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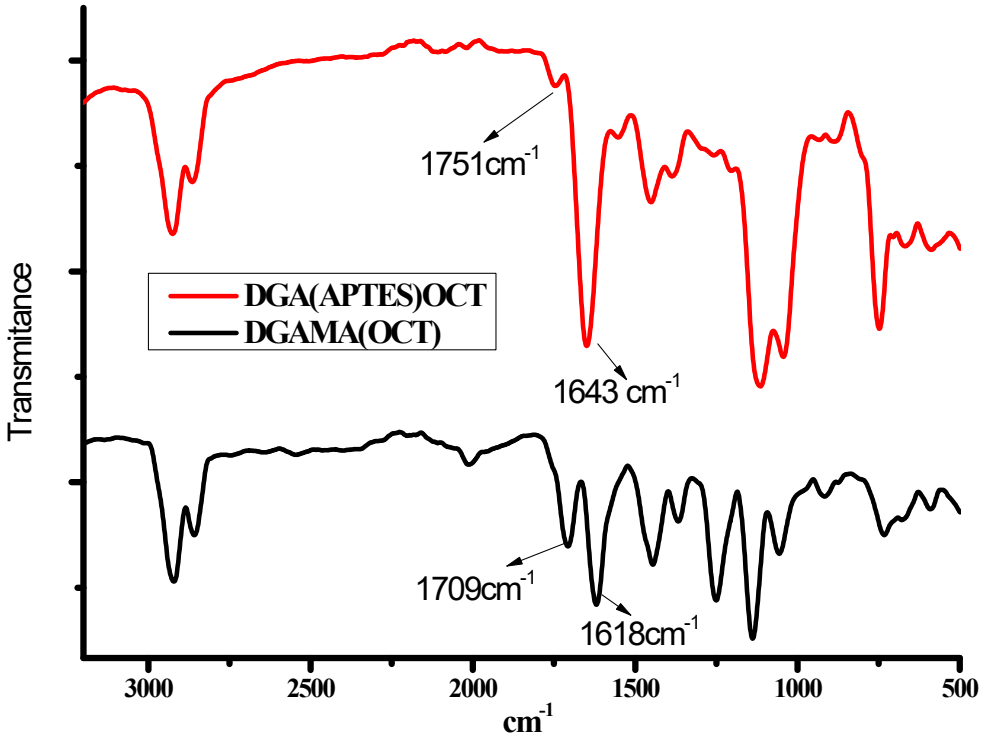

