DAFTAR PUSTAKA

Abdullahi, Y., Ali, E. A. and Lawal, A. O., 2013, 'Roast-alkaline leaching of silica from kaolinitic clay', *ARPN J. Eng. Appl. Sci.*, 8(10), 864–870.

Abdelmalek, B. E., Gómez-Estaca, J., Sila, A., Martinez-Alvarez, O., Gómez-Guillén, M. C., Chaabouni-Ellouz, S., Ayadi, M. A., and Bougatef, A., 2016, 'Characteristics and functional properties of gelatin extracted from squid (Loligo vulgaris) skin', *LWT--Food Sci. Technol.*, 65, 924–931.

Adjaye, J. D., Katikaneni, S. P. R. and Bakhshi, N. N., 1996, 'Catalytic conversion of a biofuel to hydrocarbons: Effect of mixtures of HZSM-5 and silica-alumina catalysts on product distribution', *Fuel Process. Technol.*, 48(2), 115–143.

Agliullin, M. R., Danilova, I. G., Faizullin, A. V., Amarantov, S. V., Bubennov, S. V., Prosochkina, T. R., Grigor'Eva, N. G., Paukshtis, E. A. and Kutepov, B. I., 2016, 'Sol-gel synthesis of mesoporous aluminosilicates with a narrow pore size distribution and catalytic activity thereof in the oligomerization of dec-1-ene', *Microporous Mesoporous Mater.*, 230, 118–127.

Al Ifah, A., Trisunaryanti, W., Triyono, and Dewi, K., 2016, 'Synthesis of MCM-41-NH_2 catalyst by sonochemical method for transesterification of waste palm oil', *Int. J. ChemTech Res.*, 9(8), 382–387.

Al-Saidi, G. S., Al-Alawi, A., Rahman, M. S., and Guizani, N., 2012, 'Fourier transform infrared (FTIR) spectroscopic study of extracted gelatin from shaari (Lithrinus microdon) skin: Effects of extraction conditions', *Int. Food Res. J.*, 19(3), 1167–1173.

Al-Zahrani, A., and Abdul Majid, M. H., 2009, 'Extraction of Alumina from Local Clays by Hydrochloric Acid Process', *JKAU: Eng. Sci*, 20(2), 29–41.

Ali, S., Zabidi, N. A. M., and Subbarao, D., 2011, 'Effect of loading on the physicochemical properties of alumina supported Co/Mo bimetallic nanocatalysts', *J. Appl. Sci.*, 1421–1425.

Altawell, N., 2014, *The selection process of biomass materials for the production of bio-fuels and co-firing*. John Wiley & Sons, Inc.

Ambursa, M.M., Sudarsanam, P., Voon, L. H., Hamid, S.B.A., and Bhargava, S. K., 2017, 'Bimetallic Cu-Ni catalysts supported on MCM-41 and Ti-MCM-41 porous materials for hydrodeoxygenation of lignin model compound into transportation fuels', *Fuel Process. Technol.*, 162, 87–97.

Arnesen, J.A., and Gildberg, A., 2006, 'Extraction of muscle proteins and gelatine from cod head', *Process Biochem.*, 41(3), 697–700.

Atma, Y. and Ramdhani, H., 2018, 'Gelatin extraction from the indigenous Pangasius catfish bone using pineapple liquid waste', *Indonesian Journal of Biotechnology*, 22(2), 86.

Badii, F. and Howell, N. K., 2006, 'Fish gelatin: Structure, gelling properties and interaction with egg albumen proteins', *Food Hydrocolloids*, 20(5), 630–640.

Baird, D., Scerri, E. and McIntyre, L., 2015, *Production of Biofuels and Chemicals with Microwave*, *Book*.

Bandekar, J., 1992, 'Amide modes and protein conformation', *Biochimica et Biophysica Acta (BBA)/Protein Structure and Molecular*, 1120(2), 123–143.

Bartoszek, M., Eckelt, R., Jager, C., Kosslick, H., Pawlik, A., and Schulz, A., 2009, 'Mesoporous silica-aluminas derived from precipitation: A study of the acidity, textural properties and catalytic performance', *J. Mater. Sci.*, 44(24), 6629–6636.

Barrón C.A.E., Melo-Banda, J.A., Dominguez, E.J.M., Hernández M.E., Silva R R., Reyes T.A.I., and Meraz M.M.A., 2011, 'Catalytic hydrocracking of vegetable oil for agrofuels production using Ni-Mo, Ni-W, Pt and TFA catalysts supported on SBA-15', *Catal. Today*, 166(1), 102–110.

Boaventura, A.R., Duarte, A.S.A. and Almeida, M.F. , 2000, 'Aluminium recovery from water treatment sludges', *IV International Conference Water Suplply and water quality*, (September), 1–4.

Bolis, V., 2013, *Fundamentals in Adsorption at the Solid-Gas Interface . Concepts and Thermodynamics*., Springer-Verlag

Broglia, F. Rimoldia, L., Meronia, D., De Vecchic, S., Morbidellic, M., Ardizzone, S., 2019, 'Guaiacol hydrodeoxygenation as a model for lignin upgrading. Role of the support surface features on Ni-based alumina-silica catalysts', *Fuel*, 243 (January), 501–508.

Bui, V.N., Laurenti, D., Afanasiev, P., and Geantet, C., 2011, 'Hydrodeoxygenation of guaiacol with CoMo catalysts. Part I: Promoting effect of cobalt on HDO selectivity and activity', *Appl. Catal., B*, 101(3–4), 239–245.

Bullock, R. M., 2010, *Catalysis without Precious Metals*, Wiley-VCH Verlag & Co. KGaA.

Busca, G., 2019, 'Silica-alumina catalytic materials: A critical review', *Catal. Today*. Elsevier, (January), 1–9.

Cai,W., Yu, J., Anand, C., Vinu,A., and Jaroniec, M., 2011, 'Facile synthesis of ordered mesoporous alumina and alumina-supported metal oxides with tailored adsorption and framework properties', *Chem. Mater.*, 23(5), 1147–1157.

Carati, A., Ferraris, G., Guidotti, M., Moretti, G., Psaro, R., and Rizzo, C., 2003, 'Preparation and characterisation of mesoporous silica-alumina and silica-titania with a narrow pore size distribution', *Catal. Today*, 77(4), pp. 315–323.

Chang, H. J., Luo, Y., Mou, C-Y. an Lin, H-P., 2008, 'Synthesis of gold nanoparticles containing mesoporous silica by using gelatin as template: CO oxidation reaction', *Proceedings of 4th International FEZA Conference*. Elsevier B.V.

