Lithium-ion Battery Market: Cell & Components 2011

-Sample-

Chapter 1
Lithium-ion Battery Cell Market

1-1. Lithium-ion Battery Cell Market

LIB World Market Size Transition & Forecast (Value)

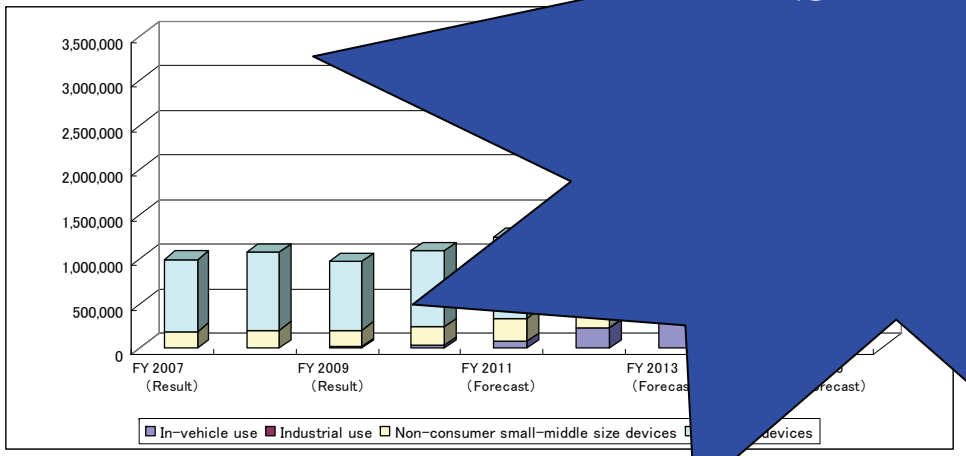
(Unit: Million yen)

Application	FY 2007 (Result)		FY 2008 (Result)		FY 2009 (Result)		FY 2010 (Estimate)		FY 2011 (Forecast)		FY 20 (Fo		FY 2013 (Forecast)		FY 2014 (Forecast)		FY 2015 (Forecast)	
	Amount	% Share	Amount	% Share	Amount	% Share	Amount	% Share	unt	% Share	Am		Amount	% Share	Amount	% Share	Amount	% Share
Portable devices	806,810	81.2%	868,908	81.0%	773,259	79.5%	852,613	77.	58	73.1%			995,358	52.8%	1,035,776	40.4%	1,075,730	35.2%
Year/year		—		107.7%		89.0%		110		106.9%				104.1%		104.1%		103.9%
Non-consumer small-middle size devices	186,798	18.8%	203,818	19.0	183,831	18.9%	215,893						305,394		325,603	12.7%	354,502	11.6%
Year/year		—		109.1%		90.2%										106.6%		108.9%
Industrial use	0	0.0%	0	0.0%		0.0%	140								97,424	3.8%	299,493	9.8%
Year/year		—		—										5.0%		304.0%		307.4%
In-vehicle use	0	0.0%	0	0.0%				02						29.3%	1,104,998	43.1%	1,326,326	43.4%
Year/year		—		—														120.0%
Total	993,608	100.0%	1,072,726	100.0%	9													100.0%
Year/year		—		108.0%														119.2%

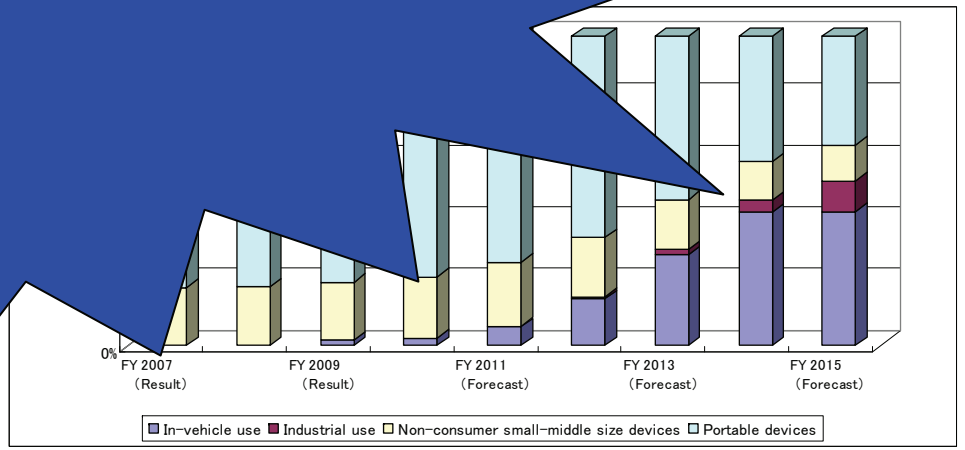
ed by Yano Research Institute)

Fig. 1. LIB World Market Size Transitio

Distribution by Application



(Est ted by Yano Research Institute)



(Estimated by Yano Research Institute)

The each application field is defined as below.

- Consumer portable devices: Portable devices such as mobile phones, note PCs, portable music players, digital cameras, digital video cameras, mobile game machines

- Non-consumer small to medium size devices: Power tools, E-bikes, Pedelecs (E-motor assist bicycle), medical and aerospace devices

- Industrial use: Smart-grid application (batteries installed together with wind and solar power generation or similar systems for achieving power supply stabilization by charging during the low power consumption time and discharging in peak power consumption), residential use (installed mainly together with a solar power generation system, and used as a residential rechargeable battery), industrial use (industrial equipment, large size vehicle, etc.), UPS (uninterrupted power supply for factories and telecommunication stations, etc)

- In-vehicle use: applications for passenger vehicles only, excluding large-size vehicles such as bus, construction vehicles, railroad vehicles, etc. that are defined as industrial applications

The market size in value in this report has been estimated based on the foreign exchange rates listed below. The exchange rate for fiscal 2010 and after, the exchange rate for fiscal 2010 has been used.

Country・Area	A currency unit	FY 2007	FY 2008	FY 2009	FY 2010～
Korea won	1won	0.1272yen	0.0965yen	0.073yen	0.073yen
China RMB	1RMB	15.32yen	14.654yen	13.905yen	12.36yen
Taiwan dollar	1NT$	3.57yen	3.29yen	2.85yen	2.62yen
US dollar	1$	117.84yen	103.46yen	93.57yen	84.5yen
Euro	1€	161.24yen	152.44yen	130.2yen	112yen

- The LIB world market size, in terms of monetary value, showed steady growth and accounted for 1,072.7 billion yen in 2008. However, due to the effects of the global recession, the market shrank in 2009 to 972.7 billion yen, equivalent to 90.7% of the size in the preceding year. The economy subsequently managed to turn around, and the demand for portable devices such as mobile phones and note PCs, which had been driving the market, began to prevail again. The market therefore started growing again, and to account for 1,094.9 billion yen for 2010.
- In 2010, it is expected that the demand for LIBs will emerge and increase, for the applications of rechargeable batteries and UPS applications. The market

- A look at the market size by application in 2009, portable devices such as mobile phones and other types of portable applications accounted for the remaining
- In 2010 and thereafter, the demand for LIB devices will grow. In 2015, the segment for portal devices is expected to share of 35.2% of the overall market. Instead, in-vehicle use will grow significantly and become the largest application category within the LIB market.
- Also, markets for industrial use, such as smart-grid applications and residential-use, will emerge. It is estimated that in 2015, industrial use will account for 9.8% of the LIB market.

