

DAFTAR PUSTAKA

- Acharya, R. and Parida, K., 2020, A review on TiO₂/g-C₃N₄ Visible-Light-Responsive Photocatalysts for Sustainable Energy Generation and Environmental Remediation, *J. Environ. Chem. Eng.*, 8, 103896.
- Alcudia-Ramos, M.A., Fuentez-Torres, M.O., Ortiz-Chi, F., Espinosa-González, C.G., Hernández-Como, N., García-Zaleta, D.S., Kesarla, M.K., Torres-Torres, J.G., Collins-Martínez, V., and Godavarthi, S., 2020, Fabrication of g-C₃N₄/TiO₂ Heterojunction Composite for Enhanced Photocatalytic Hydrogen Production, *Ceram. Int.*, 46, 38–45.
- Al-Nuaim, M.A., Alwasiti, A.A., and Shnain, Z.Y., 2022, The Photocatalytic Process in The Treatment of Polluted Water, *Chem. Pap.*, 77, 677–701.
- Amigun, A.T., Adekola, F.A., Tijani, J.O., and Mustapha, S., 2022, Photocatalytic Degradation of Malachite Green Dye Using Nitrogen/Sodium/Iron-TiO₂ Nanocatalysts, *Results Chem.*, 4, 100480.
- Ammar, M., Ashraf, S., and Baltrusaitis, J., 2023, Nutrient-Doped Hydroxyapatite: Structure, Synthesis and Properties, *Ceramics 2023, Vol. 6*, 1799–1825.
- Anggraini, D. and Nasra, E., 2024, Penyerapan Malachite Green Menggunakan Selulosa Hasil Ekstrak Kulit Pisang Kepok (Musa Balbisiana Colla), *JPTAM*, 8, 11956–11964.
- Arjun, A., Dharr, A., Raguram, T., and Rajni, K.S., 2020, Study of Copper Doped Zirconium Dioxide Nanoparticles Synthesized via Sol–Gel Technique for Photocatalytic Applications, *J. Inorg. Organomet. Polym. Mater.*, 30, 4989–4998.
- Bi, X., Yu, S., Liu, E., Liu, L., Zhang, K., Zang, J., and Zhao, Y., 2020, Construction Of g-C₃N₄ /TiO₂ Nanotube Arrays Z-Scheme Heterojunction To Improve Visible Light Catalytic Activity, *Colloids Surf. A Physicochem. Eng. Asp.*, 603, 193.
- Biswal, S., Subhadarshini, A., Behera, S.A., Achary, P.G.R., and Nanda, B., 2025, Photodegradation of Malachite Green using 2D g-C₃N₄ Nanosheet: A Promising Metal Free Catalyst, *J. Met. Mater. Miner*, 35, 2279.
- Boonprakob, N., Wetchakun, N., Phanichphant, S., Waxler, D., Sherrell, P., Nattestad, A., Chen, J., and Inceesungvorn, B., 2014, Enhanced Visible-Light Photocatalytic Activity of g-C₃N₄/TiO₂ films, *J. Colloid Interface Sci.*, 417, 402–409.
- Bystrov, V.S., Piccirillo, C., Tobaldi, D.M., Castro, P.M.L., Coutinho, J., Kopyl, S., and Pullar, R.C., 2016, Oxygen Vacancies, The Optical Band Gap (E_g) and Photocatalysis Of Hydroxyapatite: Comparing Modelling With Measured Data, *Appl. Catal. B*, 196, 100–107.

- Chen, C.C., Lu, C.S., Chung, Y.C., and Jan, J.L., 2007, UV Light Induced Photodegradation of Malachite Green on TiO₂ Nanoparticles, *J. Hazard. Mater.*, 141, 520–528.
- Chen, D., Liu, J., Jia, Z., Fang, J., Yang, F., Tang, Y., Wu, K., Liu, Z., and Fang, Z.Q., 2019, Efficient Visible-Light-Driven Hydrogen Evolution And Cr(VI) Reduction Over Porous P And Mo Co-Doped g-C₃N₄ with Feeble N Vacancies Photocatalyst, *J. Hazard. Mater.*, 361, 294–304.
- Chen, Y., Cai, M., Li, J., and Zhang, W., 2025, Study on Photocatalytic Performance of Bi₂O₃-TiO₂/Powdered Activated Carbon Composite Catalyst for Malachite Green Degradation, *Water*, 1452.
