Electronic Supplementary Material (ESI) for RSC Advances

Supporting Information

Water-stable Zeolite-like Metal-Organic Framework for Selective Separation of Organic Dyes

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Materials and Instrumentation

All reagents were purchased commercially and used without further purification. All Powder X-ray diffraction (PXRD) analyses were recorded on a Rigaku Dmax2500 diffractometer with Cu Kα radiation (λ = 1.54056 Å) with a step size of 0.05°. Thermal stability studies were carried out on a NETSCHZ STA-449C thermoanalyzer with a heating rate of 10 °C/min under an air atmosphere. Gas adsorption measurement was performed in the ASAP (Accelerated Surface Area and Porosimetry) 2020 System. High-performance liquid chromatography (HPLC) separation experiment was performed in LC-20AD System.

Synthesis of $[AgIn(ina)_4]\cdot 2DMF$ (1): Hina (246 mg, 2 mmol), $AgNO_3$ (85 mg, 0.5 mmol) and $In(NO_3)_3$ (150 mg, 0.5 mmol) were dissolved in 5 mL DMF, which were placed in a small vial. The mixture was heated at 100 °C for 8 hours, and then cooled to room temperature. Colorless block crystals of the product were formed and collected by filtration and washed with DMF several times (Yield: 75% based on H_2ina).

Synthesis of $[CuIn(ina)_4]\cdot 2DMF$ (2): Hina (246 mg, 2 mmol), CuI (95 mg, 0.5 mmol) and $In(NO_3)_3$ (150 mg, 0.5 mmol) were dissolved in 5 mL DMF, which were placed in a small vial. The mixture was heated at 100 °C for 3 days, and then cooled to room temperature. Red block crystals of the product were formed and collected by filtration and washed with DMF several times (Yield: 43% based on H_2ina).

X-ray diffraction analysis: The diffraction data for compounds were collected on an Oxford Xcalibur diffractometer equipped with a graphite–monochromatized Mo-Kα radiation (λ = 0.71073 Å) at 293(2) K. The structures were solved by direct methods and refined on F^2 by full-matrix, least-squares methods using the SHELXL-97 program package. CCDC-902245 & 902246 (**1** and **2**) contain the supplementary crystallographic data for this paper. These data can be obtained free of charge via www.ccdc.cam.ac.uk/conts/retrieving.html.

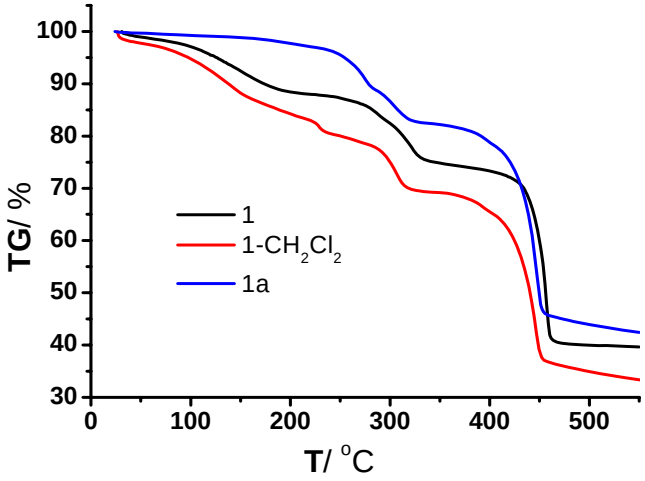

Figure S1. The TG plots of **1**, CH_2Cl_2-exchanged **1** and hollow phase of **1a**.