Chapter 2
Lithium-ion Battery Cell Market: by application

2-1. Lithium-ion Battery Cell Market: For portable devices

Portable devices for Consumer LIB World Market Size Transition & Forecast (Value)

(Unit: Million yen)

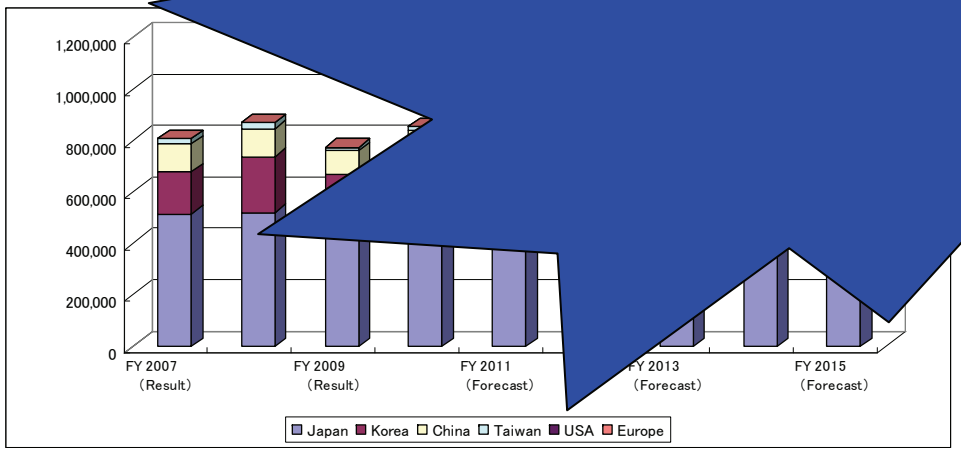
Country・Area	FY 2007 (Result)		FY 2008 (Result)		FY 2009 (Result)		FY 2010 (Estimate)		FY 2011 (Forecast)		FY 2012 (Forecast)		FY 2013 (Forecast)		FY 2014 (Forecast)		FY 2015 (Forecast)	
	Amount	% Share	Amount	% Share	Amount	% Share	Amount	% Share	Amount	% Share	Amount	% Share	Amount	% Share	Amount	% Share	Amount	% Share
Japan	515,551	63.9%	519,607	59.8%	476,327	61.6%	481,726	56.5%	474,062	52.0%	468,7	49.0%	447,911	45.0%	424,668	41.0%	419,535	39.0%
Year/year		—		100.8%		91.7%		101.1%		98.4%		98.9%		95.6%		94.8%		98.8%
Korea	162,976	20.2%	216,358	24.9%	193,315	25.0%	242,995	28.5%	268,939	29.5%		31.0%	328,468	33.0%	372,879	36.0%	365,748	34.0%
Year/year		—		132.8%		89.3%		5.7%		110		110.3%		110.8%		113.5%		98.1%
China	108,113	13.4%	111,220	12.8%	92,018	11.9%	113,3		141,307			16.0%	169,211	17.0%	196,797	19.0%	236,661	22.0%
Year/year		—		102.9%		82.7%						108.3%		11		116.3%		120.3%
Taiwan	20,170	2.5%	2	2.5%	11,599	1.5%	1					4.0%	49,768	%	41,431	4.0%	53,786	5.0%
Year/year		—				53.4%						139.9%		0.1%		83.2%		129.8%
USA	0	0.0%			0	0.0%					0			0.0%	0	0.0%	0	0.0%
Year/year		—				—								—		—		—
Europe	0	0.0%	0											0.0%	0	0.0%	0	0.0%
Year/year		—																—
Total	806,810	100.0%	868,908														1,075,730	100.0%
Year/year																	104.1%	103.9%

(Estimated by Yano Research Institute)

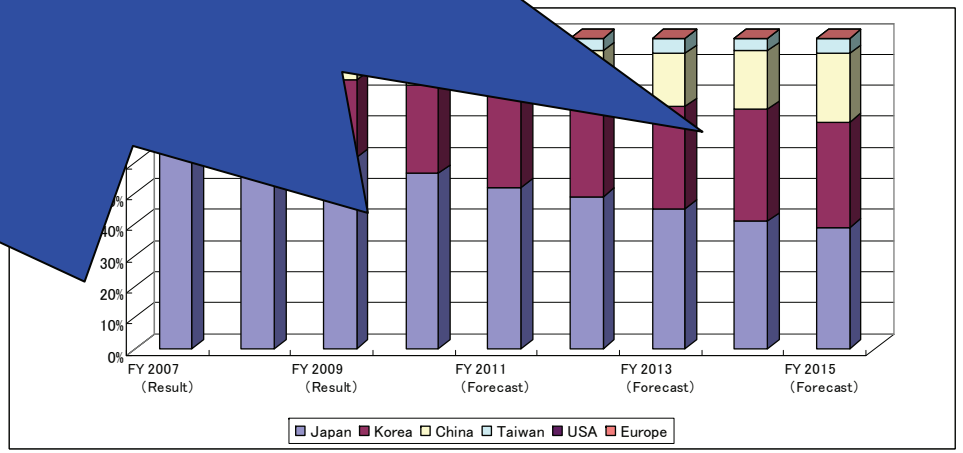
Portable devices for Consumer LIB Wor

ket Size Transition/Forecast

Country and Area



(Estimated by Yano Research Institute)



(Estimated by Yano Research Institute)

- Since 2010, the demand has been recovering for portable devices su[illegible]as mobile phones and note PCs, which had been driving the market. In particular, smart-pho[illegible]s have em[illegible]nd formed a new market. LIBs used on smart-phones are required to offer higher capa[illegible]e. [illegible]ttery oper[illegible]ion, and the demand for higher-value added LIB is beginni[illegible]e observe[illegible]
- The demand is shifting back to tra[illegible]which got popular once, which may be attributable to the fact that th[illegible]o music files in the recent years. Also,[illegible]ns.
- Mobile phones and note [illegible]he shipments of such devices in those countries are expect[illegible]
- Demand for new types of [illegible]ent years. Needs exist for higher-capacity [illegible]s applications and enhancing portability. While low [illegible]e use of high-capacity LIB will further enhance the batt[illegible]
- Under these circumstances[illegible]bl[illegible]s is expected to grow steadily in terms of volume. Yet as the [illegible]to be demanding for LIB, it is difficult to expect the market to grow substantially in [illegible]va[illegible]

