ANNUAL REPORT 2018

Tosoh Corporation and consolidated subsidiaries
Fiscal year ended March 31, 2018

TOSOH CORPORATION

Forward-Looking Statements: *Annual reports contain estimates, projections, and other forward-looking statements, which are subject to unforeseeable risks and uncertainties. Readers should understand that Tosoh's business and financial results could differ significantly from management's estimates and projections.*

For reference purposes only, US dollar amounts have been translated, unless otherwise indicated, from yen at the rate of ¥106.24 = US$1, the prevailing exchange rate at the end of the fiscal year under review.

Tosoh Corporation's 2018 fiscal year covers the period from April 1, 2017, to March 31, 2018.

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AT A GLANCE

Values

At Tosoh Corporation, we take pride in having established a resilient global enterprise whose products and services are woven into the fabric of modern life. Values based on a craftsman-like approach to product detail and quality have shaped our destiny and growth for more than 80 years.

Basics

Tosoh Corporation was established in 1935 and is listed on the First Section of the Tokyo Stock Exchange. We are the parent company of the Tosoh Group, which comprises more than 100 companies worldwide, and has a multiethnic workforce of more than 12,000 people.

Products

Tosoh furnishes the raw materials for an astonishing array of products that have revolutionized modern civilization. Look around you. It is almost impossible to find a manufactured item that does not include something from Tosoh.

MESSAGE FROM THE PRESIDENT

We are each year presented with a new set of challenges—changes and developments in the geopolitical, economic, and environmental arenas that can impact our operations in seemingly innumerable ways—and each year Tosoh employees align to move forward toward our common goals. Over the past few years, we have set our sights on consolidating our finances, on ramping up our investment in the technologies that will make possible the products and services of the future and on strengthening and optimizing the efficiency of our operations. Our efforts yielded results in fiscal 2018, and I am proud to share them. I hereby present Tosoh Corporation's annual report for fiscal 2018.

As in past years, we remained dedicated to our core mission: delivering innovative products that serve society. It was therefore imperative that we strengthened our financial foundation, invested in our R&D in the interest of commercializing innovative technologies and products that address global environmental and societal issues, and sustained our safety-related efforts to ensure the continued trust of society. I am pleased to announce that our endeavors, and favorable trade conditions, contributed to records in consolidated net sales and operating income for Tosoh in fiscal 2018.

Net sales rose significantly compared with fiscal 2017, 10.7%, to ¥822.9 billion, and operating income climbed 17.4%, to ¥130.6 billion. Ordinary income likewise rose, 16.9%, to ¥132.3 billion, as did net profit attributable to owners of the parent company, 17.4%, to ¥88.8 billion.

Our efforts internationally have continued to bear fruit. Exports and sales by our overseas subsidiaries grew to account for just under half of Tosoh's consolidated net sales in the year under review. Asia beyond Japan remains our single most successful market overseas, and prospects are excellent for continued growth in the region.

Tosoh's medium-term business plan outlines the company's objectives for the three-year period ending in March 2019. At the conclusion on March 31, 2018, of only the plan's second year, we had already exceeded our fiscal 2019 targets of ¥750 billion in net sales and ¥85 billion in operating income. Our operating profit margin in fiscal 2018, of 15.9%, also surpassed our fiscal 2019 goal, of 10% or better, and the operating profit margin achieved in fiscal 2017. And our strong 19.6% return on equity was nearly double the 10% or better target established in the medium-term business plan for fiscal 2019.

A steady reduction in interest-bearing debt and increase in our equity ratio contributed strongly to our record sales and profits in fiscal 2018. These factors also heightened our retained earnings, which positions us to move rapidly and decisively on mergers and acquisitions (M&A) and future investment.

The needs of society are changing rapidly amid the influence of political, economic, environmental, and other factors. This requires that we pursue research and development (R&D), facility upgrades, M&A, and other activities with increased resolve. We are rebuilding three of our eight R&D facilities to enhance their ability to generate significant innovations—particularly in the electronics, life science, environment, and energy fields, which we view as having the highest potential for growth.

Our investments in facility upgrades in fiscal 2018 amounted to ¥39.5 billion, a figure that we are planning to increase more than 70% in fiscal 2019. When we include funds allocated to M&A activity in the year ahead, we anticipate surpassing our fiscal 2019 medium-term business plan target for cumulative investment of ¥160 billion. We also expect that our facility upgrades and our bolstered R&D will contribute substantially to sustaining the consistently high operational rates so crucial to the continuous generation of stable profits.

In all that we do, we emphasize the importance of corporate social responsibility (CSR). The principal issues faced by management correlate to CSR and include meeting the expectations of stakeholders with regard to earnings, operational safety, growth strategies, increasingly stringent governance and compliance standards, and fortified worksite capabilities.

We continue to educate our employees on issues such as the importance of safety awareness on a daily basis. This involves reminding them of the need to act voluntarily instead of awaiting instructions and of the significance of maintaining high standards of quality. Challenges remain, of course, and we can always improve. But I am convinced that our efforts in fiscal 2018 were a major factor in establishing a safer work environment, in reducing our environmental impact, and in contributing to our strong financial performance.

Our objectives for fiscal 2019 include strengthening our chlor-alkali operations to maintain our position as one of Asia's top chlor-alkali manufacturers; furthering the efficiency of our petrochemical operations and developing differentiated, high-value-added products; and rapidly commercializing next-generation specialty products. We expect continued challenges, such as the constant battle with fluctuations in raw material costs and shifting market conditions. Yet, as always, we will monitor changes and trends in the political and economic landscapes, regionally and globally. We will also continue our efforts to innovate products to meet society's changing needs and to transform our corporate culture to a global outlook on expanding into new markets.

We are a proud company with a rich history of achievements. The energy, inspiration, and devotion of our employees—along with the enduring support of our customers and shareholders—will be invaluable as we move forward.

Toshinori Yamamoto

President

STRATEGY: Medium-Term Business Plan Update

Fiscal 2019, which began on April 1, 2018, marks the final year of the medium-term business plan Tosoh issued prior to the start of fiscal 2017. The plan outlines Tosoh's goals and initiatives for the three-year period from fiscal 2017 to fiscal 2019, which ends on March 31, 2019. Its triple tenets are to optimally balance the company's commodities and specialties operations, to maintain and fortify the company's financial standing, and to implement safety reforms throughout the company's operations.

The medium-term business plan's financial targets include net sales of ¥750 billion, operating income of ¥85 billion, and an operating income ratio and a return on equity (ROE) of 10% or better. By fiscal 2018 year-end, fully a year in advance of the plan's completion, the company had already achieved each of these targets.

This feature presents the highlights and results of the plan and of the strategies the company is employing in its commodity and specialty operations to meet the plan's targets and to stabilize its profitability. It is based on information available at the time of writing. So be advised that changes in economic conditions and that other, unknown factors in Japan and internationally could cause actual results to differ significantly from any projections presented.

Business Positioning

Tosoh has a dual operating strategy, whereby its commodity and specialty operations complement one another. Under its medium-term business plan, Tosoh is strengthening its commodity operations to secure steady cash flow and profitability by investing to enhance production capacity and other resources. The company's commodity operations must continue to meet Tosoh's internal needs for utilities and raw materials and robust demand globally for basic raw materials.

Tosoh's commodity business comprises the Chlor-alkali and Petrochemical Groups, which supply products within Tosoh and to markets worldwide. The Chlor-alkali Group boasts the largest integrated chemical commodity production capacity in Asia and provides such raw materials as chlor-alkali, cement, and polyurethane. The Petrochemical Group involves olefins and polymers and works constantly to keep pace with changing market conditions. Its compatibility with various feedstocks, such as naphtha, ethylene, propylene, and benzene, enables it to suppress costs and mitigate raw material price variations.

The medium-term business plan's focus for the company's specialty operations involves investing in growth fields and collaborating with business and academic entities in R&D and M&A.

The specialty operations are Tosoh's growth engine. They encompass the Organic Chemicals, Bioscience, and Advanced Materials Divisions, whose products are basic materials of such high quality that they lend added value to the products of other manufacturers. Featured among Tosoh's specialties are battery materials, quartz, zirconia, chromatographic systems and media, and ethyleneamines. These are well-positioned and profitable and protect the company from the fluctuations to which commodities are especially susceptible.

Tosoh is thus investing aggressively in its specialty and commodity operations. It is expanding the scope of its specialty operations with a focus on areas it deems to show the greatest potential for growth and on the development of new products. And it is bolstering its commodity operations to enhance their efficiency and productivity. In so doing, Tosoh intends to achieve the overall operational stability to enable it to endure fluctuations in its business environment and thereby maximize its corporate value.

Specialty Business

Overview

Advanced materials initiatives under the medium-term business plan focus on high-silica zeolite (HSZ), zirconia, electrolytic manganese dioxide (EMD), quartz glass, and sputtering targets. Demand for HSZ is rising, and Tosoh is increasing production capacity, with construction under way at the Nanyo Complex, and developing new grades. The company is also scheduled to begin construction at the Nanyo Complex to raise its production capacity for zirconia 30%. That and the development and marketing of new zirconia grades featuring higher quality and functionality will contribute to Tosoh's ability to keep pace with steady growth in demand.

