

# Luminescent sensing from a new Zn(II) metal-organic framework

Jian-Qiang Liu<sup>a\*</sup>, Jian Wu<sup>b</sup>, Fu-Mei Li<sup>a</sup>, Wei-Cong Liu<sup>a</sup>, Bao-Hong Li<sup>a</sup>, Jun Wang<sup>c</sup>, Qin-Ling Li<sup>a</sup>,  
Reena Yadav<sup>d</sup> and Abhinav Kumar<sup>d\*</sup>

<sup>a</sup>*School of Pharmacy, Guangdong Medical University, Dongguan, 523808, P. R. China and Guangdong Key Laboratory for Research and Development of Natural Drugs, Guangdong Medical University, P. R. China*

<sup>b</sup>*Guangxi Key Laboratory of Chemistry and Engineering of Forest Products, Guangxi University for Nationalities, College of Chemistry and Chemical Engineering, Nanning, Guangxi 530006, China*

<sup>c</sup>*School of Chemistry and Pharmaceutical Engineering, Sichuan University of Science & Engineering, Zigong 643000, PR China*

<sup>d</sup>*Department of Chemistry, Faculty of Science, University of Lucknow, Lucknow 226 007, India*

*Corresponding Authors: [jianqiangliu2010@126.com](mailto:jianqiangliu2010@126.com), Tel/Fax: 86-769-22896560*

## Measurements:

UV–Vis absorption spectroscopy was obtained on U-3010 spectrophotometer (Hitachi, Japan). Fluorescence spectra were performed with Eclipse fluorescence spectrophotometer (Varian, USA), the photomultiplier tube (PMT) voltage was 700 V, the scan speed was 1200 nm min<sup>-1</sup>, the slit width of excitation and emission is 5 nm

**Photoluminescence Measurements.** The photoluminescence of **GDMU-3** was investigated in the solid state at room temperature. For the experiments of sensing metal

ions, **GDMU-3** powder (5 mg) was immersed in DMF solutions containing 10<sup>-2</sup> M of M(NO<sub>3</sub>)<sub>x</sub>. Before photoluminescence measurements, the suspensions were oscillated for 30 min using ultrasonic waves to ensure uniform dispersion. For the titration experiments of Fe<sup>3+</sup> ion, **GDMU-3** powder (5 mg) was immersed in DMF with the dropped addition of different concentrations of Fe<sup>3+</sup> in DMF.

**Dye adsorption:** Freshly prepared compound **GDMU-3** (10 mg) were transferred to DMF solutions (8 mL) of Methylene and Solvent Yellow 2 in 10 mL sealed glass bottles. UV/Vis spectra were used to determine the selective adsorption ability of **GDMU-3** after certain time intervals.

**Dye release:** Compound **GDMU-3** loaded with Methylene and Solvent Yellow 2 (10 mg) were transferred to pure DMF and saturated NaCl in DMF solution (4 mL) in 10 mL sealed glass bottles. UV/ Vis spectra were used to determine the selective release

of **GDMU-3** after certain time intervals.

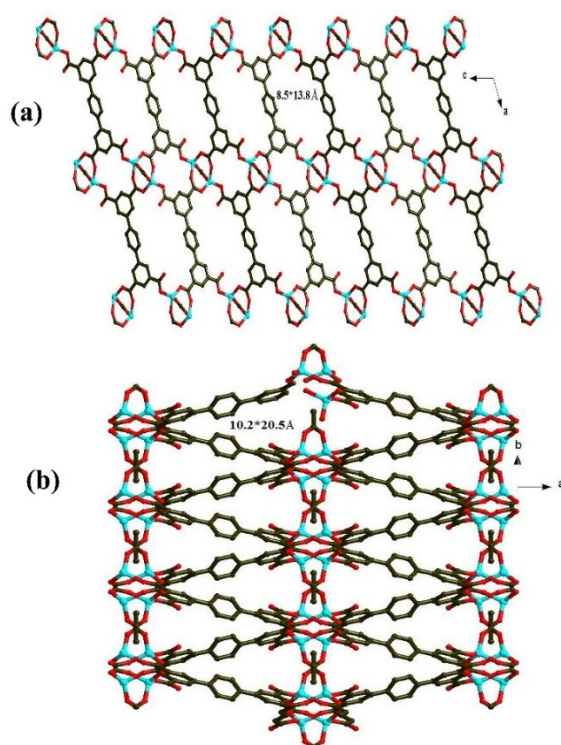


Fig. S1 X-ray single crystal structure of **GDMU-3** exhibiting two types of pores of about (a)  $5.8 \times 3.8$  Å along the *b* axis and (b)  $10.2 \times 20.5$  Å along the *c* axis, respectively.

