

Nanochemistry and biotechnology

Nano Metal-Organic Framework $\text{Cu}_2(\text{BDC})_2(\text{DABCO})$ as Efficient Catalysis for Three Component Synthesis of Imidazoles

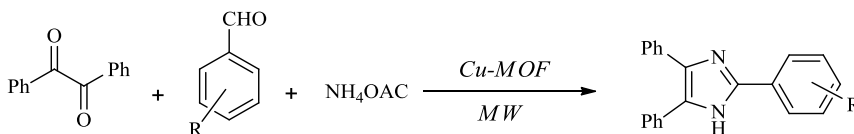
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Multicomponent reactions (MCRs) are one-pot reactions that involve three or more components to form a single product, mostly with high atom economy [1]. In the past decade, a class of crystalline porous materials known as metal-organic frameworks (MOFs) has attracted considerable attention in many applications including catalysis, luminescence, gas adsorption/storage, photonic, magnetism, polymerization, imaging, membranes [2], drug delivery [3], and so on.

In the present work, a rapid, solvent-free and eco-friendly method for the synthesis of imidazoles is suggested. In this method, an aldehyde, a 1,2-diketone and ammonium acetate were used in the presence of $[\text{Cu}_2(\text{BDC})_2(\text{DABCO})]$ as an efficient nanocatalyst. The reaction was dramatically accelerated under microwave irradiation (Scheme 1). The advantages of this method compared to traditional ones are short reaction times, high yields, solvent free condition and easy catalyst recovery. The catalyst can be recovered and reused without considerable loss of its activity.



Scheme 1. Efficient synthesis of imidazoles catalysed by Cu-MOF

- [1] Domling, Alexander, Wei Wang, and Kan Wang, //Chem. Rev., -2012.-**112**, P. 3083-3135.
- [2] LI J.-R., Sculley J., Zhou H.-C. Metal-Organic Frameworks for Separations// Chem. Rev., -2012., -**112**, P. 869-932.
- [3] Matsuyama K., Hayashi N., Yokomizo M., Kato T., Ohara K., Okuyama T. Supercritical carbon dioxide-assisted drug loading and release from biocompatible porous metal-organic frameworks // J. Mater. Chem. B, -2014.