

DAFTAR PUSTAKA

- Abdullah, Mikrajuddin. 2012. Institut Teknologi Bandung *Pengantar Nanoteknologi*.
- Abid, Namra et al. 2022. "Synthesis of Nanomaterials Using Various Top-down and Bottom-up Approaches, Influencing Factors, Advantages, and Disadvantages: A Review." *Advances in Colloid and Interface Science* 300: 102597.
- Alijani, Hajar Q. et al. 2020. "Bimetallic Nickel-Ferrite Nanorod Particles: Greener Synthesis Using Rosemary and Its Biomedical Efficiency." *Artificial Cells, Nanomedicine and Biotechnology* 48(1): 242–51.
- Alzoubi, Gassem M. 2020. "Probing the Structural and Magnetic Properties of Small Crystalline Nickel Ferrite Nanoparticles near the Upper Size Limit of the Single-Domain Regime." *Advances in Applied Ceramics* 119(4): 224–32.
- Amiri, Mahnaz et al. 2018. "Magnetic Nickel Ferrite Nanoparticles: Green Synthesis by Urtica and Therapeutic Effect of Frequency Magnetic Field on Creating Cytotoxic Response in Neural Cell Lines." *Colloids and Surfaces B: Biointerfaces* 172: 244–53.
- Amrulloh, Yasir et al. 2025. "Feasible Synthesis of Nickel Ferrite Using Uncaria Gambir Roxb. Leaf Extract for Removal of Phosphate from Aqueous Solution." *Results in Surfaces and Interfaces* 18. <https://doi.org/10.1016/j.rsurfi.2024.100404>.
- Amulya, M.A. Shilpa et al. 2020. "Sonochemical Synthesis of NiFe₂O₄ Nanoparticles: Characterization and Their Photocatalytic and Electrochemical Applications." *Applied Surface Science Advances* 1: 100023.
- Annisa, Rahmi. 2017. *Green Synthesis Material ZnFe₂O₄ Dan ZnO-ZnFe₂O₄ Menggunakan Ekstrak Daun Gambir (Uncaria Gambir Roxb) Dan Aplikasinya Terhadap Degradasi Zat Warna Metilen Biru*. Skripsi Jurusan Kimia Unand.
- Arief, Syukri, Fri Wardana Nasution, Zulhadjri, and Arniati Labanni. 2020. "High Antibacterial Properties of Green Synthesized Gold Nanoparticles Using Uncaria Gambir Roxb. Leaf Extract and Triethanolamine." *Journal of Applied Pharmaceutical Science* 10(8): 124–30.
- Bahl, Christian Robert Haffenden. 2006. 30 DTU Library "The Magnetic Properties of Antiferromagnetic Nanoparticles: NiO and α -Fe₂O₃." Technical University of Denmark (DTU).
- Bashir, A. K.H. et al. 2020. "Investigation of Electrochemical Performance, Optical and Magnetic Properties of NiFe₂O₄ Nanoparticles Prepared by a Green Chemistry Method." *Physica E: Low-dimensional Systems and Nanostructures* 119: 114002.
- Bhosale, Ankush B., Sandeep B. Somvanshi, V. D. Murumkar, and K. M. Jadhav. 2020. "Influential Incorporation of RE Metal Ion (Dy³⁺) in Yttrium Iron Garnet (YIG) Nanoparticles: Magnetic, Electrical and Dielectric Behaviour." *Ceramics International* 46(10): 15372–78. <https://doi.org/10.1016/j.ceramint.2020.03.081>.
- Bhuyan, Bishal, Bappi Paul, Arijita Paul, and Siddhartha Sankar Dhar. 2018.

- “*Paederia Foetida* Linn. Promoted Synthesis of CoFe_2O_4 and NiFe_2O_4 Nanostructures and Their Photocatalytic Efficiency.” *IET Nanobiotechnology* 12(3): 235–40.
- Chauhan, Chetna C. et al. 2022. “Tailoring Magnetic and Dielectric Properties of $\text{SrFe}_{12}\text{O}_{19}/\text{NiFe}_2\text{O}_4$ Ferrite Nanocomposites Synthesized in Presence of *Calotropis Gigantea* (Crown) Flower Extract.” *Journal of Alloys and Compounds* 900: 163415.
<https://linkinghub.elsevier.com/retrieve/pii/S0925838821048258> (January 25, 2022).
