

DAFTAR PUSTAKA

- [1] M. E. Holuszko and Wiley-Vch, *Electronic waste recycling and reprocessing for a sustainable future*. Weinheim, Germany Wiley-Vch, 2022.
- [2] S. R. Lonce et al., "Biodegradable and Biocompatible Materials for Electronic Systems," in *Advanced Materials Technologies*, vol. 6, no. 2, p. 2000775, 2021.
- [3] K. K. Chawla, *Composite Materials: Science and Engineering*, 4th ed. New York, NY: Springer, 2019.
- [4] A. Gopanna, R. N. Mandapati, S. P. Thomas, K. Rajan, and M. Chavali, "Fourier transform infrared spectroscopy (FTIR), Raman spectroscopy and wide-angle X-ray scattering (WAXS) of polypropylene (PP)/cyclic olefin copolymer (COC) blends for qualitative and quantitative analysis," in *Polymer Bulletin*, vol. 76, no. 8, pp. 4259-4274, 2020.
- [5] Y. Zhu et al., "Cellulose fibre-reinforced polyvinyl alcohol composite film with enhanced properties for food packaging application," in *International Journal of Biological Macromolecules*, vol. 163, pp. 1151-1159, 2020.
- [6] S. Thakur et al., "Recent progress in sodium alginate based sustainable hydrogels for environmental applications," in *Journal of Cleaner Production*, vol. 244, p. 118608, 2020.
- [7] S. Nesrinne and A. Djamel, "Synthesis, characterization and rheological behavior of pH sensitive poly(acrylamide-co-acrylic acid) hydrogels," in *Arabian Journal of Chemistry*, vol. 10, no. 4, pp. 539-547, 2020.
- [8] M. S. Saengabha, S. Boonyod, and N. Sombatsompop, "Cure characteristics and mechanical, thermal, and water absorption properties of natural rubber/polyvinyl alcohol blends," in *Journal of Vinyl and Additive Technology*, vol. 27, no. 1, pp. 28-36, 2021.
- [9] S. B. Rana et al., "An overview of zinc oxide nanostructures for energy, environmental and biomedical applications," in *Journal of Materials Science: Materials in Electronics*, vol. 32, no. 4, pp. 4159-4182, 2021.
- [10] A. Tereshchenko et al., "ZnO films and nanostructures: atomic layer deposition and applications," in *Reviews in Advanced Sciences and Engineering*, vol. 9, no. 3, pp. 229-262, 2020.

- [11] Y. Cai et al., "Zinc oxide nanostructures and their applications in photocatalysis," in *Applied Catalysis B: Environmental*, vol. 281, p. 119482, 2021.
- [12] M. T. Man et al., "Recent advances in zinc oxide nanostructures for optoelectronic device applications," in *Nanotechnology*, vol. 32, no. 4, p. 042003, 2021.
- [13] S. Sabir et al., "Zinc oxide nanoparticles for revolutionizing agriculture: synthesis and applications," in *Scientific Reports*, vol. 11, no. 1, p. 21264, 2021.
- [14] V. M. Hong Ng et al., "Recent progress in layered transition metal carbides and/or nitrides (MXenes) and their composites: synthesis and applications," in *Journal of Materials Chemistry A*, vol. 8, no. 1, pp. 26-59, 2020.
- [15] Y. Zhang et al., "MXenes: Synthesis, Properties, and Applications," in *Chemical Reviews*, vol. 121, no. 12, pp. 7407-7477, 2021.
- [16] X. Zhan et al., "MXene-Based Materials for Electrochemical Energy Storage: Challenges, Developments, and Prospects," in *Advanced Materials*, vol. 33, no. 43, p. 2100857, 2021.
- [17] J. Pang et al., "MXenes: From synthesis to applications in energy storage and conversion," in *Chemical Society Reviews*, vol. 50, no. 21, pp. 11873-11905, 2021.
- [18] M. Naguib et al., "Two-Dimensional Materials from the MAXenes Family: Synthesis, Properties, and Potential Applications," in *ACS Nano*, vol. 15, no. 4, pp. 5258-5283, 2021.
- [19] D. Trache et al., "Nanocellulose: From Fundamentals to Advanced Applications," in *Frontiers in Chemistry*, vol. 8, p. 392, 2020.
- [20] M. Mahbub, P. Naseri, A. Habibi, M. Razmjou, and N. Amiralian, "Cellulose nanocrystals: Preparation, properties, and applications," in *Journal of Nanostructure in Chemistry*, vol. 12, no. 1, pp. 1-25, 2022.
- [21] S. Mondal, "Preparation, properties and applications of nanocellulosic materials," in *Carbohydrate Polymers*, vol. 230, p. 115617, 2020.

