

Covalent immobilization of lipase on ionic liquids-functionalized  
magnetic Cu-based metal-organic framework with boosted catalytic  
performance in flavor esters synthesis

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**Details of characterization condition and devices**

The Fourier-transform infrared spectra (FTIR) were measured on a Nicolet iS50 (Thermo Scientific, USA) under the range of 400–4000 cm<sup>-1</sup>. X-ray diffraction spectra (XRD) were measured under the scanning rate of 4–8°min<sup>-1</sup> on a Bruker D8-Advance diffractometer (Germany). Transmission electron microscopy (TEM) images were obtained from a Tecnai G2 F20 (FEI, USA). Scanning electron microscopy images (SEM) were obtained from a Quanta 400 FEG (FEI, USA). The magnetic properties of supports were measured using a vibrating sample magnetometer (VSM, Quantum Design) under the range of 30–30 KOe. Thermogravimetric analysis (TGA) was measured in the temperature range of 30–800°C, with a heating rate of 10°C min<sup>-1</sup> under an N<sub>2</sub> atmosphere on an STA 409 PC (NETZSH, Germany). Circular dichroism (CD) was conducted on a JASCO J1500 (Japan) spectrometer in the range of 190–250 nm.

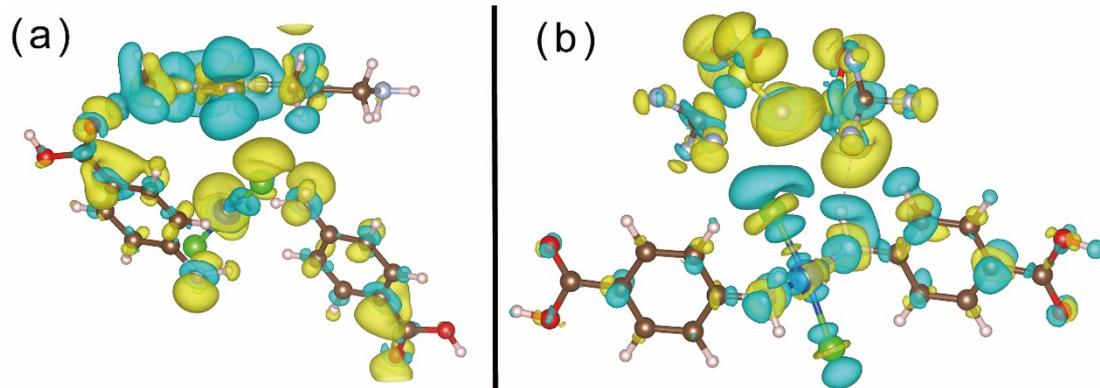


Fig. S1. Charge density difference map of [AMI]<sup>+</sup>/Fe<sub>3</sub>O<sub>4</sub>@MOF (a) and [TNf<sub>2</sub>]<sup>-</sup>/Fe<sub>3</sub>O<sub>4</sub>@MOF (b). Blue denoted the decrease of charge, and yellow denoted charge accumulation.

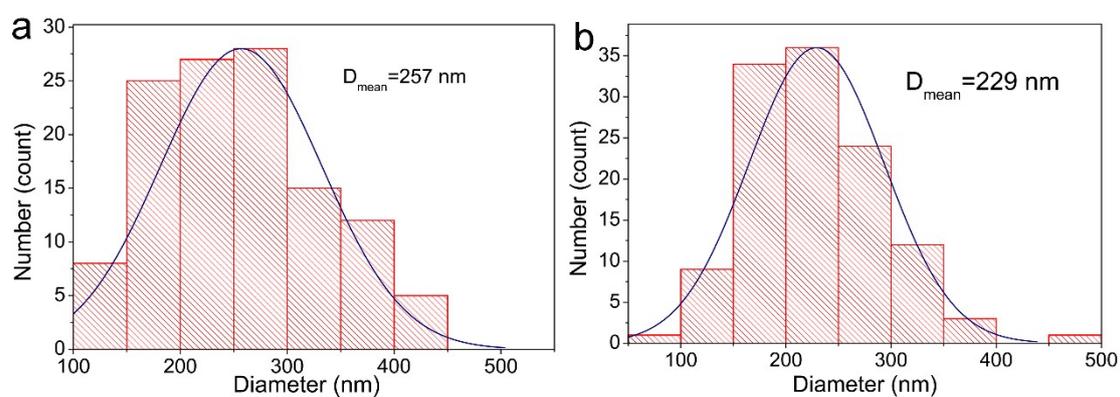


Fig. S2. Diameter distribution of (a) Fe<sub>3</sub>O<sub>4</sub>@MOF and (b) ILs/Fe<sub>3</sub>O<sub>4</sub>@MOF

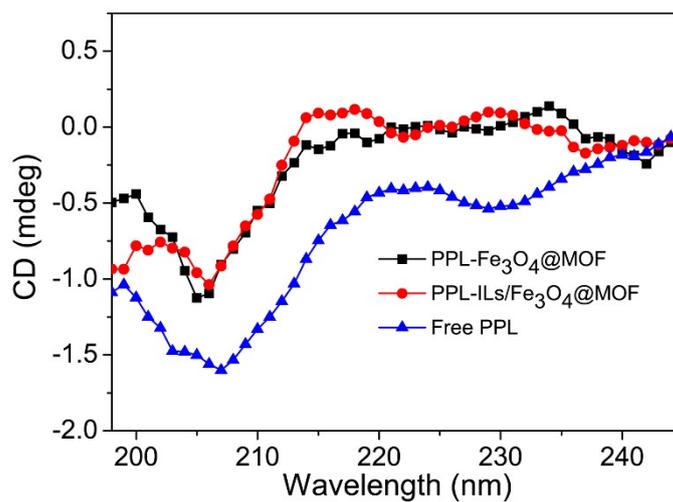


Fig. S3. CD spectra of immobilized and free PPL