Electronic Supplementary Material (ESI) for RSC Advances.

Multi-modal MR imaging and magnetic hyperthermia study of Gd doped Fe_3O_4 nanoparticles for Integrative cancer therapy

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Figure S1

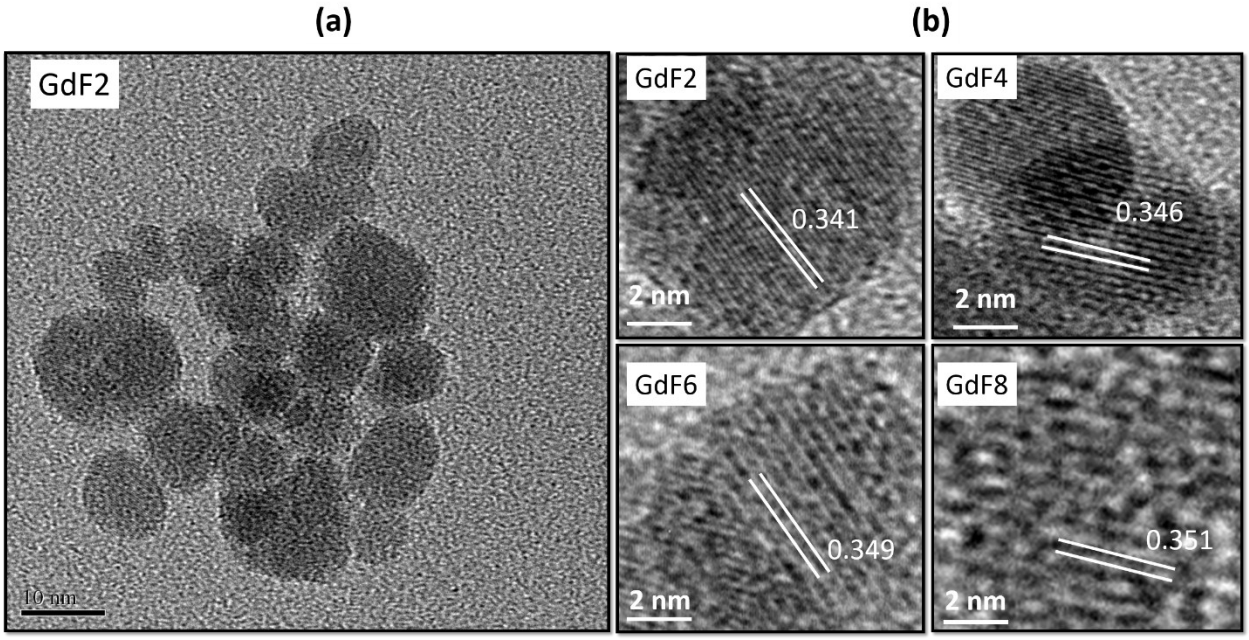

Figure S1. (a) TEM image of GdF2 sample. (b) HRTEM image of GdF2, GdF4, GdF6 and GdF8 samples.

