Electronic Supplementary Material (ESI) for Polymer Chemistry.

Multifunctional porous Tröger's base polymer with tetraphenylethene unit: CO_2 adsorption, luminescence and sensing property

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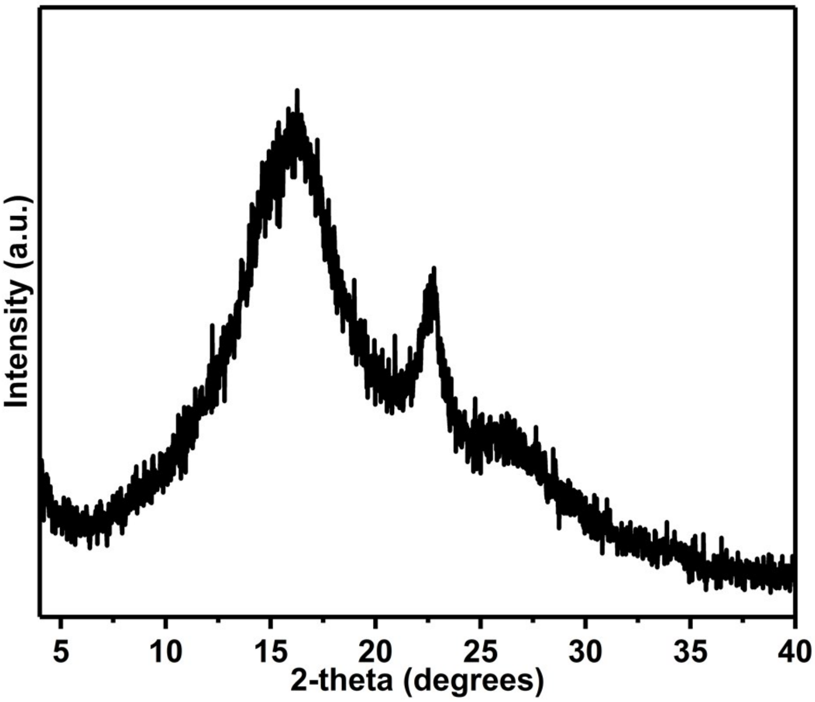

Fig. S1 Experimental powder X-ray diffraction PXRD pattern of **LMOP-15**

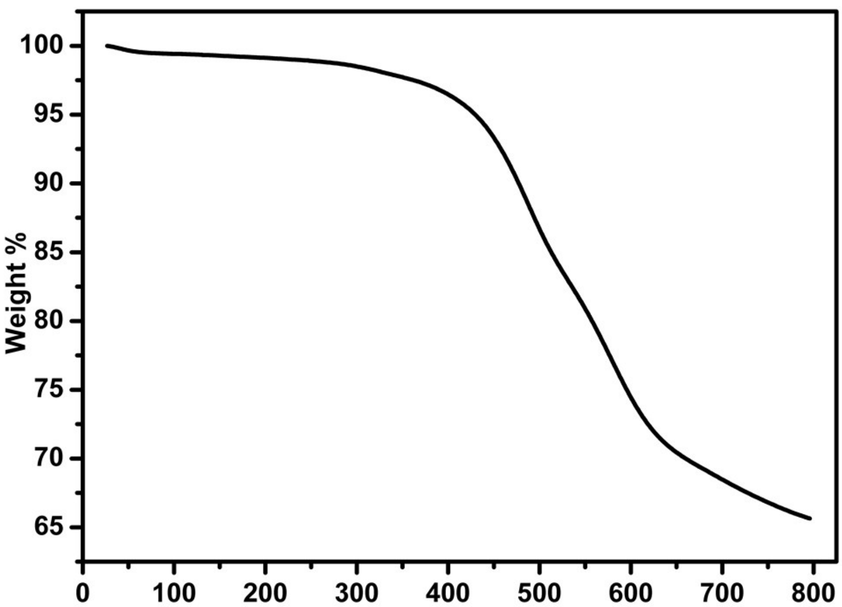

Fig. S2 TGA curve of **LMOP-15** under N_2.

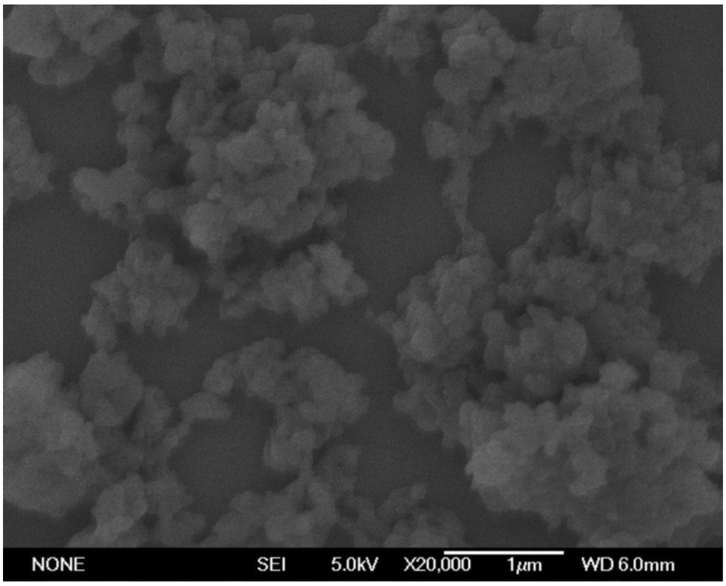

Fig. S3 SEM images of **LMOP-15**.

