

DAFTAR PUSTAKA

- Al-Saydeh, S.A., El-Naas, M.H., dan Zaidi, S.J., 2017, Copper removal from industrial wastewater: A comprehensive review, *J. Ind. Eng. Chem.*, 56, 35–44.
- Amiri, M., Khazaeli, P., Salehabadi, A., dan Salavati-Niasari, M., 2021, Hydrogel beads-based nanocomposites in novel drug delivery platforms: Recent trends and developments, *Adv. Colloid Interface Sci.*, 288, 102316.
- Barai, D.P. dan Bhanvase, B.A., 2022, Production of Ag-doped Fe₃O₄ nanoparticles in ultrasound-assisted minireactor system, *Appl. Nanosci.*, 12, 2889–2899.
- Besenhard, M.O., LaGrow, A.P., Hodzic, A., Kriechbaum, M., Panariello, L., Bais, G., Loizou, K., Damilos, S., Margarida Cruz, M., Thanh, N.T.K., dan Gavriilidis, A., 2020, Co-precipitation synthesis of stable iron oxide nanoparticles with NaOH: New insights and continuous production via flow chemistry, *Chem. Eng. J.*, 399, 125740.
- Boustani, K., Shokri, A., Shayesteh, S.F., dan Jafari, A., 2020, Ultrasound-Assisted Synthesis and Tuning the Magnetic and Structural Features of Superparamagnetic Fe₃O₄ Nanoparticles by Using Ethylenediamine as a Precipitating Agent, *J. Supercond. Nov. Magn.*, 33, 1879–1887.
- Bui, T.Q., Ngo, H.T.M., dan Tran, H.T., 2018, Surface-protective assistance of ultrasound in synthesis of superparamagnetic magnetite nanoparticles and in preparation of mono-core magnetite-silica nanocomposites, *J. Sci. Adv. Mater. Devices*, 3, 323–330.
- Dinu, M.V., Dinu, I.A., Lazar, M.M., dan Dragan, E.S., 2018, Chitosan-based ion-imprinted cryo-composites with excellent selectivity for copper ions, *Carbohydr. Polym.*, 186, 140–149.
- Fan, S., Liu, Z., Wu, Y., Zhang, Y., Hu, H., Huang, Z., Qin, Y., dan Liang, J., 2021, 3D porous tubular network-structured chitosan-based beads with multifunctional groups: Highly efficient and selective removal of Cu²⁺, *Int. J. Biol. Macromol.*, 171, 17–27.
- Fato, F.P., Li, D.W., Zhao, L.J., Qiu, K., dan Long, Y.T., 2019, Simultaneous Removal of Multiple Heavy Metal Ions from River Water Using Ultrafine Mesoporous Magnetite Nanoparticles, *ACS Omega*, 4, 7543–7549.
- Fragal, E.H., Fragal, V.H., Silva, E.P., Paulino, A.T., da Silva Filho, E.C., Mauricio,

