

## DAFTAR PUSTAKA

- [1] O. Z. Sharaf and M. F. Orhan, "An overview of fuel cell technology: Fundamentals and applications," *Renewable and Sustainable Energy Reviews*, vol. 32, pp. 810–853, Apr. 2014. doi: 10.1016/j.rser.2014.01.012.
- [2] P. Breeze, *Fuel Cells*, 1st ed. ACADEMIC PRESS, INC., 2017.
- [3] L. Y. Zhu, Y. C. Li, J. Liu, J. He, L. Y. Wang, and J. Du Lei, "Recent developments in high-performance Nafion membranes for hydrogen fuel cells applications," *Pet. Sci.*, vol. 19, no. 3, pp. 1371–1381, 2022, doi: 10.1016/j.petsci.2021.11.004.
- [4] P. Mukoma, B. R. Jooste, and H. C. M. Vosloo, "A comparison of methanol permeability in Chitosan and Nafion 117 membranes at high to medium methanol concentrations," *J. Memb. Sci.*, vol. 243, no. 1–2, pp. 293–299, 2004, doi: 10.1016/j.memsci.2004.06.032.
- [5] A. Doble, Mukesh; Kumar, *Biotreatment of Industrial Effluents*, 1st ed. Elsevier Inc., 2005. doi: <https://doi.org/10/1016/B978-0-7506-7838-4.X5000-3>.
- [6] R. O'HAYRE, *Fuel cell fundamentals*, 3rd ed. Wiley & Sons, 2016.
- [7] R. N. Ariestaa, Nina; Regita, "Sulfonated Nano - bentonite as Doping Material in Chitosan / PVA Membran in Fuel cell Application," vol. 5, no. 1, pp. 122–129, 2022, doi: <https://doi.org/10.19109/alkimia.v5i1.10220>.
- [8] D. Permana, E. Ilimu, N. M. Faariu, A. Setyawati, L. O. Kadidae, and L. O. A. N. Ramadhan, "Synthesis and Characterization of Chitosan-Polyvinyl Alcohol-Fe<sub>2</sub>O<sub>3</sub> Composite Membrane for DMFC Application," *Makara J. Sci.*, vol. 24, no. 1, pp. 1–9, 2020, doi: 10.7454/mss.v24i1.11723.
- [9] S. Kumar, M. Goswami, N. Singh, N. Sathish, M. V. Reddy, and S. Kumar, "Exploring carbon quantum dots as an aqueous electrolyte for energy storage devices," *J. Energy Storage*, vol. 55, no. April, 2022, doi: 10.1016/j.est.2022.105522.
- [10] A. Prasath, M. Athika, E. Duraisamy, A. Selva Sharma, V. Sankar Devi,

- and P. Elumalai, "Carbon Quantum Dot-Anchored Bismuth Oxide Composites as Potential Electrode for Lithium-Ion Battery and Supercapacitor Applications," *ACS Omega*, vol. 4, no. 3, pp. 4943–4954, 2019, doi: 10.1021/acsomega.8b03490.
- [11] T. Thi, B. Quyen, V. N. Hieu, and N. T. Tam, "Green synthesis of carbon quantum dots and its application for metal ions detection," *J. Chem. Biol. Phys. Sci.*, vol. 11, no. 1, pp. 54–65, 2020, doi: 10.24214/jcbps.a.11.1.05465.
- [12] E. Yuniarti, "Sintesis Dan Karakteristik Optik Carbon Quantum Dot Yang Berasal Dari Asam Sitrat Dengan Variasi Massa Urea," *Komun. Fis. Indones.*, vol. 18, no. 2, p. 99, 2021, doi: 10.31258/jkfi.18.2.99-105.
- [13] V. Vatanpour, A. Dehqan, S. Paziresh, S. Zinadini, A. A. Zinatizadeh, and I. Koyuncu, "Polylactic acid in the fabrication of separation membranes: A review," *Sep. Purif. Technol.*, vol. 296, no. April, 2022, doi: 10.1016/j.seppur.2022.121433.
- [14] H. W. Park, N. G. Jang, H. S. Seo, K. Kwon, and S. Shin, "Facile Synthesis of Self-Adhesion and Ion-Conducting 2-Acrylamido-2-Methylpropane Sulfonic Acid/Tannic Acid Hydrogels Using Electron Beam Irradiation," *Polymers (Basel)*, vol. 15, no. 18, 2023, doi: 10.3390/polym15183836.
- [15] M. P. H. ;G. A. Hards, "Direct methanol fuel cells (DMFCs)," vol. 40, no. 4, pp. 150–159, 1996, doi: <https://doi.org/10.1595/003214096X404150159>.
- [16] B. L. García, V. A. Sethuraman, J. W. Weidner, R. E. White, and R. Dougal, "Mathematical model of a direct methanol fuel cell," *J. Fuel Cell Sci. Technol.*, vol. 1, no. 1, pp. 43–48, 2004, doi: 10.1115/1.1782927.
- [17] D. J. Kim, M. J. Jo, and S. Y. Nam, "A review of polymer-nanocomposite electrolyte membranes for fuel cell application," *J. Ind. Eng. Chem.*, vol. 21, pp. 36–52, 2015, doi: 10.1016/j.jiec.2014.04.030.
- [18] E. Ogungbemi *et al.*, "Fuel cell membranes – Pros and cons," *Energy*, vol. 172, pp. 155–172, 2019, doi: 10.1016/j.energy.2019.01.034.
- [19] S. J. Peighambardoust, S. Rowshanzamir, and M. Amjadi, "Review of the proton exchange membranes for fuel cell applications," *Int. J. Hydrogen Energy*, vol. 35, no. 17, pp. 9349–9384, 2010, doi:

- 10.1016/j.ijhydene.2010.05.017.
- [20] NCERT, *Chemistry II For Class – 12*. National Council of Education Research and Training, 2022. [Online]. Available: <https://www.bookkar.co.in/product/chemistry-textbook-part-2-class-12/>
- [21] W. W. N. H. S. T. Y. L. P. Et, “A state of Art on The Development of Nafion Based Membrane for Performance Improvement in Direct Methanol Fuel Cells.” [Online]. Available: <https://encyclopedia.pub/entry/22977>
- [22] DuPont, “Nafion® PFSA Membranes N-112, NE-1135, N-115, N-117, NE-1110, Product Information,” 2002. [Online]. Available: <http://www.hesen.cn/userfiles/bochi/file/117、115参数.pdf>
- [23] “Proton Exchange Membran Nafion PFSA N117/N115/N112 Membran Asam Perfluorosulfonik.” [Online]. Available: <https://indonesian.alibaba.com/product-detail/Proton-Exchange-Membrane-Nafion-PFSA-N117-1600306744086.html>
- [24] Inamuddin, A. Mohammad, and A. M. Asiri, “Organic-inorganic composite polymer electrolyte membranes: Preparation, properties, and fuel cell applications,” *Org. Compos. Polym. Electrolyte Membr. Prep. Prop. Fuel Cell Appl.*, pp. 1–460, 2017, doi: 10.1007/978-3-319-52739-0.
- [25] I. Aranaz *et al.*, “Chitosan: An overview of its properties and applications,” *Polymers (Basel)*, vol. 13, no. 19, 2021, doi: 10.3390/polym13193256.
- [26] J. Ma and Y. Sahai, “Chitosan biopolymer for fuel cell applications,” *Carbohydr. Polym.*, vol. 92, no. 2, pp. 955–975, 2013, doi: 10.1016/j.carbpol.2012.10.015.
- [27] R. K. Tubbs, “Sequence distribution of partially hydrolyzed poly(vinyl acetate),” *J. Polym. Sci. Part A-1 Polym. Chem.*, vol. 4, no. 3, pp. 623–629, Mar. 1966, doi: <https://doi.org/10.1002/pol.1966.150040316>.
- [28] A. A. A.-C. A. H.-J. C. K. D. S. E. H. H. J. F. J. H.-H. K. T. K. K.-S. L. J. E. M. L. M. S. I. S. U. W. S. E. L. T. G. W. R. J. Young, *Biopolymers · PVA Hydrogels, Anionic Polymerisation Nanocomposites*, vol. 153, no. 4. 2000. [Online]. Available: <https://ebin.pub/biopolymers-pva-hydrogels-anionic-polymerisation-nanocomposites-advances-in-polymer-science-vol-153-1nbsped-354067313x-9783540673132.html>