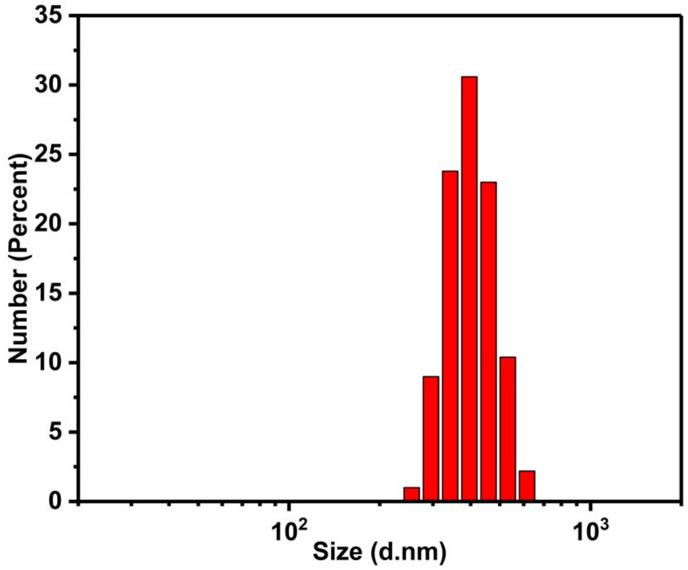

Fig. S4 Size distribution of **LMOP-15** in EtOH (0.1 mg/mL) determined by DLS analysis

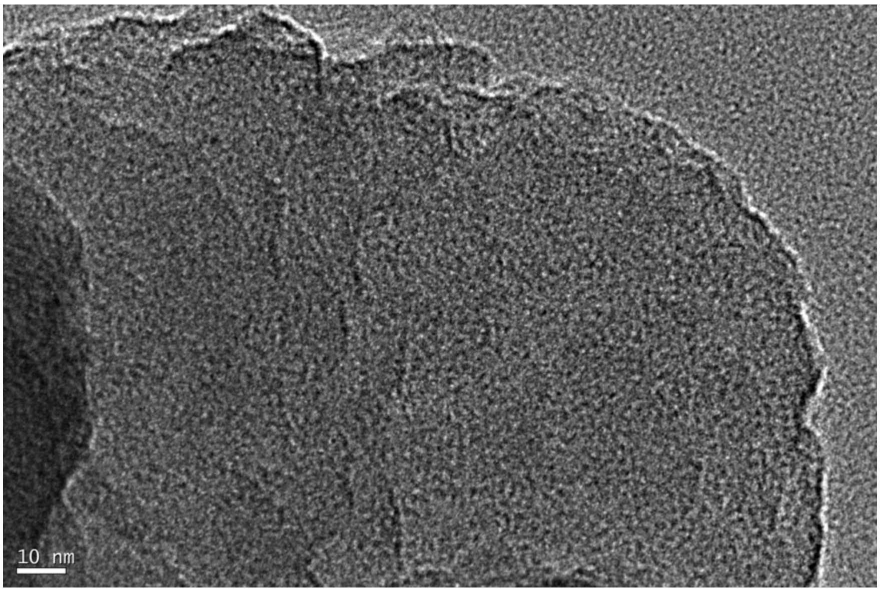

Fig. S5 TEM images of **LMOP-15**.

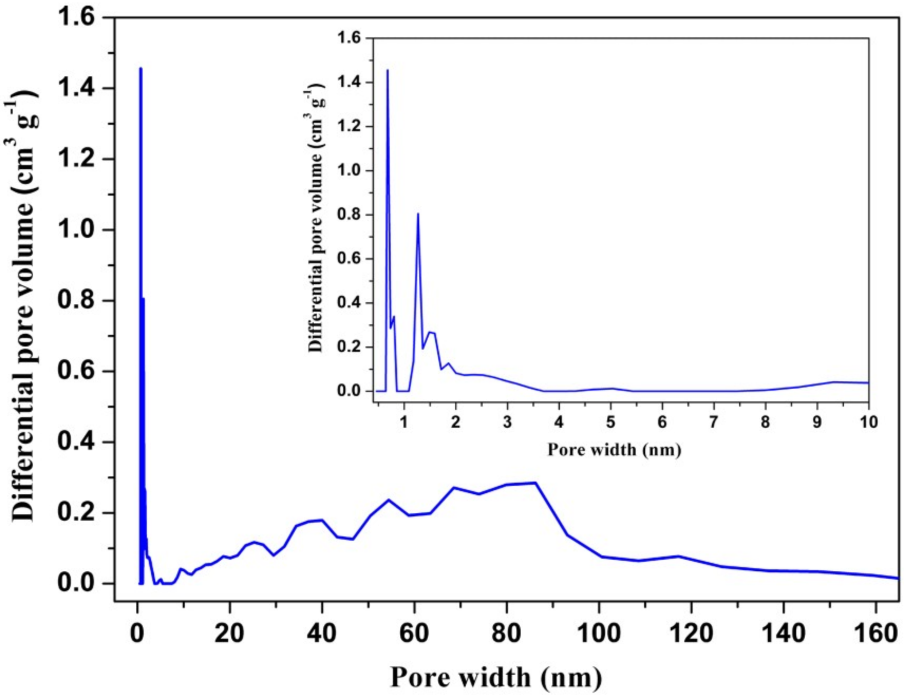

Fig. S6 Pore size distribution of **LMOP-15**.