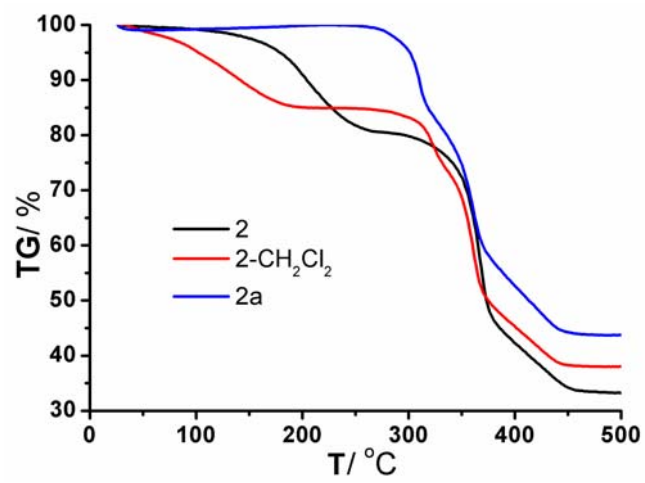

Figure S2. The TG plots of **2**, CH_2Cl_2-exchanged **2** and hollow phase of **2a**.

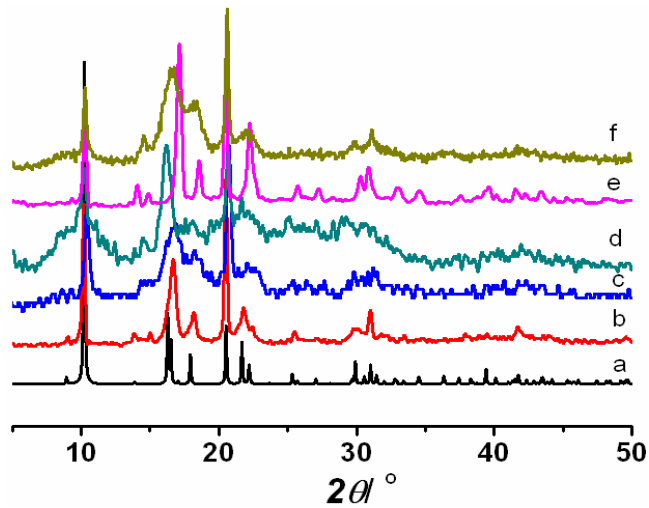

Figure S3. PXRD patterns: a) simulated from the single-crystal data of **1**, b) as-synthesized **1**, c) hollow phase of **1a**, d) MO-loading phase of **1a'**, e) the sample of **1a'** soaked in DMSO and f) the sample of **1a** soaked in water.

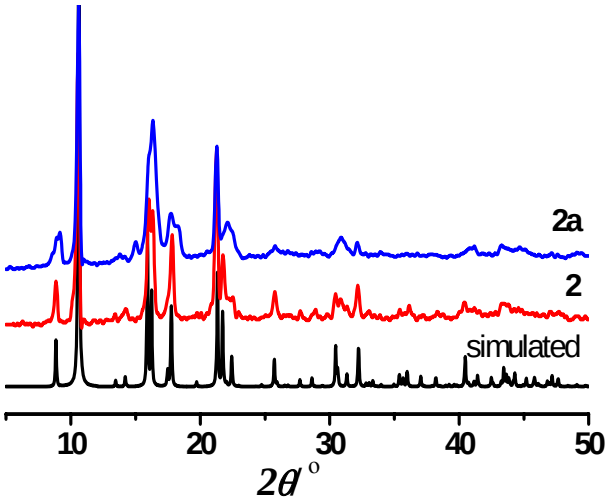

Figure S4. PXRD patterns: simulated from the single-crystal data of **2**, as-synthesized **2**, hollow phase of **2a**.

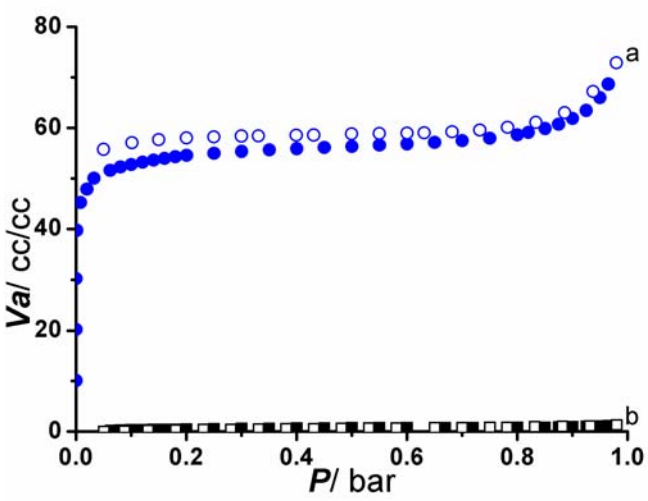

Figure S5. N_2 sorption isotherms at 77 K for **1a** (b) and **2a** (a).

