Global and China Ternary Cathode Materials (NCA/NCM) and Battery Industry Report, 2016-2020

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STUDY GOAL AND OBJECTIVES
This report provides the industry executives with strategically significant competitor information, analysis, insight and projection on the competitive pattern and key companies in the industry, crucial to the development and implementation of effective business, marketing and R&D programs.

REPORT OBJECTIVES
◆ To establish a comprehensive, factual, annually updated and cost-effective information base on market size, competition patterns, market segments, goals and strategies of the leading players in the market, reviews and forecasts.
◆ To assist potential market entrants in evaluating prospective acquisition and joint venture candidates.
◆ To complement the organizations’ internal competitor information gathering efforts with strategic analysis, data interpretation and insight.
◆ To suggest for concerned investors in line with the current development of this industry as well as the development tendency.
◆ To help company to succeed in a competitive market, and

METHODOLOGY
Both primary and secondary research methodologies were used in preparing this study. Initially, a comprehensive and exhaustive search of the literature on this industry was conducted. These sources included related books and journals, trade literature, marketing literature, other product/promotional literature, annual reports, security analyst reports, and other publications. Subsequently, telephone interviews or email correspondence was conducted with marketing executives etc. Other sources included related magazines, academics, and consulting companies.

INFORMATION SOURCES
The primary information sources include Company Reports, and National Bureau of Statistics of China etc.
Abstract

Cathode materials for lithium-ion battery can be chiefly classified by material structure into three categories:
First, the laminated materials such as LiCoO2, LiNiO2, LiMO2 (M=NiCo, NiCoMn);
Second, the materials of the spinel solid, like LiMn2O4;
Third, intercalates with olivine structure such as LixMPO4 (M=Fe, Mn, Co)

The first-generation cathode material refers to lithium cobaltate (LCO) whose voltage platform is 4.2V in general and which gets mainly used in consumer electronics. As the compacted density and energy density of LCO is on the edge of extremes, there emerges the latest technology trend -- LCO mixed high-voltage compacted density NCM ternary material, to produce high voltage battery cells.

The second-generation cathode materials consist of LMO, NCM/NCA, LFP, etc., of which NCM ternary material embraces bright prospects and has been widely used in fields such as notebook computer, tablet computer, mobile phone, electric tool, electric bicycle and electric vehicle. With lower costs compared with traditional LCO, NCM tends to replace LCO in the mobile terminals field. Now in China, 85 percent of NCM ternary materials find application in mobile terminal field and among which at least 80 percent adopts cost-efficient NCM523 cathode material.

The third-generation cathode materials refer to the laminated lithium-rich manganese series materials, lithium nickel manganese oxide spinel high-voltage materials, etc. and they have not yet been massively commercialized and are the hotspot in the research of cathode materials worldwide.

The global shipment of cathode materials reached 223,400 tons in 2015, surging by 35.89% from the previous year. Thanks to brisk demand for electric vehicles, LFP and NCA show rapid growth among which NCA gets primarily used for Panasonic 18650 cylindrical batteries (to be supplied to Tesla EVs) and substantial growth of LFP benefits mainly from China’s EV demand, particularly robust demand for electric buses as well as application in energy storage field.

Currently, the world’s ternary material manufacturers are principally from Japan, S.Korea and China, holding a combined market share of 50% worldwide. Japanese companies are expert at technologies and have rich experience; S.Korean peers have sprung up and tend to outpace Japanese ones in both technology and quality; while Chinese counterparts that accessed into the industry late are mainly involved in the medium and low-end markets with gross margin of less than 10% and serious homogeneity of products.
At present, concentration of ternary material supply is improving in China, with four leaders including Hunan Shanshan Advanced Material, Xiamen Tungsten, Ningbo Jinhe New Materials, and Shenzhen Zhenhua New Materials together holding close to 50% market shares. In future, the market will be seized by the listed companies with strength in technology and capital.

In 2015, the shipment of NCM ternary material was up to 30,500 tons with a year-on-year surge of 45.2% in China, and the output value reported RMB3.27 billion, up 35% from a year earlier and mainly spurred by growth in electric vehicles' demand for power batteries and substitution for LCO.

