DAFTAR PUSTAKA

Abdullah, M., & Khairurrijal. (2008). Karakterisasi Nanomaterial, *Jurnal Nanosains dan Nanoteknologi*, 2, 1-9.

Ahmad, M. Y., Liu, S., Tegafaw, T., Al Saidi, A. K. A., Zhao, D., Liu, Y., Nam, S.-W., Chang, Y., & Lee, G. H. (2023). Heavy metal-based nanoparticles as high-performance X-ray computed tomography contrast agents. *Pharmaceuticals*, *16(10)*, 1463. https://doi.org/10.20944/preprints202308.1571.v1

Ahmed, B., Soliman, T. S., Karthik, K., Thomas, R., & Alhazaa, A. N. (2020). Advances in X-ray diffraction techniques for nanomaterials. *Journal of Applied Crystallography*, *53*(3), 535–546. https://doi.org/10.1107/S1600576720003200

Alfiati, A. (2013). *Studi Efek Heel Pada Film Radiografi* (Doctoral dissertation, Universitas Hasanuddin).

Amalia, D. E. N., Nurhasanah, I., & Khumaeni, A. (2024). Synthesis and Characterization of Zirconium Dioxide Nanoparticles in Various Liquid Media by Nd:YAG Pulse Laser Ablation and Its Antibacterial Application. *Journal of Chemical Science and Applications*, *27*(10), 464-469. https://doi.org/10.14710/jksa.27.10.464-469

Amendola, Vincenzo., & Meneghetti, Moreno. (2009). Laser ablation synthesis in solution and size manipulation of noble metal nanoparticles. *Physical Chemistry Chemical Physics*, *11*, 3805–3821. https://doi.org/10.1039/B900654K

Arif, M., Raza, H., & Akhter, T. (2024). UV-Vis spectroscopy in the characterization and applications of smart microgels and metal nanoparticle-decorated smart microgels: A critical review. *RSC Advances*., *14*(51), 38120–38134. https://doi: 10.1039/D4RA07643E.

Aslan, N., Ceylan, B., Koç, M. M., & Findık, F. (2020). Metallic Nanoparticles As X-Ray Computed Tomography (CT) Contrast Agents: A Review. *Journal of Molecular Structure*, *1219*, 128599. https://doi.org/10.1016/j.molstruc.2020.128599

Bae, K. T. (2010). Intravenous contrast medium administration and scan timing at CT: Considerations and approaches. *Radiology*, *256*(1), 32–61. https://doi.org/10.1148/radiol.10090908

Balantrapu, K., & Goia, D. V. (2009). Silver nanoparticles for printable electronics and biological applications. *Journal of Materials Research*, *24*(9), 2828–2836. https://doi.org/10.1557/jmr.2009.0336

Barcikowski, S., & Compagnini, G. (2013). Advanced nanoparticle generation and excitation by lasers in liquids. *Physical Chemistry Chemical Physics*, *15*(9), 3022–3026. https://doi.org/10.1039/c2cp42895d

Barsoum, M. K., Ramadan, A. M., El-Kholy, N. A., Hassan, M. A., & El-Menshawy, A. M. (2022). Importance of the Hounsfield Unit value measured by CT in differentiation between hydronephrosis and pyonephrosis. *Egyptian Journal of Radiology and Nuclear Medicine*, 53(1), 1–8. https://doi.org/10.1186/s43055-022-00799-9

Bayyoodh, A. A., Alfahed, R. K. F., & Zainulabdeen, F. S. (2024). The Effect of Nanoparticle Size on The Structural, Optical, and Electrical Properties of Tungsten Oxide Prepared by Laser Ablation Method. *Journal of Materials Science: Materials in Electronics*, *35*(16). https://doi.org/10.1007/s10854-024-12821-z

Belattmania, Z., Kaidi, S., El Atouani, S., Katif, C., Bentiss, F., Jama, C., Reani, A., Sabour, B., & Vasconcelos, V. (2020). Isolation and FTIR-ATR and ^{1}H NMR Characterization of Alginates from the Main Alginophyte Species of the Atlantic Coast of Morocco. *Molecules*, *25*(18), 4335. https://doi.org/10.3390/molecules25184335

Bushberg, J. T., Seibert, J. A., Leidholdt, E. M., Boone, J. M., & Goldschmidt, E. J. (2003). *The Essential Physics of Medical Imaging*. Medical Physics, *30*(7). https://doi.org/10.1118/1.1585033

Buzea, C., Pacheco, I. I., & Robbie, K. (2007). Nanomaterials and nanoparticles: Sources and toxicity. *Biointerphases*, *2*(4), MR17–MR71. https://doi.org/10.1116/1.2815690