Advanced functionality is the company's focus in EMD, quartz glass, and sputtering targets. Tosoh seeks to distinguish itself with high-performance products for new applications and by enhancing product cost-competitiveness through reductions in production costs and the development of new materials.

The medium-term business plan's three-year strategy for organic chemicals calls for improving the profitability of ethyleneamine, polyurethane foaming catalyst, bromine, and flame retardant products and for stabilizing business in new products. Tosoh will transition to high molecular weight amines, such as triethylenetetramine, or TETA, and tetraethylenepentamine, or TEPA, to enhance profitability. It will also augment marketing activities for its polyurethane catalyst RZETA® in Europe and the United States and look to increase sales of its TOYOCAT® amine catalysts. An upgrade of its bromine manufacturing facilities has already greatly enhanced their efficiency.

Tosoh plans to invest aggressively in bioscience R&D and M&A to expand its sales of chromatography instruments, columns, separation and purification media, immunoassay analyzers, and reagents in established markets and to nurture new markets. M&A should also help the company acquire new products and technologies. Tosoh is in particular targeting the separation media market, which is expected to grow to about ¥150 billion by fiscal 2019. It will increase its TOYOPEARL® production capacity and develop columns and separation media specifically for the biopharmaceutical market. The company will also expand its lineup of differentiated reagents in regions where growth is expected, such as India, where Tosoh India will work to grow the market.

Financial Progress & Targets

Net sales for specialty operations in fiscal 2018 reached ¥187.1 billion, topping the fiscal 2019 target of ¥184.0 billion by 1.7%, and operating income was ¥33.9 billion, which fell short of the fiscal 2019 goal of ¥40.0 billion. Operating income was affected by reduced revenue from

ethyleneamines caused by an increase in raw materials prices and a decrease in market prices, by the squeezing of profit margins for zirconia products resulting from increased prices for key raw materials.

Commodity Business

Overview

The Chlor-alkali Group's initiatives toward fulfilling the goals of Tosoh's medium-term business plan by year-end fiscal 2019 include the following. It will enhance its ability to secure raw materials at competitive prices, maximize its efficiency in areas such as power generation and consignment, and improve the profitability of its soda and chlorine derivatives.

Asian demand for methylene diphenyl diisocyanate (MDI) is forecast to grow 6% on average annually. So, the Chlor-alkali Group will transition to the manufacturing of high-value-added MDI. This, together with a strengthening of its functional urethane operations, will bolster the group's ability to rapidly shift from commodity to specialty products and raise its proportion of system sales over single-item sales. The Chlor-alkali Group will also expand its functional urethane sales into medical fields and augment its hexamethylene diisocyanate (HDI)-derivative production capacity.

The Petrochemical Group will focus on enhancing olefin production—particularly of ethylene, propylene, and cumene—by sustaining high naphtha cracker operating levels, thereby maximizing its profitability. It will also strive for heightened competitiveness by raising the efficiency of its energy inputs and by formulating a pricing scheme that ensures improved margins.

Tosoh's refinery and petrochemical modeling system (RPMS) enables it to balance its rate of production, product portfolio, and market prices through measures such as the adjustment of its naphtha cracker output mix. This creates business opportunities that the company is poised to take full advantage of. It enables the Petrochemical Group to shift further, for example, into the production of unique, high-value-added polymer products—mainly the functional polymers of chloroprene rubber (CR) and chlorosulphonated polyethylene (CSM). The group will look to increase its sales of its special CR grades, including sulfur-modified and injection-mold CR.

Financial Progress & Targets

In fiscal 2018, commodity operations generated ¥509.8 billion in net sales, surpassing the fiscal 2019 target of ¥441.0 billion by 15.6%. Operating income totaled ¥89.1 billion, again comfortably exceeding the fiscal 2019 goal of ¥38.0 billion. Net sales for the Chlor-alkali Group were ¥335.0 billion, surpassing the fiscal 2019 target of ¥277.0 billion by 20.9%, while the Petrochemical Group posted net sales of ¥174.8 billion, 6.6% above the fiscal 2019 goal of ¥164.0 billion. Chlor-alkali Group operating income was ¥66.6 billion, more than triple the ¥21.0 billion target established for fiscal 2019. Operating income for the Petrochemical Group was ¥22.5 billion, exceeding the ¥17.0 billion goal for fiscal 2019 by 32.4%.

Engineering

Overview

The Engineering Group's operations are led by Organo Corporation. This Tosoh water treatment subsidiary forecasts robust capital investment in the electronics manufacturing industry—particularly in Taiwan and China—and this will be an area of focus amid its efforts to expand its overseas operations. Under its new mission and long-term vision, Organo will apply the expertise it has accumulated in its water treatment business, such as separation and refinement, analysis, and manufacturing technologies, to the development of businesses in non-water fields, including solvents and electronic materials.

Organo will, of course, continue developing products such as standard water treatment systems and water treatment chemicals, bolstering the overseas operations of its mainstay business. But it will also cultivate new areas of business.

It will, for example, develop separation and purification technologies for lithium-ion battery applications, for the rapidly growing semiconductor manufacturing domain, and for the extraction of medicinal ingredients in the biopharmaceutical field. It will also fortify its abilities in vital manufacturing technologies for the food processing industry with an eye to expanding that aspect of its business. Organo, moreover, intends to grow its share of the Chinese electronic materials market to capitalize on continued robust capital investment in China. It likewise seeks to expand its offerings in business solutions.

Financials

Net sales for the Engineering Group in fiscal 2018 were ¥84.8 billion, down ¥1.8 billion from fiscal 2017. Operating income, meanwhile, totaled ¥4.9 billion, down marginally from fiscal 2017.

REVIEW OF OPERATIONS

CHLOR-ALKALI GROUP

"Over the next few years, we will look for key opportunities that will enable us to boost our manufacturing capabilities in order to meet growing demand in Asia."

-Shingo Tsutsumi, Director; President, Chlor-alkali Group

Snapshot

The Chlor-alkali Group comprises Tosoh's chlor-alkali, urethane, and cement operations. It supplies the international chlor-alkali industry with raw materials that are vital in a variety of products common in everyday life.

The group's Chlor-alkali Division produces caustic soda, vinyl chloride monomer (VCM), polyvinyl chloride paste (PVC), calcium hypochlorite, sodium bicarbonate, and others. Its Urethane Division manufactures isocyanate raw materials and functional urethanes, including methylene diphenyl diisocyanate (MDI), toluene diisocyanate (TDI), hexamethylene diisocyanate (HDI), polyurethane adhesives, coating resins, elastomers, polyisocyanates for polyurethane paints, and polyols.

The raw materials naphtha and salt underpin the Chlor-alkali Group's materials and products, which are manufactured in the largest chlor-alkali commodity operation in Asia: Tosoh's fully integrated Vinyl Isocyanate Chain. The materials and products are then either sold to customers or channeled back into the chain as feedstocks.

MDI is an aromatic diisocyanate key as a feedstock in the production of polyurethane-based products, and a popular product in its own right. Tosoh supplies MDI to manufacturers domestically and internationally. MDI and TDI, another aromatic diisocyanate, result in such products as elastomers, coatings, foams, and adhesives. HDI is an aliphatic diisocyanate used in specialty products, such as high-performance paints and adhesives.

The integration of the vinyl chain at the Yokkaichi Complex and the vinyl isocyanate chain at the Nanyo Complex has made Tosoh a formidable presence in the international chlor-alkali market. That integration makes possible the efficient bulk manufacturing of commodities for use in Tosoh's and other manufacturers' products.

Tosoh's cement operations, also overseen by the Chlor-alkali Group, consist of the manufacture of cement and the consignment of the production output to Taiheiyo Cement Corporation, Japan's largest cement manufacturer. Tosoh collects by-products, including coal ash and slag, from its operations and other, outside sources that the Chlor-alkali Group incorporates into its cement manufacturing process. This reduces costs considerably and contributes significantly to the communities and the environments where Tosoh operates.

Group performance

Improved Profitability

Net sales by the Chlor-alkali Group in fiscal 2018 increased 19.8%, to ¥335.0 billion (US$3.2 billion) from the previous year. This accounted for 40.7% of the company's consolidated net sales, up from 37.6%, in fiscal 2017. Operating income improved 39.0%, to ¥66.6 billion (US$627.1 million), constituting 51% of consolidated operating income and resulting in an operating margin of 19.9%, an increase of 2.8 percentage points over fiscal 2017.

Price corrections in Japan and improved market conditions overseas led to an increase in caustic soda prices. VCM and PVC shipments were strong, and price corrections domestically and improved market conditions overseas boosted PVC prices.

Heightened public-sector demand raised domestic shipments of cement only slightly. Cement exports helped offset lagging local market demand.