- Das, K.C. and Dhar, S.S., 2019, Remarkable Catalytic Degradation of Malachite Green By Zinc Supported on Hydroxyapatite Encapsulated Magnesium Ferrite (Zn/HAP/MgFe₂O₄) Magnetic Novel Nanocomposite, *J. Mater. Sci.*, 55, 4592–4606.
- Deng, M., Zhang, S., Liang, J., Li, Z., Jiang, H., Zhao, W., Pang, J., and Wang, Y., 2026, Synergistic Charge Separation in Engineered 2D CoTiO₃/TiO₂ Composites for Superior Photocatalysis, *J. Mater. Sci.*, 342.
- Dettori, R., Ghourichay, S.A., Porcu, S., Melis, C., Colombo, L., and Ricci, P.C., 2025, Sustainable Photocatalysis with Phenyl-Modified g-C₃N₄/TiO₂ Polymer Hybrids: A Combined Computational and Experimental Investigation, *Polymers*, 17.
- Djebbari, C., zouaoui, E., Ammouchi, N., Nakib, C., Zouied, D., and Dob, K., 2021, Degradation of Malachite Green Using Heterogeneous Nanophotocatalysts (NiO/TiO₂, CuO/TiO₂) Under Solar and Microwave Irradiation, *SN Applied Sciences*, 3, 255.
- Du, S., Lian, J., and Zhang, F., 2022, Visible Light-Responsive N-Doped TiO₂ Photocatalysis: Synthesis, Characterizations, and Applications, *Trans. Tianjin Univ*, 28, 33–52.
- Dutta, L., Sethi, G.K., and Dey, S., 2024, A Comprehensive and Critical Assessment on the Efficiency of Natural and Synthetic Adsorbents for the Removal of Recalcitrant Malachite Green from Water: Present Level and Future Perspectives, *Korean J. Chem. Eng*, 41, 589–607.
- Elkady, M.F. and Hassan, H.S., 2021, Photocatalytic Degradation of Malachite Green Dye from Aqueous Solution Using Environmentally Compatible Ag/ZnO Polymeric Nanofibers, *Polymers*, 13.
- Fagan, R., McCormack, D.E., Hinder, S.J., and Pillai, S.C., 2016, Photocatalytic Properties of g-C₃N₄-TiO₂ Heterojunctions under UV and Visible Light Conditions, *Materials* 2016, 9.

- Faiz, T., Nabila, T., and Budiman, A.W., 2022, Sintesis Metal-Doped Carbon Nitride Nanosheets sebagai Pengurai Limbah Pewarna secara Fotokatalisis, *Equilibrium J. Chem. Eng.*, 6, 50–56.
- Fatimah, I., Fahrani, D., Harmawantika, T., Sahroni, I., Kamari, A., Rahmatillah, C.S., and Nurillahi, R., 2019, Functionalization of Hydroxyapatite Derived From Cockle (Anadara Granosa) Shells Into Hydroxyapatite–Nano TiO₂ for Photocatalytic Degradation of Methyl Violet, *Sustain. Environ. Res.*, 29 (40), 3–12.
- Ferreira, O., Monteiro, O. C., do Rego, A. B., Ferraria, A. M., Batista, M., Santos, R., ... & Silva, E. R., 2021, Visible Light-Driven Photodegradation of Triclosan and Antimicrobial Activity Against Legionella Pneumophila With Cobalt and Nitrogen Co-Doped TiO₂ Anatase Nanoparticles. *J. Environ. Chem. Eng.*, 9 (6), 106735.
- Gharavi-nakhjavani, M.S., Niazi, A., Hosseini, H., Aminzare, M., Dizaji, R., Tajdar-oranj, B., and Mirza Alizadeh, A., 2023, Malachite Green and Leucomalachite Green In Fish: A Global Systematic Review and Meta-Analysis, *Environ. Sci. Pollut. Res.*, 30, 48911–48927.
- Ghorbani-Vaghei, R., Hemmati, S., Hashemi, M., and Veisi, H., 2015, Diethylenetriamine-Functionalized Single-Walled Carbon Nanotubes (Swnts) To Immobilization Palladium as A Novel Recyclable Heterogeneous Nanocatalyst for The Suzuki-Miyaura Coupling Reaction in Aqueous Media, *C. R. Chim.*, 18, 636–643.
- Haleem, A., Ullah, M., Rehman, S. ur, Shah, A., Farooq, M., Saeed, T., Ullah, I., and Li, H., 2024, In-Depth Photocatalytic Degradation Mechanism of the Extensively Used Dyes Malachite Green, Methylene Blue, Congo Red, and Rhodamine B via Covalent Organic Framework-Based Photocatalysts, *Water* 2024, 16, 1588.
