



## DAFTAR PUSTAKA

- Byrne, K., Hawker, W. and Vaughan, J. (2017) 'Effect of key parameters on the selective acid leach of nickel from mixed nickel-cobalt hydroxide', *AIP Conference Proceedings*, 1805. Available at: <https://doi.org/10.1063/1.4974412>.
- Chen, H., Gu, S., Guo, Y., Dai, X., Zeng, L., Wang, K., He, C., Dodbiba, G., Wei, Y. and Fujita, T. (2021) 'Leaching of cathode materials from spent lithium-ion batteries by using a mixture of ascorbic acid and HNO<sub>3</sub>', *Hydrometallurgy*, 205, p. 105746. Available at: <https://doi.org/10.1016/j.hydromet.2021.105746>.
- Chong, S., Hawker, W. and Vaughan, J. (2013) 'Selective reductive leaching of oxidised cobalt containing residue', *Minerals Engineering*, 54, pp. 82–87. Available at: <https://doi.org/10.1016/j.mineng.2013.04.004>.
- Dharmawan, A., Hakam, M., Arinawati, M., Yudha, C.S. and Purwanto, A. (2022) 'Analisis Morfologi Prekursor NMC811 dari Mix Hydroxide Precipitate (MHP) dengan Presipitan Asam Oksalat', *Equilibrium Journal of Chemical Engineering*, 5(2), pp. 97–102. Available at: <https://doi.org/10.20961/equilibrium.v5i2.58474>.
- Eviany, A. (2009) 'Optimasi Metode Pengambilan Kembali Logam Nikel dari Spent Catalyst NiO/Al<sub>2</sub>O<sub>3</sub> Menggunakan Kitosan dari Cangkang Rajungan Sebagai Adsorben', pp. 1–100.
- Guarango, P.M. (2022) 'Pembuatan material katoda Nickel Manganese Cobalt (NMC) dari larutan prekursor dan leachate baterai bekas dengan metode flame assisted spray pyrolysis', *πδγγ*, (8.5.2017), pp. 2003–2005.
- Habashi, F. (2009) 'Recent trends in extractive metallurgy', *Journal of Mining and Metallurgy, Section B: Metallurgy*, 45(1), pp. 1–13. Available at: <https://doi.org/10.2298/JMMB0901001H>.
- Hiskey, B. (2000) 'Metallurgy, Survey', *Kirk-Othmer Encyclopedia of Chemical Technology*, 16. Available at: <https://doi.org/10.1002/0471238961.1921182208091911.a01>.
- Hosseini, S.A., Raygan, S., Rezaei, A. and Jafari, A. (2017) 'Leaching of nickel from a secondary source by sulfuric acid', *Journal of Environmental Chemical Engineering*,



Hu, X., Ma, B., He, F., Chen, Y. and Wang, C. (2022) ‘Ammonia leaching process for selective extraction of nickel and cobalt from polymetallic mixed hydroxide precipitate’, *Journal of Environmental Chemical Engineering*, 10(6). Available at: <https://doi.org/10.1016/j.jece.2022.108936>.

Ichlas, Z.T., Mubarak, M.Z., Magnalita, A., Vaughan, J. and Sugiarto, A.T. (2020) ‘Processing mixed nickel-cobalt hydroxide precipitate by sulfuric acid leaching followed by selective oxidative precipitation of cobalt and manganese’, *Hydrometallurgy*, 191(August 2019), p. 105185. Available at: <https://doi.org/10.1016/j.hydromet.2019.105185>.

Katsiapi, A., Tsakiridis, P.E., Oustadakis, P. and Agatzini-Leonardou, S. (2010) ‘Cobalt recovery from mixed Co-Mn hydroxide precipitates by ammonia-ammonium carbonate leaching’, *Minerals Engineering*, 23(8), pp. 643–651. Available at: <https://doi.org/10.1016/j.mineng.2010.03.006>.

Ku, H., Jung, Y., Jo, M., Park, S., Kim, S., Yang, D., Rhee, K., An, E.M., Sohn, J. and Kwon, K. (2016) ‘Recycling of spent lithium-ion battery cathode materials by ammoniacal leaching’, *Journal of Hazardous Materials*, 313(February), pp. 138–146. Available at: <https://doi.org/10.1016/j.jhazmat.2016.03.062>.

Laurendeau, N.M. (2005) *Statistical Thermodynamics: Fundamentals and applications*. New York: Cambridge University Press. Available at: <https://www.cambridge.org/id/universitypress/subjects/engineering/thermal-fluids-engineering/statistical-thermodynamics-fundamentals-and-applications?format=HB&isbn=9780521846356>.

Liu, T., Chen, J., Li, H. and Li, K. (2020) ‘An integrated process for the separation and recovery of valuable metals from the spent LiNi<sub>0.5</sub>Co<sub>0.2</sub>Mn<sub>0.3</sub>O<sub>2</sub> cathode materials’, *Separation and Purification Technology*, 245(December 2019), p. 116869. Available at: <https://doi.org/10.1016/j.seppur.2020.116869>.