Bonitatibus, P. J., Torres, A. S., Kandapallil, B., Lee, B. D., Goddard, G. D., Fitzgerald, P. F., & Kulkarni, A. M. (2010). Synthesis, characterization, and computed tomography imaging of a tantalum oxide nanoparticle imaging agent. *Chemical Communications*, 46(47), 8956–8958. https://doi.org/10.1039/C0CC03302B

Cremers, D. A., Multari, R. A., & Knight, A. K. (2006). Laser-induced breakdown spectroscopy. In R. A. Meyers (Ed.), *Encyclopedia of Analytical Chemistry*. John Wiley & Sons. https://doi.org/10.1002/9780470027318.a5110t

de Azevedo Gonç, R. C., & da Silva, E. O. (2018). Effect of the Addiction of Metal Oxide Nanoparticles on the Physical, Chemical and Thermal

Properties of PVA Based Nanocomposites. *Materials Sciences and Applications*, *9*(5), 473-488. https://doi.org/10.4236/msa.2018.95033

Díaz-Visurraga, Jorge, Claudia Daza, Cristian Pozo, Alejandro Becerra, Carlos von Plessing, dan Antonio García. 2012. Study on Antibacterial Alginate-Stabilized Copper Nanoparticles by FT-IR and 2D-IR Correlation Spectroscopy. *International Journal of Nanomedicine*, *7*, 3597–3612. https://doi.org/10.2147/IJN.S32648.

Flohr T. (2013). CT Systems. *Current Radiology Reports*, *1*(1):52–63.

Foliatini, Yulizar, Y., & Hafizah, M. A. E. (2014). Microwave-Assisted Synthesis of Alginate-Stabilized Gold Nanoparticles. *Makara Journal of Science 18*(4), 111–118. https://doi.org/10.7454/mss.v18i4.4281.

Ghanbari, M., Salavati-Niasari, M., Mohandes, F., Firouzi, Z., & Mousavi, S.-D. (2021). The impact of zirconium oxide nanoparticles content on alginate dialdehyde-gelatin scaffolds in cartilage tissue engineering. *Journal of Molecular Liquids*, *335*, 116531. https://doi.org/10.1016/j.molliq.2021.116531

Garvie, R. C. (1965). The occurrence of metastable tetragonal zirconia as a crystallite size effect. *The Journal of Physical Chemistry*, *69*(4), 1238–1243. https://doi.org/10.1021/j100888a024

Hakim, L., Dirgantara, M., & Nawir, M. (2019). Karakterisasi Struktur Material Pasir Bongkahan Galian Golongan C Dengan. *Jurnal Jejaring Matematika dan Sains*, *1*(1), 44–51. https://doi.org/10.36873/jjms.v1i1.136

Hasan S. (2015). A Review on Nanoparticles: Their Synthesis and Types Biosynthesis and Mechanism. *Research journal of recent sciences*, *4*, 1-3.

Huang, G., Zhang, C., Li, S., Khemtong, C., Yang, S. G., Tian, R., Min, Y., Wang, L., & Chen, X. (2011). ZrO_2 nanoparticles: Promising contrast agents for X-ray computed tomography. *Small*, *7*(18), 2714–2719. https://doi.org/10.1002/smll.201100808

Ii, S., Okazaki, N., & Ikuhara, Y. (2024). Quantitative characterization by transmission electron microscopy and its application to interfacial phenomena. *Microscopy*, *73*(2), 91–105. https://doi.org/10.1093/jmicro/dfae005

International Atomic Energy Agency. (2014). *Diagnostic Radiology Physics: A Handbook for Teachers and Students*, International Atomic Energy Agency.

Irshad, R., Ali, S., Rehman, A., Khatoon, A., Hasan, M. M., Rizvi, T. Z., & Sadaf, S. (2022). Application of XRD in nanomaterials characterization.

Nanomaterials, *12*(3), 427. https://doi.org/10.3390/nano12030427

Kabashin, A. V., Timoshenko, V. Y., Delaporte, P., Perriere, J., Leclercq, D., Konstantinova, E. A., Sentis, M., & Tcherniega, N. V. (2017). Pulsed laser ablation in liquids: Towards advanced nanoparticle synthesis. *Chemical Reviews*, *117*(16), 10145–10221. https://doi.org/10.1021 acs.chemrev.6b00468

Kalender, W. A. (2011). *Computed Tomography: Fundamentals, System Technology, Image Quality, Applications*. Wiley-VCH.