- Hammoud, L., Marchal, C., Caps, V., Toufaily, J., Hamieh, T., and Keller, V., 2024, Influence of Low Level of Non-Metal Doping on g-C₃N₄ Performance for H₂ Production from Water Under Solar Light Irradiation, *Int. J. Hydrogen Energy*, 51, 285–300.
- Hashemi, N., Vaezi, Z., Masoumi, S., Mohammadi, S.S., Mahdavian, R., Sedghi, M., Redl, H., Banerjee, A., Weidinger, A., and Naderi-Manesh, H., 2022, Temperature Dependent Physicochemical Characteristics, Antibacterial and Cytotoxic Potential of Iron Quantum Cluster Templated Hydroxyapatites, *Ceram. Int.*, 48, 4200–4207.
- Hiromoto, S., Doi, K., Mazlam, M.I., Ho, H.H., Nurazreena, A., Hy, K., Ho, L., Dao, H., Pham, X.K., Dermawan, S.K., Maisarah, Z., Ismail, M., Zaki Jaffri, M., and Abdullah, H.Z., 2022, Effect of the Calcination Temperature on the Properties of Hydroxyapatite from Black Tilapia Fish Bone, *J. Phys. Conf. Ser.*, 2169, 012034.

- Hu, S., Ma, L., You, J., Li, F., Fan, Z., Lu, G., Liu, D., and Gui, J., 2014, Enhanced Visible Light Photocatalytic Performance of g-C₃N₄ Photocatalysts Co-Doped with Iron and Phosphorus, *Appl. Surf. Sci.*, 311, 164–171.
- Huang, Q., Guo, X., Fu, Y., Yang, L., and Meng, J., 2024, Study on the Performance of g-C₃N₄ Composite TiO₂ Photocatalyst, *Mater. Lett.*, 364, 136119.
- Jaiswal, R., Bharambe, J., Patel, N., Dashora, A., Kothari, D.C., and Miotello, A., 2015, Copper and Nitrogen co-doped TiO₂ Photocatalyst with Enhanced Optical Absorption and Catalytic Activity, *Appl. Catal. B*, 168–169, 333–341.
- Jemli, Y. El, Abdelouahdi, K., Minh, D.P., Barakat, A., and Solhy, A., 2022, Synthesis and Characterization of Hydroxyapatite and Hydroxyapatite-Based Catalysts, *Design and Appl. HA. Catal.*, 19–72.
- Jiang, P., Yu, Y., Wang, K., and Liu, W., 2024, Efficient Electron Transfer in g-C₃N₄/TiO₂ Heterojunction for Enhanced Photocatalytic CO₂ Reduction, *Catalysts*, 14.
- Jiang, S., Zhang, Y., and Gong, J., 2024, Applications of Bismuth-Based Nanoparticles for the Removal of Pollutants in Wastewater: a review, *Environ. Sci. Nano*, 11, 1332–1367.
- Kallawar, G.A., Bhanvase, B.A., and Sathe, B.R., 2023, Sonochemically Prepared Bismuth Doped Titanium Oxide-Reduced Graphene Oxide (Bi@TiO₂-rGO) Nanocomposites for Effective Visible Light Photocatalytic Degradation of Malachite Green, *Diam. Relat. Mater.*, 139, 110423.
- Kamble, R.J., Gaikwad, P. V., Garadkar, K.M., Sabale, S.R., Puri, V.R., and Mahajan, S.S., 2021, Photocatalytic Degradation of Malachite Green Using Hydrothermally Synthesized cobalt-doped TiO₂ nanoparticles, *J. Iran. Chem. Soc.*, 19, 303–312.
- Khattab, R.M., Badr, H.A., and Zawrah, M.F., 2018, Effect of Processing Techniques on Properties of Porous TiO₂ and TiO₂/hydroxyapatite composites, *Ceram. Int.*, 44, 8643–8649.
- Kosachan, N., Jaroenworuluck, A., Jiemsirilers, S., Jinawath, S., and Stevens, R., 2017, Hydroxyapatite Nanoparticles Formed Under a Wet Mechanochemical Method, *J. Biomed. Mater. Res. B Appl. Biomater.*, 105, 679–688.
- Kumar, Prashant, Singh, G., Guan, X., Lee, J., Bahadur, R., Ramadass, K., Kumar, Pawan, Kibria, M.G., Vidyasagar, D., Yi, J., and Vinu, A., 2023, Multifunctional Carbon Nitride Nanoarchitectures for Catalysis, *Chem. Soc. Rev.*, 52, 7602–7664.
