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

Supporting Information

Photothermally Enhanced Photodynamic Therapy Based on Mesoporous Pd@Ag@*m*SiO_2 Nanocarriers

*Saige Shi, Xianglong Zhu, Zengxia Zhao, Weijun Fang, Mei Chen, Yizhuan Huang and Xiaolan Chen**

Department of Chemistry, College of Chemistry and Chemical Engineering, Xiamen University, Xiamen 361005, China

E-mail: chenxl@xmu.edu.cn.

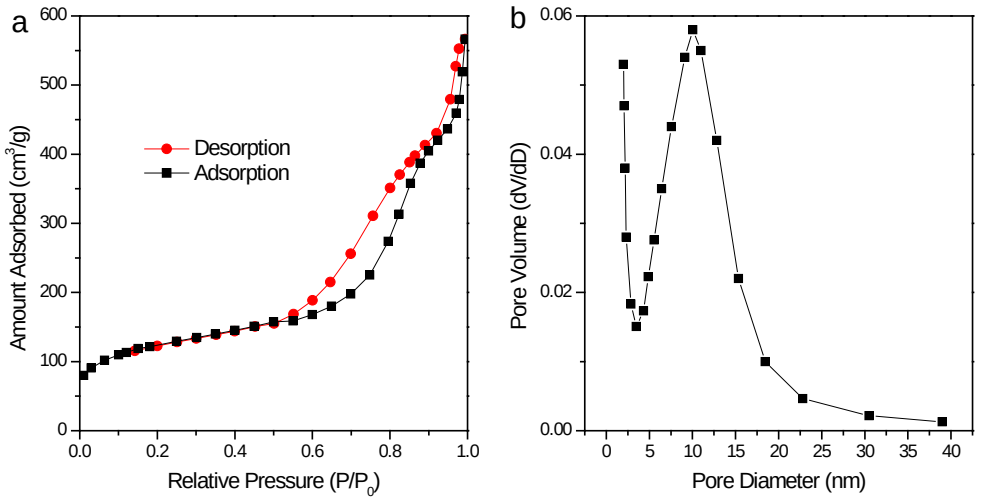

Figure S1. N_2 adsorption / desorption isotherm and the pore size distribution (inset) of Pd@Ag@*m*SiO_2 nanoparticles. Pore volume: 0.893 m^3/g; surface area: 445 m^2/g; macro pore size: ~10.1 nm.

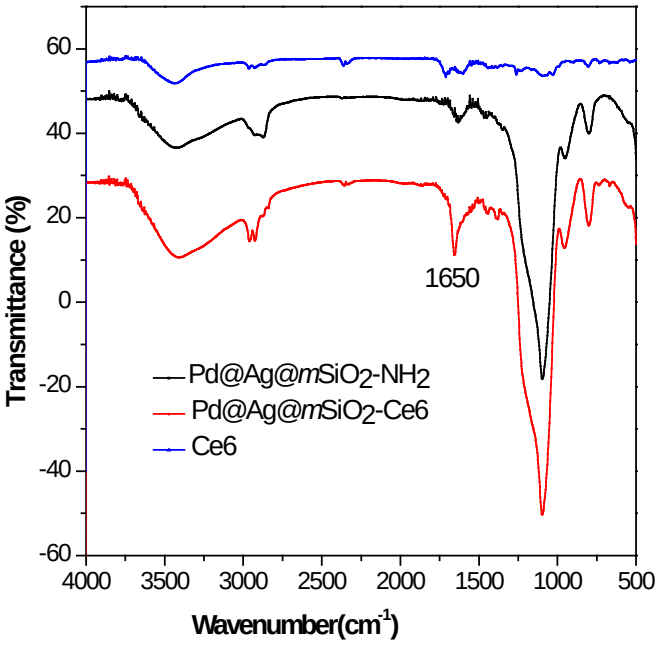

Figure S2. FTIR spectra of Pd@Ag@*m*SiO_2-NH_2, Pd@Ag@*m*SiO_2-Ce6 nanoparticles and Ce6. There is a strong absorption band at about 1650 cm^{-1}, which might contain the amide I (1650 cm^{-1}, carbonyl stretch) and amide II (1540 cm^{-1}, CN stretch and NH bend).

