

DAFTAR PUSTAKA

- Aji, A., 2019, Sintesis Nanopartikel Emas melalui Reduksi ion Au(III) Menggunakan Asam p-Aminobenzoat dan Asam p-Aminosalisilat untuk Sensor Kolorimetri Klorpirifos, *Disertasi*, Departemen Kimia FMIPA UGM, Yogyakarta.
- Ambarwati, R. dan Rustiani, E., 2022, Formulasi dan Evaluasi Nanopartikel Ekstrak Biji Alpukat (*Persea Americana* Mill) dengan Polimer PLGA, *Majalah Farmasetika*, 7(4), 305-313.
- Annur, S., Santosa, S.J., Aprilita, N. H., Phuong, N. T., dan Phuocs, N. V., 2017, A Preliminary Research for Selective Detection of Cr(III) in Water Sample, *Asian J. Env. Tech.*, 1, 2-4.
- Annur, S., Santosa, S.J., Aprilita, N. H., Phuong, N. T., dan Phuocs, N. V., 2018, Rapid Synthesis of Gold Nanoparticles without Heating, *Asian J. Env. Tech.*, 30(11), 2399-2403.
- Annur, S., 2019, Sintesis Nanopartikel Emas dengan Reduktor Asam L-Askorbat dan Penudung Asam p-Aminobenzoat serta Aplikasinya sebagai Pendeteksi Cr(III) dan Cr(VI) secara Kolorimetri dalam Sampel Air, *Disertasi*, Departemen Kimia FMIPA UGM, Yogyakarta.
- Apilux, A., Weena, S. R., Praphairaksit, N., dan Chailapakul, O., 2016, Simple and Rapid Colorimetric Detection of Hg(II) by A Paper-Based Device using Silver Nanoplates, *Talanta*, 97, 388-394.
- Anonim, 2009, *Rencana Pembangunan Jangka Panjang Bidang Kesehatan 2005-2025*, Departemen Kesehatan Republik Indonesia, Jakarta.
- Anonim, 2012, *Flame Atomic Absorption Spectrometry: Analytical Methods*, Agilent Technologies, Victoria, Australia.
- Barman, G., Maiti, S., dan Laha, J. K., 2013, Bio-fabrication of Gold Nanoparticles Using Aqueous Extract of Red Tomato and Its Use as a Colorimetric Sensor, *Nano. Res. Letter.*, 8, 181-190.
- Borah, S. B. D., Bora, T., Baruah, S. dan Dutta, J., 2015, Heavy Metal Ion Sensing in Water using Surface Plasmon Resonance of Metallic Nanostructures. *Groundwat. Sust. Dev.*, 1(1-2), 1-11.
- Bugis H., Daud A., dan Birawida A., 2013, Studi Kandungan Logam Berat Kromium VI (Cr(VI)) pada Air dan Sedimen Disungai Pangkajene Kabupaten Pangkep, *Fakultas Kesehatan Masyarakat, Universitas Hasanuddin, Makassar*.

