

## DAFTAR PUSTAKA

- Adams, B.D. and Chen, A., 2011, The role of palladium in a hydrogen economy, *Mater. Today*, 14, 282–289.
- Ahmad, M.H., Ibrahim, W.A., Sazali, J., Izhab, I., and Hassan, Z., 2020, Review: Thermal process of castor and plant based oil, *Indones. J. Chem.*, 20, 237–247.
- Almanza, L.O., Narbeshuber, T., D'Araujo, P., Naccache, C., and Taarit, Y. Ben, 1999, On the influence of the mordenite acidity in the hydroconversion of linear alkanes over Pt-mordenite catalysts, *Appl. Catal. A Gen.*, 178, 39–47.
- Al Alwan, B., Salley, S.O., and Ng, K.Y.S., 2014, Hydrocracking of DDGS corn oil over transition metal carbides supported on Al-SBA-15: Effect of fractional sum of metal electronegativities, *Appl. Catal. A Gen.*, 485, 58–66.
- Aziz, Z. and Gozan, M., 2017, Production of gasohol from isobutanol, *IOP Conf. Ser. Earth Environ. Sci.*, 65, 1–10.
- Bai, P., Feng, R., Liu, S., Zhang, P., Yan, Z., Tan, Z., et al., 2015, A comparative study of different fluorine-containing compounds in the preparation of novel alumina binders with rich Brönsted acid sites, *Appl. Petrochemical Res.*, 5, 81–87.
- Bhomick, P.C., Supong, A., Karmaker, R., Baruah, M., Pongener, C., and Sinha, D., 2019, Activated carbon synthesized from biomass material using single-step KOH activation for adsorption of fluoride: Experimental and theoretical investigation, *Korean J. Chem. Eng.*, 36, 551–562.
- Bridgwater, A. V. and Peacocke, G.V.C., 2000, Fast pyrolysis processes for biomass, *Renew. Sustain. energy Rev.*, 4, 1–73.
- Campbell, I.M., 1988, *Catalysis at Surfaces*, Springer, Netherlands.
- Cazetta, A.L., Vargas, A.M.M., Nogami, E.M., Kunita, M.H., Guilherme, M.R., Martins, A.C., et al., 2011, NaOH-activated carbon of high surface area produced from coconut shell: Kinetics and equilibrium studies from the methylene blue adsorption, *Chem. Eng. J.*, 174, 117–125.
- Chagas, C.A., Manfro, R.L., and Toniolo, F.S., 2020, Production of Hydrogen by Steam Reforming of Ethanol over Pd-Promoted Ni/SiO<sub>2</sub> Catalyst, *Catal. Letters*,.
- Cheah, K.W., Taylor, M.J., Osatiashtiani, A., Beaumont, S.K., Nowakowski, D.J., Yusup, S., et al., 2019, Monometallic and bimetallic catalysts based on Pd, Cu and Ni for hydrogen transfer deoxygenation of a prototypical fatty acid to diesel range hydrocarbons, *Catal. Today*, 1–11.
- Corcho-Corral, B., Olivares-Marín, M., Fernández-González, C., Gómez-Serrano, V., and Macías-García, A., 2006, Preparation and textural characterisation of activated carbon from vine shoots (*Vitis vinifera*) by H<sub>3</sub>PO<sub>4</sub> -Chemical activation, *Appl. Surf. Sci.*, 252, 5961–5966.
- Danish, M. and Ahmad, T., 2018, A review on utilization of wood biomass as a

