



REFERENCES

- Cetinkaya, B., Cetinkaya, E., Brookhart, M., and White, P.S. (1998). Ruthenium (III) complexes with 2,6-pyridyl-diimine ligands: synthesis, characterization and catalytic activity in epoxidation reaction. Journal of Molecular Catalysis A: Chemical, 142, 101-112.
- Costa, A.A., Graceti, G.F., Macedo, J.L., Braga, V.S., Santos, M.M., and Dias, S.C.L. (2007). Immobilization of Fe, Mn and Co tetraporphyrin complexes in MCM-41 and their catalytic activity in cyclohexene oxidation reaction by hydrogen peroxide. Journal of Molecular Catalysis A: Chemical, 282, 149-157.
- Deshpande, S., Patil, S., Kuchibhatla, S.V., and Seal, S. (2005). Size dependency variation in lattice parameter and valency states in nanocrystalline cerium oxide. Applied Physics Letters, 81, 113-133.
- Farahani, M.M., Farzaneh, F., and Ghandi, M. (2002). Molybdenum incorporated silicalite as catalyst for epoxidation of olefins. Journal of Molecular Catalysis A: Chemical, 192, 103-111.
- Frail, J.M., Garcia, J.I., Mayoral, J.A., and Vispe, E. (2002). Optimization of cyclohexene epoxidation with dilute hydrogen peroxide and silica-supported titanium catalysts. Applied Catalysis A: General, 245, 363-376.
- Frail, J.M., Barcia, J.I., Mayoral, J.A., Salvatella, L., Vispe, E., Brown, D.R., and Fuller, G. (2002). Experimental and theoretical studies on structure-reactivity relationships of titanium-modified silicas in the hydrogen peroxide-promoted oxidation of cyclohexene. Journal of Physics and Chemistry, 1007, 519-526.
- Gupta, A.K., and Gupta, M. (2005). Synthesis and surface engineering of iron oxide nanoparticles for biomedical applications. Biomaterials, 26, 3995-4021.
- Hosokawa, S., Kanai, H., Utani, K., Taniguchi, Y.I., Saito, Y. and Imamura, S. (2003). State of Ru on CeO₂ and its catalytic activity in the wet oxidation of acetic acid. Applied Catalysis B: Environmental, 45, 181-187.

- Idakiev, V., Yuan, Z.Y., Tabakova, T., and Su, B.L. (2005). Titanium oxide nanotubes as supports of nanosized gold catalysts for low temperature water-gas shift reaction. Applied Catalysis A: General, 281, 149-155.
- Ingle, R.H., Vinu, A., and Halligudi, S.B. (2007). Alkene epoxidation catalyzed by vanadomolybdophosphoric acids supported on hydrated titania. Catalysis Communications, 9, 931-938.
- Jinka, K.M., Sebastian, J., and Jasra, R.V. (2007). Epoxidation of cycloalkene with cobalt(II)-exchanged zeolite X catalysts using molecular oxygen. Journal of Molecular Catalysis A: Chemical, 274, 33-41.
- Jorda, E., Tuel, A., Teissier, R., and Kervennal, J. (1997). Synthesis, characterization, and activity in the epoxidation of cyclohexene with aqueous H₂O₂ of catalysts prepared by reaction of TiF₄ with silica. Journal of Catalysis, 175, 93-107.
- Kanai, H., Ikeda, Y., and Imamura, S. (2003). Epoxidation of allyl acetate with *tert*-butyl hydroperoxide catalyzed by MoO₃/TiO₂. Applied Catalysis A: General, 247, 185-191.
- Khare, S., and Shrivastava, S. (2004). Epoxidation of cyclohexene catalyzed by transition-metal substituted α -titanium arsenate using *tert*-butyl hydroperoxide as an oxidant. Journal of Molecular Catalysis A: Chemical, 217, 51-58.
- Lambert, R.M., Williams, F.J., Cropley, R.L., and Palermo, A. (2005). Heterogeneous alkene epoxidation: past, present and future. Journal of Molecular Catalysis A: Chemical, 228, 27-23.
- Lane, B.S., Vogt, M., Derosa, V.J., and Burgess, K. (2002). Manganese-catalyzed epoxidations of alkenes in bicarbonate solutions. Journal of Molecular Catalysis, 124, 11946-11954.
- Lu, J., Zhang, X., Bravo-Suarez, J.J., Bando, K.K., Fujitani, T., Oyama S.T. (2007). Direct propylene epoxidation over barium-promoted Au/Ti-TUD catalysts with H₂ and O₂: Effect of Au particle size. Journal of Catalysis, 250, 350-359.

