REFERENCES

Bethke, G.K. and Kung, H.H. (2000) Selective CO oxidation in a hydrogen-rich stream over Au/γ-Al_2O_3 catalysts. Applied Catalysis A: General, 194-195, 43-53.

Bond, G.C. and Thompson, D.T. (1999) Catalysis by gold. Catalysis Reviews, 41(3&4), 319-388.

Cameron, D., Holliday, R., and Thompson, D. (2003) Gold's future role in fuel cell systems. Journal of Power Sources, 118, 298-303.

Chang, C.K., Chen, Y.J., and Yeh, C.T. (1998) Charaterizations of alumina-supported gold with temperature-programmed reduction. Applied Catalysis A: General, 174, 13-23.

Dimitratos, N., Villa, a., Wang, D., Porta, F., Su, D., and Prati, L. (2006) Pd and Pt catalysts modified by alloying with Au in the selective oxidation of alcohols. Journal of Catalysis, 224,113-121.

Haruta, M. and Daté, M. (2001) Advances in the catalysis of Au nanoparticles. Applied Catalysis A: General, 222, 427-437.

Haruta, M., Yamada, N., Kobayashi, T., and Iilima, S. (1989) Gold catalysts prepared by coprecipitation for low-temperature oxidation of hydrogen and of carbon monoxide. Journal of Catalysis, 115, 301-309.

Igarashi, H., Uchida, H., Suzuki, M., Sasaki, Y., and Watanabe, M. (1997) Removal of carbon monoxide from hydrogen-rich fuels by selective oxidation over platinum catalyst supported on zeolite. Applied Catalysis A: General, 159, 159-169.

Igarashi, H., Uchida, H., and Watanabe, M. (2000) Mordenite-supported noble metal catalysts for selective oxidation of carbon monoxide in a reformed gas. Chemistry Letters, No. 11, 1262-1263.

Kotobuki, M., Watanabe, A., Uchida, H., Yamashita, H., and Watanabe, M. (2005) Reaction mechanism of preferential oxidation of carbon monoxide on Pt, Fe, and Pt-Fe/mordenite catalysts. Journal of Catalysis, 236, 262-269.

Kung, H.H., Kung, M.C., and Costello, C.K. (2003) Supported Au catalysts for low temperature CO oxidation. Journal of Catalysis, 216, 425-432.

Lin, J.N. and Wan, B.Z. (2003) Effects of preparation conditions on gold/Y-type zeolite for CO oxidation. Applied Catalysis B: Environmental, 41, 83-95.

Luengnaruemitchai, A., Osuwan, S., and Gulari, E. (2004) Selective catalytic oxidation of CO in the presence of H_2 over gold catalyst. International Journal of Hydrogen Energy, 29, 429-435.

Manasilp, A. and Gulari, E. (2002) Selective CO oxidation over Pt/alumina catalysts for fuel cell applications. Applied Catalysis B: Environmental, 37, 17-25.

Marino, F., Descorme, C., and Duprez, D. (2004) Noble metal catalysts for the preferential oxidation of carbon monoxide in the presence of hydrogen (PROX). Applied Catalysis B: Environmental, 54, 59-66.

Mattos, L.V. and Noronha, F.B. (2005) Hydrogen production for fuel cell applications by ethanol partial oxidation on Pt/CeO_2 catalysts: the effect of the reaction conditions and reaction mechanism. Journal of Catalysis, 233, 453-463.

Mohamed, M.M., Salama, T.M., and Ichikawa, M. (2000) Spectropic identification of adsorbed intermediates derived from the CO + H_2O reaction on zeolite-encapsulated gold catalysts. Journal of Colloid and Interface Science, 224, 366-371.

Monyanon, S., Pongstabodee, S., and Luengnaruemitchai, A. (2006) Catalytic activity of $Pt–Au/CeO_2$ catalyst for the preferential oxidation of CO in H_2-rich stream. Journal of Power Sources, 163, 547-554.

Naknam, P., Luengnaruemitchai, A., Wongkasemjit, S., and Osuwan,S. (2007) Preferential catalytic oxidation of carbon monoxide in presence of hydrogen over bimetallic AuPt supported on zeolite. Journal of Power Sources, 165, 351-358.

Oh, H.S., Yang, J.H., Costello, C.K., Wang, Y.M., Bare, S.R., Kung, H.H., and Kung, M.C. (2002) Selective catalytic oxidation of CO: Effect of Chloride on supported Au catalysts. Journal of Catalysis, 210, 375-386.

Oh, S.H. and Sinkevitch, R.M. (1993) Carbon monoxide removal from hydrogen-rich fuel cell feed streams by selective catalytic oxidation. Journal of Catalysis, 42, 254-262.

