Supporting information

Fast-synthesis and catalytic property of heterogeneous Co-MOF catalysts for the epoxidation of α-pinene with air

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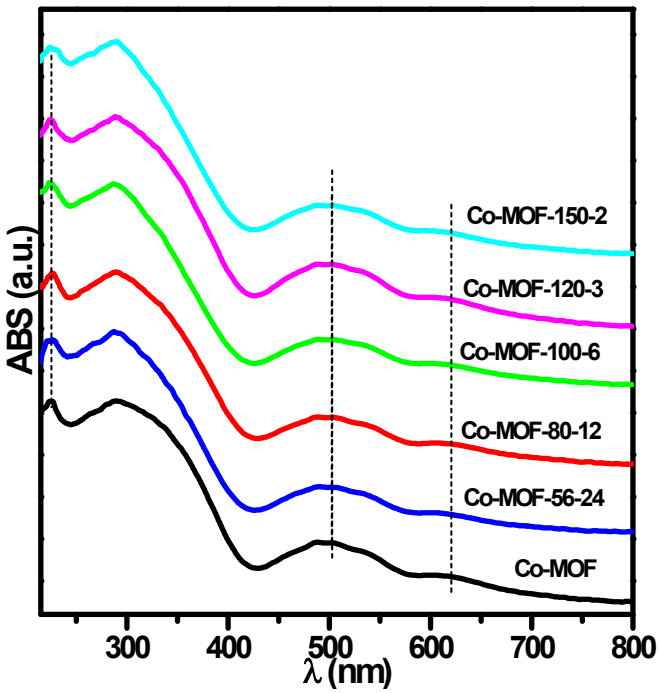

Fig. S1. UV-visible diffuse reflectance spectra of Co-MOF by different hydrothermal crystallization methods.

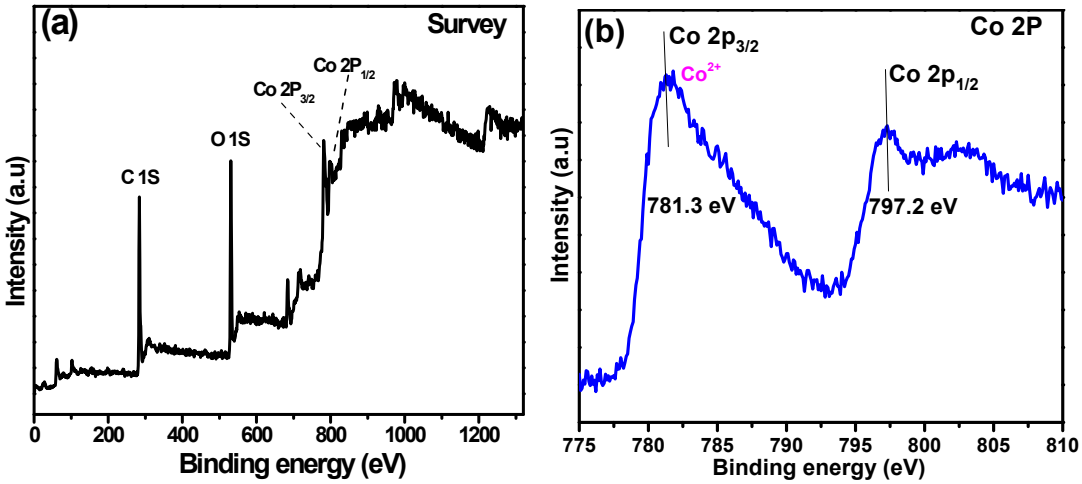

Fig. S2. XPS spectra of (a) survey and (b) Co 2p for Co-MOF-150-2.