Fig. S1: ATR-FTIR spectrum of DGAMA-OCT & DGAMA-APTES-OCT

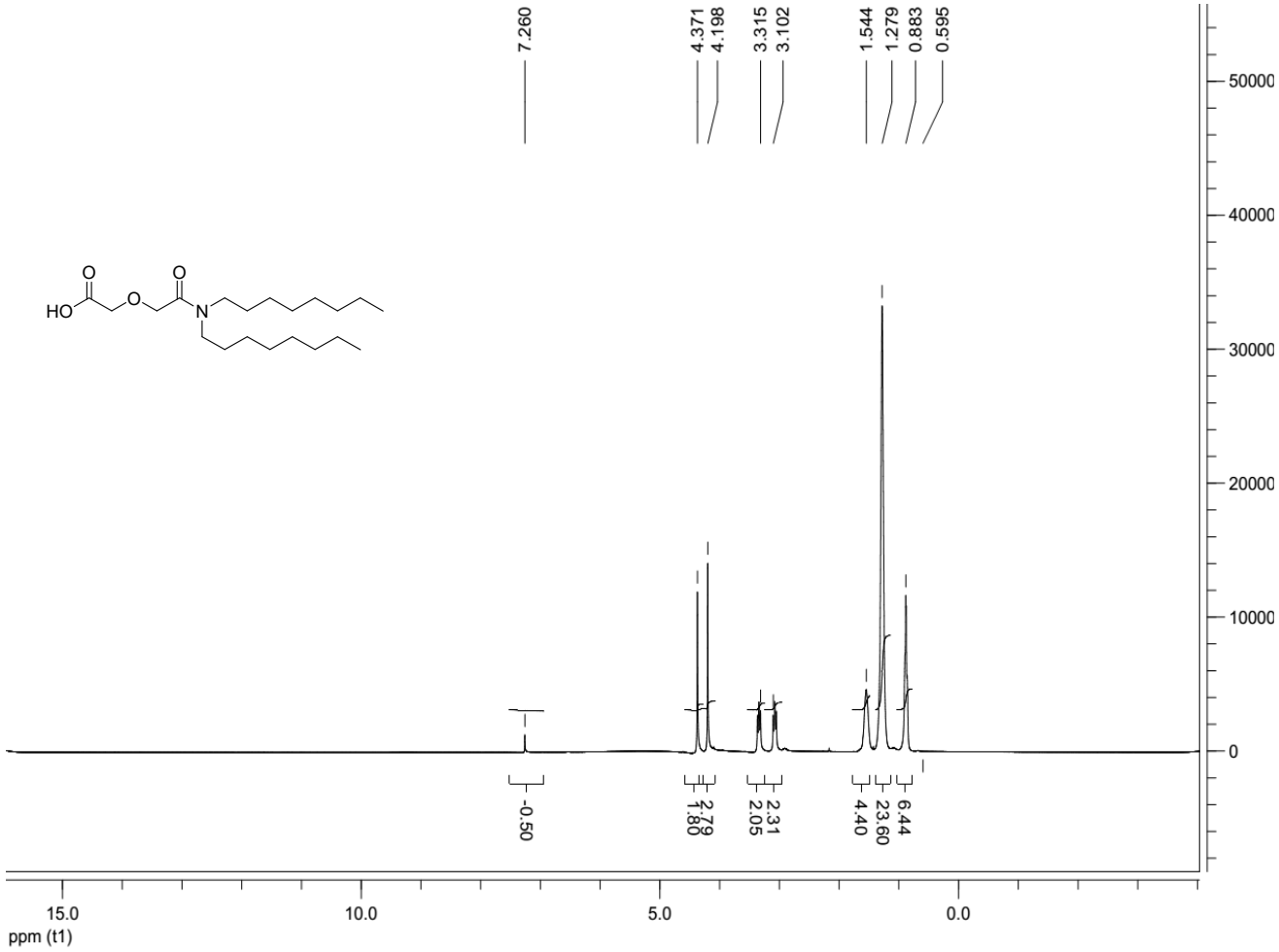

Fig. S2: ^{1}H-NMR spectra for DGAMA-OCTin $CDCl_3$

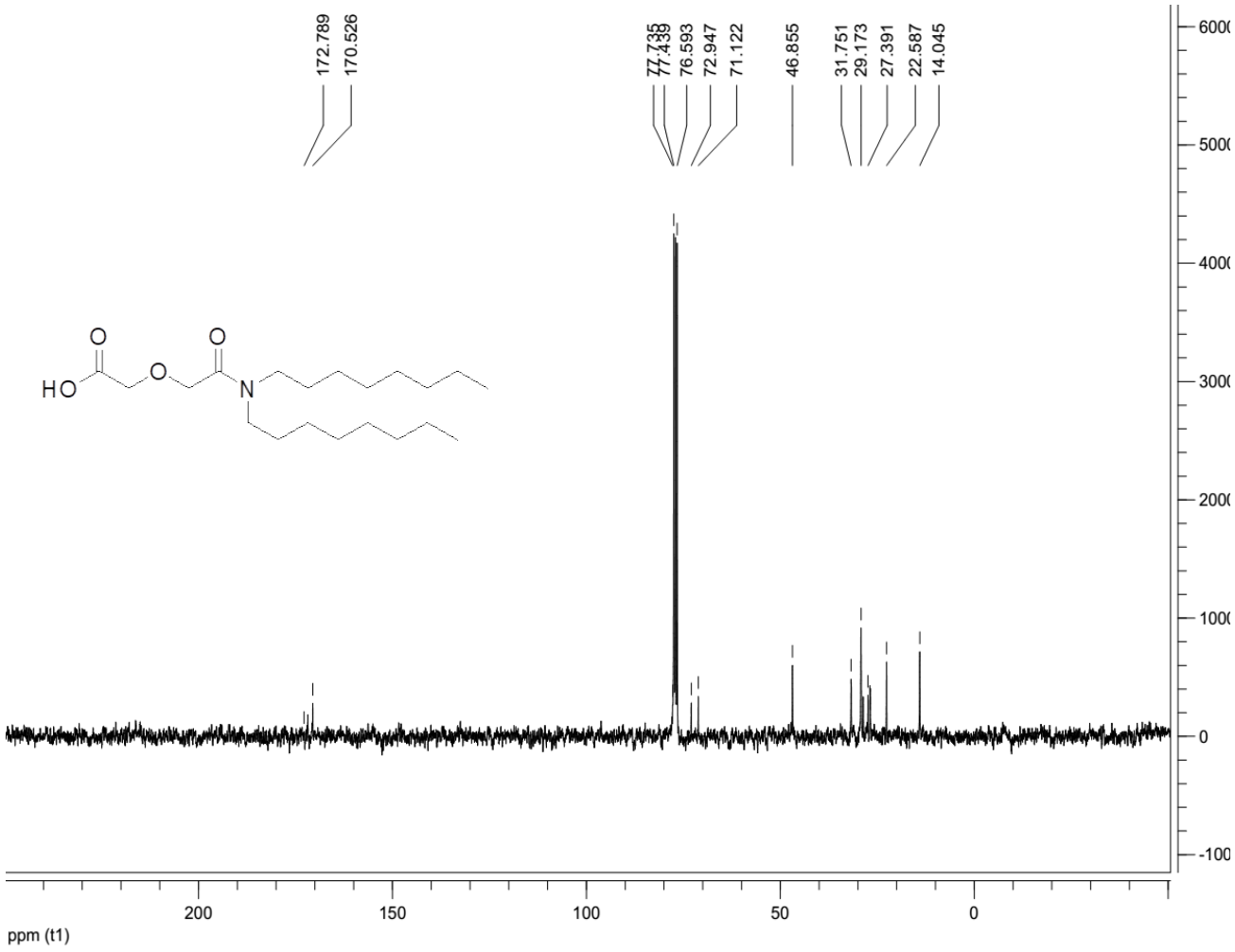

Fig. S3: ^{13}C-NMR spectra for DGAMA-OCT in $CDCl_3$

