Supplementary Information for

A one stone two birds strategy for increasing the quantum yield and designing dual-emission AIE MOFs

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1. Reagents and materials

$ZrCl_4$ was purchased from Aladdin Biochemical Technology Co., Ltd., Shanghai, China. 2,3,5,6-tetrakis(4-carboxyphenyl)pyrazine and salicylalazine were obtained from Macklin Biochemical Co., Ltd., Shanghai, China. Benzoic acid was purchased from HEOWNS Biochemical Technology Co., Ltd., Tianjin, China. Sodium chloride, potassium bromide, calcium chloride, ferric chloride hexahydrate, sodium nitrate, sodium sulfate were acquired from Guangfu Fine Chemistry Graduate School, Tianjin, China. Sodium hypochlorite solution was obtained from Titan Technology Co., Ltd., Shanghai, China. N,N'-dimethylformamide, ethanol and tetrahydrofuran were purchased from Concord Chemical Research Institute (Tianjin, China). All the chemicals were obtained at least of analytical grade and used without further purification. The ultrapure water used throughout all the experiments was purified through Water Purifier Nanopure water system (18.3 MΩ cm).

2. Instrumentations

Scanning Electron Microscopy (SEM) images were recorded with JSM-7500F, Japan. Powder X-ray diffraction (PXRD) patterns from an angle range of 2° to 40° were recorded on a D/max-2500 diffractometer (Rigaku, Japan) using Cu Kα radiation (λ = 1.5418 Å) with a scanning speed of 8° min^{-1} and a step size of 0.02° in 2θ. Infrared spectra (IR) were obtained by Bruker TENSOR II Fourier transform infrared spectroscopy, over the ranging from 400 to 4000 cm^{-1}. Thermogravimetric analysis (TGA) was performed on a PTC-10ATG-DTA analyzer heated from 20°C at a ramp rate of 15°C min^{-1} under air. CO_2 adsorption-desorption isotherm was recorded with ASAP2020/Tristar 3000 surface area and pore analyzer at 274 K. The UV−vis absorption spectra were obtained by a UV-3600-visible spectrophotometer (Shimadzu, Japan). The fluorescence experiments were performed on a FL-4600 Fluorescence Spectrometer, Hitachi, Japan, equipped with a plotter unit and a quartz cell (1 cm × 1 cm) unit.

3. Supplementary figures and tables

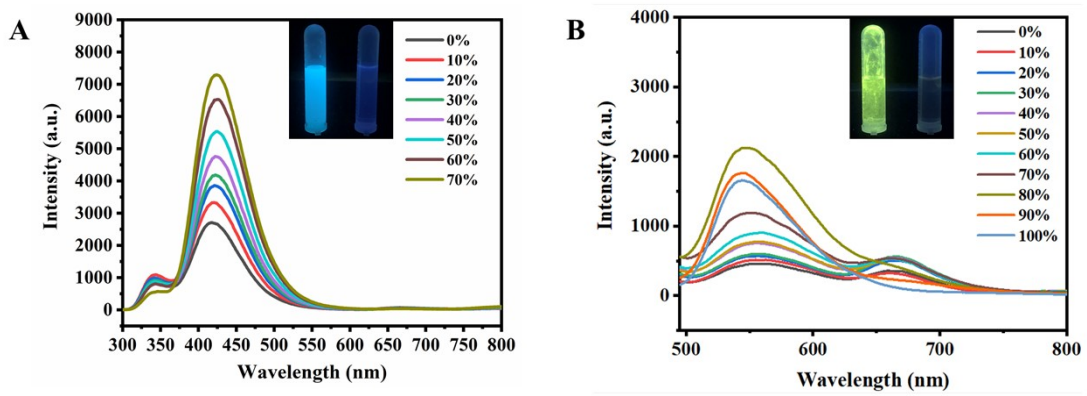

Figure S1. Fluorescence spectra of TCPP and SA in water/THF system with different water contents.

