References, Publications and Conferences

References

[1] A. Hayat, Z. Ajmal, A.Y.A. Alzahrani, S. Ben Moussa, M. Khered, N. Almuqati, A. Alshammari, Y. Al-Hadeethi, H. Ali, Y. Orooji, The photocatalytic H_2O_2 production: Design strategies, Photocatalyst advancements, environmental applications and future prospects, Coord. Chem. Rev. 522 (2025) 216218. https://doi.org/10.1016/j.ccr.2024.216218.

[2] D. Zheng, Y. Wu, X. Yang, S. Wang, Y. Fang, Developing Polymeric Carbon Nitrides for Photocatalytic H_2O_2 Production, ChemSusChem 202400528 (2024). https://doi.org/10.1002/cssc.202400528.

[3] S. Luo, W. Pan, Y. Wang, X. Zhao, K. Wah Leong, D.Y.C. Leung, High-performance H_2O_2 paper fuel cell boosted via electrolyte toning and radical generation, Appl. Energy 323 (2022) 119610. https://doi.org/10.1016/j.apenergy.2022.119610.

[4] D. Sachan, N. Singh, U. Kumar, J. Kuntail, I. Sinha, R. Singh, Design of medium entropy oxide for photo-Fenton catalytic degradation of tetracycline, Mol. Catal. 582 (2025). https://doi.org/10.1016/j.mcat.2025.115187.

[5] A. Shrivastava, U. Kumar, I. Sinha, Photo-Fenton degradation on Mo-doped $NiFe_2O_4$ photocatalyst, Dalt. Trans. (2025). https://doi.org/10.1039/d4dt03359k.

[6] M. Yadav, U. Kumar, A. Kumar De, I. Sinha, Neutral pH Fenton and photo-Fenton activity of Mo-doped iron-pyrite particles, Phys. Chem. Chem. Phys. 26 (2024) 22442–22453. https://doi.org/10.1039/d4cp00793j.

[7] P. V. Nidheesh, R. Gandhimathi, Trends in electro-Fenton process for water and wastewater treatment: An overview, Desalination 299 (2012) 1–15. https://doi.org/10.1016/j.desal.2012.05.011.

[8] S. Wu, X. Quan, Design Principles and Strategies of Photocatalytic H_2O_2 Production from O_2 Reduction , ACS ES&T Eng. 2 (2022) 1068–1079. https://doi.org/10.1021/acsestengg.1c00456.

[9] U. Kumar, A. Shrivastava, I. Sinha, In situ use of photocatalytically produced H_2O_2 for Fenton degradation of organic pollutants, Catal. Sci. Technol. (2024). https://doi.org/10.1039/d3cy01769a.

[10] J.M. Campos-Martin, G. Blanco-Brieva, J.L.G. Fierro, Hydrogen peroxide synthesis: An outlook beyond the anthraquinone process, Angew. Chemie - Int. Ed. 45 (2006) 6962–6984. https://doi.org/10.1002/anie.200503779.

[11] L. Wang, J. Zhang, Y. Zhang, H. Yu, Y. Qu, J. Yu, Inorganic Metal-Oxide Photocatalyst for H_2O_2 Production, Small 18 (2022). https://doi.org/10.1002/smll.202104561.

[12] X. Xu, Y. Sui, W. Chen, W. Huang, X. Li, Y. Li, D. Liu, S. Gao, W. Wu, C. Pan, H. Zhong, H.R. Wen, M. Wen, The photocatalytic H_2O_2 production by metal-free photocatalysts under visible-light irradiation, Appl. Catal. B Environ. 341 (2024) 123271. https://doi.org/10.1016/j.apcatb.2023.123271.

[13] P. Cieśla, P. Kocot, P. Mytych, Z. Stasicka, Homogeneous photocatalysis by transition metal complexes in the environment, J. Mol. Catal. A Chem. 224 (2004) 17–33. https://doi.org/10.1016/j.molcata.2004.08.043.

[14] S. Khan, T. Noor, N. Iqbal, L. Yaqoob, Photocatalytic Dye Degradation from Textile Wastewater: A Review, ACS Omega 9 (2024) 21751–21767. https://doi.org/10.1021/acsomega.4c00887.

[15] H.B. Yildiz, B.B. Carbas, S. Sonmezoglu, M. Karaman, L. Toppare, A

photoelectrochemical device for water splitting using oligoaniline-crosslinked $[Ru(bpy)_2(bpyCONHArNH_2)]^{+2}$ dye/IrO_2 nanoparticle array on TiO_2 photonic crystal modified electrode, Int. J. Hydrogen Energy 41 (2016) 14615–14629. https://doi.org/10.1016/j.ijhydene.2016.04.249.

[16] Y. Yang, Z. Zeng, G. Zeng, D. Huang, R. Xiao, C. Zhang, C. Zhou, W. Xiong, W. Wang, M. Cheng, W. Xue, Applied Catalysis B : Environmental Ti_3C_2 Mxene / porous g-C_3N_4 interfacial Schottky junction for boosting spatial charge separation in photocatalytic H $_2O_2$ production, Appl. Catal. B Environ. 258 (2019) 117956. https://doi.org/10.1016/j.apcatb.2019.117956.

[17] D. Kumar, N.S. Anuraag, C. Mohapatra, U. Kumar, D. Sarkar, M. Vasundhara, I. Sinha, C. Upadhyay, N.K. Prasad, r-GO coated magnetic high entropy alloy/oxide nanocomposites as highly efficient Fenton and photo-Fenton catalysts, Ceram. Int. 50 (2024) 12146–12157. https://doi.org/10.1016/j.ceramint.2024.01.118.

[18] K. Li, B. Peng, T. Peng, Recent Advances in Heterogeneous Photocatalytic CO_2 Conversion to Solar Fuels, ACS Catal. 6 (2016) 7485–7527. https://doi.org/10.1021/acscatal.6b02089.

[19] K. Shimura, H. Yoshida, Heterogeneous photocatalytic hydrogen production from water and biomass derivatives, Energy Environ. Sci. 4 (2011) 2467–2481. https://doi.org/10.1039/c1ee01120k.

[20] S. Liu, S. Wang, Y. Jiang, Z. Zhao, G. Jiang, Z. Sun, Synthesis of Fe_2O_3 loaded porous g-C_3N_4 photocatalyst for photocatalytic reduction of dinitrogen to ammonia, Chem. Eng. J. 373 (2019) 572–579. https://doi.org/10.1016/j.cej.2019.05.021.

[21] Murugan Arunachalapandi, Selvaraj Mohana Roopan, Environment Friendly g-C_3N_4-Based Catalysts and Their Recent Strategy in Organic Transformations, High

Energy Chem. 56 (2022) 73–90. https://doi.org/10.1134/S0018143922020102.

[22] H. Wang, L. Zhang, Z. Chen, J. Hu, S. Li, Z. Wang, J. Liu, X. Wang, Semiconductor heterojunction photocatalysts: Design, construction, and photocatalytic performances, Chem. Soc. Rev. 43 (2014) 5234–5244. https://doi.org/10.1039/c4cs00126e.

[23] H. Yang, A short review on heterojunction photocatalysts: Carrier transfer behavior and photocatalytic mechanisms, Mater. Res. Bull. 142 (2021) 111406. https://doi.org/10.1016/j.materresbull.2021.111406.

[24] A. Shabbir, S. Sardar, A. Mumtaz, Mechanistic investigations of emerging type-II, Z-scheme and S-scheme heterojunctions for photocatalytic applications – A review, J. Alloys Compd. 1003 (2024) 175683. https://doi.org/10.1016/j.jallcom.2024.175683.

[25] M.J. Molaei, Recent advances in hydrogen production through photocatalytic water splitting: A review, Fuel 365 (2024) 131159. https://doi.org/10.1016/j.fuel.2024.131159.

[26] H. Li, Y. Zhou, W. Tu, J. Ye, Z. Zou, State-of-the-art progress in diverse heterostructured photocatalysts toward promoting photocatalytic performance, Adv. Funct. Mater. 25 (2015) 998–1013. https://doi.org/10.1002/adfm.201401636.

[27] J. Low, J. Yu, M. Jaroniec, S. Wageh, A.A. Al-Ghamdi, Heterojunction Photocatalysts, Adv. Mater. 29 (2017). https://doi.org/10.1002/adma.201601694.

[28] W. He, L. Liu, T. Ma, H. Han, J. Zhu, Y. Liu, Z. Fang, Z. Yang, K. Guo, Controllable morphology $CoFe_2O_4$/g-C_3N_4 p-n heterojunction photocatalysts with built-in electric field enhance photocatalytic performance, Appl. Catal. B Environ. 306 (2022)

121107. https://doi.org/10.1016/j.apcatb.2022.121107.

[29] A. Shrivastava, U. Kumar, I. Sinha, Design and Development of the AgI/$NiFe_2O_4$ Photo-Fenton Photocatalyst, Ind. Eng. Chem. Res. 63 (2024) 15721–15734. https://doi.org/10.1021/acs.iecr.4c01386.

[30] J. Low, C. Jiang, B. Cheng, S. Wageh, A.A. Al-Ghamdi, J. Yu, A Review of Direct Z-Scheme Photocatalysts, Small Methods 1 (2017) 1–21. https://doi.org/10.1002/smtd.201700080.

[31] H. Li, W. Tu, Y. Zhou, Z. Zou, Z-Scheme Photocatalytic Systems for Promoting Photocatalytic Performance: Recent Progress and Future Challenges, Adv. Sci. 3 (2016). https://doi.org/10.1002/advs.201500389.

[32] J. Yu, S. Wang, J. Low, W. Xiao, Enhanced photocatalytic performance of direct Z-scheme g-C_3N_4-TiO_2 photocatalysts for the decomposition of formaldehyde in air, Phys. Chem. Chem. Phys. 15 (2013) 16883–16890. https://doi.org/10.1039/c3cp53131g.

[33] H. Tada, T. Mitsui, T. Kiyonaga, T. Akita, K. Tanaka, All-solid-state Z-scheme in CdS-Au-TiO_2 three-component nanojunction system, Nat. Mater. 5 (2006) 782–786. https://doi.org/10.1038/nmat1734.

[34] M. Ijaz, Plasmonic hot electrons: Potential candidates for improved photocatalytic hydrogen production, Int. J. Hydrogen Energy 48 (2023) 9609–9619. https://doi.org/10.1016/j.ijhydene.2022.11.251.

[35] X. Meng, P. Zong, L. Wang, F. Yang, W. Hou, S. Zhang, B. Li, Z. Guo, S. Liu, G. Zuo, Y. Du, T. Wang, V.A.L. Roy, Au-nanoparticle-supported ZnO as highly efficient photocatalyst for H_2O_2 production, Catal. Commun. 134 (2020).

https://doi.org/10.1016/j.catcom.2019.105860.

[36] H. Song, L. Wei, C. Chen, C. Wen, F. Han, Photocatalytic production of H_2O_2 and its in situ utilization over atomic-scale Au modified MoS_2 nanosheets, J. Catal. 376 (2019) 198–208. https://doi.org/10.1016/j.jcat.2019.06.015.

[37] Y. Fu, T. Huang, B. Jia, J. Zhu, X. Wang, Reduction of nitrophenols to aminophenols under concerted catalysis by Au/g-C_3N_4 contact system, Appl. Catal. B Environ. 202 (2017) 430–437. https://doi.org/10.1016/j.apcatb.2016.09.051.

[38] A. Zhang, J. Zhang, Synthesis and characterization of Ag/$BiVO_4$ composite photocatalyst, Appl. Surf. Sci. 256 (2010) 3224–3227. https://doi.org/10.1016/j.apsusc.2009.12.009.

[39] W. Xie, Z. Huang, R. Wang, C. Wen, Y. Zhou, Metallic Pt and PtO_x dual-cocatalyst-loaded WO_3 for photocatalytic production of peroxydisulfate and hydrogen peroxide, J. Mater. Sci. 55 (2020) 11829–11840. https://doi.org/10.1007/s10853-020-04837-7.

[40] W. Qi, H. Shi, P. Wang, F. Chen, X. Wang, H. Yu, Synergistic Effect of AuPd and NiOOH Cocatalysts Promoting Photoctalytic H_2O_2 Production of $BiVO_4$ Photocatalyst, J. Wuhan Univ. Technol. Mater. Sci. Ed. 40 (2025) 344–352. https://doi.org/10.1007/s11595-025-3070-3.

[41] D. Tsukamoto, A. Shiro, Y. Shiraishi, Y. Sugano, S. Ichikawa, S. Tanaka, T. Hirai, Photocatalytic H_2O_2 production from ethanol/O_2 system using TiO_2 loaded with Au-Ag bimetallic alloy nanoparticles, ACS Catal. 2 (2012) 599–603. https://doi.org/10.1021/cs2006873.

[42] S. Hu, X. Sun, Y. Zhao, W. Li, H. Wang, G. Wu, The effective photocatalytic water splitting to simultaneously produce H_2 and H_2O_2 over Pt loaded K-g-C_3N_4 catalyst,

J. Taiwan Inst. Chem. Eng. 107 (2020) 129–138. https://doi.org/10.1016/j.jtice.2019.12.007.

[43] W. Zhang, C. Hu, W. Zhai, Z. Wang, Y. Sun, F. Chi, S. Ran, X. Liu, Y. Lv, Novel Ag_3PO_4/CeO_2 p-n hierarchical heterojunction with enhanced photocatalytic performance, Mater. Res. 19 (2016) 673–679. https://doi.org/10.1590/1980-5373-MR-2016-0009.

