

DAFTAR PUSTAKA

- Abd Mutalib, M., Rahman, M. A., Othman, M. H. D., Ismail, A. F. & Jaafar, J. 2017. Chapter 9 - Scanning Electron Microscopy (SEM) and Energy-Dispersive X-Ray (EDX) Spectroscopy. *Membrane Characterization*. Elsevier.
- Alijani, H. Q., Iravani, S. & Varma, R. S. (2023). Bismuth vanadate (BiVO₄) nanostructures: Eco-friendly synthesis and their photocatalytic applications. *Catalysts*, 13, 59. <https://doi.org/10.3390/catal13010059>
- Arai, T., Yanagida, M., Konishi, Y., Iwasaki, Y., Sugihara, H. & Sayama, K. (2008). Promotion effect of CuO co-catalyst on WO₃-catalyzed photodegradation of organic substances. *Catalysis Communications - CATAL COMMUN*, 9, 1254-1258. <https://doi.org/10.1016/j.catcom.2007.11.012>
- Armaković, S. J., Savanović, M. M. & Armaković, S. (2023). Titanium dioxide as the most used photocatalyst for water purification: An overview. *Catalysts*, 13, 26. <https://doi.org/10.3390/catal13010026>
- Aymerich, M., Gómez-Varela, A. I., Álvarez, E. & Flores-Arias, M. T. (2016). Study of different sol-gel coatings to enhance the lifetime of pdms devices: Evaluation of their biocompatibility. *Materials*, 9, 728. <https://doi.org/10.3390/ma9090728>
- Bakhtiarnia, S., Sheibani, S., Aubry, E., Sun, H., Briois, P. & Arab Pour Yazdi, M. (2022). One-step preparation of Ag-incorporated BiVO₄ thin films: Plasmon-heterostructure effect in photocatalytic activity enhancement. *Applied Surface Science*, 580, 152253. <https://doi.org/10.1016/j.apsusc.2021.152253>
- Chakraborty, A., Toma, F. T. Z., Alam, K., Yousuf, S. B. & Hossain, K. (2024). Influence of annealing temperature on Fe₂O₃ nanoparticles: Synthesis optimization and structural, optical, morphological, and magnetic properties characterization for advanced technological applications. *Heliyon*, 10, e40000. <https://doi.org/10.1016/j.heliyon.2024.e40000>
- Cheng, G., Liu, X. & Xiong, J. (2024). Recent advances in coupling pollutants degradation with hydrogen production by semiconductor photocatalysis. *Chemical Engineering Journal*, 501, 157491. <https://doi.org/10.1016/j.cej.2024.157491>
- Chowdhary, P., Bharagava, R. N., Mishra, S. & Khan, N. 2020. Role of Industries in Water Scarcity and Its Adverse Effects on Environment and Human Health. *Environmental Concerns and Sustainable Development: Volume 1: Air, Water and Energy Resources*. Singapore: Springer Singapore.
- Clabel H., J. L., Chacaliaza-Ricaldi, J. & Marega Jr, E. (2022). Potential application of perovskite structure for water treatment: Effects of band gap, band edges,

- and lifetime of charge carrier for photocatalysis. *Frontiers in Nanotechnology*, 4. <https://doi.org/10.3389/fnano.2022.827925>
- Cruz-Manzo, S. & Greenwood, P. 2022. Chapter 1 - Introduction to Electrochemical Impedance Spectroscopy. *Electrochemical Phenomena in the Cathode Impedance Spectrum of PEM Fuel Cells*. Elsevier.
