

## **H<sub>2</sub>O<sub>2</sub>-Independent Chemodynamic Therapy Initiated from Magnetic Iron Carbide Nanoparticle-Assisted Artemisinin Synergy**

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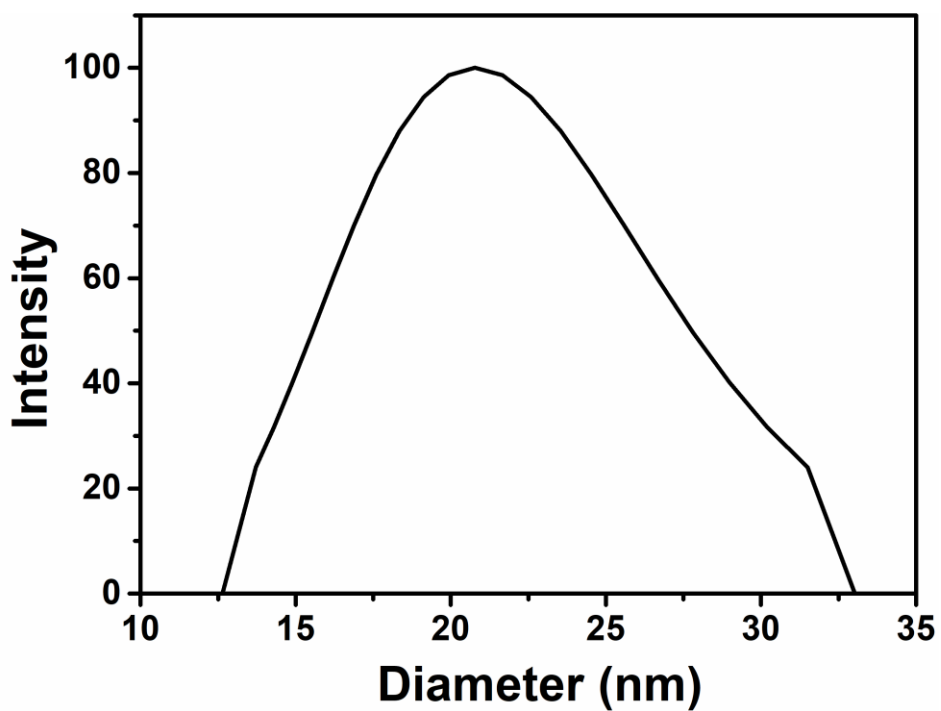


Figure S1. DLS spectrum of Fe<sub>2</sub>C@Fe<sub>3</sub>O<sub>4</sub> NPs.

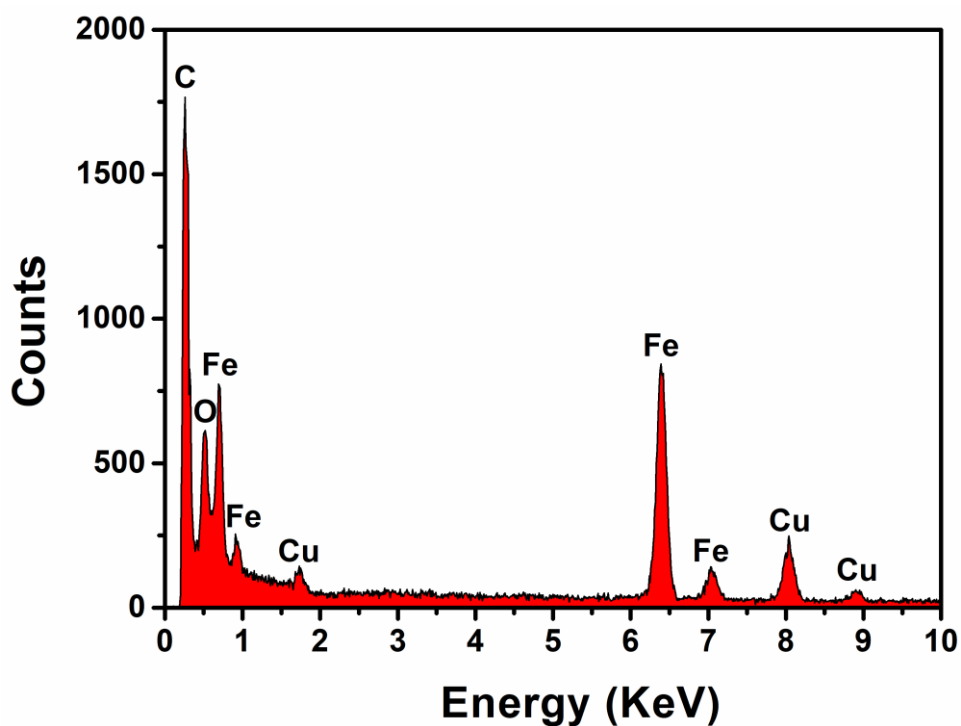


Figure S2. The energy spectrum of Fe<sub>2</sub>C@Fe<sub>3</sub>O<sub>4</sub> NPs.

