References

[1] Y. Chen *et al.*, "A review of lithium-ion battery safety concerns: The issues, strategies, and testing standards," Aug. 01, 2021, *Elsevier B.V.* doi: 10.1016/j.jechem.2020.10.017.

[2] A. Manthiram *et al.*, "Rechargeable lithium-sulfur batteries," Dec. 10, 2014, *American Chemical Society*. doi: 10.1021/cr500062v.

[3] X. B. Cheng *et al.*, "Implantable Solid Electrolyte Interphase in Lithium-Metal Batteries," *Chem*, vol. 2, no. 2, pp. 258–270, Feb. 2017, doi: 10.1016/j.chempr.2017.01.003.

[4] Y. Liu *et al.*, "Recent Progress of Porous Materials in Lithium-Metal Batteries," May 01, 2021, *John Wiley and Sons Inc*. doi: 10.1002/sstr.202000118.

[5] J. Zhang *et al.*, "Balancing particle properties for practical lithium-ion batteries," Feb. 01, 2022, *Elsevier B.V.* doi: 10.1016/j.partic.2021.05.006.

[6] B. Zhou *et al.*, "Modification of Cu current collectors for lithium metal batteries – A review," Oct. 01, 2022, *Elsevier Ltd*. doi: 10.1016/j.pmatsci.2022.100996.

[7] C. Zhang *et al.*, "Constitutive behavior and progressive mechanical failure of electrodes in lithium-ion batteries," *J Power Sources*, vol. 357, pp. 126–137, 2017, doi: 10.1016/j.jpowsour.2017.04.103.

[8] Z. Lu *et al.*, "Lithium–copper alloy embedded in 3D porous copper foam with enhanced electrochemical performance toward lithium metal batteries," *Mater Today Energy*, vol. 22, Dec. 2021, doi: 10.1016/j.mtener.2021.100871.

[9] S. Mahmud *et al.*, "Recent advances in lithium-ion battery materials for improved electrochemical performance: A review," *Results in Engineering*, vol. 15, Sep. 2022, doi: 10.1016/j.rineng.2022.100472.

[10] Y. Liu *et al.*, "Lithium-coated polymeric matrix as a minimum volume-change and dendrite-free lithium metal anode," *Nat Commun*, vol. 7, Mar. 2016, doi: 10.1038/ncomms10992.

[11] B. Liu *et al.*, "Advancing Lithium Metal Batteries," May 16, 2018, *Cell Press*. doi: 10.1016/j.joule.2018.03.008.

[12] R. Zhang *et al.*,"Advanced micro/nanostructures for lithium metal anodes," *Advanced Science*, vol. 4, no. 3, Mar. 2017, doi: 10.1002/advs.201600445.

[13] M. Yamada *et al.*, "Review of the Design of Current Collectors for Improving the Battery Performance in Lithium-Ion and Post-Lithium-Ion Batteries," Jun. 01, 2020, *Multidisciplinary Digital Publishing Institute (MDPI)*. doi: 10.3390/electrochem1020011.

[14] X. Shen *et al.*, "Beyond lithium ion batteries: Higher energy density battery systems based on lithium metal anodes," May 01, 2018, *Elsevier B.V.* doi: 10.1016/j.ensm.2017.12.002.

[15] Z. Li *et al.*, "Rationally design lithiophilic surfaces toward high−energy Lithium metal battery," *Energy Storage Mater*, vol. 37, pp. 40–46, May 2021, doi: 10.1016/j.ensm.2021.01.012.

[16] D. Lin *et al.*,"Reviving the lithium metal anode for high-energy batteries," Mar. 07, 2017, *Nature Publishing Group*. doi: 10.1038/nnano.2017.16.

[17] H. Fan *et al.*,"Powder-sintering derived 3D porous current collector for stable lithium metal anode," *Mater Lett*, vol. 234, pp. 69–73, Jan. 2019, doi: 10.1016/j.matlet.2018.09.067.

[18] Y. Liu *et al.*, "3D hierarchical porous current collector via deposition-dealloying method for lithium metal anode," *Electrochem commun*, vol. 163, Jun. 2024, doi: 10.1016/j.elecom.2024.107702.

[19] Y. Lee *et al.*, "Large-scale synthesis of copper nanoparticles by chemically controlled reduction for applications of inkjet-printed electronics," *Nanotechnology*, vol. 19, no. 41, Oct. 2008, doi: 10.1088/0957-4484/19/41/415604.