Heat of CO_2 Adsorption Calculation

The isosteric heats (Q_{st}) of adsorption for **LMOP-15** were calculated by fitting the CO_2 adsorption isotherms measured at 273 K, 283 K and 298 K to the Virial equation.

$$\ln P = \ln N + {}^{1}\!/_{T}\sum_{i=0}^{m} a_i N_i + \sum_{i=0}^{n} b_j N_i$$

$$Q_{st} = -R\sum_{i=0}^{m} a_i N_i$$

N: adsorbed volume (cm^3/g);

P: pressure (mmHg);

T: temperature (K);

a_i, b_j: constants;

R: 8.314 $J \cdot mol^{-1} \cdot K^{-1}$

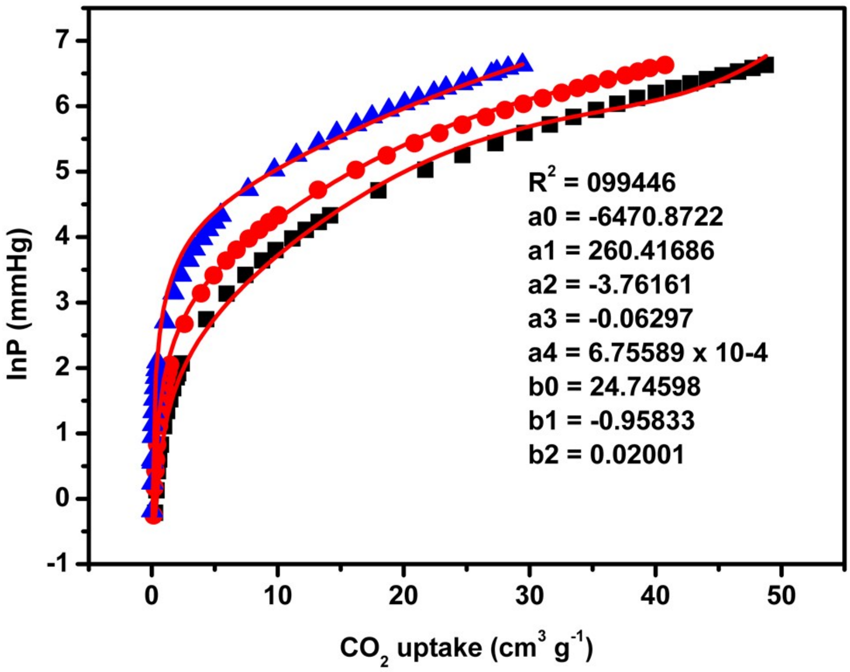

Fig. S7 Virial fitting for CO_2 isotherms of **LMOP-15**.

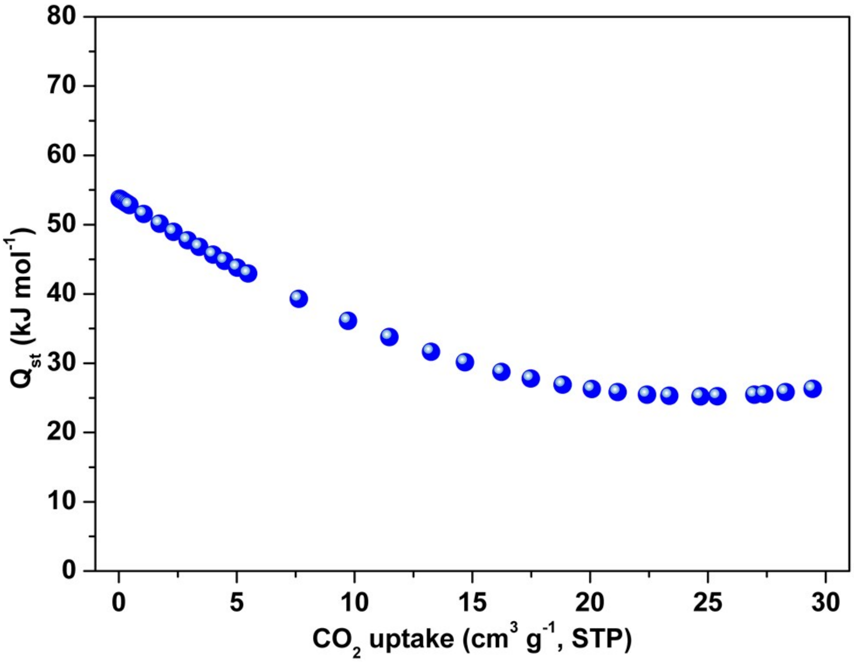

Fig. S8 The isosteric heat of adsorption for **LMOP-15**.

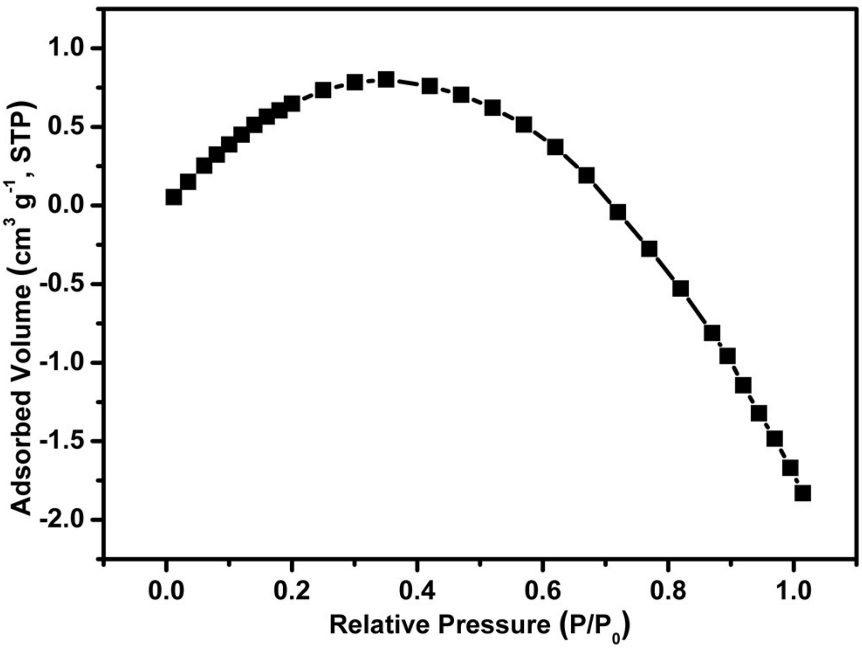

Fig. S9 Nitrogen adsorption isotherm at 273 K of **LMOP-15**.

