

DAFTAR PUSTAKA

- Abral, H., Lawrensius, V., Handayani, D., & Sugiarti, E. (2018). Preparation of Nano-Sized Particles from Bacterial Cellulose Using Ultrasonication and Their Characterization. *Carbohydrate Polymers*, 191, 161–167.
- Adhani, R. (2017). *Logam Berat Sekitar Manusia* (Vol. 148, pp. 148–162).
- Ahmad, S., Ashraf, I., Mansoor, M. A., Rizwan, S., & Iqbal, M. (2021). An Overview of Recent Advances in The Synthesis and Applications of The Transition Metal Carbide Nanomaterials. *Nanomaterials*, 11(3), 1–36.
- Alifaturrahma dan Hendriyanto. (2018). *Untuk Menyisihkan Logam Cu*. 8(2), 105–111.
- Asip, F., Mardhiah, R., & Husna. (2008). Uji Efektifitas Cangkang Telur dalam Mengadsorbsi Ion Fe dengan Proses Batch. *Jurnal Teknik Kimia*, 15(2), 22–26.
- Astuti, W., & Kurniawan, B. (2015). Adsorpsi Pb^{2+} Dalam Limbah Cair Artifisial Menggunakan Sistem Adsorpsi Kolom Dengan Bahan Isian Abu Layang Batubara Serbuk dan Granular. *Jurnal Bahan Alam Terbarukan*, 4(1), 35–43.
- Atkins, P., Paula, J. de, & Keeler, J. (2018). *Physical Chemistry* (11 th). Oxford University Press.
- Bulut, E., Ozacar, M., & Sengil, A. (2008). *Adsorption of Malachite Green Onto Bentonite : Equilibrium and Kinetics Studies And Process Design, Microporous And Mesoporous Materials*. Elsevier.
- Candani, D., Ulfah, M., Noviana, W., & Zainul, R. (2018). A Review Pemanfaatan Teknologi Sonikasi. *INA-Rxiv*, 26, 1–9.
- Dąbrowski, A. (2001). Adsorption - From Theory To Practice. *Advances in Colloid and Interface Science*, 93(1–3), 135–224.
- Darmono. (2005). *Lingkungan Hidup dan Pencemaran Hubungan Dengan Toksikologi Senyawa Logam*. UI Press.
- Darni, Y. (2020). Pengaruh Proses Ultrasonikasi terhadap Ukuran Serat Selulosa dari Batang Sorgum. *Jurnal Teknologi Dan Inovasi Industri (JTII)*, 1(1), 1–7.
- Dong, X., Wang, Y., Jia, M., Niu, Z., Cai, J., & Yu, X. (2019). *Bioresource Technology Sustainable and Scalable In-Situ Synthesis of Hydrochar-Wrapped Ti_3AlC_2 - Derived Nano Fibers as Adsorbents to Remove Heavy Metals*. 282(December 2018), 222–227.

- Dong, X., Wang, Y., Jia, M., Niu, Z., Cai, J., Yu, X., Ke, X., Yao, J., & Zhang, X. (2019). Sustainable and Scalable In-Situ Synthesis of Hydrochar-Wrapped Ti_3AlC_2 -Derived Nanofibers as Adsorbents to Remove Heavy Metals. *Bioresource Technology*, 282, 222–227.
- Dong, Y., Sang, D., He, C., Sheng, X., & Lei, L. (2019). Mxene/Alginate Composites For Lead and Copper Ion Removal from Aqueous Solutions. *RSC Advances*, 9(50), 29015–29022.
- Elumalai, S., Yoshimura, M., & Ogawa, M. (2020). Simultaneous Delamination and Rutile Formation on the Surface of Ti_3C_2Tx MXene for Copper Adsorption. *Chemistry - An Asian Journal*, 15(7), 1044–1051.
- Fard, A. K., Mckay, G., Chamoun, R., Rhadfi, T., Preud'Homme, H., & Atieh, M. A. (2017). Barium Removal From Synthetic Natural and Produced Water Using Mxene as Two Dimensional (2-D) Nanosheet Adsorbent. *Chemical Engineering Journal*, 317, 331–342.
- Faust, Samuel D, O. M. A. (1987). *Adsorption Processes for Water Treatment*. Butterworth Publisher.
- Feng, H., & Yang, W. (2011). Ultrasonic Processing. In *Nonthermal Processing Technologies for Food*.
- Feng, W., Luo, H., Wang, Y., Zeng, S., Tan, Y., Zhang, H., & Peng, S. (2018). Ultrasonic Assisted Etching and Delaminating of Ti_3C_2 MXene. *Ceramics International*, 44(6), 7084–7087.
- Fuad, M. T., Aunurohim, & NurHidayati, T. (2013). Efektivitas Kombinasi Salvinia Molesta dengan *Hydrilla Verticillata* dalam Remediasi Logam Cu pada Limbah Elektroplating. *Jurnal Sains Dan Seni POMITS*, 2(1), 240–246.
- Gan, D., Huang, Q., Dou, J., Huang, H., Chen, J., Liu, M., Wen, Y., Yang, Z., Zhang, X., & Wei, Y. (2020). Bioinspired Functionalization of MXenes (Ti_3C_2Tx) With Amino Acids for Efficient Removal of Heavy Metal Ions. *Applied Surface Science*, 504(October), 144603.
- Harinaldi. (2005). *Prinsip-Prinsip Statistik Untuk Teknik dan Sains*. Erlangga.
- He, L., Huang, D., He, Z., Yang, X., Yue, G., Zhu, J., Astruc, D., & Zhao, P. (2020). Nanoscale Zero-Valent Iron Intercalated 2D Titanium Carbides For Removal Of Cr(VI) In Aqueous Solution and The Mechanistic Aspect. *Journal of*

