



REFERENCES

- Akhtar, M., and Majumder, B. S., Effect of Nickel Doping on the Electrochemical Performances of Carbon-Coated Na₃V₂(PO₄)₃ Cathodes for Hybrid Lithium-Ion Batteries, *ACS Appl. Energy Mater.* 2021, 4, 12, 13538–13549
- Albakrey, L. M., Alabdly, H. A., and Jaafar, M. S., 2020, Ozonation and ozone / UV process for industrial wastewater treatment: comparison between two types of wastewater, *J. Phys. Conf. Ser.*, 1664 (2020) 012014.
- Athikoh, N., Gunawan, and Nur, M., 2021, Textile Liquid Waste Treatment by Oxidation Process Using Microbubble, *Arena Tekstil*, 36(2), 91-98.
- Bozorg-Haddad, O., Delpasand, M., and Loáiciga, H.A., 2021,, *Economical, Political, and Social Issues in Water Resources*, Elsevier - Health Sciences Division, Amsterdam.
- Cebeci, M.S., and Torun, T., 2017, Treatment of Textile Wastewater Using Nanofiltration, *Eur. Sci. J.*, 169-175.
- Chakraborty, J. M., 2014, *Fundamentals and Practices in Colouration of Textiles*, Woodhead Publishing India, New Delhi.
- Chou, W., Wang, C., Chang, C., Chung, C., and Kuo, Y., 2011, Removal of Color and COD from Dyeing Wastewater by Paired Electrochemical Oxidation, *Fresenius Environ. Bull.*, 20(1), 78-85.
- Dini, J.W., 1993, *ELECTRODEPOSITION: The Materials Science of Coatings and Substrates*, Noyes Publication, New Jersey.
- Failisnur, F., Sofyan, S., and Silfia, S., 2021, Colorimetric Properties of Batik Fabrics Colored Using Gambier Liquid Waste, *J. Phys. Conf. Ser.*, 1-7
- Ahuja, S., 2014, *Comprehensive Water Quality and Purification*, Elsevier, Amsterda.
- Gottschalk, C., Libra, J. A., and Saupe, A., 2009, *Ozonation of Water and Wastewater: A Practical Guide to Understanding Ozone and Its Applications*, John Wiley & Sons, New York.



- Hajiali, A., 2018, Ozone Usage in Wastewater Treatment of a Paper Industry for Removing Soluble and Suspended Chemical Oxygen Demand, *Int. J. Environ. Sci. Tech.*, 2(2), 15-18.
- Hamza, N.A., Majeed, A.S., and Jawd, S.M., 2021, Review on Types and Methods of Electroplating on Metals, *J. Power Electron. Device.*, 7(1), 44-51.
- Handayani, W., Kristijanto, A.I., Hunga, A.I.R., 2019, A Water Footprint Case Study in Jarum Village, Klaten, Indonesia: The Production of Natural-Colored Batik, *Environ. Dev. Sustain.*, 21, 1919–1932.
- Haque, I., and Siddique, S., Lead Oxide Electrode: An Update, *Sci.Int (Lahore)*, 22(1), 23-29.
- Worsfold, P., Poole, C., and Townshend, A., 2005, *Encyclopedia of Analytical Science*, 2nd Ed., Elsevier, Amsterdam.
- Huber, MM., Göbel, A., Joss, A., Herrmann, N., Löffler, D., McArdell, CS., Reid, A., Siegrist, H., Ternes, T.A., and von Gunten, U., 2005, Oxidation of Pharmaceuticals during Ozonation of Municipal Wastewater Effluents: A Pilot Study. *Environ. Sci. Tech* 39, 4290-4299.
- Ismail, A. F., & Matsuura, T., 2022, Nanofiltration, *Sep. Purif. Process.*, 61-68.
- Kariyajjanavar, P., Narayana, J., and Arthoba Nayaka, Y., 2012, Degradation of Simulated Dye Wastewater by Electrochemical Method on Carbon Electrodes, *Indian J. Nat. Sci.*, 3(10), 976-997.
- Kong, J., Shi, S., Kong, L., Zhua, X., and Ni, J., 2007, Preparation and Characterization of PbO₂ Electrodes Doped with Different Rare Earth Oxides, *Electrochim. Acta*, 53, 2048-2054.
- Kovendhan, M., Kang, H., Jeong, S., Youn, J. S., Oh, I., Park, Y. K., and Jeon, K. J., 2019, Study of stainless-steel electrodes after electrochemical analysis in seawater condition, *Environ. Research*, 173 (2019), 549–555.



