

Efficient and Chemoselective Reduction of Carbonyl Compounds with Supported Gold Catalysts under Transfer Hydrogenation Conditions

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Electronic Supplementary Information

1. Catalytic materials: Gold catalysts including 1.5wt%Au/TiO₂ (Type A, Lot no. Au/TiO₂ #02-1), 4.5wt%Au/Fe₂O₃ (Type C, Lot no. Au/Fe₂O₃ #02-5) and 0.8wt%Au/C (Type D, Lot no. Au/C #38D), all supplied by the World Gold Council (WGC).

2. Catalytic Transfer hydrogenation of carbonyl compounds

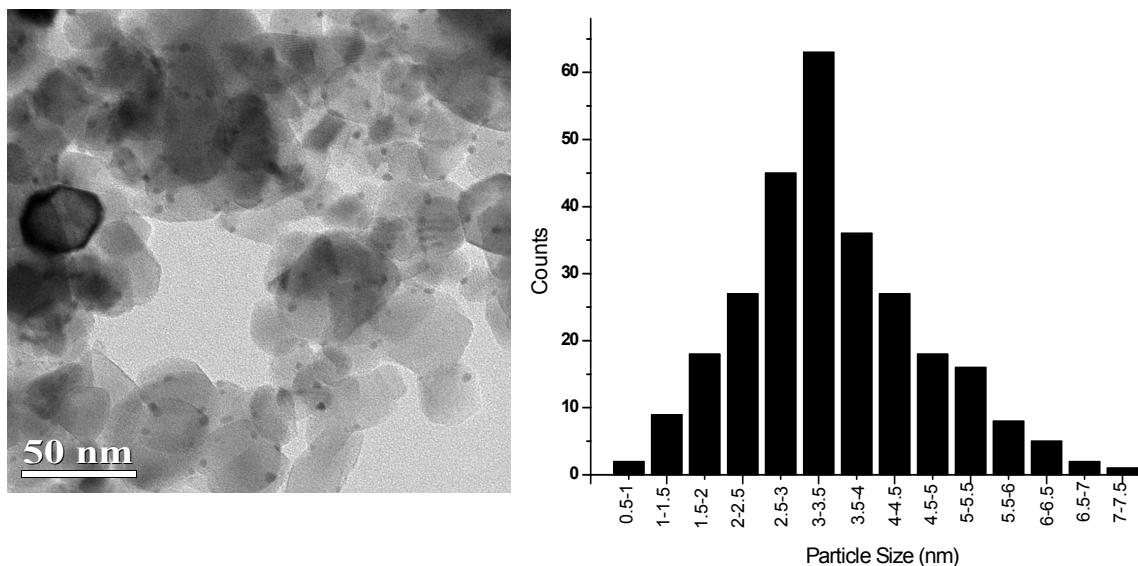
A typical procedure for transfer hydrogenation of ketones: substrate (1 mmol), Au/TiO₂ catalyst (0.78 mol% metal), KOH (0.3 equiv) and 2-propanol (10 ml) were mixed and the solution was heated to reflux under N₂. The products were analyzed by gas chromatography (Trace GC Ultra) fitted with a HP-5 capillary column (25 m × 0.32 mm) and flame ionization detector (FID), using o-xylene as the internal standard. The identification of the products was done in a GC-MS spectrometer comparing with commercially pure products.

Recovery and reuse of Au/TiO₂: the catalyst was collected after filtration washed with acetone and heated at 120 °C for 12 h. Then the catalyst was used for next reaction.

