

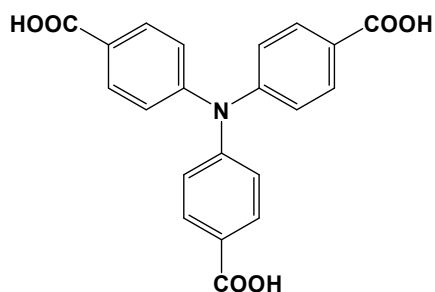
# Multifunctional Cadmium-Organic Framework Comprising Tricarboxytriphenyl Amine: Selective Gas Adsorption, Liquid-Phase Separation and Luminescent Sensing

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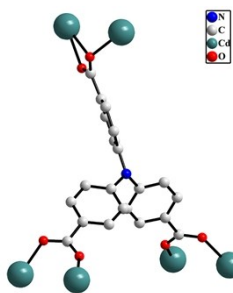
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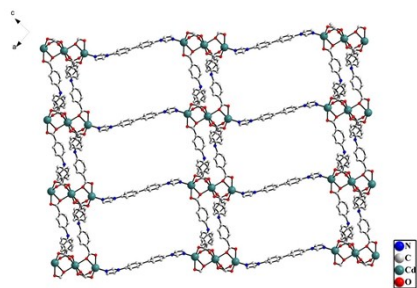


Scheme S1 Tricarboxytriphenyl amine



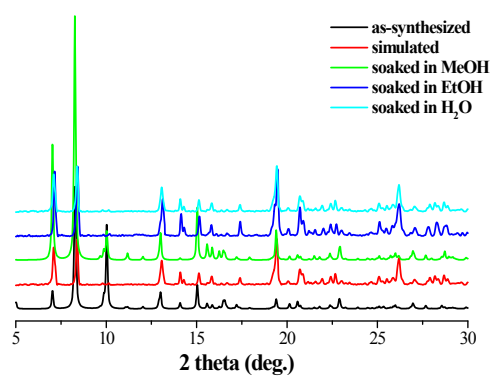
(c)

(a) Coordination environment of TCA<sup>3-</sup> anion in **1**.

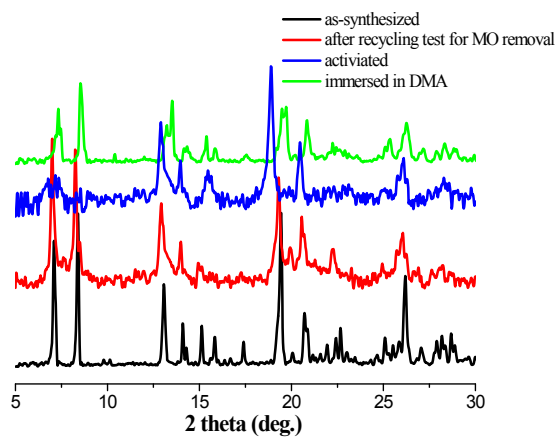


(b) 3D single framework of **1** along *b* axis.

**Figure S1**



(a)



(b)

**Figure S2.** PXRD profiles for complex **1**. Simulated spectrum was calculated from the single crystal data.

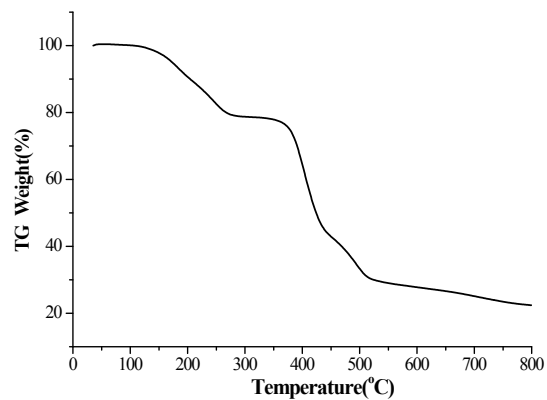


Figure S3. TG curve of complex 1.