MDI export prices rose. Modest delays in competitors' expansion plans led to continued tightness in supply and demand.

Developments

Capital Investments

The Chlor-alkali Group is raising the efficiency of the coal-fired electric power generation plant at the Nanyo Complex. It will also work to increase the Nanyo Complex's ability to use resources such as warm water, waste acid, and chlorine in the production of bromine with the goal of becoming the top manufacturer in Asia. And it will consider increasing its production capacity for caustic soda, VCM, and PVC paste to capitalize on increased demand in Southeast Asia and India.

Also in the works for the Chlor-alkali Group are improvements to its logistics infrastructure to boost competitiveness. The group will improve jetties and tanks and optimize its electricity balance. In November 2019, it will begin construction for the installation of a new naphtha cracking furnace at the Yokkaichi Complex. And in summer 2020 it will renovate the older cracker at that complex.

Vinyl Isocyanate Chain

Tosoh's truly powerful competitive advantage is its integrated production capability. The company's vinyl isocyanate chain combines the vinyl and isocyanate processes. This facilitates the efficient, high-volume production of raw materials to be used either as feedstocks fed back into the chain to make more raw materials or finished products internally by Tosoh and its group companies or to be sold to external customers for use in their finished products. No other manufacturer in Asia possesses such a comprehensive capability.

The vinyl side of the chain begins with the electrolysis of salt to generate chlorine, caustic soda, and hydrogen and with the steam cracking of naphtha to produce ethylene, carbon monoxide, and benzene. Some of the chlorine produced is then reacted with ethylene and hydrogen chloride to make ethylenedichloride (EDC), while the remainder of the chlorine is used in

manufacturing other chlorine products. EDC can be used to produce ethyleneamines by combining it with caustic soda, or it can be converted to vinyl chloride monomer (VCM), which, in turn, can be converted into PVC resins.

On the isocyanate side of the chain, the benzene that the naphtha cracking process yields is combined with hydrogen and ammonia to create aniline. This aniline is then mixed with formalin and with the chlorine and carbon monoxide generated by the vinyl chain to produce MDI, a raw material crucial in the production of polyurethanes. Hydrogen chloride, a by-product of the MDI manufacturing process, is fed back into the vinyl chain to generate additional EDC.

Sustained, safe operation of the vinyl isocyanate chain is essential in supporting not only the manufacture of the Chlor-alkali Group's urethane, chemical, and cement products but also of the Petrochemical Group's and the Specialty Group's products and, moreover, of Tosoh's external customers' products. External customers for Tosoh's commodity and specialty products rely on Tosoh for a stable supply of consistently superior-quality products regardless of economic, environmental, or other conditions. The dependency, meanwhile, of Tosoh Group PVC makers in Southeast Asia for a stable supply of raw materials from Tosoh's vinyl isocyanate chain extends the effectiveness and efficiency of the chain, greatly enhancing its value.

Urethanes

The Chlor-alkali Group's Urethane Division recorded a strong performance in fiscal 2018, primarily on the strength of increased prices for isocyanate. However, concerns persist regarding activities by competitors to increase production capacity, fluctuations in the prices of raw fuel and other materials, changes in exchange rates, and risks related to the Chinese market.

Urethane market conditions are expected to decline in the year ahead. But the Urethane Division will continue developing high-value-added MDI products and strengthening its functional urethane to contribute to stabilizing and maximizing profits. The division will also strive to operate at full capacity in manufacturing to maintain vinyl isocyanate chain operations and in sales to boost revenue.

Among the division's aims is to strengthen its business foundation by consolidating relationships with its domestic customers and by expanding the number of its specialty MDI products. The Urethane Division is also debottlenecking in phases to raise its production capacity domestically and it is bolstering its presence in China through a polyurethane sales and manufacturing base established in Shanghai's Jinshan District in March 2017. It will similarly fortify its global sales structure. As of November 2017, MDI sales operations have already begun at Tosoh India.

The Urethane Division aims for a 50% share of the domestic market by 2022 by, in part, expanding its retail sales of HDI and HDI derivatives. It will also apply new technologies to the development of specialty and high-quality products that distinguish it from competitors. The division's ongoing debottlenecking at its Nanyo Complex plant will also help it respond to growing market demand.

Chlor-alkali

Demand for PVC worldwide grew 44.0 million metric tons in fiscal 2018. The growth was driven by Asia, which accounts for over 60% of global PVC demand. The forecast for fiscal 2019 calls for continued growth in demand for PVC, again led by Asia. The most significant growth is expected in India and in Southeast Asia. PVC demand increased 3%, buoyed by robust investment in real estate and agricultural infrastructure. Domestic demand is anticipated to continue in fiscal 2019, albeit at a slower pace. Few production capacity expansion projects are anticipated in Asia and elsewhere through 2020, so it is expected that increased demand for PVC will be absorbed by existing sources.

The global caustic soda market showed improvement in fiscal 2018 and is expected to continue to grow at 3% annually amid continued tight supply and demand. Production capacity expansion plans are limited, resulting in demand overtaking supply.

Over the past several years, the Chlor-alkali Group has strengthened its operational foundation, minimized its power consumption and raw material costs, and operated at full capacity. The success of its efforts was evident in the significant increases in its net sales and profits in fiscal 2018. Going forward, the Chlor-alkali Group will examine expanding its chlor-alkali manufacturing capacity, partly by renovating and enlarging facilities at the Nanyo and Yokkaichi Complexes. The Chlor-alkali Group's objective is to ensure production capacity to meet forecasted increases in demand particularly in Asia.

Cement

The Chlor-alkali Group will ensure stable cement production by implementing planned investments to refurbish and replace aging facilities. It will also gradually increase its use of clay substitutes to permanently phase out natural clay. Among its planned capital investments are increases for substitute fuels to reduce its need for coal. As well, the group intends on increasing revenue from recycling waste collected from external sources.

Domestic demand for cement is expected to continue at its present level through fiscal 2019. It will be driven by construction for the 2020 Tokyo Olympic and Paralympic Games, for the Chuo Shinkansen (bullet train) line, for the extension of the Hokkaido and Hokuriku Shinkansen lines, and for the reconstruction work following the Kumamoto Earthquake. Cement sales volume, however, is not expected to grow much because of anticipated schedule delays due to labor shortages, increased personnel costs, and a shift from reinforced steel to steel to shorten the duration of construction projects.

In fiscal 2018, Tosoh achieved 1.24 million metric tons in cement production and sales volumes. This was a first since its transition to single-kiln operations in April 2011.

Following the completion of construction projects related to the 2020 Tokyo Olympic and Paralympic Games, it is thought that cement demand in Japan will continue because of an anticipated backlog of large projects. In particular, infrastructure projects involving the repair and renewal of aging roads and bridges nationally are forecast to drive demand.

PETROCHEMICAL GROUP

"The diversity of Tosoh's petrochemical product offering is one of the keys to our success, and one of our primary competitive advantages."

-Etsuya Ikeda, Senior Vice President, President, Petrochemical Group

Snapshot

The Petrochemical Group plays a critical role in Tosoh's dual operational strategy by producing stable-demand, revenue-generating commodity products and more-profitable high-performance specialty products. The group's primary product lines are polymers, including polyethylene and functional polymer products, and olefins. By managing the procurement of raw materials such as naphtha; by balancing the internal production and external sourcing of ethylene; and by constantly developing differentiated, high-value-added grades of products, the Petrochemical Group supports Tosoh's efforts to achieve balance between its commodity and specialty goods.

Tosoh's ability to manufacture hydrocarbon-based products, such as ethylene, propylene, cumene, and aromatic compounds, in an integrated, efficient fashion is due largely to olefin feedstock supplied by the Petrochemical Group. The company also sells the Petrochemical Group's olefins to external customers, who use them to manufacture products for automotive, construction, and diverse other applications.

Products from the group's polymer operations include ethylene vinyl acetate (EVA), which can be found in solar cells and shoe soles; low-density polyethylene (LDPE), applications for which include medicine and food packaging; linear low-density polyethylene (LLDPE) for thin-film materials; and high-density polyethylene (HDPE), which is used in injection moldings and high-purity pharmaceutical containers.

Polymer operations also produce functional polymers such as chloroprene rubber (CR), chlorosulfonated polyethylene (CSM) rubber, and polyphenylene sulfide (PPS) resin. CSM—for which Tosoh is the world's leading supplier—and CR are most commonly used in automotive applications. And PPS resin, a unique, high-performance plastic, is becoming increasingly popular in automotive engineering, as it enables the development of vehicles that are lighter and that therefore offer improved fuel efficiency.

In fiscal 2019, the Petrochemical Group expects negligible effects on the Asian market from an influx of shale-based, foreign-made ethylene derivatives. The group's diverse lineup of derivatives provides it with valuable flexibility, and its established framework enables it to maintain an ethylene supply balance. A decline in demand for propylene from industrial complex customers is forecast for the medium term, but demand is expected to remain steady throughout fiscal 2019.

