

DAFTAR PUSTAKA

1. Simbolon TR, Sembiring T, Hamid M, Hutajulu DA, Rianna M, Sebayang AMS, et al. Preparation and Characterization of ZnFe_2O_4 on the Microstructures and Magnetic Properties. *J Aceh Phys Soc.* 2021;10(2):32–5.
2. Rahmayeni, Azizah N, Stiadi Y, Putri YE, Zulhadjri. Magnetic Particles Nanorod of $\text{ZnO/CuFe}_2\text{O}_4$ Prepared by Green Synthesized Approach: Structural, Optical and Magnetic Properties, and Photocatalytic Activity. *Mater Res.* 2022;25.
3. Muflihatun, Shofiah S, Suharyadi E. Sintesis Nanopartikel Nickel Ferrite (NiFe_2O_4) dengan Metode Kopresipitasi dan Karakterisasi Sifat Kemagnetannya. *J Fis Indones.* 2015;19(56):20–5.
4. Salih SJ, Mahmood WM. Review on Magnetic Spinel Ferrite (MFe_2O_4) Nanoparticles: from Synthesis to Application. *Heliyon [Internet].* 2023;9(6):e16601. Available from: <https://doi.org/10.1016/j.heliyon.2023.e16601>
5. Nurjanah N, Adzkia QAA, Rustana R, Caroline SC, Agustine SM, Nandiyanto ABD. A Review: Nanoparticles NiFe_2O_4 Synthesis and Its Application as Hyperthermia Agents in Biomedicine. *Indones J Chem Sci.* 2022;11(2):103–13.
6. Rahmayeni, Putri J, Stiadi Y, Zilfa, Zulhadjri. Green Synthesis of NiFe_2O_4 Spinel Ferrites Magnetic in the Presence of Hibiscus Rosa-sinensis Leaves Extract: Morphology, Structure and Activity. *Rasayan J Chem.* 2019;12(4):1942–9.
7. Joshi S, Kumar M, Chhoker S, Srivastava G, Jewariya M, Singh VN. Structural, Magnetic, Dielectric and Optical Properties of Nickel Ferrite Nanoparticles Synthesized by Co-Precipitation Method. *J Mol Struct [Internet].* 2014;1076:55–62. Available from: <http://dx.doi.org/10.1016/j.molstruc.2014.07.048>
8. Amulya MAS, Nagaswarupa HP, Kumar MRA, Ravikumar CR, Prashantha SC, Kusuma KB. Sonochemical Synthesis of NiFe_2O_4 Nanoparticles: Characterization and their Photocatalytic and Electrochemical Applications. *Appl Surf Sci Adv [Internet].* 2020;1(June):100023. Available from: <https://doi.org/10.1016/j.apsadv.2020.100023>
9. Sagadevan S, Chowdhury ZZ, Rafique RF. Preparation and Characterization of Nickel Ferrite Nanoparticles Via co-Precipitation Method. *Mater Res.* 2018;21(2):21–5.
10. Nurmayansih A, Hariani PL, Said M. Synthesis NiFe_2O_4 Nanoparticles by co-Precipitation Method for Degradation of Congo Red Dye. *Indones J Fundam Appl Chem.* 2020;6(3):115–21.
11. Ahmed F, Yasmin A, Biswas B, Rahman L, Khanam J, Rakhi RJ, et al. Materials Advances Effect of Calcination Temperature on Nano-Cobalt Ferrite Synthesized by a Sol–Gel Method For Modification Of Its Structural, Morphological,. 2025;
12. Sasmaz Kuru T. Effect of Calcination Temperature on Structural, Magnetic, and Dielectric Properties of $\text{Mg}_{0.75}\text{Zn}_{0.25}\text{Al}_{0.2}\text{Fe}_{1.8}\text{O}_4$ Ferrites. *J Mater Sci Mater Electron.* 2024;35(6):1–14.