- da Trindade, L. G., Rocha, A. C. B., Teodoro, V., da Silva, V. T., Trench, A. B., Cordoncillo, E., Teodoro, M. D., Tebcherani, S. M., Longo, E. & Mazzo, T. M. (2022). Effect of calcination temperature and pressure-assisted heat treatment on the dye degradation performance of SnO₂ photocatalyst obtained by a simple synthesis method. *Materials Research Bulletin*, 153, 111914. <https://doi.org/10.1016/j.materresbull.2022.111914>
- Faizah, A. H., Gunawan, Khabibi & Wijaya, R. A. (2024). Effect of calcination temperature variation on green synthesis of cadmium sulfide for ciprofloxacin photodegradation. *International Journal of Research - Granthaalayah*, 12, 17–30. <https://doi.org/10.29121/granthaalayah.v12.i6.2024.5681>
- Fang, G., Liu, Z. & Han, C. (2020). Enhancing the PEC water splitting performance of BiVO₄ co-modifying with NiFeOOH and Co-Pi double layer cocatalysts. *Applied Surface Science*, 515, 146095. <https://doi.org/10.1016/j.apsusc.2020.146095>
- Foster, M., Mendoza Cortes, J. & Mayer, H. C. (2024). Spin coating experiments and theory for undergraduate physics and engineering students: A connection to microfabrication. *American Journal of Physics*, 92, 545-558. <https://doi.org/10.1119/5.0169090>
- Gaikwad, M. A., Suryawanshi, U. P., Ghorpade, U. V., Jang, J. S., Suryawanshi, M. P. & Kim, J. H. (2022). Emerging surface, bulk, and interface engineering strategies on BiVO₄ for photoelectrochemical water splitting. *Small*, 18, e2105084. <https://doi.org/10.1002/sml.202105084>
- Geng, Y., Zhang, X. & Wang, F. (2025). The investigation on the structural, electronic and optical properties of wide band gap semiconductor material Bi₂₄M₂O₄₀ (M = Si, Ge, As, P). *Chemical Physics Letters*, 858, 141765. <https://doi.org/10.1016/j.cplett.2024.141765>
- Grigioni, I., Di Liberto, G., Dozzi, M. V., Tosoni, S., Pacchioni, G. & Selli, E. (2021). WO₃/BiVO₄ photoanodes: Facets matching at the heterojunction and BiVO₄ layer thickness effects. *ACS Applied Energy Materials*, 4, 8421-8431. <https://doi.org/10.1021/acsaem.1c01623>
- Gunawan, G., Lusiana, R., Haris, A., Astuti, A., Pratista, E., Widiyandari, H. & Septina, W. (2022). Synthesis of BiVO₄ thin film as photoanode water splitting and dye degradation. *RASAYAN Journal of Chemistry*, 15, 2773-2781. <https://doi.org/10.31788/RJC.2022.1547058>

- Gunawan, G., Widodo, D., Sa'diyah, N. & Wijaya, R. (2026). Tailoring photocatalytic performance of spin-coated BiVO₄ via calcination time optimization under visible light. *E3S Web of Conferences*, 695. <https://doi.org/10.1051/e3sconf/202669501002>
- Hemmatpour, P. & Nezamzadeh-Ejhi, A. (2022). A Z-scheme CdS/BiVO₄ photocatalysis towards Eriochrome black T: An experimental design and mechanism study. *Chemosphere*, 307, 135925. <https://doi.org/10.1016/j.chemosphere.2022.135925>
- Hemmatpour, P., Nezamzadeh-Ejhi, A. & Ershadi, A. (2022). A brief study on the Eriochrome Black T photodegradation kinetic by CdS/BiVO₄ coupled catalyst. *Materials Research Bulletin*, 151, 111830. <https://doi.org/10.1016/j.materresbull.2022.111830>
- Ilyas, A., Rafiq, K., Abid, M. Z., Rauf, A. & Hussain, E. (2023). Growth of villi-microstructured bismuth vanadate (Vm-BiVO₄) for photocatalytic degradation of crystal violet dye. *RSC Advances*, 13, 2379-2391. <https://doi.org/10.1039/D2RA07070G>
- Jin, X., Jiao, M., Zhang, X., Chen, F., Zhou, Z. & Jia, D. (2024). Visible-light-driven CdS/ZnS heterojunctions with excellent photocatalytic performance for organic dyes removal. *Journal of Molecular Structure*, 1317, 139188. <https://doi.org/10.1016/j.molstruc.2024.139188>
- Kanan, S., Moyet, M., Arthur, R. & Patterson, H. (2019). Recent advances on TiO₂-based photocatalysts toward the degradation of pesticides and major organic pollutants from water bodies. *Catalysis Reviews*, 62, 1-65. <https://doi.org/10.1080/01614940.2019.1613323>
- Kaur, I., Pandya, D. K. & Chopra, K. L. (1980). Growth kinetics and polymorphism of chemically deposited CdS films. *Journal of The Electrochemical Society*, 127, 943. <https://doi.org/10.1149/1.2129792>
- Khan, M. M. 2025a. 14 - UV-Visible spectroscopy and diffuse reflectance spectroscopy. *Photocatalysts: Synthesis and Characterization Methods*. Elsevier.