- LIB manufacturers for consumer ap[illegible]ications operate only in three countries; Japan, Korea and China. This is as LIB manufacturers in Europe and the U.S. adopt the policy of specializing in LIB for medium and large-size applications without participating in the consumer segment already under saturation.
- In 2009, Japan maintained 61.7% market share. Meanwhile, China, with its high price competitiveness, is expected to gradually expand its market share from 11.9% in 2009 to 22.0% in 2015 and further to 31.0% in 2020. Korea is also increasing its presence in the market by aggressively expanding the production capacity for the products in volume zones. Korea is estimated to increase its market share from 25.0% in 2009 to 34.0% in 2015.

Chapter 3
Lithium-ion Battery Cell Market: by countries/areas

3-1. Lithium-ion Battery Cell Market: by countries/areas

Country / Area distinction LIB World Market Size Transition & Forecast (Value)

(Unit: Million yen)

Country・Area	FY 2007 (Result)		FY 2008 (Result)		FY 2009 (Result)		FY 2010 (Estimate)		FY 2011 (Forecast)		FY 2012 (Forecast)		FY 2013 (Forecast)		FY 2014 (Forecast)		FY 2015 (Forecast)	
	Amount	% Share	Amount	% Share	Amount	% Share	Amount	% Share	Amount	% Share		% Share	Amount	% Share	Amount	% Share	Amount	% Share
Japan	636,222	64.0%	653,923	61.0%	603,151	62.0%	627,1	57.3%	667,882	5		50.6%	872,797	46.3%	1,089,205	42.5%	1,211,554	39.6%
Year/year		—		102.8%		92.2%		104.0%				111.4%		117.3%		124.8%		111.2%
Korea	190,810	19.2%	248,561	23.2%	226,015	23.2%	28		317,834			25.3%	460,400	.4%	592,284	23.1%	622,794	20.4%
Year/year		—		130.3%		90.9%						117.2%		123.6%		128.6%		105.2%
China	120,068	12.1%	11	1.1%	100,560	10.3%						13.5%		15.0%	412,323	16.1%	522,596	17.1%
Year/year		—				84.1%						12		142.3%		145.8%		126.7%
Taiwan	31,191	3.1%	31,3			1.7%							5	3.6%	62,123	2.4%	92,826	3.0%
Year/year		—				9								126.4%		90.5%		149.4%
USA	11,955	1.2%	15,083														39	13.2%
Year/year		—																152.0%
Europe	3,362	0.3%														5.6%	203,340	6.7%
Year/y																209.7%		142.6%
Total														100.0%	2,563,801	100.0%	3,056,051	100.0%
Year/year														128.1%		136.0%		119.2%

(Estimated by Yano Research Institute)

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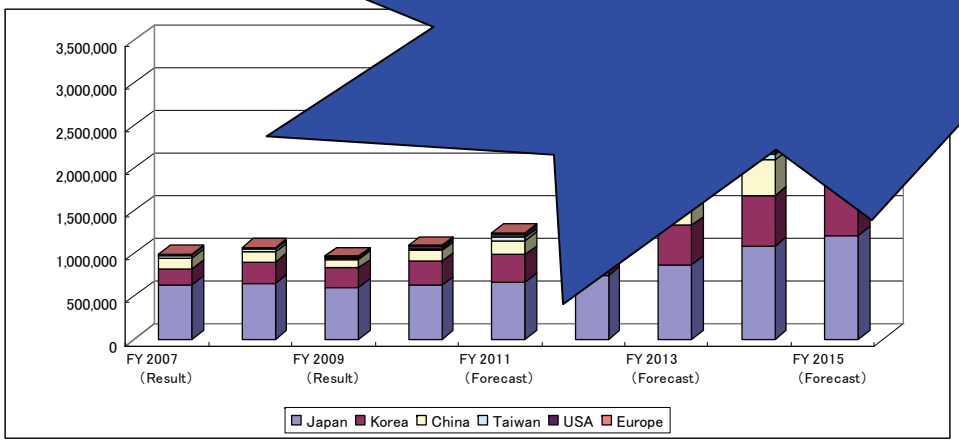
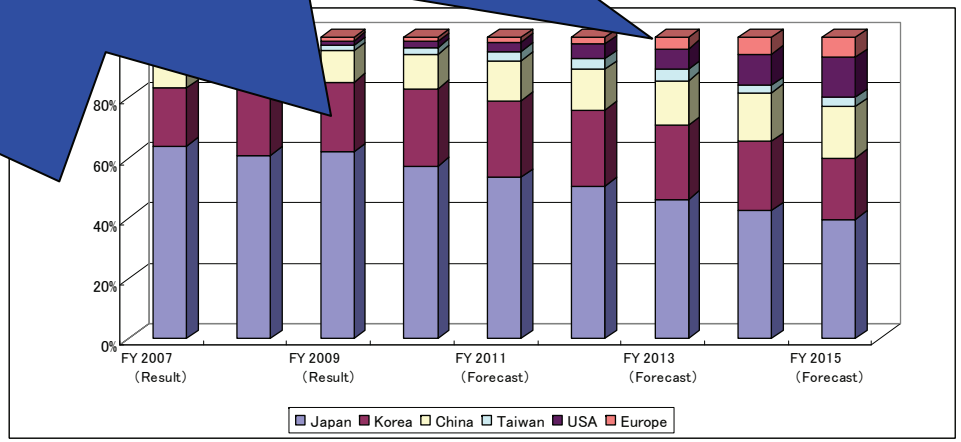
Country / Area distri

t Size Transition/Forecast (Value)



(Estimated by Yano Research Institute)



(Estimated by Yano Research Institute)

3-3. Lithium-ion Battery Cell Market: Korea

- In Korea, two major players, Samsung SDI and LG Chem, have made aggressive capital investments in their production facilities and been steadily expanding the shipments of LIB cells for consumer applications, further increasing their presence in the market. In recent years, SK Energy has newly entered into the market, while small-to-medium-sized LIB manufacturers such as Kokam and EnerTec have also appeared.
- While the Korean LIB application market is small in size, it serves large corporate groups such as Samsung, LG and Hyundai, through which products are sold worldwide. As such, the Korean LIB market resides in an environment with growth potential.
- Korea is also allocating its efforts to electri wered biles and other medium and large-size applications. Manufacturers h been pursui siness with foreign automotive-related manufacturers. Samsung SDI ha estab obiles with BOSCH of Germany. LG Chem established a LIB plan subsidiary in the U.S. SK Energy entered the LIB mer, they have attained the role of supplying Hyundai Motor Company.

