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Supplementary Information

Singlet-oxygen generated by metal-organic framework for electrochemical biosensing

Pinghua Ling,* Shan Cheng, Nuo Chen and Feng Gao*

Laboratory of Functionalized Molecular Solids, Ministry of Education, Anhui Key Laboratory of Chemo/Biosensing, College of Chemistry and Materials Science, Anhui Normal University, Wuhu 241002, China.

* Corresponding author. Phone/fax: +86-553-3937137. E-mail: phling@ahnu.edu.cn (P. Ling); fgao@ahnu.edu (F. Gao)

Supporting Figures

The elemental mappings of Zn-ZnMOF

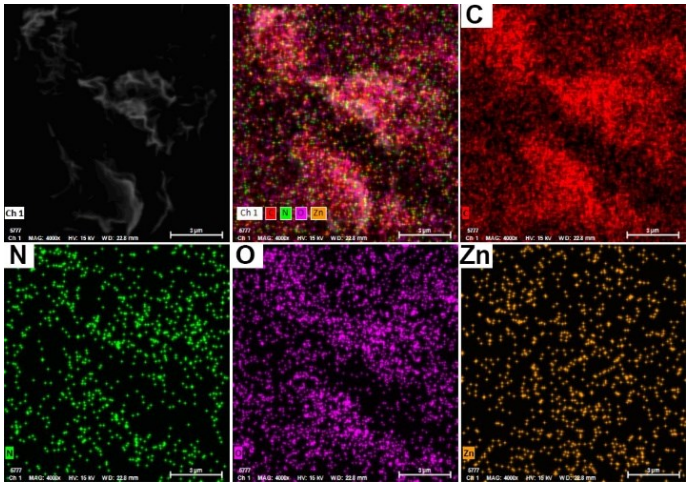

Fig. S1. Elemental mappings of C, N, O and Zn in Zn-ZnMOF.

The EDX spectrum of Zn-ZnMOF

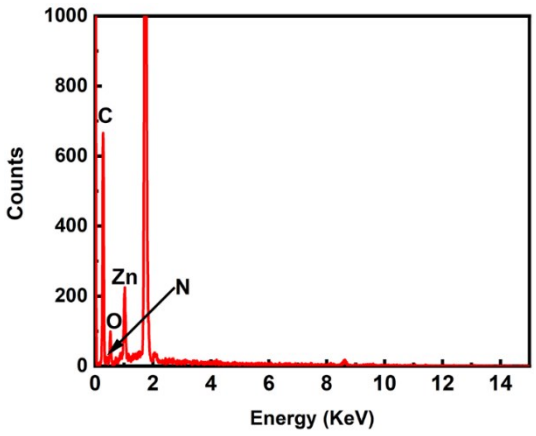

Fig. S2. EDX spectrum of Zn-ZnMOF.

The FT-IR of TCPP(Zn) and Zn-ZnMOF

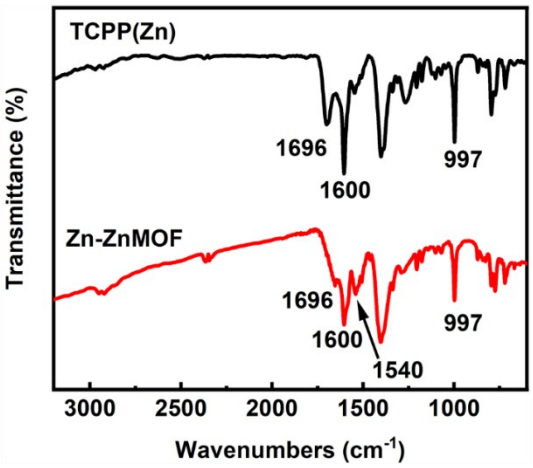

Fig. S3. FT-IR analysis of TCPP(Zn) and Zn-ZnMOF.