Group performance

Improved Profitability

The Petrochemical Group's net sales rose 8.1% from a year earlier, to ¥174.8 billion (US$1.6 billion). However, the group's contribution to Tosoh's consolidated net sales edged downward, from 21.8% to 21.2%. Operating income, meanwhile, increased ¥2.4 billion, or 12.2%, to ¥22.5 billion (US$212.0 million), owing to increased exports and accounted for 17.2% of Tosoh's consolidated operating income, down from 18.0% in fiscal 2017. The group's operating margin was 12.9%, up from 12.4% a year earlier.

Olefin products, such as ethylene and cumene, experienced decreased shipments but increased prices because of higher costs for naphtha and other raw materials. The increased cost of naphtha and other raw materials also drove polyethylene resin prices up, yet their domestic shipments likewise rose. On the strength of robust demand overseas, shipments and export prices of CR increased.

The Petrochemical Group's persistent efforts to procure naphtha and benzene at the best prices and to optimize the balance between internal production and the external procurement of materials contributed to its growth in profits.

Developments

Evolving Markets

In fiscal 2018, external naphtha cracker operators accounting for about 20% of Japan's naphtha production capacity closed their facilities, lowering the country's comprehensive production capacity of around 7.5 million metric tons to about 6 million metric tons. The decrease in naphtha output led to a decrease in the production capacity for derivatives, down to around 3 million metric tons.

The steam cracking of naphtha produces ethylene, but ethylene can also be manufactured in ethane crackers using shale gas. This method is raising ethylene production capacity globally. Its disadvantages are that ethane is challenging to ship, as it must be kept at a temperature close to -100°C, and that ethane crackers produce only ethylene.

Positioning

Olefins

Tosoh continues to balance its naphtha fraction consumption and sales and to maximize the cost-competitiveness of its cracking operations. It is installing a large new naphtha cracking furnace and gas turbine, and renovating the existing furnace, work on which is scheduled for completion in summer 2020. The company is securing steady external supplies of additional necessary components and diversifying sources of purchases, and these efforts are expected to lead to the strengthening of its commodity operations.

Polyethylenes

The Petrochemical Group remains committed to polyethylene products distinguished by functionality, quality, and service amid expansion in the market for general-purpose

polyethylene products driven by foreign manufacturers. The group will also promote its world-class ultrahigh molecular weight polyethylene.

Functional Polymers

Over the past several years, electric vehicles have grown in popularity. This has propelled demand from the automotive industry for PPS resins to satisfy requirements for lighter construction and increased fuel and power efficiency. That demand is expected to continue for the foreseeable future. And the Petrochemical Group is redoubling its R&D efforts to develop high-performance grades of PPS to meet demand. It is developing a PPS compound that offers resistance to thermal shock far superior to that of standard products.

By employing fusion technology, the Petrochemical Group hopes to develop differentiated PPS compounds to expand its PPS sales. It will also invest capital in its plants to prepare for an expected increase in demand for metal terminal connectors for automotive applications.

The Petrochemical Group is also focused on developing a high-performance product to satisfy the needs of car manufacturers for applying automobile underbody coating at a lower temperature than before. The Petrochemical Group has already started providing samples of the new product and is working closely with customers toward full-scale adoption.

Amid tightening supply in the global CR market, the Petrochemical Group maintains its full-scale manufacturing of such products as sulfur-modified CR and water-based latex, sales of which are steady. It is also developing products and cultivating applications to satisfy customers' specific needs while undertaking debottlenecking and maximizing production efficiency.

SPECIALTY GROUP

"We live in an era where societal needs related to information, the environment, and medicine are rapidly becoming more sophisticated, and we believe this presents the Specialty Group with an amazing opportunity for growth."

-Masayuki Yamada, Director; President, Specialty Group;
Senior General Manager, Bioscience Division

Snapshot

The Specialty Group encompasses organic chemicals, bioscience, and advanced materials operations. The group's products are high performance, profitable, and serve extremely specialized needs for clients in a broad range of rapidly growing industries. The group continues to develop differentiated, value-added products and to strengthen its R&D capabilities. It believes it will achieve significant growth by delivering technologies, products, and services to meet constantly changing, increasingly sophisticated societal needs.

The Specialty Group serves customers principally in the pharmaceutical, healthcare, electronics, and automotive industries. Its innovative solutions enhance the efficiency, quality, and value of their products and drive their businesses. It supports technological innovation, contributes to the preservation of the environment, and develops products and services that help to improve medical treatments.

Group performance

In fiscal 2018, Specialty Group net sales increased 6.4% from a year earlier, to ¥187.1 billion (US$1.8 billion). That constituted 22.7% of Tosoh's consolidated net sales, down from 23.7% in fiscal 2017. Group operating income decreased 4.2%, to ¥33.9 billion (US$319.1 million), and accounted for 26.0% of Tosoh's consolidated operating income, compared with 31.8% a year earlier. The group's operating margin was 18.1%, a decrease from 20.1% in fiscal 2017.

The growth in net sales was driven by increased sales volumes of advanced materials, such as zeolite, zirconia, and fused quartz; of organic chemical products, including ethyleneamine and bromine; and of bioscience products, such as liquid chromatography separation media and diagnostic reagents. Operating income, meanwhile, was suppressed by increased prices for naphtha, coal, and other raw materials and by increased fixed costs due to depreciation related to capital investment.

The Specialty Group benefited from decreased bromine production in China resulting from the enactment there of increasingly stringent environmental regulations. But those gains were offset to an extent by rising crude oil and coal prices, which drove up the cost of the group's raw materials and utilities. Also affecting the group's gains was an increased depreciation burden stemming from its robust capital investment.

Developments

Capital Investments

The Specialty Group has as its goals enhancing quality, reducing costs, and raising the safety of its manufacturing operations. It is constructing a new plant for the separation media, TOYOPEARL® and it will build an overseas inventory of this media for its customers. It is providing a safe environment for its personnel and streamlining the production process at this high-tech factory.

The Specialty Group announced in fiscal 2018 plans to boost its high-silica zeolite (HSZ) production capacity. With an investment of ¥10 billion, the group is constructing additional facilities at the Nanyo Complex that will raise its HSZ production capacity 30% and enable it to keep pace with increased demand globally for automobile emission catalysts.

In April 2017, Tosoh launched commercial operations at two new facilities: an HSZ manufacturing plant at Tosoh Advanced Materials Sdn Bhd in Malaysia and a bromine production facility at the Nanyo Complex. The implementation of new manufacturing methods at the latter will enhance the cost-competitiveness of the group's bromine production.

Network Expansion

As part of Tosoh's efforts to strengthen its bioscience business in India, Tosoh began using Tosoh India as its India sales base for urethane raw materials. Tosoh also plans to designate Tosoh India as its sales company for separation and purification media and for an increasingly broad range of products for the Indian market as it gradually increases its presence in that nation.

Positioning

Organic Chemicals

The Specialty Group seeks to stabilize the profits of its organic chemicals businesses. At the same time, it will promote the sale of new products and rapidly commercialize next-generation products in the interest of achieving an ordinary income sales ratio of 20%. In addition, the group will formulate expansion strategies as business opportunities present themselves.

Products that the Specialty Group seeks to strengthen include ethyleneamines, such as TEDA and TOYOCAT®; bromine;and heavy metal treatment agents. Firmer foundations in these products will grant a solid footing and help mitigate the effects of fluctuations in business conditions.

The adoption of increasingly stringent environmental regulations in China has decreased that nation's production of bromine. That pushed up the market price and led to increased bromine sales to China. The Specialty Group will focus on the use of such resources as warm water, waste acid, and chlorine at its Nanyo Complex bromine production facility. It will also fortify its bromine production operations by using environmentally friendly seawater with the goal of establishing Tosoh as the top bromine manufacturer in Asia.

Advanced Materials

Zeolites

The construction of facilities to supplement HSZ production at the Nanyo Complex is under way at a cost of about ¥10 billion. These facilities are slated to begin commercial operation in August 2019 and will boost the Specialty Group's HSZ production capacity 30% over present levels. The group also manufactures HSZ at Tosoh's Yokkaichi Complex. And, in mid-2017, Tosoh launched HSZ production at a new facility in Malaysia.

Ceramics

The Specialty Group's zirconia powder has gained popularity for dental and decorative applications. With the aim of further expanding business to meet customer demand, it plans to augment its zirconia production capacity 30% at the Nanyo Complex. Construction is scheduled to begin in summer 2018, and the expanded zirconia facility is expected to begin operation in October 2019.

Battery Materials

Electrolytic manganese dioxide (EMD) is important in the production of conventional batteries. And the Specialty Group is resolved to develop high-performance battery materials to differentiate its products and raise profitability. The group produces EMD at facilities in Japan and Greece and boasts the world's largest production capacity for EMD.

Electronic Materials

Market demand for semiconductors is rising from the highly diversified semiconductor industry, driven largely by data center, Internet of Things (IoT), and artificial intelligence (AI) applications. The global flat-panel display market is also expected to grow, due mainly to increasing demand for high-definition and large televisions and for organic light-emitting diode (OLED) displays for mobile applications.