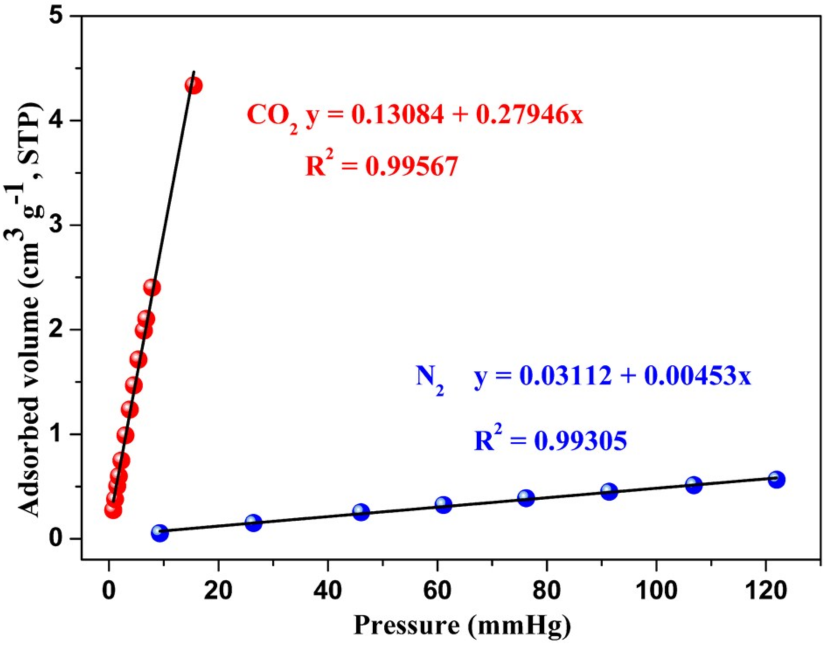

Fig. S10 CO_2/N_2 selectivity for **LMOP-15** at 273 K calculated using the Henry's Law constants in the linear low pressure range.

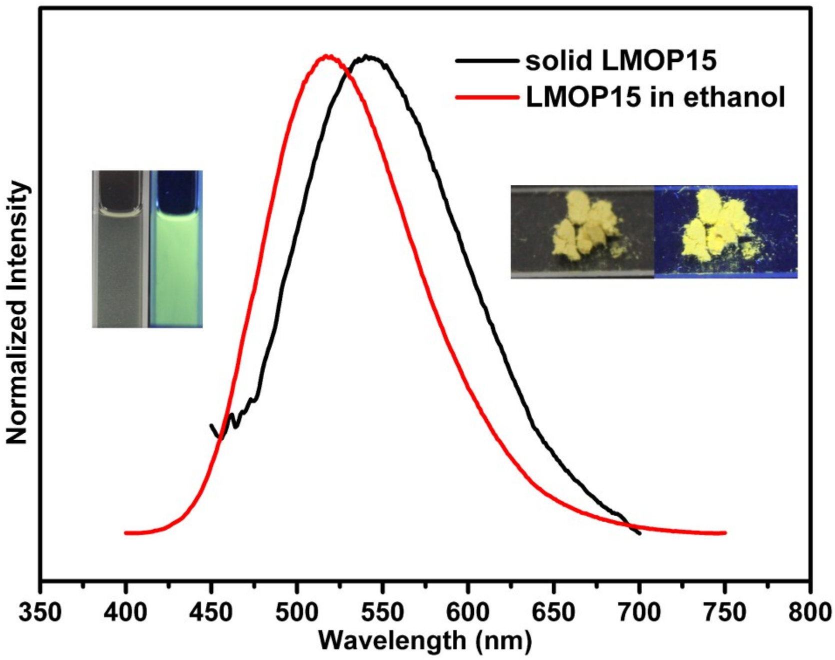

Fig. S11 Luminescent spectra of **LMOP-15** (λ_{ex} = 380 nm) in solid state, as well as **LMOP-15** dispersed in ethanol (0.1 mg/mL). The photographs were taken under visible light and UV light illumination (365 nm).

