

DAFTAR PUSTAKA

- Adeoye, J. B., Lau, S. Y., Tan, Y. H., Tan, Y. Y., Chiong, T., Mubarak, N. M., Anbuezhayan, G., Khalid, M., & Ng, J. T. W. (2025). A comprehensive review on adsorption technologies for methylene blue elimination: efficiency, mechanisms, and future perspectives. In *Discover Applied Sciences* (Vol. 7, Number 11). Springer Nature. <https://doi.org/10.1007/s42452-025-07250-4>
- Ahmad, R., & Ansari, K. (2021). Comparative study for adsorption of congo red and methylene blue dye on chitosan modified hybrid nanocomposite. *Process Biochemistry*, 108, 90–102. <https://doi.org/10.1016/j.procbio.2021.05.013>
- Ahmed, E. M. (2015). Hydrogel: Preparation, characterization, and applications: A review. In *Journal of Advanced Research* (Vol. 6, Number 2, pp. 105–121). Elsevier B.V. <https://doi.org/10.1016/j.jare.2013.07.006>
- Akbelen, M., & Özbay, N. (2022). Influence of acid activation on hydrogen adsorption properties of analcime-rich tuff from Turkey. *Turkish Journal of Chemistry*, 46(5), 1565–1576. <https://doi.org/10.55730/1300-0527.3461>
- Alshameri, A., Yan, C., Al-Ani, Y., Dawood, A. S., Ibrahim, A., Zhou, C., & Wang, H. (2014). An investigation into the adsorption removal of ammonium by salt activated Chinese (Hulaodu) natural zeolite: Kinetics, isotherms, and thermodynamics. *Journal of the Taiwan Institute of Chemical Engineers*, 45(2), 554–564. <https://doi.org/10.1016/j.jtice.2013.05.008>
- Alsuhbani, M., Alshehri, S., Alquwaizany, A., Alosime, E., Alaeq, R., & Alrehaili, A. (2026). Effective adsorption of methylene blue using natural Saudi zeolite as a low-cost sustainable adsorbent. *Scientific Reports*, 16(1). <https://doi.org/10.1038/s41598-025-33491-9>
- Aranaz, I., Alcántara, A. R., Civera, M. C., Arias, C., Elorza, B., Caballero, A. H., & Acosta, N. (2021). Chitosan: An overview of its properties and applications. In *Polymers* (Vol. 13, Number 19). MDPI. <https://doi.org/10.3390/polym13193256>
- Biswas, S., Rashid, T. U., Debnath, T., Haque, P., & Rahman, M. M. (2020). Application of chitosan-clay biocomposite beads for removal of heavy metal and dye from industrial effluent. *Journal of Composites Science*, 4(1). <https://doi.org/10.3390/jcs4010016>
- Castillo-Suárez, L. A., Sierra-Sánchez, A. G., Linares-Hernández, I., Martínez-Miranda, V., & Teutli-Sequeira, E. A. (2023). A critical review of textile industry wastewater: green technologies for the removal of indigo dyes. In *International Journal of Environmental Science and Technology* (Vol. 20, Number 9, pp. 10553–10590). Institute for Ionics. <https://doi.org/10.1007/s13762-023-04810-2>
- de Araujo, L. G., Medeiros, V. L., Guarnieri, G. de P., da Silva, D. A., Watanabe, T., Marumo, J. T., & Nery, J. G. (2023). An adsorption agent based on chitosan-zeolite composite: environmental and radioactive

- liquid waste remediation. *Environmental Science: Advances*, 2(3), 484–494. <https://doi.org/10.1039/d2va00148a>
- De Magalhães, L. F., Da Silva, G. R., & Peres, A. E. C. (2022). Zeolite Application in Wastewater Treatment. In *Adsorption Science and Technology* (Vol. 2022). Hindawi Limited. <https://doi.org/10.1155/2022/4544104>
- Dehmani, Y., Ba Mohammed, B., Oukhrib, R., Dehbi, A., Lamhasni, T., Brahmi, Y., El-Kordy, A., Franco, D. S. P., Georgin, J., Lima, E. C., Alrashdi, A. A., Tijani, N., & Abouarnadasse, S. (2024). Adsorption of various inorganic and organic pollutants by natural and synthetic zeolites: A critical review. In *Arabian Journal of Chemistry* (Vol. 17, Number 1). Elsevier B.V. <https://doi.org/10.1016/j.arabjc.2023.105474>
