

## Supporting Information

### **A Structurally Engineered Flower Shaped Magnetic Hierarchical Sorbent for Rapid and Selective Uptake of Pb<sup>2+</sup> ions from Water Samples**

Kanika Solanki<sup>ab</sup>, Shivani Sharma<sup>c</sup>, Pooja Rana<sup>a</sup>, Bhawna Kaushik<sup>a</sup>, Sneha Yadav<sup>ae</sup>, Ranjana Dixit<sup>c</sup>, Ankush V. Birdar<sup>d</sup>, Ashu Gupta<sup>b</sup> and R. K. Sharma<sup>\*a</sup>

<sup>a</sup>Green Chemistry Network Centre, Department of Chemistry, University of Delhi, New Delhi-110007, India; Tel: 011-276666250, E-mail: [rksharmagreenchem@hotmail.com](mailto:rksharmagreenchem@hotmail.com)

<sup>b</sup>Department of Chemistry, Shyamlal College, University of Delhi, New Delhi-110032, India

<sup>c</sup>Department of Chemistry, Ramjas College, University of Delhi, New Delhi-110007, India

<sup>d</sup>CSIR-CSMCRI, Bhavnagar, Gujrat, 364002, India

<sup>e</sup>Department of Chemistry, Institute of Home Economics, University of Delhi- 110016, India

#### **Table of Contents**

<b>1.</b>	<b>Result and Discussion</b>	
	<i>1.1 FT-IR analysis</i>	S2
	<i>1.2 XRD studies</i>	S2
	<i>1.3 TGA analysis</i>	S3
	<i>1.4 Quantitative Analysis of developed sorbent (Elemental composition)</i>	S3
	<i>1.5 Detailed XPS Spectra of N 1s</i>	S4
<b>2.</b>	<b>Activity of developed metal scavenger for the adsorption of Pb<sup>2+</sup> ions</b>	S4
	<i>2.1 Zeta Potential studies</i>	S4
	<i>2.2 Adsorption Kinetics (Contact time)</i>	S4
	<i>2.3 Effect of adsorbent dosage</i>	S5

## 1. Results and discussion

### 1.1. FT-IR analysis

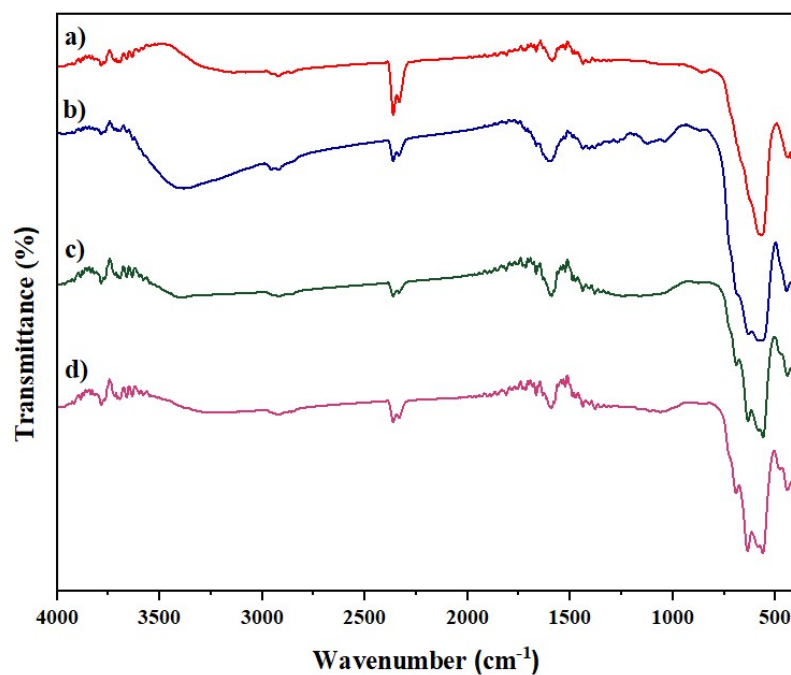


Fig. S1. FT-IR spectra of (a) flower shape  $\text{Fe}_3\text{O}_4$ , (b) functionalized ferrite ( $\text{CPTMS}@Fe_3O_4$ ), (c) ligand grafted ferrite ( $\text{SALDETA}@CPTMS@Fe_3O_4$ ) and Pb adsorbed ligand grafted ferrite ( $\text{Pb}@SALDETA@CPTMS@Fe_3O_4$ )

