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A Robust Synthesis of 4-substituted 1, 5- Benzodiazepines With the aid of Silica Supported-P2O5 as a Recyclable Catalyst in Solvent-free Conditions

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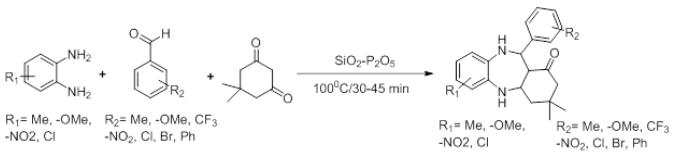
ABSTRACT

The possibility of using direct current electric conductivity measurement to study the solid state reactions involved in the preparation zinc oxide from zinc (II) maleate hydrated have been analyzed respectively. The study has been carried out in normal atmosphere. The steps corresponding to dehydration are well resolved in region from room temperature to 260 oC. The final product of decomposition in normal atmosphere was found to be ZnO from zinc maleate. The conductivity measurement was supplemented with the data obtained by chemical analysis; thermal analysis (TGA and DTG) and IR spectroscopy analysis.

Keywords : Thermal Decomposition; Electric Conductivity; Solid State; Maleate

Benzodiazepines have gathered name and fame in the market as they are one of the major constituents of drugs that are utilized for psychotropic, Anti-anxiety, Schizophrenia, Platelet-activating factor inhibitor and as Muscarinic receptor-M1 antagonist drugs. Benzodiazepine and their derivatives are one of the highly sold psychoactive drugs across the globe. In addition to this 1,5-benzodiazepines based fused ring system containing heterocyclic compounds has widened their medicinal utility as an antidepressant, anti-inflammatory, hypnotic, anticoagulant, antibacterial, analgesic and antiepileptic agents. All these pharmaceutical importance has the triggered notable attention from the researchers worldwide & a careful literature survey reveals numerous approaches for the synthesis of benzodiazepine but the majority of routes curtle down, their novelty due to use of a toxic catalyst, a toxic solvent, tedious workup procedure, a costlier catalyst with a longer reaction time and violating the environment.

Thus we thought of developing a facile route that can push back all these drawbacks and also meet with the concept of green chemistry also. Hence we have utilized a recyclable Silica supported-P_2O_5 as a novel catalyst for the three component reaction of dimedone, 1, 2-diamine and Aromatic Aldehyde in solvent-free conditions at 100^0C giving the product in an excellent amount of yield within 30-45 minutes of reaction time. Thus we have introduced an efficient, clean, solvent-free reaction protocol that uses a cheaper, environmentally benign, recyclable catalyst that can deliver the product with the excellent amount of yield within shorter reaction time period.



Scheme 1. Synthesis of 4-substituted 1, 5-Benzodiazepines