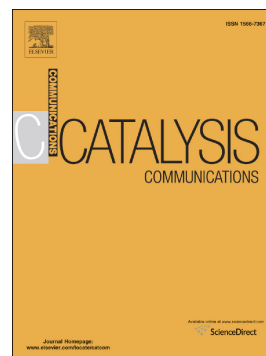


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Iridium catalysed highly efficient transfer hydrogenation reduction of aldehydes and ketones in water

Zhiheng Yang, Weiyan Cheng, and Zeyun Li*

Department of Pharmacy, The First Affiliated Hospital, Zhengzhou University, Zhengzhou 450052,
P. R. China

E-mail: zeyunli@zzu.edu.cn ; Fax: +86 371 66913047

Abstract:

We provide a new transfer hydrogenation of structurally diverse aldehydes and ketones in water using formic acid as hydride donor. The iridium complex of 4,4',5,5'-tetrahydro-1*H*,1'*H*-2,2'-biimidazole, is used as the efficient catalyst. The *S/C* ratios in aldehyde and ketone reductions are as low as 20 000 and 10 000, respectively. The TOF value in aldehyde reduction is as high as 60 000 h⁻¹. A number of functional groups such as (hetero)aryl, alkenyl, halogen, phenolic and alcoholic hydroxyls, trifluoromethyl, cyano, nitro, ester, carboxylic acid, and acidic methylenes are well tolerated.

Keywords:

Iridium catalysis, Transfer hydrogenation, High efficiency, Carbonyl, Water.

1. Introduction

Reduction of aldehydes and ketones to alcohols constitutes a very important method in organic synthesis, industrial manufacture and pharmaceutical development. Our recent studies have disclosed the presence of alcoholic hydroxyls in potent HIV-1 protease inhibitors.[1, 2] Although a large number of methods have been developed to realize the reduction of carbonyl groups, the transfer hydrogenation (TH) outstands as a preferred one.[3-7] TH can be performed in either organic solvents or water.[8-12] Due to the increasing concerns on the environmental and ecological issues, TH in water has received much attention.[13-15] In this aspect, formate salts and formic acid have emerged as promising traceless hydride donors.[8-12] The by-products are only bicarbonate salts or carbon dioxide that can be easily removed. However, the TH had long been

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