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Tuning the catalytic activity of a Zn-MOF by tandem post-synthetic surface functionalization in the synthesis of benzimidazole derivatives

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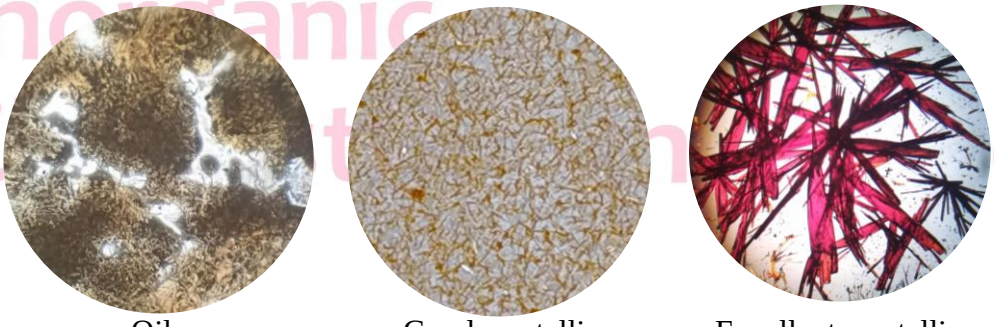
The current work reports the effect of post-synthetic surface modification of a Zn-MOF on the catalytic synthesis of benzimidazole derivatives. For this purpose, the most suitable functional groups for the catalytic formation of benzimidazole derivatives such as Lewis acid, Lewis base, Brønsted acid, and Brønsted base were introduced on the surface of the Zn-MOF. The catalytic reaction was examined in the presence of the resulting functionalized Zn-MOFs as a catalyst. As a result, it was found that the Brønsted acid group has the best performance for the catalytic reaction of benzimidazole derivatives.

Keywords: Post-synthetic modification, Functionalization, Metal-organic framework, Benzimidazole

Table 1 the reaction of benzimidazole derivatives

catalyst	Efficiency[a] (%)	Time[b] (min)	Description
Zn-MOF	<65	>60	good crystalline product
Zn-MOF functionalized by Lewis acid	<80	>60	good crystalline product
Zn-MOF functionalized by Lewis base	<70	>90	oily product
Zn-MOF functionalized by Brønsted acid	>98	<10	excellent crystalline product
Zn-MOF functionalized by Brønsted base	<60	>90	oily product

[a,b] The maximum efficiency/time of reaction for benzimidazole derivatives with each modified Zn-MOF catalyst.



Oily Good crystalline Excellent crystalline

Figure 1 The microscopic images of the synthesis of benzimidazole derivatives

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