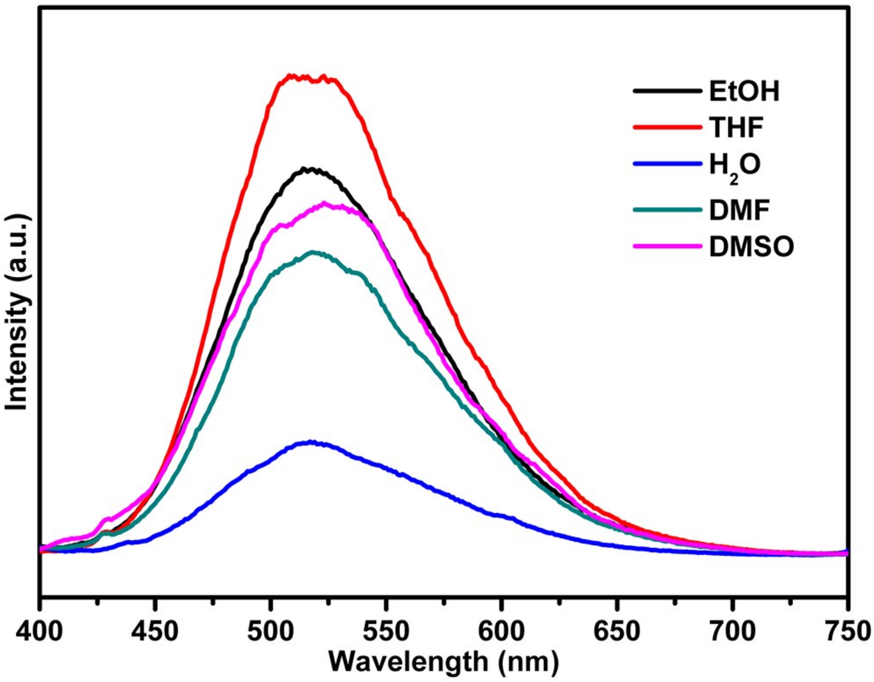

Fig. S12 Luminescent spectra of **LMOP-15** (λ_{ex} = 380 nm) in different solvents (0.1 mg/mL).

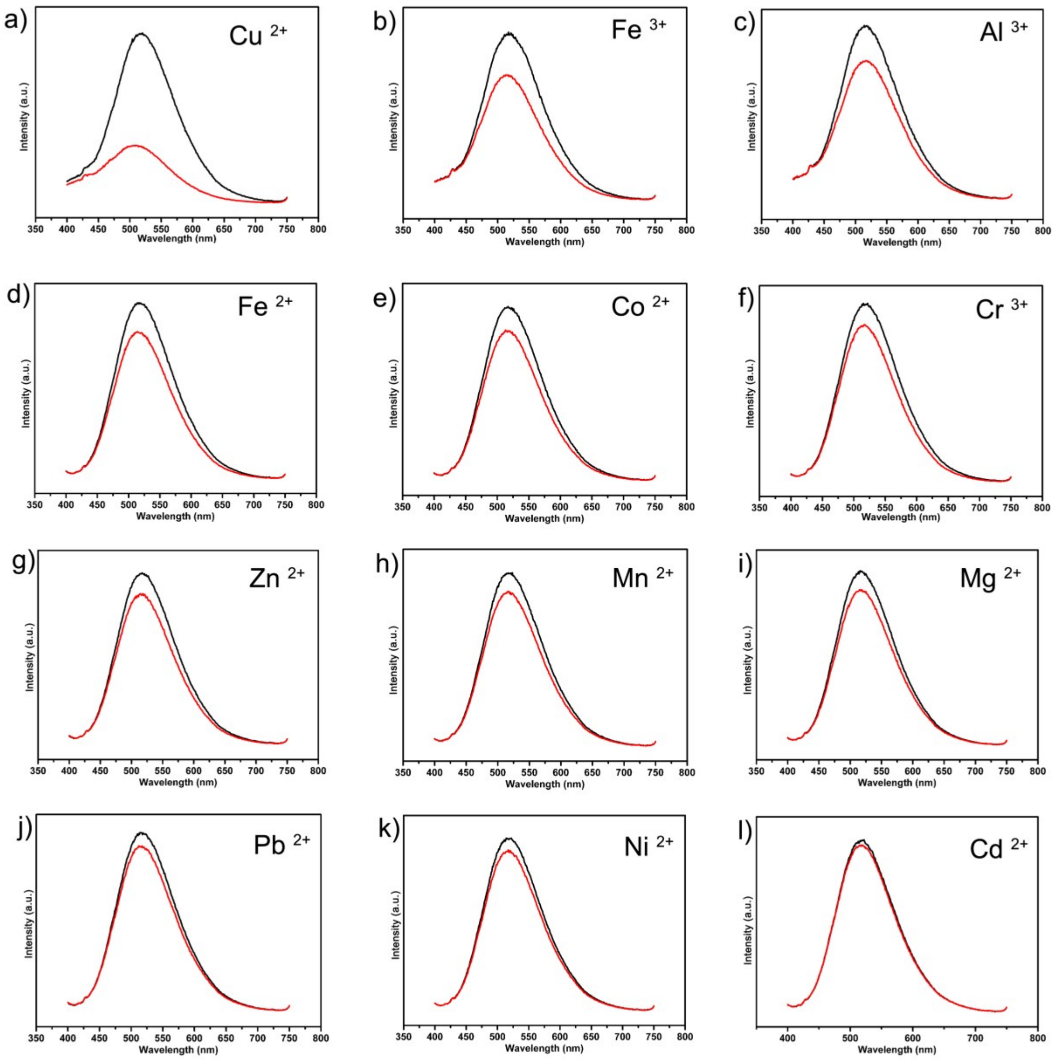

Fig. S13 Fluorescent titrations of **LMOP-15** dispersed in ethanol solution (0.1 mg/mL) with the addition of different metal ions in ethanol with a concentration of 5.9 μM (λ_{ex} = 380 nm). The slit width for excitation and emission is 2.5 nm and 2.5 nm, respectively.

