



ANNUAL REPORT 2017

Tosoh Corporation and consolidated subsidiaries
Fiscal year ended March 31, 2017

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 ¥112.19 = US\$1, the prevailing exchange rate at the end of the fiscal year under review.

Tosoh Corporation's 2017 fiscal year covers the period from April 1, 2016, to March 31, 2017.

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AT A GLANCE

Values

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

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, has a multiethnic workforce of more than 12,000 people, and generated consolidated net sales of ¥743.0 billion (US\$6.9 billion) in fiscal 2017, ended March 31, 2017.

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

It is my pleasure to present Tosoh Corporation's annual report for fiscal 2017, the year ended March 31, 2017.

Tosoh's consolidated net sales fell 1.4% from the previous year, to ¥743.0 billion, but its operating income rose 60.2%, to ¥111.2 billion; recurring income was up 71.8%, to ¥113.1 billion; and net profit attributable to the owners of the parent company rose 90.7%, to ¥75.7 billion. The company paid an interim dividend of ¥7.5 per share and a year-end dividend of ¥16.5 per share, for a full-year dividend per share of ¥24.0—a ¥10.0 increase over the previous year.

Tosoh has throughout its history sought technology through chemistry. We strive to be a chemical company strong in more than merely a financial sense. There is, for instance, an urgent need to face the realities of environmental- and energy-related societal challenges. This compels us to strengthen our business foundation and to utilize our innovations in chemistry to contribute to resolving such issues, improving lifestyles and bettering society in the process.

Tosoh's rapid responses to its ever-evolving operating environment and emphasis on fair and transparent management practices continually increase its corporate value. We are also building a business structure increasingly resistant to external factors by strengthening our commodities and expanding our specialties operations. Our objective is nothing short of formidable competitiveness globally. So our efforts regarding these operations are laying the groundwork for an expanded Tosoh presence worldwide.

We are, in that vein, forging ahead with the medium-term business plan that we released in May 2016. That plan defines our strategy and goals for the three years to March 2019. It targets net sales of ¥750 billion, operating income of ¥85 billion, and an operating profit margin and a return on equity of at least 10% each in the year ending March 31, 2019. I am pleased to report that we met all these targets, with the exception of net sales, in the year ended March 31, 2017. This resulted from substantially improved terms of trade caused by changes in market conditions.

Our goal for fiscal years 2018 and 2019 remains to build a business structure capable of withstanding changes in external conditions and of delivering on our financial targets. On the governance front, we introduced an executive officer system in June 2016 to achieve timely, effective decision-making and a management structure that can adapt to sudden changes in our operating environment. And we are of course cultivating a corporate culture of safety by continuing to act on the safety reforms that we put into place early in August 2012.

On behalf of Tosoh Corporation and the Tosoh Group, I thank our shareholders for their continued support.

Toshinori Yamamoto

President

STRATEGY: Medium-Term Business Plan Update

Shortly after the start of fiscal 2017, Tosoh announced a three-year, medium-term business plan that guides the company through its 2019 fiscal year. The plan builds on management's dual commodities and specialties approach to consistently generate value for Tosoh's customers, investors, and other stakeholders.

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 stabilize 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.

Tosoh's medium-term business plan—which is entering its second year in fiscal 2018—calls for net sales of ¥750.0 billion, operating income of ¥85.0 billion, an operating income ratio and a return of equity (ROE) of more than 10.0% each, and an equity ratio above 50.0% by the company's fiscal 2019 year-end. Substantially improved terms of trade, however, enabled Tosoh to meet all but the target for net sales in fiscal 2017, fully two years ahead of schedule.

Plan Overview

The medium-term business plan has three policies. The first involves a management focus on balanced efforts to strengthen Tosoh's commodity and specialty businesses. Tosoh is optimizing its production capacities to make its commodity products more competitive and profitable. It is also investing in R&D and mergers and acquisitions (M&A) to expand its capabilities in high-growth potential specialty products.

The plan's second policy is to maintain and strengthen Tosoh's financial position to support a flexible investment strategy for growth. And the third policy emphasizes safety reforms by developing safe, stable operating technologies and implementing improvements that eliminate safety problems and incidents.

The plan calls for ¥130.0 billion in capital spending plus ¥30.0 billion more pegged for M&A over the three years from 2017-2019. Tosoh has already increased its zirconia production capacity in Japan and its high-silica zeolite production capacity in Malaysia. It has also begun investing to increase the efficiency of its bromine production and power generation facilities. The company will further invest to expand its production capacity for Toyopearl separation and purification media and to achieve other of the growth strategy objectives of its medium-term business plan. It will do so, however, taking in account changing economic conditions.

Business Positioning

Tosoh's business is positioned on management's commitment to a dual emphasis on commodities and specialties. This entails robust portfolios of commodity and specialty products

such that an upturn in one protects the company from fluctuations in the other, thereby enhancing corporate value through balanced growth.

Tosoh's commodities operations generate profits and cash flows that underpin its business. And Tosoh will continue to ensure that it sources highly competitive high-quality feedstocks for its commodities products and that it equips its commodities operations with state-of-the-art technologies. Amid swings in business that adversely affect profits, Tosoh will, for example, take advantage of continuing firm demand for basic raw materials.

The company's focus in specialty products includes pursuing higher earnings to drive growth and maintaining high profitability while developing products. Tosoh expects lead times of around 10 years from development to profitability.

Financial Progress and Targets

The medium-term plan was compiled using then-available information. For that reason, Tosoh's results may differ from the plan's targets because of unforeseen events and changes in economic conditions in Japan and overseas.

Operating income in the year to March 31, 2017, totaled ¥111.2 billion, far exceeding the target of ¥85.0 billion for the year to March 31, 2019. This was because the market for the commodity products produced by the Petrochemical and Chlor-alkali Groups was much more favorable than envisaged in the plan.

Also in fiscal 2017, Tosoh set a profitability record due largely to a surge in commodities profits. And its ROE surpassed 20.0%, well above the more than 10.0% targeted for year-end fiscal 2019. Tosoh's net sales for fiscal 2017, of ¥743.0 billion, were below the fiscal 2019 year-end target but fully ¥23.0 billion above the ¥720.0 billion target for fiscal 2017.

Tosoh's goal for fiscal years 2018 and 2019 remains to build a business structure that can withstand changing external conditions to meet financial targets. Tosoh seeks steady revenues and a further increase in operating income, which went from ¥69.4 billion in fiscal 2016 to ¥72.0 billion in fiscal 2017. That number is expected to reach ¥100.0 billion in fiscal 2018 and to then drop to ¥85.0 billion by fiscal 2019.

The objective is an operating income ratio of more than 10.0%, up 0.8 percentage points over fiscal 2016. This requires raising the operating income ratios for commodity products 2.1 percentage points, to 8.6%, and for specialty products 3.0 percentage points, to 21.7%. By fiscal 2017 year-end, Tosoh had already exceeded those targets and is on pace to continue doing so.

Management anticipates a slightly stronger yen in fiscal 2019 and assumes exchange rates of ¥110.0 to the US dollar and of ¥120.0 to the euro. Management also assumes a domestic naphtha price for fiscal 2019 of ¥40,000.0 per kiloliter, an increase of ¥2,775.0 over fiscal 2016.

