

Chemicals



Yutaka Tarutani

Executive Officer, General Manager, Chemicals Business Division

This segment, one of our traditional businesses, manufactures and sells inorganic chemicals and chlorine derivatives that are indispensable to industry and society as part of the foundation of life. Taking advantage of the manufacturing technologies and distribution and sales systems that have been developed in this segment over many years, the segment stably supplies high-quality, cost competitive products.

In its sales strategy, the basic policy is “full production and selling out.” The segment always strives to optimize the balance of supply and demand. To maintain full production, the segment continues to strengthen the domestic base that it has built up over many years. Anticipating a decline in domestic demand due to a declining population and customers’ relocation overseas, the segment endeavors to tap into overseas demand, particularly in emerging countries where demand is expected to grow. Staff dedicated to overseas operations in the planning group cooperate with the sales company in Singapore (Tokuyama Asia Pacific Pte. Ltd.) to build our user base overseas. These initiatives resulted in the export ratio of caustic soda increasing from 12% in fiscal 2018 to 18% in fiscal 2019. The export ratio of polyvinyl

chloride resin increased from 3% to 10%. To flexibly respond to an anticipated increase in demand for caustic soda particularly in Southeast Asia, the segment started to improve infrastructure at the Tokuyama Factory to establish a system that enables stable shipment.

Because the electrolytic plant and the soda ash plant, which are the main plants of the segment, consume large amounts of electricity, we strive to enhance electrolyzer unit performance to save energy and reduce CO₂ emissions (by reducing power consumption) and to develop technology that utilizes CO₂, applying soda ash manufacturing technology. We will use our unique technologies to reduce environmental impact globally and mitigate global warming.

Due to the global impact of COVID-19, there is concern over sluggish demand in the medium to long term. Amid this situation, we will reinforce our system for stable supply by strengthening the supply chain and will seek decarbonization by breaking away from the existing energy consuming businesses. Taking the SDGs into consideration, we will promote new business in the environment and energy business domain.

SWOT

- A unique domestic soda ash and calcium chloride manufacturer
- Electrolyzer units and electrolytic and manufacturing technologies with an extensive track record

- Inadequate sales networks overseas
- Sales volumes of calcium chloride for cryoprotectants changes depending on weather conditions

S: Strengths

W: Weaknesses

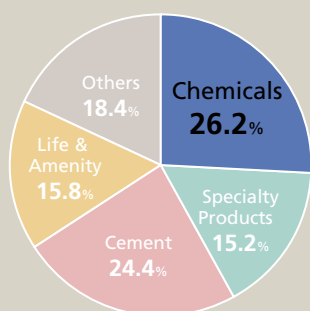
O: Opportunities

T: Threats

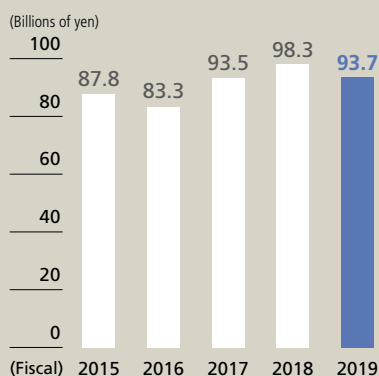
- Market penetration of fuel-cell vehicles, promotion of a hydrogen society
- Expanding demand for caustic soda and polyvinyl chloride resin on the back of economic growth in Southeast Asia and India
- Application of sodium hypochlorite and IPA in medicine and nursing care

- Falling domestic demand due to a decline in the Japanese economy and the relocation of users overseas
- Falling demand due to a slowdown of the Chinese economy

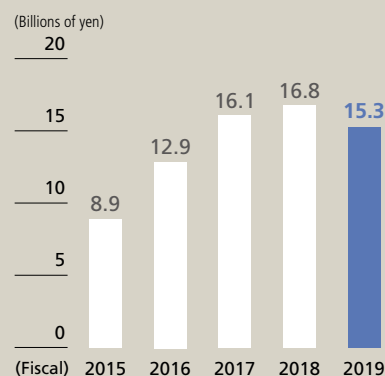
● Sales by Segments
(Fiscal 2019)



● Net Sales



● Operating Profit



Overview of Results in Fiscal 2019

Net sales in this segment stood at ¥93,730 million (down 4.7% year on year). Operating profit came to ¥15,366 million (down 8.8% year on year).

