

REFERENCES

1. Rao, A. S.; Paknikar, S. K.; Kirtane, J. G. Recent Advances in the Preparation and Synthetic Applications of Oxiranes. *Tetrahedron*, **1983**, *39*, 2323.
2. Schwartz, N. N.; Blumbergs, J. H. Epoxidations with *m*-Chloroperbenzoic Acid. *J. Org. Chem.*, **1964**, *29*, 1976.
3. Gorzynski, S. Synthesis and Application of Novel Bicyclic Guanidines: *N*-Alkylation of 1,5,7-Triazabicyclo[4.4.0]dec-5-ene. *J. Synthesis.*, **1984**, *8*, 629.
4. Crandall, J. K.; Appar, M. Lithium-Potassium Super bases as Key Reagents for the Base-Catalyzed Isomerisation of Some Terpenoids. *Org. React (NY).*, **1983**, *29*, 345.
5. Rickborn, B. In *Comprehensive Heterocyclic Chemistry*. Trost, B. M., Ed.; Pergamon: Oxford, **1991**, *3*, 733.
6. Rossiter, B. E. In *Asymmetric Synthesis*. Morrison, J. D., Ed.; Academic Press: Orlando, FL, **1983**, *5*, 194.
7. Tu, Y.; Wang, Z.; Shi, Y. An Efficient Asymmetric Epoxidation Method for *trans*-Olefins Mediated by a Fructose-Derived Ketone. *J. Am. Chem. Soc.*, **1996**, *118*, 9806.
8. Palucki, M.; Pospisil, P. J.; Zhang, W.; Jacobsen, E. N. Highly Enantioselective, Low-Temperature Epoxidation of Styrene. *J. Am. Chem. Soc.*, **1994**, *116*, 9333.
9. Kulasegaram, S.; Kulawiec, R. Palladium-Catalyzed Isomerization of Aryl-Substituted Epoxides: A Selective Synthesis of Substituted Benzylic Aldehydes and Ketones. *J. Org. Chem.*, **1997**, *62*, 6547.
10. Yuanming, Z.; Lianhe, S.; Yong, T.; Yian, S. Enantioselective Synthesis and Stereoselective Rearrangements of Enol Ester Epoxides. *J. Org. Chem.*, **2001**, *66*, 1818.
11. Surya, P.; Tromas, M.; Suchitra, K.; Eric, R. M.; George, A. O. Nafion-H Catalysed Isomerization of Epoxides to Aldehydes and Ketones. *Applied Catalysis A*, **1999**, *181*, 283.
12. Bruce, R.; Richard, M. G. Lithium Salt Catalyzed Epoxide-Carbonyl Rearrangement. *J. Am. Chem. Soc., Comm.*, **1971**, *93*, 7.

13. Parthasarathy, S.; Arpita, D.; Debnath, B.; Vinod, K. S. Studies in The Rearrangement of Epoxides with Lithium Dialkylamide-Lithium *tert*-Butoxide. *Tetrahedron*, **1997**, *53*, 1855.
14. Sophie, K. B.; Pher, G. A. Asymmetric Base-Promoted Epoxide Rearrangement: Achiral Lithium Amides Revisited. *Tetrahedron*, **2002**, *58*, 4665.
15. Olivier, E.; Alexandre, A. Enantioselective Catalytic Rearrangement of Cyclohexene Oxide with New Homochiral Bis-Lithium Amide Bases. *Tetrahedron*, **2004**, *15*, 1069.
16. Guenter, N.; Siegfried, B.; Gisbert, D.; Harry, V. Unusual Stereochemical Course of Epoxide Rearrangement in A Carvone-Derived Series. *Tetrahedron Lett.*, **1999**, *40*, 7969.
17. Akira, M.; Takeshi, S.; Atsushi, S.; Hiroyuki, N. Nickel-Catalyzed Ring-Opening Reactions of Epoxides and Their Regioselectivities. *Chemistry Lett.*, **1986**, 7243.
18. Brindaban, C. R.; Umasish, J. Indium(III) Chloride-Promoted Rearrangement of Epoxides: A Selective Synthesis of Substituted Benzylic Aldehydes and Ketones. *J. Org. Chem.*, **1998**, *63*, 8212.
19. Sanjitha, K.; Robert, J. K. Palladium-Catalyzed Isomerization of Aryl-Substituted Epoxides: A Selective Synthesis of Substituted Benzylic Aldehydes and Ketones. *J. Org. Chem.*, **1997**, *62*, 6547.
20. Sanjitha, K.; Robert, J. K. Palladium(0)-Catalyzed Reaction of α,β -Epoxy Ketones Leading to β -Diketones. *J. Am. Chem. Soc.*, **1980**, *27*, 1867.
21. Sanjitha, K.; Robert, J. K. On The Mechanism of The Palladium(0)-Catalyzed **1998**, *54*, 1361. Isomerisation of Epoxides to Carbonyl Compounds. *Tetrahedron*,
22. Andrew, M. A.; Jesse, M. B.; Parie, G. B. J.; Payne, S. M.; Ram, S. M. Bismuth(III) Oxide Perchlorate Promoted Rearrangement of Epoxides to Aldehydes and Ketones. *Tetrahedron Lett.*, **2000**, *41*, 1527.
23. Kaushilk, A. B.; Dyle, J. E.; Nicholas, M. L.; Matthew C. O.; Ram, S. M. A Facile and Efficient Method for The Rearrangement of Aryl-substituted Epoxides to Aldehydes and Ketones using Bismuth Triflate. *Tetrahedron Lett.*, **2001**, *42*, 8129.

