Supplementary Information

Redox-Mediated Dissolution of Paramagnetic Nanolids to Achieve Smart Theranostic System

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Materials and instrumentation: Cetyltrimethylammonium bromide (CTAB), tetraethylorthosilicate (TEOS), 3-Aminopropyltriethoxysilane (APTES), 1-(3-(dimethylamino)propyl)-3-ethylcarbodiimide hydrochloride (EDC·HCl), Camptothecin (CPT), Glutathione (GSH) and Dithiothreitol (DTT) were purchased from Aladdin Reagent Company. 3-[4,5-dimethylthialzol-2-yl]-2,5-diphenyltetrazolium bromide (MTT) was purchased from Sigma-Aldrich.

The morphologies and detailed structure of the samples were recorded using JEOL JSM-6700F field-emission scanning electron microscope (SEM) and FEI Tecnai G2 F20 S-TWIN transmission electron microscope (TEM). The powder XRD patterns were recorded on a Rigaku D/Ma 2550 X-ray diffractometer with Cu-Kα radiation (λ = 1.5418 Å). Fourier transform infrared (FTIR) spectra were collected on a Nicolet Impact 410 FTIR spectrometer in the range of 400 - 4000 cm^{-1}. Elemental analysis was carried out on Perkin-Elmer ICP-OES Optima 3300DV. X-ray photoelectron spectroscopy (XPS) was performed using an ESCALAB 250 spectrometer. Raman spectra were obtained with a Renishaw Raman systemmodel 1000 spectrometer.

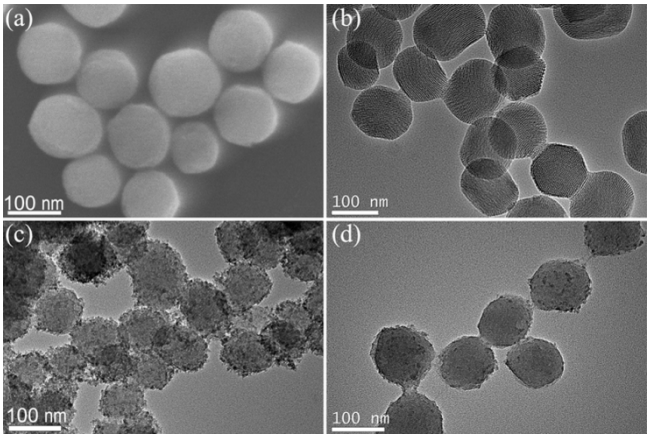

Fig. S1 (a) SEM and (b) TEM micrographs of MSNPs. (c) and (d) TEM micrographs of Mn_3O_4@MSNPs obtained after incubation in 10 mM and 20 mM DTT solutions, showing the dissolution of the Mn_3O_4 nanocrystals.

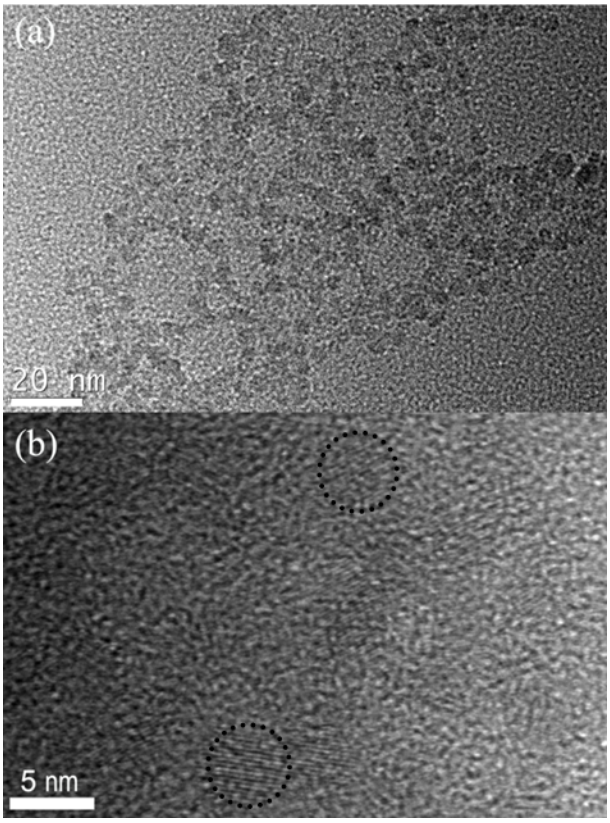

Fig. S2 (a) TEM, (b) HRTEM images of Mn_3O_4 nanocrystals.