[20] Y. Jiang *et al.*, "Cu Foam-Loaded Cu2Mg Alloy with High Electrochemical Stability to Regulate the Nucleation of Lithium for Dendrite-Free Lithium Metal Batteries," *ACS Sustain Chem Eng*, vol. 10, no. 21, pp. 7149–7157, May 2022, doi: 10.1021/acssuschemeng.2c01368.

[21] L. M. Wang *et al.*, "A 3D Cu current collector with a biporous structure derived by a phase inversion tape casting method for stable Li metal anodes," *J Mater Chem A Mater*, vol. 7, no. 29, pp. 17376–17385, 2019, doi: 10.1039/c9ta05357c.

[22] H. Qiu *et al.*, "3D Porous Cu Current Collectors Derived by Hydrogen Bubble Dynamic Template for Enhanced Li Metal Anode Performance," *Adv Funct Mater*, vol. 29, no. 19, May 2019, doi: 10.1002/adfm.201808468.

[23] Y. Lu *et al.*,"Stable lithium electrodeposition in liquid and nanoporous solid electrolytes," *Nat Mater*, vol. 13, no. 10, pp. 961–969, Oct. 2014, doi: 10.1038/nmat4041.

[24] T. J. Horn *et al.*, "Additive Manufacturing of Copper and Copper Alloys," in *Additive Manufacturing Processes*, ASM International, 2020, pp. 388–418. doi: 10.31399/asm.hb.v24.a0006579.

[25] S. Pinilla *et al.*, "Additive Manufacturing of Li-Ion Batteries: A Comparative Study between Electrode Fabrication Processes," *Adv Energy Mater*, vol. 13, no. 15, Apr. 2023, doi: 10.1002/aenm.202203747.

[26] C. Gao *et al.*, "Additive manufacturing technique-designed metallic porous implants for clinical application in orthopedics," *RSC Adv*, vol. 8, no. 44, pp. 25210–25227, 2018, doi: 10.1039/c8ra04815k.

[27] C. B. Williams *et al.*,“Additive manufacturing of metallic cellular materials via three-dimensional printing,” *International Journal of Advanced Manufacturing Technology*, vol. 53, no. 1–4, pp. 231–239, Mar. 2011, doi: 10.1007/s00170-010-2812-2.

[28] A. De *et al.*,“Advances in Additive Manufacturing Techniques for Electrochemical Energy Storage,” Feb. 19, 2024, *John Wiley and Sons Inc*. doi: 10.1002/admt.202301439.

[29] B. K. Park *et al.*, “Direct writing of copper conductive patterns by ink-jet printing,” *Thin Solid Films*, vol. 515, no. 19 SPEC. ISS., pp. 7706–7711, Jul. 2007, doi: 10.1016/j.tsf.2006.11.142.

[30] S. Mooraj *et al.*, “Three-dimensional hierarchical nanoporous copper via direct ink writing and dealloying,” *Scr Mater*, vol. 177, pp. 146–150, Mar. 2020, doi: 10.1016/j.scriptamat.2019.10.013.

[31] L. Biasetto *et al.*, “Ink Tuning for Direct Ink Writing of Planar Metallic Lattices,” *Adv Eng Mater*, vol. 25, no. 20, Oct. 2023, doi: 10.1002/adem.202201858.

[32] A. M’Barki *et al.*,“Linking Rheology and Printability for Dense and Strong Ceramics by Direct Ink Writing,” *Sci Rep*, vol. 7, no. 1, Dec. 2017, doi: 10.1038/s41598-017-06115-0.

[33] S. Jackson *et al.*, “Rheological and structural characterization of 3D-printable polymer electrolyte inks,” *Polym Test*, vol. 104, Dec. 2021, doi: 10.1016/j.polymertesting.2021.107377.

[34] L. del-Mazo-Barbara *et al.*, “Rheological characterisation of ceramic inks for 3D direct ink writing: A review,” Dec. 01, 2021, *Elsevier Ltd*. doi: 10.1016/j.jeurceramsoc.2021.08.031.

[35] X. Zeng *et al.*, “Copper inks for printed electronics: a review,” Oct. 10, 2022, *Royal Society of Chemistry*. doi: 10.1039/d2nr03990g.

[36] S. L. Taylor *et al.*, “Iron and Nickel Cellular Structures by Sintering of 3D-Printed Oxide or Metallic Particle Inks,” *Adv Eng Mater*, vol. 19, no. 11, Nov. 2017, doi: 10.1002/adem.201600365.

[37] M. Yarahmadi *et al.*, “Optimization of the ceramic ink used in Direct Ink Writing through rheological properties characterization of zirconia-based ceramic materials,” *Ceram Int*, vol. 48, no. 4, pp. 4775–4781, Feb. 2022, doi: 10.1016/j.ceramint.2021.11.013.

