

DAFTAR PUSTAKA

- Abdulkareem-Alsultan, G., Asikin-Mijan, N., Lee, H. V., and Taufiq-Yap, Y.H., 2016, A new route for the synthesis of La-Ca oxide supported on nano activated carbon via vacuum impregnation method for one pot esterification-transesterification reaction, *Chem. Eng. J.*, 304, 61–71.
- Akream, N.S., Hamd, M.I., Gheni, S.A., Al-Sudani, F.T., Mohammed, A.E., Mohammed, H.R., Ali, M.M., Ahmed, S.M.R., Türköz Karakullukçu, N., and Tahah, A.K., 2024a, High-yield activated carbon based ZnO-Ce bifunctional catalyst for production of biodiesel from waste cooking oil, *Energy Convers. Manag.*, 321, 119054.
- Al-Hamamre, Z., Sandouqa, A., Al-Saida, B., Shawabkeh, R.A., and Alnaief, M., 2023, Biodiesel production from waste cooking oil using heterogeneous KNO₃/Oil shale ash catalyst, *Renew. Energy*, 211, 470–483.
- Al-Saadi, A., Mathan, B., and He, Y., 2020, Biodiesel production via simultaneous transesterification and esterification reactions over SrO–ZnO/Al₂O₃ as a bifunctional catalyst using high acidic waste cooking oil, *Chem. Eng. Res. Des.*, 162, 238–248.
- Al-Sakkari, E.G., Abdeldayem, O.M., El-Sheltawy, S.T., Abadir, M.F., Soliman, A., Rene, E.R., and Ismail, I., 2020, Esterification of high FFA content waste cooking oil through different techniques including the utilization of cement kiln dust as a heterogeneous catalyst: A comparative study, *Fuel*, 279, 118519.
- Ali, A., Li, B., Lu, Y., and Zhao, C., 2019, Highly selective and low-temperature hydrothermal conversion of natural oils to fatty alcohols, *Green Chem.*, 21, 3059–3064.
- Amesho, K.T.T., Lin, Y.C., Chen, C.E., Cheng, P.C., and Shangdiar, S., 2022, Kinetics studies of sustainable biodiesel synthesis from *Jatropha curcas* oil by exploiting bio-waste derived CaO-based heterogeneous catalyst via microwave heating system as a green chemistry technique, *Fuel*, 323, 123876.
- Ansari, K.A., Banerjee, A., Danish, M., Hassan, S., Sahayaraj, D., Khan, M., Phan, T., and Trinh, Q.T., 2022, State-of-the-art practices to upgrade biomass fast pyrolysis derived bio-oil, *Innovations in Thermochemical Technologies for Biofuel Processing*, Elsevier Inc.
- Anuradha, S., Raj, J. A., Vijayaraghavan, R., and Viswanathan, B., 2014, Sulphated Fe₂O₃-TiO₂ catalysed transesterification of soybean oil to biodiesel, *Indian J. Chem.*, 53A, 1493-1499.
- Atadashi, I.M., Aroua, M.K., Abdul Aziz, A.R., and Sulaiman, N.M.N., 2012, Production of biodiesel using high free fatty acid feedstocks, *Renew. Sustain. Energy Rev.*, 16, 3275–3285.

- Basumatary, S.F., Brahma, Sona, Hoque, M., Das, B.K., Selvaraj, M., Brahma, Sujata, and Basumatary, S., 2023, Advances in CaO-based catalysts for sustainable biodiesel synthesis, *Green Energy Resour.*, 1, 100032.
- Berent, K., Komarek, S., Lach, R., and Pyda, W., 2019, The effect of calcination temperature on the structure and performance of nanocrystalline mayenite powders, *Materials (Basel)*., 12, 3476.
- Bharti, R.K., Kaushal, C., Singh, A., Dhar, D.W., Babu, R., and Kaushik, A., 2024, Evaluation of fuel properties for possible biodiesel output based on the fatty acid composition of oleaginous plants and microalgae, *Sci. Total Environ.*, 918, 170448.
- Boey, P.L., Maniam, G.P., Hamid, S.A., and Ali, D.M.H., 2011, Utilization of waste cockle shell (*Anadara granosa*) in biodiesel production from palm olein: Optimization using response surface methodology, *Fuel*, 90, 2353–2358.