[44] S. Li, K. Xu, S. Hu, W. Jiang, J. Zhang, J. Liu, L. Zhang, Synthesis of flower-like Ag_2 O/BiOCOOH p-n heterojunction with enhanced visible light photocatalytic activity, Appl. Surf. Sci. 397 (2017) 95–103. https://doi.org/10.1016/j.apsusc.2016.11.081.

[45] H. Huang, F. Li, H. Wang, X. Zheng, The size controlled synthesis of Cu_2S/P25 hetero junction solar-energy-materials and their applications in photocatalytic degradation of dyes, RSC Adv. 7 (2017) 50056–50063. https://doi.org/10.1039/c7ra07253h.

[46] J. Zhang, Z. Zhu, X. Feng, Construction of two-dimensional MoS_2/CdS p-n nanohybrids for highly efficient photocatalytic hydrogen evolution, Chem. - A Eur. J. 20 (2014) 10632–10635. https://doi.org/10.1002/chem.201402522.

[47] X. San, M. Li, D. Liu, G. Wang, Y. Shen, D. Meng, F. Meng, A facile one-step hydrothermal synthesis of NiO/ZnO heterojunction microflowers for the enhanced formaldehyde sensing properties, J. Alloys Compd. 739 (2018) 260–269. https://doi.org/10.1016/j.jallcom.2017.12.168.

[48] U. Kumar, A. Shrivastava, A.K. De, M.R. Pai Bc, I. Sinha, Fenton reaction by H_2O_2 produced on a magnetically recyclable Ag/$CuWO_4$/$NiFe_2O_4$ photocatalyst, Catal. Sci. Technol. 13 (2023) 2432–2446. https://doi.org/10.1039/D3CY00102D.

[49] U. Kumar, J. Kuntail, A. Kumar, R. Prakash, M.R. Pai, I. Sinha, In-situ H_2O_2 production for tetracycline degradation on Ag/s-(Co_3O_4/$NiFe_2O_4$) visible light magnetically recyclable photocatalyst, Appl. Surf. Sci. 589 (2022). https://doi.org/10.1016/j.apsusc.2022.153013.

[50] Z. Chen, D. Yao, C. Chu, S. Mao, Photocatalytic H_2O_2 production Systems: Design strategies and environmental applications, Chem. Eng. J. 451 (2023). https://doi.org/10.1016/j.cej.2022.138489.

[51] Y. Wu, H. Che, B. Liu, Y. Ao, Promising Materials for Photocatalysis-Self-Fenton System: Properties, Modifications, and Applications, Small Struct. 4 (2023). https://doi.org/10.1002/sstr.202200371.

[52] U. Kumar, I. Sinha, Visible light photo-Fenton degradation of p-nitrophenol on Ag/Fe_3O_4/WO_3 nanocomposites: Experimental and molecular dynamics investigations, J. Environ. Chem. Eng. 11 (2023). https://doi.org/10.1016/j.jece.2023.111280.

[53] Y. Chen, X. Yan, H. Lin, C. Wang, J. Xu, Enhanced Fenton-like degradation of Rhodamine B and Congo red by benzene and K+ co-doped carbon nitride with in situ-generated H_2O_2, J. Taiwan Inst. Chem. Eng. 131 (2022). https://doi.org/10.1016/j.jtice.2021.104179.

[54] J. Zhang, G. Zhang, Q. Ji, H. Lan, J. Qu, H. Liu, Carbon nanodot-modified FeOCl for photo-assisted Fenton reaction featuring synergistic in-situ H_2O_2 production and activation, Appl. Catal. B Environ. 266 (2020). https://doi.org/10.1016/j.apcatb.2020.118665.

[55] M. Yoon, Y. Oh, S. Hong, J.S. Lee, R. Boppella, S.H. Kim, F. Marques Mota, S.O. Kim, D.H. Kim, Synergistically enhanced photocatalytic activity of graphitic carbon

nitride and WO_3 nanohybrids mediated by photo-Fenton reaction and H_2O_2, Appl. Catal. B Environ. 206 (2017) 263–270. https://doi.org/10.1016/J.APCATB.2017.01.038.

[56] Y. Wu, J. Chen, H. Che, X. Gao, Y. Ao, P. Wang, Boosting 2e− . in garland carbon nitride with carbon defects for high-efficient photocatalysis-self-Fenton degradation of 2,4-dichlorophenol, Appl. Catal. B Environ. 307 (2022). https://doi.org/10.1016/j.apcatb.2022.121185.

[57] L. Chen, X.-X. He, Z.-H. Gong, J.-L. Li, Y. Liao, X.-T. Li, J. Ma, Significantly improved photocatalysis-self-Fenton degradation performance over g-C_3N_4 via promoting Fe(III)/Fe(II) cycle, (1963). https://doi.org/10.1007/s12598.

[58] X. Xu, Y. Sui, W. Chen, W. Huang, X. Li, Y. Li, D. Liu, S. Gao, W. Wu, C. Pan, H. Zhong, H.R. Wen, M. Wen, The photocatalytic H_2O_2 production by metal-free photocatalysts under visible-light irradiation, Appl. Catal. B Environ. 341 (2024) 123271. https://doi.org/10.1016/j.apcatb.2023.123271.

[59] S. Pal, S. Kumar, A. Verma, A. Kumar, T. Ludwig, M. Frank, S. Mathur, R. Prakash, I. Sinha, Development of magnetically recyclable visible light photocatalysts for hydrogen peroxide production, Mater. Sci. Semicond. Process. 112 (2020) 105024. https://doi.org/10.1016/j.mssp.2020.105024.

[60] W. Shi, W. Sun, Y. Liu, K. Zhang, H. Sun, X. Lin, Y. Hong, F. Guo, A self-sufficient photo-Fenton system with coupling in-situ production H_2O_2 of ultrathin porous g-C_3N_4 nanosheets and amorphous FeOOH quantum dots, J. Hazard. Mater. 436 (2022). https://doi.org/10.1016/j.jhazmat.2022.129141.

[61] Y. Xu, ad Feiyue Ge, M. Xie, bd Shuquan Huang, J. Qian, H. Wang, M. He, H. Xu, H. Li, Fabrication of magnetic $BaFe_{12}O_{19}/Ag_3PO_4$ composites with an in situ photo-

Fenton-like reaction for enhancing reactive oxygen species under visible light irradiation †, Cite This Catal. Sci. Technol 9 (2019) 2563. https://doi.org/10.1039/c8cy02449a.

[62] Z. Jiang, L. Wang, J. Lei, Y. Liu, J. Zhang, Photo-Fenton degradation of phenol by CdS/rGO/Fe^{2+} at natural pH with in situ-generated H_2O_2, Appl. Catal. B Environ. 241 (2019) 367–374. https://doi.org/10.1016/j.apcatb.2018.09.049.

[63] Q. Liu, L. Zhou, L. Liu, J. Li, S. Wang, H. Znad, S. Liu, Magnetic ZnO@Fe_3O_4 composite for self-generated H_2O_2 toward photo-Fenton-like oxidation of nitrophenol, Compos. Part B Eng. 200 (2020). https://doi.org/10.1016/j.compositesb.2020.108345.

[64] S. Huang, Y. Xu, T. Zhou, M. Xie, Y. Ma, Q. Liu, L. Jing, H. Xu, H. Li, Constructing magnetic catalysts with in-situ solid-liquid interfacial photo-Fenton-like reaction over Ag_3PO_4@$NiFe_2O_4$ composites, Appl. Catal. B Environ. 225 (2018) 40–50. https://doi.org/10.1016/j.apcatb.2017.11.045.

[65] S. Ma, Y. Yang, J. Li, Y. Mei, Y. Zhu, J. Wu, L. Liu, T. Yao, Q. Yang, Z-scheme $Fe_2(MoO_4)_3$/Ag/Ag_3PO_4 heterojunction with enhanced degradation rate by in-situ generated H_2O_2: Turning waste (H_2O_2) into wealth (•OH), J. Colloid Interface Sci. 606 (2022) 1800–1810. https://doi.org/10.1016/j.jcis.2021.08.134.

[66] Z. Yang, J. Wang, CdS Nanoparticles Supported on $Ti_3C_2T_x$ MXene for the Efficient Photocatalytic Production of H_2O_2: Implications for the Photocatalytic Degradation of Emerging Contaminants, ACS Appl. Nano Mater. 6 (2023) 558–572. https://doi.org/10.1021/acsanm.2c04681.

[67] Q. Liang, X. Liu, B. Shao, L. Tang, Z. Liu, W. Zhang, S. Gong, Y. Liu, Q. He, T. Wu, Y. Pan, S. Tong, Construction of fish-scale tubular carbon nitride-based

heterojunction with boosting charge separation in photocatalytic tetracycline degradation and H_2O_2 production, Chem. Eng. J. 426 (2021) 130831. https://doi.org/10.1016/j.cej.2021.130831.

[68] J. Hu, T. Yang, J. Chen, X. Yang, J. Qu, Y. Cai, Efficient solar-driven H_2O_2 synthesis in-situ and sustainable activation to purify water via cascade reaction on $ZnIn_2S_4$-based heterojunction, Chem. Eng. J. 430 (2022). https://doi.org/10.1016/j.cej.2021.133039.

[69] C. Du, W. Feng, S. Nie, J. Zhang, Y. Liang, X. Han, Y. Wu, J. Feng, S. Dong, H. Liu, J. Sun, Harnessing efficient in-situ H_2O_2 production via a KPF_6/BiOBr photocatalyst for the degradation of polyethylene, Sep. Purif. Technol. 279 (2021). https://doi.org/10.1016/j.seppur.2021.119734.

[70] Y. Yang, H. Yu, M. Wu, T. Zhao, Y. Guan, D. Yang, Y. Zhu, Y. Zhang, S. Ma, J. Wu, L. Liu, T. Yao, Dual H_2O_2 production paths over chemically etched MoS_2/FeS_2 heterojunction: Maximizing self-sufficient heterogeneous Fenton reaction rate under the neutral condition, Appl. Catal. B Environ. 325 (2023) 122307. https://doi.org/10.1016/j.apcatb.2022.122307.

[71] T. Li, Z. Wang, Z. Zhang, K. Feng, J. Liang, D. Wang, L. Zhou, Organic carbon modified Fe_3O_4/schwertmannite for heterogeneous Fenton reaction featuring synergistic in-situ H_2O_2 generation and activation, Sep. Purif. Technol. 276 (2021). https://doi.org/10.1016/j.seppur.2021.119344.

[72] Y. Xie, C. Liu, D. Li, Y. Liu, In situ-generated H_2O_2 with NCQDs/MIL-101(Fe) by activating O_2: A dual effect of photocatalysis and photo-Fenton for efficient removal of tetracyline at natural pH, Appl. Surf. Sci. 592 (2022) 153312. https://doi.org/10.1016/J.APSUSC.2022.153312.

[73] C.F. Holder, R.E. Schaak, Tutorial on Powder X-ray Diffraction for Characterizing Nanoscale Materials, ACS Nano 13 (2019) 7359–7365. https://doi.org/10.1021/acsnano.9b05157.

[74] W. Zhou, R. Apkarian, Z.L. Wang, D. Joy, Fundamentals of scanning electron microscopy (SEM), Scanning Microsc. Nanotechnol. Tech. Appl. (2007) 1–40. https://doi.org/10.1007/978-0-387-39620-0_1.

[75] S. Mourdikoudis, R.M. Pallares, N.T.K. Thanh, Characterization techniques for nanoparticles: Comparison and complementarity upon studying nanoparticle properties, Nanoscale 10 (2018) 12871–12934. https://doi.org/10.1039/c8nr02278j.

[76] G. Greczynski, R.T. Haasch, N. Hellgren, E. Lewin, L. Hultman, X-ray photoelectron spectroscopy of thin films, Nat. Rev. Methods Prim. 3 (2023) 1–19. https://doi.org/10.1038/s43586-023-00225-y.

[77] P. Makuła, M. Pacia, W. Macyk, How To Correctly Determine the Band Gap Energy of Modified Semiconductor Photocatalysts Based on UV-Vis Spectra, J. Phys. Chem. Lett. 9 (2018) 6814–6817. https://doi.org/10.1021/acs.jpclett.8b02892.

[78] F.S. Rocha, A.J. Gomes, C.N. Lunardi, S. Kaliaguine, G.S. Patience, Experimental methods in chemical engineering: Ultraviolet visible spectroscopy—UV-Vis, Can. J. Chem. Eng. 96 (2018) 2512–2517. https://doi.org/10.1002/cjce.23344.

[79] V. Lopez-Dominguez, A. Quesada, J.C. Guzmán-Mínguez, L. Moreno, M. Lere, J. Spottorno, F. Giacomone, J.F. Fernández, A. Hernando, M.A. García, A simple vibrating sample magnetometer for macroscopic samples, Rev. Sci. Instrum. 89 (2018). https://doi.org/10.1063/1.5017708.

[80] H. Gu, C. Wang, S. Gong, Y. Mei, H. Li, W. Ma, Investigation on contact angle

measurement methods and wettability transition of porous surfaces, Surf. Coatings Technol. 292 (2016) 72–77. https://doi.org/10.1016/j.surfcoat.2016.03.014.