[38] C. de Backere *et al.*, “Effect of binder type and lubrication method on the binder efficacy for direct compression,” *Int J Pharm*, vol. 607, Sep. 2021, doi: 10.1016/j.ijpharm.2021.120968.

[39] S. B. Balani *et al.*, “Processes and materials used for direct writing technologies: A review,” *Results in Engineering*, vol. 11, Sep. 2021, doi: 10.1016/j.rineng.2021.100257.

[40] S. Mooraj *et al.*, “Three-dimensional hierarchical nanoporous copper via direct ink writing and dealloying,” *Scr Mater*, vol. 177, pp. 146–150, Mar. 2020, doi: 10.1016/j.scriptamat.2019.10.013.

[41] L. Biasetto *et al.*,“Ink Tuning for Direct Ink Writing of Planar Metallic Lattices,” *Adv Eng Mater*, Oct. 2023, doi: 10.1002/adem.202201858.

[42] X. Chang *et al.*, “Co-guiding the dendrite-free plating of lithium on lithiophilic ZnO and fluoride modified 3D porous copper for stable Li metal anode,” *Journal of Materiomics*, vol. 6, no. 1, pp. 54–61, Mar. 2020, doi: 10.1016/j.jmat.2019.11.007.

[43] Z. Guo *et al.,* “Recent advances in ink-based additive manufacturing for porous structures,” Dec. 01, 2021, *Elsevier B.V.* doi: 10.1016/j.addma.2021.102405.

[44] E. Demrci *et al.*,“The Effect of nozzle diameter and layer thickness on mechanical behaviour of 3D printed PLA lattice structures under quasi-static loading,” *International Journal of 3D Printing Technologies and Digital Industry*, vol. 7, no. 1, pp. 105–113, Apr. 2023, doi: 10.46519/ij3dptdi.1256993.

[45] T. Chen *et al.*, “Rheological behavior of titania ink and mechanical properties of titania ceramic structures by 3D direct ink writing using high solid loading titania ceramic ink,” *J Alloys Compd*, vol. 783, pp. 321–328, Apr. 2019, doi: 10.1016/j.jallcom.2018.12.334.

[46] X. Xia *et al.*, “Effect of the loading and size of copper particles on the mechanical properties of novel Cu/LDPE composites for use in intrauterine devices,” *Materials Science and Engineering: A*, vol. 429, no. 1–2, pp. 329–333, Aug. 2006, doi: 10.1016/j.msea.2006.05.045.

[47] H. Shao *et al.*, “3D gel-printing of zirconia ceramic parts,” *Ceram Int*, vol. 43, no. 16, pp. 13938–13942, Nov. 2017, doi: 10.1016/j.ceramint.2017.07.124.

[48] M. Wu *et al.*, “Parameter Optimization via Orthogonal Experiment to Improve Accuracy of Metakaolin Ceramics Fabricated by Direct Ink Writing,” *Chinese Journal of Mechanical Engineering: Additive Manufacturing Frontiers*, vol. 2, no. 4, p. 100098, Dec. 2023, doi: 10.1016/j.cjmeam.2023.100098.

[49] H. C. Chu *et al.*, “High-performance lithium-ion batteries with 1.5 Mm thin copper nanowire foil as a current collector,” *J Power Sources*, vol. 346, pp. 40–48, 2017, doi: 10.1016/j.jpowsour.2017.02.041.

[50] S. Kolli *et al.*, “Process optimization and characterization of dense pure copper parts produced by paste-based 3D micro-extrusion,” *Addit Manuf*, vol. 73, Jul. 2023, doi: 10.1016/j.addma.2023.103670.

[51] C. Chen *et al.*, "3D Printed Lithium-Metal Full Batteries Based on a High-Performance Three-Dimensional Anode Current Collector," *ACS Applied Materials and Interfaces*, vol. 13, no. 21, pp. 24785–24794, Jun. 2021, doi: 10.1021/acsami.1c03997.

[52] M. Rahimian *et al.*, "The effect of particle size, sintering temperature and sintering time on the properties of Al-Al2O3 composites, made by powder metallurgy," *J Mater Process Technol*, vol. 209, no. 14, pp. 5387–5393, Jul. 2009, doi: 10.1016/j.jmatprotec.2009.04.007.