Chang, H. J. Chang, H.J., Yang, Y.M., Lin, C.C., Luo, Y.C., Chang, H.C., Lin, H.P., Lin, Y.C., Tang, C.Y., and Lin, C.Y., 2008, 'Using gelatin as protecting agent and organic template to synthesize the nobel metal nanoparticles and metal nanoparticles@mesoporous silica for SERS and co oxidation applications', *Sens. Mater.*, 20(8), 389–396.

Chen, J., 2007, *Chemistry of Zeolites and Related Porous Materials : Synthesis and Structure*. John Wiley & Sons (Asia) Pte Ltd.

Cheng, S., 2017, 'Development of Heterogeneous Catalysts for Upgrading Biomass Pyrolysis Bio-Oils into Advanced Biofuels' *Theses and Dissertations*.

Cheng, S., Wei, L., Julson, J. and Rabnawaz, M., 2017, 'Upgrading pyrolysis bio-oil through hydrodeoxygenation (HDO) using non-sulfided Fe-Co/SiO_2 catalyst', *Energy Convers. Manage.*, 150 (August), 331–342.

Cheng, S., Wei, L., Julson, J., Muthukumarappan, K., Kharel, P. R., 2017, 'Upgrading pyrolysis bio-oil to hydrocarbon enriched biofuel over bifunctional Fe-Ni/HZSM-5 catalyst in supercritical methanol', *Fuel Process. Technol.* Elsevier B.V., 167, 117–126.

Cheng, S., Wei, L., Julson, J., Muthukumarappan, K., Kharel, P. R., Cao, Y., Boakye, E., Raynie, D., and Gu, Z.,, *et al.*, 2017, 'Hydrodeoxygenation upgrading of pine sawdust bio-oil using zinc metal with zero valency', *J. Taiwan Inst. Chem. Eng.*, Elsevier B.V., 74, 146–153.

Cheng, S., Wei, L., Julson, J., Muthukumarappan, K., and Kharel, P. R., 2017, 'Upgrading pyrolysis bio-oil to biofuel over bifunctional Co-Zn/HZSM-5

catalyst in supercritical methanol', *Fuel Process. Technol.*, 147, 19–28.

Coradin, T., Bah, S. and Livage, J., 2004, 'Gelatine/silicate interactions: From nanoparticles to composite gels', *Colloids Surf., B.*, 35(1), 53–58.

Corma, A., 1997, 'Solid acid catalysts', *Solid catalysts and porous solids*, 63–74.

Dai, B., Wen, B., Zhu, M., Kang, L., and Yu, F., 2016, 'Nickel catalysts supported on amino-functionalized MCM-41 for syngas methanation', *RSC Adv.*, 6(71), 66957–66962.

Davydov, A., 2003, *Molecular Spectroscopy of Oxide Catalyst*, *Wiley*. John Wiley & Sons, Ltd.

De, S., Saha, B. and Luque, R., 2015, 'Hydrodeoxygenation processes: Advances on catalytic transformations of biomass-derived platform chemicals into hydrocarbon fuels', *Bioresour. Technol.*, 178, 108–118.

Deng, X., Chen, K. and Tüysüz, H., 2017, 'Protocol for the Nanocasting Method: Preparation of Ordered Mesoporous Metal Oxides', *Chem. Mater.*, 29(1), 40–52.

Deutschmann, O., Knözinger, H., Kochloefl, K., and Turek, T., 2011, 'Heterogeneous Catalysis and Solid Catalysts, 3. Industrial Applications', in *Ullmann's Encyclopedia of Industrial Chemistry*.

Dhepe, P. L. and Fukuoka, A., 2007, 'Cracking of cellulose over supported metal catalysts', *Catal. Surv. Asia*, 11(4), 186–191.

Dik, P. P., Danilova, I. G., Golubev, I. S., Kazakov, M. O., Nadeina, K. A., Budukva, S. V., Pereyma, V. Yu., Klimov, O. V., Prosvirin, I. P., Gerasimov, E. Yu., Bok, T. O., Dobryakova, I. V., Knyazeva, E. E., Ivanova, I. I., and Noskov, A. S., 2019, 'Hydrocracking of vacuum gas oil over NiMo/zeolite-Al_2O_3 : Influence of zeolite properties', *Fuel*. Elsevier, 237(September), 178–190.

Ding, Y., Zhao, C., Li, Y., Ma, Z., and Lv, X., 2018, 'Effect of calcination temperature on the structure and catalytic performance of the cu-mcm-41 catalysts for the synthesis of dimethyl carbonate', *Quim. Nova*, 41(10), 1156–1161.

Dong, L., Li, Y., Yan, J., Shu, X. Q., 2014, 'Efficient Extraction of SiO_2 and Al_2O_3 from Coal Gangue by Means of Acidic Leaching', *Adv. Mater. Res.*, 878, 149–156.

Duan, R., Zhang, J., Liu, L., Cui, W., and Regenstein, J.M., 2018, 'The functional properties and application of gelatin derived from the skin of channel catfish (Ictalurus punctatus)', *Food Chem.*, 239, 464–469.

Emamjomeh, M. M., Sivakumar, M. and Varyani, A. S., 2011, 'Analysis and the understanding of fluoride removal mechanisms by an electrocoagulation/flotation (ECF) process', *Desalination*, 275(1–3), 102–106.

Escribano, V. S., Garbarino, G., Finocchio, E., and Busca, G., 2017, 'γ-Alumina and Amorphous Silica–Alumina: Structural Features, Acid Sites and the Role of Adsorbed Water', *Top. Catal.*, 1554–1564.

Fadli, A. F. and Tjahjanto, R. T., 2013, 'Ekstraksi silika dalam lumpur lapindo menggunakan metode kontinyu', *Kimia. Student Journal*, 1(2), 182–187.

Fang, H. Zheng, J., Luo, X., Du, J., Roldan, A., Leoni, S., and Yuan, Y., 2017, 'Product tunable behavior of carbon nanotubes-supported Ni–Fe catalysts for guaiacol hydrodeoxygenation', *Appl. Catal., A.*, Elsevier B.V., 529, 20–31.

Febriansyah, R., Pratama, A. and Gumilar, J., 2019, 'Pengaruh Konsentrasi NaOH Terhadap Rendemen, Kadar Air dan Kadar Abu Gelatin Ceker Itik (Anas Platyrhynchos Javanica)', *Jurnal Ilmu dan Teknologi Hasil Ternak*, 14(1), 1–10.

Furimsky, E., 2000, 'Catalytic hydrodeoxygenation', *Appl. Catal., A.*, 199(2), 147–190.