[81] J. Ma, L. Xu, Z. Yin, Z. Li, Z. Song, J. Qiu, Y. Li, Boosting charge transfer of BiOBr/AgBr S-scheme heterojunctions via interface Br atom co-sharing for enhanced visible-light photocatalytic activity, Green Energy Environ. 10 (2025) 1073–1084. https://doi.org/10.1016/j.gee.2024.11.003.

[82] A.L. Nigusie, M. Ujihara, Plasmon-enhanced hydrogen evolution reaction on a Ag-branched-nanowire/Pt nanoparticle/AgCl nanocomposite, Phys. Chem. Chem. Phys. 23 (2021) 16366–16375. https://doi.org/10.1039/d1cp00467k.

[83] F. Parrino, S. Livraghi, E. Giamello, R. Ceccato, L. Palmisano, Role of Hydroxyl, Superoxide, and Nitrate Radicals on the Fate of Bromide Ions in Photocatalytic TiO2Suspensions, ACS Catal. 10 (2020) 7922–7931. https://doi.org/10.1021/acscatal.0c02010.

[84] S. Barbhuiya, B.B. Das, Molecular dynamics simulation in concrete research: A systematic review of techniques, models and future directions, J. Build. Eng. 76 (2023) 107267. https://doi.org/10.1016/j.jobe.2023.107267.

[85] D. Frenkel, B. Smit, Understanding molecular simulation: From algorithms to applications, Underst. Mol. Simul. From Algorithms to Appl. (1996). https://doi.org/10.1063/1.881812.

[86] U. Kumar, A. Shrivastava, A.K. De, M.R. Pai, I. Sinha, Fenton reaction by H_2O_2 produced on a magnetically recyclable Ag/$CuWO_4$/$NiFe_2O_4$ photocatalyst , Catal. Sci. Technol. (2023). https://doi.org/10.1039/d3cy00102d.

[87] J.S. Medina, R. Prosmiti, P. Villarreal, G. Delgado-Barrio, G. Winter, B. González,

J. V. Alemán, C. Collado, Molecular dynamics simulations of rigid and flexible water models: Temperature dependence of viscosity, Chem. Phys. 388 (2011) 9–18. https://doi.org/10.1016/j.chemphys.2011.07.001.

[88] S. Zendehboudi, Molecular dynamics simulation in energy and chemical systems, Elsevier Inc., 2023. https://doi.org/10.1016/B978-0-12-823869-1.00002-8.

[89] H.C. Andersen, Molecular dynamics simulations at constant pressure and/or temperature, J. Chem. Phys. 72 (1980) 2384–2393. https://doi.org/10.1063/1.439486.

[90] T. Zheng, A. Wang, X. Han, Y. Xia, X. Xu, J. Zhan, Y. Liu, Y. Chen, Z. Wang, X. Wu, S. Gong, W. Yan, Data-Driven Parametrization of Molecular Mechanics Force Fields for Expansive Chemical Space Coverage, (2024) 2730–2740. https://doi.org/10.1039/d4sc06640e.

[91] L. Xie, X. Wang, Z. Zhang, Y. Ma, T. Du, R. Wang, J. Wang, Photosynthesis of Hydrogen Peroxide Based on g-C_3N_4: The Road of a Cost-Effective Clean Fuel Production, Small 19 (2023) 1–25. https://doi.org/10.1002/smll.202301007.

[92] J. Yan, Y. Li, Y. Li, S. Ouyang, T. Zhang, Recent advances in photocatalytic hydrogen peroxide production, PhotoMat (2023) 1–20. https://doi.org/10.1002/phmt.8.

[93] Y. Isaka, K. Oyama, Y. Yamada, T. Suenobu, S. Fukuzumi, Photocatalytic production of hydrogen peroxide from water and dioxygen using cyano-bridged polynuclear transition metal complexes as water oxidation catalysts, Catal. Sci. Technol. 6 (2016) 681–684. https://doi.org/10.1039/c5cy01845e.

[94] S. Das, L. Acharya, L. Biswal, K. Parida, Augmented photocatalysis induced by 1T-MoS_2 bridged 2D/2D $MgIn_2S_4$@1T/2H-MoS_2 Z-scheme heterojunction: mechanistic insights into H_2O_2 and H_2 evolution, Nanoscale Adv. 6 (2024) 934–946.

https://doi.org/10.1039/d3na00912b.

[95] K. Mase, M. Yoneda, Y. Yamada, S. Fukuzumi, Efficient Photocatalytic Production of Hydrogen Peroxide from Water and Dioxygen with Bismuth Vanadate and a Cobalt(II) Chlorin Complex, ACS Energy Lett. 1 (2016) 913–919. https://doi.org/10.1021/acsenergylett.6b00415.

[96] Y. Zhang, H. Huang, L. Wang, X. Zhang, Z. Zhu, J. Wang, W. Yu, Y. Zhang, Cooperation of congenital and acquisitus sulfur vacancy for excellent photocatalytic hydrogen peroxide evolution of CdS nanorods from air, Chem. Eng. J. 454 (2023) 140420. https://doi.org/10.1016/j.cej.2022.140420.

[97] Y. Yang, Q. Wang, X. Zhang, X. Deng, Y. Guan, M. Wu, L. Liu, J. Wu, T. Yao, Y. Yin, Photocatalytic generation of H_2O_2 over a Z-scheme Fe_2O_3@C@1T/2H-MoS_2 heterostructured catalyst for high-performance Fenton reaction, J. Mater. Chem. A 11 (2023) 1991–2001. https://doi.org/10.1039/D2TA08145H.

[98] Y. Yang, H. Yu, M. Wu, T. Zhao, Y. Guan, D. Yang, Y. Zhu, Y. Zhang, S. Ma, J. Wu, L. Liu, T. Yao, Dual H_2O_2 production paths over chemically etched MoS_2/FeS_2 heterojunction: Maximizing self-sufficient heterogeneous Fenton reaction rate under the neutral condition, Appl. Catal. B Environ. 325 (2023). https://doi.org/10.1016/j.apcatb.2022.122307.

[99] Z. Li, Z. Zhou, J. Ma, Y. Li, W. Peng, G. Zhang, F. Zhang, X. Fan, Hierarchical photocatalyst of In_2S_3 on exfoliated MoS_2 nanosheets for enhanced visible-light-driven Aza-Henry reaction, Appl. Catal. B Environ. 237 (2018) 288–294. https://doi.org/10.1016/j.apcatb.2018.05.087.

[100] U. Kumar, S. Das Chakraborty, R.K. Sahu, P. Bhattacharya, T. Mishra, Improved Interfacial Charge Transfer on Noble Metal-Free Biomimetic CdS-Based Tertiary

Heterostructure @ 2D MoS_2-CdS-Cu_2O with Enhanced Photocatalytic Water Splitting, Adv. Mater. Interfaces 9 (2022). https://doi.org/10.1002/admi.202101680.

[101] U. Kumar, I. Sinha, T. Mishra, Synthesis and photocatalytic evaluation of 2D MoS_2/TiO_2 heterostructure photocatalyst for organic pollutants degradation, Mater. Today Proc. (2023). https://doi.org/10.1016/j.matpr.2023.08.061.

[102] Z. Fang, X. Huang, Y. Wang, W. Feng, Y. Zhang, S. Weng, X. Fu, P. Liu, Dual-defective strategy directing: In situ assembly for effective interfacial contacts in MoS_2 cocatalyst/In_2S_3 light harvester layered photocatalysts, J. Mater. Chem. A 4 (2016) 13980–13988. https://doi.org/10.1039/c6ta05507a.

[103] H. Zhao, H. Fu, X. Yang, S. Xiong, D. Han, X. An, MoS_2/CdS rod-like nanocomposites as high-performance visible light photocatalyst for water splitting photocatalytic hydrogen production, Int. J. Hydrogen Energy 47 (2022) 8247–8260. https://doi.org/10.1016/j.ijhydene.2021.12.171.

[104] D.P. Kumar, S. Hong, D.A. Reddy, T.K. Kim, Ultrathin MoS_2 layers anchored exfoliated reduced graphene oxide nanosheet hybrid as a highly efficient cocatalyst for CdS nanorods towards enhanced photocatalytic hydrogen production, Appl. Catal. B Environ. 212 (2017) 7–14. https://doi.org/10.1016/j.apcatb.2017.04.065.

[105] D.A. Reddy, H. Park, R. Ma, D.P. Kumar, M. Lim, T.K. Kim, Heterostructured WS_2-MoS_2 Ultrathin Nanosheets Integrated on CdS Nanorods to Promote Charge Separation and Migration and Improve Solar-Driven Photocatalytic Hydrogen Evolution, ChemSusChem 10 (2017) 1563–1570. https://doi.org/10.1002/cssc.201601799.

[106] M. Zhao, X. Guo, Z. Meng, Y. Wang, Y. Peng, Z. Ma, Ultrathin MoS2 nanosheet as co-catalyst coupling on graphitic g-C_3N_4 in suspension system for boosting

photocatalytic activity under visible-light irradiation, Colloids Surfaces A Physicochem. Eng. Asp. 631 (2021) 127671. https://doi.org/10.1016/j.colsurfa.2021.127671.

[107] X. Liu, X. Chen, L. Xu, B. Wu, X. Tu, X. Luo, F. Yang, J. Lin, Non-noble metal ultrathin MoS_2 nanosheets modified $Mn_{0.2}Cd_{0.8}S$ heterostructures for efficient photocatalytic H2 evolution with visible light irradiation, Int. J. Hydrogen Energy 45 (2020) 26770–26784. https://doi.org/10.1016/j.ijhydene.2020.07.086.

[108] S. Shen, L. Zhao, Z. Zhou, L. Guo, Enhanced photocatalytic hydrogen evolution over Cu-doped $ZnIn_2S_4$ under visible light irradiation, J. Phys. Chem. C 112 (2008) 16148–16155. https://doi.org/10.1021/jp804525q.

[109] B. Zhang, H. Shi, X. Hu, Y. Wang, E. Liu, J. Fan, A novel S-scheme $MoS_2/CdIn_2S_4$ flower-like heterojunctions with enhanced photocatalytic degradation and H_2 evolution activity, J. Phys. D. Appl. Phys. 53 (2020). https://doi.org/10.1088/1361-6463/ab7563.

[110] W. Chen, Z.C. He, G.B. Huang, C.L. Wu, W.F. Chen, X.H. Liu, Direct Z-scheme 2D/2D $MnIn_2S_4$/g-C_3N_4 architectures with highly efficient photocatalytic activities towards treatment of pharmaceutical wastewater and hydrogen evolution, Chem. Eng. J. 359 (2019) 244–253. https://doi.org/10.1016/j.cej.2018.11.141.

[111] Y. Song, Y. Guo, S. Qi, K. Zhang, J. Yang, B. Li, J. Chen, Y. Zhao, Y. Lou, $Cu_7S_4/MnIn_2S_4$ heterojunction for efficient photocatalytic hydrogen generation, J. Alloys Compd. 884 (2021) 161035. https://doi.org/10.1016/j.jallcom.2021.161035.

[112] X. Dang, S. Wu, H. Zhao, Enhanced Photocatalytic Production of H_2O_2 through Regulation of Spatial Charge Transfer and Light Absorption over a $MnIn_2S_4/WO_3$(Yb, Tm) Z-Scheme System, ACS Sustain. Chem. Eng. 10 (2022)

4161–4172. https://doi.org/10.1021/acssuschemeng.1c07985.

[113] J. Xie, H. Zhang, S. Li, R. Wang, X. Sun, M. Zhou, J. Zhou, X.W. Lou, Y. Xie, Defect-rich MoS_2 ultrathin nanosheets with additional active edge sites for enhanced electrocatalytic hydrogen evolution, Adv. Mater. 25 (2013) 5807–5813. https://doi.org/10.1002/adma.201302685.

[114] M.T. Ahmed, H. Abdullah, D.H. Kuo, Photocatalytic H_2O_2 Generation over Microsphere Carbon-Assisted Hierarchical Indium Sulfide Nanoflakes via a Two-Step One-Electron Pathway, ACS Appl. Mater. Interfaces 15 (2023) 29224–29235. https://doi.org/10.1021/acsami.3c05137.

[115] W. Yu, Z. Zhu, C. Hu, S. Lin, Y. Wang, C. Wang, N. Tian, Y. Zhang, H. Huang, Point-to-face Z-scheme junction $Cd_{0.6}Zn_{0.4}S$/g-C_3N_4 with a robust internal electric field for high-efficiency H_2O_2 production, J. Mater. Chem. A 11 (2023) 6384–6393. https://doi.org/10.1039/D2TA10074F.

[116] Z. Fang, Y. Li, J. Li, C. Shu, L. Zhong, S. Lu, C. Mo, M. Yang, D. Yu, Capturing Visible Light in Low-Band-Gap C_4N-Derived Responsive Bifunctional Air Electrodes for Solar Energy Conversion and Storage , Angew. Chemie 133 (2021) 17756–17762. https://doi.org/10.1002/ange.202104790.

[117] N. Luo, C. Chen, D. Yang, W. Hu, F. Dong, S defect-rich ultrathin 2D MoS_2: The role of S point-defects and S stripping-defects in the removal of Cr(VI) via synergistic adsorption and photocatalysis, Appl. Catal. B Environ. 299 (2021) 120664. https://doi.org/10.1016/j.apcatb.2021.120664.