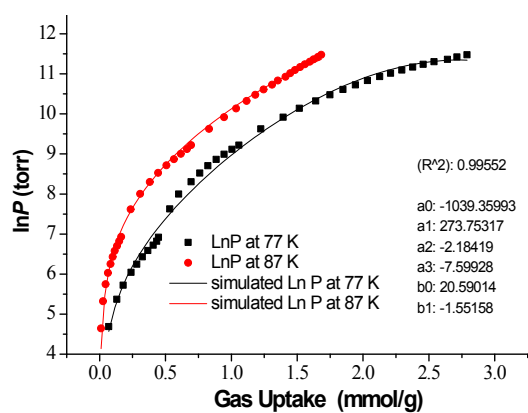
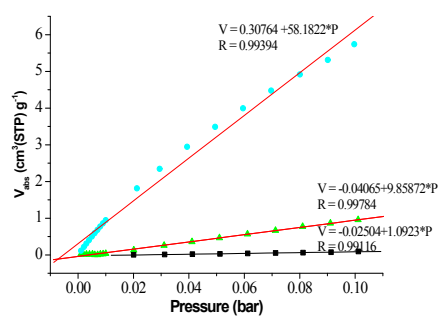
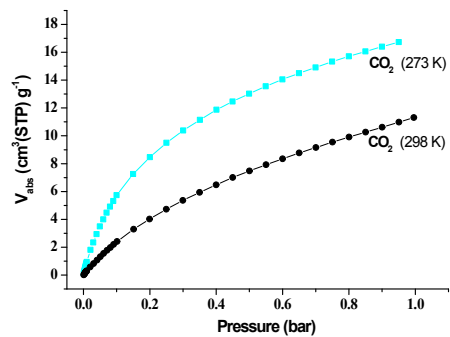


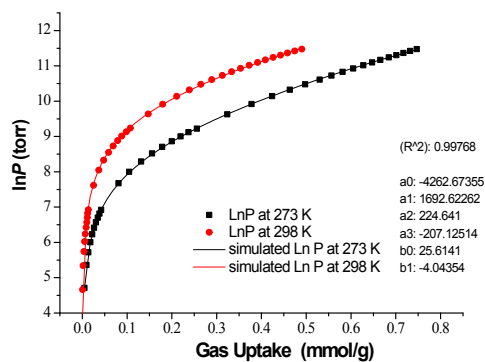
Figure S4. The details of virial equation (solid lines) fitting to the experimental for 1.



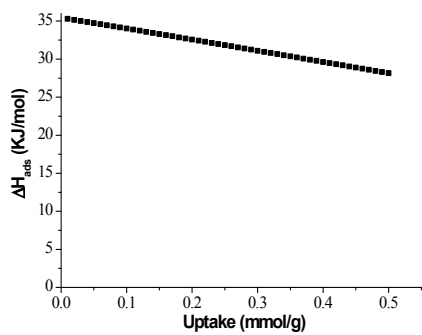
(a)



(b)

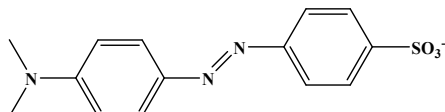


(c)

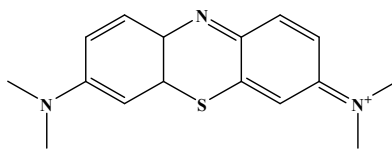


(d)

**Figure S5.** (a) Evaluation of the initial slope in the Henry region of the sorption isotherms of CO<sub>2</sub> (circle), CH<sub>4</sub> (triangle), and N<sub>2</sub> (square) at 273 K. The ratios of the initial slopes allowed an estimation of the sorption selectivity. (b) Sorption isotherms for CO<sub>2</sub> of desolvated **1**. (c) The details of virial equation (solid lines) fitting to the experimental for **1**. (d) The isosteric heat of CO<sub>2</sub> adsorption ( $Q_{st}$ ) for desolvated **1**.

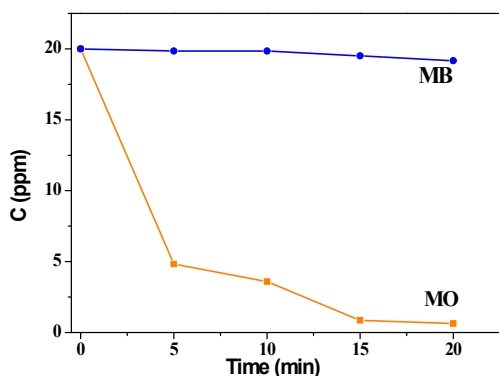


Methyl orange (MO)

