Electronic supporting information for

Facile Synthesis of Magnetic Homochiral Metal-organic Frameworks for "Enantioselective fishing"

Cui-Lan Chang§ [a], Xiao-Yue Qi§ [a], Jiang-Wei Zhang [c], Ya-Ming Qiu [b], Xian-Jiang Li [a], Xin Wang, Yu Bai [a], Jun-Liang Sun [b] and Hu-Wei Liu*[a]

[a] Beijing National Laboratory for Molecular Sciences, Key Laboratory of Bioorganic Chemistry and Molecular Engineering of Ministry of Education, Institute of Analytical Chemistry, College of Chemistry and Molecular Engineering, Peking University, Beijing 100871, P. R. China

[b] Beijing National Laboratory for Molecular Sciences, State Key Laboratory of Rare Earth Materials Chemistry and Applications, College of Chemistry and Molecular Engineering, Peking University, Beijing 100871, P. R. China

[c] J.-W. Zhang, Department of Chemistry, Tsinghua University, Beijing 100871, P. R. China

§ *These authors contributed equally to this work.*

*** Corresponding author**: Hu-Wei Liu

Phone: +86-10-62754976;

E-mail: hwliu@pku.edu.cn;

1. Experimental section

Chemicals and Materials

L-lactic acid and *D*-lactic acid were purchased from Sigma-Aldrich (St. Louis, MO, USA). $Zn(NO_3)_2 \cdot 6H2O$ was obtained from Beijing Chemical Company (Beijing, China). HPLC grade isopropanol, hexane, acetonitrile, ethyl acetate and methanol were purchased from Dikma Technology (Richmond, VA, USA). Purified water was provided by Hangzhou Wahaha Group. (Hangzhou, Zhejiang, China). All reagents and solvents employed were used as supplied without further purification. $Fe_3O_4@SiO_2$ materials were purchased from Beijing NanoChen Technology Development Co. Ltd.

Synthesis of ZnBLD

ZnBLD was prepared by the solvothermal reaction of a metal cation Zn^{2+}, a chiral ligand *L*-lactic acid and an organic connector 1,4-benzenedicarboxylic acid . DMF solution (100 mL) containing $Zn(NO_3)_2 \cdot 6H_2O$ (10 mmol), H_2bdc (5 mmol), and *L*-H_2lac (5 mmol) in a round bottom flask was heated in oil-bath at 120 ºC for 24 h with magnetic stirring at the speed of 900 r/min. Colorless rod-shaped crystals were collected, washed with DMF and ethanol, and then dried in oven to yield ZnBLD.

Synthesis of $Fe_3O_4@SiO_2$-ZnBLD and $Fe_3O_4@SiO_2$-ZnBDD

0.1 g $Fe_3O_4@SiO_2$ materials were added into the mixed DMF solution of $Zn(NO_3)_2 \cdot 6H_2O$ (10 mmol), H_2bdc (5 mmol), and *L*-H_2lac (5 mmol) or *D*-H_2lac (5 mmol). The suspension was sonicated for 30 min, and then heated in oil-bath at 120 ºC for 24 h with magnetic stirring at the speed of 900 r/min. Brown crystals were collected, washed with DMF and ethanol, and then dried in oven to yield corresponding $Fe_3O_4@SiO_2$-ZnBLD and $Fe_3O_4@SiO_2$-ZnBDD composites.

Typical separation procedure using $Fe_3O_4@SiO_2$-ZnBLD

20 mg $Fe_3O_4@SiO_2$-ZnBLD and 5 mL racemic solution of MPS dissolved in acetonitrile (final concentration is 0.1 mg/mL) were mixed in a vial, shaken with a vortex mixer at room temperature for 1 min. Then the $Fe_3O_4@SiO_2$-ZnBLD-enantiomer complexes were collected using a magnet and the supernatant was removed. The collected $Fe_3O_4@SiO_2$-ZnBLD-enantiomer complexes were added with 100 μL methanol and shaken with a vortex mixer at room temperature for 1 min in order to retrieve the absorbed enantiomer. The enantiomeric composition of the separated enantiomer was analyzed by HPLC (Agilent Technology, USA) with a CHIRAlCEL OD-3 column (4.6 x 150 mm, 3 μm, Daicel, Japan), using isopropyl alcohol and n-hexane as the mobile phase.