- [29] P. Visakh P.M., PhD, Olga Nazarenko, *Polyvinyl Alcohol-Based Biocomposites and Bionanocomposites*. Scrivener, 2023. [Online]. Available: <https://www.wiley.com/en-us/Polyvinyl+Alcohol+Based+Biocomposites+and+Bionanocomposites-p-9781119592099>
- [30] M. F. Z. Kadir, S. R. Majid, and A. K. Arof, "Plasticized chitosan-PVA blend polymer electrolyte based proton battery," *Electrochim. Acta*, vol. 55, no. 4, pp. 1475–1482, 2010, doi: 10.1016/j.electacta.2009.05.011.
- [31] S. B. Aziz *et al.*, "The study of electrical and electrochemical properties of magnesium ion conducting CS: PVA based polymer blend electrolytes: Role of lattice energy of magnesium salts on EDLC performance," *Molecules*, vol. 25, no. 19, 2020, doi: 10.3390/molecules25194503.
- [32] P. A. Putro and A. Maddu, "Sifat Optik Carbon Dots (C-Dots) Dari Daun Bambu Hasil Sintesis Hijau Berbantuan Gelombang Mikro," *Wahana Fis.*, vol. 4, no. 1, p. 47, 2019, doi: 10.17509/wafi.v4i1.15569.
- [33] J. Liu, R. Li, and B. Yang, "Carbon Dots: A New Type of Carbon-Based Nanomaterial with Wide Applications," *ACS Cent. Sci.*, vol. 6, no. 12, pp. 2179–2195, 2020, doi: 10.1021/acscentsci.0c01306.
- [34] "What is meant by quantum confinement?" [Online]. Available: <https://www.tutorchase.com/answers/ib/physics/what-is-meant-by-quantum-confinement>
- [35] G. Li, J. Xu, and K. Xu, "Physiological Functions of Carbon Dots and Their Applications in Agriculture: A Review," *Nanomaterials*, vol. 13, no. 19, pp. 1–17, 2023, doi: 10.3390/nano13192684.
- [36] D. Ozyurt, M. Al Kobaisi, R. K. Hocking, and B. Fox, "Properties, synthesis, and applications of carbon dots: A review," *Carbon Trends*, vol. 12, no. March, p. 100276, 2023, doi: 10.1016/j.cartre.2023.100276.
- [37] Y. Wang and A. Hu, "Carbon quantum dots: Synthesis, properties and applications," *J. Mater. Chem. C*, vol. 2, no. 34, pp. 6921–6939, 2014, doi: 10.1039/c4tc00988f.
- [38] S. et al. Ravi, S., Wilson, M.K., Jayalekshmi, "Glucose-derived carbon dots as nanofillers for improved ionic conductivity in polyvinyl alcohol-based

- solid polymer electrolyte membranes,” 2023, doi:  
<https://doi.org/10.1007/s11581-023-05165-x>.
- [39] B. A. Al Jahdaly, M. F. Elsadek, B. M. Ahmed, M. F. Farahat, M. M. Taher, and A. M. Khalil, “Outstanding graphene quantum dots from carbon source for biomedical and corrosion inhibition applications: A review,” *Sustain.*, vol. 13, no. 4, pp. 1–33, 2021, doi: 10.3390/su13042127.
- [40] P. K. Yadav, S. Chandra, V. Kumar, D. Kumar, and S. H. Hasan, “and Catalytic Applications for Organic Synthesis,” 2023.
- [41] N. Shaari, S. K. Kamarudin, and R. Bahru, “Carbon and graphene quantum dots in fuel cell application: An overview,” *Int. J. Energy Res.*, vol. 45, no. 2, pp. 1396–1424, 2021, doi: 10.1002/er.5889.
- [42] M. W. Azeem, M. A. Hanif, and M. M. Khan, “Bamboo,” *Med. Plants South Asia Nov. Sources Drug Discov.*, pp. 29–45, 2019, doi: 10.1016/B978-0-08-102659-5.00003-3.
- [43] E. T. Akinlabi, K. Anane-fenin, D. R. Akwada, and T. M. Plant, *Bamboo. The Multipurpose Plant*. 2017. [Online]. Available: <https://www.springer.com/us/book/9780792312604>
- [44] D. Aboagye, Cecille Wendy; Berko, Emmanuel; Adomako, “MICROWAVE PROCESSING,” 2016, doi: <http://dx.doi.org/10.13140/RG.2.2.18531.04644>.
- [45] M. Nazar, M. Hasan, B. Wirjosentono, B. A. Gani, and C. E. Nada, “Microwave Synthesis of Carbon Quantum Dots from Arabica Coffee Ground for Fluorescence Detection of Fe<sup>3+</sup>, Pb<sup>2+</sup>, and Cr<sup>3+</sup>,” *ACS Omega*, vol. 9, no. 18, pp. 20571–20581, 2024, doi: 10.1021/acsomega.4c02254.
- [46] M. Ramalingam and S. Ramakrishna, *Introduction to nanofiber composites*. Elsevier Ltd, 2017. doi: 10.1016/B978-0-08-100173-8.00001-6.
- [47] A. Amirah Md Zubir, M. P. Khairunnisa, N. Atiqah Surib, J. Norruwaida, A. Halim Bin Md Ali, and M. Rashid, “Electrospinning of PLA with DMF: Effect of polymer concentration on the bead diameter of the electrospun fibre,” *IOP Conf. Ser. Mater. Sci. Eng.*, vol. 778, no. 1, pp. 1–8, 2020, doi: 10.1088/1757-899X/778/1/012087.