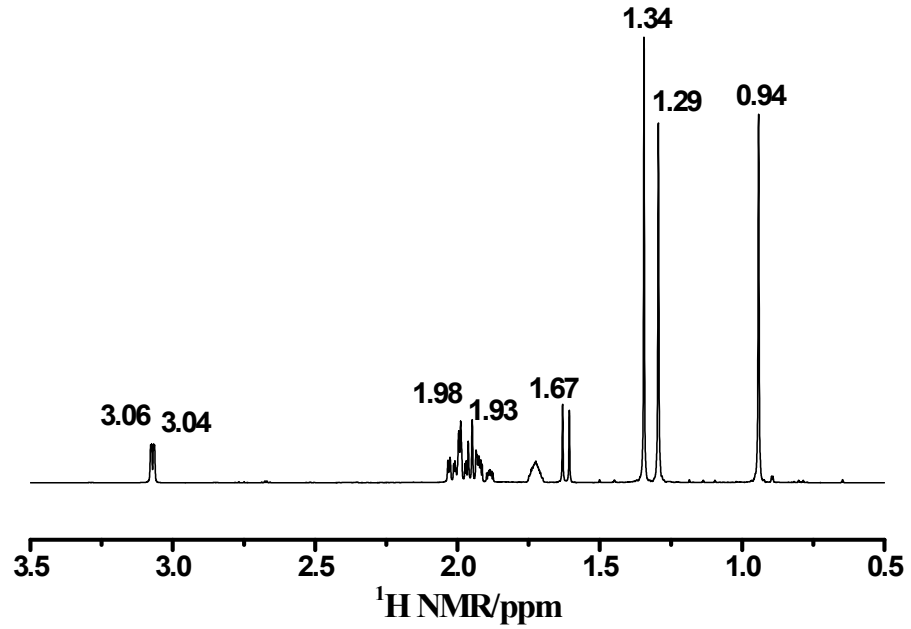

Fig. S3. ^{1}H NMR (400 MHz, $CDCl_3$) of 2,3-Epoxypinane. δ 3.06 (d, 1H), 3.04 (d, 1H), 1.98 (s, 1H), 1.93 (s, 2H), 1.67 (s, 2H), 1.34 (s, 3H), 1.29 (s, 3H), 0.94 (s, 3H).

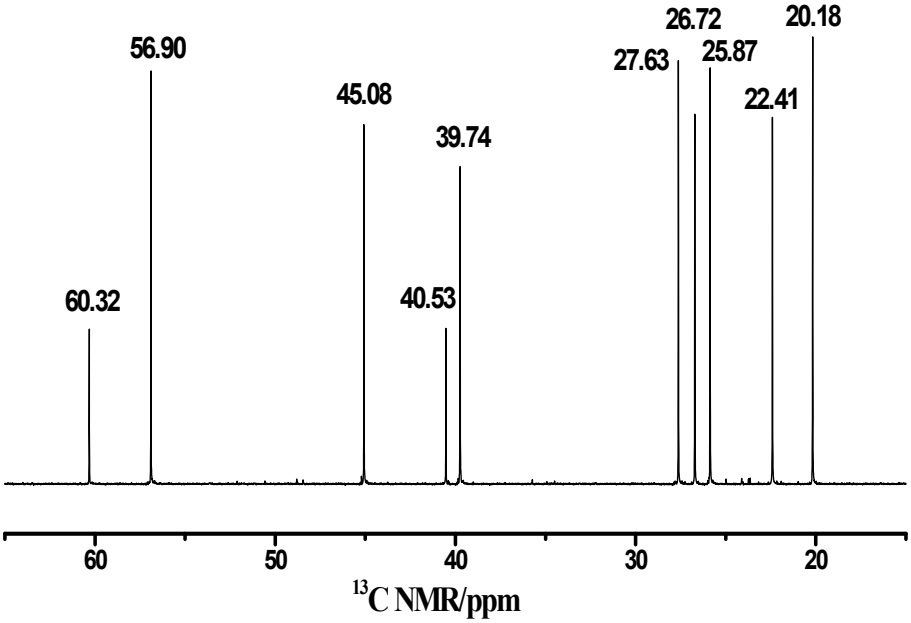

Fig. S4. ^{13}C NMR (100 MHz, $CDCl_3$) of 2,3-Epoxypinane. δ 60.32 (s), 56.90 (s), 45.08 (s), 40.53 (s), 39.74 (s), 27.63 (s), 26.72 (s), 25.87 (s), 22.41 (s), 20.18 (s).