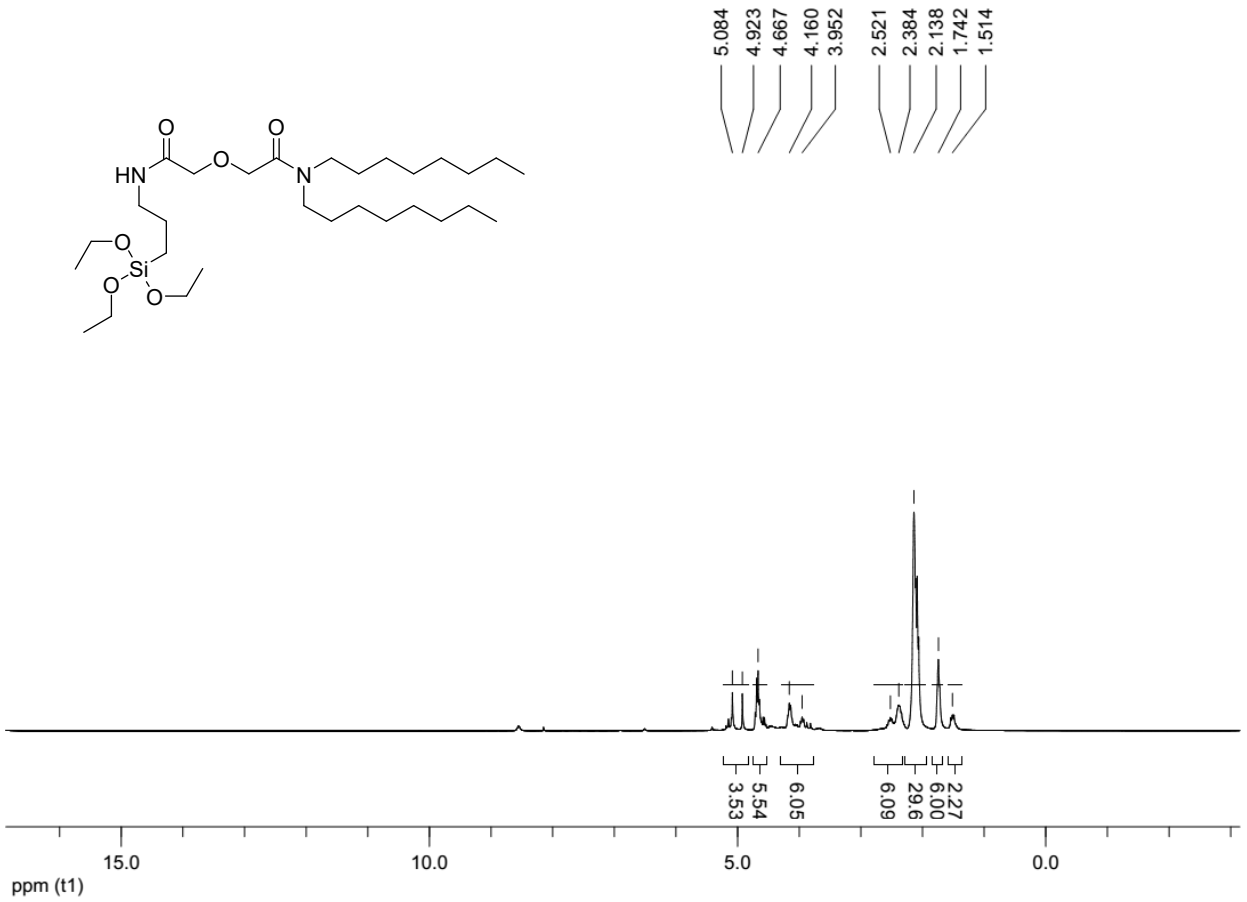

Fig. S4: ^{1}H-NMR of DGAMA-APTES-OCT in $CDCl_3$

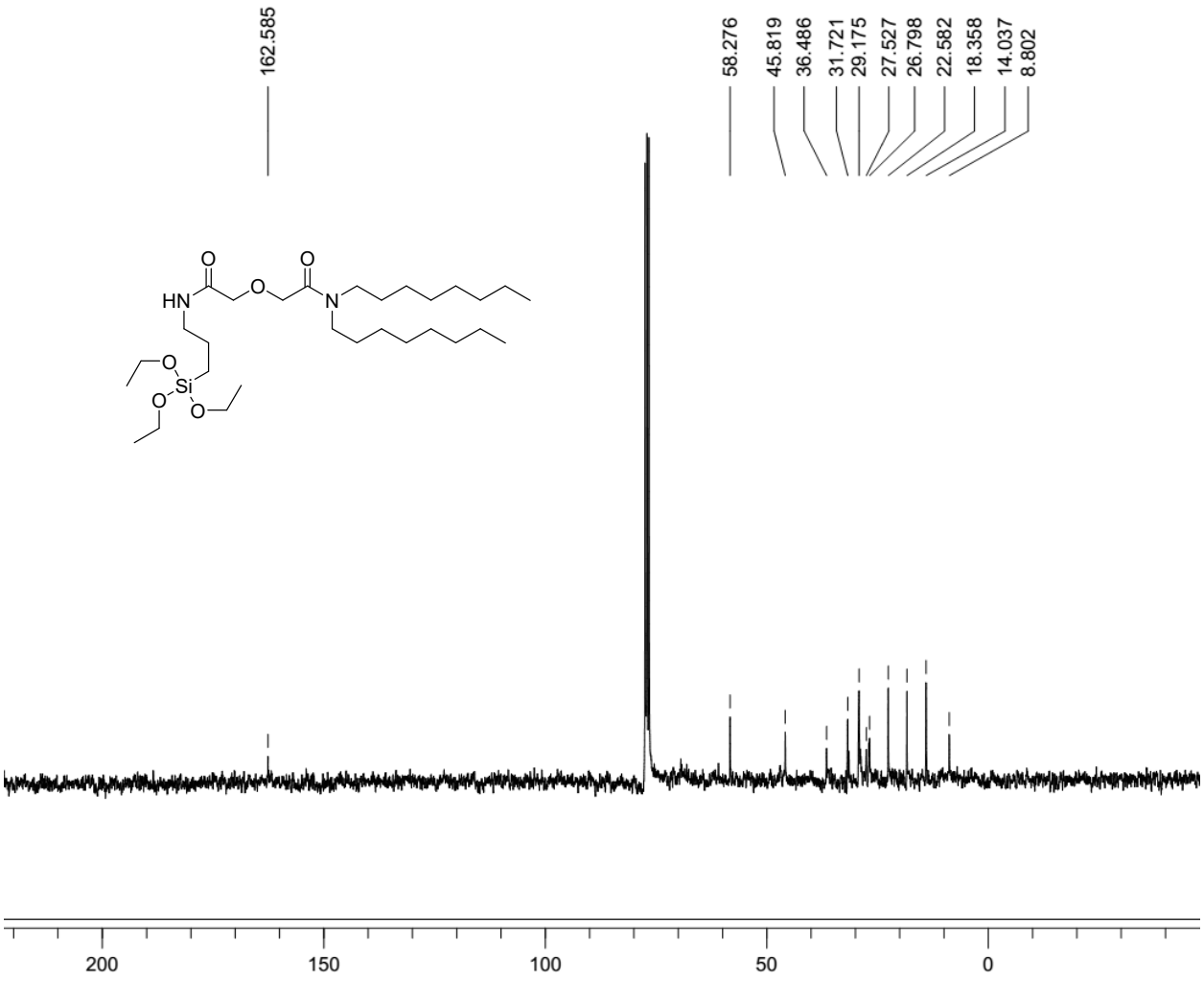

Fig. S5: ^{13}C-NMR of DGAMA-APTES-OCT in $CDCl_3$

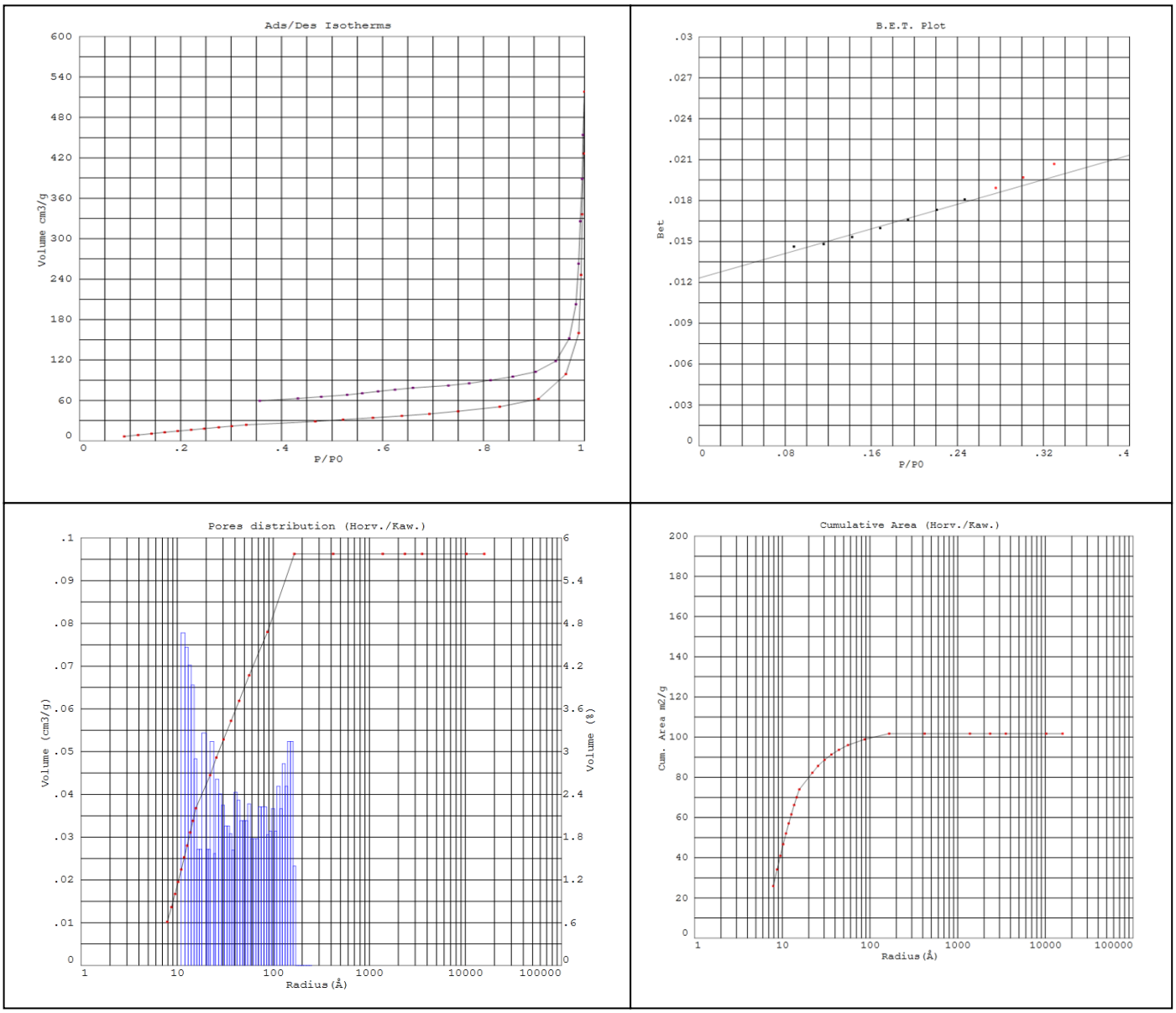

