

# Selective Hydrogenation of Aldehydes and Ketones under Syngas Using Au NPs Supported on CeO<sub>2</sub>

Category

Polymer-Supported Synthesis

Key words

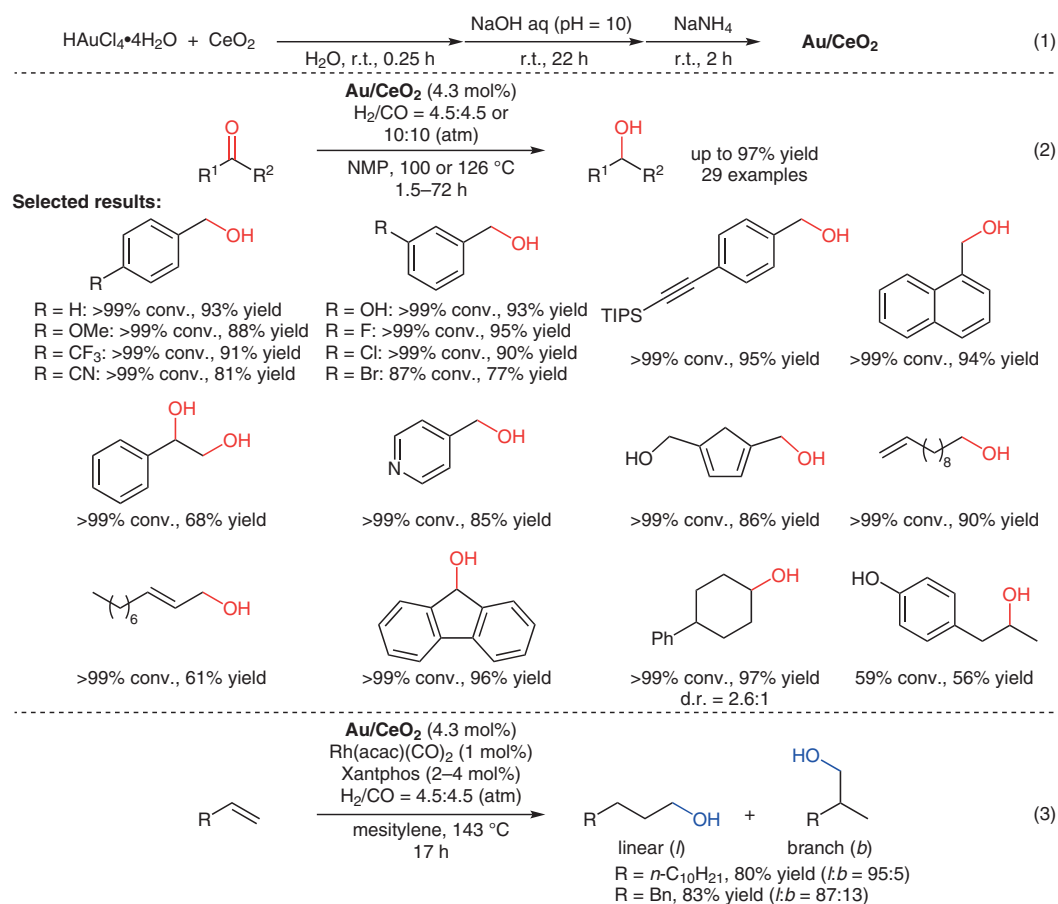
gold catalysis

selective hydrogenation

syngas

aldehydes

ketones



**Significance:** Gold nanoparticles supported on ceria (Au/CeO<sub>2</sub>), prepared according to equation 1, catalyzed the selective hydrogenation of aldehydes and ketones bearing various reducible substituents, such as alkyne, alkene, nitrile, and halogen groups under H<sub>2</sub>/CO atmosphere to afford the corresponding alcohols in up to >99% conversion with 97% selectivity (eq. 2). Au/CeO<sub>2</sub> also promoted the one-pot hydroformylation/hydrogenation of terminal alkenes in the presence of Rh(acac)(CO)<sub>2</sub> and Xantphos to afford the corresponding alcohols (eq. 3).

**Comment:** In the hydrogenation of 10-undecenal, the catalyst was recovered by filtration, treated with 1 atm of H<sub>2</sub> at 150 °C, and reused three times without significant loss of its catalytic activity. Mechanistic studies suggested that CO is adsorbed onto the Au NPs and acts as a site blocker to suppress the hydrogenation or isomerization of the alkene substituent.