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Synthesis of Zinc-Based Metal Organic Frameworks Modified as Highly Efficient and Recyclable Catalysts for Suzuki and Heck Cross-Coupling Reactions

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As a unique class of porous materials, metal-organic frameworks (MOFs) are promising platforms for creating heterogeneous catalysts [1]. MOFs with a highly porous structure enable efficient access of reactive molecules to the site of the active metal and are promising as heterogeneous catalysis. Heterogeneous catalysis is superior to homogeneous catalysis because it leads to easier separation, reusability, minimized waste, and cleaner products [2, 3]. Therefore, MOFs are used as heterogeneous catalysts to accelerate coupling reactions or as support materials in various catalysts due to having active catalytic sites in the structure, high surface area, structural diversity, and tunable pore size porosity [4, 5]. The porosity of MOFs is one of the factors affecting the rate of Suzuki and Heck cross-coupling reactions. In this research, a new modified Zinc-Based Metal–Organic Frameworks (MOF-5) catalyst was synthesized using the solovthermal method with high porosity and remarkable thermal stability. The mesostructured MOF-5 is composed of the bond between metal Zn^{2+} and 1, 4-dicarboxybenzene (PTA). In order to increase the efficiency and expand the surface area of MOF-5, from surfactant was used. The MOF-5 catalyst in Suzuki and heck cross-coupling reactions was easily recovered and recycled in 6 cycles without significant leaching or loss of catalytic activity.

Keywords: Metal-organic frameworks (MOFs), Surfactant, Heterogeneous catalysis, Porosity, Suzuki and Heck

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