The XPS of Zn 2p and O 1s in Zn-ZnMOF

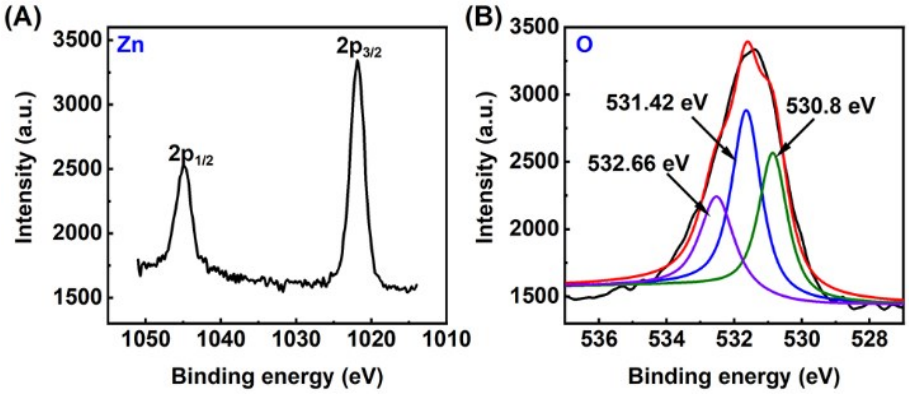

Fig. S4. (A) Zn 2p and O 1s peaks from the XPS spectra of Zn-ZnMOF.

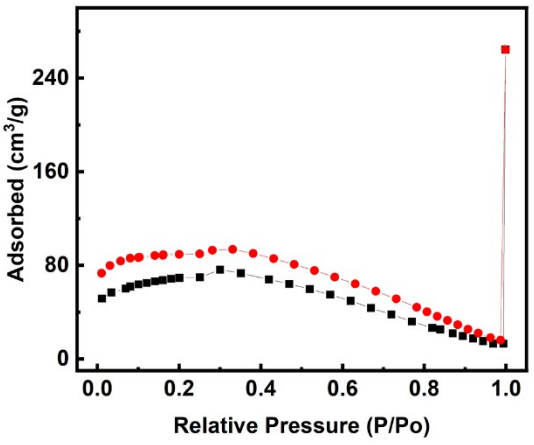

Fig. S5. N_2 adsorption isotherm of Zn-ZnMOF.

The ABDA absorption spectra as a function of time in the presence of TCPP(Zn)

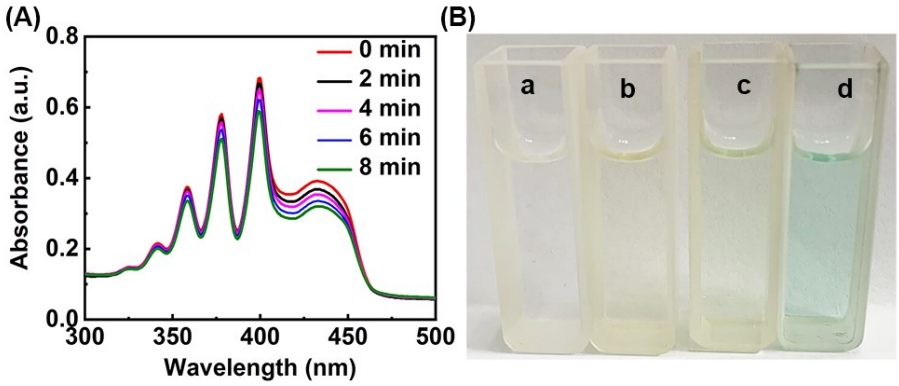

Fig. S6. (A) ABDA absorption spectra as a function of irradiation time of TCPP(Zn) in 0.1 M PBS (pH = 7.4). (B) Photo of tubes with different reaction system: TMB + 420 nm illumination (a), TCPP(Zn) + 420 nm illumination (b), TMB-TCPP(Zn) (c), and TMB-TCPP(Zn) + 420 nm illumination (d).