- Bulina, N. V., Avakyan, L.A., Makarova, S. V., Orehov, I.B., and Bystrov, V.S., 2023, Structural Features of Oxyapatite, *Minerals*, 13, 1–15.
- Cai, M., Bian, X., Xie, F., Wang, Y., Cen, P., Wu, W., Xu, G., and Yang, Y., 2022, The Selective Catalytic Reduction Reaction and Mechanism of Citric Acid Modified The CeO₂-WO₃ /TiO₂ Catalyst, *Authorea*, 573175.
- Çakırca, E.E., N Tekin, G., İlgen, O., and N Akın, A., 2018, Catalytic activity of CaO-based catalyst in transesterification of microalgae oil with methanol, *Energy Environ.*, 30, 176–187.
- Cannilla, C., Bonura, G., Rombi, E., Arena, F., and Frusteri, F., 2010, Highly effective MnCeOx catalysts for biodiesel production by transesterification of vegetable oils with methanol, *Appl. Catal. A Gen.*, 382, 158–166.
- Changmai, B., Rano, R., Vanlalveni, C., and Rokhum, S.L., 2021, A novel Citrus sinensis peel ash coated magnetic nanoparticles as an easily recoverable solid catalyst for biodiesel production, *Fuel*, 286, 119447.
- Changmai, B., Sudarsanam, P., and Rokhum, Samuel Lalthazuala, 2020, Biodiesel production using a renewable mesoporous solid catalyst, *Ind. Crops Prod.*, 145, 111911.
- Changmai, B., Sudarsanam, P., and Rokhum, Samuel Lalthazuala, 2020, Industrial Crops & Products Biodiesel production using a renewable mesoporous solid catalyst, *Ind. Crop. Prod.*, 145, 111911.
- Chukwuemeke Ulakpa, W., Maryjane Adaeze, I., Augustine Chimezie, O., Arnold Olaseinde, A., Odeworitse, E., Onoriode, E., Azeez Sarafa, O., Aderemi Olutoye, M., Dim, P., and Siddique, M., 2024, Synthesis and Characterization of Calcium Oxide Nanoparticles (CaO NPS) from Snail Shells Using Hydrothermal Method, *J. Turkish Chem. Soc. Sect. A Chem.*, 11, 825–834.
- Cordero-Ravelo, V. and Schallenberg-Rodriguez, J., 2018a, Biodiesel production as a solution to waste cooking oil (WCO) disposal. Will any type of WCO do for a transesterification process, *J. Environ. Manage.*, 228, 117–129.

- Dampang, S., Purwanti, E., Destyorini, F., Kurniawan, S.B., Abdullah, S.R.S., and Imron, M.F., 2021, Analysis of Optimum Temperature and Calcination Time in the Production of CaO Using Seashells Waste as CaCO_3 Source, *J. Ecol. Eng.*, 22, 221–228.
- Elgharbawy, A.S., Sadik, W.A., Sadek, O.M., and Kasaby, M.A., 2021, A review on biodiesel feedstocks and production technologies, *J. Chil. Chem. Soc.*, 65, 5098–5109.
- Elias, S., Rabi, A.M., Okeleye, B.I., Okudoh, V., and Oyekola, O., 2020, Bifunctional Heterogeneous Catalyst for Biodiesel Production from Waste Vegetable Oil, *Appl. Sci.*, 10, 3153.
- Enguilo Gonzaga, V., Romero, R., Gómez-Espinosa, R.M., Romero, A., Martínez, S.L., and Natividad, R., 2021, Biodiesel Production from Waste Cooking Oil Catalyzed by a Bifunctional Catalyst, *ACS Omega*, 6, 24092–24105.
- Errera, M.R., Dias, T.A. d. C., Maya, D.M.Y., and Lora, E.E.S., 2023, Global bioenergy potentials projections for 2050, *Biomass and Bioenergy*, 170, 106721.
- Ezzah-Mahmudah, S., Lokman, I.M., Saiman, M.I., and Taufiq-Yap, Y.H., 2016, Synthesis and characterization of $\text{Fe}_2\text{O}_3/\text{CaO}$ derived from Anadara Granosa for methyl ester production, *Energy Convers. Manag.*, 126, 124–131.