- sustainable precursor for activated carbon production and application, *Renew. Sustain. Energy Rev.*, 87, 1–21.
- Digne, M., Raybaud, P., Sautet, P., Guillaume, D., and Toulhoat, H., 2008, Atomic scale insights on chlorinated  $\gamma$ -alumina surfaces, *J. Am. Chem. Soc.*, 130, 11030–11039.
- Early, K., Kovalchuk, V.I., Lonyi, F., Deshmukh, S., and D'Itri, J.L., 1999, Hydrodechlorination of 1,1-dichlorotetrafluoroethane and dichlorodifluoromethane catalyzed by Pd on fluorinated aluminas: The role of support material, *J. Catal.*, 182, 219–227.
- Feliczak-Guzik, A., 2018, Hierarchical zeolites: Synthesis and catalytic properties, *Microporous Mesoporous Mater.*, 259, 33–45.
- Foger, K., 1984, Dispersed metal catalysts., *Catal. Sci. Technol.*, 6, 227–305.
- Foo, K.Y. and Hameed, B.H., 2012, Mesoporous activated carbon from wood sawdust by  $K_2CO_3$  activation using microwave heating, *Bioresour. Technol.*, 111, 425–432.
- Fuentes-Ordóñez, E.G., Salbidegoitia, J.A., González-Marcos, M.P., and González-Velasco, J.R., 2016, Mechanism and kinetics in catalytic hydrocracking of polystyrene in solution, *Polym. Degrad. Stab.*, 124, 51–59.
- Guczi, L., Lu, G., and Zsoldos, Z., 1993, Bimetallic catalysts: structure and reactivity, *Catal. Today*, 17, 459–468.
- Guillén, E., Rico, R., López-Romero, J.M., Bedia, J., Rosas, J.M., Rodríguez-Mirasol, J., and Cordero, T., 2009, Pd-activated carbon catalysts for hydrogenation and Suzuki reactions, *Appl. Catal. A Gen.*, 368, 113–120.
- Hampsey, J.E., Hu, Q., Wu, Z., Rice, L., Pang, J., and Lu, Y., 2005, Templating synthesis of ordered mesoporous carbon particles, *Carbon N. Y.*, 43, 2977–2982.
- Han, S., Lee, K.T., Oh, S.M., and Hyeon, T., 2003, The effect of silica template structure on the pore structure of mesoporous carbons, *Carbon N. Y.*, 41, 1049–1056.
- Hermida, L., Abdullah, A.Z., and Mohamed, A.R., 2015, Deoxygenation of fatty acid to produce diesel-like hydrocarbons: A review of process conditions, reaction kinetics and mechanism, *Renew. Sustain. Energy Rev.*, 42, 1223–1233.
- Ji, Y., Li, T., Zhu, L., Wang, X., and Lin, Q., 2007, Preparation of activated carbons by microwave heating KOH activation, *Appl. Surf. Sci.*, 254, 506–512.
- Joseph, C.G., Fazli, H., Zain, M., Siti, &, and Dek, F., 2006, Treatment of landfill leachate in kayu madang, sabah: Textural and physical characterization, *Malaysia J. Anal. Sci.*, 10, 1–6.
- Keera, S.T., El Sabagh, S.M., and Taman, A.R., 2018, Castor oil biodiesel production and optimization, *Egypt. J. Pet.*, 27, 979–984.

- Kilic, M., Apaydin-Varol, E., and Pütün, A.E., 2011, Adsorptive removal of phenol from aqueous solutions on activated carbon prepared from tobacco residues: Equilibrium, kinetics and thermodynamics, *J. Hazard. Mater.*, 189, 397–403.
- Li, W., Zhang, Y., Das, L., Wang, Y., Li, M., Wanninayake, N., 2018, Linking lignin source with structural and electrochemical properties of lignin-derived carbon materials, *RSC Adv.*, 8, 38721–38732.
- Li, X.-F., Xu, Q., Fu, Y., and Guo, Q.X., 2014, Preparation and characterization of activated carbon from Kraft lignin via KOH activation, *Environ. Prog. Sustain. Energy*, 33, 519–526.
- Li, X., Luo, X., Dou, L., and Chen, K., 2016, Preparation and characterization of K<sub>2</sub>CO<sub>3</sub>-Activated kraft lignin carbon, *Bio. Resources*, 11, 2096–2108.
- Macedo, J.S., Otubo, L., Ferreira, O.P., Gimenez, I. de F., Mazali, I.O., and Barreto, L.S., 2008, Biomorphic activated porous carbons with complex microstructures from lignocellulosic residues, *Microporous. Mesoporous Mater.*, 107, 276–285.
- Majka, M., Tomaszewicz, G., and Mianowski, A., 2018, Experimental study on the coal tar hydrocracking process over different catalysts, *J. Energy Inst.*, 91, 1164–1176.
- Malik, J., Rachman, O., and Balfas, J., 2015, Evaluation on utilization efficiency of merbau and relocation of its wood industry destination of relocation, *Anal. Kebijak. Hutan*, 2, 59–76.
- Maniam, K.K., Muthukumar, V., and Chetty, R., 2014, Approaches towards improving the dispersion of electrodeposited palladium on carbon supports, *Energ. Procedia*, 54, 281–291.
- Manocha, S.M., 2003, Porous carbons, *Sadhana*, 28, 335–348.
- Marsh, H. and Rodriguez-Reinoso, F., 2006, Activated Carbon, Elsevier Publisher
- Meller, E., Gutkin, V., Aizenshtat, Z., and Sasson, Y., 2016, Catalytic hydrocracking- hydrogenation of castor oil fatty acid methyl esters over nickel substituted polyoxometalate catalyst, *Chem. Select*, 1, 6396–6405.
- Mochida, I., Yoon, S.H., and Qiao, W., 2006, Catalysts in syntheses of carbon and carbon precursors, *J. Braz. Chem. Soc.*, 17, 1059–1073.
- Mondal, T., Pant, K.K., and Dalai, A.K., 2015, Catalytic oxidative steam reforming of bio-ethanol for hydrogen production over Rh promoted Ni/CeO<sub>2</sub>-ZrO<sub>2</sub> catalyst, *Int. J. Hydrogen Energy*, 40, 2529–2544.
- Mopoung, S., Moonsri, P., Palas, W., and Khumpai, S., 2015, Characterization and properties of activated carbon prepared from tamarind seeds by KOH activation for Fe(III) adsorption from aqueous solution, *Sci. World J.*, 1-9.
- Murachman, B., Pranantyo, D., and Putra, E.S., 2014, Study of gasohol as alternative fuel for gasoline substitution: Characteristics and performances, *Int. J. Renew. Energy Dev.*, 3, 175–183.