In addition to NCM, there is also little shipment of NCA ternary material in China, mainly contributed by Tianjin Lishen’s 18650 NCA ternary lithium batteries for JAC’s Iev5. Since NCA has strong chemical activity and poses exceedingly high requirements on battery thermal management system, electric vehicles in China have rare use of NCA. In 2015, the shipment of NCA ternary material approximated 2,000 tons in China.

With improvements in compacted densification, energy density, voltage, etc., ternary materials’ application in the digital domain (like tablet PC and notebook computer) sees a rising proportion. What’s more, the demand for ternary materials from electric tool market also keeps growing.

In the EV sector, the newly launched EVs in China in 2015 consisting of BAIC BJEV EV200, Chery eQ, JAC lev4, ZOTYE Cloud 100, etc all apply ternary power batteries. According to the posed requirements on new energy vehicle innovation projects by the Ministry of Industry and Information Technology of the People’s Republic of China (MIIT), in 2015, the energy density of lithium battery monomer should be not less than 180Wh/kg, the energy density of battery module is not less than 150Wh/kg, and the cycle life lasts for more than 2,000 times or ten years. Considering factors like energy density, cycle life and costs, LFP is hard to meet the new-generation lithium batteries for new energy vehicle, and the ternary cathode materials will become the mainstream technology route of cathode materials for lithium power batteries.

It is highly probable for ternary materials to replace LFP and become the mainstream cathode materials for power batteries. Only a few cathode material enterprises are capable of producing high nickel NCM622 in China. It is expected that in 2017 the penetration of ternary materials in China will be up to 20%, and till 2020 abide by 1kwh needy of 1.3kg of ternary materials, China’s demand for NCM will amount to 155,000 tons and the demand for NCA ternary material will reach 8,000 tons, from which a huge rigid gap of ternary cathode materials can be seen.

As concerns technology trends, the novel lithium-rich laminated ternary materials are possible to be utilized as the cathode material for future high-energy-density lithium-ion battery due to exceedingly high specific capacity and excellent cycling competence.
Currently, first discharge of 0.1C (C stands for capacity) such material is higher than 250mAh/g and capacity retention ratio is above 90% after the cycling of thirty times, presenting remarkable electrochemical properties. The research and development of lithium-rich ternary materials is of great significance to the industrialization of power battery.

Global Shipment of Cathode Materials (LFP/NCM/LCO/LMO/NCA), 2011-2015
Global and China Ternary Cathode Materials (NCA/NCM) and Battery Industry Report, 2016-2020 by ResearchInChina highlights the followings:

- Supply and demand of ternary materials in China and the world, particularly the shares of applications in such fields as new energy vehicle and consumer electronics;
- Competitive landscape in China and beyond, covering domestic and overseas companies’ market share, capacity planning, market pattern, etc.;
- Technology routes and development trends of ternary materials in China and the world;
- Analysis on upstream and downstream market segments of ternary materials, consisting of cobalt metal, lithium carbonate, ternary precursor, ternary lithium battery, etc.;
- Key application growth points of ternary cathode materials, and analysis of electric vehicle industry in China and the world;
- Operation, technologies, development plans and production & sales dynamics of six manufacturers of ternary cathode materials from countries like Japan, S.Korea, Belgium and Germany;
- Operation, technologies, development plans and production & sales dynamics of fourteen Chinese ternary cathode material manufacturers;
- Operation, technologies, development plans and production & sales dynamics of seven producers of ternary lithium battery from nations such as Japan, S.Korea and Europe;
- Operation, technologies, development plans and production & sales dynamics of nine Chinese ternary lithium battery manufacturers.
7 Chinese Ternary Cathode Materials Enterprises

7.1 Hunan Shanshan Advanced Material Co., Ltd.
7.1.1 Profile
7.1.2 Financial Operation
7.1.3 Output and Sales Volume
7.1.4 Products
7.1.5 Core Competence
7.1.6 Performance Prediction

7.2 Beijing Easpring Material Technology Co., Ltd.
7.2.1 Profile
7.2.2 Development Course
7.2.3 Financial Operation
7.2.4 Capacity
7.2.5 Customers
7.2.6 Ternary Cathode Material Business
7.2.7 Performance Prediction

7.3 Xiamen Tungsten Co., Ltd.
7.3.1 Profile
7.3.2 Financial Operation
7.3.3 Capacity
7.3.4 Core Competence
7.3.5 Performance Prediction