- Mandeli, D., Vliet, M.C.A., Arnold, U., Sheldon, R.A., and Schuchardt, Ulf. (2000). Epoxidation of alkenes with hydrogen peroxide catalyzed by $\text{ReO}_4\text{-SiO}_2\text{-Al}_2\text{O}_3$ and $\text{ReO}_4\text{-Al}_2\text{O}_3$. Journal of Molecular Catalysis A: Chemical, 168, 165-171.
- Mandeli, D., Vliet, M.C.A., Sheldon, R.A., and Schuchardt, Ulf. (2001). Alumina-catalyzed alkene epoxidation with hydrogen peroxide. Journal of Molecular Catalysis A: Chemical, 219, 209-213.
- Mendez, S.M., Henriquez, Y., Dominguez, O., Ornelas, L.D., and Krentzien, H. (2006). Catalytic properties of silica supported titanium, vanadium and niobium oxide nanoparticles towards the oxidation of saturated and unsaturated hydrocarbons. Journal of Molecular Catalysis A: Chemical, 252, 226-234.
- Muelle, R., Kammler, H.K., Pratsinis, E.S., and Pratsinis, E.W. (2003). OH surface density of SiO_2 and TiO_2 by thermogravimetric analysis. Langmuir, 19, 160-165.
- Murakami, Y., Matsumoto, T., and Takasu, Y. (1999). Salt catalysts containing basic anions and acidic cations for the sol-gel process of titanium alkoxide: Controlling the kinetics and dimensionality of the resultant titanium oxide. Journal of Physical Chemistry B, 103, 1836-1840.
- O'Commell, A., Smyth, T., and Hodnett, B.K. (1996). The epoxidation of cyclohexene by dioxiranes over ketone catalysts. Catalysis Today, 32, 273-276
- Oki, A.R., Xu, Q., Shpeizer, B., Clearfield, A., Qiu, X., Kirumakki, S., and Tichy, S. (2006). Synthesis, characterization and activity in cyclohexene epoxidation of mesoporous $\text{TiO}_2\text{-SiO}_2$ mixed oxides. Communications, 8, 950-956.
- Oyama, S.T. (2008). Mechanisms in Homogeneous and Heterogeneous Epoxidation Catalysis. Amsterdam: Elsevier.
- Pavasupree, S., Suzuki, Y., Pivsa-Art, S., and Yoshikazu, S. (2004). Preparation and characterization of mesoporous $\text{TiO}_2\text{-CeO}_2$ nanopowders respond to visible wavelength. Journal of Solid State Chemistry, 178, 128-134.

