Electronic Supplementary Information (ESI)

Rational Design of Fe₃O₄@C Nanoparticles for Simultaneous Bimodal Imaging and Photothermal Therapy in vitro and in vivo



Fig. S1 N_2 adsorption-desorption isotherm and pore size distribution curve (inset) of eccentric Fe₃O₄@C core-shell NPs.



Fig. S2 The EDX spectrum of Fe₃O₄@C core-shell NPs.



Fig. S3 XPS spectra of the Fe₃O₄@C core-shell NPs: (A) wide scan spectrum, and (B) Fe 2p.



Fig. S4 XRD patterns of (A) Fe₂O₃ NPs, (B) Fe₂O₃@PAA/SiO₂ core-shell NPs and (C) Fe₃O₄@C core-shell NPs.



Fig. S5 TEM image of hollow C nanospheres by etching $Fe_3O_4@C$ NPs using the diluted acid solution.



Fig. S6 TG curve of Fe₃O₄@C core-shell NPs.



Fig. S7 Hysteresis loop measurement of $Fe_3O_4@C$ core-shell NPs measured at a temperature of 300 K. Inset: photographs of $Fe_3O_4@C$ NPs solution (a) before and (b) after magnetic separation by an external magnetic field.



Fig. S8 The Raman spectrum of eccentric Fe₃O₄@C core-shell NPs.



Fig. S9 UV-Vis absorption spectra of the $Fe_3O_4@C$ core-shell NPs with different concentrations.



Fig. S10 TEM and SEM image of $Fe_3O_4@C$ core-shell NPs after four successive cycles of an on-and-off laser irradiation.



Fig. S11 (A) Photothermal effect of the irradiation of the aqueous dispersion of $Fe_3O_4@C$ core-shell NPs (0.4 mg mL⁻¹ 1 mL) with the NIR laser (808 nm, 1 W cm⁻²), in which the irradiation lasted for 10 min, and then the laser was turned off. (B) Time constant for heat transfer from the system is determined to be $\tau_s = 330.033$ s by applying the linear time data from the cooling period (after 10 min) versus negative

natural logarithm of driving force temperature.



Fig. S12 Confocal laser scanning microscopic (CLSM) images of HepG-2 cells incubated with free Dox and Dox loaded $Fe_3O_4@C$ core-shell NPs for different times.



Fig. S13 Quantitative measurement of Fe concentrations in each organ of the mice after injection of $Fe_3O_4@C$ core-shell NPs for different times.



Fig. S14 Changes of body weight of mice with different treatments in 11 days.



Fig. S15 Hematoxylin and eosin stained histological section of major organ tissues of mice.



Fig. S16 Hematoxylin and eosin stained histological section of tumors of mice with different treatments.