[118] H. Tian, M. Liu, W. Zheng, Constructing 2D graphitic carbon nitride nanosheets/layered MoS_2/graphene ternary nanojunction with enhanced photocatalytic activity, Appl. Catal. B Environ. 225 (2018) 468–476.

https://doi.org/10.1016/j.apcatb.2017.12.019.

[119] Z.Y. Zhang, H. Tian, H. Jiao, X. Wang, L. Bian, Y. Liu, N. Khaorapapong, Y. Yamauchi, Z.L. Wang, SiO_2 assisted Cu^0-Cu^+-NH_2 composite interfaces for efficient CO_2 electroreduction to C^{2+} products, J. Mater. Chem. A 12 (2023) 1218–1232. https://doi.org/10.1039/d3ta05652j.

[120] J. Cheng, Z. Niu, Z. Zhao, X. Pei, S. Zhang, H. Wang, D. Li, Z. Guo, Enhanced Ion/Electron Migration and Sodium Storage Driven by Different MoS_2-$ZnIn_2S_4$ Heterointerfaces, Adv. Energy Mater. 13 (2023). https://doi.org/10.1002/aenm.202203248.

[121] T.L. Xi, L. jun Liu, Q. Liu, H.W. Wang, L.Y. Zuo, H.T. Fan, B. Li, L.Y. Wang, Hollow MoS_2@$ZnIn_2S_4$ nanoboxes for improving photocatalytic hydrogen evolution, Int. J. Hydrogen Energy 62 (2024) 62–70. https://doi.org/10.1016/j.ijhydene.2024.03.006.

[122] Z. Fang, Y. Xia, L. Zhang, J. Liu, J. Li, B. Hu, K. Li, Q. Lu, L. Wang, Building the confined CoS_2/MoS_2 nanoreactor via interface electronic reconfiguration to synchronously enhance activity and stability of heterogeneous Fenton-like reactions, Appl. Catal. B Environ. 346 (2024) 123769. https://doi.org/10.1016/j.apcatb.2024.123769.

[123] Z. Zhu, H. Huang, L. Liu, F. Chen, N. Tian, Y. Zhang, H. Yu, Chemically Bonded α-Fe_2O_3/Bi_4MO_8Cl Dot-on-Plate Z-Scheme Junction with Strong Internal Electric Field for Selective Photo-oxidation of Aromatic Alcohols, Angew. Chemie - Int. Ed. 61 (2022). https://doi.org/10.1002/anie.202203519.

[124] S. Zhou, W. Ma, M. Kosari, A.M.H. Lim, S.M. Kozlov, H.C. Zeng, Highly active single-layer 2H-MoS_2 for CO_2 hydrogenation to methanol, Appl. Catal. B Environ.

349 (2024) 123870. https://doi.org/10.1016/j.apcatb.2024.123870.

[125] G. Li, J. Sun, W. Hou, S. Jiang, Y. Huang, J. Geng, Three-dimensional porous carbon composites containing high sulfur nanoparticle content for high-performance lithium-sulfur batteries, Nat. Commun. 7 (2016). https://doi.org/10.1038/ncomms10601.

[126] H. Tian, Z.Y. Zhang, H. Fang, H. Jiao, T.T. Gao, J.T. Yang, L. Bian, Z.L. Wang, Selective electrooxidation of methane to formic acid by atomically dispersed CuOx and its induced Lewis acid sites on V_2O_5 in a tubular electrode, Appl. Catal. B Environ. 351 (2024) 124001. https://doi.org/10.1016/j.apcatb.2024.124001.

[127] D. Sebastia-Saez, S. Gu, M. Ramaioli, Effect of the contact angle on the morphology, residence time distribution and mass transfer into liquid rivulets: A CFD study, Chem. Eng. Sci. 176 (2018) 356–366. https://doi.org/10.1016/j.ces.2017.09.046.

[128] S. Wang, Z. Xie, D. Zhu, S. Fu, Y. Wu, H. Yu, C. Lu, P. Zhou, M. Bonn, H.I. Wang, Q. Liao, H. Xu, X. Chen, C. Gu, Efficient photocatalytic production of hydrogen peroxide using dispersible and photoactive porous polymers, Nat. Commun. 14 (2023) 1–7. https://doi.org/10.1038/s41467-023-42720-6.

[129] R. Li, D. Zhang, Y. Shi, C. Li, Y. Long, M. Yang, Developing a built-in electric field in CdS nanorods by modified MoS_2 for highly efficient photocatalytic H_2O_2 production, J. Catal. 416 (2022) 322–331. https://doi.org/10.1016/j.jcat.2022.11.016.

[130] J. Wang, L. Yang, L. Zhang, Constructed 3D hierarchical micro-flowers $CoWO_4$@Bi_2WO_6 Z-scheme heterojunction catalyzer: Two-channel photocatalytic H_2O_2 production and antibiotics degradation, Chem. Eng. J. 420 (2021). https://doi.org/10.1016/j.cej.2020.127639.

[131] F. Wang, S. Yue, X. Han, T. Zhang, A. Han, L. Wang, J. Liu, ZnS/C Dual-Quantum-Dots Heterostructural Nanofibers for High-Performance Photocatalytic H_2O_2 Production, ACS Appl. Mater. Interfaces 16 (2024) 2606–2613. https://doi.org/10.1021/acsami.3c14183.

[132] M. Jourshabani, S. –H Yun, M. Razi Asrami, B. –K Lee, Superior photodegradation of organic compounds and H_2O_2 production over tungsten oxide/carbon nitride heterojunction with sizable heptazine units: Dual polycondensation and interface engineering, Chem. Eng. J. 427 (2022). https://doi.org/10.1016/j.cej.2021.131710.

[133] Q. Liang, X. Liu, B. Shao, L. Tang, Z. Liu, W. Zhang, S. Gong, Y. Liu, Q. He, T. Wu, Y. Pan, S. Tong, Construction of fish-scale tubular carbon nitride-based heterojunction with boosting charge separation in photocatalytic tetracycline degradation and H_2O_2 production, Chem. Eng. J. 426 (2021) 130831. https://doi.org/10.1016/J.CEJ.2021.130831.

[134] J. Zhang, L. Lin, B. Wang, Y. Zhang, Y. Wang, L. Zhang, Y. Jiang, H. Chen, M. Zhao, Efficient charge separation of photo-Fenton catalyst: Core-shell CdS/Fe_3O_4@N-doped C for enhanced photodegradation performance, Colloids Surfaces A Physicochem. Eng. Asp. 625 (2021). https://doi.org/10.1016/j.colsurfa.2021.126974.

[135] X. Hu, X. Zeng, Y. Liu, J. Lu, S. Yuan, Y. Yin, J. Hu, D.T. McCarthy, X. Zhang, Nano-layer based 1T-rich MoS_2/g-C_3N_4 co-catalyst system for enhanced photocatalytic and photoelectrochemical activity, Appl. Catal. B Environ. 268 (2020) 118466. https://doi.org/10.1016/J.APCATB.2019.118466.

[136] X. Wang, Z. Han, L. Yu, C. Liu, Y. Liu, G. Wu, Synthesis of Full-Spectrum-Response $Cu_2(OH)PO_4$/g-C_3N_4 Photocatalyst with Outstanding Photocatalytic H_2O_2 Production Performance via a “two Channel Route,” ACS Sustain. Chem. Eng. 6

(2018) 14542–14553. https://doi.org/10.1021/ACSSUSCHEMENG.8B03171/ASSET/IMAGES/LARGE/SC-2018-03171G_0012.JPEG.

[137] X. Chen, W. Zhang, L. Zhang, L. Feng, C. Zhang, J. Jiang, H. Wang, Construction of Porous Tubular In_2S_3@$In_2O_3$with Plasma Treatment-Derived Oxygen Vacancies for Efficient Photocatalytic H_2O_2 Production in Pure Water Via Two-Electron Reduction, ACS Appl. Mater. Interfaces 13 (2021) 25868–25878. https://doi.org/10.1021/acsami.1c02953.

[138] X. Ma, H. Cheng, Facet-dependent photocatalytic H_2O_2 production of single phase Ag_3PO_4 and Z-scheme Ag/$ZnFe_2O_4$-Ag-Ag_3PO_4 composites, Chem. Eng. J. 429 (2022) 132373. https://doi.org/10.1016/J.CEJ.2021.132373.

[139] M. Guo, Z. Xing, T. Zhao, Y. Qiu, B. Tao, Z. Li, W. Zhou, Hollow flower-like polyhedral α-Fe_2O_3/Defective MoS_2/Ag Z-scheme heterojunctions with enhanced photocatalytic-Fenton performance via surface plasmon resonance and photothermal effects, Appl. Catal. B Environ. 272 (2020) 118978. https://doi.org/10.1016/J.APCATB.2020.118978.

[140] Y.Y. Yang, H. Guo, D.W. Huang, L. Li, H.Y. Liu, L. Sui, Q. Wu, J.J. Zhu, L. Zhang, C.G. Niu, Simultaneously tuning oxygen reduction pathway and charge transfer dynamics toward sacrificial agent-free photocatalytic H_2O_2 production for in-situ water disinfection, Chem. Eng. J. 479 (2024). https://doi.org/10.1016/j.cej.2023.147863.

[141] S. Ma, Y. Yang, J. Li, Y. Mei, Y. Zhu, J. Wu, L. Liu, T. Yao, Q. Yang, Z-scheme $Fe_2(MoO_4)_3$/Ag/Ag_3PO_4 heterojunction with enhanced degradation rate by in-situ generated H_2O_2: Turning waste (H_2O_2) into wealth (•OH), J. Colloid Interface Sci.

606 (2022) 1800–1810. https://doi.org/10.1016/J.JCIS.2021.08.134.

[142] J. Cai, J. Huang, S. Wang, J. Iocozzia, Z. Sun, J. Sun, Y. Yang, Y. Lai, Z. Lin, Crafting Mussel-Inspired Metal Nanoparticle-Decorated Ultrathin Graphitic Carbon Nitride for the Degradation of Chemical Pollutants and Production of Chemical Resources, Adv. Mater. 31 (2019) 1–11. https://doi.org/10.1002/adma.201806314.

[143] L. Ma, Y. Gao, B. Wei, L. Huang, N. Zhang, Q. Weng, L. Zhang, S.F. Liu, R. Jiang, Visible-Light Photocatalytic H_2O_2 Production Boosted by Frustrated Lewis Pairs in Defected Polymeric Carbon Nitride Nanosheets, ACS Catal. 14 (2024) 2775–2786. https://doi.org/10.1021/acscatal.3c05360.

[144] J. Kuntail, S. Pal, I. Sinha, Interfacial phenomena during Fenton reaction on starch stabilized magnetite nanoparticles: Molecular dynamics and experimental investigations, J. Mol. Liq. 318 (2020) 114037. https://doi.org/10.1016/j.molliq.2020.114037.

[145] H. Chen, W. Leng, Y. Xu, Enhanced Visible-Light Photoactivity of $CuWO_4$ through a Surface- Deposited CuO, (2014).

[146] T. Mavrič, M. Valant, M. Forster, A.J. Cowan, U. Lavrenčič, S. Emin, Design of a highly photocatalytically active ZnO/$CuWO_4$ nanocomposite, J. Colloid Interface Sci. 483 (2016) 93–101. https://doi.org/10.1016/j.jcis.2016.08.019.

[147] J.C. Hill, K.S. Choi, Synthesis and characterization of high surface area $CuWO_4$ and Bi2WO6 electrodes for use as photoanodes for solar water oxidation, J. Mater. Chem. A 1 (2013) 5006–5014. https://doi.org/10.1039/c3ta10245a.

[148] N. Jatav, J. Kuntail, D. Khan, A. Kumar De, I. Sinha, AgI/$CuWO_4$ Z-scheme photocatalyst for the degradation of organic pollutants: Experimental and molecular

dynamics studies, J. Colloid Interface Sci. 599 (2021) 717–729. https://doi.org/10.1016/j.jcis.2021.04.120.

[149] S.A. Hassanzadeh-Tabrizi, Synthesis of $NiFe_2O_4$/Ag nanoparticles immobilized on mesoporous g-C3N4 sheets and application for degradation of antibiotics, J. Photochem. Photobiol. A Chem. 418 (2021) 113398. https://doi.org/10.1016/j.jphotochem.2021.113398.

[150] S. Kamal, S. Balu, S. Palanisamy, K. Uma, V. Velusamy, T.C.K. Yang, Synthesis of boron doped C_3N_4/$NiFe_2O_4$ nanocomposite: An enhanced visible light photocatalyst for the degradation of methylene blue, Results Phys. 12 (2019) 1238–1244. https://doi.org/10.1016/j.rinp.2019.01.004.

[151] P.A. Sakhare, S.S. Pawar, T.S. Bhat, S.D. Yadav, G.R. Patil, P.S. Patil, A.D. Sheikh, Magnetically Recoverable $BiVO_4$/$NiFe_2O_4$ Nanocomposite Photocatalyst For Efficient Detoxification of Polluted Water Under Collected Sunlight, Mater. Res. Bull. 129 (2020). https://doi.org/10.1016/j.materresbull.2020.110908.

