

REFERENCES

- Ayame, A., Uchida, Y., Ono, H., Miyamoto, M., Sato, T., and Hayasaka, H. (2003). Epoxidation of ethylene over silver catalysts supported on α -alumina crystal carriers. *Applied catalysis A: general*, 244, 59.
- Bhasin, M.M., and Va, C.W. (1990). Catalyst composition for oxidation of ethylene to ethylene oxide. US Patent 4,908,343.
- Campbell, C.T., and Paffett, M.T. (1984). The role of chlorine promoters in catalytic ethylene epoxidation over the Ag(110) surface. *Applied surface science*, 19, 28-42.
- Campbell, C.T., and Koel, B.E. (1985). Chlorine promotion of selective ethylene oxidation over Ag(110): Kinetics and mechanism. *Journal of catalysis*, 92, 272-283.
- Campbell, C.T. (1986). Chlorine promoters in selective ethylene epoxidation over Ag(111): A comparison with Ag(110). *Journal of catalysis*, 99, 28-38.
- Chang, J.S., Lawless, P.A., and Yamamoto, T. (1991). Corona discharge processes. *IEEE Transactions on plasma science*, 19, 1152.
- Cullity, B.D. (1956). *Elements of X-Ray Diffraction*. Reading, Mass.: Addison-Wesley Pub. Co.
- Eliasson, B., Hirth, M., and Kogelschatz, U. (1987). Ozone synthesis from oxygen in dielectric barrier discharge. *Journal of applied physics*, 20, 1421-1437.
- Eliasson, B., and Kogelschatz, U. (1991). Nonequilibrium volume plasma chemical processing. *IEEE Transactions on plasma science*, 19, 1063-1077.
- Epling, W.S., Hoflund, G.B., and Minahan, D.M. (1997). Study of Cs-promoted, α -alumina-supported silver, ethylene-epoxidation catalysts. *Journal of catalysis*, 171, 490-497.
- Fridman, A., Nester, S., Kennedy, L.A., Saveliev, A., and Mutaf-Yardimci, O. (1999). Gliding Arc Discharge. *Progress in Energy and Combustion Science*, 25, 211-231.

- Fridman, A., and Kennedy, L.A. (2004). Plasma Physics and Engineering. New York: Taylor & Francis, 10.
- Geenen, P.V., Boss, H.J., and Pott, G.T. (1982). A study the vapor-phase epoxidation of propylene and ethylene on silver and silver-gold alloy catalysts. Journal of catalysis, 77, 499-510.
- Goncharova, S.N., Paukshtis, E.A., and Bal'zhinimaev, B.S. (1995). Size effects in ethylene oxidation on silver catalysts: influence of support and Cs promoter. Applied catalysis A: general, 126, 67-84.
- Harndumrongsak, B., Lobban, L.L., Rangsuvigit, P., and Kitayanan, B. (2002). Oxidation of ethylene in plasma environment, Proceedings of the 9th APCChE Congress, Christchurch, New Zealand.
- Heintze, M., and Pietruszka, B. (2004). Plasma catalytic conversion of methane into syngas: the combined effect of discharge activation and catalysis. Catalysis today, 87, 21-25.
- Hermstein, W. (1960). Positive glow corona. Archive Elektrotech, 45, 209–224.
- Holgado, M.J., Inigo, A.C., and Rives, V. (1998). Effect of preparation conditions on the properties of highly reduced Rh/TiO₂ (anatase and rutile) catalysts. Applied catalysis A: general, 175, 33-41.
- Horvath, M., Bilitzky, L., and Huttner, J. (1985). Ozone, Elsevier Science.
- Iwakura, G. (1985). A Novel Silver Catalyst Prepared by Using Superheated-Steam as a Heating Medium for Ethylene Oxide Production. Japan Patent 63-126552.
- Jankowiak, J.T., and Barteau, M.A. (2005). Ethylene epoxidation over silver and copper-silver bimetallic catalysts: I. Kinetics and selectivity. Journal of catalysis, 236, 366-378.
- Jankowiak, J.T., and Barteau, M.A. (2005). Ethylene epoxidation over silver and copper-silver bimetallic catalysts: II. Cs and Cl promotion. Journal of catalysis, 236, 379-386.
- Jeong, J.Y., Park, J., Henins, I., Babayan, S.E., Tu, V.J., Selwyn, G.S., Ding, G., and Hicks, R.F. (2000). Reaction chemistry in the afterglow of an oxygen-helium, atmospheric-pressure plasma. Journal of physical chemistry A, 104, 8072-8032.

