

Financial Results for 1Q (Three months) of FYE 3/2020

Securities code: 4109

1. Consolidated Financial Results for 1Q (Three months) of FYE 3/2020

- Financial Summary
- Breakdown of Non-Operating Profit and Loss/Extraordinary Profit and Loss
- Quarterly Operating Profit
- Sales Revenue and Operating Profit by Business
- Transitions in Trade Statistics Value of Anhydrous Hydrofluoric Acid
- Balance Sheet

<Financial Summary>

(In millions of yen)	1Q(Three months) of FYE 3/2019	1Q(Three months) of FYE 3/2020	Increase/ Decrease	Percentage Increase/ Decrease
Sales Revenue	10,134	9,733	-401	-4.0
Gross Profit	2,048	1,986	-61	-3.0
Operating Profit	949	847	-102	-10.8
Ordinary Profit	1,029	754	-275	-26.7
Quarterly Profit Attributable to Owners of Parent	581	466	-114	-19.7
Earnings Per Share (yen)	45.03	36.15	-8.88	-19.7

Capital Expenditures	646	739	93	14.5
Depreciation & Amortization	784	812	28	3.6
Research & Development Expenses	359	399	40	11.2

<Breakdown of Non-Operating Profit and Loss/Extraordinary Profit and Loss>

■ Non-operating Profit and Loss

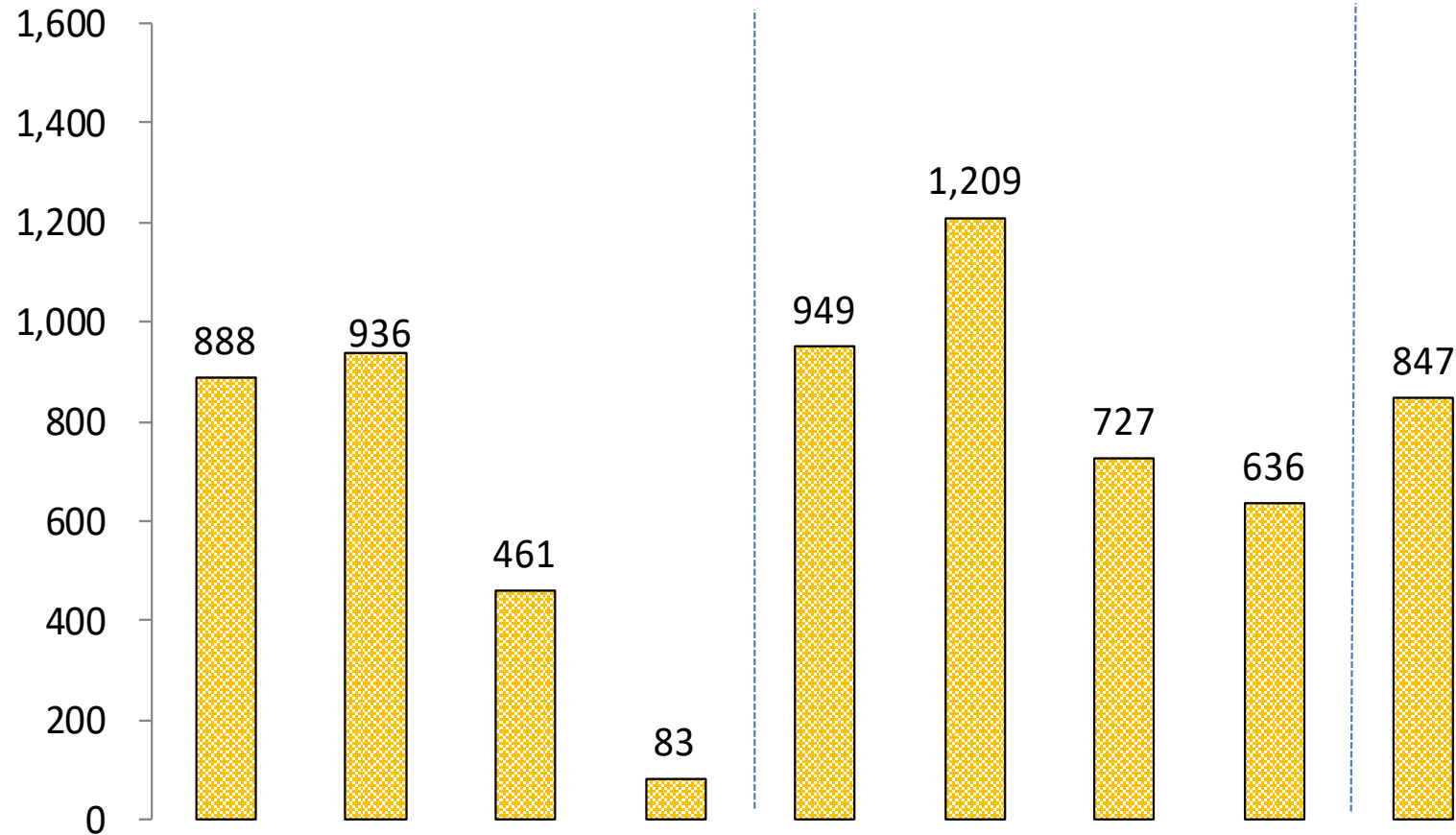
(In millions of yen)	1Q(Three months) of FYE 3/2019	1Q(Three months) of FYE 3/2020
Non-Operating Profit	314	42
Interest income	0	1
Dividend income	0	0
Gain on valuation of derivatives	293	-
Share of profit of entities accounted for using the equity method	-	15
Other	19	23
Non-Operating Expenses	234	135
Interest expenses	9	10
Foreign exchange losses	88	82
Loss on valuation of derivatives	-	29
Share of loss of entities accounted for using the equity method	133	-
Other	3	13

■ Extraordinary Profit and Loss

(In millions of yen)	1Q(Three months) of FYE 3/2019	1Q(Three months) of FYE 3/2020
Extraordinary Profit	6	15
Gain on sales of non-current assets	6	15
Extraordinary Losses	1	50
Loss on abandonment of non-current assets	1	50

<Quarterly Operating Profit>

(million yen)

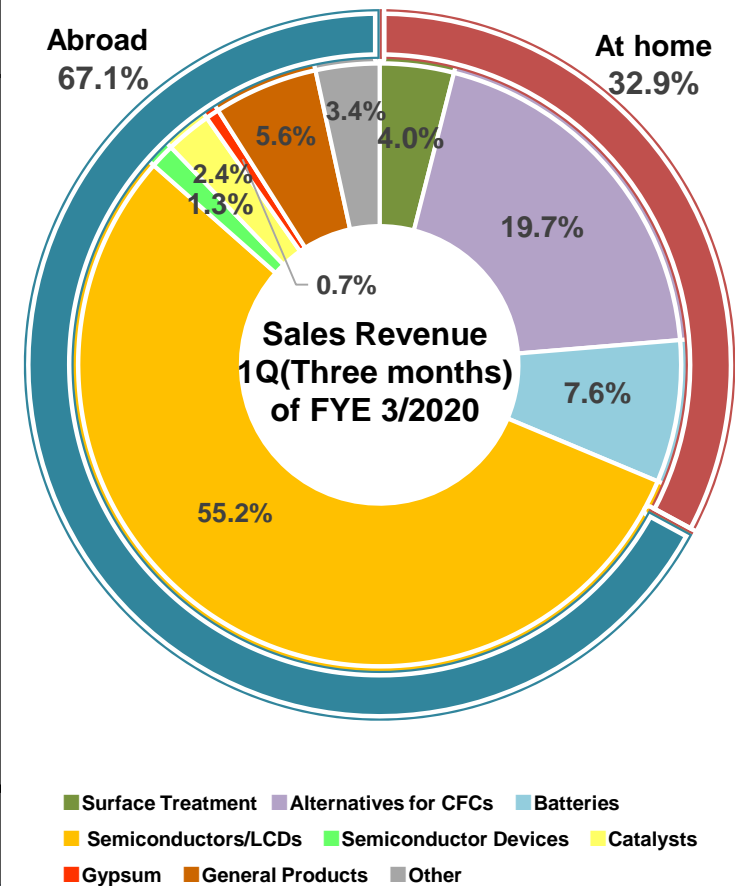


(In millions of yen)	FYE 3/2018				FYE 3/2019				FYE 3/2020			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Sales Revenue	8,159	8,561	8,314	8,587	10,134	9,323	9,275	9,649	9,733			
Operating Profit	888	936	461	83	949	1,209	727	636	847			
Operating Profit Margin (%)	10.9%	10.9%	5.5%	1.0%	9.4%	13.0%	7.8%	6.6%	8.7%			

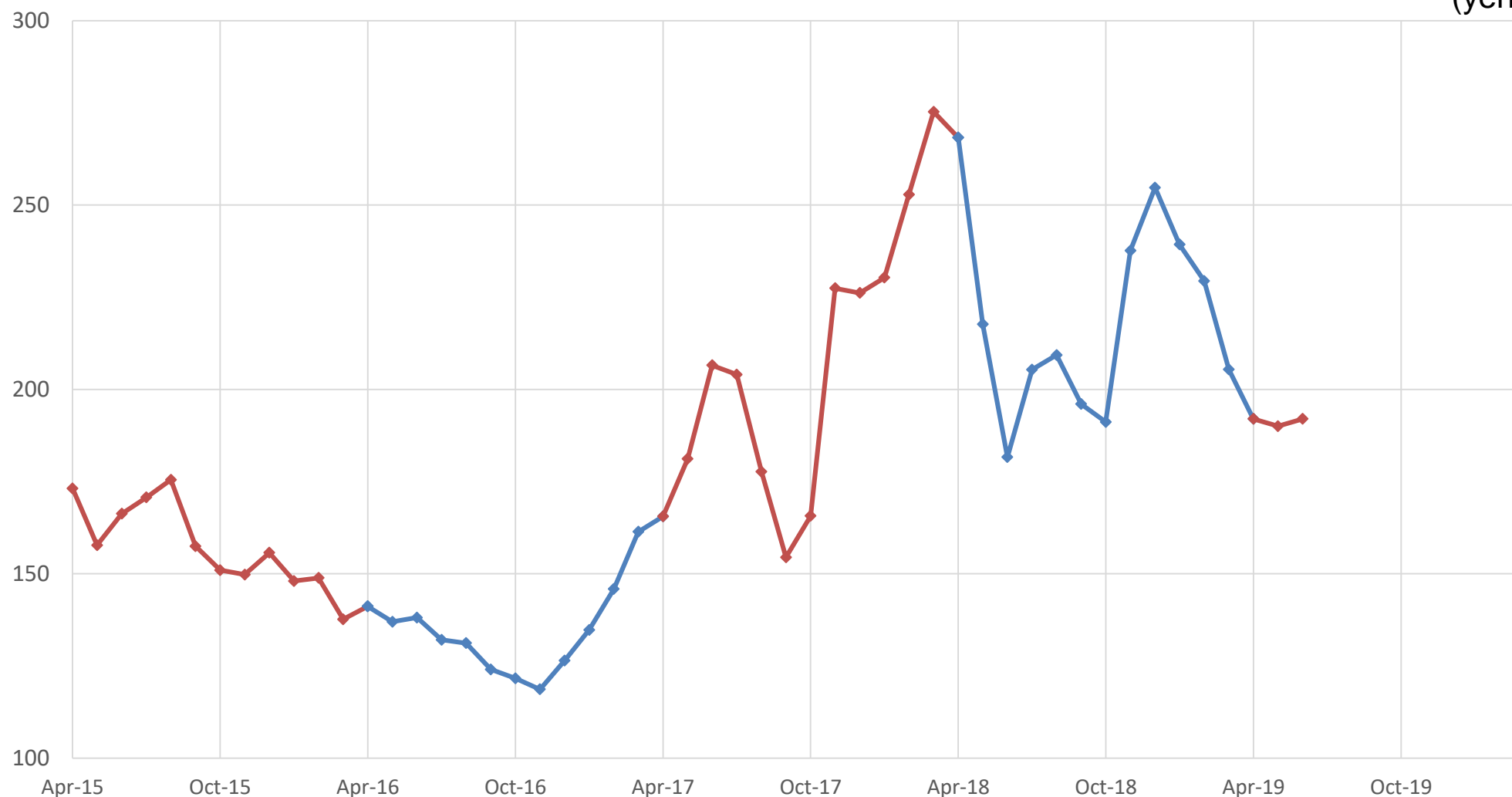
<Sales Revenue and Operating Profit by Business>