- Díaz-Flores, P. E., Flores-Rojas, A. I., Medellín-Castillo, N. A., Cisneros-Ontiveros, H. G., Cruz-Briano, S. A., Gallegos-Almanza, A. V., Cruz-Labana, J. D., & Espinosa-Martínez, I. A. (2024). Chitosan and zeolite-based composites: Characterization and removal of methylene blue dye from aqueous solution. *MRS Advances*, 9(22), 1713–1719. <https://doi.org/10.1557/s43580-024-00959-1>
- Dinh, N. T., Vo, L. N. H., Tran, N. T. T., Phan, T. D., & Nguyen, D. B. (2021). Enhancing the removal efficiency of methylene blue in water by fly ash via a modified adsorbent with alkaline thermal hydrolysis treatment. *RSC Advances*, 11(33), 20292–20302. <https://doi.org/10.1039/d1ra02637b>
- Dissanayake, N. S. L., Pathirana, M. A., Wanasekara, N. D., Mahltig, B., & Nandasiri, G. K. (2023). Removal of Methylene Blue and Congo Red Using a Chitosan–Graphene Oxide-Electrosprayed Functionalized Polymeric Nanofiber Membrane. *Nanomaterials*, 13(8). <https://doi.org/10.3390/nano13081350>
- Dutta, S., Gupta, B., Srivastava, S. K., & Gupta, A. K. (2021a). Recent advances on the removal of dyes from wastewater using various adsorbents: A critical review. In *Materials Advances* (Vol. 2, Number 14, pp. 4497–4531). Royal Society of Chemistry. <https://doi.org/10.1039/d1ma00354b>
- Dutta, S., Gupta, B., Srivastava, S. K., & Gupta, A. K. (2021b). Recent advances on the removal of dyes from wastewater using various adsorbents: A critical review. In *Materials Advances* (Vol. 2, Number 14, pp. 4497–4531). Royal Society of Chemistry. <https://doi.org/10.1039/d1ma00354b>
- Elboughdiri, N. (2020). The use of natural zeolite to remove heavy metals Cu (II), Pb (II) and Cd (II), from industrial wastewater. *Cogent Engineering*, 7(1). <https://doi.org/10.1080/23311916.2020.1782623>
- Hakim, Muh. S., Iqbal, R. M., 'Adany, F., Putra, R., Nitriany, I., Telaumbanua, I. S., Sitorus, R. U., & Dewi, R. K. (2024). A Review on Development of Porous Aluminosilicate-Based Zeolite Adsorbent for Heavy Metal Pollution Treatment. *Jurnal Sains Materi Indonesia*, 25(2), 85–99. <https://doi.org/10.55981/jsmi.2024.1076>

- Hidayat, E., Yonemura, S., Mitoma, Y., & Harada, H. (2022). Methylene Blue Removal by Chitosan Cross-Linked Zeolite from Aqueous Solution and Other Ion Effects: Isotherm, Kinetic, and Desorption Studies. *Adsorption Science and Technology*, 2022. <https://doi.org/10.1155/2022/1853758>
- Huang, Y., Xiao, C., Huang, Q., Liu, H., & Zhao, J. (2021). Progress on polymeric hollow fiber membrane preparation technique from the perspective of green and sustainable development. In *Chemical Engineering Journal* (Vol. 403). Elsevier B.V. <https://doi.org/10.1016/j.cej.2020.126295>
- Iqbal, M., Hanif, M. A., Rashid, U., Jilani, M. I., Alharthi, F. A., & Kazerooni, E. A. (2023). Optimization and Kinetic Study of Treating Dye-Contaminated Wastewater Using Bio-Composite Synthesized from Natural Waste. *Separations*, 10(7). <https://doi.org/10.3390/separations10070386>
- Jabar, J. M., Odusote, Y. A., Alabi, K. A., & Ahmed, I. B. (2020). Kinetics and mechanisms of congo-red dye removal from aqueous solution using activated Moringa oleifera seed coat as adsorbent. *Applied Water Science*, 10(6). <https://doi.org/10.1007/s13201-020-01221-3>
