Electronic Supplementary Information (ESI)

A Luminescent Metal-Organic Framework for Highly Selective Sensing of Nitrobenzene and Aniline

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Materials and general methods

All solvents and starting materials for synthesis were purchased commercially and were used as received. Powder X-ray diffraction (PXRD) patterns were collected with a Bruker AXS D8 advanced automated diffractometer with Cu-K radiation. Luminescence spectra for the solid samples and liquid
samples were investigated with a HitachiF-4500 fluorescence spectrophotometer and Varian Cary Eclipse Fluorescence spectrophotometer, respectively. All UV/Vis spectra were measured on a SP-752(PC) UV-Vis spectrophotometer (Shanghai Spectrum Instrument Co., Ltd).

**Synthesis of gea-MOF-1**

The crystal of gea-MOF-1 was synthesized according to references. A solution of Y(NO$_3$)$_3$ * 6H$_2$O (8.6 mg, 0.0225mmol), H$_3$BTB (6.6 mg, 0.015 mmol), 2-fluorobenzoic acid (95.2 mg, 0.675 mmol), DMF (2 mL) and H$_2$O (0.5 mL) was prepared in a 20 ml scintillation vial and subsequently heated to 378 K for 36 hours in a preheated oven.

**Experimental details for the anti-interference ability of gea-MOF-1**

The powder sample of gea-MOF-1 (36 mg) was immersed in methanol (100 mL). Treated by ultrasonication and then aged to generate stable suspensions before the fluorescence study. Some aromatic compounds with the same concentrations of 60 ppm were added to the methanol suspension of gea-MOF-1, and the corresponding emission spectra were monitored. With the subsequent addition of 60 ppm nitrobenzene into the parallel tests, and the corresponding emission spectra were monitored.
### Table S1 Summary of the quenching efficiency of luminescent MOF sensors for NB

<table>
<thead>
<tr>
<th>MOF</th>
<th>Quantity(mg)/solvent (mL)</th>
<th>NB concentration</th>
<th>Quenching efficiency</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Tb(L)_2(3(H_2O))_2H_2O]_3</td>
<td>3 mg/5 mL</td>
<td>1000 ppm</td>
<td>60%</td>
<td>[1]</td>
</tr>
<tr>
<td>[[(UO_2)_2(H_2TTHA)(H_2O))_4.4'-bipy-2H_2O]_n</td>
<td>2 mg/3 mL</td>
<td>1000 ppm</td>
<td>90%</td>
<td>[2]</td>
</tr>
<tr>
<td>Mg_2(L)(DMF)<em>2(H_2O)(DMF)$</em>{3/2}$</td>
<td>5 mg/3 mL</td>
<td>1500 ppm</td>
<td>100%</td>
<td>[3]</td>
</tr>
<tr>
<td>[Eu(L)_1.5(DEF)]_n</td>
<td>3 mg/5 mL</td>
<td>970 ppm</td>
<td>100%</td>
<td>[4]</td>
</tr>
<tr>
<td>[Cd_4(NTB)_3(DMA)_3] 2DMA</td>
<td>2 mg/3 mL</td>
<td>600 ppm</td>
<td>79%</td>
<td>[5]</td>
</tr>
<tr>
<td>[Zn(trz)(bpc)])_n *DMA</td>
<td>3 mg/3 mL</td>
<td>500 ppm</td>
<td>89%</td>
<td>[6]</td>
</tr>
<tr>
<td>Tb@NENU-522</td>
<td>3 mg/3 mL</td>
<td>2000 ppm</td>
<td>100%</td>
<td>[7]</td>
</tr>
<tr>
<td>[Cd(ppvpa)(1,4-NDC)]_n</td>
<td>2 mg/2 mL</td>
<td>800 ppm</td>
<td>94%</td>
<td>[8]</td>
</tr>
<tr>
<td>Cd_0.5Na(NTB)_3(DMF)_3 3DMF</td>
<td>0.3 mg/3 mL</td>
<td>500 ppm</td>
<td>83%</td>
<td>[9]</td>
</tr>
<tr>
<td>[Zn(HL)_2(H_2O)]_2-DMA-H_2O</td>
<td>0.3 mg/3 mL</td>
<td>300 ppm</td>
<td>92%</td>
<td>[10]</td>
</tr>
<tr>
<td>[Tb(mtpc)_1.5(DMA)(H_2O)]_2H_2O</td>
<td>0.4 mg/5 mL</td>
<td>150 ppm</td>
<td>87.9%</td>
<td>[11]</td>
</tr>
<tr>
<td>(DMA)<em>2[Y</em>{m+1-OH}(m+2-OH)BTRB)_n (solv)]_n</td>
<td>1.8 mg/5 mL</td>
<td>60 ppm</td>
<td>93.1%</td>
<td>This work</td>
</tr>
</tbody>
</table>

* The values were estimated from the literature[^1]. ** The values were estimated from the literature[^2].

[^1]: [1]
[^2]: [2]
[^3]: [5]

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Fig. S1 PXRD patterns of gea-MOF-1
**Fig. S2** Excitation (at 284 nm) and emission (at 385 nm) spectra of H$_3$BTB in the solid state at room temperature.

**Fig. S3** Excitation (at 290 nm) and emission (at 373 nm) spectra of gea-MOF-1 in the solid state at room temperature.
Fig. S4 Emission spectra of gea-MOF-1 (5 mg) at room temperature in different solvents (5 mL) ($\lambda_{ex} = 290$ nm)

![Graph showing emission spectra of gea-MOF-1 in different solvents.]

Fig. S5 The luminescent intensity of gea-MOF-1 in different concentration of nitroaromatic compounds (a) 2,4-dinitrophenol (DNP), (b) p-nitrophenol (PNP), (c) 4-nitrotoluene (4-NP), (d) o-nitrophenol (ONP) ($\lambda_{ex} = 290$ nm)

![Graphs showing luminescent intensity of gea-MOF-1 at different concentrations of nitroaromatic compounds.]
**Fig. S6** Emission spectra of methanol suspension of **gea-MOF-1** upon addition of different nitroaromatic compounds (a) 2,4-dinitrophenol (DNP), (b) p-nitrophenol (PNP), (c) 4-nitrotoluene (4-NP), (d) o-nitrophenol (ONP) followed by NB ($\lambda_{ex} = 290$ nm)

**Fig. S7** Fluorescence intensity ratio histograms of **gea-MOF-1** dispersed in methanol with the addition of different aromatic compounds (pink) and subsequent addition of NB (blue) ($\lambda_{ex} = 290$ nm)
**Fig. S8** Reproducibility of the quenching ability of gea-MOF-1 dispersed in methanol to NB ($\lambda_{ex}=290$ nm).

**Fig. S9** Fluorescence intensity ratio histograms of gea-MOF-1 dispersed in methanol with the addition of different organic amines (pink) and subsequent addition of AN (blue) ($\lambda_{ex}=290$ nm)
Fig. S10 Reproducibility of the quenching ability of gea-MOF-1 dispersed in methanol to AN ($\lambda_{ex}=290\text{ nm}$)

Fig. S11 The PXRD patterns of gea-MOF-1: the samples after 5 quenching cycles

Fig. S12 The UV-vis absorption spectra of NB, DNP, PNP, 4-NP, ONP, AN in methanol
Reference: