Digest Paper

Chiral Benzimidazoles as Hydrogen Bonding Organocatalysts

Carmen Nájera, Miguel Yus

PII: S0040-4039(15)00569-9
DOI: http://dx.doi.org/10.1016/j.tetlet.2015.03.099
Reference: TETL 46102

To appear in: *Tetrahedron Letters*

Received Date: 2 February 2015
Revised Date: 16 March 2015
Accepted Date: 18 March 2015

Please cite this article as: Nájera, C., Yus, M., Chiral Benzimidazoles as Hydrogen Bonding Organocatalysts, *Tetrahedron Letters* (2015), doi: http://dx.doi.org/10.1016/j.tetlet.2015.03.099

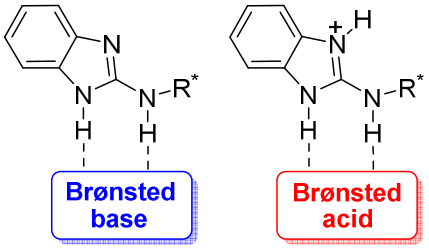
Chiral Benzimidazoles as Hydrogen Bonding Organocatalysts

Carmen Nájera,[*a] Miguel Yus[a]

[a] *Departamento de Química Orgánica, Facultad de Ciencias, and Centro de Innovación en Química Avanzada (ORFEO-CINQA), Universidad de Alicante, Apdo. 99, 03080-Alicante, Spain.*

cnajera@ua.es

Table of Contents/Abstract Graphic



Abstract

Several bifunctional organocatalysts bearing the 2-aminobenzimidazole unit have been designed in order to act as bifunctional systems by hydrogen bonding. Chiral 2-aminobenzimidazoles are conformational rigid guanidines able to catalyze enantioselectively Michael reaction, direct S_N1 of alcohols and aldol reactions. Some of these organocatalysts can be easily recovered by simple isolation methods and reused without loss of catalytic activity. Related (2-aminoalkyl)benzimidazoles have been used as chiral organocatalysts in aldol and amination reactions of carbonyl compounds.

1. Introduction

Benzimidazole, firstly described by Hobrecker in 1872, is an important heterocyclic motif[1] present in many natural products,[2] in material science fuel cells,[3] in ionic liquids,[4] and in pharmaceutical industry,[5] as for instance in the proton pump inhibitor esomeprazole **1**, which also is an antiulcer and antiviral drug (Figure 1). Molecules containing the benzimidazole unit are important in medicinal chemistry due to antiarrythmic, antihistamine, anticancer, fungicidal, antihelmintical, and ionotropic activities, and in many biological processes.[6] Recently, chiral benzimidazole derivatives have enmerged as valuable structures in asymmetric catalysis either as metal ligands or as organocatalysts. The main features of benzimidazole are the basic character (pK_a = 5.4),[6] high stability, facile synthesis of derivatives,[1] and its capability to form hydrogen bonding. In 2005, Göbel's group discovered that 2-aminobenzimidazoles were good