Supporting information

One pot synthesis of carbon dots entrenched chitosan modified magnetic nanoparticles for fluorescence based Cu^{2+} ion sensing and cell imaging

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Synthesis of Fe_3O_4

The superparamagnetic Fe_3O_4 nanoparticles were prepared by previously reported procedure[1]. In typical recipe, 0.324 g of $FeCl_3$ and 0.274 g of $FeSO_4.7H_2O$ was taken in 40 mL Millipore water under argon atmosphere. The aqueous ammonia solution (2.5M) was dropped in to the reaction vessel with a violent stirring. The reaction was continued for 1 h at 80° C for complete growth of the nanoparticles.The obtained magnetite was washed with Millipore water under magnetic separation. After that, the resulting magnetic nanoparticles were dried in a vacuum oven at 50°C for overnight.

Synthesis of OCMC coated Fe_3O_4 nanoparticles (Fe_3O_4@OCMC)

To prepare the Fe_3O_4@OCMC previous reported method[2]. In typical procedure, 500 mg of OCMC was dissolved in 50 mL of Millipore water and added dropwise in to the Fe_3O_4 and stirring for 12 h at the room temperature for the preparation of OCMC coated Fe_3O_4 nanoparticles (Fe_3O_4@OCMC). The obtained Fe_3O_4@OCMC was washed with ethanol and Millipore water to remove unreacted OCMC then dried in a vacuum oven at 50 °C for overnight.

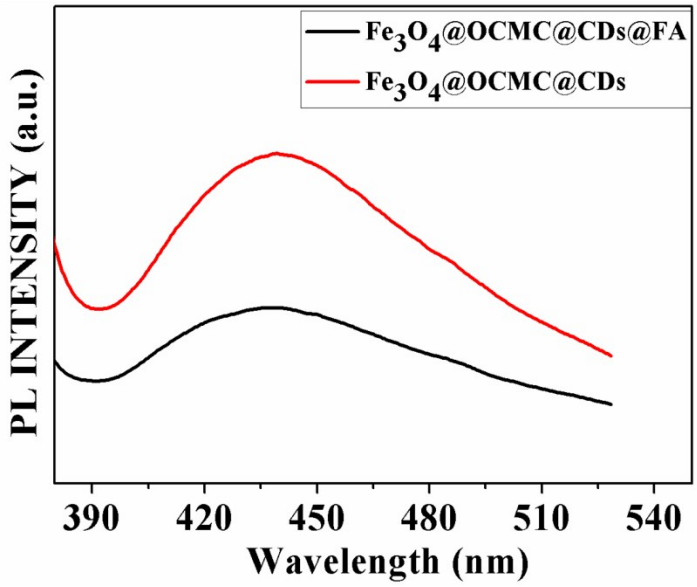

Figure S1. Photoluminescent spectra of Fe_3O_4@CMC@CDs and Fe_3O_4@CMC@CDs-FA.

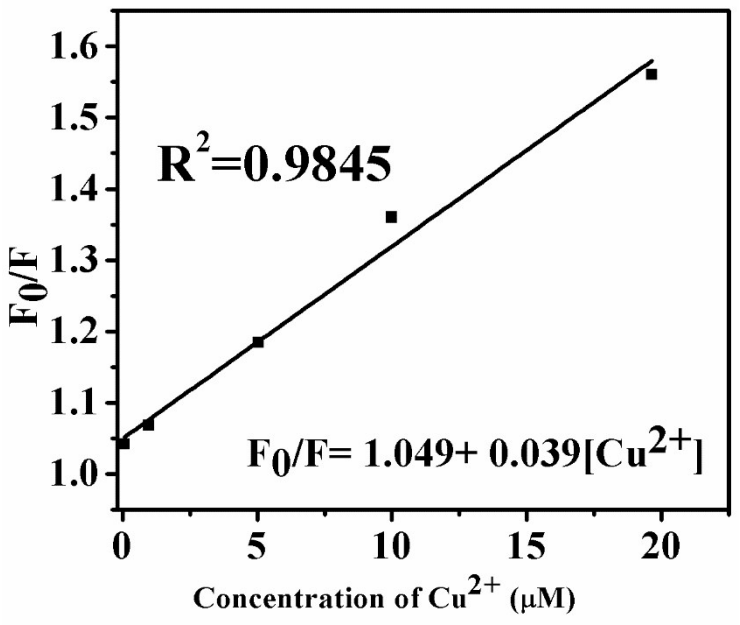

Figure S2. Linear dependence of fluorescence quenching of Fe_3O_4@CMC@CDs with copper ion (0-20μM) concentration for LOD calculation.