- De-Bashan, Luz E., and Yoav Bashan. 2004. “Recent Advances in Removing Phosphorus from Wastewater and Its Future Use as Fertilizer (1997–2003).” *Water Research* 38(19): 4222–46.
- Elisma, N. et al. 2019. “Green Synthesis of Copper Nanoparticles Using *Uncaria Gambir* Roxb. Leaf Extract and Its Characterization.” *Rasayan Journal of Chemistry* 12(4): 1752–56.
- Fithri, Najma Annuria et al. 2025. “*Uncaria Gambir* Based Green Synthesis of Inorganic Nanoparticles for Photothermal Induced Thrombolytic and Antibacterial Applications.” *Science and Technology Indonesia* 10(1): 303–14.
- Ghosh, Mritunjoy Prasad et al. 2020. “Tuning the Microstructural, Optical and Superexchange Interactions with Rare Earth Eu Doping in Nickel Ferrite Nanoparticles.” *Materials Chemistry and Physics* 241: 122383.
- Gökırmak Söğüt, Eda, and Mehmet Gülcan. 2023. “Adsorption: Basics, Properties, and Classification.” *Adsorption through Advanced Nanoscale Materials: Applications in Environmental Remediation*: 3–21.
- Gu, Wei et al. 2018. “Science of the Total Environment Removal of Phosphate from Water by Amine-Functionalized Copper Ferrite Chelated with La (III).” *Science of the Total Environment* 619–620: 42–48.
<https://doi.org/10.1016/j.scitotenv.2017.11.098>.
- Handani, Sri, Emriadi, Dahyunir Dahlan, and Syukri Arief. 2020. “Enhanced Structural, Optical and Morphological Properties of ZnO Thin Film Using Green Chemical Approach.” *Vacuum* 179: 109513.
- Huang, Weiya, Yuanming Zhang, and Dan Li. 2017. “Adsorptive Removal of Phosphate from Water Using Mesoporous Materials: A Review.” *Journal of Environmental Management*.
<http://dx.doi.org/10.1016/j.jenvman.2017.02.030>.
- Jabbar, Kadhim Q., Azeez A. Barzinjy, and Samir M. Hamad. 2022. “Iron Oxide Nanoparticles: Preparation Methods, Functions, Adsorption and Coagulation/flocculation in Wastewater Treatment.” *Environmental Nanotechnology, Monitoring and Management* 17(August 2021): 100661.
<https://doi.org/10.1016/j.enmm.2022.100661>.
- Jadhav, Swapnil A et al. 2022. “Photocatalytic Activity of Nickel Ferrite Nanoparticles Synthesized via Sol-Gel Auto Combustion Method.” *Advanced Materials Research* 1169: 123–27.
<https://www.scientific.net/AMR.1169.123>.
- Jadhav, Swapnil A., Mangesh V. Khedkar, Sandeep B. Somvanshi, and K. M. Jadhav. 2021. “Magnetically Retrievable Nanoscale Nickel Ferrites: An Active Photocatalyst for Toxic Dye Removal Applications.” *Ceramics*

- International* 47(20): 28623–33.
<https://doi.org/10.1016/j.ceramint.2021.07.021>.
- Kamal, Sefrianita et al. 2022. “Simultaneous TLC-Densitometric Analysis of Catechin, Pyrocatechol and Quercetine in Gambir Block from Pesisir Selatan.” *Heliyon* 8(3): e08985.
<https://doi.org/10.1016/j.heliyon.2022.e08985>.
- Karthikeyan, Perumal, P. Sirajudheen, Manuvel Raja Nikitha, and Sankaran Meenakshi. 2020. “Removal of Phosphate and Nitrate via a Zinc Ferrite@activated Carbon Hybrid Composite under Batch Experiments: Study of Isotherm and Kinetic Equilibriums.” *Environmental Nanotechnology, Monitoring & Management* 14: 100378.
- Kefeni, Kebede K., Bhekie B. Mamba, and Titus A.M. Msagati. 2017. “Application of Spinel Ferrite Nanoparticles in Water and Wastewater Treatment: A Review.” *Separation and Purification Technology* 188: 399–422. <http://dx.doi.org/10.1016/j.seppur.2017.07.015>.