[152] X. Pang, N. Skillen, D.W. Bahnemann, D.W. Rooney, P.K.J. Robertson, Photocatalytic H_2O_2 Generation Using Au-Ag Bimetallic Alloy Nanoparticles loaded on ZnO, Catalysts 12 (2022). https://doi.org/10.3390/catal12090939.

[153] J.M. Linge, H. Erikson, M. Merisalu, V. Sammelselg, K. Tammeveski, Oxygen reduction on silver catalysts electrodeposited on various nanocarbon supports, SN Appl. Sci. 3 (2021) 1–10. https://doi.org/10.1007/s42452-021-04289-x.

[154] H. Erikson, A. Sarapuu, K. Tammeveski, Oxygen Reduction Reaction on Silver Catalysts in Alkaline Media: a Minireview, ChemElectroChem 6 (2019) 73–86. https://doi.org/10.1002/celc.201800913.

[155] C. Chen, W. Bi, Z. Xia, W. Yuan, L. Li, Hydrothermal Synthesis of the $CuWO_4$/ZnO Composites with Enhanced Photocatalytic Performance, ACS Omega 5 (2020) 13185–13195. https://doi.org/10.1021/acsomega.0c01220.

[156] U. Kumar, S. Das Chakraborty, R.K. Sahu, P. Bhattacharya, T. Mishra, Improved Interfacial Charge Transfer on Noble Metal-Free Biomimetic CdS-Based Tertiary Heterostructure @ 2D MoS_2-CdS-Cu_2O with Enhanced Photocatalytic Water Splitting, Adv. Mater. Interfaces 9 (2022) 1–11. https://doi.org/10.1002/admi.202101680.

[157] X. An, K. Li, J. Tang, Cu_2O/reduced graphene oxide composites for the photocatalytic conversion of CO_2, ChemSusChem 7 (2014) 1086–1093. https://doi.org/10.1002/cssc.201301194.

[158] Y. Zhao, L. Xu, J. Yan, W. Yan, C. Wu, J. Lian, Y. Huang, J. Bao, J. Qiu, L. Xu, Y. Xu, H. Xu, H. Li, Facile preparation of $NiFe_2O_4$/MoS_2 composite material with synergistic effect for high performance supercapacitor, J. Alloys Compd. 726 (2017) 608–617. https://doi.org/10.1016/j.jallcom.2017.07.327.

[159] Y. Tang, N. Rong, F. Liu, M. Chu, H. Dong, Y. Zhang, P. Xiao, Enhancement of the photoelectrochemical performance of $CuWO_4$ films for water splitting by hydrogen treatment, Appl. Surf. Sci. 361 (2016) 133–140. https://doi.org/10.1016/j.apsusc.2015.11.129.

[160] X. Gao, W. Wang, J. Bi, Y. Chen, X. Hao, X. Sun, J. Zhang, Morphology-controllable preparation of $NiFe_2O_4$ as high performance electrode material for supercapacitor, Electrochim. Acta 296 (2019) 181–189. https://doi.org/10.1016/j.electacta.2018.11.054.

[161] Z. Chang, T. Li, G. Li, K. Wang, One-pot in-situ synthesis of $Ni(OH)_2$–$NiFe_2O_4$

nanosheet arrays on nickel foam as binder-free electrodes for supercapacitors, J. Mater. Sci. Mater. Electron. 30 (2019) 600–608. https://doi.org/10.1007/s10854-018-0326-0.

[162] L. Liu, S. Hu, K. Gao, Natural nanofiber-based stacked porous nitrogen-doped carbon/$NiFe_2O_4$ nanohybrid nanosheets, Cellulose 27 (2020) 1021–1031. https://doi.org/10.1007/s10570-019-02843-w.

[163] L. Lin, S. Huang, Y. Zhu, B. Du, Z. Zhang, C. Chen, X. Wang, N. Zhang, Construction of CdS/MoS_2 heterojunction from core-shell MoS_2 @Cd-MOF for efficient photocatalytic hydrogen evolution, Dalt. Trans. 48 (2019) 2715–2721. https://doi.org/10.1039/c8dt04745f.

[164] K.K. Das, S. Mansingh, R. Mohanty, D.P. Sahoo, N. Priyadarshini, K. Parida, 0D–2D Fe_2O_3 /Boron-Doped g-C_3N_4 S-Scheme Exciton Engineering for Photocatalytic H_2O_2 Production and Photo-Fenton Recalcitrant-Pollutant Detoxification: Kinetics, Influencing Factors, and Mechanism, J. Phys. Chem. C (2022). https://doi.org/10.1021/acs.jpcc.2c06369.

[165] W. Miao, Y. Wang, Y. Liu, H. Qin, C. Chu, S. Mao, Persulfate-Induced Three Coordinate Nitrogen (N_3C) Vacancies in Defective Carbon Nitride for Enhanced Photocatalytic H_2O_2 Evolution, Engineering 25 (2023) 214–221. https://doi.org/10.1016/j.eng.2021.12.016.

[166] Q. Liang, X. Liu, B. Shao, L. Tang, Z. Liu, W. Zhang, S. Gong, Y. Liu, Q. He, T. Wu, Y. Pan, S. Tong, Construction of fish-scale tubular carbon nitride-based heterojunction with boosting charge separation in photocatalytic tetracycline degradation and H_2O_2 production, Chem. Eng. J. 426 (2021). https://doi.org/10.1016/j.cej.2021.130831.

[167] L. Zheng, H. Su, J. Zhang, L.S. Walekar, H. Vafaei Molamahmood, B. Zhou, M. Long, Y.H. Hu, Highly selective photocatalytic production of H_2O_2 on sulfur and nitrogen co-doped graphene quantum dots tuned TiO_2, Appl. Catal. B Environ. 239 (2018) 475–484. https://doi.org/10.1016/j.apcatb.2018.08.031.

[168] J. Tian, T. Wu, D. Wang, Y. Pei, M. Qiao, B. Zong, One-pot synthesis of potassium and phosphorus-doped carbon nitride catalyst derived from urea for highly efficient visible light-driven hydrogen peroxide production, Catal. Today 330 (2019) 171–178. https://doi.org/10.1016/j.cattod.2018.07.039.

[169] J. Cai, J. Huang, S. Wang, J. Iocozzia, Z. Sun, J. Sun, Y. Yang, Y. Lai, Z. Lin, Crafting Mussel-Inspired Metal Nanoparticle-Decorated Ultrathin Graphitic Carbon Nitride for the Degradation of Chemical Pollutants and Production of Chemical Resources, Adv. Mater. 31 (2019). https://doi.org/10.1002/adma.201806314.

[170] Y. Yang, G. Zeng, D. Huang, C. Zhang, D. He, C. Zhou, W. Wang, W. Xiong, X. Li, B. Li, W. Dong, Y. Zhou, Molecular engineering of polymeric carbon nitride for highly efficient photocatalytic oxytetracycline degradation and H_2O_2 production, Appl. Catal. B Environ. 272 (2020). https://doi.org/10.1016/j.apcatb.2020.118970.

[171] Y. Yang, B. Cheng, J. Yu, L. Wang, W. Ho, TiO_2/In_2S_3 S-scheme photocatalyst with enhanced H_2O_2-production activity, Nano Res. (2021). https://doi.org/10.1007/s12274-021-3733-0.

[172] Y. Yang, H. Yu, M. Wu, T. Zhao, Y. Guan, D. Yang, Y. Zhu, Y. Zhang, S. Ma, J. Wu, L. Liu, T. Yao, Dual H_2O_2 production paths over chemically etched MoS_2/FeS_2 heterojunction: Maximizing self-sufficient heterogeneous Fenton reaction rate under the neutral condition, Appl. Catal. B Environ. 325 (2023) 122307.

[173] Y. Xie, C. Liu, D. Li, Y. Liu, In situ-generated H_2O_2 with NCQDs/MIL-101(Fe) by

activating O_2: A dual effect of photocatalysis and photo-Fenton for efficient removal of tetracyline at natural pH, Appl. Surf. Sci. 592 (2022). https://doi.org/10.1016/j.apsusc.2022.153312.

[174] S. Huang, Y. Xu, T. Zhou, M. Xie, Y. Ma, Q. Liu, L. Jing, H. Xu, H. Li, Constructing magnetic catalysts with in-situ solid-liquid interfacial photo-Fenton-like reaction over Ag_3PO_4@$NiFe_2O_4$ composites, Appl. Catal. B Environ. 225 (2018) 40–50. https://doi.org/10.1016/j.apcatb.2017.11.045.

[175] Z. Xiong, Z. Wang, M. Muthu, Y. Zhang, Construction of an in-situ Fenton-like system based on a g-C_3N_4 composite photocatalyst, J. Hazard. Mater. 373 (2019) 565–571. https://doi.org/10.1016/J.JHAZMAT.2019.03.114.

[176] J. Feng, M. Cui, H. Liu, F. Zhou, S. Bi, D. Zhang, Design of an efficient photocatalyst: a type II heterojunction for enhanced hydrogen production driven by visible light, Phys. Chem. Chem. Phys. 23 (2021) 11893–11899. https://doi.org/10.1039/d1cp00347j.

[177] Z. Wang, Z. Lin, S. Shen, W. Zhong, S. Cao, Advances in designing heterojunction photocatalytic materials, Chinese J. Catal. 42 (2021) 710–730. https://doi.org/10.1016/S1872-2067(20)63698-1.

[178] S. Khan, M.A. Qaiser, W.A. Qureshi, S.N. uz Z. Haider, X. Yu, W. Wang, Q. Liu, Photocatalytic hydrogen peroxide production: Advances, mechanistic insights, and emerging challenges, J. Environ. Chem. Eng. 12 (2024) 114143. https://doi.org/10.1016/j.jece.2024.114143.

[179] M. Teranishi, S.I. Naya, H. Tada, In situ liquid phase synthesis of hydrogen peroxide from molecular oxygen using gold nanoparticle-loaded titanium(IV) dioxide photocatalyst, J. Am. Chem. Soc. 132 (2010) 7850–7851.

https://doi.org/10.1021/ja102651g.

[180] Y. Liu, F. Chen, Q. Wang, J. Wang, J. Wang, Direct unassisted hydrogen peroxide generation from oxygen and water on plasmonic Ag-graphene-Cu nanosandwitch, Appl. Catal. B Environ. 224 (2018) 940–950. https://doi.org/10.1016/j.apcatb.2017.11.026.

[181] G. Zuo, S. Liu, L. Wang, H. Song, P. Zong, W. Hou, B. Li, Z. Guo, X. Meng, Y. Du, T. Wang, V.A.L. Roy, Finely dispersed Au nanoparticles on graphitic carbon nitride as highly active photocatalyst for hydrogen peroxide production, 123 (2019) 69–72. https://doi.org/10.1016/j.catcom.2019.02.011.

[182] M.J. Jacinto, L.F. Ferreira, V.C. Silva, Magnetic materials for photocatalytic applications—a review, J. Sol-Gel Sci. Technol. 96 (2020) 1–14. https://doi.org/10.1007/s10971-020-05333-9.

[183] C. Haw, W. Chiu, S. Abdul Rahman, P. Khiew, S. Radiman, R. Abdul Shukor, M.A.A. Hamid, N. Ghazali, The design of new magnetic-photocatalyst nanocomposites ($CoFe_2O_4$-TiO_2) as smart nanomaterials for recyclable-photocatalysis applications, New J. Chem. 40 (2016) 1124–1136. https://doi.org/10.1039/c5nj02496j.

[184] U. Kumar, J. Kuntail, A. Kumar, R. Prakash, M.R. Pai, I. Sinha, In-situ H_2O_2 production for tetracycline degradation on Ag/s-(Co_3O_4/$NiFe_2O_4$) visible light magnetically recyclable photocatalyst, Appl. Surf. Sci. 589 (2022) 153013. https://doi.org/10.1016/j.apsusc.2022.153013.

[185] U. Kumar, K. Sanket, R. Mandal, A. Kumar De, A. Shrivastava, S.K. Behera, I. Sinha, Silver nanoparticle-decorated $NiFe_2O_4$/$CuWO_4$ heterostructure electrocatalyst for oxygen evolution reactions, Phys. Chem. Chem. Phys. 26 (2024) 14883–14897. https://doi.org/10.1039/d4cp00473f.

[186] A.K. De, S. Majumdar, S. Pal, S. Kumar, I. Sinha, Zn doping induced band gap widening of Ag_2O nanoparticles, J. Alloys Compd. 832 (2020) 154127. https://doi.org/10.1016/j.jallcom.2020.154127.

[187] A.K. De, I. Sinha, Synergistic effect of Ni doping and oxygen vacancies on the visible light photocatalytic properties of Ag_2O nanoparticles, J. Phys. Chem. Solids 167 (2022) 110733. https://doi.org/10.1016/j.jpcs.2022.110733.

[188] C. Su, D. Zhang, X. Pu, Z. He, X. Hu, L. Li, G. Hu, Magnetically separable $NiFe_2O_4/Ag_3VO_4/Ag_2VO_2PO_4$ direct Z-scheme heterostructure with enhanced visible-light photoactivity, J. Chem. Technol. Biotechnol. 96 (2021) 2976–2985. https://doi.org/10.1002/jctb.6855.

