Rational Design of a Comprehensive Cancer Therapy Platform Using Temperature-Sensitive Polymer Grafted Hollow Gold Nanospheres: Simultaneous Chemo / Photothermal / Photodynamic Therapy Triggered by a 650 nm Laser with Enhanced Anti-Tumor Efficacy

Xiaoran Deng, a,c Yinyin Chen, a,c Ziyong Cheng, a,* Kerong Deng, a,c Ping’an Ma, a
Zhiyao Hou, a,* Bei Liu, a,c Shanshan Huang, a Dayong Jin b and Jun Lin a,*

a State Key Laboratory of Rare Earth Resource Utilization, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun 130021, P. R. China;
b Institute for Biomedical Materials and Devices, Faculty of Science, University of Technology Sydney, NSW, 2007, Australia;
c University of Chinese Academy of Sciences, Beijing, 100049, China.

E-mail address: jlin@ciac.ac.cn; zycheng@ciac.ac.cn; zhou@ciac.ac.cn
Fig. S1. Wide-angle XRD patterns of as-made HAuNs and the standard JCPDS card 04-0784 of Au.
Fig. S2. The chemical reacting equations and $^1$H-NMR spectra of temperature-sensitive polymer $p$(OEGMA-co-MEMA).
Fig. S3 N$_2$ absorption/desorption isotherm and pore width (insert) of the HAuNs.
Fig. S4 FT-IR spectra of temperature-sensitive polymer p(OEGMA-co-MEMA).
Fig. S5 The zeta potential and hydrodynamic diameter of HAuNS, HAuNS-p(OEOMA-co-MEMA) and HAuNSs-p(OEOMA-co-MEMA)-Ce6 nanocomposite at different temperature.
Fig. S6 The curve of light transmittance of p(OEGMA-co-MEMA) in PBS solution and serum with different temperature.
Fig. S7 Absorbance changes of DPBF treated with 650 nm laser irradiation for different times.
Fig. S8 In vitro L929 cells’ relative viabilities after incubation for 24 h with HAuNs-p(OEGOMA-co-MEMA)-Ce6-DOX nanocomposites at different concentrations at 37 oC and pH=7.4. The nanocomposites concentrations were 62.5, 125, 250, 500, 1000 μg/mL, respectively. Error bars indicate standard deviations, N = 4.
**Fig. S9** *In vivo* change in body weight (A) achieved from normal mice after twice intravenously injection with PBS and HAuNs-p(OEGMA-co-MEMA)-Ce6 nanocomposites at day 1 and 7. Blood analysis data for mice (B) and hematoxylin and eosin (H&E) stained images of major organs of mice (C) 21 days after two doses intravenously injection with PBS and HAuNs-p(OEGMA-co-MEMA)-Ce6 nanocomposites. And the gray area is the normal range.
Fig. S10 Photographs of mice bearing tumor (A) and excised tumors from euthanized representative mice (B) (the photographs a-l are the groups HAuNs-p(OEOMA-co-MEMA)-Ce6-DOX (a), HAuNs-p(OEOMA-co-MEMA)-Ce6 (b), HAuNs-p(OEGMA-co-MEMA)-DOX (c), free DOX (d), HAuNs-p(OEGMA-co-MEMA) (e), free Ce6 (f) and blank group (l) with laser irradiation and HAuNs-p(OEGMA-co-MEMA)-Ce6-DOX (g), HAuNs-p(OEGMA-co-MEMA)-DOX (h), HAuNs-p(OEGMA-co-MEMA)-Ce6 (i), HAuNs-p(OEGMA-co-MEMA) (j), free Ce6 (k) without laser irradiation).
Fig. S11 Hematoxylin and eosin (H&E) stained images of major organs of mice 13 days after two doses injection in situ (A) and blood analysis data for mice (B) treated with HAuNs-p(EGMA-co-MEMA)-Ce6-DOX, HAuNs-p(EGMA-co-MEMA)-Ce6, HAuNs-p(EGMA-co-MEMA)-DOX, HAuNs-p(EGMA-co-MEMA), free Ce6, free DOX with and without laser irradiation. And the gray area is the normal range.