7.4 Shenzhen Green Eco-manufacture Hi-tech
7.4.1 Profile
7.4.2 Development Course
7.4.3 Financial Operation
7.4.4 Capacity
7.4.5 Ternary Cathode Material Business
7.4.6 Core Competence
7.4.7 Performance Prediction

7.5 Fujian Zhonghe Co., Ltd.
7.5.1 Profile
7.5.2 Development Course
7.5.3 Financial Operation
7.5.4 Capacity
7.5.5 Core Competence
7.5.6 Performance Prediction

7.6 Kingray New Materials Science & Technology Co., Ltd.
7.6.1 Profile
7.6.2 Financial Operation
7.6.3 Capacity
7.6.4 Performance Prediction

7.7 Ningbo Jinhe New Materials Co., Ltd.
7.7.1 Profile
7.7.2 Financial Operation
7.7.3 Capacity

7.8 Shenzhen Tianjiao Technology Co., Ltd.
7.8.1 Profile
7.8.2 Financial Operation

7.9 Xinxiang Tianli Energy Material Co., Ltd.
7.9.1 Profile
7.9.2 Financial Operation
7.9.3 Capacity
7.9.4 Performance Prediction

7.10 Henan Kelong New Energy Co., Ltd.
7.10.1 Profile
7.10.2 Financial Operation
7.10.3 Capacity
7.10.4 Performance Prediction

7.11 Hunan Changyuan Lico Co., Ltd.
7.11.1 Profile
7.11.2 Financial Operation
7.11.3 Capacity
7.11.4 Performance Prediction

7.12 Pulead Technology Industry Co., Ltd.
7.12.1 Profile
7.12.2 Ternary Cathode Materials

7.13 Hunan Reshine New Material Co., Ltd.
7.13.1 Profile
7.13.2 Ternary Cathode Material Business

7.14 Jiangxi Ganfeng Lithium Co., Ltd.
7.14.1 Profile
7.14.2 Ternary Lithium Battery Manufacturers

8 Major Global Ternary Lithium Battery Manufacturers

8.1 Panasonic
### 9 Major Chinese Ternary Lithium Battery Manufacturers

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Profile</th>
<th>Battery Technology</th>
<th>Business Development and Prospect</th>
<th>Customers</th>
<th>Capacity and Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tianjin Lishen</td>
<td>9.1.1 Profile</td>
<td>9.1.2 Battery Technology</td>
<td>9.1.3 Business Development and Prospect</td>
<td>9.1.4 Customers</td>
<td>9.1.5 Capacity and Output</td>
</tr>
<tr>
<td>ATL</td>
<td>9.2.1 Profile</td>
<td>9.2.2 Battery Technology</td>
<td>9.2.3 Business Development and Prospect</td>
<td>9.2.4 Industry Chain</td>
<td>9.2.5 Investment and Capacity</td>
</tr>
<tr>
<td>China Bak Battery</td>
<td>9.3.1 Profile</td>
<td>9.3.2 Battery Technology</td>
<td>9.3.3 Business Development and Prospect</td>
<td>9.3.4 Customers</td>
<td>9.3.5 Capacity and Output</td>
</tr>
<tr>
<td>Wanxiang EV</td>
<td>9.4.1 Profile</td>
<td>9.4.2 Battery Technology</td>
<td>9.4.3 Business Development and Prospect</td>
<td>9.4.4 Customers</td>
<td>9.4.5 Capacity and Output</td>
</tr>
<tr>
<td>Sinopoly Battery</td>
<td>9.5.1 Profile</td>
<td>9.5.2 Battery Technology</td>
<td>9.5.3 Business Development and Prospect</td>
<td>9.5.4 Customers</td>
<td>9.5.5 Capacity and Output</td>
</tr>
<tr>
<td>CITIC GUOAN Mengguli</td>
<td>9.6.1 Profile</td>
<td>9.6.2 Battery Technology</td>
<td>9.6.3 Business Development and Prospect</td>
<td>9.6.4 R &amp; D</td>
<td>9.6.5 Capacity and Output</td>
</tr>
<tr>
<td>China Aviation Lithium Battery</td>
<td>9.7.1 Profile</td>
<td>9.7.2 Battery Technology</td>
<td>9.7.3 R &amp; D</td>
<td>9.7.4 Business Development and Prospect</td>
<td>9.7.5 Customers</td>
</tr>
</tbody>
</table>