Gao, Y. Gao, Y., Zheng, B., Wu, G., Ma, F., and Liu, C., 2016, 'Effect of the Si/Al ratio on the performance of hierarchical ZSM-5 zeolites for methanol aromatization', *RSC Adv.*, 6(87), 83581–83588.

Garcıa-Martınez, J. and Li, K., 2015, *Mesoporous Zeolites*. Weinheim Germany: Wiley-VCH Verlag GmbH & Co.

Garcia, T., Weng, W., Solsona, B., Carter, E., Carley, A. F., Kiely, C. J., and Taylor, S. H., 2011, 'The significance of the order of impregnation on the activity of vanadia promoted palladium-alumina catalysts for propane total oxidation', *Catal. Sci. Technol.*, 1(8), 1367–1375.

Ge, Y. Jia, Z., Gao, C., Gao, P., Zhao, L., and Zhao, Y., 2014, 'Synthesis of mesoporous silica-alumina materials via urea-templated sol-gel route and their catalytic performance for THF polymerization', *Russ. J. Phys. Chem. A*, 88(10), 1650–1655.

GIMA, 2012, 'Gelatin handbook', *Gelatin Manufacturers Institute of America*, 25.

Graybeal, B. and Tanesi, J., 2008, 'A Cementitious Long-Life Wearing Course to Reduce Frequency of Maintenance Works on High-Traffic Roads', *Transport Research Arena Europe 2008*, 1561(February), 454–461.

Gorgieva, S. and Kokol, V., 2011, 'Collagen- vs. Gelatine-Based Biomaterials and Their Biocompatibility: Review and Perspectives', *Biomaterials Applications for Nanomedicine*, (May 2014).

Guo, F., Guo, S., Qiu, Z., Zhao, L., and Xiang, H., 2014, 'Effects of impregnation methods and drying conditions on quinoline hydrodenitrogenation over Ni-W based catalysts', *J. Braz. Chem. Soc.*, 25(4), 750–758.

Guo, Y. Zhao, Z., Zhao, Q., and Cheng, F.,2017, 'Novel process of alumina extraction from coal fly ash by pre-desilicating—Na_2CO_3 activation—Acid leaching technique', *Hydrometallurgy*. Elsevier B.V., 169, 418–425.

Han, Q., Rehmana, M.U., Wang, J., Rykov, A., Gutiérrezc, O.Y., Zhaoa, Y., Wanga, S., Maa, X., and Lercher, J.A., 2019, 'The synergistic effect between Ni sites and Ni-Fe alloy sites on hydrodeoxygenation of lignin-derived phenols', *Appl. Catal., B.,* Elsevier, 253(January), 348–358.

Hanani, N.Z.A., Beatty, E. , Roos, Y.H. , Kerry, J. P., 2011, 'Manufacture of gelatin-based films using extrusion: Assessment of extrusion parameters on film properties', *Proceedings of the 11th International Congress on Engineering and Food (ICEF11)*, III, 1943–1944.

Haq, I. U., Akhtar, K. and Malik, A., 2014,'Effect of experimental variables on the extraction of silica from the rice husk ash', *J.Chem.Soc.Pak*, 36(3), 382–387.

Hattori, H. and Ono, Y., 2015, *Solid Acid Catalysis*., CRC Press Taylor & Francis Group.

He, Z. and Wang, X., 2012, 'Hydrodeoxygenation of model compounds and catalytic systems for pyrolysis bio-oils upgrading', *Catal. Sustainable Energy*, 1, 28–52.

Hensen, E. J. M. Hensen, E. J. M., Poduval, D. G., Degirmenci, V., Ligthart, D. A. J. M., Chen, W.,R., Marcello, S.,Veen, Rob van Veen, J A., 2012, 'Acidity Characterization of Amorphous Silica – Alumina', J. Phys. Chem. C, 116, 21416–21429.

Heimann, K., Karthikeyan, O. P., and Muthu, S.S., 2017, *of Products and Processes Biodegradation and Bioconversion of Hydrocarbons*. Springer.

Hew, K. L., Tamidi, A. M., Yusup, S., Lee, K. T., and Ahmad, M. M., 2010,

'Catalytic cracking of bio-oil to organic liquid product (OLP)', *Bioresour. Technol.*, 101(22), 8855–8858.

Hong, Y., Hensley, A., McEwen, J. S., and Wang, Y., 2016, 'Perspective on Catalytic Hydrodeoxygenation of Biomass Pyrolysis Oils: Essential Roles of Fe-Based Catalysts', *Catalysis Letters*, 146(9), 1621–1633.

Hosseinzadeh, F. and Sarpoolaky, H., 2019,'Sol–Gel Synthesis of Mesoporous Alumina Considering the Simultaneous Effects of Preparation Parameters by Response Surface Methodology', *J. Inorg. Organomet. Polym. Mater.*, 29(6), 1956–1971.

Hsu, C. H., Lin, H. P., Tang, C. Y., and Lin, C. Y., 2007, 'Synthesis of mesoporous silica and mesoporous carbon using gelatin as organic template', *Studies in Surface Science and Catalysis*. Elsevier Masson SAS.

Huang, L., Xie, J., Chu, W., Chen, R., Chu, D., and Hsu, A. T., 2009, 'Iron-promoted nickel-based catalysts for hydrogen generation via auto-thermal reforming of ethanol', *Catal. Commun.*, 10(5), 502–508.

Huang, Y., Wei, L., Zhao, X., Cheng, S., Julson, J., Cao, Y., and Gu, Z., 2016, 'Upgrading pine sawdust pyrolysis oil to green biofuels by HDO over zinc-assisted Pd/C catalyst', *Energy Convers. Manage.*, 115, 8–16.

Huynh, T. M., Armbruster, U., Nguyen, L. H., and Nguyen, D. A., 2015, 'Hydrodeoxygenation of Bio-Oil on Bimetallic Catalysts : From Model Compound to Real Feed', *J. Sustainable Bioenergy Syst.*, 5(December), 151–160.

Huynh, T. M., Armbruster, U., Kreyenschulte, C. R., Nguyen, L. H., Phan, B. M.Q., Nguyen, D. A., and Martin, A., (2016) 'Understanding the Performance and Stability of Supported Ni-Co-Based Catalysts in Phenol HDO', *Catalysts*, 6(11).

Irwandi, J., Faridayanti, S., Mohamed, E. S.M., Hamzah, M. S., Torla, H. H., and Che Man, Y. B., 2009, 'Extraction and characterization of gelatin from different marine fish species in Malaysia', *Int. Food Res. J.*, 16(3), 381–389.

