DAFTAR PUSTAKA

Adamczyk, Z., Komorek, J., Białecka, B., Nowak, J., and Klupa, A. (2020). Assessment of the potential of polish fly ashes as a source of rare earth elements. *Journal of Ore Geology Reviews*, *124*(February), 103638. https://doi.org/10.1016/j.oregeorev.2020.103638.

Alonso, E., Sherman, A. M., Wallington, T. J., and Everson, M. P. (2012). Evaluating rare earth element availability: a case with revolutionary demand from clean technologies. *Article of Enviromental Science and Technology*, *46*, 3406–3414.

Amornpitoksuk, P., Intarasuwan, K., Suwanboon, S., and Baltrusaitis, J. (2013). Effect of phosphate salts (Na_3PO_4, Na_2HPO_4, and NaH_2PO_4) on Ag_3PO_4 morphology for photocatalytic dye degradation under visible light and toxicity of the degraded dye products. *Industrial and Engineering Chemistry Research*, *52*(49), 17369–17375. https://doi.org/10.1021/ie401821w.

Andarini, N., Haryati, T., dan Lutfia, Z. (2018). Sintesis zeolit A dari abu terbang (fly ash) batubara variasi rasio molar Si/Al. *Jurnal Ilmu Dasar*, *19*(2), 105–110. https://jurnal.unej.ac.id/index.php/JID/article/view/5910.

Balaram, V. (2019). Rare earth elements : A review of applications, occurrence, exploration, analysis, recycling, and environmental impact. *Journal of Geoscience Frontiers*, *10* (4), 1285–1303. https://doi.org/10.1016/j.gsf.2018.12.005.

Behera, S. S., and Parhi, P. K. (2016). Leaching kinetics study of neodymium from the scrap magnet using acetic acid. *Separation and Purification Technology*, *160*, 59–66. https://doi.org/10.1016/j.seppur.2016.01.014.

Beltrami, D., Deblonde, G. J. P., Bélair, S., & Weigel, V. (2015). Recovery of yttrium and lanthanides from sulfate solutions with high concentration of iron and low rare earth content. *Hydrometallurgy*, *157*, 356–362. https://doi.org/10.1016/j.hydromet.2015.07.015.

Bicer, A. (2018). Effect of fly ash particle size on thermal and mechanical properties of fly ash-cement composites. *Thermal Science and Engineering Progress*, *8*, 78–82. https://doi.org/10.1016/j.tsep.2018.07.014.

Binnemans, K., Jones, P. T., Blanpain, B., and Gerven, T. Van. (2015). Towards zero-waste valorisation of rare-earth-containing industrial process residues : a critical review. *Journal of Cleaner Production*, *99*, 17–38. https://doi.org/10.1016/j.jclepro.2015.02.089.

Binnemans, Koen, Tom, P., Blanpain, B., Gerven, T. Van, Yang, Y., Walton, A., and Buchert, M. (2013). Recycling of rare earths : a critical review. *Journal of Cleaner Production*, *51*, 1–22. https://doi.org/10.1016/j.jclepro.2012.12.037.

Deviani, S. S., Mahatmanti, F. W., & Widiarti, N. (2018). Sintesis dan karakterisasi zeolit dari abu sekam padi menggunakan metode hidrotermal. *Indonesian Journal of Chemical Science*, *7*(1), 86–93.

Dupont, D., dan Binnemans, K. (2015). Rare-earth recycling using a functionalized

ionic liquid for the selective dissolution and revalorization of Y2O3:Eu3+ from lamp phosphor waste. *Green Chemistry*, *17*(2), 856–868. https://doi.org/10.1039/c4gc02107j.

Fadlilah, I., Prasetya, A., and Mulyono, P. (2018). Recovery ion Hg^{2+} dari limbah Cair Industri Penambangan Emas Rakyat dengan Metode Presipitasi Sulfida dan hidroksida. *Jurnal Rekayasa Proses*, *12*(1), 23. https://doi.org/10.22146/jrekpros.34496.