Kanitz, A., Hoppius, J. S., Noll, R., & Gurevich, E. L. (2019). Review on laser ablation of solids in liquids for nanoparticle generation. *Nanomaterials*, *9*(11), 1550. https://doi.org/10.3390/nano9111550

Kathirvel, A., Srinivasan, R., Harini, S., Ranjith, N., Kumar, G.S., Lalithambigai, K., Atchudan, R., Habila, M. A., Aljuyawi, A. M., & Yun, H. K. (2025). Eco-Friendly Synthesis of Zirconium Dioxide Nanoparticles from Toddalia asiatica: Applications in Dye Degradation, Antioxidant and Antibacterial Activity. *Nanomaterials* *15*(2), 84. https://doi.org/10.3390/nano15020084.

Khademi, S., Azimian, H., & Ghadiri, H. (2022). The evaluation of contrast-to-noise ratio in CT images using different parameters of gold nanoparticles versus Omnipaque. *Frontiers in Biomedical Technologies*, *9*(4), 291–296. https://doi.org/10.18502/fbt.v9i4.10420

Khumaeni, A., Sutanto, H. and Budi, W.S., 2019. The role of laser irradiance, pulse repetition rate, and liquid media in the synthesis of gold nanoparticles by the laser ablation method using an Nd:YAG laser 1064 nm at low energy. *International Journal of Technology*, *10*(5), pp.961–969. https://doi.org/10.14716/ijtech.v10i5.1953

Kim, Dae-Won., Park, Ji-Hyun., Kim, Hye-Seung., Choi, Yoon-Jung., Kim, Sun-Young., & Jeong, Yong-Yi. (2007). Gold nanoparticles for contrast-enhanced X-ray imaging and CT. *Journal of the American Chemical Society*, *129*(24), 7661–7665. https://doi.org/10.1021/ja070725y

Kuru, D., Akpinar Borazan, A., & Ay, N. (2019). The Effect of Piranha and Silane Modifications on Boron Nitride Nanosheets (BNNSs) Thin Film Formation. *Cumhuriyet Science Journal*, *40*(2), 424–432. https://doi.org/10.17776/csj.521889

Lee, K. Y., & Mooney, D. J. (2012). Alginate: properties and biomedical applications. *Progress in Polymer Science*, *37*(1), 106–126. https://doi.org/10.1016/j.progpolymsci.2011.06.003

Li, J., Mooney, D. J., & Chen, W. (2016). Alginate-based platforms for cancer-targeted drug delivery. *International Journal of Biological Macromolecules*, *92*, 748–761. https://doi.org/10.1016 j.ijbiomac.2016.07.031

Liu, S., Wang, J., Chen, Y., Song, Z., Han, B., Wu, H., Zhang, T., & Liu, M. (2023). Tetragonal nanosized zirconia: Hydrothermal synthesis and its performance as a promising ceramic reinforcement. *Inorganics*, *11*(5), 217. https://doi.org/10.3390/inorganics11050217

Lusic, H., Grinstaff, M.W. (2013). X-ray-Computed Tomography Contrast Agents. *Chemical Review*, *113*, 1641-1666. https://doi.org/10.1021/cr200358s

Maharani, A. A., Husnii, A., & Ekantari, N. (2017). Karakteristik Natrium Alginat Rumput Laut Cokelat Sargasum fluitans dengan metode ekstrasi yang berbeda. *Jurnal Pengelolaan Hasil Perikanan Indonesia*, *20*(3) 478 – 487. https://doi.org/10.17844/jphpi.v20i3.19768

Manicone, P. F., Iometti, P. R., dan Rafaelli, L. (2007). An Overview of Zirconia Ceramics: Basic Properties and Clinical Application. *Journal of Dentistry*, *35*, 819-826. https://doi.org/10.1016/j.jdent.2007.07.008

Manimaran, M., Norizan, M. N., Kassim, M. H. M., Adam, M. R., Abdullah, N., & Norrrahim, M. N. F. (2025). A critical review on the stability and thermal conductivity of water-based hybrid nanofluids for heat transfer applications. *RSC Advances*, *15*, 14088–14125. https://doi.org/10.1039/D5RA00844A

McDonald, R. J., McDonald, J. S., Carter, R. E., Katzberg, R. W., Kallmes, D. F., & Williamson, E. E. (2014). Risk of intravenous contrast material-mediated acute kidney injury. *Radiology*, *271*(1), 65–73. https://doi.org/10.1148/radiol.13130775

Mohamed, M. A., Jaafar, J., Ismail, A. F., Othman, M. H. D., & Rahman, M. A. (2017). Fourier Transform Infrared (FTIR) Spectroscopy. *In Membrane Characterization*. Elsevier. https://doi.org/10.1016/B978-0-444-63776-5.00001-2

Mohanraj, V. J., & Chen, Y. (2006). Nanoparticles – A Review. *Tropical Journal of Pharmaceutical Research*, *5*(1), 561–573.