The Specialty Group's quartz products are used in manufacturing equipment parts for the semiconductor industry, and its sputtering targets are used for thin-film deposition. The group will continue to develop differentiated products and to execute timely investments in Japan and overseas in line with growing demand in the semiconductor and flat-panel display markets.

Bioscience

Separation and Purification

The Specialty Group recognizes the massive potential for growth in the global bioscience market and is adopting aggressive strategies for developing business in this and other high-growth fields. It will focus on the development and sales of bioscience-related separation media and columns, expanding in particular its sales of separation media for the manufacture of antibody and nucleic acid drugs. It will also strengthen its operational foundation through R&D on original materials such as silica-based gel and ligands for Toyopearl.

Clinical Diagnostics

In May 2017, the Specialty Group received approval for the manufacture and sale of an in vitro diagnostic agent for a new reagent that targets autotaxin, a protein whose concentration increases in the blood of patients with liver damage. That protein is recognized as an effective marker in the early diagnosis of liver fibrosis. And the group's new reagent measures its concentration using Tosoh's AIA-series Automated Enzyme Immunoassay Analyzer. It is therefore expected to contribute to the diagnosis and treatment of chronic liver disease.

The Specialty Group plans to develop further diagnostic products for the immunodiagnostic field and will lessen their time to market by collaborating with entities external to Tosoh. It will also work to strengthen Tosoh's presence in diabetes diagnosis by developing the next-generation HbA1c glycohemoglobin analyzer. The Specialty Group's work in genetic testing sees it developing a line of reagents for its TRCReady®-80 molecular testing system, formulating a plan for the expansion of sales, and considering products such as an influenza test to introduce to new markets.

ENGINEERING GROUP

"We will take a leadership role in engineering technology to contribute to healthy, fulfilled daily lives, and the future development of society."

-Keiichiro Nishizawa, Director; President, Engineering Group

Snapshot

The activities of the Engineering Group are driven mainly by water treatment engineering specialist Organo Corporation. Tohoku Denki Tekko Co., Ltd., and other group companies involved in construction also contribute to the Engineering Group's bottom line.

Organo's business is focused in three areas: its plant business, which entails the sales of water treatment systems to customers in the electronics, chemical, energy, food and beverage, paper and pulp, and healthcare industries; its solution business, which provides system maintenance and management, energy efficiency and environmental impact consulting, and water treatment outsourcing services; and its functional products business, which handles the sales of water treatment systems and chemicals and of materials used in food processing.

The primary business of Tohoku Denki Tekko is construction. It builds various types of plants and furnishes electrical design, production, installation, and diverse other construction services. Tosoh places orders with Tohoku Denki Tekko for work on some of its facilities.

Group performance

Laying the Groundwork

Net sales by the Engineering Group in fiscal 2018 decreased ¥1.7 billion, to ¥84.8 billion (US$798.4 million), a 2.0% decline from fiscal 2017. The group's net sales accounted for 10.3% of Tosoh's consolidated net sales, a decrease of 1.42 percentage points. Operating income likewise decreased, down 5.4%, to ¥4.9 billion (US$45.8 million), resulting in an operating margin of 5.7%, a decrease from 5.9% in fiscal 2017.

Active capital investment, primarily in Japan and China, drove increased sales for the Engineering Group's water treatment business to the electronics manufacturing industry. But the completion of a number of large industrial projects in fiscal 2017 contributed to the decline in the group's net sales overall. Investment in Japan in electric power, water supply, and sewage treatment and plans for investment in Southeast Asia were either running into delays or being cancelled, and this, too, contributed to the group's drop in sales and profitability.

Robust activity in LCD, semiconductor, and organic EL plant construction in China and elsewhere in Asia contributed to Organo receiving many orders in fiscal 2018. But the time lag from project start to completion and settlement resulted in a delay before the financial dividends could be officially recorded. The decreases in net sales and profits recorded by the Engineering Group in fiscal 2018 are not reflective of the degree of business activity. Settlements for orders received in fiscal 2018 will largely be reflected in the fiscal 2019 financial results, and significant increases in net sales and profits are forecast.

Organo forecasts increased sales domestically but sees domestic orders declining slightly, due primarily to an expected decrease in orders from electronics manufacturing clients in Japan. It expects overseas operations to grow, however, as it pursues aggressive expansion. It forecasts increases in orders and sales for all regions and estimates that overseas sales will account for 25.8% of the group's consolidated net sales, up from 21.5% last year.

In fiscal 2018, Organo introduced two small standard water treatment systems. It intends to take one or two such systems to market each year as part of efforts to fortify its solution business. Sales of these systems are primarily to domestic customers, but the systems have been well received by overseas clients.

Organo's solution business sales are expected to remain essentially the same in fiscal 2019 as in fiscal 2018. It forecasts significant growth, however, for its plant business, where sales are seen increasing 32.7%, to ¥37.7 billion. But it foresees the portion of water treatment engineering sales accounted for by its solution business decreasing from 54.4% in fiscal 2018 to 47.3%, in fiscal 2019.

The construction subsidiaries of the Engineering Group recorded increases in sales in fiscal 2018.

Developments

Strategic Collaborations

Organo has joined the Murugappa Group of India in a joint venture in that country called Murugappa Organo Water Solutions. The venture's mission is to provide clean water at an affordable price. Organo's water treatment technologies are expected to contribute to resolving issues related to wastewater treatment and water processing for industry and eventually to play a role in providing potable water. Water regulations are becoming increasingly strict in India. Under India's "zero liquid discharge" initiative, the joint venture is applying Organo technologies to refine water used in manufacturing processes and to reuse it without discharging it into natural water sources.

New Philosophy and Vision

Organo has redefined its philosophy and long-term vision. While retaining some principles of its previous philosophy, Organo is embarking on new directions in the development of the separation, purification, and manufacturing technologies it has accumulated through its long experience in the water treatment business. Those new directions include a host of non-water fields. Organo also plans to expand its operations beyond Japan and Asia to other parts of the world.

Positioning

Water Treatment

In its functional products business, Organo is focusing on the development of products such as standard systems and water treatment chemicals, the furthering of its overseas operations, and the strengthening of its food product manufacturing technologies. It will pursue the development of water treatment chemicals for sale to customers for non-water applications and in the electronics industry, while also developing and rolling out IoT- and AI-based products.

Organo will look to expand its share of the electronics manufacturing market in China, where capital investment continues at a robust pace. It will also establish a presence in the electronics manufacturing industry in India. In addition, it plans to reconfigure its solution business with the goal of improving profitability and expanding the business abroad.

Organo's development of new businesses include separation and purification technologies for applications related to the manufacturing of lithium-ion batteries and sophisticated technologies for electronic material production—particularly nanoscale semiconductors—and for biopharmaceutical applications, such as medicinal ingredient extraction.

Construction

Outside its core construction businesses, Tohoku Denki Tekko is developing innovative products. It recently acquired a patent for a new Coanda injector for filter bags that offers greatly enhanced collection capability. It has also developed a solar-powered white LED streetlight that has been well received by public- and private-sector clients.

ANCILLARY

"We will work to improve the strategic sharing of human resources across key facilities in Japan, and to secure talented personnel for Tosoh's future growth."

-Keiichiro Nishizawa, Director; Director, Organo Corporation

Snapshot

Tosoh relies on its ancillary business group companies for timely support. They ensure Tosoh's various operations stay connected with one another and with their customers and are equipped to meet their objectives.

Ancillary businesses encompass trading companies and an array of professional services companies. The latter provide logistics, administration, personnel, and IT support. One of these companies offers research and analysis in support of Tosoh's development of innovative technologies, products, and services.

These companies have evolved into profit-generating businesses in their own right. They compete for Tosoh Group business with outside entities. And this ensures healthy cost-competition and inspires enhanced administrative performance and technological development.

Group performance

From Cost Centers to Profit Centers

Net sales by Tosoh's ancillary businesses in fiscal 2018 increased 5.0%, to ¥41.1 billion (US$387.1 million), and accounted for 5.0% of the company's consolidated net sales. This was down from 5.3% in fiscal 2017. Operating income fell 0.7%, to ¥2.7 billion (US$25.1 million), and the operating margin decreased to 6.5%, from 6.9% in fiscal 2017.

Supporting Tosoh Group

Logistics

As a chemical manufacturer, Tosoh depends on safe, efficient logistics operations. Tosoh Logistics Corporation enhances safety by raising awareness among employees. And it is prudently expanding overseas to provide its services to the Tosoh Group worldwide. It is performing a strategic, phased upgrading of the Tosoh Group's logistics-related infrastructure, from the group's marine fleet to warehouses and other facilities and structures.

General Services

Tosoh's operations are diverse and require considerable administration. Tosoh General Services Co. Ltd. provides the required capabilities. This subsidiary is charged with conducting general services in human resources management, in disaster prevention, in the health and safety of Tosoh Group employees, and in operating the Tosoh Group salary administration system.

