Electronic Supplementary Information (ESI†)

Covalent bridging of Surface Functionalized Fe_3O_4 and YPO_4: Eu Nanostructures for Simultaneous Imaging and Therapy

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Cell culture procedure:

Human lung carcinoma (A549) was obtained from National Centre for Cell Sciences, Pune, India. Cells were cultured in Dulbecco's Modified Eagle Medium (DMEM: GIBCO, Invitrogen, Carlbad, CA, USA) supplemented with 10% fetal calf serum (FCS: Himedia Laboratories, Mumbai, India) and antibiotics (100 U ml-1 penicillin and 100 µg ml-1 streptomycin) in a humidified atmosphere of 5% CO_2 at 37 °C. The desired number of cells were seeded in complete DMEM and incubated at culture conditions for overnight, followed by treatment with MLHN.

After exposure of AC magnetic field to the controls and MLHN treated cells, cells were cultured for 48 h. Then, the media containing MLHN was carefully removed and the cells were further incubated with 0.5 ml of MTT solution (0.5mg/ml, Sigma, USA) at culture conditions for 2 h. The supernatant was aspirated and 1 ml of DMSO was added to each culture dish to solubilize the MTT crystals. The crystals were thoroughly dissolved and further diluted (1: 10) with dimethyl sulfoxide (DMSO). 200 µl of above solution from P-30 culture dishes was transferred to 96 well plates and the blue colour was read in a microplate reader (Tecan infinite 200 PRO, Switzerland) at 544 nm. The cell viability was calculated by comparing the absorption of treated cells to that of control, which was defined as 100%.

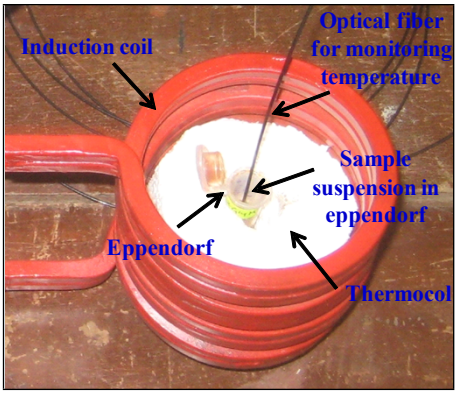

Fig. S1. Photograph of induction coil showing arrangements for time-dependent calorimetric measurements.

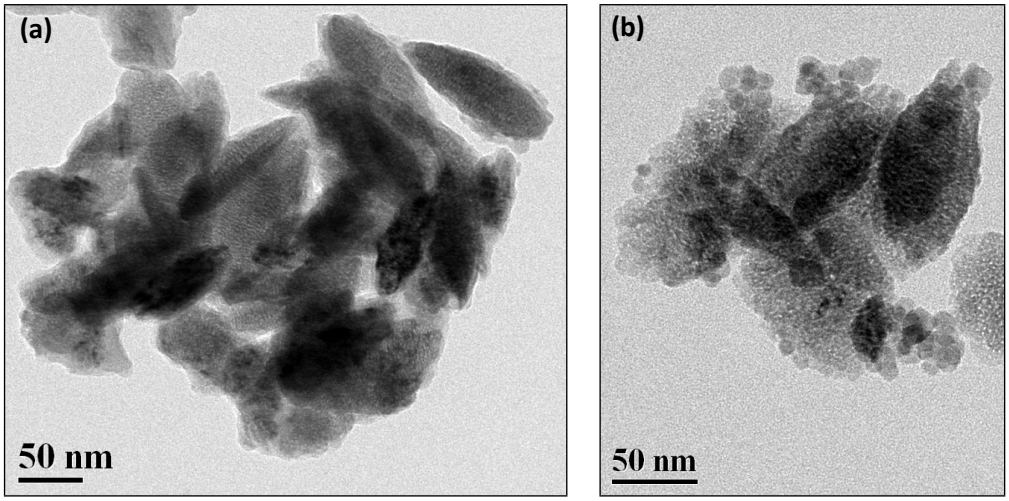

Fig. S2. TEM micrographs of (a) AFLN and (b) MLHN.

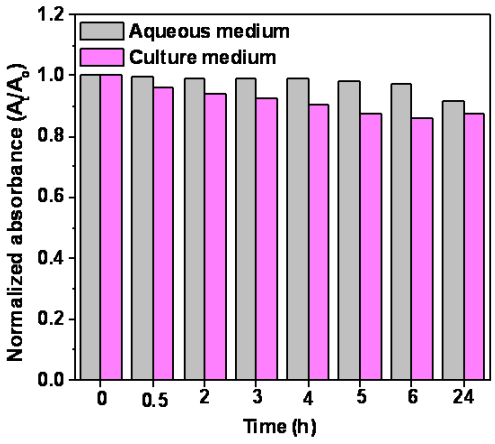

Fig. S3. Normalized absorbance vs. time plot of MLHN in aqueous and cell culture mediums.