Ishihara, A., 2012, 'Preparation of Amorphous Silica-Alumina Using the Sol-Gel Method and its Reactivity for a Matrix in Catalytic Cracking', *Catal. Surv. Asia*, 16(1), 36–47.

Ishihara, A., Hashimoto, T. and Nasu, H., 2012, 'Large Mesopore Generation in an Amorphous Silica-Alumina by Controlling the Pore Size with the Gel Skeletal Reinforcement and Its Application to Catalytic Cracking', *Catalysts*, 2(4), 368–385.

Ishihara, A., Negura, H., Hashimoto, T., and Nasu, H., 2010, 'Catalytic properties of amorphous silica-alumina prepared using malic acid as a matrix in catalytic cracking of n-dodecane', *Appl. Catal., A.*, Elsevier B.V., 388(1–2), 68–76.

Jahromi, H. and Agblevor, F. A., 2018, 'Hydrotreating of guaiacol: A comparative study of Red mud-supported nickel and commercial Ni/SiO_2-Al_2O_3 catalysts', *Appl. Catal., A*, 558(January), 109–121.

Jamilah, B. and Harvinder, K. G., 2002, 'Properties of gelatins from skins of fish - Black tilapia (Oreochromis mossambicus) and red tilapia (Oreochromis nilotica)', *Food Chem.*, 77(1), 81–84.

Jia, J., Zhou, X., Caruso, R. A., and Antonietti, M., 2004, 'Synthesis of microporous silica templated by gelatin', *Chem. Lett.*, 33(2), 202–203.

Jongjareonrak, A., Rawdkuen, S., Chaijan, M., Benjakul, S., Osako, K., and Tanaka, M., 2010, 'Chemical compositions and characterisation of skin gelatin from farmed giant catfish (Pangasianodon gigas)', *LWT-Food Sci. Technol.*. Elsevier Ltd, 43(1), 161–165.

Karim, A. A. and Bhat, R., 2009, 'Fish gelatin: properties, challenges, and prospects as an alternative to mammalian gelatins', *Food Hydrocolloids*. Elsevier Ltd, 23(3), 563–576.

Karnjanakom, S., Guan, G., Asep, B., Du, X., Hao, X., Samart, C., and Abudula, A., 2015, 'Catalytic steam reforming of tar derived from steam gasification of sunflower stalk over ethylene glycol assisting prepared Ni/MCM-41', *Energy Convers. Manage.*. Elsevier Ltd, 98, 359–368.

Kaur, M., Hardman, A., Melia, C. D., Jumel, K., and Higginbottom, S., 2002, 'Improved SDS-PAGE molecular weight determination of a succinylated limed ossein gelatin', *Int. J. Polym. Anal. Charact.*, 7(3), 195–209.

Keller, T. C., Arras, J., Haus, M. O., Hauert, R., Kenvin, A., Kenvin, J. and Pérez-Ramírez, J., 2016, 'Synthesis-property-performance relationships of amorphous silica-alumina catalysts for the production of methylenedianiline and higher homologues', *Journal of Catalysis*. Elsevier Inc., 344, 757–767.

Kittiphattanabawon, P., Benjakul, S., Visessanguan, W., and Shahidi, F., 2010, 'Comparative study on characteristics of gelatin from the skins of brownbanded bamboo shark and blacktip shark as affected by extraction conditions', *Food Hydrocolloids*. Elsevier Ltd, 24(2–3), 164–171.

Kittiphattanabawon, P., Benjakul, S., Sinthusamran, S., and Kishimura, H., 2016, 'Gelatin from clown featherback skin: Extraction conditions', *LWT--Food*

Sci. Technol.. Elsevier Ltd, 66, 186–192.

Kizzire, D.G., Dey, S., Mayanovic, R.A., Sakidja, R., Landskron, K., Mandal, M., Wang, Z., and Benamara, M., 2017, 'Studies of the mechanical and extreme hydrothermal properties of periodic mesoporous silica and aluminosilica materials', *Microporous Mesoporous Mater.*, Elsevier Ltd, 252, 69–78.

Kleitz, F., 2002, 'Ordered Mesoporous Materials : Template Removal , Frameworks and Morphology', *Doctoral thesis*, 1–191.

Kodirov, T. J. and Shoyimov, S. S., 2018, 'Degradation , Hydrolysis , Synthesis and Properties of COLLAGEN from Waste of Chrome Tanning of Tanning Industry', *IJARSET*, 5(12),. 7459–7463

Kumar, R., Strezov, V., Lovell, E., Kan, T., Weldekidan, H., He, J., Dastjerdi, B., and Scott, J., 2019, 'Bio-oil upgrading with catalytic pyrolysis of biomass using Copper/zeolite-Nickel/zeolite and Copper-Nickel/zeolite catalysts', *Bioresour. Technol.*. Elsevier, 279(January), 404–409.

Kusumastuti, H., Trisunaryanti, W., Falah, I. I., and Marsuki, M. F., 2018, 'Synthesis of mesoporous silica-alumina from lapindo mud as a support of Ni and Mo metals catalysts for hydrocracking of pyrolyzed α-cellulose', *Rasayan J. Chem.*, 11(2), 522–530.

Kuzema, P., Laguta, I. and Stavinskaya, O. N., 2016, 'TGA and TPD MS study of silica-gelatin materials', *Himia, Fizika ta Tehnologia Poverhni*, 7(2), 145–156.

Lalchhingpuii, Tiwari, D., Lalhmunsiama and Lee, S. M., 2017, 'Chitosan templated synthesis of mesoporous silica and its application in the treatment of aqueous solutions contaminated with cadmium(II) and lead(II)', *Chem. Eng. J.*. Elsevier B.V., 328, 434–444.

Laosiripojana, N., Sutthisripok, W., Charojrochkul, S., and Assabumrungrat, S., 2014, 'Development of Ni-Fe bimetallic based catalysts for biomass tar cracking/reforming: Effects of catalyst support and co-fed reactants on tar conversion characteristics', *Fuel Process. Technol.*, Elsevier B.V., 127, 26–32.

Lee, H. W., Kim, Y. M., Jae, J., Jeon, J. K., Jung, S. C., Kim, S. C., and Park, Y. K., 2016, 'Production of aromatic hydrocarbons via catalytic co-pyrolysis of torrefied cellulose and polypropylene', *Energy Convers. Manage.*. Elsevier Ltd, 129, 81–88.

Leydier, F., Chizallet, C., Chaumonnot, A., Digne, M., Soyer, E., Quoineaud, A.A., Costa, D. and Raybaud, P., 2011, 'Brønsted acidity of amorphous silica-alumina: The molecular rules of proton transfer', *J. Catal.*, 284(2), 215–229.