Single crystal structure of ZnBLD

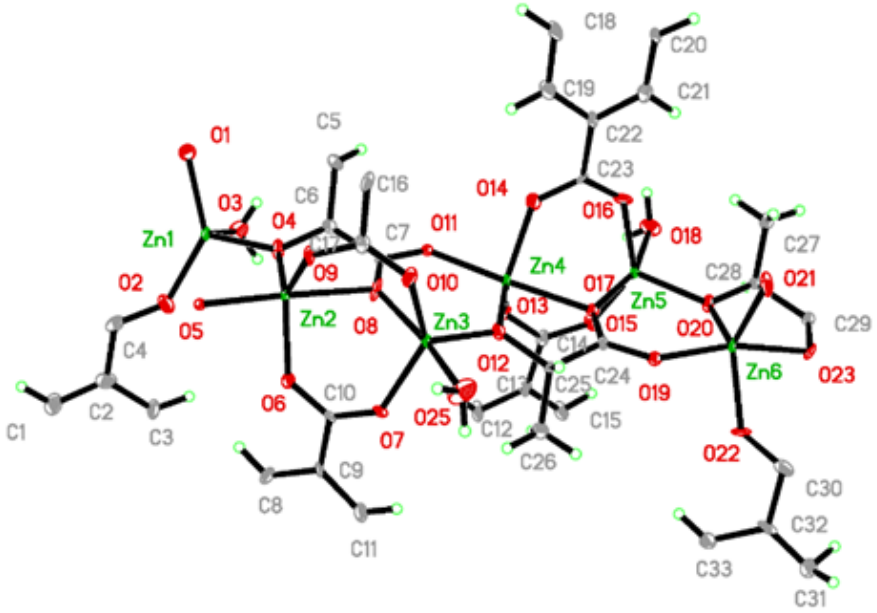

Figure S1. Single crystal X-ray structure of ZnBLD, showing the coordination environments of the Zn^{2+} ion. Thermal ellipsoids are set at 30% probability.

2. PXRD of ZnBLD

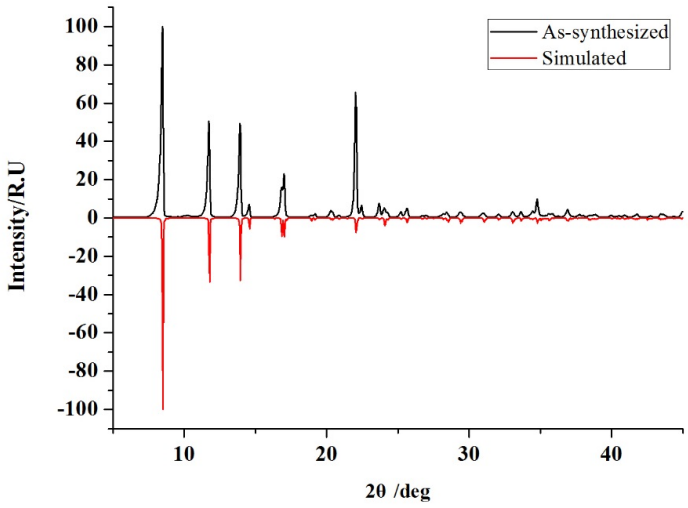

Figure S2. The experimental powder X-ray diffractogram of as-synthesised ZnBLD (normal black plot) and corresponding simulation result (inverted red plot).