The Cyclic voltammograms of bare ITO electrode and Zn-ZnMOF/ITO electrode

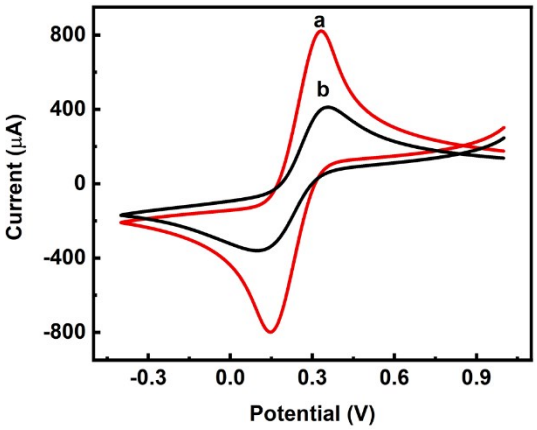

Fig. S7. Cyclic voltammograms of bare TIO electrode (a) and Zn-ZnMOF/ITO electrode (b) in 5 mM $K_3[Fe(CN)_6]/K_4[Fe(CN)_6]$ in 0.1 M PBS (pH 7.4) containing 0.1 M KCl at scan rate of 50 mV s^{-1}.

The EIS of bare ITO electrode and Zn-ZnMOF/ITO electrode

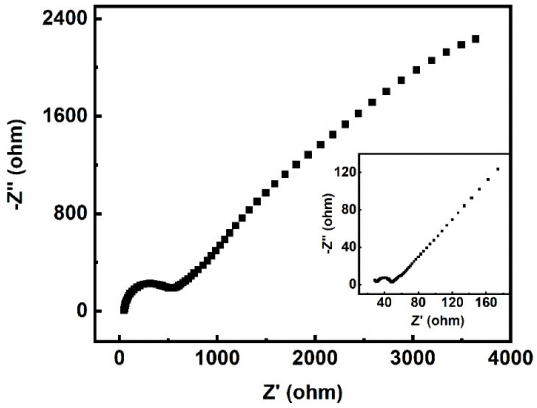

Fig. S8. EIS of Zn-ZnMOF/ITO electrode (inset: bare TIO electrode) in 5 mM $K_3[Fe(CN)_6]/K_4[Fe(CN)_6]$ in 0.1 M PBS (pH 7.4) containing 0.1 M KCl.

The effect of potential for potoelectrochemical bosensor

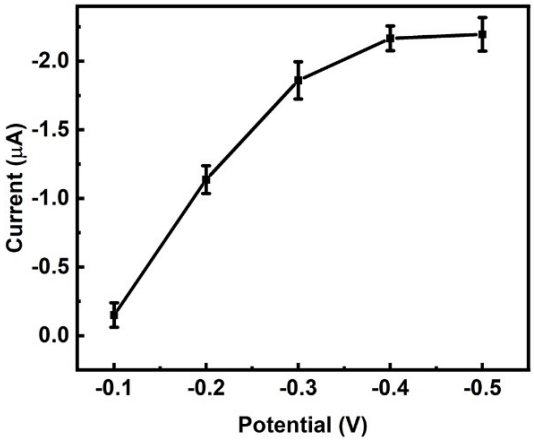

Fig. S9. Effects of potential on current response in the presence of 40 μM HQ in 0.1 M pH 7.4 PBS with 420 light illumination.