[53] G. N. Felege *et al.*, "Evolution of Microtexture and Microstructure During Sintering of Copper," *Metall Mater Trans A Phys Metall Mater Sci*, vol. 50, no. 9, pp. 4193–4204, Sep. 2019, doi: 10.1007/s11661-019-05317-7.

[54] R. Bjørk *et al.*,"The effect of particle size distributions on the microstructural evolution during sintering," *Journal of the American Ceramic Society*, vol. 96, no. 1, pp. 103–110, Jan. 2013, doi: 10.1111/jace.12100.

[55] S. Zhang *et al.*, "Controlled lithium plating in three-dimensional hosts through nucleation overpotential regulation toward high-areal-capacity lithium metal anode," *Mater Today Energy*, vol. 21, Sep. 2021, doi: 10.1016/j.mtener.2021.100770.

[56] X. Fei *et al.*, "Porous lithiophilic Cu-Sn solid solution current collector for dendrite-free lithium metal batteries," *Energy Storage Mater*, vol. 65, Feb. 2024, doi: 10.1016/j.ensm.2023.103079.

[57] H. Jia *et al.*, "Hierarchical porous silicon structures with extraordinary mechanical strength as high-performance lithium-ion battery anodes," *Nat Commun*, vol. 11, no. 1, Dec. 2020, doi: 10.1038/s41467-020-15217-9.

[58] Y. KISHIMOTO *et al.*, “Simple evaluation method of mechanical strength and mechanical fatigue of negative electrode for lithium-ion battery,” *Mechanical Engineering Journal*, vol. 7, no. 4, pp. 19-00545-19–00545, 2020, doi: 10.1299/mej.19-00545.

[59] Q. Cheng *et al.*, “Stabilizing Solid Electrolyte-Anode Interface in Li-Metal Batteries by Boron Nitride-Based Nanocomposite Coating,” *Joule*, vol. 3, no. 6, pp. 1510–1522, Jun. 2019, doi: 10.1016/j.joule.2019.03.022.

[60] Y. Zhu *et al.*, “A Highly-Lithiophilic Mn3O4/ZnO-Modified Carbon Nanotube Film for Dendrite-Free Lithium Metal Anodes,” *J Colloid Interface Sci*, vol. 648, pp. 299–307, Oct. 2023, doi: 10.1016/j.jcis.2023.05.101.

[61] G. Singh *et al.*, “Rapid manufacturing of copper components using 3D printing and ultrasonic assisted pressureless sintering: Experimental investigations and process optimization,” *J Manuf Process*, vol. 43, pp. 253–269, Jul. 2019, doi: 10.1016/j.jmapro.2019.05.010.

[62] A. Cañadilla *et al.*, “Mechanical, Electrical, and Thermal Characterization of Pure Copper Parts Manufactured via Material Extrusion Additive Manufacturing,” *Materials*, vol. 15, no. 13, Jul. 2022, doi: 10.3390/ma15134644.

[63] G. Singh *et al.*, “Copper extrusion 3D printing using metal injection moulding feedstock: Analysis of process parameters for green density and surface roughness optimization,” *Addit Manuf*, vol. 38, Feb. 2021, doi: 10.1016/j.addma.2020.101778.

[64] W. Zhou *et al.*, “Effects of external mechanical loading on stress generation during lithiation in Li-ion battery electrodes,” *Electrochim Acta*, vol. 185, pp. 28–33, Dec. 2015, doi: 10.1016/j.electacta.2015.10.097.

[65] J. Qiu *et al.*, “A review on copper current collector used for lithium metal batteries: Challenges and strategies,” Oct. 20, 2024, *Elsevier Ltd*. doi: 10.1016/j.est.2024.113683.

[66] Y. Liu *et al.*, “Research Progress on Copper-Based Current Collector for Lithium Metal Batteries,” Aug. 19, 2021, *American Chemical Society*. doi: 10.1021/acs.energyfuels.1c02008.

[67] Z. Hao *et al.*, “Designing Current Collectors to Stabilize Li Metal Anodes,” Feb. 25, 2025, *John Wiley and Sons Inc*. doi: 10.1002/adma.202415258.

[68] Y. Tang *et al.*, “Three-dimensional ordered macroporous Cu current collector for lithium metal anode: Uniform nucleation by seed crystal,” *J Power Sources*, vol. 403, pp. 82–89, Nov. 2018, doi: 10.1016/j.jpowsour.2018.09.083.

[69] C. Gao *et al.*, “Advances in anode current collectors with a lithiophilic gradient for lithium metal batteries,” Jul. 19, 2024, *Royal Society of Chemistry*. doi: 10.1039/d4cc02324b.