- There is a limited numbe that the shares of Korean manufacturers in th leanwhile, given the strong price competitiveness, counting for a major portion of the market.

- Korea ranks No. 2 in f LIB ce However, the country has weaknesses in its component and material te ite d ndent on imports. Focused investment in research and development for components a erials required to achieve the domestic production, and to secure the core technologies for the next eration. The country has formulated a plan to become a technologically advanced nation by means of concentrating efforts on the research and development of positive and negative electrode materials that may impact greatly on medium and large-size batteries in terms of safety, price and service life.
- In terms of applications, Korea is exerting efforts aimed at quickly securing the necessary technologies for medium and large-size LIB cells for use in green cars, green homes and for the storage of renewable power supplies, which are expected to grow in the future.

Chapter 4
Lithium-ion Battery Cell Market: by manufacturers

4-1. Lithium-ion Battery Cell Market: Manufacturers share

LIB World Market: Share of the Manufacturers (in Value)

(Unit: Million yen)

Manufacturers	FY 2007(Result)		FY 2008(Result)		FY [illegible]esult)		FY 2010(Estimate)	
	Amount	% share	Amount	[illegible]are	A[illegible]	% share	Amount	% share
SANYO	260,000	26.2%	270,000	[illegible]	[illegible]	25.7%	260,000	23.7%
Sony	200,000	[illegible]	210,00[illegible]	[illegible]	[illegible]	[illegible]	220,000	20.1%
Samsung SDI	125,400	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	167,900	15.3%
LG Chemical	79,400	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]2.0%
Panasonic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	9.0%
Hitachi Maxell	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	30,000	2.7%
ATL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	30,000	2.7%
Lishen	19,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible],700	2.3%
BYD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	24,000	2.2%
BAK	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	20,000	1.8%
E-One Moli	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	18,340	1.7%
GS Yuasa	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.7%	[illegible]000	1.4%
EnerDel	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.4%	10,000	0.9%
others	[illegible]	[illegible]	[illegible]	[illegible]	36,262	3.7%	44,607	4.1%
Total	995,[illegible]	[illegible]	[illegible]	10[illegible]	972,658	100.0%	1,094,947	100.0%
Year/year	[illegible]	[illegible]	[illegible]	108.0%	[illegible]	90.7%	[illegible]	112.6%

(Estimated by Yano Research Institute)

Chapter 5
Lithium-ion Battery Component Market

5-1. Lithium-ion Battery Component Market

LIB Major 4 Components: World Market Size Transition (FY 2008(Result)- 2012(Forec n Value)

(Unit: Million yen)

	FY 2008(Result)		FY 2009(Result)		2010(Estimate		1(Forecast)		FY 2012(Forecast)	
		% share		% share		%		% share		% share
Cathode	157,710	5	153,042	50.6		900	4		239,180	46.0%
Year/year	–		97.0%			114.9			112.9%	

LIB Major 4 Components: World ne)

	FY 2008(Result)									
										% share
Cathode(t)									84,140	–
Year/year									120.1%	
Anode(t)	15,78								45,666	–
Year/year	–								133.8%	
Electrolyte(t)									47,000	–
Year/year									126.0%	
Separator(㎡)									700,000	–
Year/year									140.0%	

stimated by Yano Research Institute)

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Chapter 6
Lithium-ion Battery Cathode Market

6-1. Lithium-ion Battery Component Market: Cathode (Overall)

LIB Cathode Materials: World Market Size Transition by Material (2008/Result – 2012/Forecast in Volume)

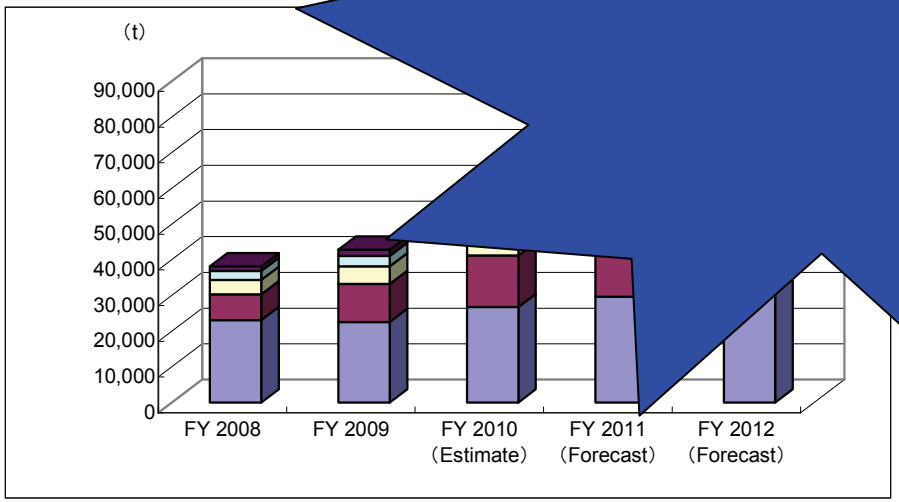
(Unit: ton)

	FY 2008(Result)		FY 2009(Result)		FY 2010(Estimate)		2011(Forecast)		FY 2012(Forecast)	
		% share		% share		% share		% share		% share
Lithium cobalt oxide (LCO)	23,134	60.5%	22,640	5	26,808		29,700	42.9%	30,900	37.2%
Year/year	–		97.9%		118.4%		110.8%		104.0%	
Ternary cathode material (NCM)	7,222	18.9%	10,652		14,442		17,700	25.6%	24,100	29.0%
Year/year			147.5%				122.6%		136.2%	
Lithium manganate (LMO)	4,029		4,909				14,00	2%	17,800	21.4%
Year/year	–		121.8						127.1%	
Lithium nickel oxide (NCA)	2,505							6.8%	6,020	7.2%
Year/year	–									
Lithium iron phosphate (LFP)	1,351									5.2%
Year/									138.5%	
Total								%	83,140	100.0%
Year/year									120.1%	

