

DAFTAR PUSTAKA

- Abewaa, M., Mengistu, A., Takele, T., Fito, J., & Nkambule, T. (2023). Adsorptive removal of malachite green dye from aqueous solution using *Rumex abyssinicus* derived activated carbon. *Scientific Reports*, 13(1).
- Adha, F. F., & Warsiki, E. (2023). Silica Synthesis from Oil Palm Mill Boiler Ash under Different Concentration of NaOH and Extraction Time. *IOP Conference Series: Earth and Environmental Science*, 1187(1).
- Agrawal, M., Prasad, V. V. S. H., Nijhawan, G., Jalal, S. S., Rajalakshmi, B., & Dwivedi, S. P. (2024). A Comprehensive Review of Electron Microscopy in Materials Science: Technological Advances and Applications. *E3S Web of Conferences*, 505.
- Ahmad, A. A., Ahmad, M. A., Yahaya, N. K. E. M., & Karim, J. (2021). Adsorption of malachite green by activated carbon derived from gasified *Hevea brasiliensis* root. *Arabian Journal of Chemistry*, 14(4).
- Aigbe, U. O., Ukhurebor, K. E., Onyancha, R. B., Osibote, O. A., Darmokoesoemo, H., & Kusuma, H. S. (2021). Fly ash-based adsorbent for adsorption of heavy metals and dyes from aqueous solution: a review. In *Journal of Materials Research and Technology* (Vol. 14, pp. 2751–2774). Elsevier Editora Ltda.
- Alaqarbeh, M., Al, P., & Abdullah, H. Bin. (2021). Adsorption Phenomena: Definition, Mechanisms, and Adsorption Types: Short Review. *RHAZES: Green and Applied Chemistry*, 13, 43–51.
- Alcalde-Garcia, F., Prasher, S., Kaliaguine, S., Tavares, J. R., & Dumont, M.-J. (2023). Desorption Strategies and Reusability of Biopolymeric Adsorbents and Semisynthetic Derivatives in Hydrogel and Hydrogel Composites Used in Adsorption Processes. *ACS Engineering Au*, 3(6), 443–460.
- Ali, A., Chiang, Y. W., & Santos, R. M. (2022). X-Ray Diffraction Techniques for Mineral Characterization: A Review for Engineers of the Fundamentals, Applications, and Research Directions. *Minerals*, 12(2).
- Allouss, D., Essamlali, Y., Amadine, O., Chakir, A., & Zahouily, M. (2019). Response surface methodology for optimization of methylene blue adsorption onto carboxymethyl cellulose-based hydrogel beads: Adsorption kinetics, isotherm, thermodynamics and reusability studies. *RSC Advances*, 9(65), 37858–37869.
- Al-Maliky, E. A., Gzar, H. A., & Al-Azawy, M. G. (2021). Determination of Point of Zero Charge (PZC) of Concrete Particles Adsorbents. *IOP Conference Series: Materials Science and Engineering*, 1184(1), 012004.

- Anggraini, R. V., Koesnarpadi, S., & Widodo, N. T. (2022). Optimasi Magnetit Tersalut Asam Humat ($\text{Fe}_3\text{O}_4\text{-AH}$) Sebagai Adsorben Methylene Blue. *Prosiding Seminar Nasional Kimia*.
- Antoni, W., Hamdiani, S., & Kamali, S. R. (2019). Thermodynamics and Kinetics of Adoption of Ag (I) on Paramagnetic Silica Rice Husk Ash Surface. *Acta. Chim.*
- Anwar, K. (2019). Isotermis dan Termodinamika Adsorpsi Methylene Blue. *Skripsi*. Universitas Islam Negeri Maulana Malik Ibrahim.
- Ardani, A. (2020). Analisis Peningkatan Substitusi Unsur Nikel Terhadap Struktur Kristal Dan Sifat Magnet Material Lantanum Barium Manganat. *Skripsi*. Universitas Islam Negeri Syarif Hidayatullah.
- Azizi, A., Moniri, E., Hassani, A. H., & Panahi, H. A. (2020). Reusability, optimization, and adsorption studies of modified graphene oxide in the removal of direct red 81 using response surface methodology. *Advances in Environmental Technology*, 6(4), 175–185.