Tosoh spent ¥37.8 billion on capital investments in 2017 and plans to invest an additional ¥92.2 billion in fiscal 2018 and fiscal 2019. Two policies guide the company's capital expenditures. The first is to invest in renewal and productivity improvements that maintain and improve supply stability and competitiveness in commodity products. The second is to boost investment in specialty products, increasing the production capacities of growth businesses; leveraging R&D with universities, start-up ventures, and other partners; and acquiring bioscience and other firms to broaden Tosoh's business scope.

Capital expenditures to increase production capacities prioritize high-silica zeolite (HSZ), zirconia, Toyopearl separation and purification media operations, polyvinyl chloride (PVC) operations in the Philippines, and functional polymer and functional urethane operations. Additional investment will go to enhance Tosoh's power generating efficiencies.

Financial Position and Shareholder Returns

Tosoh has already surpassed the medium-term plan's fiscal 2019 year-end aim of an equity ratio exceeding 50.0%. In fiscal 2017, the company realized an equity ratio of 52.8%, a gain of 6.5% over the previous year. Tosoh continues, meanwhile, to reduce its interest-bearing debt.

Tosoh likewise is delivering on its policy of paying stable dividends and of determining dividends based on comprehensive assessments of performance, free cash flow, and business development potential. In a May 10, 2017, meeting, Tosoh's Board of Directors (BOD) decided that dividends of surplus will be issued to shareholders of record as of March 31, 2017. This raised fiscal 2017 year-end dividends from the interim ¥7.5 per share to ¥16.5 per share. Over the medium and long terms, Tosoh will target a payout ratio of 30.0%, above fiscal 2017's 20.6%.

Balanced Growth

The medium-term business plan builds through fiscal 2019 on Tosoh's competitive edge globally in supplying diverse basic chemicals and functional and advanced materials. The company will continue to balance large-volume commodity operations with high-value-added specialty operations to bolster revenues and earnings in good and bad operating conditions.

Tosoh's operational structure—with chlor-alkali and petrochemicals on the commodity side and advanced materials, bioscience technologies, and organic chemicals on the specialty side—helps it weather the inevitable downturns and rapid changes in business environment experienced by its commodity operations. That structure also enables it to secure high margins from participating in the world's most technology-intensive industries.

Specialty Operations Expansion

Tosoh has increasingly come to rely on its specialty operations to shore up its profitability when the cash-generating capabilities of its commodity operations lag. Specialty products regularly contribute a substantial portion of Tosoh's consolidated net sales, and this is especially vital amid tough years mainly for their chlor-alkali- and petrochemical-based commodity counterparts.

The company is working to achieve a March 2019 operating income target of ¥40.0 billion in its specialty operations. It is differentiating and heightening the added value of its specialty products and expanding its sales of strategic products. And it is on pace to reach its target, having hit ¥35.4 billion in operating income for fiscal 2017, which is ¥3.5 billion over the planned ¥31.9 billion target set for the year under review.

Tosoh's capital spending on its specialty operations is in line with the plan to date and is focused on expanding investment in growth businesses and business fields through R&D (including collaboration with academia and venture companies) and M&A (especially life science companies). And management will make timely decisions based on an understanding of the risks and synergies involved.

Until recently, specialties accounted for around a mere 20.0% of the company's net sales. That increased to 23.7% in fiscal 2017, and a similar figure is expected for year-end fiscal 2019. Specialty products are even more important as profit drivers. They represented 31.8% of operating income in fiscal 2017 and should remain around that level, if not higher, through fiscal 2019.

Tosoh, meanwhile, hopes to expand its R&D especially in collaboration with academia and venture companies. It will complement its tie-ups with increased mergers and acquisitions, ideally with life science companies. It is also renewing the main building and the R&D infrastructure at its Nanyo Complex, construction on which should conclude in spring 2018 and fall 2019, respectively. The company is likewise renewing the R&D infrastructure at its Yokkaichi Complex, and that work is slated to end in spring 2019.

In fiscal 2017, the company expanded the production capacities for a number of its specialties products. It increased its commercial manufacturing of automated immunoassay analyzer (AIA) reagents in November 2016. And it raised zirconia production capacity at the Yokkaichi Complex in March 2017. In addition, it commenced commercial operations at its newly constructed HSZ plant in Malaysia in the spring of 2017.

Commodity Operations Profitability

Commodity products are a core Tosoh business and, like the company's specialty products, are being optimized. They continue to earn the lion's share of consolidated net sales, but they are sensitive to market changes. The latter is especially true for chlor-alkali, a longtime core

Tosoh product group. Tosoh will improve the profitability of its Chlor-alkali Group by enhancing the group's ability to deal with market pressures and to control costs; by adjusting the group's product mix; and by furthering the integration, efficiency, and effectiveness of the group's vinyl isocyanate chain.

Operating income from Tosoh's commodity businesses increased to ¥47.9 billion for fiscal 2017 because lower feedstock prices improved terms of trade and pushed up product prices. Tosoh's profit targets for its commodity operations will be upwardly revised if favorable market conditions persist. But Tosoh aims to meet its profit targets even if the terms of trade worsen, as anticipated, by focusing on implementing its strategy for growth.

Tosoh is focusing investment on renewal of facilities and increased efficiency to sustain and strengthen its ability to provide a competitive and stable supply of commodity products. Among its Chlor-alkali Group's products, Tosoh is intent on raising its production capacity for vinyl chloride monomer (VCM). This will ensure an abundant and stable supply of VCM to meet increased production capacity at Tosoh's domestic and overseas PVC production facilities. Tosoh's PVC business will, in turn, capitalize on the stability and abundance of VCM supply by boosting sales of PVC to customers worldwide.

Tosoh Group company Philippine Resins Industries, Inc. (PRII), headquartered in Makati City, the Philippines, is preparing to increase its PVC production capacity with the construction of additional PVC manufacturing facilities in February 2017 at a cost of ¥4.2 billion. Upon completion, in December 2018, the new facilities are expected to add 110,000 metric tons a year to and thereby double PRII's PVC production capacity. Commercial operations are to start in January 2019 and to contribute to establishing a stable supply of PVC to meet growing demand in the Philippines and elsewhere in Asia.

Caustic soda is central to Tosoh's operations. The company was, after all, founded in 1935 as Toyo Soda Manufacturing Co., Ltd. Tosoh's ongoing production of caustic soda should benefit from the medium-term plan's aim of full electrolysis operating rates at the Nanyo and Yokkaichi Complexes. The higher production of caustic soda that results should strengthen profitability through heightened sales of soda and chlorine derivatives.

Other commodity operations that Tosoh will strengthen include the Petrochemical Group's olefin operations. The company intends on raising the operating rate of the naphtha cracker at its Yokkaichi Complex, which contributes to the manufacture of VCM, PVC, and olefins, by installing a gas turbine there by spring 2020. In addition, Tosoh will work to heighten the responsiveness and flexibility of its olefin manufacturing and sales system.

Tosoh's emphasis, meanwhile, for the Petrochemical Group's polymer operations is the further development of high-value-added functional and specialized polyethylene products. This includes improved engineering grades of polyphenylene sulfide (PPS) resins and better, non-contaminating grades of chloroprene rubber (CR). As well, the polymer operations will increase

sales of their advanced and specialty grades of functional polymers, especially chlorosulfonated polyethylene (CSM), of which Tosoh is the world's leading producer.