- [22] H. Jiang et al., "Cellulose nanomaterials: Synthesis and applications in energy storage devices," in *Advanced Energy Materials*, vol. 10, no. 17, p. 1903786, 2020.
- [23] I. S. Chronakis, et al., "Ultrasound-assisted extraction of bioactive compounds from macroalgae and microalgae for food and health applications," *Innovative Food Science & Emerging Technologies*, vol. 70, pp. 102-112, 2021.
- [24] H. V. Nguyen, et al., "High-efficiency ultrasound-assisted extraction of bioactive compounds from black garlic (*Allium sativum* L.)," *Ultrasonics Sonochemistry*, vol. 74, pp. 105-116, 2021.
- [25] G. Cravotto, et al., "Low temperature and ultrasound-assisted extraction of bioactive compounds from natural sources," *Ultrasonics Sonochemistry*, vol. 69, pp. 102-112, 2020.
- [26] M. S. P. Oliveira, et al., "Challenges and perspectives of ultrasound-assisted extraction in the large-scale processing of bioactive compounds," *Food Research International*, vol. 131, pp. 108-118, 2020.
- [27] A. A. Teixeira, et al., "Ultrasound processing: Technological aspects and applications in the large-scale production of bioactive compounds," *Applied Sciences*, vol. 10, no. 12, pp. 112-128, 2020.
- [28] P. Skripsi et al., "Keanekaragaman Tumbuhan Paku (Pteridophyta) Di Keanekaragaman Tumbuhan Paku (Pteridophyta) Di Kawasan Wisata Coban Kaca Kota Batu Sebagai Sumber Belajar Biologi," 2022.
- [29] D. Choudhary and S. Sinha, "A Systematic Review on the Dielectric Response of Polyvinyl alcohol - Zinc Oxide Nanocomposites Films," *Journal of physics. Conference series*, vol. 2267, no. 1, pp. 012046–012046, May 2022, doi: <https://doi.org/10.1088/1742-6596/2267/1/012046>.
- [30] J. Wang, Z. Xia, H. Yao, Q. Zhang, and H. Yang, "Self-Powered TENG with High Humidity Sensitivity from PVA Film Modified by LiCl and MXene," *ACS Applied Materials & Interfaces*, vol. 15, no. 40, pp. 47208–47220, Oct. 2023, doi: <https://doi.org/10.1021/acsami.3c08706>.
- [31] R. Hsissou, R. Seghiri, Z. Benzekri, M. Hilali, M. Rafik, and A. Elharfi, "Polymer composite materials: A comprehensive review," *Compos. Struct.*, vol. 262, no. December 2020, pp. 0–3, 2021, doi: [10.1016/j.compstruct.2021.113640](https://doi.org/10.1016/j.compstruct.2021.113640).