Meshram, P., Pandey, B.D. and Mankhand, T.R. (2015) ‘Recovery of valuable metals from cathodic active material of spent lithium ion batteries: Leaching and kinetic aspects’, *Waste Management*, 45, pp. 306–313. Available at:



- Mrozik, W., Rajaeifar, M.A., Heidrich, O. and Christensen, P. (2021) 'Environmental Science and pathways of spent lithium-ion batteries', pp. 6099–6121. Available at: <https://doi.org/10.1039/d1ee00691f>.
- Mubarok, M.Z. and Lieberto, J. (2013) 'Precipitation of Nickel Hydroxide from Simulated and Atmospheric-leach Solution of Nickel Laterite Ore', *Procedia Earth and Planetary Science*, 6, pp. 457–464. Available at: <https://doi.org/10.1016/j.proeps.2013.01.060>.
- Myung, S.T., Maglia, F., Park, K.J., Yoon, C.S., Lamp, P., Kim, S.J. and Sun, Y.K. (2017) 'Nickel-Rich Layered Cathode Materials for Automotive Lithium-Ion Batteries: Achievements and Perspectives', *ACS Energy Letters*, pp. 196–223. Available at: <https://doi.org/10.1021/acsenergylett.6b00594>.
- Nasution, M. (2021) 'Karakteristik bateraia sebagai penyimpan energi listrik spesifik', *Journal of Electrical Technology*, 6(1), pp. 35–40.
- Neumann, J., Petranikova, M., Meeus, M., Gamarra, J.D., Younesi, R., Winter, M. and Nowak, S. (2022) 'Recycling of Lithium-Ion Batteries — Current State of the Art , Circular Economy , and Next Generation Recycling', 2102917. Available at: <https://doi.org/10.1002/aenm.202102917>.
- Nishi, Y. (2014) *2 – Past, Present and Future of Lithium-Ion Batteries: Can New Technologies Open up New Horizons?*, *Lithium-Ion Batteries Advances and Applications*. Elsevier. Available at: <https://doi.org/10.1016/B978-0-444-59513-3.00002-9>.
- Niu, B., Xu, Z., Xiao, J. and Qin, Y. (2023) 'Recycling Hazardous and Valuable Electrolyte in Spent Lithium-Ion Batteries: Urgency, Progress, Challenge, and Viable Approach', *Chemical Reviews*, 123(13), pp. 8718–8735. Available at: <https://doi.org/10.1021/acs.chemrev.3c00174>.
- Nurfaidah, A.Y., Lestari, D.P., Azzahra, R.T. and Suminar, D.R. (2020) 'Pengaruh Suhu dan Konsentrasi terhadap Proses Pemisahan Nikel dari Logam Pengotor Menggunakan Metode Leaching', *Fluida*, 13(2), pp. 81–92. Available at: <https://doi.org/10.35313/fluida.v13i2.2388>.



- F.A. (2020) 'Baterai lithium', 9(2), pp. 103–109. Available at: <https://doi.org/10.20961/inkuiri.v9i2.50082>.
- Perdana, I., Rahman, M.I., Aprilianto, D.R., Petrus, H.T.B.M. and Kinanti, D.H. (2024) 'Kinetics and Thermodynamics Study of Ammonia Leaching on Spent LMR-NMC Battery Cathodes', *Indonesian Journal of Chemistry*, 24(3), p. 876. Available at: <https://doi.org/10.22146/ijc.93312>.
- Permana, D., Kumalasari, R., Wahab, W. and Musnajam, M. (2020) 'Pelindian Bijih Nikel Laterit Kadar Rendah Menggunakan Metode Atmospheric Acid Leaching Dalam Media Asam Klorida (Hcl)', *RISSET Geologi dan Pertambangan*, 30(2), p. 203. Available at: <https://doi.org/10.14203/risetgeotam2020.v30.1097>.
- Philippe, B. (2013) *Insights in Li-ion Battery Interfaces through Photoelectron Spectroscopy Depth Profiling*.
- Piskin, Uygur, A. (2019) 'ScienceDirect Morphology effect on electrochemical properties of doped ( W and Mo ) 622NMC , 111NMC , and 226NMC cathode materials', 5, pp. 2–8.
- Pradanawati, S.A., Nursanto, E.B., Thufail, A., Raihan, A.Z., Sugianto, Oktaviano, H.S., Nilasary, H., Subhan, A. and Nugroho, A. (2022) 'A Comparative Study on The Electrochemical Properties of Hydrothermal and Solid-State Methods in The NCM Synthesis for Lithium Ion Battery Application', *ASEAN Journal of Chemical Engineering*, 22(2), pp. 284–295. Available at: <https://doi.org/10.22146/ajche.74209>.
- Rizky Awaliah, W., Yesfisari, S., Firdaus and Wahab (2023) 'Studi Pengolahan Bijih Mangan Desa Kumbewaha, Kabupaten Buton Dengan Metode Hidrometalurgi Dalam Suasana Asam', *Journal of Applied Geoscience and Engineering*, 2(1), pp. 26–35. Available at: <https://doi.org/10.34312/jage.v2i1.20102>.
- Setiawan, H., Petrus, H.T.B.M. and Perdana, I. (2019) 'Reaction kinetics modeling for lithium and cobalt recovery from spent lithium-ion batteries using acetic acid', *International Journal of Minerals, Metallurgy and Materials*, 26(1), pp. 98–107. Available at: <https://doi.org/10.1007/s12613-019-1713-0>.
- Da Silva Lima, L., Quartier, M., Buchmayr, A., Sanjuan-Delmás, D., Laget, H., Corbisier, D., Mertens, J. and Dewulf, J. (2021) 'Life cycle assessment of lithium-ion batteries and