Analysis and Research

Tosoh Analysis and Research Center Co., Ltd., provides invaluable support to Tosoh's operations. It utilizes advanced technology in the analysis of inorganic and organic materials, polymer chemistry, and a myriad of other fields with the aim of contributing to the expansion of Tosoh's product lineup and cultivation of new applications.

The company conducts most of its analysis and research operations at the Nanyo and Yokkaichi Complexes. But it also receives support from a number of regional offices and conducts operations at its Tokyo office, which opened in June 2017.

Tosoh provides considerable support for its group companies worldwide, ensuring that they have all necessary equipment and systems and that maintenance and upgrades are conducted regularly. The company's analysis and research business, Tosoh Analysis and Research Center, serves a crucial function within the Tosoh Group and in recent years has become a profit-generating business.

Information Systems

Tosoh Information Systems Co., Ltd., provides a wide variety of information and communication-related services. They range from system proposal, design, construction, and operation to the provision of general office and specialized equipment, education, and technological expertise.

In the coming years, the success of a company may well depend on its adoption of AI and its management of the big data supporting AI. Tosoh Information Systems is transitioning the

parent company's manufacturing facilities into the new era through IoT technologies, such as analysis instrument remote monitoring capabilities. This other business is applying its planning, proposal, and implementation capabilities in powerful information and communication solutions to resolve the Tosoh Group's needs in and issues with information management.

Additional Functions

Tosoh Nikkemi Corporation undertakes sales activities for Tosoh's petrochemical products and industrial chemicals and is also a source for raw material procurement. Toho Acetylene Co., Ltd., is involved in the manufacture and sales of products such as oxygen, nitrogen, and carbon dioxide. And Kasumi Kyodo Jigyo Co., Ltd., owns, maintains, and manages industrial complex common facilities.

CORPORATE SOCIAL RESPONSIBILITY

Positioning CSR as the Foundation of Management
Acting in a Unified Manner to Realize a Sustainable Society

Tosoh's Vision for CSR

During fiscal 2018, an increase in petrochemical product prices resulting from a rise in raw material and fuel prices along with active product markets overseas led to favorable business conditions for Tosoh. The company consequently achieved record consolidated net sales, operating income, and net income. I believe that we made solid progress toward the goals of the three-year medium-term business plan that we launched in fiscal 2017. Our implementation of measures to achieve the objectives of our three basic management policies—the strengthening of commodities and specialties management, the maintenance and strengthening of the financial base, and the promotion of safety reforms—helped in that respect.

We have seen our profitability grow steadily in recent years. Increasing corporate value, however, which is another of our goals, is not simply a matter of becoming a company with strong earnings—it is about becoming a company worthy of the trust of our shareholders and investors, customers, business partners, local communities, and other stakeholders. As conveyed by our corporate philosophy, "Contribute to society through the chemistry of innovation," we have positioned the company's CSR activities as the foundation of management. We believe that our primary responsibility is to refine technologies in accordance with changing needs to deliver products of value to society.

Establishing Our Materiality and Strengthening Our Promotional Structure

We have implemented a number of policies to proceed with comprehensive and systematic groupwide CSR. The most important is the introduction of the Tosoh Group CSR Basic Policy, which replaces the Management Basic Policy. The new plan positions CSR as a management priority and clearly conveys our internal and external corporate direction. In formulating the policy, we clarified our corporate philosophy and defined our actions in response to societal issues to make them easy to understand. We have also restructured our corporate ideals and created a materiality assessment of 18 items based on the biaxial matrix of "demands from society" and the "sustainable growth" of the Tosoh Group. The "demands from society" are based on the Sustainable Development Goals (SDGs) adopted by the United Nations in 2015.

We have fortified our CSR promotion structure on a companywide basis. We have established the CSR Committee, a cross-disciplinary body for which I will serve as chairperson, and implemented a plan-do-check-act (PDCA) cycle for our business activities. We also intend to share information through daily communication and regular meetings led by the CSR representative of each division and complex. By instilling awareness in all employees that CSR is an issue that they must take an active role in, we will enhance the effectiveness of our CSR-related activities.

Medium-term Business Plan (2017-2019)

Basic Policies

Strengthen Commodities and Specialties Management

- Consolidate the dual operations of commodities and specialties and achieve a suitable balance
- Bolster the competitiveness and earning power of commodities based on present capabilities
- Invest in expansion of growth areas and expand business domain of specialties through R&D and M&A

Maintain and Strengthen Financial Base

- Construct a solid financial foundation for flexible, agile investment in growth areas

Promote Safety Reforms

- Establish safe, stable operating technologies
- Eliminate problems and abnormal events
- Raise corporate value by strengthening commodities and specialties while maintaining a suitable balance, and construct a business portfolio that is strong enough to withstand fluctuations in the external environment

Business Positioning

Commodities

- Secure cash flow and profits, the foundation of management
- Provide highly competitive utilities and raw materials for use in Tosoh products
- Keep in mind that despite changes in profit and loss caused by the external environment, demand for commodities remains steady, as they are required basic materials

Specialties

- Expand earnings as a driver of growth
- Maintain high profitability through sustained development
- Recognize that lead time in excess of 10 years is required from development until profitability is achieved

Fiscal 2019 Targets

Net Sales	¥750 billion
Operating Income	¥85 billion
Operating Margin	10% or better
ROE	10% or better

The SDGs adopted by the United Nations in 2015 are international development targets for 2030 that apply to all nations. They consist of 17 goals and 169 targets for sustainable diversity and inclusion and are designed for global coverage. In Japan, governments, private companies, and various associations are pursuing the UN's SDGs.

Aiming to Become the World's Safest Chemical Manufacturer

Safety reform ranks among the three basic policies of our medium-term business plan. Over a three-year period beginning in 2014, we invested about \10 billion on restoration construction. Going forward, we will continue to focus on safety measures that eliminate trouble by investing in safety and preventative maintenance.

The restoration performed to this point has succeeded in reducing the occurrence of abnormal events caused by procedures. Additionally, our five-year effort to restore to the Yokkaichi Complex the high-pressure gas certification it lost after the 2011 accident at the Nanyo Complex bore fruit in fiscal 2017 with the complex's recertification.

Reacquiring certification, though, was not the sole objective. We aim to become the world's safest chemical manufacturer. To that end, we are consolidating the technological capabilities and knowledge of all employees in related divisions. And we are constructing operational support systems capable of heading off major incidents before they occur with the introduction of digital technologies such as IoT and AI.

Reducing and Using CO_2 Emissions

Chemical manufacturers are naturally closely connected with the environment. Over the past several decades, therefore, Tosoh has undertaken numerous environment-related initiatives, including anti-pollution, energy conservation, and waste reduction measures.

Our most pressing issue is how to reduce CO_2 emissions. To secure the high volume of electric power required in manufacturing chemical products at low cost, we operate a coal-fired power generation plant. Determining how best to reduce its CO_2 emissions is crucial for our medium- and long-term growth.

In June 2018, we established the CO_2 Reduction and Effective Use Promotion Committee alongside the Energy Management Committee we had formed previously to resolve this issue. We will continue working to lower our CO_2 emissions volume, while also conducting company-wide R&D to determine how to use those emissions. The obstacles are daunting technologically and financially, but I believe that it is our mission as a chemical manufacturer to navigate them.

Engendering a Healthy and Open Corporate Culture

Governance at Tosoh considers compliance essential to survival. In 2017, numerous scandals at major manufacturing companies were brought to light, and this has resulted in a harsher view of corporations within society. If we are to prove worthy of the trust of our stakeholders and society at large and to continue our growth, we must observe our internal company rules and adhere sincerely to the norms of ethical behavior expected of members of society. Schemes and regulations are necessary elements of a CSR program. But they are meaningless if we only formulate and don't commit. One of my most important roles is to direct sustained efforts to ensure our employees are aware of the significance of CSR.

It's time for employees to get back to basics and reconsider their behavior. It's imperative that we work to engender an open corporate culture where we can look at activities that have been conducted and systems that have been in place and observed or upheld as a matter of custom and feel free to identify those that might be odd or unreasonable. I intend to continue to lead by example in this regard.

I hope that all of you who have a stake in this company will review the 2018 CSR Report thoroughly, and that you won't hesitate to provide us with comments and opinions on the various aspects of our activities and performance. Thank you very much for your sustained, valuable support.

Toshinori Yamamoto
Tosoh Corporation
President

A Fresh New Approach to CSR

In June 2018, we completed our new CSR Basic Policy, established a CSR promotional structure, and formulated a materiality assessment with the goal of strengthening the promotion of our CSR activities.

We believe that the implementation of a materiality assessment based on the Tosoh Group CSR basic policy will enable us to contribute to resolving key societal issues through the sustained promotion of our CSR activities. Our basic policy is a concrete plan devised to lead us to the realization of our corporate philosophy.

The role chemical companies play in solving societal issues has grown considerably in magnitude. We pledge to continue to make our presence known as a chemical company that is actively doing its part to support the sustainable growth of society.