Calculation of detection limit (LOD): All fluorescence emission spectra of the fluorophore were integrated vs. wavenumber, and calibration curves were generated, with the analyte concentration on the X-axis (in μM) and F0/F on the Y-axis, where F = the integrated fluorophore emission at a particular Cu^{2+} ions concentration and F_0 = the integrated fluorophore emission in the absence of Cu^{2+} ions. The lower fluoride concentrations yielded a linear relationship, and the equation for the line was determined. The limit of the blank was taken to be the average of the blank (without Cu^{2+} ions) +3 times the standard deviation of the blank. This value was entered into the equation determined in (for the Y value), and the corresponding X value was determined. This value provided the LOD in μM.

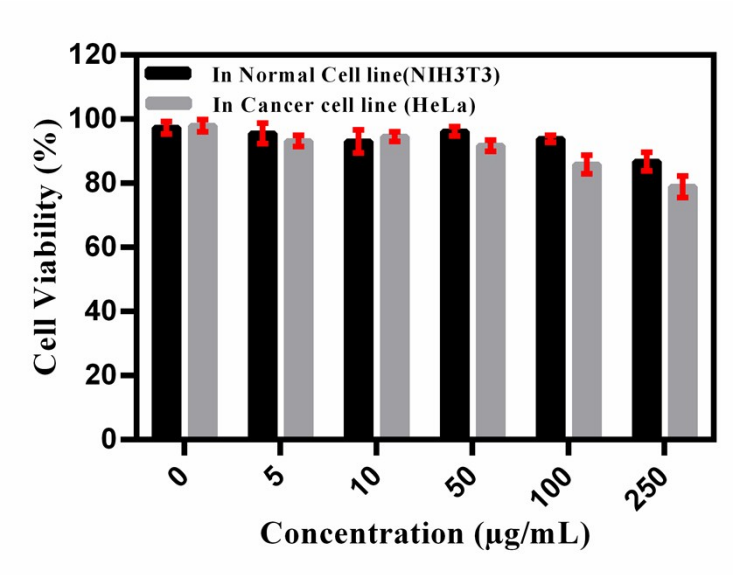

Figure S3. Cell viability study of Fe_3O_4@OCMC@CDsafter exposure up to 250 µg/ml in different cell lines.

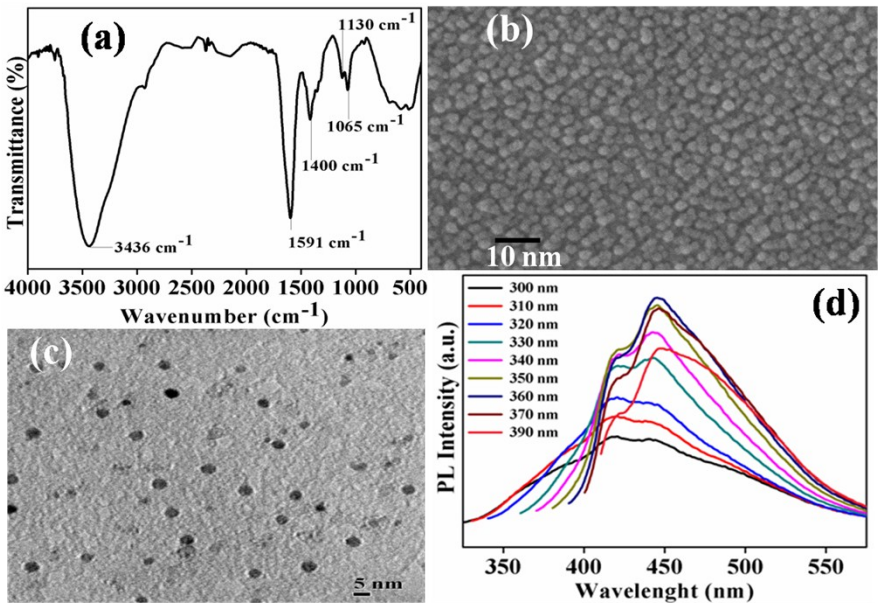

Figure S4. FT-IR spectra (a), FESEM image (b), TEM image (c) and PL spectra (at different excitation) of CDs (without Fe_3O_4 nanoparticles).

References

1. Mahto, T. K.; Chowdhuri, A. R.; Sahu, S. K. Polyaniline-Functionalized Magnetic Nanoparticles for the Removalof Toxic Dye from Wastewater, Journal of applied polymer science **2014**, *131*, 40840-40848.

2. Sahu, S. K.; Maiti, S.; Pramanik,A.; Ghosh, S. K.; Pramanik, P. Controlling the thickness of polymeric shell on magnetic nanoparticles loadedwith doxorubicin for targeted delivery and MRI contrast agent, Carbohydrate Polymers **2012***, 87*, 2593– 2604.