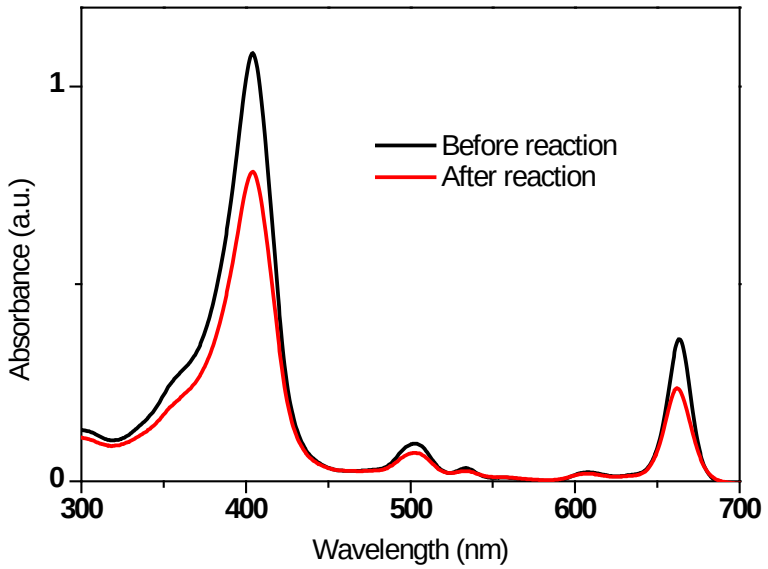

Figure S3. Absorption spectra showing the change of absorption intensity of the solutions of Ce6 before and after reacted with Pd@Ag@*m*SiO_2-NH_2 nanoparticles.

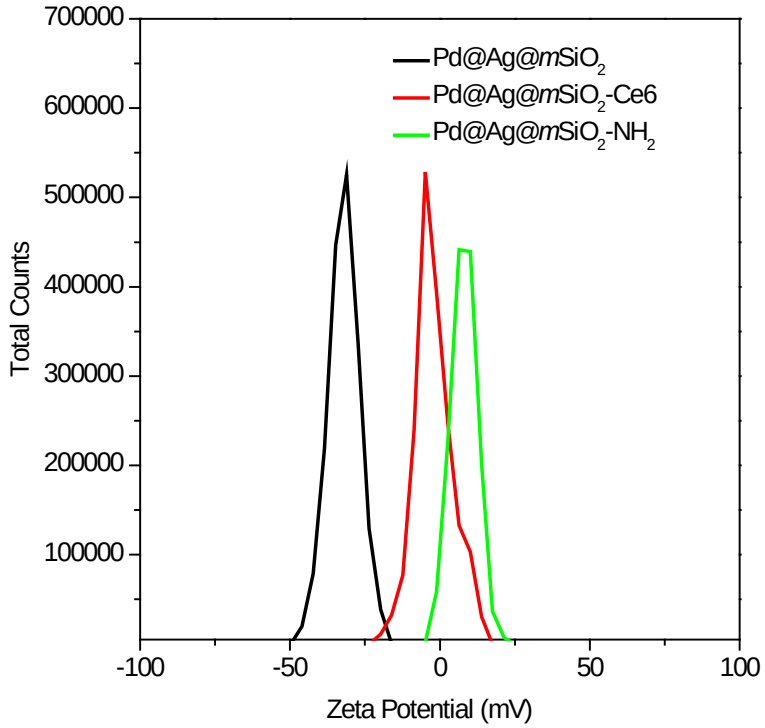

Figure S4. Zeta potentials of Pd@Ag@mSiO$_2$, Pd@Ag@mSiO$_2$-NH$_2$ and Pd@Ag@mSiO$_2$-Ce6 nanoparticles in aqueous solutions at pH 7.4.