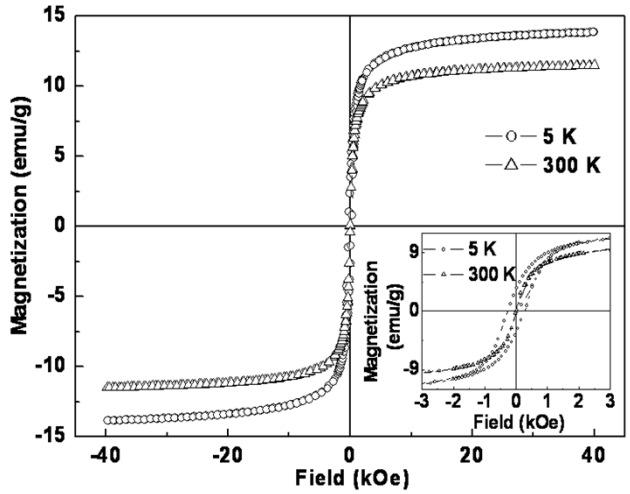

Fig. S4. Field dependence of magnetization (M vs. H) plots of hybrid nanostructures (prepared with 6:1 weight ratio of AFLN and CFMN) at 5 and 300 K (inset: expanded M vs. H plot of MLHN at low field region). The hybrid nanostructures with 6:1 weight ratio of AFLN and CFMN were prepared using 5 mg CFMN, 30 mg AFLN, 0.33 ml EDC and 0.67 ml NHS. The maximum magnetizations of hybrid nanostructures prepared with 6:1 weight ratio of AFLN and CFMN is slightly lower than that of hybrid nanostructures prepared with 4:1 weight ratio of AFLN and CFMN. This is mainly due to the presence of higher amount of non-magnetic AFLN in the hybrid sample.

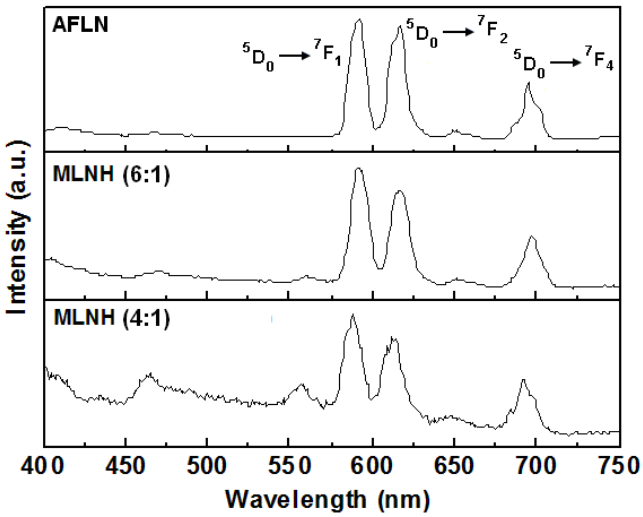

Fig. S5. Emission spectra of MLHN prepared with 6:1 weight ratios of AFLN and CFMN recorded at excitation wavelength of 260 nm using 375 nm filter. The luminescent intensity of MLHN prepared with 6:1 weight ratios of AFLN and CFMN is higher than that of MLHN prepared with 4:1 weight ratios of AFLN and CFMN. This enhancement in luminescent intensity can be attributed to the presence of larger amount of AFLN in the hybrid sample.