Figure S2

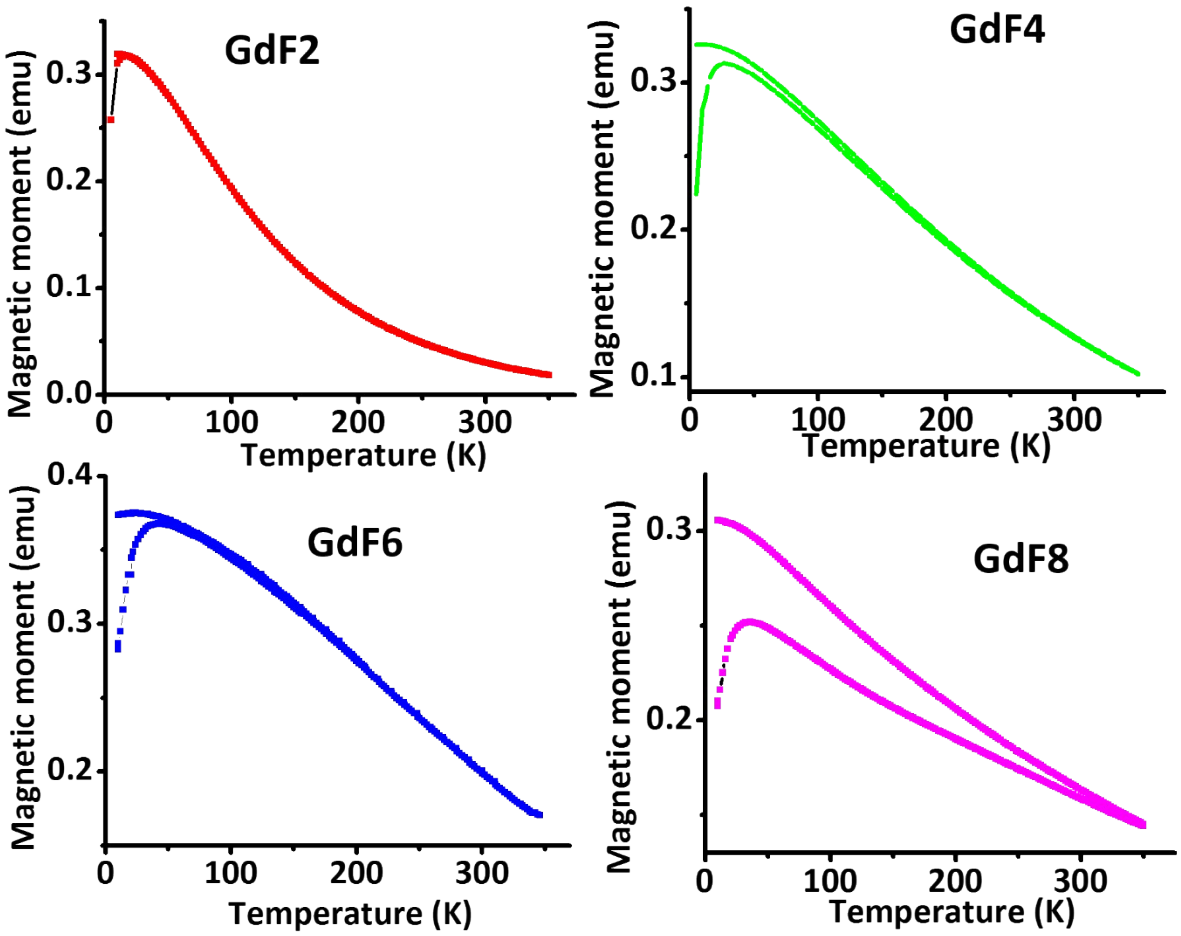
GdF2
Magnetic moment (emu)
0.0
0.1
0.2
0.3
0
100
200
300
Temperature (K)
GdF4
Magnetic moment (emu)
0.1
0.2
0.3
0
100
200
300
Temperature (K)
GdF6
Magnetic moment (emu)
0.2
0.3
0.4
0
100
200
300
Temperature (K)
GdF8
Magnetic moment (emu)
0.2
0.3
0
100
200
300
Temperature (K)

Figure S2 Temperature dependence of ZFC and FC magnetization curves of GdF2, GdF4, GdF6 and GdF8 samples at H=500 Oe.

Table S1. The hyperfine field values (H_{hf}), isomer shift (δ), quadrupole splitting (Δ), line width (Γ) and relative area (R_A) of of tetrahedral and octahedral sites of Fe^{3+} ions for $Gd_xFe_{3-x}O_4$(x = 0.02, 0.04, 0.06 and 0.08) derived from Mössbauer spectra recorded at room temperature. Isomer shift values are relative to Fe metal foil (δ = 0.0 mm/s).

Comp. x	**Iron Sites**	**Relative Area R_A (%)**	**Outer line width, (Γ) mm/s**	**Isomer shift, (δ) mm/s**	**Quadrupole splitting, (Δ) mm/s**	**Hyperfine field, (H_{hf}) Tesla**	**Fitting Quality (χ^2)**
Fe_3O_4	Doublet:1	0.128269	0.56 ± 0.023	0.22 ± .026	0.62 ± 0.034		1.00025
	Sextet: 1	0.2011	0.93 ± 0.061	0.58 ± 0.016	0.713 ± 0.027	49.98 ± 0.22	
0.02	Doublet A	64	0.709 ±0.05	0.319±0.01	0.683 ±0.01	--	1.0625
	Doublet B	36	1.809±0.38	0.402±0.05	0.685 ±0.26	--	
0.04	Doublet A	18.3	1.003±0.09	0.317±0.01	0.839±0.08	--	1.3302
	Doublet B	14.8	0.506±0.04	0.376±0.01	0.616±0.01		
	Sextet A	16.0	0.444±0.05	0.326±0.01	-0.006±0.01	48.39±0.05	
	Sextet B	50.9	1.519±0.05	0.587±0.01	-0.012±0.02	44.47±0.13	
0.06	Doublet A	23.6	0.837±0.05	0.314±0.01	0.697±0.01	--	1.1453
	Doublet B	1.9	0.262±0.05	0.335±0.02	0.646±0.04	--	
	Sextet A	17.2	0.360±0.07	0.292±0.01	-0.06±0.02	48.99±0.05	
	Sextet B	44.3	1.936±0.05	0.590±0.02	0.01±0.01	44.56±0.16	
0.08	Doublet A	28.6	0.837±0.05	0.314±0.01	0.697±0.01	--	1.0298
	Doublet B	1.9	0.262±0.05	0.335±0.02	0.646±0.04	--	
	Sextet A	15.2	0.360±0.07	0.292±0.01	-0.06±0.02	49.29±0.1	
	Sextet B	54.3	1.936±0.05	0.590±0.02	0.01±0.01	44.93±0.2	