عنوان مقاله:

Metal-Organic Frameworks (MOFs) as Heterogeneous (Photo-)Catalysts in Organic Transformation Reactions

محل انتشار:

بیست و ششمین سمینار شیمی آلی ایران (سال: 1397)

تعداد صفحات اصل مقاله: 1

نویسنده:

Saba Daliran - *Faculty of Chemistry, Bu-Ali Sina University, Hamedan, Iran*

خلاصه مقاله:

Modern synthetic designs demand the minimization of synthetic steps together with environmentallyand chemically more efficient benign processes, which dictate and appeal the furtherdevelopment of such synthetic strategies and tactics. Designing new protocols with emphasison reducing the use of toxic reaction media, transition metals, oxidants/additives, andprecious (rare and expensive) catalysts, remains significantly challenging. Metal–organicframeworks (MOFs), so-called porous coordination polymers (PCPs), are three-dimensionallyextended crystalline materials having high porosity, and are composed of metal-ioncontainingnodes/secondary building units (SBUs) and organic linkers/struts. By using rationallychosen organic linkers and metal-containing precursors, crystalline solids with uniformlystructured cavities, high surface area, high porosity, and tailorable physicochemical propertiescan be achieved [1,2]. In addition, the possibility of post-synthetic modification (PSM) ofMOFs, as an important method to produce new functionalized frameworks, creates new opportunitiesfor their further applications. As a result, MOFs have been recently demonstratedto be highly valuable materials for a wide range of potential applications such as gas storage,separation, sensing, conductivity, light harvesting, drug delivery, deactivation of chemicalwarfare agents, removing toxic materials from air and water, and catalysis. This emergingclass of catalysts exhibits the advantages of both homogeneous and heterogeneous catalysts.Porosity, as a microstructured reactor, can be used both to increase accessible catalyticallyactive sites and to preconcentrate substrates, increasing reaction rates and yields of products.Furthermore, non-covalent interactions, such as van der Waals forces and solvophobic effectsmay serve to intensify the interaction between substrates and the surface of MOF, resulting inmore efficient adsorption and packing, thereby causing the enhancement of the reaction rate.The utilization of MOFs in heterogeneous photocatalysis is currently an emerging field in organictransformations, aiming the use of natural light as renewable energy to minimize theenvironmental problems. With growing demand for organic chemicals and pharmaceuticals, itis urgent to develop green and effective strategies for selective synthesis of the compounds.

کلمات کلیدی: