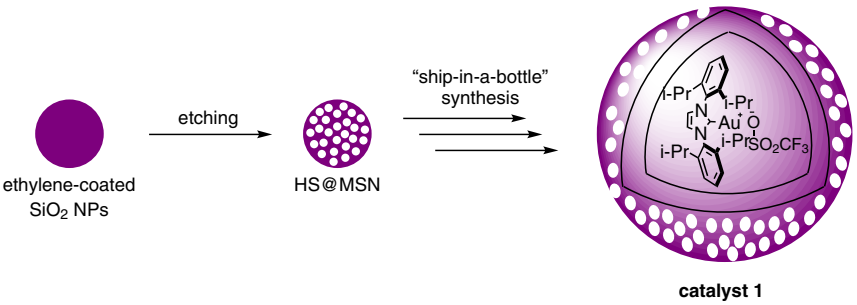
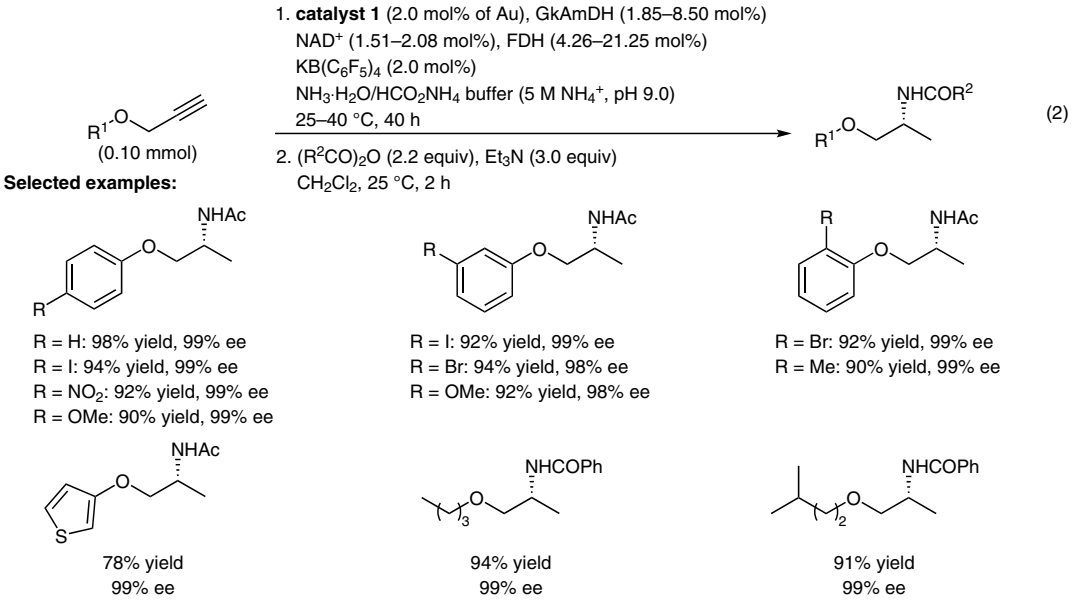
F. CHANG, C. WANG, Q. CHEN, Y. ZHANG, G. LIU* (SHANGHAI NORMAL UNIVERSITY, P. R. OF CHINA)

A Chemoenzymatic Cascade Combining a Hydration Catalyst with an Amine Dehydrogenase: Synthesis of Chiral Amines
Angew. Chem. Int. Ed. **2022**, *61*, e202114809 DOI: 10.1002/anie.202114809.

Catalytic Hydration/Enantioselective Reductive Amination Cascade Reaction of Propargyl Ethers



(1)



(2)

Significance: An Au/carbene complex was encapsulated within the cavities of hollow-shell mesoporous silica nanoparticles to form **catalyst 1** (eq. 1). By using a combination of **catalyst 1** and the amine dehydrogenase *Gk*AmDH, a hydration/enantioselective reductive amination cascade reaction of propargyl ethers was promoted in the presence of nicotinamide adenine dinucleotide (NAD^+) and formate dehydrogenase (FDH) to give the corresponding chiral amines in ≤98% yield and 99% ee (eq. 2).

Comment: **Catalyst 1** promoted the hydration of phenyl propargyl ether to give phenoxyacetone. *Gk*AmDH then catalyzed the enantioselective reductive amination of phenoxyacetone. The cascade reaction using the homogeneous Au/carbene complex IPrAuOTf with *Gk*AmDH did not give the desired amines, due to deactivation of *Gk*AmDH. The hollow-shell silica of **catalyst 1** prevents interaction with the Au/carbene complex so that *Gk*AmDH retains its catalytic properties to complete the chemoenzymatic cascade.

SYNFACTS Contributors: Yasuhiro Uozumi, Teruki Takahashi
Synfacts 2022, 18(05), 0529 Published online: 20.04.2022
DOI: 10.1055/s-0041-1737423; **Reg-No.:** Y03122SF

© 2022. Thieme. All rights reserved.
Georg Thieme Verlag KG, Rüdigerstraße 14, 70469 Stuttgart, Germany

Category
Polymer-Supported Synthesis

Key words
asymmetric catalysis
hydration
reductive amination
amine dehydrogenase
propargyl ethers

Synfact of the Month

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