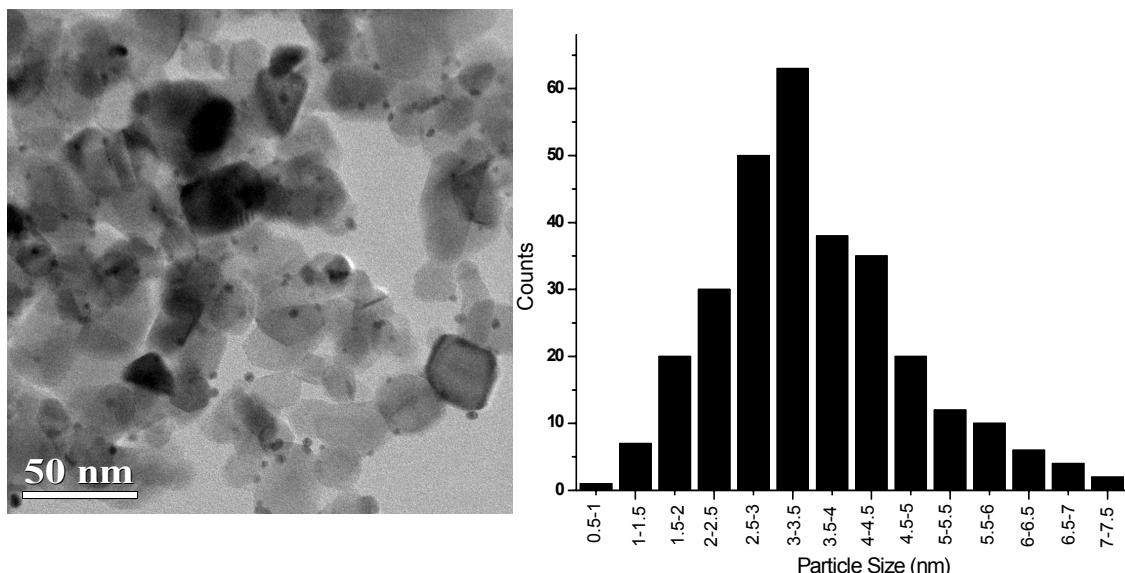
Transfer hydrogenation of aldehydes over Au/TiO₂: substrate (1 mmol), Au/TiO₂ (0.78 mol% metal), K₂CO₃ (0.3 equiv) and 2-propanol (10 ml) were put into a stirred autoclave reactor (Dalian Tongchan Co. Ltd., Capacity: 50 ml) under N₂ atmosphere at 120 °C.

3. TEM images of Au catalysts.

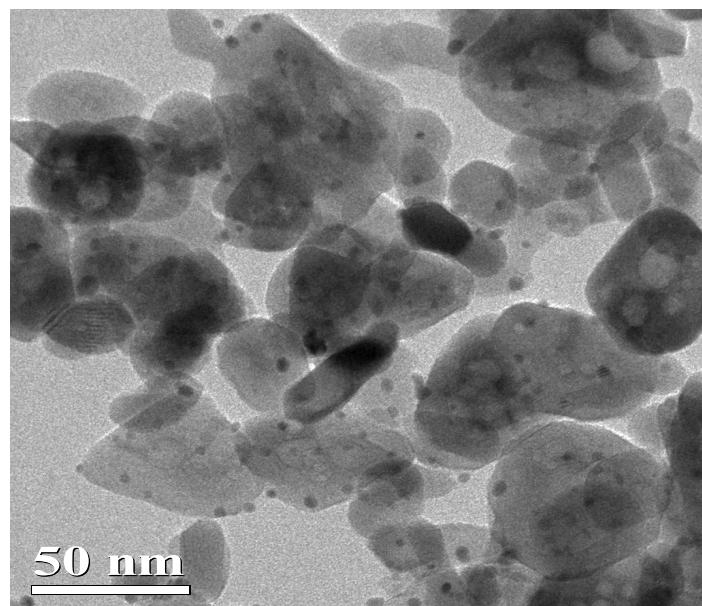
3.1 TEM image and size distribution of Au/TiO₂ before reaction.



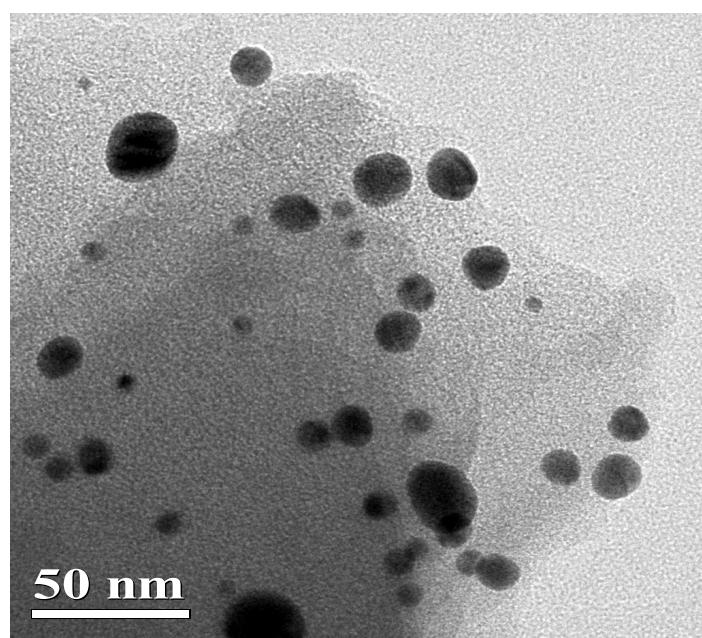
3.2 TEM image and size distribution of Au/TiO₂ after reaction.



3.3 TEM images of Au/Fe₂O₃ and Au/C



Au/Fe₂O₃



Au/C