- Khan, M. M. 2025b. 18 - Emission spectroscopy: photoluminescence spectroscopy. *Photocatalysts: Synthesis and Characterization Methods*. Elsevier.
- Kolhe, N. D., Walekar, L. S., Kadam, A. N., Chopade, A. S., Lee, S.-W., Mhamane, D. S., Shringare, S. N., Lawand, A. S., Gokavi, G. S., Misra, M. & Mali, M. G. (2023). MOF derived in-situ construction of core-shell Z-scheme BiVO₄@ α -Fe₂O₃-CF nanocomposites for efficient photocatalytic treatment of organic pollutants under visible light. *Journal of Cleaner Production*, 420, 138179. <https://doi.org/10.1016/j.jclepro.2023.138179>
- Kumar, A., Raorane, C. J., Syed, A., Bahkali, A. H., Elgorban, A. M., Raj, V. & Kim, S. C. (2023). Synthesis of TiO₂, TiO₂/PAni, TiO₂/PAni/GO

- nanocomposites and photodegradation of anionic dyes Rose Bengal and thymol blue in visible light. *Environmental Research*, 216, 114741. <https://doi.org/10.1016/j.envres.2022.114741>
- Li, Q., Li, X. & Yu, J. 2020. Chapter 10 - Surface and interface modification strategies of CdS-based photocatalysts. *Interface Science and Technology*. Elsevier.
- Li, S., Xu, W., Meng, L., Tian, W. & Li, L. (2022). Recent progress on semiconductor heterojunction-based photoanodes for photoelectrochemical water splitting. *Small Science*, 2, 2100112. <https://doi.org/10.1002/smsc.202100112>
- Lin, L., Yang, H. & Xu, X. (2022). Effects of water pollution on human health and disease heterogeneity: A review. *Frontiers in Environmental Science*, 10. <https://doi.org/10.3389/fenvs.2022.880246>
- Lin, Y., Cai, H., Chen, H. & Luo, H. (2021). One-pot synthesis of Bi₄V₂O₁₁/BiVO₄ heterostructure with enhanced photocatalytic activity for dye degradation. *Applied Surface Science*, 544, 148921. <https://doi.org/10.1016/j.apsusc.2020.148921>
- Liu, T., Wang, B., Zhang, J., Lu, Z., Gu, J., Wang, W., Wang, M. & Zhou, Q. (2022). 0D/1D BiVO₄/CdS Z-scheme nanoarchitecture for efficient photocatalytic environmental remediation. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 650, 129583. <https://doi.org/10.1016/j.colsurfa.2022.129583>
- Low, J., Jiang, C., Cheng, B., Wageh, S., Al-Ghamdi, A. A. & Yu, J. (2017). A review of direct Z-scheme photocatalysts. *Small Methods*, 1, 1700080. <https://doi.org/10.1002/smt.201700080>
- Lu, J., Gu, S., Li, H., Wang, Y., Guo, M. & Zhou, G. (2023). Review on multi-dimensional assembled S-scheme heterojunction photocatalysts. *Journal of Materials Science & Technology*, 160, 214-239. <https://doi.org/10.1016/j.jmst.2023.03.027>
- Lukong, V. T., Ukoba, K. & Jen, T.-C. (2022). Review of self-cleaning TiO₂ thin films deposited with spin coating. *The International Journal of Advanced Manufacturing Technology*, 122, 1-22. <https://doi.org/10.1007/s00170-022-10043-3>
- Luo, Y.-N., Dong, J.-L., Jiang, Z.-J., Zhang, X.-Q., Li, Y. & Wang, C.-W. (2021). β-Ni(OH)₂/NiS/TiO₂ 3D flower-like p-n-p heterostructural photocatalysts for high-efficiency removal of soluble anionic dyes and hydrogen releasing. *Optical Materials*, 114, 110951. <https://doi.org/10.1016/j.optmat.2021.110951>
- Mirzaeifard, Z., Shariatnia, Z., Jourshabani, M. & Darvishi, S. (2020). ZnO photocatalyst revisited: Effective photocatalytic degradation of emerging

- contaminants using S-doped ZnO nanoparticles under visible light radiation. *Industrial & Engineering Chemistry Research*, XXXX. <https://doi.org/10.1021/acs.iecr.0c03192>
- Mizuki, J. i. & Kamiyama, T. 2024. Chapter 12 - Diffraction with X-rays and neutrons. *Non-Destructive Material Characterization Methods*. Elsevier.
