

DAFTAR PUSTAKA

- Abdelhalim, M. A. K., & M. Mady, M. (2012). Physical Properties of Different Gold Nanoparticles: Ultraviolet-Visible and Fluorescence Measurements. *Journal of Nanomedicine & Nanotechnology*, 03(03). <https://doi.org/10.4172/2157-7439.1000133>
- Ahmed, N. M., Samsuri, S. A. M., Jasim, A. H., Radzi, N. A. binti M., Omar, N. F. N. binti, Almessiere, M. A., & Rajamanickam, S. (2025). Water pressure-assisted gold nanoparticle synthesis via pulsed laser ablation in liquid: A simple approach to controlling size distribution. *Optik*, 332, 172382. <https://doi.org/10.1016/j.ijleo.2025.172382>
- Algethami, M., Feltis, B., & Geso, M. (2017). Bismuth Sulfide Nanoparticles as a Complement to Traditional Iodinated Contrast Agents at Various X-Ray Computed Tomography Tube Potentials. *Journal of Nanomaterials & Molecular Nanotechnology*, 06(04). <https://doi.org/10.4172/2324-8777.1000222>
- Alhasan, A., Abdul Sani, S. F., Tajuddin, H. A., & Ali, T. H. (2025). Development of nanoparticles and quantum dots as alternatives to iodinated contrast agents for mono-modal and bi-modal computed tomography imaging. *Nanomedicine: Nanotechnology, Biology and Medicine*, 68, 102831. <https://doi.org/10.1016/j.nano.2025.102831>
- Alluhaybi, H. A., Ghoshal, S. K., Shamsuri, W. N. W., Alsobhi, B. O., Salim, A. A., & Krishnan, G. (2019). Pulsed laser ablation in liquid assisted growth of gold nanoparticles: Evaluation of structural and optical features. *Nano-Structures & Nano-Objects*, 19, 100355. <https://doi.org/10.1016/j.nanoso.2019.100355>
- Amika, Kumar, D., Sharma, R., & Sindhu, M. (2023). *Structural and morphological properties of bismuth oxide nanostructured materials*. 020056. <https://doi.org/10.1063/5.0162786>
- Anam, C., Amilia, R., Naufal, A., Sutanto, H., Budi, W. S., & Dougherty, G. (2025). Performance of A Statistical-Based Automatic Contrast-to-Noise Ratio Measurement on Images of the ACR CT Phantom. *Journal of Imaging*, 11(6), 175. <https://doi.org/10.3390/jimaging11060175>
- Arrigoni, P., Eng, B., Boles, M., Eng, B., Disanto, C., Eng, B., Mikhaeil, E., Eng, B., Savino, A., & Eng, B. (2020). *X-Ray Sensors in Computed Tomography*. July. <https://doi.org/10.13140/RG.2.2.30444.39045>
- Baltrusaitis, J., Schuttlefield, J., Zeitler, E., & Grassian, V. H. (2011). Carbon dioxide adsorption on oxide nanoparticle surfaces. *Chemical Engineering Journal*, 170(2–3), 471–481. <https://doi.org/10.1016/j.cej.2010.12.041>