The sales volume of caustic soda was firm, but earnings decreased, reflecting higher raw material prices and lower export prices due to a decline in overseas markets.

Earnings from polyvinyl chloride resin rose as the spread between raw material prices and sales prices was maintained.

Earnings from propylene oxide decreased owing to a drop in sales volume for polyurethane, its main application.

Earnings from calcium chloride declined, reflecting a decrease in sales volume for snow melting applications due to the warm winter and low snowfall, and an increase in logistics costs.

Challenges to Address

Operations in Japan and overseas will likely be affected by the spread of COVID-19 for some time to come. In this environment, we will strive to secure profits by stably supplying domestic customers, taking advantage of our production bases in Japan, identifying customers overseas, building an optimum distribution network including warehouses and inventory control, enhancing cost competitiveness by reducing unit energy consumption and fixed costs, and creating a production system enabling higher productivity.

In January 2020, we reorganized the chemicals development department and began initiatives to help achieve the SDGs. Our themes are the development of a brine electrolyzer unit, an alkaline water electrolyzer unit and system, and technology utilizing CO₂, an area where we can use and apply our own technologies. Through this development, we will reduce CO₂ emissions and introduce renewable sources of energy, thereby improving our environmental value. We will enhance our corporate value by developing operations focusing on hydrogen in the environment and energy fields.

Major Topics

Topics

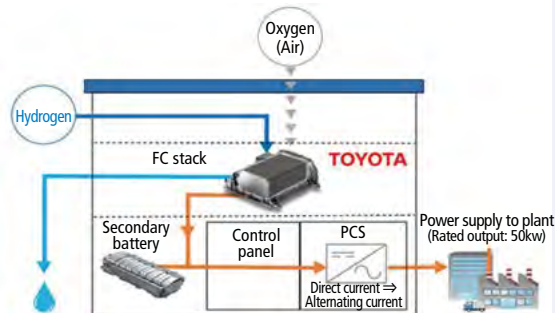
Tokuyama and Toyota Start Verification Tests in Japan for Stationary Fuel Cell Generator That Uses By-product Hydrogen

Tokuyama Corporation and Toyota Motor Corporation started verification tests of a stationary fuel cell generator (FC generator) using a fuel cell system (FC system) that is installed in Toyota's MIRAI fuel cell electric vehicles and has been set up within the Tokuyama Factory grounds.

In the verification tests, the by-product hydrogen generated during Tokuyama's manufacturing of caustic soda using brine electrolysis is used as fuel for the FC generator. The electricity generated by the FC generator is supplied to the Tokuyama Factory.

Tokuyama will examine a model regional contribution project using by-product hydrogen as one of Japan's leading diversified chemicals manufacturers with the ability to supply high-purity by-product hydrogen.

● System Structure of FC Generator



Specialty Products



Hiroshi Nomura Director, Managing Executive Officer, General Manager, Specialty Products Business Division

The Specialty Products segment manufactures and sells high value-added products, such as semiconductor-grade polycrystalline silicon, fumed silica, aluminum nitride and high-purity chemicals for electronics manufacturing, which are used for state-of-the-art digital devices and technological innovation in the field of the environment and to save energy. In the thermal management material business, as a leading company that developed the world's first aluminum nitride sintered body through which light passes in 1982, we supply high-purity aluminum nitride, with its high ability to dissipate heat (thermal conductivity) and its insulating properties. Our share of the global market is over 70%.

The semiconductor market continues to technologically innovate, including in miniaturization, and there are volatile demand changes in the market. The key requirement for market participation is meeting customers' quality, volume, price and service requirements in a timely manner. The market is growing, and the number of new competitors entering the market is increasing worldwide. Competition between existing competitors and new ones is expected to intensify. In this business environment, we focus on manufacturing

higher quality products, developing new products and on accurately identifying the needs of the manufacturers of leading-edge semiconductors and semiconductor materials based on what we consider are our strengths, namely our history of delivering to the world's top manufacturers of semiconductors and semiconductor materials and our production technology and analysis technique that enables us to continue to manufacture high-quality (high-purity) products.

