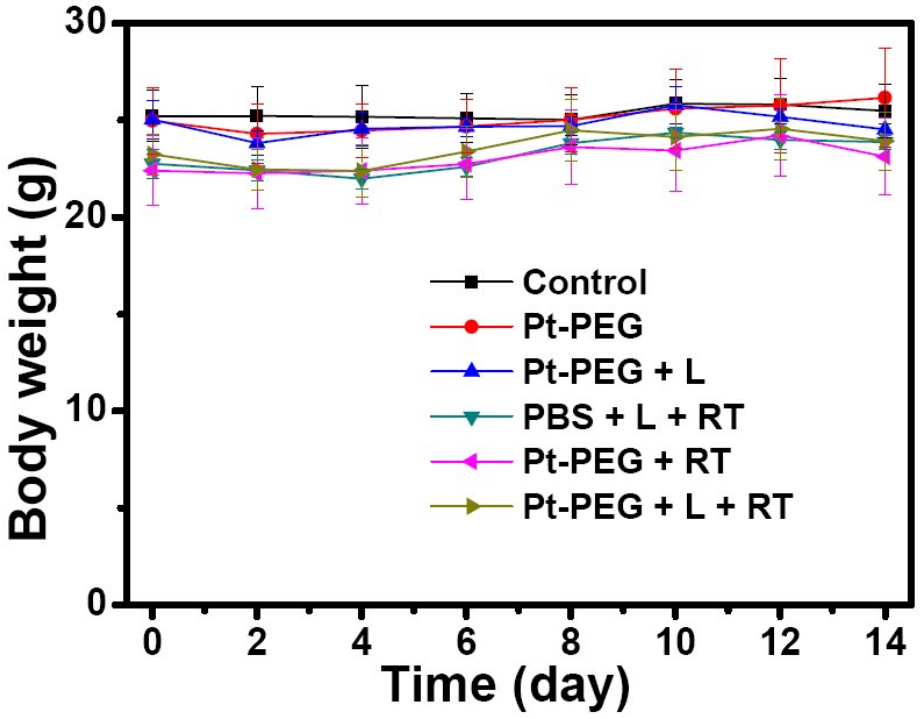
Supporting Figure S7. The UV-vis–NIR absorbance spectra of Pt nanoworms before and after irradiation with 1064-nm laser (0.75 W/cm^2, 5 min).



Supporting Figure S8. Relative cell viabilities of 4T1 cells after incubation with Pt-PEG nanoworms (80 μg/mL) and irradiation with the 1064-nm laser at varied power densities.



Supporting Figure S9. CT signal intensity of the tumor of the mice before and after injection of the Pt-PEG nanoworms (16 mg/kg).



Supporting Figure S10. Body weight curves of six groups of mice after various treatments during a 14-day therapy.