Commodities and Specialties Innovation

Tosoh supports innovation in its commodity and specialty operations through leading-edge technology and R&D. That support enables these operations to generate next-generation products for the advancement of civilization, including increasingly versatile and functional products for niche applications.

The company has developed filler for low molecular weight antibody purification, an analytical column for antibody drugs, a coating-type organic electroluminescence material, a high-performance gas barrier material, a conductive polymer material, a high-performance heavy metal treatment agent for wastewater, and a two-color sintered body zirconia.

Tosoh hopes to bring its R&D resources to bear more fully than ever on short-term development initiatives for products and technologies related to organic, inorganic, polymer, and polyurethane materials. Its latest R&D reorganization makes possible enhanced R&D for Tosoh's three long-term priorities: life sciences, energy and environmental conservation, and electronic materials. The commanding focus that these priorities have in specialty operations reflects Tosoh's shifting of its specialty operations from a supporting role—whereby they shore up profits when the business cycle for commodity operations takes a downturn—to a leading role as a driver of the company's business.

The progress of Tosoh's efforts in this respect is evident in its establishment of a US-based team of technology and venture investment experts. They work with Tosoh researchers to gather information on new technology and M&A opportunities. Tosoh has also invested in a research fund to strengthen its ability to source technical information. And the company is transforming its Yokkaichi Complex into a center for petrochemical and polymer product development efforts.

Amid market shifts, Tosoh has faced the challenge of managing increasingly frequent crises while keeping its business plans on course. Each of Tosoh's groups and divisions faces different issues but overall are united by the strategy to expand the specialty businesses, to reinforce the commodity operations, and to thereby ensure Tosoh's continued growth and ability to fulfill its commitments to its stakeholders and society. That strategy is well expressed in Tosoh's medium-term business plan for the three years from fiscal 2017 through fiscal 2019, achieving the aims of which will set Tosoh on a sound footing well into the future.

REVIEW OF OPERATIONS

SPECIALTY GROUP

The Specialty Group meets the needs of its varied customers for high-value-added bioscience, organic chemicals, and advanced material products and technologies. Its extensive offerings are solidly positioned in stable and expanding niche markets and drive Tosoh's profitability.

The Specialty Group's clients span the globe and include companies in the pharmaceutical, healthcare, semiconductor, consumer electronics, and automobile industries. Among them are emerging businesses whose successes hinge on the Specialty Group's development of solutions to fuel their progress. Innovative products and technologies from the Specialty Group align Tosoh with market opportunities and offer potential for sustainable expansion strategies.

Group Performance

In fiscal 2017, Specialty Group net sales increased 0.8% from a year earlier, to ¥175.9 billion (US\$1.6 billion). That constituted 23.7% of Tosoh's consolidated net sales, up from 23.2% in fiscal 2016. Group operating income climbed 8.2%, to ¥35.4 billion (US\$326.6 million), and accounted for 31.8% of Tosoh's consolidated operating income, compared with 47.1% a year earlier. The group's operating margin was 20.1%, an increase from 18.7% in fiscal 2016.

Ethyleneamine product prices declined on the back of a strong yen and softening markets overseas. Shipments of ethyleneamines by the Specialty Group decreased in fiscal 2017.

The year saw an increase in fused silica glass shipments for the semiconductor industry. Among the group's separation-related products, shipments of liquid chromatography packing materials also rose. Looking at diagnostic-related products, shipments of in vitro diagnostic reagents increased. Shipments of high-silica zeolites (HSZ) for use in automotive catalytic converters likewise increased, as did shipments of zirconia for dental applications and ornamental products.

Developments

Capital Investments

Tosoh announced in fiscal 2017 that it will increase its production capacity for Toyopearl liquid chromatography separation and purification media at its Nanyo Complex nearly 50% at a cost of around ¥5 billion. This is in response to growing global demand for purification media from the antibody drug manufacturing industry. Construction on Toyopearl manufacturing facilities began in October 2016 and is slated for completion in August 2018, with commercial operations due to commence in April 2019.

In March 2016, the Specialty Group launched the commercial production of zirconia powder at the Nanyo Complex's new zirconia manufacturing facilities. This was followed by a similar launch at the Yokkaichi Complex in March 2017, further boosting Tosoh's zirconia production capacity.

Work is also progressing on the construction of a reaction tower for the Specialty Group's bromine operations at other Tosoh facilities in Japan. When completed in fiscal 2018, the state-of-the-art tower will lower production costs and raise competitiveness for Tosoh's bromine business.

Network Expansion

Tosoh expanded and strengthened its bioscience operations with the early fiscal 2016 acquisition of Indian in vitro diagnostics company Lilac Medicare Pvt. Ltd. Renamed Tosoh India Pvt. Ltd., Tosoh is leveraging erstwhile Lilac's domestic network and product familiarity to introduce the Specialty Group's immunological and diabetes diagnostic analyzers. Tosoh India will continue to play a central role in the Specialty Group's plans to grow its presence in India for its bioscience business.

Group Consolidation

In October 2017, Tosoh's wholly owned subsidiaries Tosoh Finechem Corporation, Tosoh F-Tech, Inc., and Tosoh Organic Chemical Co., Ltd., will merge, leaving Tosoh Finechem Corporation as the surviving entity. Each of the three subsidiaries have developed, produced, and sold organic compounds of distinct characteristics. The merger will combine their technologies to accelerate the development of chemical compounds and to improve responsiveness to customers' diverse needs.

Positioning

Organic Chemicals

The Specialty Group has three main objectives for its organic chemicals business. Firstly, it aims to boost profitability through a reinforced production structure and competitive pricing in ethyleneamines, bromines, and flame retardants. Secondly, it intends to create new business amid emerging demand for environmentally friendly polyurethane amine catalysts, heavy metals treatment agents, and industrial cleaners. Finally, it will hone the group's reputation as a source of organic electroluminescent materials.

Tosoh is a global leader in production of ethyleneamines, exporting around 80% of its 71,000-metric-ton annual output. Tosoh intends to uphold this position by prioritizing increased production of high molecular weight amines. This is part of a continued effort by the Specialty Group to shift toward high molecular weight amines while enlarging the group's ethyleneamine derivative network globally. Further efforts include developing systems that better produce the isocyanates and polyols for the group's RZETA polyurethane catalyst operations, which are essential to the automotive and furniture industries, and buttressing the capacity of its Toyocat facilities.

Long-term, the Specialty Group maintains a twofold business strategy for its eco-business products and services. It will continue to produce the piperazine-based agents essential to its environmental product line, and will at the same time expand to emerging markets in Asia, including China, where rapid economic development has brought pressing environmental concerns.

Advanced Materials

Zeolites

Tosoh is expanding production capacity for HSZ at its Nanyo Complex about 30% at a cost of ¥10 billion. Construction on additional HSZ manufacturing facilities at the complex is due to begin in May 2018 and to be completed in March 2019, with commercial production expected to start in August 2019. The new facilities will join the HSZ production facility Tosoh built in Malaysia in 2016 in furthering Tosoh's HSZ manufacturing capacity.