The Performance of Photoelectrochemical Biosensor

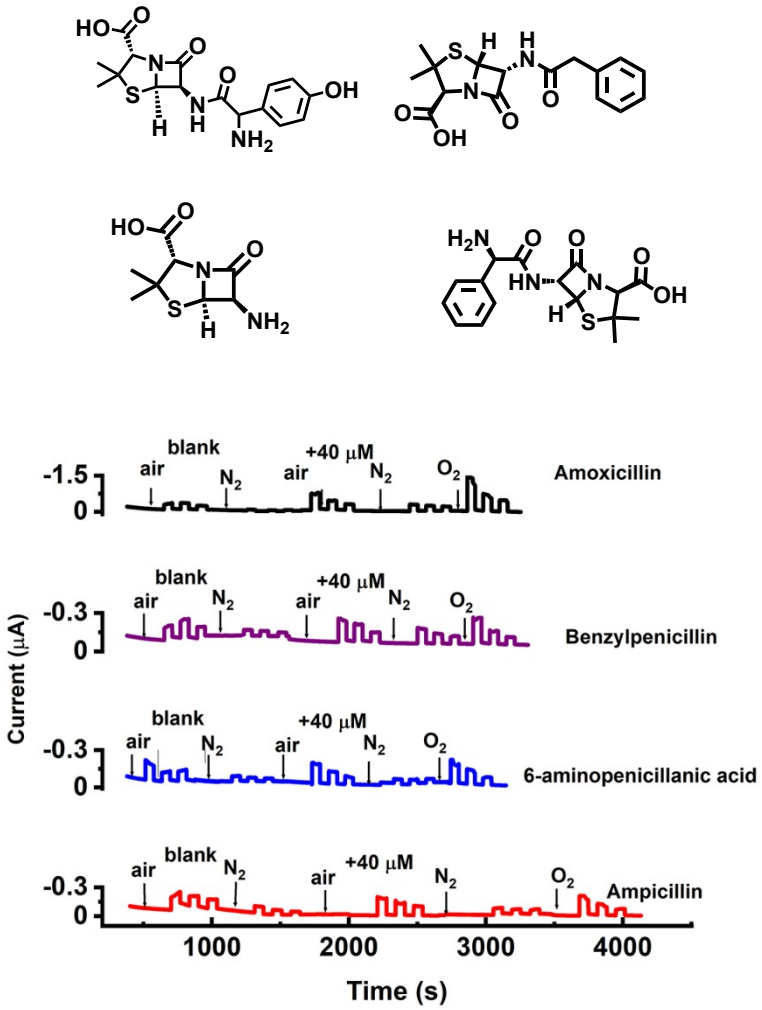

Fig. S10. Amperometry measurements at Zn-ZnMOF/ITO electrode in pure buffer and in the presence of 40 μM amoxicillin, 40 μM ampicillin, 40 μM benzylpenicillin and 40 μM 6-aminopenicillanic acid at -0.4 V in 0.1 M pH 7.4 PBS with 420 nm light illumination.

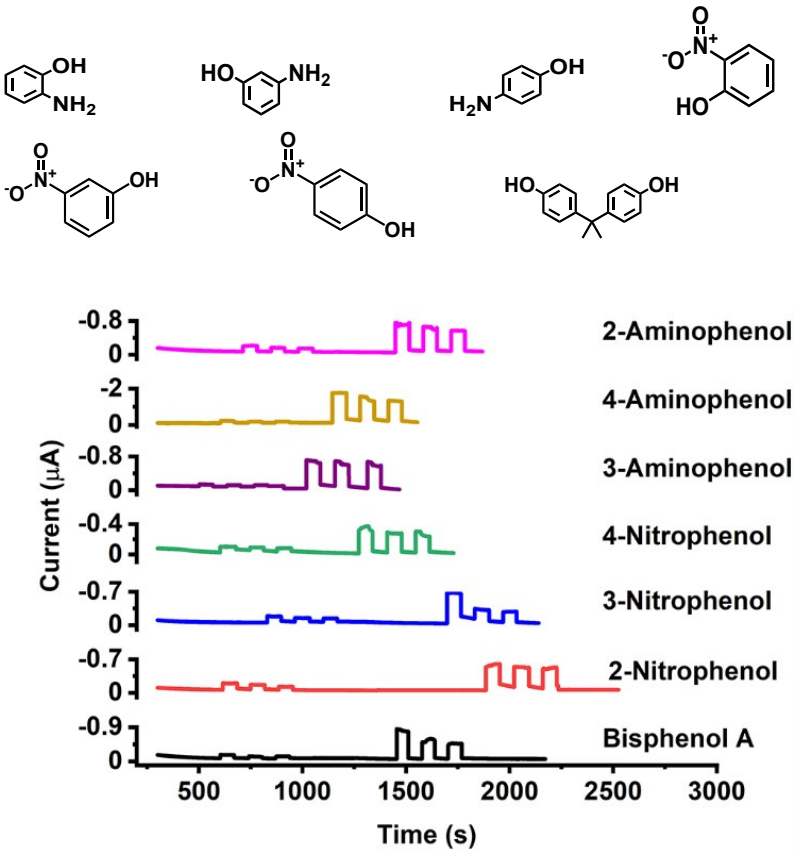

Fig. S11. The structure of 2-aminophenol, 3-aminophenol, 4-aminophenol, 2-nitrophenol, 3-nitrophenol, 4-nitrophenol, and bisphenol A and amperometry measurements at Zn-ZnMOF/ITO electrode in pure buffer and in the presence of 40 μM 3-nitrophenol, 40 μM 2-nitrophenol, 40 μM 4-nitrophenol, 40 μM 2-aminophenol, 40 μM 3-aminophenol, 40 μM 4-aminophenol and 40 μM bisphenol A at -0.4 V in 0.1 M pH 7.4 PBS with 420 light irradiation.

