

Global Market of Four Major LiB (Lithium Ion Battery) Components: Key Research Findings 2017

◆ Research Outline

Yano Research Institute has conducted a study on the global market of four major LiB components with the following conditions:

1. Research period: From March to September, 2017
2. Research targets: Manufacturers of LiB components (in Japan, South Korea, China, Europe, etc.)
3. Research about: Cathodes, anodes, electrolytes, and separators
4. Research methodologies: Face-to-face interviews by the expert researchers, surveys via telephone/email, and literature research

<What are Four Major LiB (Lithium Ion Battery) Components?>

LiBs, used for power sources of smartphones and other communication devices and of EVs/PHEVs, consist of more than ten components and materials. This research only reports the following four components among such materials: Cathodes, Anodes, Electrolytic solutions/electrolytes, and Separators. Note that the figures in this research are calculated on US-Dollar basis: For 2013, 1 USD to 97.8 yen, 1116.97 won, 6.16 RMB, or 0.75 EUR. For 2014, 1 USD to 105.9 yen, 1152.93 won, 6.14 RMB, or 0.75 EUR. For 2015, 1 USD to 121.0 yen, 1129.94 won, 6.23 RMB, or 0.90 EUR. For 2016 and beyond, 1 USD to 108.8 yen, 1207.70 won, 6.64 RMB, or 0.94 EUR.

◆ Key Findings

■ Global Market of Four Major LiB Components in 2016 Rose to US\$ 9,877.45 Million, 140.1 % on Y-o-Y Basis, Projected to Attain US\$ 13,000 Million by 2017

The global four major LiB (lithium ion battery) components market in 2016 estimated to have grown to US\$ 9,877.449 million, 140.1% of the size of the previous year, based on the shipment value at manufacturers. In 2016 the shipment volume of components for mid-to-large size LiBs including those for EV and HEV applications exceeded that of components for LiBs for small consumer equipment, which clearly showed a shift in the driving forces of the market. While the demand of materials for LiBs for vehicles is expected to continue expanding in 2017 and beyond, LiB components for small consumer equipment are likely to keep their moderate growth. The prices of some components are seen to be on the rise mainly because of the rising costs of raw materials, which is projected to partly cause the entire market size to be as large as US\$ 13,000 Million by 2017.

■ China Remains Showing Major Presence in Global Market of Four Major LiB Components, Future of Japan and South Korea Depends on Trend of OEM in Japan, Europe and US

In 2016 Chinese manufacturers remained showing their large presence in the business of most of the four major LiB components. Boosted by the domestic demands in China, the manufacturers of Chinese LiB components are likely to keep expanding their shipment in 2017 and beyond. On the other hand, Japanese and South Korean manufacturers of LiB components are currently mainly supply their products to Japanese and South Korean LiB makers. If Japanese, European and US automakers (OEM), i.e., the customers of LiB makers, are able to

increase their sales in the xEV markets in Europe, Japanese and South Korean manufacturers of LiB components may be able to increase the shipment.

■ **Balance of Supply and Demand Differs by Component and by Standard of Product Quality, and Tight Supply of LiB for Vehicles Anticipated**

Aiming to continuously acquire large business of all four major LiB components in 2017 and beyond, manufacturers are tend to prioritize investment in plant and equipment, but the gap between production capacity and actual demand differs by component. With regard to higher-grade products (especially higher grade electrolytic solutions and wet-type separators) that can be adopted in LiBs for vehicles, tight supply may continue for the time being.

◆ **Report Format**

Published report: “Lithium-ion Battery Material Market 2017 – Major Four Components”

Issued on: September 29, 2017

Language: Japanese

Format: 475 pages in A4 format

Price: 260,000 yen (The consumption tax shall additionally be charged for the sales in Japan.)

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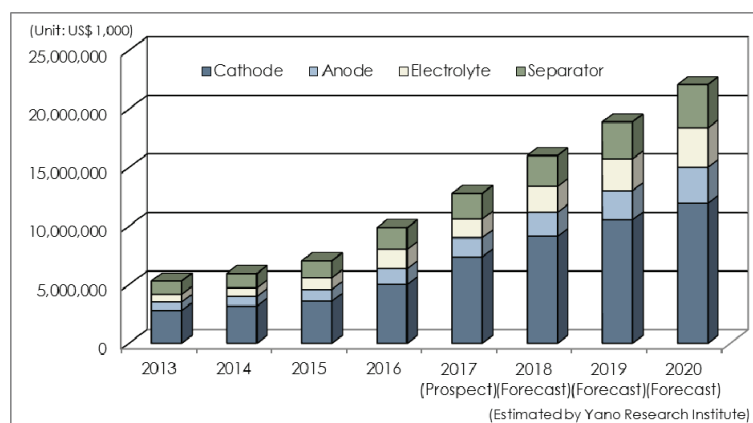
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■ **Table 1 & Figure 1: Transition of Global Market Size Forecast for Four Major LIB Components**