- Falowo, O.A., Ojadiran, O.J., Moses, O., Eghianruwa, R., and Betiku, E., 2024, A bifunctional catalyst from waste eggshells and its application in biodiesel synthesis from waste cooking oil, *Results Eng.*, 23, 102613.
- Farouk, S.M., Tayeb, A.M., Abdel-Hamid, S.M.S., and Osman, R.M., 2024, Recent advances in transesterification for sustainable biodiesel production, challenges, and prospects: a comprehensive review, *Environ. Sci. Pollut. Res.*, 31, 12722–12747.
- Fattah, I.M.R., Ong, H.C., Mahlia, T.M.I., Mofijur, M., and Silitonga, A.S., 2020, State of the Art of Catalysts for Biodiesel Production, *Front. Energy Res.*, 8, 1–17.
- Fiala, K., Rublaim, A., and Leasing, R., 2025, Boosting wet yeast-based biodiesel production by in-situ transesterification using a novel acid-base bifunctional carbon-based catalyst derived from spent coffee ground and cement residue, *Renew. Energy*, 241, 122341.
- Fitria, R.A., Prasetyo, N., Saviola, A.J., Trisunaryanti, W., Syoufian, A., Amin, A.K., Oh, W.C., and Wijaya, K., 2025, Synthesis of cobalt-dispersed sulfated zirconia nanocatalyst for the hydroconversion of used palm cooking oil into bio-jet fuel, *Case Stud. Chem. Environ. Eng.*, 11, 101052.
- Fung, S., Brahma, S., Hoque, M., and Kumar, B., 2023, Green Energy and Resources Advances in CaO-based catalysts for sustainable biodiesel synthesis, *Green Energy Resour.*, 1, 100032.

- Ganesan, K., Sukalingam, K., and Xu, B., 2019, Impact of consumption of repeatedly heated cooking oils on the incidence of various cancers- A critical review, *Crit. Rev. Food Sci. Nutr.*, 59, 488–505.
- Gauto, M.A., Carazzolle, M.F., Rodrigues, M.E.P., de Abreu, R.S., Pereira, T.C., and Pereira, G.A.G., 2023, Hybrid vigor: Why hybrids with sustainable biofuels are better than pure electric vehicles, *Energy Sustain. Dev.*, 76, 101261.
- Gohar Khan, S., Hassan, M., Anwar, M., Zeshan, Masood Khan, U., and Zhao, C., 2022, Mussel shell based CaO nano-catalyst doped with praseodymium to enhance biodiesel production from castor oil, *Fuel*, 330, 125480.
- Huang, J., Zou, Y., Yaseen, M., Qu, H., He, R., and Tong, Z., 2021, Fabrication of hollow cage-like CaO catalyst for the enhanced biodiesel production via transesterification of soybean oil and methanol, *Fuel*, 290, 119799.
- Hussain, M.N., Samad, T. Al, and Janajreh, I., 2016, Economic feasibility of biodiesel production from waste cooking oil in the UAE, *Sustain. Cities Soc.*, 26, 217–226.
- Istadi, I., Anggoro, D.D., Buchori, L., Rahmawati, D.A., and Intaningrum, D., 2015, Active Acid Catalyst of Sulphated Zinc Oxide for Transesterification of Soybean Oil with Methanol to Biodiesel, *Procedia Environ. Sci.*, 23, 385–393.
- Istadi, I., Prasetyo, S.A., and Nugroho, T.S., 2015, Characterization of K₂O/CaO-ZnO Catalyst for Transesterification of Soybean Oil to Biodiesel, *Procedia Environ. Sci.*, 23, 394–399.
- Jana, D.K., Bhattacharjee, S., Roy, S., Dostál, P., and Bej, B., 2022, The optimization of biodiesel production from waste cooking oil catalyzed by ostrich-eggshell derived CaO through various machine learning approaches, *Clean. Energy Syst.*, 3, 100033.
- Kaduk, J.A., 2018, Crystal structures of tricalcium citrates, *Powder Diff.*, 33, 98–107.
- Kajama, M.N., 2015, Hydrogen permeation using nanostructured silica membranes, *Sustain. Dev. Plan. VII*, 1, 447–456.