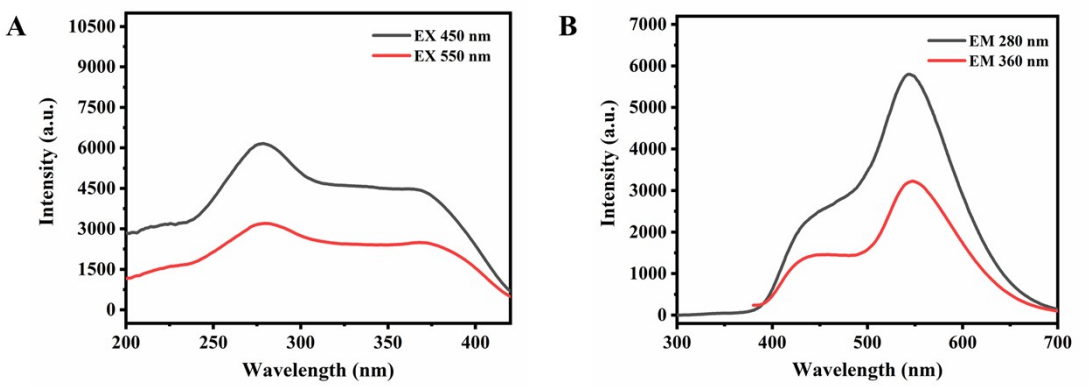

Figure S2. (A) The excitation spectrum of SA@Zr-TCPP. (B) The emission spectrum of SA@Zr-TCPP at different excitation wavelengths

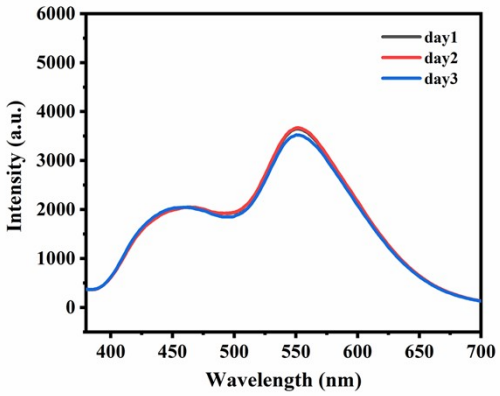

Figure S3. Emission stability of SA@Zr-TCPP after being soaked in aqueous solutions for several days.

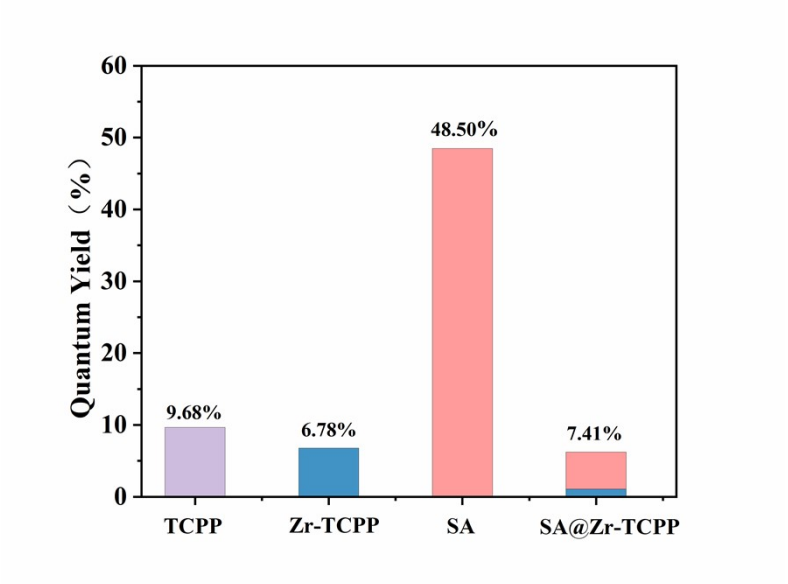

Figure S4. Quantum yield of TCPP, Zr-TCPP, SA and SA@Zr-TCPP in soild state.

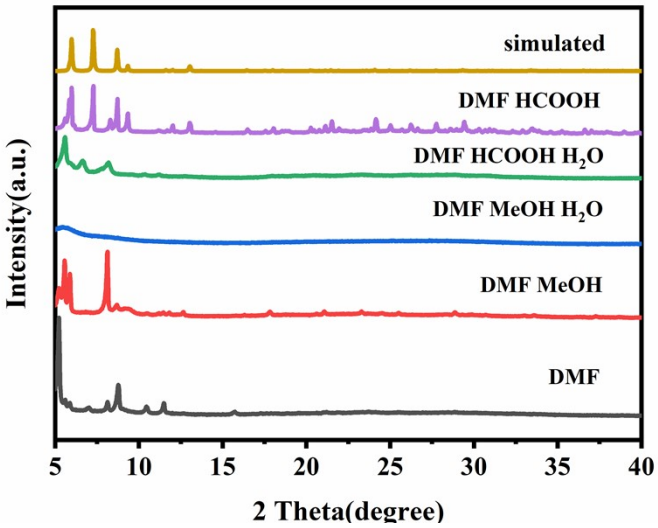

Figure S5. PXRD patterns of Zr-TCPP under different solvent conditions.