**Table of contents**

8.1.1 Profile
8.1.2 Battery Technology
8.1.3 Business Development and Prospect
8.1.4 Layout in China
8.1.5 Customers
8.1.6 Output Capacity
8.2 AESC
8.2.1 Profile
8.2.2 Battery Technology
8.2.3 Business Development and Prospect
8.2.4 Layout in China
8.2.5 Capacity and Output
8.3 LEJ
8.3.1 Profile
8.3.2 Battery Technology
8.3.3 Business Development and Prospect
8.3.4 Customers
8.3.5 Capacity and Output
8.4 LGC
8.4.1 Profile
8.4.2 Battery Technology
8.4.3 Business Development and Prospect
8.4.4 Customers
8.4.5 Layout in China
8.4.6 Capacity and Output
8.5 Samsung SDI
8.5.1 Profile
8.5.2 Battery Technology
8.5.3 Business Development and Prospect
8.5.4 Customers
8.5.5 Layout in China
8.5.6 Capacity and Output
8.6 SKI
8.6.1 Profile
8.6.2 Battery Technology
8.6.3 Business Development and Prospect
8.6.4 Layout in China
8.6.5 Capacity and Output
8.7 Li-Tec\&Accumotive

9.1 Tianjin Lishen
9.1.1 Profile
9.1.2 Battery Technology
9.1.3 Business Development and Prospect
9.1.4 Customers
9.1.5 Capacity and Output
9.2 ATL
9.2.1 Profile
9.2.2 Battery Technology
9.2.3 Business Development and Prospect
9.2.4 Industry Chain
9.2.5 Investment and Capacity
9.2.6 Production and Marketing
9.3 China Bak Battery
9.3.1 Profile
9.3.2 Battery Technology
9.3.3 Business Development and Prospect
9.3.4 Customers
9.3.5 Capacity and Output
9.4 Wanxiang EV
9.4.1 Profile
9.4.2 Battery Technology
9.4.3 Business Development and Prospect
9.4.4 Customers
9.5 Sinopoly Battery
9.5.1 Profile
9.5.2 Battery Technology
9.5.3 Business Development and Prospect
9.5.4 Customers
9.5.5 Capacity and Output
9.6 CITIC GUOAN Mengguli
9.6.1 Profile
9.6.2 Battery Technology
9.6.3 Business Development and Prospect
9.6.4 R & D
9.6.5 Capacity and Output
9.7 China Aviation Lithium Battery
9.7.1 Profile
9.7.2 Battery Technology
9.7.3 R & D
9.7.4 Business Development and Prospect
9.7.5 Customers
• Structure Diagram of Laminated LiNi1/3Co1/3Mn1/3O2
• Performance Comparison of Ternary Cathode Materials
• Performance Parameters of NCM Ternary Cathode Material
• Metal Demand from NCM Ternary Cathode Material
• Merits and Demerits of Ternary Synergy Effect
• Comparison of Sundry Models of NCM Ternary Cathode Material
• Cost Analysis of Sundry Models of NCM Ternary Cathode Material
• Comparison of NCM Performance with Different Composition Ratios
• Performance Parameters of NCA Ternary Cathode Material
• Metal Demand from NCA Ternary Cathode Material
• Comparison of NCM, NCA and LFP
• NCM Lithium Manufacturing Methods and Features
• Process Flow of NCM Coprecipitation Method
• Global Shipment of Cathode Materials (LFP/NCM/LCO/LMO/NCA), 2011-2015
• Consumption Structure of Lithium Battery Cathode Materials Worldwide, 2015
• Performance Comparison of Ternary Cathode Materials and Other Cathode Materials
• Development Orientation of Li-ion Battery Cathode Materials
• Michael Porter’s Five Forces Model of Global Cathode Materials Industry
• Market Share of Cathode Material Manufacturers Worldwide, 2014
• Global Shipment of Ternary Cathode Materials (NCA/NCM), 2011-2015
• Global Shipment of Ternary Cathode Materials, 2009-2020
• Price Trend of Ternary Cathode Materials Worldwide, 2010-2020
• Shares (%) of Cathode Materials (LFP, LCO, LMO, NCM) (for Electric Vehicle), 2020
• Shares (%) of Cathode Materials (LFP, LCO, LMO, NCM) (for 3C Consumer Electronics), 2020
• Market Share of Ternary Cathode Material Manufacturers Worldwide, 2014
Selected Charts