- Hazardous Materials*, 388(Vi), 121761.
- Hwang, S. K., Kang, S. M., Rethinasabapathy, M., Roh, C., & Huh, Y. S. (2020). MXene: An Emerging Two-Dimensional Layered Material for Removal of Radioactive Pollutants. *Chemical Engineering Journal*, 397, 125428.
- Jun, B. M., Heo, J., Taheri-Qazvini, N., Park, C. M., & Yoon, Y. (2020). Adsorption of Selected Dyes on Ti₃C₂T_x MXene and Al-Based Metal-Organic Framework. *Ceramics International*, 46(3), 2960–2968.
- Jun, B. M., Her, N., Park, C. M., & Yoon, Y. (2020). Effective removal of Pb(ii) from synthetic wastewater using Ti₃C₂T_x MXene. *Environmental Science: Water Research and Technology*, 6(1), 173–180.
- Jun, B. M., Kim, S., Rho, H., Park, C. M., & Yoon, Y. (2020). Ultrasound-Assisted Ti₃C₂T_x MXene Adsorption of Dyes: Removal Performance and Mechanism Analyses Via Dynamic Light Scattering. *Chemosphere*, 254, 126827.
- Kannan, K., Sadasivuni, K. K., Abdullah, A. M., & Kumar, B. (2020). Current Trends in MXene-Based Nanomaterials for Energy Storage and Conversion System: A Mini Review. *Catalysts*, 10(5), 1–28.
- Klaassen, C. D. (2008). *Toxicology (The Basic)*. McGrawHill.
- Kusuma, I. D. G. D. P., Wiratini, N. M., & Wiratma, I. G. L. (2014). Isoterm Adsorpsi Cu²⁺ oleh Biomassa Rumput Laut Eucheuma Spinosum. *E-Jurnal Kimia Visvitalis Universitas Pendidikan Ganesha*, 2(1), 1–10.
- Kwon, J. S., Yun, S. T., Lee, J. H., Kim, S. O., & Jo, H. Y. (2010). Removal of Divalent Heavy Metals (Cd, Cu, Pb, and Zn) and arsenic(III) From Aqueous Solutions Using Scoria: Kinetics and Equilibria of Sorption. *Journal of Hazardous Materials*, 174(1–3), 307–313.
- Lestari, I., Anggorowati, H., & Hadi, F. (2021). Efek Pretreatment Ultrasonikasi Terhadap Hidrolisis Enzimatis Spirulina Platensis Residue. *Eksperi*, 18(1), 24.
- Li, S., Wang, L., Peng, J., Zhai, M., & Shi, W. (2019). Efficient thorium(IV) removal by Two-Dimensional Ti₂CT_x MXene From Aqueous Solution. *Chemical Engineering Journal*, 366(February), 192–199.
- Liu, T., Yang, X., Wang, Z. L., & Yan, X. (2013). Enhanced Chitosan Beads-Supported Fe₀-Nanoparticles for Removal of Heavy Metals From Electroplating Wastewater In Permeable Reactive Barriers. *Water Research*,

