DAFTAR PUSTAKA

Aboul-Gheit, A. K., El-Masry, M. S., dan Awadallah, A. E., 2012, Oxygen Free Convertion of Natural Gas to Useful Hydrocarbons and Hydrogen Over Monometallic Mo and Bimetallic Mo-Fe, Mo-Co, Mo-Ni/HZSM-5 Catalysts Prepared by Mechanical Mixing, *Fuel Process. Technol.*, 102, 24-49.

Achouri, I. E., Abatzoglou, N., Fauteux-lefebvre, C., dan Braidy, N., 2013, Diesel Steam Reforming: Comparison of Two Nickel Aluminate Catalysts Prepared by Wet Impregnation and Co-Precipitation, *Catal. Today*, 207, 13–20.

Alisha, G. D., 2021, Silika Mesopori dari Pasir Pantai Parangtritis Tercetak CTAB sebagai Pengemban Logam Mo untuk Katalis Hidrorengkah Minyak Sawit Bekas Menjadi Biofuel, *Tesis,* Jurusan Kimia FMIPA UGM, Yogyakarta.

Arellano, U., Wang, J. A., Timko, M. T., Chen, L. F., Paredes-Carrera, S. P., dan Asomoza, M., 2014, Oxidative Removal of Dibenzothiophene in a Biphasic System Using Sol-Gel FeTio2 Catalysts and H_2O_2 Promoted with Acetic Acid, *Fuel*, 126, 16–25.

Augustine, R. L., 1996, *Heterogenous Catalysis for the Synthetic Chemist,* Marcel Dekker Inc., New York.

Campos-Martin, J. M., Capel-Sanchez, M. C., Perez-Presas, P., dan Fierro, J. L. G., 2010, Oxidative Processes of Desulfurization of Liquid Fuels, *J. Chem. Technol. Biotechnol.*, 85, 879–890.

Cao, X., Li, L., Yu, S., Liu, S., Wu, Q., dan Ragauskas, A. J., 2019, Catalytic Conversion of Waste Cooking Oils Using In-situ Coating Metal Oxide on SBA-15 as Heterogenous Catalyst, *J. Anal. Appl. Pyrolysis.*, 138, 137-144.

Cao, Y., Wang, H., Ding, R., Wang, L., Liu, Z., dan Lv, B., 2020, Highly Efficient Oxidative Desulfurization of Dibenzothiopene Using Ni Modified MoO3 Catalyst, *Applied Catalysis A, General*, 589, 117308.

Chang, H., Yi, H., dan Zhang, J., 2021, Preparation of a NiO-Bi2WO6 Catalyst and Its Photocatalytic Oxidative Desulfurization Performance, *Colloid Interface Sci. Commun.*, 41, 100381.

Chen, L., dan Yuan, Z. Y., 2021, Design Strategies of Supported Metal-Based Catalysts for Efficient Oxidative Desulfurization of Fuel, Review, *J. Ind. Eng. Chem.*, 10, 1016.

Coey, J. M. D., 2009, *Magnetism and Magnetic Material*, Cambridge University Press, Cambridge.

Dar, B. A., Mohsin, M., Basit, A., dan Farooqui, M., 2013, Sand: A natural and Potential Catalyst in Renowned Friedel Craft's Acylation of Aromatic Compounds, *J. Saudi Chem. Soc.*, 17, 177–180

Dong, Y., Ren, X., Wang, M., He, Q., Chang, L., dan Bao, W., 2013, Effect of Impregnation Methods on Sorbents Made from Lignite for Desulfurization at Middle Temperature, *J. Energy Chem.*, 22, 783-789.

Fan, L., Cheng, D., Chen, F., dan Zhan, X., 2019, Preparation of Highly Dispersed Iron Species over ZSM-5 with Enhanced Metal-Support Interaction through Freeze-Drying Impregnation, *Chinese J. Catal.*, 40, 1109-1115.

Feng, D., Guo, D., Zhang, Y., Sun, S., Zhao, Y., Chang, G., Guo, Q., dan Qin, Y., 2021, Adsorption-enrichment Characterization of CO_2 and Dynamic Retention of Free NH_3 in Functionalized Biochar with $H_2O/NH_3{\cdot}H_2O$ Activation for Promotion of New Ammonia-based Carbon Capture, *Chem. Eng. J.*, 409, 128193.