Keiichiro Nishizawa
Tosoh Corporation
Director and Executive Vice President

ENVIRONMENT and SOCIETY

Tosoh is aware of the impact on the environment of its operations. It is dedicated to reducing its environmental loading by applying technological and common sense solutions and by exercising care in its use of natural resources and in its handling and management of the products and by-products of its manufacturing operations. The company expends extensive effort and funds on R&D and on employee education programs to ensure the fulfillment of its mission. Its aim is to be a chemical manufacturer devoted to providing value to society and to support society's and its own sustainable growth.

Input and Output

In manufacturing its products, Tosoh reacts, breaks down, and distills a variety of raw materials. Reacting and breaking down these materials requires heat. That heat is provided by the steam generated by our power-generation boilers, which also produce the electricity needed to drive these processes. We suppress the heat created by the reaction process using industrial-use water and seawater. And we carefully monitor, manage, and work to reduce the atmospheric, land, and water emissions resulting from our manufacturing activities to ease the burden on the environment to the maximum extent possible.

Effective Resource Utilization

The company is constantly working to discover new and innovative ways to reuse and recycle precious natural resources and the by-products of manufacturing. Most industrial waste from Tosoh's power generation facilities is recycled. Coal ash, for instance, is a key ingredient in Tosoh's cement. The Nanyo Complex reuses or reprocesses virtually all of its industrial waste and sources general and industrial waste externally for use as fuel in operating its cement manufacturing facilities.

Tosoh's final disposal volume for fiscal 2018 was 830 metric tons. This was 0.20% of its overall industrial waste volume of 424,215 metric tons.

Industrial Waste Emissions

Tosoh is dedicated to achieving the target established by the Japan Business Federation (Keidanren) for industrial waste disposal volume—a 70% reduction by 2020. In fiscal 2018, Tosoh disposed of 830 metric tons of industrial waste, which was far below the Responsible Care® (RC) target of 1,500 metric tons.

The company's goal for fiscal 2019 is to dispose of no more than 1,000 metric tons of industrial waste.

Class 1 Chemical Emissions

Japan's Pollutant Release and Transfer Register (PRTR) law requires businesses that deal with chemical substances to estimate and report the volume of chemical substances they emit. Tosoh complies with the law and works to reduce its emissions in the interest of contributing to a cleaner, healthier environment.

In fiscal 2018, Tosoh's Class 1 chemical emissions totaled 576 metric tons. That marked decrease of 17 metric tons from fiscal 2017.

Atmospheric Preservation

Tosoh's operation of boilers and furnaces that burn fuel results in the emission of smoke into the atmosphere that contains sulfur oxide (SOx), nitrogen oxide (NOx), and particulate matter. To mitigate the possible adverse effects on health from atmospheric emissions, Japan's Air Pollution Control Act sets regulatory values for each such facility and applies a total volume control structure to each business unit. Tosoh has gone a step further. We work with the communities where we operate and forge agreements and formulate regulations for appropriate values for our local operations. We have also established our own stringent values in the interest of contributing to sustainable environmental preservation. We strive constantly to meet and better the various standards.

We did not exceed any regulatory values in fiscal 2018. Tosoh will continue to work harder to meet and better the values set forth in regulations and agreements.

Water Preservation

Japan's Water Pollution Prevention Act and additional regulations based on drainage standards that govern effluent protect open coastal areas and closed bodies of water including Tokyo Bay, Ise Bay, and the Inland Sea where industrial activity is concentrated. Tosoh's business units, in addition to complying with these and municipal effluent regulations and agreements, have established proprietary effluent values in the interest of sustainable environmental preservation.

Tosoh did not exceed any regulatory values in fiscal 2018, and will continue to work with greater effort to meet and improve upon the values established by regulations and agreements.

Minamata Convention Compliance

In October 2013, the world adopted the Minamata Convention on Mercury, a global treaty protecting people and the environment from potential mercury hazards. Signatories to the convention agree to ban the establishment of new mercury mines and to eradicate established mines, to reduce and eliminate in phases the use of mercury in products and manufacturing processes, and to control the emission of mercury on land and in water. As of May 2017, the Minamata Convention had the 50 signatories, including Japan, needed for ratification and was brought into force in August 2017.

In 2015, Japan's government established the Act on Preventing Environmental Pollution of Mercury and implemented revisions to its Air Pollution Control Act and Law Concerning Waste Disposal and Scavenging. Its goal was to lead the world in the management of mercury.

Earlier, in 2013, Tosoh established an RC directive regarding mercury and since has worked to reduce and eliminate its mercury use and emissions. It has also developed products in light of the Minamata Convention and increasingly strict regulations for mercury, cadmium, and zinc. These include its TX-55 wastewater heavy metal treatment agent.

Tosoh will continue to pursue ways to reduce the concentration of mercury in smoke exhaust emitted from its boilers and cement kilns. It will also find improved methods for processing industrial waste containing mercury.

GOVERNANCE

Tosoh Corporation Governance

Tosoh has established an organizational structure designed to enable it to respond in a flexible and agile manner to fluctuations in its business environment. The company is also aware of the need for a high degree of fairness and transparency in its management and day-to-day operations and of the impact on corporate value. In line with the importance and spirit of the Corporate Governance Code, Tosoh practices fairness and transparency in management, operations, and reporting. The company is also working to enhance its corporate governance structure and reporting mechanism to ensure proper information disclosure to shareholders and all others with a stake in the company.

Board of Directors (as of June 28, 2017)

	Internal	External (independent)
Directors	8	2

Tosoh's Board of Directors is composed of 8 internal and 2 external directors, for a total of 10 directors. At its meetings, which are in principle conducted once a month, the Board is tasked with addressing important issues related to management and is responsible for overseeing the performance of Board members and executive officers. The Board also makes final determinations concerning executive officer selection and dismissal.

Analysis and Evaluation of the Effectiveness of the Board of Directors

Tosoh undertakes the analysis and evaluation of the effectiveness of its Board of Directors annually and publishes an overview of its findings. This has proven effective in improving the Board's function.

In fiscal 2018, the company's analysis and evaluation surveyed Board members for candid feedback. The findings were that Tosoh's Board of Directors is fulfilling its role.

The fiscal 2017 findings, conversely, revealed that discussions of management and business strategies related to the company's medium-term business plan needed to be enhanced. Progress was achieved in this regard in fiscal 2018, with discussions of the plan's strategies held regularly throughout the year. The fiscal 2018 analysis and evaluation, however, did find that the quality of such discussions by the Board required improvement. As such, the Board will continue to work to further enrich its discussions.

Board of Auditors (as of June 28, 2017)

	Internal	External (independent)
Directors	2	2

Tosoh's Board of Auditors includes two internal and two external directors, for a total of four directors. At its meetings, which are in principle conducted once a month, the Board of Auditors assesses the Board of Directors' activity and execution of business. Members of the Board of Auditors are present at Board of Directors meetings to receive reports and review documentation related to important decisions. They also have the opportunity to communicate with members of the Internal Control Committee and with the accounting auditor to enhance audit efficiency and effectiveness. The Board of Auditors incorporates a secretariat for the purpose of maximizing the performance of its members.

External Directors and Auditors

The primary criteria for the selection of external directors and auditors are experience and knowledge of corporate management. Tosoh also adheres to directives issued by the Tokyo Stock Exchange (TSE) with regard to the appointment of external directors and reports these appointments accordingly. In addition, the company establishes its own standards by which to assess the independence and capabilities of external directors and auditors.

Executive Officer System

Tosoh's introduction in June 2016 of an executive officer system has contributed to management effectiveness and speed. That system distinguishes decision-making from supervision and thereby enables Tosoh to respond flexibly and quickly to changes in its business environment. It also prioritizes the transparency of management responsibilities.

Compliance Structure

Internal Control Committee

The responsibilities of Tosoh's Internal Control Committee include the development of internal controls to ensure compliance with financial reporting standards in accordance with Japan's Financial Instruments and Exchange Act. The committee is further responsible for adjusting controls as deemed necessary based on audits conducted by Tosoh's Audit Office for

producing and releasing internal control reports, and for heightening awareness of the compliance structure and associated risks related to internal controls throughout the Tosoh Group.

Compliance Committee

Compliance entails the adherence on the part of directors and employees to high ethical and moral standards and to a high degree of fairness and transparency in business activities. Ensuring compliance is the purview of the Compliance Committee. To reduce and avoid compliance-related indiscretions and promptly resolve issues, the committee operates internal and external compliance hotlines that ensure anonymity and facilitate reporting.

Export Supervision Committee

Tosoh's Export Supervision Committee ensures the safe and secure management of exports. It works with personnel in each of Tosoh's business units to administer cargo control, and it sees to it that Tosoh fulfills the duties and responsibilities of an international corporation in complying with Japan's Foreign Exchange and Foreign Trade Act.