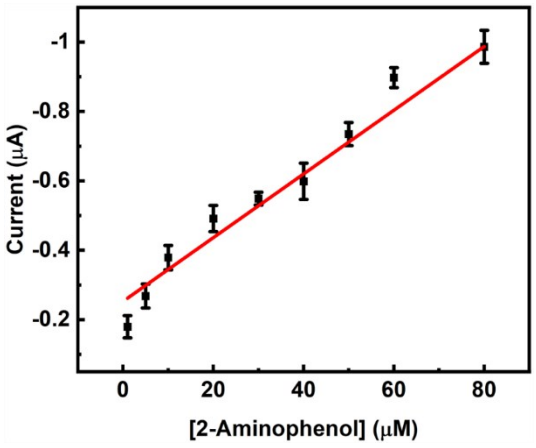

Fig. S12. Calibration curve of current intensity vs different concentration of 2-Aminophenol at -0.4 V in 0.1 M pH 7.4 PBS with 420 nm light irradiation.

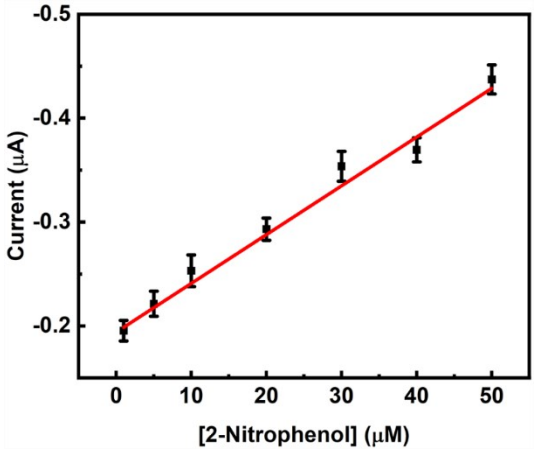

Fig. S13. Calibration curve of current intensity vs different concentration of 2-Nitrophenol at -0.4 V in 0.1 M pH 7.4 PBS with 420 nm light irradiation.

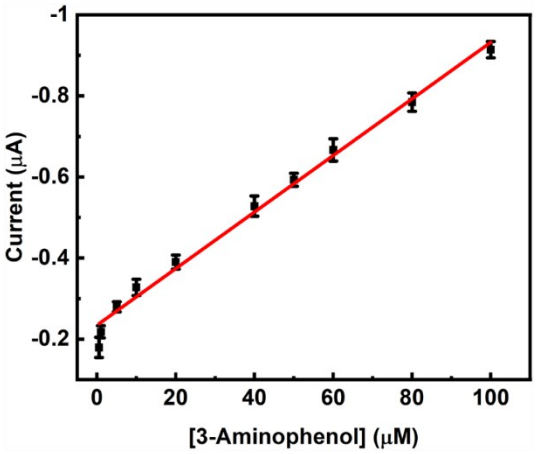

Fig. S14. Calibration curve of current intensity vs different concentration of 3-Aminophenol at -0.4 V in 0.1 M pH 7.4 PBS with 420 nm light irradiation.