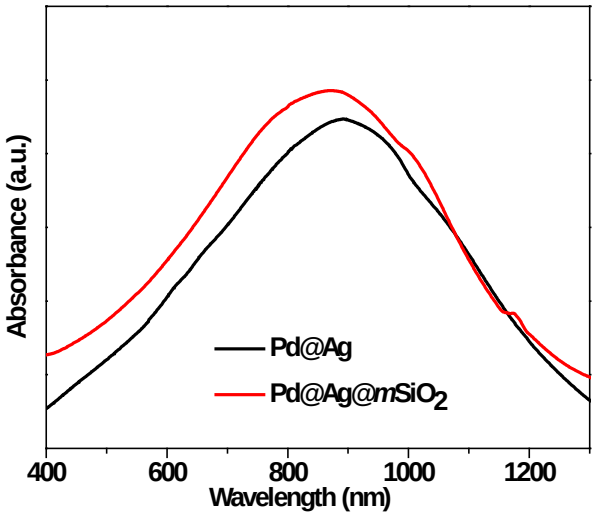

Figure S5. Visible/NIR spectra of Pd@Ag nanoplates and Pd@Ag@mSiO$_2$ nanoparticles.

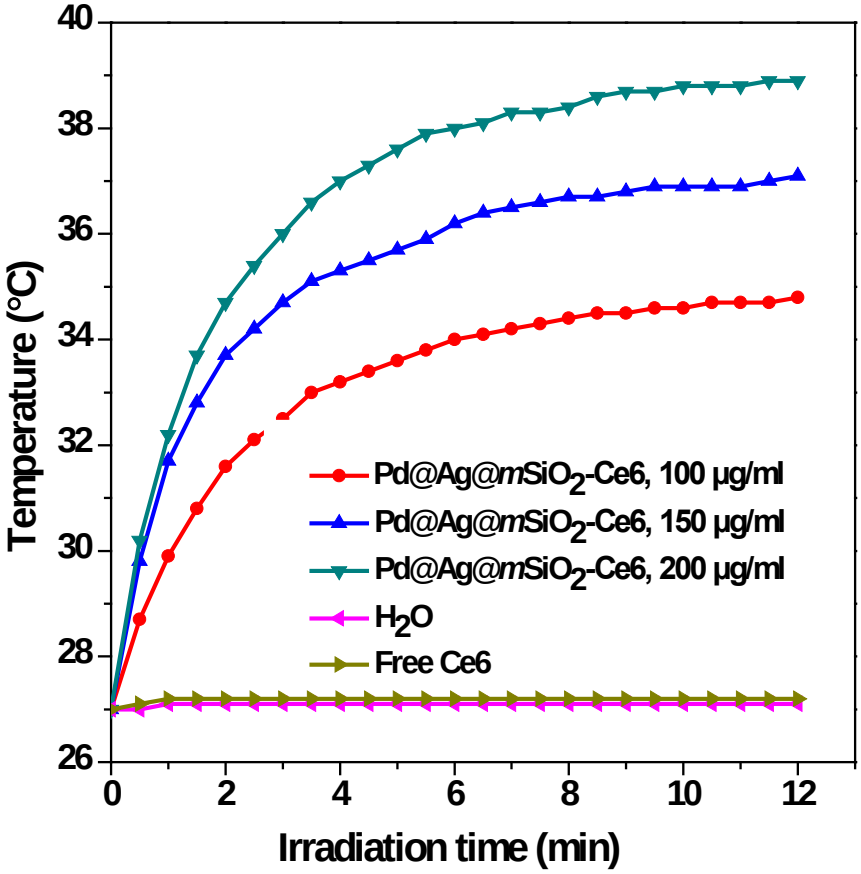

Figure S6. Temperature versus time plots of 1 ml solutions containing Pd@Ag@mSiO$_2$-Ce6 nanoparticles at various concentrations under laser irradiation of 1W at 808 nm. H_2O and free Ce6 used as controls.