- Jolibois, J., Zouzou, N., Moreau, E., and Tatibouët, J.M. (2011). Generation of surface DBD on rough dielectric: Electrical properties, discharge-induced electric wind and generated chemical species. *Journal of electrostatics*, 69, 522-528.
- Kailu, Y., Taigang, L., Yuguang, Z., Changming, Y., Lijuan, S., and Chong, L. (2009). Carbon nanotube synthesis over glow discharge-treated Ni/AAO membrane. *Materials letters*, 63, 566–568.
- Kalra, C., Cho, Y., Gutsol, A., Fridman, A., and Rafael, T.S. (2004). Non-thermal plasma catalytic conversion of methane to syn-gas. *Fuel chemistry*, 49, 976.
- Kilty, P.A., Rol, N.C., and Sachtler, W.M.H. (1973). The activity and selectivity of oxygen atoms adsorbed on a Ag/ α -Al₂O₃ catalyst in ethene epoxidation. *Catalysis letters*, 99, 45-53.
- Kondaries, D.I., and Verykios, X.E. (1996). Interaction of oxygen with supported Ag-Au alloy catalysts. *Journal of catalysis*, 158, 363-377.
- Kroschwitz, J.I., Howe-Grant, M., Kirk, R.E., and Othmer, D.F. (1998). *Kirk-Othmer Encyclopedia of Chemical Technology*. 25: Vitamins to Zone Refining, Wiley-Interscience, New York.
- Kruapong, A. (2000). *Partial oxidation of methane to synthesis gas in low temperature plasmas*. M.S. Thesis, Chulalongkorn University, Bangkok, Thailand.
- Lambert, R.M., Cropley, R.L., Husain, A., and Tikhov, M.S. (2003). Halogen-induced selectivity in heterogeneous epoxidation is an electronic effect-fluorine, chlorine, bromine and iodine in the Ag-catalysed selective oxidation of ethene. *Chemical Communications*, 18, 1184-1185.
- Law, G.H., Charleston, S., and Chitwood, H.C. (1942). Process of making olefin oxides. US Patent 2,279,470.
- Linic, S., Jankowiak, J., and Barteau, M.A. (2004). Selectivity driven design of bimetallic ethylene epoxidation catalysts from first principles. *Journal of catalysis*, 224, 489-493.
- Lieberman, M.A., and Lichtenberg, A.J. (2005). *Principles of Plasma Discharges and Materials Processing*, 2nd ed., Wiley Interscience, Hoboken, NJ: Wiley.

- Liu, C., Marafee, A., Mallinson, R.G., and Lobban, L. (1997). Methane conversion to higher hydrocarbons in a corona discharge over metal oxide catalysts with OH groups. Applied catalysis A: general, 164, 21-33.
- Liu, Y.Q., Chu, M.S., Chapman, I.T., and Hender, T.C. (2008). Toroidal self-consistent modeling of drift kinetic effects on the resistive wall mode. Physics of Plasmas, 15, 1-12.
- Malik, M.A. and Malik, S.A. (1999). Catalyst enhanced oxidation of VOCs and methane in cold-plasma reactors. Platinum metal review, 43(3), 109-113.
- Mao, C.F., and Vannice, M.A. (1995). High surface area α -aluminas: III. Oxidation of ethylene, ethylene oxide, and acetaldehyde over silver dispersed on high surface area α -alumina. Applied catalysis A: general, 122, 61-76.
- Matar, S., Mirbach, M.J., and Tayim, H.A. (1989). Catalysis in Petrochemical Processes, Kluwer Academic Publishers, Dordrecht: The Netherlands, 85.
- Matin, N.S., and Whitehead, J.C. (2007). A chemical model for the atmospheric pressure plasma reforming of methane with oxygen. 28 th ICPIG, Prague, Czech Republic.
- McClellan, P.P. (1950). Manufacture and uses of ethylene oxide and ethylene glycol. Industrial and engineering chemistry research, 42, 2402-2407.
- McQuarrie, D.A., and Rock, P.A. (1987). General chemistry, New York: W.H. Freeman and Company.
- Mendes, G.C.C., Brandaõ, T.R.S., and Silva, C.L.M. (2007). Ethylene oxide sterilization. American journal of infection control, 35, 574-581.
- Mizolek, A.W., Daniel, R.G., and Skaggs, R.R. (1999). Non-thermal plasma processing and chemical conversion of halons: reactor considerations and preliminary results. Halon options technical working conference.
- Nasser, E. (1971). Fundamentals of gaseous ionization and plasma electronics. USA: John Wiley & Sons, Inc.