Fernando, W. A. M., Ilankoon, I. M. S. ., Syed, T. H., and Yellishetty, M. (2018). Challenges and opportunities in the removal of sulphate ions in contaminated mine water: A review. *Journal of Minerals Engineering*, *117*, 74–90. https://doi.org/10.1016/j.mineng.2017.12.004.

Franus, Wojciech, Wiatros-Motyka, M. M., and Wdowin, M. (2015). Coal fly ash as a resource for rare earth elements. *Environmental Science and Pollution Research*, *22*(12), 9464–9474. https://doi.org/10.1007/s11356-015-4111-9.

Goodenough, K. M., Wall, F., & Merriman, D. (2018). The rare earth elements: demand, global resources, and challenges for resourcing future generations. *Journal of Natural Resources Research*, *27*(2), 201–216. https://doi.org/10.1007/s11053-017-9336-5.

Hajji, S., Turki, T., Hajji, M., and Mzoughi, N. (2018). Application of response surface methodology for optimization of cadmium ion removal from an aqueous solution by eggshell powder. *Journal of Chemical*, *34*(2), 302–310. https://doi.org/10.1007/s40242-018-7163-9.

Han, K. N. (2020). Characteristics of precipitation of rare earth elements with various precipitants. *Journal of Minerals*, *10*(2). https://doi.org/10.3390/min10020178.

Handini, T., Purwoto., dan Mulyono. (2007). Pemisahan itrium dari konsentrat logam tanah jarang dengan pengendapan fraksional hidroksida, J. Prosiding PPI, ISSN 0216 – 3128.

Handoyo, H., Bendiyasa, I. M., and Prasetya, A. (2019). Leaching neodymium from magnetic coal fly ash using acetic acid solvent. *J. Eksergy*, *16*(2), 42. https://doi.org/10.31315/e.v16i2.3027.

Humphries, M. (2012). Rare earth elements : The Global Supply Chain.

IEA. (2014). Special report: Southeast Asia energy outlook.

Innocenzi, V., and Veglio, F. (2012). Recovery of rare earths and base metals from spent nickel-metal hydride batteries by sequential sulphuric acid leaching and selective precipitations. *Journal of Power Sources*, *211*, 184–191. https://doi.org/10.1016/j.jpowsour.2012.03.064.

Jegal, Yujin, Thenepalli, Ahn, Thriveni, and Jiwhan. (2015). The crucial role of coal for coal-fired power plants affected by the geological origin : South Korea. *5*(3).

Kaczmarczyk, A. M., Spórna-Kucab, A., & Michałowski, T. (2017). Solubility products and solubility concepts. *Descriptive Inorganic Chemistry Researches of Metal Compounds*, *June*. https://doi.org/10.5772/67840

Kashiwakura, S., Kumagai, Y., Kubo, H., Wagatsuma, K. (2013). Dissolution of rare earth elements from coal fly ash particles in a dilute H_2SO_4 solvent. Open J. Phys. Chem. 3, 69–75. https://doi.org/10.4236/ojpc.2013.32009.

KESDM (Kementrian Energi Sumber Daya Mineral). (2020). Potensi logam tanah jarang di Indonesia. 1(2), 7–8.

KESDM (Kementrian Energi Sumber Daya Mineral). (2017). Handbook of energy & economic statistics. *Energy & Economic; Handbook Of; Of Indonesia; Statistics*.

Keun, Young, Hwa, S., and Cheol, Y. (2019). Effects of chemical composition of fly ash on compressive strength of fly ash cement mortar. *Construction and Building Materials*, *204*, 255–264. https://doi.org/10.1016/j.conbuildmat.2019.01.208.

Kim, C. J., Yoon, H. S., Chung, K. W., Lee, J. Y., Kim, S. D., Shin, S. M., Lee, S. J., Joe, A. R., Lee, S. Il, Yoo, S. J., and Kim, S. H. (2014). Leaching kinetics of lanthanum in sulfuric acid from rare earth element (REE) slag. *Hydrometallurgy*, *146*, 133–137. https://doi.org/10.1016/j.hydromet.2014.04.003.