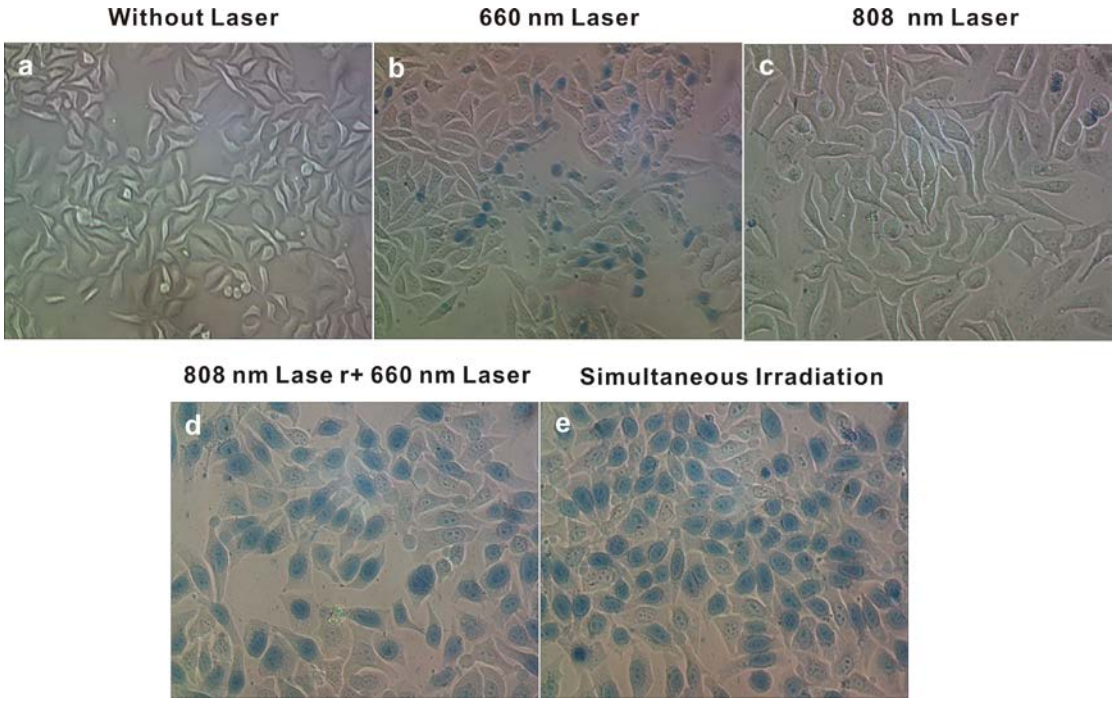

Figure S7. Tyrpan blue stained images of HeLa cells incubated with Pd@Ag@*m*SiO_2-Ce6 nanoparticles at 90 μg/ml after various laser treatments. a) without laser; b) 660 nm laser for 5 min; c) 808 nm laser for 5 min; d) first 808 nm laser for 5 min, then 660 nm laser for 5 min; e) simultaneous irradiation by both 808 nm and 660 nm lasers for 5 min. The power densities for 660 nm and 808 nm lasers are 0.1 W/cm^2 and 1 W/cm^2, respectively.