- Baruah, S., Rani, B., & Sahu, N. K. (2023). Facile synthesis of PEG-glycerol coated bimetallic FePt nanoparticle as highly efficient electrocatalyst for methanol oxidation. *Scientific Reports*, 13(1), 13249. <https://doi.org/10.1038/s41598-023-38358-5>
- Berna, F. (2017). *Fourier Transform Infrared Spectroscopy (FTIR)* (pp. 285–286). https://doi.org/10.1007/978-1-4020-4409-0_15
- Bunaciu, A. A., Udriștioiu, E. gabriela, & Aboul-Enein, H. Y. (2015). X-Ray Diffraction: Instrumentation and Applications. *Critical Reviews in Analytical Chemistry*, 45(4), 289–299. <https://doi.org/10.1080/10408347.2014.949616>
- Chaffin, E. A., Bhana, S., O'Connor, R. T., Huang, X., & Wang, Y. (2014). Impact of Core Dielectric Properties on the Localized Surface Plasmonic Spectra of Gold-Coated Magnetic Core–Shell Nanoparticles. *The Journal of Physical Chemistry B*, 118(49), 14076–14084. <https://doi.org/10.1021/jp505202k>
- Chang, K.-P., Hsu, T.-K., Lin, W.-T., & Hsu, W.-L. (2017). Optimization of dose and image quality in adult and pediatric computed tomography scans. *Radiation Physics and Chemistry*, 140, 260–265. <https://doi.org/10.1016/j.radphyschem.2017.02.006>
- Chemin, A., Lam, J., Laurens, G., Trichard, F., Motto-Ros, V., Ledoux, G., Jarý, V., Laguta, V., Nikl, M., Dujardin, C., & Amans, D. (2019). Doping nanoparticles using pulsed laser ablation in a liquid containing the doping agent. *Nanoscale Advances*, 1(10), 3963–3972. <https://doi.org/10.1039/C9NA00223E>
- Dadashi, S., Poursalehi, R., & Delavari, H. (2018). Optical and structural properties of oxidation resistant colloidal bismuth/gold nanocomposite: An efficient nanoparticles based contrast agent for X-ray computed tomography. *Journal of Molecular Liquids*, 254, 12–19. <https://doi.org/10.1016/j.molliq.2018.01.069>
- Dadashi, S., Poursalehi, R., & Delavari H., H. (2019). In situ PEGylation of Bi nanoparticles prepared via pulsed Nd:YAG laser ablation in low molecular weight PEG: a potential X-ray CT imaging contrast agent. *Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization*, 7(4), 420–427. <https://doi.org/10.1080/21681163.2018.1452634>
- Dalrymple, N. C., & Oliphant, M. (2009). Imaging Evaluation of Trauma. In *Problem Solving in Abdominal Imaging* (pp. 184–214). Elsevier. <https://doi.org/10.1016/B978-0-323-04353-3.50015-X>
- Dance, D. R., "Christofides, S. [New N. G. H. (Cyprus)]", "Maidment, A. D. A. [University of P. (United S., "McLean Vienna (Austria)]," I. D. [International A. E. A., & "Ng Kuala Lumpur (Malaysia)]," K. H.

- [University of M. (2014). *Diagnostic radiology physics: A handbook for teachers and students*. Endorsed by: American Association of Physicists in Medicine, Asia-Oceania Federation of Organizations for Medical Physics, European Federation of Organisations for Medical Physics. IAEA; Vienna (International Atomic Energy Agency (IAEA)). <https://doi.org/https://doi.org/>
- Dell’Aglío, M., & De Giacomo, A. (2020). Plasma charging effect on the nanoparticles releasing from the cavitation bubble to the solution during nanosecond Pulsed Laser Ablation in Liquid. *Applied Surface Science*, 515, 146031. <https://doi.org/10.1016/j.apsusc.2020.146031>
- Dell’Aglío, M., Gaudioso, R., De Pascale, O., & De Giacomo, A. (2015). Mechanisms and processes of pulsed laser ablation in liquids during nanoparticle production. *Applied Surface Science*, 348, 4–9. <https://doi.org/10.1016/j.apsusc.2015.01.082>
- Díaz-Ortíz, A. Y., Rodríguez González, E., Melendrez-Amavizca, R., Cázares-López, E. A., Zamorano-Noriega, E. G., Ochoa-Landín, R., Castillo, S. J., Mota, M. L., & López-Oyama, A. B. (2026). Laser-Assisted Synthesis of Polymer-Coated Gold Nanoparticles for Studying Gamma Radiation Resistance. *Processes*, 14(3), 454. <https://doi.org/10.3390/pr14030454>
- Dolai, J., Mandal, K., & Jana, N. R. (2021). Nanoparticle Size Effects in Biomedical Applications. *ACS Applied Nano Materials*, 4(7), 6471–6496. <https://doi.org/10.1021/acsanm.1c00987>
- Dong, Y. C., Hajfathalian, M., Maidment, P. S. N., Hsu, J. C., Naha, P. C., Si-Mohamed, S., Breuilly, M., Kim, J., Chhour, P., Douek, P., Litt, H. I., & Cormode, D. P. (2019). Effect of Gold Nanoparticle Size on Their Properties as Contrast Agents for Computed Tomography. *Scientific Reports*, 9(1), 14912. <https://doi.org/10.1038/s41598-019-50332-8>
- Egerton, R. F. (2016). *Physical Principles of Electron Microscopy*. Springer International Publishing. <https://doi.org/10.1007/978-3-319-39877-8>
- Fahmi, M. Z. (2019). *Nanoteknologi dalam Perspektif Kesehatan*. Airlangga University Press.
- Fan, Z., Ji, G., Jin, Y., Shi, Z., & Wang, X. (2019). Mechanical analysis of the interface bonding state of a TiO₂ film/Si substrate. *Ceramics International*, 45(7), 8798–8803. <https://doi.org/10.1016/j.ceramint.2019.01.205>
- Fatimah, S., Ragadhita, R., Husaeni, D. F. Al, & Nandiyanto, A. B. D. (2021). How to Calculate Crystallite Size from X-Ray Diffraction (XRD) using Scherrer Method. *ASEAN Journal of Science and Engineering*, 2(1), 65–76. <https://doi.org/10.17509/ajse.v2i1.37647>
- Ford, B. ., Joy, D. ., & Bradbury, S. (2025). Transmission Electron Microscope. In

Encyclopedia

Britannica.

<https://www.britannica.com/technology/transmission-electron-microscope>

- Frost, R. L., Čejka, J., Sejkora, J., Plášil, J., Reddy, B. J., & Keeffe, E. C. (2011). Raman spectroscopic study of a hydroxy-arsenate mineral containing bismuth–atelestite $\text{Bi}_2\text{O}(\text{OH})(\text{AsO}_4)$. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 78(1), 494–496. <https://doi.org/10.1016/j.saa.2010.11.016>
- Gentile, L., Mateos, H., Mallardi, A., Dell’Aglia, M., De Giacomo, A., Cioffi, N., & Palazzo, G. (2021). Gold nanoparticles obtained by ns-pulsed laser ablation in liquids (ns-PLAL) are arranged in the form of fractal clusters. *Journal of Nanoparticle Research*, 23(2), 35. <https://doi.org/10.1007/s11051-021-05140-5>
- George, G., Wilson, R., & Joy, J. (2017). Ultraviolet Spectroscopy. In *Spectroscopic Methods for Nanomaterials Characterization* (pp. 55–72). Elsevier. <https://doi.org/10.1016/B978-0-323-46140-5.00003-0>
- Glancy, S. B., Morris, H. D., Ho, V. B., & Klarmann, G. J. (2023). Optimal Agents for Visualizing Collagen Tissue Microarchitecture Using Contrast-Enhanced MicroCT. *Pharmaceuticals*, 16(12), 1719. <https://doi.org/10.3390/ph16121719>
- Goncharova, D. A., Kharlamova, T. S., Lapin, I. N., & Svetlichnyi, V. A. (2019). Chemical and Morphological Evolution of Copper Nanoparticles Obtained by Pulsed Laser Ablation in Liquid. *The Journal of Physical Chemistry C*, 123(35), 21731–21742. <https://doi.org/10.1021/acs.jpcc.9b03958>
- Gondal, M. A., Saleh, T. A., & Drmash, Q. (2012). Optical Properties of Bismuth Oxide Nanoparticles Synthesized by Pulsed Laser Ablation in Liquids. *Science of Advanced Materials*, 4(3), 507–510. <https://doi.org/10.1166/sam.2012.1310>
- Gulliksrud, K., Stokke, C., & Trægde Martinsen, A. C. (2014). How to measure CT image quality: Variations in CT-numbers, uniformity and low contrast resolution for a CT quality assurance phantom. *Physica Medica*, 30(4), 521–526. <https://doi.org/10.1016/j.ejmp.2014.01.006>
- Hainfeld, J. F., Ridwan, S. M., Stanishevskiy, Y., Smilowitz, N. R., Davis, J., & Smilowitz, H. M. (2018). Small , Long Blood Half-Life Iodine Nanoparticle for Vascular and Tumor Imaging. *Scientific Reports*, April, 2–11. <https://doi.org/10.1038/s41598-018-31940-2>
- Hainfeld, J. F., Slatkin, D. N., Focella, T. M., & Smilowitz, H. M. (2006). Gold nanoparticles: a new X-ray contrast agent. *The British Journal of Radiology*, 79(939), 248–253. <https://doi.org/10.1259/bjr/13169882>
- Hupfeld, T., Laurens, G., Merabia, S., Barcikowski, S., Gökce, B., & Amans, D.