Lezanska, M, Olejniczak, A., Rokicinska, A., Kustrowski, P., and Lukaszewicz, J., 2017, 'Type A and B gelatin as precursors of silica-templated porous carbon with a specified number of nitrogen- and oxygen-containing functionalities', *Mater. Express*, 7(2), 123–133.

Li, F. X., Wang, X. F., Zheng, Y., and Chen, J. X., 2018, 'Influence of metallic promoters on the performance of Ni/SiO2 catalyst in the hydrodeoxygenation of anisole', *Ranliao Huaxue Xuebao/Journal of Fuel Chemistry and Technology*, 46(1), 75–83.

Li, H., Fang, Z., Smith, R. L., and Yang, S., 2016, 'Efficient valorization of biomass to biofuels with bifunctional solid catalytic materials', *Prog. Energy Combust. Sci.*, 55, 98–194.

Li, J., Gan, J. and Li, X., 2009, 'Leaching of aluminum and iron from boiler slag generated from a typical Chinese Steel Plant', *J. Hazard. Mater.*, 166(2–3), 1096–1101.

Li, S., 2017, '*Fundamentals of Reaction Kinetics' Reaction Engineering*, Chemical Industry Press., Elsevier Inc.,

Li, X., Chen, G., Liu, C., Ma, W., Yan, B., and Zhang, J., 2017, 'Hydrodeoxygenation of lignin-derived bio-oil using molecular sieves supported metal catalysts: A critical review', *Renewable Sustainable Energy Rev.*, Elsevier Ltd, 71(December), 296–308.

Liu, H. Y., Han, J. and Guo, S. D., 2009, 'Characteristics of the gelatin extracted from Channel Catfish (Ictalurus Punctatus) head bones', *LWT--Food Sci. Technol.*. Elsevier Ltd, 42(2), 540–544.

Liu, H. Y., Li, D. and Guo, S. D. , 2008, 'Extraction and properties of gelatin from channel catfish (Ietalurus punetaus) skin', *LWT--Food Sci. Technol.*, 41(3), 414–419.

Liu, J., Chu, J., Xue, T., Han, Y., and Qi, Tao., 2011, 'Kinetics on the desiliconization during alkaline leaching of titanium slag', *Adv. Mater. Res.*, 233–235, 1322–1327.

Liu, K. and Liu, K., 2016, 'Catalytic Hydrodeoxygenation of Bio-oil and Model Compounds', *Thesis*, (June). Department of Chemical Engineering Imperial College London

Li, X., Wang, H., Zhou, Q., QI, T., Liu, G., Peng, Z., and Wang, Y., 2019, 'Efficient separation of alumina and silica in reduction-roasted kaolin by alkali

leaching', *Trans. Nonferrous Met. Soc. China (English Edition)*. The Nonferrous Metals Society of China, 29(2), 416–423. doi:

Liu, Q., Wang, A., Wang, X., and Zhang, T., 2006, 'Ordered crystalline alumina Molecular sieves synthesized via a nanocasting route', *Chem. Mater.*, 18 (22), 5153–5155.

Loricera, C. V., Pawelec, B., Infantes-Molina, A., Álvarez-Galván, M. C., Huirache-Acuña, R., Nava, R., and Fierro, J. L.G., 2011, 'Hydrogenolysis of anisole over mesoporous sulfided CoMoW/SBA-15(16) catalysts', *Catal. Today*, 172(1), 103–110.

Long, Y., Yu, Y., Chua, Y. W., and Wu, H., 2017, 'Acid-catalysed cellulose pyrolysis at low temperatures', *Fuel*, 193, 460–466.

Louis, C., Cheng, Z. X. and Che, M., 1993, 'Characterization of Ni/SiO_2 catalysts during impregnation and further thermal activation treatment leading to metal particles', *Journal of Physical Chemistry*, 97(21), 5703–5712.

Mang, G. Q. and Cheng, M., 2014, 'Research of Al and Fe leaching rate in the process of slag leaching by hydrochloric acid', *Appl. Mech. Mater.*, 675–677, 1417–1420.

Mariod, A. A. and Adam, H. F., 2013, 'Review: Gelatin, source, extraction and industrial applications', *Acta Sci. Pol., Technol. Aliment.*, 12(2), 135–147.

Marsuki, M. F., Trisunaryanti, W., Falah, I. I., and Wijaya, K., 2018, 'Synthesis of Co, Mo, Co-Mo and Mo-Co catalysts, supported on mesoporous silica-alumina for hydrocracking of a-cellulose pyrolysis oil', *Orient. J. Chem.*, 34(2), 955–962.

Matjie, R. H., Bunt, J. R. and Van Heerden, J. H. P., 2005, 'Extraction of alumina from coal fly ash generated from a selected low rank bituminous South African coal', *Miner. Eng.*, 18(3), 299–310.

Meng, F., Zhong, P., Li, Z., Cui, X., and Zheng, H., 2014, 'Surface structure and catalytic performance of Ni-Fe catalyst for low-temperature CO hydrogenation', *J. Chem.*, Hindawi Pub. Corp.,

Mijan, N. A., Lee, H. V., Alsultan, G. A., and Yap, T., 2016, 'Synthesis and Characterization of Silica-Alumina Supported Ca and Ni Catalyst for Deoxygenation of Vegetable Oil into Diesel', *Mater. Sci. Forum*, 840, 353–358.

Möller, K. and Bein, T., 2011, 'Pores within pores - How to craft ordered hierarchical zeolites', *Science*, 333(6040), 297–298.

Monsur, H. A., Jaswir, I., Salleh, H. M., and Alkahtani, H. A., 2014, 'Effects of pretreatment on properties of gelatin from perch (Lates Niloticus) skin', *Int. J. Food Prop.*, 17(6), 1224–1236.

Mortensen, P. M., Grunwaldt, J. D., Jensen, P. A., Knudsen, K. G., and Jensen, A. D., 2011,'A review of catalytic upgrading of bio-oil to engine fuels', *Appl. Catal., A*, 407(1–2), 1–19.

Murzin, D. Y. and Salmi, T., 2016, '*CATALYTIC KINETICS Chemistry and Engineering'.*, 2nd, Elsevier.

Muyonga, J. H., Cole, C. G. B. and Duodu, K. G., 2004, 'Fourier transform infrared (FTIR) spectroscopic study of acid soluble collagen and gelatin from skins and bones of young and adult Nile perch (Lates niloticus)', *Food Chem.*, 86(3), 325–332.

Mustopa, R. S. and Risanti, D. D., 2013, 'Karakterisasi Sifat Fisis Lumpur Panas Sidoarjo dengan Aktivasi Kimia dan Fisika', *Jurnal Teknik Pomits*, 2(2), 256–261.