King, J. F., Taggart, R. K., Smith, R. C., Hower, J. C., and Hsu-Kim, H. (2018). Aqueous acid and alkaline extraction of rare earth elements from coal combustion ash. *International Journal of Coal Geology*, *195*(2017), 75–83. https://doi.org/10.1016/j.coal.2018.05.009.

Kolker, A., Scott, C., Hower, J. C., Vazquez, J. A., Lopano, C. L., and Dai, S. (2017). Distribution of rare earth elements in coal combustion fly ash, determined by SHRIMP-RG ion microprobe. *International Journal of Coal Geology*. https://doi.org/10.1016/j.coal.2017.10.002.

Kristyaka, H. S. R. (2018). Optimasi Kondisi Proses Pengendapan Hidroksida Logam - Logam Berat Kromium Dan Nikelsecara Bertingkat Dalam Limbah Cair Elektroplating. *Jurnal Ilmiah Kanderang Tingang*, *9*(2), 150–165. https://doi.org/10.37304/jikt.v9i2.14.

Kumari, A., Kumar, M., Pramanik, S., and Kumar, S. (2020). Recovery of rare earths from spent NdFeB magnets of wind turbine : Leaching and kinetic aspects. *Waste Management*, *2018*. https://doi.org/10.1016/j.wasman.2018.01.033.

Kuppusamy, Kumar, V., Kumar, A., and Holuszko, M. (2019). Simultaneous extraction of clean coal and rare earth elements from coal tailings using alkali-acid leaching process. *Journal of Energy Resources Technology*, *141*(7), 070708. https://doi.org/10.1115/1.4043328.

Lanthanum, I., Pollution, E., and Based, A. (2018). The rare earth element (REE) lanthanum (La) induces hormesis in. 238, 1044–1047. https://doi.org/10.1016/j.envpol.2018.02.068.

Laudal, D. A., Benson, S. A., Palo, D., and Addleman, R. S. (2018). Rare earth elements in North Dakota lignite coal and lignite-related materials. *Journal of Energy Resources Technology*, *140*(6), 1–9. https://doi.org/10.1115/1.4039738.

Lewis, A. (2017). Sustainable heavy metal remediation Volume 2: Case studies. 8, 1–288. https://doi.org/10.1007/978-3-319-58622-9

Li, Y. S., Church, J. S., Woodhead, A. L., & Moussa, F. (2010). Preparation and characterization of silica coated iron oxide magnetic nano-particles. *Spectrochimica Acta - Part A: Molecular and Biomolecular Spectroscopy*,

76(5), 484–489. https://doi.org/10.1016/j.saa.2010.04.004.

Lin, R., Stuckman, M., Howard, B. H., Bank, T. L., Roth, E. A., Macala, M. K., Lopano, C., Soong, Y., and Granite, E. J. (2018). Application of sequential extraction and hydrothermal treatment for characterization and enrichment of rare earth elements from coal fly ash. *Fuel*, *232*(May), 124–133. https://doi.org/10.1016/j.fuel.2018.05.141.

Maidel, M., José, M., Santana, J. De, and Araújo, H. De. (2019). Separation and purification technology recycling lanthanum from effluents of elektrokinetic treatment of FCC spent catalyst, using a selective precipitation technique. *Separation and Purification Technology*, *210*(July 2018), 251–257. https://doi.org/10.1016/j.seppur.2018.08.001.

Manurung, H., Rosita, W., Bendiyasa, M., and Prasetya, A. (2020). Recovery of rare earth elements and yttrium from non-magnetic coal fly ash using acetic acid solution. *Journal of Metal Indonesia*, *42*(1).

Matias, P., Sá Couto, C., Graa, I., Lopes, J. M., Carvalho, A. P., Ramôa Ribeiro, F., and Guisnet, M. (2011). Desilication of a ton zeolite with NaOH: Influence on porosity, acidity and catalytic properties. *Applied Catalysis A: General*, *399*(1–2), 100–109. https://doi.org/10.1016/j.apcata.2011.03.049.

