

A novel magnetic heterogeneous catalyst based on decoration of halloysite with ionic liquid-containing dendrimer

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Abstract

A magnetic catalyst is synthesized through growth of dendrimer of generation 3 (G3) on the surface of halloysite (Hal) nanotubes followed by decoration of dendrimer terminal groups with ionic liquid (IL) and incorporation of Fe species. The structure of the catalyst was confirmed by using several characterization techniques. Moreover, the catalytic activity of the catalyst for oxidation of benzaldehydes to the corresponding benzoic acids in the presence of hydrogen peroxide was investigated. Notably, to improve the yield of the reaction, β -cyclodextrin (β -CD) was employed as phase transfer agent. The contribution of dendrimer and IL to the catalysis was confirmed by comparing the catalytic activity of the catalyst with that of control the catalysts (the catalyst without IL, Fe species and dendrimer). Furthermore, the effect of dendrimer generation was elucidated by comparing the catalytic activities of the catalysts prepared by growth of dendrimers of G1, G2 and G3 on Hal. Studying the recyclability of the catalyst, it was found that the catalyst could be recovered and recycled for several reaction times with slight loss of leaching of Fe species.

Keywords: Halloysite, Dendrimer, Magnetic catalyst, Cyclodextrin