Nagarajan, M., Benjakul, S., Prodpran, T., Songtipya, P., and Kishimura, H., 2012, 'Characteristics and functional properties of gelatin from splendid squid (Loligo formosana) skin as affected by extraction temperatures', *Food Hydrocolloids*. Elsevier Ltd, 29(2), 389–397.

Naik, B. and Ghosh, N., 2009, 'A Review on Chemical Methodologies for Preparation of Mesoporous Silica and Alumina Based Materials', *Recent Pat. Nanotechnol.*, 3(3), 213–224.

Nampi, P. P., Moothetty, P., Berry, F. J., Mortimer, M, and Warrier, K. G., 2010, 'Aluminosilicates with varying alumina–silica ratios: synthesis via a hybrid sol–gel route and structural characterisation', *Dalton Trans.*, 39(21), 5101.

Narno, S., and Budiman, A., 2014, 'Non-catalytic thermal cracking of bio-oil to organic liquid (OLP)', *Proceeding the Regional Conference on Chemical Engineering* 2014', Yogyakarta, ISBN: 978-602-71398-0-0.

Natov, M. A. and Dzhagarova, Y. K., 1966, 'Effect of low molecular weight substances on the viscosity of polymer melts', *Polymer Science U.S.S.R.*, 8(10), 2032–2038.

Niu, L., Zhou, X., Yuan, C., Bai, Y., Lai, K., Yang, F., and Huang, Y., 2013, 'Characterization of tilapia (Oreochromis niloticus) skin gelatin extracted with alkaline and different acid pretreatments', *Food Hydrocolloids*. Elsevier Ltd, 33(2), 336–341.

Nuryanto, R., Trisunaryanti, W., Falah, I. I., and Triyono, 2018, 'Extraction of gelatin from catfish bone using NaOH and its utilization as a template on mesoporous silica alumina', *IOP Conf. Ser.: Mater. Sci. Eng.*, 349(1), 012051.

Oga, T., Nakamura, A. and Murakami, K., 2017, 'The effect of mesoporous silica-alumina and iron loading on catalytic cracking of bio-oil', *Global Journal of Engineering Science and Research Management*, 4(2), 13–25.

Olcese, R. N., Bettahar, M., Petitjean, D., Malaman, B., Giovanella, F., and Dufour, A., 2012, 'Gas-phase hydrodeoxygenation of guaiacol over Fe/SiO_2 catalyst', *Appl. Catal., B*, 115–116, 63–73.

Olveira, A., Paulista, A., Alencar, A., and Braga, T. P., 2017, 'Gelatin Template Synthesis of Aluminum Oxide and / or Silicon Oxide Containing Micro / Mesopores Using the Proteic Sol-Gel Method', *J. Nanomater.*, Hindawi, Article ID 2504796.

Ozinger, N., Deutschmann, O., Knözinger, H., and Kochloefl, K., 2009, 'Heterogeneous Catalysis and Solid Catalysts', *Ullmann's Encyclopedia of Industrial Chemistry*, Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim.

Ozkan, U. S., 2009, *Design of Heterogeneous Catalysts*. Wiley-VCH Verlag GmbH & Co.

Parker, W. O., and Wegner, S., 2012, 'Aluminum in mesoporous silica – alumina', *Microporous Mesoporous Mater.*, 158, 235–240.

Patial, J., Dar, B. A., Sharma, P., Kumar, K. A., Sharma, P. R., Ray, S. K., Mukharjee, D., and Singh, B., 2012, 'Pore-engineered silica-alumina: Texture, acidity, and activity for conversion of longifolene to isolongifolene', *Monatshefte fur Chemie*, 143(5), 747–751.

Pepper, R. A., Couperthwaite, S. J. and Millar, G. J., 2016, 'Comprehensive examination of acid leaching behaviour of mineral phases from red mud: Recovery of Fe, Al, Ti, and Si', *Miner. Eng.*, Elsevier Ltd, 99, 8–18.

Pino, N., Sitthisa, S., Tan, Q., Souza, T., López, D., and Resasco, D. E., 2017, 'Structure, activity, and selectivity of bimetallic $Pd-Fe/SiO_2$ and $Pd-Fe/\Gamma-Al_2O_3$ catalysts for the conversion of furfural', *J. Catal.*, Elsevier Inc., 350, 30–40.

Phillips, G. O. and Williams, P. A., 2009, *Handbook of hydrocolloids*, 2nd,. Woodhead Hall, Abington Park, Granta

Rayzman, V. L., Pevzner, I. Z., Sizyakov, V. M., Ni, L. P., Filipovich, I. K., and Aturin, A. V., 2003 'Extracting Silica and Alumina from Low-Grade Bauxite', *Jom*, 55(8), 47–50.

Reinhard, S. and Herbert, G. (2007) *Gelatine Handbook : Theory and Industrial Practice*, Wiley-VCH Verlag GmbH & Co.

Regali, F., Liotta, L. F., Venezia, A. M., Boutonnet, M., and Järås, S., 2014, 'Hydroconversion of n-hexadecane on Pt/silica-alumina catalysts: Effect of metal loading and support acidity on bifunctional and hydrogenolytic activity', *Appl. Catal., A*,. 469, 328–339.

Regali, F., Suárez París, R., Aho, A., Boutonnet, M., and Järås, S., 2013, 'Deactivation of a Pt/Silica-Alumina Catalyst and Effect on Selectivity in the Hydrocracking of n-Hexadecane', *Top. Cat.*, Springer Science, 56(9–10), 594–601.

Ribeiro, F., 1984, *Zeolites: Science and Technology*, Martinus Nijhoff Publishers, Published in cooperation with NATO Scientific Affairs Division.

Ren, J., Zhang, L. and Eckert, H., 2014, 'Sol-gel Preparation of Mesoporous Al_2O_3-SiO_2 Glasses: Structural Evolution Monitored by Solid State NMR', *J. Sol-Gel Sci. Technol.*, 70(3), 482–490.

Retuert, J., Martinez, Y., Quijada, R., and Yazdani-Pedram, M., 2004, 'Highly porous silica networks derived from gelatin/siloxane hybrids prepared starting from sodium metasilicate', *J. Non-Cryst. Solids*, 347(1–3), 273–278.

Rizzo, C., Carati, A., Barabino, C., Perego, C., and Bellussi, G., 2002, 'Influence of pH in mesoporous silica aluminas (MSA) synthesis', *Stud. Surf. Sci. Catal.*, 144(11), 625–632.