### 1.2 X-ray diffraction studies (XRD)

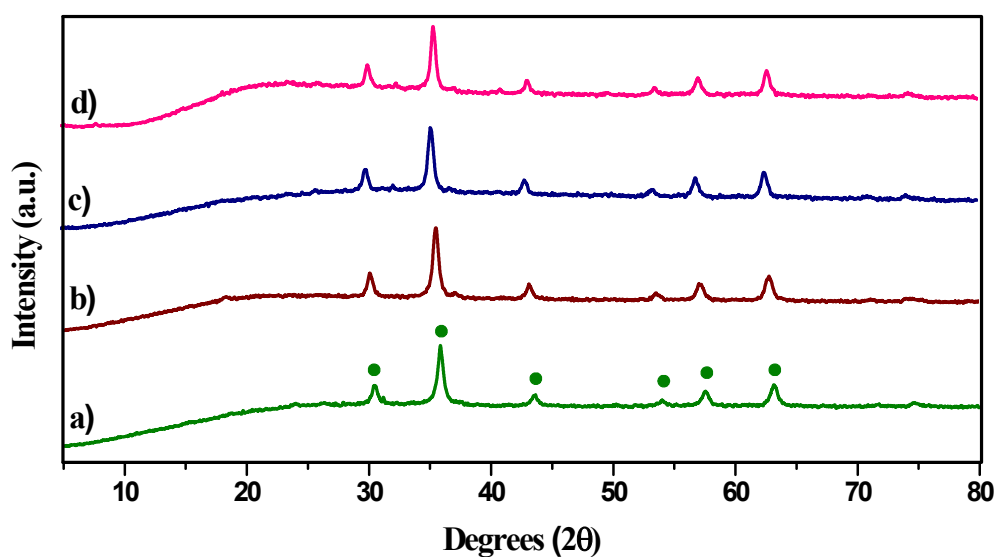


Fig. S2. XRD patterns of a) 3D flower shaped  $\text{Fe}_3\text{O}_4$ , b)  $\text{CPTMS}@Fe_3O_4$ , c)  $\text{SALDETA}@CPTMS@Fe_3O_4$  and d)  $\text{Pb}^{2+}@SALDETA@CPTMS@Fe_3O_4$