(In millions of yen)		1Q(Three months) of FYE 3/2019		1Q(Three months) of FYE 3/2020		Percentage Increase/ Decrease	
		Sales Revenue	Operating Profit	Sales Revenue	Operating Profit	Sales Revenue	Operating Profit
High-Purity Chemical Business		9,001	952	8,575	955	-4.7	0.3
[High-Purity Chemical Business: Breakdown]	Surface Treatment	567		340		-40.1	
	Alternatives for CFCs	1,544		1,691		9.5	
	Batteries	1,026		653		-36.3	
	Semiconductors /LCDs	4,870		4,734		-2.8	
	Semiconductor Devices	142		112		-20.5	
	Catalysts	243		210		-13.6	
	Gypsum	63		61		-3.3	
	General Products	302		479		58.4	
	Other	240		292		22.0	
Transportation Business		1,088	223	1,120	166	2.9	-25.7
Medical Business		-	- 243	-	- 282	-	-
Other		44	8	37	6	-16.7	-18.7

Sales Revenue Constituent Ratio of High-Purity Chemicals



<Transitions in Trade Statistics Value of Anhydrous Hydrofluoric Acid> *Reference data (yen/kg)



	FYE 3/2016	FYE 3/2017	FYE 3/2018	FYE 3/2019	FYE 3/2020 1Q (Three months)
Average Price (yen/kg)	158	135	209	220	191

Source: Prepared by our company based on the Ministry of Finance's "Trade Statistics of Japan" (<http://www.customs.go.jp/toukei/info/>)

<Balance Sheet>

(In millions of yen)	FYE 3/2019 End-of-Year	Jun.30,2019	Increase/ Decrease	Percentage Increase/ Decrease
Assets	55,454	52,795	-2,658	-4.8
Cash and cash equivalents	14,044	12,407	-1,637	-11.7
Operating receivables	9,678	8,941	-737	-7.6
Inventory assets	6,183	6,018	-165	-2.7
Property, plant, and equipment	22,329	22,373	44	0.2
Intangible assets	565	610	45	8.0
Liabilities	21,536	18,832	-2,703	-12.6
Operating liabilities	4,562	3,461	-1,100	-24.1
Interest-bearing liabilities	11,069	10,594	-474	-4.3
Net Assets	33,918	33,963	44	0.1
Equity capital	32,821	32,956	135	0.4
Liabilities and Net Assets	55,454	52,795	-2,658	-4.8

2. Financial Forecast for FYE 3/2020

- Financial Forecast
- Forecast on Sales Revenue and Operating Profit by Business

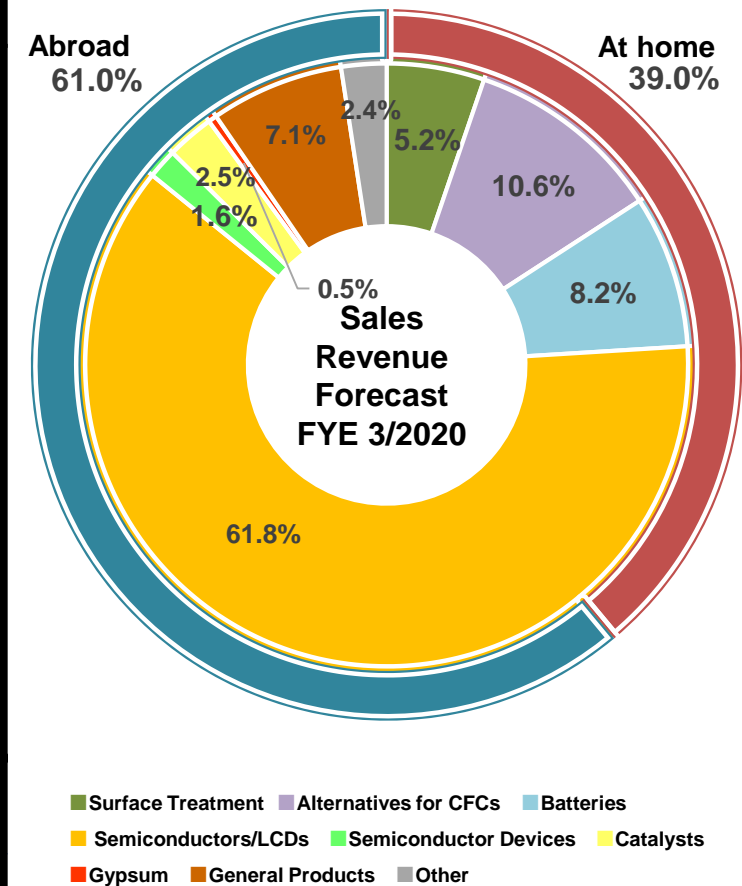
<Financial Forecast>

(In millions of yen)	FYE 3/2019 Actual	FYE 3/2020 Forecast	Increase/ Decrease	Percentage Increase/ Decrease
Sales Revenue	38,384	37,800	-584	-1.5
Gross Profit	7,931	7,550	-382	-4.8
Operating Profit	3,523	2,450	-1,074	-30.5
Ordinary Profit	3,810	2,550	-1,260	-33.1
Profit Attributable to Owners of Parent	2,350	1,700	-651	-27.7
Earnings Per Share (yen)	182.06	131.65	-50.41	-27.7
Dividend (yen)	45	45	-	-
ROE (%)	7.3	5.1	-2.2	-30.1
Capital Expenditures	4,435	4,580	144	3.3
Depreciation & Amortization	3,253	3,490	236	7.3
Research & Development Expenses	1,566	1,770	203	13.0

<Forecast on Sales Revenue and Operating Profit by Business>

		FYE 3/2019 Actual		FYE 3/2020 Forecast		Percentage Increase/ Decrease	
		Sales Revenue	Operating Profit	Sales Revenue	Operating Profit	Sales Revenue	Operating Profit
High-Purity Chemical Business		33,776	3,782	33,020	2,880	-2.2	-23.9
[High-Purity Chemical Business: Breakdown]	Surface Treatment	2,080		1,730		-16.8	
	Alternatives for CFCs	3,618		3,500		-3.3	
	Batteries	3,629		2,700		-25.6	
	Semiconductors /LCDs	20,093		20,410		1.6	
	Semiconductor Devices	633		530		-16.4	
	Catalysts	904		840		-7.2	
	Gypsum	176		150		-15.0	
	General Products	1,762		2,360		33.9	
	Other	876		800		-8.7	
Transportation Business		4,382	726	4,570	760	4.3	4.6
Medical Business		-	-1,051	-	-1,220	-	-
Other		225	42	210	30	-7.0	-28.8

Sales Revenue Constituent Ratio of High-Purity Chemicals



3. STELLA CHEMIFA CORPORATION

- Corporate Profile/Sales Office Locations/Plant Locations
(as of June 30, 2019)
- List of Affiliated Companies
- High-Purity Chemical Business

<Corporate Profile/Sales Office Locations/Plant Locations (as of June 30, 2019)>

◆ Corporate profile

Corporate name:	STELLA CHEMIFA CORPORATION
Head office:	Meiji Yasuda Seimei Osaka Midosuji Bldg. 10F, 4-1-1 Fushimi-machi, Chuo-ku, Osaka City, Osaka
Founded	February 1916
Established	February 1944
Capital fund	4,829,782,512 yen
Representatives	Chairperson, Representative Director: Junko Fukada Representative Director, President and Chief Executive Officer: Aki Hashimoto
URL	https://www.stella-chemifa.co.jp/













◆ Sales office

Osaka Sales Department	Meiji Yasuda Seimei Osaka Midosuji Bldg. 10F, 4-1-1 Fushimi-machi, Chuo-ku, Osaka City, Osaka
Tokyo Sales Department	Marunouchi Trust Tower North 12F, 1-8-1 Marunouchi, Chiyoda-ku, Tokyo ※Moved on July 16, 2019

◆ Factory addresses

Sanpo Factory	7-227 Kaisan-cho, Sakai-ku, Sakai City, Osaka
Izumi Factory	1-41 Rinkai-cho, Izumiotsu City, Osaka
Kitakyushu Factory	1-1 Kurosakishiroishi, Yahatanishi-ku, Kitakyushu City, Fukuoka

<List of Affiliated Companies>

Base	Logo	Corporate Name	Business Segment	Head Office
At home		STELLA CHEMIFA CORPORATION	High-Purity Chemical Business	Chuo-ku, Osaka City, Osaka
		Blue Express, Inc.	Transportation Business	Sakai-ku, Sakai City, Osaka
		Blue Auto Trust Co., Ltd.	Other Business	Sakai-ku, Sakai City, Osaka
		Stella Pharma Corporation	Medical Business	Chuo-ku Osaka City, Osaka
Abroad		STELLA CHEMIFA SINGAPORE PTE LTD	High-Purity Chemical Business	Singapore
		STELLA EXPRESS PTE LTD	Transportation Business	Singapore
		Blue Express (Shanghai) International Trade Inc.	High-Purity Chemical Business	China
		Blue Express (Shanghai) International Freight Forwarding Co., Ltd.	Transportation Business	China
		Zhejiang Blue Star Chemical Co., Ltd.	High-Purity Chemical Business	China
		FECT Co., Ltd.	High-Purity Chemical Business	South Korea
		Quzhou BDX New Chemical Materials Co., Ltd.	High-Purity Chemical Business	China

<High-Purity Chemical Business>

Our products, fluorine compounds, are still used in the manufacture of various products.