Mohanty, U. S., Awan, F. U. R., Ali, M., Aftab, A., Keshavarz, A., & Iglauer, S. (2021). Physicochemical Characterisation of Zirconia Nanoparticles Based Sodium Alginate Polymer Suspension for Enhanced Oil Recovery. *Energy & Fuels,* *35*(23), 19389–19398. https://doi.org/10.1021/acs.energyfuels.1c02724

Muyonga, J. H., Cole, C. G. B., & Duodu, K. G. (2004). Fourier transform infrared (FTIR) spectroscopic study of acid soluble collagen and gelatin from skins and bones of young and adult Nile perch (Lates niloticus). *Food Chemistry*, *86*(3), 325–332. https://doi.org/10.1016/j.foodchem.2003.09.038

Nasrullah, F., Nurhasanah, I., Triadyaksa, P., dan Rukmono, D. A. 2023. A Comparison of Image Quality of Cerium Oxide Nanoparticles and Iodine Contrast Agents in Computed Tomography Scan. *Jurnal Pijar MIPA*, *18*(6), 981–985. https://doi.org/10.29303/jpm.v18i6.6004.

Nautiyal, A., Mondal, T., Manii, M., Kaushik, A., Goel, A., Dey, S. K., & Mitra, D. (2021). Significant reduction of radiation dose and DNA damage in 18F- FDG whole-body PET/CT study without compromising diagnostic image quality. *Journal of Radiation Research and Applied Sciences, 14*(1), 358-368. https://doi.org/https://doi.org/10.1080/16878507.2021.1969197

Nurhasanah, I., & Khumaeni, A. (2023). *Prinsip dan Aplikasi Ablasi Laser Pulsa dalam Medium Cair untuk Sintesis Koloid Nanopartikel*. Penerbit UNDIP.

Papageorgiou, S.K., Kouvelos, E.P., Favvas, E.P., Sapalidis, A.A., Romanos, G.E., & Katsaros, F.K. (2010). Metal–carboxylate interactions in metal–alginate complexes studied with FTIR spectroscopy. *Carbohydrate Research*, *345*(4), 469–473. https://doi.org/10.1016/j.carres.2009.12.010

Pratama, M. R. F., Suratno, S., & Mulyani, E. (2018). Profile of Thin-Layer Chromatography and UV-Vis Spectrophotometry of Akar Kuning Stem Extract (*Arcangelisia flava*). *Borneo Journal of Pharmacy*, *1*(2), 72–76. https://doi.org/10.33084/bjop.v1i2.367

Purnomo, S. R., Rupiasih, N. N., & Sumadiyasa, M. (2017). Sintesis nanopartikel perak dengan metode biologi menggunakan ekstrak tanaman sambiloto (*Andrographis paniculata Ness*). *Buletin Fisika*, *18*(1), 6–12. https://doi.org/10.24843/BF.2017.v18.i01.p02

Quaia, E. (2016). Comparison between 80 kV, 100 kV and 120 kV CT protocols in the assessment of the therapeutic outcome in HCC. *Liver and Pancreatic Sciences*, *1*(1), 1–4. https://doi.org/10.15761/LPS.1000101

Razak, H. R. A., Rahmat, S. M. S. S., & Saad, W. M. M. (2013). Effects of different tube potentials and iodine concentrations on image enhancement, contrast-to-noise ratio and noise in micro-CT images: A phantom study. *Quantitative Imaging in Medicine and Surgery*, *3*(5), 256–261. https://doi.org/10.3978/j.issn.2223-4292.2013.10.04

Rivai, A. K. dan Takahashi, M., 2010, Investigations of a Zirconia Solid Electrolyte Oxygen Sensor In Liquid Lead, *Journal of Nuclear Materials*, *398*(1), Elsevier, hal. 160–164.

Rodriguez-Molares, Alfonso., Rindal, Ole Marius Hoel., D’Hooge, Jan., Måsøy, Svein-Erik., Austeng, Andreas., Lediju Bell, Muyinatu A., & Torp, Hans. (2020). The Generalized Contrast-to-Noise Ratio: A Formal Definition for Lesion Detectability. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, *67*(4), 745–759. https://doi.org/10.1109/TUFFC.2019.2956855

Safaei, M., Moradpoor, H., Salmani Mobarakeh, M., & Fallahnia, N. (2022). Optimization of Antibacterial, Structures, and Thermal Properties of Alginate-ZrO_2 Bionanocomposite by the Taguchi Method. *Journal of Nanotechnology*, *2022*, 7406168. https://doi.org/10.1155/2022/7406168

Sankari, G., Krishnamoorthy, E., Jayakumaran, S., Gunasekaran, S., Vishnu, P.V., Subramanian, S., Subramaniam, S. and Surapaneni, K.M. (2010) Analysis of Serum Immunoglobulins Using Fourier Transforms Infrared Spectral Measurements. *Biology & Medicine*, *2*(3), 42-48.