- (2020). Dynamics of laser-induced cavitation bubbles at a solid–liquid interface in high viscosity and high capillary number regimes. *Journal of Applied Physics*, 127(4). <https://doi.org/10.1063/1.5116111>
- Ibrahim, Y. O., Maalej, N., Masood Pirzada, B., Younis Raja, A., Anjum, D. H., Jan, N., Behouch, A., & Ul Haq Qurashi, A. (2024). Gold nanoparticles spectral CT imaging and limit of detectability in a new materials contrast-detail phantom. *Physica Medica*, 120, 103326. <https://doi.org/10.1016/j.ejmp.2024.103326>
- Jiang, Z., Zhang, M., Li, P., Wang, Y., & Fu, Q. (2023). Nanomaterial-based CT contrast agents and their applications in image-guided therapy. *Theranostics*, 13(2), 483–509. <https://doi.org/10.7150/thno.79625>
- Jinyi Qi, & Huesman, H. (2006). Theoretical study of penalized-likelihood image reconstruction for region of interest quantification. *IEEE Transactions on Medical Imaging*, 25(5), 640–648. <https://doi.org/10.1109/TMI.2006.873223>
- Jung, H., Jeong, S., Park, Y., Shin, Y., & Jeong, H. (2023). X-ray Diffraction Analysis of Damaged Layer During Polishing of Silicon Carbide. *International Journal of Precision Engineering and Manufacturing*, 24(1), 25–32. <https://doi.org/10.1007/s12541-022-00711-5>
- Kalender, W. A., Deak, P., Kellermeier, M., van Straten, M., & Vollmar, S. V. (2009). Application- and patient size-dependent optimization of x-ray spectra for CT. *Medical Physics*, 36(3), 993–1007. <https://doi.org/10.1118/1.3075901>
- Kanagaraj, T., Murphin Kumar, P. S., Thomas, R., Kulandaivelu, R., Subramani, R., Mohamed, R. N., Lee, S., Chang, S. W., Chung, W. J., & Nguyen, D. D. (2022). Novel pure α -, β -, and mixed-phase α/β -Bi₂O₃ photocatalysts for enhanced organic dye degradation under both visible light and solar irradiation. *Environmental Research*, 205, 112439. <https://doi.org/10.1016/j.envres.2021.112439>
- Keskar, N. R., & Chelikowsky, J. R. (1992). Structural properties of nine silica polymorphs. *Physical Review B*, 46(1), 1–13. <https://doi.org/10.1103/PhysRevB.46.1>
- Khairnar, S. D., & Shrivastava, V. S. (2019). Photocatalytic degradation of chlorpyrifos and methylene blue using α -Bi₂O₃ nanoparticles fabricated by sol–gel method. *SN Applied Sciences*, 1(7), 762. <https://doi.org/10.1007/s42452-019-0761-4>
- Khan, S. A., Khan, S. B., Khan, L. U., Farooq, A., Akhtar, K., & Asiri, A. M. (2018). Fourier Transform Infrared Spectroscopy: Fundamentals and Application in Functional Groups and Nanomaterials Characterization. In *Handbook of Materials Characterization* (pp. 317–344). Springer International Publishing. https://doi.org/10.1007/978-3-319-92955-2_9

- Khorsand Zak, A., & Hashim, A. M. (2025). Advanced XRD peak broadening analysis of gallium-doped ZnO nanoparticles for crystallite size evaluation. *Scientific Reports*, 16(1), 1717. <https://doi.org/10.1038/s41598-025-31317-2>
- Khumaeni, A., Jonathan, F., Alkian, I., Sugito, H., Nurhasanah, I., Ibrahim, R. K. R., & Julkapli, N. M. (2025). Direct synthesis of bismuth-doped ZnO nanoparticles in liquid precursor: A one-step pulsed laser ablation approach for enhanced photocatalytic dye removal. *Journal of Molecular Liquids*, 434, 128054. <https://doi.org/10.1016/j.molliq.2025.128054>
- Khumaeni, A., Sutanto, H., & 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), 961. <https://doi.org/10.14716/ijtech.v10i5.1953>
- Kohl, H., & Reimer, L. (2008). *Transmission Electron Microscopy* (Vol. 36). Springer New York. <https://doi.org/10.1007/978-0-387-40093-8>
- Kotadiya, M. C. (Ed.). (2024). Ultraviolet and Visible Spectroscopy. In *Organic Spectroscopy Technology and Applications* (pp. 9–33). BENTHAM SCIENCE PUBLISHERS. <https://doi.org/10.2174/9789815313239124010004>
- Kuriakose, A. C., Nampoori, V. P. N., & Thomas, S. (2019). Facile synthesis of Au/CdS core-shell nanocomposites using laser ablation technique. *Materials Science in Semiconductor Processing*, 101, 124–130. <https://doi.org/10.1016/j.mssp.2019.05.030>
- Kuru, D., Akpınar 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, S. H., Jung, H. J., Lee, S. J., Theerthagiri, J., Kim, T. H., & Choi, M. Y. (2020). Selective synthesis of Au and graphitic carbon-encapsulated Au (Au@GC) nanoparticles by pulsed laser ablation in solvents: Catalytic Au and acid-resistant Au@GC nanoparticles. *Applied Surface Science*, 506, 145006. <https://doi.org/10.1016/j.apsusc.2019.145006>
- Leopold, N., Chiş, V., Mircescu, N. E., Marişca, O. T., Buja, O. M., Leopold, L. F., Socaci, C., Braicu, C., Irimie, A., & Berindan-Neagoe, I. (2013). One step synthesis of SERS active colloidal gold nanoparticles by reduction with polyethylene glycol. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 436, 133–138. <https://doi.org/10.1016/j.colsurfa.2013.05.075>
- Li, W. (2006). Facile synthesis of monodisperse Bi₂O₃ nanoparticles. *Materials Chemistry and Physics*, 99(1), 174–180.

<https://doi.org/10.1016/j.matchemphys.2005.11.007>

- Li, Y., & Wang, J. (2024). Contrast-induced acute kidney injury: a review of definition, pathogenesis, risk factors, prevention and treatment. *BMC Nephrology*, 25(1), 140. <https://doi.org/10.1186/s12882-024-03570-6>
- Lusic, H., & Grinstaff, M. W. (2013). X-ray-Computed Tomography Contrast Agents. *Chemical Reviews*, 113(3), 1641–1666. <https://doi.org/10.1021/cr200358s>
- Ma, Z., Ren, F., Yang, Z., & Volinsky, A. A. (2021). Theoretical and experimental studies on electronic structure and optical properties of Bi-doped anatase TiO₂. *Optik*, 241, 167107. <https://doi.org/10.1016/j.ijleo.2021.167107>
- Malatesta, M. (2021). Transmission Electron Microscopy as a Powerful Tool to Investigate the Interaction of Nanoparticles with Subcellular Structures. *International Journal of Molecular Sciences*, 22(23), 12789. <https://doi.org/10.3390/ijms222312789>
- Mehta, K., Soumyashree, S., Pandya, J., Singh, P., Kushawaha, R. K., Kumar, P., Shinde, S., Saha, J., & Baruah, P. K. (2023). Impact of viscosity of liquid on nanoparticles synthesized by laser ablation in liquid: An experimental and theoretical investigation. *Applied Physics A*, 129(5), 388. <https://doi.org/10.1007/s00339-023-06673-3>
- Moore, J. A., & Chow, J. C. L. (2021). Recent progress and applications of gold nanotechnology in medical biophysics using artificial intelligence and mathematical modeling. *Nano Express*, 2(2), 022001. <https://doi.org/10.1088/2632-959X/abddd3>
- Motakef-Kazemi, N., & Yaqoubi, M. (2020). Green synthesis and characterization of bismuth oxide nanoparticle using mentha pulegium extract. *Iranian Journal of Pharmaceutical Research*, 19(2), 70–79. <https://doi.org/10.22037/ijpr.2019.15578.13190>
- Muhsin, M. S., Salim, E. T., & Saimon, J. A. (2024). Structural, morphological and optical properties of tungsten trioxide nanoparticle synthesis by pulsed laser ablation in water: effect of laser fluence. *Journal of Optics*, 53(3), 2339–2354. <https://doi.org/10.1007/s12596-023-01368-7>
- Müller, A. M. (2020). Optical control of layered nanomaterial generation by pulsed-laser ablation in liquids. *Journal of Modern Optics*, 67(1), 49–54. <https://doi.org/10.1080/09500340.2019.1682204>
- Mzwd, E., Ahmed, N. M., Suradi, N., Alsaee, S. K., Altowyan, A. S., Almessiere, M. A., & Omar, A. F. (2022). Green synthesis of gold nanoparticles in Gum Arabic using pulsed laser ablation for CT imaging. *Scientific Reports*, 12(1), 10549. <https://doi.org/10.1038/s41598-022-14339-y>

