Electronic Supplementary Information

Y_2O_3:Yb,Er@*m*SiO_2-Cu_xS double-shelled hollow spheres for enhanced chemo-/photothermal anti-cancer therapy and dual-modal imaging

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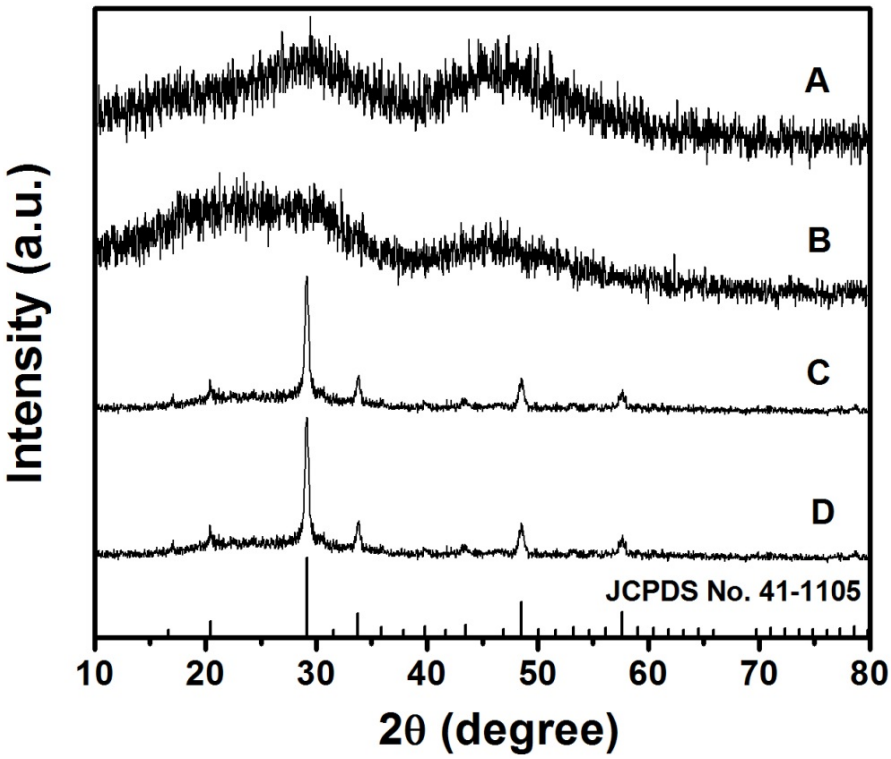

Fig. S1 XRD patterns of the samples obtained in different steps. (A) C@$Y(OH)_x(CO_3)_y$:Yb,Er; (B) C@$Y(OH)_x(CO_3)_y$:Yb,Er@*m*SiO_2; (C) Y_2O_3:Yb,Er@*m*SiO_2, (D) Y_2O_3:Yb,Er@*m*SiO_2-Cu_xS.

