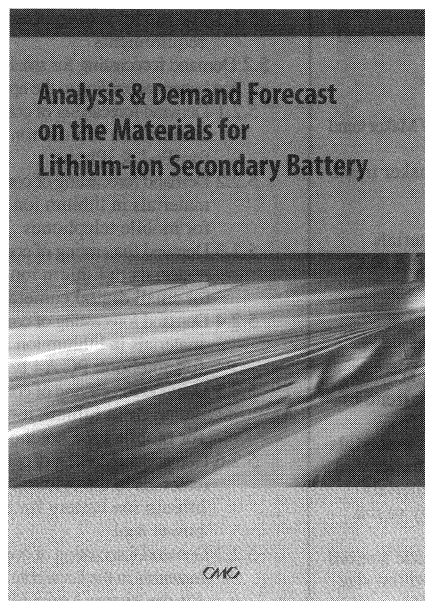


Analysis & Demand Forecast on the Materials for Lithium-ion Secondary Battery



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Book description

The constitution of the raw materials of these batteries changes greatly while demand for various secondary batteries (Nickel-Cadmium : Ni-Cd, Nickel Metal Hydride : NiMH and a Lithium Ion) structure changes, and it is going to be grown a wound new demand. In such a change, a change of the market is an important problem to be connected for production schedule directly for the materials maker of the Lithium Ion Battery and the associated industry.

- The materials of any kind of performance and function,
- As of when, it is how much amount,
- At any cost level,
- It is how much scale as a market of the total,
- A future trend, correspondence with the number of concrete batteries of the machinery which lithium ion battery is put on,
- An electric power tool as the new battery market and electric assist bicycle,
- The deployment and the demand scale of the lithium ion to an ultimate hybrid car,

If the applied market of the lithium ion battery escalates it in many fields, this investigation report is accompanied, and from the viewpoint "how quantity of indispensability of constitution materials links", analyzes the constitution materials of the Lithium-ion Battery, and there is me for the purpose of it is based on data, and judging the requirements, a market size and a demand change according to materials according to the use.

If it is it with a help when the plan of the companies which did it including the materials maker where the analysis data of this investigation report and the technique of the market analysis are related to a Lithium-ion Secondary Battery, development, the various places of the field of business read a market, We are happy.

April, 2010

Shuichi Sugawara, Technical Analyst, Master of Science, Tohoku University
Kiyoshi Aramaki, Chief Editor, President of CMC Research Co., Ltd.

—An object and a summary of the research —

<Research object battery>

- (1) A small mobile use (<1 Ah/single cell) : mobile telephone, digital camera, note PC
- (2) A medium-scale power use(<10 Ah/single cell) : electric tools, electric assist bicycle
- (3) A large-scale power use (module) : hybrid car, battery car*
- (4) A large-scale energy use (module) : Natural energy accumulation of electricity (the wind power, solar power), new transportation system

<Field of research object>

- (1) Hybrid and electric car (Japan, U.S.A., Europe and Asian maker)
- (2) An electric assist bicycle (A domestic marketing maker)
- (3) An electric power tool (A domestic marketing maker, others)
- (4) A mobile device, others

1 Summary and the market trend of the lithium ion secondary battery

1.1 A kind and use of the lithium ion secondary battery

1.2 Summary of the second lithium ion battery according to the capacity and the structure

1.2.1 Summarized according to the structure (Prismatic Type, Cylindrical Type, Laminate Type)

(1) A kind of the lithium ion secondary battery

(2) Internal structure of the cell, Curl around cylindrical type

(3) Laminate type

(4) Real applied example

1.2.2 Summary in accordance with the capacity and the use

(1) Capacity of the cell

(2) The use in accordance with the capacity

1.3 Market trend in accordance with the use of the small and middle type

1.3.1 Small type mobile device

(1) Mobile telephone

(2) Digital audio (iPod and iPhone)