- Buduru, P. dan Reddy, S. R., 2016, Oxamic Acid and *p*-Aminobenzoic Acid Functionalized Gold Nanoparticles as A Probe for Colorimetric Detection of Fe^{3+} Ion, *Sens. Actuators B Chem.*, 237, 935-943.
- Busa, L.S.A., Mohammadi, S., Maeki, M., Ishida, A., Tani, H., dan Tokeshi, M., 2016, Advances in Microfluidic Paper-based Analytical Devices for Food and Water Analysis, *Micromachines*, 7(5), 86.
- Carrilho E., Martinez A.W, dan Whitesides, G.M., 2009, Understanding Wax Printing: A Simple Micropatterning Process for Paper-based Microfluidics, *Anal Chem.*, 81(16), 7091–7095.
- Chen, H., Zhou, K., dan Zhao, G., 2018, Gold nanoparticles: From Synthesis, Properties to Their Potential Application as Colorimetric Sensors in Food Safety Screening, *Trends Food Sci. Technol.*, 78, 83-94.
- Chen, W., Cao, F., Zheng, W., Tian, Y., Xianyu, Y., Xu, P. dan Jiang, X., 2015, Detection of The Nanomolar Level of Total Cr[(III) and (VI)] by Functionalized Gold Nanoparticles and A *Smartphone* with The Assistance of Theoretical Calculation Models, *Nanoscale*, 7(5), 2042–2049.
- Cinti, S., Fiore, L., Massoud, R., Cortese, C., Moscone, D., dan Palleschi, G., 2018, Low-cost and Reagent-free Paper-based Device to Detect Chloride Ions in Serum and Sweat, *Talanta*, 179, 186–192.
- Cunningham, J.C., DeGregory P.R., dan Crooks R.M., 2016, New Functionalities for Paper-Based Sensors Lead to Simplified User Operation, Lower Limits of Detection, and New Applications, *Annu Rev Anal Chem.*, 9(1), 183-202.
- Dai, Y., Yu, P., Zhang, X., dan Zhuo, R., 2016, Gold Nanoparticles Stabilized by Amphiphilic Hyperbranched Polymers for Catalytic Reduction of 4-Nitrophenol, *J. Catal.*, 337, 65–71.
- Das, S., Gagandeep, dan Bhatia, R., 2022, Paper-based Microfluidic Devices: Fabrication, Detection, and Significant Applications in Various Fields, *Rev Anal Chem.*, 41(1), 112-136.
- Dutta, T., Ghosh, N. N., Das, M., Adhikary, R., Mandal, V., dan Chattopadhyay, A. P., 2020, Green synthesis of antibacterial and antifungal silver nanoparticles using Citrus limetta Peel Extract: Experimental and Theoretical Studies, *J. Environ. Chem. Eng.*, 8(4), 104-109.
- Dyaninggar, P. S., 2021, Analisis Kromium(III) Berbasis Proses Gambar Digital Menggunakan Nanopartikel Emas sebagai Sensor Kolorimetri, *Tesis*, Departemen Kimia FMIPA UGM, Yogyakarta.

- Eustis, S. dan El-Sayed, M., A., 2006, Why Gold Nanoparticles Are More Precious than Pretty Gold: Noble Metal Surface Plasmon Resonance and Its Enhancement of the Radiative and Nonradiative Properties of Nanocrystals of Different Shapes, *Chem. Soc. Rev.*, 35, 209-217.
- Eviane, D., 2020, Sintesis Nanopartikel Emas Tertudung Histidin untuk Deteksi Hg^{2+} , *Disertasi*, Departemen Kimia FMIPA UGM, Yogyakarta.
- Fan, Y., Li, J., Guo, Y., Xie, L., dan Zhang, G., 2021, Digital Image Colorimetry on *Smartphone* for Chemical Analysis: a Review, *Meas. Sci. Rev.*, 171, 1-10.
- Fathimah, E. N. dan Hidajati, N., 2012, Sintesis dan Karakterisasi Nanopartikel Emas sebagai Material Pendukung Aktivitas Tabir Surya Turunan Sinamat, *Prosiding Seminar Nasional Kimia Unesa*, (ISBN: 978-979028-550-7), 978-979.
- Firdaus, M. L., Alwi, W., Trinoveldi, F., Rahayu, I., Rahmidar, L., dan Warsito, K., 2014, Determination of Chromium and Iron using Digital Image-based Colorimetry, *Procedia Environ. Sci.*, 20, 298-304.
- Frost, R. L.; Erickson, K. L. dan Weier, M. L., 2004, Hydrogen Bonding in Selected Vanadates: A Raman and Infrared Spectroscopy Study, *Spectrochim. Acta - Part A Mol. Biomol. Spectrosc.*, 60(10), 2419-2423.
- Golshaei, R., Guler, Z., Unsal, C. dan Sarac, A. S., 2015, In Situ Spectroscopic and Electrochemical Impedance Study of Gold/Poly (Anthranilic Acid) Core/Shell Nanoparticles, *Eur. Polym. J.*, 502-512.
- Gusrizal, 2017, Sintesis Nanopartikel Perak melalui Reduksi Ion Perak dengan Asam 2-,3-, dan 4-Hidroksibenzoat serta Aplikasinya untuk Penentuan Parakuat, *Disertasi*, UGM, Yogyakarta.
- Hambali, H. dan Mutalib, A., 2014, Sintesis Nanopartikel Emas Menggunakan Reduktor Trisodium Sitrat, *Prosiding Pertemuan Ilmiah Radioisotop, Radiofarmaka, Siklotron dan Kedokteran Nuklir*, 95-101.
- Han, K.N., Choi, JS., dan Kwon, J., 2017, Gold Nanozyme-Based Paper Chip for Colorimetric Detection of Mercury Ions, *Sci Rep.*, 2806(7), 1-7.
- Heitland, D., Blohm, M., Breuer, C., Brinkert, F., Achilles, E.G., Pukite, I., dan Koster, H.D., 2017, Application of ICP-MS and HPLC-ICP-MS for Diagnosis and Therapy of A Severe Intoxication with Hexavalent Chromium and Inorganic Arsenic, *J. Trace. Elem. Med. Bio.*, 41, 36-40.
- Herizchi, R., Abbasi, E., Milani, M., dan Akbarzadeh, A., 2016, Current Methods for Synthesis of Gold Nanoparticles, *Artif. Cells Nanomed. Biotechnol.*, 44(2), 596-

602.

