

## Construction and Application of Zr-MCM41 Nanoreactors as Highly Active and Efficiently Catalyst in the Synthesis of Biginelli-Type Compounds

**Authors :** Zohreh Derikvand

**Abstract :** Nanoreactors Zr-MCM-41 were prepared via the reaction of  $\text{ZrOCl}_2$ , Fumed silica, sodium hydroxide and cetyltrimethyl ammonium bromide under hydrothermal condition. The prepared nanoreactors were characterized by FT-IR spectroscopy, X-ray diffraction (XRD), Scanning electron micrographs (SEM) and nitrogen adsorption-desorption. The XRD pattern of Zr-MCM-41 exhibits a high-intensity (100) and two low-intensity reflections (110 and 200) which are characteristic of hexagonal structure, exhibiting the long-range order and good textural uniformity of mesoporous structure. Based on the green chemistry approach, we report an efficient and environmentally benign protocol to study the catalytic activity of Zr-MCM-41 in the Biginelli type reactions initially. Nanoreactors Zr-MCM-41 were used as highly recoverable and reusable catalyst for synthesis of 3,4-dihydropyrimidin-2(1H)-one, octahydroquinazolinone, benzimidazolo-quinazolinone and 4,6-diarylpyrimidin-2(1H)-one. The methodology offers several advantages such as short reaction time, high yields and simple operation. The catalyst was active up to three cycles.

**Keywords :** Zr-MCM-41 nanoreactors, Biginelli like reactions, 3,4-dihydropyrimidin-2(1H)-ones, octahydroquinazolinones

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