عنوان مقاله:

New epoxidation catalyst derived from immobilization of a molybdenum complex on aminopropyl modified MCM-41

محل انتشار:

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خلاصه مقاله:

Among the variety of catalytically active metal complexes the transition metals bearing Schiff base ligands are of great interest and several works devoted to investigate their catalytic activities in various catalytic organic reactions [1]. Schiff base ligands are able to stabilize many different metals in various oxidation states, controlling the performance of metals in a large variety of useful catalytic transformations [2]. In this work, mesoporous molecular sieve MCM-41 was covalently modified with molybdenum-Schiff base complex via two methods. In the first method, MCM-41 was modified with 3-aminopropyl trimethoxysilane to give modified MCM-41 (AmpMCM-41) and then reacted with MoO2(acac)2 complex to give MoO2-acacAmpMCM-41 (I) catalyst. In the second method, MCM-41 was modified with 3-aminopropyl trimethoxysilane and acetyl acetone (acac) successively to give a supported Schiff base ligand i.e. acacAmpMCM-41. In the next step, reaction of the MoO2(acac)2 complex with acacAmpMCM-41 resulted in the preparation of MoO2-acacAmpMCM-41 (II) catalyst. Here is a question whether the characteristics of the final product is the same In order to answer this question, we tried to indicate the differences between both heterogenized molybdenum catalysts prepared with these two methods. Characterization of these materials was carried out with FT-IR and ICP-OES spectroscopies, powder X-ray diffraction (XRD), and BET nitrogen adsorption–desorption methods. FT-IR and ICP-OES spectroscopies confirmed the successful incorporation of molybdenum complex within the mesopores of MCM-41. The XRD and BET analyses revealed that textural properties of support were preserved during the grafting experiments. The resultant materials successfully catalyzed the epoxidation of cyclooctene, cyclohexene, 1-hexene, and 1-octene with tert-butyl hydroperoxide (TBHP) to the corresponding epoxides. The reusability of catalyst was examined in 5 reaction cycles without any significant loss of activity. Our results showed .that MoO2-acacAmpMCM-41 (II) catalyst is more active in the catalytic epoxidation of olefins

کلمات کلیدی:

Molybdenum; MCM-41; Catalyst; Epoxidation; Schiff base