

LIBs for EV - Technology Issue and Market Forecast (2011~2020)

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Abstracts

After Anyos Jedlik invented an early type of electric motor in 1828, various EV-related companies including Morrison Electric Vehicle, Baker, and Coulmbia were established in the United States in 1890s. Especially, it is known that electric cars outsold gasoline-based cars in 1899. In 1904, EV companies produced 2000 units of taxis, trucks, and buses and expanded their taxi and car rental businesses from New York to Chicago and about 57 small businesses were producing about 4000 electric cars. However, electric cars surrendered its leading position to gasoline-powered cars and have not made remarkable progress until the early 2000s for the same reason. That is because electric vehicles adopting batteries are more expensive, slower and have a shorter driving range than those using internal combustion engines. Furthermore, they failed to keep abreast of the rapid progress being made in gasoline-powered vehicles and have significantly decreased in number, losing its footing.

Likewise, the biggest obstacle to expanding the EV market lies on batteries to power electric motors. In other words, the development of new battery technologies is the key to expand the EV market. Although traditional lead-acid batteries and Ni-MH batteries have been used in electric cars, lithium-ion batteries are currently receiving most attention and integration into new secondary batteries such as Li-S and redox flow batteries is also being considered.

This report provides close examination on technological issues of currently available batteries used in electric vehicles in terms of energy density, prices, safety, and low-temperature performance, and long-term reliability and new technologies and applications being developed to solve the current technological challenges. In addition, the EV battery market forecast section is dedicated to analyzing and forecasting the EV and EV battery markets by country, technology, and type. According to the analysis of

the EV battery market provided in this report, the EV market is expected to reach 1857 vehicles in 2020 compared with 0.91 million vehicles and the EV battery market is expected to hit 84.1GWh (\$28.8 billion) compared with .4GWh(\$2.6 billion) in 2011. Although Ni-MH batteries used in Toyota's HEVs have driven the EV battery market so far, the sales of PHEVs and BEVs whose capacity is about 20 times higher than that of existing HEVs are gradually increasing. Furthermore, as the competitors are strategically expanding EV lineup adopting LiBs, the LiB market share is expected to increase from 56.4% of 2011 to 91.8% in 2020. Although PHEVs and BEVs are now accounting only small portions of the entire sales, they are expected to drive the growth of the EV battery market due to their high capacity.

This report provides close examination on technological issues and solutions for EV batteries and a comprehensive analysis of the global EV and EV battery markets.

The strong points of this report include

1. Current technological issues over EV batteries and development trends for technological solutions
2. R&D and business trends for EV battery technologies by country, and manufacturer
3. Global EV market analysis and forecasts by technology and type (2011-2020)
4. Analysis of global EV battery sales by technology, type and anufacturer and market forecast (2011 -2020)

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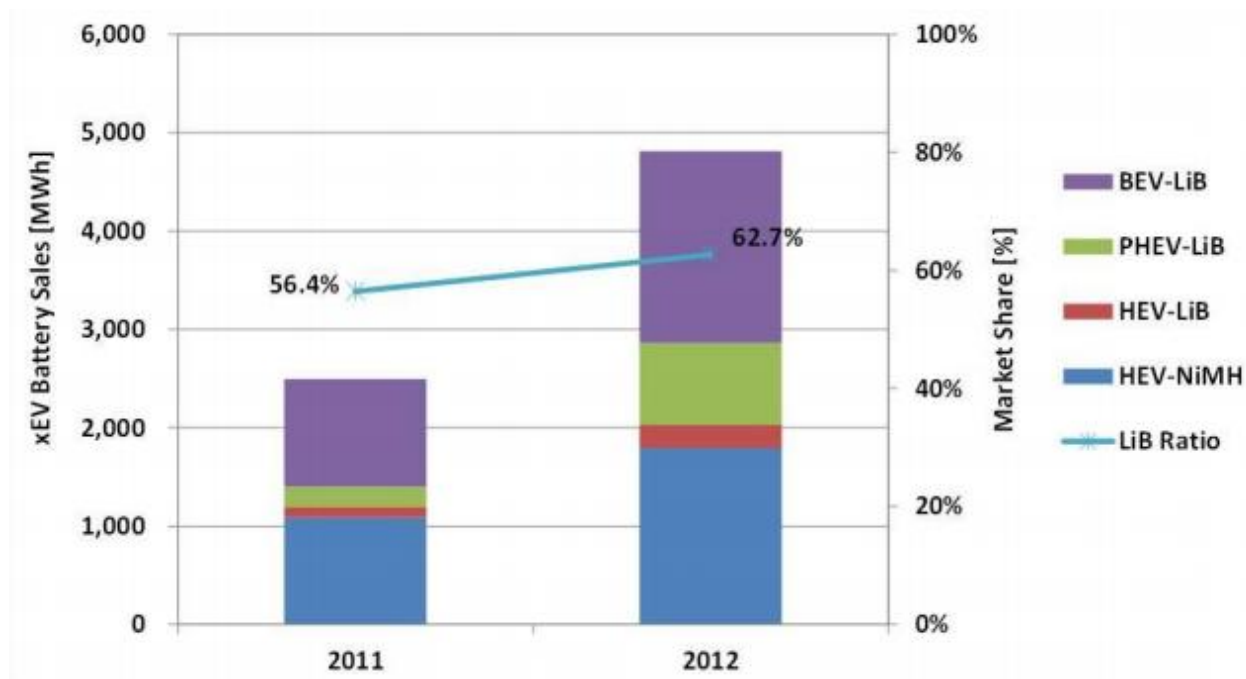
About

The global sales of electric vehicles totaled 0.912 million units and 1.666 million units respectively in 2011 and 2012, and total 2.5GWh and 4.8GWh of batteries were consumed for them in the same period. As for EV technology types, HEVs, PHEVs, and BEVs, each battery type accounted for 42.2%, 17.3%, and 40% respectively in 2012. Although HEVs accounted for 92% of the EV application market as of 2012, battery packs used in BEVs are of higher capacity than those used in HEVs: BEVs require battery packs of 16.5KWh, 24KWh, 48KWh, and 60KWh sedans and 50-100KWh for buses, while HEVs use about 1.3KWh. In this sense, BEVs are very small in sales volumes but in a similar level with HEVs in terms of the amount of batteries sold. In other words, BEVs hold a key post in the battery market despite their small sales volume.

Currently, NiMH is used in HEVs and LIBs are in HEVs, PHEVs and BEVs. EV manufacturers except Toyota shift from NiMH to LIBs or adopt LIBs for their new models to differentiate themselves from Toyota. Likewise, as LIBs are used in more and more EV models and especially the sales of PHEVs & BEVs that employ high capacity battery packs are gradually increasing, the share of LIBs in the global EV battery market increased to 62.7% in 2012 from 56.4% of 2011.

On the other hand, NiMH posted a slight decrease from 44.0% in 2011 to 40.5% in 2012 in the global EV battery market.

Global EV battery sales by technology type (2011~2012)



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