- Application of Patents for Ternary Cathode Materials Worldwide
- Technological Tendencies of Ternary Cathode Material Technologies, 2015-2030
- Auto Models Supported by Ternary Cathode Materials in Japan
- Sales of NCM Ternary Cathode Materials in Japan, 2012-2015
- Auto Models Supported by Ternary Cathode Materials in South Korea
- Development Roadmap of Ternary Cathode Materials in South Korea
- Output of Cathode Materials (NCM/LCO/LFP/LMO) in China, 2014Q1-2015Q2
- Products, Revenue and Capacity of Key Cathode Material Manufacturers in China, 2014
- Capacities and Clients of Major Domestic Cathode Material Manufacturers in China, 2015
- Prices of Cathode Materials in China, 2010-2016
- Ternary Cathode Materials (NCM/NCA) Shipment in China, 2015-2020
- Ternary Cathode Material Capacities of Leading Manufacturers in China
- Capacities (GWh) of Key Chinese Ternary Lithium Battery Manufacturers, 2015-2017
- Prices of NCM 523 and LFP in China, 2011-2015
- Market Shares of Key Chinese Ternary Cathode Material Manufacturers, 2015
- National Policy’s Requirements on Lithium Battery
- Status Quo of Research on Lithium-rich Ternary Cathode Materials in China
- Development Trends of Ternary Cathode Materials in China
- Percentages of Cobalt Applications
- Amount of Cobalt Consumed by Different Ternary Cathode Materials
- Distribution of Cobalt Resource Reserves Worldwide
Selected Charts

- Distribution of Cobalt Resource Reserves in China
- Cobalt Supply and Demand in China, 2011-2015
- Cobalt Demand Structure Worldwide
- Cobalt Demand Structure in China
- Lithium Carbonate Supply in the World, 2012-2020
- Lithium Carbonate Demand in the World, 2012-2020
- Global Demand for Lithium Carbonate (by Sector), 2012-2020
- Output of Lithium Carbonate in China, 2009-2020
- Proportion of China’s Lithium Carbonate Output in Global Total, 2012-2020
- Supply-demand Gap of Lithium Carbonate in China, 2009-2020
- Downstream Consumption Structure of Lithium Carbonate Worldwide, 2013
- Downstream Consumption Structure of Lithium Carbonate Worldwide, 2015
- World’s Leading EV Makers’ Selection of Cathode Materials
- Ternary Precursor Capacities of Leading Manufacturers in China
- National Policy on Ternary Precursor Export Rebates, 2015
- Ternary Precursor Preparation Methods
- Comparison of Mainstream Ternary Cathode Material Precursor Preparation Technologies
- Lithium Battery Demand Structure Worldwide, 2012-2020
- Consumption of Lithium Battery Worldwide (by Products), 2015
- Global Demand from Consumer Electronics for Lithium Battery and Growth Rates, 2013-2020
- Sales Volume of Mobile Phones and Demand for Lithium Battery Worldwide, 2012-2020
- Sales Volume of Tablet Computers and Demand for Lithium Battery Worldwide, 2012-2020
- Sales Volume of Notebook PCs and Demand for Lithium Battery Worldwide, 2012-2020
- Sales Volume of Electronic Cigarettes and Shares (%) Worldwide, 2012-2020
Selected Charts