Due to COVID-19, economic activities are sluggish, and the world economy is slowing remarkably. However, in the semiconductor industry, demand for semiconductors for data centers is expected to increase in response to increasing communication volume due to the expansion of working from home and other hours spent at home. To ensure that sales opportunities are seized, we will forcefully implement differentiation strategies. We will invest with the aim of reinforcing the facilities used for each of our products in a timely manner to meet the needs of the market and customers, and we will accelerate our efforts to improve quality and develop new products.

SWOT

<ul style="list-style-type: none"> • Superior quality products related to semiconductors • Unique high purification technologies, such as nitride reduction (thermal management materials) and direct hydration (IPA) • A large share of the thermal management material market 	<ul style="list-style-type: none"> • Inadequate marketing capability for the global market
<ul style="list-style-type: none"> • Shift to the next-generation communications standard (5G) and the sophistication of electronic equipment • Growth in the semiconductor field attributable chiefly to higher performance, higher-capacity memory and electrical equipment for vehicles • Higher customer quality requirements due to advances in miniaturization and lamination 	<ul style="list-style-type: none"> • Entrance of new overseas manufacturers • Technological innovation in the semiconductor market

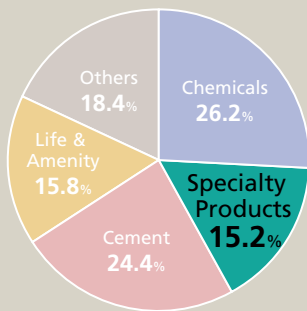
S: Strengths

W: Weaknesses

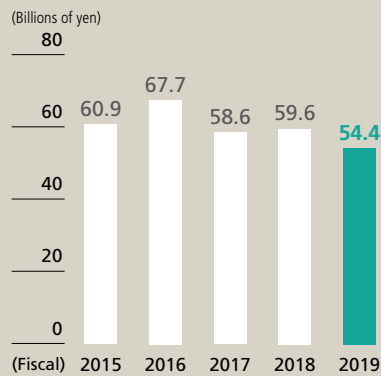
O: Opportunities

T: Threats

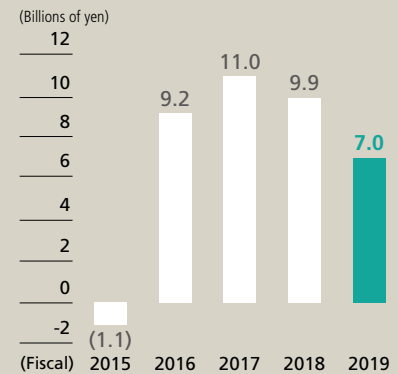
● Sales by Segments (Fiscal 2019)



● Net Sales



● Operating Profit



Overview of Results in Fiscal 2019

Net sales in this segment stood at ¥54,466 million (down 8.7% year on year). Operating profit was ¥7,058 million (down 29.0% year on year).

Although there were signs of recovery in the semiconductor-grade polycrystalline silicon and thermal management materials markets, sales volume fell due to inventory adjustments and earnings decreased. The sales volume of high-purity chemicals for electronics manufacturing, primarily those for overseas markets, recovered and was on a par with the level of the previous fiscal period.

In research and development, we upgraded existing silica products and developed new conformal silica. We strengthened the organization for the trial production of aluminum nitride filler, boron nitride filler and silicon nitride powder and made progress with customer evaluations. Development of a silicon nitride substrate was commenced. We stepped up efforts to meet the need for highly purified materials associated with the miniaturization and 3D integrated processes of semiconductor devices.

Challenges to Address

We expect that the semiconductor market will continue to grow in the medium to long term. Each business in the Specialty Products segment is being deployed mainly in Asia, particularly in Taiwan, South Korea and China. We are considering expanding the businesses into other regions. If certain conditions are met, we will actively create new bases in new markets to increase the ratio of overseas sales.

We will prepare to continue to invest in what is necessary to expand business, improve quality and launch new products in a timely manner. Meanwhile, we will enhance the production and quality control technologies that make business expansion, quality improvement and new product launches possible. We will also enhance engineering capabilities, designing and building facilities and plants that will enable the production of high-quality products. We aim to build a cost-competitive production system that will also maintain the quality of products to increase customer satisfaction regarding quality and cost.

Major Topics

Topics

Center for Commercialization of Advanced Technology to Be Established for the Commercialization of Silicon Nitride

Tokuyama has started construction of the Center for Commercialization of Advanced Technology, which will be used for the commercialization of silicon nitride, among other advanced materials. The center will begin operating in 2021.