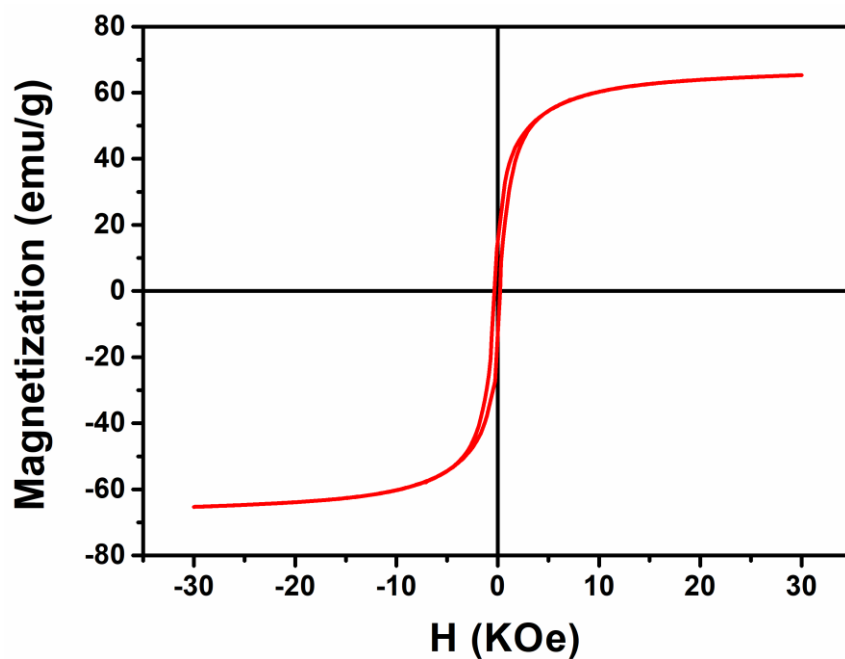


Figure S3. Room-temperature magnetic hysteresis loops of  $\text{Fe}_2\text{C}@Fe_3\text{O}_4$  NPs.

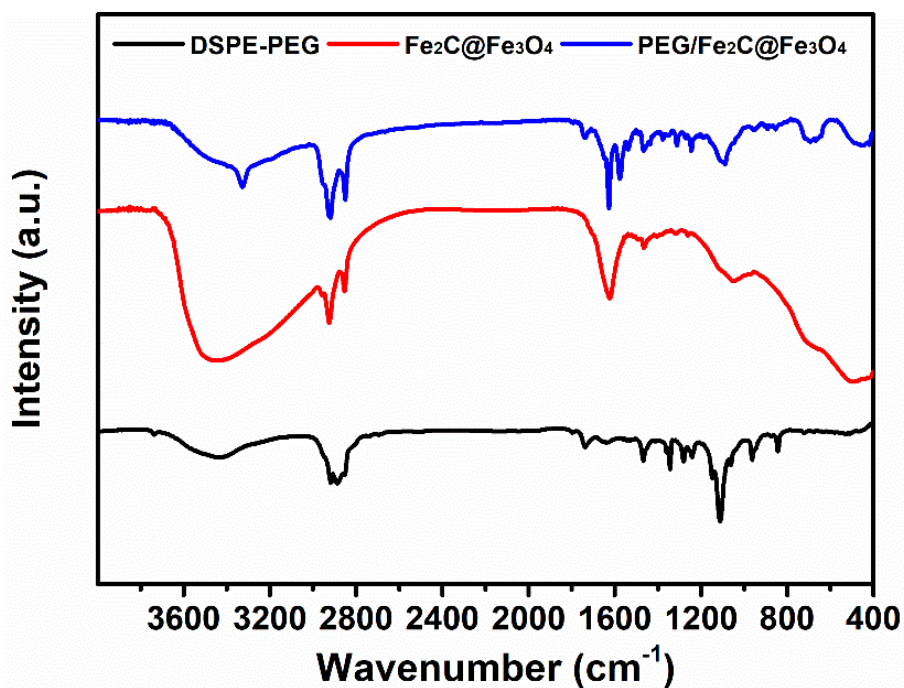
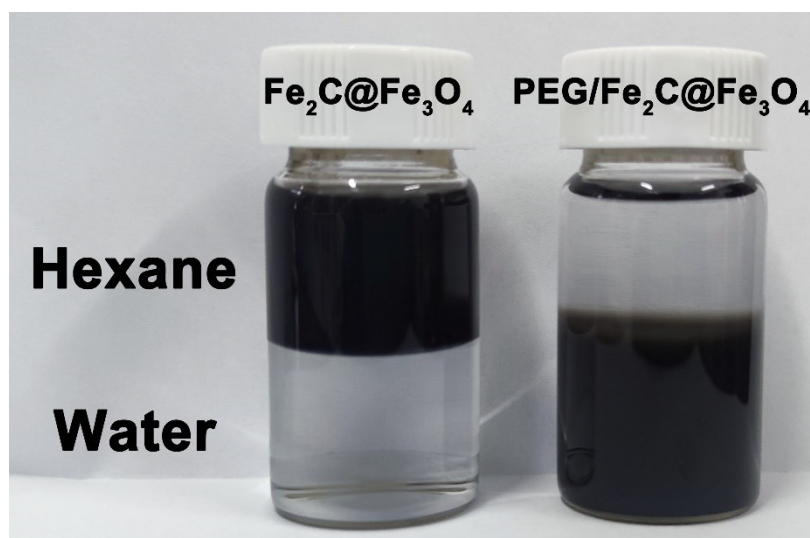
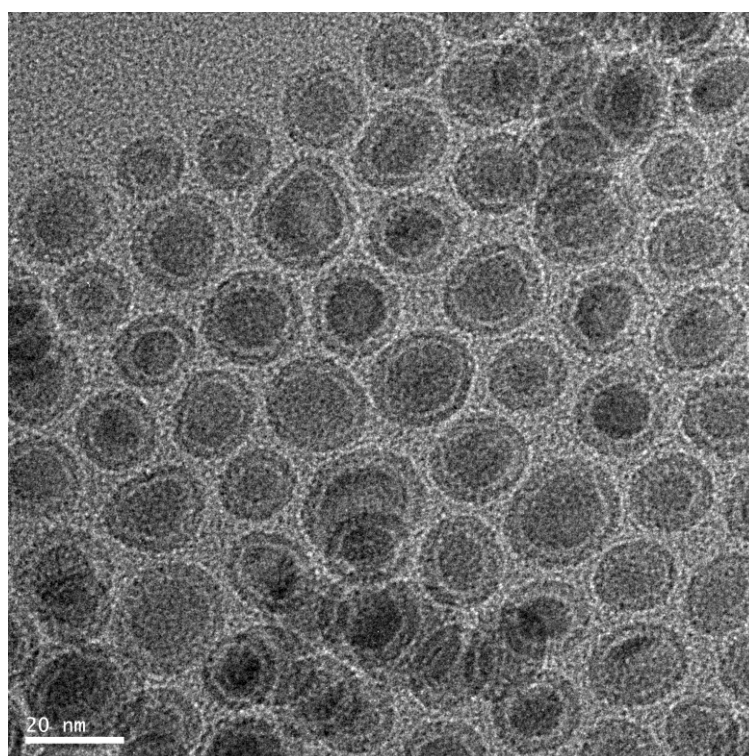


