

Supporting Information

FeOOH nanosheets assisted metal ion coordination with porphyrins for rapid detection and removal of cadmium ions in water

Zheng Li^{a,†}, Chang He^{a,†}, Xiangming Zhou^a, Lixiang Wang^a, Ying Zhang^a, Guangfu Feng^{*a}, Jun Fang^{*a}

^a School of Bioscience and Biotechnology, Hunan Agricultural University, Changsha 410128, China

[†] These authors contributed equally to this work.

* Corresponding author:

Tel: +86-15084819640

Email: GuangfuFeng@hunau.edu.cn (G. Feng)
fangjun1973@hunau.edu.cn

Table S1. Comparison of cadmium ion detection systems.

Testing method	Linear range	Detection limit	References
Colorimetry	0-1.0 μM	0.18 μM	[1]
Fluorescence	0.22-500 μM	0.22 μM	[2]
Fluorescence	0.2-12 μM	0.12 μM	[3]
Fluorescence	0-26.8 μM	0.2 μM	[4]
Colorimetry	0.01-0.12 mM	0.21 μM	[5]
Colorimetry	0.5-10 μM	0.24 μM	This work

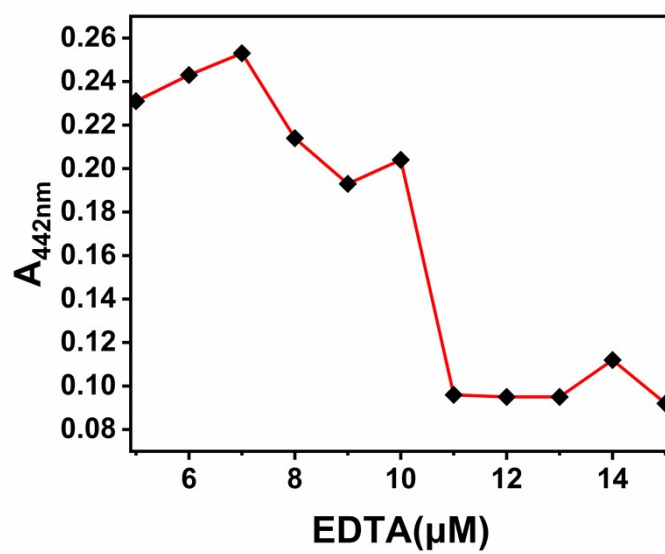


Figure S1. UV-Vis absorption spectrum of $\text{FeOOH@TMPyP4@Cd}^{2+}$ ($[\text{Cd}^{2+}] = 10 \mu\text{M}$) after the addition of EDTA.

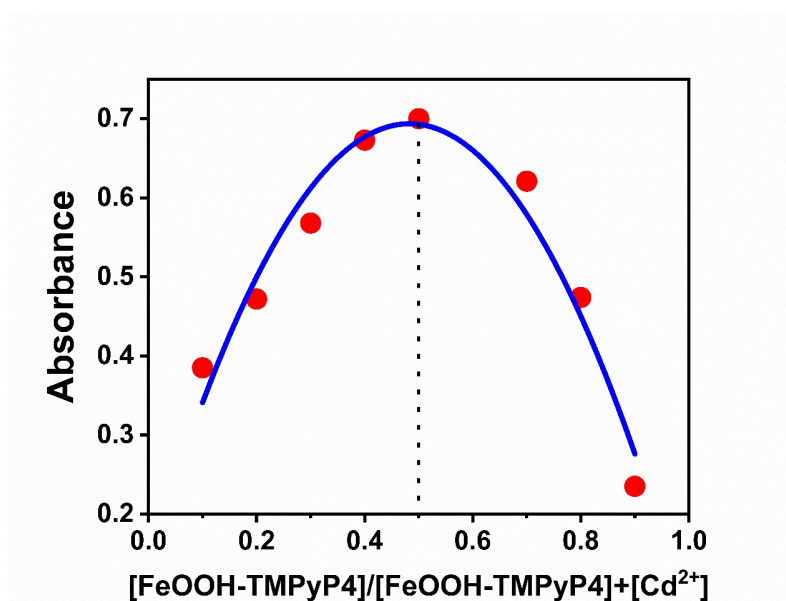


Figure S2. Job plot diagram of FeOOH-TMPyP4 and cadmium ions. ($[\text{FeOOH}] + [\text{Cd}^{2+}] = 10 \mu\text{M}$)