Segment Name	Main Product	Applications
Surface treatment	Hydrofluoric acid for industrial use	Used for acid cleaning of stainless steel and for thinning glass substrates for LCDs
Alternatives for CFCs	Anhydrous hydrofluoric acid	Material for chlorofluorocarbon and fluorine resin
Batteries	Additive for batteries Lithium hexafluorophosphate	Additive for electrolyte to improve the performance of lithium-ion secondary batteries Electrolyte for lithium-ion secondary batteries
Semiconductors and LCDs	High-purity hydrofluoric acid	Cleaning solution for silicon wafers and LCDs Solar batteries
	High-purity buffered hydrofluoric acid	
Semiconductor devices	High-purity fluoride (CaF_2 , PbF_2 , MgF_2 , AlF_3 and others)	Lens material for i-line steppers and cameras
	Potassium fluoride	Auxiliary agent for manufacturing tantalum for tantalum capacitors
General products	Tin fluoride	Quasi-drug

Semiconductors and LCDs

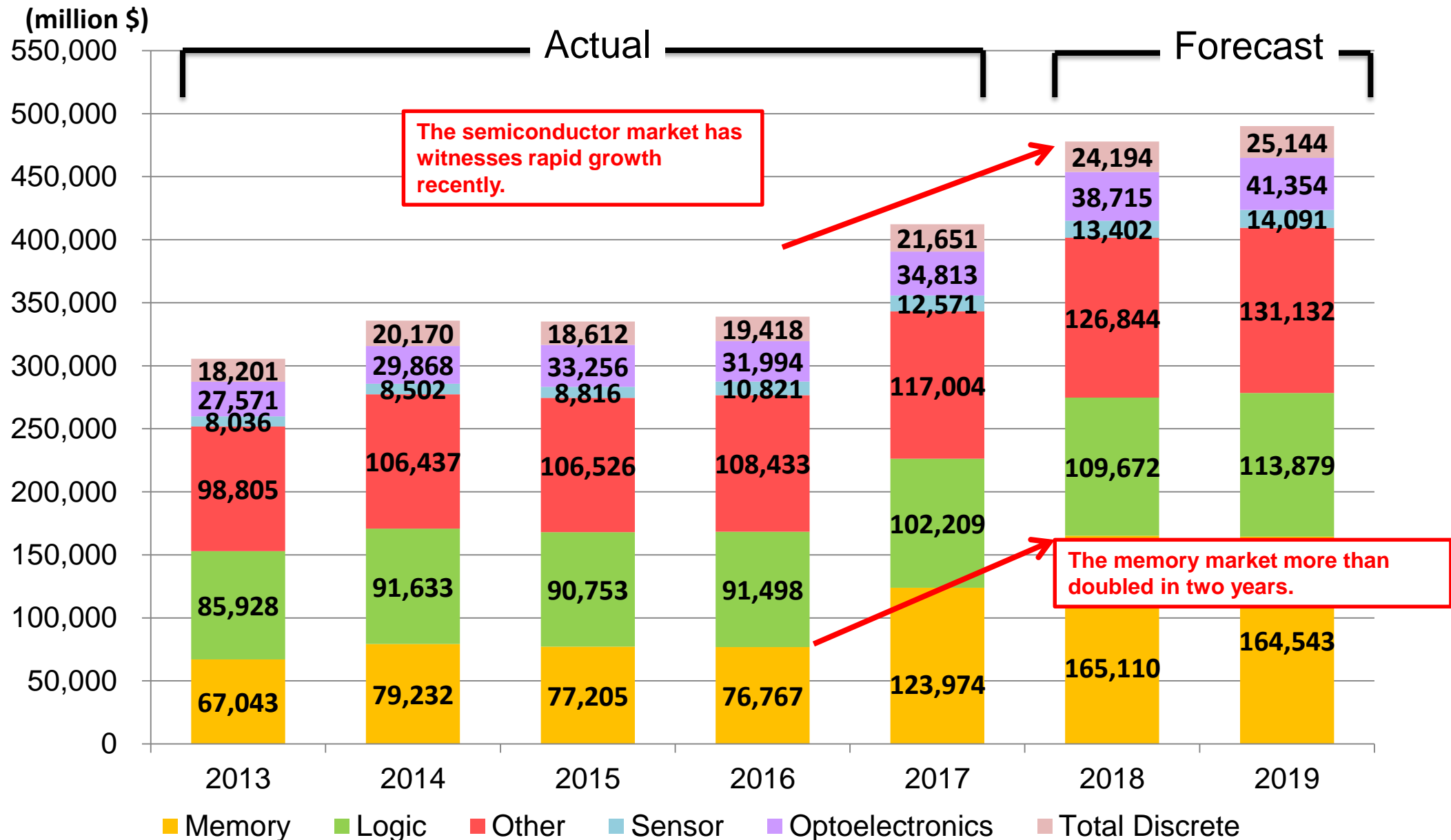
- Features of Our Products and New Products
- Results and Forecast of World Semiconductor Market Scale by Product
- Development of a New Memory Market
- Maintenance and Strengthening of Quality Edge
- Change of Shipping Volume of High-Purity Hydrofluoric Acid (Semiconductors and LCDs)
- Boosting Production of Semiconductor Chemicals

<Features of Our Products and New Products>

- (1) With our ultra purification technology and ultra sensitive technology, we are able to supply the ultra-high-purity hydrofluoric acid and the ultra-high-purity buffered hydrofluoric acid with the best quality in the world.
- (2) Products Lineups are readied to respond the customer requirements, including like suppression of adhering particles, and suppression of increased roughness of wafer surfaces, and others, for the semiconductor and FPD manufacturing process.

Product name (Semiconductor and LCDs)	Description
Ultra-high-purity hydrofluoric acid	An ultra-high-purity chemical used for wet cleaning of silicon wafers in manufacturing semiconductors, FPDs, solar batteries, and MEMS
LL HF	HF with various functionalities made possible by adding a surfactant. It is mainly used for cleaning silicon wafers.
Ultra-high-purity buffered hydrofluoric acid	A chemical mixed with 50% hydrofluoric acid and 40% ammonium fluoride solutions
LL BHF	BHF with various functionalities made possible by adding a surfactant
LAL BHF	BHF that contains an additive has enabled it to achieve extended service life and given other advantages by optimizing the concentration of ammonium fluoride at 15% to 25%, about half the concentration of ammonium fluoride contained in conventional BHF.
Ex-LAL BHF	BHF containing an environmentally friendly additive with a maximum ammonium fluoride concentration of 5%
HSN Series	An etchant for silicon nitride with selectivity to silicon oxide, which is mainly used in the DRAM manufacturing process
LPL BHF	A silicon oxide etchant with minimum damage to silicon or polysilicon film

<Results and Forecast of World Semiconductor Market Size by Product>



Source: World Semiconductor Trade Statistics Inc. (WSTS)

<Development of a New Memory Market>

Manufacturer	Place of Construction	Base Name	Produced Item	Wafer Size	Production Capacity, etc.	Plan
Samsung Electronics	Xian	Fab2	3D-NAND	12 inches	70,000 wafers/month	Under construction It is scheduled to be completed in the second half of 2019.
	Pyeongtaek	Phase2	DRAM	12 inches		
SK Hynix	Wuxi	C2F	DRAM	12 inches	130,000 wafers/month	Flushing started in October 2018
	Cheongju	M15	3D-NAND	12 inches		Mass production to start in the second half of 2019
Toshiba Memory	Yokkaichi	Y6 Phase1	3D-NAND	12 inches		Operating rate increasing
		Y6 Phase2	3D-NAND	12 inches		Flushing started.
	Iwate	K1	3D-NAND	12 inches		Under construction Flushing is scheduled for the first half of 2019.
Intel	Dalian	Fab2	3D-NAND	12 inches	80,000 wafers/month	Trial production started.
Micron Technology	Hiroshima	Fab15	DRAM	12 inches		Currently gearing up for mass production of 1Xnm
Innotron Memory	Hefei	Phase1	DRAM	12 inches	125,000 wafers/month	Trial production started.
Yangtze River Storage Technology (YRST); YMTC * Tsinghua Unigroup acquired capital in XMC.	Chengdu	Phase1	3D-NAND	12 inches	50,000 wafers/month	Trial production started. 200,000 wafers/month in 2020, and 1 million wafers/month in 2030

Large-scale investments are planned in new memory factories, mainly in China.
Even though there was a slowdown in 2019, further growth is expected in 2020.

Source: STELLA CHEMIFA

Demand for memories is expected to continue in the future with sophistication of the Internet, popularization of IoT, utilization of artificial intelligence (AI) and so on.

We pursue sales in the memory market through aggressive strategies.

<Maintenance and Strengthening of Quality Edge>

◆SA Grade HF quality◆

Product technology generation	≥45 nm	28 nm	≤16 nm
Our product grade	SA/SA-X	SA-XX	SA-XXX
Metal impurities level	<100 ppt	<10 ppt	<1 ppt <small>Succeeded in ultra-high-purity</small>
Management size of particle	0.2/0.1 μm	0.05 μm	0.03 μm

Further strengthening particle management

With Introducing the world's most advanced analytical instruments.



Liquid-borne particle counter

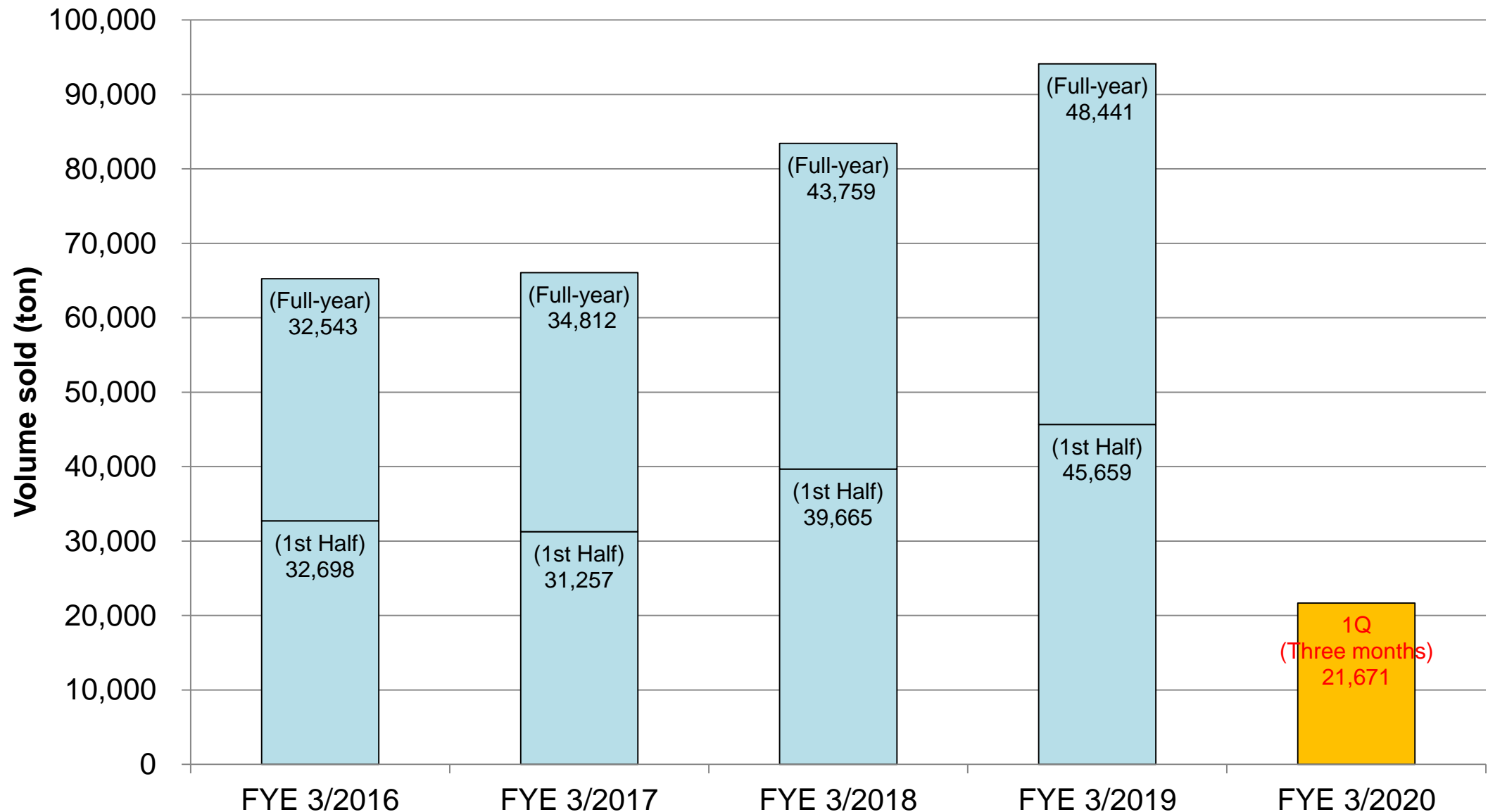
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High resolution ICP-MS

©Thermo Fisher Scientific K. K.

