Supporting Information

Design of dual-signal sensing platform for D-penicillamine based on UiO-66-NH_2 MOFs and APBA @Alizarin Red

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Chemicals

The chemical reagents used in the experiments are of analytical grade without further purification. The deionized water used in this experiment has a resistivity greater than 18 MΩ cm^{-1}. $ZrCl_4$, Tris-HCl and 2-aminoterephthalic acid were purchased from Sinopharm Chemical Reagent Co. Ltd.Alizarin Red (ARS),3-aminophenylboronic acid (APBA) and D-Penicillamine(D-PA) were purchased fromShanghai Aladdin Co. Ltd. NaCl, KCl, NH_4Cl, $CuCl_2$, KSCN, DMF and EtOHwere purchased from Tianjin Guangfu Institute of Fine Chemicals. Glucose, Proline, Threonine, Tyrosine, Glycine and Phenylalaine were purchased from Beijing Dingguo Biotechnology Co. Ltd. This experiment used 10 mM Tris-HCl buffer solution to adjust the pH of the reaction solution.

Instrumentation

Fluorescence spectral data were obtained from a Shimadzu RF-5301PC spectrofluorometer instrument equipped with a xenon lamp, and the data were measured using a quartz cuvette with an optical path length of 1 cm (Shimadzu Co., Kyoto, Japan). UV-visible absorption spectroscopy data were obtained by testing with a Varian GBC Cintra 10e UV-Vis spectrometer (Japan). Scanning electron microscope (SEM) experiment was performed on a JF6700 scanning electron Microscope (JEOL Ltd, Japan). Fourier transform infrared spectroscopy data were measured by using a Bruker IFS66V FT-IR spectrometer equipped with a DGTS detector (32 scans) (Germany). Powder X-ray diffraction (XRD) patterns of MOF

were obtained using a D/max 2550 VB/PC diffractometerwith Cu Kα radiation (λ = 1.5406 Å) (Rigaku, Japan). All pH measurements and the configured buffer solutions were performed using a PHS-3C pH meter (Tuopu Co., Hangzhou, China). Transmission Electron Microscopy (TEM) was obtained by Hitachi H-800 electron microscope using an accelerating voltage of 300 KeV (http://www.hitachi.com.cn/).

