Title: Chiral organobases: Properties and applications in asymmetric catalysis

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PII: S1001-8417(18)30229-8
DOI: https://doi.org/10.1016/j.cclet.2018.05.041
Reference: CCLET 4573

To appear in: *Chinese Chemical Letters*

Please cite this article as: Cao W, Liu X, Feng X, Chiral organobases: Properties and applications in asymmetric catalysis, *Chinese Chemical Letters* (2018), https://doi.org/10.1016/j.cclet.2018.05.041

Review

Chiral organobases: Properties and applications in asymmetric catalysis

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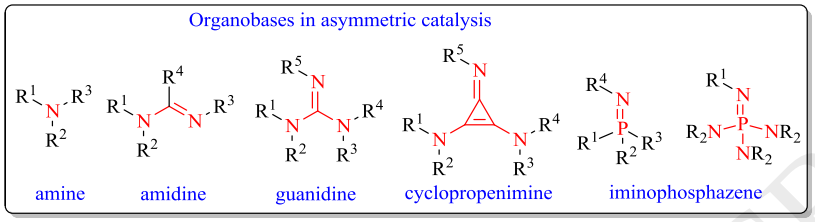
Graphical Abstract



Chiral organobases are efficient catalysts used in asymmetric reactions. This review provided a summary of chiral organobases in the aspects of their properties and applications.

ARTICLE INFO

Article history:
Received 10 April 2018
Received in revised form 18 May 2018
Accepted 23 May 2018
Available online

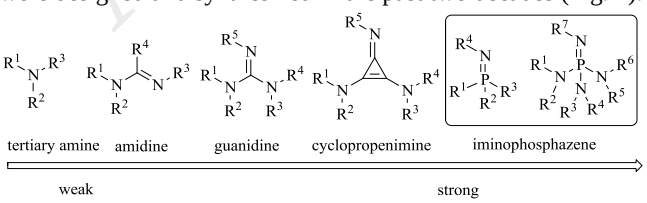
Keywords:
Chiral organobases
Asymmetric organocatalysis
Amines
Amidines
Guanidines
Cyclopropenimines
Iminophosphoranes

ABSTRACT

Chiral organobases occupy a significant position in asymmetric organocatalysis. The general types of chiral organobases include tertiary amines, amidines, guanidines, cyclopropenimines, and iminophosphoranes, *etc.* These organobases are demonstrated to be effective organocatalysts to promote divers kinds of base-initiated reactions in excellent yields and stereoselectivities. In previous reports, several groups have summarized each kind of chiral organobases in different reviews. To the aim of understanding the whole of them in one review, herein, we provide a brief introduction of these chiral organobases in asymmetric catalysis.

1. Introduction

In the field of asymmetric catalysis, organocatalysis together with metal catalysis and enzymatic transformations are the three general categories to the catalytic production of stereochemical diversity. Among the different types of organocatalysts, chiral organobases [1-3], mainly nitrogen-containing compounds have been selected as efficient catalysts for carbon-carbon and carbon-heteroatom forming reactions in a highly stereoselective fashion. Indeed, Bredig and Fiske have reported the use of cinchona alkaloid as the chiral organobase to accelerate enantioselective cyanohydrin synthesis early in 1912 [4]. However, chiral organobase catalysis did not have a wide application until much growing attention to organocatalysis nearly three decades ago. In this case, common chiral tertiary amines with weak basicity, for example, the use of cinchona alkaloid derivatives [5-6] was surging. To match the variable basicity of catalysts for diverse organic reactions, chiral organosuperbases including guanidines [7-11], cyclopropenimines [12] and iminophosphazenes [13] were designed and synthesized in the past two decades (Fig. 1).



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