<Change of Shipping Volume of High-Purity Hydrofluoric Acid (Semiconductors and LCDs)>

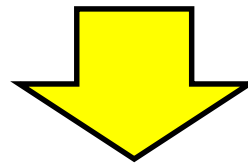


<Boosting Production of Semiconductor Chemicals>

The shipping volume exceeded 90,000 t in FYE 3/2019 highest ever.

The shipping volume in FYE 3/2020 is expected to be 97,000 t.

To expand our share further and strengthen the stable supply system



Establish the supply system with 105,000 t/year in FYE 3/2020.



Batteries

- Features of Our Products/Business Development in China
- EV Applications Drive LiB Market Growth
- Construction Rush for Giant Battery Plants
- Sales Results and Forecast of Additives for LiB

<Features of Our Products>

- (1) Used as main material comprising the lithium-ion secondary batteries and commercialized ahead of other companies.
- (2) Because of the product's high purity, it is being used for high-performance lithium-ion secondary batteries.

Product Name (Related to Batteries)	Description
Additive for batteries	Additive for electrolytic solution to improve the performance of lithium-ion secondary batteries
Lithium hexafluorophosphate	Electrolyte for lithium-ion secondary batteries

<Business Development in China>



- Quzhou BDX New Chemical Materials Co., Ltd.
(established in December 2015)
- Capital fund: 70 million Chinese yuan
(STELLA CHEMIFA's stake: 25%) *As of March 31, 2019
- Some of the facilities used to manufacture electrolytes for lithium-ion secondary batteries were relocated to this joint venture company.
The joint venture company uses the relocated facilities to produce electrolytes for lithium-ion secondary batteries and sells them in and outside China.

<EV Applications Drive LiB Market Growth>

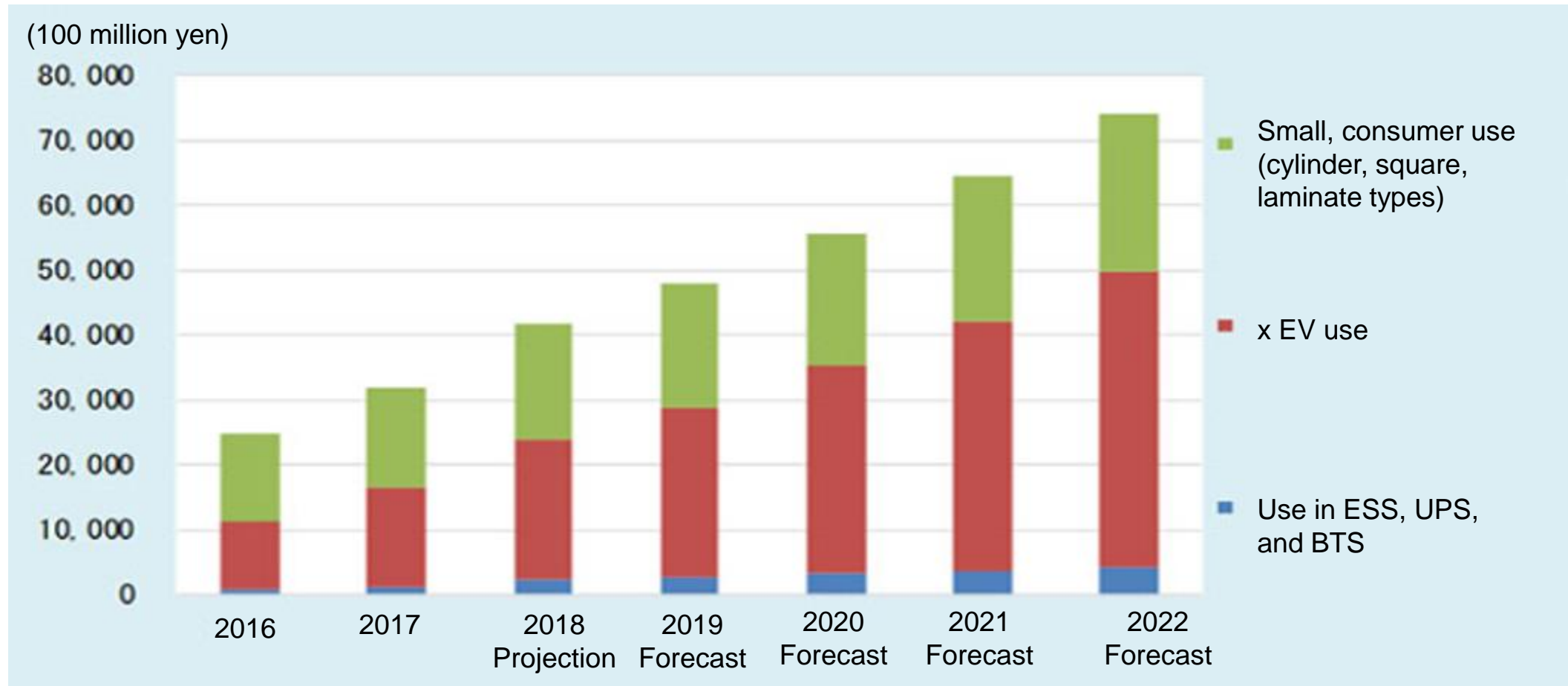


Fig. Change in sales in Li-ion secondary batteries market by application (results and forecasts)
(Source: Materials released by Fuji Keizai)

Establishment of production system to meet the demand

<Construction Rush for Giant Battery Plants>

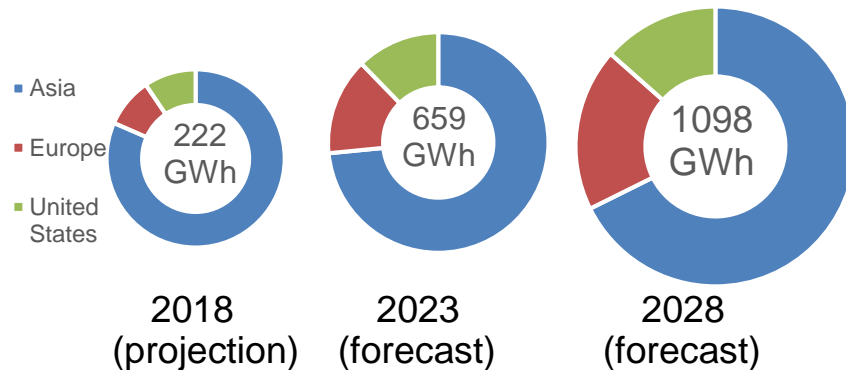
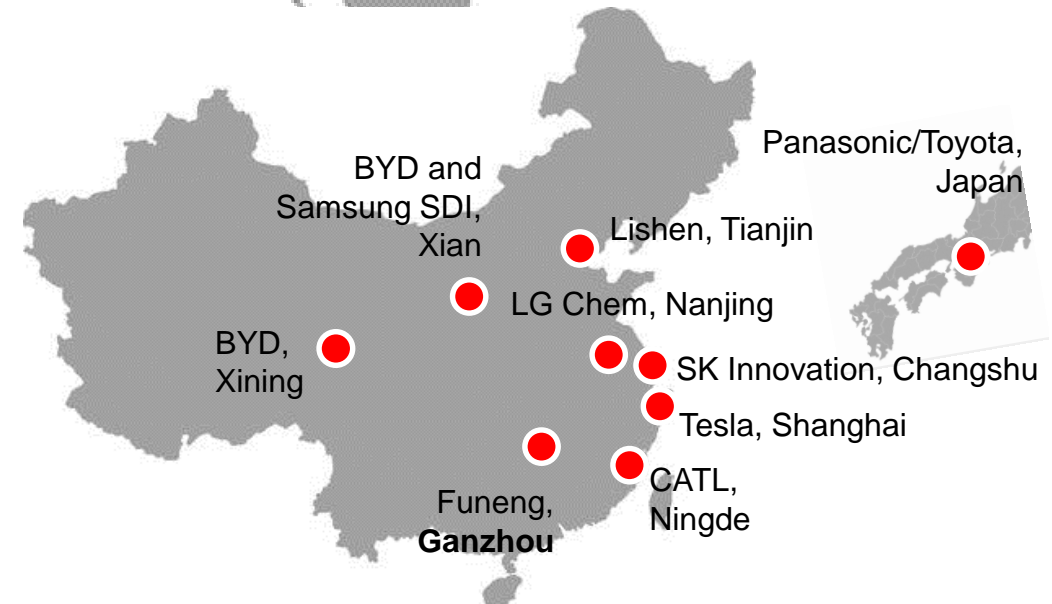
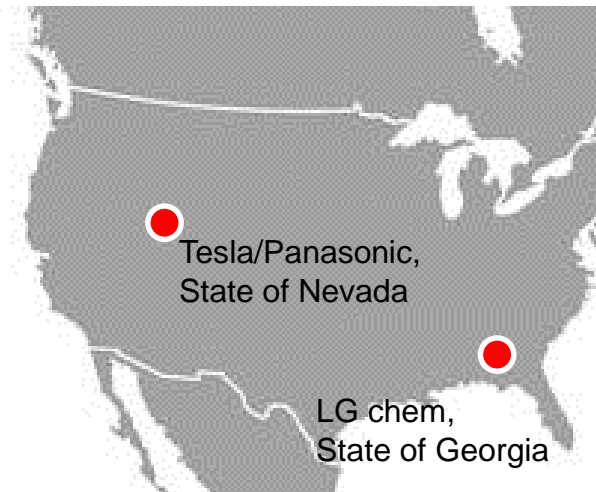
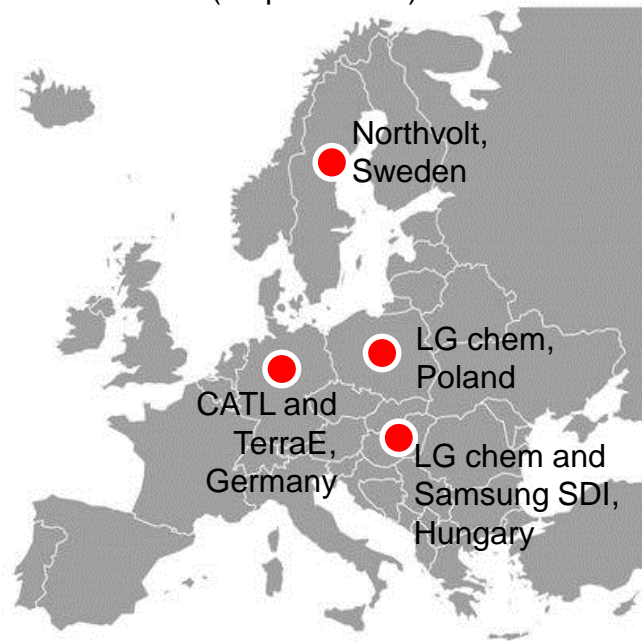
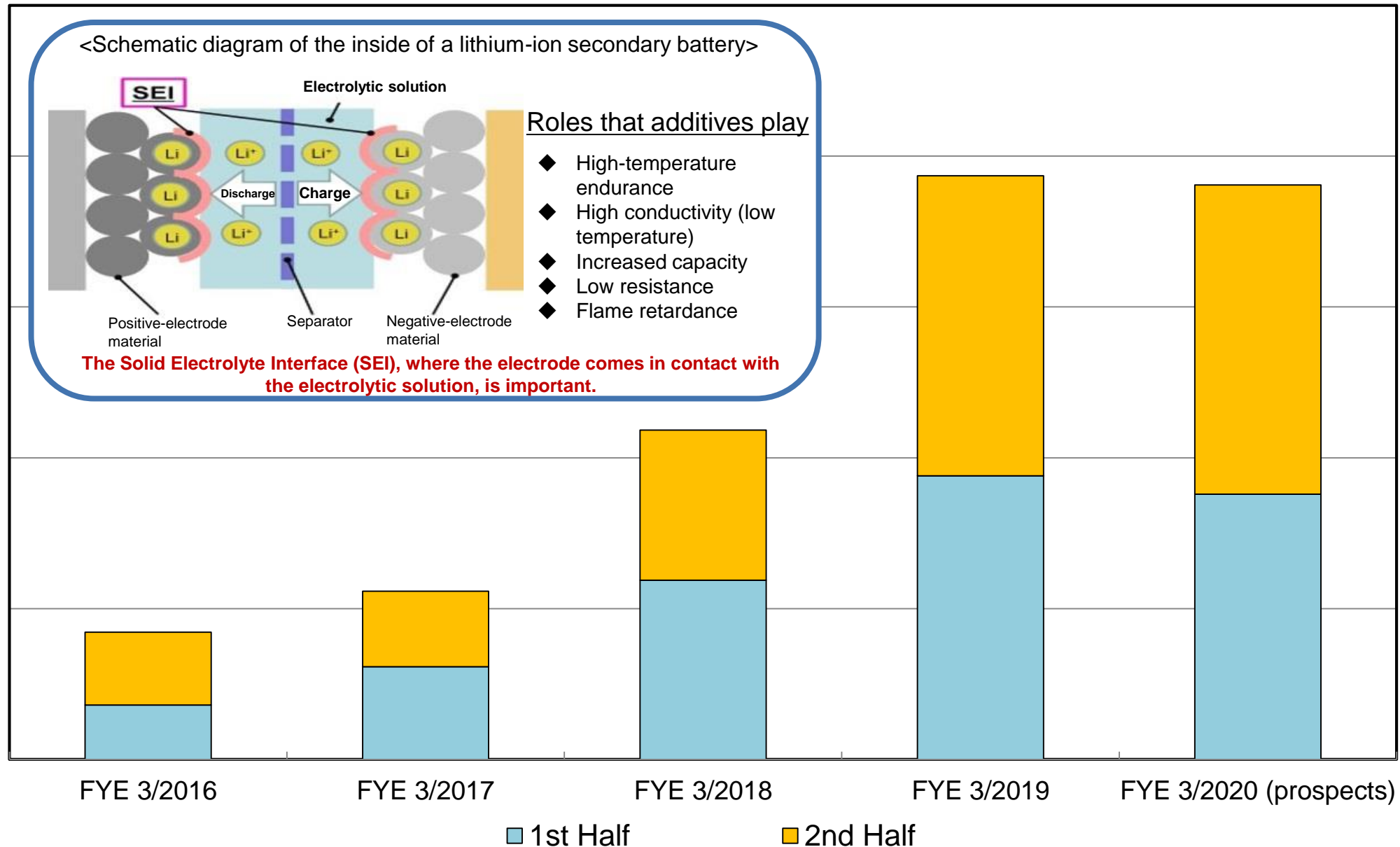


