

## Supplementary Information

### Regeneratable chitosan embedded magnetic iron oxide beads for nitrate removal from industrial wastewater

Muntaha Nasir<sup>1</sup>, Farhan Javaid<sup>1</sup>, M Talha Masood<sup>1</sup>, Dr Muhammad Arshad<sup>2</sup>, Muhammad Yasir<sup>3</sup>, Vladimir Sedlarik<sup>3</sup>, Muhammad Abdel Qadir<sup>4</sup>, Hazim M. Qiblawey<sup>5</sup>, Wenjuan Zhang<sup>6</sup>, Kashif Mairaj Deen<sup>7</sup>, Edouard Asselin<sup>7</sup>, Nasir M. Ahmad<sup>1,\*</sup>

<sup>1</sup> Polymer Research Lab, School of Chemical and Materials Engineering (SCME), National University of Sciences and Technology (NUST), H-12, Islamabad, Pakistan

<sup>2</sup> Institute of Environmental Science and Engineering (IESE), National University of Sciences and Technology (NUST), H-12, Islamabad, Pakistan

<sup>3</sup> Centre of Polymer Systems, University Institute, Tomas Bata University in Zlín, Třída Tomáše Bati 5678, 76001 Zlín, Czech Republic

<sup>4</sup> School of Chemistry, The University of the Punjab, Lahore-54590, Pakistan

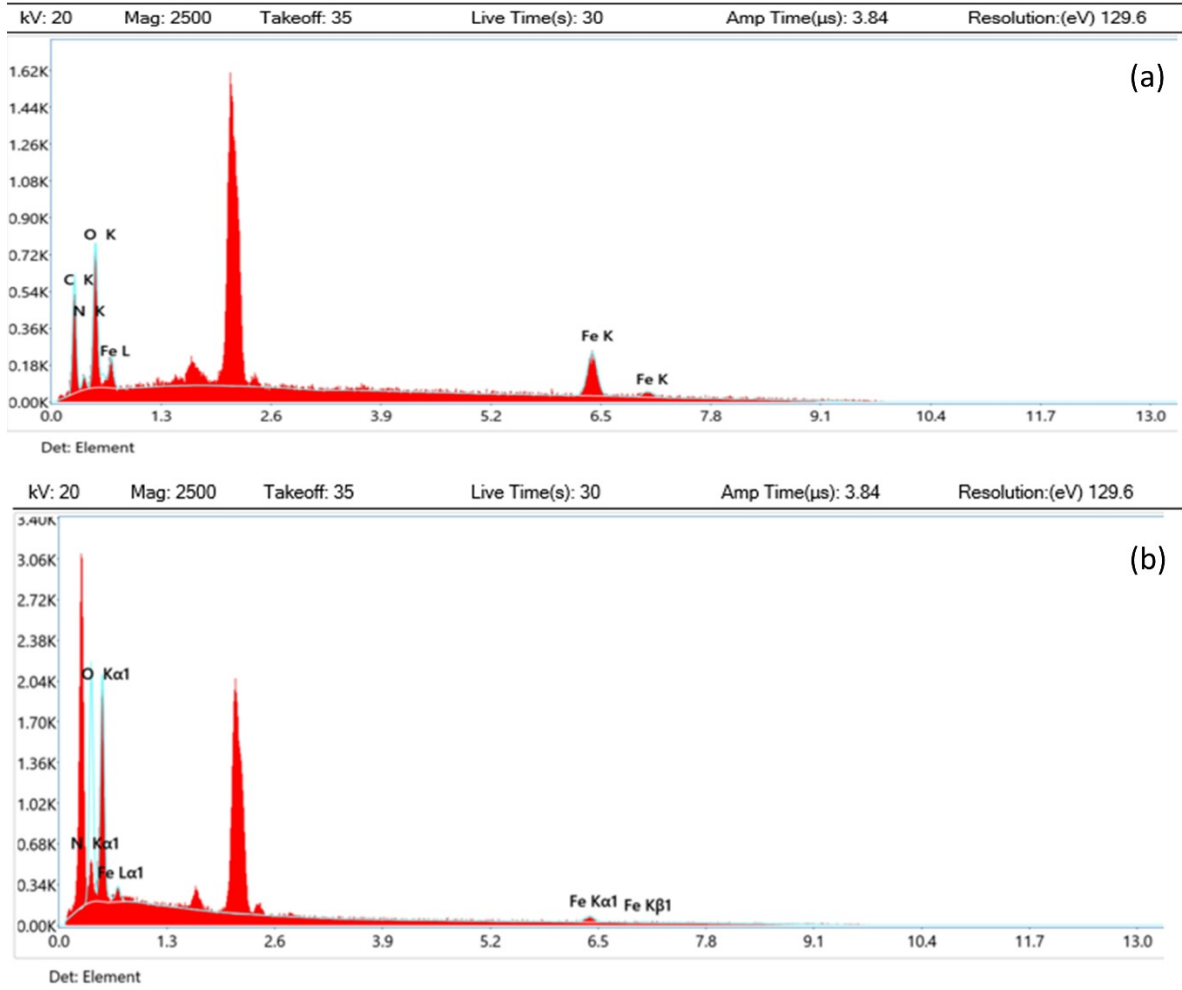
<sup>5</sup> Department of Chemical Engineering, College of Engineerirng, Qatar University

