Electronic Supplementary Material (ESI) for Dalton Transactions.

Dual-Emissive Metal-Organic Framework: A Novel Turn-on and Ratiometric Fluorescent Sensor for Highly Efficient and Specific Detection of Hypochlorite

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1- Methods

Powder X-ray diffraction (PXRD) patterns were collected on a Rigaku MiniFlex2 diffractometer working with Cu Kα radiation. UV-vis spectra were measured on a UV-2600 (Shimadzu) ultraviolet spectrophotometer. Fluorescent measurements were carried out on a FS5 Spectrofluorometer (Edinburgh Instruments Ltd.) with a scan speed of 5 nm s^{-1} and emission/excitation slit widths of 3 nm. Fluorescent lifetimes were measured on a FLS980 Spectrofluorometer (Edinburgh Instruments Ltd.) with an excitation wavelength of 375 nm. SEM (scanning electron microscopy) images were collected in JSM6700-F and SU-8010 field emission scanning electron microscopes.

2- Chracterization

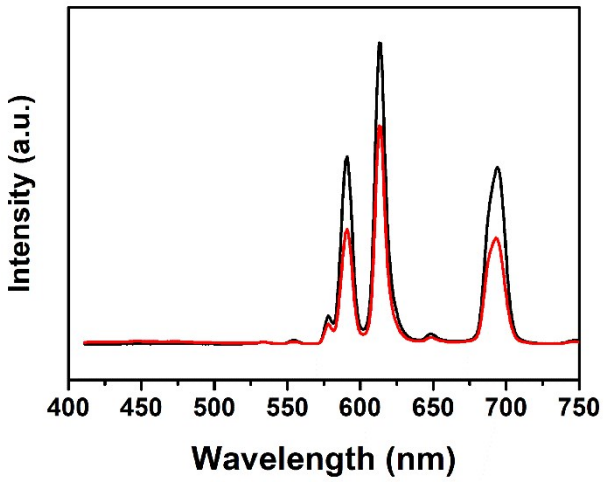

Figure S1. Fluorescent spectra of PDA/Eu/PDA-UiO-66-NH_2(20) and PDA/Eu/PDA-UiO-66-NH_2(0) suspensions when excited at 280 nm.

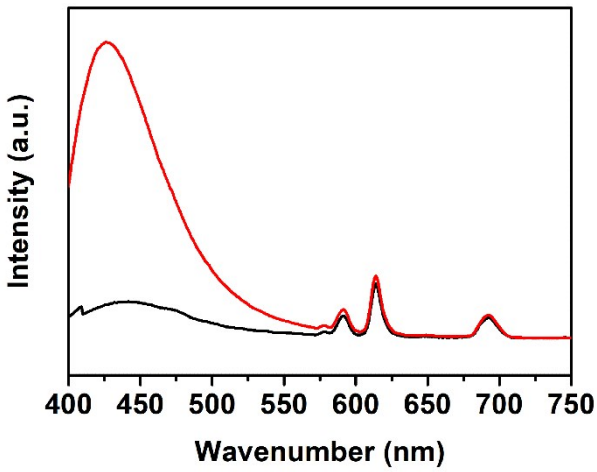

Figure S2. Fluorescent spectra of PDA/Eu/PDA-UiO-66-NH_2(40) suspension before (black) and after (red) adding 60 μL aqueous solution of NaClO (3 mM).

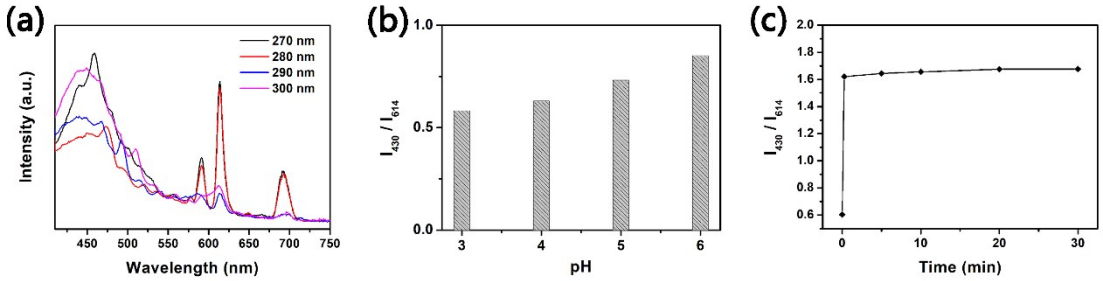

Figure S3. Effect of (a) excitation wavelength, (b) pH, and (d) contact time to the fluorescence of PDA/Eu/PDA-UiO-66-NH_2(40) suspension.

