Electronic Supplementary Information (ESI)

for

The tongs role of *L*-histidine: a strategy of grasping Tb^{3+} by ZIF-8 to design sensors for monitoring anthrax biomarker on-the-spot

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3. Supporting References

1. Experimental Section

Preparation of ZIF-8 nanocrystals. ZIF-8 nanocrystals were synthesized according to reporting literature.[1S] Briefly, a solution of $Zn(NO_3)_2 \cdot 6H_2O$ (1.173 g) in 80 mL methanol was added into a solution of 2-methylimidazole (2.595 g) in 80 mL methanol under stirring with a magnetic bar. After keeping at room temperature for 1 h, ZIF-8 was formed, and then separated by centrifugation at 7000 rpm for 5 min and washed with methanol three times. The collected white powder was dried in the oven at 60 °C overnight.

Preparation of ZIF-8/Tb^{3+}. The synthesis of ZIF-8/Tb^{3+} was performed by dispersing 30.0 mg His@ZIF-8 to 60.0 mL $Tb(NO_3)_3$ ethanol solution (10 mmol L^{-1}). Then the above solution was stirred for 2 h at room temperature. The product was collected by centrifugation at 7000 rpm for 5 min and repeatedly washed with ethanol for 3 times. The collected white powder was dried in the oven at 60 °C overnight.

2. Supporting Figures and Tables

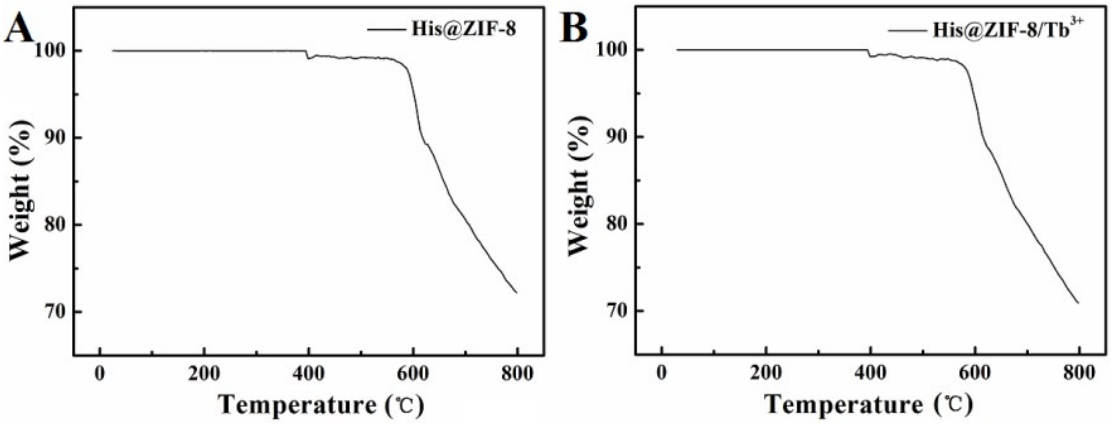

Fig. S1 TGA curve of the synthesized His@ZIF-8 (A) and His@ZIF-8/Tb^{3+} (B).