- Azmiyawati, C., Sawitri, E., & Siahaan, P. (2018). Silica Magnetite Adsorbent: Effect of Drying Temperature of Silica Sol Gel on Magnetite Core Structure. *Jurnal Kimia Sains Dan Aplikasi*, 21(3), 149–154.
- Bora, R., Rasid, S. S., & Hussain, Md. A. (2024). Toxicological Impact of Malachite Green on Freshwater Fish: A Comprehensive Review. *Uttar Pradesh Journal Of Zoology*, 45(17), 659–668.
- Bunaciu, A. A., Udriștioiu, E. gabriela, & Aboul-Enein, H. Y. (2015). X-Ray Diffraction: Instrumentation and Applications. In *Critical Reviews in Analytical Chemistry* (Vol. 45, Issue 4, pp. 289–299). Taylor and Francis Ltd.
- Cai, W., Guo, M., Weng, X., Zhang, W., Owens, G., & Chen, Z. (2020). Modified green synthesis of $\text{Fe}_3\text{O}_4@\text{SiO}_2$ nanoparticles for pH responsive drug release. *Materials Science and Engineering C*, 112.
- Cha, J. H., Choi, H. H., Jung, Y. G., Choi, S. C., & An, G. S. (2020). Novel synthesis of core-shell structured $\text{Fe}_3\text{O}_4@\text{SiO}_2$ nanoparticles via sodium silicate. *Ceramics International*, 46(10), 14384–14390.
- Choudhary, M., Kumar, R., & Neogi, S. (2020). Activated biochar derived from *Opuntia ficus-indica* for the efficient adsorption of malachite green dye, Cu^{+2} and Ni^{+2} from water. *Journal of Hazardous Materials*, 392.
- De Marco, C., Mauler, R. S., Daitx, T. S., Krindges, I., Cemin, A., Bonetto, L. R., Crespo, J. S., Guégan, R., Carli, L. N., & Giovanela, M. (2020). Removal of malachite green dye from aqueous solutions by a magnetic adsorbent. *Separation Science and Technology (Philadelphia)*, 55(6), 1089–1101.

- Dilekoğlu, M. F. (2022). Malachite green adsorption from aqueous solutions onto biochar derived from sheep manure: adsorption kinetics, isotherm, thermodynamic, and mechanism. *International Journal of Phytoremediation*, 24(4), 436–446.
- Ebelegi, A. N., Ayawei, N., & Wankasi, D. (2020). Interpretation of Adsorption Thermodynamics and Kinetics. *Open Journal of Physical Chemistry*, 10(03), 166–182.
- El Messaoudi, N., El Khomri, M., El Mouden, A., Bouich, A., & Jada, A. (2022). Regeneration and reusability of non-conventional low-cost adsorbents to remove dyes from wastewaters in multiple consecutive adsorption–desorption cycles: a review. *Biomass Conversion and Biorefinery*.
- Fadlelmoula, A., Pinho, D., Carvalho, V. H., Catarino, S. O., & Minas, G. (2022). Fourier Transform Infrared (FTIR) Spectroscopy to Analyse Human Blood over the Last 20 Years: A Review towards Lab-on-a-Chip Devices. In *Micromachines* (Vol. 13, Issue 2). MDPI.
- Fatmawati, R. A., Koesnarpadi, S., & Wirawan, T. (2024). Adsorpsi Ion Logam Kadmium (II) Menggunakan Magnetit (Fe_3O_4)-Arang Aktif Dari Kulit Buah Tarap (*Artocarpus odoratissimus*). *ATOMIK*, 9(2), 110–119.
- Ge, J. C., Yoon, S. K., & Choi, N. J. (2018). Application of Fly Ash as an adsorbent for removal of air and water pollutants. *Applied Sciences (Switzerland)*, 8(7).
- Ghorbani, F., & Kamari, S. (2019). Core–shell magnetic nanocomposite of $\text{Fe}_3\text{O}_4@\text{SiO}_2@\text{NH}_2$ as an efficient and highly recyclable adsorbent of methyl red dye from aqueous environments. *Environmental Technology and Innovation*, 14.