[70] J. Chen *et al.*, “Porous Metal Current Collectors for Alkali Metal Batteries,” Jan. 04, 2023, *John Wiley and Sons Inc*. doi: 10.1002/advs.202205695.

[71] Y. Zhang *et al.*, “A carbon-based 3D current collector with surface protection for Li metal anode,” *Nano Res*, vol. 10, no. 4, pp. 1356–1365, Apr. 2017, doi: 10.1007/s12274-017-1461-2.

[72] P. Albertus *et al.*,“Status and challenges in enabling the lithium metal electrode for high-energy and low-cost rechargeable batteries,” *Nat Energy*, vol. 3, no. 1, pp. 16–21, Jan. 2018, doi: 10.1038/s41560-017-0047-2.

[73] C. Lamiel *et al.*, “Properties, functions, and challenges: current collectors,” Dec. 01, 2022, *Elsevier Ltd*. doi: 10.1016/j.mtchem.2022.101152.

[74] S. Park *et al.*,“Intagliated Cu substrate containing multifunctional lithiophilic trenches for Li metal anodes,” *Chemical Engineering Journal*, vol. 428, Jan. 2022, doi: 10.1016/j.cej.2021.130939.

[75] J. Zhou *et al.*, “Lithium-metal host anodes with top-to-bottom lithiophilic gradients for prolonged cycling of rechargeable lithium batteries,” *J Power Sources*, vol. 495, May 2021, doi: 10.1016/j.jpowsour.2021.229773.

[76] M. Zhao *et al.*, “Constructing porous nanosphere structure current collector by nitriding for lithium metal batteries,” *J Energy Storage*, vol. 47, Mar. 2022, doi: 10.1016/j.est.2021.103665.

[77] C. Luan *et al.*, “Electrochemical Dealloying-Enabled 3D Hierarchical Porous Cu Current Collector of Lithium Metal Anodes for Dendrite Growth Inhibition,” *ACS Appl Energy Mater*, vol. 4, no. 12, pp. 13903–13911, Dec. 2021, doi: 10.1021/acsaem.1c02696.

[78] Y. Ma *et al.*, “Electrochemically Dealloyed 3D Porous Copper Nanostructure as Anode Current Collector of Li-Metal Batteries,” *Small*, vol. 19, no. 28, Jul. 2023, doi: 10.1002/smll.202301731.

[79] K. Fu *et al.*, “Graphene Oxide-Based Electrode Inks for 3D-Printed Lithium-Ion Batteries,” *Advanced Materials*, vol. 28, no. 13, pp. 2587–2594, Apr. 2016, doi: 10.1002/adma.201505391.

[80] Q. Li *et al.*, “3D Porous Cu Current Collector/Li-Metal Composite Anode for Stable Lithium-Metal Batteries,” *Adv Funct Mater*, vol. 27, no. 18, May 2017, doi: 10.1002/adfm.201606422.

[81] B. Lu *et al.*, “Quantitatively Designing Porous Copper Current Collectors for Lithium Metal Anodes,” *ACS Appl Energy Mater*, vol. 4, no. 7, pp. 6454–6465, Jul. 2021, doi: 10.1021/acsaem.1c00438.

[82] D. Callegari *et al.*, “Extrusion 3D Printing of Patterned Cu Current Collectors for Advanced Lithium Metal Anodes,” *Batter Supercaps*, vol. 6, no. 9, Sep. 2023, doi: 10.1002/batt.202300202.

[83] D. Zhang *et al.*, “Lithiophilic 3D Porous CuZn Current Collector for Stable Lithium Metal Batteries,” *ACS Energy Lett*, vol. 5, no. 1, pp. 180–186, Jan. 2020, doi: 10.1021/acsenergylett.9b01987.

[84] Q. Zhao *et al.*, “Facile Lithiophilic 3D Copper Current Collector for Stable Li Metal Anode,” *J Electron Mater*, vol. 51, no. 8, pp. 4248–4256, Aug. 2022, doi: 10.1007/s11664-022-09598-4.

[85] C. P. Yang *et al.*, “Accommodating lithium into 3D current collectors with a submicron skeleton towards long-life lithium metal anodes,” *Nat Commun*, vol. 6, Aug. 2015, doi: 10.1038/ncomms9058.

[86] S. Jin *et al.*, “Advanced 3D Current Collectors for Lithium-Based Batteries,” *Advanced Materials*, vol. 30, no. 48, Nov. 2018, doi: 10.1002/adma.201802014.