(3) Digital camera

(4) Notebook PC

1.3.2 Medium-sized power & energy use

(1) Assist bicycle

(2) Electric tool

1.4 Large-scale energy & power use

1.4.1 Natural energy accumulation of electricity (wind power / photovoltaic power generation)

1.4.2 New transportation system

1.5 Large-scale power & energy use

1.5.1 Hybrid car (HEV, PHEV)

1.5.2 Electric vehicle (EV)

1.6 Summary

(1) Market and a development trend

(2) The development trend of the new battery

1.7 Reference materials (Production / the shipment statistics of the secondary battery)

(1) Sale change of the secondary battery

(2) Total production of batteries in 2008

(3) Production of secondary batteries ratio of 2008

2 Lithium ion secondary battery maker trend

2.1 Tie-up and reorganization trend

2.2 Sanyo Electric

2.3 Panasonic (Energy Company)

2.4 Panasonic EV energy

2.5 Sony

2.6 Toshiba

2.7 NEC Tokin

2.8 Automotive Energy Supply (AESC)

2.9 GS Yuasa

2.10 Lithium Energy Japan

2.11 Hitachi Vehicle Energy

2.12 Shin-Kobe Electric Machinery

2.13 Hitachi Maxell

2.14 BYD

2.15 LG Chem

2.16 CONTINENTAL

2.17 Samsung SDI

2.18 Furukawa Battery

2.19 Others

(1) A123 Systems

(2) Johnson Controls-Saft

3 Market trend / the maker trend of constitution materials

3.1 Cathode materials

3.1.1 Trend of cathode materials

3.1.2 Market trend

3.1.3 Maker trend

3.2 Anode materials

3.2.1 Trend of anode materials

3.2.2 Conductive carbon

3.2.3 Market trend of anode materials

3.2.4 Maker trend

3.3 Electrolyte solution, electrolyte and additive (stabilizer)

3.3.1 Trend of the electrolyte solution

3.3.2 Electrolyte

3.3.3 Market trend and the maker trend of the electrolyte solution and electrolyte

3.4 Polymer materials

3.4.1 Separator

3.4.2 Separator market trend / Maker trend

3.4.3 Binder

3.4.4 Market trend / the maker trend of binder

3.4.5 Packing (Polymers)

3.4.6 Casing laminate materials

3.5 Collector foil and a casing box (container)

3.5.1 Collector foil

3.5.2 Copper foil

3.5.3 Aluminum foil

3.5.4 Metal casing container

3.5.5 Market trend / maker trend of the collector foil

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4.2 Analysis data of the prismatic type cell

4.3 Analysis data of the medium size (cylindrical type)

4.4 Summary of the materials indispensability in the medium size cell (cylindrical type)

4.5 Large-scale power use (Laminate type)

4.6 The specifications of a battery for cars

5 Demand and the prediction of the constitution materials of the lithium ion secondary battery

5.1 Materials price and the precondition for trial calculation

5.1.1 The process loss of raw materials

5.1.2 The price of raw materials and the market price

5.1.3 The model setting of materials requirements

5.2 Demand forecasting for small lithium ion battery according to the application

5.2.1 Demand forecasting of constitution materials in lithium ion battery for iPod & iPhone

5.2.2 Demand forecasting of constitution materials in lithium ion battery for mobile telephones

5.2.3 Demand forecasting of constitution materials in lithium ion battery for small digital cameras

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5.2.6 Demand forecasting of constitution materials in the cylindrical type lithium ion battery for electric power tool

5.2.7 Demand forecasting of constitution materials in the Laminate type cell for the power Assist bicycles

5.2.8 Summary and conclusion of the constitution materials in the lithium ion battery(2008-2012)

5.3 The production cost of the lithium ion battery (2012, Japan)

Sample

1 Summary and the market trend of the lithium ion secondary battery

1.1 A kind and use of the lithium ion secondary battery

Shape	Characteristics
Cylindrical Type	Low cost, High capacity by the volume ratio. There are many cases that the per gram with together in a module, and in use.
Prismatic Type	The capacity of the battery is reverse to coin with the use rate. Maximum use of the aluminum can increase by lightening.
Laminate Type	Based on electrode, an electrolyte by a laminate film.
Materials	<ul style="list-style-type: none"> Low cost, High capacity by the volume ratio. There are many cases that the per gram with together in a module, and in use. The capacity of the battery is reverse to coin with the use rate. Maximum use of the aluminum can increase by lightening. Based on electrode, an electrolyte by a laminate film.

Materials	Characteristics
LiCoO ₂	Materials are expensive. The change of the price is intense. The general characteristics is good.
LiFePO ₄	It is high capacity, but there is a problem in voltage. Manufacture is difficult also.
LiMnO ₂	Materials are cheap. The price is good. There is little capacity.
Graphite	It is developed by the measure of the material cost of the cell. Higher cost performance.
Electrolyte	It is all the change voltage 4.2 ~ 4.7 V. Some average voltage is high in the charge state (about 0.1 V). The market price has big capacity in the low voltage.

Materials	Characteristics
Graphite/Natural Graphite, Artificial Graphite	High capacity, and a relatively low cost at low temperature.
Carbon (Hard Carbon)	A change of the voltage by the electric discharge is big. Residual quantity management is easy by the voltage measurement. Long life and higher safety.

Table 1: Classification by the shape

Table 2: Classification by the cathode

Table 3: Classification by the anode materials

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Figure 11: The weight of the cylindrical type cell (Constitution ratio)

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