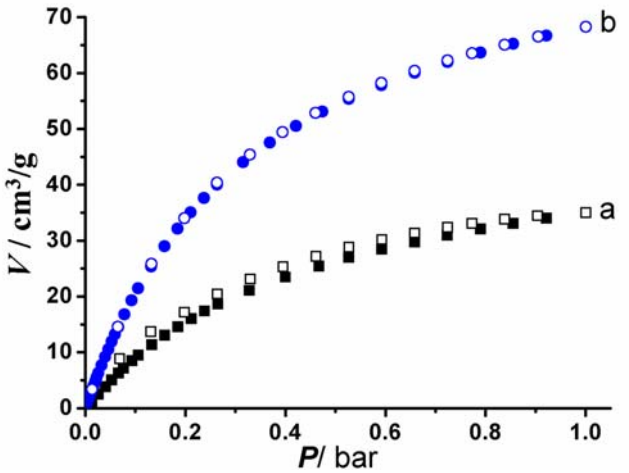

Figure S6. CO_2 sorption isotherms: a) CO_2 at 273 K for **1a**; b) CO_2 at 273 K for **2a**.

Figure S7. Photos of MO enrichment progress over **2a** in 6 mins.

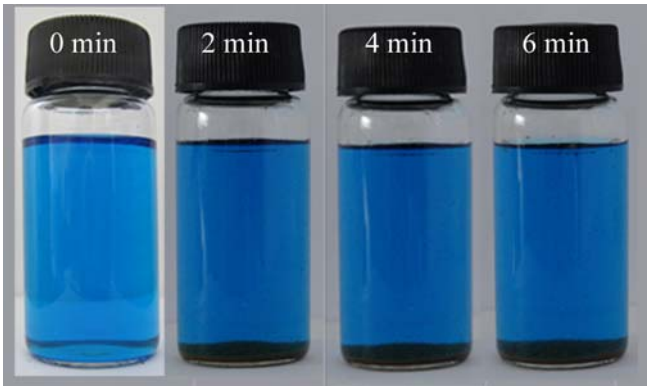

Figure S8. Photos of MB enrichment progress over **2a** in 6 mins.

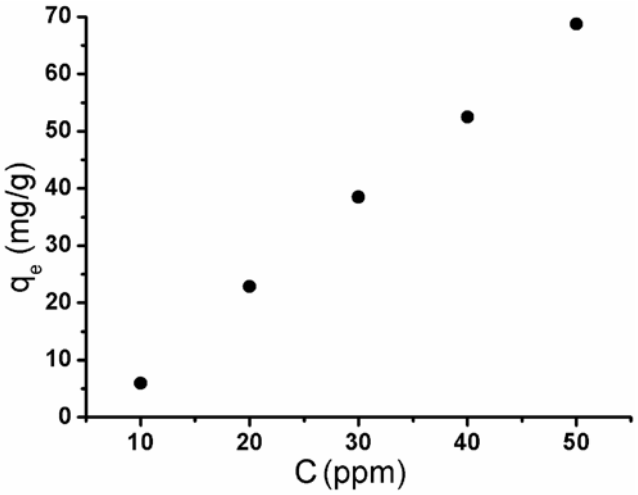

Figure S9. Adsorption isotherm for MO adsorption over **1a**.

