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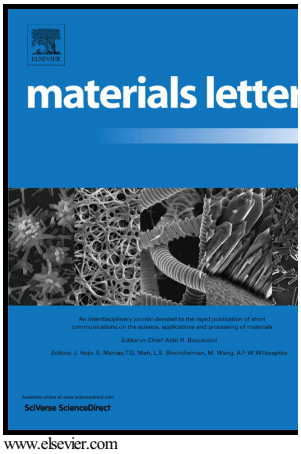

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Synthesis, characterization of bio-derived ZnO nanoparticles and its catalytic activity

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Abstract

Synthesis of ZnO nanoparticles using Carica papaya leaf extract and its utility as nanocatalyst for preparation of oximes derivatives are reported here. Bio-derived ZnO nanoparticles were characterized by XRD, XPS, FT-IR, SEM, BET and TEM techniques. The substituted oximes were synthesized using ZnO nanocatalyst under microwave irradiation (MI) in solvent free condition with excellent yield (80±1.0 - 96±1.8%). The catalyst can be efficiently recycled up to 5th run.

Key words: Nanoparticles, Carica papaya, Biomaterials, Oximes

1. Introduction

Nowadays, ZnO nanoparticles have gained the popularity due to their distinctive and fascinating properties. Over the past several years, plant and different natural sources have come up as a low cost, energy-efficient and non-toxic approach for synthesis of ZnO nanoparticles. Several investigations were carried out using natural materials like Corriandrum Sativum [1], orange juice [2], leaf extract of Acalypha indica [3], leaf extract of Calotropis Gigantea [4] and peel extract of Musa balbisiana [5].

In this investigation, synthesis of ZnO nanoparticles using Carica papaya leaf extract is reported as an environmentally benign process without use of harsh, toxic and expensive chemicals. Furthermore, this procedure is more valuable due to its cost effectiveness. The fruit and leaf of the plant is a food additive and help in normalizing digestive disorder [6].

The transformation of carbonyl compounds into oximes is one of the most important synthetic reaction due to protection, purification and characterization of carbonyl compounds [7], as intermediates for conversion into nitro compounds [8], nitriles [9] etc. In this study we have also investigated the catalytic activity of ZnO nanoparticles in microwave synthesis of oxime derivatives in solvent free condition.

2. Materials and methods