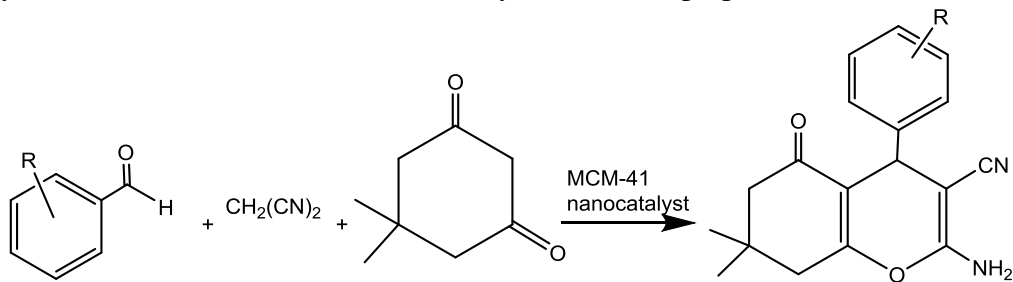
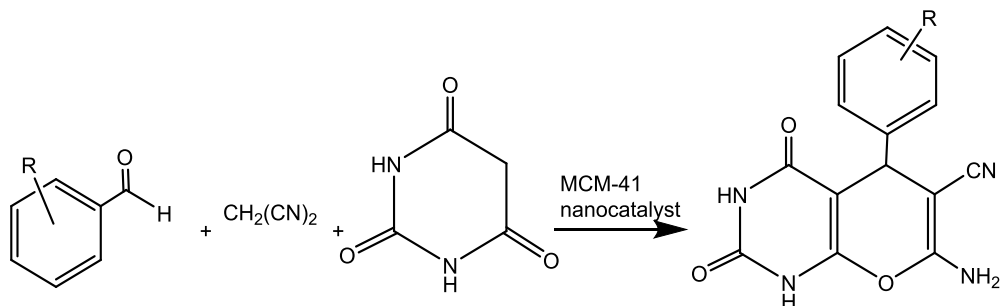


## Abstract

A simple, efficient and environmentally benign protocol has been developed for the one-pot, multicomponent synthesis of fused six membered highly saturated chromene derivatives. These compounds have shown diverse medicinally important effects such as anti-coagulant, anti-espasmodic, antibacterial, anti-HIV, The use of MCM-41-Pr-NH<sub>2</sub> based nanocatalysts for the preparation of organic molecules has been emerged as a vital and progressive area of research in recent years. In the recent work, the condensation of various aldehydes, dimedone and malononitrile in the ratio of 1: 1: 1.2 mmol respectively in the presence of a MCM-41-Pr-NH<sub>2</sub> based nanocatalyst under solvent-free conditions is reported. The reaction was well performed at ambient temperatures (70 °C) and the 2-amino-7,7-dimethyl-8 oxo-4-phenyl-5,6,7,8-tetrahydro-4H-chromene-3-carbonitrile and 7-amino-2,4-dioxo-5-phenyl-1,3,4,5-tetrahydro-2H-pyrano[2,3-*d*]pyrimidine-6-carbonitrile products were easily separated from the nanocatalyst by dissolving in ethanol and simple filtration. Relatively short reaction times, no need to extra harmful organic solvent, high yields and reusability of the catalyst were among the other advantages of the present protocol. kinds eutectic solvents conditions without catalyst MCM-41-Pr-NH<sub>2</sub> at were efficiently used for the preparation of derivatives



The synthesis of Chromene derivatives in the presence of MCM-41-Pr-NH<sub>2</sub> and deep eutectic solvent



The synthesis of pyrano[2, 3-*d*]pyrimidine derivatives in the presence of MCM-41-Pr-NH<sub>2</sub> and deep eutectic solvent

Keywords: Barbituric acid, Dimedone, Green Chemistry, MCM-41-Pr-NH<sub>2</sub>, multicomponent reaction



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(In the field of organic chemistry)

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Heterocyclic fused rings from cyclic compounds  
containing active methylene**

First Supervisor: **Dr. Reza Aryan**

Second Supervisor: **Dr. Hamid Beyzei**

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