

SUPPORTING INFORMATION

A Magnetic Nano-sorbent Incorporating Antimicrobial Papain for the Rapid and Efficient Removal of Levofloxacin and Pb(II) from Aqueous Systems

Mahdi Akhgari^a, Elias Mosaffa^{a, b, c}, Haniyeh Dogari^a, Nasim Amiri Ramsheh^a, Hossein Ghafuri^{a}, Atanu Banerjee^c.*

^aCatalysts and Organic Synthesis Research Laboratory, Department of Chemistry, Iran University of Science and Technology, P.O. Box 16846-13114, Tehran, I. R., Iran.

^bDr. K. C. Patel R & D Centre, P D Patel Institute of Applied Sciences, Charotar University of Science and Technology (CHARUSAT), Anand, Gujrat, India.

^cP D Patel Institute of Applied Sciences, Charotar University of Science and Technology (CHARUSAT), Anand, Gujrat, India.

**Correspondence: Ghafuri@iust.ac.ir*

Emails:

mahdiakhgari20@gmail.com (M. Akhgari), elias.mosaffa1986@gmail.com, (E. Mosaffa), haniyedogari@gmail.com (H. Dogari), n.amiriramsheh@gmail.com (N. Amiri Ramsheh), ghafuri@iust.ac.ir (H. ghafuri), atanubanerjee.rnd@charusat.ac.in (A, Banerjee)*

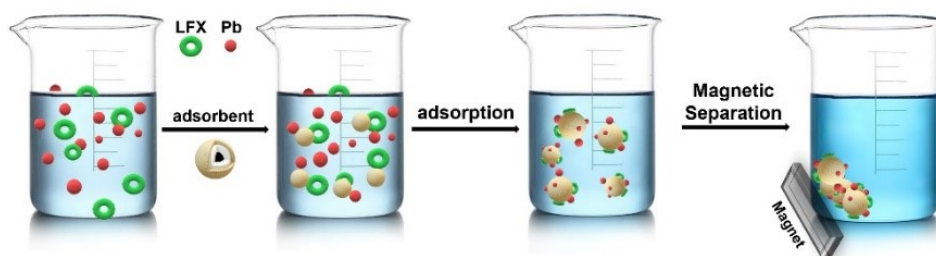


Fig.S1 Batch adsorption experiment.

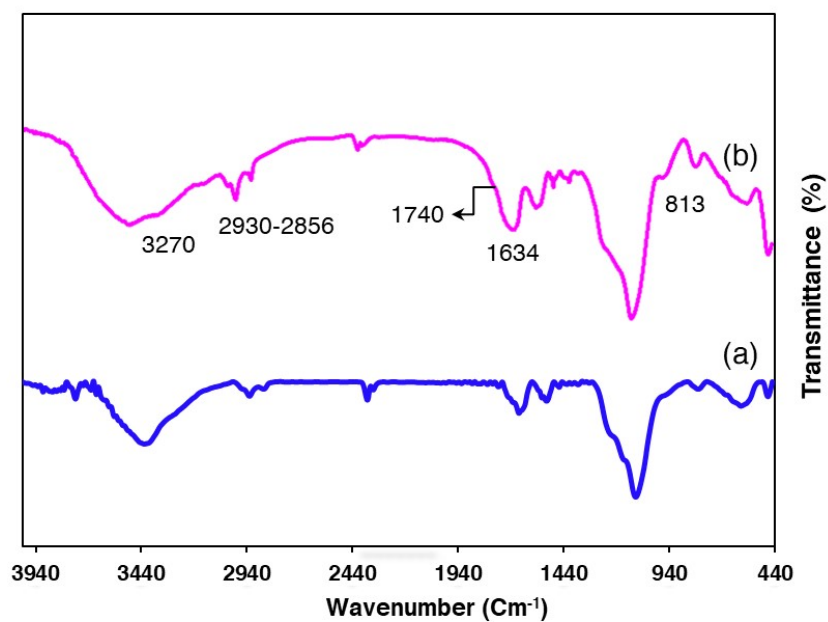


Fig.S2 FTIR spectra of adsorbent before adsorption (a), and after adsorption of Levofloxacin (b).