- Khoso, Waheed Ali, Noor Haleem, Muhammad Anwar Baig, and Yousuf Jamal. 2021. “Synthesis, Characterization and Heavy Metal Removal Efficiency of Nickel Ferrite Nanoparticles (NFN's).” *Scientific Reports* 11(1): 1–10.
<https://doi.org/10.1038/s41598-021-83363-1>.
- Koca, Fatih Doğan, and Batuhan Şahin. 2024. “Green Synthesis of NiFe₂O₄ Nanoparticles and Evaluation of Their Photocatalytic Activities.” *Inorganic and Nano-Metal Chemistry* 0(0): 1–7.
<https://doi.org/10.1080/24701556.2024.2356034>.
- Koh, Kok Yuen, Sui Zhang, and J. Paul Chen. 2020. “Hydrothermally Synthesized Lanthanum Carbonate Nanorod for Adsorption of Phosphorus: Material Synthesis and Optimization, and Demonstration of Excellent Performance.” *Chemical Engineering Journal* 380: 122153.
- Kulkarni, Govind D et al. 2021. “Green Synthesis and Investigations of Structural, Cation Distribution, Morphological, and Magnetic Properties of Nanoscale Nickel Ferrites: The Effect of Green Fuel Proportion.” *Phase Transitions* 94(12): 994–1005. <https://doi.org/10.1080/01411594.2021.1993221>.
- Kumari, S. Chaitanya, Vivek Dhand, and P. Naga Padma. 2021. “Green Synthesis of Metallic Nanoparticles: A Review.” *Nanomaterials: Application in Biofuels and Bioenergy Production Systems*: 259–81.
- Labanni, Arniati et al. 2020. “The Effect of Monoethanolamine as Stabilizing Agent in Uncaria Gambir Roxb. Mediated Synthesis of Silver Nanoparticles and Its Antibacterial Activity.” *Journal of Dispersion Science and Technology* 41(10): 1480–87.
<https://doi.org/10.1080/01932691.2019.1626249>.
- Lamouri, R. et al. 2020. “Size Effect on the Magnetic Properties of CoFe₂O₄ Nanoparticles: A Monte Carlo Study.” *Ceramics International* 46(6): 8092–96.
- Lapisa, Remon et al. 2024. “The Effect of *Uncaria Gambir* on Optical Properties and Thermal Stability of CNF/PVA Biocomposite Films.” *Journal of Renewable Materials* 0(0): 1–10.
- Lemine, O. M. et al. 2020. “Comparative Heating Efficiency of Hematite (α -Fe₂O₃) and Nickel Ferrite Nanoparticles for Magnetic Hyperthermia Application.” *Ceramics International* 46(18): 28821–27.

- Lofrano, Giusy et al. 2016. "Polymer Functionalized Nanocomposites for Metals Removal from Water and Wastewater: An Overview." *Water Research* 92: 22–37.
- Malik, Abdul Raouf et al. 2022. "Lime Peel Extract Induced NiFe₂O₄ NPs: Synthesis to Applications and Oxidative Stress Mechanism for Anticancer, Antibiotic Activity." *Journal of Saudi Chemical Society* 26(2): 101422.
- Mat Saad, Mohd Faiz et al. 2020. "From Phytochemical Composition to Pharmacological Importance." *Tropical Journal of Pharmaceutical Research* 19(8): 1767–73.
- Munggari, Indah Putri, Dikdik Kurnia, Yusi Deawati, and Euis Julaeaha. 2022. "Current Research of Phytochemical, Medicinal and Non-Medicinal Uses of *Uncaria Gambir* Roxb.: A Review." *Molecules* 27(19).
- Obald, Jaafar Badr, Hassanain Hataf Jaber, and Abdulsalam Mirdin Ali. 2016. "Eco Friendly Synthesis and Characterization of Iron Oxide Nano- Particles by Using *Amaranthus spinosus* Leave Extract and Apply It for Domestic Wastewater Treatment." *International Journal of Research* 3(9): 665–72.
- Qin, Hong et al. 2021. "Spinel Ferrites (MFe₂O₄): Synthesis, Improvement and Catalytic Application in Environment and Energy Field." *Advances in Colloid and Interface Science* 294(July): 102486. <https://doi.org/10.1016/j.cis.2021.102486>.
- Rahaman, Sk Meheub et al. 2023. "Controlled Synthesis of Samarium Trifluoride Nanoparticles in a Water-in-Oil Microemulsion: Effects of Water-to-Surfactant Ratio on Particles and Phosphate Removal." *Journal of Hazardous Materials Advances* 11: 100348.