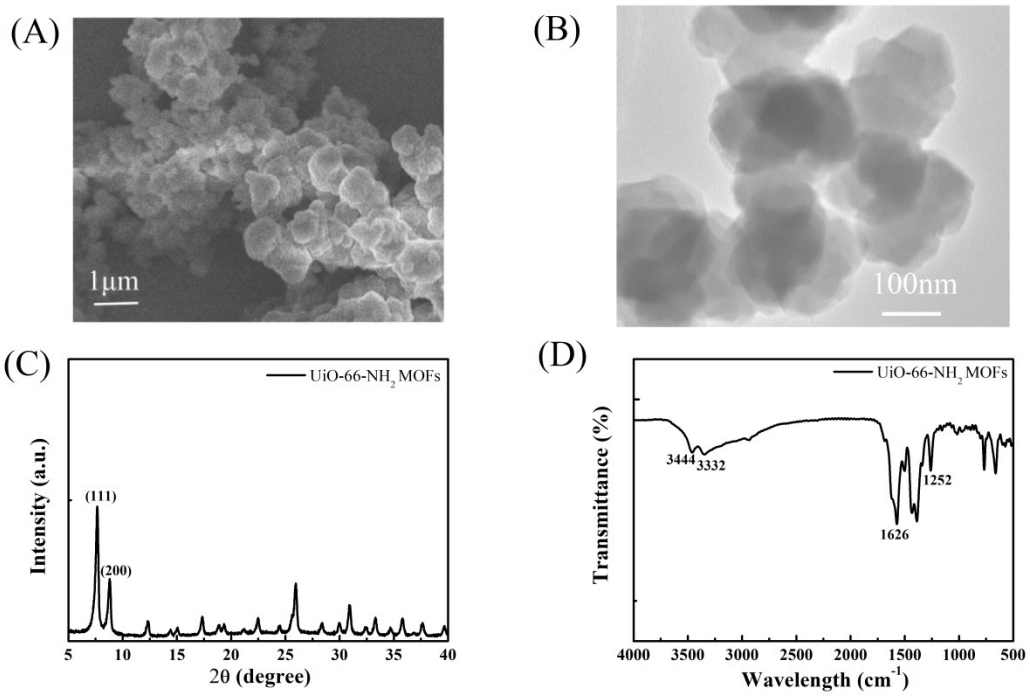

Fig. S1(A) The SEM image,(B) The TEM image, (C)The XRD, (D) The FT−IR spectraof UiO-66-NH_2 MOFs.