- Kusumastuti, S.W., Bisri, M., Solichin, S., Prayogo, T.B., Septiariva, I.Y., and Limantara, L.M., 2020, Water Quality Monitoring and Evaluation in the Bengawan Solo River Region, *Technol. Rep. Kansai Univ.*, 62(3), 797-806.
- Langlais, B., Reckhow, D.A., and Brink, D.R., 1991, *Ozone in Water Treatment: Application and Engineering*, Lewis Publishers, New York.
- Lasminto, U., Lumantara, E., Widystuti, H., and Zharin, F., 2016, Flood Assessment of Bengawan Solo River, *ARPN J. Eng. Appl. Sci.*, 11(24), 14443-14450.
- Li, D., and Liu, S., 2019, *Water Quality Monitoring and Management: Basis, Technology, and Case Studies*, Elsevier, London.
- Mahesh, S., Prasad, B., Mall, I. D., and Mishra I. M., 2006, Electrochemical Degradation of Pulp and Paper Mill Wastewater. Part 1. COD and Color Removal, *Ind. Eng. Chem. Res.*, 45, 2830-2839.
- Maryani, Amalia, N.N., and Agustina, T., 2020, Batik Liquid Waste Inhibited Germination and Degraded Root Tissues of Tagetes erecta L. and Zinnia violacea Cav., *Int. Conf. Systems. Biol. Sci.*, 030023-1 - 030023-7.
- Ministry of Public Works, 2010, Decree of the Minister of Public Workers on the Water Resources Management Pattern of the Bengawan Solo River Region.
- Mukadar, L. A., Joko, T., and Setiani, O., 2021, Liquid Waste Pollution Load Analysis Home Industry Batik and The Impact on The Quality of River Water in the Sub-District of Pekalongan Selatan, Pekalongan City, *Int., J., Health., Promot., Educ.*, 4(11), 48-60.
- Mukimin, A., Vistanty, H., Zen, N., Purwanto, A., and Wicaksono, K. A., 2018, Performance of Bioequalization-Electrocatalytic Integrated Method for Pollutants Removal of Hand-Drawn Batik Wastewater, *J. Water Process. Eng.*, 21, 77–83.
- Muslimah, E., Alawiyah, N.N., Soeparman, S., Yanuwiyadi, B., and Riniwati, H., 2020, Waste Reduction in Green Productivity in Small and Medium-Sized



- Enterprises of Kampoeng Batik Laweyan, *Int. j. emerg. trends eng. dev.*, 6(8), 2360-2364.
- Nghi, N.H., Cuong, L.C., Dieu, T.V., Ngu, T., and Oanh, D.T.Y., 2018, Ozonation Process and Water Disinfection, *Vietnam J. Chem.*, 56(6), 717-720.
- Panizza, M., Bocca, C., & Cerisola, G, 2000, Electrochemical Treatment of Wastewater Containing Polyaromatic Organic Pollutants, *Water Research*, 34(9), 2601-2605.
- Pocaznoi, D., Calmet, A., Etcheverry, L., Erable, B., and Bergel, A., 2012, Stainless-steel is A Promising Electrode Material for Anodes of Microbial Fuel Cells, *Energy Env. Sci.* 5, 9645–9652.
- Prajoko, S., and Ismawati, R., 2018, Water Feasibility Study of Bengawan Solo River for Irrigation: The Need for Technology to Solve Rice Field Pollution in Sragen, Indonesia, *Int. j. appl. biol.*, 2(1), 12-21.
- Pujiono, F.E., Mulyati, T.A., and Fizakia, M.N., 2020, Activated Carbon of Coconut Shell Modified TiO₂ as a Batik Waste Treatment, *JRTPPI*, 11(2), 1-10.
- Qisti, A., Pribadi, R.A., Ali, H.F., Utomo, Y., and Rokhim, D.A., 2021, Treatment of Dye Wastewater Containing Chromium from Batik Industry using Coconut Shell Activated Carbon Adsorption, *Fullerene Journ. Of Chem.*, 6(1), 7-1.
- Rajkumar, D., and Palanivelu, K., 2003, Electrochemical Degradation of Cresols for Wastewater Treatment, *Ind. Eng. Chem. Res.*, 42, 1833-1839.
- Reid. A., Mielcke, J. Wieland, A., 2007, Ozonation of Municipal Waste Water Effluents: A Tool for the Removal of Pharmaceuticals, EDCs and Pathogens, *Micropol & Ecohazard 2007*, Frankfurt am Main/Germany.
- Riyanto, and Wulandari, S., 2017, Utilization of Pb and PbO₂ from Lead Storage Battery Waste for Batik Wastewater Treatment Using Electrochemical Method, *Int. Conf. Sci. Appl. Sci.*
- Saidin, N.U., Ying, K.K., and Khuan, N.I., 2011, Electrodeposition: Principles, Applications and Methods, *NTC 2011*, 44(49), 44122714.