Figure S4. FT-IR spectra of DSPE-PEG,  $\text{Fe}_2\text{C}@Fe_3\text{O}_4$ , and PEG/ $\text{Fe}_2\text{C}@Fe_3\text{O}_4$  NPs.



**Figure S5.** Digital graph of  $\text{Fe}_2\text{C}@Fe_3O_4$  and  $\text{PEG}/Fe_2C@Fe_3O_4$  NPs dispersed in hexane or water.



**Figure S6.** TEM image of  $\text{PEG}/Fe_2C@Fe_3O_4$ .

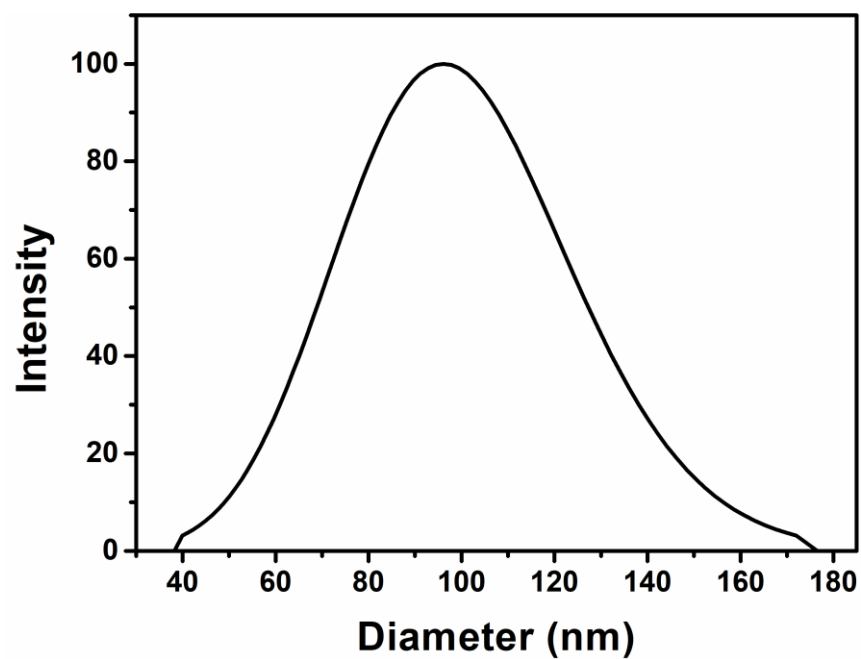


Figure S7. DLS spectrum of PEG/Fe<sub>2</sub>C@Fe<sub>3</sub>O<sub>4</sub> NPs.

