# Supporting Information

## Peroxidase-like $Fe_3O_4$ Nanocomposite for Activatable Reactive Oxygen Species Generation and Cancer Theranostics

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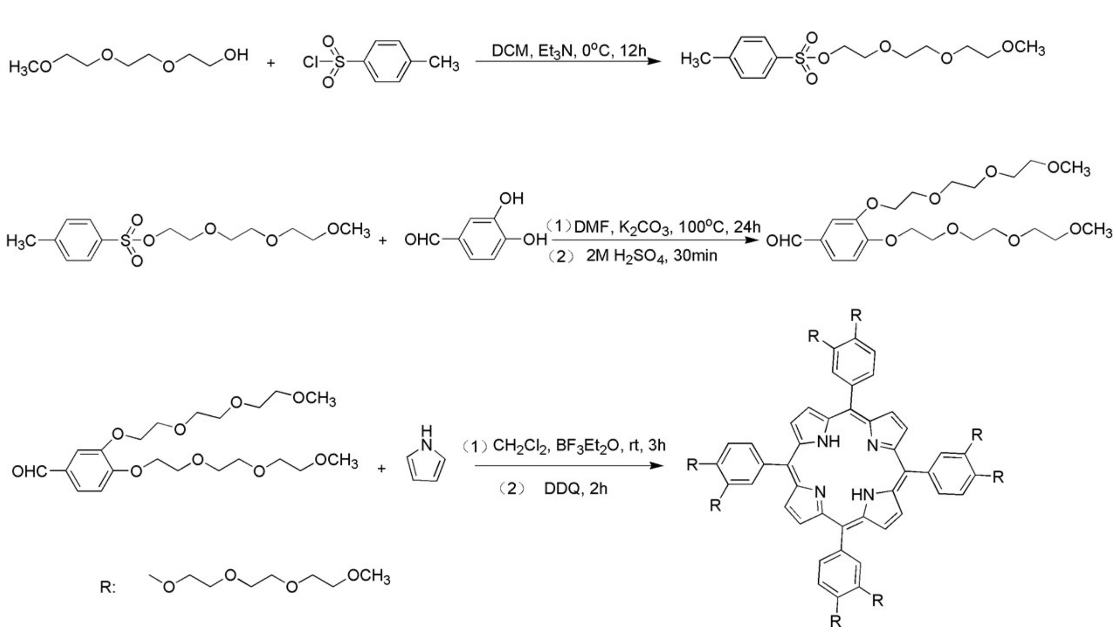