Fig. Change in production capacity for Li-ion secondary batteries by region (output-based)



The medium-term demand for batteries for EVs will be supplied by Giga plants, which are being constructed around the world

<Sales Results and Forecast of Additives for LiB>



GMP-related

- GMP(Good Manufacturing Practice)
- Oral Care-related ~ Tin Fluoride (SnF_2) ~

< GMP(Good Manufacturing Practice) >

The **GMP inspection** by **USFDA** for tin fluoride, an active ingredient of OTC anticaries drugs, **was completed** in November 2017.



Obtained official approval by a public organization in the US



Started selling GMP-certified products in 2018



Inside Izumi Factory (Izumiotu City)

Standards for Manufacturing Control and Quality Control for Drugs and Quasi-drugs

Three principles:

“Reducing human errors to the lowest level”

“Preventing contamination and product quality loss”

“Designing systems to assure high product quality”

<Oral Care-related ~ Tin Fluoride (SnF_2) ~>

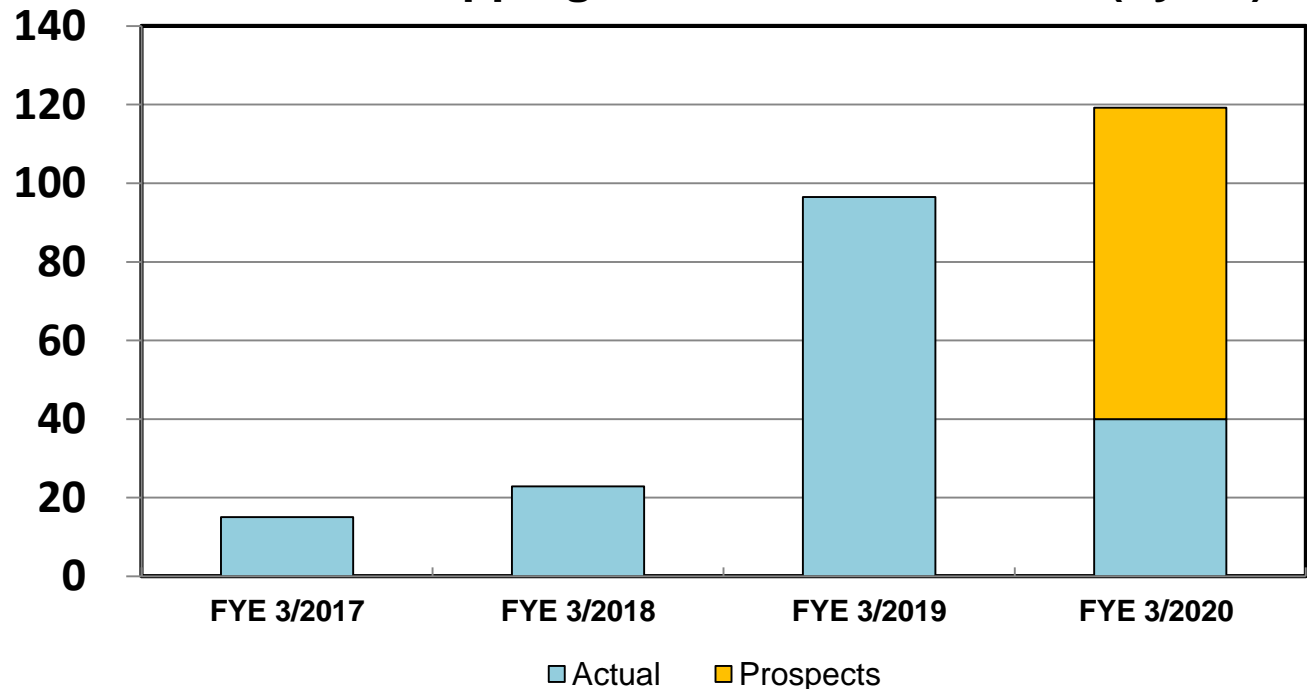
<Actions of fluorine on teeth>

- To suppress *Streptococcus mutans* from producing acid (Cavity prevention)
- To promote tooth remineralization
- To form acid-resistant teeth (to form fluorapatite)

We expect to see big demand mainly in Europe and the US, where there is strong interest in dental health and beauty.



Trend in shipping volume of tin fluoride (t/year)



4. Medical Business

- Corporate Profile (as of June 30, 2019)
- Development of New Radiotherapy Technology -BNCT-
- Establishment of Enrichment Technology/Features of Enriched Boron/Applications of Enriched Boron Compounds
- World's First Accelerator-based BNCT Clinical Trial
- Participation in Development of Imaging Diagnostic Technology - PET Diagnosis -
- Establishment of $^{18}\text{FBPA}$ -PET Development System

<Corporate Profile (as of June 30, 2019)>

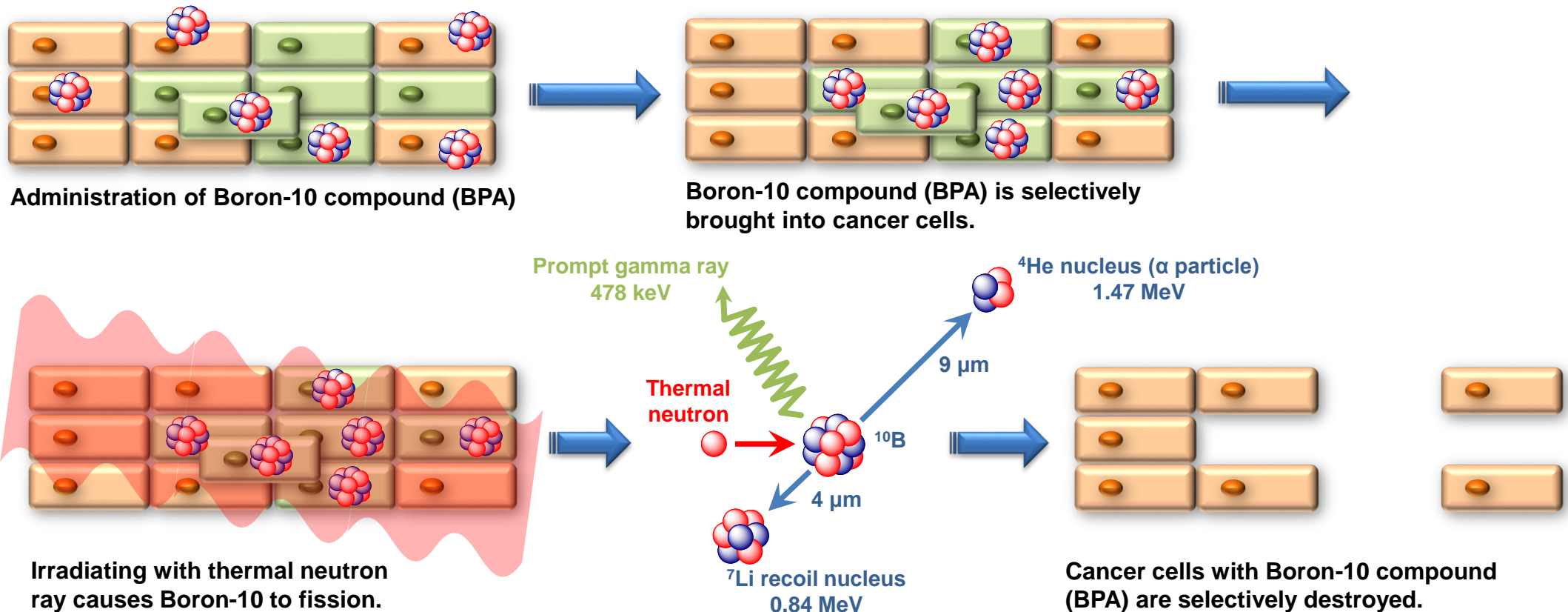
Corporate name:	STELLA PHARMA CORPORATION
Head Office:	3-2-7 Koraibashi, Chuo-ku, Osaka City, Osaka
Representatives	Tomoyuki Asano, Representative Director and President
Established	June 2007
Capital Fund	1.9 billion yen
Business Lineup	Research and development, manufacture, and marketing, etc. of drugs and medical devices
Shareholders	STELLA CHEMIFA CORPORATION Innovation Network Corporation of Japan Sumitomo Heavy Industries, Ltd.
Research Facility	Sakai Drug Discovery Research Center (Naka-ku, Sakai City, Osaka)



STELLA PHARMA

<Development of New Radiotherapy Technology -BNCT->

Boron Neutron Capture Therapy (BNCT) is a particle beam radiation therapy, which specifically damages cancer cells by making the best of **nuclear fission reactions** between **boron-10** and **thermal neutrons** with low energy.