- Kathumbi, L.K., Home, P.G., Raude, J.M., and Gathitu, B.B., 2023, Performance and emission characteristics of a diesel engine fuelled by biodiesel from black soldier fly larvae: Effects of synthesizing catalysts with citric acid, *Heliyon*, 9, 21354.
- Kathumbi, L.K., Home, P.G., Raude, J.M., and Gathitu, B.B., 2022, Performance of Citric Acid as a Catalyst and Support Catalyst When Synthesized with NaOH and CaO in Transesterification of Biodiesel from Black Soldier Fly Larvae Fed on Kitchen Waste, *Fuels*, 3, 295–315.

- Kouider Elouahed, S., Asikin-Mijan, N., Alsultan G., A., Kaddour, O., Yusop, M.R., Mimoun, H., Samidin, S., Mansir, N., and Taufiq-Yap, Y.H., 2024, Optimization of the activity of $\text{Mo}_7\text{-Zn}_3/\text{CaO}$ catalyst in the transesterification of waste cooking oil into sustainable biodiesel via response surface methodology, *Energy Convers. Manag.*, 303, 118185.
- Kumar, A., Khandelwal, M., Gupta, S.K., Kumar, V., and Rani, R., 2019, Fourier transform infrared spectroscopy: Data interpretation and applications in structure elucidation and analysis of small molecules and nanostructures, Elsevier Inc.
- Laonapakul, T., Sutthi, R., Chaikool, P., Mutoh, Y., and Chindaprasirt, P., 2019, Optimum conditions for preparation of bio-calcium from blood cockle and golden apple snail shells and characterization, *ScienceAsia*, 45, 10–20.
- Laskar, I.B., Rajkumari, K., Gupta, R., Chatterjee, S., Paul, B., and Rokhum, L., 2018, Waste snail shell derived heterogeneous catalyst for biodiesel production by the transesterification of soybean oil, *RSC Adv.*, 8, 20131–20142.
- Lee, H. V., Juan, J.C., and Taufiq-Yap, Y.H., 2015, Preparation and application of binary acid-base $\text{CaO-La}_2\text{O}_3$ catalyst for biodiesel production, *Renew. Energy*, 74, 124–132.
- Lee, S.M., Lee, S.H., Jeong, S.K., Youn, M.H., Nguyen, D.D., Chang, S.W., and Kim, S.S., 2017, Calcium extraction from steelmaking slag and production of precipitated calcium carbonate from calcium oxide for carbon dioxide fixation, *J. Ind. Eng. Chem.*, 53, 233–240.
- Li, F., Jiang, J., Liu, P., Zhai, Q., Wang, F., Hse, C., and Xu, J., 2018, Catalytic cracking of triglycerides with a base catalyst and modification of pyrolytic oils for production of aviation fuels, *Sustain. Energy Fuels*, 2, 1206–1215.
- Lim, S.Y., Mutalib, M.S.A., Khaza'ai, H., and Chang, S.K., 2018, Detection of fresh palm oil adulteration with recycled cooking oil using fatty acid composition and ftir spectral analysis, *Int. J. Food Prop.*, 21, 2428–2451.
- Liu, Y., Sotelo-Boyás, R., Murata, K., Minowa, T., and Sakanishi, K., 2011, Hydrotreatment of Vegetable Oils to Produce Bio-Hydrogenated Diesel and Liquefied Petroleum Gas Fuel over Catalysts Containing Sulfided Ni–Mo and Solid Acids, *Energy & Fuels*, 25, 4675–4685.
- Lowe, B., Gardy, J., and Hassanpour, A., 2022, The Role of Sulfated Materials for Biodiesel Production from Cheap Raw Materials, *Catalysts*, 12, 223.
- Mahesh, S.E., Ramanathan, A., Begum, K.M.M.S., and Narayanan, A., 2015, Biodiesel production from waste cooking oil using KBr impregnated CaO as catalyst, *Energy Convers. Manag.*, 91, 442–450.
- Malau, N.D. and Sianturi, M., 2024, Efficiency of Shell Waste as a Source of Calcium Carbonate to Produce Calcium Oxide through Calcination Process, *Asian J. Adv. Res. Reports*, 18, 164–169.