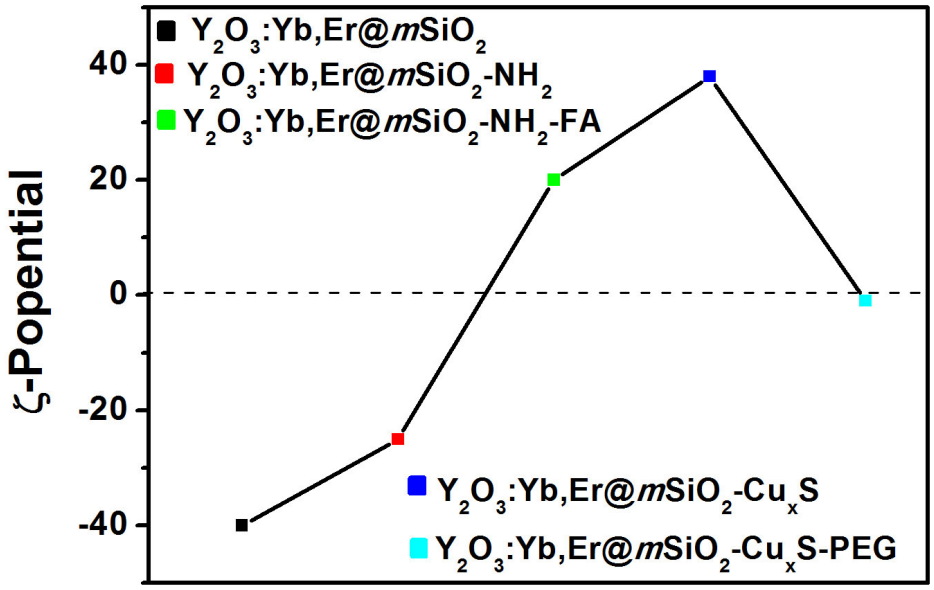

Fig. S2 Zeta potential of Y_2O_3:Yb,Er@*m*SiO_2, Y_2O_3:Yb,Er@*m*SiO_2-NH_2, Y_2O_3:Yb,Er@*m*SiO_2-NH_2-FA,Y_2O_3:Yb,Er@*m*SiO_2-Cu_xS, and Y_2O_3:Yb,Er@*m*SiO_2-Cu_xS-PEG.

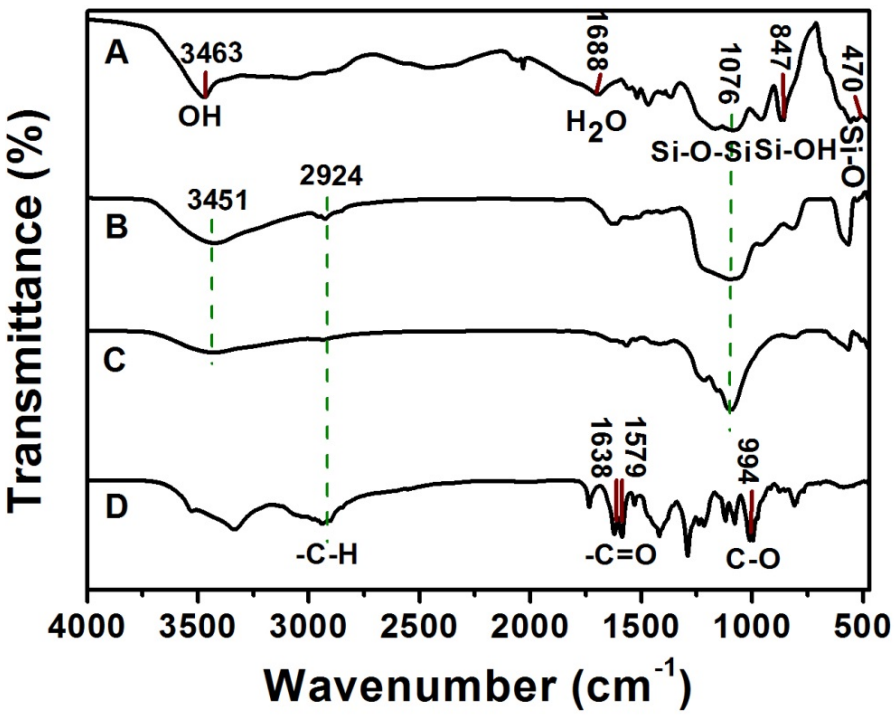

Fig. S3 FT-IR spectra of (A) Y_2O_3:Yb,Er@*m*SiO_2, (B) Y_2O_3:Yb,Er@*m*SiO_2-Cu_xS, (C) DOX-Y_2O_3:Yb,Er@*m*SiO_2-Cu_xS, and (D) pure DOX.