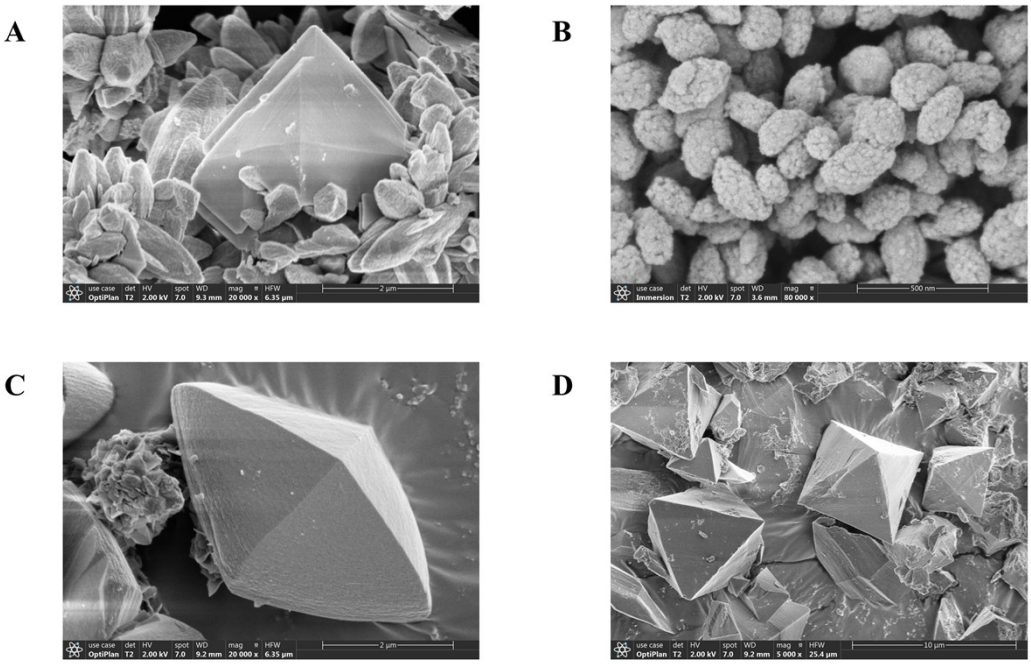

Figure S6. SEM images of Zr-TCPP under different solvent conditions (A) DMF (B) DMF and H_2O (C) DMF and MeOH (D) DMF and HCOOH.