Sarker, M. S. R., A, M. Z., Qadir, M. R., Gafur, M. A., and Moniruzzaman, M.,. *et al.* (2015) 'Extraction and characterization of alumina nanopowders from aluminum dross by acid dissolution process', *Int. J. Miner., Metall. Mater.*, 22(4), 429–436.

Savva, P. G., Goundani, K., Vakros, J., Bourikas, K., Fountzoula, C., Vattis, D., Lycourghiotis, A., and Kordulis, C., 2008, 'Benzene hydrogenation over Ni/Al2O3 catalysts prepared by conventional and sol-gel techniques', *Appl. Catal., B*, 79(3), 199–207.

Schulman, E., Wu, W. and Liu, D., 2020, 'Two-dimensional zeolite materials: Structural and acidity properties', *Materials*, 13(8).

Setyawan, H. and Balgis, R., 2011, 'Mesoporous silicas prepared from sodium

silicate using gelatin templating', *Asia-Pac. J. Chem. Eng*, 7(3), 258–261.

Shakila, R.J., Jeevithan, E., Varatharajakumar, A., Jeyasekaran, G., and Sukumar, D., 2012, 'Functional characterization of gelatin extracted from bones of red snapper and grouper in comparison with mammalian gelatin', *LWT--Food Sci. Technol.*, Elsevier, 48(1), 30–36.

Shalaby, N. H., Elsalamony, R. A. and El Naggar, A. M. A., 2018, 'Mesoporous waste-extracted SiO_2-Al_2O_3-supported Ni and Ni-H3PW12O40 nano-catalysts for photo-degradation of methyl orange dye under UV irradiation', *New J. Chem.*, Royal Society of Chemistry, 42(11), 9177–9186.

Shalygin, A. S., Kozhevnikov, I. V., Gerasimov, E. Y., Andreev, A. S., Lapina, O. B., and Martyanov, O. N., 2017, 'The impact of Si/Al ratio on properties of aluminosilicate aerogels', *Microporous and Mesoporous Mater.*, 251, 105–113.

Shen, Y. C., Hsu, C. H. and Lin, H. P., 2018, 'Biodegradable Gelatin as Template for the Preparation of Mesoporous Alumina', *J. Chin. Chem. Soc.*, 65(4), 424–429.

Shrotri, A., Tanksale, A., Beltramini, J. N., Gurav, H., and Chilukuri, S. V., 2012, 'Conversion of cellulose to polyols over promoted nickel catalysts', *Catal. Sci. Technol.*, 2(9), 1852–1858.

Shi, D., Wojcieszak, R., Paul, S., and Marceau, E., 2019, 'Ni promotion by Fe: What benefits for catalytic hydrogenation?', *Catalysts*, 9(5).

Shim, J., Velmurugan, P. and Oh, B. T., 2015, 'Extraction and physical characterization of amorphous silica made from corn cob ash at variable pH conditions via sol gel processing', *J. Ind. Eng. Chem.*, 30, 249–253.

Shrotri, A., Tanksale, A., Beltramini, J. N., Gurav, H., and Chilukuri, S. V., 2012, 'Conversion of cellulose to polyols over promoted nickel catalysts', *Catal. Sci. Technol.*, 2(9), 1852–1858.

Si, Z., Zhang, X., Wang, C., Ma, L., and Dong, R., 2017, 'An Overview on Catalytic Hydrodeoxygenation of Pyrolysis Oil and Its Model Compounds', *Catalysts*, 7(6), 169.

Simakova, O. A., Davis, R. J. and Murzin, D. Y., 2013, *Biomass Processing over Gold Catalysts*. Springer Sciences+ business Media B.V.

Sinthusamran, S., Benjakul, S. and Kishimura, H., 2014, 'Characteristics and gel properties of gelatin from skin of seabass (Lates calcarifer) as influenced by extraction conditions', *Food Chemistry*. Elsevier Ltd, 152, 276–284.

Sitthisa, S., An, W. and Resasco, D. E., 2011, 'Selective conversion of furfural to methylfuran over silica-supported NiFe bimetallic catalysts', *J. Catal.*, 284(1), 90–101.

Smirnova, M. Y., Kikhtyanin, O. V., Smirnov, M. Y., Kalinkin, A. V., Titkov, A. I., Ayupov, A. B., and Ermakov, D. Y., 2015, 'Effect of calcination temperature on the properties of Pt/SAPO-31 catalyst in one-stage transformation of sunflower oil to green diesel', *Appl. Catal., A*. Elsevier B.V., 505, 524–531.

Speight, J. G., 2011, *Handbook of Industrial Hydrocarbon Processes, Handbook of Industrial Hydrocarbon Processes*. Elsevier.

Srivastava, K., Shringi, N., Devra, V., and Rani, A., 2013, 'Pure Silica Extraction from Perlite : Its Characterization and Affecting factors', *International Journal of Innovative Research in Science, Engineering and Technology*, 2(7), 2936–2942.

Srivastava, N. and Srivastava, P. C., 2010, 'Realizing NiO nanocrystals from a simple chemical method', *Bull. Mater. Sci.*, 33(6), pp. 653–656. doi: 10.1007/s12034-011-0142-0.

Suib, S. L., 2013, *New and developments future in catalysis*. Elsevier B.V.

Sukkwai, S., Kijroongrojana, K. and Benjakul, S., 2011, 'Extraction of gelatin from bigeye snapper (Priacanthus tayenus) skin for gelatin hydrolysate production', *Int. Food Res. J.*, 18(3), pp. 1129–1134.

Sun, Z. X., Zheng, T. T., Bo, Q. B., Du, M., and Forsling, W., 2008, 'Effects of calcination temperature on the pore size and wall crystalline structure of mesoporous alumina', *J. Colloid and Interface Sci.*, 319(1), 247–251.

Sunarno, Herman, S., Rochmadi, Mulyono, P., and Budiman, A., 2017, 'Effect of support on catalytic cracking of bio-oil over Ni/silica-alumina', *AIP Conf. Proc.*, 1823.

Tantawy, M. A. and Alomari, A. A., 2019, 'Extraction of Alumina from Nawan Kaolin by Acid Leaching', *Orient. J. Chem.*, 35(3), 1013–1021.

Taromi, A. A. and Kaliaguine, S., 2017, 'Synthesis of ordered mesoporous γ-alumina – Effects of calcination conditions and polymeric template concentration', *Microporous and Mesoporous Matter.*, 248, 179–191.

Thommes, M., Kaneko, K., Neimark, A. V., Olivier, J. P., Rodriguez-Reinoso, F., Rouquerol, J., and Sing, K.S.W., 2015, 'Physisorption of gases, with special

reference to the evaluation of surface area and pore size distribution (IUPAC Technical Report)', *Pure Appl. Chem.*, 87(9–10), 1051–1069.