- Mancini, A., Imperlini, E., Nigro, E., Montagnese, C., Daniele, A., Orrù, S., and Buono, P., 2015, Biological and nutritional properties of palm oil and palmitic acid: Effects on health, *Molecules*, 20, 17339–17361.
- Maneedaeng, A., Wiangkham, A., Ariyarit, A., Pumpuang, A., and Sukjit, E., 2025, Investigating the impact of fatty acid profiles on biodiesel lubricity using artificial intelligence techniques, *Clean. Eng. Technol.*, 25, 100913.
- Maneerung, T., Kawi, S., Dai, Y., and Wang, C.H., 2016, Sustainable biodiesel production via transesterification of waste cooking oil by using CaO catalysts prepared from chicken manure, *Energy Convers. Manag.*, 123, 487–497.
- Mansir, N., Hwa Teo, S., Lokman Ibrahim, M., and Yun Hin, T.Y., 2017, Synthesis and application of waste egg shell derived CaO supported W-Mo mixed oxide catalysts for FAME production from waste cooking oil: Effect of stoichiometry, *Energy Convers. Manag.*, 151, 216–226.
- Mansir, N., Taufiq-Yap, Y.H., Rashid, U., and Lokman, I.M., 2017, Investigation of heterogeneous solid acid catalyst performance on low grade feedstocks for biodiesel production: A review, *Energy Convers. Manag.*, 141, 171–182.
- Mao, Y., Cheng, J., Guo, H., Qian, L., Tu, J., and Yang, W., 2023, Acid-base bifunctional Fe-NC catalyst with Fe-N₄ and Fe nanoparticles active sites derived from Fe-doped ZIF-8 boosted microalgal lipid conversion, *Appl. Surf. Sci.*, 634, 157679.
- Mao, Y., Cheng, J., Guo, H., Qian, L., Yang, W., and Park, J.Y., 2023, Synthesis of Acid-Base Bifunctional Catalysts by In Situ Growth of Co-LDH Nanosheets on HY Zeolite To Enhance Co(OH)_x Utilization for Microalgal Lipid Conversion, *Energy and Fuels*, 37, 5220–5228.
- Marwaha, A., Dhir, A., Mahla, S.K., and Mohapatra, S.K., 2018, An overview of solid base heterogeneous catalysts for biodiesel production, *Catal. Rev.*, 00, 1–35.
- Mel'gunov, M.S., 2023, Application of the simple Bayesian classifier for the N₂ (77 K) adsorption/desorption hysteresis loop recognition, *Adsorption*, 29, 199–208.
- Moghadas, M., Abbasi, M., Mousavi, M., Apoorvari, M.A., Khoshghamat, A., Hosseini, A., Jalaeian, S., Sheida, M., Mobaraki, M., Torabi, E., Amiri, A., and Mirzaei, M., 2025, Trends in Analytical Chemistry Porous materials in analytical sample preparation : Current status and future perspectives, *Trends Anal. Chem.*, 186, 118193.
- Muhammed Niyas, M. and Shaija, A., 2022, Performance evaluation of diesel engine using biodiesels from waste coconut, sunflower, and palm cooking oils, and their hybrids, *Sustain. Energy Technol. Assessments*, 53, 102681.
- Mulyatun, M., Prameswari, J., Istadi, I., and Widayat, W., 2022, Production of non-food feedstock based biodiesel using acid-base bifunctional heterogeneous catalysts: A review, *Fuel*, 314, 122749.

- Mumtaz, M.W., Adnan, A., Mukhtar, H., Rashid, U., and Danish, M., 2017, Biodiesel Production Through Chemical and Biochemical Transesterification : Trends , Technicalities , and Future Perspectives, Elsevier Inc.
- Nabgan, W., Nabgan, B., Ikram, M., Jadhav, A.H., Ali, M.W., Ul-Hamid, A., Nam, H., Lakshminarayana, P., kumar, A., Bahari, M.B., and Khusnun, N.F., 2022, Synthesis and catalytic properties of calcium oxide obtained from organic ash over a titanium nanocatalyst for biodiesel production from dairy scum, *Chemosphere*, 290, 133296.
- Nath, B., Das, B., Kalita, P., and Basumatary, S., 2019, Waste to value addition : Utilization of waste Brassica nigra plant derived novel green heterogeneous base catalyst for effective synthesis of biodiesel, *J. Clean. Prod.*, 239, 118112.