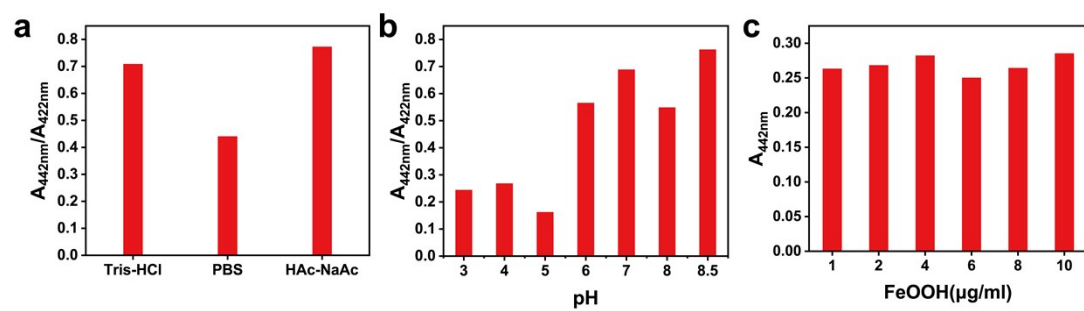


Figure S3. Optimization of the type of buffer (a), the pH value of the buffer (b) and the concentration of FeOOH nanosheets (c).

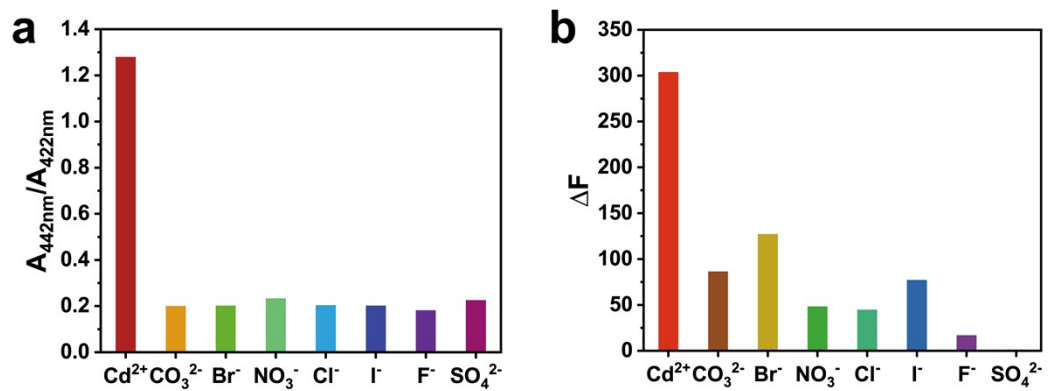


Figure S4. Relative absorbance (a) and fluorescence intensity (b) of FeOOH@TMPyP4 nanocomposite in the presence of Cd²⁺ and other anions.

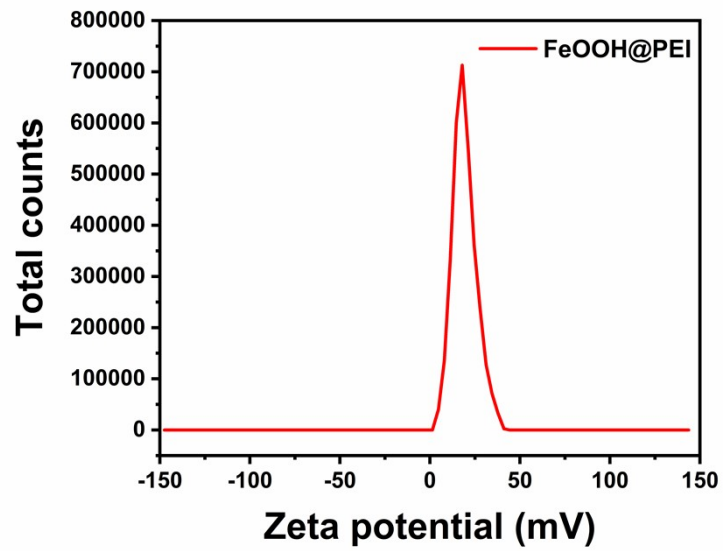


Figure S5. Zeta potential measurements of the PEI-modified FeOOH nanosheets.

References

1. X.-Y. Xu and B. Yan, *Sens. Actuators B Chem.*, 2016, **222**, 347-353.
2. A. Shahat, H. M. Hassan and H. M. Azzazy, *Anal. Chim. Acta*, 2013, **793**, 90-98.
3. Y. Pan, J. Wang, X. Guo, X. Liu, X. Tang and H. Zhang, *J. Colloid Interface Sci.*, 2018, **513**, 418-426.
4. Q. Tan, X. Li, L. Wang, J. Zhao, Q. Yang, P. Sun, Y. Deng and G. Shen, *Front. Chem.*, 2022, 1234.
5. J. Charoensuk, J. Thonglao, B. Wichaiyo, K. Mukdasai, Y. Santaladchaiyakit, S. Srijaranai and S. Mukdasai, *Microchem. J.*, 2021, **160**, 105666.