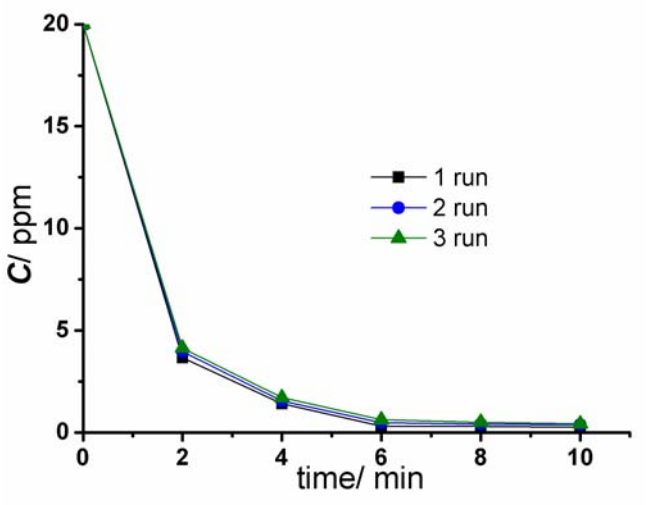

Figure S10. Measured concentration curves of MO enrichment progress over **1a**. A recycling test with three consecutive runs.

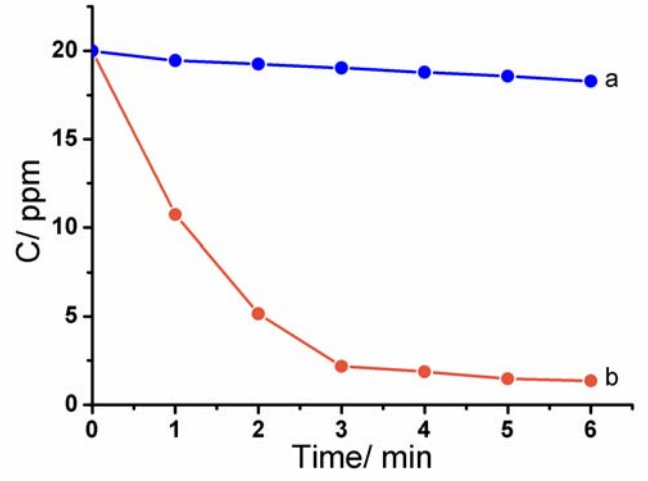

Figure S11. The concentrations of mixed MB (a) and MO (b) in water solution.

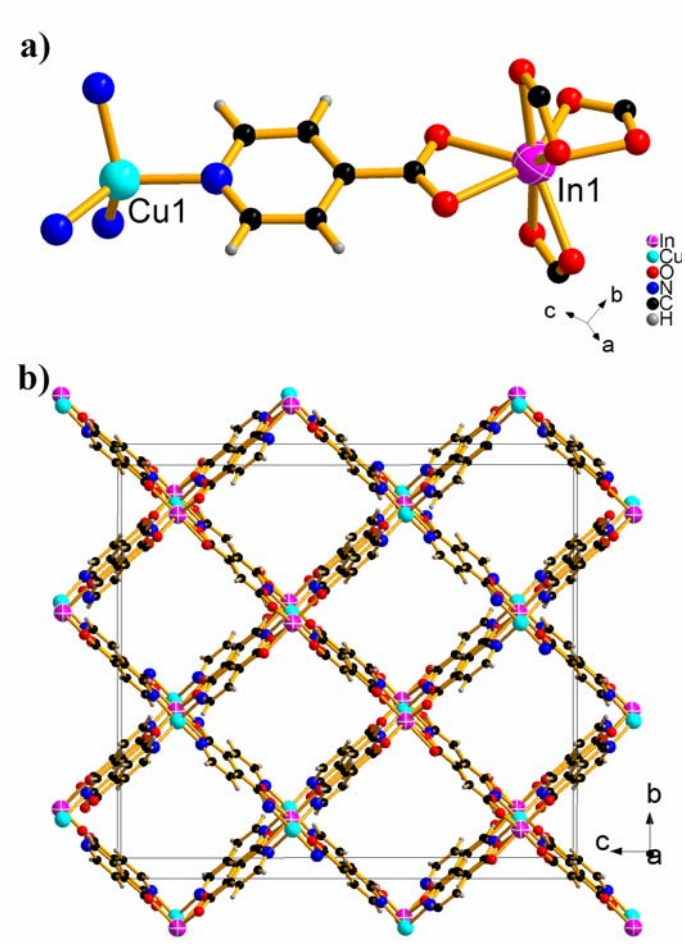

Figure S12. (a) Two tetrahedral building units ($[CuN_4]^+$ and $[In(COO)_4]^-$) linked by the ina ligand in **2**; (b) The 3D framework of **2**.