vanadium redox flow batteries-based renewable energy storage systems', *Sustainable Energy Technologies and Assessments*, 46. Available at: <https://doi.org/10.1016/j.seta.2021.101286>.

Stilhano Vilas Boas, C.R., Sturm, J.M., van den Beld, W.T.E. and Bijkerk, F. (2021) 'Oxidation kinetics of transition metals exposed to molecular and atomic oxygen', *Materialia*, 20(August). Available at: <https://doi.org/10.1016/j.mtla.2021.101203>.

Thackeray, M.M., David, W.I.F., Bruce, P.G. and Goodenough, J.B. (1983) 'Lithium insertion into manganese spinels', *Materials Research Bulletin*, 18(4), pp. 461–472. Available at: [https://doi.org/10.1016/0025-5408\(83\)90138-1](https://doi.org/10.1016/0025-5408(83)90138-1).

Vincenzo, A. Di and Floriano, M.A. (2020) 'Elucidating the Influence of the Activation Energy on Reaction Rates by Simulations Based on a Simple Particle Model', *Journal of Chemical Education*, 97(10), pp. 3630–3637. Available at: <https://doi.org/10.1021/acs.jchemed.0c00463>.

Wang, R.C., Lin, Y.C. and Wu, S.H. (2009) 'A novel recovery process of metal values from the cathode active materials of the lithium-ion secondary batteries', *Hydrometallurgy*, 99(3–4), pp. 194–201. Available at: <https://doi.org/10.1016/j.hydromet.2009.08.005>.

Warner, J.T. (2019) 'Lithium-ion battery chemistries: A primer'. Available at: <https://doi.org/https://doi.org/10.1016/C2017-0-02140-7>.

Wicaksana, A. and Rachman, T. (2018) 'Pemisahan logam nikel, kobalt dan mangan dari mixed hydroxide precipitate (MHP) dengan metode ekstraksi pelarut', *Angewandte Chemie International Edition*, 6(11), 951–952., 3(1), pp. 10–27. Available at: <https://medium.com/@arifwicaksanaa/pengertian-use-case-a7e576e1b6bf>.

Williams, C., Hawker, W. and Vaughan, J.W. (2013) 'Selective leaching of nickel from mixed nickel cobalt hydroxide precipitate', *Hydrometallurgy*, 138, pp. 84–92. Available at: <https://doi.org/10.1016/j.hydromet.2013.05.015>.

Yu. A. Makashev, B. P. Sharonov, S. A. Grachev, V. E. Mironov, and N.E.M. (1976) 'The Kinetics of Complex Formation of Some Transition Metals with Quercetin and Morin', (4), pp. 885–886.

Yu, W., Guo, Y., Shang, Z., Zhang, Y. and Xu, S. (2022) 'A review on comprehensive



recycling of spent power lithium-ion battery in China', *eTransportation*, 11, p. 100155.

Available at: <https://doi.org/10.1016/j.etrans.2022.100155>.

Yuan, X., Liu, H. and Zhang, J. (2011) *Lithium-ion batteries: advanced materials and technologies*. CRC press. Available at:  
[https://www.researchgate.net/publication/326357300\\_LITHIUM-ION\\_BATTERIES\\_Advanced\\_Materials\\_and\\_Technologies](https://www.researchgate.net/publication/326357300_LITHIUM-ION_BATTERIES_Advanced_Materials_and_Technologies).

Zheng, Y., Wang, S., Gao, Y., Yang, T., Zhou, Q., Song, W., Zeng, C., Wu, H., Feng, C. and Liu, J. (2019) 'Lithium Nickel Cobalt Manganese Oxide Recovery via Spray Pyrolysis Directly from the Leachate of Spent Cathode Scraps'. Available at:  
<https://doi.org/10.1021/acsaem.9b01647>.

Zhou, L.F., Yang, D., Du, T., Gong, H. and Luo, W. Bin (2020) 'The Current Process for the Recycling of Spent Lithium Ion Batteries', *Frontiers in Chemistry*, 8(December), pp. 1–7. Available at: <https://doi.org/10.3389/fchem.2020.578044>.