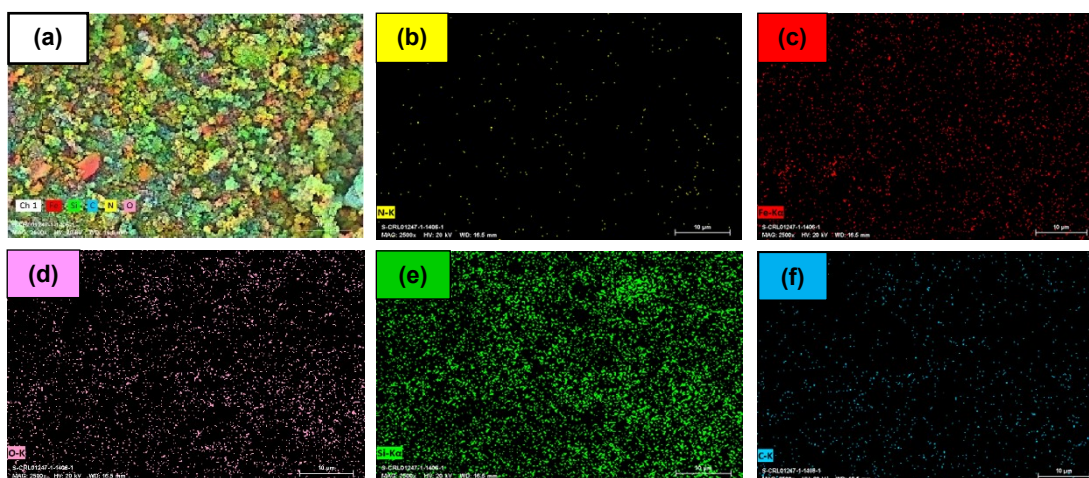


Fig.S3 EDS mapping of the final product (a), Nitrogen (b), Iron (c), Oxygen(d), Silicon (e), carbon (f).