- Naharuddin, N. Z. A., Sadrolhosseini, A. R., Abu Bakar, M. H., Tamchek, N., & Mahdi, M. A. (2020). Laser ablation synthesis of gold nanoparticles in tetrahydrofuran. *Optical Materials Express*, 10(2), 323. <https://doi.org/10.1364/OME.381427>
- Naser, H., Alghoul, M. A., Hossain, M. K., Asim, N., Abdullah, M. F., Ali, M. S., Alzubi, F. G., & Amin, N. (2019). The role of laser ablation technique parameters in synthesis of nanoparticles from different target types. *Journal of Nanoparticle Research*, 21(11), 249. <https://doi.org/10.1007/s11051-019-4690-3>
- Nasiri, P., Doranian, D., & Sari, A. H. (2019). Synthesis of Au/Si nanocomposite using laser ablation method. *Optics & Laser Technology*, 113, 217–224. <https://doi.org/10.1016/j.optlastec.2018.12.033>
- Nasrollahzadeh, M., Sajadi, S. M., Sajjadi, M., & Issaabadi, Z. (2019). *An Introduction to Nanotechnology* (pp. 1–27). <https://doi.org/10.1016/B978-0-12-813586-0.00001-8>
- Ojeda, J. J., & Dittrich, M. (2012). *Fourier Transform Infrared Spectroscopy for Molecular Analysis of Microbial Cells* (pp. 187–211). https://doi.org/10.1007/978-1-61779-827-6_8
- Oliveira, A. E. F., Pereira, A. C., Resende, M. A. C., & Ferreira, L. F. (2023). Gold Nanoparticles: A Didactic Step-by-Step of the Synthesis Using the Turkevich Method, Mechanisms, and Characterizations. *Analytica*, 4(2), 250–263. <https://doi.org/10.3390/analytica4020020>
- Omping, J., Unabia, R., Reazo, R. L., Lapening, M., Lumod, R., Ruda, A., Rivera, R. B., Sayson, N. L., Latayada, F., Capangpangan, R., Dumancas, G., Malaluan, R., Lubguban, A., Petalcorin, G., & Alguno, A. (2024). Facile Synthesis of PEGylated Gold Nanoparticles for Enhanced Colorimetric Detection of Histamine. *ACS Omega*, 9(12), 14269–14278. <https://doi.org/10.1021/acsomega.3c10050>
- P.J. LinsP.J. Linstrom and W.G. Mallard, E. (2025). *NIST Chemistry WebBook, NIST Standard Reference Database Number 69*. National Institute of Standards and Technology, Gaithersburg MD, 20899. <https://doi.org/https://doi.org/10.18434/T4D303>
- Pande, S., Jian, T., Khetrapal, N. S., Wang, L.-S., & Zeng, X. C. (2018). Structural Evolution of Gold-Doped Bismuth Clusters AuBi_n – (n = 4–8). *The Journal of Physical Chemistry C*, 122(12), 6947–6954. <https://doi.org/10.1021/acs.jpcc.8b00166>
- Pasieczna-Patkowska, S., Cichy, M., & Flieger, J. (2025). Application of Fourier Transform Infrared (FTIR) Spectroscopy in Characterization of Green Synthesized Nanoparticles. *Molecules*, 30(3), 684. <https://doi.org/10.3390/molecules30030684>