- Monfort, O. & Plesch, G. (2018). Bismuth vanadate-based semiconductor photocatalysts: a short critical review on the efficiency and the mechanism of photodegradation of organic pollutants. *Environmental Science and Pollution Research*, 25. <https://doi.org/10.1007/s11356-018-2437-9>
- Monov, X., Kurniawati, A., F. Rusliani, P., Muhammad, B., Milana, P., Wijaya, R., Gunawan, G., Sari, K., Nursam, N., Yulianto, B. & Septina, W. (2024). Exploration of In₂S₃ as an electron transport layer for all-inorganic CsPbBr₃ perovskite solar cells. *International Conference on Radar, Antenna, Microwave, Electronics*, 307-310. <https://doi.org/10.1109/ICRAMET62801.2024.10809329>
- Moscow, S., Veerappan, K., Masilamani, S., Kalaikathir, S., Jothivnkatachalam, K., Fu, Y.-P. & Anandan, S. (2022). Synthesis of Sn and Zr-Doped BiVO₄ nanocatalyst with enhanced photocatalytic and photoelectrochemical activity. *ChemistrySelect*, 7. <https://doi.org/10.1002/slct.202104000>
- Najm, A. S., Naeem, H. S., Alwarid, D. A. R. M., Aljuhani, A., Hasbullah, S. A., Hasan, H. A., Sopian, K., Bais, B., Al-Iessa, H. J., Majdi, H. S., Sultan, A. J. & Moria, H. (2022). Mechanism of chemical bath deposition of CdS thin films: Influence of sulphur precursor concentration on microstructural and optoelectronic characterizations. *Coatings*, 12, 1400. <https://doi.org/10.3390/coatings12101400>
- Noman, M., Khan, Z. & Jan, S. T. (2024). A comprehensive review on the advancements and challenges in perovskite solar cell technology. *RSC Advances*, 14, 5085-5131. <https://doi.org/10.1039/D3RA07518D>
- Orimolade, B. O. & Arotiba, O. A. (2020). Bismuth vanadate in photoelectrocatalytic water treatment systems for the degradation of organics: A review on recent trends. *Journal of Electroanalytical Chemistry*, 878, 114724. <https://doi.org/10.1016/j.jelechem.2020.114724>
- Page, S. E., Arnold, W. A. & McNeill, K. (2010). Terephthalate as a probe for photochemically generated hydroxyl radical. *Journal of Environmental Monitoring*, 12, 1658-1665. <https://doi.org/10.1039/C0EM00160K>
- Palanisamy, B., Babu, C. M., Sundaravel, B., Anandan, S. & Murugesan, V. (2013). Sol-gel synthesis of mesoporous mixed Fe₂O₃/TiO₂ photocatalyst: application for degradation of 4-chlorophenol. *J Hazard Mater*, 252-253, 233-42. <https://doi.org/10.1016/j.jhazmat.2013.02.060>

- Patel, H. & Vashi, R. T. 2015. Chapter 3 - Feasibility of naturally prepared adsorbent. *Characterization and Treatment of Textile Wastewater*. Boston: Elsevier.
- Pletcher, D., Greff, R., Peat, R., Peter, L. M. & Robinson, J. 2010. 6 - Potential sweep techniques and cyclic voltammetry. *Instrumental Methods in Electrochemistry*. Woodhead Publishing.