- Hitsmi, M., Firdaus, M. L., dan Nurhamidah, 2020, Pengembangan Metode Citra Digital Berbasis Android untuk Analisis Ion Logam Cr(VI), *Jurnal Pendidikan dan Ilmu Kimia*, 4(2), 117-124.
- Hu, L., Cai, Y. dan Jiang, G., 2016, Occurrence and Speciation of Polymeric Chromium(III), Monomeric Chromium(III) and Chromium(VI) in Environmental Samples, *Chemosphere*, 156, 14–20.
- Jain, P., Kumari, A., Manna, A. K., dan De, A., 2020, Plasmonic Sensing of Cr(III) and Al (III) Ions from Aqueous Solution by Green Synthesized Gold Nanoparticles, *Mater. Today: Proc.*, 1-4.
- Jin, W., Huang, P., Chen, Y., Wu, F., dan Wan, Y., 2015, Colorimetric Detection of Cr^{3+} Using Gold Nanoparticles Functionalized with 4-Amino Hippuric Acid, *J. Nanopart. Res.*, 17(9), 358-361.
- Joshi, M., Bhattacharyya, A., dan Ali, S. W., 2008, Characterization Techniques for Nanotechnology Applications in Textiles, *Indian J. Fibre Text. Res.*, 33(3), 304-317.
- Kaewarsa P., Laiwattanapaisal W., Palasuwan A., dan Palasuwan D., 2017, A New Paper-based Analytical Device for Detection of Glucose-6-phosphate Dehydrogenase Deficiency, *Talanta*, 164, 534–539.
- Kanagaraj, R., Nam, Y.S., Pai, S. J., Han, S. S., dan Lee, K. B., 2017, Highly Selective and Sensitive Detection of Cr^{6+} Ions using Size Label-Free Gold Nanoparticles, *Sens. Actuators B Chem.*, 251, 683-691.
- Karabacakoglu, B. dan Savlak, O., 2014, Electrochemical Regeneration of Cr(VI) Saturated Granular and Powder Activated Carbon: Comparison of Regeneration Efficiency, *Ind. Eng. Chem. Res.*, 53(33), 13171–13179.
- Karri, V., Schuhmacher, M., dan Kumar, V., 2016, Heavy metals (Pb, Cd, As and MeHg) as risk factors for cognitive dysfunction: A general Review of Metal Mixture Mechanism in Brain, *Environ. Toxicol. Pharmacol.*, 48, 203-213.
- Le Ouay, B., dan Stellacci, F., 2015, Antibacterial activity of silver nanoparticles: A surface science insight, *Nano Today*, 10(3), 339-354.
- Lewis, G. G., DiTucci, M. J., dan Phillips, S. T., 2012, Quantifying Analytes in Paper-based Microfluidic Devices Without using External Electronic Readers, *Angew. Chem. Int. Ed.*, 51(51), 12707-12710.
- Li, S., Wei, T., Ren, G., Chai, F., Wu, H., dan Qu, F., 2017, Chemical Simple and Selective Colorimetric Detection of Hypochlorite Based on Anti-Aggregation

of Gold Nanoparticles, *Colloids Surf.*, 535, 215–224.