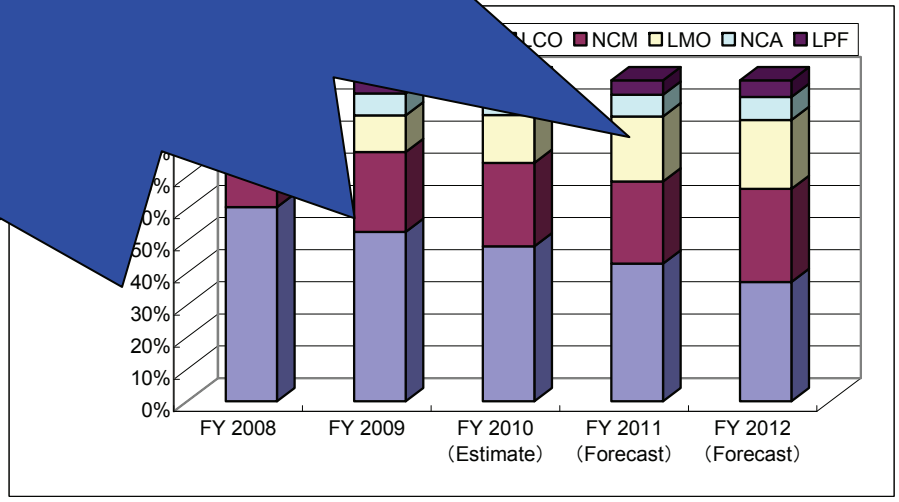
o Research Institute)

LIB Cathode Materials: World Market Siz
(2008/Result – 201

istribution by Material
recast in Volume)



(Estimated by Yano Research Institute)



(Estimated by Yano Research Institute)

- The shipment of LCO which is primarily for consumer portable devices decreased year-on-year in fiscal 2009 due to the effects of the Lehman Shock of the previous year. However, the shipment of the other cathode materials has increased. Consequently, the overall cathode material market has increased from the preceding year. Shipments for all cathode materials have been on the increase during fiscal 2010. In particular, LMO has been showing higher growth than any other material, supported by the start of full-fledged operation of the EV market. It accounts for 168.2% of the preceding year.
- The overall market is projected to continue growing at a pace of % year-on-year during the fiscal years of 2011 and 2012. The increase in shipment for med and lar applications, primarily for in-vehicle use, will drive the overall market. While the shipm of L ncrease mpared to the previous year, supported by the introduction of pplicatio es. ce of growth is expected to slow down.
- Historical changes in the materia rs are more quickly shifting away from ceds for NCM and LMO as alternatives to LCO is s is also increasing. NCA shows no considerable growth fo ed formulation for in-vehicle use is driving the market size applications is expected to increase in the in or after fiscal 2013 when the full-blown applicatio
- In terms of value, the ma , although it s estimated to shift again towards growth in and e of t shrinkage in fiscal 2009 was the price factors of LCO. A ddenly in fiscal 2008, the market prices regained stability in fiscal 2009 and the av ice CO had been restored to the previous level.
- Looking at the market by materi e price of LCO which has excellent cost performance, is expected to be reduced when mass-production f EV fully rolls out. Thus, the shipment in value may not grow, not so much as the growth in volume. Foreign manufacturers of cathode materials are expected to increase their strengths in LCO and NCM business with their advantage of cost competitiveness. As a result, the growth in value is likely to be smaller than the increase in volume.

World LIB Cathode Materials Market Size & Share Transition by Manufacturer
(FY 2008/Result to FY2010/Estimate in Volume)

(Unit: ton)

	FY 2008(Result)		FY 2009(Result)		FY 2010(Estimate)	
		% share		% share		% share
NICHIA	7,000	18.3%	6,0	14.0%	700	12.1%
Year/year	–				111.7%	
UMICORE	5,500	14.4%	5,(	1	700	.3%
Year/year	–				114.0	
Hunan shanshan	2,380	%	3		,20	9.4%
Year/year	–					
L&F	1,300					9.0%
Year/year	–					
CITIC GUOAN	1,850					
Year/year						
SANTOKU						%
Year/year						
LG Chem(In-house)						4.2%
Year/year						
AGC SEIMI CHEMICAL	2,(					%
Year/year						
TODA KOGYO						3.9%
Year/year						
Nippon Denko						3.6%
Year/year						
Panasonic Energy(In-house)					90	%
Year/year					100.0%	
NIPPON CHEMICAL					370	2.5%
Year/year					115.1%	
others				.3%	25	27.8%
Year/year					131.8%	
Total	30,2			0.0%	55,545	100.0%
Year/year	–		112.2%		129.5%	

(Estimated by Yano Research Institute)

World LIB Cathode Materials Marke & Share Transition by Ma ufacturer
(FY 2008/Result to F 010/Estimate in Value)

(Unit: Million yen)

	FY 2008(Result)		2009(Result		Y 2010(Estimate)	
		% share		% s		% share
NICHIA	34,100	21.6%			26,140	14.2%
Year/year	–				10	
UMICORE	18	11.8%			16,(	9.2%
Year/year						%
Hunan shanshan	7,	0%				7.9%
Year/year						
AGC SEIMI CHEMICAL	13,1					
Year/year						
SANTOKU						%
Year/year						
L&F						5.3%
Year/year						
CITIC GUOAN						4.8%
Year/year						
TODA KOGYO						4.7%
Year/year					7%	
Panasonic Energy						4.4%
Year/						
LG Chem(In-house)						3.4%
Year/year						
NIPPON CHEMICAL					5,000	7%
Year/year					120.8%	
Tanaka Chemical				2.	4,000	2.2%
Year/year					100.0%	
others			39,	25.7%	54,164	29.4%
Year/year			1	%	137.6%	
Total	157	100.0	153,042	100.0%	184,493	100.0%
Year/year			97.0%		120.6%	

(Estimated by Yano Research Institute)

6-3. Lithium-ion Battery Component Market: NCM

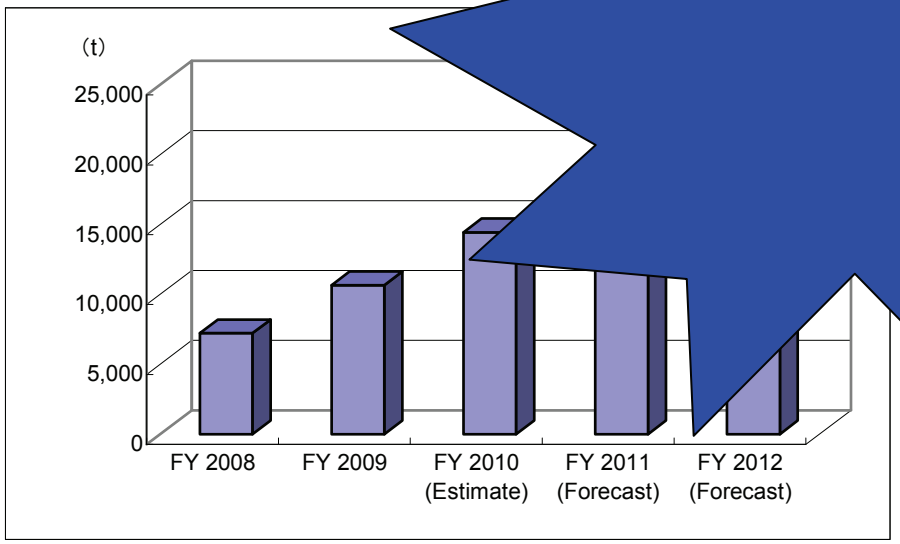
NCM World Market Size Transition (2008/Re 2012/F Volume and in Value)