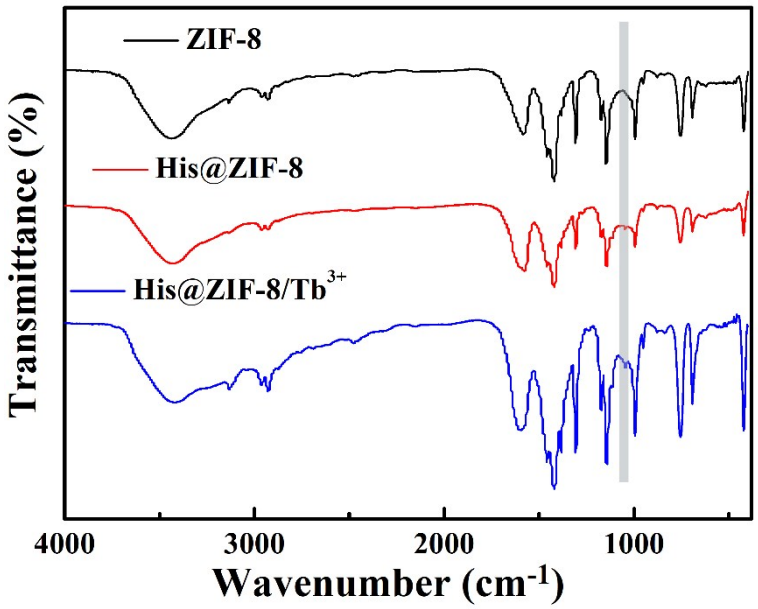

Fig. S2 FT-IR spectra of ZIF-8, His@ZIF-8 and His@ZIF-8/Tb^{3+}.

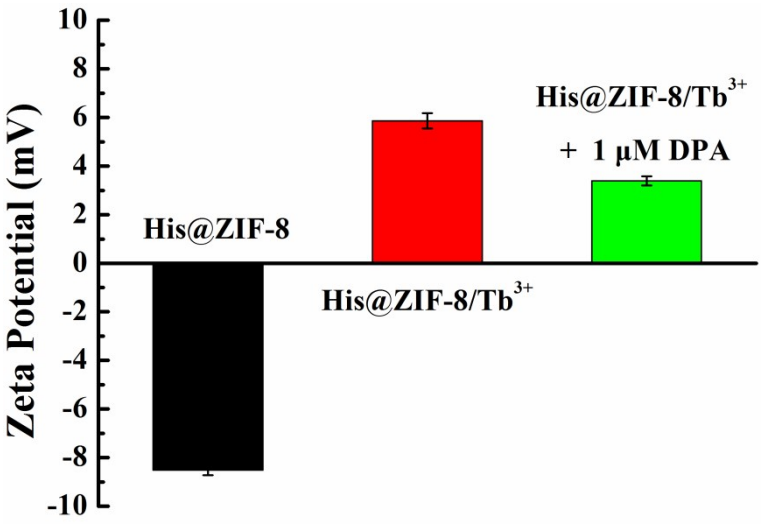

Fig. S3 Zeta potential of His@ZIF-8, His@ZIF-8/Tb^{3+} and His@ZIF-8/Tb^{3+} upon adding 1 μmol L^{-1} DPA.

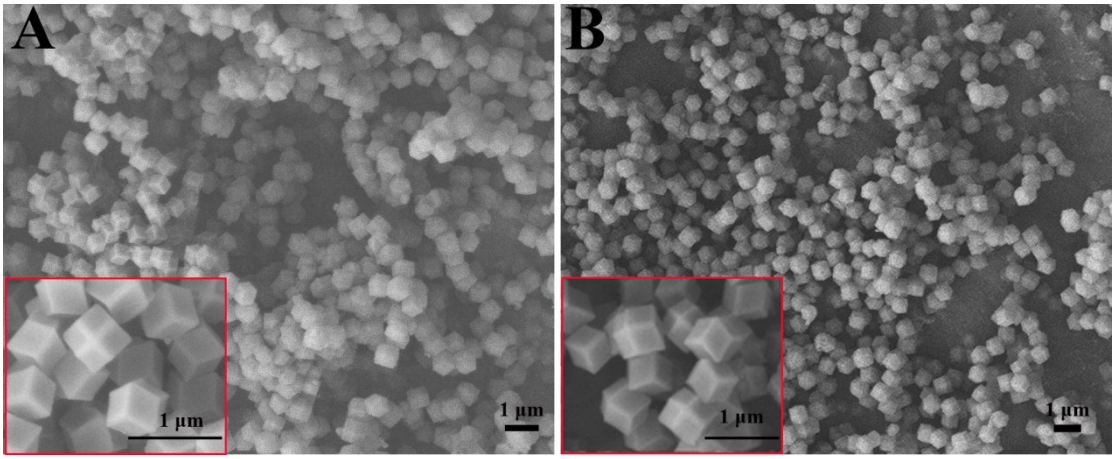

Fig. S4 SEM images of His@ZIF-8 (A) and His@ZIF-8/Tb^{3+} (B).