[189] Z. Lu, Z. Yu, J. Dong, M. Song, Y. Liu, X. Liu, Z. Ma, H. Su, Y. Yan, P. Huo, Facile microwave synthesis of a Z-scheme imprinted $ZnFe_2O_4$/Ag/PEDOT with the specific recognition ability towards improving photocatalytic activity and selectivity for tetracycline, Chem. Eng. J. 337 (2018) 228–241. https://doi.org/10.1016/j.cej.2017.12.115.

[190] Y. Wang, L. Liu, C. Meng, Y. Zhou, Z. Gao, X. Li, X. Cao, L. Xu, W. Zhu, A novel ethanol gas sensor based on $TiO_2/Ag_{0.35}V_2O_5$ branched nanoheterostructures, Sci. Rep. 6 (2016) 1–10. https://doi.org/10.1038/srep33092.

[191] G. Swain, S. Sultana, J. Moma, K. Parida, Fabrication of Hierarchical Two-Dimensional MoS_2 Nanoflowers Decorated upon Cubic $CaIn_2S_4$ Microflowers: Facile Approach to Construct Novel Metal-Free p-n Heterojunction Semiconductors with Superior Charge Separation Efficiency, Inorg. Chem. 57 (2018) 10059–10071. https://doi.org/10.1021/acs.inorgchem.8b01221.

[192] S.Y. Zhang, T.T. Li, H.L. Zhu, Y.Q. Zheng, Co_3O_4 polyhedrons with enhanced

electric conductivity as efficient water oxidation electrocatalysts in alkaline medium, J. Mater. Sci. 53 (2018) 4323–4333. https://doi.org/10.1007/s10853-017-1855-2.

[193] S. Pal, A. Kumar, U. Kumar, R. Prakash, I. Sinha, α-FeOOH/β-FeOOH/Cu_2O p-n-p heterojunction nanostructures, (2023). https://doi.org/10.1016/j.mssp.2023.107766.

[194] N. Singh, U. Kumar, N. Jatav, I. Sinha, Photocatalytic Degradation of Crystal Violet on Cu, Zn Doped $BiVO_4$ Particles, Langmuir 40 (2024) 8450–8462. https://doi.org/10.1021/acs.langmuir.3c04039.

[195] N.A. Zubir, C. Yacou, J. Motuzas, X. Zhang, J.C. Diniz Da Costa, Structural and functional investigation of graphene oxide-Fe_3O_4 nanocomposites for the heterogeneous Fenton-like reaction, Sci. Rep. 4 (2014) 1–8. https://doi.org/10.1038/srep04594.

[196] M. Hua, L. Xu, F. Cui, J. Lian, Y. Huang, J. Bao, J. Qiu, Y. Xu, H. Xu, Y. Zhao, H. Li, Hexamethylenetetramine-assisted hydrothermal synthesis of octahedral nickel ferrite oxide nanocrystallines with excellent supercapacitive performance, J. Mater. Sci. 53 (2018) 7621–7636. https://doi.org/10.1007/s10853-018-2052-7.

[197] Y. Tang, D. Zhang, Y. Li, B. Huang, H. Li, X. Pu, Y. Geng, Fabrication of magnetically recoverable Ag/$CuNb_2O_6$/$CuFe_2O_4$ ternary heterojunction composite for highly efficient photocatalytic degradation of pollutants, Sep. Purif. Technol. 220 (2019) 78–88. https://doi.org/10.1016/j.seppur.2019.03.049.

[198] Z. Shao, X. Meng, H. Lai, D. Zhang, X. Pu, C. Su, H. Li, X. Ren, Y. Geng, Coralline-like Ni2P decorated novel tetrapod-bundle $Cd_{0.9}Zn_{0.1}S$ ZB/WZ homojunctions for highly efficient visible-light photocatalytic hydrogen evolution, Chinese J. Catal. 42 (2021) 439–449. https://doi.org/10.1016/S1872-2067(20)63597-5.

[199] D. Kong, H. Fan, D. Yin, D. Zhang, X. Pu, S. Yao, C. Su, $AgFeO_2$ Nanoparticle/$ZnIn_2S_4$ Microsphere p-n Heterojunctions with Hierarchical Nanostructures for Efficient Visible-Light-Driven H_2 Evolution, ACS Sustain. Chem. Eng. 9 (2021) 2673–2683. https://doi.org/10.1021/acssuschemeng.0c07638.

[200] X. Jiang, D. Kong, B. Luo, M. Wang, D. Zhang, X. Pu, Preparation of magnetically retrievable flower-like AgBr/BiOBr/$NiFe_2O_4$ direct Z-scheme heterojunction photocatalyst with enhanced visible-light photoactivity, Colloids Surfaces A Physicochem. Eng. Asp. 633 (2022) 127880. https://doi.org/10.1016/j.colsurfa.2021.127880.

[201] L. Yang, G. Dong, D.L. Jacobs, Y. Wang, L. Zang, C. Wang, Two-channel photocatalytic production of H_2O_2 over g-C_3N_4 nanosheets modified with perylene imides, J. Catal. 352 (2017) 274–281. https://doi.org/10.1016/j.jcat.2017.05.010.

[202] X. Sun, K. He, Z. Chen, H. Yuan, F. Guo, W. Shi, Construction of visible-light-response photocatalysis-self-Fenton system for the efficient degradation of amoxicillin based on industrial waste red mud/CdS S-scheme heterojunction, Sep. Purif. Technol. 324 (2023). https://doi.org/10.1016/j.seppur.2023.124600.

[203] X. Lin, X. Wang, Q. Zhou, C. Wen, S. Su, J. Xiang, P. Cheng, X. Hu, Y. Li, X. Wang, X. Gao, R. Nözel, G. Zhou, Z. Zhang, J. Liu, Magnetically Recyclable MoS_2/Fe_3O_4 Hybrid Composite as Visible Light Responsive Photocatalyst with Enhanced Photocatalytic Performance, ACS Sustain. Chem. Eng. 7 (2019) 1673–1682. https://doi.org/10.1021/acssuschemeng.8b05440.

[204] Z. Zheng, F. Han, B. Xing, X. Han, B. Li, Synthesis of Fe_3O_4@CdS@CQDs ternary core–shell heterostructures as a magnetically recoverable photocatalyst for selective alcohol oxidation coupled with H_2O_2 production, J. Colloid Interface Sci. 624 (2022)

460–470. https://doi.org/10.1016/j.jcis.2022.05.161.

[205] S. Mirsadeghi, H. Zandavar, H.R. Rajabi, F. Sajadiasl, M.R. Ganjali, S.M. Pourmortazavi, Superior degradation of organic pollutants and H_2O_2 generation ability on environmentally-sound constructed Fe_3O_4-Cu nanocomposite, J. Mater. Res. Technol. 14 (2021) 808–821. https://doi.org/10.1016/j.jmrt.2021.07.007.

[206] S. Srivastava, R. Awasthi, N.S. Gajbhiye, V. Agarwal, A. Singh, A. Yadav, R.K. Gupta, Innovative synthesis of citrate-coated superparamagnetic Fe_3O_4 nanoparticles and its preliminary applications, J. Colloid Interface Sci. 359 (2011) 104–111. https://doi.org/10.1016/j.jcis.2011.03.059.

[207] T.T. Dung, T.M. Danh, L.T.M. Hoa, D.M. Chien, N.H. Duc, Structural and magnetic properties of starch-coated magnetite nanoparticles, J. Exp. Nanosci. 4 (2009) 259–267. https://doi.org/10.1080/17458080802570609.

[208] F. Saman, H. Bahruji, A.H. Mahadi, C.H.S. Ling, Pd/g-C_3N_4 photocatalyst for hydrogen production: Role of experimental condition for Schottky barrier, Fuel 349 (2023) 128725. https://doi.org/10.1016/j.fuel.2023.128725.

[209] S.M. Hosseini, M. Ghiaci, S.A. Kulinich, W. Wunderlich, H. Farrokhpour, M. Saraji, A. Shahvar, Au-Pd@g-C_3N_4 as an Efficient Photocatalyst for Visible-Light Oxidation of Benzene to Phenol: Experimental and Mechanistic Study, J. Phys. Chem. C 122 (2018) 27477–27485. https://doi.org/10.1021/acs.jpcc.8b08788.

[210] F. Sun, Q. Jing, T. Xing, Y. Li, B. Jiang, Y. Zhao, H. Wang, Boosting Photocatalytic H_2 O_2 Fuel Cell Performance with Conjugated Graphite-Phase Carbon Nitride Decorated by Ag Nanoparticles, (2025). https://doi.org/10.1021/acssuschemeng.4c10911.

[211] M.A. Qaiser, S. Khan, W.A. Qureshi, S.N. uz Z. Haider, W. Wang, Q. Liu, Eco-friendly sacrificial agents-free photocatalytic synthesis of hydrogen peroxide: Recent innovations and future prospects, Int. J. Hydrogen Energy 95 (2024) 935–956. https://doi.org/10.1016/j.ijhydene.2024.11.272.

[212] Y. He, Y. Wang, J. Qian, K. Xu, B. Lu, S. Tang, Y. Liu, J. Shen, Efficient photocatalytic H_2O_2 production and green oxidation of glycerol over a $SrCoO_3$-incorporated catalyst, Appl. Catal. B Environ. 361 (2025). https://doi.org/10.1016/j.apcatb.2024.124565.

[213] A. Shrivastava, J. Kuntail, U. Kumar, I. Sinha, Co-adsorption mechanism of organic pollutants on $NiFe_2O_4$/GO nanostructures: Experimental and molecular dynamics studies, J. Mol. Liq. 389 (2023) 122932. https://doi.org/10.1016/J.MOLLIQ.2023.122932.

[214] X. Zhou, J. Liang, L. Xu, S. Wu, M. Xie, Q. Liang, J. Luo, X. Fan, X. Zhou, X. Zhou, Weakness-complementing Z-scheme black phosphorus/TiO_2 heterojunction with efficient charge separation and photocatalytic overall water splitting activity, J. Colloid Interface Sci. 689 (2025) 1–10. https://doi.org/10.1016/j.jcis.2025.03.029.

[215] Y. Xian, Z. Li, L. Peng, J. Luo, X. Ning, X. Zhou, X. Zhou, MoB_2 modified g-C_3N_4: A Schottky junction with enhanced interfacial redox activity and charge separation for efficient photocatalytic H_2 evolution, Sep. Purif. Technol. 345 (2024) 127337. https://doi.org/10.1016/j.seppur.2024.127337.

[216] B. Sun, X. Sun, W. Chen, Y. Zhou, W. Zhang, Q. Nie, X. Lin, Y. Li, Y. Liu, Efficient metal bridged TiO_2/Bi/BiOI photocatalyst for tetracycline degradation by defect mediated construction strategy, Colloids Surfaces A Physicochem. Eng. Asp. 711 (2025) 136384. https://doi.org/10.1016/j.colsurfa.2025.136384.

[217] S. Pal, P.N. Singh, A. Verma, A. Kumar, D. Tiwary, R. Prakash, I. Sinha, Visible light photo-Fenton catalytic properties of starch functionalized iron oxyhydroxide nanocomposites, Environ. Nanotechnology, Monit. Manag. 14 (2020) 100311. https://doi.org/10.1016/J.ENMM.2020.100311.

[218] A. Bumajdad, S. Ali, A. Mathew, Characterization of iron hydroxide/oxide nanoparticles prepared in microemulsions stabilized with cationic/non-ionic surfactant mixtures, J. Colloid Interface Sci. 355 (2011) 282–292. https://doi.org/10.1016/j.jcis.2010.12.022.

[219] W. Huang, C. Jing, X. Zhang, M. Tang, L. Tang, M. Wu, N. Liu, Integration of plasmonic effect into spindle-shaped MIL-88A(Fe): Steering charge flow for enhanced visible-light photocatalytic degradation of ibuprofen, Chem. Eng. J. 349 (2018) 603–612. https://doi.org/10.1016/j.cej.2018.05.121.

[220] Y. Ma, M. Fa, Y. Zhang, L. Xiong, X. Li, S. Zhou, International Journal of Hydrogen Energy A $AgPd_3$/2D-CdS photocatalyst : The function of $AgPd_3$ cocatalyst , and the enhanced photocatalytic hydrogen generation property under visible light, Int. J. Hydrogen Energy 116 (2025) 378–388. https://doi.org/10.1016/j.ijhydene.2025.03.157.

[221] S. Li, G. Dong, R. Hailili, L. Yang, Y. Li, F. Wang, Y. Zeng, C. Wang, Effective photocatalytic H_2O_2 production under visible light irradiation at g-C_3N_4 modulated by carbon vacancies, Appl. Catal. B Environ. 190 (2016) 26–35. https://doi.org/10.1016/J.APCATB.2016.03.004.

[222] Z. Lu, Z. Yu, J. Dong, M. Song, Y. Liu, X. Liu, Z. Ma, H. Su, Y. Yan, P. Huo, Facile microwave synthesis of a Z-scheme imprinted $ZnFe_2O_4$/Ag/PEDOT with the specific recognition ability towards improving photocatalytic activity and selectivity

for tetracycline, Chem. Eng. J. 337 (2018) 228–241. https://doi.org/10.1016/j.cej.2017.12.115.

[223] W. Zhang, C. Jiang, H. Guan, Y. Wang, Y. Hu, W. Wang, W. Tian, L. Hao, Unlocking OER catalytic potential and chiral Fe_3O_4 film as a game-changer for electrochemical water oxidation pathway and by-product control, Mater. Adv. 5 (2024) 1340–1347. https://doi.org/10.1039/d3ma00854a.