Okumura, M., Masuyama, N., Konishi, E., Ichikawa, S., and Akita, T. (2002) CO Oxidation below Room Temperature over Ir/TiO_2 Catalyst Prepared by Deposition Precipitation Method. Journal of Catalysis, 208, 485-489.

Qi, A., Wang, S., Fu, G., and Wu, D. (2006) Integrated fuel processor built on autothermal reforming of gasoline: A proof-of-principle study. Journal of Power Sources, 162, 1254-1264.

Rosso, I., Galletti, C., Saracco, G., Garrone, E., and Specchia, V. (2004) Development of A zeolite-supported noble-metal catalysts for CO preferential oxidation: H_2 gas purification for fuel cell. Applied Catalysis B: Environmental, 48, 195-203.

Snytnikov, P.V., Sobyanin, V.A., Belyaev, V.D., Tsyrulnikov,P.G., Shitova, N.B., and Shlyapin, D.A. (2003) Selective oxidation of carbon monoxide in excess hydrogen over Pt-, Ru- and Pd-supported catalysts. Applied Catalysis A: General, 239, 149-156.

Srinivas, S. and Gulari, E. (2006) Preferential CO oxidation in a two-stage packed-bed reactor: Optimization of oxygen split ration and evaluation of system robustness. Catalysis Communications, 7, 819-826.

Wan, B.Z., Chen, J.H., Lin, J.N, Kang, Y.M., Yu, W.Y., and Kuo, C.N. (2005) Preparation of nano-gold in zeolites for CO oxidation: Effects of structures and number of ion exchange sites of zeolites. Applied Catalysis A: General, 291, 162-169.

Wang, Y.H., Zhu, J.L., Zhang, J.C., Song, L.F., Hu, J.Y., Ong, S.L., and Ng, W.J. (2006) Selective oxidation of CO in hydrogen-rich mixture and kinetics investigation on platinum-gold supported on zinc oxide catalyst. Journal of Power Sources, 155, 440-446.

Watanabe, M., Uchida, H., Igarashi, H., and Suzuki, M. (1995) Pt catalyst supported on zeolite for selective oxidation of CO in reformed gases. Chemistry Letters, No. 1, 21-22.

Watanabe, M., Uchida, H., Ohkubo, K., and Igarashi, H. (2003) Hydrogen purification for fuel cells: selective oxidation of carbon monoxide on Pt-Fe/zeolite catalysts. Applied Catalysis B: Environmental, 46, 595-600.

Wolf, A. and Schuth, F. (2002) A systematic study of the synthesis conditions for the preparation of highly active gold catalysts. Applied Catalysis A: General, 226, 1-13.

APPENDIX

Calculations

1. Catalyst Preparation

1.1 Amount of Au:Pt Ratio

Example Prepared 2 g of 1% (1:1) Au:Pt/mordenite catalyst ;

- Amount of Au (MW = 197 g/mole) and Pt (MW = 195.1 g/mole)

  Catalyst 1 g → Metal (Au:Pt) = 2*(1/100) g

  = 0.02 g

  Ratio (1:1) ; Au = 0.02*(1/2) g

  = 0.01 g

  Pt = 0.02*(1/2) g

  = 0.01 g

- Amount of $HAuCl_4.3H_2O$ (MW= 394 g/mole)

  $HAuCl_4.3H_2O$ = 0.01*(394/197) g

  = 0.02 g

- Amount of H_2Cl_6Pt (MW = 409.81 g/mole)

  H_2Cl_6Pt = 0.01*(409.81/195.1) g

  = 0.021 g

- Amount of Mordenite zeolite

  Mordenite zeolite = 2-(0.02+0.021) g

  = 1.959 g

CURRICULUM VITAE

Name: Ms. Prang Kiatkumjai

Date of Birth: April 2, 1983

Nationality: Thai

University Education:

2001-2005 Bachelor Degree of Science in Chemical Engineering, Department of Chemical Technology, Faculty of Science, Chulalongkorn University, Bangkok, Thailand

Working Experience:

April 2004 – March 2004	Position:	Internship
	Company name:	the Siam Cement (Ta Luang) Co., Ltd.

Presentation:

1. Kiatkumjai, P., Luengnaruemitchai, A., and Wongkasemjit, S. (2006, December 3-5) Effect of Pt on Au Supported on Mordenite Catalysts for the Preferential Oxidation of CO in the Presence of H_2. Oral presented at the 13th Regional Symposium on Chemical Engineering (RSCE 2006) "Advances in Chemical and Biomolecular Engineering", Nanyang Technological University, Singapore.