### 1.3 TGA analysis

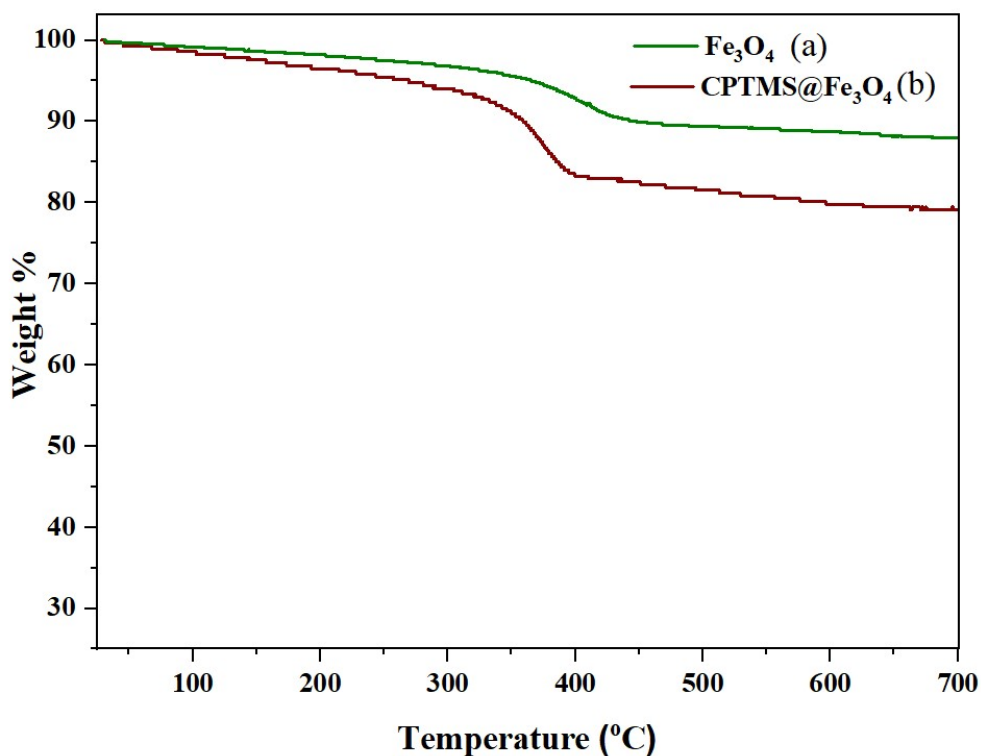


Fig. S3. TGA curves of Fe<sub>3</sub>O<sub>4</sub> (a) and CPTMS@Fe<sub>3</sub>O<sub>4</sub> (b)

### 1.4 Detailed quantitative analysis of elemental composition of developed adsorbent

Element	Weight %	Atomic %	Net Int.	Error %
C K	29.32	45.47	86.34	8.21
N K	4.38	5.82	5.99	15.34
O K	31.94	37.18	149.94	9.08
Si K	0.23	0.15	4.47	17.62
Fe K	34.13	11.38	233.84	2.18

Fig. S4. Detailed quantitative analysis of elemental composition of developed adsorbent

