

Palladium-Catalyzed Selective Generation of CO from Formic Acid for Carbonylation of Alkenes

Rui Sang,[†] Peter Kucmierczyk,^{†‡} Kaiwu Dong,[†] Robert Franke,^{‡§} Helfried Neumann,[†] Ralf Jackstell,[†] and Matthias Beller^{*,†}

[†]Leibniz-Institut für Katalyse e.V. an der Universität Rostock, Albert-Einstein-Str. 29a, Rostock, 18059, Germany

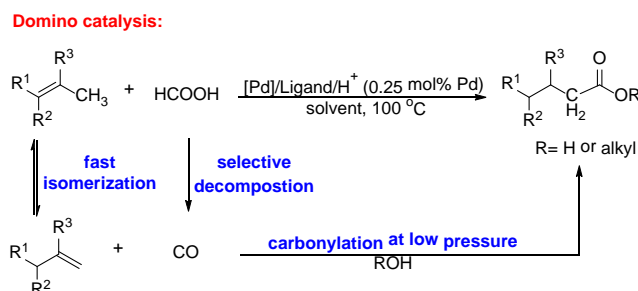
[‡]Lehrstuhl für Theoretische Chemie, Ruhr-Universität Bochum, 44780 Bochum, Germany

[§]Evonik Performance Materials GmbH, Paul-Baumann-Str. 1, 45772 Marl, Germany

Rui.Sang@catalysis.de

Abstract

A general and selective palladium-catalyzed alkoxy-carbonylation of all kinds of alkenes with formic acid (HCOOH) is described. Terminal, di-, tri- and tetra-substituted including functionalized olefins are converted into linear esters with high yields and regioselectivity. Key-to-success is the use of specific palladium catalysts containing ligands with built-in base. Comparison experiments demonstrate that the active catalyst system not only facilitates isomerization and carbonylation of alkenes, but also promotes the selective decomposition of HCOOH to CO under mild conditions.



References

1. R. Sang, P. Kucmierczyk, K. Dong, R. Franke, H. Neumann, R. Jackstell, M. Beller *J. Am. Chem. Soc.* **2018**, *140*, 5217–5223.