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N-Heterocyclic Carbene–Palladium Complex onto Graphene Oxide and Poly (ethylene glycol) (PEG) Applied as Superior Catalyst for the Suzuki-Miyaura Cross-Coupling Reaction in Water

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Abstract

Using polymeric nanocomposites incorporated Pd to promote C-C coupling reactions has been found as one of the most successful strategies. In this paper we apply graphene oxide (GO) as an efficient surface immobilized by water-soluble poly (ethylene glycol)-imidazole followed by introduction of $PdCl_2$ salt to obtain the desired catalyst. Catalytic performance of this composite was investigated in the Suzuki–Miyaura cross-coupling reaction under mild reaction conditions and superior results were obtained. The hydrophilic nature of the catalyst and well distribution of Pd lead to superior catalytic activity in water media. Moreover, the Suzuki–Miyaura reaction proceed successfully with excellent yield and short reaction time without any loss of activity even after seven consecutive reaction cycles.

Keywords: conducting polymer, graphene oxide, heterogeneous catalyst, N-heterocyclic carbene (NHC), Suzuki-Miyaura reaction, Aliphatic compounds, Catalyst activity