(Unit:t/Million yen)

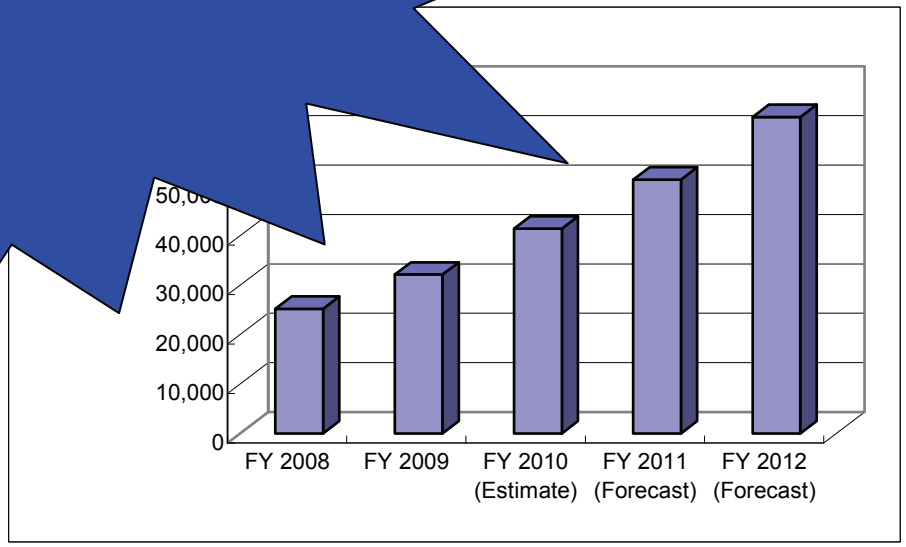
Ternary Cathode Material (NCM)	FY 2008	Year/	FY 200	Y	e)	1(Forecast)	Year/year	FY 2012(Forecast)	Year/year
Shipment volume	7,222							64,100	136.2%
Value	25,288							64,100	124.6%

d by Yano Research Institute)

NCM World Market Size Transition (2008/Result – 20 Result – 2012/Forecast in Value)



(Estimated by Yano Research Institute)



(Estimated by Yano Research Institute)

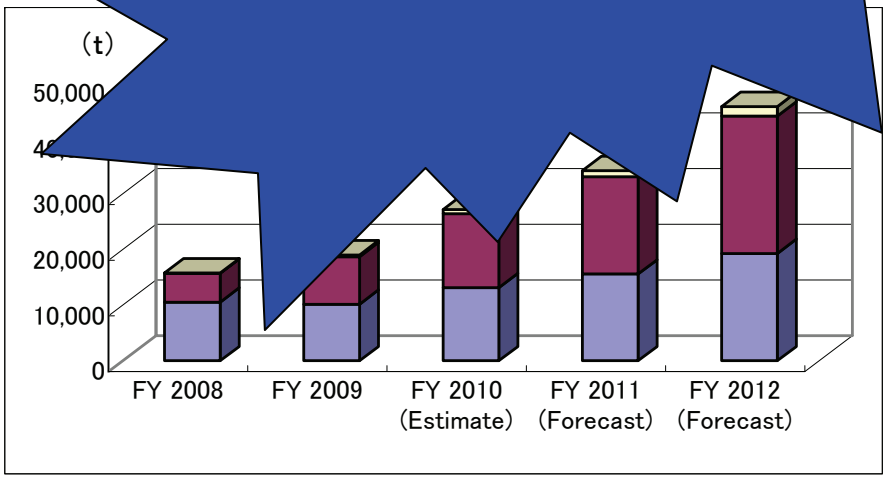
Chapter 7
Lithium-ion Battery Anode Market

7-1. Lithium-ion Battery Component Market: Anode (Overall)

LIB Anode Material World Market Size Transition(FY 2008 to 2[illegible]ecast in Volume)

Volume (t)		FY 2008	% share	FY 2009	% share	F[illegible](Estim[illegible]	% sh[illegible]	[illegible]011(Forecast)	% sh[illegible]	FY 2012(Forecast)	% share
Graphite -base	Artificial graphite	10,559	66.9	[illegible]	53.4%	[illegible]	[illegible]	[illegible],572	[illegible].6%	19,255	42.2%
	Year/year	–		[illegible]		[illegible]		[illegible]		123.7%	
	Natural graphite	5,149	32.6%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]4.1%
	Year/year	–		[illegible]		[illegible]		[illegible]		[illegible].2%	
others		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible],701	3.7%
	Year/year	[illegible]		[illegible]		[illegible]		[illegible]		162.1%	
Total		15,7[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]%	45,666	100.0%
	Year/year	[illegible]		[illegible]		[illegible]		[illegible]		133.8%	

[illegible]no Research Institute)



(Source: Estimated by Yano Research Institute)

Production Capacity & Production Increase Plan of Manufacturers

Anode material manufacturer	Production site	Type of anode material	Production capacity
Hitachi Chemical	Yamazaki Works	Artificia…te/Nat…	Consumer products: 600-650t/month ＝7,200～8,400t/year ＊ Both artificial and natural graphite anode materials are used for consumer products.
			In-vehicle p…ducts: 150-200t/month (October 2010) *Only na…al graphite anode material is used for all the in-vehicle produ…
			…ction capacity will be increased to about 10,000t/month in …011.
			…/month (2010)
JFE Chemical	Kurashiki Plant/Kasaoka Plant		…010)
	Chiba Plant(Chiba, Chiba)		
Nippon Carbon	Toyama Plant		… 3,600t/year (2010) ⇒ Plan for further enhancement, …ot yet decided
MITSUBISHI CHEMICAL	Sakaide Plant(Sakaide, Kag…		…000t/year → 5,000t/year (2010) …r in May 2011 → 35,000t/year in 2015 (11.7 times)
	China (New facilities for the m… spheroidal graphite → A… the production…		…(May 2010) for spheroidal graphite …year (Sep 2010) for spheroidal graphite and anode material …tion
			…r
CHUO DENKI KOGYO	Osaka Plant (Existin…		…apacity of 100t/month (2010)
	Myoko Plant (Enhancemen…		→ 400t… …(2015)
SHOWA DENKO	Omachi Plant		1,000t/year
			→ 3,000t/year (2012: Already)
KUREHA	Iwaki Factory	Ha… …bon	600t/year (2010)
			→ 1,600t/year (Commercial production from Jan 2012)
	U.S.A.		→ 1,000t/year (Start in 2013)
MITSUI KINZOKU	Japan	Metal silicon base	Not yet determined
Nippon Power Graphite	Kitakyushu Plant	Natural graphite	250t/year (2010) → 1,000t/year (2011)
			→ 2,000t/year (2011 & later) → Finally to 5,000t/year
Titan Kogyo	-	Lithium titanate	Not disclosed
ISHIHARA SANGYO	Yokkaichi Plant	Lithium titanate	20 to 1.000t/year → Further enhancement plan
OSAKA GAS CHEMICALS	Carbon Fiber Materials Production Center	Artificial graphite	2,000t/year (Up to 2008)