- Rahmayeni et al. 2019. "Green Synthesis of NiFe₂O₄ Spinel Ferrites Magnetic in the Presence of *Hibiscus Rosa-Sinensis* Leaves Extract: Morphology, Structure and Activity." *Rasayan Journal of Chemistry* 12(4): 1942–49.
- . 2021. "Simbang Darah (*Iresine Herbstii*) Extract Mediated Hydrothermal Method in the Synthesis of Zinc Ferrite Spinel Nanoparticles Used for Photocatalysis and Antibacterial Applications." *Journal of Environmental Chemical Engineering* 9(2): 105140. <https://linkinghub.elsevier.com/retrieve/pii/S2213343721001184> (December 6, 2021).
- Reddy, D. Harikishore Kumar, and Yeoung Sang Yun. 2016. "Spinel Ferrite Magnetic Adsorbents: Alternative Future Materials for Water Purification?" *Coordination Chemistry Reviews* 315: 90–111.
- Rilda, Yetria et al. 2024. "Mucor Sp. (Fungal Philospheric) of Gambir (*Uncaria*) Leaf Surface as a Biosynthetic Mg Doped ZnO Nanorods Media for Antibacterial Applications." *Journal of Dispersion Science and Technology* 45(12): 2291–2301. <https://doi.org/10.1080/01932691.2023.2263544>.
- Safitri, Tria Rizki, and Dwi Puryanti. 2020. "Pengaruh Konsentrasi NH₄OH Terhadap Ukuran Nanopartikel Nikel Ferit (NiFe₂O₄) Yang Disintesis Dengan Metode Kopresipitasi." *Jurnal Fisika Unand* 9(3): 318–22.
- Salih, Shameran Jamal, and Wali M. Mahmood. 2023. "Review on Magnetic Spinel Ferrite (MFe₂O₄) Nanoparticles: From Synthesis to Application." *Heliyon* 9(6): e16601. <https://doi.org/10.1016/j.heliyon.2023.e16601>.
- Sarala, E., M. Vinuth, M. Madhukara Naik, and Y.V. Rami Reddy. 2022. "Green Synthesis of Nickel Ferrite Nanoparticles Using *Terminalia Catappa*:

- Structural, Magnetic and Anticancer Studies against MCF-7 Cell Lines.” *Journal of Hazardous Materials Advances* 8(August): 100150.
- Shen, Wei et al. 2018. “Growth Mechanism of Octahedral like Nickel Ferrite Crystals Prepared by Modified Hydrothermal Method and Morphology Dependent Magnetic Performance.” *Ceramics International* 44(8): 9809–15.
- Shyla, B., Mahadevaiah, and G. Nagendrappa. 2011. “A Simple Spectrophotometric Method for the Determination of Phosphate in Soil, Detergents, Water, Bone and Food Samples through the Formation of Phosphomolybdate Complex Followed by Its Reduction with Thiourea.” *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy* 78(1): 497–502.
- Soufi, Amal et al. 2021. “Spinel Ferrites Nanoparticles: Synthesis Methods and Application in Heterogeneous Fenton Oxidation of Organic Pollutants – A Review.” *Applied Surface Science Advances* 6: 100145.
- Stiadi, Yeni et al. 2023. “Tuning the Structural, Magnetic, and Optical Properties of ZnO/NiFe₂O₄ Heterojunction Photocatalyst for Simultaneous Photodegradation of Rhodamine B and Methylene Blue under Natural Sunlight.” *Environmental Engineering Research* 28(3): 0–3.
- Sun, Weiling, Weiyi Pan, Fei Wang, and Nan Xu. 2015. “Removal of Se(IV) and Se(VI) by MFe₂O₄ Nanoparticles from Aqueous Solution.” *Chemical Engineering Journal* 273: 353–62.
- Suppiah, Durga Devi, Nurhidayatullaili Muhd Julkapli, Suresh Sagadevan, and Mohd Rafie Johan. 2023. “Eco-Friendly Green Synthesis Approach and Evaluation of Environmental and Biological Applications of Iron Oxide Nanoparticles.” *Inorganic Chemistry Communications* 152(March): 110700. <https://doi.org/10.1016/j.inoche.2023.110700>.