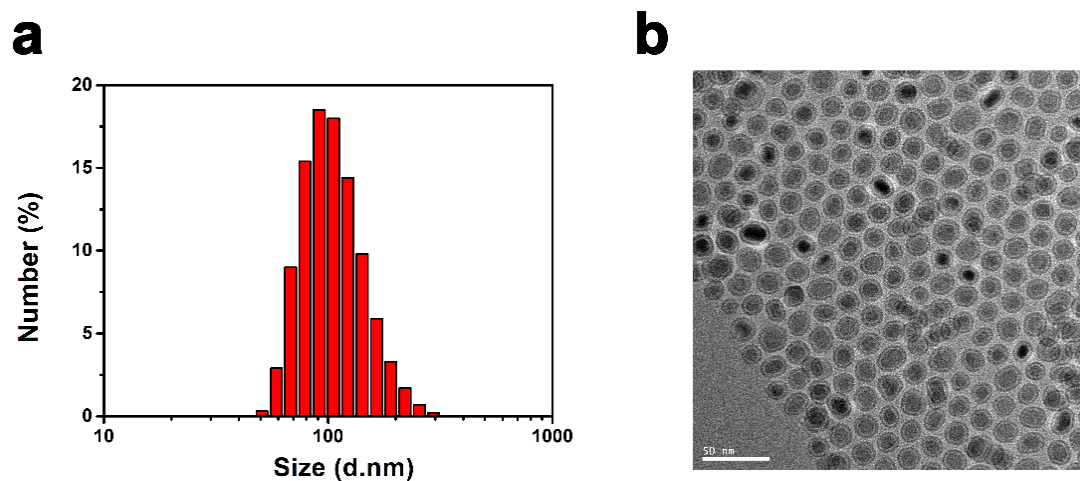
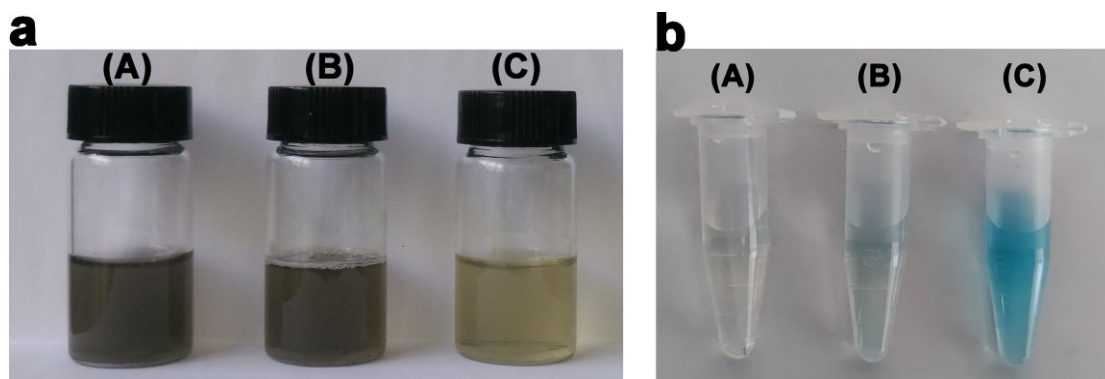
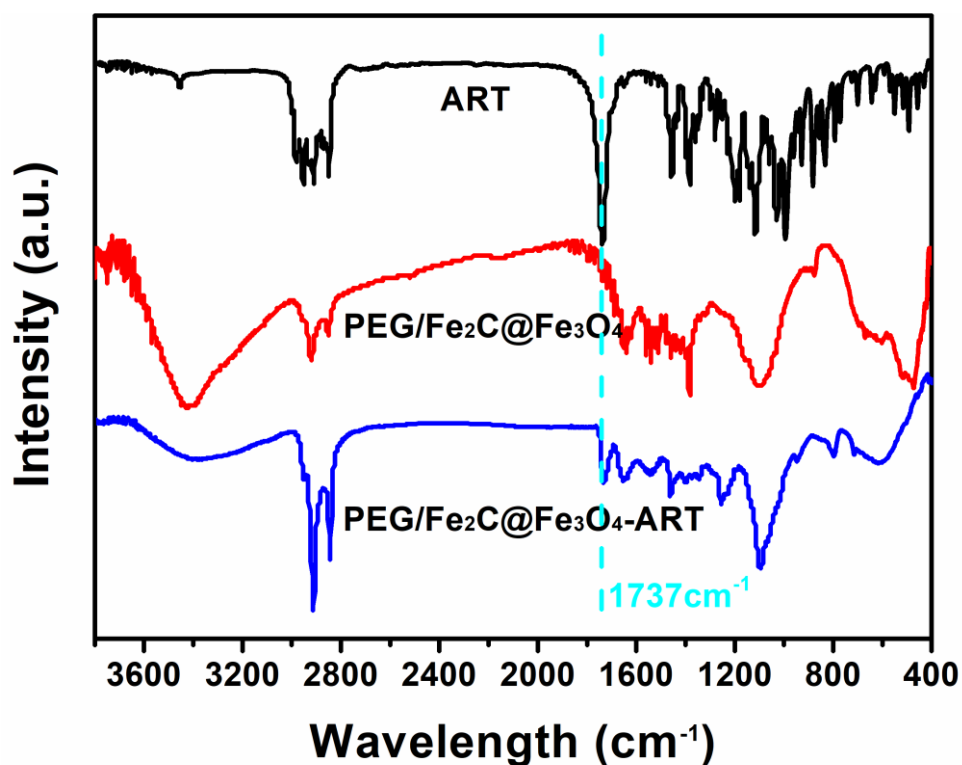


Figure S8. (a) DLS spectrum of PEG/Fe<sub>2</sub>C@Fe<sub>3</sub>O<sub>4</sub> NPs after 7 days storage. (b) TEM image of PEG/Fe<sub>2</sub>C@Fe<sub>3</sub>O<sub>4</sub> NPs after 7 days storage.



**Figure S9.** (a) Photo of PEG/Fe<sub>2</sub>C@Fe<sub>3</sub>O<sub>4</sub> NPs dispersing in (A) pH 7.4, (B) pH 6.5 and (C) pH 5.4 for 24 h. (b) Photo of potassium ferricyanide (Fe<sup>2+</sup> indicator) dispersed in the supernatant of PEG/Fe<sub>2</sub>C@Fe<sub>3</sub>O<sub>4</sub> NPs in (A) pH 7.4, (B) pH 6.5 and (C) pH 5.4.



**Figure S10.** FT-IR spectra of standard ART, PEG/Fe<sub>2</sub>C@Fe<sub>3</sub>O<sub>4</sub> NPs and ART-loaded PEG/Fe<sub>2</sub>C@Fe<sub>3</sub>O<sub>4</sub> NPs.