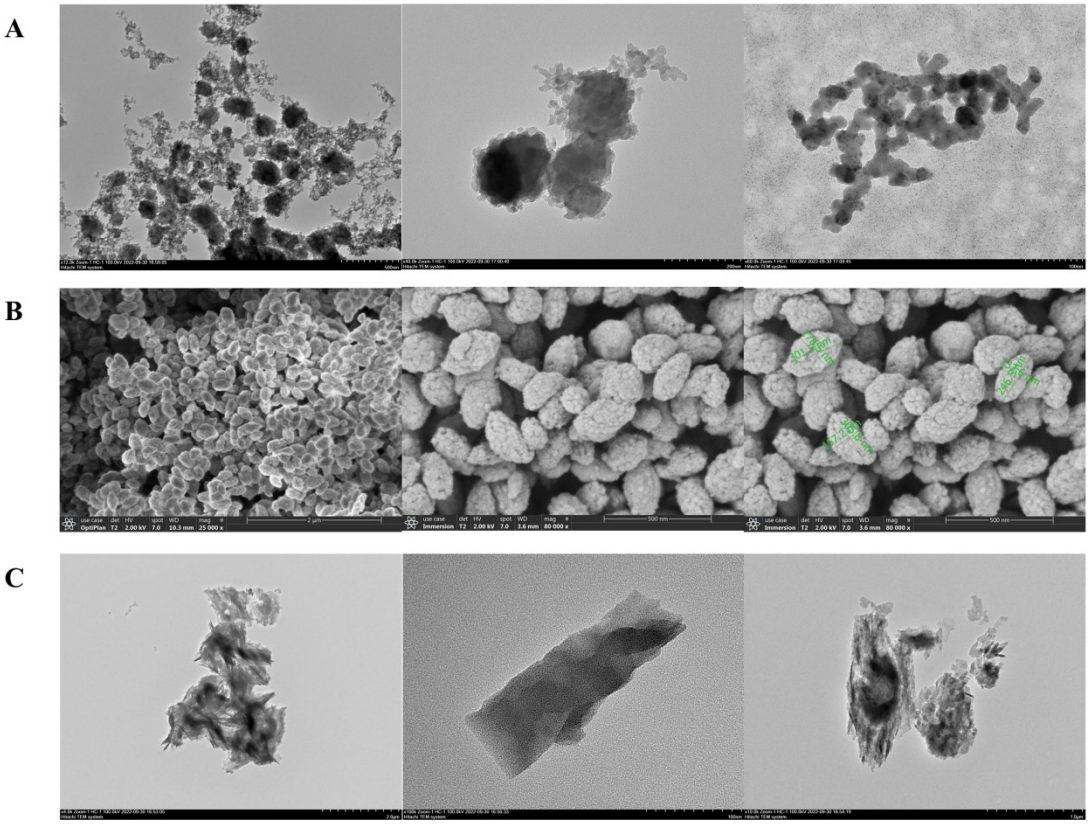

Figure S7. SEM images of Zr-TCPP when the dosage of regulator benzoic acid was (A) 0.3 g (B) 0.5 g and (C) 1.0 g.

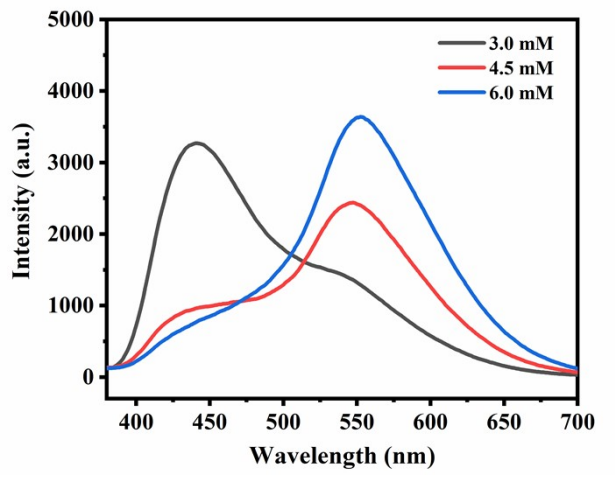

Figure S8. Fluorescence emission spectra of SA@Zr-TCPP with different concentrations of SA solution.

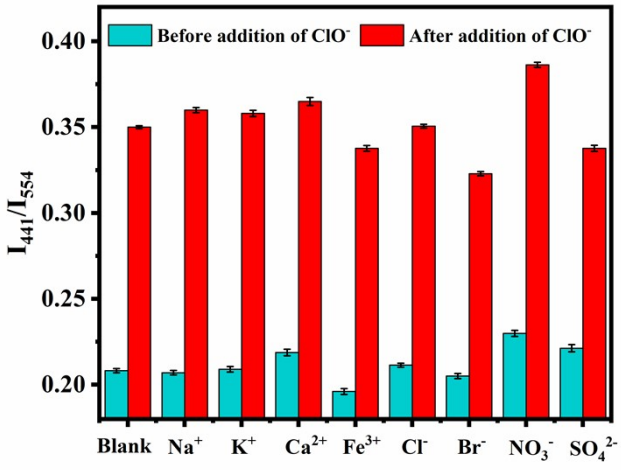

Figure S9. Intensity ratio of SA@Zr-TCPP responding to different cations and ions before and after addition of ClO^- (in the presence of ClO^- with three-fold of interference anions).