Ghosh, B. K., Hazra, S., Naik, B., dan Ghosh, N. N., 2015, Preparation of Cu Nanoparticle Loaded SBA-15 and Their Excellent Catalytic Activity in Reduction of Variety of Dyes, *Power Technol.*, 209, 371-378.

Han, Y., Zhang, Y., Xu, C., dan Samuel, C., 2018, Molecular Characterization of Sulfur-Containing Compounds in Petroleum, *Fuel*, 221, 144-158.

Harrop, T. C., dan Mascharak, P. K., 2004, Fe(III) and Co(III) Centers with Carboxamido Nitrogen and Modified Sulfur Coordination: Lessons Learned from Nitrile Hydratase, *Acc. Chem. Res*., 37, 253–260.

Hegedus, L.L., 1987, *Catalysts Design Progress and Perspectives*, John Wiley and Sons, New York

Hossain, M. N., Park, H. C., dan Choi, H. S., 2019, A Comprehensive Review on Catalytic Oxidative Desulfurization of Liquid Fuel Oil, *Catalyst*, 9, 229.

Ji, H., Sun, J., Wu, P., Dai, B., Chao, Y., Zhang, M., Jiang, W., Zhu, W., dan Li, H., 2016, Deep Oxidative Desulfurization with a Microporous Hexagonal Boron Nitride Confining Phosphotungstic Acid Catalyst, *J. Mol. Catal. Chem.* 423, 207–215.

Kamel, L. dan Anbia, M., 2019, Composite Beads of Molybdenum Oxide Supported on Textured Silicon as an Oxidative Desulfurization Nanocatalyst, *Silicon*, 12, 1325-1336.

Khalaji, A. D., dan Das, D., 2014, Synthesis and Characterizations of NiO Nanoparticles Via Solid-State Thermal Decomposition of Nickel (II) Schiff Base Complexes, *Int. Nano Lett.*, 4, 117

Kobayashi, M., Nagasawa, T., dan Yamada, H., 1992, Enzymatic Synthesis of Acrylamide: A Success Story Not Yet Over, *Trends Biotechnol.*, 10, 402–408

Kovacs, J. A., 2004, Synthetic Analogues of Cysteinate-Ligated Non-Heme Iron and Non-Corrinoid Cobalt Enzymes, *Chem. Rev*., 104, 825–84

Li, J., Yang, Z., Li, S., Jin, Q., Zhao, J., 2020, Review on Oxidative Desulfurization of fuel by Supported Heteropolyacid Catalysts, *J. Ind. Eng. Chem.*, 82, 1-16.

Li, H., Zhu, W., Wang, Y., Zhang, J., Lu, J., dan Yan, Y., 2009, Deep Oxidative Desulfurization of Fuels in Redox Ionic Liquids Based on Iron Chloride, *Green Chem.*, 11, 810-818.

Li, X., Mao, Y., Leng, K., Ye, G., Sun, Y., dan Xu, W., 2017, Enchancement of Oxidative Desulfurization Performance Over Amorphous Titania by Doping MIL-101(Cr), *Micropor. Mesopor. Mater.*, 254, 114-120.

Liu, F., Yu, J., Qazi, A. B., Zhang, L., Liu, X., 2021, Metal-Based Ionic Liquids in Oxidative Desulfurization: A Critical Review, *Environ. Sci. Technol.*, 55, 1419-1435.

Lowell, S., Shield, J. E., Thomas, M. A., dan Thommes, M., 2004, *Characterization of Porous Solids and Powders: Surface Area, Pore Size, and Density*, Springer Science Business Median New York.

Lu, C., Yang, H., Wang, J., Tan, Q., dan Fu, L., 2020, Utilization of iron tailing to Prepare High-Surface Area Mesoporous Silica Material, *Sci. Total Environ.*, 736, 139483.

Lusiana, A., Toifur, M., dan Rohman, F., 2014, Uji Sifat Magnetik Pasir Pantai melalui Penentuan Permeabilitas Relatif Menggunakan Logger Pro, *J. Fis.*, 2014, 4(2), 78-82.

Ma, X., Zhou, A., dan Song, C., 2007, A Novel Method for Oxidative Desulfurization of Liquid Hydrocarbon Fuels Based on Catalytic Oxidation Using Molecular Oxygen Coupled with Selective Adsorption, *Catal. Today*, 123, 276–284.