**Scheme S 1.** Synthesis of Porphyrin.

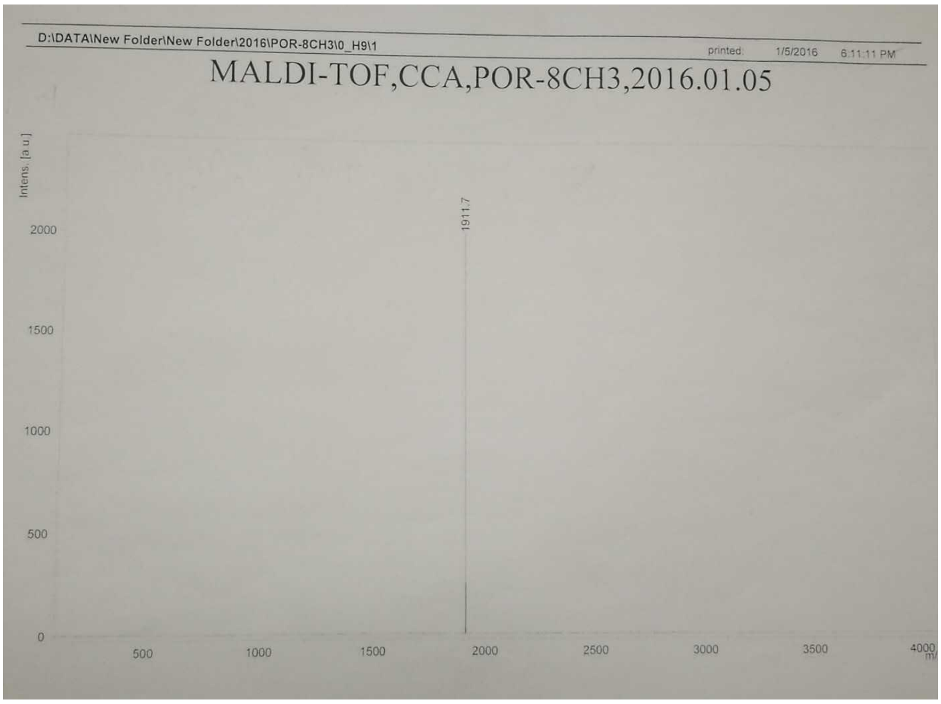


**Fig. S 1.** Mass Spectrometry of porphyrin.

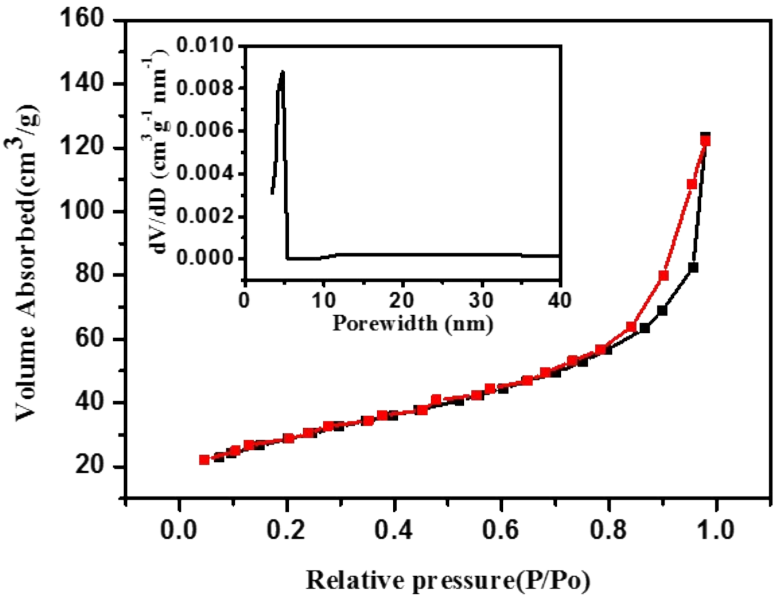


**Fig. S2.** $N_2$ adsorption-desorption isotherms (inset: the pore diameter distribution) of $Fe_3O_4$@CS/CuS NPs

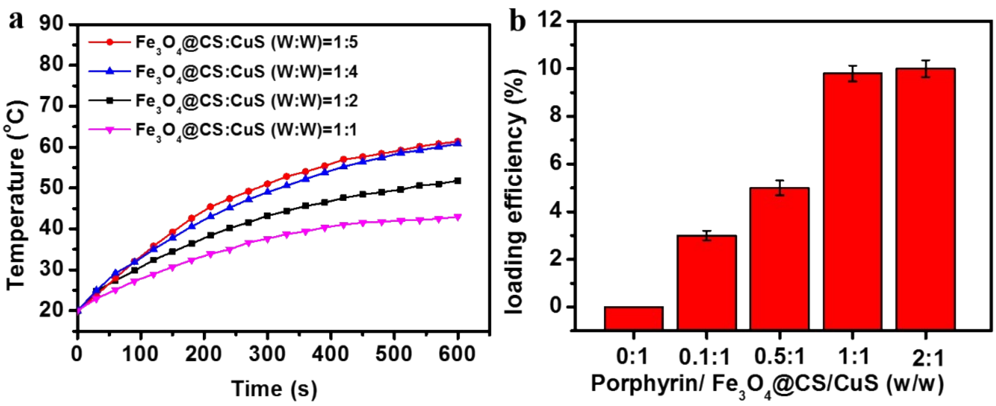


**Fig. S3.** a) Photothermal heating curves of different weight ratio of $Fe_3O_4$ @CS and CuS solutions under 980 nm NIR-laser irradiation for 10 min, b).Loading efficiency of different weight ratio of porphyrin and $Fe_3O_4$ @CS/CuS.

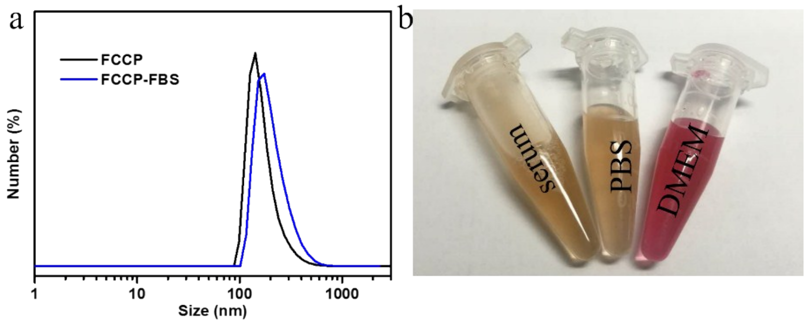


**Fig. S4.** (a) DLS of FCCP before and after mixing with serum. (b) Dispersity of FCCP at different buffer media (serum, PBS, DMEM)

