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Enhancement of catalytic activity of Au/TiO₂ by thermal and plasma treatment for CO oxidation and preferential oxidation**Asif Mahmood and Waheed A Al Masry**
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A significant enhancement in the catalytic activity of Au/TiO₂ in CO oxidation and preferential oxidation reaction by creating the active sites on the catalyst surface by thermal treatment as well as by producing small gold particles by plasma treatment has been studied. Au/TiO₂ catalyst (Au (1 wt.%) supported on TiO₂) was prepared by conventional deposition-precipitation method with NaOH (DP NaOH) followed by washing, drying and calcination in air at 400°C for 4h. Thermal treatment of Au/TiO₂ was carried out at 450°C under 0.05 mTorr. A small amount of Au/TiO₂ catalyst was taken from the untreated and thermally treated Au/TiO₂ and both kinds of catalysts were treated with plasma sputtering at room temperature. The activity of the catalysts has been examined in the reaction of CO oxidation and preferential oxidation (PROX) at 25-250°C. Thermally treated Au/TiO₂ showed better catalytic activity as compared to the untreated catalyst. There is also an additional enhancement in the catalytic activity due to plasma sputtering on the both kinds of catalysts. Thermally treated Au/TiO₂ followed by plasma sputtering Au/TiO₂ showed higher conversion rates for CO oxidation reaction compared with untreated, thermally treated and plasma sputtered Au/TiO₂ catalysts. It may be concluded that the enhancement of catalytic activity of thermally treated Au/TiO₂ followed by plasma sputtering owing to the generation of active sites such as oxygen vacancies/defects in TiO₂ support using thermal treatment as well as by producing small gold particles using plasma treatment.

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