Maciuca, A.L., Ciocan, C.E., Dumitriu, E., Fajula, F., dan Hulea, V., 2008, V-, Mo- and W-containing Layered Double Hydroxides as Effective Catalysts for Mild Oxidation of Thioethers and Thiophenes with H_2O_2, *Catal. Today*, 138, 33–37.

Mamaghani, A. H., Fatemi, S., Asgari, M., 2013, Investigation of Influential Parameters in Deep Oxidative Desulfurization of Dibenzothiophene with Hydrogen Peroxide and Formic Acid, *Int. J. Chem. Eng.*, 951045.

Matsugi, A., 2021, Modeling Third-body Effect in the Thermal Decomposition of H_2O_2, *Combution and Flame*, 225, 444-452.

Matsumiya, M., Qiu, F., Shin, W., Izu, N., Murayama N., dan Kanzaki, S., 2002, Thin-film Li doped NiO for thermoelectric hydrogen gas sensor., *Thin Solid Films*, 419, 213-217.

Mirante, F., Ribeiro, S. O., Castro, B. D., Granadeiro, C. M., dan Balula, S. S., 2017, Sustainable Desulfurization Processes Catalyzed by Titanium-Polyoxometalate@TM-SBA-15, *Top Catal*, 60, 1140-1150.

Naseri, H., Mazloom, G., Akbari, A., dan Banisharif, F., 2021, Investigation of Ni, Co, and Zn Promoters on Mo/HY Modified Zeolite for Developing an Efficient Bimetallic Catalyst for Oxidative Desulfurization of Dibenzothiophene, *Microporous and Mesoporous Material*, 325, 111341.

Niyonsaba, E., Manheim, J., Yerabolu, R., dan Kenttamaa, H., 2018, Recent Advances in Petroleum Analysis by Mass Spectrometry, *Anal. Chem.*, 91, 156-177.

Novianti, S. A., 2021, Green Preparation of ZnO Blended with Parangtritis Beach Sand Catalyst for Oxidative Desulfurization of Dibenzothiophene, *Skripsi*, Jurusan Kimia FMIPA UGM, Yogyakarta.

Otsuki, S., Nonaka, T., Takashima, N., Qian, W., Ishihara, A., Imai, T., dan Kabe, T., 2000, Oxidative Desulfurization of Light Gas Oil and Vacuum Gas Oil by Oxidation and Solvent Extraction, *Energy and Fuels*, 14, 1232–1239.

Paniv, P. M., Pysh'ev, S. V., Gaivanivich, V. I., dan lazorko, O. I., 2006, Noncatalytic Oxidation Desulfurization of the Kerosene Cut, *Chem Technol Fuels Oils*, 42, 159-166.

Parvin, T., Keerthiraj, N., Ibrahim, I. A., Phanichphant, S., dan Byrappa, K., 2012, Photocatalytic Degradation of Municipal Wastewater and Brilliant Blue Dye Using Hydrotermally Synthesized Surface-Modified Siver-Doped ZnO Designer Particles, *Int. J. Photoenergy*, 670610.

Pholnak, C., Sirisathitkul, C., Suwanbon, S., dan Harding, D. J., 2014, Effects of Precursor Concentration and Reaction Time on Sonochemically Synthesized ZnO Nanoparticles, *Mater. Res.*, 17, 405-411.

Piscopo, C. G., Granadeiro, C. M., Balula, S. S., dan Boskovic, D., 2020, Metal-Organic Framework-Based Catalysts for Oxidative Desulfurization, *Chem. Cat. Chem.*, 4721-4731.

Qian, E. W., 2008, Development of Novel Nonhydrogenation Desulfurization Process Oxidative Desulfurization of Distillate, *J. Japan Pet. Inst.*, 51(1), 14-31.

Rahmawati, F., Wahyuni, S., dan Kadarwati, S., 2012, Studi Deaktivasi Katalis Ni-Mo/Zeolit Alam pada Reaksi Hidrodenitrogenasi (HDN) Piridin, *Indo. J. Chem. Sci.*, 1 (1), 21-26.

Rakhman, A. N., 2013, Rekayasa Geomedis Pemanfaatan Pasir Pantai di Pantai Parangtritis dan Sekitarnya, Kecamatan Kretek Kabupaten Bantul, Daerah Istimewa Yogyakarta, *J. Tekno. Techoscientia*, 6(1), 21-31.