- 47(17), 6691–6700.
- Malaki, M., Maleki, A., & Varma, R. S. (2019). MXenes and Ultrasonication. *Journal of Materials Chemistry A*, 7(18), 10843–10857.
- Malek, M. N. F. A., Hussin, N. M., Embong, N. H., Bhuyar, P., Rahim, M. H. A., Govindan, N., & Maniam, G. P. (2020). Ultrasonication: A Process Intensification Tool For Methyl Ester Synthesis: A Mini Review. *Biomass Conversion and Biorefinery*.
- Maleski, K., Ren, C. E., Zhao, M. Q., Anasori, B., & Gogotsi, Y. (2018). Size-Dependent Physical and Electrochemical Properties of Two-Dimensional MXene Flakes [Research-article]. *ACS Applied Materials and Interfaces*, 10(29), 24491–24498.
- Mu, W., Du, S., Li, X., Yu, Q., Wei, H., Yang, Y., & Peng, S. (2019). Removal of Radioactive Palladium Based on Novel 2D Titanium Carbides. *Chemical Engineering Journal*, 358, 283–290.
- Muslich, Suryadarma, P., & Hayuningtyas, P. I. R. (2010). Kinetika Adsorpsi Isotermal B-Karoten dari Olein Sawit Kasar Dengan Menggunakan Bentonit. *Jurnal Teknik Industri Pertanian*, 19(2), 93–100.
- Nurhamiddin, F., & Ibrahim, M. H. (2018). Studi Pencemaran Logam Berat Timbal (Pb) dan Tembaga (Cu) pada Sedimen Laut di Pelabuhan Bastiong Kota Ternate Provinsi Maluku Utara. *Jurnal Dintek*, 11(1), 41–55. <http://jurnal.ummu.ac.id/index.php/dintek/article/view/139>
- Nuriadi, Napitupulu, M., & Rahman, N. (2013). Analisis Logam Tembaga (Cu) Pada Buangan Limbah Tromol (*Tailing*) Pertambangan Poboya Analysis of Copper (Cu) Metal On Drum Waste Disposal (*Tailings*) at Poboya Mining. *J. Akad.Kim.2*, 2(May), 90–96.
- Nuryadi, Tutut Dewi Astuti, CTA Endang Sri Utami, & M. Budiantara. (2017). *Dasar-Dasar Statistika Penelitian* (Issue Januari). Sibuku Media.
- O'Connell, D. W., Birkinshaw, C., & O'Dwyer, T. F. (2008). Heavy Metal Adsorbents Prepared from The Modification of Cellulose: A review. *Bioresource Technology*, 99(15), 6709–6724.
- Palar, H. (Ed.). (2012). *Pencemaran dan Toksikologi Logam Berat*. PT. Rineka Cipta.

- Pandey, R. P., Rasool, K., Rasheed, P. A., & Mahmoud, K. A. (2018). Reductive Sequestration of Toxic Bromate from Drinking Water using Lamellar Two-Dimensional Ti_3C_2Tx (MXene). *ACS Sustainable Chemistry and Engineering*, 6(6), 7910–7917.
- Patel, H. (2019). Fixed-Bed Column Adsorption Study: A Comprehensive Review. *Applied Water Science*, 9(3), 1–17.
- Peng, Q., Guo, J., Zhang, Q., Xiang, J., Liu, B., Zhou, A., Liu, R., & Tian, Y. (2014). Unique Lead Adsorption Behavior of Activated Hydroxyl Group in Two-Dimensional Titanium Carbide. *Journal of the American Chemical Society*, 136(11), 4113–4116.
- Peng, Y. Y., Akuzum, B., Kurra, N., Zhao, M. Q., Alhabeb, M., Anasori, B., Kumbur, E. C., Alshareef, H. N., Ger, M. Der, & Gogotsi, Y. (2016). All-MXene (2D Titanium Carbide) Solid-State Microsupercapacitors for On-Chip Energy Storage. *Energy and Environmental Science*, 9(9), 2847–2854.
- Permata, M. A. D., Purwiyanto, A. I. S., & Diansyah, G. (2018). Kandungan Logam Berat Cu (Tembaga) dan Pb (Timbal) Pada Air dan Sedimen di Kawasan Industri Teluk Lampung, Provinsi Lampung. *Journal of Tropical Marine Science*, 1(1), 7–14.
- Piccin, J. S., Cadaval, T. R. S. A., De Pinto, L. A. A., & Dotto, G. L. (2017). Adsorption Process for Water Treatment and Purification. In *Adsorption Processes for Water Treatment and Purification*. Springer.
- Prihantini, M., Zulfa, E., Prastiwi, L. D., & Yulianti, I. D. (2020). Pengaruh Waktu Ultrasonikasi Terhadap Karakteristik Fisika Nanopartikel Kitosan Ekstrak Etanol Daun Suji (*Pleomele Angustifolia*) dan Uji Stabilitas Fisika Menggunakan Metode Cycling Test. *Jurnal Ilmu Farmasi Dan Farmasi Klinik*, 16(02), 125.
- Putra, A. Y., & Mairizki, F. (2020). Penentuan Kandungan Logam Berat Pada Air Tanah Di Kecamatan Kubu Babussalam, Rokan Hilir, Riau. *Jurnal Katalisator*, 5(1), 47.
- Reynolds, T.D. dan Richards, P. A. (1996). *Unit Operation and Process in Environmental Engineering*. PWS. Publishing Company.
- Ruthven, S. (1984). *Principles of Adsorption and Adsorption Process*. John Wiley.

