

## Electronic Supplementary Information

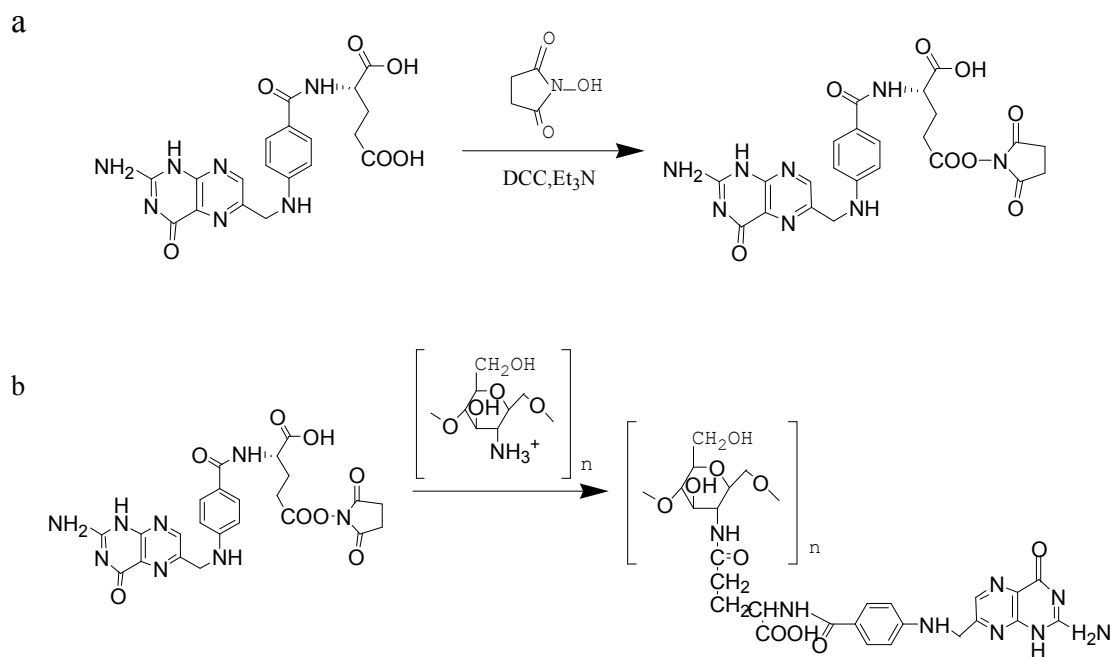
# A smart tumor microenvironment responsive nanoplatform based on upconversion nanoparticles for efficient multimodal imaging guided therapy