- Kumar, S., Alharthi, F.A., El marghany, A., Ahmed, F., Ahmad, N., Chae, K.H., and Kumari, K., 2021, Role of Fe doping on Surface Morphology, Electronic Structure and Magnetic Properties of Fe doped CeO₂ Thin Film, *Ceram. Int.*, 47, 4012–4019.

- Lee, P.W., Ong, S.T., Hung, Y.T., and Lee, S.L., 2013, Photodegradation of Malachite Green by Immobilization of Titanium Dioxide on Glass Plates, *Asian. J. Chem.*, 25, 755–758.
- Lee, Y.C., Choi, M., Yang, J.W., and Shin, H.J., 2015, Removal of Malachite Green (MG) From Aqueous Solutions by Adsorption, Precipitation, and Alkaline Fading Using Talc: Kinetic, Thermodynamic, and Column Feasibility Studies, *Desal. Water Treat.*, 56, 1918–1928.
- Lee, Y.C., Kim, J.Y., and Shin, H.J., 2013, Removal of Malachite Green (MG) From Aqueous Solutions by Adsorption, Precipitation, and Alkaline Fading Using Talc, *Sep. Sci. Technol.*, 48, 1093–1101.
- Leong, C.Y., Teh, H.L., Chen, M.C., and Lee, S.L., 2022, Effect of Synthesis Methods on Properties of Copper Oxide Doped Titanium Dioxide Photocatalyst in Dye Photodegradation of Rhodamine B, *Sci. technol.*, 7, 91–97.
- Li, C., Zhu, D., Cheng, S., Zuo, Y., Wang, Y., Ma, C., and Dong, H., 2022, Recent Research Progress of Bimetallic Phosphides-Based Nanomaterials as Cocatalyst for Photocatalytic Hydrogen Evolution, *Chin. Chem. Lett.*, 33, 1141–1153.
- Li, T., Tian, D., Zhu, Z., Jin, W., Wu, S., and Li, H., 2019, The Gut Microbiota: A New Perspective on the Toxicity of Malachite Green (MG), *Appl. Microbiol. Biotechnol.*, 103, 9723–9737.
- Li, Y., Lv, K., Ho, W., Dong, F., Wu, X., and Xia, Y., 2017, Hybridization of Rutile TiO₂ (rTiO₂) with g-C₃N₄ Quantum Dots (CN QDs): An Efficient Visible-Light-Driven Z-Scheme Hybridized Photocatalyst, *Appl. Catal. B*, 202, 611–619.
- Liang, G., Li, B., and Liu, L., 2026, Co-doped Black Carbon Nitride (BCN)@TiO₂ Heterojunction: A Bifunctional Material for Simultaneous Solar Evaporation and Photothermal Catalytic Wastewater Purification, *Desalination*, 620, 119685.
- Lin, H.Y. and Shih, C.Y., 2016, Efficient One-Pot Microwave-Assisted Hydrothermal Synthesis of M (M = Cr, Ni, Cu, Nb) and Nitrogen co-doped TiO₂ for Hydrogen Production by Photocatalytic Water Splitting, *J. Mol. Catal. A Chem.*, 411, 128–137.
- Liu, S., Wang, C., Song, Y., Yan, B., Ai, B., Pan, K., and Zhang, L., 2023, Fabrication of a Hybrid Phase TiO₂/g-C₃N₄ Heterojunction Composite with Enhanced Adsorption and Photocatalytic Degradation of MB Under Visible Light, *New J. Chem.*, 47, 8170–8181.
- López, R. and Gómez, R., 2011, Band-gap Energy Estimation from Diffuse Reflectance Measurements on Sol–Gel and Commercial TiO₂: a Comparative Study, *J. Sol-Gel Sci. Technol.*, 61, 1–7.

- Madhan, D., Devabharathi, V., Muthusamy, S., and Subramani, T., 2025, CoAl-LDH Incorporated g-C₃N₄ Nanosheets: a Dual-Function Photocatalyst for Hydrogen Production and Dye Degradation, *Ionics*, 31, 7177–7190.
- Makula, P., Pacia, M., and Macyk, W., 2018, How To Correctly Determine the Band Gap Energy of Modified Semiconductor Photocatalysts Based on UV-Vis Spectra, *J. Phys. Chem. Lett*, 9, 6814–6817.