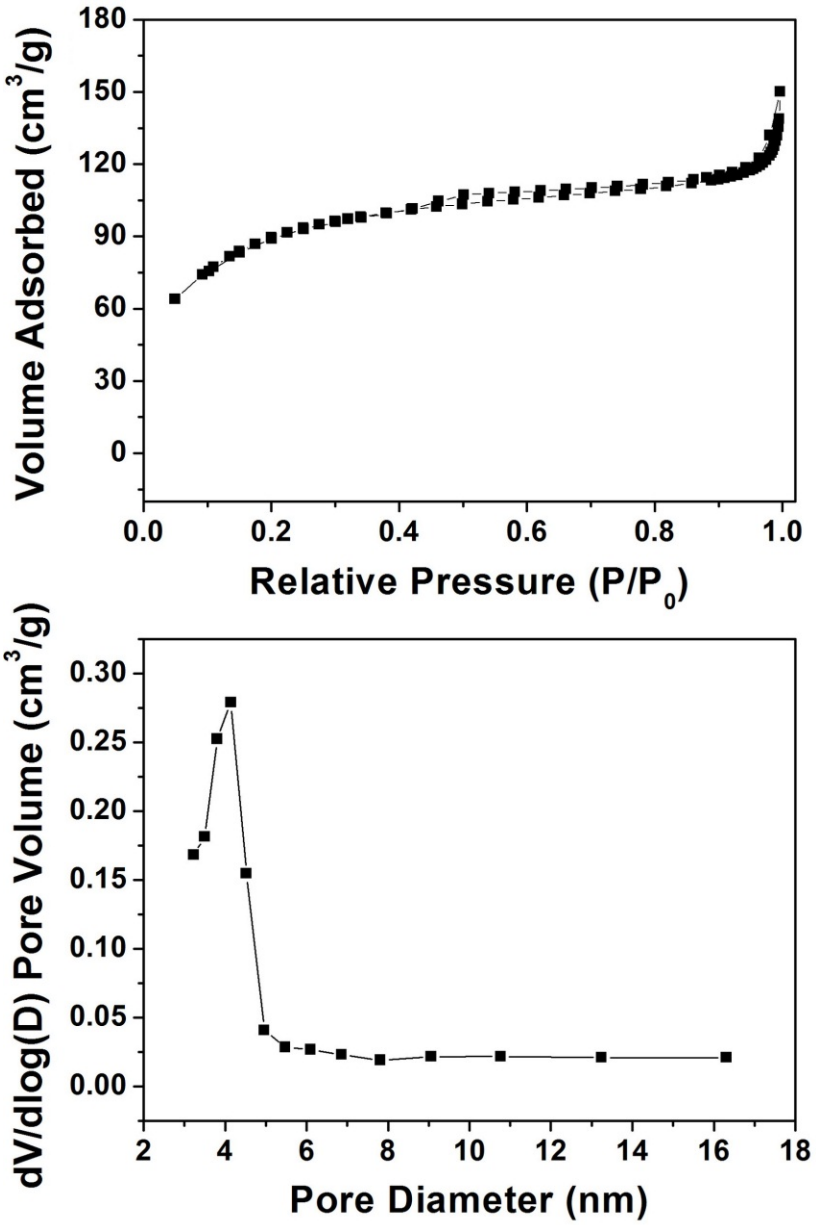

Fig. S4 N_2 adsorption/desorption isotherm and the pore size distribution of Y_2O_3:Yb,Er@*m*SiO_2-Cu_xS.

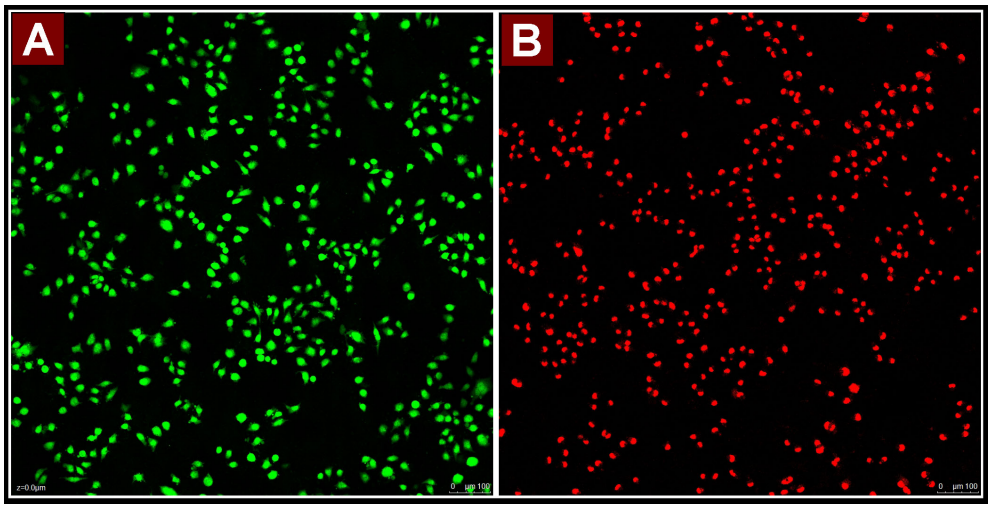

Fig. S5 Confocal images of HeLa cancer cells dyed with calcein AM (green, live cells) and propidium iodide (red, dead cells) co-stained cells after treatment of Y_2O_3:Yb,Er@*m*SiO_2-Cu_xS. (a) without and (b) with 980 nm laser irradiation.