<sup>6</sup> State Key Laboratory of Advanced Metallurgy, University of Science and Technology Beijing, Beijing 100083, China

<sup>7</sup> Department of Materials Engineering, The University of British Columbia, Vancouver, V6T 1Z4, BC, Canada

**\*Corresponding authors:** Nasir M. Ahmad ([nasir.ahmad@scme.nust.edu.pk](mailto:nasir.ahmad@scme.nust.edu.pk))

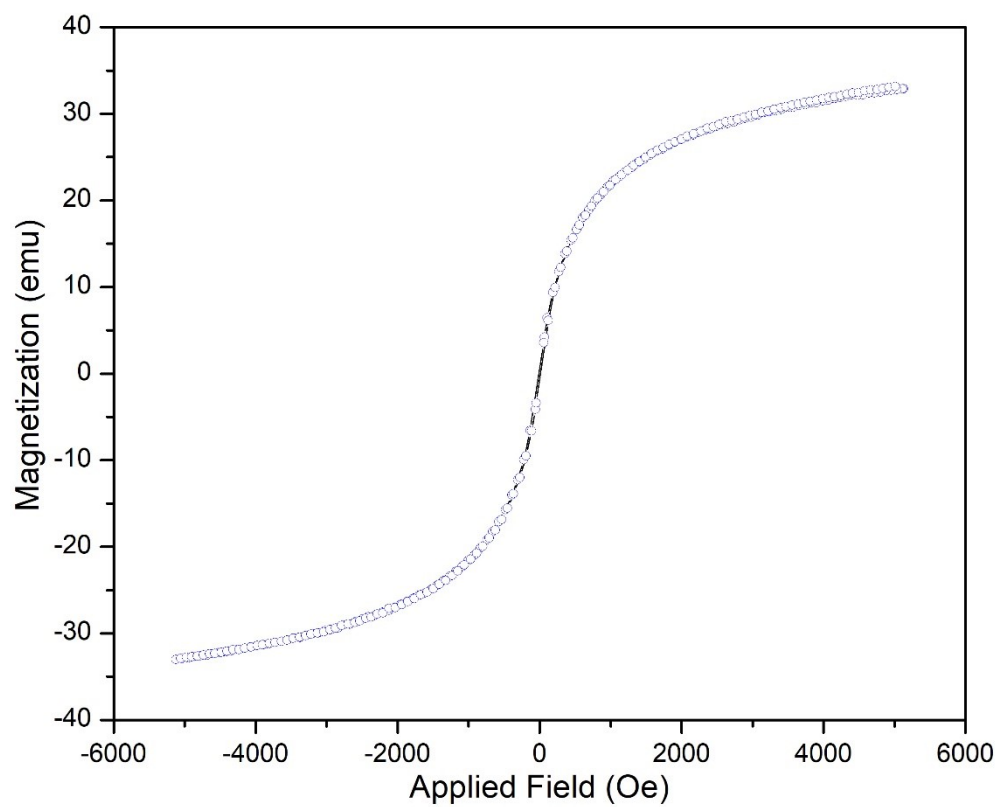
### 3.2 EDX elemental analysis



**Figure S1.** EDX analysis of magnetic chitosan bead (IECBs) (a) before adsorption and (b) after adsorption.

**Table S1.** EDX analysis of the IECBs before and after adsorption of nitrates.

Element	Values before adsorption				Values after adsorption			
	Weight %	MDL	Atomic %	Error %	Weight %	MDL	Atomic %	Error %
C K	33.4	1.13	44.5	12.5	-	-	-	-
N K	9.1	3.06	9.6	14.3	30.7	0.66	34.2	10.5
O K	41.1	1.39	41.1	12.3	66.7	1.40	65.1	12.2
Fe K	17.0	1.41	4.9	5.9	2.6	0.71	0.7	30.2



**Figure S2.** Magnetization hysteresis of the developed IECBs.