- Mallah, A., Abdelrahman, E.A., Raza, N., Alqarni, L.S., Ismail, M., Modwi, A., Al-Farraj, E.S., Ghoniem, M.G., and Khairy, M., 2024, Boosting of Photocatalytic Degradation of Malachite Green Dye on Facile Synthesized Highly Active Ca@TiO₂@g-C₃N₄ Photocatalyst: Photocatalytic Mechanism and Kinetics, *Inorg. Chem. Commun.*, 170, 113464.
- Mansab, A., Jakhrani, A., Tahira, M.A., Bhatti, A., Zeng, S., Ye, J., Lin, L., Nasra, E., Kurniawati, D., Etika, S.B., Silvia, R., and Rahmatika, A., 2021, Effect of pH and Concentration on Biosorption Malachite Green and Rhodamine B Dyes using Banana Peel (*Musa balbisiana* Colla) as Biosorbent, *J. Phys. Conf. Ser.*, 1788.
- Mhalshekar, K., Pawar, V., Gaydhane, M., and Sontakke, S., 2025, Ni-Co doped TiO₂ Catalyst for Efficient Photocatalytic Degradation of Malachite Green Under UV and Direct Sunlight, *Environ. Sci. Pollut. Res.*, 1–16.
- Mirković, M., Filipović, S., Kalijadis, A., Mašković, P., Mašković, J., Vlahović, B., and Pavlović, V., 2022, Hydroxyapatite/TiO₂ Nanomaterial with Defined Microstructural and Good Antimicrobial Properties, *Antibiotics*, 11.
- Mugundan, S., Rajamannan, B., Viruthagiri, G., Shanmugam, N., Gobi, R., and Praveen, P., 2015, Synthesis and Characterization of Undoped and Cobalt-Doped TiO₂ Nanoparticles via *Sol–gel* Technique, *Appl. Nanosci.*, 5, 449–456.
- Naveenkumar, R., Karthikeyan, B., and Senthilvelan, S., 2024, Facile Green Synthesis of Activated Biocarbon-Cobalt-Doped TiO₂ Nanocomposite for Enhanced Antibacterial Effect and Efficient Photocatalytic for Dye Degradation, *Braz. J. Phys.*, 54, 1–22.
- Nemiwal, M., Zhang, T.C., and Kumar, D., 2021, Recent Progress in g-C₃N₄, TiO₂ and ZnO Based Photocatalysts for Dye Degradation: Strategies to Improve Photocatalytic Activity, *Sci. Total Environ.*, 767, 144896.
- Noviyanti, A.R., Haryono, H., Pandu, R., and Eddy, D.R., 2017, Cangkang Telur Ayam sebagai Sumber Kalsium dalam Pembuatan Hidroksiapatit untuk Aplikasi Graft Tulang, *J. Chim. Nat. Acta*, 5, 107–111.
- Ong, W.J., Tan, L.L., Ng, Y.H., Yong, S.T., and Chai, S.P., 2016, Graphitic Carbon Nitride (g-C₃N₄)-Based Photocatalysts for Artificial Photosynthesis and Environmental Remediation: Are We a Step Closer To Achieving Sustainability, *Chem. Rev.*, 116, 7159–7329.

- Paramitha, Tika, Utami, K., Anggraini, Y.M., and Paramitha, Tifa, 2023, Sintesis dan Karakterisasi Semikonduktor TiO₂ Doping Magnesium dengan Metode Hidrotermal, *Kovalen J. Ris. Kim*, 9, 33–42.
- Parsafard, N. and Shoorgashti, Z., 2024, The Effect of Transition Metal Oxides in the La/TiO₂ Structure for the Photocatalytic Degradation of Malachite Green Under UV and Visible Light Irradiation, *Appl. Water. Sci.*, 14, 220.
- Pei, L., Tsuzuki, T., Dodd, A., & Saunders, M., 2017, Synthesis of Calcium Chlorapatite Nanoparticles and Nanorods via a Mechanically-Induced Solid-State Displacement Reaction and Subsequent Heat Treatment., *Ceramics Inter.*, 43(14), 11410-11414.
- Pelaez, M., Nolan, N.T., Pillai, S.C., Seery, M.K., Falaras, P., Kontos, A.G., Dunlop, P.S.M., Hamilton, J.W.J., Byrne, J.A., O'Shea, K., Entezari, M.H., and Dionysiou, D.D., 2012, A review on the Visible Light Active Titanium Dioxide Photocatalysts for Environmental Applications, *Appl. Catal. B*, 125, 331–349.