Trisunaryanti, W., Falah, I. I. and Susanto, H., 2016, 'Synthesis of Mesoporous Silica Using Gelatin as a Template and Cr / silica Catalyst For Hydrocracking of Waste Lubricant Oil', *Int. J. ChemTech Res.*, 9(08), 388–397.

Trisunaryanti, W., Lisna, P. S., Kartini, I., Sutarno, Falah, I. I., and Triyono., 2016, 'Extraction of gelatin from bovine bone and its use as template in synthesis of mesoporous silica', *Asian J. Chem*, 28(5), 996–1000.

Triyono, Khoiri, H. M., Trisunaryanti, W., and Dewi, K., 2015, 'Synthesis of NH_2 /MCM-41 Catalysts Using Silica of Sidoarjo Mud and Their Characterization for Palm Oil Transesterification', *IOSR J. Appl. Chem.*, 8(8), 50–56.

Valeev, D., Pak, V., Mikhailova, A., Gol'Dberg, M., Zheleznyi, M., Dorofievich, I., Lainer, Y., Bychinskii, V., and Chudnenko, K., 2016, 'Extraction of Aluminium By Autoclave Hydrochloric Acid Leaching of Boehmite-Kaolinite Bauxite', *Light Metals 2016*, (February), 23–28.

Vít, Z. and Šolcová, O., 2006, 'Synthesis and properties of mesoporous silica-alumina with narrow pore size distribution obtained without use of pore-regulating agents', *Microporous and Mesoporous Mater.*, 96(1–3), 197–204.

Vitale, G., Molero, H., Hernandez, E., Aquino, S., Birss, V., and Pereira-Almao, P., 2013, 'One-pot preparation and characterization of bifunctional Ni-containing ZSM-5 catalysts', *Appl. Catal., A*. Elsevier B.V., 452, 75–87.

Wilhelm, S. and Kind, M., 2015, 'Influence of pH, temperature and sample size on natural and enforced syneresis of precipitated silica', *Polymers*, 7(12), 2504–2521.

Xiao, J., Li, F., Zhong, Q., Bao, H., Wang, B., Huang, J., and Zhang, Y., 2015, 'Separation of aluminum and silica from coal gangue by elevated temperature acid leaching for the preparation of alumina and SiC', *Hydrometallurgy*. Elsevier B.V., 155, 118–124.

Xu, B., Yang, Y., Xu, Y., Han, B., Wang, Y., Liu, X., and Yan, Z., 2017, 'Microporous and Mesoporous Materials Synthesis and characterization of mesoporous Si-modi fi ed alumina with high thermal stability', *Microporous and Mesoporous Mater.*, 238, 84–89.

Xu, N., Liu, Z., Bian, S., Dong, Y., and Li, W., 2016, 'Template-free synthesis of mesoporous γ-alumina with tunable structural properties', *Ceram. Int.*, 42(3), 4072–4079.

Yabuki, M.,Takahashi, R., Sato, S., Sodesawa, T., and Ogura, K., 2002, 'Silica–alumina catalysts prepared in sol–gel process of TEOS with organic additives', *Phys. Chem. Chem. Phys.*, 4(19), 4830–4837.

Yang, Y., Qiao, L., Hao, J., Shi, H., and Lv, G., 2019, 'Hydrodeoxygenation upgrading of bio-oil on Ni-based catalysts with low Ni loading', *Chem. Eng. Sci.*, Elsevier Ltd, 208, 115154.

Yoon, J. and Vannice, M. A., 1983, 'Benzene Hydrogenation over Iron', *J. Catal.*, 82, 457–468.

Yu, J., Paterson, N. and Millan, M., 2019, 'The primary products of cellulose pyrolysis in the absence of extraparticle reactions', *Fuel*, 237(October 2018), 911–915.

Zarai, Z., Balti, R., Mejdoub, H., Gargouri, Y., and Sayari, A., 2012, 'Process for extracting gelatin from marine snail (Hexaplex trunculus): Chemical composition and functional properties', *Process Biochem.*, Elsevier Ltd, 47(12), 1779–1784.

Zhang, S., Cui, M., Zhang, Y., Yu, Z., and Meng, C., 2016, 'Synthesis of zeolite Y from diatomite and its modification by dimethylglyoxime for the removal of Ni(II) from aqueous solution', *J. Sol-Gel Sci. and Technol*. Springer US, 80(1), 215–225.

Zhang, X., Niu, Y., Meng, X., Li, Y., and Zhao, J., 2013, 'Structural evolution and characteristics of the phase transformations between α-Fe2O3, Fe3O4 and γ-Fe2O3 nanoparticles under reducing and oxidizing atmospheres', *Cryst. Eng. Comm.*, 15(40), 8166–8172.

Zhang, Y., Zhang, S., Wang, K., Ding, F., and Wu, J., 2013, 'Surfactant-free solvothermal method for synthesis of mesoporous nanocrystalline TiO2 microspheres with tailored pore size', *J. Nanomater.*, 2013.

Zhang, Y., Tao, Y., Huang, J., and Williams, P., 2017, 'Influence of silica–alumina support ratio on H_2 production and catalyst carbon deposition from the Ni-catalytic pyrolysis/reforming of waste tyres', *Waste Manage. Res.*, 35(10).

Zhang, Z.,Bi, P., Jiang, P., Fan, M., Deng, S., Zhai, Q., and Li, Q., 2015, 'Production of gasoline fraction from bio-oil under atmospheric conditions by an integrated catalytic transformation process', *Energy*. Elsevier Ltd, 90, 1922–1930.

Zhao, D., Wan, Y. and Zhou, W., 2013, *Ordered Mesoporous Materials*. Wiley-VCH Verlag GmbH & Co.

Zhao, H. Y., Li, D., Bui, P., and Oyama, S. T., 2011, 'Hydrodeoxygenation of guaiacol as model compound for pyrolysis oil on transition metal phosphide hydroprocessing catalysts', *Appl. Catal., A.*, 391(1–2), 305–310.

Zheng, M., Wang, Z., Li, X., Qiao, X., Song, W., and Guo, L., 2016, 'Initial reaction mechanisms of cellulose pyrolysis revealed by ReaxFF molecular dynamics', *Fuel*, 177, 130–141.

Zhou, C., Yan, C., Zhao, J., Wang, H., Zhou, Q, and Luo, W., 2016, 'Rapid synthesis of morphology-controlled mesoporous silica nanoparticles from silica fume', *Journal of the Taiwan Institute of Chemical Engineers*. Elsevier B.V., 62, 307–312.