- Samet, Y., Chaabane Elaoud, S., Ammar, S., and Abdelhedi R., 2006, Electrochemical degradation of 4-chloroguaiacol for wastewater treatment using PbO₂ anodes, *J. Hazard. Mater.*, B138 (2006), 614–619.
- Sankara Narayanan, T.S.N., Park, I.S., and Lee. M.H., 2015, *Surface Modification of Magnesium and Its Alloys for Biomedical Applications*, Vol. 1, Woodhead Publishing, Cambridge.
- Worsfold, P., Poole, C., Townshend, A., and Miro, M., 2019, *Encyclopedia of Analytical*, 3rd Ed., Elsevier, Amsterdam
- Salsabila, N., 2021, Degradation of Lendah Kulonprogo Batik Dye Waste Using Nickel Doped PbO₂ Electrode, Undergraduate Thesis, Gadjah Mada University, Yogyakarta.
- Sires, Low C.T.J., Ponce-de-Leon, and Walsh, F.C., 2010, The Characterisation of PbO₂-Coated Electrodes Prepared from Aqueous Methanesulfonic Acid Under Controlled Deposition Conditions, *Electrochim. Acta*, 55, 2163-2170.
- Valerie., Wijaya, J.C., and Pinontoan, R., 2018, The use of Microbes Potential as Bioremediation Agent for Color Textile Waste, *Fast-Jurnal Sains dan Teknologi*, 2(1), 32-47.
- Wei, C., Zhang, F., Hu, Y., Feng, C., and Wu, H., 2016, Ozonation in water treatment: the generation, basic properties of ozone and its practical application, *Rev. Chem. Eng.*, 1-41.
- Widodo D. S., Ismiyarto, and Noorikhlas, F., 2009, Electroremediation of Polluted Waters: Electrodecolorization of Remazol black B Solution with Lead Oxide/Carbon Electrodes and Analysis of Residual Decolorization Solution, *J. Sci. Appl. Chem.*, 12(1), 1-6.
- Xiong, X., Wang, B., Zhu, W., Tian, K., and Zhang, H., 2019, A Review on Ultrasonic Catalytic Microbubbles Ozonation Processes: Properties, Hydroxyl Radicals Generation Pathway and Potential in Application, *Catalyst*, 9(10), 1-18.



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Yu, L., and Brooks, M., 2016, Food Industry Protein By-Products and Their Applications, *Protein Byproducts*, 120-132.

Zerin, I., 2021, A Review on the Drawbacks of Nano-Filtration of Textile Wastewater Treatment, *J. Text. Eng. Southeast Univ.*, 1(1), 62-65, ISSN 2709-9598.

Zhao, T., Lu, J., Hu, C., Zhu, C., Zhao, J., and Dong, W., 2014, Electrochemical Degradation of 4, 4'-(propane-2, 2-diyl) Diphenol in Water with CeO₂= β -PbO₂=Ti Electrode, *Int. J. Electrochem. Sci.*, 9(5), 2354–2366.