

DAFTAR PUSTAKA

- Abdul A. S., Aprimuharam M. S., dan Samsul B.M., 2020, Pemanfaatan Limbah Abu Batubara Sebagai Sumber Logam Tanah Jarang, *Jurnal GEOMining*, 1(2), 72-78.
- Abdullah, M., dan Khairurrijal, 2009, Review: Karakterisasi Nanomaterial, *J. Nano Saintek.*, 2(1), 1-9.
- Agustiani, T., 2015, Adsorpsi Simultan Ion Logam Cu(II) dan Mg(II) pada Abu Dasar Batubara Terimobilisasi Ditizon, *Skripsi*, Departemen Kimia UGM, Yogyakarta.
- Ali, Asif, Yi W. C., and Rafael M. S., 2022, X-ray Diffraction Techniques for Mineral Characterization: A Review for Engineers of the Fundamentals, Applications, and Research Directions, *Minerals* 12(2), 205–217.
- Anastas, P. T., and Warner, J. C., 1998, *Green Chemistry: Theory and Practice*, Oxford University Press, New York.
- Aprilita, N. H., Mudasir, Githa A. A., 2008, Study on The Adsorption of Bottom Ash Towards Ni(II) Metal Ion, *Proceeding of The International Seminar on Chemistry*, 89-92.
- Arbi, Y., Aidha, E. R. and Deflianti, L., 2018, Analisis Nilai Kalori Briket Tempurung Kelapa Sebagai Bahan Bakar Alternatif Di Kecamatan Sipora Utara Kabupaten Mentawai, *Jurnal PTK: Pendidikan Teknologi Kejuruan*, 1(3), 119–123.
- Azizah, Sri Yanti Lisha, 2019, Pemanfaatan Limbah Abu Dasar Batubara (Bottom Ash) Sebagai Adsorben Logam Fe pada Limbah Cair PLTU Teluk Sirih, Sumatera Barat, *Jurnal Aerasi*, 1(1), 14-20.
- Bansal, R. C., dan Meenakshi, G., 2005, *Activated Carbon Adsorption*, New York, Taylor and Francis Group.
- Bertolini, T.C.R., Izidoro, J.C., Magdalena, C.P., dan Fungaro, D.A., 2013, Adsorption of Crystal Violet Dye from Aqueous Solution onto Zeolites from Coal Fly and Bottom Ashes, *Orbital: Electron. J. Chem.*, 5(3), 179-191.
- Botahala, L., 2022, *Adsorpsi Arang Aktif*, Deepublish, NTT.
- Chen, L., Zhou, S., Shi, Y., Wang, C., Li, B., Li, Y., dan Wu, S., 2018, Heavy Metals in Food Niops, Soil, and Water in the Lihe River Watershed of the Taihu Region and Their Potential Health Risks When Ingested, *Sci. Total Environ.*, 615, 141-149.
- Fitriana, D., 2019, Adsorpsi Ion Logam Pb(II) Dan Cd(II) Pada Adsorben Abu Layang Batubara (Coal Fly Ash) Terimobilisasi Ditizon, *Tesis*, Departemen Kimia FMIPA UGM, Yogyakarta.