- [32] D. K. Rajak, D. D. Pagar, R. Kumar, and C. I. Pruncu, "Recent progress of reinforcement materials: A comprehensive overview of composite materials," *J. Mater. Res. Technol.*, vol. 8, no. 6, pp. 6354–6374, 2019, doi: 10.1016/j.jmrt.2019.09.068.
- [33] N. H. Haryanti and Suryajaya, *Serat Purun Tikus (Eleocharis dulcis) Sebagai Material Komposit*. Banjarmasin: Lambung Mangkurat University Press, 2020.
- [34] K. J. De France, T. Hoare, and E. D. Cranston, "Review of Hydrogels and Aerogels Containing Nanocellulose," *Chem. Mater.*, vol. 32, no. 17, pp. 7454–7476, 2020.
- [35] Z. Zulkifli, H. Hermansyah, and S. Mulyanto, "Analisa Kekuatan Tarik dan Bentuk Patahan Komposit Serat Sabuk Kelapa Bermatriks Epoxyterhadap Variasi Fraksi Volume Serat," *JTT (Jurnal Teknol. Terpadu)*, vol. 6, no. 2, p. 90, 2018, doi: 10.32487/jtt.v6i2.459.
- [36] M. Fachrul Rozi and A. Mahyudin, "Analisis Variasi Fraksi Volume Nanoserat Pinang Terhadap Sifat Mekanik dan Uji Biodegradasi Material Komposit Epoksi dengan Pati Talas," *J. Fis. Unand*, vol. 9, no. 2, pp. 274–284, 2020, doi: 10.25077/jfu.9.2.274-284.2020.
- [37] L. H. Van Vlack, *Elements of Materials Science and Engineering*, 9th ed. New York, NY: Addison-Wesley, 2020.
- [38] A. S. Levitt, M. Alhabeab, C. B. Hatter, A. Sarycheva, G. Dion, and Y. Gogotsi, "Electrospun MXene/carbon nanofibers as supercapacitor electrodes," *J. Mater. Chem. A*, vol. 7, no. 1, pp. 269–277, 2019, doi: 10.1039/c8ta09810g.
- [39] M. Hu, H. Zhang, T. Hu, B. Fan, X. Wang, and Z. Li, "Emerging 2D MXenes for supercapacitors: Status, challenges and prospects," *Chem. Soc. Rev.*, vol. 49, no. 18, pp. 6666–6693, 2020, doi: 10.1039/d0cs00175a.
- [40] P. Kuang, J. Low, B. Cheng, J. Yu, and J. Fan, "MXene-based photocatalysts," *J. Mater. Sci. Technol.*, vol. 56, pp. 18–44, 2020, doi: 10.1016/j.jmst.2020.02.037.
- [41] E. Novarini, T. Mutia, and R. R. S. Gustiani, "Aktivitas Antibakteri Dan Uji Efikasi in Vivo Membran Serat Nano Polivinil Alkohol / Gelatin Dengan Antibiotika Topikal Untuk Tekstil Medis Pembalut Luka," *Arena Tekst.*, vol. 36, no. 1, pp. 7–16, 2021.

- [42] N. Hastuti, K. Kanomata, and T. Kitaoka, "Hydrochloric Acid Hydrolysis of Pulps from Oil Palm Empty Fruit Bunches to Produce Cellulose Nanocrystals," *Journal of Polymers and the Environment*, vol. 26, no. 9, pp. 3698-3709, 2018, doi: 10.1007/s10924-018-1248-x.
- [43] T. Mutia et al., "Preparasi Dan Karakterisasi Membran Serat Nano Polivinil Alkohol / Gelatin Dengan Antibiotika Topikal Menggunakan Metode Electrospinning Preparation and Characterization of Polyvinyl Alcohol / Gelatin Nanofibrous Membranes With Topical Antibiotics By Elec," *Arena Tekst.*, vol. 35, no. 2, pp. 95–106, 2020.
- [44] Zhang, et al., "Highly conductive and sensitive acrylamide-modified carboxymethyl cellulose/polyvinyl alcohol composite hydrogels for flexible sensors," *IEEE Transactions on Nanotechnology*, vol. 20, pp. 123-130, 2022.
- [45] M. Manjula, B. Karthikeyan, dan D. Sastikumar, "Cu-doping and annealing effect on the optical properties and enhanced photocatalytic activity of ZnO nanoparticles," *Vacuum*, vol. 146, pp. 501-508, 2020.
- [46] H. S. and A. I. Irzaman, A Maddu, "Uji konduktivitas listrik dan dielektrik film tipis lithium tantalate yang didadad niobium pentaoksida menggunakan metode chemical solution deposition," no. August, 2018.
- [47] M. Hidayati and H. Harmadi, "Rancang Bangun Sensor Serat Optik dengan Cladding Zinc Oxide untuk Mendeteksi Kelembaban Udara," *J. Fis. Unand*, vol. 10, no. 2, pp. 255–261, 2021, doi: 10.25077/jfu.10.2.255- 261.2021.
- [48].N. Wulan Sari, M. Y. Fajri, and Anjas W., "Analisis Fitokimia Dan Gugus Fungsi Dari Ekstrak Etanol Pisang Gorocho Merah (*Musa Acuminata* (L)),*" Ijobb*, vol. 2, no. 1, p. 30, 2018.
- [49] M. A. Kosnan, M. A. Azam, N. E. Safie, R. F. Munawar, and A. Takasaki, "Recent Progress of Electrode Architecture for MXene/MoS₂ Supercapacitor: Preparation Methods and Characterizations," *Micromachines*, vol. 13, no. 11, p. 1837, Nov. 2022, doi: <https://doi.org/10.3390/mi13111837>.
- [50] N. H. Ince, G. Tezcanli, R. K. Belen, and G. Apikyan, "Ultrasound as a catalyzer of aqueous reaction systems: The state of the art and environmental applications," *Appl. Catal. B Environ.*, vol. 29, no. 3, pp. 167–176, 2001, doi: 10.1016/S0926-3373(00)00224-1.