- Periyasamy, A.P., 2024, Recent Advances in the Remediation of Textile-Dye-Containing Wastewater: Prioritizing Human Health and Sustainable Wastewater Treatment, *Sustainability (Switz.)*, 16, 495.
- Pratista, E., Alharissa, E.Z., Wahyuni, E.T., and Mudasir, M., 2026, Iron Rust-Derived TiO₂-Fe/Fe₃O₄: A Visible-Light-Activated Photocatalyst for Anionic Surfactant Degradation in Laundry Wastewater, *Water Air Soil Pollut.*, 237.
- Putri, E.M.M., Rachimoellah, M., Rahendaputri, C.S., Adisti, Y., and Zetra, Y., 2018, Photocatalytic Degradation of Malachite Green Using TiO₂ and O₂/UV, *AIP Conf. Proc.*, 2049.
- Qi, K., Wang, Zirun, Xie, X., and Wang, Zhaowei, 2023, Photocatalytic Performance of Pyrochar and Hydrochar in Heterojunction Photocatalyst for Organic Pollutants Degradation: Activity Comparison and Mechanism Insight, *Chem. Eng. J.*, 467, 143424.
- Rabiei, M., Palevicius, A., Monshi, A., Nasiri, S., Vilkauskas, A., and Janusas, G., 2020, Comparing Methods for Calculating Nano Crystal Size of Natural Hydroxyapatite Using X-Ray Diffraction, *Nanomaterials*, 10, 1–21.
- Rafi, B., Arif, M., Hussain, R., Ahmad, R., Shah, A., Siddiqui, N.A., Hussain, A., Toufiq, A.M., Hussain, S., Aziz, U., and ur Rahman, S., 2024, The Structural, Optical, and Antibacterial Properties of Cd/Co co-doped TiO₂, *Inorg. Chem. Commun.*, 161, 112093.
- Rashid, M.M., Tavčer, P.F., and Tomšič, B., 2021, Influence of Titanium Dioxide Nanoparticles on Human Health and The Environment, *Nanomaterials*, 11, 456–458.
- Sadek, O., Touhtouh, S., Rkhis, M., Anoua, R., El Jouad, M., Belhora, F., and Hajjaji, A., 2022, Synthesis by Sol-Gel Method and Characterization of Nano-TiO₂ powders, *Mater. Today Proc.*, 66, 456–458.

- Safeen, A., Safeen, K., Ullah, R., Zulfqar, N., Shah, W.H., Zaman, Q., Althubeiti, K., Al Otaibi, S., Rahman, N., Iqbal, S., Khan, Alamzeb, Khan, Aurangzeb, and Khan, R., 2022, Enhancing the Physical Properties and Photocatalytic Activity of TiO₂ Nanoparticles Via Cobalt Doping, *RSC Adv.*, 12, 15767.
- Samsami, S., Mohamadi, M., Sarrafzadeh, M.H., Rene, E.R., and Firoozbahr, M., 2020, Recent Advances in the Treatment of Dye-Containing Wastewater from Textile Industries: Overview and perspectives, *Process Saf. Environ. Prot.*, 143, 138–163.
- Sharma, R., Almasi, M., Nehra, S.P., Rao, V.S., Panchal, P., Paul, D.R., Jain, I.P., and Sharma, A., 2022, Photocatalytic Hydrogen Production Using Graphitic Carbon Nitride (GCN): A precise review, *Renew. Sustain. Energy Rev.*, 168, 112776.
- Singh, N., Chakraborty, R., and Gupta, R.K., 2018, Mutton Bone Derived Hydroxyapatite Supported TiO₂ Nanoparticles for Sustainable Photocatalytic Applications, *J. Environ. Chem. Eng.*, 6, 459–467.
- Slimani, Y., Almessiere, M.A., Mohamed, M.J.S., Hannachi, E., Caliskan, S., Akhtar, S., Baykal, A., and Gondal, M.A., 2023, Synthesis of Ce and Sm Co-Doped TiO₂ Nanoparticles with Enhanced Photocatalytic Activity for Rhodamine B Dye Degradation, *Catalysts* 2023, 13, 668.
- Solonenko, A.P., Shevchenko, A.E., Rozdestvensky, A.A., and Dzyuba, G.G., 2022, Investigation of the Process and Products of Calcination of Composite Granules Based on Hydroxyapatite, Wollastonite and Gelatine, *J. Phys. Conf. Ser.*, 2182.