- Noor, P., Khanmohammadi, M., Roozbehani, B., Yaripour, F., and Bagheri Garmarudi, A., 2018, Introduction of table sugar as a soft second template in ZSM-5 nanocatalyst and its effect on product distribution and catalyst lifetime in methanol to gasoline conversion, *J. Energy Chem.*, 27, 582–590.
- Nwosu, C., 2012, An electronegativity approach to catalytic performance, *J. Tech. Sci. Technologies*, 1, 25–28.
- Oak, M.A., Lee, J.H., Jang, H.M., Goh, J.S., Choi, H.J., and Scott, J.F., 2011, 4d-5p orbital mixing and asymmetric In 4d-O<sub>2</sub>p hybridization in InMnO<sub>3</sub>: A new bonding mechanism for hexagonal ferroelectricity, *Phys. Rev. Lett.*, 106, 4–7.
- Ogunniyi, D.S., 2006, Castor oil: A vital industrial raw material, *Bioresour. Technol.*, 97, 1086–1091.
- Omri, A. and Benzina, M., 2012, Characterization of activated carbon prepared from a new raw lignocellulosic material : *Ziziphus spina-christi* seeds, *J. la Société Chim. Tunisie*, 14, 175–183.
- Parekh, V.J., Rathod, V.K., and Pandit, A.B., 2011, Substrate hydrolysis: Methods, mechanism, and industrial applications of substrate hydrolysis, 2<sup>nd</sup>. Elsevier B.V.
- Park, S. and Jung, W., 2002, Effect of KOH activation on the formation of oxygen structure in activated carbons synthesized from polymeric precursor, 98, 93–98.
- Pezoti, O., Cazetta, A.L., Souza, I.P.A.F., Bedin, K.C., Martins, A.C., Silva, T.L., and Almeida, V.C., 2014, Adsorption studies of methylene blue onto ZnCl<sub>2</sub>-activated carbon produced from buriti shells (*Mauritia flexuosa* L.), *J. Ind. Eng. Chem.*, 20, 4401–4407.
- Prahas, D., Kartika, Y., Indraswati, N., and Ismadji, S., 2008, Activated carbon from jackfruit peel waste by H<sub>3</sub>PO<sub>4</sub> chemical activation: Pore structure and surface chemistry characterization, *Chem. Eng. J.*, 140, 32–42.
- Prinetto, F., Manzoli, M., Ghiotti, G., Ortiz, M.D.J.M., Tichit, D., and Coq, B., 2004, Pd/Mg(Al)O catalysts obtained from hydrotalcites: Investigation of acid-base properties and nature of Pd phases, *J. Catal.*, 222, 238–249.
- Ramezani, K., Rowshanzamir, S., and Eikani, M.H., 2010, Castor oil transesterification reaction: A kinetic study and optimization of parameters, *Energy*, 35, 4142–4148.
- Raymundo-Piñero, E., Azaïs, P., Cacciaguerra, T., Cazorla-Amorós, D., Linares-Solano, A., and Béguin, F., 2005, KOH and NaOH activation mechanisms of multiwalled carbon nanotubes with different structural organisation, *Carbon N. Y.*, 43, 786–795.
- Román-Figueroa, C., Olivares-Carrillo, P., Paneque, M., Palacios-Nereo, F.J., and Quesada-Medina, J., 2016, High-yield production of biodiesel by non-catalytic supercritical methanol transesterification of crude castor oil (*Ricinus communis*), *Energy*, 107, 165–171.