Fig. S6: N_2 adsorption- desorption study and BET analysis for Fe_3O_4MNP

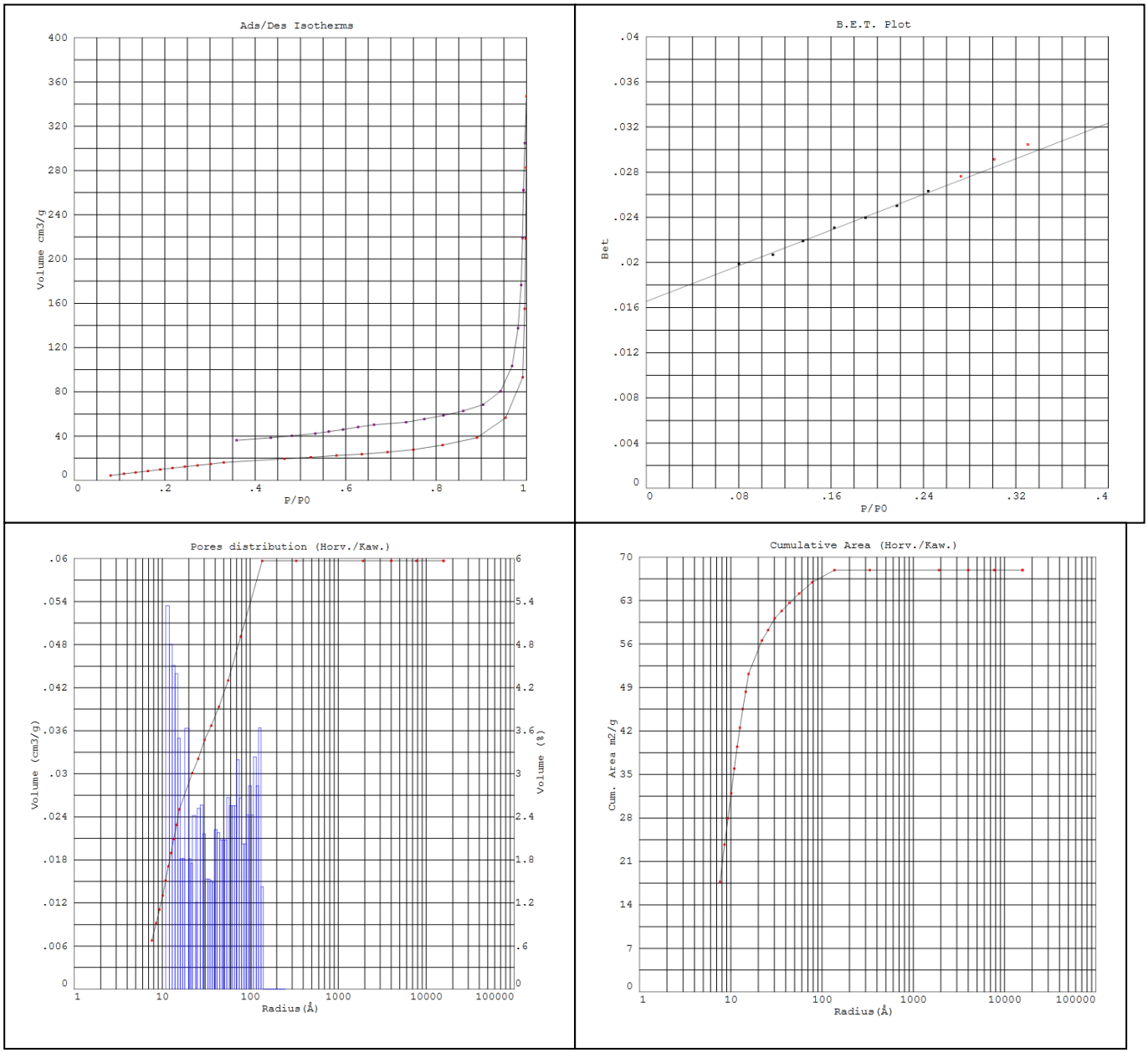

Fig. S7: N_2 adsorption- desorption study and BET analysis for silica coated core shell Fe_3O_4 MNP