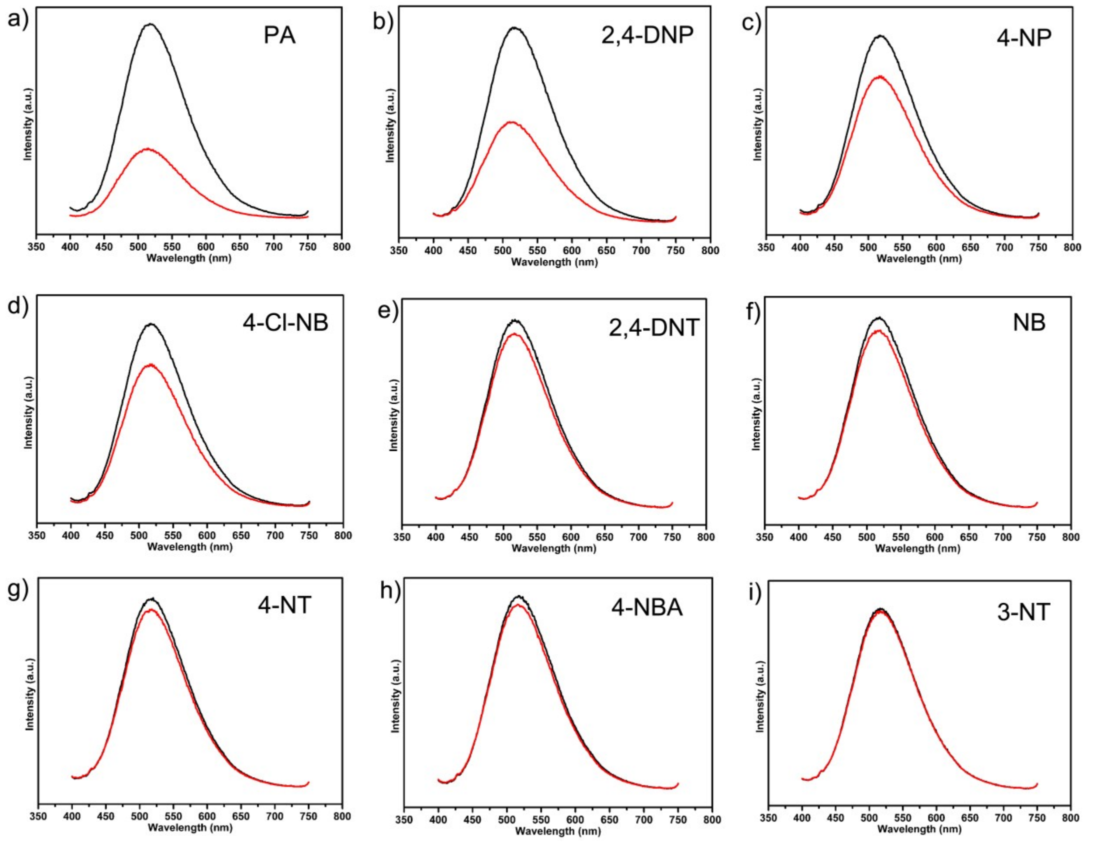

Fig. S14 Fluorescent titrations of **LMOP-15** dispersed in ethanol solution (0.1 mg/mL) with the addition of NACs in ethanol with a concentration of 47.62 μM (λ_{ex} = 380 nm). The slit width for excitation and emission is 2.5 nm and 2.5 nm, respectively.

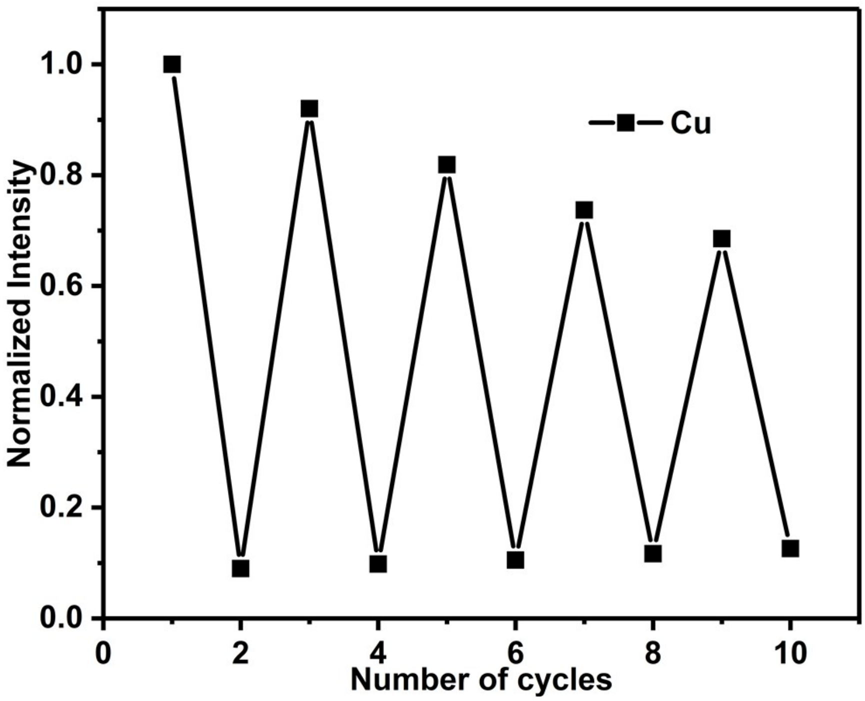

Fig. S15 The quenching and recovery test of **LMOP-15** dispersed in ethanol in the presence of Cu^{2+} solution (13.6 μM).