McNeil, A., M., Karali, Nihan, Letschert, and Virginie. (2019). Forecasting Indonesia's electricity load through 2030 and peak demand reductions from appliance and lighting efficiency. *Energy for Sustainable Development*, *49*, 65–77. https://doi.org/10.1016/j.esd.2019.01.001.

Mcneil, Michael, A., Karali, Nihan, Letschert, and Virginie. (2019). Energy for sustainable development forecasting Indonesia ' s electricity load through 2030 and peak demand reductions from appliance and lighting ef fi ciency. *Energy for Sustainable Development*, *49*, 65–77. https://doi.org/10.1016/j.esd.2019.01.001.

Mondal, S., Ghar, A., Satpati, A. K., and Sinharoy, P. (2019). Recovery of rare earth elements from coal fly ash using TEHDGA impregnated resin. *Journal of Hydrometallurgy*, *185*(January), 93–101. https://doi.org/10.1016/j.hydromet.2019.02.005.

Mondal, S., Ghar, A., Satpati, A. K., Sinharoy, P., Singh, D. ., Sharma, J. ., Sreenivas, T., and Kain, V. (2019). Recovery of rare earth elements from coal fly ash using TEHDGA impregnated resin. *Hydrometallurgy*, *185*(September 2018), 93–101. https://doi.org/10.1016/j.hydromet.2019.02.005.

Mondal, S., Ghar, A., Satpati, A. K., Sinharoy, P., Singh, D. K., Sharma, J. N., Sreenivas, T., and Kain, V. (2019). Hydrometallurgy recovery of rare earth elements from coal fly ash using TEHDGA impregnated resin. *Hydrometallurgy*. *185*. 93–101. https://doi.org/10.1016/j.hydromet.2019.02.005.

Myers, R.H., Montgomery, D.C., and Anderson- Cook, C.M. (2016). Response surface methodology: process and product optimization using designed experiments. John Wiley & Sons.

Montgomery. Douglas C. (2009). Statistical quality control: A modern introduction. Asia: John Wiley & Sons, Inc.

Omodara, L., Pitkaaho, S., Turpeinen, E.-M., Saavalainen, P., Oravisjarvi, K., and

Keiski, R. L. (2019). Recycling and substitution of light rare earth elements, cerium, lanthanum, neodymium, and praseodymium from end-of-life applications - A review. *Journal of Cleaner Production*, *236*. https://doi.org/10.1016/j.jclepro.2019.07.048.

Oncel, M. S., Muhcu, A., Demirbas, E., and Kobya, M. (2013). A comparative study of chemical precipitation and electrocoagulation for treatment of coal acid drainage wastewater. *Journal of Environmental Chemical Engineering*, *1*(4), 989–995. https://doi.org/10.1016/j.jece.2013.08.008.

Pan, J., Nie, T., Vaziri Hassas, B., Rezaee, M., Wen, Z., and Zhou, C. (2020). Recovery of rare earth elements from coal fly ash by integrated physical separation and acid leaching. *Journal of Chemosphere*, *248*. https://doi.org/10.1016/j.chemosphere.2020.126112.

Pane, D. N., Fikri, M. EL, & Ritonga, H. M. (2018). Buletin ketenagalistrikan. *Journal of Chemical Information and Modeling*, *53*(9).

Park, S., and Liang, Y. (2019). Bioleaching of trace elements and rare earth elements from coal fly ash. *International Journal of Coal Science and Technology*, *6*(1), 74–83. https://doi.org/10.1007/s40789-019-0238-5.

Pavon, S., Fortuny, A, Coll, M. ., and Sastre, A. M. (2019). Improved rare earth elements recovery from fluorescent lamp wastes applying supported liquid membranes to the leaching solutions. *Separation and Purification Technology*. https://doi.org/10.1016/j.seppur.2019.05.015.

Peramaki, S. (2014). Method development for determination and recovery of rare earth elements from industrial fly ash.

PP (Peraturan Pemerintah) Nomor 22. (2021). Penyelenggaraan perlindungan dan pengelolaan lingkungan hidup. *Sekretariat Negara Republik Indonesia*.