[87] Z. Liang *et al.*, “Composite lithium metal anode by melt infusion of lithium into a 3D conducting scaffold with lithiophilic coating,” *Proc Natl Acad Sci U S A*, vol. 113, no. 11, pp. 2862–2867, Mar. 2016, doi: 10.1073/pnas.1518188113.

[88] H. Shang *et al.*,“N-Doped Graphdiyne Coating for Dendrite-Free Lithium Metal Batteries,” *Chemistry - A European Journal*, vol. 26, no. 24, pp. 5434–5440, Apr. 2020, doi: 10.1002/chem.201905618.

[89] V. Egorov *et al.* ,“Architected porous metals in electrochemical energy storage,” Jun. 01, 2020, *Elsevier B.V.* doi: 10.1016/j.coelec.2020.02.011.

[90] H. N. Umh *et al.*, “Lithium metal anode on a copper dendritic superstructure,” *Electrochem commun*, vol. 99, pp. 27–31, Feb. 2019, doi: 10.1016/j.elecom.2018.12.015.

[91] R. Xu *et al.*, "Artificial Soft–Rigid Protective Layer for Dendrite-Free Lithium Metal Anode," *Adv Funct Mater*, vol. 28, no. 8, Feb. 2018, doi: 10.1002/adfm.201705838.

[92] K. Yan *et al.*, "Three-dimensional pie-like current collectors for dendrite-free lithium metal anodes," *Energy Storage Mater*, vol. 11, pp. 127–133, Mar. 2018, doi: 10.1016/j.ensm.2017.10.012.

[93] D. Wang *et al.*, "Towards High-Safe Lithium Metal Anodes: Suppressing Lithium Dendrites via Tuning Surface Energy," *Advanced Science*, vol. 4, no. 1, Jan. 2017, doi: 10.1002/advs.201600168.

[94] X. B. Cheng *et al.*, "Dendrite-Free Lithium Deposition Induced by Uniformly Distributed Lithium Ions for Efficient Lithium Metal Batteries," *Advanced Materials*, vol. 28, no. 15, pp. 2888–2895, Apr. 2016, doi: 10.1002/adma.201506124.

[95] Z. Qiang *et al.*, "Preparation of Three-Dimensional Copper-Zinc Alloy Current Collector by Powder Metallurgy for Lithium Metal Battery Anode," *ChemElectroChem*, vol. 8, no. 13, pp. 2479–2487, Jul. 2021, doi: 10.1002/celc.202100561.

[96] E. Vaněčková *et al.*, "Copper electroplating of 3D printed composite electrodes," *Journal of Electroanalytical Chemistry*, vol. 858, Feb. 2020, doi: 10.1016/j.jelechem.2019.113763.

[97] P. Li *et al.*, "Anchoring an Artificial Solid–Electrolyte Interphase Layer on a 3D Current Collector for High-Performance Lithium Anodes," *Angewandte Chemie*, vol. 131, no. 7, pp. 2115–2119, Feb. 2019, doi: 10.1002/ange.201813905.

[98] I. Yang *et al.*, "Structurally Tailored Hierarchical Cu Current Collector with Selective Inward Growth of Lithium for High-Performance Lithium Metal

Batteries," *Adv Energy Mater*, vol. 13, no. 2, Jan. 2023, doi: 10.1002/aenm.202202321.

[99] Y. Shi *et al.*, "A self-supported, three-dimensional porous copper film as a current collector for advanced lithium metal batteries," *J Mater Chem A Mater*, vol. 7, no. 3, pp. 1092–1098, 2019, doi: 10.1039/c8ta09384a.

[100] H. Zhao *et al.*, "Compact 3D Copper with Uniform Porous Structure Derived by Electrochemical Dealloying as Dendrite-Free Lithium Metal Anode Current Collector," *Adv Energy Mater*, vol. 8, no. 19, Jul. 2018, doi: 10.1002/aenm.201800266.

[101] W. Zhang *et al.*, "Diffusion couples Cu-X (X=Sn, Zn, Al) derived 3D porous current collector for dendrite-free lithium metal battery," *J Power Sources*, vol. 440, Nov. 2019, doi: 10.1016/j.jpowsour.2019.227142.

[102] C. Zhang *et al.*, "A Lightweight 3D Cu Nanowire Network with Phosphidation Gradient as Current Collector for High-Density Nucleation and Stable Deposition of Lithium," *Advanced Materials*, vol. 31, no. 48, Nov. 2019, doi: 10.1002/adma.201904991.

[103] Z. Yang *et al.*, "Ultrasmooth and Dense Lithium Deposition Toward High-Performance Lithium-Metal Batteries," *Advanced Materials*, vol. 35, no. 15, Apr. 2023, doi: 10.1002/adma.202210130.