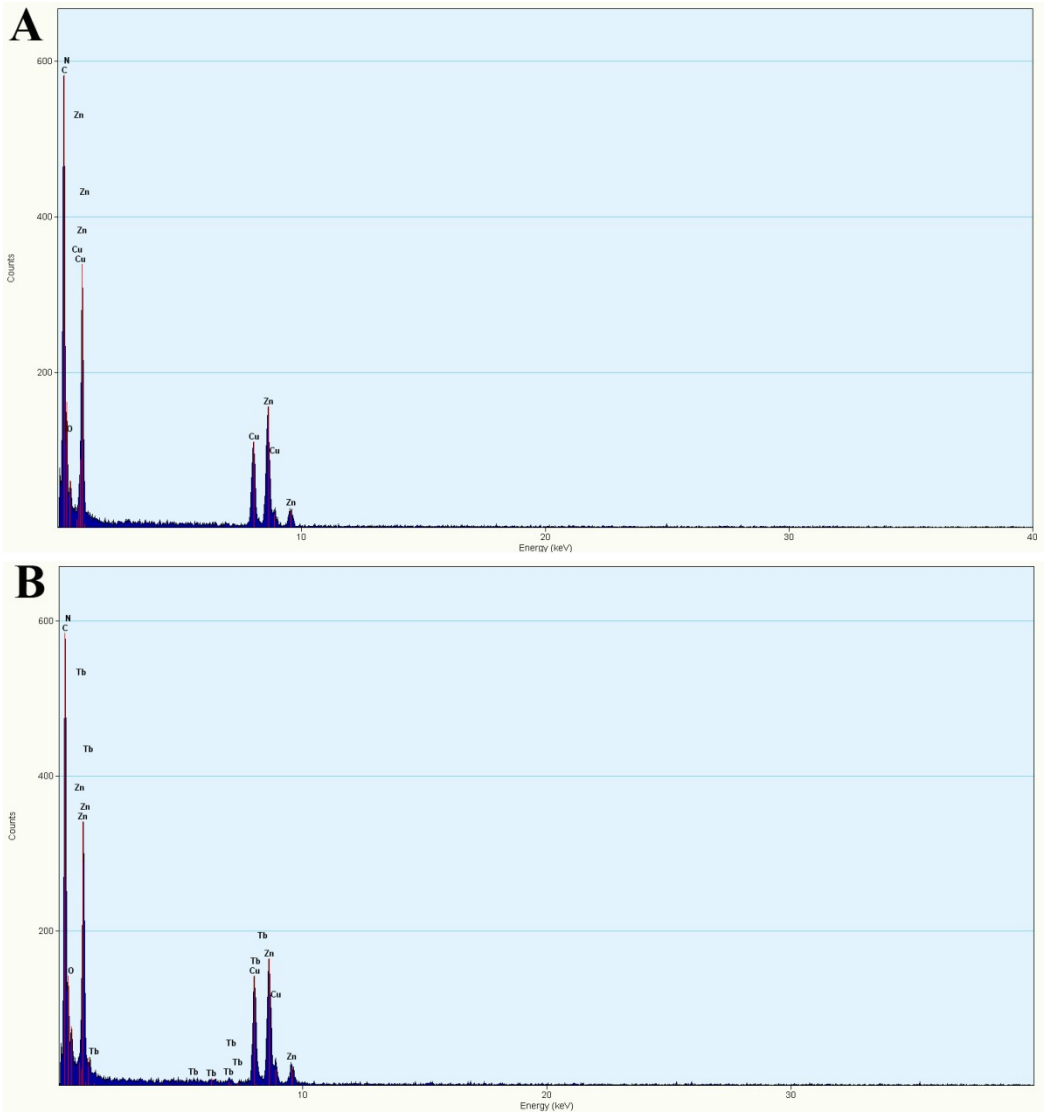

Fig. S5 The EDX of His@ZIF-8 (A) and His@ZIF-8/Tb^{3+} (B).