Antimonopoly Act Compliance Committee

The Antimonopoly Act Compliance Committee secures Tosoh's compliance with Japan's Antimonopoly Act and support of a fair, free business environment. It prepares and enforces internal rules and instructions and provides direction for emerging business activities and corporate development.

RESEARCH AND DEVELOPMENT

In a world where change occurs at a frenetic pace and the needs of society become increasingly sophisticated each day, Tosoh's future depends greatly on the success of its R&D. The company has therefore structured its R&D organization to function as efficiently as possible. Strategically distributed groups focus on particular technical fields and functions, but all work in concert to cultivate ideas and to develop and rapidly commercialize products in life sciences, environment and energy, and electronic materials—the fields identified by Tosoh for high growth potential.

The Tokyo Research Center incorporates Tosoh's Advanced Materials Research Laboratory and Life Science Research Laboratory. The former undertakes R&D related to advanced materials for the electronics, and the environment and energy industries. The latter develops clinical diagnostic technologies and separation and purification media for pharmaceuticals. These facilities work primarily in support of the Specialty Group.

Tosoh's Yokkaichi Complex is home to two R&D facilities. The Functional Polymers Research Laboratory focuses on the development of polymer materials for use in optical, electronic, biological, and various other applications. The Polymer Materials Research Laboratory focuses on new polymer materials that include customized grades with customer-specified properties. Both facilities help to drive the efforts of the Petrochemical Group. In fall 2019, the Polyurethane Research Laboratory, which is responsible for developing raw materials and specialty systems for polyurethane resin, will join the two R&D facilities at the Yokkaichi Complex.

The Nanyo Complex, too, hosts two R&D facilities. The Organic Materials Research Laboratory develops organic functional products for electronics and environment applications, and the Inorganic Materials Research Laboratory devises inorganic functional products for those same fields. These facilities support the Specialty and the Chlor-alkali Groups.

Organo Corporation's R&D Center cultivates technologies for the manufacture of ultrapure water, for water purification and wastewater treatment, and for advanced separation and purification, including those technologies that contribute to environmental purification and reductions in environmental loading. It supports Tosoh's Engineering Group.

R&D is so crucial to Tosoh's future that the company increasingly emphasizes collaboration to source ideas and commercialize products and technologies. To shorten lead times, Tosoh is also pursuing open innovation that sees it incorporate concepts from an ever-broadening range of sources. The company will intensify efforts to collaborate with universities. It will also work more closely with government and academia to formulate educational programs to cultivate the next generation of R&D personnel knowledgeable in chemical industry materials and products and in cutting-edge technologies.

Tosoh's enhancements to its R&D also involve ongoing investment in venture funds and the dispatch of researchers to the United States to acquire information on new technologies. In concert, all of its R&D-related activities will serve to reduce time to market and to strengthen the company's R&D globally.

Construction, meanwhile, is underway at the Yokkaichi Complex of an R&D facility in which Tosoh will centralize its polymer, polyurethane, and petrochemical R&D. This, too, will enhance efficiency and shorten lead times. The new facility is scheduled for completion in spring 2019.

A new facility is also being erected at the Nanyo Complex, specifically to heighten the efficiency of R&D in support of Specialty Group products. This facility, which should be completed sometime in 2020, will help the company take advantage of synergies among the technologies it develops.

In fiscal 2018, Tosoh's R&D force totaled 960 people, up from 900 in fiscal 2017. The company also invested ¥15.5 billion in R&D during the year under review, an increase of ¥1.1 billion from the previous year.

R&D by Business Group

Petrochemical Group

The Petrochemical Group's R&D centers on the improvement of polymer products and related technologies and on the development of polymers.

The Petrochemical Group is working to develop new and to improve established polyethylene products for the medical and lamination fields with the objective of providing differentiated and high-value-added products of enhanced functionality. Its latest polyethylene is a key element in infusion bags and bottles and is highly evaluated domestically and overseas. And its ultrahigh molecular weight polyethylene (UHMWPE) is well received for applications such as separators for lithium-ion batteries and friction parts.

The Petrochemical Group's development of high-grade polyphenylene sulfide (PPS) resins is making possible weight reduction and increased complexity in automobile design. Its petroleum resins, meanwhile, are successful as pressure-sensitive adhesives and as ecological tire modifiers. The group is also working on new grades of chloroprene rubber (CR) with enhanced durability for power transmission belts. And it is boosting Tosoh's position as the world leader in chlorosulfonated polyethylene (CSM) quality and production volume with new applications that take advantage of CSM's superior water and chemical resistance.

In addition to its polyvinyl chloride (PVC) resin paste for wallpaper and flooring applications, the Petrochemical Group is developing new grades of PVC resin paste to satisfy automotive industry requirements. It is also working on polymer materials based on Tosoh's proprietary concept for such applications as optical materials, LCDs, and flexible display substrates.

R&D expenditures for the Petrochemical Group increased from ¥1.9 billion in fiscal 2017 to ¥2.2 billion in fiscal 2018.

Chlor-alkali Group

Central to Chlor-alkali Group, R&D is strengthening manufacturing technologies related to Tosoh's vinyl isocyanate chain.

In addition to developing functional polyols and polyurethane-related products, such as polyurethane foams, elastomers, and coatings, the Chlor-alkali Group cooperates in R&D projects with Tosoh's other business groups. These include low-density, high-durability all-MDI seat cushions to meet automotive requirements for light weight and high functionality; polyurethane resins of superior chemical resistance for use in synthetic leather; and a low-viscosity hardener for automotive clear top coats.

The Chlor-alkali Group is also developing raw materials for environmentally friendly water-based coatings. In addition, it is also working on a thermal insulation polyurethane foam that incorporates a newly developed blowing agent that does not contribute to ozone depletion and global warming. It is also making progress on improving the energy efficiency of electrolytic technology for producing sodium hydroxide.

Fiscal 2018 R&D expenditures for the Chlor-alkali Group rose to ¥3.2 billion from ¥3.0 billion in fiscal 2017.

Specialty Group

R&D undertaken by the Specialty Group concentrates on fields with the highest potential for growth: life sciences, energy and the environment, and electronic materials.

The Specialty Group's life science R&D involves developing next-generation equipment and reagents for immunological testing. The group is also devising new liquid chromatography columns and separating materials for bio-pharmaceutical purification. And through its participation in a next-generation bio-pharmaceutical manufacturing technology R&D group, the Specialty Group is working on an innovative process to purify antibody drugs and on technology for advanced antibody analysis. In addition, it is developing microfabrication technologies for the early detection of cancer and for the diagnosis of cells in regenerative medicine. The Specialty Group is also coming up with new products in high-translucency zirconia for dental use and in colored zirconia for decorative applications.

Forecasts for continued growth in energy demand compel the Specialty Group to continue its development of materials for lithium-ion batteries (LIBs). It is working in particular on conductive polymers that contribute to enhancing condenser capacity.

Environment-related R&D includes hydrofluoroolefin (HFO) urethane catalysts that feature minimal environmental impact; efforts to expand the sales of Tosoh's urethane blowing catalyst RZETA®, which reduces volatile organic compounds (VOCs); engine oil additives that aid in reducing energy consumption; and aldehyde scavengers. The group is also engaged in improving zeolites for automobile exhaust gas catalysts and in developing functional zeolites for other applications. In addition, the Specialty Group has fortified its line of heavy metal treatment agents that remove harmful materials from fly ash and water.

In electronic materials, the Specialty Group is enhancing the efficiency and product life cycle of organic electroluminescence (EL) transport material. It is as well developing sputtering targets with the aim of achieving thin-film material that features low resistance at low temperatures for use in touch-panel applications.

Continuing trends in the miniaturization of semiconductor devices sees the Specialty Group working to develop organometallic compounds for next-generation wiring. It has also made remarkable progress in high-performance quartz components for use in next-generation semiconductor manufacturing equipment. And through industry-academia collaboration, the Specialty Group is developing coating-type organic semiconductor materials for printed electronics. That collaboration also sees it working on light-curable insulating materials, surface hydrophilic modification materials, and protective layer materials.

Fiscal 2018 expenditures for Specialty Group R&D increased to ¥8.3 billion, from ¥7.9 billion in fiscal 2017.

Engineering Group

The R&D Center of Tosoh subsidiary Organo Corporation drives Engineering Group R&D.

The Engineering Group is developing large-scale water treatment systems for pure, ultrapure, and clean water. It is also working on underground wastewater treatment equipment and chromatographic separation equipment. In addition, it is attempting to commercialize a urea trace meter, coagulation-sedimentation equipment, a biological treatment device, an electrical demineralizer, cabinet-type ultrapure water manufacturing equipment, and an electronic material purification resin.

Functional product R&D projects underway in the Engineering Group include standard water treatment systems, water treatment chemicals, and additives and materials for processed foods. The group is also making progress toward commercializing a nutritional supplement for use in wastewater treatment.

The Engineering Group's fiscal 2018 R&D expenditures increased to ¥1.8 billion, from ¥1.5 billion in fiscal 2017.

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As of June 28, 2017