- Qin, J., and Aika, K.I. (1997). Catalytic wet air oxidation of ammonia over alumina supported metals. Applied Catalysis B: Environmental, 16, 261-268.
- Ramachandran, C.E., Du, H., Kim, Y.J., Kung, M.C., Snurr, R.Q., and Broadbelt, L.J. (2007). Solvent effects in the epoxidation reaction of 1-hexene with titanium silicalite-1 catalyst. Journal of Catalysis, 0, 1-11.
- Reddy, A., Chien, C., Chen, C., Chien, S., Lin, C., Lin, K., Chen, C., and Chang, S. (2010). Synthesis and characterization of Fe/CeO₂ catalysts: epoxidation of cyclohexene. Journal of Molecular Catalysis A: Chemical, 318, 60-67.
- Rouquerol, F., Rouquerol, J., and Sing, K. (1999). Adsorption by Powders and Porous Solid: Principle, Methodology and Applications. San Diego: Academic Press.
- Satterfield, C.N. (1991). Heterogeneous Catalysis in Industrial Practice. New York: McGraw-Hill, Inc.
- Smith J.V., Editor. (1960). X-ray Powder Data File. American Society for Testing Materials.
- Sreethawong, T., Yamada, Y., Kobayashi, T., and Yoshikawa, S. (2005). Catalysis of nanocrystalline mesoporous TiO₂ on cyclohexene epoxidation with H₂O₂: Effect of mesoporosity and metal oxide additives. Journal of Molecular Catalysis A: Chemical, 241, 23-32.
- Sreethawong, T., Yamada, Y., Kobayashi, T., and Yoshikawa, S. (2006). Optimization of reaction conditions for cyclohexene epoxidation with H₂O₂ over nanocrystalline mesoporous TiO₂ loaded with RuO₂. Journal of Molecular Catalysis A: Chemical, 248, 226-232.
- Sreethawong, T., Suzuki, Y., and Yoshikawa, S. (2005). Synthesis, characterization, and photocatalytic activity for hydrogen evolution of nanocrystalline mesoporous titania prepared by surfactant-assisted templating sol-gel process. Journal of Solid State Chemistry, 178, 329-338.
- Wang, C. and Ying, J. (1999). Sol-gel synthesis and hydrothermal processing of anatase and rutile titania nanocrystals. Chemistry of Materials, 11, 3113-3120.

- Woragamon, K. (2009) Catalytic Epoxidation of Cyclohexene over Different Oxide Catalysts. M.S. Thesis, The Petroleum and Petrochemical College, Chulalongkorn University, Thailand
- Woragamon, K., Jongpatiwut, S., and Sreethawong, T. (2010). Liquid-phase cyclohexene epoxidation with H_2O_2 over RuO_2 -loaded mesoporous-assembled TiO_2 nanocrystals: catalyst preparation and recyclability. Catalysis Letters, 136, 249-259.
- Wu, J.C. and Chen, C.H. (2004). A visible-light response vanadium-doped titania nanocatalyst by sol-gel method. Journal of Photochemistry and Photobiology A: Chemistry, 163, 509-515.
- Zhang, W., Basak, A., Kosugi, Y., Hoshino, Y., and Yamamoto, H. (2005). Enantioselective epoxidation of allylic alcohols by a chiral complex of vanadium: An effective controller system and a rational mechanistic model. Journal of Molecular Catalysis, 44, 4389-4391.
- Zhang, Y., Zhao, J., He, L., Zhao, D., and Zhang, S. (2006). Manganese (III) salen complex anchored onto MCM-41 as catalyst for the aerobic epoxidation of olefins. Microporous and Mesoporous Materials, 94, 159-165.
- Zou, H. and Lin, Y.S. (2004). Structural and surface chemical properties of sol-gel derived TiO_2 - ZrO_2 oxides. Applied Catalysis A: General, 265, 35-42.

CURRICULUM VITAE

Name: Ms. Parvinee Chaemchaeng

Date of Birth: November 7, 1988

Nationality: Thai

University Education:

2010–2012 Master Degree of Science, Petrochemical Technology Program, The Petroleum and Petrochemical College, Chulalongkorn University, Bangkok, Thailand

2006–2010 Bachelor Degree of Chemical Engineering, Chemical Engineering Department, Sirindhorn International Institute of Technology, Thammasat University, Bangkok, Thailand

Presentations:

1. Chaemchaeng P.; and Jongpatiwut S. (2012, January) Cyclohexene Epoxidation: A comparative study between Ce/TiO₂ and Ru/Ce/TiO₂ mixed oxide catalysts. Poster presentation at 2012 PACCON, Chiang Mai, Thailand.
2. Chaemchaeng P.; and Jongpatiwut S. (2012, March) Liquid-Phase Cyclohexene Epoxidation over Ce/Ru/TiO₂ Mixed-Oxide Catalysts. Poster presentation at 2012 American Chemical Society, San Diego, California, United States of America.
3. Chaemchaeng P.; and Jongpatiwut S. (2012, April) Effect of Ce in Ce/Ru/TiO₂ mixed-oxide catalysts for optimization of cyclohexene epoxidation. Poster presentation at 2012 PPC, Bangkok, Thailand.