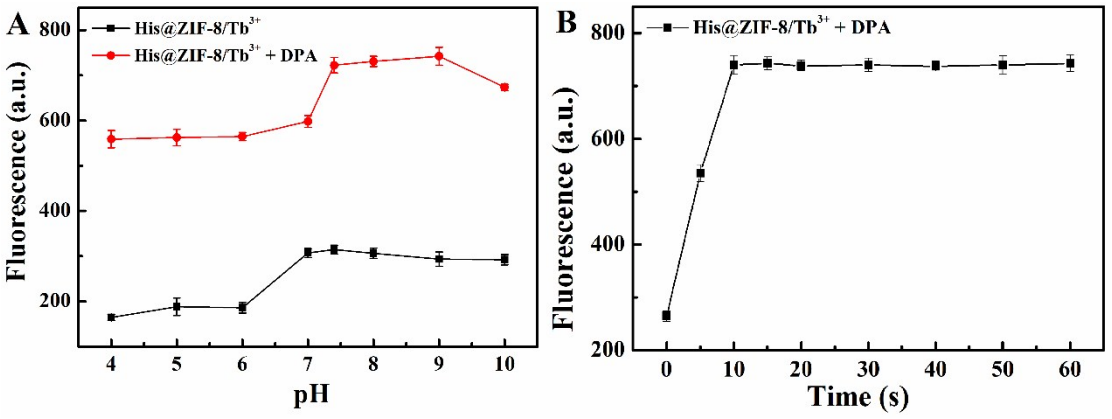

Fig. S6 (A) Effects of pH values on fluorescence intensity of His@ZIF-8/Tb^{3+} with DPA (red line) and without DPA (black line). (B) Effects of reaction time on fluorescence intensity of His@ZIF-8/Tb^{3+} with DPA (1 μmol L^{-1}); HEPES buffer: 20 mmol L^{-1}, pH 7.4.

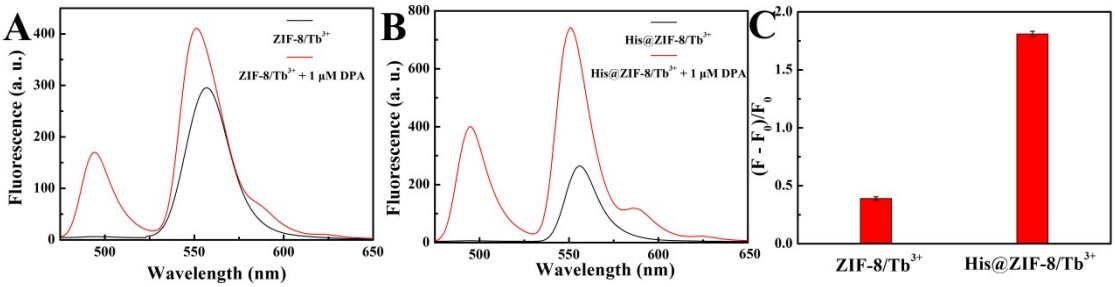

Fig. S7 (A) The fluorescence emission spectra of ZIF-8/Tb^{3+} and ZIF-8/Tb^{3+} with 1 μmol L^{-1} DPA. (B) The fluorescence emission spectra of His@ZIF-8/Tb^{3+} and His@ZIF-8/Tb^{3+} with 1 μmol L^{-1} DPA. (C) The comparison of fluorescence response ability of ZIF-8/Tb^{3+} and His@ZIF-8/Tb^{3+}, respectively. (F_0 is the fluorescence of ZIF-8/Tb^{3+} and His@ZIF-8/Tb^{3+}; F is the fluorescence of ZIF-8/Tb^{3+} and His@ZIF-8/Tb^{3+} with 1 μmol L^{-1} DPA.)