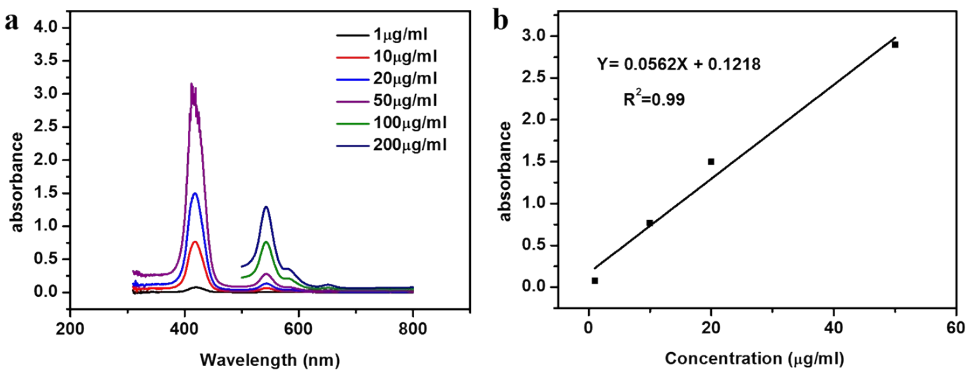


**Fig. S5.** (a)UV-vis absorption spectra of porphyrin at different concentrations. (b) Linear fit of porphyrin absorbance at 410 nm

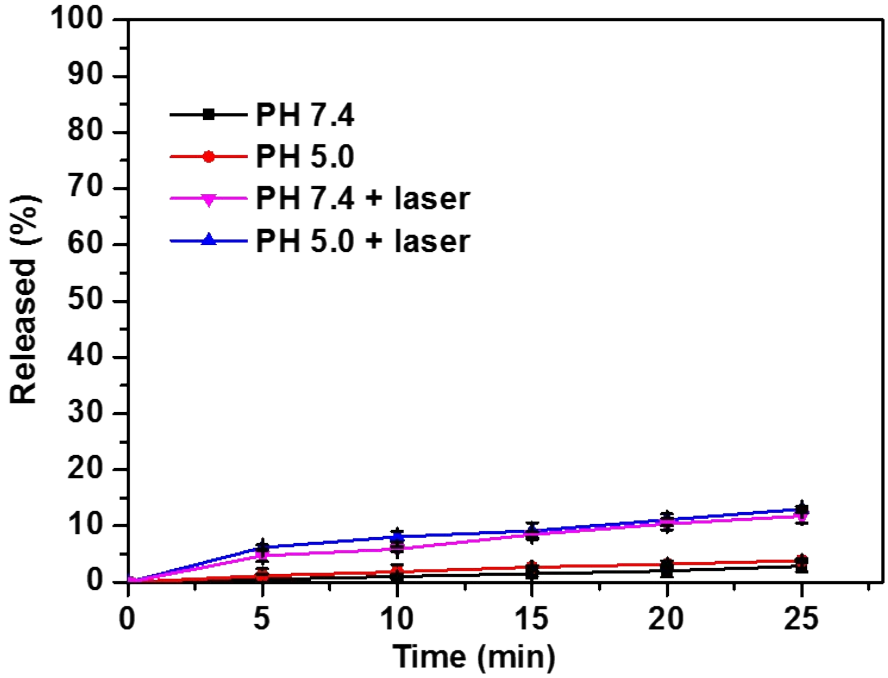


**Fig. S6.** Released profiles of porphyrin from FCCP with or without 980 nm NIR-laser irradiation at PBS buffer PH 5.0, 7.4 in PBS buffer.

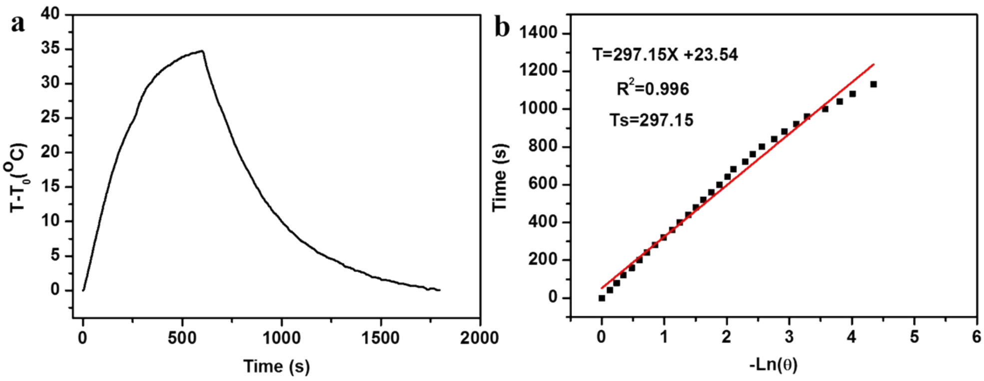


**Fig. S7.** (a) The photothermal response of the $Fe_3O_4$@CS-CuS/porphyrin solution aqueous solution (100 µgmL−1) under the irradiation of an NIR laser (980 nm, 2.1 W cm$^{-2}$) for 600 s and then the laser was shut off. (b) Plot of the cooling time versus – ln(θ)obtained from the cooling stage as shown in