- Electric Vehicles’ Demand for Lithium Power Battery Worldwide (by Type), 2011-2020
- Battery Capacity (Single Vehicle) of Electric Passenger Cars Worldwide, 2011-2020
- Demand for Lithium Power Battery in China (by Type), 2011-2020
- Cost Structure of 100Ah Ternary Cathode Material Li-ion Battery
- Trend for Energy Density Development of Ternary Cathode Materials, 2015-2019
- China’s Output of Power Batteries in Different Systems, 2014-2018
- Installation of Ternary Batteries in Battery Electric Passenger Cars in China, Nov 2015
- Auto Models Supported by Ternary Cathode Material Lithium Battery Overseas
- Ternary Lithium Battery Projects which are Newly Built or Put into Production in China
- Ternary Cathode Material Battery Market Size, 2020
- Auto Models Supported by Newly Launched Ternary Battery in Chinese Market, 2015
- Sales Volume of Electric Passenger Cars Worldwide (by Major Countries), 2013-2014
- Sales Volume of World’s Top 20 Electric Passenger Car Brands, 2013-2014
- Sales Volume of World’s Top 20 Electric Passenger Car Brands, 2015H1
- Sales Volume of Electric Vehicles in the United States (by Auto Model), 2013-2015H1
- Sales Volume of Electric Vehicles in Europe (by Auto Model), 2013-2015H1
- Sales Volume of Electric Vehicles in Japan (by Auto Model), 2013-2015H1
- Output and Sales Volume of Electric Vehicles in China, 2010-2015
- Output of New Energy Vehicles (EV&PHEV) in China, Jan-Dec.2015
- Sales Volume of Electric Vehicles (EV&PHEV) in China, 2011-2020
- Sales Volume of Electric Passenger Cars (EV&PHEV) in China, 2011-2020
- Sales Volume of New Energy Passenger Cars (EV &PHEV) in China, Jan-Dec.2015
- Output of New Energy Commercial Vehicles in China, Jan-Dec.2015
- Electric Vehicle Promotion Program in China, 2014-2015
Selected Charts

- Output of New Energy Buses in China, Jan-Dec.2015
- Output of Battery Electric Trucks in China, Jan-Dec.2015
- Sales Volume of Electric Commercial Vehicles (EV & PHEV) in China, 2011-2020
- Umicore’s Financials, 2011-2015H2
- Umicore’s Cathode Material Production Bases Worldwide
- Umicore’s Operations in China
- Umicore’s Offices and Business Distribution in China
- Umicore’s Ternary Cathode Material (NCM) R&D Route
- Development Course of Nichia
- Nichia’s Revenue, 2009-2014
- Nichia’s Output of Cathode Materials, 2012 & 2013
- L&F’s Total Revenue, 2006-2014
- L&F’s Output of Cathode Materials, 2012 & 2013
- Toda Kogyo’s Financials, 2012-2015
- Structure of Toda Kogyo’s Lithium Battery Cathode Material Products
- Performance of Toda Kogyo’s Ternary Cathode Material Products
- BASF’s Global Integrated Network and Production Bases
- BASF’s Layout and Distribution of Production Bases in China
- BASF’s Financials, 2011-2015
- BASF’s Key Ternary Cathode Material Products
- BASF’s Cathode Material Research and Production Bases Worldwide
- BASF’s Research Priorities and Methods of Ternary Cathode Materials
- Comparison of BASF’s Ni-MH Batteries and Lead-acid Batteries
- SMM’s Financials, 2012-2015
- SMM’s Revenue Structure, FY2015
Selected Charts

- SMM's Material Business Layout Worldwide
- Organization Structure of Ningbo Shanshan in New Energy Field
- Operating Results of Hunan Shanshan Advanced Material, 2009-2014
- Cathode Material Product Lines of Hunan Shanshan Advanced Material
- Physical and Chemical Indexes of Major Products of Hunan Shanshan Advanced Material
- Performance Forecast of Ningbo Shanshan, 2012-2017
- Joint-stock and Shareholding Companies of Beijing Easpring Material Technology
- Development Course of Beijing Easpring Material Technology, 1992-2015
- Operating Results of Beijing Easpring Material Technology, 2009-2015
- Revenue Structure of Beijing Easpring Material Technology (by Products), 2015H2
- Revenue Structure of Beijing Easpring Material Technology (by Regions), 2015H2
- Major Global Clients of Beijing Easpring Material Technology for Small-sized Cathode Material Products
- Performance Forecast of Beijing Easpring Material Technology, 2015-2017
- Operating Results of Xiamen Tungsten, 2009-2015
- Revenue Structure of Xiamen Tungsten (by Products), 2015H2
- Capacity Planning of Xiamen Tungsten, 2016
- Performance Forecast of Xiamen Tungsten, 2016-2017
- Development Route of Shenzhen Green Eco-manufacture Hi-tech, 2001-2016
- Operating Results of Shenzhen Green Eco-manufacture Hi-tech, 2009-2015H3
- Revenue Structure of Shenzhen Green Eco-manufacture Hi-tech (by Products), 2015H2
- Current Capacity of Shenzhen Green Eco-manufacture Hi-tech
- Ternary Cathode Material Business Revenue of Shenzhen Green Eco-manufacture Hi-tech, 2012-2014
- Performance Forecast of Shenzhen Green Eco-manufacture Hi-tech, 2016-2017
- Lithium Battery Industry Chain of Fujian Zhonghe
Selected Charts

