



4TH National Conference of Iran Chemistry, Chemical Engineering And Nano

Ni-S-(PROPYL)2-AMINO BENZOTHIOLATE ON Fe₃O₄ NANOPARTICLES: EFFICIENT AND RECYCLABLE CATALYST FOR ORGANIC REACTIONS

Arash Ghorbani-Choghamarani¹, Bahman Tahmasbi¹, Sami Sajjadifar, Shefa Miraninezhad

¹Department of Chemistry, Faculty of Science, Ilam University, P. O. Box 69315516, Ilam, Iran. Department of Chemistry, Payame Noor University, Ilam, Iran, P.O. Box 19395-4697

Abstract: Ni-S-(propyl)2-aminobenzothioate supported on functionalized Fe₃O₄ magnetic nanoparticles (Ni-SPATB/Fe₃O₄), has been reported for the one-pot synthesis of polyhydroquinoline derivatives and also for selective oxidation of sulfides to sulfoxides as a high reusable and efficient nanocatalyst. The prepared nanoparticles were characterized by FT-IR, VSM, TGA, SEM, XRD and ICP-OES techniques. This nanocatalyst was easily recovered using external magnet and reused for several times without significant loss of its catalytic efficiency.

Keywords: Magnetic nanoparticles, nickel, polyhydroquinoline, sulfoxides, organometal catalyst.

1. INTRODUCTION

In recent years, supported catalysts on the nanoparticles have attracted much attention in organic reactions [1]. The main drawback of these catalysts is their separation; because nanoparticles have diameters of less than 100 nm, which cannot be separated by conventional methods such as filtration techniques [2]. This drawback can be overcome using magnetic nanoparticles (MNPs), which can be easily recovered from the reaction mixture by external magnet [3]. Furthermore, magnetic separation of the MNPs is more effective and easier than filtration or centrifugation [4]. Herein, we reported a new complex of nickel that immobilized on Fe₃O₄ MNPs and further used as an excellent nano organometal catalyst for the one-pot synthesis of polyhydroquinoline derivatives and selective oxidation of sulfides into sulfoxides. Some of biologically active sulfoxides play an important role as therapeutic agents such as antibacterial, antifungal, antihypertensive, anti-ulcer, anti-atherosclerotic, and anti-atherosclerotic as well as psychotropics and vasodilators [5-7]. Also polyhydroquinoline derivatives have been reported to possess a wide range of pharmaceutical activities and biological properties such as hepatoprotective, vasodilator, antitumor, antiatherosclerotic, geroprotective, bronchodilator, antidiabetic activity and also their ability to modulate calcium channels [7-9].

2. EXPERIMENTAL

2.1. Preparation of Ni-SPATB/Fe₃O₄

The ATBA-MNPs were synthesized according to our recently reported procedure [7]. The obtained ATBA-MNPs (0.5 g) were dispersed in 25 mL ethanol by sonication for 20 min, and then Ni(NO₃)₂·4H₂O (1 mmol) was added to the reaction mixture. The reaction mixture was stirred under N₂ atmosphere at 80 °C for 20 h. The final product was separated by magnetic decantation and washed by ethanol to remove the unattached substrates. The nanoparticles product (Ni-SPATB/Fe₃O₄) was dried at room temperature.