3. Spatial structure of ZnBLD

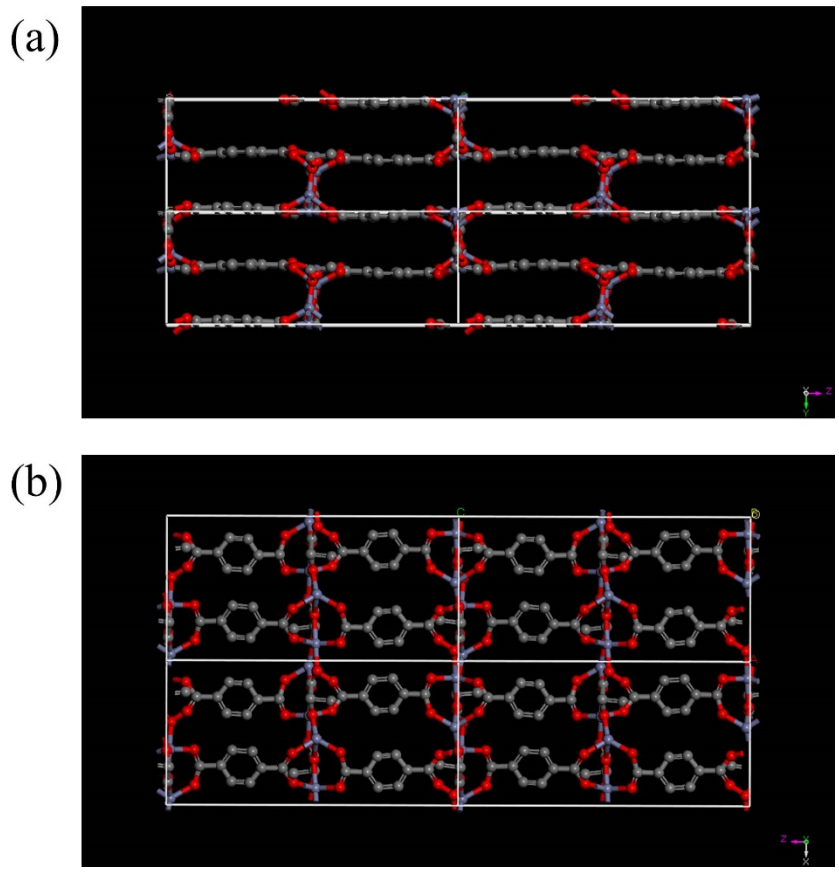

Figure S3. Spatial structures of ZnBLD from different views: (a) x-Axis; (b) y-Axis.

4. Magnetization measurement of Fe_3O_4@SiO_2

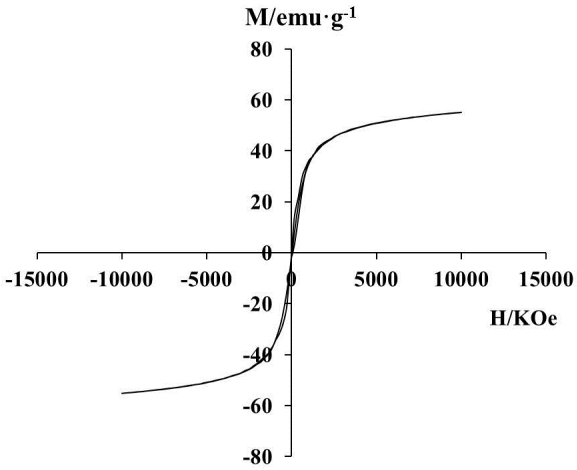

Figure S4. Magnetization curve of Fe_3O_4@SiO_2 that was used for functionalization of homochiral MOFs.