Rezvani, M. A. dan Aghmasheh, M., 2017, Synthesis and Characterization of New Nanocomposite TBA-PW11Ni@NiO As an Efficient and Reusable Heterogeneous Catalyst in Oxidative Desulphurization of Gasoline, *J Taiwan Inst Chem Eng*, 77, 321-328.

Rezvani, M. A., dan Miri, O. F., 2019, Synthesis and Characterization of PWMn/NiO/PAN Nanosphere Composite with Superior Catalytic Activity for Oxidative Desulfurization of Real Fuel, *Chemical Engineering Journal*, 369, 775-783

Rezvani, M. A., Afshari, P., dan Aghmasheh, M., 2021, Deep Catalytic Oxidative Desulfurization Process Catalyzed by TBA-PWFe@NiO@BNT Composite Material as an Efficient and Recyclable Phase-Transfer Nanocatalyst, *Materials Chemistry and Physics*, 267, 124662.

Rodiansono dan Trisunaryanti, W., 2005, Activity Test and Regeneration of Ni/Mo/Z Catalyst for Hydrocracking Waste Plastic Fraction to Gasoline Fraction, *Indones. J. Chem.*, 5(3), 261-268.

Saleh, T., 2020, Characterization, Determination, and Elimination Technologies for Sulfur from Petroleum: Toward Cleaner Fuel and Safe Environment, *Trends Environ. Anal.*, 25.

Semar, D., 2007, Pengaruh Viskositas dan Kandungan Sulfur dalam Minyak Solar terhadap Sifat Lubrisitas Minyak Solar Indonesia, *Lembar Publikasi Lemigas*, 41 (1), 20-28.

Shafiq, I., Shafique, P., Akhter, P., Ishaq, M., Yang, W., dan Hussain, M., 2021, Recent Breakthroughs in Deep Aerobic Oxidative Desulfurization of Petroleum Refinery Product, *J. Clean. Prod.*, 294, 125731.

Shi, C., Wang, W., Liu, N., Xu, X., Wang, D., Zhang, M., Sun, P., dan Chen, T., 2015, Low Temperature Oxidative Desulfurization with Hierarchically Mesoporous Titanium Silicate Ti-SBA-2 Single Crystals, *Chem. Commun*, 51, 11500-11503.

Soleimani, M., Bassi, A., dan Margaritis, A., 2007, Biodesulfurization of Refractory Organic Sulfur Compounds in Fossil Fuels, *Biotechnology Advances*, 25, 570-596.

Somorgai, dan Gabor, A., 1994, *Introduction to Surface Chemistry and Catalysis*, John Willey and Sons Inc., Canada

Song, C., dan Ma, X., 2003, New Design Approaches to Ultra-Clean Diesel Fuels by Deep Desulfurization and Deep Dearomatization, *Appl. Catal.*, 41, 207-238.

Srivastav, A., dan Srivastava, V. C., 2009, Adsorptive Desulfurization by Activated Alumina, *Journal of Hazardous Materials*, 170, 1133-1140

Subhan, S., Rahman, A. U., Yaseen, M., Rashid, H. U., Ishaq, M., Sahibzada, M., dan Tong, Z., 2019, Ultra-Fast and Highly Efficient Catalytic Oxidative Desulfurization of Dibenzothiophene at Ambient Temperature Over Low Mn Loades Co-Mo/Al_2O_3 and Ni-Mo/Al_2O_3 Catalysts Using NaClO as Oxidant, *Fuel*, 237, 793-805.

Tang, X. D., Hu, T., Li, J., Wang, F., dan Qing, D., 2015, Deep Desulfurization of Condensate Gasoline by Electrochemical Oxidation and Solvent Extraction, *RSC Adv*, 66, 53172-53987

Taufiq, A., Nikmah, A., Hidayat, A., Sunaryono, S., Mufti, N., Hidayat, N., dan Susanto, H., 2020, Synthesis of Magnetite/Silica Nanocomposite from Natural Sand to Create a Drug Delivery Vehicle, *Heliyon*, 6, e03784

Trisunaryanti, W., Larasati, S., Bahri, S., Ni'mah, Y. L., Efiyanti, L., dan Amri, K., 2020, Performance comparison of Ni-Fe loaded on NH2-functionalized mesoporous silica and beach sand in the hydrotreatment of waste palm cooking oil, *J. Environ. Chem. Eng.*, 8, 104477.