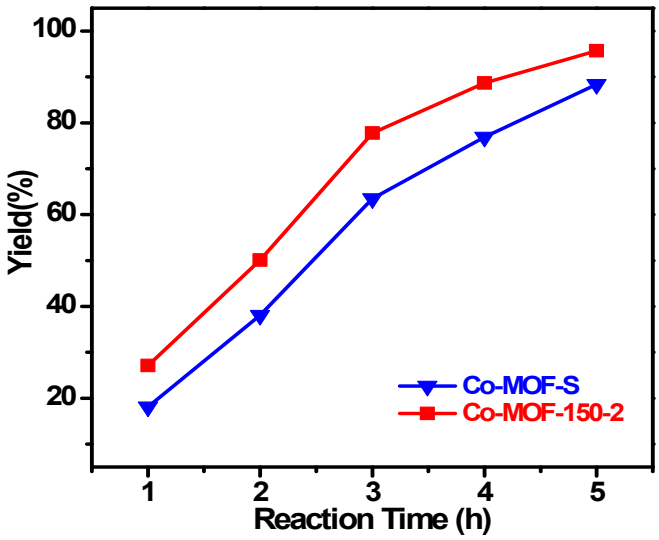

Fig. S5. Effects of reaction time on the epoxidation of α-pinene. Reaction conditions: catalyst 30 mg, α-pinene (3 mmol), α-pinene/initiator=10; DMF (10 g), flowrate of air (40 mL/min), temperature (90 °C), time (5 h).

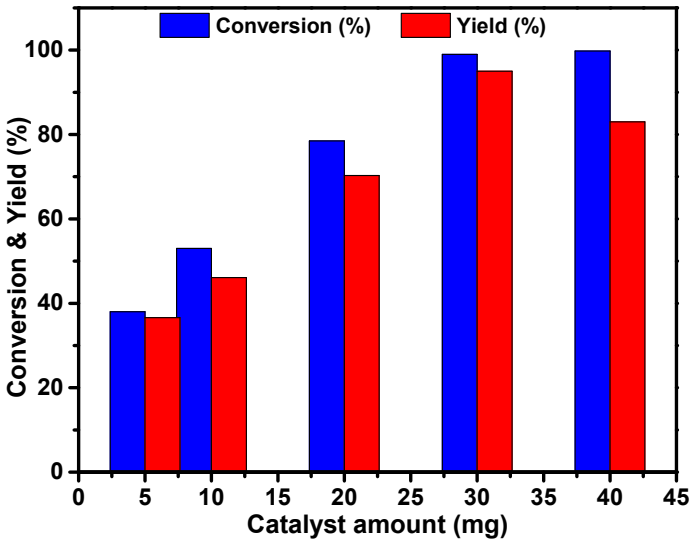

Fig. S6. Effect of the catalyst amount on the epoxidation of α-pinene. Reaction conditions: catalyst (Co-MOF-150-2), α-pinene (3 mmol), CHP (0.3 mmol), DMF (10 g), flowrate of air (40 mL/min), temperature (90 °C), time (5 h).

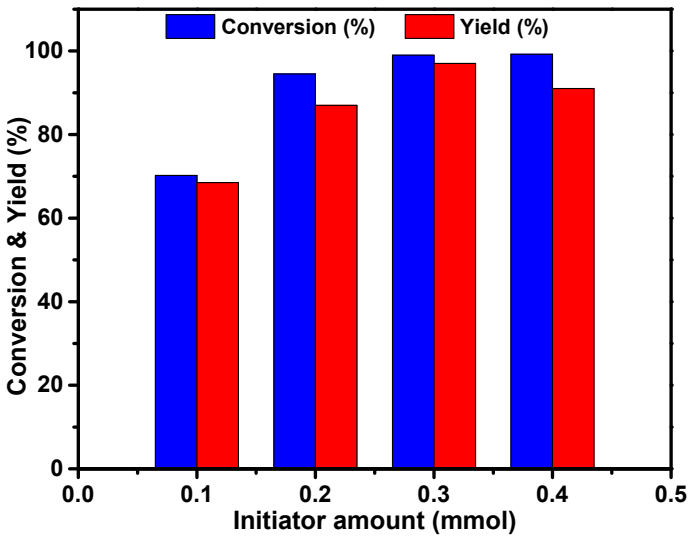

Fig. S7. Effect of the CHP amount on the epoxidation of α-pinene. Reaction conditions: catalyst (Co-MOF-150-2, 30 mg), α-pinene (3 mmol), CHP (0.3 mmol), DMF (10 g), flowrate of air (40 mL/min), temperature (90 °C), time (5 h).