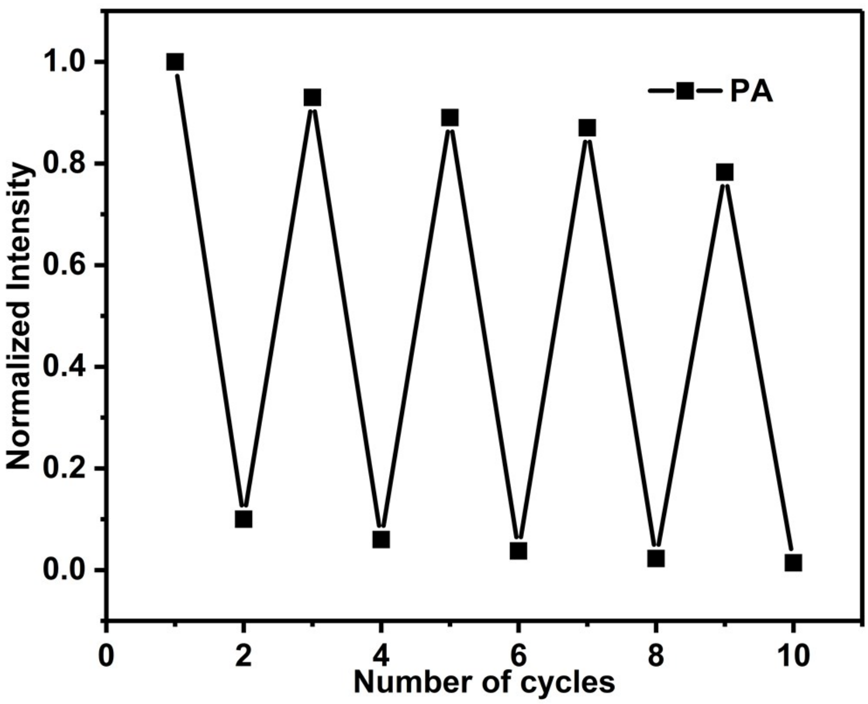

Fig. S16 The quenching and recovery test of **LMOP-15** dispersed in ethanol in the presence of PA solution (90.9 μM).

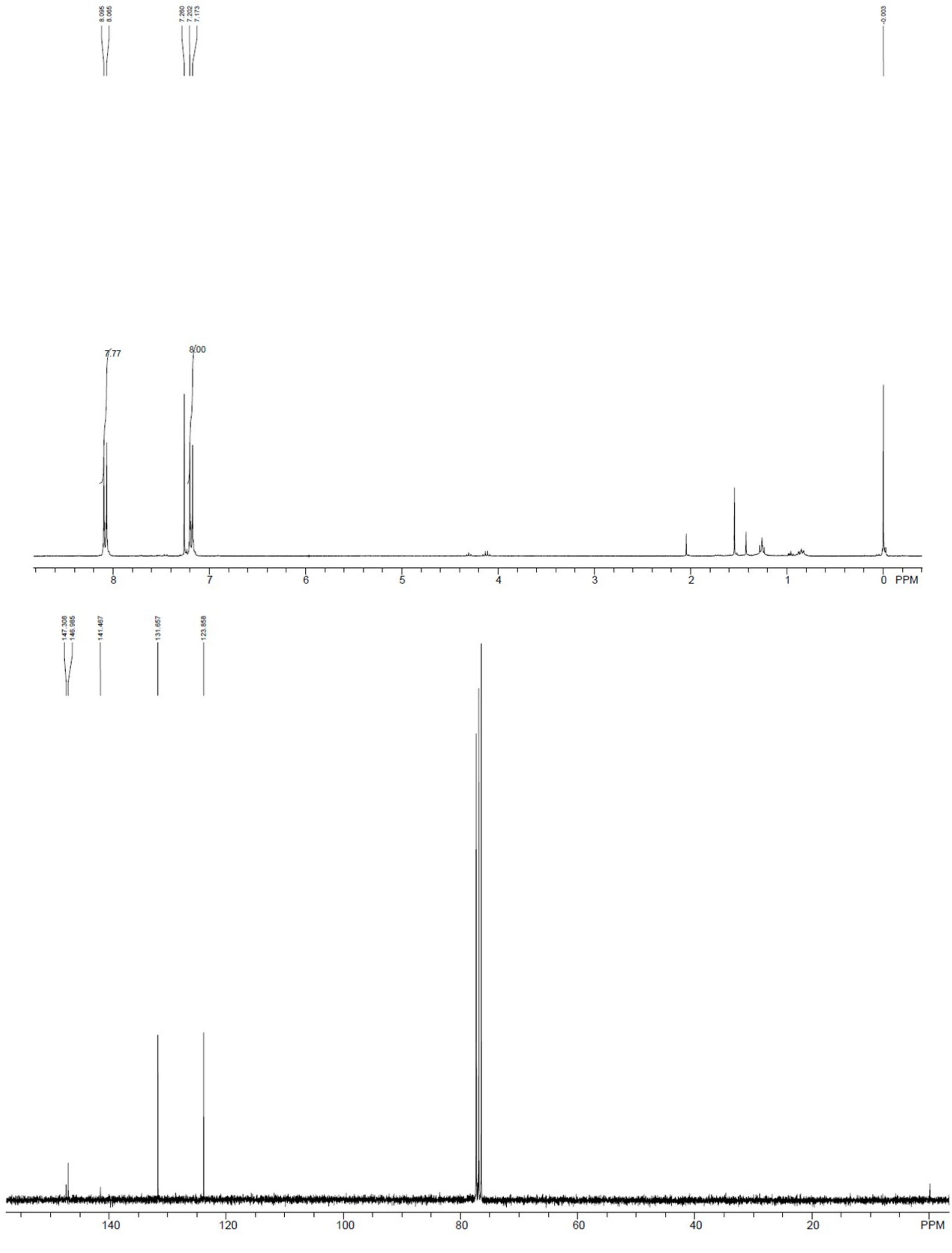

Fig. S17 ^{1}H and ^{13}C NMR spectra of 1,1,2,2-tetrakis(4-nitrophenyl)ethene (TNPE).