Shanmugam, K., & Sahadevan, R. (2018). Bioceramics–An Introductory Overview dalam Thomas, S., Balakrishnan, P., dan Sreekala, M. S. (Eds.). *Fundamental Biomaterials: Ceramics*. Woodhead Publishing.

Shuvo, M. R. H., Rahman, S. M. M., Diha, A. T., Arafa, H. R., Rakib, M. S., Mim, J. J., Islam, S., & Hossain, N. (2026). Characterization of eco-friendly green synthesis of ZrO_2 nanoparticles using medicinal leaf extracts of Curcuma zedoaria and Diospyros blancoi. *Materials Today Communications*, *52*, 115103. https://doi.org/10.1016/j.mtcomm.2026.115103

Strambeanu, N., Demetrovici, L., & Dragos, D. (2015). Natural Sources of Nanoparticles. *In Nanoparticles' Promises and Risks*, 9–19. https://doi.org/10.1007/978-3-319-11728-7

Tanzi, M. C., Farè, S., dan Candiani, G. (2019). *Foundations Of Biomaterials Engineering*. Academic Press.

Tsoi, J. K. (2019). Ceramic Materials in Dentistry dalam Khurshid, Z., Najeeb, S., Zafar, M. S., dan Sefat, F. *Advanced Dental Biomaterials*. Woodhead Publishing.

Ul Hasan, S. M., Siddique, M.T., E-alam, M.F., Atif, M., Saifullah, A., Marwat, N., Khurshid, A., Noor, O., Hossain, N., Ahmad, S., & Alimgeer, K.S. (2022). Hydrothermally Synthesized Lanthanide-Incorporated Multifunctional Zirconia Nanoparticles: Potential Candidate for

Multimodal Imaging. *Journal of King Saud University-Science*, *34*, 102080. https://doi.org/10.1016/j.jksus.2022.102080

Veerasingam, S. (2021). Contributions of Fourier Transform Infrared spectroscopy in materials and life sciences: Advances and perspectives. *Applied Spectroscopy Reviews*, *56*(9), 691–718. https://doi.org/10.1080/10643389.2020.1807450

Wang, Y., Xie, J., Lee, S., & Chen, X. (2013). Engineered nanoparticles for CT imaging. *Wiley Interdisciplinary Reviews: Nanomedicine and Nanobiotechnology*, *5*(4), 317–333. https://doi.org/10.1002/wnan.1214

Willems. (2005). *Roadmap Report on Nanoparticles*. Methodology, November, 1–57.

Williams, D. B., & Carter, C. B. (1996).*Transmission electron microscopy: A textbook for materials science*. Plenum Press. https://doi.org/10.1007/978-1-4757-2519-3

Xi, D., Dong, S., Meng, X., L, Q., Meng, L., & Ye, J. (2012). Gold nanoparticles as computerized tomography (CT) contrast agents. *RSC Advances*, *2*, 12515–12524. https://doi.org/10.1039/C2RA21263C

Yu, L., Leng, S., Kofler, J. M., McCollough, C. H., & Fletcher, J. G. (2020). Technical note: CNR and noise properties in low-dose CT imaging. *Medical Physics*, *47*(6), 2468–2476. https://doi.org/10.1002/mp.14156

Yoon, J., Choi, Y. H., Lee, S. M., Lee, J., Park, J., Kim, H. S., & Kim, M. J. (2019). Optimization of CT image quality: The role of contrast-to-noise ratio and radiation dose. *Korean Journal of Radiology*, *20*(7), 1170–1185. https://doi.org/10.3348/kjr.2019.0074

Zhang, D., Gökce, B., & Barcikowski, S. (2017). Laser synthesis and processing of colloids: Fundamentals and applications. *Chemical Reviews*, *117*(5), 3990–4103. https://doi.org/10.1021/acs.chemrev.6b00468

Zhao, H. (2024). Fabrication of novel nanofiber composed of gelatin/alginate with zirconium oxide NPs regulate orthodontic progression of cartilage degeneration on Wnt/β-catenin signaling axis in MC3T3-E1 cells. *Regenerative Therapy,* *25*, 308–319. https://doi.org/10.1016/j.reth.2024.01.004