[104] F. Pei *et al.*, "Robust Lithium Metal Anodes Realized by Lithiophilic 3D Porous Current Collectors for Constructing High-Energy Lithium-Sulfur Batteries," *ACS Nano*, vol. 13, no. 7, pp. 8337–8346, Jul. 2019, doi: 10.1021/acsnano.9b03784.

[105] L. Liu *et al.*,"Preparations and Properties of Porous Copper Materials for Lithium-Ion Battery Applications," Jun. 02, 2016, *Taylor and Francis Ltd.* doi: 10.1080/00986445.2015.1104504.

[106] A. Maurel *et al.*, “Ag-Coated Cu/Polylactic Acid Composite Filament for Lithium and Sodium-Ion Battery Current Collector Three-Dimensional Printing via Thermoplastic Material Extrusion,” *Front Energy Res*, vol. 9, Apr. 2021, doi: 10.3389/fenrg.2021.651041.

[107] D. K. Mishra *et al.* “Experimental investigation into the fabrication of green body developed by micro-extrusion-based 3D printing process,” *Polym Compos*, vol. 41, no. 5, pp. 1986–2002, May 2020, doi: 10.1002/pc.25514.

[108] G. J. H. Lim *et al.*, “Robust pure copper framework by extrusion 3D printing for advanced lithium metal anodes,” *J Mater Chem A Mater*, vol. 8, no. 18, pp. 9058–9067, May 2020, doi: 10.1039/d0ta00209g.

[109] D. Oropeza *et al.*, “Porosity control of copper-based alloys via powder bed fusion additive manufacturing for spacecraft applications,” *Journal of Porous Materials*, 2024, doi: 10.1007/s10934-023-01544-x.

[110] G. Singh *et al.*, “Uniform and graded copper open cell ordered foams fabricated by rapid manufacturing: surface morphology, mechanical properties and energy absorption capacity,” *Materials Science and Engineering: A*, vol. 761, Jul. 2019, doi: 10.1016/j.msea.2019.138035.

[111] B. Bian *et al.*, “Application of 3D printed porous copper anode in microbial fuel cells,” *Front Energy Res*, vol. 6, no. JUN, Jun. 2018, doi: 10.3389/fenrg.2018.00050.

[112] P. Chen *et al.*, “Performance of a Thermally Regenerative Battery with 3D-Printed Cu/C Composite Electrodes: Effect of Electrode Pore Size,” *Ind Eng Chem Res*, vol. 59, no. 49, pp. 21286–21293, Dec. 2020, doi: 10.1021/acs.iecr.0c03937.

[113] H. Miyanaji *et al.*,“Binder jetting additive manufacturing of copper foam structures,” *Addit Manuf*, vol. 32, Mar. 2020, doi: 10.1016/j.addma.2019.100960.

[114] D. A. Ramirez *et al.*, “Open-cellular copper structures fabricated by additive manufacturing using electron beam melting,” *Materials Science and Engineering: A*, vol. 528, no. 16–17, pp. 5379–5386, Jun. 2011, doi: 10.1016/j.msea.2011.03.053.

[115] W. A. A. Eluasry *et al.*, *EG9601925 AREAEA/RER.334 ARAB REPUBLIC OF EGYPT ATOMIC ENERGY AUTHORITY DEPARTMENT OF METALLURGY STUDIES ON THE SINTERING OF COPPER POWDER COMPACTS*.

[116] P. Sharma *et al.*, “Rapid manufacturing of biodegradable pure iron scaffold using amalgamation of three-dimensional printing and pressureless microwave sintering,” *Proc Inst Mech Eng C J Mech Eng Sci*, vol. 233, no. 6, pp. 1876–1895, Mar. 2019, doi: 10.1177/0954406218778304.

[117] S. A. McDonald *et al.*,“Microstructural evolution during sintering of copper particles studied by laboratory diffraction contrast tomography (LabDCT),” *Sci Rep*, vol. 7, no. 1, Dec. 2017, doi: 10.1038/s41598-017-04742-1.

[118] A. Pei *et al.*,“Nanoscale Nucleation and Growth of Electrodeposited Lithium Metal,” *Nano Lett*, vol. 17, no. 2, pp. 1132–1139, Feb. 2017, doi: 10.1021/acs.nanolett.6b04755.

[119] C. Chen *et al.*, “3D Printed High-Loading Lithium-Sulfur Battery Toward Wearable Energy Storage,” *Adv Funct Mater*, vol. 30, no. 10, Mar. 2020, doi: 10.1002/adfm.201909469.