- Kaczorowska, M. A., & Bożejewicz, D. (2024). The Application of Chitosan-Based Adsorbents for the Removal of Hazardous Pollutants from Aqueous Solutions—A Review. In *Sustainability (Switzerland)* (Vol. 16, Number 7). Multidisciplinary Digital Publishing Institute (MDPI). <https://doi.org/10.3390/su16072615>
- Li, G., Wang, S., & Zhu, F. (2016). Physicochemical properties of quinoa starch. *Carbohydrate Polymers*, 137, 328–338. <https://doi.org/10.1016/j.carbpol.2015.10.064>
- Li, M., Zhu, X., Zhu, F., Ren, G., Cao, G., & Song, L. (2011). Application of modified zeolite for ammonium removal from drinking water. *Desalination*, 271(1–3), 295–300. <https://doi.org/10.1016/j.desal.2010.12.047>
- Li, P., Yang, Z., Li, Y., & Tian, Y. (2024). Preparation of efficient adsorbent for methylene blue and Congo red by co-hydrothermal of red mud with food waste compost. *Desalination and Water Treatment*, 320. <https://doi.org/10.1016/j.dwt.2024.100791>
- Liu, C., Chen, W., Li, M., Hong, S., Li, W., Pan, M., Wu, Q., & Mei, C. (2019). Rapid microwave activation of waste palm into hierarchical porous carbons for supercapacitors using biochars from different carbonization temperatures as catalysts. *RSC Advances*, 9(34), 19441–19449. <https://doi.org/10.1039/c9ra03031j>
- Liu, X., Xu, B., & Wang, J. (2024). Facile sponge-like chitosan capsules as efficient adsorbent for anionic Congo red, Reactive brilliant blue KNR, and Methyl blue dyes: Performance and mechanism. *Journal of Environmental Chemical Engineering*, 12(6). <https://doi.org/10.1016/j.jece.2024.114367>
- Manu, G. P., Narh, D., Asimeng, B., Kwakye, N., Abusuapa, B. A., Appuing, D., Nyankson, E., & Efavi, J. K. (2025). Characterization of Chitosan/

- Zeolite drug delivery composite and curcumin release kinetics in a simulated pH environment. *Scientific African*, 28. <https://doi.org/10.1016/j.sciaf.2025.e02668>
- Marotta, A., Luzzi, E., De Luna, M. S., Aprea, P., Ambrogio, V., & Filippone, G. (2021). Chitosan/zeolite composite aerogels for a fast and effective removal of both anionic and cationic dyes from water. *Polymers*, 13(11). <https://doi.org/10.3390/polym13111691>
- Micic, A., Ristic, I., Djordjevic, S., Ristic, N., & Djordjevic, D. (2021). Adsorbent from textile waste for removal of textile reactive dye from water – equilibrium adsorption and kinetics. *Tekstilec*, 64(4), 286–297. <https://doi.org/10.14502/Tekstilec2021.64.286-297>
- Mohamed Nasser, S., Abbas, M., & Trari, M. (2024). Understanding the rate-limiting step adsorption kinetics onto biomaterials for mechanism adsorption control. In *Progress in Reaction Kinetics and Mechanism* (Vol. 49). SAGE Publications Ltd. <https://doi.org/10.1177/14686783241226858>
- Mousavi, S. H., Yaghoobi, M., & Asjadi, F. (2024). Highly efficient adsorption of congo red and methyl orange dyes using mesoporous α -Mn₂O₃ nanoparticles synthesized with *Pyracantha angustifolia* fruit extract. *Scientific Reports*, 14(1). <https://doi.org/10.1038/s41598-024-69432-1>
- Ng, J. C. Y., Cheung, W. H., & McKay, G. (2003). Equilibrium studies for the sorption of lead from effluents using chitosan. *Chemosphere*, 52(6), 1021–1030. [https://doi.org/10.1016/S0045-6535\(03\)00223-6](https://doi.org/10.1016/S0045-6535(03)00223-6)
- Oladoye, P. O., Bamigboye, M. O., Ogunbiyi, O. D., & Akano, M. T. (2022). Toxicity and decontamination strategies of Congo red dye. In *Groundwater for Sustainable Development* (Vol. 19). Elsevier B.V. <https://doi.org/10.1016/j.gsd.2022.100844>