- Polo, A., Nomellini, C., Marra, G., Selli, E. & Dozzi, M. V. (2025). WO₃/BiVO₄ heterojunction photoanodes: Optimized photoelectrochemical performance in relation to both oxides layer thickness. *Catalysis Today*, 446, 115137. <https://doi.org/10.1016/j.cattod.2024.115137>
- Rasheed, T., Bilal, M., Nabeel, F., Adeel, M. & Iqbal, H. M. N. (2019). Environmentally-related contaminants of high concern: Potential sources and analytical modalities for detection, quantification, and treatment. *Environment International*, 122, 52-66. <https://doi.org/10.1016/j.envint.2018.11.038>
- Rebelo, S. L. H., Melo, A., Coimbra, R., Azenha, M. E., Pereira, M. M., Burrows, H. D. & Sarakha, M. (2006). Photodegradation of atrazine and ametryn with visible light using water soluble porphyrins as sensitizers. *Environmental Chemistry Letters*, 5, 29-33. <https://doi.org/10.1007/s10311-006-0072-z>
- Sánchez-Albores, R., Reyes, O., Ríos-Valdovinos, E. I., Fernández-Madrigal, A. & Pola, F. (2023). Analysis and characterization of BiVO₄/FeOOH and BiVO₄/α-Fe₂O₃ nanostructures photoanodes for photoelectrochemical water splitting. *Journal of Materials Science: Materials in Electronics*, 34. <https://doi.org/10.1007/s10854-023-10382-1>
- Senasu, T., Youngme, S., Hemavibool, K. & Nanan, S. (2021). Sunlight-driven photodegradation of oxytetracycline antibiotic by BiVO₄ photocatalyst. *Journal of Solid State Chemistry*, 297, 122088. <https://doi.org/10.1016/j.jssc.2021.122088>
- Septina, W., Gunawan, Ikeda, S., Harada, T., Higashi, M., Abe, R. & Matsumura, M. (2015). Photosplitting of water from wide-gap Cu(In,Ga)S₂ thin films modified with a CdS layer and Pt nanoparticles for a high-onset-potential photocathode. *The Journal of Physical Chemistry C*, 119, 8576-8583. <https://doi.org/10.1021/acs.jpcc.5b02068>
- Shabbir, A., Sardar, S. & Mumtaz, A. (2024). Mechanistic investigations of emerging type-II, Z-scheme and S-scheme heterojunctions for photocatalytic applications: A review. *Journal of Alloys and Compounds*, 1003, 175683. <https://doi.org/10.1016/j.jallcom.2024.175683>
- Shi, F., Wu, J., Wu, S., Wu, X., Hu, H., Li, T. & Du, T. (2025). Construction of a novel α-Fe₂O₃/BiVO₄ heterojunction for enhanced visible light photocatalytic degradation of norfloxacin. *Applied Surface Science*, 714, 164497. <https://doi.org/10.1016/j.apsusc.2025.164497>

- Tay, D. J. J., Febriansyah, B., Salim, T., Wong, Z. S., Dewi, H. A., Koh, T. M. & Mathews, N. (2023). Enabling a rapid SnO₂ chemical bath deposition process for perovskite solar cells. *Sustainable Energy & Fuels*, 7, 1302-1310. <https://doi.org/10.1039/D2SE01475K>
- Tyona, M. D., Osuji, R. U., Lokhande, C. D. & Ezema, F. I. (2018). Photovoltaic properties of aluminum doped zinc oxide electrodes based on variation of aluminum impurities in the semiconductor. *Journal of Materials Physics and Chemistry*, 6, 9-16. <https://doi.org/10.12691/jmpc-6-1-2>
- Wan, Y., Wang, H., Liu, J., Liu, X., Song, X., Zhou, W., Zhang, J. & Huo, P. (2023). Enhanced degradation of polyethylene terephthalate plastics by CdS/CeO₂ heterojunction photocatalyst activated peroxy monosulfate. *J Hazard Mater*, 452, 131375. <https://doi.org/10.1016/j.jhazmat.2023.131375>