Ceramics

The Specialty Group intends to remain a key contributor to the global fine ceramics market, a position it has held since introducing Zpex, a translucent, colored, high-strength grade of zirconia, in 2011. This was furthered by the introduction of Zpex Smile, a high-translucency zirconia for front teeth, in 2014.

The Specialty Group will build on that positioning by capitalizing on zirconia's popularity in applications for wristwatches, car accessories, and mobile phones.

Battery Materials

Tosoh is the world's largest producer of electrolytic manganese dioxide (EMD), which has positioned Tosoh as a top supplier of EMD to the global conventional battery market.

Elsewhere, demand for lithium-ion secondary batteries is expected to continue growing amid expanding demand and production of electric vehicles, as well as rising standards of living globally, which has seen an increased use of portable and electronic devices. To capture this

interest, the Specialty Group is establishing itself as a principal producer of manganese-based cathode materials for the lithium-ion secondary battery market.

Electronic Materials

Demand is also growing for thin-film materials and quartz, two areas where the Specialty Group is expanding operations. In fiscal 2017, fused silica glass shipments for the semiconductor industry grew on the back of increased demand for handheld devices, automobile and other consumer electronic products, and digital information technologies.

Further developments include pursuing measures to serve the next-generation memory and printable electronics markets, and expanding sales of products for atomic layer deposition and coating applications.

Bioscience

Separation and Purification

Tosoh is committed to a major presence in the global bioscience market. Through its Specialty Group, it has established its bioscience brands in the leading markets of Japan, the United States, and nations in Europe. The group now targets high-growth markets in China, India, Southeast Asia, and the Middle East. Over the medium term, the focus is on selling high-performance liquid chromatography (HPLC) separation columns and Toyopearl separation media.

Tosoh began expanding its Toyopearl production facilities at the Nanyo Complex in October 2016. Construction is expected to end in August 2018, and commercial operations are anticipated to launch in April 2019. The new facilities should expand Toyopearl production around 50% and enable Tosoh to respond to growing global demand for purification media from the antibody drug manufacturing industry.

Clinical Diagnostics

Tosoh continues to build its worldwide presence in clinical diagnostic systems. The company has an especially positive reputation in the global diabetes market thanks to its line of Specialty Group glycohemoglobin (GHb) analyzers.

The Specialty Group's plans include producing compact, reasonably priced GHb analyzers suitable for developed and developing countries and expanding the support network for all of its GHb analyzer models.

The global molecular testing market, too, is growing steadily and is estimated to be worth over ¥500 billion. Market growth is particularly strong in emerging countries, where molecular testing is most valued in testing for infectious diseases, for which Tosoh's nucleic-acid amplification

testing products are particularly useful. The group has made steady inroads in the market, especially with its next-generation TRCReady-80 molecular testing system.

Medium-Term Business Plan

Tosoh's medium-term business plan targets ¥40 billion in operating income and an operating margin of 21.7% for the Specialty Group by fiscal 2019. These aims represent increases of ¥4.6 billion and 1.6 percentage points, respectively, over fiscal 2017.

The plan's three-year strategy for advanced materials is to develop new grades of and to boost production capacity for HSZ. On the capacity front, demand for HSZ is on the rise. Tosoh has been proactive in meeting that demand. Commercial operations began at Tosoh's new HSZ plant in Malaysia in April 2017. And Tosoh's next-phase increase to its HSZ manufacturing centers at the Nanyo Complex is expected to finish construction in March 2019.

Tosoh's zirconia product strategy is to continuously market distinctive grades. The Specialty Group will work on increasingly translucent zirconia dental materials and on accelerating development to meet customer needs. Tosoh, meanwhile, increased its zirconia manufacturing capacity at the Yokkaichi Complex in March 2017.

The Specialty Group's focus in EMD, quartz glass, and sputtering targets is on advanced functionality. This includes heightening the differentiation of Tosoh's EMD. It also includes raising the competitiveness of Tosoh's quartz glass by reducing manufacturing costs and developing new materials. The Specialty Group will also emphasize sputtering targets and the development of high-performance products for touch screen applications. Touch screen demand should grow as emerging economies follow developed countries in expanding smartphone usage.

The strategy for the Specialty Group's organic chemical operations in ethyleneamines, urethane foaming catalysts, and bromine and flame retardant product lines is to improve profitability and to stabilize new business. The Specialty Group is integral to Tosoh's aim of significantly improving profitability by shifting to high molecular weight amines. It will also focus on sales of urethane foaming catalysts, most notably highly functional products for Toyocat, and on bolstering Tosoh's marketing in European nations and in the United States for RZETA. Its efforts in bromine and flame retardants are furthered by Tosoh's investment in more efficient bromine production facilities, which began commercial operation in spring 2017.

Tosoh's strategy for bioscience instruments, columns, separation media, immunoassay analyzers, and reagents is to expand markets through R&D and acquisitions and to cultivate demand in emerging economies. Initiatives include acquiring new technologies and products. And the group plans to increase Tosoh's share of this approximately ¥50 billion and rapidly growing market.

The Specialty Group will develop columns and separation media for the biopharmaceutical market and increase as anticipated by summer 2018 its production capacity for Toyoparl separation media. It has complemented its fiscal 2015 launch of its diagnostic AIA-CL2400 automated immunoassay analyzer with the compact AIA-CL1200. It will also expand its offerings of distinctive reagents in growth areas and cultivate the Indian market through Tosoh India. It will be helped hugely by the completion of Tosoh's reagent production capacity enhancement in October 2016 to 30% beyond then current capacity. The Specialty Group, meanwhile, will continue to pursue various M&A opportunities.

CHLOR-ALKALI GROUP

The Chlor-alkali Group operates the largest fully integrated manufacturing capacities of their kind for chemical commodities in Asia and supplies the worldwide chlor-alkali industry with raw materials for a vast range of products. It is well positioned to take advantage of opportunities, especially in Asia's expanding markets.

The group's main products are caustic soda, chlorine, vinyl chloride monomer (VCM), polyvinyl chloride (PVC) resins, calcium hypochlorite, sodium bicarbonate, methylene diphenyl diisocyanate (MDI), toluene diisocyanate (TDI), hexamethylene diisocyanate (HDI), and functional urethanes. It sells these raw materials to external customers and furnishes them as feedstock to Tosoh's fully integrated Vinyl Isocyanate Chain, which yields the company's commodity and many specialty products.

Within the Chlor-alkali Group, the Urethane Division oversees the production of MDI, an important raw material for polyurethane and a fine chemical with multiple uses in organic synthesis. MDI also offers attractive marketing synergies with Tosoh's diverse product lines, including organic synthesis compounds, polyurethane catalysts, and specialty polymers. TDI, too, serves myriad applications, many similar to those served by MDI. And HDI is a higher-value-added product with applications in high-performance paints and other specialty polymers.

The Chlor-alkali Group's chemical commodities business is thriving in tandem with the growth of economies worldwide and despite constantly changing shipment volumes and prices as supply and demand fluctuate. The group has the know-how and systems to optimize its production mix to match circumstances and to enable Tosoh to compete globally in chlor-alkali.