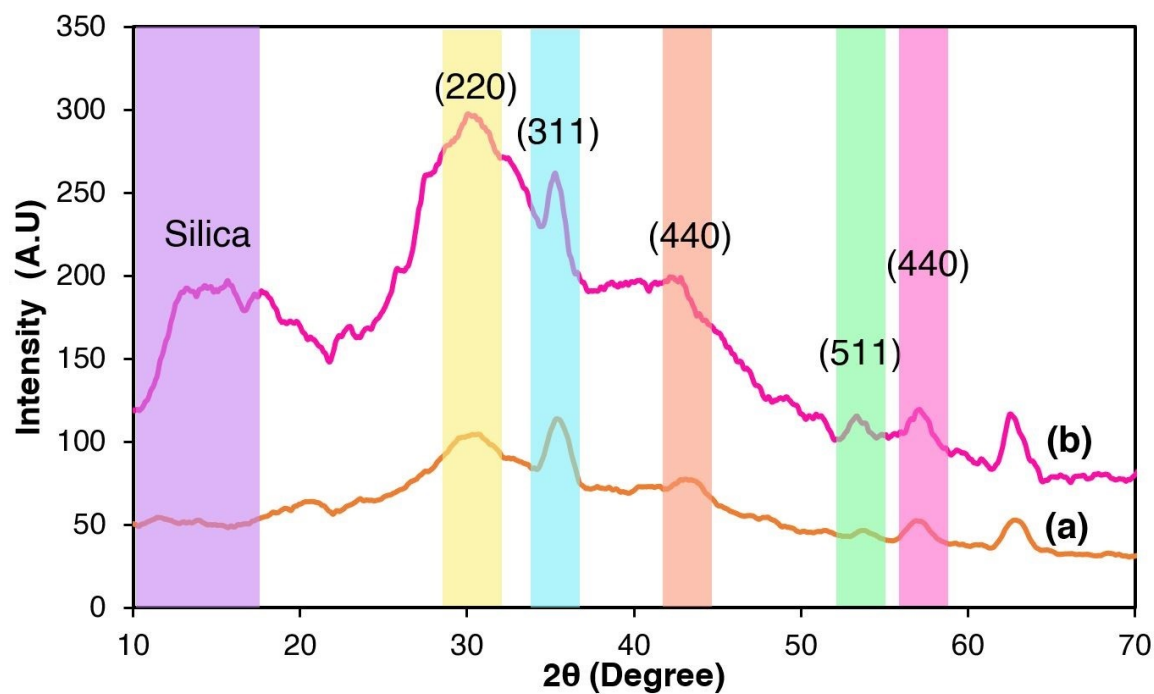


Fig.S4 XRD patterns of Fe₃O₄@SiO₂ (a), and Fe₃O₄@SiO₂@CPTMS@Papain MNPs (b).

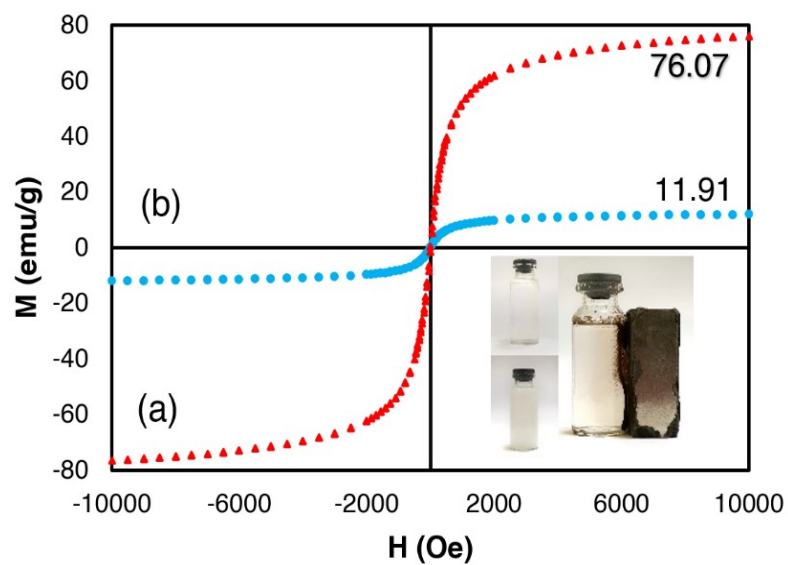


Fig.S5 The Magnetization curves of uncoated Fe₃O₄(a), and Fe₃O₄@SiO₂@CPTMS@Papain nanoparticles (b).

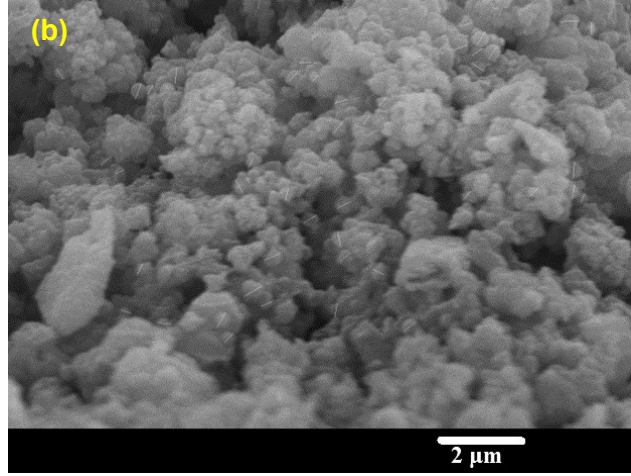
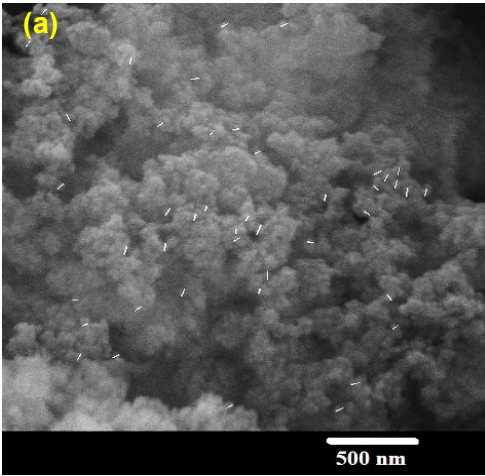