(Source: Prepared by Yano Reserch Institute based on the various literatures and interviews)

Chapter 8
Lithium-ion Battery Electrolyte Solution/Electrolyte Market

LIB Electrolyte Solution World Market: Market Share Transition by countries
(FY 2008 to 2010/Estimate in Volume)

(Unit: 1000㎡)

		FY 2008		FY 2009		FY 2010(Estimate)	
			% share		% share		% share
Japan		11,000	58.8%	10,500	46.7%	12,000	40.4%
	Year/year	—		9		114.3%	
Korea		1,500	8	2	12.0%	,710	15.9%
	Year/year	—				174.4%	
China		00	3		41	13,000	43.8%
	Year/year					139.8%	
Total							0%
	Year/year						

ch Institute)

LIB Electrolyte Sol countries

(Unit: Million yen)

						010(Estimate)	
					are		% share
Japan					57.5%	27,000	49.4%
	Ye			89.2%		108.0%	
Korea			%	,000	9.2%	7,000	12.8%
	Year/year			200.0%		175.0%	
China		0	4.4%	14,484	33.3%	20,650	37.8%
	Year/year	—		149.3%		142.6%	
Total		69,730	100.0%	43,484	100.0%	54,650	100.0%
	Year/year	–		109.4%		125.7%	

(Source: Estimated by Yano Research Institute)

- In the electrolyte solution market, shares of Japanese manufactures are on the decline. In terms of shipping volume, they accounted for 11,000 tons or 58.8% in fiscal 2008 and 12,000 tons or 40.4% in fiscal 2010.
- On the other hand, Korean and Chinese manufacturers are increasing their shares due to the strength of LIB manufacturers in their countries. From fiscal 2008 through fiscal 2010, Korean manufacturers increased their shares from 8.0% to 15.9% while Chinese manufacturers expanded from 33.2% to 43.8%.
- These trends will continue for the time being. However, once the medium and large-size LIB market has been launched (for automotive applications etc.), manufacturers and countries that quickly have established their positioning in the market will expand their shares quickly and considerably thereafter.

8-1-2. Lithium-ion Battery Component Market: Electrolyte

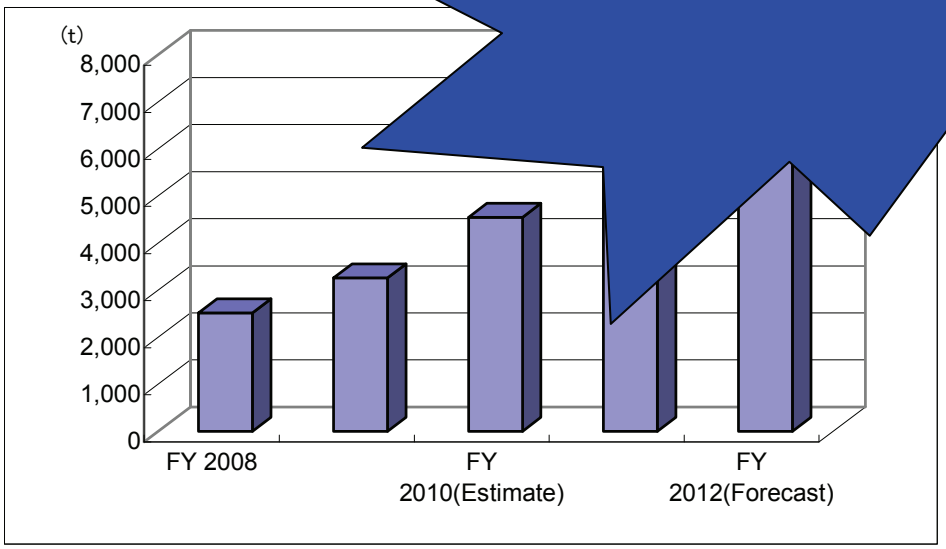
LIB Electrolyte World Market Size ition (FY 2 2/Forecast)

(Unit:t, Million yen)

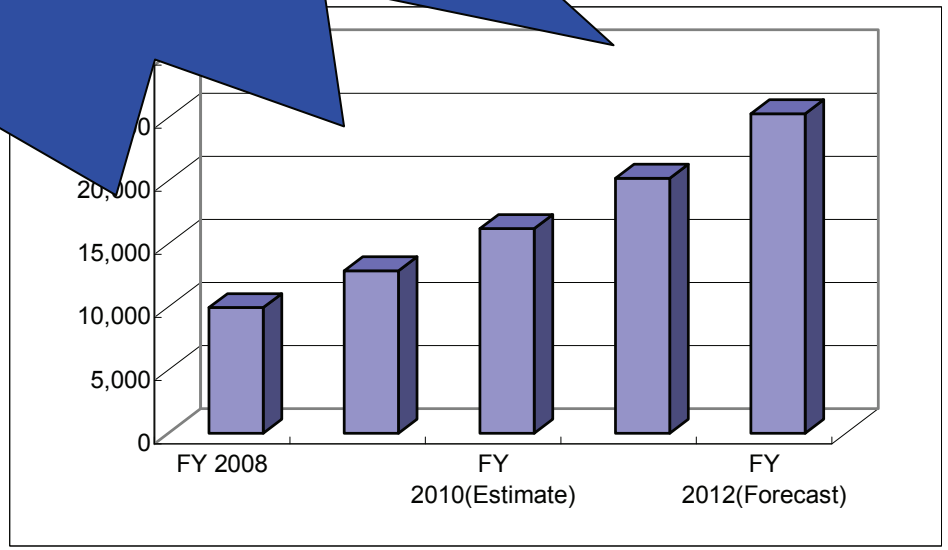
	FY 2008		FY 2009		FY 2011(st)		FY 2012(Forecast)	
		Year/		Yea		r/year		Year/year
In Volume	2,520					125.2%	7,200	126.3%
In Value	10,819							125.2%

esearch Institute)

