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SBA-15@methenamine-HPA: a novel, simple, and efficient catalyst for one-pot three-component synthesis of 2-amino-4H-chromene derivatives in aqueous medium

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Abstract

Cl-functionalized SBA-15 was reacted with methenamine and subsequently applied for embedding heteropolyacids. The novel catalyst, SBA-15@methenamine-HPA, was characterized by using scanning electron microscopy (SEM) with energy-dispersive X-ray (EDX) analysis, X-ray diffraction (XRD) analysis, Brunauer–Emmett–Teller (BET) measurements, thermogravimetric analysis (TGA), and Fourier-transform infrared (FTIR) spectroscopy and successfully used for synthesis of a wide range of 2-amino-4H-chromene derivatives containing various substituents on the 4H-chromene ring through one-pot three-component reaction of aromatic aldehydes, malononitrile, and α -naphthol or β -naphthol in aqueous medium. The catalytic activity of this catalyst was superior to some previously reported conventional catalysts. Moreover, the catalyst was reusable and could be recovered and reused for at least five reaction runs with only slight loss of catalytic activity. The heterogeneous nature of the catalyst, facile workup, excellent yield, and clean, green, and ecofriendly procedure are other advantageous of this protocol.

Keyword: Heteropolyacid, SBA, Hybrid catalyst, Multicomponent reactions