- Sukarta, I.N. and Sastrawidana, I.D.K., 2024, Synthesis and Characterization of Hydroxyapatite/Titania Composite and Its Application on Photocatalytic Degradation of Remazol Red B Textile Dye Under UV Irradiation, *Ecol. Eng. Environ. Technol.*, 25, 178–189.
- Taha, S., Begum, S., Narwade, V.N., Halge, D.I., Dadge, J.W., Mahabole, M.P., Khairnar, R.S., and Bogle, K.A., 2020, Development of Alcohol Sensor Using TiO₂-Hydroxyapatite Nano-Composites, *Mater. Chem. Phys.*, 240, 122228.
- Tewari, K., Singhal, G., and Arya, R.K., 2018, Adsorption removal of malachite green dye from aqueous solution, *Rev. Chem. Eng.*, 34, 427–453.
- Teymori, M., Khorsandi, H., Aghapour, A.A., Jafari, S.J., and Maleki, R., 2020, Electro-Fenton Method for the Removal of Malachite Green: Effect of Operational Parameters, *Springer*, 10.
- Toubal, B., Bensaha, R., and Yakuphanoglu, F., 2017, The Influence of Copper-Cobalt Co-Doping on Optical and Electrical Properties of Nanostructures TiO₂ Thin Films Prepared by Sol-Gel, *J. Sol-Gel Sci. Technol.*, 478–489.
- Tripathi, A., Raj, R., Sathe, S.M., Surampalli, R.Y., and Ghangrekar, M.M., 2023, Reviewing the Advancement of Calcium Hydroxyapatite-Mediated Treatment

for the Remediation of Wastewater: Applications, Degradation Kinetics and Future Perspective, *Clean Technol. Envir.*, 26, 3697–3714.

- Viruthagiri, G. and Kannan, P., 2019, Visible Light Mediated Photocatalytic Activity of Cobalt Doped Bi₂O₃ nanoparticles, *J. Mater. Res. Technol.*, 8, 127–133.
- Wang, Y., Fiaz, M., Kim, J., Carl, N., and Kim, Y.K., 2023, Kinetic Evidence for Type-II Heterojunction and Z-Scheme Interactions in g-C₃N₄/TiO₂ Nanotube-Based Photocatalysts in Photocatalytic Hydrogen Evolution, *ACS Appl. Energy Mater.*, 6, 5197–5206.
- Wang, Yangang, Xu, Y., Wang, Yunzhu, Qin, H., Li, X., Zuo, Y., Kang, S., and Cui, L., 2016, Synthesis of Mo-doped Graphitic Carbon Nitride Catalysts and Their Photocatalytic Activity in The Reduction of CO₂ with H₂O, *Catal. Commun.*, 74, 75–79.
- Woo, S., Jung, H., and Yoon, Y., 2023, Real-Time UV/VIS Spectroscopy to Observe Photocatalytic Degradation, *Catalysts*, 13.
- Xiao, G., Xu, S., Li, P., and Su, H., 2018, Visible-Light-Driven Activity and Synergistic Mechanism of TiO₂@g-C₃N₄ Heterostructured Photocatalysts Fabricated Through a Facile and Green Procedure for Various Toxic Pollutants Removal, *Nanotech.*, 29, 315601.
- Xu, Y., Liang, Y., Yuai, Z., Long, H., He, Q., Guo, K., Zhang, Y., Chen, D., Xu, X., and Hu, H., 2022, Co-doping g-C₃N₄ with P and Mo for Efficient Photocatalytic Tetracycline Degradation Under Visible Light, *Ceram. Int.*, 48, 24677–24686.
- Xu, Z., Li, C., Wang, N., Ding, Y., Yan, Z., and Li, Q., 2024, Functional Graphitic Carbon Nitride/Hydroxyapatite Heterojunction for Robust Formaldehyde Removal At Ambient Temperature, *J. Environ. Chem. Eng.*, 12, 111679.
- Xu, Z., Zada, N., Habib, F., Ullah, Hamid, Hussain, Kashif, Ullah, N., Bibi, Marwa, Bibi, Maria, Ghani, H., Khan, S., Hussain, Khitab, Cai, X., and Ullah, Habib, 2023, Enhanced Photocatalytic Degradation of Malachite Green Dye Using Silver–Manganese Oxide Nanoparticles, *Molecules*, 28, 6241.
- Yang, D., Xia, Y., Xiao, T., Xu, Z., Lei, Y., Jiao, Y., Zhu, X., and Feng, W., 2025, Constructing Ag–TiO₂-g-C₃N₄ S-scheme Heterojunctions for Photocatalytic Degradation of Malachite Green, *Opt. Mater. (Amst.)*, 159, 116652.