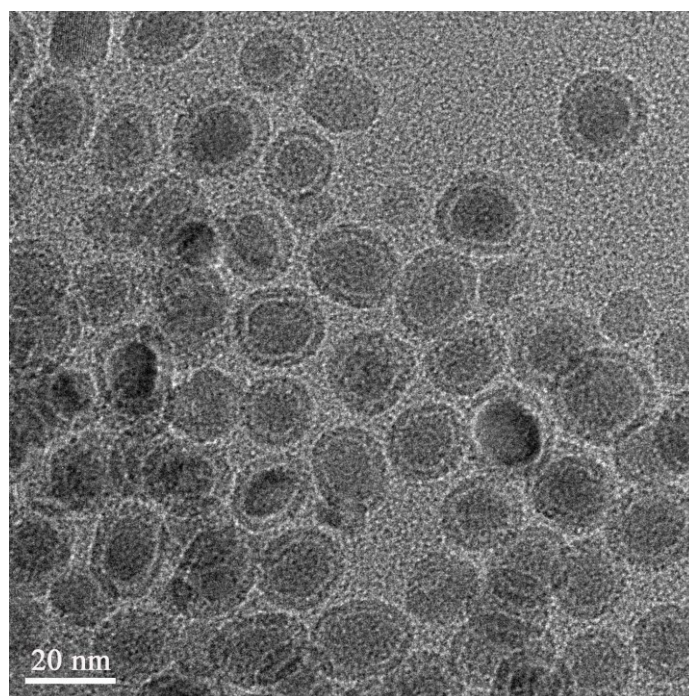


Figure S11. TEM image of PEG/Fe<sub>2</sub>C@Fe<sub>3</sub>O<sub>4</sub>-ART.

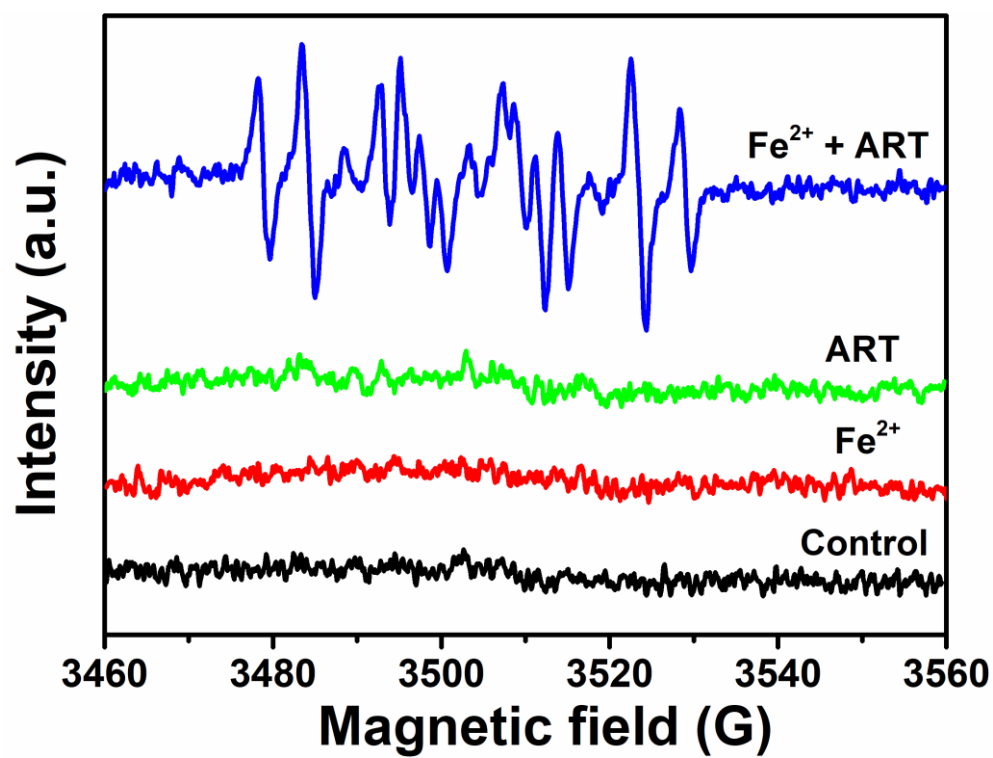
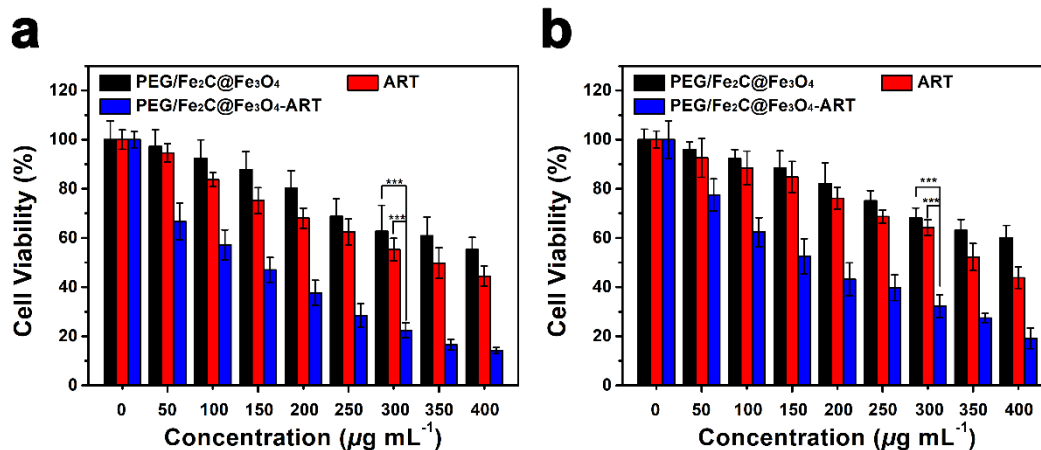
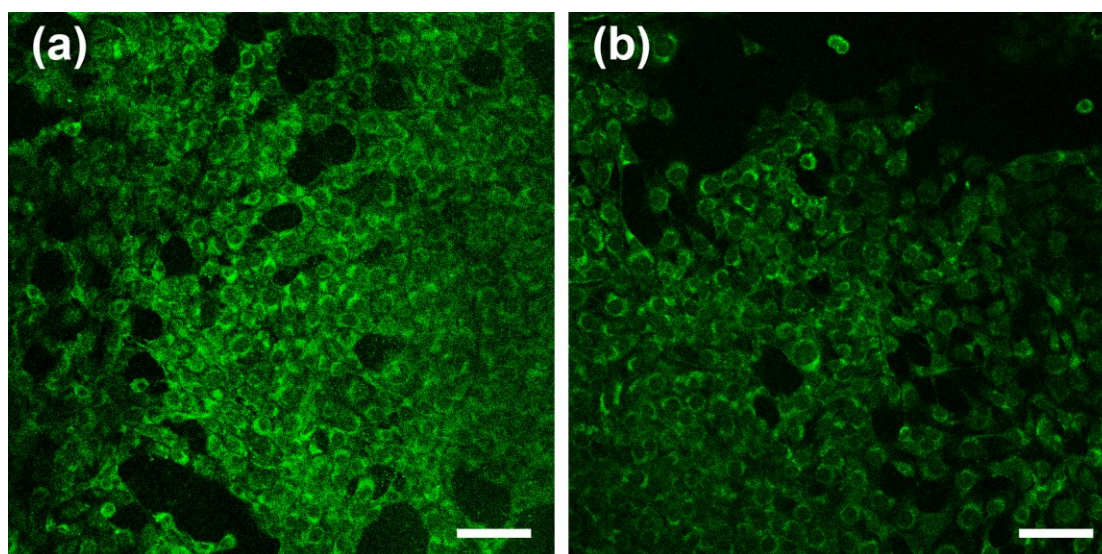