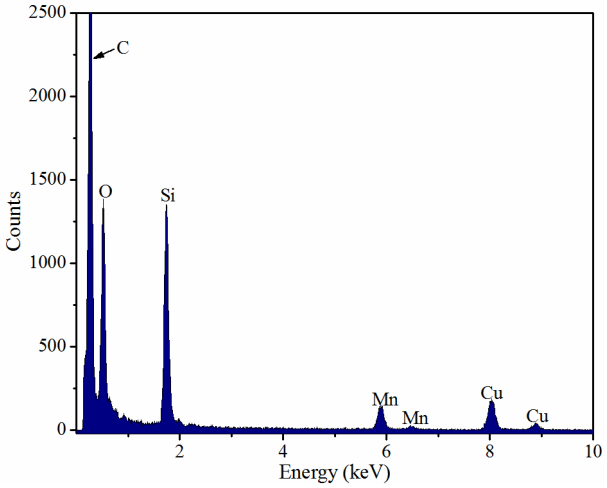

Fig. S3 EDX spectrum of Mn_3O_4@MSNPs.

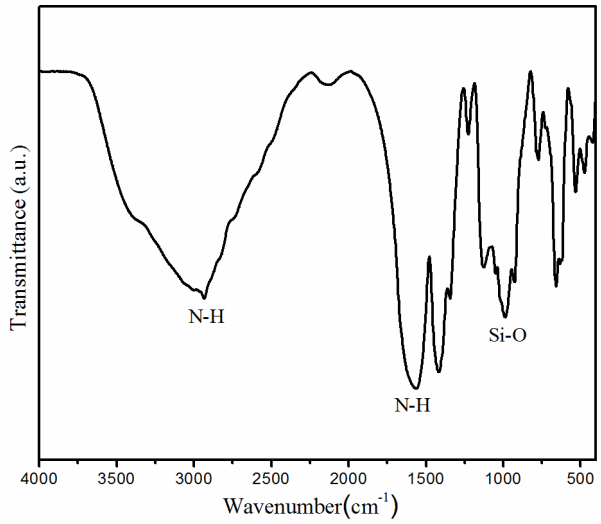

Fig. S4 FTIR spectra of Mn_3O_4 nanocrystals.

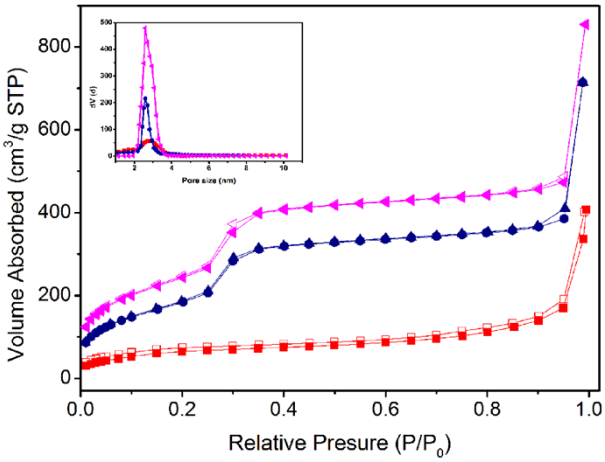

Fig. S5 Nitrogen adsorption−desorption isotherms for (a) MSN functionalized with carboxyl groups (pink), (b) MSN@CPT (blue), (c) Mn_3O_4@MSN@CPT (red). (Inset: corresponding pore size distribution curve from adsorption branch).