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Chiral Metal-Organic Frameworks Bearing Free Carboxylic Acids for Organocatalyst Encapsulation
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MOFs Bearing Free Carboxylic Acids for Organocatalyst Encapsulation

Category

Polymer-Supported Synthesis

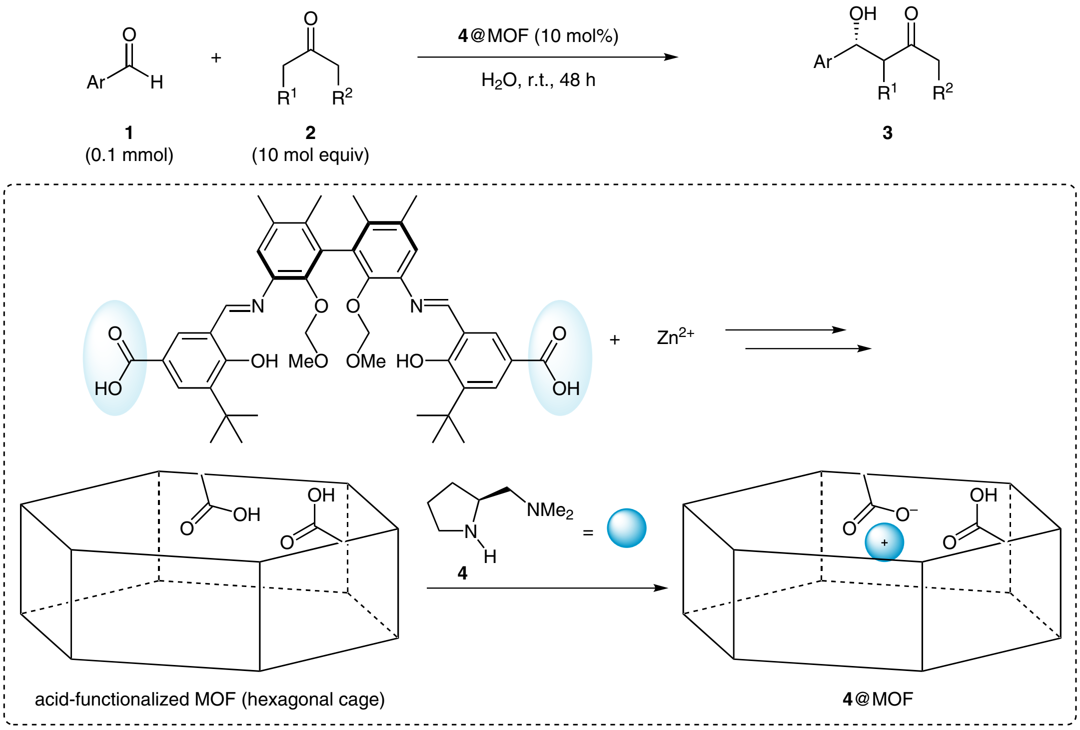
Key words

aldol reaction

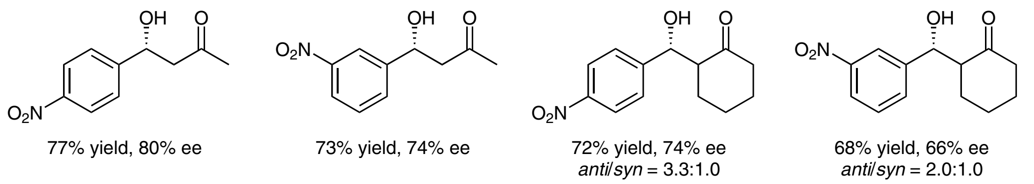
heterogeneous catalysis

metal-organic framework

organocatalysis



Selected examples:



Significance: Carboxylic acid functionalized micro- and mesoporous metal-organic frameworks (MOFs) were developed for the organocatalyst encapsulation via acid–base interactions. The reaction of aldehydes **1** with ketones **2** in the presence of **4**@MOF (encapsulated **4** in acid-functionalized MOF) proceeded in water to give the aldol products **3** in 68–77% yield with 66–80% ee.

Comment: The MOF-based catalyst **4**@MOF gave higher enantioselectivity than the combination of **4** and benzoic acid as homogeneous counterparts. Thus, the reaction of 4-nitrobenzaldehyde and acetone in the presence of **4** with benzoic acid (1 mol equiv) afforded the corresponding product **3** in 79% yield with 64% ee (cf. **4**@MOF: 77% yield, 80% ee).

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