- Hakim, L., & Nawir, D. M. (2019). Karakterisasi Struktur Material Pasir Bongkahan Galian Golongan C Dengan Menggunakan X-Ray Difraction (X-RD) Di Kota Palangkaraya. In *Jurnal Jejaring Matematika dan Sains* (Vol. 1, Issue 1).
- Handayani, T. (2021). Pembuatan Komposit Fe_3O_4 Termobilisasi SiO_2 Dari Abu Daun Bambu Dan Uji Aktivitas Fotokatalis Pada Degradasi Metil Violet. *Skripsi*. Universitas Islam Indonesia.
- Harumi, M., Shaleh, F., Sudiono, S., & Triyono, T. (2020). Studi Kinetika Adsorpsi Ion Au(III) Menggunakan Kulit Buah Manggis (*Garcinia mangostana* L.). *PRAXIS*, 2(2), 148.
- Hasan, M. I., Bag, S., Halder, D., Bhowmik, S., Chakraborty, A., & Ghosh, A. (2024). Simultaneous removal of malachite green and lead from water by

- consortium dry-biomasses of *Bacillus licheniformis* AG3 and *Bacillus cereus* M116. *Scientific Reports*, 14(1).
- Hidayatulloh, P. F. (2023). Kitosan Termodifikasi Magnetit dan SiO₂ Hasil Sintesis Dari Abu Layang Untuk Adsorpsi Zat Warna Malachite Green. *Skripsi*. Universitas Jenderal Soedirman.
- Ibrahim, A. J. (2023). Adsorption behavior of Crystal Violet dye in aqueous solution using Co⁺² hectorite composite as adsorbent surface. *Analytical Methods in Environmental Chemistry Journal*, 6(1), 5–16.
- Idohou, E. A., Fatombi, J. K., Osseni, S. A., Agani, I., Neumeyer, D., Verelst, M., Mauricot, R., & Aminou, T. (2020). Preparation of activated carbon/chitosan/Carica papaya seeds composite for efficient adsorption of cationic dye from aqueous solution. *Surfaces and Interfaces*, 21.
- Irwansyah, F. S., Amal, A. I., Diyanthi, E. W., Hadisantoso, E. P., Noviyanti, A. R., Eddy, D. R., & Risdiana, R. (2024). How to Read and Determine the Specific Surface Area of Inorganic Materials using the Brunauer-Emmett-Teller (BET) Method. *ASEAN Journal of Science and Engineering*, 4(1), 61–70.
- Ishmah, S. N., Permana, M. D., Firdaus, M. L., & Eddy, D. R. (2020). Extraction of Silica from Bengkulu Beach Sand using Alkali Fusion Method. *PENDIPA Journal of Science Education*, 4(2), 1–5.
- Jami, A., Lissa Nuri, H., & Subhiyah, H. (2021). Kajian Teknologi Instrumen Untuk Analisis Plastik Sintilasi Berbasis Polistirena. *PRIMA*, 18(2).
- Jee, K., Meenu, Shivani, Kumar, R., & Gupta, N. (2022). A Short Review On Ultraviolet And Visible Spectroscopy. *International Journal of Scientific Development and Research (IJS DR)*, 7(12).
- Jura, J., & Ulewicz, M. (2021). Assessment of the possibility of using fly ash from biomass combustion for concrete. *Materials*, 14(21).
- Khairil, D. F., & Etika, S. B. (2022). Optimasi pH dan Konsentrasi Penyerapan Malachite Green Menggunakan C-Sinamalkaliks[4]Resorsinarena Sebagai Adsorben. *Periodic*, 11(2).
- Kurniasih, M., Aprilita, N. H., Roto, R., & Mudasir, M. (2025). Modification of coal fly ash for high capacity adsorption of methylene blue. *Case Studies in Chemical and Environmental Engineering*, 11.