13. Linda D, Pratapa S. Sintesis Fe_2O_3 dari Pasir Besi dengan Metode Logam Terlarut Asam Klorida. 2014;3(2):33–5.
14. Safitri I, Wibowo YG, Rosarina D, Sudibyo. Synthesis and Characterization of Magnetite (Fe_3O_4) Nanoparticles from Iron Sand in Batanghari Beach. *IOP Conf Ser Mater Sci Eng.* 2021;1011(1).
15. Rianna M, Sianturi HA, Sembiring T, Amiruddin E, Ananda N, Sitanggang LD, et al. Utilization of Rice Husk and Local Iron Sand as Magnetic Materials. *Results in Surfaces and Interfaces [Internet].* 2025;18(December 2024):100425. Available from: <https://doi.org/10.1016/j.rsufi.2025.100425>
16. Prasetyowati, Rita; Widiawati, Dede; Swastika. Synthesis and Characterization of Magnetite (Fe_3O_4) Nanoparticles Based on Iron Sands at Glagah Beach Kulon Progo with Coprecipitation Methods at Various NH_4OH CONCENTRATIONS. 2021;10(2):57–61.
17. Khairunnisa UK. Karakterisasi Pasir Besi Dan Sifat Magnetik Pantai Romantis Kabupaten Serdang Bedagai. *Saintifik.* 2024;10(2):276–82.
18. Singh AK, Zaidi MGH, Sah PL, Saxena R. A. Review on Classification of Various Ferrite Particles on the Basis of Crystal Structure. *Eur J Adv Eng Technol.* 2018;5(5):350–4.

19. Vivek Kumar, Kakali Sarkar, Saurabh Kumar, Rahul Srivastava, Rajan Kumar. A Review on Developments in Spinel Ferrite Nanomaterials: Synthesis, Characterization, and Diverse Applications. *Int Res J Adv Eng Hub*. 2024;2(06):1659–64.
20. Jacob BP, Kumar A, Pant RP, Singh S, Mohammed EM. Influence of Preparation Method on Structural and Magnetic Properties of Nickel Ferrite Nanoparticles. *Bull Mater Sci*. 2011;34(7):1345–50.
21. Rahmawati E, Putri NP. Sintesis Dan Karakterisasi PANI/Fe₃O₄ menggunakan Fe₃O₄ dari Pasir Besi Gunung Galunggung Jawa Barat. *Inov Fis Indones*. 2024;13(2):45–50.
22. Mardana IBP, Nur Lutfiyah Y, Yasa P, Agung Widiantra GK. Synthesis and Characterization of Magnetite Fe₃O₄ Nanoparticles from Natural Iron Sand in Gelar River. *Indones Phys Rev*. 2024;7(1):166–74.
23. Rahmayeni, Zulhadjri, Jamarun N, Emriadi, Arief S. Synthesis of ZnO-NiFe₂O₄ magnetic Nanocomposites by Simple Solvothermal Method for Photocatalytic Dye Degradation Under Solar Light. *Orient J Chem*. 2016;32(3):1411–9.
24. Utari U, Dasi YHK, Purnama B. Comparison of Ni_{0.6}Co_{0.4}Fe₂O₄ and NiFe₂O₄ Nanoparticles for Magnetic Characteristics, Synthesized Using Co-Precipitation Method. *Indones J Appl Phys*. 2022;12(1):61.
25. Muhaymin A, Ahmad Mohamed HE, Hkiri K, Safdar A, Kotsedi L, Maaza M. Green Synthesis of NiFe₂O₄ Nanoparticles using Hyphaene Thebaica: A Facile Route Towards Magnetic and Photocatalytic Application. *Mater Today Chem* [Internet]. 2024;40(August):102286. Available from: <https://doi.org/10.1016/j.mtchem.2024.102286>
26. Mahmudin L, Ndora Y, Ullum MS. Physical and Optical Properties of Nickel Ferrite (NiFe₂O₄) Nanoparticles Based on Iron Sand [Internet]. Atlantis Press International BV; 2023. 109–113 p. Available from: http://dx.doi.org/10.2991/978-94-6463-228-6_13
27. Asri NS, Maghfirah A, Batubara NI. Synthesis and Characterization of Soft Magnetic Materials Ni_xZn_{1-x}Fe₂O₄ (x=0,2-0,8) from Lombok Iron Sand with Co-precipitation Method. *J of Technomaterial Physics*. 2021;03(01):21–8.