- Pelaz, B., del Pino, P., Maffre, P., Hartmann, R., Gallego, M., Rivera-Fernández, S., de la Fuente, J. M., Nienhaus, G. U., & Parak, W. J. (2015). Surface Functionalization of Nanoparticles with Polyethylene Glycol: Effects on Protein Adsorption and Cellular Uptake. *ACS Nano*, 9(7), 6996–7008. <https://doi.org/10.1021/acsnano.5b01326>
- Podgorsak, E. B. (2016). *Radiation Physics for Medical Physicists*. Springer International Publishing. <https://doi.org/10.1007/978-3-319-25382-4>
- Prakash, A., Pathrose, B. P., Radhakrishnan, P., & Mujeeb, A. (2020). Nonlinear optical properties of neutral red dye: Enhancement using laser ablated gold nanoparticles. *Optics & Laser Technology*, 130, 106338. <https://doi.org/10.1016/j.optlastec.2020.106338>
- Qi, Z., Zambelli, J., Bevins, N., & Chen, G.-H. (2010). Quantitative imaging of electron density and effective atomic number using phase contrast CT. *Physics in Medicine and Biology*, 55(9), 2669–2677. <https://doi.org/10.1088/0031-9155/55/9/016>
- Reilly, R. M. (2019). X-Ray, CT, and Mammography Technology. In *Medical Imaging for Health Professionals* (pp. 11–26). Wiley. <https://doi.org/10.1002/9781119537397.ch2>
- Reznickova, A., Slepicka, P., Slavikova, N., Staszek, M., & Svorcik, V. (2017). Preparation, aging and temperature stability of PEGylated gold nanoparticles. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 523, 91–97. <https://doi.org/10.1016/j.colsurfa.2017.04.005>
- Rice, S. B., Chan, C., Brown, S. C., Eschbach, P., Han, L., Ensor, D. S., Stefaniak, A. B., Bonevich, J., Vladár, A. E., Walker, A. R. H., Zheng, J., Starnes, C., Stromberg, A., Ye, J., & Grulke, E. A. (2013). Particle size distributions by transmission electron microscopy: an interlaboratory comparison case study. *Metrologia*, 50(6), 663–678. <https://doi.org/10.1088/0026-1394/50/6/663>
- Rotimi, L., Ojemaye, M. O., Okoh, O. O., Sadimenko, A., & Okoh, A. I. (2019). Synthesis, characterization, antimalarial, antitrypanocidal and antimicrobial properties of gold nanoparticle. *Green Chemistry Letters and Reviews*, 12(1), 61–68. <https://doi.org/10.1080/17518253.2019.1569730>
- Sadeghian, M., Akhlaghi, P., & Mesbahi, A. (2020). Investigation of imaging properties of novel contrast agents based on gold, silver and bismuth nanoparticles in spectral computed tomography using Monte Carlo simulation. *Polish Journal of Medical Physics and Engineering*, 26(1), 21–29. <https://doi.org/10.2478/pjmpe-2020-0003>
- Salesa, B., Ferrús-Manzano, P., Tuñón-Molina, A., Cano-Vicent, A., Assis, M., Andrés, J., & Serrano-Aroca, Á. (2023). Study of biological properties of gold nanoparticles: Low toxicity, no proliferative activity, no ability to

- induce cell gene expression and no antiviral activity. *Chemico-Biological Interactions*, 382, 110646. <https://doi.org/10.1016/j.cbi.2023.110646>
- Schaumberg, C. A., Wollgarten, M., & Rademann, K. (2014). Metallic Copper Colloids by Reductive Laser Ablation of Nonmetallic Copper Precursor Suspensions. *The Journal of Physical Chemistry A*, 118(37), 8329–8337. <https://doi.org/10.1021/jp501123y>
- Seeram, E. (2010). Computed Tomography: Physical Principles and Recent Technical Advances. *Journal of Medical Imaging and Radiation Sciences*, 41(2), 87–109. <https://doi.org/10.1016/j.jmir.2010.04.001>
- Semaltianos, N. G. (2010). Nanoparticles by Laser Ablation. *Critical Reviews in Solid State and Materials Sciences*, 35(2), 105–124. <https://doi.org/10.1080/10408431003788233>
- Shi, L., Zhang, J., Zhao, M., Tang, S., Cheng, X., Zhang, W., Li, W., Liu, X., Peng, H., & Wang, Q. (2021). Effects of polyethylene glycol on the surface of nanoparticles for targeted drug delivery. *Nanoscale*, 13(24), 10748–10764. <https://doi.org/10.1039/D1NR02065J>
- Stern, T. (2025). Deciphering the Triple-Peak C-O-C Stretching FTIR Absorbance Consistently Occurring in Semicrystalline PEG. *Polymers*, 17(16), 2199. <https://doi.org/10.3390/polym17162199>
- Strambeanu, N., Demetrovici, L., Dragos, D., & Lungu, M. (2015). Nanoparticles: Definition, Classification and General Physical Properties. In *Nanoparticles' Promises and Risks* (pp. 3–8). Springer International Publishing. https://doi.org/10.1007/978-3-319-11728-7_1
- Suhartati, T. (2013). *Dasar-dasar Spektrofotometri Uv-vis dan spektrometri Massa untuk Penentuan Struktur Senyawa Organik*. Graha Ilmu.
- Svetlichnyi, V. A., Shabalina, A. V., Lapin, I. N., & Goncharova, D. A. (2016). Metal Oxide Nanoparticle Preparation by Pulsed Laser Ablation of Metallic Targets in Liquid. In *Applications of Laser Ablation - Thin Film Deposition, Nanomaterial Synthesis and Surface Modification*. InTech. <https://doi.org/10.5772/65430>
- Takiguchi, S., Takahashi, A., Yamauchi, N., Tada, S., Takase, T., Kimura, M., Gonda, K., & Kobayashi, Y. (2025). Development of Gold Nanoparticles Coated with Bismuth Oxide for X-ray Computed Tomography Imaging. *Journal of Cluster Science*, 36(1), 7. <https://doi.org/10.1007/s10876-024-02724-8>
- Tam, L. T. T., Ngoc, D. T., Linh, N. T. N., Tam, L. T., Dong, N. V., Yen, N. T., Suong, N. T., Dung, N. T., & Lu, L. T. (2025). Ultrasmall Bi/Bi₂O₃ nanoparticles as biocompatible and efficient CT imaging contrast agents. *Nanoscale Advances*, 7(13), 4183–4193.

