Supporting Information

Fabrication and evaluation of molecularly imprinted magnetic nanoparticles for selective recognition and magnetic separation of lysozyme in human urine

Zulei Zhang[a]*, Hongmei Wang[a], Hailong Wang[a], Cuichen Wu[b, c], Mengli Li[a], Lei Li[a]*

[a] *School of Biology and Chemical Engineering, Jiaxing University, Jiaxing 314001, China*

[b] *Molecular Science and Biomedicine Laboratory, State Key Laboratory of Chemo/Bio-sensing and Chemo-metrics, College of Chemistry and Chemical Engineering, College of Life sciences, Aptamer Engineering Center of Hunan Province, Hunan University, Changsha, Hunan 410082, China*

[c] *Department of Chemistry and Department of Physiology and Functional Genomics, Center for Research at the Bio/Nano Interface, UF Health Cancer Center, UF Genetics Institute, McKnight Brain Institute, University of Florida, Gainesville, Florida 32611-7200, United States*

***Corresponding author:** Dr. Zulei Zhang, Professor Lei Li

Email: jerry3641172@126.com, lei.li@mail.zjxu.edu.cn

Fax: +86-573-83646203; Tel: +86-573-83646203

1. Equations

The pseudo-first-order equation is generally expressed as:

$$\ln(Q_e - Q_t) = \ln Q_e - k_1 t \qquad (1)$$

The pseudo-second-order equation is generally expressed as:

$$\frac{t}{Q_t} = \frac{1}{k_2 Q_e^2} + \frac{t}{Q_e} \qquad (2)$$

where t (min) is adsorption time; Q_t (mg/g) and Q_e (mg/g) are the amounts of the adsorbed Lyz at time t (min) and at equilibrium, respectively; k_1 is the rate constant of the pseudo-first-order adsorption model, k_2 (g/(mg min)) represents the pseudo-second-order adsorption rate constant.

2. Supporting data

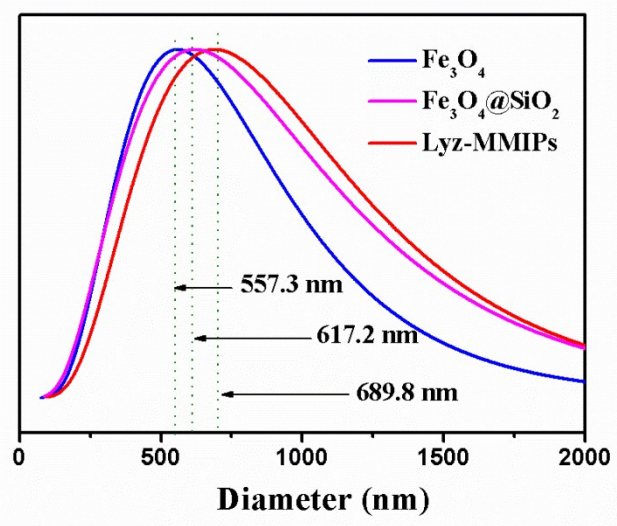

Fig.S1 Diameter distribution of Fe_3O_4, Fe_3O_4@SiO_2 and Lyz-MMIPs by DLS technique