Figure S12. ESR measurements of free radical formation by ART with Fe<sup>2+</sup>.

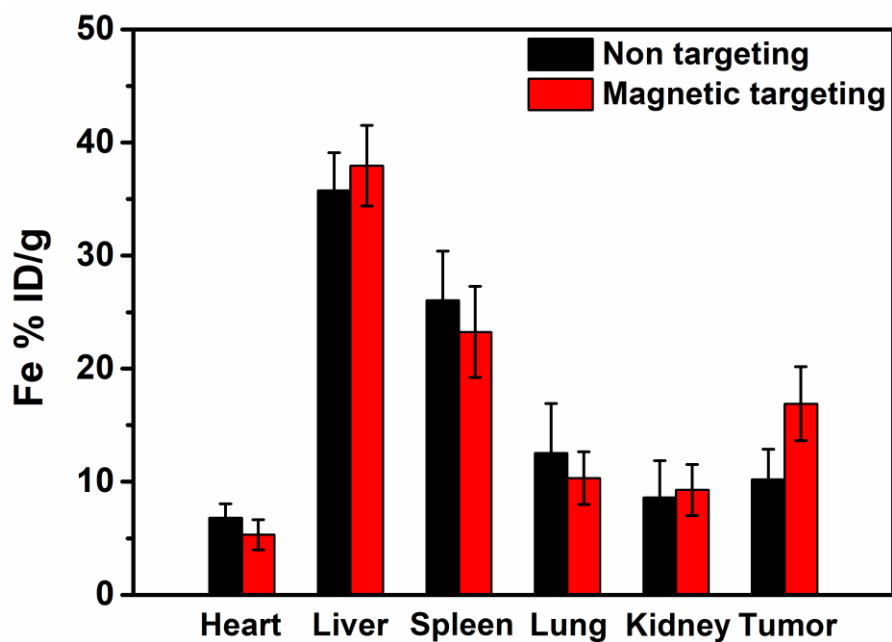


**Figure S13.** Viability of Hela (a) and MDA-MB-231 (b) cells after different treatments under various conditions for 24 h ( $n = 6$ , mean  $\pm$  s.d., \*\*\* $p < 0.001$ ).