- Saygılı, H. and Saygılı, G.A., 2019, Optimized preparation for bimodal porous carbon from lentil processing waste by microwave-assisted  $K_2CO_3$  activation: Spectroscopic characterization and dye decolorization activity, *J. Clean. Prod.*, 226, 968–976.
- Sie, S.T., 1993, Acid catalyzed cracking of paraffinic hydrocarbons evidence for the protonated cyclopropane mechanism from catalytic cracking experiments, *Ind. Eng. Chem. Res.*, 32, 397–402.
- Solano, A., Lillo-Ródenas, M., Marco-Lozar, J., Kunowsky, M., and Romero-Anaya, A., 2012, NaOH and KOH for preparing activated carbons used in energy and environmental applications, *Int. J. Energy, Environ. Econ.*, 20, 59–91.
- Soszka, E., Marcin, J., Kocemba, I., and Keller, N., 2020, Value added chemicals, *Catalysts*, 10, 1026.
- Sriningsih, W., Saerodji, M.G., Trisunaryanti, W., Triyono, Armunanto, R., and Falah, I.I., 2014, Fuel production from LDPE plastic waste over natural zeolite supported Ni, Ni-Mo, Co and Co-Mo Metals, *Procedia Environ. Sci.*, 20, 215–224.
- Sudibandriyo, 2003, A generalize ono kondo lattice model for high pressure adsorption on carbon adsorbents, *Thesis*, 1, 2–5.
- Thian Tye, C., 2019, Catalysts for hydroprocessing of heavy oils and petroleum residues, *Process. Heavy Crude Oils - Challenges Oppor.*, 1–17.
- Torrenes-Espinoza, G., Miranda, B.C., Vega-Baudrit, J., and Mata-Segreda, J.F., 2017, Castor oil (*Ricinus communis*) supercritical methanolysis, *Energy*, 140, 426–435.
- Trisunaryanti, W., 2018, Material katalis dan karakternya, UGM PRESS, Yogyakarta
- Trisunaryanti, W., Kartika, I.A., Mukti, R.R., Hartati, H., Triyono, T., Widyawati, R., and Suarsih, E., 2019, Preparation of Ni- and Mo-based catalysts supported on  $\gamma-Al_2O_3$  for hydrocracking of Calophyllum inophyllum oil, *Biofuels*, 0, 1–6.
- Trisunaryanti, W., Purwono, S., and Putranto, A., 2010, Catalytic hydrocracking of waste lubricant oil into liquid fuel fraction using  $ZnO$ ,  $Nb_2O_5$ , activated natural zeolite and their modification, *Indones. J. Chem.*, 8, 342–347.
- Trisunaryanti, W., Suarsih, E., Triyono, and Falah, I.I., 2019, Well-dispersed nickel nanoparticles on the external and internal surfaces of SBA-15 for hydrocracking of pyrolyzed  $\alpha$ -cellulose, *RSC Adv.*, 9, 1230–1237.
- Trisunaryanti, W., Triwahyuni, E., and Sudiono, S., 2005, Preparasi, modifikasi dan karakterisasi katalis Ni-Mo/zeolit alam dan Mo-Ni/zeolit alam, *Teknoin*, 10, 269–282.
- Trisunaryanti, W., Triyono, Armunanto, R., Hastuti, L.P., Ristiana, D.D., and