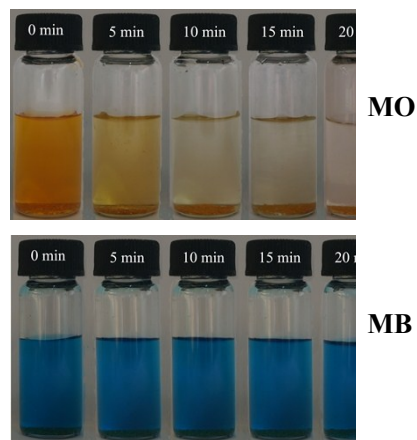


Methylene blue (MB)

**Scheme S2.** The molecular structures of MO and MB.



(a)



(b)

**Figure S6.** Concentration curves of MO and MB (a) and Photos (b) enrichment progress over **1** in 20 min.

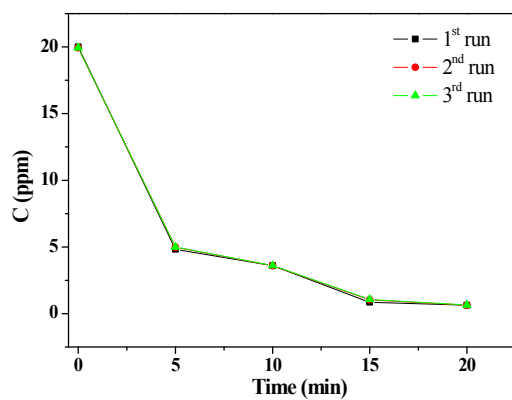


(a)

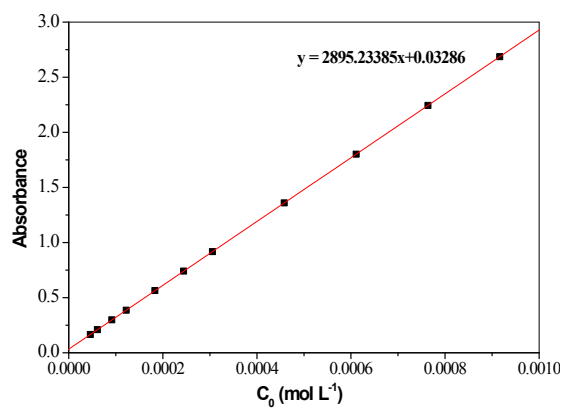


(b)

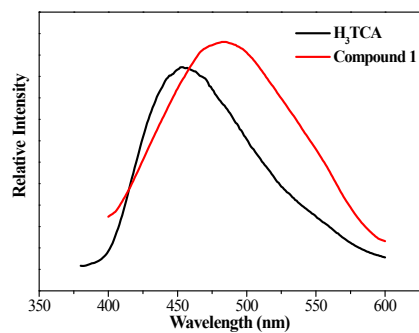
**Figure S7.** Photos showing MO-loaded **1** (a) and the release of MO from **1** in DMA solution (b).



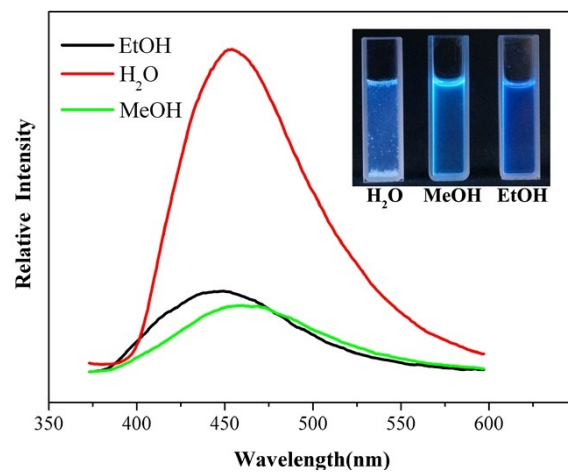
**Figure S8.** Recycling tests with three consecutive runs for **1**.



**Figure S9.** The standard curve of MO.



**Figure S10.** Fluorescent emission spectra of complexes **1** and free ligand H<sub>3</sub>TCA in solid state at room temperature.



**Figure S11.** Emission spectra of free ligand H<sub>3</sub>TCA in MeOH, EtOH, and H<sub>2</sub>O. Inset: color changes upon addition of different solvents.