Fig.S6 FE-SEM images of the Fe_3O_4 (a), and final product (b).

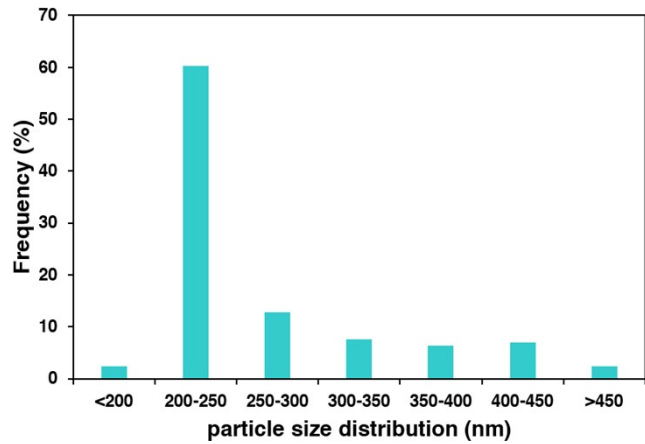
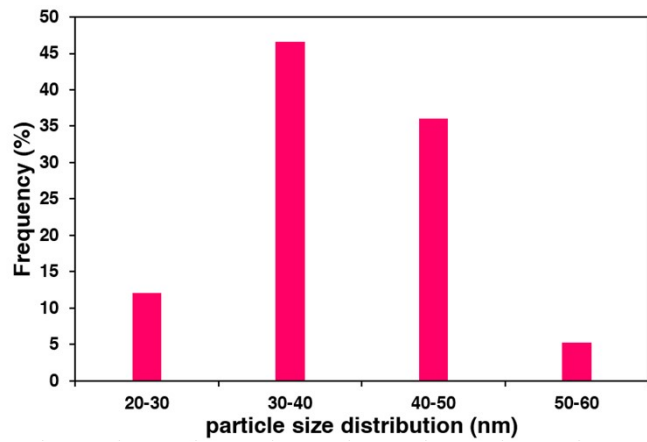


Fig.S7 particle size distribution of Fe_3O_4 (a), and the final product (b).

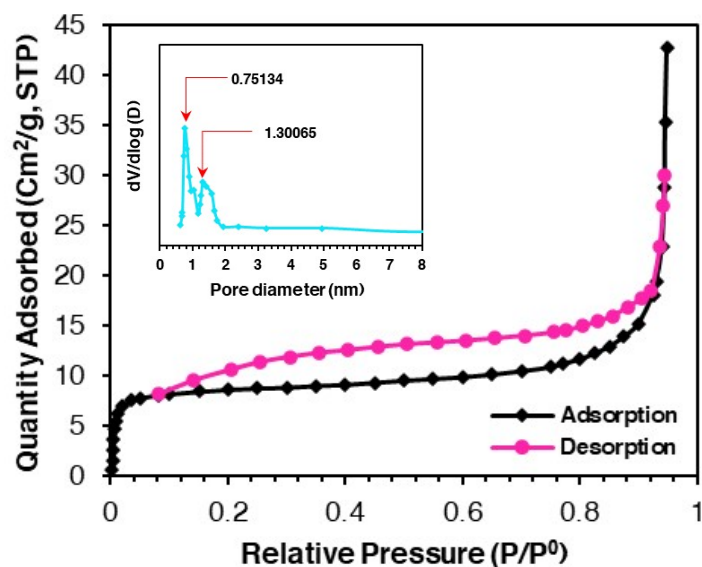


Fig.S8 BET N₂ adsorption (black) and desorption (pink) diagram, and pore size distribution of synthesized adsorbent.