<Establishment of Enrichment Technology/Features of Enriched Boron/ Applications of Enriched Boron Compounds>

▪ Establishment of enrichment technology

STELLA CHEMIFA established mass production technology of ^{10}B for the first time in Japan.
In November 2000, **the only** enrichment plant **in Japan** was established.



▪ Features of enriched boron

^{10}B offers properties of remarkably high neutron absorption capacity, and by increasing ^{10}B concentration, the absorption capacity is improved significantly.

▪ Applications of Enriched Boron Compounds

- Neutron-absorbing material of spent nuclear fuel transportation and storage containers
- Material of control rods of nuclear reactors and rack material of spent nuclear fuel pools
- Excess reaction control of pressurized-water reactors by dissolving into primary cooling water.
- **Cancer drug for boron neutron capture therapy (BNCT)**

<World's First Accelerator-based BNCT Clinical Trial>

The world's first clinical trials using the boron-based drug (SPM-011) developed by Stella Pharma and the accelerator-based irradiation system (BNCT 30) developed by Sumitomo Heavy Industries, are on-going.

Phase II study for brain tumor

Having completed BNCT irradiation on all subjects slated for testing, we are conducting an ongoing follow-up study. (As of the end of June 2019)

Phase II study for head and neck cancer

Having completed BNCT irradiation on all subjects slated for testing, we are conducting an ongoing follow-up study. (As of the end of June 2019)

<<Flow chart of planned steps from clinical trial to approval application>>

Phase I study

Phase II study

Approval application
(scheduled)

Neutron dose is increased stepwise to check safety.

Verification of the effect at the determined dose.

SPM-011 and BNCT30 were designated as the products subject to the MHLW Prioritized Review System for innovative medicines "SAKIGAKE" in 2017.

This allows the drug and device to be given priority in the consultation and review process for approval, and hence we are undertaking efforts to speed up their development.



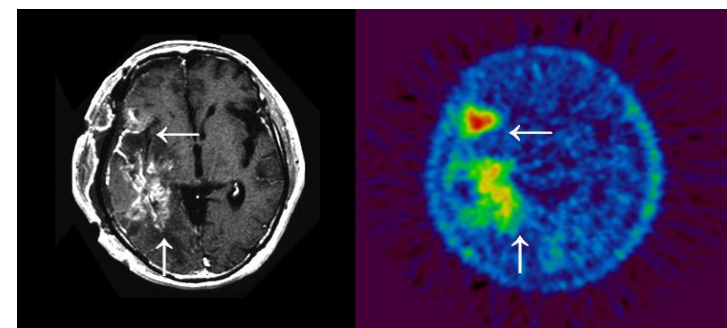
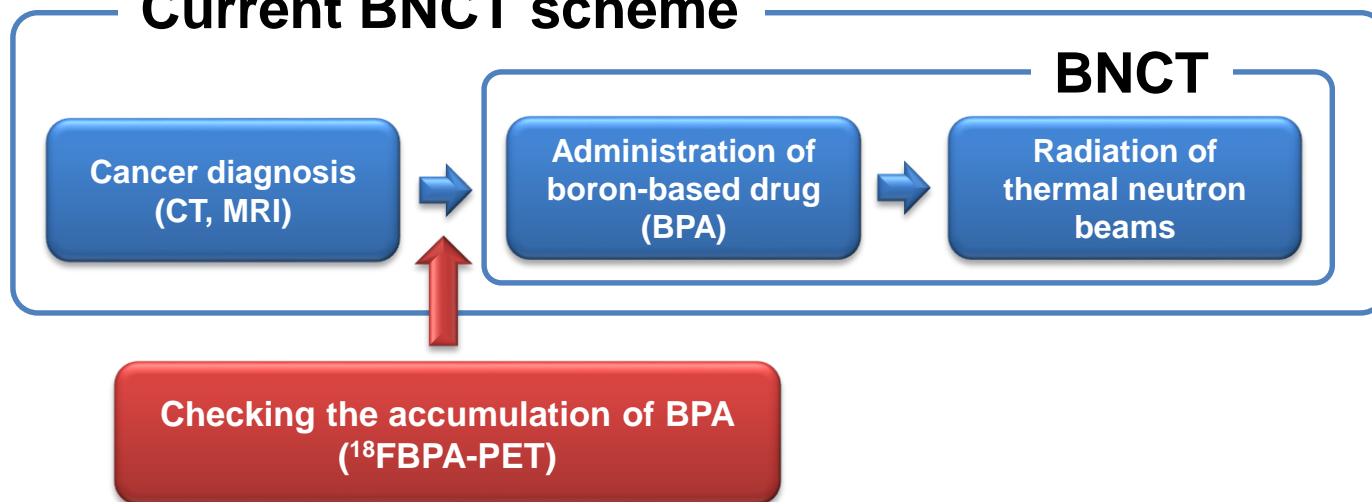
<Participation in Development of Imaging Diagnostic Technology - PET Diagnosis ->

The “PET diagnosis” that attracts attention as a technology useful for the early detection of cancers
We have undertaken the development of ^{18}F BPA, which has been studied as a new drug to be used for the technology.

Features of ^{18}F BPA-PET

- ★ It is expected that ^{18}F BPA-PET will contribute to the development of BNCT because the accumulation of the boron-based drug (BPA) against cancer can be checked beforehand (before treatment).

Current BNCT scheme

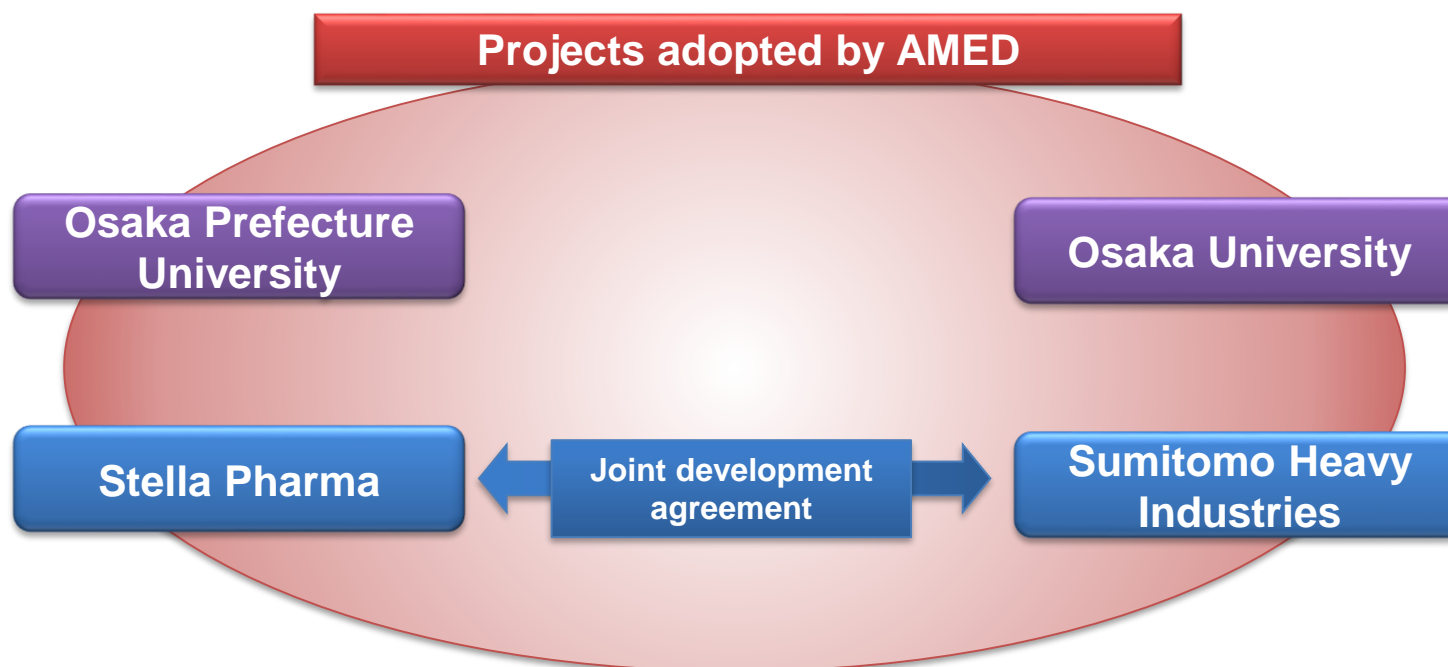


(Left) MRI image of brain tumors
(Right) ^{18}F -BPA PET image of brain tumors

Photo: Courtesy of Professor Ono at Kyoto University Research Reactor Institute

<Establishment of ^{18}F BPA-PET Development System>

To implement this project, we have been conducting joint research with Osaka Prefecture University, Osaka University, and Sumitomo Heavy Industries, through the following projects adopted by the Japan Agency for Medical Research and Development (AMED). We have also been proceeding with the specific development of an automated synthesis equipment required for the commercialization jointly with Sumitomo Heavy Industries, Ltd.



5. Transportation Business

- Corporate Profile (as of June 30, 2019)
- Transportation System by Cooperation with Domestic Bases
- Overseas Bases
- International Intermodal Logistics System
- Future Activities