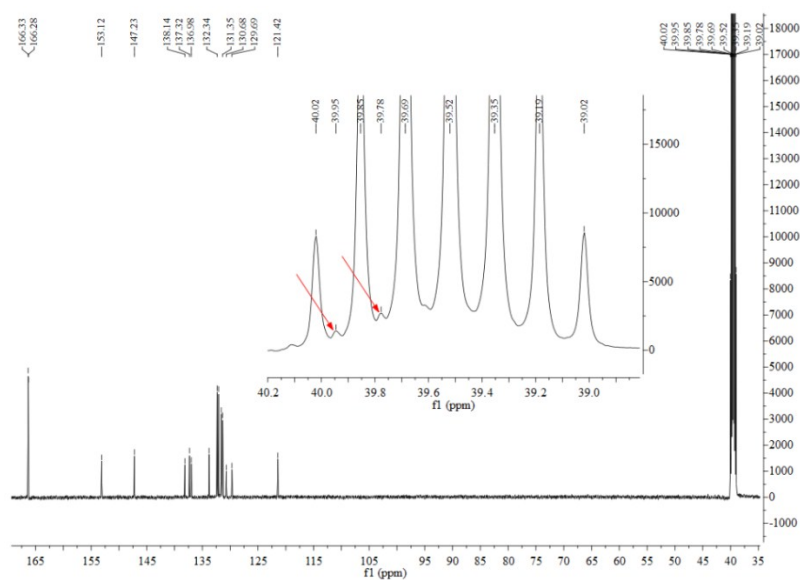


Fig. S2  $^{13}\text{C}$  NMR spectra of title compound.

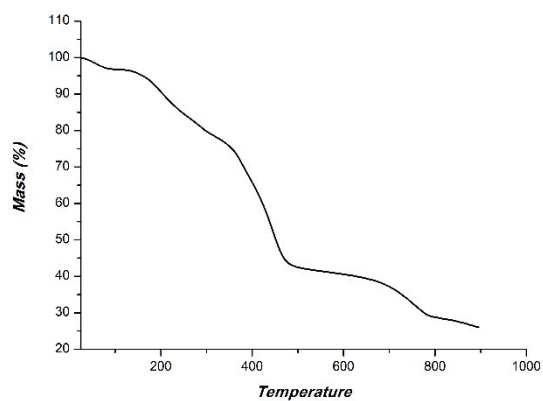


Fig. S3. TGA curves of compound **GDMU-3**.

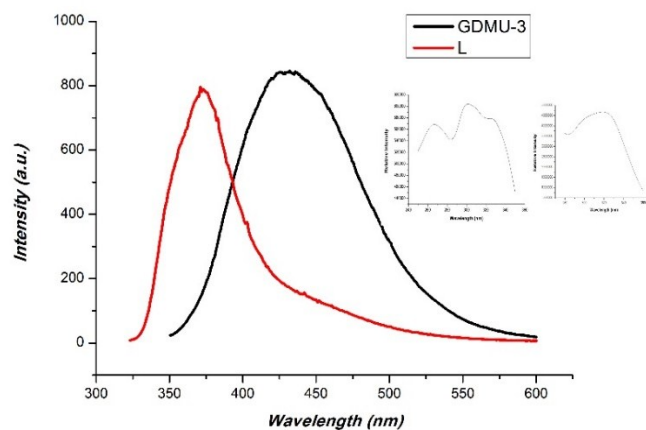


Fig. S4. PL curves of compound **GDMU-3** and L ligand at room temperature in the solid state (the inserts show excitation spectrum  $\lambda_{\text{ex}} = 300$  nm for L(left) and  $\lambda_{\text{ex}} = 320$  nm for GDMU-3(right)).

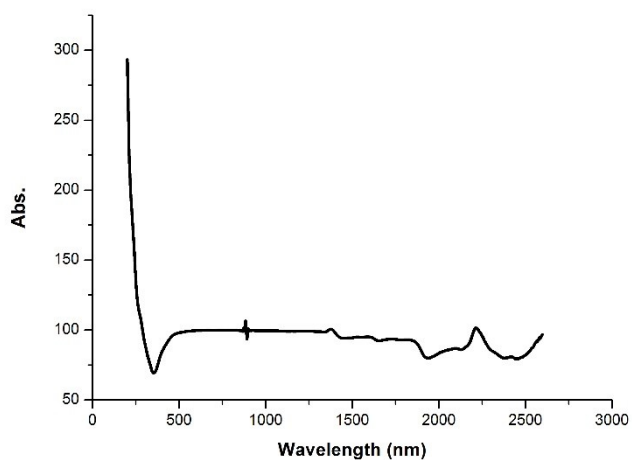


Fig. S5 UV-Vis-NIR spectra for title compound

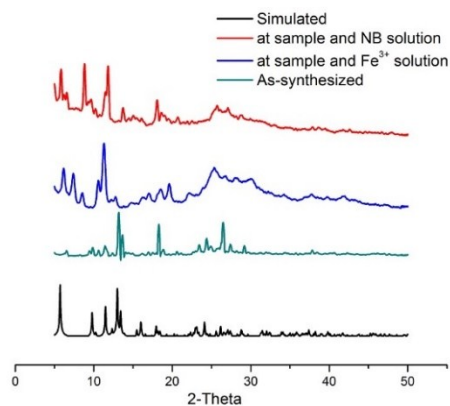


Fig. S6 XRPD patterns for **GDMU-3**.