- Kusumaningrum, D. I. P., Sudarni, D. H. A., & Wahyuningsih, S. (2022). Optimasi Pengaruh Waktu Kontak dan Dosis Adsorben Limbah Daun Kayu Putih (*Melaleuca cajuputi*) dengan Metode Isoterm Adsorpsi Langmuir. *Jurnal Teknik Kimia USU*, 11(2), 72–79.

- Kusumaningtyas, R. (2019). Karakterisasi FTIR dan SEM-EDX Arang Aktif Eceng Gondok Berdasarkan Variasi Suhu Karbonasi. *Skripsi*. Universitas Jember.
- Li, H., Jin, H., Li, R., Hua, J., Zhang, Z., & Li, R. (2024). Magnetic $\text{Fe}_3\text{O}_4@\text{SiO}_2$ study on adsorption of methyl orange on nanoparticles. *Scientific Reports*, 14(1).
- Mahmuda, D. (2021). Magnetite Surface Modification with Silica and Its Application as Adsorbent of Heavy Metal Ion Nickel and Manganese. *Eksergi*, 19(1), 6–9.
- Mahmuda, D., Sakinah, N., & Suharyadi, D. E. (2014). Adsorpsi Logam Tembaga (Cu), Mangan (Mn) dan Nikel (Ni) dalam Artificial Limbah Cair dengan Menggunakan Nanopartikel Magnetit (Fe_3O_4). In *Indonesian Journal of Applied Physics* (Vol. 4, Issue 2).
- Marthen, K. B., Mariwy, A., & Untailawan, R. (2023). Kajian Kinerja Spektrofotometri Uv-Vis Pada Analisis Spesi Iodium Dalam Garam Konsumsi. *MJoCE*, 13(2), 64–73.
- Masruroh, Manggara, A. B., Papilaka, T., & Triandi, R. (2013). Penentuan ukuran Kristal (crystallite size) lapisan tipis PZT dengan metode XRD melalui pendekatan persamaan Debye Scherrer. *Erudio Journal of Education and Inovation*, 24–29.
- Mhemeed, A. (2018). A General Overview on the Adsorption. *Indian Journal of Natural Sciences*, 9(51).
- Miarti, A., & Legasari, L. (2022). Ketidakpastian Pengukuran Analisa Kadar Biuret, Kadar Nitrogen, dan Kadar Oil Pada Pupuk Urea Di Laboratorium Kontrol Produksi PT Pupuk Sriwidjaja Palembang. *Cakrawala Ilmiah*, 2(3).
- Moustafa, M. T. (2023). Preparation and characterization of low-cost adsorbents for the efficient removal of malachite green using response surface modeling and reusability studies. *Scientific Reports*, 13(1).
- Munasir, Dewanto, A. S., Kusumawati, D. H., Putri, N. P., Yulianingsih, A., Sa'Adah, I. K. F., Taufiq, A., Hidayat, N., Sunaryono, S., & Supardi, Z. A. I. (2018). Structure Analysis of $\text{Fe}_3\text{O}_4@\text{SiO}_2$ Core Shells Prepared from Amorphous and Crystalline SiO_2 Particles. *IOP Conference Series: Materials Science and Engineering*, 367(1).
- Musah, M., Azeh, Y., Mathew, J., Umar, M., Abdulhamid, Z., & Muhammad, A. (2022). Adsorption Kinetics and Isotherm Models: A Review. *Caliphate Journal of Science and Technology*, 4(1), 20–26.

- Nandiyanto, A. B. D., Ragadhita, R., & Aziz, M. (2023). How to calculate and measure solution concentration using uv-vis spectrum analysis: Supporting measurement in the chemical decomposition, photocatalysis, phytoremediation, and adsorption process. *Indonesian Journal of Science and Technology*, 8(2), 345–362.
- Nasra, E., Yonel, S. H., Oktavia, B., & Etika, S. B. (2021). Optimasi Penyerapan Zat Warna Malachite Green Menggunakan Karbon Aktif dari Kulit Pisang Kepok (*Musa balbisiana* Colla). *Periodic*, 11, 28.
- Nath, J., Bag, S., Bera, D., & Ray, L. (2019). Biotreatment of malachite green from aqueous solution and simulated textile effluent by growing cells (batch mode) and activated sludge system. *Groundwater for Sustainable Development*, 8, 172–178.
