Fig. SF1 TGA curve of as obtained NiFe$_2$O$_4$
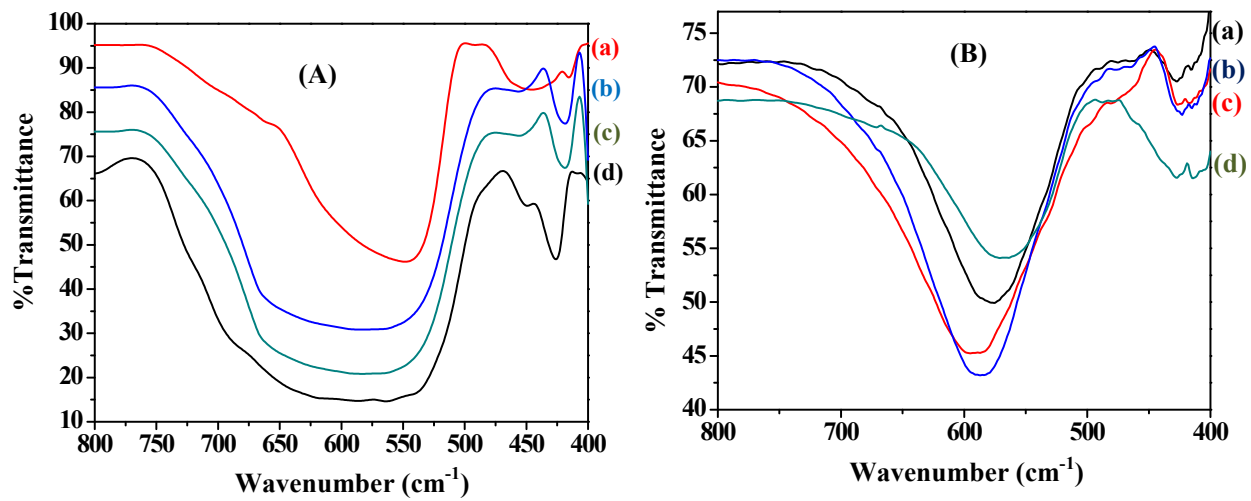
Fig. SF2 FTIR Spectra of (a) $ZnFe_2O_4$ (b) $NiFe_2O_4$ (c) $CoFe_2O_4$ and (d) $CuFe_2O_4$ annealed at (A) 400 °C and (B) 1000 °C.

Table ST1 Different parameters of MFe_2O_4 (M= Co, Ni, Cu and Zn) annealed at 400 °C

Ferrite	D_{TEM} (nm)	Crystallite size (nm)	Lattice Parameter (Å)	Eg (eV)	M_s (emu/g)	H_c (Oe)
$CoFe_2O_4$	20	25.80	8.388	1.26	65	1150
$NiFe_2O_4$	25	26.12	8.350	2.08	19	70
$CuFe_2O_4$	15	17.51	8.381	1.38	60	300
$ZnFe_2O_4$	30	30.06	8.442	1.94	6	25

Calculus of BET surface area analysis

The unique values of Q_m and C which were estimated from slope (A) and intercept (I) of BET plots can be calculated according to following equations:

$$Q_m = \frac{1}{A + I}$$

(1)

$$C = 1 + \frac{A}{I}$$

(2)

In addition, total surface area and specific surface area were obtained using following equations:

$$S_{total} = \frac{Q_m N_s}{V}$$

(3)

$$S_{BET} = \frac{S_{total}}{M}$$

(4)

where N is Avogadro's number, s ($0.1620 \ nm^2$) is the molecular cross-sectional area, V is the molar volume of the adsorbate gas and M is the mass of the adsorbent sample.