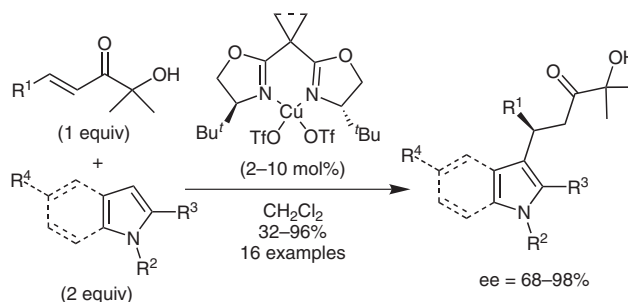


C. PALOMO,\* M. OIARBIDE, B. G. KARDAK, J. M. GARCIA, A. LINDEN (UNIVERSIDAD DEL PAÍS VASCO, SAN SEBASTIÁN, SPAIN)

Highly Enantioselective Friedel–Crafts Alkylations of Pyrroles and Indoles with  $\alpha'$ -Hydroxy Enones under Cu(II)-Simple Bis(oxazoline) Catalysis

*J. Am. Chem. Soc.* **2005**, *127*, 4154–4155.

## Enantioselective Friedel–Crafts Alkylations of Pyrroles and Indoles via $\alpha'$ -Hydroxyenones



**Significance:** The Friedel–Crafts reaction is of great value in organic synthesis. In terms of metal-catalyzed Friedel–Crafts alkylations, there are few examples demonstrating high enantioselectivity. In many of the reported cases, strongly coordinating bidentate Michael acceptors are required for good enantiocontrol. Presented herein, non-enolizable  $\alpha'$ -hydroxyenones represent the above characteristics and, in the presence of easily accessible *tert*-butyl-bis(oxazoline) Cu(II) complexes and electron-rich heteroaromatics, provide highly enantioenriched Friedel–Crafts alkylation products. This method is efficient with both pyrrole and indole as nucleophile, and with alkyl or aryl  $\beta$ -substituents.

**Comment:** The Cu(II)-*t*-BOX-enone complex makes the enone *S*' face accessible for nucleophilic attack. Although numerous alkyl and aryl  $\beta$ -substituents were tested, it is noted that aryl  $\beta$ -substituents resulted in a marked reduction in ee. Electron-donating substituents on the benzenoid ring of indole had no adverse effects, although electron-withdrawing substituents were not evaluated. Finally, the products of these reactions were elaborated into various examples of pyrrole- and indole-substituted aldehydes, ketones, and carboxylic acids.

**SYNFACTS Contributors:** Mark Lautens, Andrew Martins

Synfacts 2005, 0, 0036-0036

DOI: 10.1055/s-2005-869945; Reg-No.: L01305SF

2005 © THIEME STUTTGART • NEW YORK