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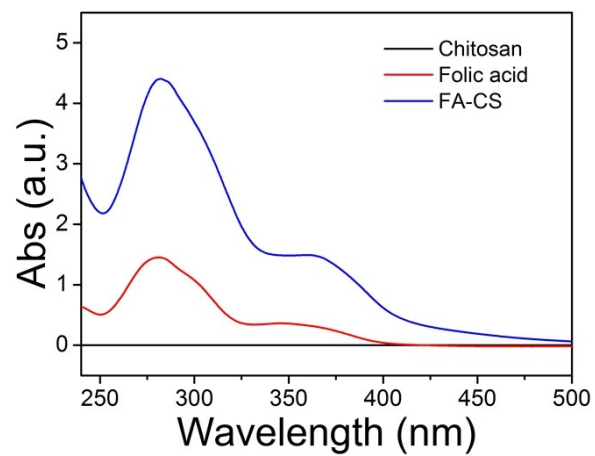
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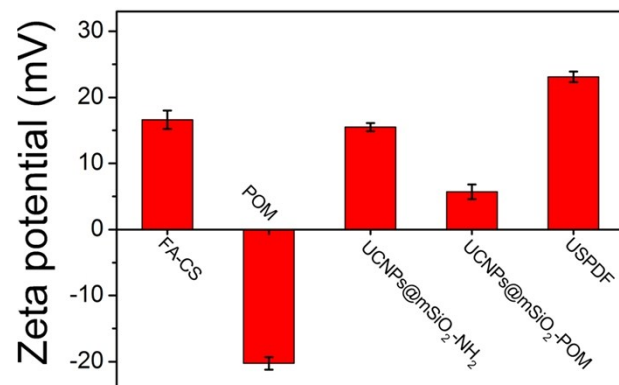
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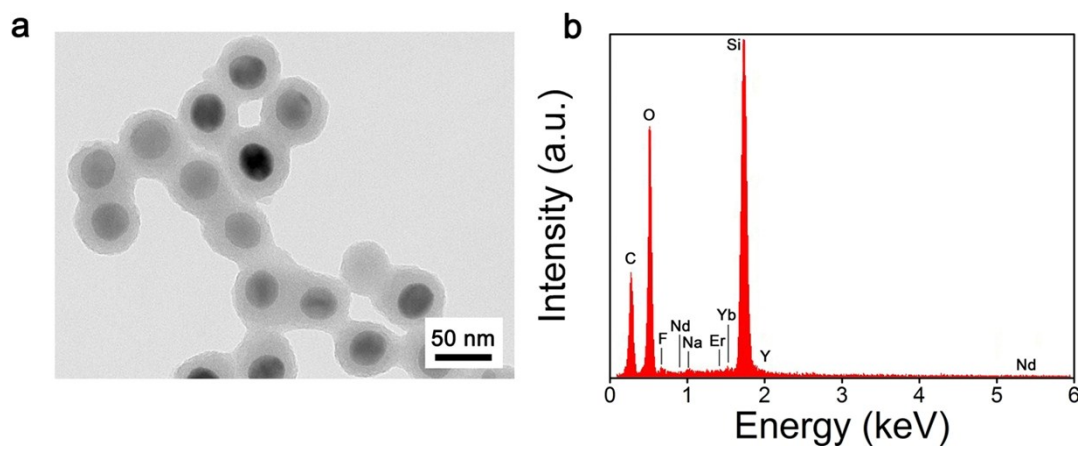
**Scheme S1** Schematic illustration for the synthesis of folate chitosan. (a) The reaction between folic acid and NHS to form NHS-ester of folic acid. (b) The synthesis of folate chitosan from NHS-ester of folic acid and chitosan.



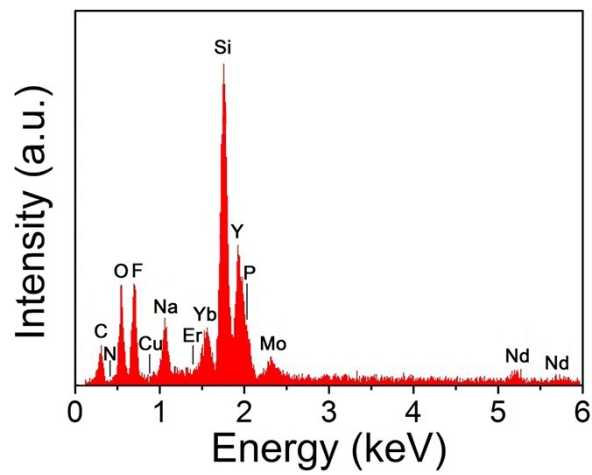
**Fig. S1** The UV-vis absorption spectra of folic acid, chitosan and folate chitosan, respectively.



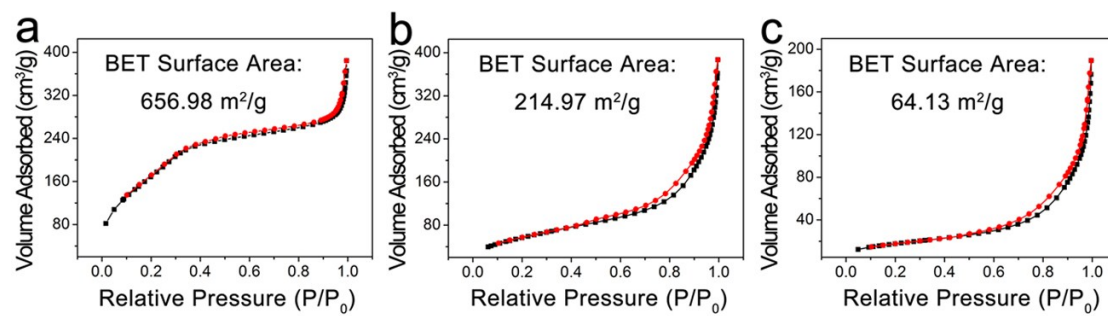
**Fig. S2** The Zeta potentials of FA-CS, POM cluster, UCNPs@mSiO<sub>2</sub>-NH<sub>2</sub>, UCNPs@mSiO<sub>2</sub>-POM, USPDF.