24. Fernando, M.; Carmen, D. C.; Emilio, F. L. High Valence Vanadium Complex Promoted Selective Rearrangement of Epoxides to Aldehydes or Ketones. *J. Chem. Soc.*, **2000**, 1749.
25. Kulasegaram, V.; Kulawic, R. J.; Chemo- and Regioselective Isomerization of Epoxides to Carbonyl Compounds via Palladium Catalysis. *J. Org. Chem.*, **1994**, *59*, 7195.
26. Yanagisawa, A.; Yasue, K.; Yamamoto, H. Organoaluminum Reagents for Selective Organic Transformation. *J. Am. Chem. Soc., Comm.*, **1994**, 2103.
27. Takanami, T.; Hirabe, R.; Ueno, M.; Hino, F.; Suda, K. The Chemistry of Pericyclic Reactions and Their Application to Syntheses of Heterocyclic Compounds. *Chem. Lett.*, **1996**, 1323.
28. Kohji, S.; Kenji, B.; Shin-ichiro, N.; Toshikatsu, T. Metalloporphyrin- Catalyzed Regioselective Rearrangement of Monoalkyl-Substituted Epoxides into Aldehydes. *Tetrahedron Lett.*, **1999**, *40*, 7243.
29. Kohji, S.; Taketoshi, K.; Shin-ichiro, N.; Toshikatsu, T. Highly Regio- and Stereoselective Rearrangement of Epoxides to Aldehydes Catalyzed by High-Valent Metalloporphyrin Complex, Cr(TPP)OTf. *J. Am. Chem. Soc.*, **2004**, *126*, 9554.
30. Takanami, T.; Hirabe, R.; Ueno, M.; Hino, F.; Suda, K. High-Valent Metalloporphyrin, Fe(tpp)OTf, Catalyzed Rearrangement of α,β -Epoxy Ketone into 1,2-Diketones. *Chem. Lett.*, **1996**, 1031.
31. Swamer, F. W.; Harsler, C. R. Claisen Acylations and Carbethoxylations of Ketone and Esters by Means of Sodium Hydride. *J. Am. Chem. Soc.*, **1950**, *72*, 1352.
32. Wilkinson. G.; Gillard, R. D.; McClerverty, J. A. *Comprehension Coordination Chemistry*. Vol2. New York: Pergamon Press Publishing, **1981**, *120*, 1252.
33. Sebin, J.; Manning, H. R.; Cessac, G. "Ligation Effects in Vanadyl Complexes" *J. Inorg. Nucl. Chem.*, **1963**, *25*, 1253.
34. Falvo, R. E.; Mink, L. M.; Marsh, D. F. Synthesis and $^1\text{H-NMR}$ Analysis of Tetraphenylporphyrins. *J. Chem Ed.*, **1999**, *76*, 237.
35. Nian, J. L.; Min, L.; Kong, H. A. Syntheses and Characterization of Some Porphyrin and Metalloporphyrins. *Inorg. Chem. Acta.*, **1990**, *178*, 59.
36. Furness, S.; Hanoford, J.; Smith, G.; Tachell, R. *Vogel's Textbook of Practical Organic Chemistry*, 5th ed., **1980**, 1077.