	2013		2014		2015		2016		2017 (Prospect)		2018 (Forecast)		2019 (Forecast)	
	Value	Comp.ratio	Value	Comp.ratio	Value	Comp.ratio	Value	Comp.ratio	Value	Comp.ratio	Value	Comp.ratio	Value	Comp.ratio
Cathode	2,793,967	52.6%	3,173,429	53.2%	3,596,810	51.0%	5,017,100	50.8%	7,367,877	57.6%	9,115,370	56.9%	10,533,430	55.7%
Y-o-Y	-		113.6%		113.3%		139.5%		146.9%		123.7%		115.6%	
Anode	719,485	13.5%	837,700	14.1%	999,826	14.2%	1,351,967	13.7%	1,639,276	12.8%	2,073,258	12.9%	2,506,301	13.3%
Y-o-Y	-		116.4%		119.4%		135.2%		121.3%		126.5%		120.9%	
Electrolyte	669,435	12.6%	715,928	12.0%	1,018,080	14.4%	1,656,323	16.8%	1,598,165	12.5%	2,197,837	13.7%	2,708,160	14.3%
Y-o-Y	-		106.9%		142.2%		162.7%		96.5%		137.5%		123.2%	
Separator	1,133,322	21.3%	1,234,210	20.7%	1,433,404	20.3%	1,852,059	18.8%	2,194,245	17.1%	2,638,438	16.5%	3,148,842	16.7%
Y-o-Y	-		108.9%		116.1%		129.2%		118.5%		120.2%		119.3%	
Total	5,316,209	100.0%	5,961,267	100.0%	7,048,120	100.0%	9,877,449	100.0%	12,799,563	100.0%	16,024,903	100.0%	18,896,733	100.0%
Y-o-Y	-		112.1%		118.2%		140.1%		129.6%		125.2%		117.9%	

(Estimated by Yano Research Institute)



Notes:

1. The market size is based on shipment value at manufacturers.
2. The figures in this research are calculated on US-Dollar basis: For 2013, 1 USD to 97.8 yen, 1116.97 won, 6.16 RMB, or 0.75 EUR. For 2014, 1 USD to 105.9 yen, 1152.93 won, 6.14 RMB, or 0.75 EUR. For 2015, 1 USD to 121.0 yen, 1129.94 won, 6.23 RMB, or 0.90 EUR. For 2016 and beyond, 1 USD to 108.8 yen, 1207.70 won, 6.64 RMB, or 0.94 EUR.
3. Since the figures are rounded off, some rates within the table may partly be inconsistent.

■ **Table 2: Transition of Global Market Share of Four Major LiB Components by Country**

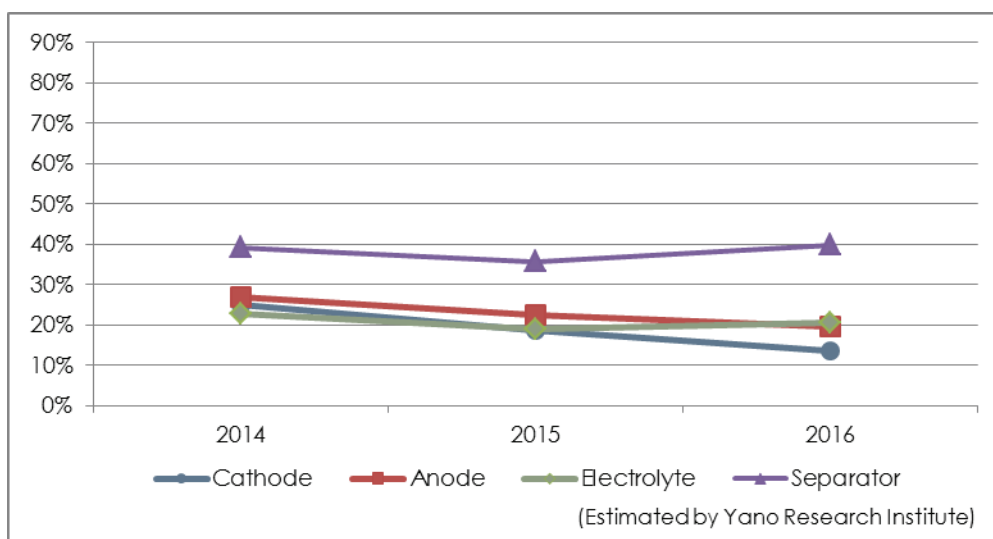
	Cathode			Anode			Electrolyte			Separator		
	2014	2015	2016	2014	2015	2016	2014	2015	2016	2014	2015	2016
China	53.3%	61.6%	67.7%	69.8%	74.8%	76.6%	70.5%	76.2%	75.0%	37.8%	45.5%	49.6%
Japan	25.0%	18.8%	13.6%	26.8%	22.4%	19.6%	22.7%	19.0%	20.6%	39.2%	35.8%	39.8%
South Korea	11.0%	9.0%	8.3%	1.9%	1.7%	3.0%	6.8%	4.8%	4.5%	11.9%	11.1%	10.5%
Others	10.7%	10.5%	10.3%	1.4%	1.1%	0.8%	-	-	-	11.0%	7.6%	-
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

(Estimated by Yano Research Institute)

Notes:

- The figures are based on the shipment volume at manufacturers.
- Since the figures are rounded off, some rates within the table may partly be inconsistent.

■ **Figure 2: Transition of Global Market Share of Four Major LiB Components Shipped in Japan**



(Estimated by Yano Research Institute)

Notes:

- The figures are based on the shipment volume at manufacturers.

■ **Table 3. Comparison of Production Capacity and Actual Demands of Four Major LiB Components**

(Unit: tons, thousand m³, %)

LiB Four Major Components	2015			2016			
	Production Capacity	Actual Demand	Operation Rate	Production Capacity	Actual Demand	Operation Rate	
Cathode (t)	284,920	188,248	66.1%	342,580	258,513	75.5%	
Anode (t)	243,220	104,132	42.8%	301,620	147,545	48.9%	
Electrolyte (t)	244,100	98,000	40.1%	261,600	123,540	47.2%	
Separator (1,000m ³)	2,728,000	1,445,470	53.0%	3,743,000	1,944,635	52.0%	
Average Operation Rate			50.5%	Average Operation Rate			55.9%

(Surveyed by Yano Research Institute)

Notes:

- The figures are based on the shipment volume at manufacturers.