Trisunaryanti, W., Novianti, S. A., Fatmawati, D. A., Triyono, T., Ulfa, M., dan Prasetyoko, D., 2022, Simple and Green Preparation of ZnO Blended with Highly Magnetic Silica Sand from Parangtritis Beach as Catalyst for Oxidative Desulfurization of Dibenzothiophene, *Indones. J. Chem.*, 22 (2), 455-467.

Trisunaryanti, W., Sumbogo, S. D., Novianti, S. A., Fatmawati, D. A., Ulfa, M., dan Nikmah, Y. L., 2021, ZnO-Activated Carbon Blended as a Catalyst for Oxidative Desulfurization of Dibenzothiophene, *BCREC*, 16 (4), 881-887.

Wang, C., Chen, Z., Yao, X., Jiang, W., Zhang, M., Li, H., Liu, H., Zhu, W., dan Li, H., 2017, One-Pot Extraction and Aerobic Oxidative Desulfurization with Highly Dispersed V_2O_5/SBA-15 Catalyst in Ionic Liquids, *RSC Adv.*, 7, 39383-39390.

Wei, S., He, H., Cheng, Y., Yang, C., Zeng, G., Kang, L., Qian, H., dan Zhu, C., 2017, Preparation, Characterization, and Catalytic Performances of Cobalt

Catalysts Supported on KIT-6 Silicas in Oxidative Desulfurization of Dibenzothiophene, *Fuel*, 200, 11-21.

Yao, X., Wang, C., Liu, H., Li, H., Wu, P., Fan, L., Li, H., dan Zhu, W., 2018, Immobilizing Highly Catalytically Molybdenum Oxide Nanoparticles on Graphene-Analogous BN: Stable Heterogenous Catalysts with Enchanced Aerobic Oxidative Desulfurization Performance, *Ind. Eng. Chem. Res.*, 58, 863-871.

Zhang, H., Chen, B., Jiang, H., Wang, C., Wang, H., dan Wang, X., 2011, A strategy Nanorod Mediated Multi-Mode Cancer Treatment, *Biomaterials*, 32, 1906–1914.

Zhang, J., Zhu, W., Li, H., Jiang, W., Jiang, Y., Huang, W., dan Yan, Y., 2009, Deep Oxidative Desulfurization of Fuels by Fenton-Like Reagent in Ionic Liquids, *Green Chem.*, 11, 1801-1087

Zhang, M., Liu, J., Yang, J., Chen, X., Wang, M., Li, H., Zhu, W., dan Li, H., 2019, Molybdenum-Containing Dendritic Mesoporous Silica Spheres for Fast Oxidative Desulfurization in Fuel, *Inorg. Chem. Front.* 6, 451-458.

Zhang, P., Kang, L., Zhu, M., dan Dai, B., 2020, Oxidative Desulfurization Catalyzed by a Novel ZrP/MCM-41 Catalyst with High Performance, *Sustain. Energy Fuels*, 4, 4293-4300.

Zheng, P., Li, T., Chi, K., Xiao, C., Wang, X., Fan, J., Duan, A., dan Xu, C., 2019, DFT insights into the direct desulfurization pathways of DBT and 4,6-DMDBT catalyzed by Co-promoted and Ni-promoted MoS2 corner sites, *Chemical Engineering Science*, 206, 249-260.

Zhou, X., Zhao, C., Yang, J., dan Zhang, S., 2007, Catalytic Oxidation of Dibenzothiophene Using Cyclohexanone Peroxide, *Energy Fuels*, 21, 7-10.

Zhu, W., Wu, P., Yang, L., Chang, Y., Chao, Y., dan Li, H., 2013, Pyridium-Based Temperature-Responsive Magnetic Ionic Liquid for Oxidative Desulfurization of Fuels, *Chem. Eng. J.*, 229, 250-256.

Zou, J., Lin, Y., Wu, S., Wu, M., dan Yang, C., 2021, Construction of Bifunctional 3-D Ordered Mesoporous Catalyst for Oxidative Desulfurization, *Sep. Purif. Thechnol.*, 264, 118434.