37. Kirk-othmer, *Encyclopedia of Chemical Technology*, 2nd Ed, **1986**, 473.
38. Iranpoor, N.; Adibi, H. Iron(III) Trifluoroacetate as an Efficient Catalyst for Solvolytic and Nonsolvolytic Nucleophilic Ring Opening of Epoxides. *Bull. Chem. Soc. Jpn.*, **2000**, *73*, 675-680.
39. Jetipattaranat, W. Epoxides Ring Opening Reaction Utilizing Transition Metal Catalysts. Master's Thesis , Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University, 2003.
40. Harada, A.; Shiotski, K.; Fukushima, H.; Yamaguchi, H.; Kamachi, M. Supramolecular Assembly of Porphyrins and Monoclonal Antibies. *Inorg. Chem.*, **1995**, *34*, 1070.
41. Lewis, J.; Mabbs, F. E.; Richards, A. The Preparation and Magnetic Properties of Some Oxy-bridged Binuclear Iron(II) Schiff-base Complexes. *J. Chem. Soc. (A)*., **1967**, 1014.
42. Hughes, D. L.; Kleinkes, U.; Leidgh, G. J.; Maiwald, M.; Sanders, J. R. The Preparation and Structure of $[\text{VI}_2(\text{salen})]\cdot\text{CH}_2\text{Cl}_2$ [salen = N,N'-ethylenebis(salicylieneimine)(2-)] and of Some Homologues of Related Schiff Bases. *J. Chem. Soc., Dalton Trans.*, **1993**, 3093.
43. Winstein, S.; Ingraham, L. L. Neighboring Carbon and Hydrogen. XVII. The Pinacol Rearrangement: Solvolysis of 2-Chloro-2-phenylethanol and Related Halides. *J. Am. Chem. Soc.*, **1955**, *77*, 1738-1743.
44. Norio, H.; Atsushi, K. Practical and Environmentally Friendly Epoxidation of Olefins using Oxone. *Organic Process Research & Development*, **2002**, *6*, 405.
45. Hancu, D.; Green, J.; Beckman, E. J. H_2O_2 in $\text{CO}_2/\text{H}_2\text{O}$ Biphasic Systems: Green Synthesis and Epoxidation Reactions. *Ind. Eng. Chem. Res.*, **2002**, *41*, 4466.
46. Kim, S. G.; Liem, A.; Stewart, B. C., Miller, J. A. New Studies on *trans*- Anethole Oxide and *trans*-Asarone Oxide. Carcinogenesis., **1999**, *20*, 1303.
47. Rickborn, B. In *Comprehensive Organic Synthesis*. Oxford, **1991**, *3*, 733.
48. David, P. S.; Rafael, V. G.; Juan, A. M.; Alicia, G. Liquid Phase Rearrangement of Long Straight-Chain Epoxides Over Amorphous, *Meso*- structure and Zeolitic Catalysts. *Chemistry Lett.*, **2004**, *269*, 137.
49. Noriyuki, H.; Akiyoshi, M.; Akinori, T.; Yoshinori, F. Stereochemical Course of The Hydrogen Migration in The Boron Trifluoride Etherate- catalyzed Rearrangement of 1,1-disubstituted Epoxides. *Tetrahedron*, **2000**, *11*, 1859.

50. Peter, W.; Wenjing, X. Organozirconocenes in Organic Synthesis: Tandem Epoxide Rearrangement-Carbonyl Addition. *J. Org. Chem.*, **1993**, *58*, 825.
51. Sammakia, T. Lewis Acids in Organic Synthesis. Volumes 1 and 2 Edited by Hisashi Yamamoto (Nagoya University). Wiley-VCH: Weinheim. **2000**.
52. Ralph, G. P. Hard and Soft Acids and Bases-The Evolution of a Chemical Concept. *Coordination Chem. Rev.* **1990**, *100*, 403.

VITA

Mr. Surakarn Kantawong was born on Oct 22, 1981 in Nakornpathom, Thailand. He graduated with Bachelor's Degree in Chemistry from Faculty of Science, Mahidol University in 2002. He continued his study in Petrochemistry and Polymer Science Program, Faculty of Science, Chulalongkorn University in 2003 and completed in 2005.

His present address is 149/1 Moo 3, Kongmai, Samphan, Nakornpathom, Thailand 73110. Tel. 034-325002