The group also oversees Tosoh's cement operations, which use waste and coal ash, slag, and other by-products from Tosoh's operations and elsewhere. That valuable contribution to recycling also occasions a considerable reduction in the cost of manufacturing cement. The entire cement output is then consigned for sale by Taiheiyo Cement Corporation, Japan's largest cement manufacturer.

Group Performance

Improved Profitability

Chlor-alkali Group net sales decreased 0.1%, to ¥279.7 billion (US\$2.6 billion), in fiscal 2017. That represented 37.6% of Tosoh's consolidated net sales, up from 37.1% a year earlier. Operating income improved 116.4%, to ¥47.9 billion (US\$442.3 million), and contributed 43.1% of consolidated operating income. The operating margin was 17.1%, compared with 6.4% in fiscal 2016.

Caustic soda prices in Japan gradually decreased, but export prices for caustic soda increased because of improved market conditions overseas. Shipments of VCM and PVC resin remained strong; however, prices for these products decreased because of a strong yen and a fall in naphtha prices.

Cement shipments decreased domestically as demand fell in Japan. Cement exports, though, increased.

Shipments of MDI increased, but MDI export prices fell, largely because of a strong yen.

Developments

Capital Investments

Tosoh is building competitiveness for its Chlor-alkali Group in part by replacing the Nanyo Complex's coal-fired electric power generation plant, and investing in piers, tanks, and other infrastructure at the complex. Construction at the Nanyo Complex to improve the power generation facilities and to maximize production capacities is under way and is expected to be completed in December 2018, at a cost of around ¥20 billion. Tosoh will also raise the efficiency of the complex's facilities for producing bromine from seawater.

A highlight of fiscal 2017 was Tosoh's investment of ¥4.2 billion to increase PVC production capacity at Tosoh Group company Philippine Resins Industries, Inc. (PRII), headquartered in Makati City, the Philippines. PRII began construction of additional PVC manufacturing facilities in February 2017, and they are expected to be completed in December 2018. Commercial operations are expected to begin in January 2019. They will add 110,000 metric tons a year to PRII's PVC production capacity, effectively doubling capacity in an effort to meet growing demand in the Philippines and elsewhere in Asia.

Positioning

Vinyl Isocyanate Chain

The profitability of the vinyl isocyanate chain has been an issue for the Tosoh Group over the past decade. Fortunately, the chain's profitability improved in fiscal 2017 because of lower naphtha and other raw material prices and the yen's appreciation.

The upgrade in power generating facilities is due to be completed in winter 2018. Tosoh is also stabilizing the procurement of raw materials. And it is expanding PVC production capacity at PRII and enlarging the Chlor-alkali Group's hydrochloric acid shipment facility.

Exploiting the cost-effectiveness of Tosoh's independent electricity generation capabilities is an important way the Chlor-alkali Group is boosting the cost-competitiveness of its primary chloride and other product lines. The Chlor-alkali Group is devising methods to share Tosoh's electricity generation capabilities among its operations at the company's domestic factories, beginning with the Yokkaichi Complex and including the Sakata Plant of Tohoku Tosoh Chemical Co., Ltd. Increasing domestic environmental taxes on fossil fuels also require the group to continue efforts to distribute Tosoh's electricity generation and keep its electric power costs and its product pricing competitive.

The global VCM market is highly competitive but growing. The Chlor-alkali Group employs a wide range of measures to reduce its VCM production costs and to strengthen its VCM marketing. The group is also considering prioritizing domestic and overseas markets where profitability is greatest amid changing exchange rates, market conditions, and technologies.

The group is focusing on products, including PVC, produced by Tosoh subsidiaries. Its plan is to encourage subsidiaries to collaborate in expanding markets in ways that ensure their profitability. The goals specifically for VCM and PVC operations are to provide stable VCM supplies to Tosoh's PVC manufacturing subsidiaries and to maximize profits for all. This means strengthening domestic sales and tapping sales opportunities overseas in such markets as Indonesia and India. In contrast, China remains a difficult market to access because of its increasing use of the inexpensive carbide method to produce PVC.

Tosoh produces more than 35% of Japan's VCM output and is the domestic leader in PVC resins, accounting for one-fourth of national output. Long term, VCM and PVC demand should increase in Asia, and Tosoh expects to benefit despite heightened competition at home and abroad.

Urethanes

The Chlor-alkali Group's Urethane Division embodies the full integration of Tosoh's and Nippon Polyurethane Industry Co., Ltd.'s (NPU) MDI, TDI, HDI, and functional urethane operations. NPU was fully integrated into Tosoh's Urethane Division in 2014. From a single location within

Tosoh's head office, the division's administrative staff has been examining how best to optimize Tosoh's ample resources to further Tosoh's urethane business strategies. This will be particularly important in view of growing volatility in the polyurethane business climate amid raw material cost fluctuations, planned capacity increases by competitors, foreign exchange rate swings, Chinese market risks, and other factors.

Regardless of operating climate, the Urethane Division will pursue efforts to cultivate high-value-added MDI offerings and to reinforce its functional urethane business to bolster Tosoh's profitability. The division also looks to maximize production and sales to help stabilize Tosoh's vinyl isocyanate chain and increase the company's earnings.

Tosoh's conversion to low-cost MDI production was mostly complete before the integration of its vinyl isocyanate chain through the tie-up with NPU's operations. The Urethane Division is now contending with debottlenecking and thereby freeing up MDI production capacity which will lend to increasing the presence of Tosoh's MDI products domestically and overseas.

The division also intends to reinforce its MDI export sales structure. While reviewing its sales structure in China, it will attempt to reduce its reliance on China's market. It will instead expand sales in Southeast and South Asia, which offer potential for stable demand. To reinforce its MDI marketing drive in Asia, particularly in the Association of Southeast Asian (ASEAN) markets, the division has set up an MDI stockpiling base in Singapore.

Strengthening sales of monomeric MDI is another divisional priority. It will accomplish this through the increased production capacity of specialty MDI for high-value-added applications. It is also looking to accelerate the shift from commodity products to specialty products and from single-item sales to system sales.

In addition, the Urethane Division is considering establishing an overseas polyurethane system house.

Cement

The Chlor-alkali Group is improving the waste plastic processing of its cement operations through an upgrade to cement manufacturing facilities, simultaneous with continued programs aimed at conserving energy and reducing energy costs. The Chlor-alkali Group's single-kiln cement operations feature low maintenance, labor, and outsourcing expenses and thus low fixed costs.

Medium term, the group is considering increasing the waste plastic processing of its cement operations. This will involve an upgrade to its cement manufacturing facilities alongside ongoing programs to conserve energy and reduce energy costs.

In fiscal 2018, the Chlor-alkali Group expects that demand for cement will remain steady. Demand related to the 2020 Summer Olympics and Paralympics in Tokyo, the Linear Chuo

Shinkansen (bullet train) and Kumamoto earthquake recovery needs should pick up in the first half of that year and offset a tapering off in domestic public-sector demand. Overseas, competition in Asia could intensify owing to slower growth in China. Tosoh, though, anticipates operating at full kiln production and sales capacity in fiscal 2018.

Medium-Term Business Plan

Under its three-year business plan, Tosoh's objective is ¥21 billion in operating income for the Chlor-alkali Group by fiscal 2019. The group, however, surpassed this aim in fiscal 2017, garnering operating income of ¥47.9 billion. Operating income, though, is expected to drop to ¥46.5 in fiscal 2018 and to decline again in fiscal 2019. Tosoh is therefore aiming for a group operating margin of 15.5% in fiscal 2018, following a margin of 17.1% in fiscal 2017.