<Corporate Profile (as of June 30, 2019)>

Corporate name: BLUE EXPRESS CORPORATION

Head Office: 10 Ohamanishi-machi, Sakai-ku, Sakai City, Osaka

Representatives Kiyonori Saka, Representative Director and President

Established June 1991

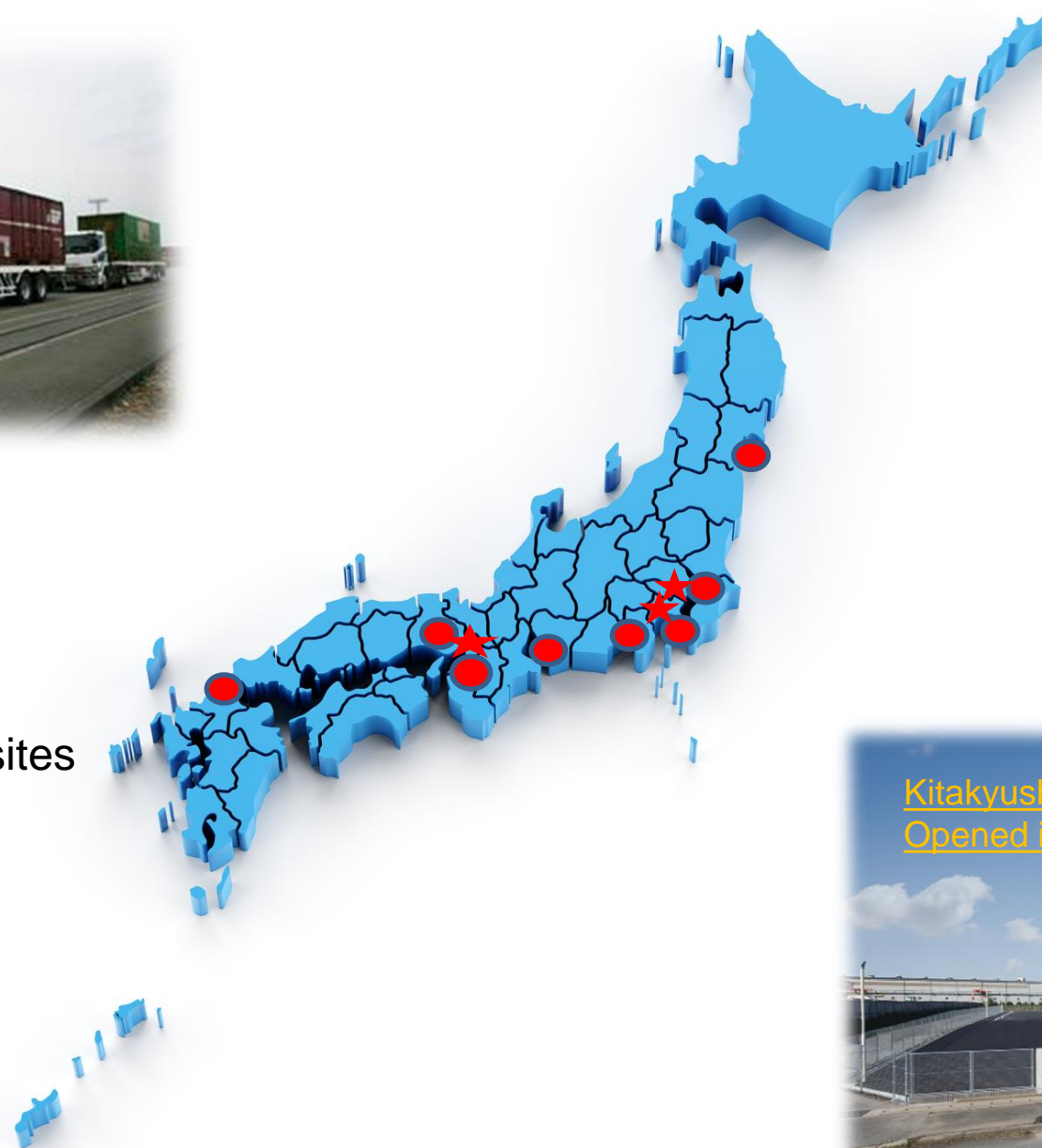
Capital Fund 350 million yen

Business Lineup Common motor trucking/International intermodal transport
Warehousing/Customs clearing agent/Sales, rental and lease of containers, tanks, etc.
Automobile maintenance services/Business related to life insurance and non-life insurance agent, etc.

URL <http://www.blue-express.co.jp/>



<Transportation System by Cooperation with Domestic Bases>



● Shipping terminals

Sendai Office
Kanto Office
Yokohama Office
Shimizu Office
Nagoya Office
Ohama Office
Kobe Office
Kitakyushu Office

★ Customs clearance sites

Yokohama Office
Osaka Office
Ohama Office

Kitakyushu Office
Opened in October 2014

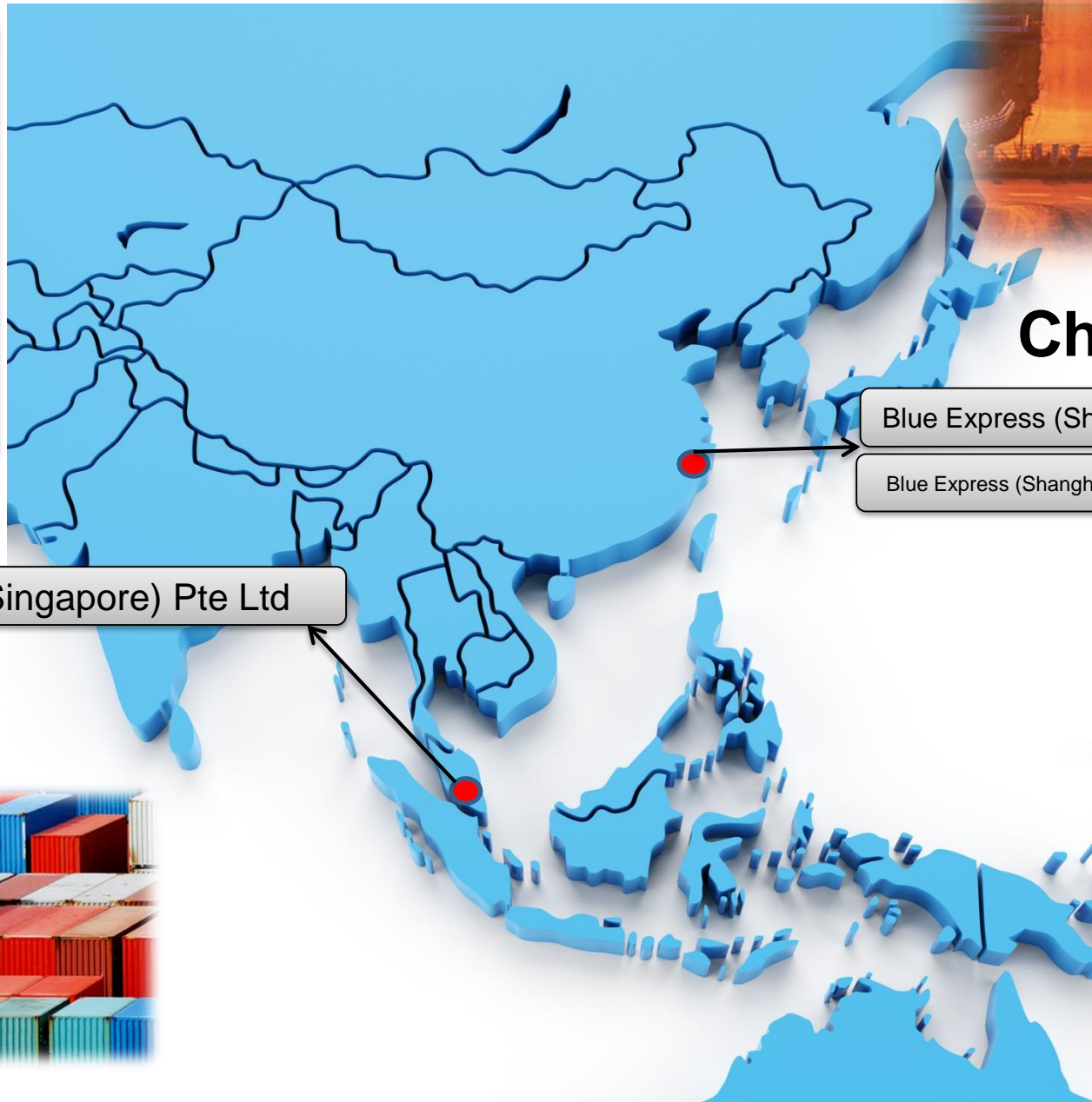


<Overseas Bases>



Singapore

Stella Express (Singapore) Pte Ltd



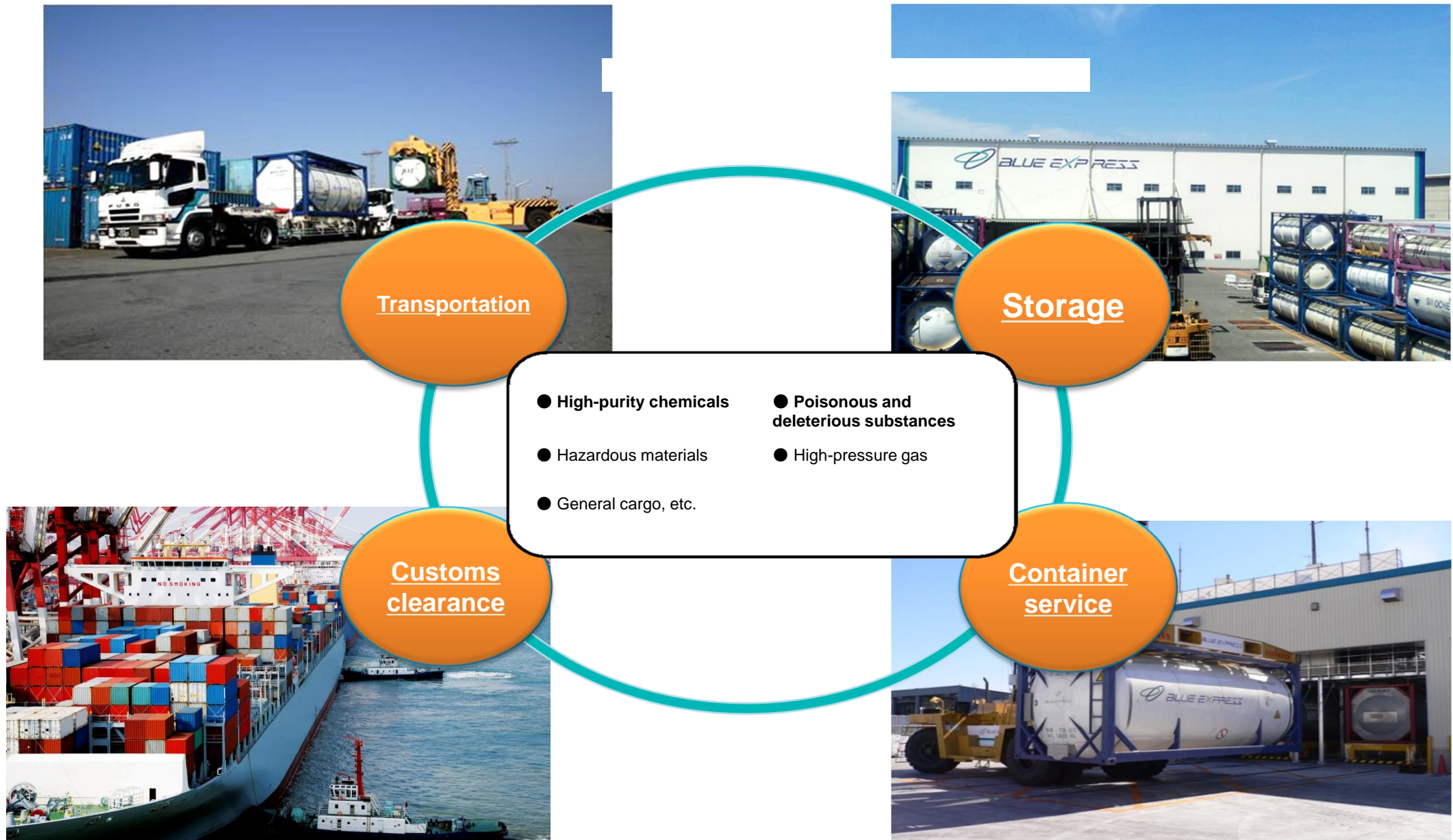
China (Shanghai)

Blue Express (Shanghai) International Trade Inc.

Blue Express (Shanghai) International Freight Forwarding Co., Ltd.