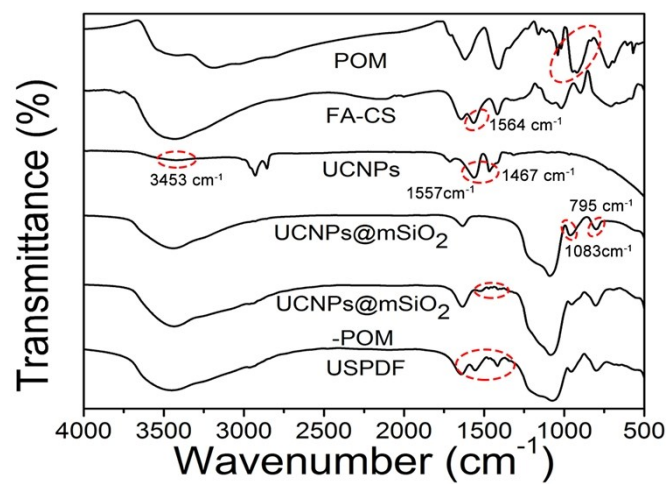
**Fig. S3** The TEM image and EDS spectrum of UCNPs@mSiO<sub>2</sub>.



**Fig. S4** The EDS spectrum of USPDF.

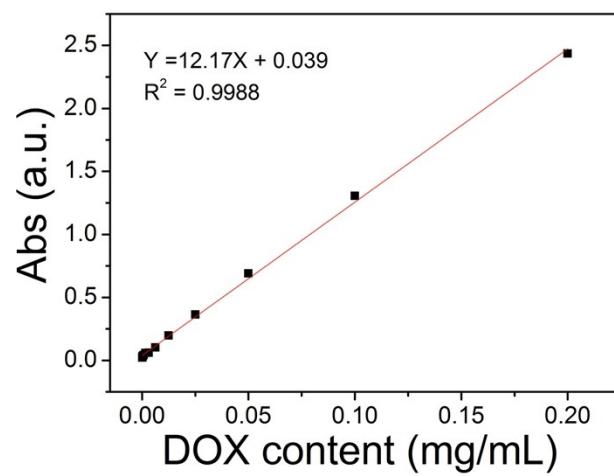


**Fig. S5**  $N_2$  adsorption/desorption isotherms of (a) UCNPs@mSiO<sub>2</sub> (b) UCNPs@mSiO<sub>2</sub>-POM and (c) UCNPs@mSiO<sub>2</sub>-POM-DOX.

