

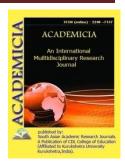
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AN OVERVIEW OF LITHIUM ION BATTERY AND ITS COMPOSITION

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ABSTRACT

For a wide variety of Li-ion battery electrodes, this overview covers important technical advances and scientific difficulties. Many families of appropriate materials are compared using a periodic table and potential/capacity graphs. Commercial intercalation materials such as lithium cobalt oxide (LCO), lithium nickel cobalt manganese oxide (NCM), lithium nickel cobalt aluminum oxide (NCA), lithium iron phosphate (LFP), lithium titanium oxide (LTO), and others are compared to conversion materials such as alloying anodes in terms of performance, current limitations, and recent breakthroughs (F, Cl, Br, I). There's also talk of new polyanion cathode materials. Each kind of electrode material is discussed in terms of cost, abundance, safety, Li and electron transfer, volumetric expansion, material dissolution, and surface reactions. The study covers and categorizes both basic and particular methods for overcoming current problems.

KEYWORD: *Anodes, Cathodes, Electrodes, Li-Ion Battery.*

REFERENCES

- **1.** S. Ma *et al.*, "Temperature effect and thermal impact in lithium-ion batteries: A review," *Progress in Natural Science: Materials International*. 2018, doi: 10.1016/j.pnsc.2018.11.002.
- **2.** G. Zubi, R. Dufo-López, M. Carvalho, and G. Pasaoglu, "The lithium-ion battery: State of the art and future perspectives," *Renewable and Sustainable Energy Reviews*. 2018, doi: 10.1016/j.rser.2018.03.002.
- 3. B. Huang, Z. Pan, X. Su, and L. An, "Recycling of lithium-ion batteries: Recent advances

ISSN: 2249-7137

- and perspectives," Journal of Power Sources. 2018, doi: 10.1016/j.jpowsour.2018.07.116.
- **4.** P. K. Nayak, L. Yang, W. Brehm, and P. Adelhelm, "From Lithium-Ion to Sodium-Ion Batteries: Advantages, Challenges, and Surprises," *Angewandte Chemie International Edition*. 2018, doi: 10.1002/anie.201703772.
- **5.** C. R. Birkl, M. R. Roberts, E. McTurk, P. G. Bruce, and D. A. Howey, "Degradation diagnostics for lithium ion cells," *J. Power Sources*, 2017, doi: 10.1016/j.jpowsour.2016.12.011.
- **6.** Y. Jin, B. Zhu, Z. Lu, N. Liu, and J. Zhu, "Challenges and recent progress in the development of Si anodes for lithium-ion battery," *Adv. Energy Mater.*, 2017, doi: 10.1002/aenm.201700715.
- 7. B. Rousseau, V. Timoshevskii, N. Mousseau, M. Côté, and K. Zaghib, "A novel intercalation cathode material for sodium-based batteries," *Electrochem. commun.*, 2015, doi: 10.1016/j.elecom.2014.12.022.
- **8.** Z. Xiong, Y. S. Yun, and H. J. Jin, "Applications of carbon nanotubes for lithium ion battery anodes," *Materials (Basel).*, 2013, doi: 10.3390/ma6031138.
- **9.** X. Zuo, J. Zhu, P. Müller-Buschbaum, and Y. J. Cheng, "Silicon based lithium-ion battery anodes: A chronicle perspective review," *Nano Energy*. 2017, doi: 10.1016/j.nanoen.2016.11.013.
- **10.** Y. Chen, J. Li, Y. Lai, J. Li, and Z. Zhang, "Tailoring graphitic nanostructures in hard carbons as anode materials achieving efficient and ultrafast sodium storage," *J. Mater. Sci.*, 2018, doi: 10.1007/s10853-018-2295-3.