- Nath, B., Kalita, P., Das, B., and Basumatary, S., 2020a, Highly efficient renewable heterogeneous base catalyst derived from waste Sesamum indicum plant for synthesis of biodiesel, *Renew. Energy*, 151, 295–310.
- Nongbe, M.C., Ekou, T., Ekou, L., Yao, K.B., Le Grogne, E., and Felpin, F.-X., 2017, Biodiesel production from palm oil using sulfonated graphene catalyst, *Renew. Energy*, 106, 135–141.
- Nur Syazwani, O., Lokman Ibrahim, M., Wahyudiono, Kanda, H., Goto, M., and Taufiq-Yap, Y.H., 2017, Esterification of high free fatty acids in supercritical methanol using sulfated angel wing shells as catalyst, *J. Supercrit. Fluids*, 124, 1–9.
- Nurhayati, Amri, T.A., Annisa, N.F., and Syafitri, F., 2020, The Synthesis of Biodiesel from Crude Palm Oil (CPO) using CaO Heterogeneous Catalyst Impregnated H₂SO₄, Variation of Stirring Speed and Mole Ratio of Oil to Methanol, *J. Phys. Conf. Ser.*, 1655, 012106.
- Orege, J.I., Oderinde, O., Kifle, G.A., Ibikunle, A.A., Raheem, S.A., Ejeromedoghene, O., Okeke, E.S., Olukowi, O.M., Orege, O.B., Fagbohun, E.O., Ogundipe, T.O., Avor, E.P., Ajayi, O.O., and Daramola, M.O., 2022, Recent advances in heterogeneous catalysis for green biodiesel production by transesterification, Elsevier Ltd.
- Osman, N., Rashid, T.D.U., Mastuli, M.S., and Taufiq-Yap, Y.H., 2018, Esterification of Palm Fatty Acid Distillate (PFAD) to Biodiesel using Bi-functional Catalyst Synthesized from Waste Angel Wing Shell (*Cyrtopleura costata*), *Renew. Energy*, 131, 187–196.
- Paul, R., Shit, S.C., Fovanna, T., Ferri, D., Srinivasa Rao, B., Gunasooriya, G.T.K.K., Dao, D.Q., Le, Q. Van, Shown, I., Sherburne, M.P., Trinh, Q.T., and Mondal, J., 2020, Realizing Catalytic Acetophenone Hydrodeoxygenation with Palladium-Equipped Porous Organic Polymers, *ACS Appl. Mater. Interfaces*, 12, 50550–50565.
- Di Pietro, M.E., Mannu, A., and Mele, A., 2020, NMR Determination of Free Fatty Acids in Vegetable Oils, *Processes*, 8, 410.

- Pratika, R.A., Wijaya, K., and Trisunaryanti, W., 2021, Hydrothermal treatment of SO_4/TiO_2 and TiO_2/CaO as heterogeneous catalysts for the conversion of *Jatropha* oil into biodiesel, *J. Environ. Chem. Eng.*, 9, 106547.
- Puhan, D., Casford, M.T.L., and Davies, P.B., 2023, Evaluation of Structural and Compositional Changes of a Model Monoaromatic Hydrocarbon in a Benchtop Hydrocracker Using GC, FTIR, and NMR Spectroscopy, *ACS Omega*, 8, 35988–36000.
- Rabiah Nizah, M.F., Taufiq-Yap, Y.H., Rashid, U., Teo, S.H., Shajaratun Nur, Z.A., and Islam, A., 2014, Production of biodiesel from non-edible *Jatropha curcas* oil via transesterification using $\text{Bi}_2\text{O}_3\text{-La}_2\text{O}_3$ catalyst, *Energy Convers. Manag.*, 88, 1257–1262.
- Rahman, N.J.A., Ramli, A., Jumbri, K., and Uemura, Y., 2019, Tailoring the surface area and the acid–base properties of ZrO_2 for biodiesel production from *Nannochloropsis* sp., *Sci. Rep.*, 9, 16223.
- Raia, R.Z., da Silva, L.S., Marcucci, S.M.P., and Arroyo, P.A., 2017, Biodiesel production from *Jatropha curcas* L. oil by simultaneous esterification and transesterification using sulphated zirconia, *Catal. Today*, 289, 105–114.