28. Atmono TM, Prasetyowati R, Kartika AMR. Pembuatan Prototipe Vibrating Sample Magnetometer untuk Pengamatan Sifat Magnetik Lapisan Tipis. *Sains dan Teknol Nuklir BATAN*. 2015;47(40):57–66.
29. Silva FG da, Depeyrot J, Campos AFC, Aquino R, Fiorani D, Peddis D. Structural and Magnetic Properties of Spinel Ferrite Nanoparticles. *J Nanosci Nanotechnol*. 2019;19(8):4888–902.
30. Cechinel MAP, Nicolini JL, Tápiá PM, Miranda EAC, Eller S, de Oliveira TF, et al. Cobalt Ferrite (CoFe₂O₄) Spinel as a New Efficient Magnetic Heterogeneous Fenton-like Catalyst for Wastewater Treatment. *Sustainability*. 2023;15(20):15183.
31. Saeed N, Malen JA, Chamanzar M, Krishnamurti R. Experimental Correlation of Thermal Conductivity with Dielectric Properties of Wood and Wood-Based Materials: Possibilities for Rapid In-Situ Building Energy Evaluation. *J Build Eng* [Internet]. 2022;50(November 2021):104178. Available from: <https://doi.org/10.1016/j.jobbe.2022.104178>
32. Didik LA. Pengukuran Konstanta Dielektrik untuk Mengetahui Konsentrasi Larutan Gula dengan Menggunakan Metode Plat Sejajar. *J Pendidik Fis* [Internet]. 2020;8(2):127–32. Available from: <http://journal.uinalauddin.ac.id/index.php/PendidikanFisika/article/view/1416/9509>
33. Salih SJ, Mahmood WM. Review on Magnetic Spinel Ferrite (MFe₂O₄) Nanoparticles: from Synthesis to Application. *Heliyon* [Internet]. 2023;9(6):e16601. Available from: <https://doi.org/10.1016/j.heliyon.2023.e16601>
34. Nengsih S, Jalil Z, Majid S, Mursal. Analysis of Fe Concentration in Iron Sand and the Effect of Stirring Speed on Band Gap Energy in Magnetite Synthesis. *J Aceh Phys* [Internet]. 2025;14(1):9–15. Available from: <http://www.jurnal.unsyiah.ac.id/JAcPS>
35. González MF, Saadatkhan N, Patience GS. Experimental Methods in Chemical Engineering: X-ray Fluorescence—XRF. *Can J Chem Eng*. 2024;102(6):2004–18.
36. Febriliani A, Rama Denny Y, Antarnusa G. Analisis XRD Nanopartikel Fe₃O₄ dengan Variasi Suhu Sintesis. 2025;6(1):14–8.

37. Hakim L, Dirgantara M, Nawir M. Karakterisasi Struktur Material Pasir Bongkahan Galian Golongan C dengan menggunakan X-Ray Diffraction (XRD) di Kota Palangkaraya. *J Jejaring Mat dan Sains*. 2019;1(1):44–51.
38. Faturachman GF, Ramanda AA, Maharani S, Latif LA, Belo GAG, Ayubi SG Al. Application of Fourier Transform Infrared Spectroscopy (FTIR) for Quantitative Analysis of Pharmaceutical Compounds. *Indones J Pharm Educ*. 2025;5(1):27–33.