- M.R., Silva, R., Rubira, A.F., dan Muniz, E.C., 2022, Magnetic-responsive polysaccharide hydrogels as smart biomaterials: Synthesis, properties, and biomedical applications, *Carbohydr. Polym.*, 292, 1–17.
- Gaetke, L.M., Chow-Johnson, H.S., dan Chow, C.K., 2014, Copper: toxicological relevance and mechanisms, *Arch. Toxicol.*, 88, 1929–1938.
- Godiya, C.B., Cheng, X., Li, D., Chen, Z., dan Lu, X., 2019, Carboxymethyl cellulose/polyacrylamide composite hydrogel for cascaded treatment/reuse of heavy metal ions in wastewater, *J. Hazard. Mater.*, 364, 28–38.
- Han, B., Weatherley, A.J., Mumford, K., Bolan, N., He, J.Z., Stevens, G.W., dan Chen, D., 2022, Modification of naturally abundant resources for remediation of potentially toxic elements: A review, *J. Hazard. Mater.*, 421, 126755.
- Hu, S. zhong, Huang, T., Zhang, N., Lei, Y. zhou, dan Wang, Y., 2022, Chitosan-assisted MOFs dispersion via covalent bonding interaction toward highly efficient removal of heavy metal ions from wastewater, *Carbohydr. Polym.*, 277, 118809.
- İsmail, O. dan Kocabay, Ö.G., 2021, Absorption and adsorption studies of polyacrylamide/sodium alginate hydrogels, *Colloid Polym. Sci.*, 299, 783–796.
- Jiang, H., Yang, Y., Lin, Z., Zhao, B., Wang, J., Xie, J., dan Zhang, A., 2020, Preparation of a novel bio-adsorbent of sodium alginate grafted polyacrylamide/graphene oxide hydrogel for the adsorption of heavy metal ion, *Sci. Total Environ.*, 744, 140653.
- Kim, J.J., Kim, Y.S., dan Kumar, V., 2019, Heavy metal toxicity: An update of chelating therapeutic strategies, *J. Trace Elem. Med. Biol.*, 54, 226–231.
- Li, Z. dan Lin, Z., 2021, Recent advances in polysaccharide-based hydrogels for synthesis and applications, *Aggregate*, 2, 1–26.
- Liu, H., Wang, Q., dan Zhang, F., 2020, Preparation of Fe₃O₄@SiO₂@ P(AANa-co-AM) Composites and Their Adsorption for Pb(II), *ACS Omega*, 5, 8816–8824.
- Liu, Z. dan Zhou, S., 2018, Removal of humic acid from aqueous solution using polyacrylamide/chitosan semi-IPN hydrogel, *Water Sci. Technol.*, 2017, 16–26.
- Mallik, A.K., Kabir, S.F., Bin Abdur Rahman, F., Sakib, M.N., Efty, S.S., dan Rahman, M.M., 2022, Cu(II) removal from wastewater using chitosan-based adsorbents: A review, *J. Environ. Chem. Eng.*, 10, 108048.
- Mitra, S., Chakraborty, A.J., Tareq, A.M., Emran, T. Bin, Nainu, F., Khusro, A., Idris, A.M., Khandaker, M.U., Osman, H., Alhumaydhi, F.A., dan Simal-Gandara, J.,

- 2022, Impact of heavy metals on the environment and human health: Novel therapeutic insights to counter the toxicity, *J. King Saud Univ. - Sci.*, 34, 101865.
- Mo, L., Zhang, S., Qi, F., dan Huang, A., 2022, Highly stable cellulose nanofiber/polyacrylamide aerogel via in-situ physical/chemical double crosslinking for highly efficient Cu(II) ions removal, *Int. J. Biol. Macromol.*, 209, 1922–1932.
- Nguyen, N.T., Nguyen, V.A., dan Nguyen, T.H., 2022, Ultrasound assisted co-precipitation synthesis Fe₃O₄ nanoparticles as a magnetic adsorbent for Congo red removal, *J. Dispers. Sci. Technol.*, 0, 1–8.
- Nisticò, R., 2021, A synthetic guide toward the tailored production of magnetic iron oxide nanoparticles, *Bol. la Soc. Esp. Ceram. y Vidr.*, 60, 29–40.
- Pakdel, P.M. dan Peighambaroust, S.J., 2018, Review on recent progress in chitosan-based hydrogels for wastewater treatment application, *Carbohydr. Polym.*, 201, 264–279.
- Pellenz, L., de Oliveira, C.R.S., da Silva Júnior, A.H., da Silva, L.J.S., da Silva, L., Ulson de Souza, A.A., de Souza, S.M. de A.G.U., Borba, F.H., dan da Silva, A., 2023, A comprehensive guide for characterization of adsorbent materials, *Sep. Purif. Technol.*, 305, 1–18.
- Poddar, M.K., Arjmand, M., Sundararaj, U., dan Moholkar, V.S., 2018, Ultrasound-assisted synthesis and characterization of magnetite nanoparticles and poly(methyl methacrylate)/magnetite nanocomposites, *Ultrason. Sonochem.*, 43, 38–51.
- Pour, Z.S. dan Ghaemy, M., 2015, Removal of dyes and heavy metal ions from water by magnetic hydrogel beads based on poly(vinyl alcohol)/carboxymethyl starch-g-poly(vinyl imidazole), *RSC Adv.*, 5, 64106–64118.
- Pu, S., Ma, H., Zinchenko, A., dan Chu, W., 2017, Novel highly porous magnetic hydrogel beads composed of chitosan and sodium citrate: an effective adsorbent for the removal of heavy metals from aqueous solutions, *Environ. Sci. Pollut. Res.*, 24, 16520–16530.
- Qu, B. dan Luo, Y., 2020, Chitosan-based hydrogel beads: Preparations, modifications and applications in food and agriculture sectors – A review, *Int. J. Biol. Macromol.*, 152, 437–448.
- Rathi, B.S. dan Kumar, P.S., 2021, Application of adsorption process for effective removal of emerging contaminants from water and wastewater, *Environ. Pollut.*, 280, 116995.