LIB Electro arket Size Transition
(FY 2008 to 2 cast in Value)



(Source: Estimated by Yano Research Institute)



(Source: Estimated by Yano Research Institute)

Chapter 9
Lithium-ion Battery Separator Market

9-1. Lithium-ion Battery Component Market: Separator

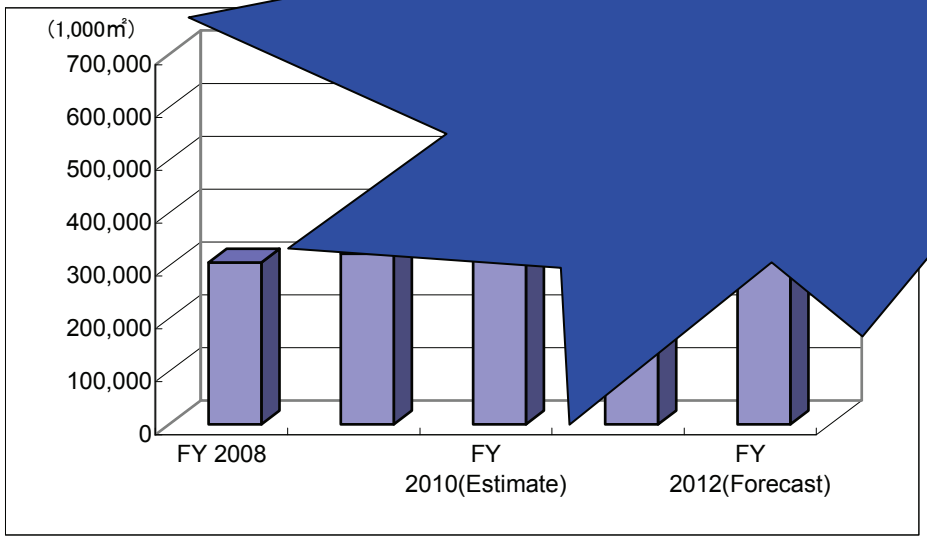
LIB Separator World Market Size ition (FY 2 o 2012/Forecast)

(Unit: 1,000㎡, Million yen)

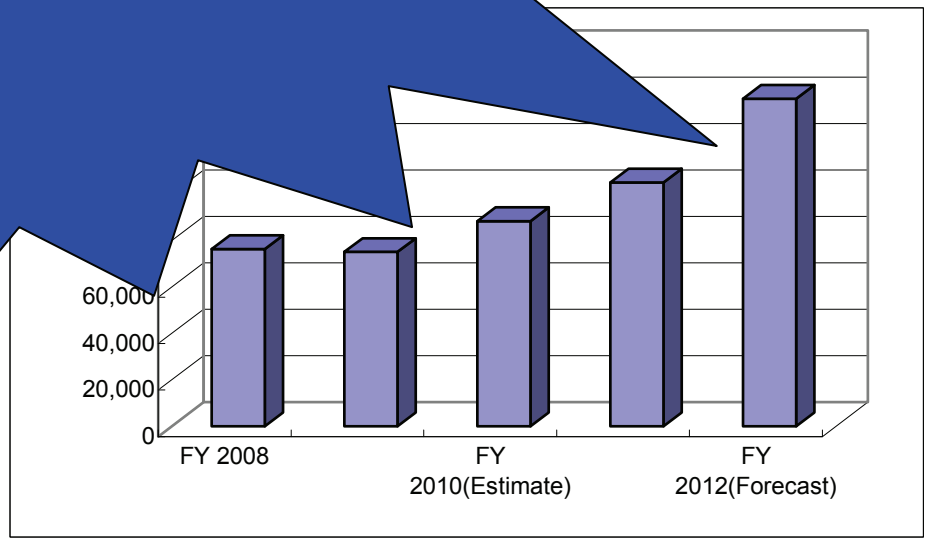
	F	FY 2	FY 20 ast)	FY 2012(Forecast)
			ar/year	Year/year
In Volume	306,500			
In Value	76,311			134.3%

Research Institute)

LIB Separator World M ansition
(FY 2008/Result orecast in Value)



(Source: Estimated by Yano Research Institute)



(Source: Estimated by Yano Research Institute)

- In terms of thermal resistance, cellulose-based and non-woven fabric based new separators have been commercialized in the market. Cellulose-based separators offer high thermal resistance with no substantial thermal shrinkage, and hence achieve better combination with electrolyte solutions. Due to their low electrical resistance, these separators do not suppress the movements of lithium ions and achieve lower energy loss. Non-woven fabric is formed by processing polyolefin into extremely thin fabric of about several μm, which is then coated with non-organic particles of several hundred nm to 1 μm in order to add thermal resistance. Even when the polyolefin melts away, the non-organic substance rema and prevents electrodes from contacting each other.
- In both types of separators, an issue is the insuffi tren lose-based separators have low resistance against stretching, while non-wo fabric-base due e thin fiber of the fabric and the larger rate of porosity. Hence, th so s (they are suitable for layer-built cells). While thinner film is requ strength issue. If fibers are stacked in hig ed.
- It is hoped that the he applications, then gradually accumulate their successfu lead to the cost reduction.
- Separator is no acity and output of LIB cell, and does not have the e mponent to be determined. In order to achieve the resp he most ble separator is selected in terms of porosity ratio, t an gth.
- When a change is ma dingly for each LIB cell manufacturer. However, for reasons such as past performa abi nd fea bility in production, suppliers are rarely changed. Separator manufacturers are expe o provide stable supply.
- Therefore, the key elements in e recent years have been: “price”, “continuous stable supply”, and “past performance (reliability)”.

- As of fiscal 2010, the prices of wet-type separators range from 200 to 300 yen/m^2 while the prices of dry-type separators have been lowered to about 200 yen/m^2.
- Korean and Chinese separators are priced lower. In China, the dry type is mainly used and even a high-grade separator costs around 150 yen /m^2. In Korea, many manufacturers are focusing on the wet type, and although their products do not differ greatly from Japanese products, prices are about 20% lower, partly due to the effects of strong yen.

Lithium-ion Battery Market: Cell & Components 2011

Price: ¥315,000 (JPY) (Incl. Japanese consumption tax)
(Report price: ¥300,000 + Consumption tax: ¥15,000)

Published in March 2011
Publisher: Yano Research Institute Ltd.
Researched and Edited by Chemical Materials & Electronics and Optics Research Department
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