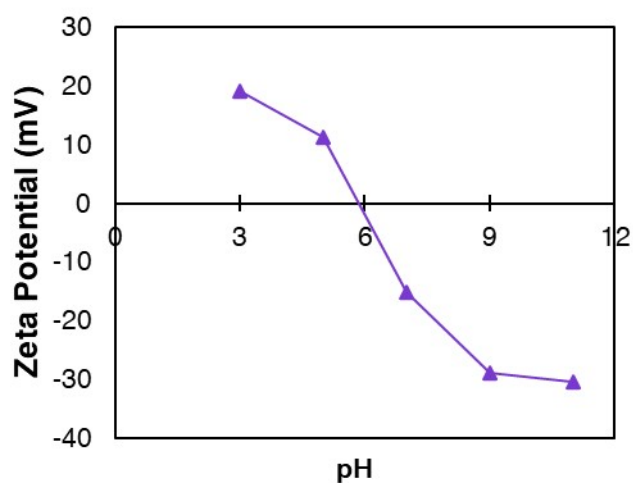
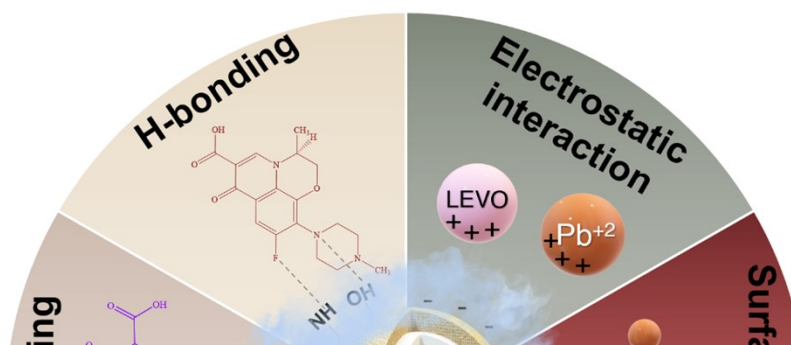


Fig.S9 Zeta potential (ζ) measurements of final products as a function of pH.



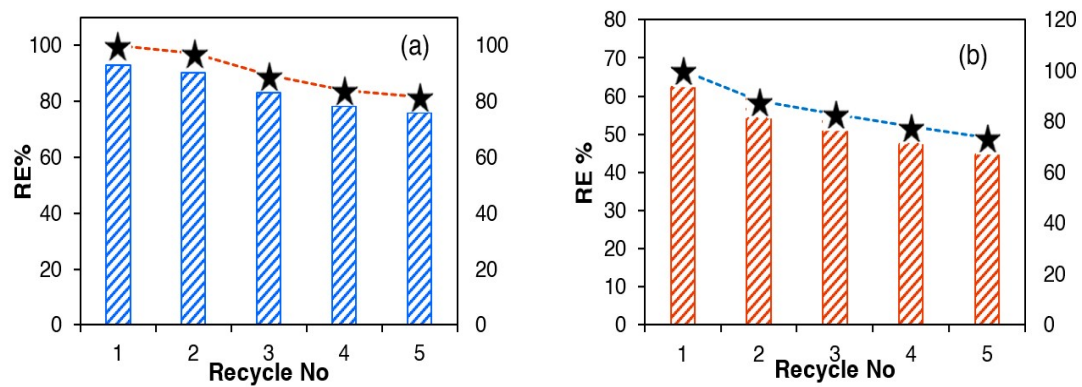


Fig.S11 Effects of regeneration cycle on Pb (II) (a), and Levo (b) adsorption.