The center will be used as a base for the development and commercialization of products that contribute to global environmental protection and the further application of ICT. For the foreseeable future, the center will focus on the commercialization of silicon nitride for the power semiconductor modules used in environmentally friendly vehicles and renewable energy power generation equipment.

Tokuyama will contribute to the development of the environmentally friendly and sustainable society by promoting the use of silicon nitride materials that are both quality and cost.

- Center for Commercialization of Advanced Technology Ceremony praying for the safety of construction work



Cement



Takahide Taniguchi Executive Officer, General Manager, Cement Business Division

Our cement business was born from the effective use of the waste generated in the production of soda ash. Tokuyama’s cement plant, in terms of production capacity, is one of the largest single plants in Japan. It provides cement and related products, including cement-type stabilizer. These products support infrastructure, such as buildings, port facilities, bridges and roads. The plant’s port facilities are capable of unloading raw materials from ships and loading products onto large vessels. Three kilns enable optimized production and stable supply.

Although demand fell due to COVID-19, we actively sell products for construction to increase sales volume. Demand also fell overseas due to COVID-19. We are changing destinations to markets where demand is rising, even if slightly, to increase the volume of exports. On another front, we are striving to tap into new sources of demand, such as customers’ capital expenditures, in cooperation with our other business segments.

Coal prices are falling, which is helping reduce manufacturing costs. At the same time, the

operating rate is dropping due to a decrease in sales volume, which is increasing costs. In this environment, we will continue to curb any increases in fixed costs. The aging of equipment is another major challenge. We will strengthen our safety system by continuing to conduct periodic maintenance and invest in replacement, in addition to conducting routine inspections, thereby ensuring stable and safe operation.

In 1995, we succeeded in burning waste plastics in the front portion of the kiln, an industry first, and we have also established a technology to treat large amounts of waste plastics without polluting. While continuing to pursue the resources and environment business using the kiln, we are considering developing a recycling business that would be independent from the kiln to contribute to solutions to social issues.

We will help with measures to improve the aging infrastructure built or improved during the period of high economic growth through concrete patching and reinforcement to support sustainable social development.

SWOT

- Contributing to environmental conservation by accepting waste in and outside the Company and using it as raw materials for cement and alternative thermal energy sources

- Increasing repair costs due to the aging of equipment

S: Strengths

W: Weaknesses

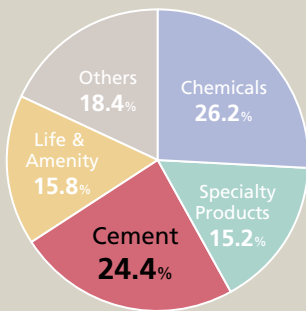
O: Opportunities

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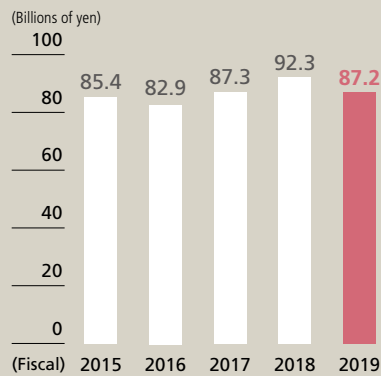
- Domestic demand related to the National Resilience Initiative and the Linear Chuo Shinkansen Line project
- Demand for infrastructure development associated with economic development in emerging countries

- Intensifying competition due to the reorganization of the cement industry
- The adverse effect of CO₂ emissions on the cement industry
- Falling domestic demand due to the declining population

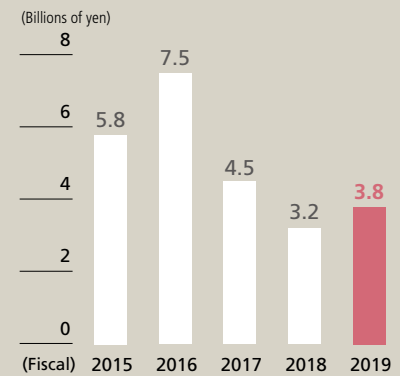
● Sales by Segments
(Fiscal 2019)



● Net Sales



● Operating Profit



Overview of Results in Fiscal 2019

Net sales in this segment stood at ¥87,289 million yen (down 5.5% year on year). Operating profit came to ¥3,835 million (up 19.7% year on year).