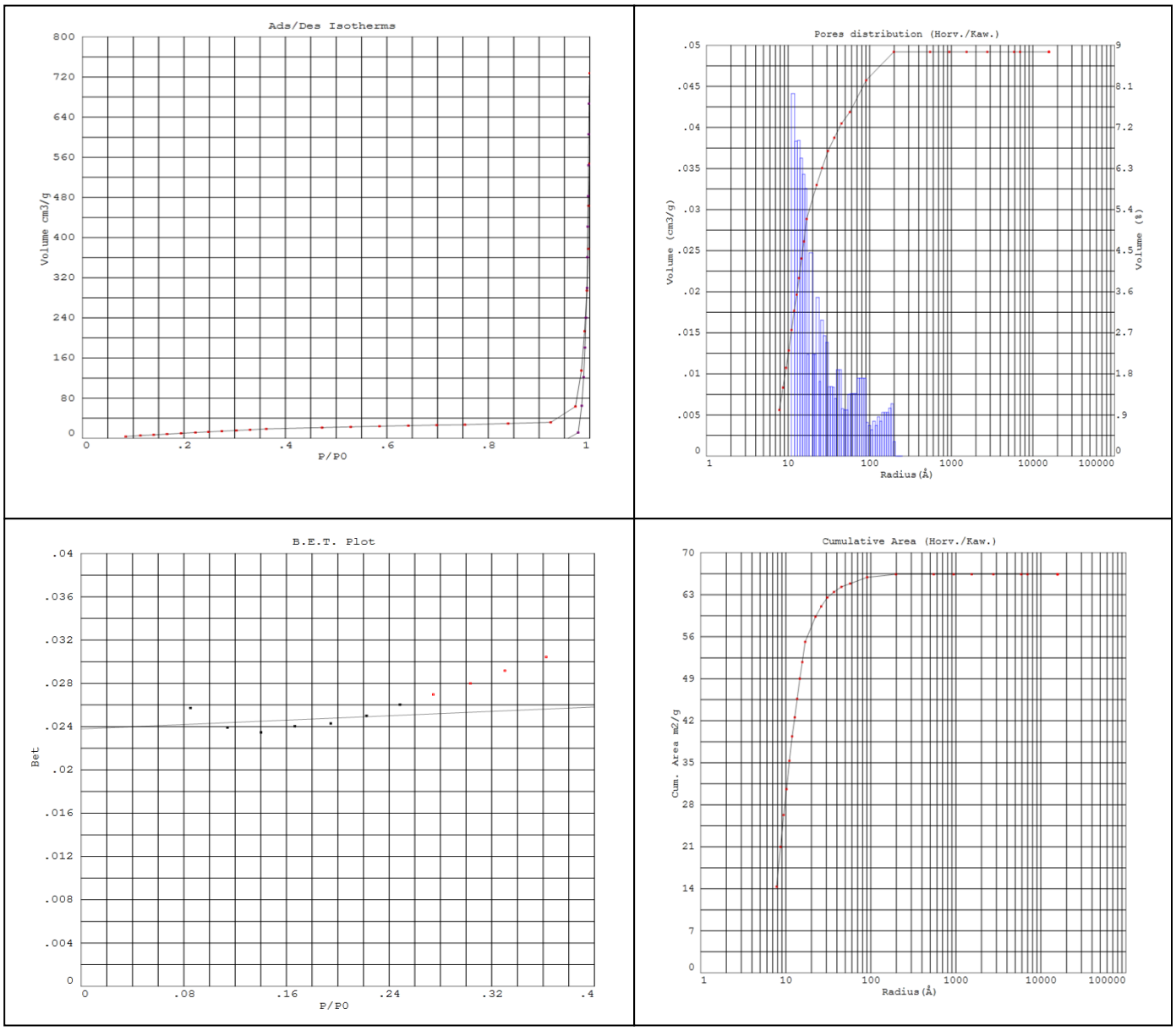

Fig. S8: N_2 adsorption- desorption study and BET analysis for MNSCDGA

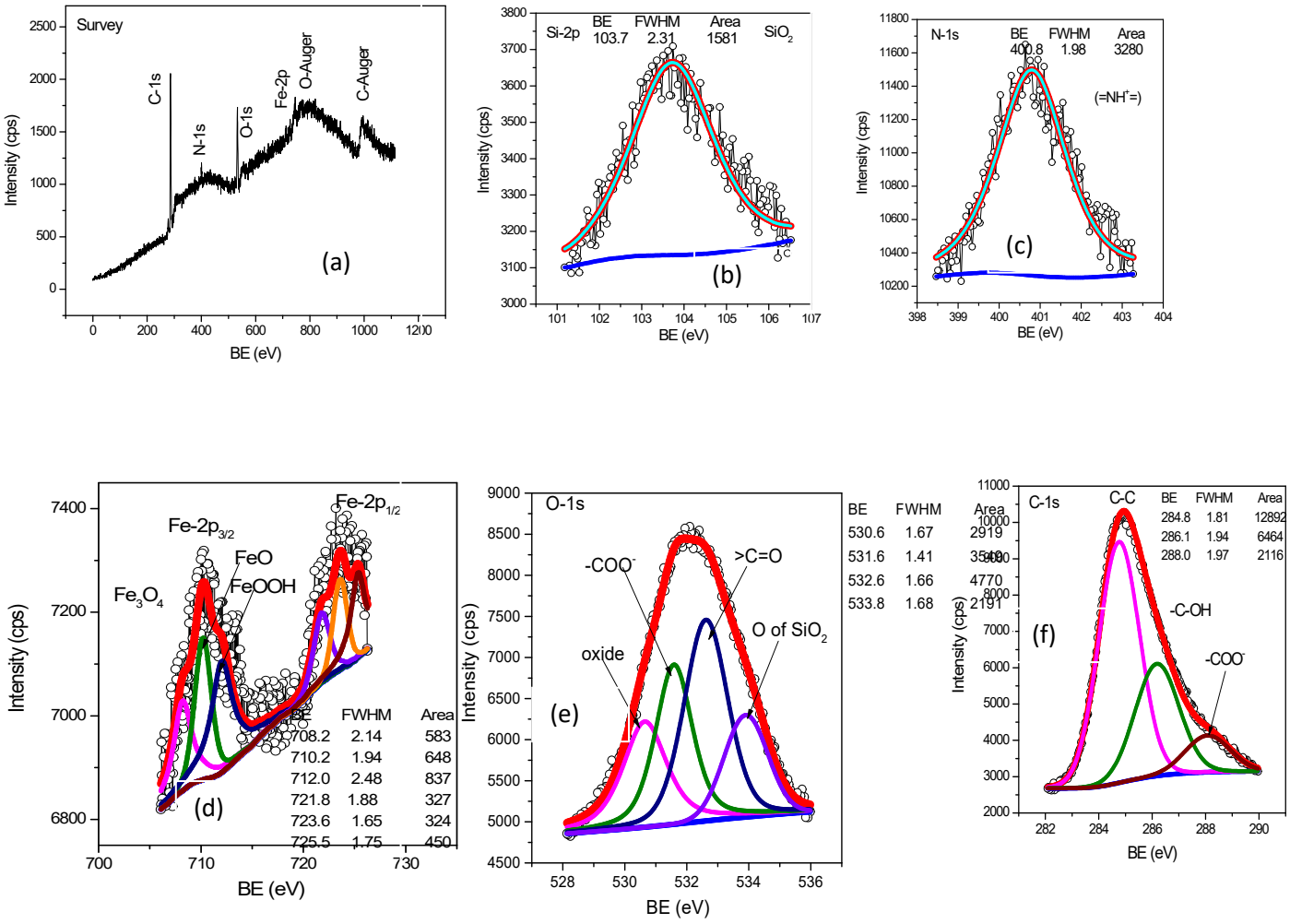

Fig. S9: XPS analysis for DGAMA-APTES-OCT (a) Full spectra in the range of 0-1100 eV; (b) Deconvoluted spectra for Si^{2P}; (c) Deconvoluted spectra for N^{1s}; (d) Deconvoluted spectra for Fe^{2P}; (e) Deconvoluted spectra for O^{1s}; (f) Deconvoluted spectra for C^{1s}

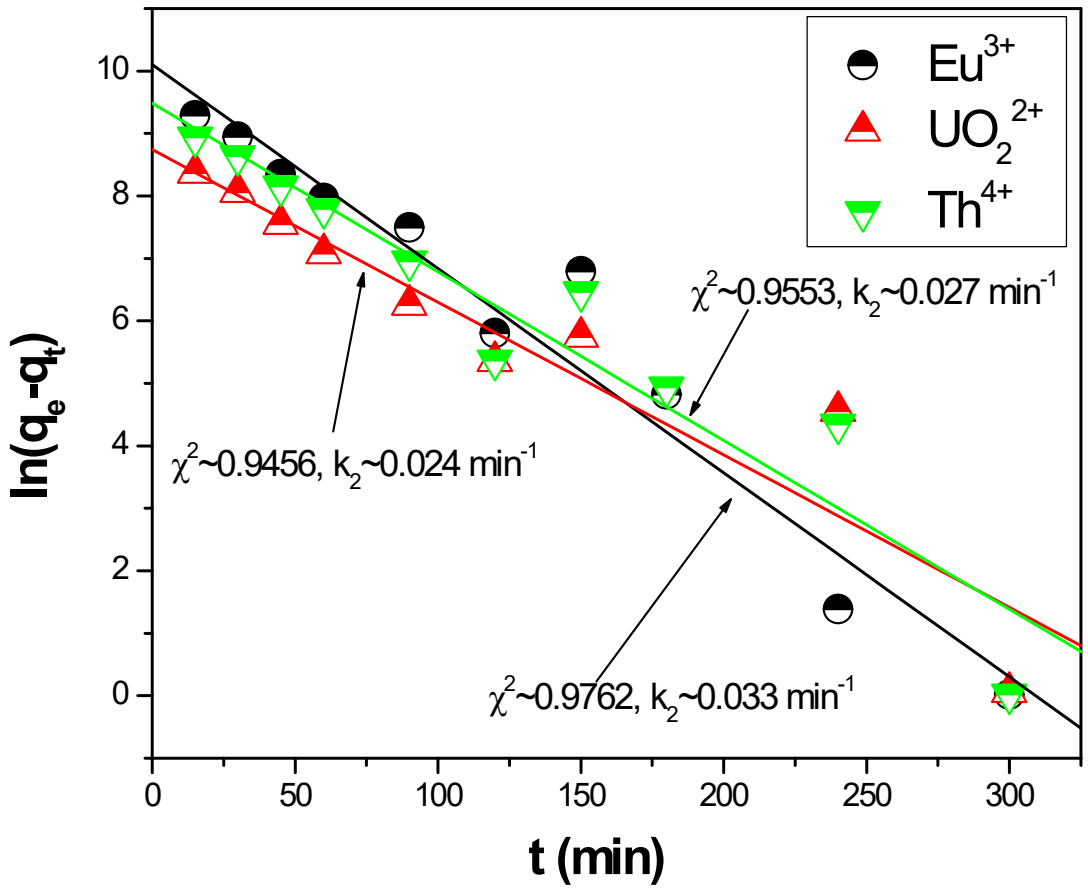

Fig. S10: Linear regression analysis for Lagergren 1st order rate kinetics for the sorption of Eu, U and Th

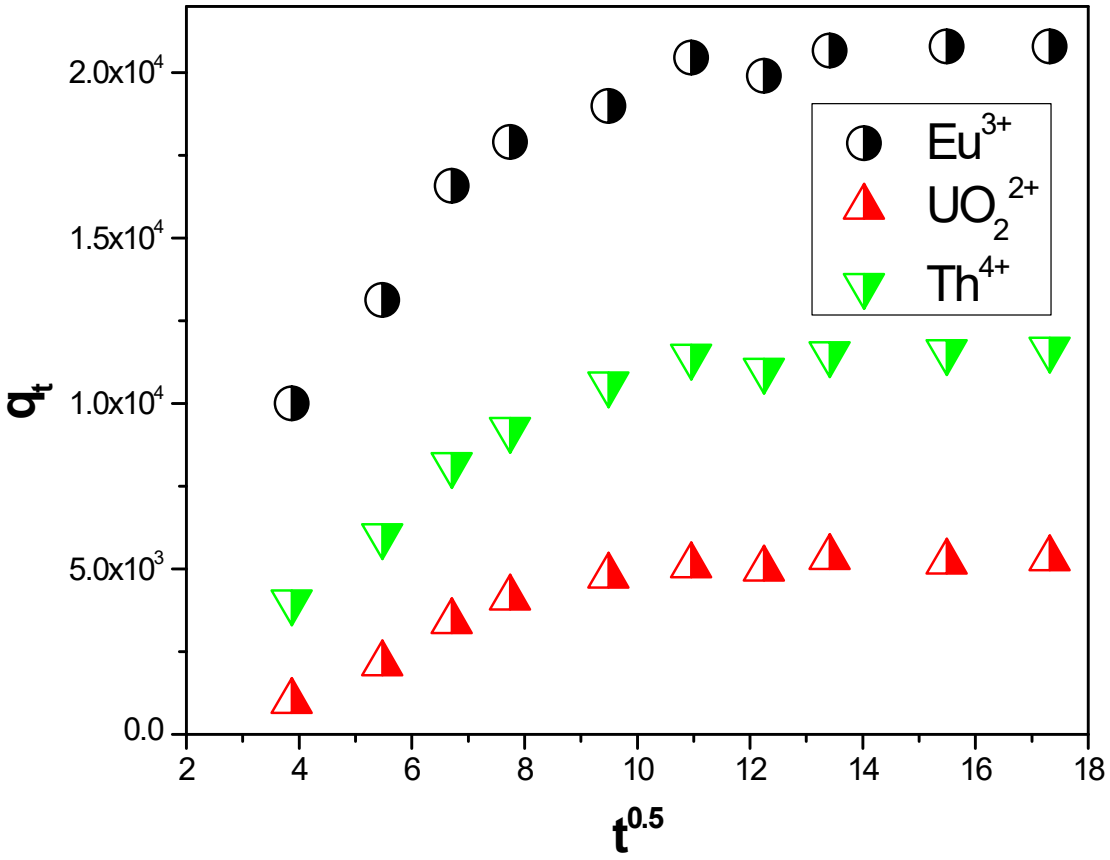

Fig. S11: Linear regression analysis for Intra particle diffusion kinetics for the sorption of Eu, U and Th