The singlet oxygen quantum yield was calculated by the following equation S1 with respect to the reference:

$$\Phi_{\Delta}^{S} = \Phi_{\Delta}^{R}\frac{F^{R}k^{S}}{F^{S}k^{R}} \tag{S1}$$

where S and R represent the sample and Ce6, In addition k is the slope of a plot of the difference in change in absorbance of DPBF with the irradiation time, and $F$ is the absorption correction factor, which is calculated by $F = 1 - 10^{-OD}$ (OD at the irradiation wavelength)

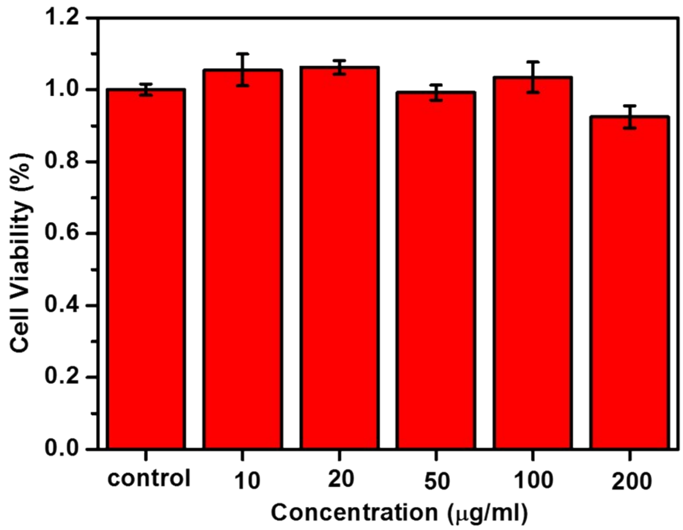


**Fig. S8.** In vitro cytotoxicity with different FCCP concentration of nanomaterials (10-200 μg/mL) in DMEM.

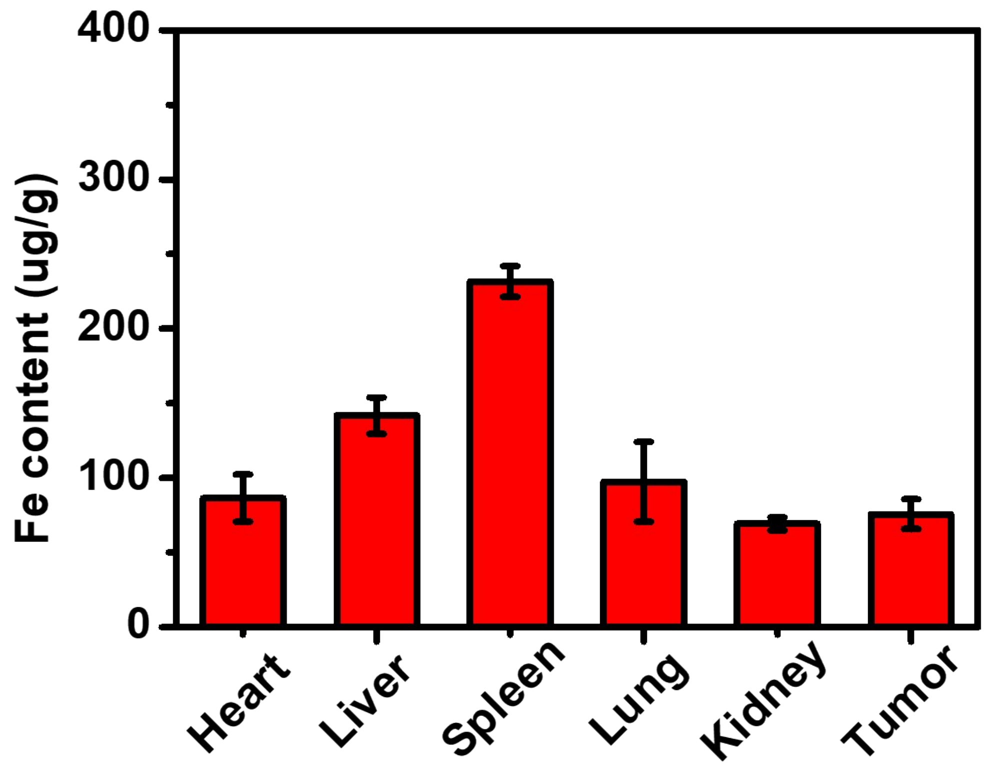


**Fig. S9.** Biodistribution of Fe in various organs and tissues at cancer tumor-bearing mice. Error bars were based on the standard error of the mean of triplicate samples.