- Widodo, D., Suyati, L., Gunawan, G., Haris, A., Wijaya, R. & Safitri, S. (2022). Modification of Fenton method in decolorizing remazol black B via irradiationless approach using lead oxide. *AIP Conference Proceedings*, 2553, 020040. <https://doi.org/10.1063/5.0103672>
- Wodka, D., Socha, R., Bielańska, E., Elżbieciak-Wodka, M., Nowak, P. & Warszyński, P. (2014). Photocatalytic activity of titanium dioxide modified by Fe₂O₃ nanoparticles. *Applied Surface Science*, 319, 173-180. <https://doi.org/10.1016/j.apsusc.2014.08.010>
- Xia, L., Bai, J., Li, J., Qingyi, Z., Linsen, L. & Zhou, B. (2016). High-performance BiVO₄ photoanodes cocatalyzed with an ultrathin α -Fe₂O₃ layer for photoelectrochemical application. *Applied Catalysis B: Environmental*, 204. <https://doi.org/10.1016/j.apcatb.2016.11.015>
- Xu, H., Hao, Z., Feng, W., Wang, T. & Li, Y. (2021). Mechanism of photodegradation of organic pollutants in seawater by TiO₂-based photocatalysts and improvement in their performance. *ACS Omega*, 6, 30698-30707. <https://doi.org/10.1021/acsomega.1c04604>
- Xue, K., Tu, B., Qiu, P., Qi, H., Zhang, T. & Su, X. (2026). Engineering high-performance BiVO₄-based photoanodes for photoelectrochemical water splitting. *Applied Energy*, 417, 128002. <https://doi.org/10.1016/j.apenergy.2026.128002>
- Yacobi, B. 2003. Semiconductor materials: An introduction to basic principles. Kluwer Academic.
- Yadav, S., Yadav, B., Chaudhary, S. & Pandya, D. (2017). Deposition potential controlled structural and thermoelectric behavior of electrodeposited CoSb₃ thin films. *RSC Adv*, 7, 20336-20344. <https://doi.org/10.1039/C7RA01740E>
- Yang, J., Chao, M., Yao, R., Li, J. & Liu, G. (2026). Boosting charge separation and catalytic kinetics in BiVO₄ photoanodes via a coordinated Fe₂O₃/NiFeO_x

- system. *Journal of Alloys and Compounds*, 1057, 186714. <https://doi.org/10.1016/j.jallcom.2026.186714>
- Yang, Z., Li, H., Cui, X., Zhu, J., Li, Y., Zhang, P. & Li, J. (2022). Direct Z-scheme nanoporous BiVO₄/CdS quantum dots heterojunction composites as photoanodes for photocathodic protection of 316 stainless steel under visible light. *Applied Surface Science*, 603, 154394. <https://doi.org/10.1016/j.apsusc.2022.154394>
- Yang, Z., Yang, J., Li, L., Cao, W., Zhang, J., Zhao, H. & Wang, L. (2024). A novel F-BiVO₄/g-C₃N₄/CdS dual S-scheme heterojunction for high efficient photocatalytic removal of multiple pollutants. *Applied Surface Science*, 672, 160738. <https://doi.org/10.1016/j.apsusc.2024.160738>
- Zhang, L., Zhang, J., Yu, H. & Yu, J. (2022). Emerging S-scheme photocatalyst. *Advanced Materials*, 34, 2107668. <https://doi.org/10.1002/adma.202107668>
- Zhang, T., Wang, W., Jiang, X., Wang, H., He, Z.-H., Yang, Y., Wang, K., Liu, Z.-T. & Han, B. (2024). Fabricating CdS/Ag/BiVO₄ Z-heterojunction for solvent-free photocatalytic oxidation of amines. *Green Chemistry*, 26, 3338-3345. <https://doi.org/10.1039/D3GC04644C>
- Zhang, Y., Gan, L. T., Wang, M., Ning, W., Liu, P. F. & Yang, H. G. (2023). A conformal carbon nanolayer coated Fe₂O₃ cocatalyst for the promoted activity of plasma-sputtered BiVO₄ photoanode. *Chemistry*, 29, e202203165. <https://doi.org/10.1002/chem.202203165>
- Zhong, X., Li, Y., Wu, H. & Xie, R. (2023). Recent progress in BiVO₄-based heterojunction nanomaterials for photocatalytic applications. *Materials Science and Engineering: B*, 289, 116278. <https://doi.org/10.1016/j.mseb.2023.116278>