

The promotion effect of metal oxide on CO oxidation over Au/TiO₂ with the photo-electro-catalytic system

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Catalytic CO oxidation has recently drawn considerable attention due to the growing application in air purification, pollution control in automobiles of reformat gases and preferential oxidation of carbon monoxide in fuel cells(PEMFC). With the knowledge that supported Au catalyst has high activity in low-temperature CO oxidation, our new studies were focused on the activity of support Au on TiO₂ in addition of various transition metal oxide. The oxidation of CO on Au/MO_x/TiO₂ (M=Mn, Fe) has been carried out both in a constant pressure and a closed system with photo electro catalytic system. Photo electro catalytic system was composed of UV-LED, photocatalyst coating mesh and electron emitting instrument for excited ion. In the photo electro catalytic system, the retarded recombination of electron-hole pairs could be improved the activity. Apparently, Au/MO_x/TiO₂ provides lower apparent activation energy than that for Au/TiO₂, which may be the reason for promoting effect of MO_x on Au in the oxidation of CO. The Ea values on temperature dependence is highly significant. in the presence of UV irradiation, the CO Oxidation was highly affected. The removal of CO was enhanced for maximum 10% under UV irradiation.