- Liu, S., Su, W., dan Ding, X., 2016, A Review on Microfluidic Paper-Based Analytical Devices for Glucose Detection, *Sensors*, 16(12), 2086-2087.
- Liu, T., Zhang, S., Liu, W., Zhao, S., Lu, Z., Wang, Y., Wang, G., Zou, P., Wang, X., Zhao, Q., dan Rao, H., 2020, *Smartphone* Based Platform for Ratiometric Fluorometric and Colorimetric Determination H_2O_2 and Glucose, *Sens. Actuators B. Chem.*, 305, 1-9.
- Liu, Y. dan Wang, X., 2013, Colorimetric Speciation of Cr(III) and Cr(VI) with A Gold Nanoparticle Probe, *Anal. Methods-UK.*, 5 (6), 1442-1448.
- Lu, L., Zhang, J. dan Yang, X., 2013, Chemical Simple and Selective Colorimetric Detection of Hypochlorite Based on Anti-Aggregation of Gold Nanoparticles, *Sensor. Actuat. B-Chem*, 184, 189–195.
- Maruyama, T., Fujimoto, Y., dan Maekawa, T., 2015, Synthesis of Gold Nanoparticles Using Various Amino Acids, *J. Colloid Interf. Sci.*, 447, 254–257.
- Masawat, P., Harfield, A., dan Namwong, A., 2015, An iPhone-based Digital Image Colorimeter for Detecting Tetracycline in Milk, *Food Chem.*, 184, 23-29.
- Meileza, N., Firdaus., M. L., dan Elvinawati, 2018, Analisis Ion Merkuri(III) Menggunakan Nano Partikel Perak Terimobilisasi pada Kertas Saring, *Jurnal Pendidikan dan Ilmu Kimia*, 2(2), 191-197.
- Mohamed, A., Li, X., Li, C., Li, X., Yuan, C. and Barakat, H., 2021, Smartphone-Based Colorimetric Detection of Chromium (VI) by Maleic Acid-Functionalized Gold Nanoparticles. *Appl. Sci.*, 11(22), 10894.
- Mohammadpour, D. N., Eskandari, R., Avadi, M. R., Zolfagharian, H., Mir Mohammad, S. A., dan Rezayat, M., 2012, Preparation and in Vitro Characterization of Chitosan Nanoparticles Containing Mesobuthus Eupeus Scorpion Venom as An Antigen Delivery System, *J. Venom. Anim. Toxins Incl. Trop. Dis.*, 18, 44-52.
- Moonrungsee, N., Pencharee, S., dan Jakmunee, J., 2015, Colorimetric Analyzer Based on Mobile Phone Camera for Determination of Available Phosphorus in Soil, *Talanta*, 136, 204-209.
- Muawiyah, S., 2022, Deteksi Kromium(VI) Berbasis Proses Gambar Digital Menggunakan Nanopartikel Emas Tertudung PABA sebagai Sensor Kolorimetri, *Skripsi*, Departemen Kimia FMIPA UGM, Yogyakarta.

- Origin(Pro), Version 2023, OriginLab Corporation, Northampton, MA, USA.
- Paterson, A.S., Raja, B., Mandadi, V., Townsend, B., Lee, M., Buell, A., Vu, B., Brgoch, J., dan Wilson, R. C., 2017, A low-cost *Smartphone*-based Platform for Highly Sensitive Point-of-care Testing with Persistent Luminescent, *Lab Chip*, 17(6), 1051-1059.
- Puangbanlang, C., Sirivibulkovit, K., Nacapricha, D., dan Sameenoi, Y., 2019, A paper-based Device for Simultaneous Determination of Antioxidant Activity and Total Phenolic Content in Food Samples, *Talanta*, 198, 542–549.
- Pyrzynska, K., 2012, Redox Speciation of Chromium Using Sorption-Based Systems. *TrAC - Trend. Anal. Chem.*, 32, 100–112.
- Riyanto, 2014, *Validasi dan Verifikasi Metode Uji*, Deepublish, Yogyakarta.
- Rohman, A., 2016, *Validasi dan Penjaminan Mutu Metode Analisis Kimia*, UGM Press, Yogyakarta.
- Shama, M., Phatak, M., Roy, B., Chand, A., Dhanda, G., Abbasi, N., dan Panchal, G., 2016, Green Synthesis of Gold Nanoparticles and Their Characterization, *J. Mater. Nanosci.*, 3(1), 8-10.
- Shekhawat, K., Chatterjee, S. dan Joshi, B., 2015, Chromium Toxicity and Its Health Hazards, *Int. J. Adv. Res.*, 3(7), 167-172.
- Shen, L., Hagen, J., dan Papautsky, I., 2012, Point-of-care Colorimetric Detection with a *Smartphone*, *Lab on a chip*. 12, 4240-4243.
- Smith, S., Oberholzer, A., Korvink, J.G., Mager, D., L., dan, K., 2019, Wireless Colorimetric Readout to Enable Resource-limited Point-of-care, *Lab A Chip*, 19(19), 3344–3353.
- SNI 06-6989.17-2004., 2004, Air dan Air Limbah-Bagian 17: Cara Uji Krom Total (Cr-T) dengan Metode Spektrofotometri Serapan Atom (SSA)-nyala, *Badan Standarisasi Nasional*.
- Suganthi, N., Sri Ramkumar, V., Pugazhendhi, A., Benelli, G. dan Archunan, G., 2017, Biogenic Synthesis of Gold Nanoparticles from Terminalia Arjuna Bark Extract: Assessment of Safety Aspects and Neuroprotective Potential via Antioxidant, Anticholinesterase, and Anti-amyloidogenic Effects. *Environ. Sci. Pollut. Res.*, 112-119.
- Sugihartono, S., 2016, Pemisahan Krom pada Limbah Cair Industri Penyamakan Kulit Menggunakan Gelatin dan Flokulan Anorganik, *Majalah Kulit, Karet, dan Plastik*, 32(1), 21-30.