- Fitriana, W., Emiyarti, Pratikino, A.G., 2021, Sebaran Logam Berat Nikel (Ni) pada Air di Perairan Kecamatan Pomala Kabupaten Kolaka, *Jurnal Sapa Laut*, 6(3), 177-182.
- Gandhimathi, R., Ramesh, S.T., Sindhu, V., dan Nidheesh, P.V., 2012, Single and Tertiary System Dye Removal from Aqueous Solution Using Bottom Ash: Kinetic and Isotherm Studies, *Iranica Journal of Energy and Environment*, 3(1), 35–45.
- Gonsalvesh, L., Marinov, S.P., Gryglewicz, G., Carleer, R., and Yperman, J., 2016, Preparation Characterization and Application of Polystyrene Based Activated Carbon for Ni(II) Removal Aqueous Solution, *Fuel Process. Technol.*, 149, 75–85.
- Hafiyah S., 2013, Kinetika Adsorpsi Zat Warna Rhodamin B Menggunakan Karbon Aktif Sekam Padi (*Oryza Sativa L.*), *Journal of Chemical Information and Modeling*, 53(9), 1689–1699.
- Ho, Y. S., 2004, Citation Review of Lagergren Kinetic Rate Equation on Adsorption Reactions, *Scientometrics*, 59(1), 171- 177.
- Ho, Y. S., 2004, Citation Review of Lagergren Kinetic Rate Equation on Adsorption Reactions. *Scientometrics*, 59(1), 171- 177.
- Hong, Y. K., Kim, J. W., Kim, H. S., Lee, S. P., Yang, J. E., dan Kim, S. C., 2021, Bottom Ash Modification via Sintering Process for Its Use as a Potential Heavy Metal Adsorbent: Sorption Kinetics and Mechanism, *Materials*, 14, 3060.
- Indra Prilana,I., (2017) Adsorpsi Logam Ni(II) Pada Zeolit Sintesis Dari Abu Dasar Batubara Termodifikasi Ligan Ditizon, *Skripsi Thesis*, UIN Sunan Kalijaga.
- Islam, M.A., Angove, M.J., and Morton, D.W., 2019, Macroscopic and Modeling Evidence for Nickel(II) Adsorption Onto Selected Manganese Oxides and Boehmite, *J. Water Process. Eng.*, 32, 1-10.
- Jarusiripot, C., 2014, Removal of Reactive Dye by Adsorption over Chemical Pretreatment Coal Based Bottom Ash , *Procedia Chem.*, 9, 121-130.
- Jazi, H., Ezzahi, A., Karim, A., Machtani, D. I., Bouhria, M., and Alami, S. A., 2022, Sintering Effect on Cationic and Anionic Dyes Adsorption Efficiency Using Natural Red Clay: Limitations and Future Scope of The Study, *Second International Symposium on Nanomaterials and Membrane Science for Water, Energy and Environment (SNMS)*, 76–88.
- Julia Ayala, J., dan Begoña F., 2016, A Case Study of Landfill Leachate Using Coal Bottom Ash for the Removal of Cd^{2+} , Zn^{2+} and Ni^{2+} , *Metals*, 6(12), 300.
- Kadja, T. M. and Ilmi, M. M., 2019, Indonesia Natural Mineral For Heavy Metal Adsorption: A Review, *J. Environ. Sustain. Dev.*, 2(2), 139-164.

- Kalak, T., Kinga M., and Joanna P., 2021, Highly Effective Adsorption Process of Ni(II) Ions with the Use of Sewage Sludge Fly Ash Generated by Circulating Fluidized Bed Combustion (CFBC) Technology, *Materials (Basel)*, 14(11), 3106.
- Khopkar, S. M., 2002, *Konsep Dasar Kimia Analitik*, UI Press, Jakarta.
- Kurniawati P., Bayu W., Angga K., dan Tri E. P., 2013, Kinetic study of Cr(VI) Adsorption on Hydrotalcite Mg/Al with Molar Ratio 2:1, *Jurnal Eksakta*, 13(1), 11-21.
- Madiabu M. J., Joko U., dan Imas S., 2020, Studi Kesetimbangan Isotherm Adsorpsi Logam Ni(II) pada Limbah Cair Menggunakan Canggang Telur: Adsorben Berbiaya Murah, *Warta Akab*, 44(2), 84-92.
- Maharani dan Khalimatus, 2021, Logam Nikel Menggunakan Adsorben Serbuk Gergaji Kayu, *Distilat*, 7(2), 170-178.
- Maria M., 2018, Modifikasi Abu Dasar Batubara dengan 8-Hidroksi quinolin untuk Adsorpsi Ion Logam Cu(II) Dan Ni(II), *Skripsi*, Departemen Kimia FMIPA UGM, Yogyakarta.
- Moharana, S., Bibhuti, B., Rozalin, N., and Ram, N. M., 2022, *Renewable Polymers and Polymer-Metal Oxide Composites*, Elsevier, UK.
- Muniarti, 2007, Pembuatan Zeolite dari Abu Dasar Batubara dan Aplikasinya Sebagai Adsorben Cu(II), *Tesis*, FMIPA, UGM, Yogyakarta.
- Nurdila, F. A., Nining S. A., dan Edi S., 2015, Adsorpsi Logam Tembaga (Cu), Besi (Fe), dan Nikel (Ni) dalam Limbah Cair Buatan Menggunakan Nanopartikel Cobalt Ferrite (CoFe₂O₄) Femila Amor, *Jurnal Fisika Indonesia*, 19 (55), 23-27.
- O'Connell, D. W., Birkinshaw, C., dan O'Dowry, T. F., 2008, Heavy Metal Adsorbent Prepared from The Modification of Cellulose: A Review, *Bioresource Technology*, 99,6709-6724.
- Paloma, J., Mañosa, J., Maldonado, A., Quina, M. J., and Chimenos, J. M., 2019, Rapid Sintering of Weathered Municipal Solid Waste Incinerator Bottom Ash And Rice Husk for Lightweight Aggregate Manufacturing and Product Properties. *J. Clean. Prod.*, 232, 713-721.
- Peraturan Menteri Lingkungan Hidup Dan Kehutanan Nomor 6 Tahun 2021 tentang Tata Cara dan Persyaratan Pengelolaan Limbah Bahan Berbahaya Dan Beracun.
- Peraturan Menteri Lingkungan Hidup Dan Kehutanan Republik Indonesia Nomor 5 Tahun 2022 tentang Pengolahan Air Limbah Bagi Usaha Dan/Atau Kegiatan Pertambangan dengan Menggunakan Metode Lahan Basah Buatan.
- Peraturan Pemerintah Republik Indonesia Nomor 22 Tahun 2021 tentang Penyelenggaraan Perlindungan dan Pengelolaan Lingkungan Hidup.