- Development History of Fujian Zhonghe’s Lithium Battery Business
- Operating Results of Fujian Zhonghe, 2009-2015H3
- Revenue Structure of Fujian Zhonghe (by Products), 2015H2
- Lithium Battery Material Product Capacity and Planning of Fujian Zhonghe
- Performance Forecast of Fujian Zhonghe, 2016-2017
- Operating Results of Kingray New Materials Science & Technology, 2009-2015H3
- Revenue Structure of Kingray New Materials Science & Technology (by Products), 2015H2
- Capacity Details of Kingray New Materials Science & Technology
- Performance Forecast of Kingray New Materials Science & Technology, 2016-2017
- Capacity Details of Ningbo Jinhe New Materials Co., Ltd.
- Operating Results of Shenzhen Tianjiao Technology, 2013-2015H2
- Output of Ternary Cathode Materials of Shenzhen Tianjiao Technology, 2016-2017
- Performance Forecast of Shenzhen Tianjiao Technology, 2015-2017
- Operating Results of Xinxiang Tianli Energy Material, 2013-2015H1
- Revenue Structure of Xinxiang Tianli Energy Material (by Products), 2014
- Output of Xinxiang Tianli Energy Material, 2015-2017
- Performance Forecast of Xinxiang Tianli Energy Material, 2015-2017
- Revenue Structure of Henan Kelong New Energy, 2013
- Capacity Details of Ternary Cathode Materials of Henan Kelong New Energy
- Performance Forecast (Battery Material Business) of Henan Kelong New Energy, 2015-2017
- Product Features of PU50A
- Product Features of PU50B
- Operating Results of Panasonic, FY2008/09-FY2013/14
- R&D Expenditure of Panasonic, FY2008/09-FY2013/14
- Revenue Structure of Panasonic (by Segment), 2012-2014
• Operating Income Structure of Panasonic (by Segment), 2012-2014
• Revenue Structure of Panasonic (by Region), 2014
• Technical Parameters of Panasonic’s NCA 18650 Cell for Tesla
• Development Plan of Panasonic’s Automotive Batteries, 2013-2019
• Development Plan of Panasonic’s Automotive Division, 2013-2019
• Development Plans of Panasonic’s Business Divisions, 2013-2019
• Electric Vehicles Supported by Panasonic’s Lithium Power Batteries
• Tesla EV Delivery, 2010-2016
• Panasonic’s Shipment of Power and Energy Storage Batteries, 2011-2015
• Equity Structure of AESC, 2014
• Cost Structure of AESC’s BEV Cell Materials
• Battery Module Structure of AESC’s Lithium Power Battery
• Specifications and Serial & Parallel Connection Modes of AESC’s High-capacity Power Batteries
• Performance Parameters of AESC’s High-capacity Power Batteries
• Specifications and Serial & Parallel Connection Modes of AESC’s High-power Batteries
• Performance Parameters of AESC’s High-power Batteries
• AESC’s Power Battery System Solutions
• Electric Vehicles Supported by AESC’s Lithium Power Batteries
• AESC’s Shipment of Power and Energy Storage Batteries, 2011-2015
• Equity Structure of LEJ, 2014
• Specifications of LEJ’s Lithium Power Batteries
• Electric Vehicles Supported by LEJ’s Lithium Power Batteries
• LEJ’s Shipment of Power and Energy Storage Batteries, 2011-2015
• Equity Structure of LGC, 2014
• Operating Results of LGC, 2007-2015H1
Selected Charts