- Ouéda, N., Tchakala, I., Sanni, S., & Bawa, M. (2024). Simple Use of Low-cost and Available Adsorbent for Cationic Dye Adsorption from Aqueous Solution. *American Journal of Applied Chemistry*, 12(6), 149–157. <https://doi.org/10.11648/j.ajac.20241206.13>
- Phuoc, N. M., Thien, L. T., Phuong, N. T. T., Duong, N. T. H., Van Dung, N., & Quang Long, N. (2024). Novel chitosan-zeolite X composite beads prepared by phase-inversion method for CO₂ adsorptive capture. *Chemosphere*, 352. <https://doi.org/10.1016/j.chemosphere.2024.141327>
- Pukcothanung, Y., Siritanon, T., & Rangsiwatananon, K. (2018). The efficiency of zeolite Y and surfactant-modified zeolite Y for removal of 2,4-dichlorophenoxyacetic acid and 1,1"-dimethyl-4,4"-bipyridinium ion. *Microporous and Mesoporous Materials*, 258, 131–140. <https://doi.org/10.1016/j.micromeso.2017.08.035>
- Raji, Z., Karim, A., Karam, A., & Khalloufi, S. (2023). Adsorption of Heavy Metals: Mechanisms, Kinetics, and Applications of Various Adsorbents in Wastewater Remediation—A Review. *Waste*, 1(3), 775–805. <https://doi.org/10.3390/waste1030046>

- Rathi, A., Barman, S., Basu, S., & Arya, R. K. (2022). Post-fabrication structural changes and enhanced photodegradation activity of semiconductors@zeolite composites towards noxious contaminants. In *Chemosphere* (Vol. 288). Elsevier Ltd. <https://doi.org/10.1016/j.chemosphere.2021.132609>
- Sen, S., Pal, D., & Prajapati, A. K. (2020). NCNE-2020 Special Issue Adsorption studies on the reduction of COD and color from textile dyeing effluent using wheat husk adsorbent. In *J. Indian Chem. Soc* (Vol. 97).
- Tebeje, A., Worku, Z., Nkambule, T. T. I., & Fito, J. (2022). Adsorption of chemical oxygen demand from textile industrial wastewater through locally prepared bentonite adsorbent. *International Journal of Environmental Science and Technology*, 19(3), 1893–1906. <https://doi.org/10.1007/s13762-021-03230-4>
- Thuan, N. M., Linh, N. T. M., Phuong, N. T. T., Duong, N. T. H., Hung, N. M., Tuyet, P. T., Van Dung, N., & Long, N. Q. (2024). Ethanolamine-modified zeolite – Chitosan beads as new adsorbents for carbon dioxide capture and crystal violet removal. *Case Studies in Chemical and Environmental Engineering*, 10. <https://doi.org/10.1016/j.csee.2024.100917>
- Wang, J., & Guo, X. (2020). Adsorption kinetic models: Physical meanings, applications, and solving methods. In *Journal of Hazardous Materials* (Vol. 390). Elsevier B.V. <https://doi.org/10.1016/j.jhazmat.2020.122156>
- Wang, Y., Yang, D., Li, S., Chen, M., Guo, L., & Zhou, J. (2018). Ru/hierarchical HZSM-5 zeolite as efficient bi-functional adsorbent/catalyst for bulky aromatic VOCs elimination. *Microporous and Mesoporous Materials*, 258, 17–25. <https://doi.org/10.1016/j.micromeso.2017.08.052>
- Wekoye, J. N., Wanyonyi, W. C., Wangila, P. T., & Tonui, M. K. (2020). Kinetic and equilibrium studies of Congo red dye adsorption on cabbage waste powder. *Environmental Chemistry and Ecotoxicology*, 2, 24–31. <https://doi.org/10.1016/j.enceco.2020.01.004>
- Yanat, M., & Schroën, K. (2021). Preparation methods and applications of chitosan nanoparticles; with an outlook toward reinforcement of biodegradable packaging. *Reactive and Functional Polymers*, 161. <https://doi.org/10.1016/j.reactfunctpolym.2021.104849>
- Zohuriaan-Mehr, M. J., & Kabiri, K. (2008). Superabsorbent Polymer Materials: A Review. In *Polymer Journal* (Vol. 17, Number 6). www.SID.ir