- Nur'aeni, D., Hadisantoso, E. P., & Suhendar, D. (2017). Adsorpsi Ion Logam Mn^{2+} Dan Cu^{2+} Oleh Silika Gel Dari Abu Ampas Tebu. *Al-Kimiya*, 4(2), 70–80.
- Nurfitria, N., & Febriyantiningrum, K. (2023). Studi Pemanfaatan Limbah Fly Ash Batu Bara Berdasarkan Kajian Parameter Kimia. *Biology Natural Resource Journal (BINAR)*, 2(2), 75–79.
- Nurrohmat, M. N. R., Dewi, E., & Junaidi, R. (2023). Pemanfaatan Fly Ash dari Sisa Pembakaran Batubara PT. Pupuk Sriwidjaja Palembang dalam Pembuatan Silika Gel Sebagai Adsorben Limbah Zat Warna Methylene Blue. *Jurnal Pendidikan Tambusai*, 7(3), 21917–21924.
- Nzereogu, P. U., Omah, A.D., Ezema, F. I., Iwuoha, E. I., Nwanya, A. C. (2023). Silica extraction from rice husk: Comprehensive review and applications. *Hybrid Advances*, 4.
- Olii, M. R., Wahab, A. A., Ichsan, I., Abdul Djau, R., & Nento, S. (2023). Beton Hijau Menggunakan Fly ash sebagai Substitusi Parsial Semen. *Siklus : Jurnal Teknik Sipil*, 9(1), 11–20.
- Panda, S. K., Aggarwal, I., Kumar, H., Prasad, L., Kumar, A., Sharma, A., Vo, D. V. N., Van Thuan, D., & Mishra, V. (2021). Magnetite nanoparticles as sorbents for dye removal: a review. In *Environmental Chemistry Letters* (Vol. 19, Issue 3, pp. 2487–2525). Springer Science and Business Media Deutschland GmbH.
- Phouthavong, V., Yan, R., Nijpanich, S., Hagio, T., Ichino, R., Kong, L., & Li, L. (2022). Magnetic Adsorbents for Wastewater Treatment: Advancements in Their Synthesis Methods. In *Materials* (Vol. 15, Issue 3). MDPI.
- Priyanka, & Choudhary, O. P. (2018). Uses of Transmission Electron Microscope in Microscopy and its Advantages and Disadvantages. *International Journal of Current Microbiology and Applied Sciences*, 7(05), 743–747.

- Reubun, M., Unwakoly, S., & Nazudin, dan. (2024). Adsorpsi Asam Lemak Bebas Minyak Jelantah Menggunakan Silika Gel Dari Abu Layang Kelapa Sawit. *MJoCE*, 14(1), 28–37.
- Sari, N. W., Fajri, M. Y., & Anjas. (2018). Analisis Fitokimia Dan Gugus Fungsi Dari Ekstrak Etanol Pisang Goroho Merah (*Musa Acuminata* (L)). *IJOBB*, 2(1), 30.
- Septiano, A. F., Susilo, & Setyaningsih, N. E. (2021). Analisis Citra Hasil Scanning Electron Microscopy Energy Dispersive X-Ray (SEM EDX) Komposit Resin Timbal dengan Metode Contrast to Noise Ratio (CNR). In *Indonesian Journal of Mathematics and Natural Sciences* (Vol. 44, Issue 2).
- Setiawan, A., Fatoni, A., & Azis Ramadani, T. (2022). Pemurnian Bioetanol Menggunakan Adsorben Silika Gel dari Limbah Botol Kaca di Industri Kecap Purification of Bioethanol Using Silica Gel Adsorbent from Waste Glass Bottles in the Soy Sauce Industry. *Jurnal Pengendalian Pencemaran Lingkungan (JPPL)*, 4(2).
- Sharma, J., Sharma, S., & Soni, V. (2023). Toxicity of malachite green on plants and its phytoremediation: A review. *Regional Studies in Marine Science*, 62.