- Sahani, S., Roy, T., and Chandra Sharma, Y., 2019, Clean and efficient production of biodiesel using barium cerate as a heterogeneous catalyst for the biodiesel production; kinetics and thermodynamic study, *J. Clean. Prod.*, 237, 117699.
- Sakti La Ore, M., Wijaya, K., Trisunaryanti, W., Saputri, W.D., Herald, E., Yuwana, N.W., Hariani, P.L., Budiman, A., and Sudiono, S., 2020, The synthesis of SO_4/ZrO_2 and Zr/CaO catalysts via hydrothermal treatment and their application for conversion of low-grade coconut oil into biodiesel, *J. Environ. Chem. Eng.*, 8, 104205.
- dos Santos, R.C.M., Gurgel, P.C., Pereira, N.S., Breves, R.A., de Matos, P.R.R., Silva, L.P., Sales, M.J.A., and Lopes, R. de V.V., 2020, Ethyl esters obtained from pequi and macaúba oils by transesterification with homogeneous acid catalysis, *Fuel*, 259, 116206.
- Sirisomboonchai, S., Abuduwayiti, M., Guan, G., Samart, C., Abliz, S., Hao, X., Kusakabe, K., and Abudula, A., 2015, Biodiesel production from waste cooking oil using calcined scallop shell as catalyst, *Energy Convers. Manag.*, 95, 242–247.
- Srikumar, K., Tan, Y.H., Kansedo, J., Tan, I.S., Mubarak, N.M., Ibrahim, M.L., Yek, P.N.Y., Foo, H.C.Y., Karri, R.R., and Khalid, M., 2024, A review on the environmental life cycle assessment of biodiesel production: Selection of catalyst and oil feedstock, *Biomass and Bioenergy*, 185, 107239.
- Suzihaque, M.U.H., Alwi, H., Kalthum Ibrahim, U., Abdullah, S., and Haron, N., 2022, Biodiesel production from waste cooking oil: A brief review, *Mater. Today Proc.*, 63, S490–S495.

- Syazwani, O.N., Rashid, U., Mastuli, M.S., and Taufiq-Yap, Y.H., 2019, Esterification of palm fatty acid distillate (PFAD) to biodiesel using Bi-functional catalyst synthesized from waste angel wing shell (*Cyrtopleura costata*), *Renew. Energy*, 131, 187–196.
- Thaunay, F., Calvo, F., Nicol, E., Ohanessian, G., and Clavaguéra, C., 2019, Infrared Spectra of Deprotonated Dicarboxylic Acids: IRMPD Spectroscopy and Empirical Valence-Bond Modeling, *ChemPhysChem*, 20, 803–814.
- Trisunaryanti, W., Triyono, T., Ghoni, M.A., Fatmawati, D.A., Mahayuwati, P.N., and Suarsih, E., 2020, Hydrocracking of calophyllum inophyllum oil employing Co and/or Mo supported on γ -Al₂O₃ for biofuel production, *Bull. Chem. React. Eng. Catal.*, 15, 743–751.
- Trisunaryanti, W., Triyono, T., Hadjarningrum, S.A.N., and Fatmawati, D.A., 2021, Activity of ni-nh₂/mesoporous silica material as bifunctional catalyst for hydrocracking of used cooking oil, *Key Eng. Mater.*, 884 KEM, 83–89.
- Usman, M.R., Permana, M.D., Ardinsyah, A.F., Wulandari, M.T., Purwanti, A., Setyaningrum, L., Lestari, I.F., and Artemisia, S.D., 2022, Calcium Extract Characterization from Rajungan Crab Shell (*Portunus pelagicus*) and Bakau Crab Shell (*Scylla serrata*) using Calcination as Effervescent, *J. Akad. Kim.*, 11, 122–128.
- Vieira, S.S., Magriotis, Z.M., Ribeiro, M.F., Graça, I., Fernandes, A., Lopes, J.M.F.M., Coelho, S.M., Santos, N.A. V., and Saczk, A.A., 2015, Use of HZSM-5 modified with citric acid as acid heterogeneous catalyst for biodiesel production via esterification of oleic acid, *Microporous Mesoporous Mater.*, 201, 160–168.