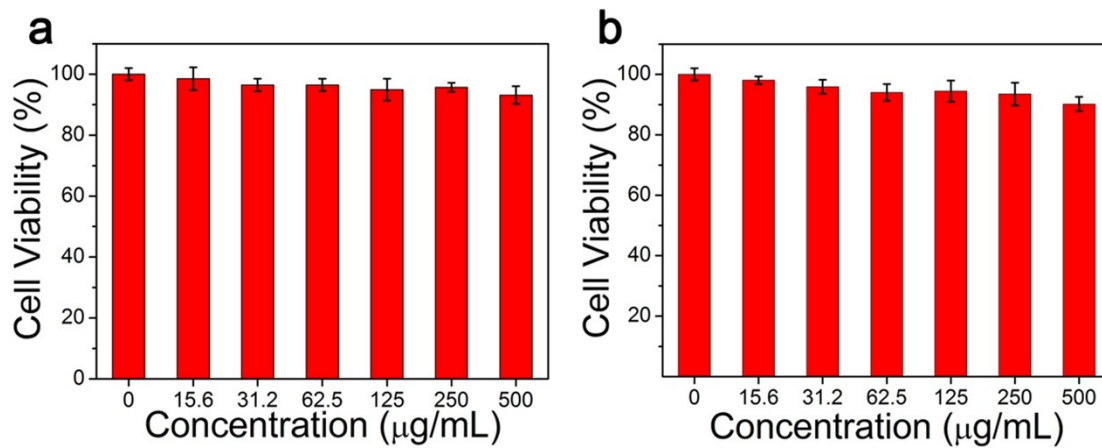


**Fig. S6** FT-IR spectra of POM, UCNPs, UCNPs@mSiO<sub>2</sub>, UCNPs@mSiO<sub>2</sub>-POM, FA-CS, and USPDF.

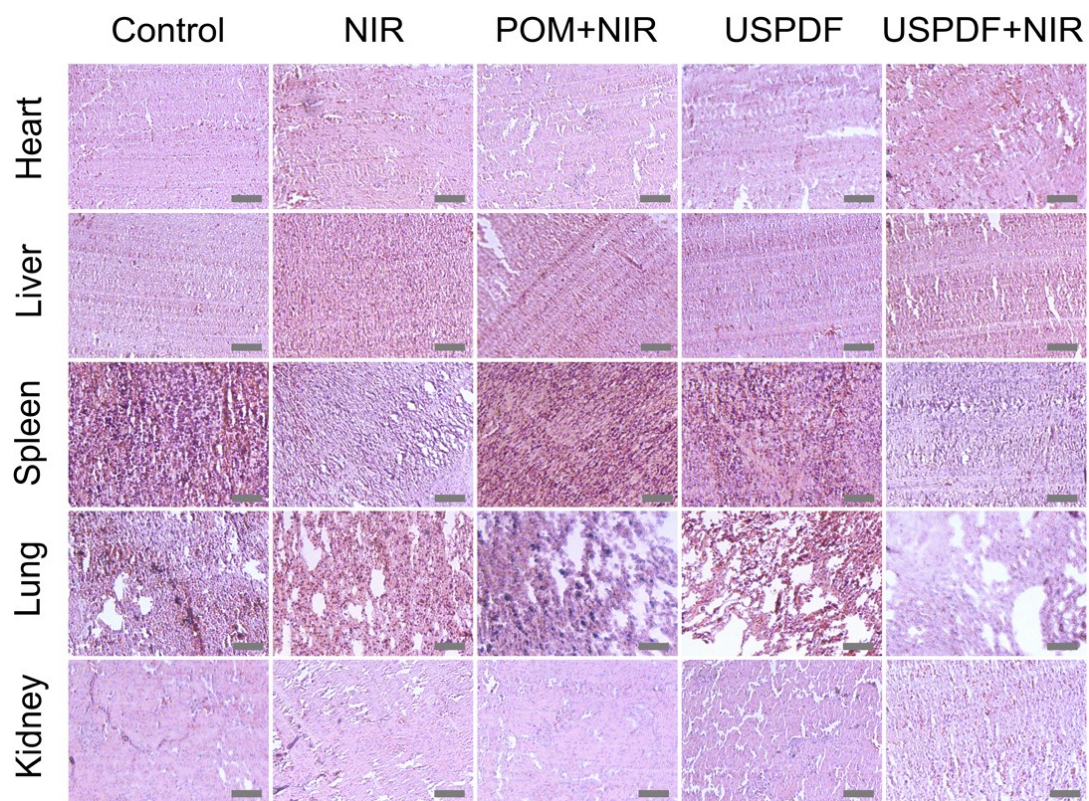




**Fig. S7** The standard curve of pure DOX detected at 490 nm.



**Fig. S8** The cell viability of L929 cell line after incubating with different concentration of POM (a) and USPDF (b) for 24 h.



**Fig. S9** H&E stained images of liver, lung, kidney, heart and spleen obtained from different groups after 14 days treatment (Scale bar: 30  $\mu$ m).