<https://doi.org/10.1039/D5NA00389J>

- Tarighatnia, A., Fouladi, M. R., Tohidkia, M. R., Johal, G., Nader, N. D., Aghanejad, A., & Ghadiri, H. (2021). Engineering and quantification of bismuth nanoparticles as targeted contrast agent for computed tomography imaging in cellular and animal models. *Journal of Drug Delivery Science and Technology*, 66, 102895. <https://doi.org/10.1016/j.jddst.2021.102895>
- Toghan, A., Mwafy, E. A., Mostafa, A. M., & Rezk, R. A. (2023). Adsorption of phosphate ions from water using PVA-NiO nanocomposite based on tuning influence of pulsed laser ablation method. *Physica Scripta*, 98(1), 015611. <https://doi.org/10.1088/1402-4896/aca00c>
- Villard, C., & Al-kattan, A. (2014). *Gold nanoparticles prepared by laser ablation in aqueous biocompatible solutions: assessment of safety and biological identity for nanomedicine applications*. 5415–5430.
- Vogt, C., Wondergem, C. S., & Weckhuysen, B. M. (2023). *Ultraviolet-Visible (UV-Vis) Spectroscopy* (pp. 237–264). https://doi.org/10.1007/978-3-031-07125-6_11
- Wang, C.-H., Liu, C.-J., Wang, C.-L., Hua, T.-E., Obliosca, J. M., Lee, K. H., Hwu, Y., Yang, C.-S., Liu, R.-S., Lin, H.-M., Je, J.-H., & Margaritondo, G. (2008). Optimizing the size and surface properties of polyethylene glycol (PEG)–gold nanoparticles by intense x-ray irradiation. *Journal of Physics D: Applied Physics*, 41(19), 195301. <https://doi.org/10.1088/0022-3727/41/19/195301>
- Wang, Y., & Li, Y. (2015). Metastable γ -Bi₂O₃ tetrahedra: Phase-transition dominated by polyethylene glycol, photoluminescence and implications for internal structure by etch. *Journal of Colloid and Interface Science*, 454, 238–244. <https://doi.org/10.1016/j.jcis.2015.05.001>
- Wang, Y., Quinsaat, J. E. Q., Ono, T., Maeki, M., Tokeshi, M., Isono, T., Tajima, K., Satoh, T., Sato, S., Miura, Y., & Yamamoto, T. (2020). Enhanced dispersion stability of gold nanoparticles by the physisorption of cyclic poly(ethylene glycol). *Nature Communications*, 11(1), 6089. <https://doi.org/10.1038/s41467-020-19947-8>
- Williams, D. B., & Carter, C. B. (2009). *Transmission Electron Microscopy*. Springer US. <https://doi.org/10.1007/978-0-387-76501-3>
- Zhu, B., Dong, Q., Huang, J., Yang, M., Chen, X., Zhai, C., Chen, Q., Wang, B., Tao, H., & Chen, L. (2023). Self-Assembly of Bi₂Sn₂O₇/β-Bi₂O₃ S-Scheme Heterostructures for Efficient Visible-Light-Driven Photocatalytic Degradation of Tetracycline. *ACS Omega*, 8(15), 13702–13714. <https://doi.org/10.1021/acsomega.2c07899>
- Zhu, M., Lei, B., Ren, F., Chen, P., Shen, Y., Guan, B., Du, Y., Li, T., & Liu, M.

(2014). Branched Au Nanostructures Enriched with a Uniform Facet: Facile Synthesis and Catalytic Performances. *Scientific Reports*, 4(1), 5259. <https://doi.org/10.1038/srep05259>