- [48] L. A. Bosworth and S. Downes, "Acetone, a Sustainable Solvent for Electrospinning Poly( $\epsilon$ -Caprolactone) Fibres: Effect of Varying Parameters and Solution Concentrations on Fibre Diameter," *J. Polym. Environ.*, vol. 20, no. 3, pp. 879–886, 2012, doi: 10.1007/s10924-012-0436-3.
- [49] N. Z. A. Al-Hazeem, "Nanofibers and Electrospinning Method," *Nov. Nanomater. - Synth. Appl.*, 2018, doi: 10.5772/intechopen.72060.
- [50] W. Yan, M. Shi, C. Dong, L. Liu, and C. Gao, "Applications of tannic acid in membrane technologies: A review," *Adv. Colloid Interface Sci.*, vol. 284, no. 229, p. 102267, 2020, doi: 10.1016/j.cis.2020.102267.
- [51] R. Dewi, N. Shamsuddin, M. S. Abu Bakar, S. Thongratkaew, K. Faungnawakij, and M. R. Bilad, "Development of Tannic Acid Coated Polyvinylidene Fluoride Membrane for Filtration of River Water Containing High Natural Organic Matter," *Sci*, vol. 5, no. 4, 2023, doi: 10.3390/sci5040042.
- [52] F. Ridwan, N. Febriyan, M. A. Husin, and F. Aulia, "Revue des Composites et des Matériaux Avancés-Journal of Composite and Advanced Materials Developing Sustainable Reinforcement PLA / NCC from Kapok to Improve Mechanical and Electrical Properties Composites with PVA Matrix," vol. 34, no. 5, pp. 613–619, 2024.
- [53] A. K. Singha, Arvind; Kumarb, Sumeet; Ojhaa, "Charcoal derived graphene quantum dots for flexible supercapacitor oriented applications," 2020, doi: <https://doi.org/10.1039/D0NJ00899K>.
- [54] H. Tsai, N. F. Tampubolon, T. Wu, M. Wu, and Y. Lin, "Characterization of carbon dots from fructus gardeniae (Zhi-zi) and gardenia charcoal (black Zhi-zi) via microwave-assisted extraction," vol. 32, no. 3, 2024.
- [55] L. Pan, H. Wang, C. Wu, C. Liao, and L. Li, "Tannic acid coated polypropylene membrane as separator for lithium-ion batteries," pp. 1–26.
- [56] H. Junoh *et al.*, "Fabrication of nanocomposite membrane via combined electrospinning and casting technique for direct methanol fuel cell," *J. Membr. Sci. Res.*, vol. 4, no. 3, pp. 146–157, 2018, doi: 10.22079/JMSR.2017.68712.1149.
- [57] A. Bayu, D. Nandiyanto, R. Oktiani, and R. Ragadhita, "Indonesian Journal

of Science & Technology How to Read and Interpret FTIR Spectroscopy of Organic Material,” no. 1, pp. 97–118, 2019.

- [58] Sigma-Aldrich, “IR Spectrum Table & Chart SHARE THIS PAGE IR Spectrum Table by Frequency Range,” *Sigma Aldrich*, pp. 1–6, 2019, [Online]. Available: <https://www.sigmaaldrich.com/technical-documents/articles/biology/ir-spectrum-table.html>
- [59] Mandeep, “A Study on Electrochemical Impedance Spectroscopy,” vol. 6, no. 2, pp. 403–408, 2018.
- [60] F. Ridwan, N. Febriyan, M. A. Husin, and F. Aulia, “International Journal of Energy Production and Management A Study on the Effect of Cellulose Nanocrystalline Paper on PVA-KOH Electrolyte Membranes for Increasing Ionic Conductivity,” vol. 9, no. 2, pp. 113–120, 2024.
- [61] S. A. Gep, “Electrochemical stability and ionic conductivity of solid electrolytes based Electrochemical stability and ionic conductivity of solid,” pp. 0–8, 2020, doi: 10.1088/1755-1315/461/1/012074.
- [62] T.-H. Min, Kyungwhan; Munsur, Abu Zafar Al; Paek, Sae Yane; Jeon, Soomin; Lee, So Young; Kim, “Development of High-Performance Polymer Electrolyte Membranes through the Application of Quantum Dot Coatings to Nafion Membranes,” 2023, doi: <https://doi.org/10.1021/acsami.3c01289>.
- [63] A. Krishnan, K. Rozylowicz, S. K. Kelly, and P. Grover, “Hydrophilic Conductive Sponge Sensors for Fast Setup, Low Impedance Bio-potential Measurements,” *Proc. Annu. Int. Conf. IEEE Eng. Med. Biol. Soc. EMBS*, vol. 2020-July, pp. 3973–3976, 2020, doi: 10.1109/EMBC44109.2020.9176005.