### 1.5 Detailed XPS Spectra of N 1s of developed adsorbent

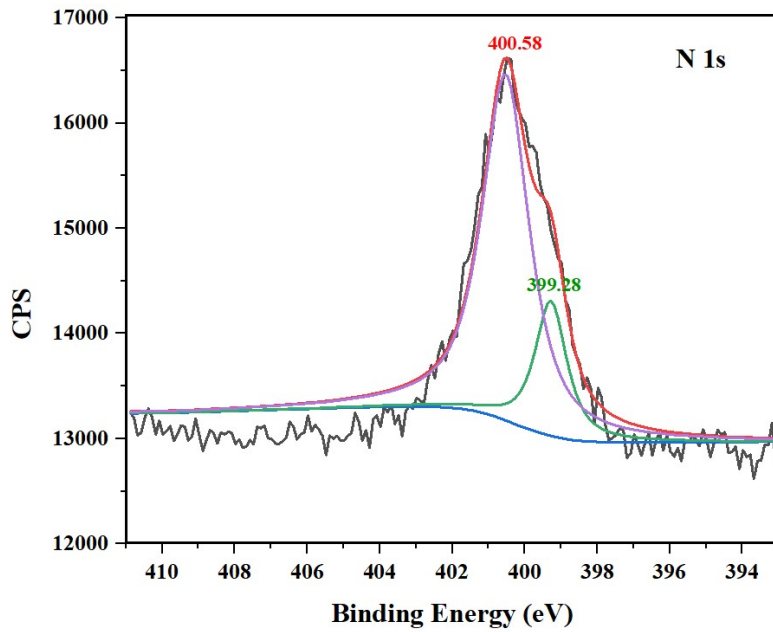


Fig. S5. Detailed XPS Spectra of N 1s of adsorbent

## 2. Activity of developed metal scavenger for the adsorption of $Pb^{2+}$ ions

### 2.1 Zeta Potential studies

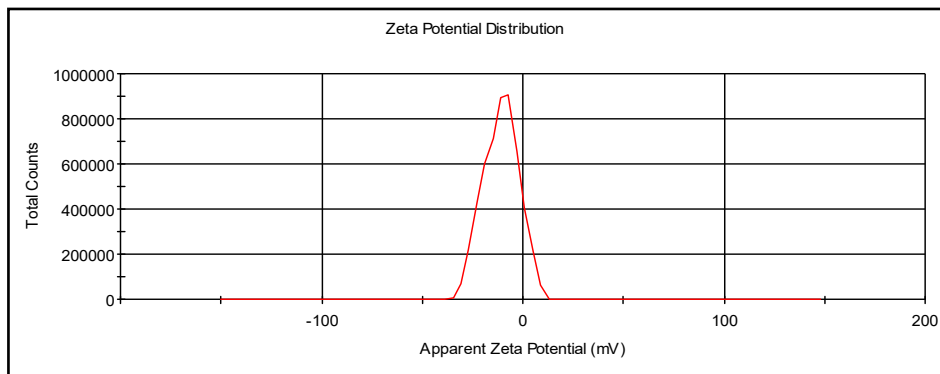


Fig. S6. Zeta potential measurements (-10.9 mV) of SALDETA@CPTMS@ $Fe_3O_4$

### 2.2 Adsorption Kinetics (Contact time)

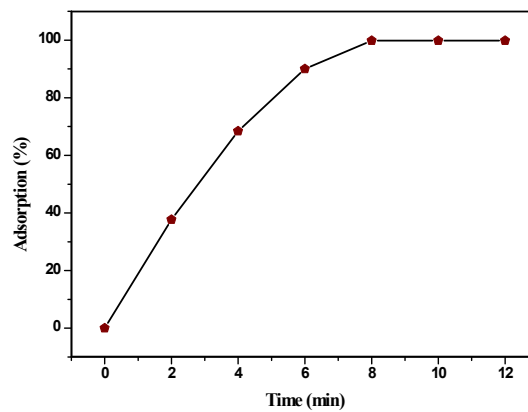


Fig. S7. Effect of contact time on the adsorption of  $\text{Pb}^{2+}$  ions by engineered 3D hierarchical structures (Conditions: initial concentration:  $10 \text{ mg L}^{-1}$ , pH: 5.5, adsorbent dosage:  $1 \text{ g L}^{-1}$ , temperature: 298 K)

### 2.2 Effect of adsorbent dosage

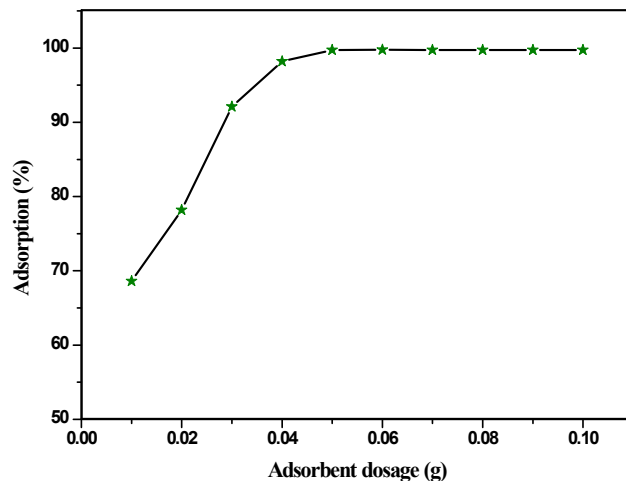


Fig. S8. Effect of adsorbent dosage on the adsorption of  $\text{Pb}^{2+}$  ions by SALDETA decorated magnetic architectures (Conditions: initial concentration:  $10 \text{ mg L}^{-1}$ , pH: 5.5, time: 8 min, temperature: 298 K)

### 2.3 Adsorption thermodynamics and effect of temperature

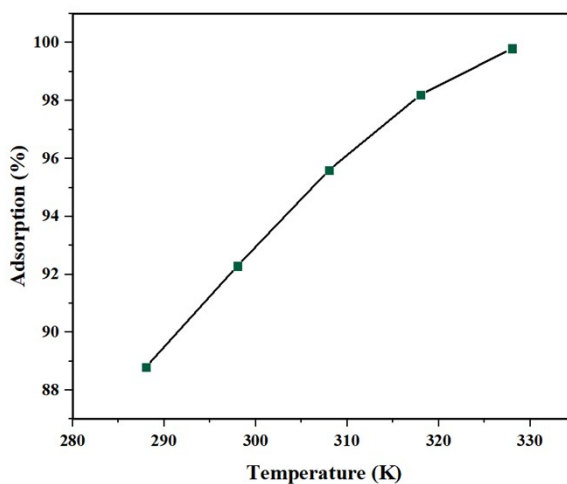


Fig. S9. Effect of temperature on the adsorption of  $\text{Pb}(\text{II})$  by functionalized flower shape architectures ( $\text{SALDETA@CPTMS@Fe}_3\text{O}_4$ )

