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Efficient synthesis of sec-butanol from sec-butyl acetate under mild conditions with the basic ionic liquid catalysts

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Abstract

Three kinds of imidazolide basic ionic liquids were prepared and employed as efficient catalysts for the synthesis of sec-butanol from the transesterification of sec-butyl acetate and methanol. The effect of anions and cations of basic ionic liquids on the catalytic activity were explored, and the relationship between their catalytic activities and basicities was established. Among various of basic ionic liquids, 1-butyl-3-methyl-imidazolium imidazolide ([Bmim]Im) performed better and was chosen for the further studying the influence of experimental conditions. The conversion of sec-butyl acetate reached 90.4% at 60 °C for 60 min under ambient pressure. In addition, the catalyst [Bmim]Im was repeatedly used for five times without noticeable drop in activity and obvious change in chemical structure. The reaction mechanism of the transesterification catalysed by [Bmim]Im was also proposed.

Keywords: basic ionic liquid; sec-butyl acetate; transesterification; sec-butanol, reaction mechanism

1. Introduction

Sec-butanol is an important chemical material with a mint smell, which is mainly used in the