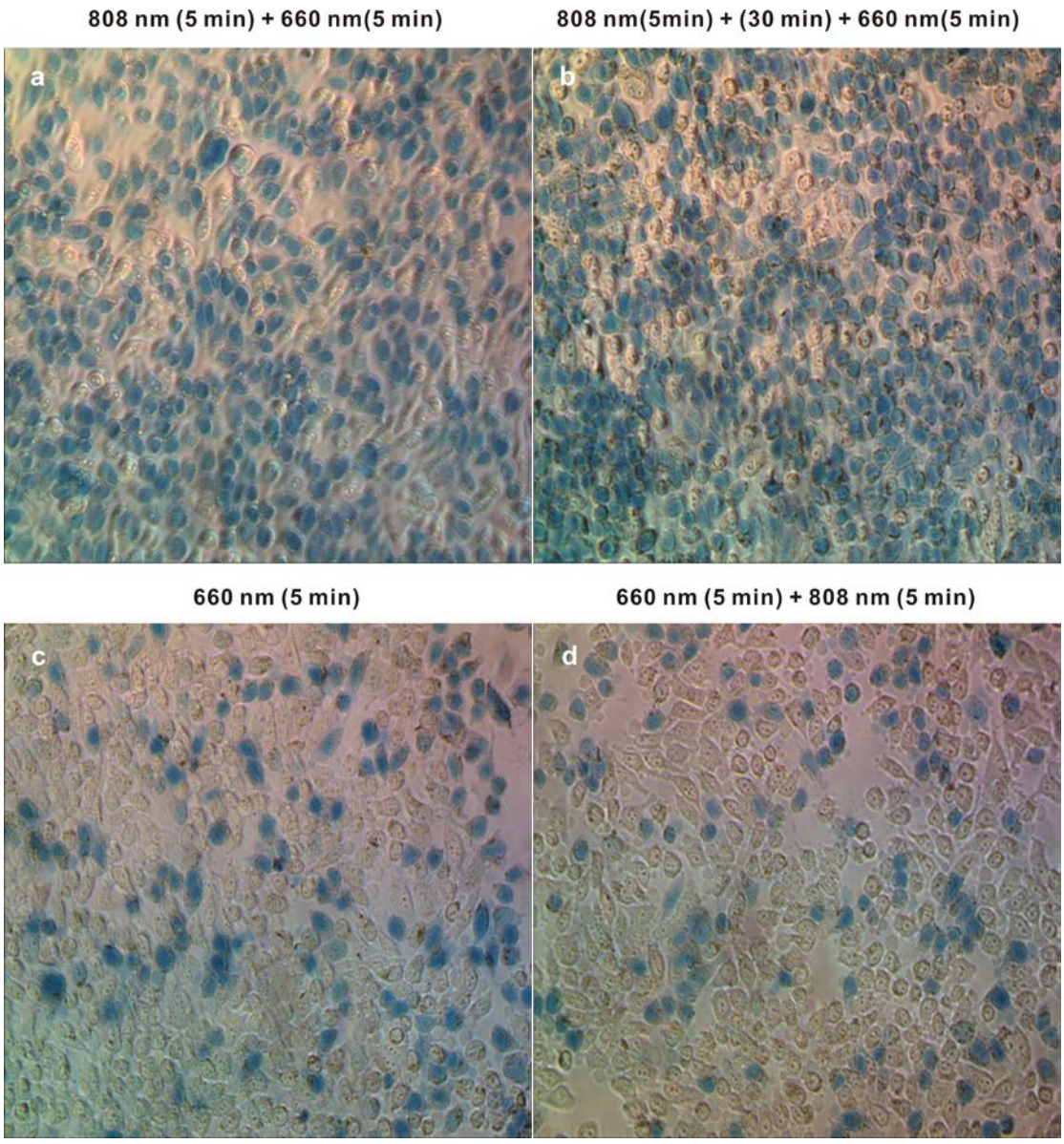

Figure S8. Tyrpan blue stained images of HeLa cells incubated with Pd@Ag@*m*SiO_2-Ce6 nanoparticles at 120 μg/ml after various laser treatments. a) first 808 nm laser (1W/cm^2) for 5 min, then 660 nm laser (0.1W/cm^2) for 5 min. b) 808 nm for 5 min, staying at room temperature for 30 min, then 660 nm for 5 min. c) 660 nm laser for 5 min. d) 660 nm for 5 min, then 808 nm for 5 min.