39. Gong Y, Chen X, Wu W. Application of Fourier Transform Infrared (FTIR) Spectroscopy in Sample Preparation: Material Characterization and Mechanism Investigation. *Adv Sample Prep [Internet]*. 2024;11(April):100122. Available from: <https://doi.org/10.1016/j.sampre.2024.100122>
40. Jumardin, Maddu A, Santoso K, Isnaeni. Karakteristik Sifat Optik Nanopartikel Karbon (Carbon Dots) dengan Metode UV-Vis DRS (Ultraviolet-Visible Diffuse Reflectance Spectroscopy). *JFT J Fis dan Ter*. 2022;9(1):1–15.
41. Singh Mehta D, Thapa P, Singh V, Joshi H, Sarangi DJ, Mishra D, et al. Multimodal and Multispectral Diagnostic Devices for Oral and Breast Cancer Screening in Low Resource Settings. *Curr Opin Biomed Eng [Internet]*. 2023;28:100485. Available from: <https://doi.org/10.1016/j.cobme.2023.100485>
42. Pinctada Putri Pamungkas AD. Microstructure With Scanning Electron Microscope and Sensory. *J Ilmu dan Teknol Pertanian*. 2022;9(2):275–86.
43. Fachrully SA, Erna S N, Susilo. Analisis Citra Hasil Scanning Electron Microscopy Energy Dispersive X-Ray (SEM EDX) Komposit Resin Timbal dengan Metode Contrast to Noise Ratio (CNR). *Indones J Math Nat Sci [Internet]*. 2021;44(2):81–5. Available from: <http://journal.unnes.ac.id/nju/index.php/JM>
44. Ellingham STD, Thompson TJU, Islam M. Scanning Electron Microscopy–Energy-Dispersive X-Ray (SEM/EDX): A Rapid Diagnostic Tool to Aid the Identification of Burnt Bone and Contested Cremains. *J Forensic Sci*. 2018;63(2):504–10.
45. Misbachudin MC, Trihandaru S, Sutresno A. Pembuatan Prototipe Vibrating Sample Magnetometer untuk Pengamatan Sifat Magnetik Lapisan Tipis Tri. 2013;4(1):345–50.
46. Padma Sree M. Vibrating Sample Magnetometer and Its Application In Characterisation Of Magnetic Property Of The Anti Cancer Drug Magnetic Microspheres. *Int J Pharm Drug Anal*. 2016;4(5):227–33.
47. Wendari TP, Rizki A, Zulhadjri, Putri YE, Emriadi, Labanni A, et al. Structure, Ferroelectric, Magnetic, and Energy Storage Performances of Lead-Free $\text{Bi}_4\text{Ti}_{2.75}(\text{FeNb})_{0.125}\text{O}_{12}$ Aurivillius Ceramic by Doping Fe^{3+} Ions Extracted from Padang Beach Sand. *Case Stud Chem Environ Eng*. 2024;9(March).
48. Prasetya OD, Darminto P, Malik MS, Baqiya A, Si M. Efek Pengadukan dan Variasi pH pada Sintesis Fe_3O_4 dari Pasir Besi dengan Metode Kopresipitasi. 2020;
49. Syafriani N. Sintesis Nanomaterial $\text{Co}_x\text{Zn}_{(1-x)}\text{Fe}_2\text{O}_4$ dengan Metode Hidrotermal dan Kopresipitasi Dimediasi Ekstrak Daun Sirih Hijau (Piper Betle, L.) sebagai Capping Agent. 2022;
50. Karbeka, Martasiana; Koly, Faryda Veronica; Tellu NM. Karakterisasi Sifat Kemagnetan Pasir Besi Pantai Puntaru Kabupaten Alor-NTT. *Lantanida J*. 2020;8(2).
51. Susilawati S, Doyan A, Taufik M, Wahyudi W, Gunawan ER, Kosim K, et al. Identifikasi Kandungan Fe pada Pasir Besi Alam di Kota Mataram. *J Pendidik Fis dan Teknol*. 2018;4(1):105–10.