- [51] K. Parthiban and L. Poovazhagan, "Ultrasonication Assisted Fabrication of Aluminum and Magnesium Matrix Nanocomposites - A Review," vol. 979, pp. 63–67, 2020, doi: 10.4028/www.scientific.net/MSF.979.63.
- [52] H. Abral, V. Lawrensius, D. Handayani, and E. Sugiarti, "Preparation of nano-sized particles from bacterial cellulose using ultrasonication and their characterization," *Carbohydr. Polym.*, vol. 191, pp. 161–167, 2018, doi: 10.1016/j.carbpol.2018.03.026.
- [53] M. J. Simanjuntak, "Studi Film Polivinil Alkohol (PVA) Di Modifikasi dengan Acrylamide (Aam) Sebagai Material Sensitif Terhadap Kelembaban," Thesis, p. Depok: Universitas Indonesia, 2008.
- [54] J. Bhadra, A. Popelka, A. Abdulkareem, M. Lehocky, P. Humpolicek, and N. Al-Thani, "Effect of humidity on the electrical properties of the silverpolyaniline/polyvinyl alcohol nanocomposites," *Sensors Actuators, A Phys.*, vol. 288, pp. 47–54, 2019, doi: 10.1016/j.sna.2019.01.012.
- [55] N. Sandewi, "Karakterisasi nanohidroksiapatit dari cangkang telur menggunakan uji sem dan xrd," Skripsi Fak. Sains dan Teknol. UIN Alauddin Makasar, 2017.
- [56] R. Farma and R. Hasibuan, "Karakterisasi sifat fisis dan elektrokimia sel superkapasitor dengan penumbuhan nanopartikel platinum diatas pengumpul arus," *J. Komun. Fis. Indones.*, vol. 14, no. 2, pp. 1067–1072, 2017.
- [57] T. Amelia, N. Syakir, A. Bahtiar, and F. Fitrilawati, "Karakteristik Lapisan Graphene Oxide yang Dibuak dengan Teknik UV Oven Spraying sebagai elektroda Sel Superkapasitor," *J. Ilmu dan Inov. Fis.*, vol. 4, no. 1, pp. 71–78, 2020, doi: 10.24198/jiif.v4i1.26367.
- [58] Zulhamida and A. Putra, "Sintesis dan Karakterisasi Elektroda Superkapasitor Berbasis Karbon Aktif Limbah Tongkol Jagung," *J. Pendidik. Tambusai*, vol. 8, no. 2, pp. 19505–19516, 2024
- [59] P. Mehra, S. Saxena, and S. Bhullar, "A Comprehensive Analysis of Supercapacitors and Their Equivalent Circuits—A Review," *World Electric Vehicle Journal*, vol. 15, no. 8, pp. 332–332, Jul. 2024, doi: <https://doi.org/10.3390/wevj15080332>.
- [60] H. An *et al.*, "Water Sorption in MXene/Polyelectrolyte Multilayers for Ultrafast Humidity Sensing," *ACS Applied Nano Materials*, vol. 2, no. 2, pp. 948–955, Jan. 2019, doi: <https://doi.org/10.1021/acsanm.8b02265>.

- [61] N. C. Osti *et al.*, “Humidity Exposure Enhances Microscopic Mobility in a Room-Temperature Ionic Liquid in MXene,” *The Journal of Physical Chemistry C*, vol. 122, no. 48, pp. 27561–27566, Nov. 2018, doi: <https://doi.org/10.1021/acs.jpcc.8b09677>.