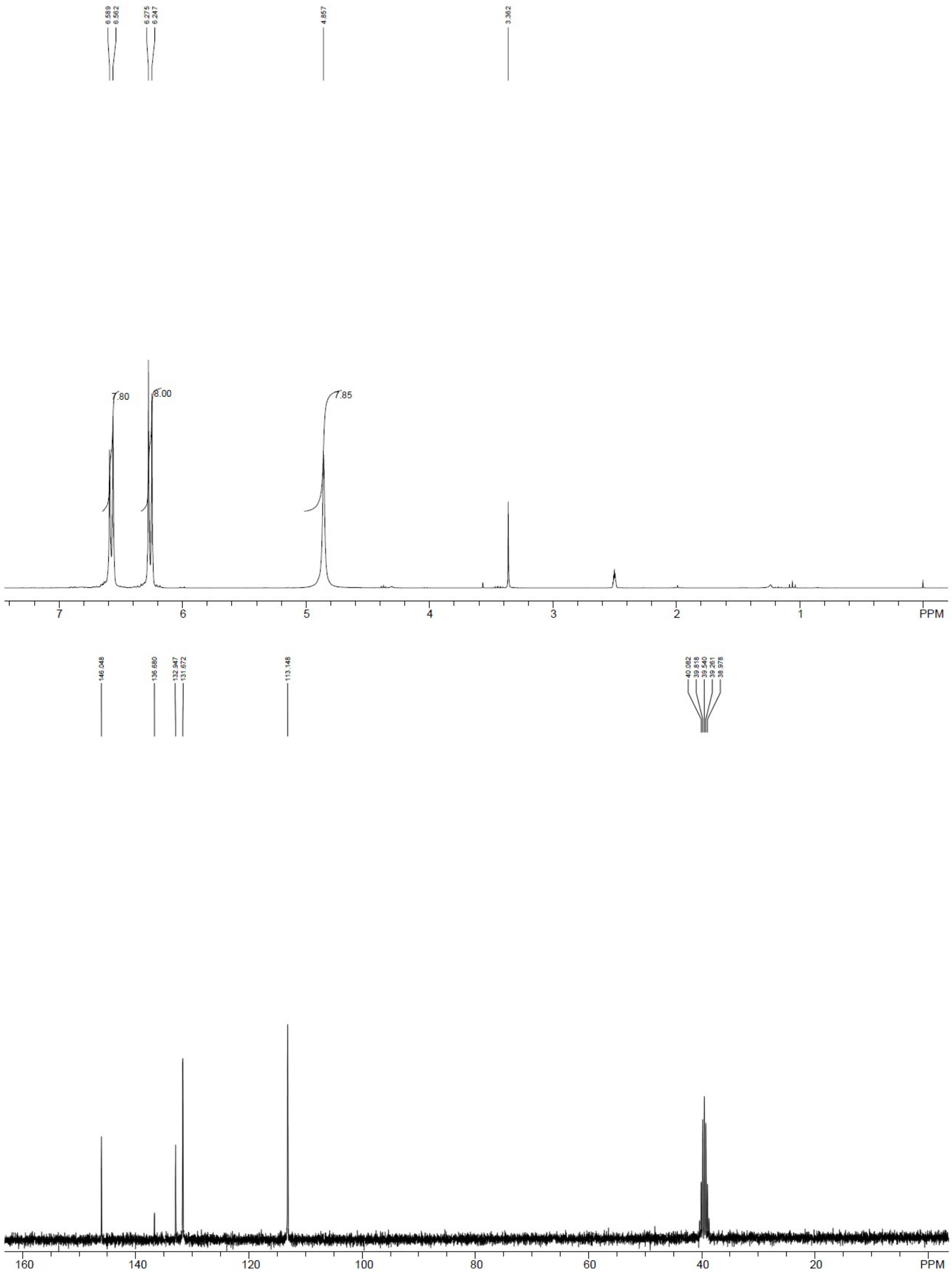

Fig. S18 ^{1}H and ^{13}C NMR spectra of 1,1,2,2-tetrakis(4-aminophenyl)ethene (TAPE).

Table S1 Elemental analysis of **LMOP-15**.

Element	**LMOP-15**	Calculated
C [%]	78.57	81.79
H [%]	5.79	5.49
N [%]	10.53	12.72

Limit of detection (LOD) Calculation

Limit of detection of was determined according to the following definitions:

$$S_b = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1}} \quad (1)$$

$$S = \frac{\Delta l}{\Delta c} \quad (2)$$

$$LOD = \frac{3S_b}{S} \quad (3)$$

Firstly, the standard deviation (S_b) was calculated by measuring the fluorescence intensity of **LMOP-15** in ethanol for 11 times and then got the average intensity ($\bar{x}$). By fitting the data into equation (1), the value of standard deviation (S_b) was obtained. Secondly, a certain amount of picric acid was added into the solvent and the resulting variation of the intensity (Δl) was recorded. By fitting the data into equation (2), where Δl is the variation of intensity, and Δc is the variation of quencher concentration, the value of precision S was calculated. Finally the LOD was calculated according to Function (3). The LODs of **LMOP-15** for Cu^{2+} and PA are 5.1×10^{-8} M and 3.3×10^{-7} M, respectively.