[120] G. J. H. Lim *et al.*, “Robust pure copper framework by extrusion 3D printing for advanced lithium metal anodes,” *J Mater Chem A Mater*, vol. 8, no. 18, pp. 9058–9067, May 2020, doi: 10.1039/d0ta00209g.

[121] D. Li *et al.*, “Constructing 3D Porous Current Collectors for Stable and Dendrite-Free Lithium Metal Anodes,” May 01, 2022, *John Wiley & Sons, Inc.* doi: 10.1002/adsu.202200010.

[122] S. Zhang *et al.*, “Ultrathin hierarchical porous Cu current collector fabricated by anodic oxidation in complexing agent system for stable anode-free Lithium metal batteries,” *Electrochim Acta*, vol. 442, Feb. 2023, doi: 10.1016/j.electacta.2023.141895.

[123] Y. An *et al.*, “Vacuum distillation derived 3D porous current collector for stable lithium–metal batteries,” *Nano Energy*, vol. 47, pp. 503–511, May 2018, doi: 10.1016/j.nanoen.2018.03.036.

[124] X. Ma *et al.*, “Facile and scalable electrodeposition of copper current collectors for high-performance Li-metal batteries,” *Nano Energy*, vol. 59, pp. 500–507, May 2019, doi: 10.1016/j.nanoen.2019.02.048.

[125] J. Wang *et al.*, “In-situ construction of lithiophilic interphase in vertical micro-channels of 3D copper current collector for high performance lithium-metal batteries,” *Energy Storage Mater*, vol. 34, pp. 22–27, Jan. 2021, doi: 10.1016/j.ensm.2020.09.002.

[126] S. H. Wang *et al.*, “Stable Li Metal Anodes via Regulating Lithium Plating/Stripping in Vertically Aligned Microchannels,” *Advanced Materials*, vol. 29, no. 40, Oct. 2017, doi: 10.1002/adma.201703729.

[127] Q. Yun *et al.*, “Chemical Dealloying Derived 3D Porous Current Collector for Li Metal Anodes,” *Advanced Materials*, vol. 28, no. 32, pp. 6932–6939, Aug. 2016, doi: 10.1002/adma.201601409.

[128] H. Zhao *et al.*, “Compact 3D Copper with Uniform Porous Structure Derived by Electrochemical dealloying as Dendrite-free Lithium Metal Anode Current Collector”, doi: /doi.org/10.1002/aenm.201800266.

[129] K. Qin *et al.*, “A Powder Metallurgic Approach Toward High-Performance Lithium Metal Anodes,” *Small*, vol. 16, no. 24, Jun. 2020, doi: 10.1002/smll.202000794.

List of publications and Patent

➢ Publications from thesis work

1. **V. M. Tripathi**, P. Sharma, and R. Tyagi, "Development of a high particle loading novel copper ink for the fabrication of a three-dimensional hierarchical porous structure using direct ink writing and sintering," ***Journal of Porous Materials (Springer/SCI/ I.F= 2.5)/Published***, Apr. 2024, doi: 10.1007/s10934-024-01579-8.
2. **V. M. Tripathi**, P. Sharma, and R. Tyagi, "Development of a processing route for the fabrication of thin hierarchically porous copper self-standing structure using direct ink writing and sintering for electrochemical energy storage application," ***Journal of Material Research (Springer/SCI/I.F= 3)/Published*****,** Sep. 2024, doi: 10.1557/s43578-024-01436-z.
3. **V. M. Tripathi**, P. Sharma, and R. Tyagi, "Advancing 3D-Printed Hierarchical Porous Copper Electrodes: "Enhancing Performance through Post-Sintering Parameters Optimization," ***Material Chemistry and physics (Elsevier/SCI/ I.F=5)/ Published,*** June 2025, doi.org/10.1016/j.matchemphys.2025.131181.
4. **V. M Tripathi**, P. Sharma and R Tyagi, V. M. Tripathi, P. Sharma, and R. Tyagi, "Advanced Lithium Metal Battery: "Enhancing Electrochemical Performance with 3D-Printed Hierarchically Porous Copper Collectors*,"* ***Journal of Energy Storage (Elsevier/SCI/ I.F= 10)/Published,*** May 2025, doi.org/10.1016/j.est.2025.117027.

➢ Patent

1. **"A METHOD OF PREPARING A 3D PRINTING METALLIC INK AND A PRODUCT THEREOF",** Date of filing - 29/02/2024, Published date - 13/09/2024.