Lithium-ion Batteries 2016-2026

Description: This report has over 170 detailed slide-format pages of new forecasts, analysis and infographics seeing the future with depth on technology trends, needs and market forecasts. The emphasis is almost entirely on the present and the future such as how parameters will improve and lower costs, new shapes and mechanical properties, improved safety and non-flammable non-toxic versions will open up new markets. Over 450 manufacturers are compared in chemistry, assembly and sales thrust.

There is depth on the next technology breakthroughs such as silicon anodes. The key parts of recent presentations by all the key players are embedded in this work, almost entirely researched in 2016 by award winning PhD level analysts travelling worldwide. Interviews, databases, web searches and conference attendance were extensively used.

The structure of the report is a comprehensive Executive Summary and Conclusions with forecasts, issues, roadmaps etc. then Introduction looking at battery basics and lithium-ion in particular. An Applications chapter maps parameters and solutions with detail on the largest market of the coming decade - the trillion dollar electric vehicle business in 2026.

Subsequent chapters delve into the new characteristics needed and the technology to achieve them, notably "Li-ion for high energy density, low cost, long life" then "Li-ion becomes thin, flexible, stretchable". After that we look closely at, "Li-ion becomes non-flammable, non-toxic, structural" with some extra achievements such as transparency. Finally, the report has a unique new listing of over 450 manufacturers of Li-ion cells by country, anode, cathode, electrolyte, structure and application where data are established.

Some of the key findings that are detailed and explained are:

The main market value has recently changed to large versions and electric vehicles and this will continue. This creates a paradox where the number of manufacturers is proliferating past 450 but only a few can make relatively safe, acceptable, affordable large versions - the main market demand. This is because it is easy to make small versions of limited life using primitive factory conditions.

The Japanese and Koreans are named that control the key technology and, with the Chinese, the production. The Tesla Gigafactory using Japanese Panasonic Technology will exceed all this capacity but our calculations show that many gigafactories will be needed in the decade. We say who will build others.

We explain why competitive advantage in Li-ion batteries will primarily be based on energy density, safety record, cost, production capacity and being in the protected large market of China. Competitive disadvantages are detailed. We explain which alternatives to Li-ion are strongest. We detail a feeding frenzy building up with purchasers coming from more widely afield in both territory and interest. We identify how successful niche players are proliferating and attracting bidders.

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7. ANODE, CATHODE, ELECTROLYTE, CONSTRUCTION, APPLICATIONS OF THE LITHIUM BATTERIES OF 450 MANUFACTURERS
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