[224] N. Padmavathy, I. Chakraborty, A. Kumar, A. Roy, S. Bose, K. Chatterjee, Fe_3O_4@Ag and Ag@Fe_3O_4 Core–Shell Nanoparticles for Radiofrequency Shielding and Bactericidal Activity, ACS Appl. Nano Mater. 5 (2022) 237–248. https://doi.org/10.1021/acsanm.1c02722.

[225] T. Garg, Nitansh, S. Kaur, P. Kaur, B. Singh, S. Singhal, Photo-Fenton degradation of tetracyclines over cascade dual Z-scheme g-C_3N_4/MoS_2/$ZnFe_2O_4$ heterojunction: Degradation pathways, mechanistic insights and fluorescence recognition, Appl. Mater. Today 43 (2025) 102650. https://doi.org/10.1016/j.apmt.2025.102650.

[226] C. Singh, Devika, R. Malik, V. Kumar, S. Singhal, CdS nanorod-MFe_2O_4 (M = Zn, Co and Ni) nanocomposites: A heterojunction synthesis strategy to mitigate environmental deterioration, RSC Adv. 5 (2015) 89327–89337. https://doi.org/10.1039/c5ra13837j.

[227] U. Kumar, E. Picheau, H. Li, Z. Zhang, T. Kikuchi, I. Sinha, R. Ma, Constructing a 2D Heterointerface of MoS_2/$MnIn_2S_4$ with Improved Interfacial Charge Carrier Transfer for Photocatalytic H_2O_2 Production, ACS Appl. Energy Mater. (2025). https://doi.org/10.1021/acsaem.4c03296.

[228] W. Miao, Y. Wang, Y. Liu, H. Qin, C. Chu, S. Mao, Persulfate-induced three coordinate nitrogen (N_3C) vacancies in defective carbon nitride for enhanced

photocatalytic H_2O_2 evolution, Engineering (2022). https://doi.org/10.1016/j.eng.2021.12.016.

[229] J. Tian, T. Wu, D. Wang, Y. Pei, M. Qiao, B. Zong, One-pot synthesis of potassium and phosphorus-doped carbon nitride catalyst derived from urea for highly efficient visible light-driven hydrogen peroxide production, Catal. Today 330 (2019) 171–178. https://doi.org/10.1016/j.cattod.2018.07.039.

[230] C. Feng, L. Tang, Y. Deng, J. Wang, J. Luo, Y. Liu, X. Ouyang, H. Yang, J. Yu, J. Wang, Synthesis of Leaf-Vein-Like g-C_3N_4 with Tunable Band Structures and Charge Transfer Properties for Selective Photocatalytic H_2O_2 Evolution, Adv. Funct. Mater. 30 (2020). https://doi.org/10.1002/adfm.202001922.

[231] X. Chen, W. Zhang, L. Zhang, L. Feng, C. Zhang, J. Jiang, T. Yan, H. Wang, Sacrificial agent-free photocatalytic H_2O_2 evolution via two-electron oxygen reduction using a ternary α-Fe_2O_3/CQD@g-C_3N_4 photocatalyst with broad-spectrum response, J. Mater. Chem. A 8 (2020) 18816–18825. https://doi.org/10.1039/D0TA05753C.

[232] G. Zuo, S. Liu, L. Wang, H. Song, P. Zong, W. Hou, B. Li, Z. Guo, X. Meng, Y. Du, T. Wang, V.A.L. Roy, Finely dispersed Au nanoparticles on graphitic carbon nitride as highly active photocatalyst for hydrogen peroxide production, Catal. Commun. 123 (2019) 69–72. https://doi.org/10.1016/j.catcom.2019.02.011.

[233] Y. Yang, C. Zhang, D. Huang, G. Zeng, J. Huang, C. Lai, C. Zhou, W. Wang, H. Guo, W. Xue, R. Deng, M. Cheng, W. Xiong, Boron nitride quantum dots decorated ultrathin porous g-C_3N_4: Intensified exciton dissociation and charge transfer for promoting visible-light-driven molecular oxygen activation, Appl. Catal. B Environ. 245 (2019) 87–99. https://doi.org/10.1016/j.apcatb.2018.12.049.

[234] Y. Li, F. Ma, L. Zheng, Y. Liu, Z. Wang, P. Wang, Z. Zheng, H. Cheng, Y. Dai, B. Huang, Boron containing metal-organic framework for highly selective photocatalytic production of H_2O_2 by promoting two-electron O2reduction, Mater. Horizons 8 (2021) 2842–2850. https://doi.org/10.1039/d1mh00869b.

[235] Y. Pan, X. Yuan, L. Jiang, H. Wang, H. Yu, J. Zhang, Stable self-assembly AgI/UiO-$_{66}(NH_2)$ heterojunction as efficient visible-light responsive photocatalyst for tetracycline degradation and mechanism insight, Chem. Eng. J. 384 (2020) 123310. https://doi.org/10.1016/j.cej.2019.123310.

[236] D.H. Cui, Y.F. Zheng, X.C. Song, A novel visible-light-driven photocatalyst Ag_2O/AgI with highly enhanced photocatalytic performances, J. Alloys Compd. 701 (2017) 163–169. https://doi.org/10.1016/j.jallcom.2017.01.106.

[237] J. Zhang, Z. Ma, Ag_3VO_4/AgI composites for photocatalytic degradation of dyes and tetracycline hydrochloride under visible light, Mater. Lett. 216 (2018) 216–219. https://doi.org/10.1016/j.matlet.2018.01.035.

[238] W. Zhang, L. Zhou, J. Shi, H. Deng, Fabrication of novel visible-light-driven AgI/g-C_3N_4 composites with enhanced visible-light photocatalytic activity for diclofenac degradation, J. Colloid Interface Sci. 496 (2017) 167–176. https://doi.org/10.1016/j.jcis.2017.02.022.

[239] M. Xu, W. De Zhang, Facile Preparation of AgI/Bi_2MoO_6 Heterostructured Photocatalysts with Enhanced Photocatalytic Activity, Eur. J. Inorg. Chem. 2016 (2016) 826–831. https://doi.org/10.1002/ejic.201501260.

[240] F. Chen, Q. Yang, J. Sun, F. Yao, S. Wang, Y. Wang, X. Wang, X. Li, C. Niu, D. Wang, G. Zeng, Enhanced Photocatalytic Degradation of Tetracycline by AgI/BiVO4 Heterojunction under Visible-Light Irradiation: Mineralization Efficiency and

Mechanism, ACS Appl. Mater. Interfaces 8 (2016) 32887–32900. https://doi.org/10.1021/acsami.6b12278.

[241] H. Yu, B. Huang, H. Wang, X. Yuan, L. Jiang, Z. Wu, J. Zhang, G. Zeng, Facile construction of novel direct solid-state Z-scheme AgI/BiOBr photocatalysts for highly effective removal of ciprofloxacin under visible light exposure: Mineralization efficiency and mechanisms, J. Colloid Interface Sci. 522 (2018) 82–94. https://doi.org/10.1016/j.jcis.2018.03.056.

[242] H. Yao, H. Zhang, C. Lin, D. Fang, M. Tie, J. Wang, Z. Zhang, Immobilized Z-scheme Ag|AgBr/Ag/$FeTiO_3$ nanocomposite film photocatalyst for visible-light-driven photocatalytic degradation of norfloxacin with simultaneous hydrogen evolution and mechanism perspective, J. Environ. Chem. Eng. 11 (2023) 111621. https://doi.org/10.1016/j.jece.2023.111621.

[243] L. Li, H. Feng, X. Wei, K. Jiang, S. Xue, P.K. Chu, Ag as cocatalyst and electron-hole medium in CeO_2 QDs/Ag/Ag_2 Se Z-scheme heterojunction enhanced the photo-electrocatalytic properties of the photoelectrode, Nanomaterials 10 (2020). https://doi.org/10.3390/nano10020253.

[244] Y. Zou, J.W. Shi, D. Ma, Z. Fan, C. Niu, L. Wang, Fabrication of g-C_3N_4/Au/C-TiO_2 Hollow Structures as Visible-Light-Driven Z-Scheme Photocatalysts with Enhanced Photocatalytic H_2 Evolution, ChemCatChem 9 (2017) 3752–3761. https://doi.org/10.1002/cctc.201700542.

[245] M. Amiri, K. Dashtian, M. Ghaedi, S. Mosleh, R. Jannesar, Bi_2WO_6/Ag_3PO_4-Ag Z-scheme heterojunction as a new plasmonic visible-light-driven photocatalyst: Performance evaluation and mechanism study, New J. Chem. 43 (2019) 1275–1284. https://doi.org/10.1039/c8nj05195j.

[246] J. Wei, Q. Wang, M. He, S. Li, Y. Zhang, Y. Yang, S. Luo, L. Fu, X. Wang, T. Yang, Construction of Fe(III) doping modified AgI/NH_2-MIL-68(In/Fe) Z-scheme heterojunction photocatalysts through unique internal and interfacial charge transmission and separation efficiency, Appl. Surf. Sci. 612 (2023) 155726. https://doi.org/10.1016/j.apsusc.2022.155726.

[247] N. Jatav, U. Kumar, A. Shrivastava, N. Singh, I. Sinha, Fabrication of Ag_2MoO_4/$CuWO_4$ Nanocomposite Photocatalyst for the Degradation of Rhodamine-B, ChemistrySelect 9 (2024) 1–9. https://doi.org/10.1002/slct.202400963.

[248] U. Kumar, I. Sinha, Visible light photo-Fenton degradation of p-nitrophenol on Ag/Fe_3O_4/WO_3 nanocomposites: Experimental and molecular dynamics investigations, J. Environ. Chem. Eng. 11 (2023) 111280. https://doi.org/10.1016/j.jece.2023.111280.

[249] J. Wang, L. Yang, L. Zhang, Constructed 3D hierarchical micro-flowers $CoWO_4$@Bi_2WO_6 Z-scheme heterojunction catalyzer: Two-channel photocatalytic H_2O_2 production and antibiotics degradation, Chem. Eng. J. 420 (2021) 127639. https://doi.org/10.1016/J.CEJ.2020.127639.

[250] Y. Yang, Q. Wang, X. Zhang, X. Deng, Y. Guan, M. Wu, L. Liu, J. Wu, T. Yao, Y. Yin, Photocatalytic generation of H_2O_2 over a Z-scheme Fe_2O_3@C@1T/2H-MoS_2 heterostructured catalyst for high-performance Fenton reaction, J. Mater. Chem. A 11 (2023) 1991–2001. https://doi.org/10.1039/D2TA08145H.

[251] Y.X. Ye, J. Pan, F. Xie, L. Gong, S. Huang, Z. Ke, F. Zhu, J. Xu, G. Ouyang, Highly efficient photosynthesis of hydrogen peroxide in ambient conditions, Proc. Natl. Acad. Sci. U. S. A. 118 (2021). https://doi.org/10.1073/pnas.2103964118.

[252] X. Liu, X. Dong, Y. Wang, J. Gao, N. Zheng, X. Zhang, Polyimide/$ZnIn_2S_4$ heterostructures toward outstanding photocatalytic H_2O_2 production from pure water and air, Appl. Surf. Sci. 643 (2024) 158637. https://doi.org/10.1016/j.apsusc.2023.158637.

[253] Y. Mou, X. Wu, C. Qin, J. Chen, Y. Zhao, L. Jiang, C. Zhang, X. Yuan, E. Huixiang Ang, H. Wang, Linkage Microenvironment of Azoles-Related Covalent Organic Frameworks Precisely Regulates Photocatalytic Generation of Hydrogen Peroxide, Angew. Chemie Int. Ed. 62 (2023) e202309480. https://doi.org/10.1002/ANIE.202309480.

[254] F. Liu, P. Zhou, Y. Hou, H. Tan, Y. Liang, J. Liang, Q. Zhang, S. Guo, M. Tong, J. Ni, Covalent organic frameworks for direct photosynthesis of hydrogen peroxide from water, air and sunlight, Nat. Commun. 2023 141 14 (2023) 1–10. https://doi.org/10.1038/s41467-023-40007-4.

[255] H. Zhang, X. Bai, Protonated g-C_3N_4 coated Co_9S_8 heterojunction for photocatalytic H_2O_2 production, J. Colloid Interface Sci. 627 (2022) 541–553. https://doi.org/10.1016/J.JCIS.2022.07.077.

[256] X. Zeng, Y. Liu, Y. Kang, Q. Li, Y. Xia, Y. Zhu, H. Hou, M.H. Uddin, T.R. Gengenbach, D. Xia, C. Sun, D.T. McCarthy, A. Deletic, J. Yu, X. Zhang, Simultaneously Tuning Charge Separation and Oxygen Reduction Pathway on Graphitic Carbon Nitride by Polyethylenimine for Boosted Photocatalytic Hydrogen Peroxide Production, ACS Catal. 10 (2020) 3697–3706. https://doi.org/10.1021/acscatal.9b05247.

[257] X. Zhao, Y. You, S. Huang, Y. Wu, Y. Ma, G. Zhang, Z. Zhang, Z-scheme photocatalytic production of hydrogen peroxide over $Bi_4O_5Br_2$/g-C_3N_4

heterostructure under visible light, Appl. Catal. B Environ. 278 (2020) 119251. https://doi.org/10.1016/J.APCATB.2020.119251.