5. TEM image of Fe_3O_4@SiO_2

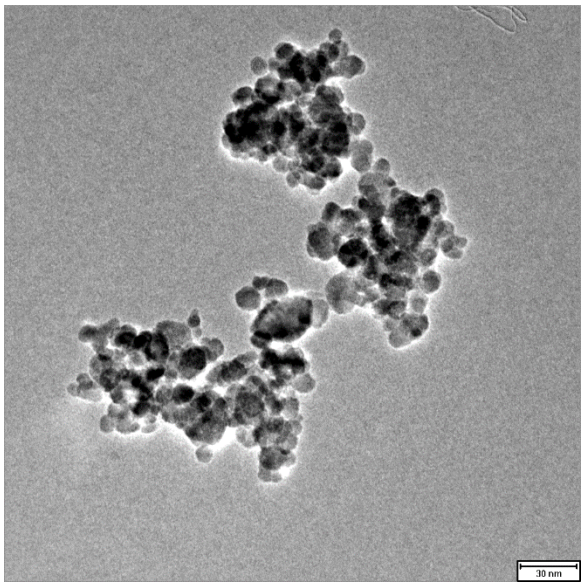

Figure S5. TEM image of Fe_3O_4@SiO_2.

6. IR spectrum of Fe_3O_4@SiO_2-ZnBLD

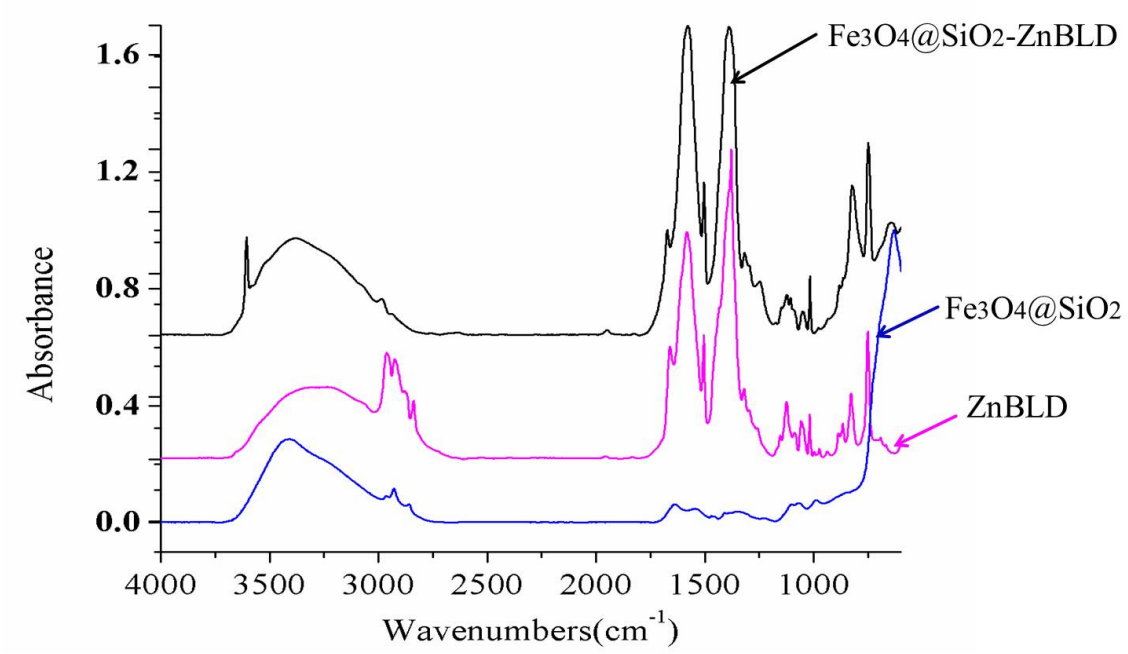

Figure S6. IR spectrum of as-synthesized Fe_3O_4@SiO_2-ZnBLD (black curve), Fe_3O_4@SiO_2 (pink curve) and ZnBLD (blue curve).