52. Puspitarum DL, Safitri G, Ardiyanti H, Anrokhi MS. Karakterisasi dan Sifat Kemagnetan Pasir Besi di Wilayah Lampung Tengah. *J Pendidik Fis*. 2019;7(2):236.
53. Agus L, Amiruddin, Nalis M, Misudo S, Fujii Y, Ishikawa Y, et al. Effect of pH and Stirring Speed on the $\gamma\text{-Fe}_2\text{O}_3$ Material Properties Synthesized from Iron Sand by Using Co-Precipitation Method. *Int J Acta Mater*. 2024;1(1):40–50.
54. Idris AH, Azurahaman C, Abdullah C, Yusof NA. One-pot Synthesis of Iron Oxide Nanoparticles : Effect of Stirring Rate and Reaction Time on its Physical Characteristics. *Inorg Nano-Metal Chem [Internet]*. 2022;0(0):1–7. Available from: <https://doi.org/10.1080/24701556.2022.2072339>
55. Rozi TY. Pengaruh Temperatur Kalsinasi pada Sintesis Nanopartikel Silika Pantai Purus Kota Padang. 2016;5(4):351–6.

56. Panduwinata, Fina., Mahmudin, Lufsyi. I. Fabrikasi dan Karakterisasi Sifat Optik Nanopartikel Magnetit Fe_3O_4 Berbasis Pasir Besi. 2019;18(1).
57. Ponglabra I. Sintesis Nanopartikel Magnetit (Fe_3O_4) dari Campuran $\text{Fe}^{2+}/\text{Fe}^{3+}$ dengan Metode Kopresipitasi. Skripsi. 2016;UNHAS: FMI:1–34.
58. Andersen HL, Granados-Mirallas C, Jensen KMO, Saura-Múzquiz M, Christensen M. The Chemistry of Spinel Ferrite Nanoparticle Nucleation, Crystallization, and Growth. *ACS Nano*. 2024;18(14):9852–70.
59. Rani S, Varma GD. Tuning of Structural and Magnetic Properties of Mn-doped CoFe_2O_4 Nanoparticles. *AIP Conf Proc*. 2015;1665:590–6.
60. Slimani Y, Almessiere MA, Güner S, Tashkandi NA, Baykal A, Sarac MF, et al. Calcination Effect on the Magneto-Optical Properties of Vanadium Substituted NiFe_2O_4 Nanoferrites. *J Mater Sci Mater Electron* [Internet]. 2019;30(10):9143–54. Available from: <https://doi.org/10.1007/s10854-019-01243-x>
61. Zahra, Samreen; Naz, Uzma; Irshad, Misbah; Sheikh, Asma; Zahra S. Effect of Calcination Temperature on Structural and Magnetic Properties of Polypropylene Glycol Stabilized Nickel Ferrite Nanoparticles. *BMC Chem*. 2025;47(3):3680–91.
62. Stiadi Y, Wendari TP, Zilfa, Zulhadjri, Rahmayeni. Tuning the Structural, Magnetic, and Optical Properties of $\text{ZnO}/\text{NiFe}_2\text{O}_4$ Heterojunction Photocatalyst for Simultaneous Photodegradation of Rhodamine B and Methylene Blue Under Natural Sunlight. *Environ Eng Res*. 2023;28(3).