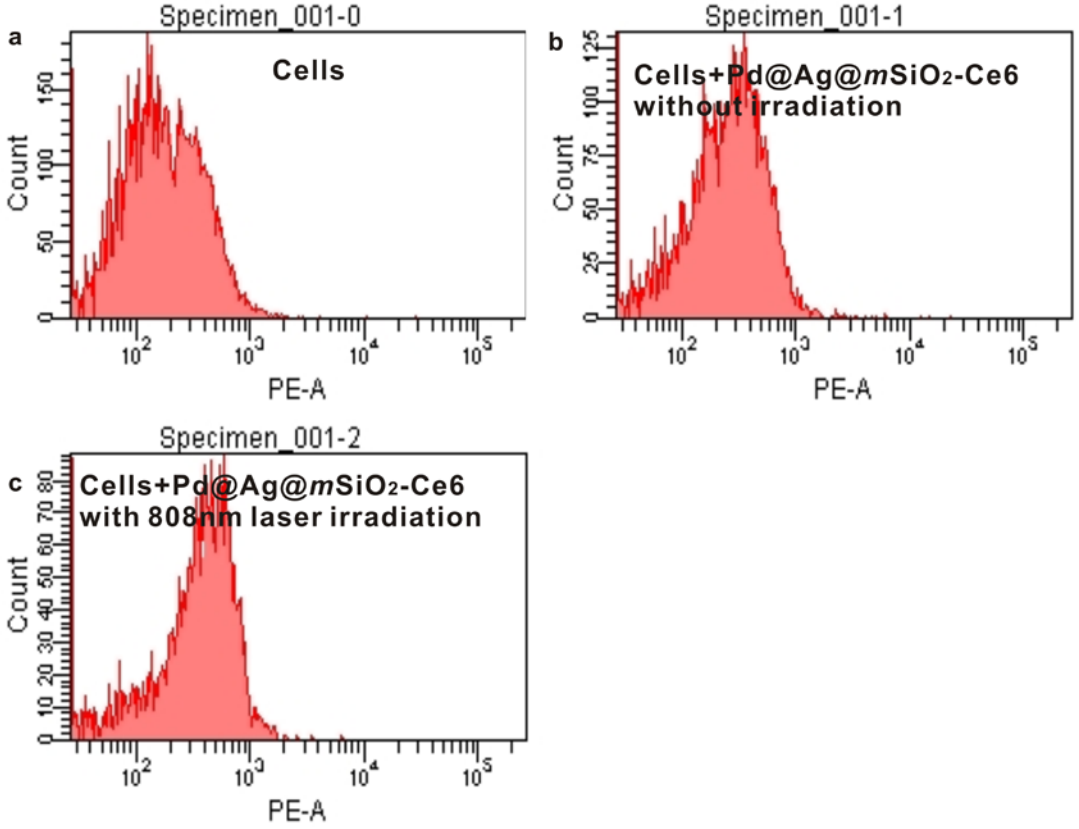

Figure S9. Flow cytometry measurements confirming higher Ce6 fluorescence in cells incubated with Pd@Ag@*m*SiO_2-Ce6 nanoparticles with 808 nm laser irradiation (0.4 W/cm^2) for 15 min than at 37 ºC without light irradiation. Untreated HeLa cells is shown for comparison.