PP (Peraturan Pemerintah) Nomor 101. (2014). Pengelolaan limbah bahan berbahaya dan beracun. *Sekretariat Negara Republik Indonesia*.

Perwira, N. I., Basuki, K. T., Biyantoro, D., & Effendy, N. (2018). Optimization Recovery of Yttrium Oxide in Precipitation, Extraction, and Stripping Process. *IOP Conference Series: Materials Science and Engineering*, *349*(1). https://doi.org/10.1088/1757-899X/349/1/012044

Petrus, H. T. B. M., Olvianas, M., Suprapta, W., Setiawan, F. A., Prasetya, A., Sutijan, and Anggara, F. (2020). Cenospheres characterization from Indonesian coal-fired power plant fly ash and their potential utilization. *Journal of Environmental Chemical Engineering*, *8*(5), 104116. https://doi.org/10.1016/j.jece.2020.104116.

Pimsuta, M., Neramittagapong, A., Prayoonpokarach, S., and Wittayakun, J. (2012). Desilication of NaZSM-5 and utilization as support of Fe for phenol hydroxylation. *International Journal of Chemical Engineering and Applications*, *3*(2), 86–91. https://doi.org/10.7763/ijcea.2012.v3.166.

PT Perusahaan Listrik Negara (Persero). (2017). Rencana usaha penyediaan tenaga listrik (RUPTL) PLN 2017-2026. 2026(29 Maret 2017).

Puspitarini, R., Sn, A. K., and Ar, R. (2019). Pengaruh ukuran partikel , zat aktivator, waktu aktivasi dan waktu kontak adsorben fly ash untuk mengurangi kadar kadmium (Cd) pada air lindi di tempat pembuangan akhir purworejo , jawa tengah effect of particle size , activator agent , activation time. 13(2),

109–118.

Romero, J. L., and Mccord, S. A. (2012). Rare earth elements : Procurement, Application , and Reclamation. July.

Rosita, W., Bendiyasa, I. M., Perdana, I., and Anggara, F. (2020). Experimental study of rare earth element enrichment from Indonesian coal fly ash: Alkaline leaching. *J. Key Engineering Materials*, *840*, 514–519. https://doi.org/10.4028/www.scientific.net/kem.840.514

Rosita, W., Bendiyasa, I. M., Perdana, I., and Anggara, F. (2020). Recovery of rare earth elements and Yttrium from Indonesia coal fly ash using sulphuric acid leaching. *AIP Conference Proceedings*, *2223*(April). https://doi.org/10.1063/5.0000836.

Rosita, W., Bendiyasa, I. M., Perdana, I., and Anggara, F. (2020). Sequential particle-size and magnetic separation for enrichment of rare-earth elements and yttrium in Indonesia coal fly ash. *Journal of Environmental Chemical Engineering*, *8*(1), 103575. https://doi.org/10.1016/j.jece.2019.103575.

Rosita, W., Dea, A. A. B., Bendiyasa, I. M., Indra, P., Ferian, A., and Himawan, T. B. M. P. (2020). Potency of rare earth elements and yttrium in indonesia coal ash. *Key Engineering Materials*, *849 KEM*, 102–107. https://doi.org/10.4028/www.scientific.net/KEM.849.102.

Silva, R. G., Antonio, C., & Teixeira, L. V. (2019). Selective precipitation of high-quality rare earth oxalates or carbonates from a purified sulfuric liquor containing soluble impurities. *Journal of Mining, Metallurgy and Exploration*. https://doi.org/10.1007/s42461-019-0090-6.

Silva, G., R., Morais, C. A., and Oliveira, É. D. (2019). Selective precipitation of rare earth from non-purified and purified sulfate liquors using sodium sulfate and disodium hydrogen phosphate. *Minerals Engineering*, *134*(January), 402–416. https://doi.org/10.1016/j.mineng.2019.02.028.

Sriramoju, S. K., Suresh, A., Lingam, R. K., and Dash, P. S. (2017). Mechanism of a coal chemical-leaching process and recovery of spent chemicals: A pilot-scale study. *International Journal of Coal Preparation and Utilization*, *37*(6), 293–302. https://doi.org/10.1080/19392699.2016.1179637.