- Sun, K., Qiu, J., Liu, J. dan Miao, Y., 2009, Preparation and Characterization of Gold Nanoparticles using Ascorbic Acid as Reducing Agent in Reverse Micelles, *J. Mater. Sci.*, 44(3), 754–758.
- Wikantyasning, E.R., Rizqiyana, F., Santoso, B., dan Suprpto, 2015, Sensor Kolorimetrik Berbasis Agregasi Nanopartikel Emas dan Polimer Responsif pH Poli(Asam Akrilat), *University Research Colloquium*, 116-122.
- World Health Organization (WHO), 2004, Chromium in drinking water, 2nd ed., *Guidelines for Drinking-Water Quality vol. 2*, World Health Organization, Geneva.
- Wu, S., Li, D. D., Wang, J. M., Zhao, Y. Q., Dong, S. J., dan Wang, X. Y., 2017, Gold Nanoparticles Dissolution Based Colorimetric Method for Highly Sensitive Detection of Organophosphate Pesticides, *Sens. Actuators B Chem.* 238, 427–433.
- Yeshchenko, O.A., Bondarchuk, I.S., Gurin, V.S., Dmitruk, I.M., dan Kotko, A.V., 2013, Temperature Dependence of The Surface Plasmon Resonance in Gold Nanoparticles, *Surf. Sci.*, 608, 275–281.
- Yesudasu, V., Pradhan, H. S., dan Pandya, R. J., 2021, Recent Progress in Surface Plasmon Resonance-based Sensors: A Comprehensive Review, *Heliyon.*, (7)113.
- Yin, T. dan Qin, W., 2013, Applications of Nanomaterials in Potentiometric Sensors, *TrAC - Trend. Anal. Chem.*, 51, 79–86.
- Zayed, M.F., Mahfoze, R.A., El-kousy, S.M., dan Al-Ashkar, E.A., 2019, In-vitro Antioxidant and Antimicrobial Activities of Metal Nanoparticles Biosynthesized using Optimized Pimpinella anisum Extract, *Colloids Surf. A Physicochem. Eng. Asp.*, 585, 124167.
- Zhang, Y., McKelvie, I. D., Cattrall, R.W., dan Kolev, S.D., 2016, Colorimetric Detection Based on Localised Surface Plasmon Resonance of Gold Nanoparticles: Merits, Inherent Shortcomings and Future Prospects, *Talanta*, 152, 410–422.
- Zhang, Y., Zou, J., Zhang, X. dan Wang, L., 2014, Shape Evolution in Brust – Schiffrin Synthesis of Au Nanoparticles, *Mater. Lett.*, 118, 196–199.
- Zhao, P., Li, N., dan Astruc, D., 2013, State of The Art in Gold Nanoparticle Synthesis, *Coord. Chem. Rev.*, 257(3–4), 638–665.
- Zheng, J., Zhu, M., Kong, J., Li, Z., Jiang, J., Xi, Y., and Li, F., 2022, Microfluidic

Paper-based Analytical Device by Using Pt Nanoparticles as Highly Active Peroxidase Mimic for Simultaneous Detection of Glucose and Uric Acid with Use of a *Smartphone*, *Talanta*, 237, 122954.

Zhuang, Y. T., Chen, S., Jiang, R., Zhang, Y. L., dan Wang, J. H., 2019, Ultrasensitive Colorimetric Chromium Chemosensor Based on Dye Color Switching under the Cr(VI)-Stimulated Au NPs Catalytic Activity, *Anal. Chem.*, 91(8), 5346–5353.

Zümreoglu-Karan, B., 2009, A Rationale on The Role of Intermediate Au(III)-Vitamin C Complexation in The Production of Gold Nanoparticles, *J.Nanopart.Res.*, 11(5), 1099–1105.