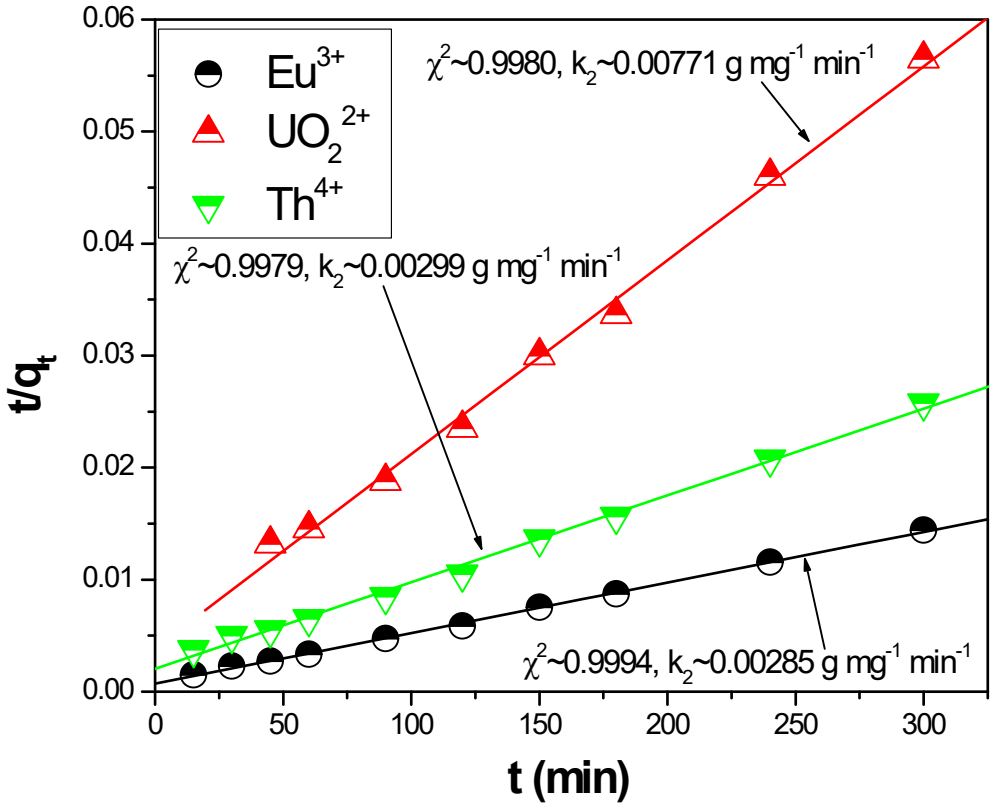

Fig. S12: Linear regression analysis for Pseudo2nd order rate kinetics for the sorption of Eu, U and Th

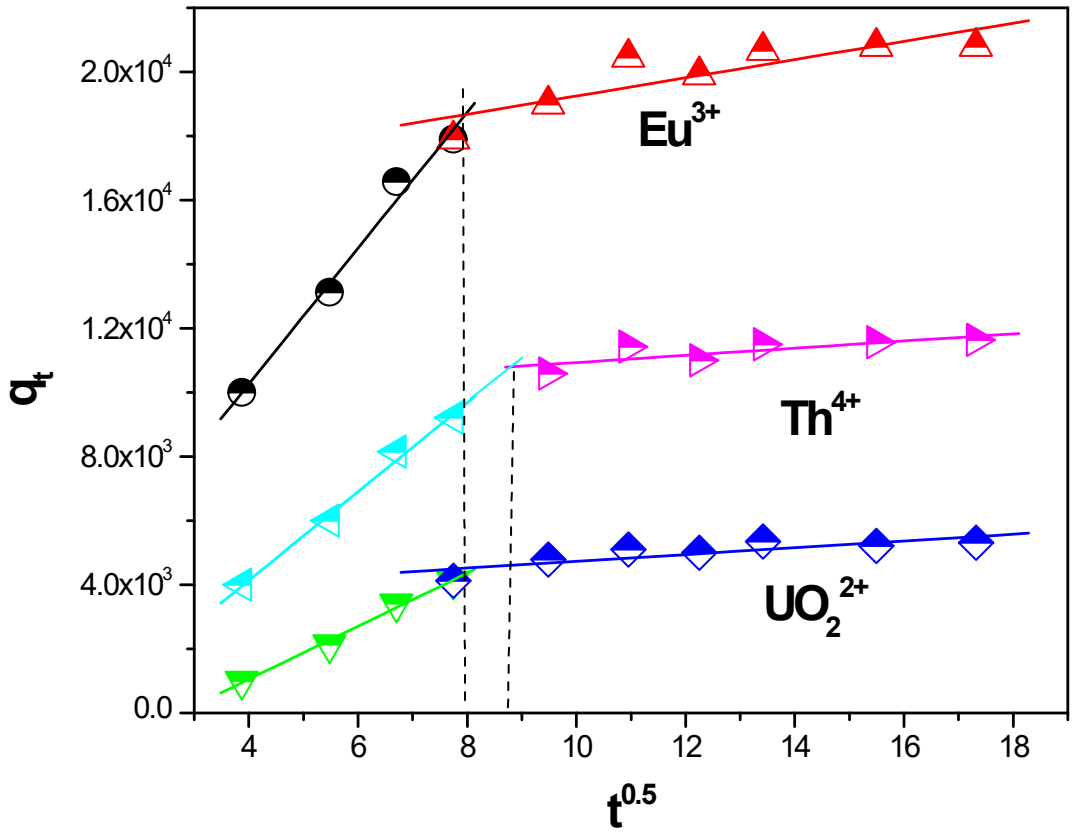

Fig. S13: Linear regression analysis for Weber-Morris model for the sorption of Eu, U and Th

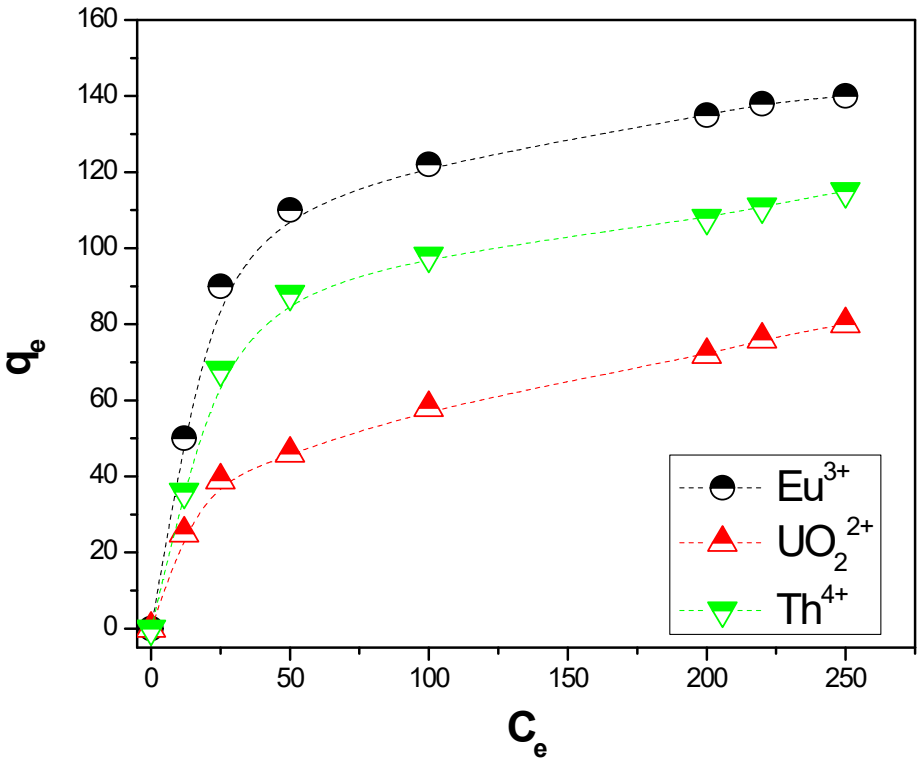

Fig. S14: Non-linear analysis of Langmuir isotherm for the sorption of Eu, U and Th