- Revenue Breakdown of LGC by Regions, 2014
- Cost Structure of LGC’s PHEV Cell Materials
- LGC Road Map for HEV LIB Technology
- LGC Road Map for PHEV LIB Technology
- LGC Road Map for EV LIB Technology
- LGC’s Lithium Business Development and Prospects
- Operating Results of LGCPI (LG Chem Power Inc), 2010-2014
- Operating Results of HL Green Power, 2010-2014
- Operating Results of LGC’s Battery Business, 2013Q1-2015Q2
- Electric Vehicles Supported by LGC’s Lithium Power Batteries
- Administrative Organs of LGC in China
- LGC’s Production and Marketing Network in China
- LGC’s Shipment of Power and Energy Storage Batteries, 2012-2015
- Equity Structure of SDI, 2014
- Operating Results of SDI, 2008-2015H1
- Revenue Breakdown of SDI by Regions, 2014
- SDIRoad Map for xEV LIB Technology
- Technical Performance of SDI’s Lithium Power Battery Cell
- Operating Results of SDI, 2007-2015H1
- SDI’s Battery Shipment and ASP, 2007-2014
- SDI’s Revenue from Power and Energy Storage Batteries, 2013Q1-2014Q4
- Electric Vehicles Supported by SDI’s Lithium Power Batteries
- SDI’s Shipment of Power and Energy Storage Batteries, 2012-2015
- Main Subsidiaries under SKI
- Electric Vehicles Supported by SKI’s Lithium Power Batteries
Selected Charts

- Equity Structure of BESK (SKI’s Joint Venture in China)
- Basic Information of BESK (SKI’s Joint Venture in China)
- Technical Parameters of BESK’s Lithium Power Batteries
- Specifications of Li-Tec’s High-capacity Power Battery
- Performance Parameters of Li-Tec’s High-capacity Power Battery
- Li-tec’s Power Battery Plant in Landkreis Kamenz, Germany
- Equity Structure of Tianjin Lishen
- Operating Results of Tianjin Lishen, 2011-2015H1
- Cell Technology Roadmap of Tianjin Lishen
- Battery Pack (Module) Technology Roadmap of Tianjin Lishen
- Performance Parameters of Spiral Cell of Tianjin Lishen
- Performance Parameters of Laminated Cell of Tianjin Lishen
- Performance Parameters of Polymer Cell of Tianjin Lishen
- Technical Parameters of Battery Cell of Tianjin Lishen
- Power Battery Clients of Tianjin Lishen
- Performance Parameters of Power Battery Pack (Module) of Tianjin Lishen
- Lithium Battery Capacity of Tianjin Lishen, 2000-2015
- Power Battery Investment Plan of Tianjin Lishen, 2012-2015
- Operating Results of ATL, 2008-2014
- Basic Information of ATL-QH
- Clients Supported by ATL’s Power and Small-sized Batteries
- ATL’s Power Battery Suppliers
- ATL’s Battery Output and Utilization, 2012-2014
- ATL’s Capacity Layout of Power and Small-sized Batteries (by the end of 2014)
- ATL’s Power and Energy Storage Battery Business Revenue and Prices, 2012-2014
• ATL's Revenue from Small-sized Lithium Battery, 2008-2014
• ATL's Shipment of Small-sized Lithium Batteries, 2008-2014
• Operating Results of China BAK Battery, 2008-2015H1
• Revenue Structure of China BAK Battery by Regions, 2009-2014
• R&D Investment of China BAK Battery, 2010-2015H1
• Technical Parameters of China BAK Battery’s Power Battery Cell
• Basic Information of BAK International (Tianjin)
• Basic Information of Dalian BAK Power Battery
• Lithium Battery Revenue of China BAK Battery, 2009-2015H1
• Power Battery Investment Plan of China BAK Battery, 2013-2015
• Revenue and Gross Margin of Sinopoly Battery, 2011-2015H1
• Net Income of Sinopoly Battery, 2011-2015H1
• Technical Parameters of Sinopoly Battery’s Power Cell
• Operating Results of CITIC GUOAN Mengguli, 2009-2015H1
• Technical Parameters of Cathode Materials of CITIC GUOAN Mengguli
• Technical Parameters of Power Battery Module of CITIC GUOAN Mengguli
• Equity Structure of China Aviation Lithium Battery, 2014
• Operating Results of China Aviation Lithium Battery, 2010-2014
• BEV BMS of China Aviation Lithium Battery
• Battery Product Certifications of China Aviation Lithium Battery
• Global Marketing Network of China Aviation Lithium Battery
• Major Customers of China Aviation Lithium Battery
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