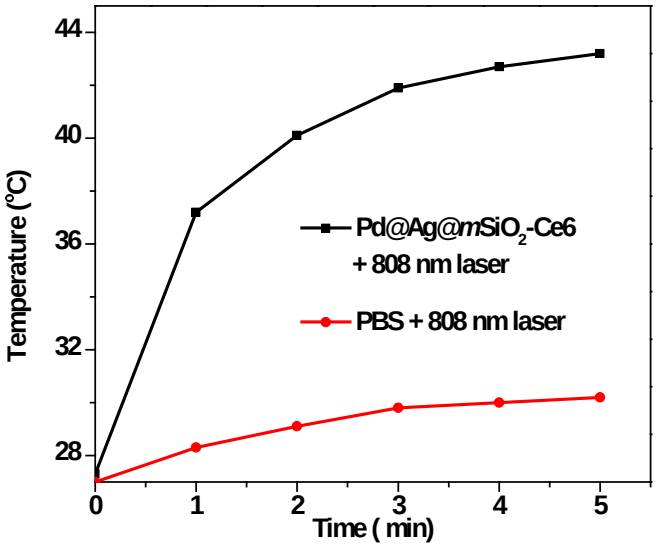

Figure S10. Temperature change of the tumor site with irradiation by 808 nm laser (1 W/cm^2).

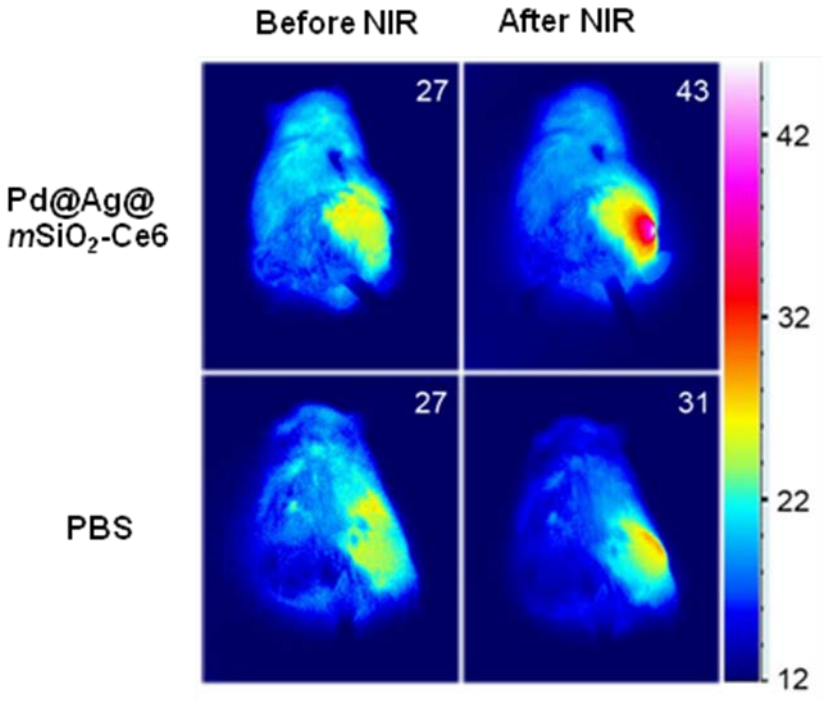

Figure S11. IR images of the tumor sites with irradiation by 808nm laser (1 W/cm^2).

Table S1. Summary of the treatments applied to mice for comparative therapeutic efficacy study. The material was intra-tumorally injected into each S180 tumor-bearing mouse.

Group	**Injected material**	**Concentration of material**	**Dosage of injection**	**Laser exposure**
1	PBS		125 μl	Simultaneous irradiation by 808 nm (1W/cm^2, 5 min) and 660 nm (0.1 W/cm^2,5 min)
2	Pd@Ag@*m*SiO$_2$-Ce6	150 μg/ml	125 μl	
3	Pd@Ag@*m*SiO$_2$-Ce6	150 μg/ml	125 μl	660 nm (0.1 W/cm^2,5 min)
4	Pd@Ag@*m*SiO$_2$-Ce6	150 μg/ml	125 μl	808 nm (1W/cm^2, 5 min)
5	Pd@Ag@*m*SiO$_2$-Ce6	150 μg/ml	125 μl	Simultaneous irradiation by 808 nm (1W/cm^2, 5 min) and 660 nm (0.1 W/cm^2,5 min)