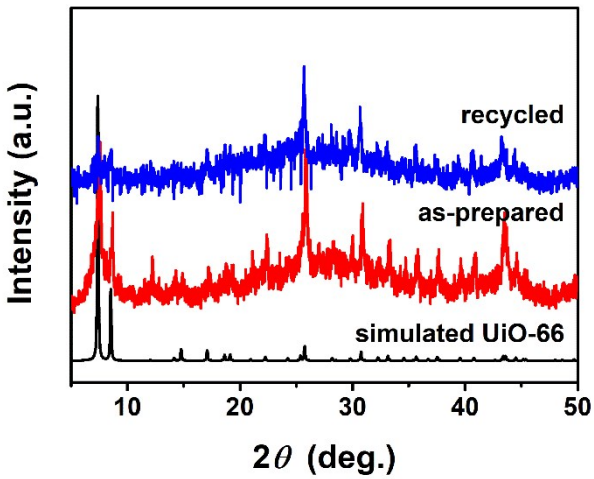

Figure S4. PXRD patterns of pristine and recycled PDA/Eu/PDA-UiO-66-NH_2(40).

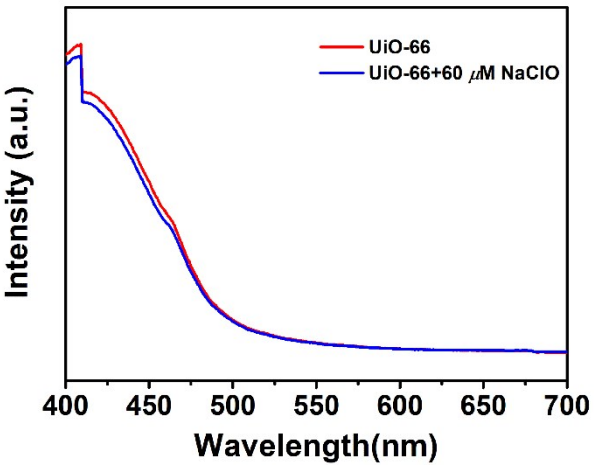

Figure S5. Fluorescent spectra of UiO-66 suspensions before (black) and after (red) adding 60 μL aqueous solution of NaClO (3 mM).

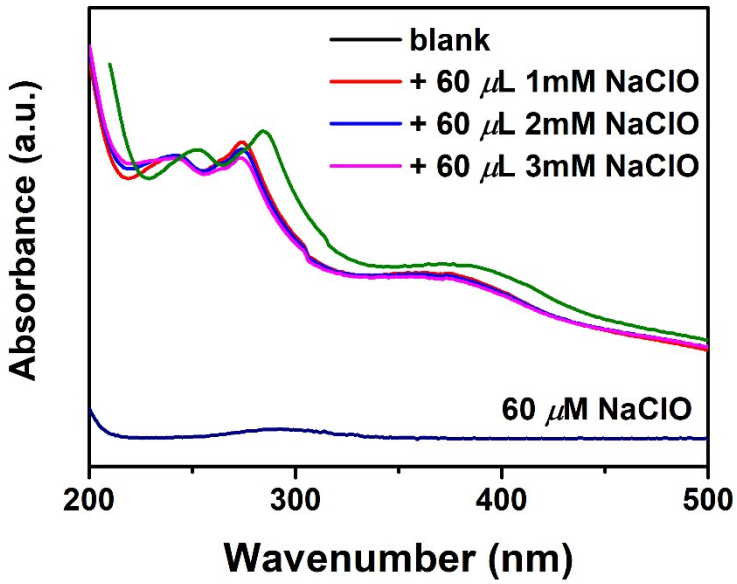

Figure S6. UV-*vis* absorbance spectra of ClO^- (60 μM) and PDA/Eu/PDA-UiO-66-NH_2(40) after adding various amount of ClO^-.