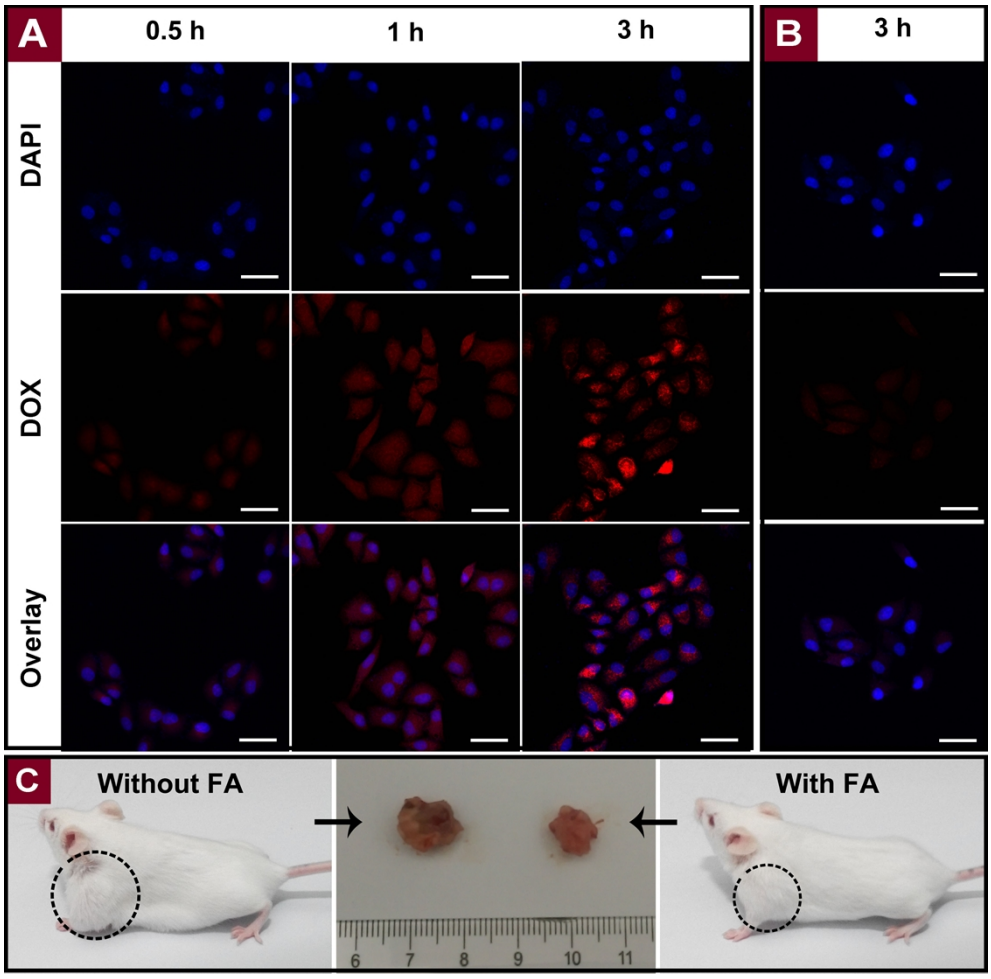

Fig. S6 Confocal laser scanning microscopy (CLSM) images of HeLa cells incubated with (A) DOX-Y_2O_3:Yb,Er@*m*SiO_2-NH_2-FA-Cu_xS-PEG and (B) DOX-Y_2O_3:Yb,Er@*m*SiO_2-NH_2-Cu_xS-PEG for different times. All the scale bars are 50 μm. (C) The digital photographs of the H22 tumor-bearing Balb/c mice injected *in situ* with DOX-Y_2O_3:Yb,Er@*m*SiO_2-NH_2-FA-Cu_xS-PEG and DOX-Y_2O_3:Yb,Er@*m*SiO_2-NH_2-Cu_xS-PEG and the corresponding tumor sizes.