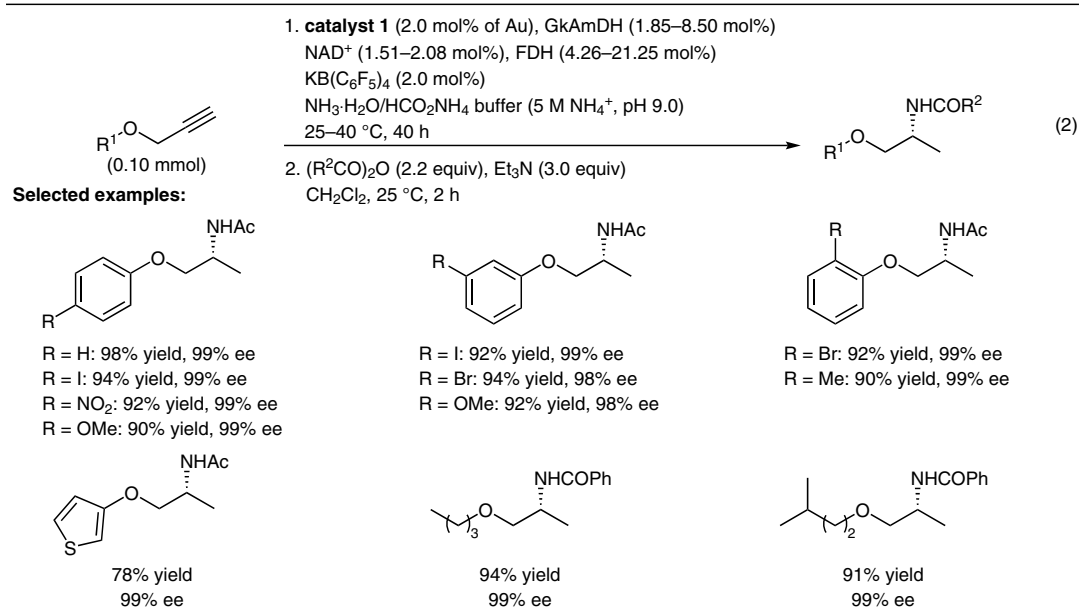
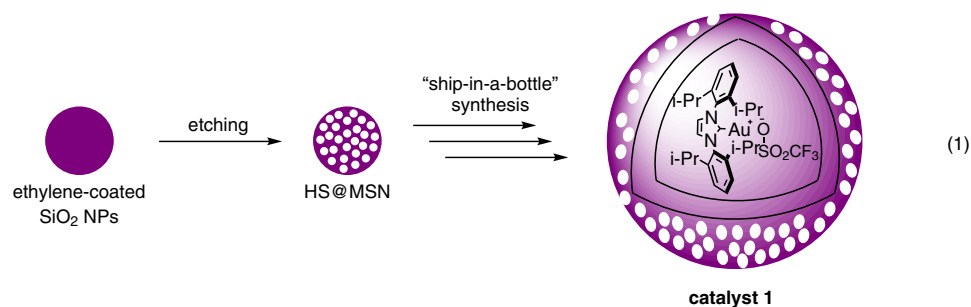


Catalytic Hydration/Enantioselective Reductive Amination Cascade Reaction of Propargyl Ethers



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 *GkAmDH*, 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 $\leq 98\%$ yield and 99% ee (eq. 2).

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