Category

Polymer-Supported Synthesis

Key words

nanoporous gold

reduction

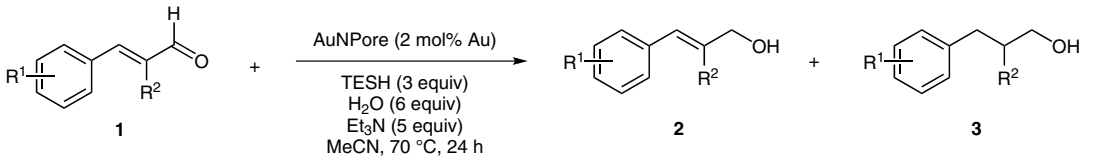
α,β-unsaturated aldehydes

alcohols

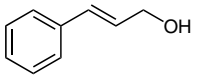
B. S. TAKALE, S. WANG, X. ZHANG, X. FENG, X. YU, T. JIN, M. BAO,* Y. YAMAMOTO*
(DALIAN UNIVERSITY OF TECHNOLOGY, P. R. OF CHINA AND TOHOKU UNIVERSITY, SENDAI, JAPAN)

Chemoselective Reduction of α,β-Unsaturated Aldehydes Using An Unsupported Nanoporous Gold Catalyst
Chem. Commun. **2014**, *50*, 14401–14404.

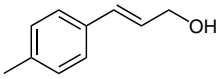
Chemoselective Reduction of α,β-Unsaturated Aldehydes with AuNPore



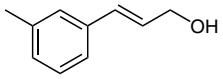
Results:



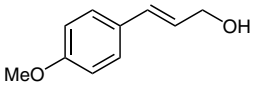
73% yield, **2**/**3** > 99:1



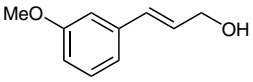
70% yield, **2**/**3** = 100:0



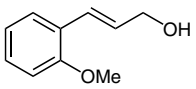
71% yield, **2**/**3** = 89:11



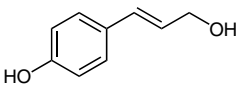
78% yield, **2**/**3** = 91:9



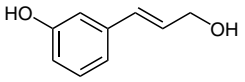
70% yield, **2**/**3** = 91:9



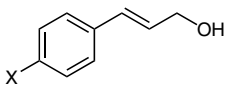
70% yield, **2**/**3** = 82:18



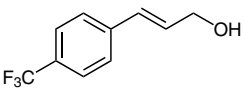
75% yield, **2**/**3** = 100:0



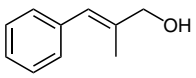
70% yield, **2**/**3** > 99:1



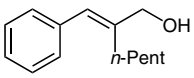
X = Br, 45% yield, **2**/**3** = 100:0
X = F, 42% yield, **2**/**3** = 100:0



46% yield, **2**/**3** > 99:1



69% yield, **2**/**3** > 99:1



62% yield, **2**/**3** = 97:3

Significance: Nanoporous gold (AuNPore) catalyzed the 1,2-reduction of α,β-unsaturated aldehydes **1** with triethylsilane. The reduction was carried out in the presence of water and triethylamine to give the corresponding allyl alcohols **2** in 42–78% yield with 82:18 to 100:0 (**2**/**3**) chemoselectivity.

Comment: Previously, the authors reported the AuNPore-catalyzed chemoselective reduction of imines with dimethylphenylsilane (*Org. Lett.* **2014**, *16*, 2558). In the reduction of cinnamyl aldehyde, the catalytic activity of AuNPore was superior to that of $Au_{30}Ag_{70}$ alloy, homogeneous $AuCl(Ph_3P)/Bu_3P$, and AuCl/IPr·HCl. ICP-MS analysis showed that no gold content was leached from the catalyst during the reaction.

SYNFACTS Contributors: Yasuhiro Uozumi, Fumie Sakurai
Synfacts 2015, 11(1), 0098 Published online: 15.12.2014
DOI: 10.1055/s-0034-1379712; **Reg-No.:** Y14214SF