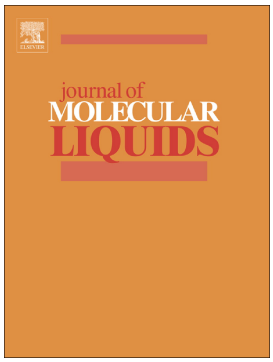

Nicotinium methane sulfonate (NMS): A bio-renewable protic ionic liquid and bi-functional catalyst for synthesis of 2-amino-3-cyano pyridines

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Nicotinium methane sulfonate (NMS): a bio-renewable protic ionic liquid and bi-functional catalyst for synthesis of 2-amino-3-cyano pyridines

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Abstract

In this work, a simple approach was used to quantitative preparation of nicotinum methane sulfonate (1-methyl-2-(pyridin-3-yl)pyrrolidin-1-ium methanesulfonate (NMS)) from nicotine and methane sulfonic acid. NMS, as a novel, mild, efficient, economic, and task-specific ionic liquid (TSIL) with dual acid and base functional groups, has been characterized by NMR, FT-IR, acidity measurements, and elemental analysis. This protic ionic liquid shows excellent catalytic activity in one-pot synthesis of 2-amino-3-cyanopyridines in 78-98% from malononitrile, aromatic aldehydes, methyl ketones, and ammonium acetate under solvent-free conditions. NMS is a nature-based recyclable and reusable catalyst.

Keywords: Nicotine, Protic ionic liquid, Methansulfonate, Aminocyanopyridine.

1. Introduction

Multicomponent reactions (MCRs) are key tools to access to complex molecules that used for multi-disciplinary scientific purposes [1-5]. Amino-cyano pyridines (AmCyPs), with a variety of biological activities in addition to their reaction intermediate potential for synthesis of other important materials, are among the functionalized molecules prepared by MCRs [6-8]. Four-component reaction of acetophenone or 1,3-dicarbonyls with aldehydes, malononitrile, and ammonium acetate using various catalysts is the most developed route to synthesis of AmCyPs [9].