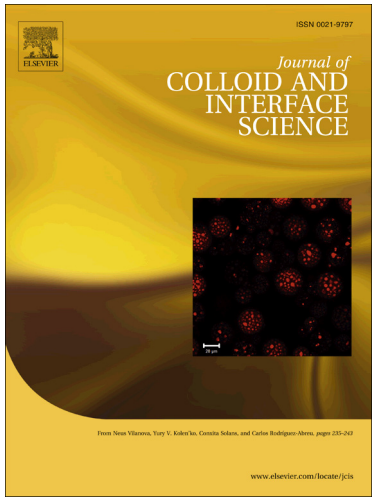

Editor's Choice

One-Pot Reductive-Acetylation of Nitroarenes with $NaBH_4$ Catalyzed by Separable Core-Shell Fe_3O_4@$Cu(OH)_x$ Nanoparticles

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One-Pot Reductive-Acetylation of Nitroarenes with $NaBH_4$ Catalyzed by Separable Core-Shell Fe_3O_4@$Cu(OH)_x$ Nanoparticles

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Abstract: One-pot reductive-acetylation of nitroarenes to acetanilides was carried out efficiently with $NaBH_4$ in the presence of magnetically separable core-shell Fe_3O_4@$Cu(OH)_x$ nanoparticles. All reactions were carried out in H_2O followed by acetylation with acetic anhydride within 5-17 min giving the *N*-arylacetamides in high to excellent yields. Reusability of the catalyst was examined 9 times without significant loss of its catalytic activity.

Keywords: Acetanilides, Fe_3O_4@$Cu(OH)_x$, $NaBH_4$, Nitroarenes, Nanoparticles, Reductive-acetylation

1. Introduction

Nowadays, heterogeneous catalysts and reagents are known and become essential for a great variety of organic reactions [1-6]. In this context, the manufacture of many materials and foodstuffs would be possible only with effective heterogeneous catalysis. Zeolites [7], metal oxides [8], hydrotalcites [9], ion-exchange resins [10], solid supports [11], and polyoxometalates [12-14] are some of the heterogeneous catalysts which have been used in numerous reactions.

Recently the design and synthesis of core-shell nanoparticles because of their potential abilities to catalyze organic reactions has attracted more attention [15,16]. The core-shell nano composites containing the core of paramagnetic materials are air-stable and can be easily separated by an external magnet to avoid traditional filtration processes [17]. A literature review displays that magnetical nanoparticles have been widely used in biomedicine [18-20], biosensors, biochips [21], biology [22] and material sciences [23-25]. In this context, the immobilization of different metallic salts such as MnO_2 [26], TiO_2 [27], $Co(NO_3)_2$ [28], $Fe(OH)_3$ [29], $Cu(OH)_x$ [30, 31], $Ru(OH)_x$ [32], Pd [33, 34], Pt [35] and Rh(III)-metalloporphyrin [36] on paramagnetic Fe_3O_4 has also been successfully reported for various functional group transformations.

Reduction of nitro groups and then acylation of the resulting amines is often carried out in synthetic organic chemistry to provide an important protection strategy for amines which are sensitive to oxidative degradation under demanding conditions. The conventional two-step