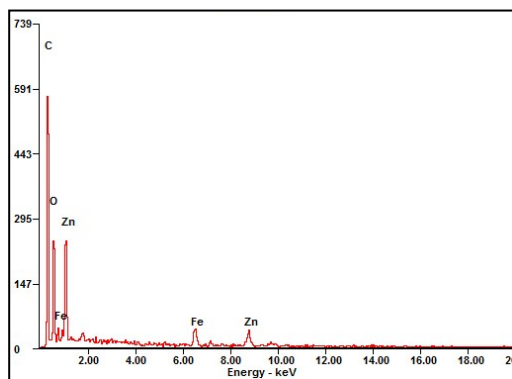


Fig. S7 The EDS of the solid samples of **GDMU-3-Fe<sup>3+</sup>** obtained by centrifugal separation of **GDMU-3** soaked in DMF solution containing  $\text{Fe}(\text{NO}_3)_2$  with  $10^{-2}$  M, washing with DMF, and drying in 60 °C oven.

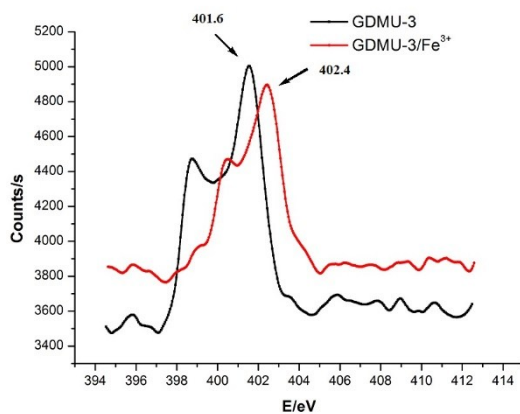
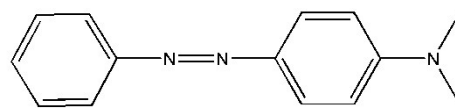
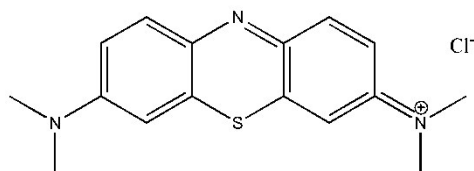


Fig. S8 N1s XPS spectra of the original **GDMU-3** (black) and **GDMU-3 @Fe<sup>3+</sup>** (red).



Solvent Yellow 2



Methylene Blue

Figure S9. The structures of dye molecules that were used in the experiment of dye adsorption

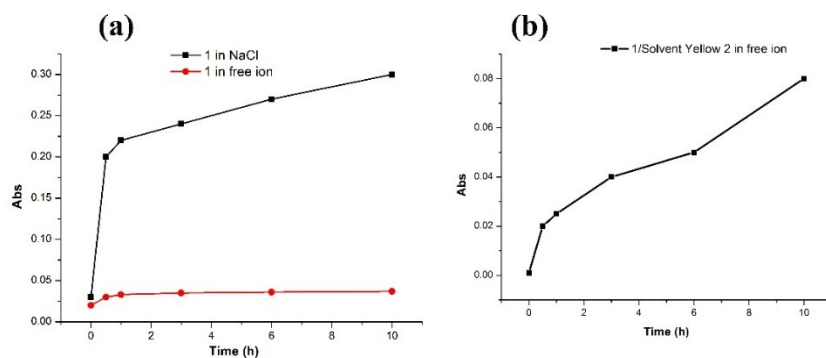


Fig. S10. The two of dyes release from the dye  $\rightarrow$  1 in pure DMF and saturated NaCl solution in DMF marked by UV absorption: a) MB, b) solvent yellow 2.

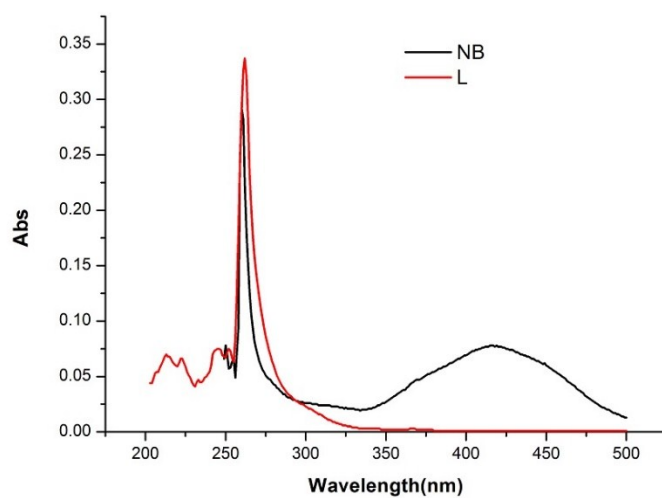


Fig. S11 The UV/vis absorption spectra for NB and L.