- Pertiwi, N., 2017, *Implementasi Sustainable Development di Indonesia*, Pustaka Ramadhan, Bandung.
- Purwitasari D.G., Rahma T., dan Rif'an F., 2022, Adsorpsi Logam Kadmium (Cd) pada Kadmium Sulfat (CdSO_4) Menggunakan Batang Pohon Pisang Sebagai Adsorben, *Jurnal Chemurgy*, 6(1), 131-136.
- Retno D., 2018, Abu Batubara dan Pemanfaatannya: Tinjauan Teknis Karakteristik Secara Kimia dan Toksikologinya, *Jurnal Teknologi Mineral dan Batubara*, 14(3), 213-231.
- Riyanto, 2016, *Kimia Analisis Instrumental Modern*, UII Press, Yogyakarta.
- Sawyer, Clair, N., and McCarty, Perry, L., dan Parkin, dan Gene, F, 1994, *Chemistry for Environmental Engineering*, McGraw-Hill, New York.
- Schechter, I., Barzilai, I. L., and Bulatov, V., 1997, Online Remote Prediction of Gasoline Properties by Combined Optical Method, *Ana.Chim.Acta*, 339, 193-199.
- Seader, J. D., dan Henley, E.J., 1998, *Separation Process Principles*, John Wiley and Sons, New York.
- Sharma, D.P., Bisen, S., and Sharma, B. G., 2012, X-Ray Diffraction: A Powerful Method of Characterizing Nanomaterials, *Recent Research in Science and Technology*, 4(8), 77-79.
- Shim, Y.S., Kim Y.K., Kong, S.H., and Le, W.K., 2003, The Adsorption Characteristic of Heavy Metals by Various Particle Sizes of MSWI Bottom Ash, *Waste Manag*, 23(9), 851-857.
- Silverstein, R. M., and Bassler, 1998, *Spectrometric Identification Of Organic Compounds*. Sixth Edition, John Wiley and Sons Inc., New York.
- Singh, M., and Shiddique, R., 2013, Effect of Coal Bottom Ash as Partial Replacement of Sand on Properties of Concrete, *J. Res. Cons. Rec.*, 72, 20-32.
- Singh, V., Chauhan, P.K., Kanta, R., Dhewa, T. and Kumar, V., 2010, Isolation and Characterization of Pseudomonas Resistant to Heavy Metals Contaminants, *International Journal of Pharmaceutical Sciences Review and Research*, 3, 164-167.
- Skoog, Holler, and Nieman, 1998, *Principles of Instrumental Analysis*, 5th ed, Saunders College Publishing, USA.
- Soco, E., and Jan, K., 2013, Adsorption of Nickel(II) and Copper(II) Ions From Aqueous Solution by Coal Fly Ash, *J. Environ. Chem. Eng.*, 1(3), 581-588.
- Sukpreabprom, H., Arquero, O.A., Naksata, W., Sooksamiti, P., and Janhom, S., 2014, Isotherm, Kinetic and Thermodynamic Studies on the Adsorption of Cd(II) and Zn(II) Ions from Aqueous Solutions onto Bottom Ash, *Inter. J. Environ. Sci. Develop.*, 5(2), 65-170.