- Yang, J., Yang, X., Lin, Y., Ng, T.B., Lin, J., and Ye, X., 2015, Laccase-Catalyzed Decolorization of Malachite Green: Performance Optimization and Degradation Mechanism, *PLoS One*, 10.
- Yao, D., Xie, X., Liang, X., Lu, S., and Lai, H., 2024, Photocatalytic Degradation of Malachite Green by Titanium Dioxide/Covalent Organic Framework Composite: Characterization, Performance and Mechanism, *Chemistry Open*, 13, 209.

- Yao, J., Zhang, Y., Wang, Y., Chen, M., Huang, Y., Cao, J., Ho, W., and Lee, S.C., 2017, Enhanced Photocatalytic Removal of NO Over Titania/Hydroxyapatite (TiO₂/HAp) Composites with Improved Adsorption and Charge Mobility Ability, *RSC Adv.*, 7, 24683–24689.
- Yongheng, D., Huayu, Y., Jiang, L., Qi, S., Qianwen, Y., and Yuntao, Z., 2023, Direct Z-scheme P–TiO₂/g-C₃N₄ Heterojunction for the Photocatalytic Degradation of Sulfa Antibiotics, *RSC Adv.*, 13, 5957–5969.
- Yu, J., Low, J., Xiao, W., Zhou, P., and Jaroniec, M., 2014, Enhanced Photocatalytic CO₂-Reduction Activity of Anatase TiO₂ by Coexposed {001} and {101} Facets, *J. Am. Chem. Soc.*, 136, 8839–8842.
- Zein, D.A., Mahatmanti, F.W., Wahyuni, S., and Widiarti, N., 2025, Synthesis of TiO₂/Hydroxyapatite Composite Based on Chicken Egg Shells for Methylene Blue Photodegradation, *J. Kim. Sains Apl.*, 28, 31–38.
- Zeitoun, Z. and Selem, N.Y., 2023, A Comprehensive Review on Textile Wastewater Treatment by Coupling TiO₂ with PVDF Membrane, *Bull. Natl. Res. Cent*, 47, 1–16.
- Zhang, P., Yu, Y., Wang, E., Wang, J., Yao, J., and Cao, Y., 2014, Structure of Nitrogen and Zirconium Co-Doped Titania with Enhanced Visible-Light Photocatalytic Activity, *ACS Appl. Mater. Interfaces*, 6, 4622–4629.
- Zhang, R., Li, P., Wang, F., Ye, L., Gaur, A., Huang, Z., Zhao, Z., Bai, Y., and Zhou, Y., 2019, Atomically Dispersed Mo Atoms on Amorphous g-C₃N₄ Promotes Visible-Light Absorption and Charge Carriers Transfer, *Appl. Catal. B*, 250, 273–279.
- Zhao, M.H., Bai, X., Fan, X., Li, Y., Liu, Y., Huang, J.L., Mo, W.L., Wei, X.Y., and Saikia, B.K., 2023, Removal Behaviors of Phenol from Aqueous Solution Using Industrial Coal Sludge-Derived Porous Carbon Sorbent, *J. Mol. Liq.*, 385, 122427.
- Zhong, R., Zhang, Z., Luo, S., Zhang, Z.C., Huang, L., and Gu, M., 2019, Comparison of TiO₂ and g-C₃N₄ 2D/2D Nanocomposites from Three Synthesis Protocols for Visible-Light Induced Hydrogen Evolution, *Catal. Sci. Technol.*, 9, 75–85.
- Zhou, D. and Qiu, C., 2019, Study on the Effect of Co Doping Concentration on Optical Properties of g-C₃N₄, *Chem. Phys. Lett.*, 728, 70–73.
- Zhou, L., Wang, L., Lei, J., Liu, Y., and Zhang, J., 2017, Fabrication of TiO₂/Co-g-C₃N₄ Heterojunction Catalyst and its Photocatalytic Performance, *Catal. Commun.*, 89, 125–128.
- Zhou, L., Wang, L., Zhang, J., Lei, J., and Liu, Y., 2016, The Preparation, and Applications of g-C₃N₄/TiO₂ Heterojunction Catalysts—a review, *Res. Chem. Intermed.*, 43, 2081–2101.

Zhou, X., Zhang, J., Pan, Z., and Li, D., 2019, Review of Methods for the Detection and Determination of Malachite Green and Leuco-Malachite Green in Aquaculture, *Crit. Rev. Anal. Chem.*, 49, 1–20.