Evolution of lithium ion batteries

Evolution of lithium ion batteries

5 CURRENT CHALLENGES FACING LI-ION BATTERIES. Today, rechargeable lithium-ion batteries dominate the battery market because of their high energy density, power density, and low self-discharge rate. They are currently transforming the transportation sector with electric vehicles.

We will take a journey through time to explore the evolution of lithium battery technology, from its humble beginnings to its current state of prominence. The history of lithium batteries dates back to the early 20th century when researchers first began experimenting with lithium as an anode material.

Here we look back at the milestone discoveries that have shaped the modern lithium-ion batteries for inspirational insights to guide future breakthroughs.

battery was, however, truly heightened by the revolutionary advancement of information technology which occurred in the early 1980s, bringing portable electronics into fashion.

So much has been said about the astonishing advancements of and societal transformations brought about by Li-ion batteries (LIBs) in portable electronics, and more recently transportation and...

Lithium-ion batteries have become an integral part of our daily lives. From powering our smartphones to propelling electric vehicles, these compact energy storage solutions have revolutionized the way we live and work. But how did we get here? We will take a journey through time to explore the evolution of lithium battery technology, from its humble beginnings to its current state of prominence. The history of lithium batteries dates back to the early 20th century when researchers first began experimenting with lithium as an anode material. However, the technology remained largely dormant due to safety concerns and technological limitations. It wasn’t until the 1970-80s that lithium batteries found their way into commercial applications.

Dr. Goodenough’s work laid the foundation for the commercialization of lithium-ion batteries. The release of the first commercially successful lithium-ion battery by Sony in 1991, which utilized cobalt oxide, marked a turning point. The technology rapidly found its way into laptops, cell phones, and various portable devices, forever changing the way we live and work. Dr. Goodenough’s contributions to lithium-ion battery technology have had a lasting impact, and his groundbreaking discoveries continue to influence the field to this day. His dedication to pushing the boundaries of energy storage has played a significant role in shaping the evolution of lithium battery technology.

Author: Dr. Nicholas Grundish

Thank you for visiting nature . You are using a browser version with limited support for CSS. To obtain the

best experience, we recommend you use a more up to date browser (or turn off compatibility mode in Internet Explorer). In the meantime, to ensure continued support, we are displaying the site without styles and JavaScript.

The revolutionary work of John Goodenough, M. Stanley Whittingham and Akira Yoshino has finally been awarded the Nobel Prize in Chemistry. Scientific discovery and engineering brilliance continue to shape battery technology.

So much has been said about the astonishing advancements of and societal transformations brought about by Li-ion batteries (LIBs) in portable electronics, and more recently transportation and grid-scale storage, that the recognition from the 2019 Nobel committee to the three LIB pioneers in October feels long overdue. Nonetheless, the story of their seminal work in laying the foundations of Li-ion chemistry bears repeating. At the same time, it is important to recognize the key milestones along the road to today"s commercial LIBs and to consider the path ahead to the batteries of the future.

The revolution started during the oil crisis of the 1970s when society was hungering for alternative energy sources to replace fossil fuels. Batteries then, such as lead-acid and nickel-cadmium, did not offer much hope for high-energy output. Writing first in the Journal of the Chemical Society, Chemical Communications in 19741, M. Stanley Whittingham noted that ions can be electrochemically intercalated into layered transition-metal disulfides such as TiS2. This intercalation chemistry, as he demonstrated subsequently in Science in 1976, enabled the first rechargeable Li battery, which consisted of a TiS2 cathode and a metallic Li anode2.