Tosoh's strategy for its Chlor-alkali Group and specifically for the group's PVC, VCM, caustic soda, and chlorine derivatives operations is to maximize profits by optimizing the vinyl isocyanate chain. Initiatives include ensuring the stable procurement of competitively priced raw materials and building competitiveness through greater efficiencies in power generation, power consignment, and other areas. Tosoh will also strengthen the profitability of its soda and chlorine derivative products.

Tosoh, meanwhile, will continue to strengthen its functional urethane operations and to shift to high-value-added MDI production. This will accelerate the company's move from commodity to specialty products and from single-item to system sales. The Chlor-alkali Group will underpin Tosoh's strategies in this regard, especially through an MDI marketing drive in Asia reinforced by the Urethane Division's MDI stockpiling base in Singapore. The division will also promote sales of functional urethanes in medical fields and plans to add production capacity for HDI derivatives.

PETROCHEMICAL GROUP

The Petrochemical Group supplies diverse customers with conventional and high-performance and specialty products. Polymers, including polyethylenes and functional polymers, and olefins are the group's main product lines, and the group maintains its competitive edge by moving its products upstream, managing its product mix, cutting its costs, and diversifying its product lines. The Petrochemical Group bridges the gap between the Specialty and Chlor-alkali Groups in Tosoh's dual commodities and specialties strategy.

Tosoh has utilized olefin feedstock from the Petrochemical Group to become an integrated manufacturer of hydrocarbon-based products and their derivatives, including ethylene, propylene, cumene, and aromatic compounds. Customers use olefins to manufacture a broad range of products, from automotive additives to food flavors and fragrances.

The Petrochemical Group's polymer operations manufacture ethylene vinyl acetate (EVA); low-density polyethylene (LDPE); linear low-density polyethylene (LLDPE); high-density polyethylene (HDPE); and such functional polymers as chloroprene rubber (CR), adhesive polymers, and engineering plastic resins. The polymer operations adapt product specifications to meet customer needs for polymers in consumer and industrial products. Various grades of EVA are found in everything from solar cells to shoe soles. LDPE is used in medical applications and food packaging. And HDPE is applied in injection moldings and high-purity pharmaceutical containers.

Chlorosulfonated polyethylene (CSM) rubber and polyphenylene sulfide (PPS) feature in the Petrochemical Group's functional polymer lineup. CSM is a highly durable rubber, and Tosoh is the leading global CSM producer. PPS is also in great demand globally as an engineering plastic, as it helps automakers develop lighter, more fuel-efficient vehicles.

Group Performance

Significantly Improved Profitability

The Petrochemical Group's net sales decreased 7.8% from a year earlier, to ¥161.7 billion (US\$1.5 billion). The group's contribution to Tosoh's consolidated net sales likewise declined, from 23.3% to 21.8%. In contrast, operating income rose ¥8.5 billion, or 72.9%, to ¥20.1 billion (US\$185.3 million), owing to increased exports and accounted for 18.1% of Tosoh's consolidated operating income. The group's operating margin was 12.4%, up from 6.6% a year earlier.

Petrochemical Group product shipments of ethylene, propylene, and other olefins were steady. But prices fell because of decreases in the cost of naphtha and other raw materials and fuel.

Prices of polyethylene resin products in Japan also fell, reflecting lower naphtha prices. Exports of CR and CSM, however, increased on strong demand overseas. Prices dropped, though, because of the strong yen.

Developments

During the period under review, Tosoh allocated ¥1.9 billion to Petrochemical Group R&D. The group, in turn, continued and continues to develop and commercialize PPS to meet the demand for increasingly lightweight and complex automotive components. It also continues its R&D on grades of CR for transmission belts.

Petrochemical Group R&D is dedicated to developing and improving polymers and related technologies. R&D into unique, high-value-added polyethylene products of superior functionality is ongoing. The group is also developing new and improving grades of laminate products, food packaging materials, and other related products. It is making progress toward clean, heat-resistant grades of polyethylene products intended for medical applications.

Using Tosoh's new, proprietary catalyst, the Petrochemical Group has developed a world-class, ultrahigh molecular weight polyethylene (UHMWPE). Applications being developed for this product are wide ranging and include separators for lithium secondary batteries, sliding parts, and more.

Tosoh is the world's top manufacturer of CSM. Through the Petrochemical Group, it is establishing a reputation among customers and is expanding the market for this high-quality product. The group is also developing applications for PVC paste in wallpaper, flooring materials, and other applications by listening to the market and responding to customers' needs. In addition, the Petrochemical Group is devising polymer materials based on unique concepts for their use as LCD materials, flexible display substrate materials, and other applications.

Positioning

Olefins

Tosoh continues to operate its Yokkaichi Complex-based naphtha cracker at full rate to achieve a balance between the consumption and sale of each fraction of naphtha. To this end, the Petrochemical Group will increase the efficiency of that naphtha cracker by installing a gas turbine by spring 2020.

In Asia, the Petrochemical Group sees olefins as a growth market over the long term despite rising competition from Middle Eastern and Asian suppliers. Developing economies invariably consume increasingly large amounts of olefins, as is happening throughout the Asia-Pacific region. And the Petrochemical Group maintains some advantages over competitors in many markets.

Polyethylenes

The Petrochemical Group's strategy for its core polyethylene products is differentiation. It will focus on high-value-added grades, new products, and customization for market segments and major customers. This also involves promoting the commercialization of ultrahigh-molecular weight polyethylene.

Functional Polymers

The Petrochemical Group is repositioning itself in the technically advanced CR market by expanding its line of superior-grade products. This includes introducing injection-mold and sulfur-modified CR grades.

Demand for PPS resins from the principal customer for these products, the global automobile industry, is estimated to grow over the medium term. The Petrochemical Group is poised to meet that demand and continues to develop PPS grades for new applications in automotive

parts to help automakers reduce vehicle weight. Susteel-brand PPS, for example, features superior metal bonding for automotive applications. The group has in addition developed SGX-grade PPS resin, which a leading smartphone maker and several Chinese smartphone makers are using in mobile phone casings.

Medium-Term Business Plan

Tosoh's medium-term business plan has as an objective ¥17 billion in operating income for the Petrochemical Group by fiscal 2019. This represents a 15.5% decline from the ¥20.1 billion in operating income achieved in fiscal 2017. The plan also aims for a fiscal 2019 group operating margin of 10.4%, a drop of 2 percentage points from fiscal 2017. The Petrochemical Group is well positioned to reach its targets for fiscal 2019, having exceeded them in the first year of the plan.

The plan's focus in olefins is on ethylene, propylene, and cumene. A priority will be to optimize earnings by maintaining high-capacity utilization rates for the Petrochemical Group's naphtha crackers. The group will enhance its energy-intensity competitiveness and build a pricing structure that incorporates an appropriate spread.

The Petrochemical Group relies on its refinery and petrochemical modeling system (RPMS) to deal with a changing business environment. It adjusts the mix of its cracker output, for instance, to maximize profitability. As a result, it is prepared to expand by taking advantage of opportunities that arise from managing the balance among production rates, product mix, and market prices.

