

HPA@Methenamine-HNTs A Novel Catalyst for Promoting One-Pot and Three-Component Synthesis of Chromenopyrimidine-2,5-Diones and Thioxochromenopyrimidin-5-ones in Aqueous Media

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Abstract

A novel catalyst has been prepared through functionalization of halloysite nanoclay (HNTs) with methenamine and subsequent incorporation of Keggin type heteropolyacid (HPA). The catalyst was applied for promoting synthesis of chromenopyrimidine-2,5-diones and thioxochromenopyrimidin-5-ones through one-pot reaction of urea/thiourea, aldehydes and 4-hydroxycoumarin under mild reaction condition. The results confirmed that the catalyst could efficiently catalyze the reaction to furnish the corresponding products in high yields and short reaction times. Moreover, the catalyst was reusable up to three reaction runs with slight HPA leaching. The comparison of the catalytic activity of the catalyst with that of HPA, HNTs, HPA supported on HNTs and methenamine confirmed the superior catalytic activity of the catalyst, indicating the efficiency of Methenamine-HNTs as a catalyst support. Finally, the comparison of the efficiency of the present protocol with some of the previous reports, confirmed the merit of use of this novel catalyst in terms of reaction yield and heterogeneity of the catalyst.

Keywords: Chromenopyrimidine, Halloysite, Heteropolyacid, Hybrid catalyst