Category

Organo- and Biocatalysis

Key words

anhydrides

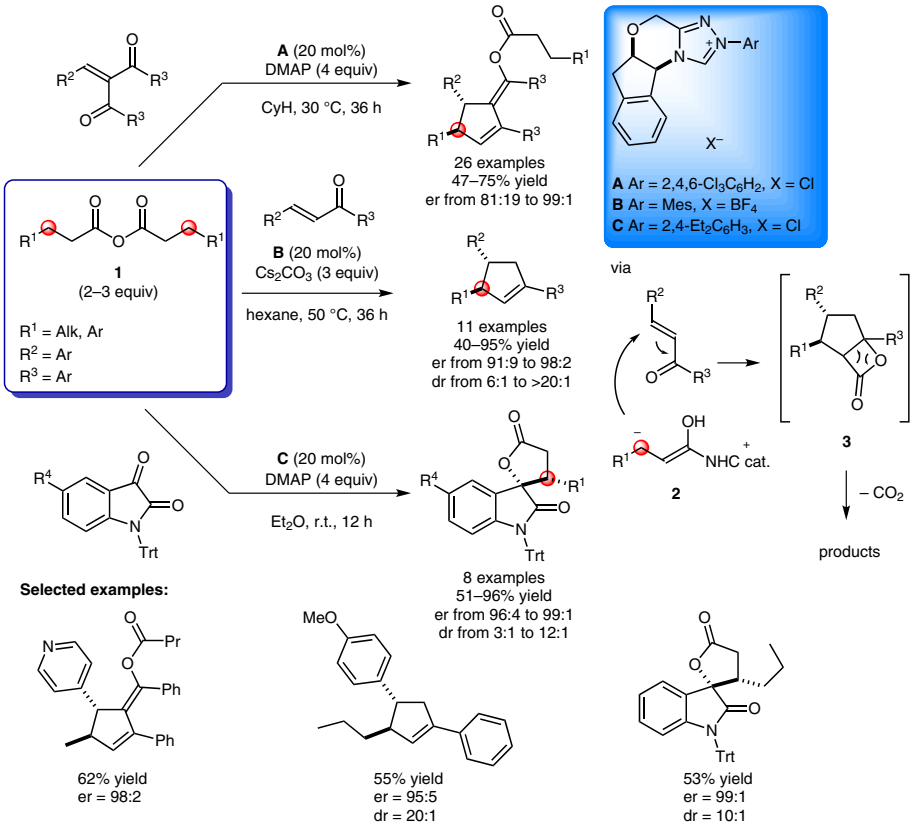
N-heterocyclic carbenes

β-functionalization

Z. JIN, S. CHEN, Y. WANG, P. ZHENG, S. YANG,* Y. R. CHI* (NANYANG TECHNOLOGICAL UNIVERSITY, SINGAPORE, SINGAPORE AND GUIZHOU UNIVERSITY, GUIYANG, P. R. OF CHINA)

β-Functionalization of Carboxylic Anhydrides with β-Alkyl Substituents through Carbene Organocatalysis
Angew. Chem. Int. Ed. **2014**, *53*, 13506–13509.

β-Functionalization of Carboxylic Anhydrides with N-Heterocyclic Carbenes



Significance: Chi, Yang, and co-workers report the asymmetric β-functionalization of symmetrical aliphatic anhydrides **1**. Nucleophilic attack of the N-heterocyclic carbene catalyst to the anhydride generates the NHC-bound ester intermediate, which upon deprotonation forms nucleophile **2**. This adds to various electrophiles, such as alkylidene diketones, chalcones, and isatins, in a highly selective manner. Decarboxylation of the β-lactone intermediates **3** yields the final products. For almost all substrates tested, consistently very high enantioselectivities accompanied with good diastereoselectivities were achieved.

Comment: In continuation of the work by the Chi group on the activation of esters with NHC catalysts for the functionalization of the β-position (*Nature Chem.* **2013**, *5*, 835), overcoming the limitation of β-aryl substrates is the main objective of the current work. Under the previous reaction conditions, only low yields (8–40%) were obtained. The presented solution for these challenging substrates utilizes anhydride substrates instead, affording the desired products in moderate to very good yields under the optimized conditions.

SYNFACTS Contributors: Benjamin List, Tim Gatzenmeier
Synfacts 2015, 11(1), 0096 Published online: 15.12.2014
DOI: 10.1055/s-0034-1379626; **Reg-No.:** B13014SF

2015 © THIEME STUTTGART • NEW YORK

This document was downloaded for personal use only. Unauthorized distribution is strictly prohibited.