- Paosombat, B., Suttkul, T., and Chavadej, S. (2012). Ethylene epoxidation in a low-temperature parallel plate dielectric barrier discharge system: effects of ethylene feed position and O₂/C₂H₄ feed molar ratio. World Academy of Science, Engineering and Technology, 64, 53-55.
- Patiño, P., Hernández, F.E., and Rondón, S. (1995). Reactions of O(³P) with secondary C-H bonds of saturated hydrocarbons in nonequilibrium plasmas. Plasma chemistry and plasma processing, 15, 159-171.
- Patiño, P., Ropero, M., and Iacocca D. (1996). Reactions of O(³P) with aromatic compounds in liquid phase. Plasma Chemistry and Plasma Processing, 16, 563-575.
- Patiño, P., Sánchez, N., Suhr, H., and Hernández, N. (1999). Reactions of nonequilibrium oxygen plasmas with liquid olefins. Plasma chemistry and plasma processing, 19, 241-254.
- Permsin, N. (2009) Ethylene epoxidation in low-temperature dielectric barrier discharge system: effect of electrode geometry. M.S. Thesis, Chulalongkorn University, Bangkok, Thailand.
- Pietruszka, B., and Heintze, M. (2004). Methane conversion at low temperature: the combined application of catalysis and non-equilibrium plasma. Catalysis today, 90, 151-8.
- Podgornov, E.A., Prosvirin, I.P. and Bukhtiyarov, V.I. (2000). XPS, TPD and TPR Studies of Cs-O Complexes on Silver: their Role in Ethylene Epoxidation. Journal of molecular catalysis A: chemical, 158, 337.
- Rainer, H., Holger, K., Martin, S., and Karl. H.S. (2008). Low Temperature Plasmas: Fundamentals, Technologies and Techniques. John Wiley & Sons, volume 1, 2nd edition.
- Raizer, Y.P., Shneider, M.N., and Yatsenko, N.A. (1995). Radio-Frequency Capacitive Discharge. CRC Press.
- Rojluechai, S., Chavadej, S., Schwank, J.W., and Meeyoo, V. (2006). Activity of ethylene epoxidation over high surface area alumina support Au-Ag catalysts. Journal chemical engineering of Japan, 39, 321-326.

