

The Catalytic Asymmetric Fischer Indolization

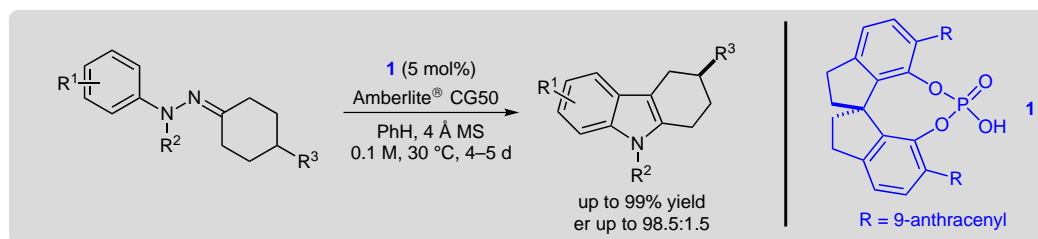
Category

Organo- and Biocatalysis

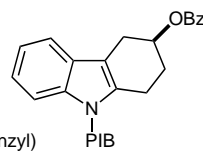
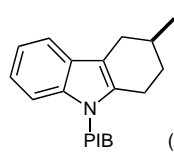
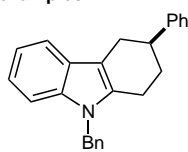
Key words

Fischer indolization
ion exchange resins
spirocyclic phosphoric acids

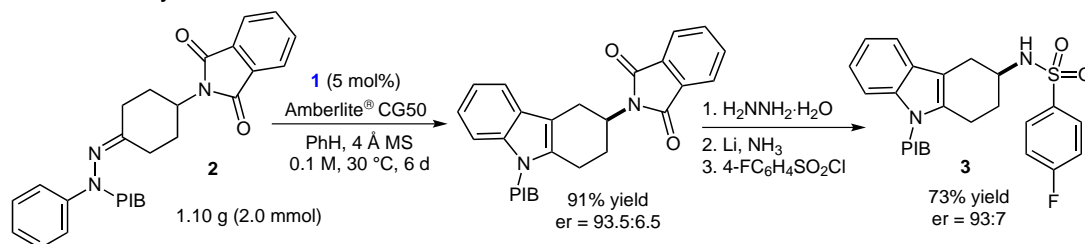
SYNFACT
of the month



Selected examples:



Formal synthesis of ramatroban:



Significance: The List group presents the first catalytic asymmetric Fischer indolization using newly developed spirocyclic phosphoric acid catalyst **1**. The authors achieved an efficient catalyst turnover by the addition of a weakly acidic cation exchange resin, which removes the generated ammonia. To show the synthetic utility of this reaction, the authors carried out a formal synthesis of the thromboxane receptor antagonist ramatroban starting from 2.0 mmol scale of **2**, and the desired intermediate **3** was obtained without loss of enantioselectivity.

Comment: The Fischer indolization, first reported over 120 years ago, remains one of the most important reactions in organic synthesis. However, a catalytic asymmetric version of this reaction was elusive. Possibly one of the main reasons for this is the formation of ammonia, which poisons Brønsted acid catalysts during the reaction. Key to the success of described reaction has been the addition of an acidic ion exchange resin, which does not catalyze the reaction but efficiently removes ammonia. The new methodology provides a scalable and efficient asymmetric Fischer indolization process under mild reaction conditions.