- Sheikhmohammadi, A., Safari, M., Alinejad, A., Esrafil, A., Nourmoradi, H., & Asgari, E. (2019). The synthesis and application of the $\text{Fe}_3\text{O}_4@\text{SiO}_2$ nanoparticles functionalized with 3-aminopropyltriethoxysilane as an efficient sorbent for the adsorption of ethylparaben from wastewater: Synthesis, kinetic, thermodynamic and equilibrium studies. *Journal of Environmental Chemical Engineering*, 7(5).
- Sulistiono, D. O. (2018). Sintesis Komposit MCM-41/HKUST-1 Serta Kinerjanya Sebagai Adsorben Methylene Blue dan Congo Red Dalam Air. *Skripsi*. Institut Teknologi Sepuluh Nopember.
- Swan, N. B., & Zaini, M. A. A. (2019). Adsorption of Malachite Green and Congo Red Dyes from Water: Recent Progress and Future Outlook. *Ecological Chemistry and Engineering S*, 26(1), 119–132.
- Taib, S., & Suharyadi, E. (2015). Sintesis Nanopartikel Magnetite (Fe_3O_4) dengan Template silika (SiO_2) dan Karakterisasi Sifat Kemagnetannya. *Indonesian Journal of Applied Physics*, 5(1), 23–30.
- Tang, H., Zhou, W., & Zhang, L. (2012). Adsorption isotherms and kinetics studies of malachite green on chitin hydrogels. *Journal of Hazardous Materials*, 209–210, 218–225.

- Tao, J., Zhu, Y., Huang, T., Zhang, J., Wu, J., & Liu, L. (2023). Fe₃O₄/SiO₂/polymer hybrid biosorbent based on an etch-fill strategy for heavy metal ion adsorption. *Journal of Industrial Textiles*, 53.
- Tebriani, S. (2019). Analisis Vibrating Sample Magnetometer (VSM) Pada Hasil Elektrodeposisi Lapisan Tipis Magnetite Menggunakan Aruscontinue Direct Current. *NATURAL SCIENCE JOURNAL*, 5(1), 722–730.
- Tukan, N. D., Tambunan, L. R., Kustomo, & Rasidah. (2023). A Review: Optimum Conditions for Magnetite Synthesis (Fe₃O₄). *Jurnal Ilmiah Berkala: Sains Dan Terapan Kimia*, 17(2).
- Tyas, A. H., Zaharah, T. A., & Shofiyan, A. (2018). Penentuan Kemampuan Penggunaan Ulang Komposit Kitosan-Karbon Pada Proses Adsorpsi Ce(IV). *Jurnal Kimia Khatulistiwa*, 7(2), 61–68.
- Utama, L. Y., & Reza, S. M. (2021). Kajian Termodinamika Adsorpsi Karbon Aktif Dari Kulit Pisang Kepok Terhadap Ion Cr(VI). *Skripsi*. Universitas Brawijaya.
- Wardhani, S., Mardiansyah, H. A., & Purwonugroho, D. (2023). Fe₃O₄-SiO₂-Alginate Photocatalyst for Textile Dyes Waste Degradation. *Science and Technology Indonesia*, 8(1), 108–115.
- Wardiyati, S., Fisli, A., & Ridwan, D. (2011). Penyerapan Logam Ni Dalam Larutan Oleh Nanokomposit Fe₃O₄-Karbon Aktif. *Jurnal Sains Materi Indonesia Indonesian Journal of Materials Science*, 12(3), 1411–1098.
- Yetim, N. K., & Özkan, E. H. (2021). Synthesis of Au-doped magnetic nanocomposites: structural, magnetic, and catalytic properties. *Journal of Materials Science: Materials in Electronics*, 32(20), 24766–24774.
- Zemnukhova, L. A., Panasenko, A. E., Artem'yanov, A. P., & Tsoy, E. A. (2015). Dependence of porosity of amorphous silicon dioxide prepared from rice straw on plant variety. *BioResources*, 10(2), 3713–3723.
- Zulfania, F., Fathoni, an, & Moh Nur, A. (2022). Kemampuan Adsorpsi Logam Berat Zn Dengan Menggunakan Adsorben Kulit Jagung (Zea Mays). *Jurnal Chemurgy*, 6(2), 65–69.