- Sahoo, T. R., & Prelot, B. (2020). Adsorption processes for the removal of contaminants from wastewater. In *Nanomaterials for the Detection and Removal of Wastewater Pollutants*. Elsevier Inc.
- Said, N. I. (2018). Metoda Penghilangan Logam Berat (As, Cd, Cr, Ag, Cu, Pb, Ni Dan Zn) Di Dalam Air Limbah Industri. *Jurnal Air Indonesia*, 6(2), 136–148.
- Sawyer, C. N. (2003). *Chemistry for environmental engineering and science* (4th ed.). McGraw Hill.
- Shahzad, A., Rasool, K., Miran, W., Nawaz, M., Jang, J., Mahmoud, K. A., & Lee, D-S. (2017). Two-Dimensional $Ti_3C_2T_x$ MXene Nanosheets for Efficient Copper Removal from Water. *ACS Sustainable Chemistry and Engineering*, 5(12), 11481–11488.
- Somerville, R. (2007). *Low-Cost Adsorption Materials for Removal of Metals From Contaminated Water* [KTH Architecture and the Built Environment].
- Song, G., Kang, R., Guo, L., Ali, Z., Chen, X., Zhang, Z., Yan, C., Lin, C. Te, Jiang, N., & Yu, J. (2020). Highly Flexible Few-Layer Ti_3C_2 MXene/Cellulose Nanofiber Heat-Spreader Films With Enhanced Thermal Conductivity. *New Journal of Chemistry*, 44(17), 7186–7193.
- Tang, Y., Yang, C., & Que, W. (2018). A Novel Two-Dimensional Accordion-Like Titanium Carbide (Mxene) for Adsorption of Cr(VI) From Aqueous Solution. *Journal of Advanced Dielectrics*, 8(5), 1–5.
- Tchobanoglou, G., Burton, F. L., & Stensel, H. D. (2014). *Wastewater Engineering: Treatment and Resource Recovery*. McGraw Hill.
- Tunesi, M. M., Soomro, R. A., Han, X., Zhu, Q., Wei, Y., & Xu, B. (2021). Application of MXenes in Environmental Remediation Technologies. *Nano Convergence*, 8(1).
- Vakili, M., Cagnetta, G., Huang, J., Yu, G., & Yuan, J. (2019). *Synthesis and Regeneration of A MXene-Based Pollutant Adsorbent by Mechanochemical Methods*. 1–11.
- Wang, S., Boyjoo, Y., Choueib, A., & Zhu, Z. H. (2005). Removal of dyes from aqueous solution using fly ash and red mud. *Water Research*, 39(1), 129–138.
- Wei, Z., Peigen, Z., Wubian, T., Xia, Q., Yamei, Z., & ZhengMing, S. (2018). Alkali Treated Ti_3C_2Tx MXenes and Their Dye Adsorption Performance. *Materials*

- Chemistry and Physics*, 206, 270–276.
- WHO. (1996). *Guidelines for Drinking-Water Quality* (2nd edn, Vol. 2). Health Criteria and Supporting Information, WHO.
- Yang, C., Que, W., Yin, X., Tian, Y., Yang, Y., & Que, M. (2017). Improved Capacitance of Nitrogen-Doped Delaminated Two-Dimensional Titanium Carbide By Urea-Assisted Synthesis. *Electrochimica Acta*, 225, 416–424.
- Yang, G., Lin, W., Lai, H., Tong, J., Lei, J., Yuan, M., Zhang, Y., & Cui, C. (2021). Ultrasonics Sonochemistry Understanding the Relationship Between Particle Size and Ultrasonic Treatment During The Synthesis of Metal Nanoparticles.
- Ying, Y., Liu, Y., Wang, X., Mao, Y., Cao, W., Hu, P., & Peng, X. (2015). Two-Dimensional Titanium Carbide for Efficiently Reductive Removal of Highly Toxic Chromium(VI) from Water. *ACS Applied Materials and Interfaces*, 7(3), 1795–1803.
- Yudo, S. (2018). Kondisi Pencemaran Logam Berat Di Perairan Sungai Dki Jakarta. *Jurnal Air Indonesia*, 2(1), 1–15.
- Zhang, P., Wang, L., Du, K., Wang, S., Huang, Z., Yuan, L., Li, Z., Wang, H., Zheng, L., Chai, Z., & Shi, W. (2020). Effective Removal of U(VI) and Eu(III) by Carboxyl Functionalized MXene Nanosheets. *Journal of Hazardous Materials*, 396(February).
- Zhou, C., Zhao, X., Xiong, Y., Tang, Y., Ma, X., Tao, Q., Sun, C., & Xu, W. (2022). A Review of Etching Methods of Mxene and Applications of MXene Conductive Hydrogels. *European Polymer Journal*, 167(November 2021).