- Ginting, R.V., 2018, Hydrocracking of  $\alpha$ -cellulose using Co, Ni, and Pd supported on mordenite catalysts, *Indones. J. Chem.*, 18, 166–172.
- Tuo, C. Long, Z.J., 2016, Method of making mesoporous carbon from natural wood and mesoporous carbon hollow tubes made thereby, *Pat. Appl.*, 1, 1–5.
- Ulfa, M., Trisunaryanti, W., Falah, I.I., and Kartini, I., 2015, Characterization of Gelatines Extracted From Cow Bone for Carbon Synthesis, 8, 57–63.
- Vollmann, J. and Laimer, M., 2013, Novel and traditional oil crops and their biorefinery potential, *Bioprocess. Technol. Biorefinery Sustain. Prod. Fuels, Chem. Polym.*, 47–60.
- Wang, J. and Kaskel, S., 2012, KOH activation of carbon-based materials for energy storage, *J. Mater. Chem.*, 22, 23710–23725.
- Wang, L., Sun, F., Hao, F., Qu, Z., Gao, J., Liu, M., et al., 2020, A green trace  $K_2CO_3$  induced catalytic activation strategy for developing coal-converted activated carbon as advanced candidate for  $CO_2$  adsorption and supercapacitors, *Chem. Eng. J.*, 383, 123205.
- Wang, X., Lee, J.S., Tsouris, C., DePaoli, D.W., and Dai, S., 2010, Preparation of activated mesoporous carbons for electrosorption of ions from aqueous solutions, *J. Mater. Chem.*, 20, 4602–4608.
- Weitkamp, J., 2012, Catalytic hydrocracking-mechanisms and versatility of the process, *Chem. Cat. Chem.*, 4, 292–306.
- Wijaya, K., Ariyanti, A.D., Tahir, I., Syoufian, A., Rachmat, A., and Hasanudin, 2018, Synthesis of Cr/ $Al_2O_3$ - bentonite nanocomposite as the hydrocracking catalyst of castor oil, *Nano. Hybrids. Compos.*, 19, 46–54.
- Wolfbeisser, A., Klötzer, B., Mayr, L., Rameshan, R., Zemlyanov, D., Bernardi, J., 2015, Surface modification processes during methane decomposition on Cu-promoted Ni-ZrO<sub>2</sub> catalysts, *Catal. Sci. Technol.*, 5, 967–978.
- Wu, Y., Cao, J.P., Zhao, X.Y., Hao, Z.Q., Zhuang, Q.Q., Zhu, J.S., 2017, Preparation of porous carbons by hydrothermal carbonization and KOH activation of lignite and their performance for electric double layer capacitor, *Electrochim. Acta*, 252, 397–407.
- Xia, C. and Shi, S.Q., 2016, Self-activation for activated carbon from biomass: Theory and parameters, *Green. Chem.*, 18, 2063–2071.
- Xu, Q., Chen, L., Harries, K.A., Zhang, F., Liu, Q., and Feng, J., 2015, Combustion and charring properties of five common constructional wood species from cone calorimeter tests, *Constr. Build. Mater.*, 96, 416–427.
- Xue, Y., Lu, G., Guo, Yun, Guo, Yanglong, Wang, Y., and Zhang, Z., 2008, Effect of pretreatment method of activated carbon on the catalytic reduction of NO by carbon over CuO, *Appl. Catal. B Environ.*, 79, 262–269.
- Yorgun, S. and Yildiz, D., 2015, Preparation and characterization of activated carbons from Paulownia wood by chemical activation with  $H_3PO_4$ , *J. Taiwan*

*Inst. Chem. Eng.*, 53, 122–131.

Zaini, M.A.A. and Kamaruddin, M.J., 2013, Critical issues in microwave-assisted activated carbon preparation, *J. Anal. Appl. Pyrolysis*, 101, 238–241.

Zanuttini, M.S., Gross, M., Marchetti, G., and Querini, C., 2019, Furfural hydrodeoxygenation on iron and platinum catalysts, *Appl. Catal. A Gen.*, 587, .

Zhang, J., Wang, Y., and Wu, D., 2003, Hydrogen production from partial oxidation and steam reforming of n-octane over alumina-supported Ni and Ni-Pd catalysts, 81, 307–311.

Zhu, L.W., Wang, J.G., Zhao, P.P., Song, F., Sun, X.Y., Wang, L.H., 2017, Preparation of the Nb-P/SBA-15 catalyst and its performance in the dehydration of fructose to 5-hydroxymethylfurfural, *Ranliao Huaxue Xuebao/Journal Fuel Chem. Technol.*, 45, 651–659.