Recycle use of Fe_3O_4@SiO_2-ZnBLD

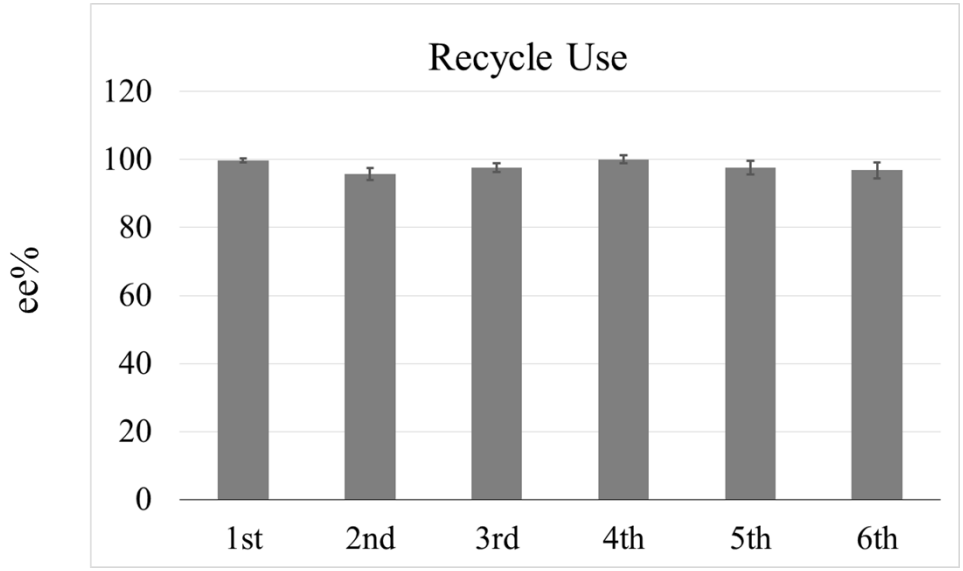

Figure S7. Recycle use of Fe_3O_4@SiO_2-ZnBLD composites.

7. "Enantioselective fishing" using Fe_3O_4@SiO_2-ZnBDD

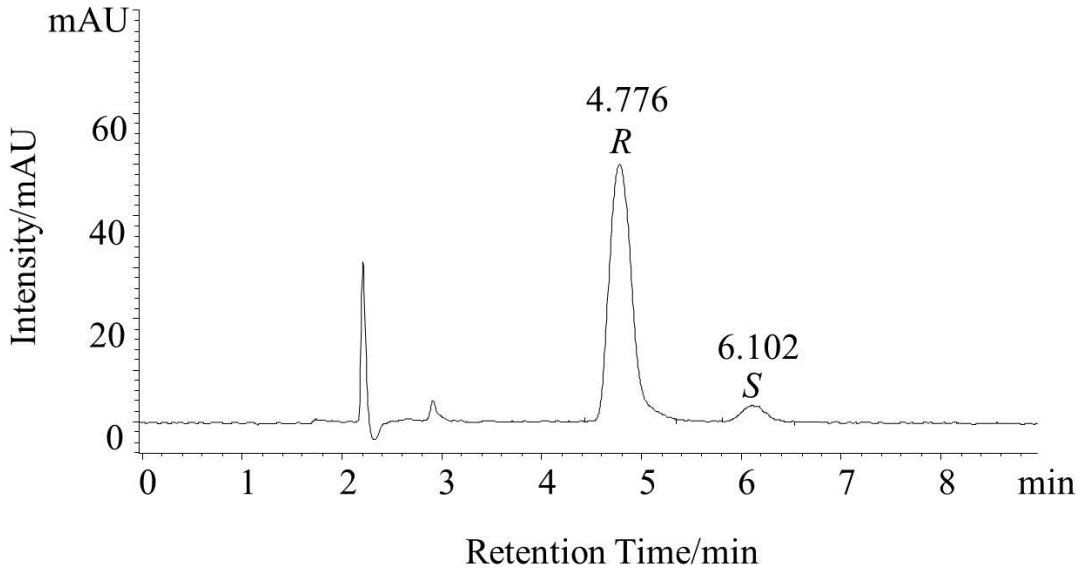

Figure S8. Enantioselective ability of Fe_3O_4@SiO_2-ZnBDD for MPS.