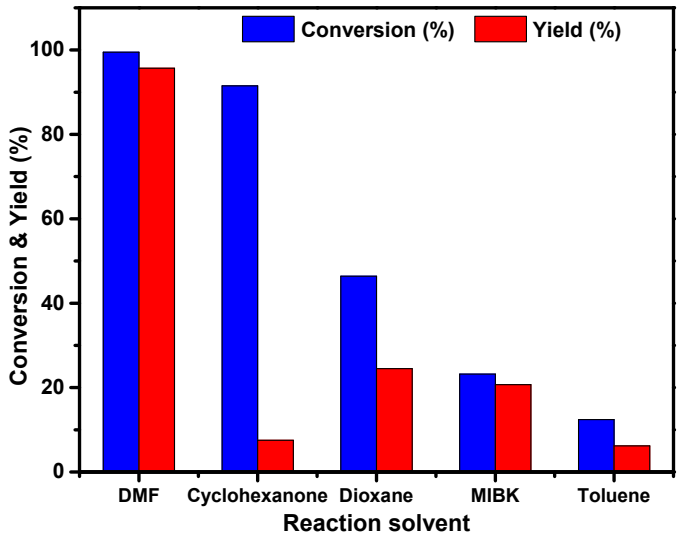

Fig. S8. Effect of solvents on the epoxidation of α-pinene. Reaction conditions: catalyst (Co-MOF-150-2, 30 mg), α-pinene (3 mmol), CHP (0.3 mmol), solvent (10 g), flowrate of air (40 mL/min), temperature (90 °C), time (5 h).

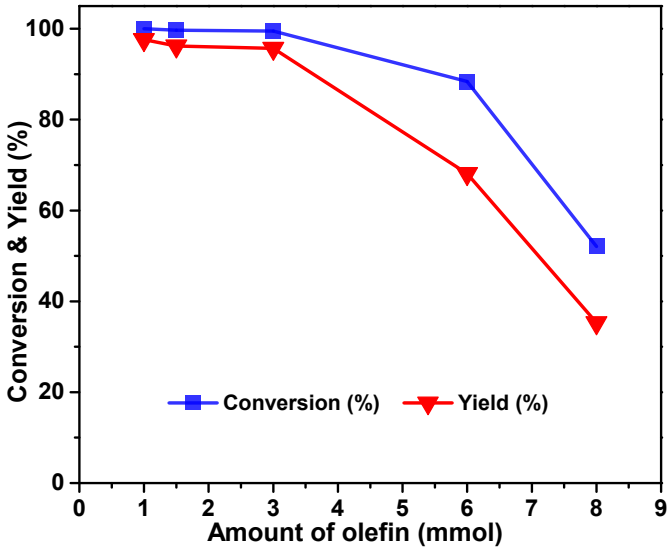

Fig. S9. Effect of olefin moles on the epoxidation of α-pinene. Reaction conditions: catalyst (Co-MOF-150-2, 30 mg), α-pinene, CHP (CHP/α-pinene=1/10), DMF (10 g), flowrate of air (40 mL/min), temperature (90 °C), time (5 h).

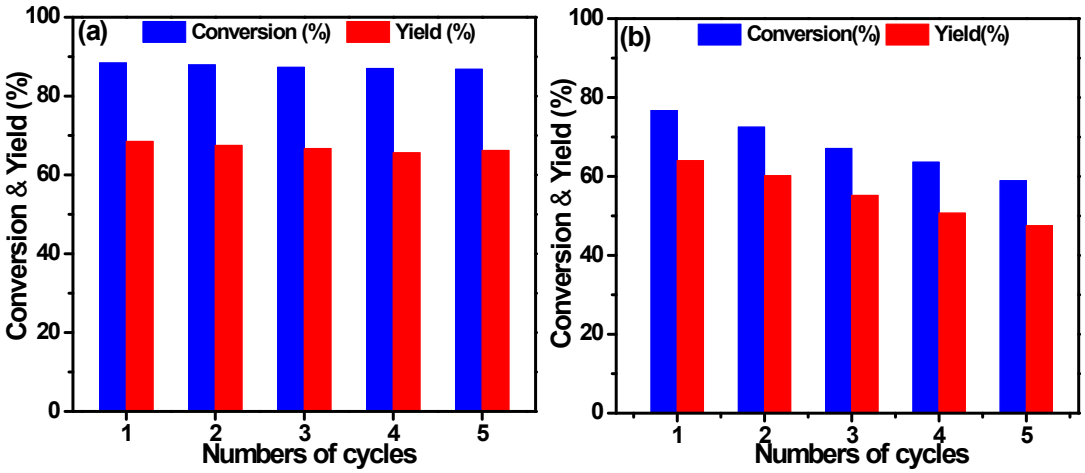

Fig. S10. Recycling tests of catalysts. Reaction conditions: catalyst (Co-MOF-150-2 for (a), Co-MOF-S for (b), α-pinene (6 mmol), α-pinene/initiator=10; DMF (10 g), flowrate of air (40 mL/min), temperature (90 °C), time (5 h).