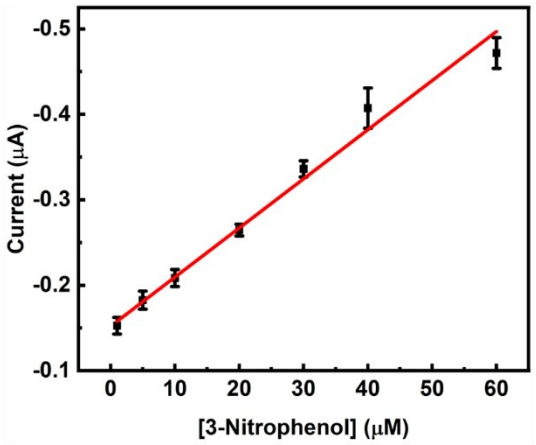

Fig. S15. Calibration curve of current intensity vs different concentration of 3-Nitrophenol at -0.4 V in 0.1 M pH 7.4 PBS with 420 nm light irradiation.

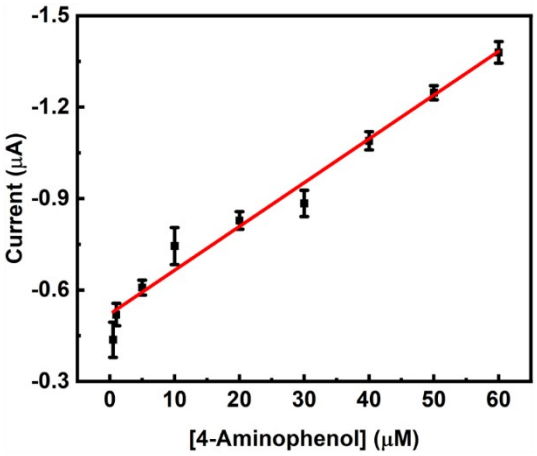

Fig. S16. Calibration curve of current intensity vs different concentration of 4-Aminophenol at -0.4 V in 0.1 M pH 7.4 PBS with 420 nm light irradiation.

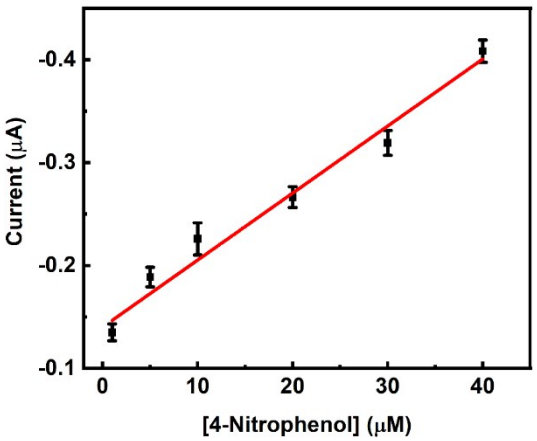

Fig. S17. Calibration curve of current intensity vs different concentration of 4-Nitrophenol at -0.4 V in 0.1 M pH 7.4 PBS with 420 nm light irradiation.

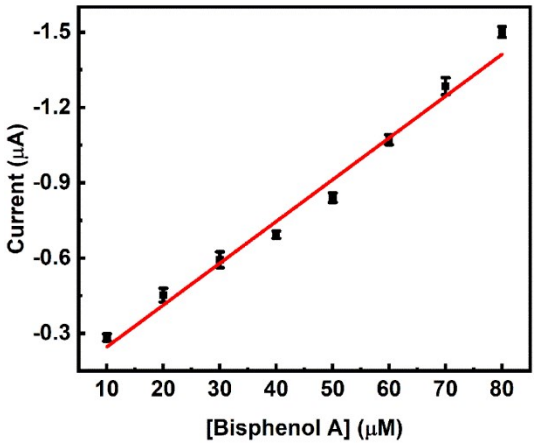

Fig. S18. Calibration curve of current intensity vs different concentration of Bisphenol A at -0.4 V in 0.1 M pH 7.4 PBS with 420 nm light irradiation.

Table S1. Comparison of the detection limit of hydroquinone (HQ) between the proposed method and other reported detection methods.

Electrode	Technique	Detection limit (μM)	Refs
Graphene-PANI/Tyr/ Nafion/GCE	LSV	200	1
GCE	CV	1.75	2
graphitized mesoporous carbon/GCE	DPV	0.91	3
LDH/GCE	DPV	2.6	4
CPE	SWV	2	5
Poly/GCE	LSV	3.91	6
Zn-ZnMOF/ITO	amperometry	0.8	This work

Reference

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