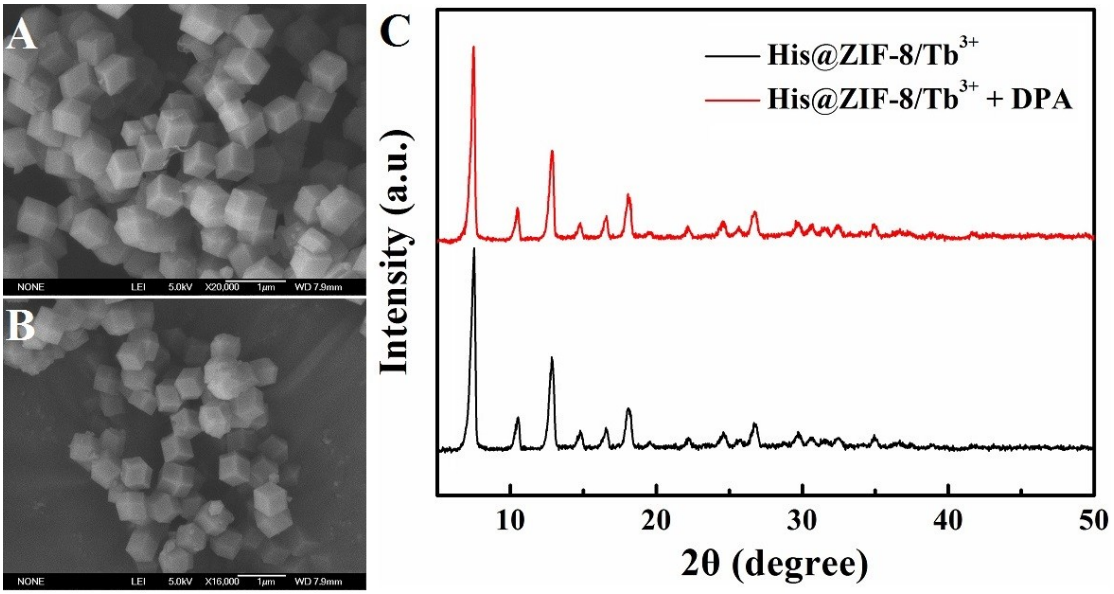

Fig. S8 SEM images of His@ZIF-8/Tb^{3+} before (A) and after (B) reacting with DPA aqueous solution (1 mmol L^{-1}) for 3 min. (C) XRD patterns of His@ZIF-8/Tb^{3+} before and after reacting with DPA aqueous solution (1 mmol L^{-1}) for 3 min.

Table S1 The comparison of different fluorescent probe for DPA detection.

Probes	Linear range	Detection limit	Response time	Refs.
TbP-CPs	0-8 μM	0.005 μM	30 s	2S
RiP/Eu^{3+} CPs	0-1 μM	0.0415 μM	/	3S
Tb/Eu@bio-MOF	0.05-1 μM	0.034 μM	20 s	4S
CDs-Cu^{2+} systems	0.25-20 μM	0.079 μM	1 min	5S
EBT-Eu^{3+}	0-32 μM	2 μM	/	6S
Terbium functionalized micelle	0-7 μM	0.054 μM	/	7S
His@ZIF-8/Tb^{3+}	0-10 μM	0.02 μM	10 s	This work

/: Not mentioned.

Table S2 Analytical results of real samples.

Sample	Added (μM)	Found (μM)	Recovery (%)	RSD (%)
Human Urine	0	/	/	/
	0.50	0.51	102.0	2.76
	1.00	0.99	99.0	1.28
	5.00	5.16	103.2	0.92
10% Bovine Serum	0	/	/	/
	0.50	0.49	98.0	3.12
	1.00	1.03	103.0	1.36
	5.00	5.09	101.8	2.21

/: Not detected.

3. Supporting References

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