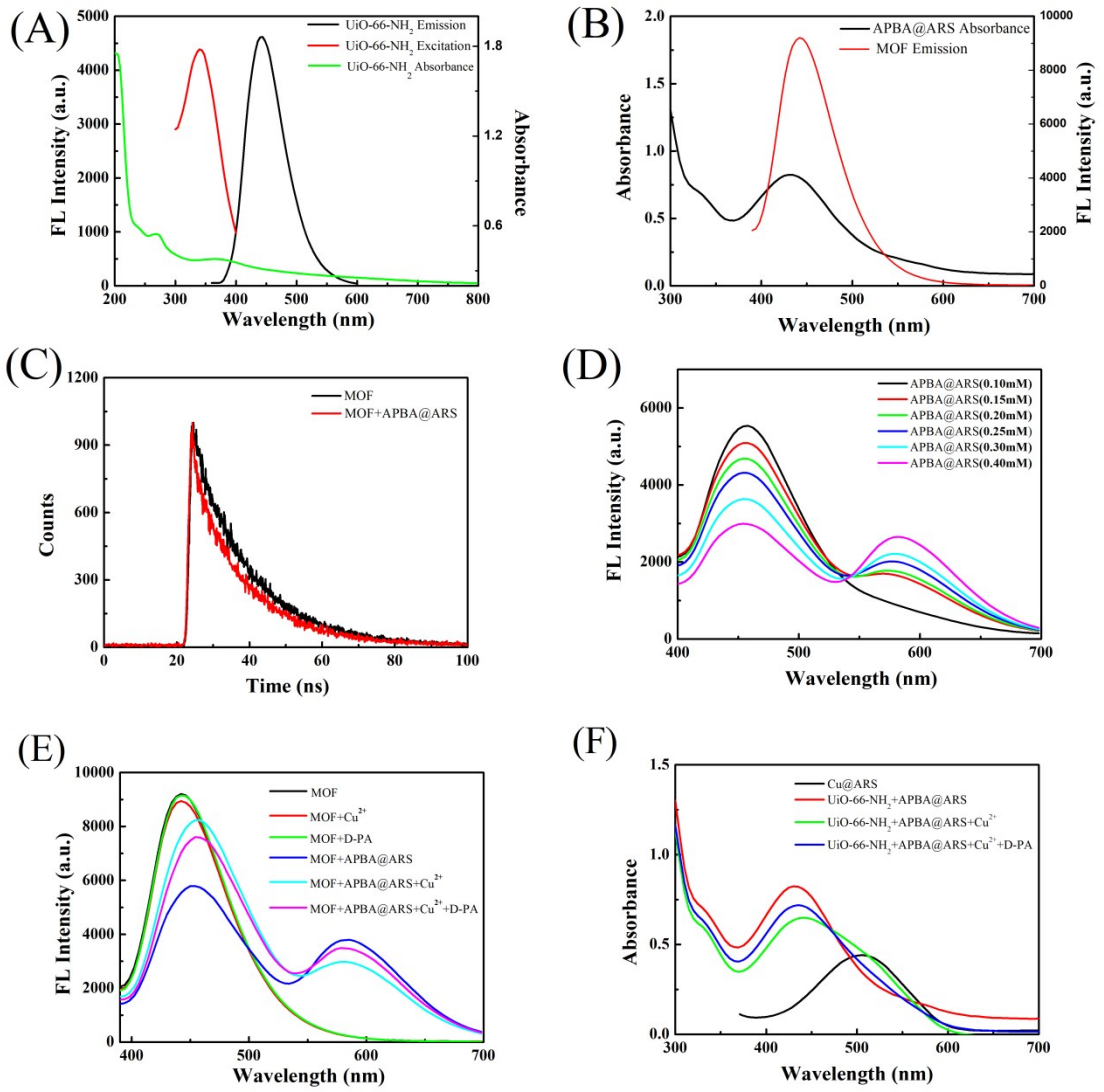

Fig. S2 (A) UV–vis absorption spectra, fluorescence excitation and emission spectra of UiO-66-NH_2 MOFs. (B) Fluorescence emission spectrum of UiO-66-NH_2 MOFs and UV absorption spectrum of APBA@ARS. (C) Fluorescence lifetime spectra of UiO-66-NH_2 MOFs and UiO-66-NH_2 MOFs/APBA@ARS. (D) The fluorescence emission spectra of UiO-66-NH_2 MOFs and APBA@ARS mixing system with different APBA@ARS concentration,0.2mg/ml UiO-66-NH_2 MOFs.(E)Fluorescence emission spectra of MOF, MOF/Cu^{2+}, MOF/D-PA,MOF/APBA@ARS,MOF/APBA@ARS/Cu^{2+},MOF/APBA@ARS/Cu^{2+}/D-PA system. (F) The UV–vis absorption spectra of Cu@ARS, UiO-66-NH_2 MOFs+APBA@ARS, UiO-66-NH_2 MOFs+APBA@ARS+Cu^{2+},UiO-66-NH_2 MOFs+APBA@ARS+Cu^{2+} +D-PA system.

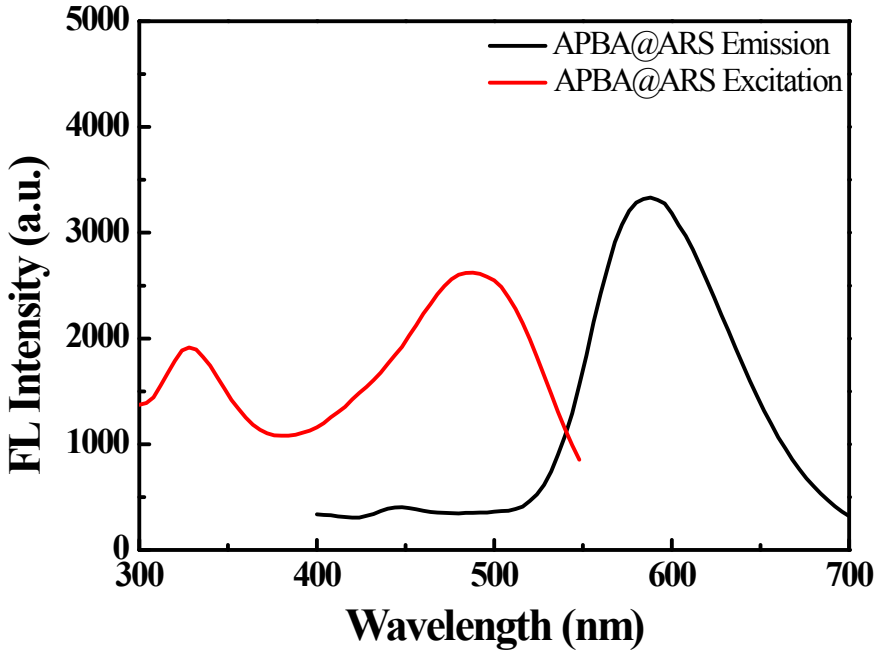

Fig.S3 Fluorescence excitation and emission spectra of APBA@ARS.