Polymers, too, figure in the medium-term business plan. The emphasis is on polyethylene and the functional polymers CR and CSM. The focus in functional polymers is to expand sales of special grades of CR, particularly of sulfur-modified and injection-mold CR.

ENGINEERING GROUP

The Engineering Group comprises water treatment and pure water generation leader Organo Corporation and construction-related group companies such as Tohoku Denki Tekko Co., Ltd.

Organo maintains three principal businesses. Its plant business sells water treatment systems to electronics, chemicals, oil refinery, food and beverage, paper and pulp, waterworks and sewage treatment, health care, and other companies. Its solution business maintains and manages systems, suggests ways to enhance efficiency and lower environmental impact, and provides water treatment outsourcing services. And its functional products business sells standardized water treatment systems and chemicals and food processing materials.

Tohoku Denki Tekko has five main businesses. The construction business engages in machinery, plant, steel structure, environmental and sanitation facilities, and container construction. Its four other businesses encompass electrical machinery, instrumentation, civil engineering, quality assurance, and maintenance.

Group Performance

A Solid Performance

In fiscal 2017, the Engineering Group's net sales amounted to ¥86.6 billion (US\$799 million), an improvement of 2.8% over fiscal 2016. The group's operating income climbed 12.4%, to ¥5.1 billion (US\$47.5 million). The group accounted for 11.7% of Tosoh's consolidated net sales, compared with 11.2% the previous fiscal year. Its operating margin was 5.9%, an increase of 5.5% from fiscal 2016.

Tosoh's water treatment business increased its sales during the year under review through growth in plant construction, maintenance, and reconstruction projects for general industrial wastewater treatment and water purification facilities. Its overseas sales were steady to the electronics industry in Taiwan and to the petrochemical industry in Southeast Asia. Sales by the Engineering Group's construction subsidiaries increased.

Developments

Strategic Collaborations

Organo has taken steps to consolidate its businesses and expand its service capabilities and reach. It has strengthened its factories in Indonesia and Vietnam and expanded beyond its established business regions.

Positioning

Water Treatment

In fiscal 2018, Tosoh subsidiary Organo plans to bolster its earnings capacity, develop and improve technologies and products that strengthen its businesses, and allocate resources to bolster its R&D activities. Its efforts to generate long-term growth will center on such specific areas as functional products, semiconductor processing, and the separation and purification of nonaqueous solvents and gas.

Organo's management expects sales and operating income to increase, reflecting Organo's progress in expanding its sales of functional products and improving its profitability. The subsidiary's management also anticipates increased capital investment to improve and further differentiate technologies and products and to carve out new business areas for medium- and long-term sustainable growth.

Organo intends to enhance its operations in Asia and to extend its services to new regions and business areas. The latter include semiconductor manufacturing processes, energy and natural resources, and life sciences.

Organo's expansion into semiconductor manufacturing sees it developing etching, stripping, and cleaning solutions as part of the chemical purification process in wastewater treatment. This positions Organo between the chemical manufacturer and chemical purifier in the semiconductor manufacturing process.

In energy and natural resources, Organo looks to develop its purification of electrolytic solutions and separation and recycling of rare metals. Its N-methyl-2-pyrrolidone (NMP) production is expected to grow 10% annually.

Life science needs are growing simultaneous with aging and increasingly health-conscious societies. And Organo will respond with its development of functional materials for diverse applications.

Large electronics industry projects should again contribute most to Organo's performance. Its domestic and overseas orders from that industry will probably decline in fiscal 2018, but it foresees an increase in sales of plants in China. Organo will also target sales to the water treatment chemicals industry and reinforce its solutions business while continuing to reduce costs to improve profitability.

A mature domestic market, however, compels Organo to increasingly look abroad for business, especially in water treatment for power stations. Organo is thus leveraging its network of subsidiaries and affiliates in China, Thailand, Malaysia, Taiwan, Vietnam, and Indonesia and converting its overseas activities to local operations and staffing as appropriate.

Construction

Tohoku Denki Tekko is constantly seeking new business. To that end, the subsidiary is pushing beyond hardware to planning, construction and installation as part of its continued efforts to adopt a solution-oriented sales approach for its industrial electrical machinery businesses.

Medium-Term Business Plan

Over the next two years, Organo will prioritize areas of most potential. It will cultivate domestic business for power plants and establish operations overseas where electricity demand is rising. It will also enhance its equipment and systems businesses for the supply of water treatment chemicals and standardized water treatment equipment.

Organo will improve its R&D to ensure its growth over the medium and long terms. Its emphases in functional products include semiconductor processing, the separation and

purification of nonaqueous solvents and gas, and expanded scale through the cultivation of new markets. Organo views the medium-term business plan's three-year span as an investment period for improved profitability.

The Engineering Group's construction-related group companies will continue to prioritize bolstering their technological and service capabilities so as to heighten customer satisfaction.

OTHER

Tosoh is committed to close connections among its business operations and customers. It relies on its other businesses to ensure those connections. Timely support of its diverse operations is mission critical for Tosoh. Tosoh's other businesses, therefore, are always on call.

In addition to trading companies, Tosoh's other businesses include professional services that assist the Tosoh Group. These include logistics, administrative services, personnel training, information technology (IT) support, and more. Other businesses also contribute essential research and analytical support for Tosoh's introduction of innovative technologies, products, and services.

Tosoh works to ensure that each of its other businesses evolves from a cost center to a profit center. And it ensures that they compete with external suppliers for Tosoh Group business, which benefits them and the Tosoh Group by promoting cost- and administrative effectiveness and technological advances.

Group Performance

A Solid Performance in a Challenging Environment

Other sales declined 1.5%, to ¥39.1 billion (US\$361.3 million), and accounted for 5.3% of Tosoh's consolidated net sales, an increase from 3.7% a year earlier. Operating income was up 4.6%, to ¥2.7 billion (US\$24.8 million), and the operating margin, at 6.9%, was also up, from 6.5% in fiscal 2016.

The main factor in the sales decline was a decrease in trading company sales. Sales by additional other operations also trended low for the year in review.

Supporting Tosoh Group

Logistics

Logistics are an important part of Tosoh Group's business efforts. There are four ways this logistical support helps Tosoh Group companies: by reducing manpower required and improving efficiency; by providing risk management and other related processes to upgrade

safety and quality; by making sure that shipping terminals and warehouses are ready to meet changing needs, and that shipping route traffic is optimized; and through logistics support overseas expansion.

General Services

Tosoh's general services businesses assist with personnel management, employee benefit administration and training, optimization of the health and safety of Tosoh Group employees, and encouraging encouragement of participation by subsidiaries and affiliates in the Tosoh Group salary administration system.

Analysis and Research

Tosoh's analysis and research businesses provide various services to Tosoh Group companies worldwide, ranging from organic, inorganic, polymer chemistry and electronic materials in assisting the development of new products and applications in those fields.

Around half of the analysis and research is conducted at the Nanyo Complex, while the remainder is undertaken at the Yokkaichi Complex and other various Tokyo-based Tosoh operations.