63. Biswas B, Ahmed MF, Rahman ML, Khanam J, Bhuiyan MHR, Sharmin N. Investigation of Structural, Optical, And Magnetic Properties of NiFe_2O_4 for Efficient Photocatalytic Degradation of Organic Pollutants Through Photo Fenton Reactions. *Heliyon* [Internet]. 2024;10(17):e37199. Available from: <https://doi.org/10.1016/j.heliyon.2024.e37199>
64. Assar ST, Asal NA, Moharram BM, Okba EA, Hatem O. Investigation of structural, Elastic, Thermal, Magnetic, Optical, and Photocatalytic Properties of Nanosized Mg-Mn-Li Ferrites. *J Sol-Gel Sci Technol* [Internet]. 2024;111(3):850–77. Available from: <http://dx.doi.org/10.1007/s10971-024-06456-z>
65. Ebrahimi M, Ghasemi M, Soleimanian V, Nekoeinia M, Mokhtari A. Effects of Annealing Temperature on Microstructural, Optical and FTIR Properties of NiFe_2O_4 Spinel Nanoparticles. *Chem Phys Lett* [Internet]. 2023;833(October):140911. Available from: <https://doi.org/10.1016/j.cplett.2023.140911>
66. Shanmugavel T, Gokul Raj S, Ramesh Kumar G, Rajarajan G, Saravanan D. Cost Effective Preparation and Characterization of Nanocrystalline Nickel Ferrites (NiFe_2O_4) in Low Temperature Regime. *J King Saud Univ - Sci* [Internet]. 2015;27(2):176–81. Available from: <http://dx.doi.org/10.1016/j.jksus.2014.12.006>
67. Rahmawati E. Sintesis NiFe_2O_4 dan NiFe_2O_4 /Bentonit untuk Oksidasi Katalitik Metil Violet. 2023; Available from: [https://dspace.uui.ac.id/handle/123456789/45147%0Ahttps://dspace.uui.ac.id/bitstream/handle/123456789/45147/Evi Rahmawati_Skripsi sah.pdf?sequence=1&isAllowed=y](https://dspace.uui.ac.id/handle/123456789/45147%0Ahttps://dspace.uui.ac.id/bitstream/handle/123456789/45147/Evi%20Rahmawati_Skripsi%20sah.pdf?sequence=1&isAllowed=y)
68. Simon C, Zakaria MB, Kurz H, Tetzlaff D, Blösser A, Weiss M, et al. Magnetic NiFe_2O_4 Nanoparticles Prepared via Non-Aqueous Microwave-Assisted Synthesis for Application in Electrocatalytic Water Oxidation. *Chem - A Eur J*. 2021;27(68):16990–7001.
69. El shater RE, Awad AW, Abdel-Khalek EK, El-Bahnasawy HH, Meaz TM, Okba EA. Influence of Sintering Temperature on Structural and Optical Properties of $\text{Cd}_{0.5}\text{Cu}=\text{Cr}_x\text{Fe}_{2-x}\text{O}_4$ Ferrites. *Sci Rep* [Internet]. 2023;13(1):1–28. Available from: <https://doi.org/10.1038/s41598-023-41214-1>
70. Sun L, Zhang R, Wang Z, Ju L, Cao E, Zhang Y. Structural, Dielectric and Magnetic Properties of NiFe_2O_4 Prepared Via Sol – Gel Auto-Combustion Method. *J Magn Mater* [Internet]. 2017;421:65–70. Available from: <http://dx.doi.org/10.1016/j.jmmm.2016.08.003>
71. Rimafatin N, Cahyono BE, Misto M. Karakterisasi Konstanta Dielektrik dan Kapasitansi pada Lemak Hewani dengan Menggunakan Variasi Suhu dan Frekuensi. *J Fis Flux J Ilm Fis FMIPA Univ Lambung Mangkurat*. 2019;16(2):78.
72. Kumar S, Ahmed F, Shaalan NM, Arshi N, Dalela S, Chae KH. Investigations of

- Structural, Magnetic, and Electrochemical Properties of NiFe_2O_4 Nanoparticles as Electrode Materials for Supercapacitor Applications. *Materials* (Basel). 2023;16:1–18.
73. Zeng Z, Wu H, Zhou C, et al. Effect of Sintering Temperature on Magnetoelectric Properties of $\text{PbTiO}_3/\text{NiFe}_2\text{O}_4$ Composite Ceramics. *J Asian Ceramic*. 2020;8(4):1206