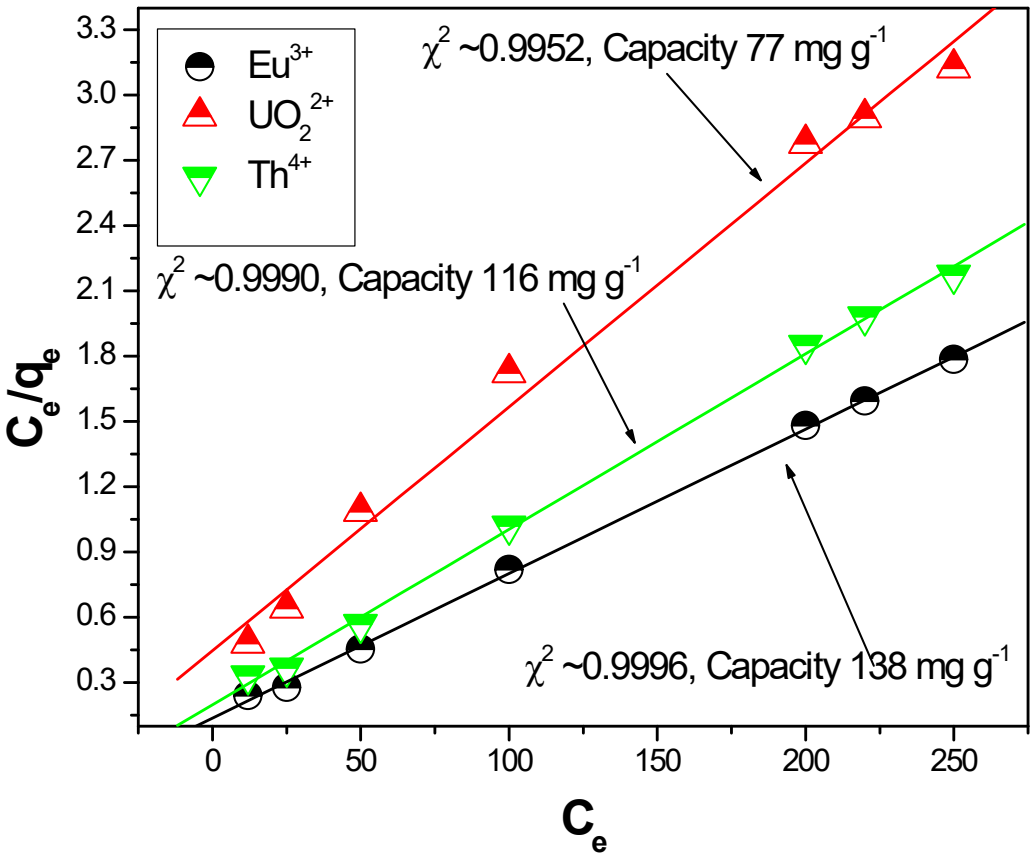

Fig. S15: Linear regression analysis of Langmuir isotherm for the sorption of Eu, U and Th

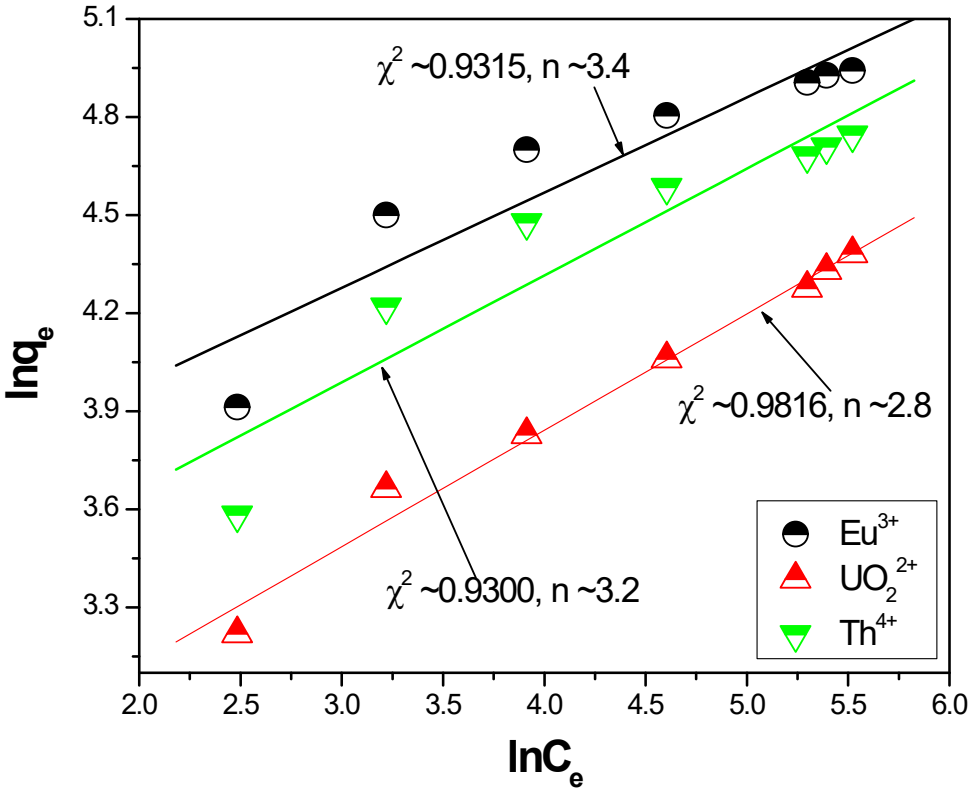

Fig. S16: Linear regression analysis of Fruendlich isotherm for the sorption of Eu, U and Th

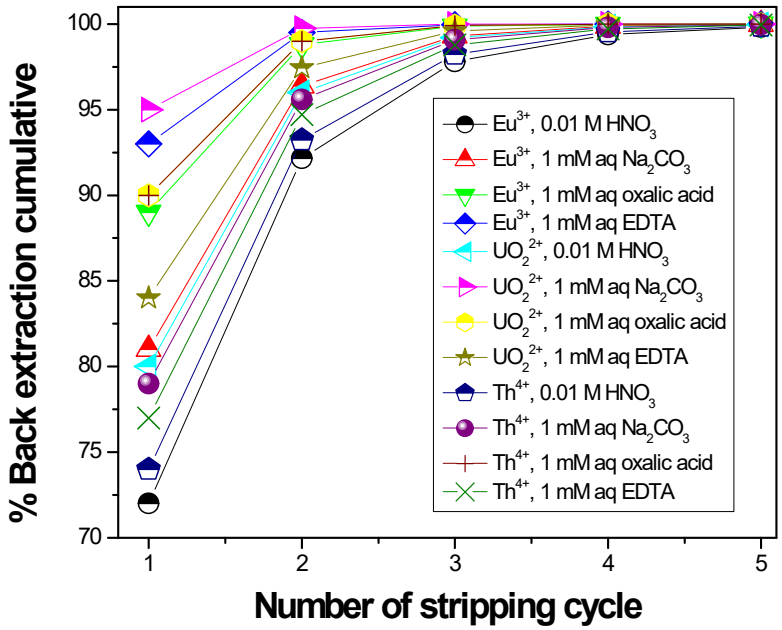

Fig. S17: Cumulative back extraction of f-block cations from loaded solid phase using different aqueous phase complexing agents