- Sukpreabprom, H., Arquero, O.A., Naksata, W., Sooksamiti, P., dan Janhom, S., 2014, Isotherm and Thermodynamic Studies on the Adsorption Of Cd(II) and Zn(II) Ions from Aqueous Solutions onto Bottom Ash, *Inter. J. Environ. Sci. Develop*, 5 (2), 165–170.
- Sunarti dan Nazudin, 2021, Sintesis Zeolit A Dari Abu Dasar Batubara (Coal Bottom Ash) dengan Metode Peleburan dan Hidrotermal, *MJoCE*, 11(1), 8-16.
- Surender Kumar Sharma, S. K., Dalip S. V., Latif U. K., Shalendra K., dan Sher B. K., 2018, *Handbook of Materials Characterization*, Publisher Springer Cham, Switzerland.
- Tchobanoglous, G., dan Burton, F.L., 1991, *Wastewater Engineering Treatment, Disposal and Reuse*. McGraw Hill Inc, Pennsylvania, PA.
- Thermo N., 2001, *Introduction to FTIR Spectrometry*, Thermo Nicolet Inc: Madison, USA.
- Ulfa Meila Anggriani , Abu Hasan , Indah Purnamasari, 2021, Kinetika Adsorpsi Karbon Aktif Dalam Penurunan Konsentrasi Logam Tembaga (Cu) Dan Timbal (Pb), *Jurnal Kinetika*, 12(2): 29-37.
- Ulfah,M., Rahayu, P., dan Dewi L.R., 2013, *Konsep Pengetahuan Lingkungan Green Chemistry Pada Program Studi Pendidikan Biologi*, Seminar Nasional X Pendidikan Biologi FKIP UNS , Hal:180–185.
- Verbinnen, B., Pieter, B., Jo V. C., and Carlo, V., 2017, Recycling of MSWI Bottom Ash: A Review of Chemical Barriers, Engineering Applications and Treatment Technologies, *Waste Biomass Valor*, 8(5), 1453–1466.
- Wahyudianto, I.F., 2016, Adsorpsi Simultan Ion Logam Ni(II) dan Mg(II) Pada Abu Dasar Batubara Terlapis Dithizon, *Skripsi*, UGM
- Wali, W., Emiyart, dan Afu, L.O.A., 2020, Kandungan Logam Berat Nikel (Ni) pada Sedimen dan Air di Perairan Desa Apuemea Kabupaten Konawe Utara, *Jurnal Ilmu Kelautan*, 5(1), 37-47.
- Wan L., Shuang, W., Chenghui, L., Shengkun, Z., Shams, A. B., Zimo, L., and Xinhua, 2023, Application of Sintered Textile Sludge as Novel Adsorbents for Sb(V) Removal From Textile Wastewater: Performances, Mechanisms and Perspectives, *J. Clean. Prod.*, 425.
- Wang, S., Sudi, M., Li, L., dan Zhu, Z., 2006, Coal Ash Conversion Into Effective Adsorbents for Removal of Heavy Metals and Dyes From Wastewater, *J. Hazard. Mater.*, 133(3), 243–251.
- Wardiyati, S., Fisli, A., dan Ridwan, 2011, Penyerapan Logam Ni dalam Larutan oleh Nanokomposit Fe_3O_4 - Karbon Aktif, *Jusami*, 12(3), 224-228.
- Yahya, R. (2018). Pengolahan Limbah Kromium Industri Elektroplating Menggunakan Teknologi Filtrasi, Absorpsi, Adsorpsi, Sedimentasi, *Mathematics Education Journal*, 1(1), 75.

Zhou, Z., Kong D., Zhu, H., Wang, N.Z., liu, W., Li, Q., Zhang, W., and Ren, Z., 2018, Preparation and Adsorption Characteristics of an Ion Imprinted Polymer for Fast Removal of Ni(II) Ions from Aqueous Solution, *Journal Hazard Mater*, 341, 355–364.