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Synthesis and Identification of the Copper Salon Composite Stabilized on PMO-IL and its High Performance Study on the Synthesis of Polyhydroquinolin Derivatives

,. **Fatemeh Dehghaniyan[1], Alireza Salimi Beni*[1], Aliyeh Barzekar[1]**
[1] Department of Chemistry, Faculty of Science, Yasouj University, Yasouj 75918-74831, Iran
E-mail: salimibeni@mail.yu.ac.ir, alirezasalimi7173291@gmail.com

ABSTRACT

An efficient salen-Cu @ PMO-IL nanocatalysts has been synthesized by immobilization of Cu (II)-salen on Periodic mesoporous organosilicas and characterized by infrared Fourier transform spectroscopy (FTIR), nitrogen adsorption desorption analysis and Transmission Electroen Microscopic (TEM). This catalyst demonstrated highly effective performance for the synthesis of different derivatives of polyhydroquinolines. The reactivity of thise catalyst under the reaction conditions have also been investigated

Keywords: copper salen complex, Periodic mesoporous organosilicas, polyhydroquinolines derivative

1. INTRODUCTION

In recent decades, the synthesis of multi-component reactions has been widely used in the field of organic chemistry. The importance of these reactions is related to the ability of a one-step synthesis of a large number of different compounds from different materials. for a multi-component reaction, the benefits include increasing the efficiency of the reaction, reducing the number of steps to react, reducing time, increasing the usefulness of the product's returns, and hence cost-effective, economically and less harmful to the environment. In addition, the achievement of complex structures is one of the most important benefits of these reactions, which leads to the development, design and molecular architecture. The Biginelli and Hantzsch reactions are the most famous multi-component reactions, which are similar in both types of primary materials, in both reactions, aldehyde, and the 1,3dicarbonyl compound is used as an active methylene compound. In the Hantzsch reaction, two moles of 1,3-dicarbonyl, a source of ammonia and one aldehyde, are condensed to produce dihydro-pyridine (DHP), and, after oxidation, produce Pyridine Hantzsch. 1,4-dihydropyridines exhibit a wide range of biological activities, including blocking the calcium channel and the effects of vasodilatation and antihypertensive therapy, cardiovascular, antimicrobial and antifungal. The importance of the 1.4 dihydropyridine compounds has led to many methods are recommended for synthesizing these compounds. Several catalysts have been reported for the synthesis of these compounds, some of which are Ammonium nitrate, (CAN), silicaperchloricacid, nickel nanoparticles, trifluorophosphate, K_7 [$PW_{11}CoO_{40}$], p-TSA, SBA-Pr-SO_3H, $Bi(OTf)_3$, Ionic liquids, Sulfamic acid, these homogeneous catalytic systems has many disadvantages these homogeneous catalytic systems have many disadvantages, such as usually expensive, require large amounts of unrecoverable catalyst ,and isolation from the reaction environment is not possible One of the solutions to overcome the problems of stabilizing homogeneous materials on recyclable substrates such as carbon and silica and polymer The presence of metal core on these heterogeneous catalysts is a major move to increasing efficiency, increasing activity, improving product quality and shortening reaction time [1] to [19]. Nanoporous materials have nano-sized purpose and are very diverse. Periodic structure with a high ratio, selectivity of shape and size are the most important properties of these materials, which has resulted in the application of a lot of catalytic, purification, absorbent materials for separation and highlighting their role in nanotechnology. In order to enhance the applications of nanoporous compounds in various fields such as catalysts, chemical sensors and chromatography, mesoporous silica must be functional with appropriate functional groups. The method of fixation of functional groups on silica nanostructures, which is also the method of supplying interphase catalysts, is two methods of sol-gel and bonding. Periodic mesoporous organosilicas have properties such as: high surface area, high thermal and mechanical stability, and large pore size .The method of synthesis of these materials is that, after the accumulation of surfactants and the formation of the micelle, the organosilanes are located around the Mycell, and after the extraction of surfactants, the Periodic mesoporous organosilicas is formed The shiff base complexes in which there are intermediate