- Sarkar, N., Sahoo, G., dan Swain, S.K., 2020, Nanoclay sandwiched reduced graphene oxide filled macroporous polyacrylamide-agar hybrid hydrogel as an adsorbent for dye decontamination, *Nano-Structures and Nano-Objects*, 23, 100507.
- Sennakesavan, G., Mostakhdemin, M., Dkhar, L.K., Seyfoddin, A., dan Fatihhi, S.J., 2020, Acrylic acid/acrylamide based hydrogels and its properties - A review, *Polym. Degrad. Stab.*, 180, 109308.
- El Sharif, H., 2016, Smart materials: towards on-site detection of biomacromolecules using hydrogel-based molecularly imprinted polymers, *Univ. Surrey*, 19–176.
- Singh, R., Munya, V., Are, V.N., Nayak, D., dan Chattopadhyay, S., 2021, A Biocompatible, pH-Sensitive, and Magnetically Separable Superparamagnetic Hydrogel Nanocomposite as an Efficient Platform for the Removal of Cationic Dyes in Wastewater Treatment, *ACS Omega*, 6, 23139–23154.
- Tang, S., Lin, L., Wang, X., Yu, A., dan Sun, X., 2021, Interfacial interactions between collected nylon microplastics and three divalent metal ions (Cu(II), Ni(II), Zn(II)) in aqueous solutions, *J. Hazard. Mater.*, 403, 123548.
- Utomo, S.B., Jumina, Siswanta, D., dan Mustofa, 2012, KINETICS AND EQUILIBRIUM MODEL OF Pb (II) AND Cd (II) ADSORPTION ONTO TETRAKIS-THIOMETHYL-C-4-METHOXYPHENYLCALIX[4]RESORCINARENE, 12, 49–56.
- Vareda, J.P., 2023, On validity, physical meaning, mechanism insights and regression of adsorption kinetic models, *J. Mol. Liq.*, 376, 1–14.
- Wang, J. dan Guo, X., 2020a, Adsorption isotherm models: Classification, physical meaning, application and solving method, *Chemosphere*, 258, 127279.
- Wang, J. dan Guo, X., 2020b, Adsorption kinetic models: Physical meanings, applications, and solving methods, *J. Hazard. Mater.*, 390, 122156.
- Wiśniewska, M., Chibowski, S., dan Urban, T., 2017, Comparison of adsorption affinity of ionic polyacrylamide for the surfaces of selected metal oxides, *Adsorpt. Sci. Technol.*, 35, 582–591.
- Wu, W., Wu, Z., Yu, T., Jiang, C., dan Kim, W.S., 2015, Recent progress on magnetic iron oxide nanoparticles: Synthesis, surface functional strategies and biomedical applications, *Sci. Technol. Adv. Mater.*, 16, 23501.
- Yang, J., Ao, Z., Niu, X., Dong, J., Wang, S., dan Wu, H., 2021, Facile one-step synthesis of 3D honeycomb-like porous chitosan bead inlaid with Mn–Fe bimetallic oxide nanoparticles for enhanced degradation of dye pollutant, *Int. J.*

Biol. Macromol., 186, 829–838.

Yanti, I., Santosa, S.J., dan Kartini, I., 2016, Kinetics Study of Au(III) Adsorption on Gallic Acid Intercalated Mg/Al-Hydrotalcite, *J. Eksakta*, 16, 27–35.

Yazdani, F. dan Seddigh, M., 2016, Magnetite nanoparticles synthesized by co-precipitation method: The effects of various iron anions on specifications, *Mater. Chem. Phys.*, 184, 318–323.

Zhang, C., Dai, Y., Wu, Y., Lu, G., Cao, Z., Cheng, J., Wang, K., Yang, H., Xia, Y., Wen, X., Ma, W., Liu, C., dan Wang, Z., 2020, Facile preparation of polyacrylamide/chitosan/Fe₃O₄ composite hydrogels for effective removal of methylene blue from aqueous solution, *Carbohydr. Polym.*, 234, 115882.

Zheng, X., Zheng, H., Xiong, Z., Zhao, R., Liu, Y., Zhao, C., dan Zheng, C., 2020, Novel anionic polyacrylamide-modify-chitosan magnetic composite nanoparticles with excellent adsorption capacity for cationic dyes and pH-independent adsorption capability for metal ions, *Chem. Eng. J.*, 392, 1–15.