Suganal, Umar, D. F., and Mamby, H. E. (2018). Identification of occurrence of rare earth metals in coal ash from ombilin electric power generation plant, West Sumatera. *Journal of Mineral and Coal Technology*, *14*(2), 111–125. https://doi.org/10.30556/jtmb.vol14.no2.2018.395.

Tian, Yilan, Liu, Zhongwu, Zhang, and Guoqing. (2019). Recovering REEs from NdFeB wastes with high purity and efficiency by leaching and selective precipitation process with modified agents. *Journal of Rare Earths*, *37*(2), 205–210. https://doi.org/10.1016/j.jre.2018.10.002.

Trisnawati, I., Prameswara, G., Mulyono, P., Prasetya, A., and Petrus, H. T. B. M. (2020). Sulfuric acid leaching of heavy rare earth elements (HREEs) from Indonesian zircon tailing. *International Journal of Technology*, *11*(4), 804. https://doi.org/10.14716/ijtech.v11i4.4037.

USGS (The United States Geological Survey). (2020). Mineral commodity summaries 2020. In *U.S Departtment OF The Interior, U.S Geological Survey*.

USGS (The United States Geological Survey). (2019). Mineral commodity

summaries 2019. In Handbook of Environmental Chemistry (Vol. 3). https://doi.org/10.1007/978-3-540-47108-04.

Varala, S., Ravisankar, V., Al-Ali, M., Pownceby, M. I., Parthasarathy, R., and Bhargava, S. K. (2019). Process optimization using response surface methodology for the removal of thorium from aqueous solutions using rice-husk. *Journal of Chemosphere*, *237*, 124488. https://doi.org/10.1016/j.chemosphere.2019.124488.

Wang, Y., Chen, X., Liu, W., Cheng, L., and Zhang, L. (2010). Exploration of YPO4 as a potential environmental barrier coating. *Ceramics International*, *36*(2), 755–759. https://doi.org/10.1016/j.ceramint.2009.10.014.

Wu, C.F.J. dan Hamada, M. (2000). Experiments: planing, analysis and parameter design optimization. Wiley, New York.

Xu, Y., Chen, C., Lan, Y., Wang, L., and Li, J. (2020). Desilication and recycling of alkali-silicate solution seeded with red mud for low-grade bauxite utilization. *Journal of Materials Research and Technology*, *9*(4), 7418–7426. https://doi.org/10.1016/j.jmrt.2020.04.095.

Zhang, W., and Honaker, R. (2020). Characterization and recovery of rare earth elements and other critical metals (Co, Cr, Li, Mn, Sr, and V) from the calcination products of a coal refuse sample. *Journal of Fuel*, *267*. https://doi.org/10.1016/j.fuel.2020.117236.

Zhang, W., Noble, A., Yang, X., and Honaker, R. (2020). A comprehensive review of rare earth elements recovery from coal-related materials. *Journal of Minerals*, *10*(5), 1–30. https://doi.org/10.3390/min10050451.

Zhou, H., Bhattarai, R., Li, Y., Li, S., and Fan, Y. (2019). Resources , conservation & recycling utilization of coal fly and bottom ash pellet for phosphorus adsorption : Sustainable management and evaluation. *Resources, Conservation & Recycling*, *149*(March), 372–380. https://doi.org/10.1016/j.resconrec.2019.06.017.

Zhu, D., Chen, Q., Qiu, T., and Zhao, G. (2021). Optimization of rare earth carbonate reactive-crystallization process based on response surface method. *Journal of Rare Earths*, *39*(1), 98–104. https://doi.org/10.1016/j.jre.2020.03.011.

Zhuang, M., Zhao, J., Li, S., Liu, D., and Wang, K. (2017). Chemosphere concentrations and health risk assessment of rare earth elements in vegetables from mining area in Shandong , China. *Journal of Chemosphere*, *168*, 578–582. https://doi.org/10.1016/j.chemosphere.2016.11.023.