Although cement manufacturing costs fell due to a decrease in raw material prices, earnings from cement dropped, reflecting lower sales volume and an increase in fixed costs, including repair costs. Earnings from resource recycling rose as a result of an increase in the volume of waste accepted.

In research and development, we are continuing development for the utilization of waste and by-products in the cement production process to reduce environmental impact. We have started to develop a technology to recycle solar panels as a new theme to utilize waste effectively. As basic research into cement, we continued an examination to lower the cement clinker burning temperature to save energy.

Challenges to Address

We are concerned about a decline in demand as construction work was suspended temporarily, primarily in large cities, due to COVID-19.

In this environment, we will strive to secure earnings through efforts to receive orders after construction work resumes and significant reductions in manufacturing costs. With regard to receiving orders, we are considering tapping into demand in the Tokai area, particularly demand related to the Linear Chuo Shinkansen Line project and redevelopment in front of Nagoya Station, using the Nagoya Service Station, which was established in 2019, as a base. To reduce manufacturing costs, we will create an organization dedicated to the introduction of advanced high energy efficiency technology in the cement manufacturing department and will take steps to ensure we are highly competitive.

We will cultivate the building materials business, which mainly engages in concrete repair materials used for the repair and reinforcement of aging social infrastructure such as roads, tunnels and bridges, as the next core business in this segment by developing new products and enhancing product sales.

Major Topics

Topics

Technology for 100% Recycling of Waste Gypsum Boards Wins Minister of the Environment Award and LCA Society of Japan Chairman's Award

Gypsum board is a material used to build interior walls and ceilings. When new buildings are built and buildings are dismantled and rebuilt, waste gypsum board is generated, and most of it is disposed of in landfills.

Tokuyama Chiyoda Gypsum and Tokuyama have developed a 100% recycling technology for producing material for gypsum board from waste gypsum board and have succeeded in commercializing the technology. The technology was recognized, with the two companies winning the Minister of the Environment Award at the 46th Environmental Awards and the Chairman's Award at the 16th LCA Society of Japan Awards.

There are high expectations as a technology enabling the conservation of raw materials and significantly improving the environmental efficiency of housing construction materials.



Award ceremony for the 46th Environmental Awards

Life & Amenity



Ryo Sugiyama Managing Executive Officer, General Manager, Life & Amenity Business Division

This segment provides pharmaceutical ingredients / intermediates, dental materials and equipment, medical diagnosis systems, food packaging materials and materials for disposable diapers, among other products, to help people live comfortable lives. Of these products, photochromic dye materials, which are created using an organic synthetic technology in which we excel, are widely used as photochromic dye materials in plastic eyeglass lenses to protect people’s eyes due to their unique properties in which their color quickly develops and fades and they filter out ultraviolet light.

In the present super-aging society, health-care markets, particularly overseas markets, are expanding. The domestic market is undergoing drastic change, including falling drug prices due to the policy of reducing healthcare spending and intensifying competition attributable to the entry of overseas manufacturers, especially Chinese manufacturers, into the market.

In this market environment, the Company operates state-of-the-art manufacturing equipment that conforms to the manufacturing control and quality control standards for pharmaceuticals and quasi drugs under a strict control system that ensures product reliability, and it also develops

high value-added products that are both price competitive and superior in terms of performance, efficacy and usability. The departments responsible for development, manufacturing and sales cooperate with each other to meet the diverse expectations of customers promptly and faithfully.

We also promote open innovation, including joint research with external organizations, and develop products for markets where the uses of products are different from existing markets. To strengthen marketing capabilities overseas, we actively hire human resources that are knowledgeable regarding overseas markets. We aim to expand the markets for dental materials and equipment, medical diagnosis systems and ion exchange membranes, among other types of products.

As environmental regulations that apply to corporate activities are becoming more stringent, we are developing environment-related businesses. The ion exchange membranes business, for example, recycles resources recovered from industrial effluent. Tokuyama will contribute to building a sustainable society by providing products that reduce environmental impact, including ion exchange membranes and plastic window sashes.