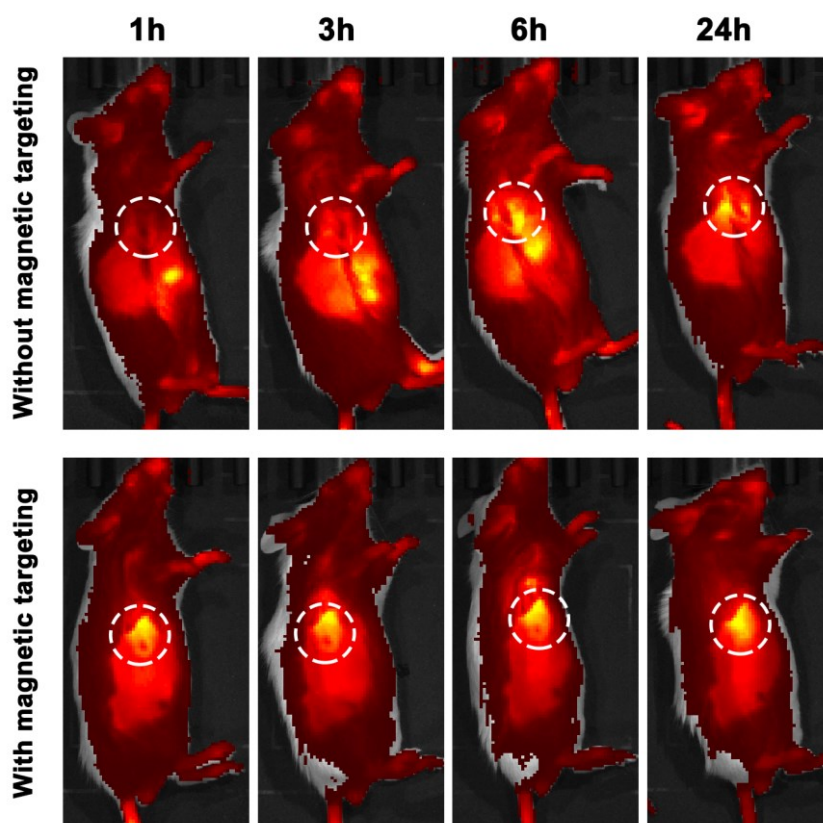


**Figure S14.** Fluorescence images of DCFH-DA labeled 4T1 cells treated by (a) PEG/Fe<sub>2</sub>C@Fe<sub>3</sub>O<sub>4</sub>-ART and (b) PEG/Fe<sub>2</sub>C@Fe<sub>3</sub>O<sub>4</sub>-ART plus 2,2-bipyridyl under magnetic targeting. Scale bars are 75  $\mu\text{m}$ .

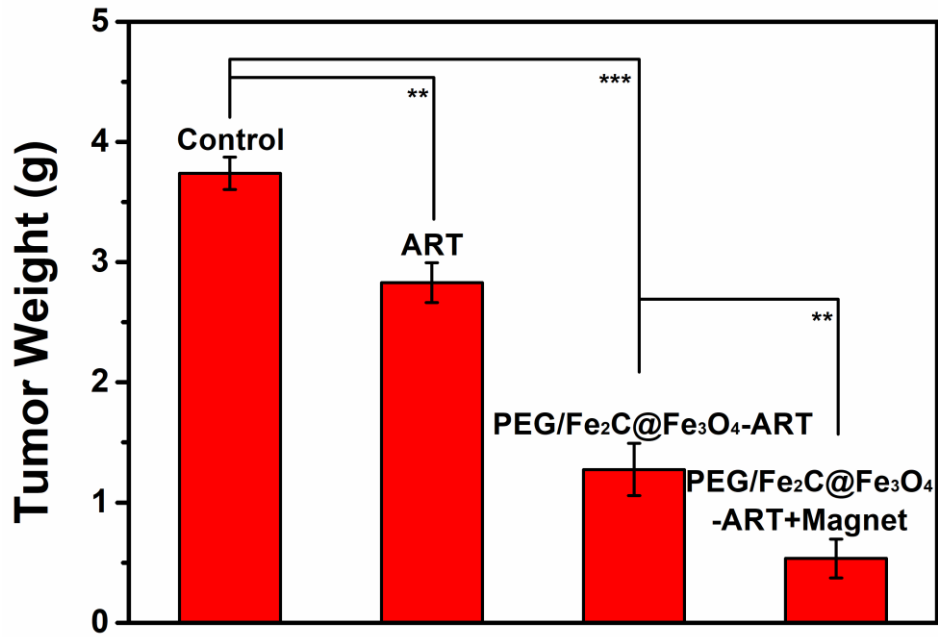




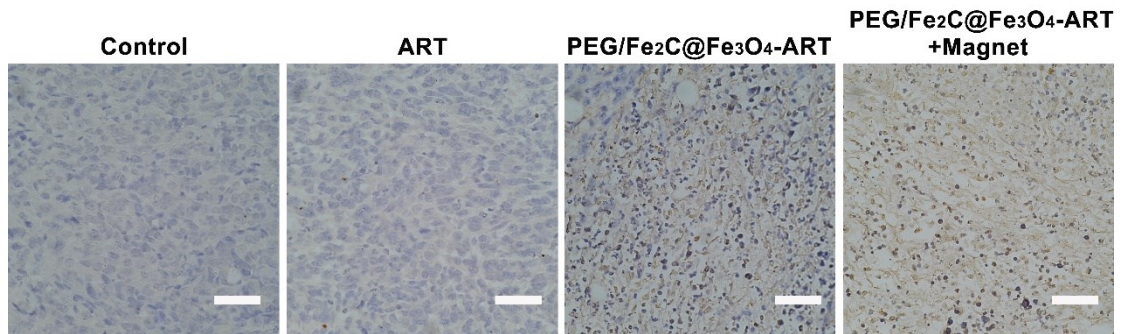
**Figure S15.** The biodistribution of Fe (% administrated dose (ID) of Fe per gram of tissues) in main tissues and tumors after intravenous administrations with or without magnetic targeting for 24 h.