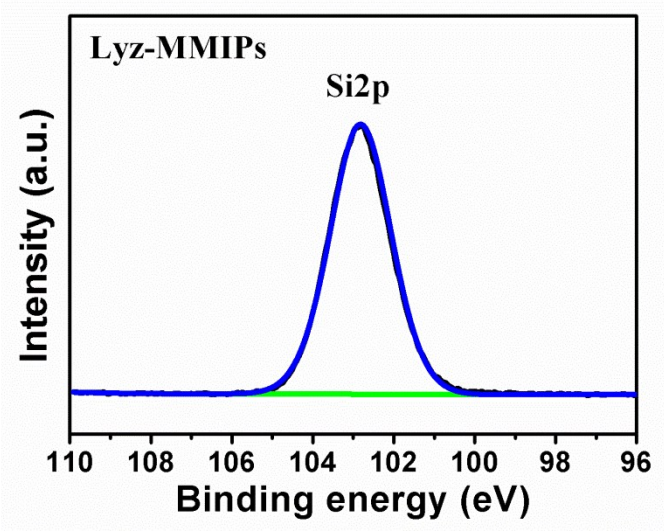

Fig.S2 XPS high-resolution scan of Si2p of Lyz-MMIPs

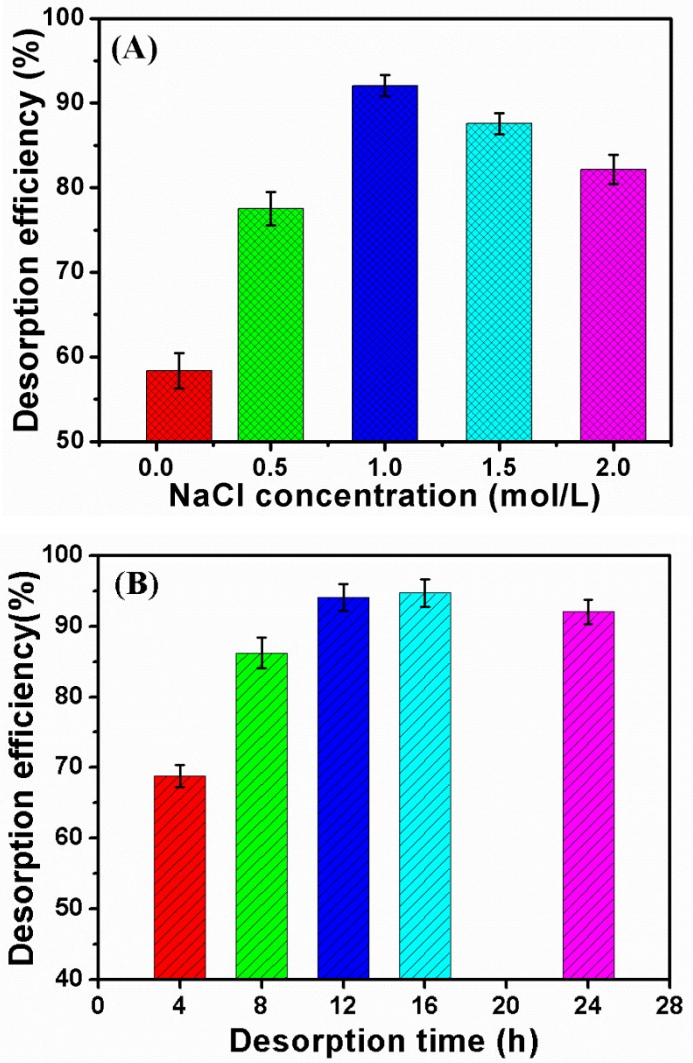

Fig.S3 The effects of (A) NaCl concentrations (desorption period: 12 h, solution volume: 20 mL, pH: 7.0) and (B) desorption period (NaCl concentration: 1.0 mol/L, solution volume: 20 mL, pH: 7.0) on the desorption of Lyz from Lyz-MMIPs