SWOT

<ul style="list-style-type: none"> • Ability to develop products and technologies based on extensive experience • The unification of the sales and development divisions enables the Company to respond to users’ requests promptly and meticulously 	<ul style="list-style-type: none"> • Presence in overseas markets • Insufficient expansion into overseas markets
<ul style="list-style-type: none"> • Growth in the healthcare field due to the arrival of a super-aging society and increasing health consciousness • Increasing demand for energy-saving products, including plastic window sashes and home building materials 	<ul style="list-style-type: none"> • Existing products no longer used due to changes in lifestyles.

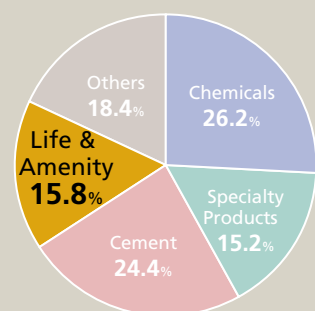
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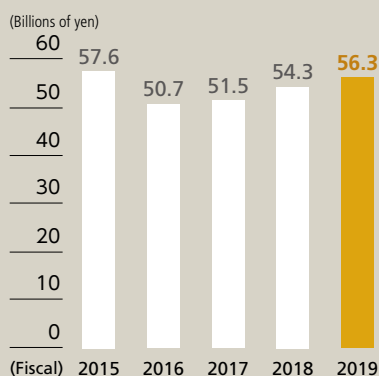
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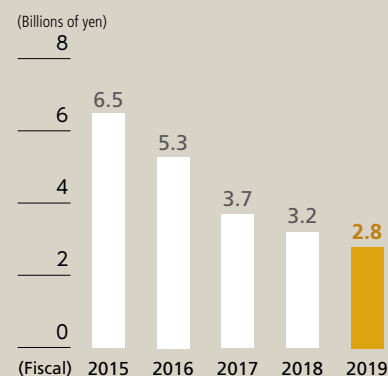
● Sales by Segments
(Fiscal 2019)



● Net Sales



● Operating Profit



Overview of Results in Fiscal 2019

Net sales in this segment came to ¥56,307 million (up 3.5% year on year). Operating profit stood at ¥2,885 million (down 10.8% year on year).

Although sales volume of dental materials and equipment increased mainly overseas, earnings from dental materials fell chiefly due to an increase in advertising expenses related to the launch of new products. Earnings from medical diagnosis systems rose, reflecting steady orders for clinical testing devices and systems. Earnings from ion exchange membranes fell due to a decrease in large-scale projects.

The Company developed products in each business. With regard to plastic lens-related materials, the Company developed next-generation photochromic dye materials. In relation to ion exchange membranes, it expanded application technology of bipolar membrane electrodialysis and developed ion exchange membranes for which there were customer needs.

Challenges to Address

Due to the impact of COVID-19 in Europe and the United States, sales volume of dental materials and equipment, among other products, is expected to fall temporarily. In this environment, the Company will focus on developing and selling new healthcare products in response to changes in customer needs and the market, aiming to expand earnings.

In the pharmaceutical ingredients / intermediates business, we will develop products for supplements and cosmetics, which support healthy and comfortable lives, including skin whitening and skincare products and health foods. We will build optimal development, production and sales systems, while considering alliances with outside entities as well as mergers and acquisitions.

In the ion exchange membranes business, where demand is growing for applications other than existing uses, including resource recovery and the reduction of process effluents that contribute to reducing environmental impact, we will improve the supply system to meet expanding demand. In the polyolefin film business, where the main product is food packaging film, we will focus on environmentally friendly products using biomass plastics.

Major Topics

Topics

Tokuyama Chosen as a CPhI Pharma Awards 2019 Finalist

In recognition of our success in active pharmaceutical ingredient (API) process development, Tokuyama was chosen as one of six finalists for the Excellence in Pharma award in the API Development category of the CPhI Pharma Awards 2019.

The CPhI Pharma Awards are given to technologies based on actual production in each of the sectors in the healthcare business. Nominated in the API Development category that Tokuyama entered are manufacturing technologies in which process chemists from original and generic manufacturers throughout the world pursued the limits of creativity, efficiency and economy. The Company's process development technology can reduce the existing manufacturing process by nearly half and can improve productivity and economic efficiency significantly. Tokuyama will continue striving to develop competitive technologies in both product development and process development to provide technologies and products that contribute to healthy and better lives.

