Supporting Information

Multifunctional hemin@metal-organic framework and its application to construct an electrochemical aptasensor for thrombin detection

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Comparison of electrochemical response with different labeled probes

In order to demonstrate the specific role of hemin in MOFs, some control experiments were made. We constructed two types of contrastive aptasensor, one was the system constructed with Au/hemin@MOFs, and the other one was the system constructed with Au/Fe-MIL-88 MOFs. The two types of contrastive aptasensor were performed at the same condition. As can be seen from Fig S1, the two types of contrastive aptasensor showed a completely different signal response, which has reconfirmed the important role of hemin in our electrochemical aptasensor

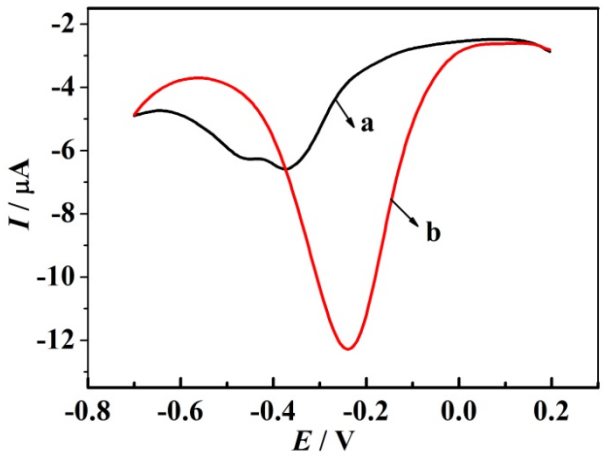

Fig. S1 The DPV responses of aptasensor (incubated with 10 nM TB) sandwiched with different labeled probes obtained in 0.1 M PBS (pH 7.0) containing 3.0 mM glucose: (a) Au/Fe-MIL-88 MOFs-TBA II-GOD bioconjugates, (b) Au/hemin@MOFs-TBA II-GOD bioconjugates.

Table S1 Summary of different analytical methods for the detection of thrombin

Detection Technique	Employed nanomaterials	Amplification	Detection limit	Linear range	Ref.
PEC	Graphene-CdS nanoparticles	Yes	1.0 pM	2.0 pM-6 nM	1
Colorimetric	Ag/Pt bimetallic nanoclusters	No	2.6 nM	1-50 nM	2
SERS	Gold nanoparticles	No	20 pM	0.1~10 nM	3
SPR	Gold nanoparticles	No	0.1 nM	0.1-75 nM	4
UV−vis	Gold nanoparticles	Yes	20 pM	50 pM-5 nM	5
ECL	Graphene oxide	No	0.4 pM	0.9-226 pM	6
EIS	Carbon nanotubes	Yes	0.05 pM	0.05 pM-5 nM.	7
CV	Graphene-Gold nanoparticles	No	0.33 pM	0.001~80 nM	8
DPV	Gold nanoparticles	Yes	0.15 pM	0.5 pM-20 nM	9
DPV	Au/hemin@MOFs	Yes	0.068 pM	0.1 pM-30 nM	This work

Photoelectrochemical (PEC); electrochemiluminescent (ECL); Surface-Enhanced Raman Spectroscopy (SERS); UV-vis absorbance measurements (UV-vis); cyclic voltammetry (CV); surface plasmon resonance (SPR), electrochemical impedance spectroscopy (EIS); Differential pulse voltammetry (DPV).

References

1. S. G. Li, W. Zhu, Y. C. Xue and S. Q. Liu, *Biosens. Bioelectron*., 2015, **64**, 611-617.
2. C. Zheng, A. X. Zheng, B. Liu, X. L. Zhang, Y. He, J. Li, H. H. Yang and G. N. Chen, *Chem. Commun*., 2014, **50**, 13103-13106.
3. J. Hu, P. C. Zheng, J. H. Jiang, G. L. Shen, R. Q. Yu and G. K. Liu, *Anal. Chem*., 2009, **81**, 87-93.
4. Y. F. Bai , F. Feng , L. Zhao, C. Y. Wang, H.Y. Wang, M. Z. Tian, J. Qin, Y. L.

Duan and X. X. He, *Biosens. Bioelectro*., 2013, **47**, 265-270.

5. X. Y. Wang, A. Gao, C. C. Lu, X. W. He and X. B. Yin, *Biosens. Bioelectro*., 2013, **48**, 120-125.
6. J. Li, H. E. Fu, L. J. Wu, A. X. Zheng, G. N. Chen and H. H. Yang, *Anal. Chem.* 2012, **84**, 5309-5315.
7. J. Li, J. J. Wang, X. Guo, Q. Zheng, J. Peng, H. Tang and S. Z. Yao, *Anal. Chem*., 2015, **87**, 7610-7617.
8. S. B. Xie, R. Yuan, Y. Q. Chai, L. J. Bai, Y. L. Yuan, Y. Wang, *Talanta*, 2012, **98** 7-13.
9. Y. L. Yuan, R. Yuan, Y. Q. Chai, Y. Zhuo, X. Y. Ye, X. X. Gan, L. J. Bai, *Chem. Commun*., 2012, 48, 4621-4623.