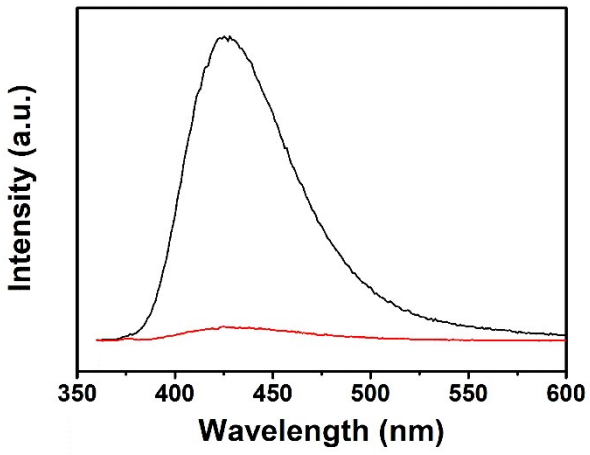

Figure S7. Fluorescent spectra of UiO-66-NH_2 suspension before (black) and after (red) adding 60 μL aqueous solution of NaClO (3 mM).

Table S1. ICP results of PDA/Eu/PDA@UiO-66-NH_2(x).

Samples	Eu (wt%)	Zr (wt%)	n_{Eu}/n_{Zr}
PDA/Eu/PDA@UiO-66-NH_2(0)	14.12%	12.90%	65.67%
PDA/Eu/PDA@UiO-66-NH_2(20)	12.07%	19.34%	37.45%
PDA/Eu/PDA@UiO-66-NH_2(30)	4.81%	34.11%	8.46%
PDA/Eu/PDA@UiO-66-NH_2(40)	3.92%	33.87%	6.94%
PDA/Eu/PDA@UiO-66-NH_2(50)	3.02%	30.15%	6.01%
PDA/Eu/PDA@UiO-66-NH_2(80)	0.487%	24.60%	1.19%
PDA/Eu/PDA@UiO-66-NH_2(100)	0.24%	28.13%	0.51%

Table S2. Comparison of the reported MOF-based sensors and other representative prober for ClO^- detection.

Probe	Operation mode	Linear range (μM)	Response time (s)	LOD (μM)	media	Ref.
Compound 1	Turn-off	10-400	NM	10	DMF	[1]
AF@MOF-801	Off-on	0.5-15	30	0.075	HEPES	[2]
UiO-68-ol	Turn-off	0.1-100	5	0.10	PBS	[3]
NH_2-MIL-53(Al)	Turn-off	0.05-15	180	0.04	PBS	[4]
UiO-Eu-L1	Turn-on	0.1-5	5	0.016	Pure water	[5]
UiO-68-PT	Turn-on	0-80	< 10	0.28	Water	[6]
Eu/BPyDC@MOF-253-NH_2	Ratiometric and turn-off	0.1-30	< 15	0.094	Tris-HCl	[7]
Py-Pd	Turn-on	0.5-15	30	0.075	H_2O/DMSO	[8]

CD@Ru(bpy)$_3^{2+}$	Ratiometric and turn-off	0.05-7	NM	0.012	PBS	[9]
BiTClO	Turn-on	0-20	10	0.21	PBS	[10]
M-TPEP-CN	Turn-on	0-110	NM	2.363	PBS-MeCN	[11]
NFCDs	On-off	0-20	Very quickly	0.012	water	[12]
BODIPY	ratiometric	0-70	600	0.15	PBS	[13]
PDA/Eu/PDA-UiO-66-NH_2	Ratiometric turn on	0.10-60	< 15	0.10	Tris-HCl	This work

NM = no mentioned.

Table S3. Fluorescent lifetimes of PDA/Eu/PDA-UiO-66-NH_2(40) suspensions (in Tris-HCl buffer solution) after adding 60 μL aqueous solutions of NaClO with various NaClO concentration.

Sample	τ_1 (s)	Rel (%)	τ_2 (s)	Rel (%)	τ (s)
Suspension	2.45E-10	35.88	1.39E-08	64.12	9.01E-09
Suspension + 60 μL 1mM ClO^-	2.68E-10	18.34	1.43E-08	81.66	1.17E-08
Suspension + 60 μL 2mM ClO^-	2.70E-10	15.06	1.44E-08	84.94	1.22E-08
Suspension + 60 μL 3mM ClO^-	2.81E-10	8.98	1.46E-08	91.02	1.33E-08

Reference

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