<International Intermodal Logistics System>



<Future Activities>

- To steadily expand business, with priority given to the improvement of customer satisfaction.
Further quality improvement of international intermodal logistics service
- To maintain continuous investment for further growth
 - Completion of a new hazardous materials warehouse
=> Operations start (December 2018)
- To further strengthen business operations and increase revenue base
 - Completion of a new office building at Sanpo Office
=> Streamlining through integration of Headquarters' Transportation Section at Sanpo (April 2018)
 - Working to secure human resources



6. Future Activities

- Our Company's Approach to the Batteries Field
- Response to the Battery Roadmap
- New Additives for High-Performance LiB
- Approaches to Advanced Energy Devices
- Dental Materials Field
- Phosphor Materials Field

<Our Company's Approach to the Batteries Field>



Next-generation battery materials

Development and proposal of new materials for next-generation batteries

New additives

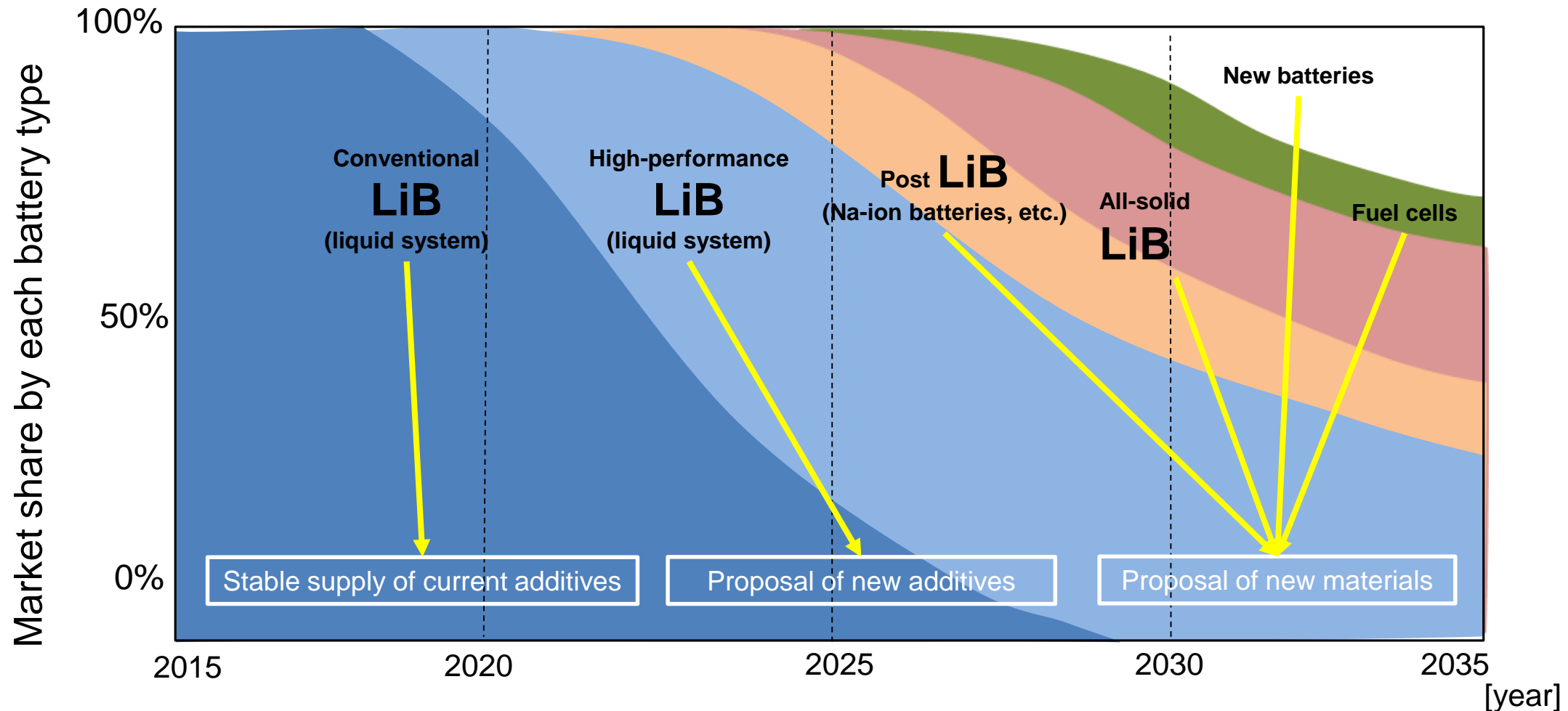
Response to constantly evolving battery performance

Development of production technology

Response to customer requests (quality and cost)



<Response to the Battery Roadmap>



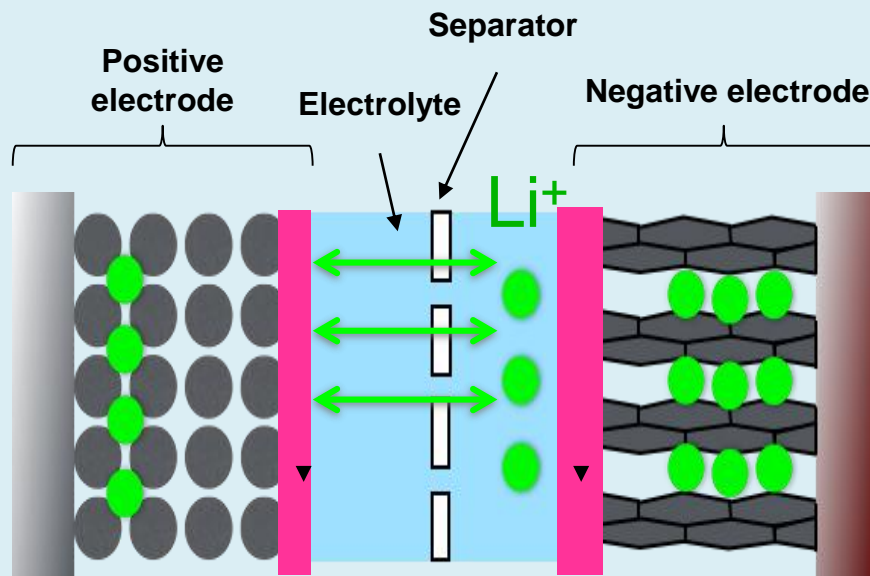
Source: STELLA CHEMIFA

Fig. Image for future changes in battery technology

Concentrating on the development of new additives and materials with a focus on medium- to long-term battery technology

<New Additives for High-Performance LiB>

Improvement of battery performance and durability in EV batteries



Forms a uniform coating on the surface of the electrode which improves its characteristics and life



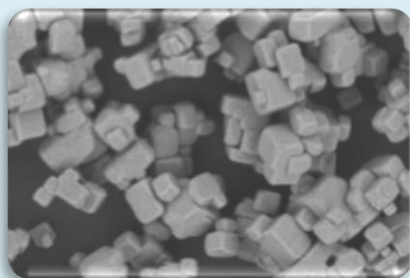
Appearance of a newly developed additive

Evaluation ongoing while tuning it to the customer's battery system

<Approaches to Advanced Energy Devices>

Metal-ion secondary batteries

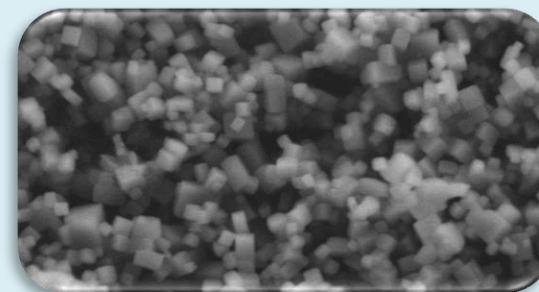
High-purity electrolytes for sodium-ion batteries, etc.



Mass production of high-purity electrolytes

All-solid lithium-ion batteries

Forms a bonding layer at the electrode/electrolyte interface



Characteristics improvement through interface control

Fuel cells

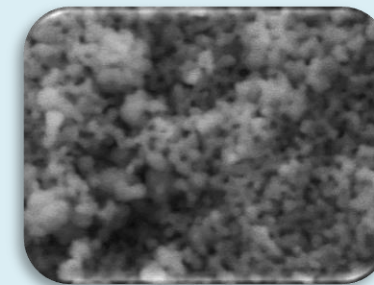
Catalyst performance and durability improvement through proprietary technologies



Reduction in use of precious metals

Fluorine-ion batteries

Fluorine-ion conductor and electrode materials



Development of core technologies into key materials for new devices

Approaches to
Advanced
Energy Devices

<Dental Materials Field>

Filler for dental composite resins; fluoride nanoparticles

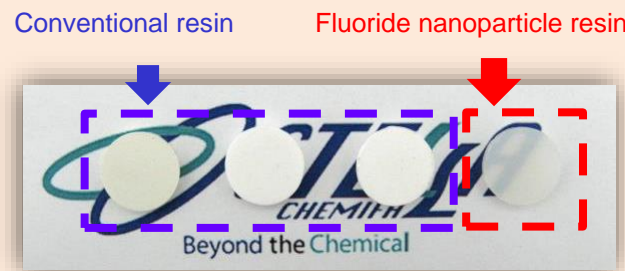
[1] Radiolucency



Dental X-ray image

Easy identification of fillings

[2] Transparency



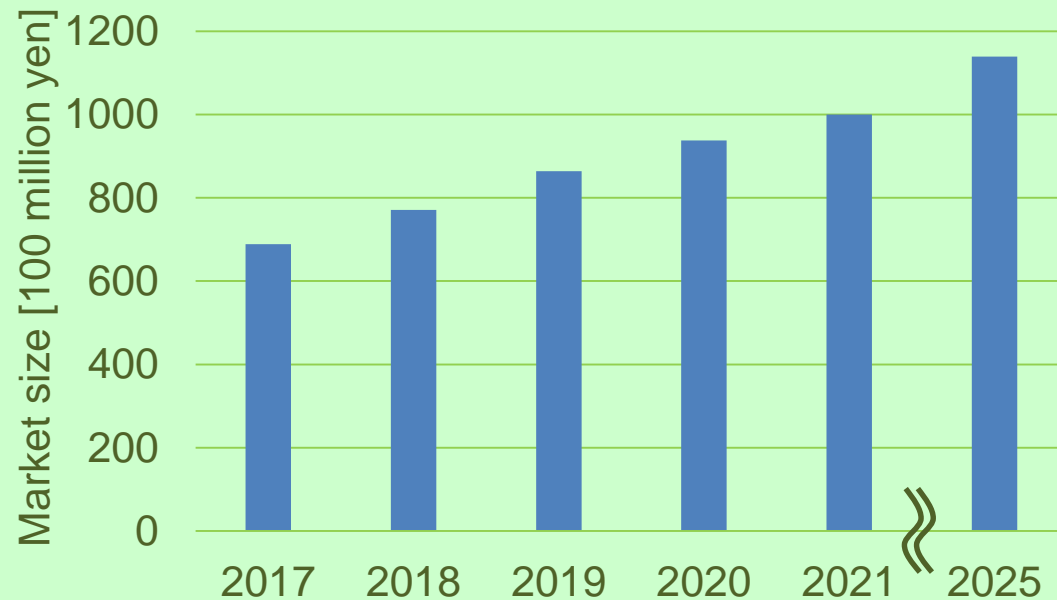
Addresses treatments with better esthetics



Also applicable to CAD/CAM blocks

<Phosphor Materials Field>

Development of high-efficiency, long-life fluoride phosphors utilizing our company's core technology



Source: 2018 Comprehensive Survey on LED/LD Market (Fuji Chimera Research Institute, Inc.)

Market Forecast for Phosphors for LEDs (prospect for 2018 and later)

Demands also increasing for Mini LEDs and PIDs (Public Information Displays)



No light emission



Light emitting state

Fluoride phosphor by our company

Under evaluation by the customer

Corporate slogan

Beyond the Chemical
Beyond the Chemical

We are drawing upon our strengths in the chemical field, whose growth we have nurtured so far, and moving toward even greater development in the future.

High-purity chemical
business field

Transportation
business field

Medical business
field



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