- Wang, A., Li, H., Zhang, H., Pan, H., and Yang, S., 2018, Efficient catalytic production of biodiesel with acid-base bifunctional rod-like Ca-B oxides by the sol-gel approach, *Materials (Basel)*, 12, 83.
- Wang, B., Meng, D., Wang, W., LI, Z., and MA, X., 2016, Effect of citric acid addition on MoO₃/CeO₂-Al₂O₃ catalyst for sulfur-resistant methanation, *J. Fuel Chem. Technol.*, 44, 1479–1484.
- Wang, S., Fu, H., Abulizi, A., Okitsu, K., Maeda, Y., Nulahong, A., Ren, T., and Niu, S., 2025, Biodiesel production from sheep fat catalyzed by CaO-SrO(x)/BCs(y) acid-base bifunctional catalyst and process optimization, *Renew. Energy*, 238, 121881.
- Wijaya, K., Ayu Pratika, R., Trisunaryanti, W., and Tikoalu, A., 2024, Modification of TiO₂ as SO₄/TiO₂ Acid and CaO/TiO₂ Base Catalysts and Their Applications in Conversion of Waste Frying Oil (WFO) into Biodiesel, *Adv. Mater. Res.*, Springer, Cham.

- Wijaya, K., Trisunaryanti, W., Tahir, I., Yuwono, N.W., Haryono, D., Fransiska, U., Daryanto, E., Fatwa, M.M., Ningrum, T.S., Mahmudah, R., and Agharadatu, R.H., 2023, Diversification of Used Cooking Oil into Biodiesel as an Attempt to Increase BumDes Mangesti Sejahtera's Revenue in Gentan Village, Baki District, Sukoharjo Regency, *Proc. 3rd Int. Conf. Community Engagem. Educ. Sustain. Dev.*, 159–167.
- Xia, S., Li, J., Chen, G., Tao, J., Li, W., and Zhu, G., 2022, Magnetic reusable acid-base bifunctional Co doped Fe₂O₃–CaO nanocatalysts for biodiesel production from soybean oil and waste frying oil, *Renew. Energy*, 189, 421–434.
- Xia, S., Tao, J., Zhao, Y., Men, Y., Chen, C., Hu, Y., Zhu, G., Chu, Y., Yan, B., and Chen, G., 2024, Application of waste derived magnetic acid-base bifunctional CoFe/biochar/CaO as an efficient catalyst for biodiesel production from waste cooking oil, *Chemosphere*, 350, 141104.
- Yuliana, S., Vania Utami, A., Mulyaningtyas, A., resmi Jl Yani, A.A., Kartasura, K., Sukoharjo, K., Tengah, J., and Yani, J.A., 2021, Pengaruh rasio cangkang kerang darah (anadara granosa) dan serat alam terhadap kekuatan bending komposit, *ROTASI*, 23, 1–5.
- Yusuff, A.S. and Owolabi, J.O., 2019, Synthesis and characterization of alumina supported coconut chaff catalyst for biodiesel production from waste frying oil, *South African J. Chem. Eng.*, 30, 42–49.
- Zeng, D., Liu, S., Gong, W., Wang, G., Qiu, J., and Tian, Y., 2013, Acid properties of solid acid from petroleum coke by chemical activation and sulfonation, *Catal. Commun.*, 40, 5–8.
- Zhang, G. and Xie, W., 2023, ZrMo oxides supported catalyst with hierarchical porous structure for cleaner and sustainable production of biodiesel using acidic oils as feedstocks, *J. Clean. Prod.*, 384, 135594.
- Zhang, Q., Zhang, Y., Li, H., Gao, C., and Zhao, Y., 2013, Heterogeneous CaO–ZrO₂ acid-base bifunctional catalysts for vapor-phase selective dehydration of 1,4-butanediol to 3-buten-1-ol, *Appl. Catal. A Gen.*, 466, 233–239.
- Zheng, B., Ban, L., Nie, Y., Chen, L., Yang, S., and Zhang, H., 2024, Sustainable production of biodiesel enabled by acid-base bifunctional ZnF₂ via one-pot transformation of Koelreuteria integrifoliola oil: Process optimization, kinetics study and cost analysis, *J. Clean. Prod.*, 453, 142263.