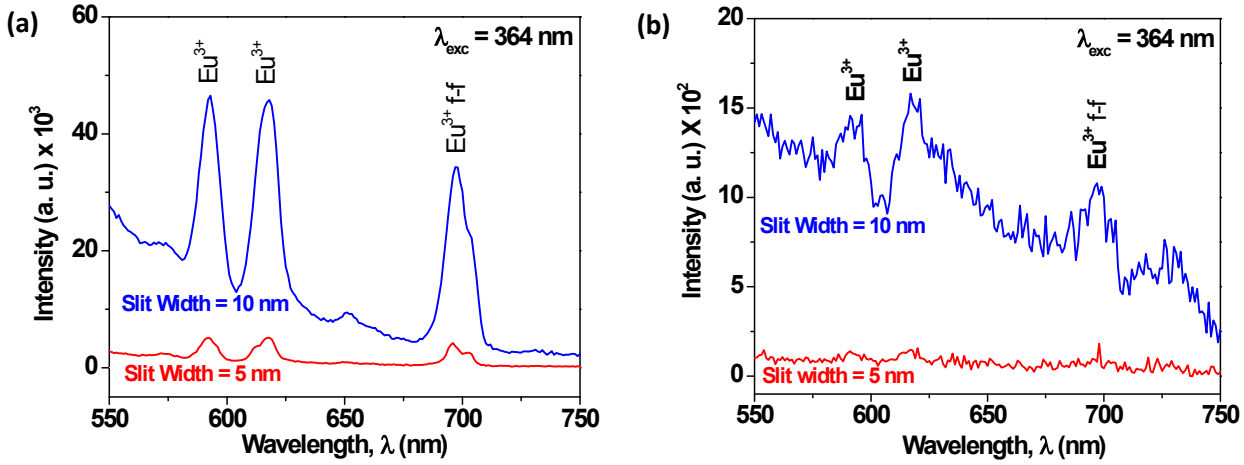

Fig. S6. Emission spectra of (a) AFLN and (b) MLHN recorded at excitation wavelength of 364 nm with different slit width of excitation and emission windows.

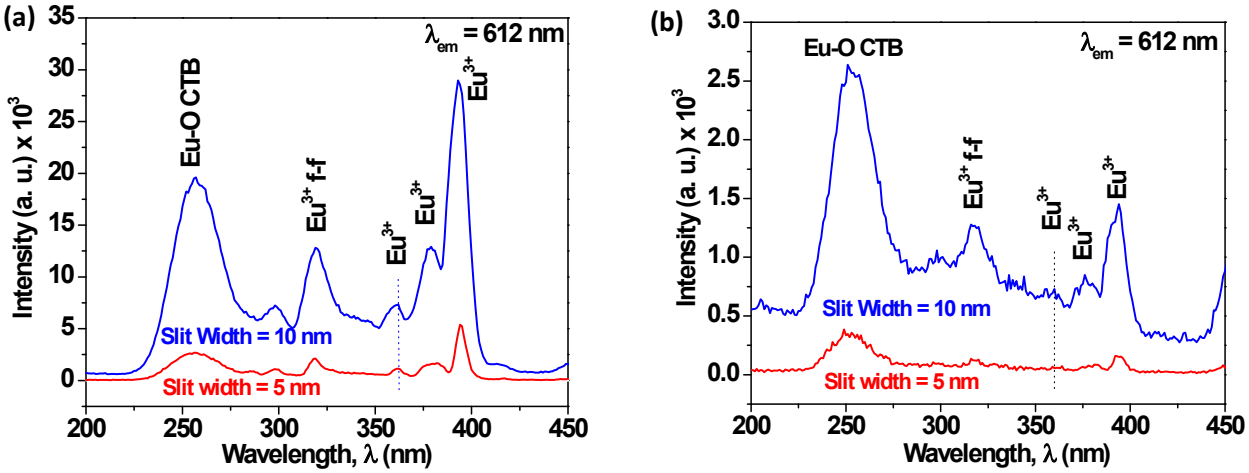

Fig. S7. Excitation spectra of (a) AFLN and (b) MLHN by monitoring wavelength at 612 nm with different slit width of excitation and emission windows.

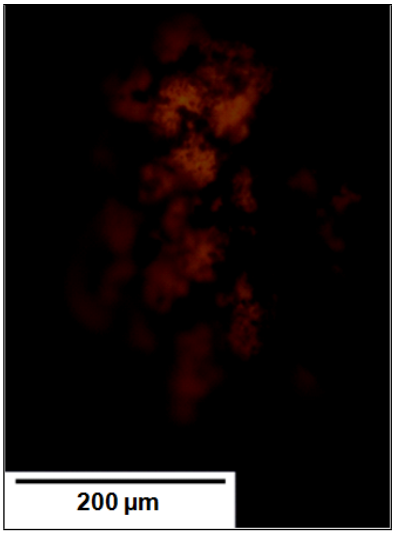

Fig. S8. Fluorescence microscopy image of MLHN powder mounted on glass slide.

Table S1. Zeta-potential of MLHN incubated with BSA for different time.

Sample	Zeta-potential of sample in 0.01M PBS (pH 7.3)	Zeta-potential of sample incubated with BSA(0.025 mg/ml) in 1 ml of 0.01 PBS (pH 7.3)			
MLHN	-26.7	-27.5	-26.7	-27.5	-26.4