[258] H. Chen, Y. Xing, S. Liu, Y. Liang, J. Fu, L. Wang, W. Wang, Mechanistic insights into efficient photocatalytic H_2O_2 production of 2D/2D g-C3N4/In_2S_3 photocatalyst by tracking charge flow direction, Chem. Eng. J. 462 (2023) 142038. https://doi.org/10.1016/J.CEJ.2023.142038.

[259] C. Lai, M. Xu, F. Xu, B. Li, D. Ma, Y. Li, L. Li, M. Zhang, D. Huang, L. Tang, S. Liu, H. Yan, X. Zhou, Y. Fu, H. Yi, An S-scheme CdS/$K_2Ta_2O_6$ heterojunction photocatalyst for production of H_2O_2 from water and air, Chem. Eng. J. 452 (2023) 139070. https://doi.org/10.1016/J.CEJ.2022.139070.

[260] E. Zhang, Q. Zhu, J. Huang, J. Liu, G. Tan, C. Sun, T. Li, S. Liu, Y. Li, H. Wang, X. Wan, Z. Wen, F. Fan, J. Zhang, K. Ariga, Visually resolving the direct Z-scheme heterojunction in CdS@$ZnIn_2S_4$ hollow cubes for photocatalytic evolution of H2 and H_2O_2 from pure water, Appl. Catal. B Environ. 293 (2021) 120213..

[261] H. Zhang, X. Bai, Photocatalytic production of hydrogen peroxide over Z-scheme Mn_3O_4/Co_9S_8 with p-n heterostructure, Appl. Catal. B Environ. 298 (2021) 120516. https://doi.org/10.1016/J.APCATB.2021.120516.

[262] Y. Zheng, T. Gao, S. Chen, C.T.J. Ferguson, K.A.I. Zhang, F. Fang, Y. Shen, N.A. Khan, L. Wang, L. Ye, $CsPbBr_3$ quantum dots-decorated porous covalent triazine frameworks nanocomposites for enhanced solar-driven H_2O_2 production, Compos. Commun. 36 (2022) 101390. https://doi.org/10.1016/J.COCO.2022.101390.

List of Publications

(1) **Kumar, U**.; Kuntail, J.; Kumar, A.; Prakash, R.; Pai, M. R.; Sinha, I. In-Situ H_2O_2 Production for Tetracycline Degradation on Ag/s-(Co_3O_4/$NiFe_2O_4$) Visible Light Magnetically Recyclable Photocatalyst. *Appl. Surf. Sci.* **2022**, *589,* 153013. https://doi.org/10.1016/j.apsusc.2022.153013.

(2) **Kumar, U**.; Shrivastava, A.; De, A. K.; Pai, M. R.; Sinha, I. Fenton Reaction by H_2 O_2 Produced on a Magnetically Recyclable Ag/$CuWO_4$/$NiFe_2O_4$ Photocatalyst . *Catal. Sci. Technol.* **2023,** 13(8), 2432-2446. https://doi.org/10.1039/d3cy00102d.

(3) **Kumar, U.**; Sinha, I. Visible Light Photo-Fenton Degradation of p-Nitrophenol on Ag/Fe_3O_4/WO_3 Nanocomposites: Experimental and Molecular Dynamics Investigations. *J. Environ. Chem. Eng.* **2023**, *11* (6), 111280. https://doi.org/10.1016/j.jece.2023.111280.

(4) **Kumar, U**.; Sanket, K.; Mandal, R.; Kumar De, A.; Shrivastava, A.; Behera, S. K.; Sinha, I. Silver Nanoparticle-Decorated $NiFe_2O_4$/$CuWO_4$ Heterostructure Electrocatalyst for Oxygen Evolution Reactions. *Phys. Chem. Chem. Phys.* **2024**, *26* (20), 14883–14897. https://doi.org/10.1039/d4cp00473f.

(5) **Kumar, U.**; Sinha, I.; Mishra, T. Synthesis and Photocatalytic Evaluation of 2D MoS_2/TiO_2 Heterostructure Photocatalyst for Organic Pollutants Degradation. *Mater. Today Proc.* **2023**, *112*, 66-72. https://doi.org/10.1016/j.matpr.2023.08.061.

(6) **Kumar, U**.; Picheau, E.; Li, H.; Zhang, Z.; Kikuchi, T.; Sinha, I.; Ma, R. Constructing a 2D Heterointerface of MoS_2/$MnIn_2S_4$ with Improved Interfacial Charge Carrier Transfer for Photocatalytic H_2O_2 Production. *ACS Appl. Energy Mater.* **2025,** *8*(5), 3107-3119. https://doi.org/10.1021/acsaem.4c03296.

(7) **Kumar , U**.; Shrivastava, A.; Sinha, I. In situ use of photocatalytically produced H_2O_2 for Fenton degradation of organic pollutants. *Catalysis Science & Technology*, 2024, *14*(10), 2668-2683. https://doi.org/10.1039/D3CY01769A.

(8) **Kumar, U**. and Sinha, I., Elsevier. Graphitic carbon nitride-based materials for photoelectrochemical water splitting. In *Photoelectrochemical Engineering for Solar*

Harvesting, 2024, 353-372. https://doi.org/10.1016/B978-0-323-95494-5.00006-9.

(9) Sanket, K[#].; **Kumar, U[#] (# Equal Contribution)**.; Sinha, I.; Behera, S. K. An Oxycarbide-Derived-Carbon Supported Nickel Ferrite/Copper Tungstate Ternary Composite for Enhanced Electrocatalytic Activity towards the Oxygen Evolution Reaction. *Dalt. Trans.* **2024**, 797–810. https://doi.org/10.1039/d4dt02688h.

(10) Shrivastava, A.; **Kumar, U**.; Sinha, I. Design and Development of the AgI/NiFe2O4 Photo-Fenton Photocatalyst. *Ind. Eng. Chem. Res.* **2024**, *63* (36), 15721–15734. https://doi.org/10.1021/acs.iecr.4c01386.

(11) De, A. K.; **Kumar, U**.; Jatav, N.; Sinha, I. Cd-Doped $Ag_2O/BiVO_4$ Visible Light Z-Scheme Photocatalyst for Efficient Ciprofloxacin Degradation. *RSC Adv.* **2022**, *12* (55), 35639–35648. https://doi.org/10.1039/D2RA07200A.

(12) Kuntail, J.; **Kumar, U.**; Sinha, I. Insight into Photo-Fenton Reaction Mechanism on a Magnetite-GO Nanocomposite: Computational and Experimental Investigations. *Mol. Catal.* **2022**, *528* (January), 112491. https://doi.org/10.1016/j.mcat.2022.112491.

(13) Singh, N.; **Kumar, U.**; Jatav, N.; Sinha, I. Photocatalytic Degradation of Crystal Violet on Cu, Zn Doped $BiVO_4$ Particles. *Langmuir* **2024**, *40* (16), 8450–8462. https://doi.org/10.1021/acs.langmuir.3c04039.

(14) Yadav, M.; **Kumar, U**.; Kumar De, A.; Sinha, I. Neutral PH Fenton and Photo-Fenton Activity of Mo-Doped Iron-Pyrite Particles. *Phys. Chem. Chem. Phys.* **2024**, *26* (34), 22442–22453. https://doi.org/10.1039/d4cp00793j.

(15) Jatav, N.; **Kumar, U**.; Shrivastava, A.; Singh, N.; Sinha, I. Fabrication of $Ag_2MoO_4/CuWO_4$ Nanocomposite Photocatalyst for the Degradation of Rhodamine-B. *ChemistrySelect* **2024**, *9* (31), 1–9. https://doi.org/10.1002/slct.202400963.

(16) Anuraag, N. S.; **Kumar, U**.; Pradhan, S.; Shaw, S. K.; Sharma, A.; Sinha, I.; Prasad, N. K. Rhombohedral Phase High-Entropy Alloy of AlMnCuZnBi as a Photo-Fenton Catalyst for Methyl Orange Degradation. *J. Alloys Compd.* **2025**, *1010* (September 2024), 177142. https://doi.org/10.1016/j.jallcom.2024.177142.

(17) Anuraag, N. S.; **Kumar, U**.; Sinha, I.; Prasad, N. K. Nanoparticles of MnFeNiCuBi High

Entropy Alloy as Catalyst for Fenton and Photo-Fenton Decomposition of p-Nitrophenol. *Inorg. Chem. Commun.* **2024**, *167* (April), 112843. https://doi.org/10.1016/j.inoche.2024.112843.

(18) De, A. K.; Kamal, N.; **Kumar, U**.; Jatav, N.; Sinha, I. The Bandgap of Sulfur-Doped Ag_2O Nanoparticles. *Phys. Chem. Chem. Phys.* **2022**, *25* (3), 2320–2330. https://doi.org/10.1039/d2cp05236a.

(19) Shrivastava, A.; Kuntail, J .; **Kumar, U**. ; Sinha, I. Co-Adsorption Mechanism of Organic Pollutants on $NiFe_2O_4$/GO Nanostructures: Experimental and Molecular Dynamics Studies. *J. Mol. Liq.* **2023**, *389*, 122932. https://doi.org/10.1016/J.MOLLIQ.2023.122932.

(20) Pal, S.; Kumar, A.; **Kumar, U**.; Prakash, R.; Sinha, I. Visible light photo-Fenton catalytic properties of starch functionalized α-FeOOH/β-FeOOH/Cu_2O p-n-p heterojunction nanostructures." *Materials Science in Semiconductor Processing* 167 (2023): 107766. https://doi.org/10.1016/j.mssp.2023.107766.

(21) Kumar, D.; Anuraag, N. S.; Mohapatra, C.; **Kumar, U**.; Sarkar, D.; Vasundhara, M.; Sinha, I.; Upadhyay, C.; Prasad, N. K. R-GO Coated Magnetic High Entropy Alloy/Oxide Nanocomposites as Highly Efficient Fenton and Photo-Fenton Catalysts. *Ceram. Int.* **2024**, *50* (7), 12146–12157. https://doi.org/10.1016/j.ceramint.2024.01.118.

(22) Singh, R. V.; Pai, M. R.; Banerjee, A. M.; Shrivastava, A.; **Kumar, U**.; Sinha, I.; Dutta, B.; Hassan, P. A.; Ningthoujam, R. S.; Ghosh, R.; Nath, S.; Sharma, R. K.; Jagannath, N.; Bapat, R. D. Interfacial Engineering over Pt-Calcium Ferrite/2D Carbon Nitride Nanosheet p-n Heterojunctions for Superior Photocatalytic Properties. *ACS Omega* **2024,** *9*(38), 40182-40203. https://doi.org/10.1021/acsomega.4c06353.

(23) Shrivastava, A.; **Kumar, U**.; Sinha, I. Photo-Fenton degradation on Mo-doped-$NiFe_2O_4$ photocatalyst . *Dalt. Trans.* **2025**,. DOI: 10.1039/D4DT03359K.

(24) Sachan, D.; Singh, N.; **Kumar, U.**; Kuntail, J.; Sinha, I.; Singh, R.;.Design of medium entropy oxide for photo-Fenton catalytic degradation of tetracycline 582 (2025), 115187.

List of Conferences

(1) MetWaste-2023: **Uttam Kumar**, "Fenton Reaction by H_2O_2 Produced on a Magnetically Recyclable Ag/$CuWO_4$/$NiFe_2O_4$ Photocatalyst" International Conference on Management and Recycling of Metallurgical Wastes. (IIT BHU), Varanasi, February 27-28, 2023.

(2) MetWaste-2023: **Uttam Kumar**, "Synthesis and photocatalytic evaluation of 2D MoS_2/TiO_2 heterostructure photocatalyst for organic pollutant degradation," International Conference on Management and Recycling of Metallurgical Wastes. (IIT BHU), Varanasi, February 27-28, 2023.

(3) ISMC-2022: **Uttam Kumar**, "In-situ H_2O_2 production for tetracycline degradation on Ag/s-(Co_3O_4/$NiFe_2O_4$) visible light magnetically recyclable photocatalyst". 9th Interdisciplinary Symposium on Materials Chemistry, BARC (DAE, BRNS), Mumbai, December 7-10, 2022.

(4) SEFCO-2022: **Uttam Kumar, "**Self-Fenton degradation of antibiotic molecules on visible light enhanced magnetically recyclable photocatalyst**".** 6th National Symposium on Shaping and Energy Future: Challenges and Opportunities, CSIR IIP, Dehradun, August 26-27, 2022.

(5) 4 Minutes Research Pitch: **Uttam Kumar**, "Development of magnetically recyclable visible light photocatalyst for H_2O_2 production". IIS Deemed University, Jaipur, April 15-16, 2022.

(6) RIC-2022: **Uttam Kumar** "In situ H_2O_2 production for organic pollutant degradation on visible light magnetically recyclable photocatalyst." Research and Industrial Conclave, IIT Guwahati and IIT Guwahati Research Park, January 20-23, 2022.

(7) ICAMP 2022: **Uttam Kumar "**H_2O_2 production and its in-situ utilization for tetracycline degradation on Ag/s-(Co_3O_4/$NiFe_2O_4$) visible light magnetically recyclable photocatalysts, International Conference on Advances in Materials processing, NIT- Raipur, January 8-9, 2022**.**