- Rosacha, L.A., Anderson, G.K., Bechtold, L.A., Coogan, J.J., Heck, H.G., Kang, M., McCulla, W. H., Tennant, R. A., and Wantuck, P. J. (1993). Treatment of hazardous organic wastes using silent discharge Plasmas. Non-Thermal Plasma Technique for Pollution Control, NATO ASI series, 34, part B, 128-139.
- Saktrakool, K. (2003). Oxidative removal of ethylene in a multistage plasma reactor in the presence of TiO₂. M.S. Thesis, Chulalongkorn University, Bangkok.
- Satterfield, C.N. (1991). Heterogeneous Catalysis in Industrial Practice. New York: McGraw-Hill.
- Seyedmonir, S.R., Plischke, J.K., Vannice, M.A., and Young, H.W. (1990) Ethylene oxidation over small silver crystallites. Journal of catalysis, 123, 534-549.
- Sreethawong, T., Suwannabart, T., and Chavadej, S. (2008). Ethylene epoxidation in a low-temperature dielectric barrier discharge system. Plasma Chemistry and Plasma Processing, 28, 629-624.
- Suga, Y., and Sekiguchi, H. (2005). Epoxidation of carbon double bond using atmospheric non-equilibrium oxygen plasma. Thin solid films, 506-507, 427-431.
- Suhr, H. (1983). Application of nonequilibrium plasmas in organic chemistry. Plasma chemistry and plasma processing, 3, 1-61.
- Suhr, H., Schmid, H., Pfeundschuh, H., and Lacocca, D. (1984). Plasma oxidation of liquids. Plasma chemistry and plasma processing, 4, 285-295.
- Suhr, H., and Pfreundschuh, H. (1988). Reactions of nonequilibrium oxygen plasmas with liquid olefins. Plasma chemistry and plasma processing, 8, 67-74.
- Sutthiruangwong, S. (1999). Plasma Catalytic Production of Methanol. M.S. Thesis, Chulalongkorn University, Bangkok, Thailand.
- Suttikul, T., Sreethawong, T., Segiguchi, H. and Chavadej, S. (2011). Ethylene epoxidation over alumina-and silica-supported silver catalysts in low-temperature AC dielectric barrier discharge. Plasma chemistry and plasma processing, 31, 273-290.

- Suwannabart, T. (2008). Ethylene epoxidation in low-temperature AC dielectric barrier discharge: effect of electrode geometry. M.S. Thesis, Chulalongkorn University, Bangkok, Thailand.
- Tan, S.A., Grant, R.B., and Lambert, R.M. (1986). Chlorine-oxygen interactions and the role of chlorine in ethylene oxidation over Ag(111). Journal of catalysis, 100(2), 383-391.
- Tansuwan, A. (2007). Epoxidation of ethylene over silver catalysts in low-temperature corona discharge. M.S. Thesis, Chulalongkorn University, Bangkok, Thailand.
- Tetsuji, O., Tomohide, K., Tadashi, T., and Kazuo, S. (1996). Nitric oxide decomposition in air by using non-thermal plasma processing - with additives and catalyst. IEEE transactions on industry applications, 34.
- Tetsuji, O. (2006). Atmospheric pressure nonthermal plasma decomposition of gasous air contaminants and that diagnosis. Masuda Lecture - Nonthermal Plasma Decomposition of Gaseous Air Contaminants.
- Tezuka, M., and Yajima, T. (1996). Oxidation of aromatic hydrocarbons with oxygen in a radiofrequency plasma. Plasma chemistry and plasma processing, 16(3), 329-340.
- Tories, N., and Verikios, X.E. (1987). The oxidation of ethylene over silver-based alloy catalysts: 3. Silver-gold alloys. Journal of catalysis, 108, 161-174.
- Viriyasiripongkul, S. (2000). Oxidative coupling of methane to higher hydrocarbons over zeolite in AC electric discharges. M.S. Thesis, Chulalongkorn University, Bangkok, Thailand.
- Watkinson, C. (2007). Improving the reliability of mechanical seals in ethylene oxide applications. Sealing Technology, 12, 8-12.
- Yeung, K.L., Gavriilidis, A., Varma, A., and Bhasin, M.M. (1998). Effects of 1, 2 dichloroethane addition on the optimal silver catalyst distribution in pellets for epoxidation of ethylene. Journal of catalysis, 174, 1-12.
- Yong, Y.S., Kennedy, E.M., and Cant, N.W. (1991). Oxide catalysed reactions of ethylene oxide under conditions relevant to ethylene epoxidation over supported silver. Applied catalysis, 76, 31-48.

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2. Dulyalaksananon, W., Suttikul, T., and Chavadej, S. (2013, May 12-16) Ethylene Epoxidation in A Low-Temperature Parallel Plate Dielectric Barrier Discharge System with Two SiO₂ Dielectric Layers. Proceedings of 2nd International Conference on Materials for Energy (EnMat II). Karlsruhe, Germany.