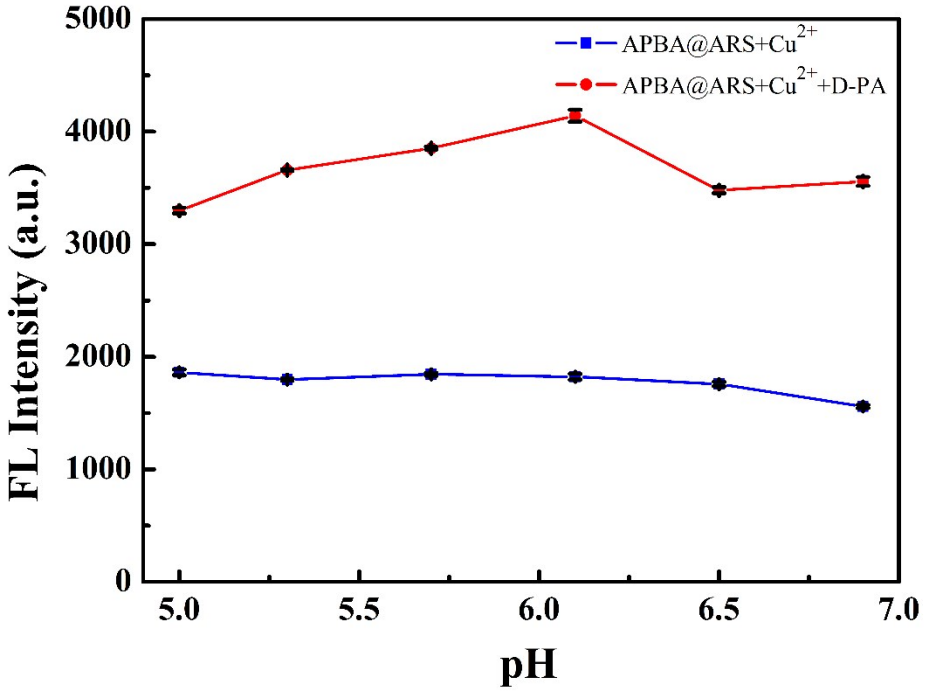

Fig.S4 The effect of pH on the fluorescence intensity of APBA@ARS+Cu^{2+}, APBA@ARS+Cu^{2+} +D-PA.

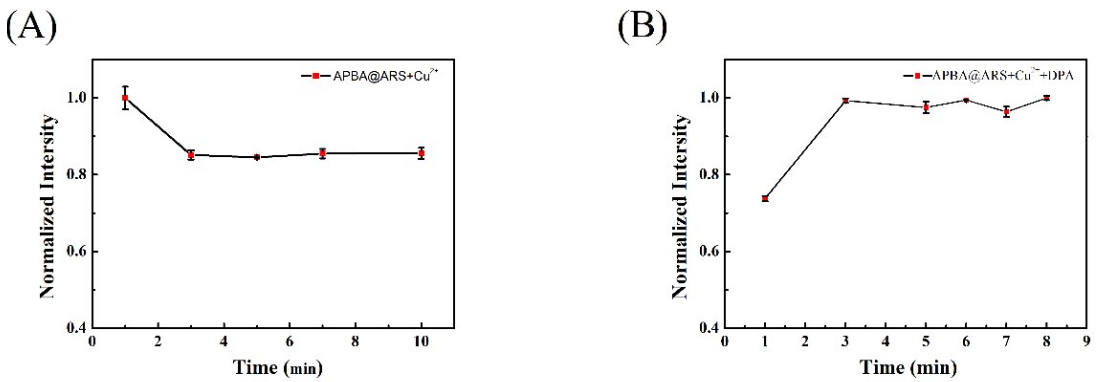

Fig.S5 The effect of reactiontime on the fluorescence intensity of APBA@ARS+Cu^{2+}, APBA@ARS+Cu^{2+}+D-PA.

Table S1. Comparison of our method with the previous methods for the detection of D-penicillamine

Methods	Materials	Linear range (μM)	LOD (μM)	Reference
Spectrophotometric	Ni^{2+}	3.0 − 200	0.89	[1]
Fluorescence	BSA-stabilized AuNCs	20 – 239	5.4	[2]
Fluorescence	GQDs @ Pb^{2+}	0.6 − 50	0.47	[3]
Electrochemical assay	MIP-GCE	10.0 – 480.0	3.5	[4]
Fluorescence	UiO-66-NH_2 and APBA@Alizarin Red	1−20	0.46	This work
colorimetric		2 –50	1.38	

References

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