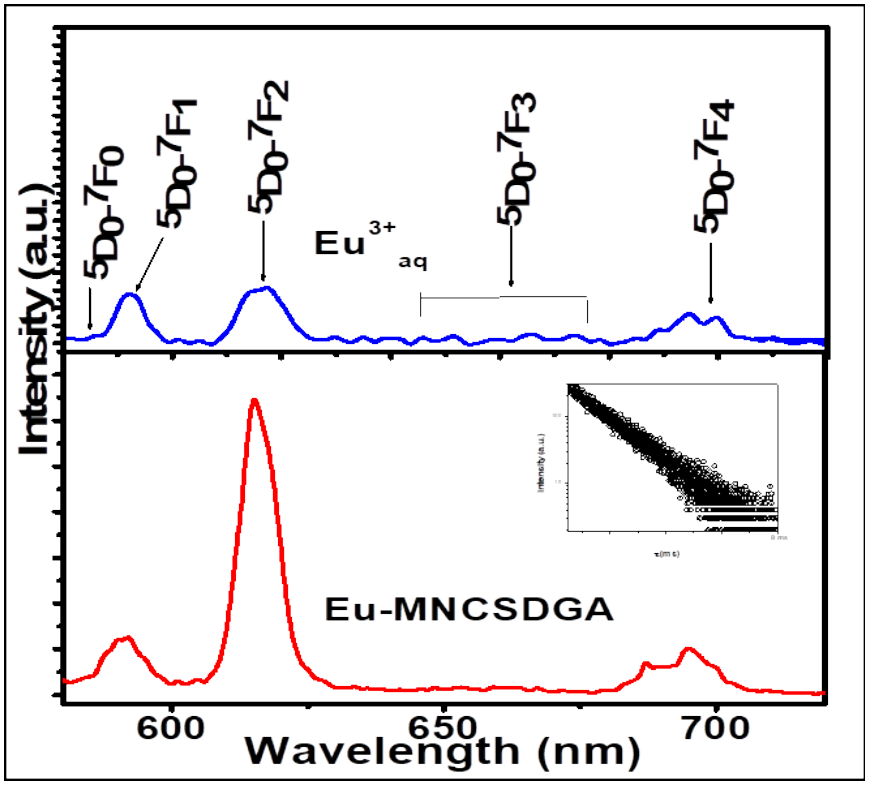

Fig. S18: Luminescence spectra of Eu^{3+} aq. & Eu MNCSDGA

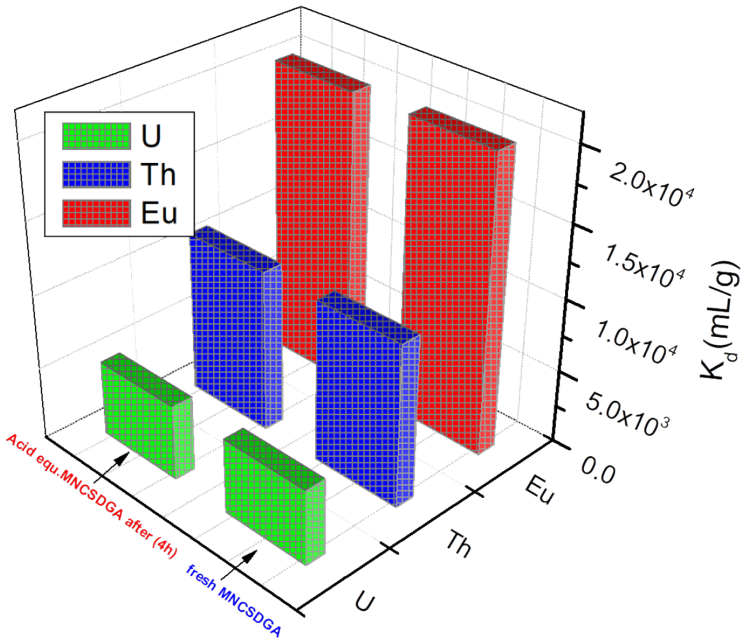

Fig. S19: K_d (mL/g) values of Eu, Th, & U from 4.0 M HNO_3 before and after 4h of acid equilibration

Table S1: The separation factor of common metal ions over Eu, U and Th

Material	Specific surface area ($m^2 g^{-1}$)	pore specific volume($cm^3 g^{-1}$)	maximum pore volume ($cm^3 g^{-1}$	C Value BET	Co-relation factor
Fe_3O_4MNP	124.93	0.096	0.096	2.83	0.9890
Silica coated Fe_3O_4MNP	77.69	0.060	0.060	3.38	0.9983
MNCSDGA	150.77	0.049	0.049	1.21	0.3081

Table S2: The separation factor of common metal ions over Eu, U and Th

Metal ion (X)	$\beta_{Eu/X}$	$\beta_{U/X}$	$\beta_{Th/X}$
Na^+	355.3	89.3	196.4
K^+	301.5	75.8	166.6
Ca^{2+}	49.8	12.5	27.5
Mg^{2+}	43.2	10.9	23.9
Fe^{3+}	28.43	7.1	15.7
Cr^{3+}	29.9	7.5	16.5
Mn^{2+}	46.3	11.6	25.6

Table S3: Comparative picture of sorption behaviour different magnetic materials

Material	Sorption capacity (mg/g)			Operating medium	Stability in nitric acid	Ref
	U	Th	Eu			
GEMNPs	47.28	45.48	32.2	pH	No	22
Fe3O4@SiO2/P (TRIM-VPA)	60.4	*	*	4.0 M HNO3	Yes	23
Fe3O4@C@ASA	46.2	*	*	pH	No	24
Fe3O4@MCM-41-PDA/OA	38.11	*	25.4	pH	No	25
Fe3O4@MnO2 hollow spheres	13.95	*	*	pH	No	26
Octadecylphosphonic acid bilayer@MnFe2 O 4 NPs	1000	*	*	pH	No	27
Oleyl phosphate bilayer@MnFe2 O 4 NPs	1667	*	*	pH	No	27
Phosphated-Fe3 O 4 NPs	1690	*	*	pH	No	28
Fe3O4@ZIF-8	523.5	*	*	pH	No	10a
MNSCDGA	77	116	138	4.0 M HNO3	Yes	This work

*not reported

Equation(s)

i. Lagergren 1st order: $\ln (q_e - q_t) = lnq_e - k_1 t$, Here, q_e and q_t (mg/g) are the adsorptive removal capacity at equilibrium and variable time (t), respectively. k_1 is the rate constant

ii. Pseudo 2nd order : $\frac{t}{q_t} = \frac{1}{k_2 q_e^2} + \frac{t}{q_e}$; Where, qt and qe are the amount of metal ion adsorbed at equilibrium and at time t, k2 is the pseudo 2nd order rate constants.

iii. Intra-particle diffusion kinetics: $q_t = k_I\sqrt{t} + C$; K_d is the intraparticle diffusion rate constant and C is the intercept

iv. Langmuir isotherm: $\frac{C_e}{q_e} = \frac{1}{q_o b} + \frac{C_e}{q_o}$; where qe (mg/g) and Ce (mg/L) are the amount of adsorbed metal ion per unit mass of adsorbent and unadsorbed metal ion concentration in solution at equilibrium, respectively. Q_0 (mg/g) is the maximum amount of metal ion per unit mass of sorbent to form a complete monolayer on the surface bound at high Ce and b is a constant related to the affinity of the binding sites.

v. Freundlich Isotherm: $\log q_e = \log K_f + \frac{1}{n}\log c_e$; where K_f and n are Freundlich constants ; K_f (mg/g (L/mg)1/n) being the sorption capacity of the adsorbent, and n giving an indication the favorability of the sorption process. Values of n > 1 represent favorable adsorption condition

vi. $N_{H_2O} = \frac{1.05}{\tau} - 0.7$; where N_{H2O}, stands for number of water molecule and lifetime of the luminescence decay

vii. Asymmetry factor = $\frac{I_{5_{D_0 \rightarrow {}^7F_1}}}{I_{5_{D_0 \rightarrow {}^7F_2}}}$; I stands for intensity of respective emission lines.

Reference:

1. P.P. Barthelemy, G.R. Choppin, Luminescence study of complexation of europium and dicarboxylic acids, Inorg. Chem. , 28 (1989) 3354 –3357.
2. H. Zheng , D. Liu, Y. Zheng, S. Liang, Z. Liu, Sorption isotherm and kinetic modeling of aniline on Cr-b entonite, J. Hazard. Mater, 167 (20 09) 141–147.