- Syukri, Daimon, and Huswatun Hasanah. 2023. *Catatan Pengembangan Produk Berbahan Baku Gambir*. Padang: Andalas University Press.
- Tadic, Marin et al. 2022. “Magnetic Properties of Mesoporous Hematite/alumina Nanocomposite and Evaluation for Biomedical Applications.” *Ceramics International* 48(7): 10004–14.
- Taha, T. A., A. A. Azab, and M. A. Sebak. 2019. “Glycerol-Assisted Sol-Gel Synthesis, Optical, and Magnetic Properties of NiFe₂O₄ Nanoparticles.” *Journal of Molecular Structure* 1181: 14–18.
- Taqvi, Syed Iqleem H. et al. 2022. “Plant Extract-Based Green Fabrication of Nickel Ferrite (NiFe₂O₄) Nanoparticles: An Operative Platform for Non-Enzymatic Determination of Pentachlorophenol.” *Chemosphere* 294(December 2021): 133760. <https://doi.org/10.1016/j.chemosphere.2022.133760>.
- Tholkappian, R., and K. Vishista. 2014. “Synthesis and Characterization of Barium Zinc Ferrite Nanoparticles: Working Electrode for Dye Sensitized Solar Cell Applications.” *Solar Energy*. <https://www.mendeley.com/catalogue/7d8501f4-5613-3065-9e41-2a59e2b4e128/>.
- Tian, Yushi et al. 2024. “Achieved Advanced Wastewater Phosphate Removal via Improved Ionic Interference Resistance in a Migration-Electric-Field Assisted Electrocoagulation (MEAEC) System with Modified-Biochar Pseudocapacitor Electrode.” *Separation and Purification Technology* 328:

124972.

- Tong, K. S., M. Jain Kassim, and A. Azraa. 2011. "Adsorption of Copper Ion from Its Aqueous Solution by a Novel Biosorbent *Uncaria Gambir*: Equilibrium, Kinetics, and Thermodynamic Studies." *Chemical Engineering Journal* 170(1): 145–53.
- Tsai, Cho-Jen, Ching-Yu Yang, Ying-Chan Liao, and Yu-Lun Chueh. 2012. "Hydrothermally Grown Bismuth Ferrites: Controllable Phases and Morphologies in a Mixed KOH/NaOH Mineralizer." *Journal of Materials Chemistry* 22(34): 17432–36. <http://dx.doi.org/10.1039/C2JM33859A>.
- Umut, Evrim et al. 2019. "Nickel Ferrite Nanoparticles for Simultaneous Use in Magnetic Resonance Imaging and Magnetic Fluid Hyperthermia." *Journal of Colloid and Interface Science* 550: 199–209.
- Venkatesh, M. et al. 2016. "Microwave Assisted Combustion Synthesis and Characterization of Nickel Ferrite Nanoplatelets." *Modern Electronic Materials* 2(3): 74–78.
- You, Xintong et al. 2024. "Mechanistic Insight into the Simultaneous Removal of Cr(VI) and Phosphate by a Novel Versatile Bimetallic Material." *Journal of Environmental Chemical Engineering* 12(6): 114446.
- Zeng, Yanbo et al. 2024. "Spark Deposition of Lanthanum-Carbon Composite Nanoparticles Embedded in a Polypropylene Membrane for Phosphate Removal in Aqueous Solutions." *Separation and Purification Technology* 337: 126253.
- Zhang, Weizhen et al. 2023. "Selective Removal of Phosphate by Magnetic $\text{NaCe}(\text{CO}_3)_2/\text{Fe}_3\text{O}_4$ Nanocomposites: Performance and Mechanism." *Separation and Purification Technology* 325: 124741.
- Zhao, Qing, Zhenhua Yan, Chengcheng Chen, and Jun Chen. 2017. "Spinels: Controlled Preparation, Oxygen Reduction/Evolution Reaction Application, and Beyond." *Chemical Reviews* 117(15): 10121–211. <https://doi.org/10.1021/acs.chemrev.7b00051>.
- Zulhadjri et al. 2025. "La³⁺ Doped ZnFe₂O₄ Synthesized via Green Chemistry Approach Using *Uncaria Gambir* Roxb: A Study on Structural, Optical, Magnetic, and Photocatalytic Properties." *Journal of Photochemistry and Photobiology A: Chemistry* 461: 116168.