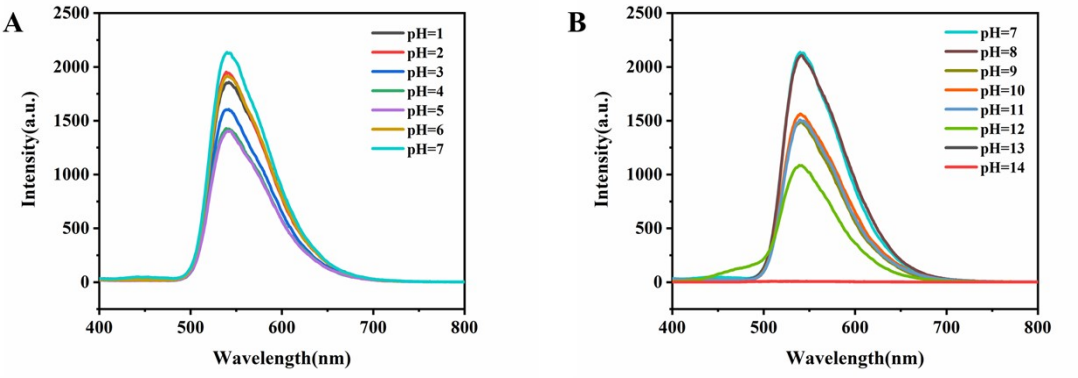

Figure S10. Fluorescence emission spectra of SA under various pH conditions.

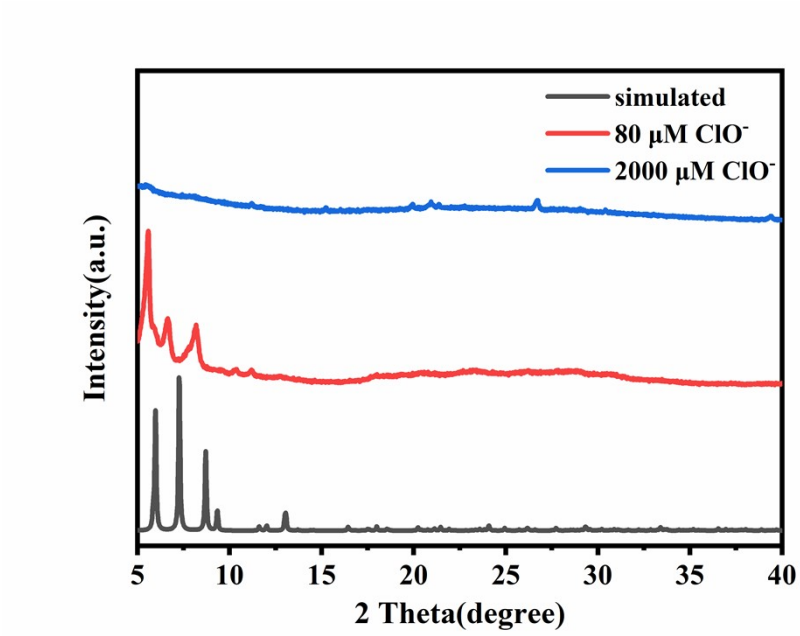

Figure S11. PXRD patterns of SA@Zr-TCPP after treated with different concentrations of ClO^-.

Table S1. Synthetic conditions of SA@Zr-TCPP.

Samples	Zr-TCPP (mg)	SA (mg)	SA (mM)	EtOH (mL)
1	20	14.4	3.0	20
2	20	21.6	4.5	20
3	20	28.8	6.0	20

Table S2. Comparison of the limit of detection (LOD) for the detection of ClO^- with fluorescence analytical methods

No	Materials	Limit of detection (LOD)	Linear range	Reference
1	**5-5-Eu/BPyDC@MOF-253-NH_2**	**0.094 μM**	**0.1–30 μM**	**[1]**
2	**UiO-66-HIA**	**0.244 μM**	**40-200 μM**	**[2]**
3	**Cd-PTZ-db**	**26 nM**	**0-25 μM**	**[3]**
4	**PDA/EU/PDA-UIO-66-NH_2**	**0.10 μM**	**0.1-60 μM**	**[4]**
5	**NBCu**	**82.95 nM**	**0-150 μM**	**[5]**
6	**Al^{3+}@UiO-66-$(OH)_2$**	**1.63 μM**	**0 to 30 μM**	**[6]**
7	**{[$Eu_2Cu(IN)_5(CO_3)(H_2O)$] 3 H_2O}n**	**10 μM**	**/**	**[7]**
8	**SA@Zr-TCPP**	**11.67 μM**	**0-3000 μM**	**This work**

Table S3. The ClO^- detection of SA@Zr-TCPP in real samples

Samples	Add (μM)	Found (μM)	Recovery (%)	RSD (%)
Tap water	0	1.62±0.06	——	3.7
	10	9.41±0.23	77.9	2.4
	40	39.52±0.71	94.8	1.8
	60	56.19±1.18	91.0	2.1
	80	72.86±0.29	89.1	0.4
	100	107.68±0.22	106.1	0.2