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Boehmite magnetic nanoparticles as a practical and magnetically recoverable nanocatalyst in the synthesis of tetrazoles

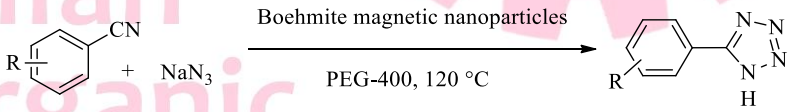
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High catalytic activity is usually observed in the homogeneous catalyst systems [1]. However, purification of the products and recovery of the catalyst is often difficult and time consuming in the homogeneous catalyst systems [2]. In the other hand, clean technology and green chemistry require the use of recyclable catalysts [3]. While we need to a catalytic systems which have recyclability and high activity. This goal is achieved by nanocatalysts which are the bridge between heterogeneous and homogeneous catalysts [4]. However, nanoparticles (NPs) are not fully recycled by conventional methods such as centrifugation or filtration. All of these problems can be overcome using magnetic nanoparticles (MNPs) [5], which are quickly, easily and completely recovered using an external magnet [6,7].

In this work, boehmite MNPs were synthesized from a hybrid of boehmite and Fe_3O_4 nanoparticles. At first, boehmite nanoparticles were prepared. Then, these nanoparticles were magnetized using Fe_3O_4 NPs. Boehmite MNPs was characterized by TEM, SEM, EDS, WDX, ICP, FT-IR, Raman, XRD and VSM techniques. Then, boehmite MNPs were applied as a homoselective, highly efficient, and recoverable nanocatalyst in the synthesis of tetrazoles. Boehmite magnetic nanoparticles was recycled for several runs in the synthesis of tetrazoles.



Scheme 1. Synthesis of 5-substituted 1H-tetrazoles in the presence of Boehmite magnetic nanoparticles

Keywords: Boehmite NPs, magnetic NPs, heterogeneous nanocatalyst, reusable nanocatalyst

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