Key words

syngas

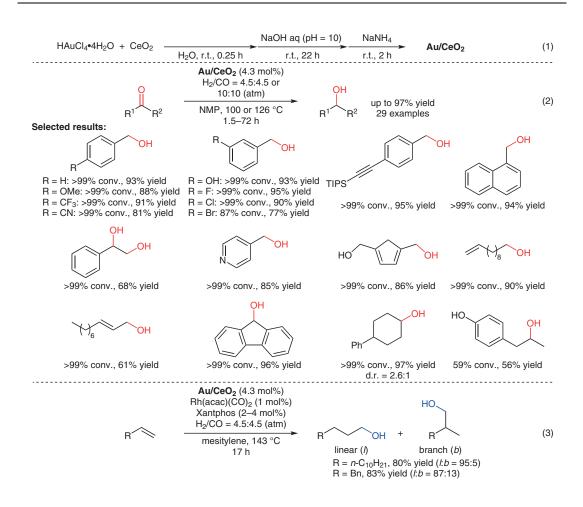
aldehydes

ketones

gold catalysis selective hydrogenation

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



**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  $H_2/CO$  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 Xant-phos 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.

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