

THESIS INFORMATION

Title: **Using Copper-based organic frameworks (Cu-MOFs): $\text{Cu}_3(\text{BTC})_2$, $\text{Cu}_2(\text{BPDC})_2(\text{BPY})$, $\text{Cu}_2(\text{BDC})_2(\text{BPY})$ as catalysts for C-C and C-N coupling reactions**

Major: **Chemical Technology**

Major code: **62520301**

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Advisors: **Prof. Dr. Phan Thanh Son Nam**

University: **Vietnam National University, Ho Chi Minh City University of Technology**

Thesis Contents

This thesis aims to apply Cu-MOFs: $\text{Cu}_3(\text{BTC})_2$, $\text{Cu}_2(\text{BPDC})_2(\text{BPY})$, $\text{Cu}_2(\text{BDC})_2(\text{BPY})$ as catalysts in direct C–C and C–N coupling reactions to synthesize many bioactive compounds such as benzoxazole derivatives, ynamides, α -amino carbonyls. The main contents of this thesis are listed below.

- Cu-MOFs: $\text{Cu}_3(\text{BTC})_2$, $\text{Cu}_2(\text{BPDC})_2(\text{BPY})$ and $\text{Cu}_2(\text{BDC})_2(\text{BPY})$, were successfully synthesized by solvothermal methods and analyzed characteristics by PXRD, FT-IR, SEM, TEM, TGA, ICP/AAS and nitrogen physisorption measurements.
- It is first time to use these Cu-MOFs as heterogeneous catalysts for the reactions: i) direct C-arylation of heterocycles with aryl halides under conditions of $\text{Cu}_2(\text{BPDC})_2(\text{BPY})$ catalysis; ii) oxidative cross coupling between activated N – H amines and terminal alkynes using $\text{Cu}_2(\text{BDC})_2(\text{BPY})$; iii) C–N coupling reaction between α -carbonyls and secondary amines catalyzed by $\text{Cu}_3(\text{BTC})_2$.
- $\text{Cu}_3(\text{BTC})_2$, $\text{Cu}_2(\text{BPDC})_2(\text{BPY})$ and $\text{Cu}_2(\text{BDC})_2(\text{BPY})$ showed excellent catalytic activities for the surveyed C–C and C–N coupling reactions and the optimal conditions of the these reactions have been determined.

- These Cu-MOFs can be reused and recycled several times without significant degradation in catalytic activities. Fresh Cu-MOFs and reused Cu-MOFs were also compared by PXRD and FT-IR spectra.
- All main products were confirmed by GC-MS, ^1H NMR and ^{13}C NMR. Besides, the isolated yields of reactions were calculated.

Advisors

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