CHAPTER V
CONCLUSIONS

From the experimental reports here presented manifestly that irradiation time, precipitant concentration, calcination, and storage conditions were factors behind the catalytic activities of Au/ZnO prepared by photodeposition as follows:

(i) The increasing of irradiation time, the higher of catalytic activities were obtained because of the different morphology of ZnO prepared by using 0.1 M Na_2CO_3 in both of support preparation and Au loading (the uncalcined Au(0.1)/ZnO(0.1)). However, in the detailed study in this section the highest irradiation time sample was not performed very good activities.

(ii) According to the small Au particle, the hundred-percent CO conversion was obtained by low-precipitant concentration in which the lower concentration the smaller Au particle. In this work reported that the uncalcined Au(0.05)/ZnO(0.05)-240 can promisingly remove CO; especially so at low temperature. Although, making a comparison with other conditions the Au particle has not strongly different sizes, suggesting that precipitant concentration might be influent on morphology of ZnO supports leading to the different in catalytic activities.

(iii) Calcination under air in the temperature of 300°C extremely showed positive effect on the uncalcined Au(0.1)/ZnO(0.1). The specific surface area of the calcined Au(0.1)/ZnO(0.1) is higher than uncalcined sample due to the smaller Au particle size of calcined catalysts and the increasing of reducibility of ZnO. Furthermore, prepared catalysts with low precipitant concentration in previous study have been investigated, it was clearly seen that they still showed high catalytic activities because of strong interaction between Au_xO_y and ZnO.

(iv) The uncalcined Au(0.05)/ZnO(0.05)-240 was investigates the catalytic activities after storing in different conditions—the exposed and unexposed to light catalysts for 3 months—it was shown evidently that exposed catalysts slightly decrease, whereas the reduction of Au_xO_y decreased apparently, indicating that both of Au zero and oxidized species were necessary but the Au cationic form was the significant population for removing CO in H_2 stream in agreement with calcination effect study, and the Au particle not much changed.

Uncalcined Au(0.05)/ZnO(0.05)-240 catalysts was tested the stability for 100 hours which it performed a long-life time with a hundred-percent CO conversion even at 100^{th} hour.