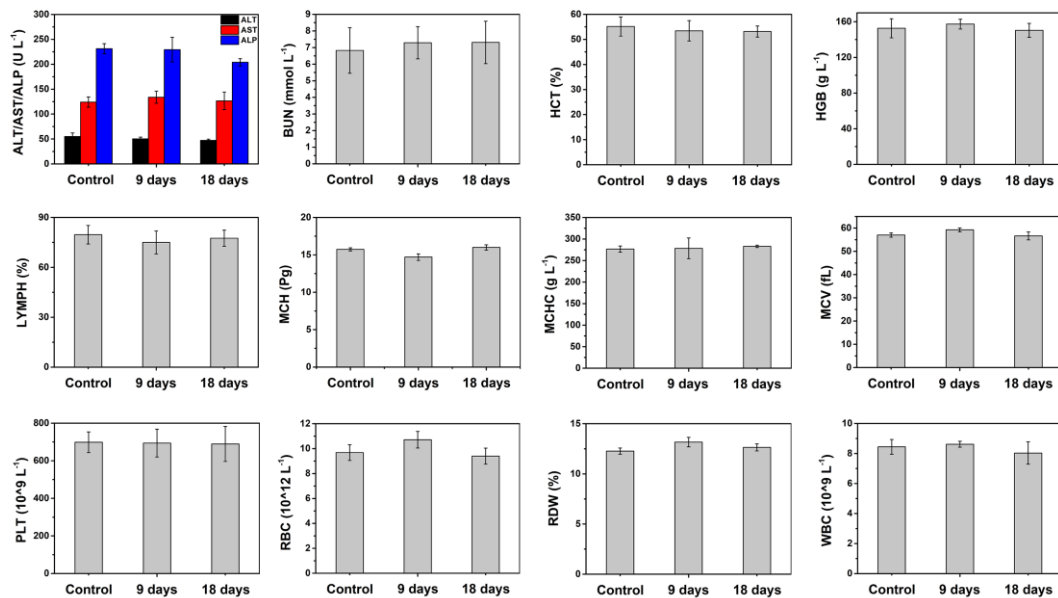
**Figure S16.** In vivo NIR imaging of tumor-bearing mice after intravenous injection of IR783-labeled  $\text{Fe}_2\text{C}@\text{Fe}_3\text{O}_4$  NPs at 1, 3, 6, and 24 h post-injection (White circled area: tumor site).



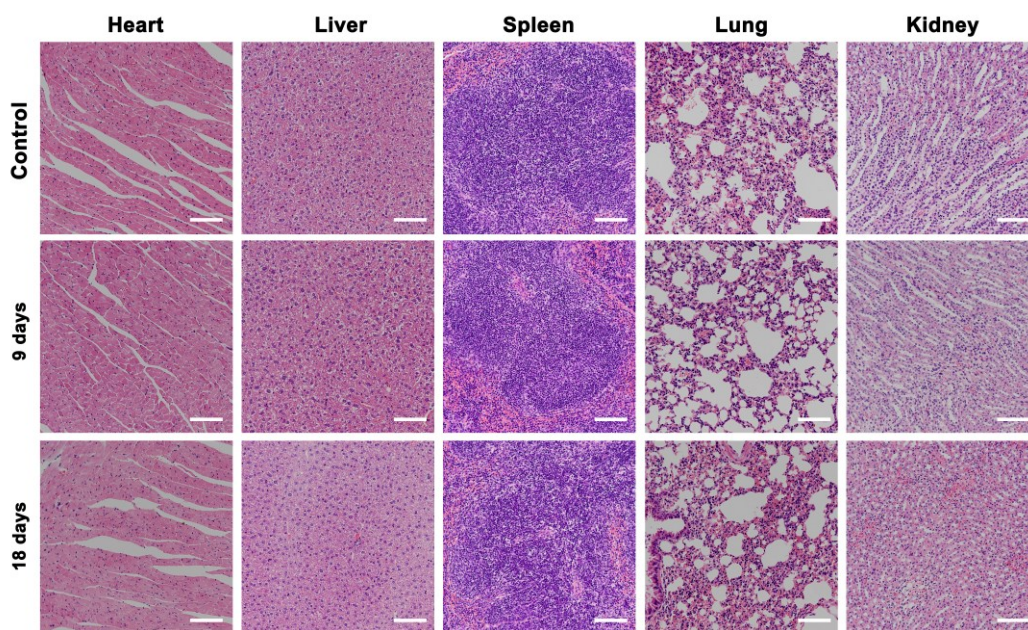
**Figure S17.** Average tumor mass excised from the 4T1 tumor-bearing mice after treatment ( $n = 5$ , mean  $\pm$  s.d., \*\* $p < 0.01$ , \*\*\* $p < 0.001$ ).



**Figure S18.** TUNEL staining of 4T1 tumor sections in different groups. (scale bar 100  $\mu\text{m}$ )



**Figure S19.** Blood panel analysis and blood biochemistry test of healthy mice after intravenous injection of PEG/Fe<sub>2</sub>C@Fe<sub>3</sub>O<sub>4</sub>-ART NPs with different time (9 days or 18 days).



**Figure S20.** H&E staining images of major organs (heart, liver, spleen, lung, kidney) of the mice after injection of PEG/Fe<sub>2</sub>C@Fe<sub>3</sub>O<sub>4</sub>-ART NPs with different time (9 days or 18 days) (scale bar 100  $\mu$ m).