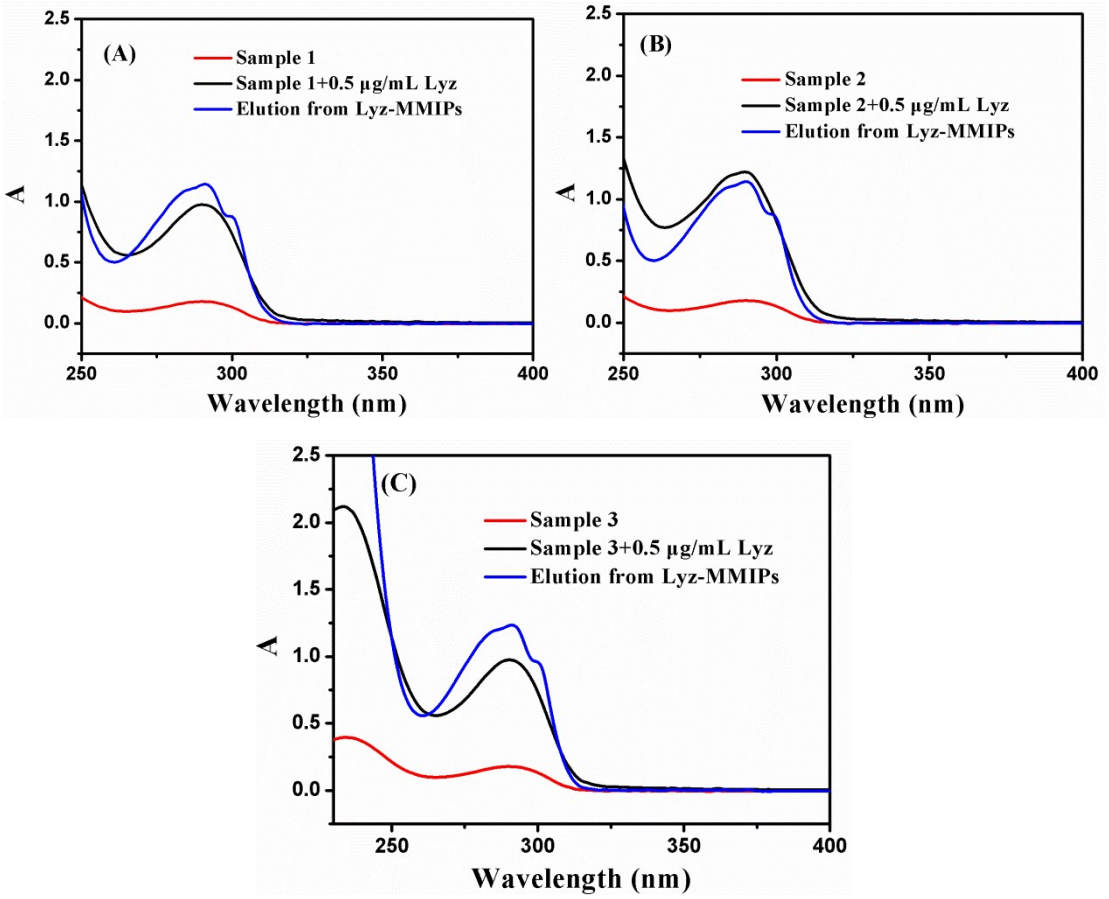

Fig.S4 UV-vis spectrograms of human urine samples

Table S1 Comparison with reported method for the adsorption capacity of Lyz

Adsorbents	Preparation method	Adsorption capacity (mg/g)	Ref.
Fe_3O_4@Lyz-MIP	surface imprinting	11.87	1
MIP	precipitation polymerization	22.50	2
PVC-MIP	surface imprinting	38.46	3
Lyz-MIP	surface imprinting	90.33	4
Fe_3O_4@MIP	surface imprinting	103.1	5
Fe_3O_4@SiO_2-MIP	surface imprinting	108.0	6
Lyz-MMIPs	surface imprinting	124.3	this work

References

1. Q. Q. Gai, F. Qu, Z. J. Liu, R. J. Dai, Y. K. Zhang, *J. Chromatogr. A* 2010, 1217 (31), 5035-5042.

2. G. Q. Pan, Q. P. Guo, C. B. Cao, H. L. Yang and B. Li, *Soft Matter*, 2013, **9**, 3840-3850.
3. H. Ayadi, T. Mekhalif, Z. Salma, et al. *J. Appl. Polym. Sci.*, 2016, **133**, 43694.
4. C. J. Zhang, Y. Z. Wang, Y. G. Zhou, J. X. Guo and Y. J. Liu, *Anal. Methods*, 2014, **6**, 8584-8591.
5. S. L. Ji, N. Li, Y. Shen, Q. Li, J. Qiao and Z. B. Li, *Anal. Chim. Acta*, 2016, **909**, 60-66.
6. K. J. Xu, Y. Z. Wang, X. X. Wei, J. Chen, P. L. Xu and Y. G. Zhou, *Microchim. Acta*, 2018, **185**, 146-152.