Tosoh promotes the independent development of Tosoh Group companies worldwide with a substantial equipment budget, which provides for annual upgrades, installation and analysis of equipment. In recent years, external sales in analysis and research have increased, helping these companies to become profitable on their own.

Information Systems

Information Systems is responsible for constant evaluation and upgrade of technologies, systems and services. They comprise the IT backbone of Tosoh, and train employees on programming languages, writing applications for the IT systems, and acquiring skills in innovation and process improvement.

In light of massive cyber attacks on corporations and public infrastructure around the world, Tosoh is taking a more proactive approach to heightening its ability to manage IT risk. Tosoh's IT strategy team, working with Tosoh Information Systems Corporation, has made IT security a major priority. An assortment of upgrades to Tosoh's IT security infrastructure have already been executed so as to limit the company's exposure to incidents involving sensitive information leaving the company, and to viruses and other dangerous programs coming into the company's network. Future upgrades to employee computer hardware and to software will continue so as to further strengthen Tosoh's ability minimize IT risk. The IT strategy team also holds regular educational seminars throughout the year so as to sustain and expand employee awareness of and ensure compliance with IT security measures.

CORPORATE SOCIAL RESPONSIBILITY

MANAGEMENT

Message from Tosoh's President

Tosoh's Business Environment

Fiscal 2017 saw considerable improvement in terms of trade, attributable in part to a weak yen and the leveling off of crude oil prices. An increasing number of companies in the chemical industry—including Tosoh—recorded strong financial performances. Tosoh achieved record profits and all of its initial sales targets.

Fiscal 2017 was only the first year of our newly formulated medium-term management plan, and yet we accomplished a number of the three-year plan's overall objectives. Tosoh management, however, places a dual emphasis on commodities and specialties, and the commodity sector is unstable because it is significantly influenced by external, often unclear, factors globally. Performance in commodities therefore will be key to Tosoh's ability to achieve all of the objectives for the final year of its medium-term business plan.

Management faces five major issues: meeting earnings expectations, implementing safety measures, devising a growth strategy, ensuring governance and compliance, and strengthening on-site capabilities. These issues are all closely tied to CSR activities, and as such management asks that Tosoh employees band together to tackle them with the five principles encapsulating the Tosoh Spirit in mind.

Tosoh Spirit

1. Eager acceptance of challenges
2. Calm assessment of situations
3. Passionate response
4. Firm resolve
5. Cooperation and gratitude
6. The Philosophy behind Tosoh Spirit

Tosoh Spirit was formulated in the flamboyant era of the bubble economy some 30 years ago. The company was reworking its corporate identity and had just changed its name from Toyo Soda Manufacturing Co., Ltd. to Tosoh Corporation. I am very fond of the tenets that Tosoh Spirit comprises, and I believe that even today they are firmly rooted in our corporate ethos.

An “eager acceptance of challenges” represents the willingness to set lofty goals. This requires that we view our situation objectively and unemotionally, applying the second principle: a “calm assessment of situations.”

A “passionate response” symbolizes the courage not to give in regardless of how formidable the path might be to achieving our goals. It signifies the relentless pursuit of our mission, which is not possible without “firm resolve.” I feel that “firm resolve” is synonymous with the word sustainability.

The fifth tenet of Tosoh Spirit, “cooperation and gratitude”—which implies employees working together and showing appreciation for one another—is extremely important. Tosoh exists because this and its other tenets were accepted and practiced by the various stakeholders that established the enterprise, and I want all employees to continue to observe and maintain them.

The Strong Correlation between CSR Activities and Tosoh Spirit

The expression “CSR” was not common in Japan 30 years ago. A company's contribution to society manifested itself in practices such as donations to its community, cultural activities or sponsorship of sporting events. For the most part, however, the manufacturing sector prioritized profit, and it was not thought necessary to devote much effort or money to other things. Over time, society and corporate culture have matured to where the pursuit of profit alone is insufficient to justify a company's existence.

Today, a company is assessed based on its relationship with society. It must prioritize existing in harmony with its stakeholders, including its community, its clients, and its shareholders, and with the environment. I believe that Tosoh must develop accordingly. “Cooperation and gratitude,” already a tenet of Tosoh Spirit 30 years ago, has turned out to be a forward-looking idea underpinning our present-day CSR activities.

My View of Tosoh's Societal Responsibilities

I believe that a company's essential role is to contribute to society from various perspectives through its business activities. Societal and market needs are changing at a furious pace. As a materials manufacturer, it is vital that Tosoh enhance its technology in line with societal demands and deliver to clients products of unprecedented value. I feel that this is Tosoh's truest contribution to society. I also feel that natural to this process and crucial to our philosophy in approaching our daily activities is maintaining the highest-possible standards with regard to quality and safety and our impact on the environment.

Tosoh's products are ubiquitous in daily life, but are often unseen. Our caustic soda and hydrochloric acid, for example, work invisibly to make possible clean tap water for people to

drink. From materials essential to electrical appliances, to dental ceramics and bioscience diagnostic reagents, our products play a role behind the scenes in bettering society by supporting comfort and convenience in everyday life.

R&D Generates Value for Society

Lifestyles are becoming increasingly diverse, such that the demand for materials and products offering value is accelerating. To stay in step with this transformation, it is vital that we ascertain future market needs and societal issues. Tosoh looks ahead to determine what fields of business show promise and focuses its R&D on them. An internal corporate selection committee narrows our focus to materials and functions that it deems to be of greatest potential. In recent years, we have concentrated on life sciences, the environment and energy, and electric materials. In anticipation of the adoption of sustainable development goals by the United Nations in 2015, we also began mapping out our R&D theme.

Simply undertaking activities pursued by other companies, however, is not how Tosoh will produce anything of unprecedented value. We are trying to look at things from a perspective different to other companies and to develop products that no company but Tosoh could develop. This, of course, is easier said than done. To this purpose, however, we have reorganized our R&D structure into seven facilities, each focusing on a particular field. We are also about to rebuild certain R&D facilities to consolidate and thereby enhance synergies and to provide our researchers with environments that inspire them.

Meanwhile, we are reviewing our fiscal 2017 CSR activities and pursuing enhanced productivity. In addition, we are shifting from corrective to preventive maintenance through an investment of ¥10 billion over three years in facility renovation. And we continue our transfer of skills to young researchers in the interest of safety, as this generated tangible results in the way of no serious accidents in fiscal 2017.

In our environmental activities, we have as a goal low-energy manufacturing. As such, we are reviewing our production methods under the theme of enhanced energy efficiency. We have for many years been improving our energy efficiency per unit of production, but we are nearing the limit to the benefits of innovation at the production site. We aim to achieve further reductions in environmental loading by establishing entirely new production processes. We are also developing increasingly environmentally friendly materials that, in turn, improve the environmental performance of our customers' products. In this way, we are contributing directly and indirectly to the preservation of the global environment.

Since fiscal 2016, we have expanded our efforts in establishing systems and enhancing awareness of governance and compliance from a focus on our Tokyo headquarters to encompass Tosoh Group companies worldwide. Business practices and cultures may differ between Japan and other countries, but we intend to continue our efforts toward unity in governance and compliance.

Earning Society's Trust

Governance—the establishment of systems necessary to overseeing corporate operations—is exceedingly important. But it extends beyond the tangible. An executive's management style will not be successful if it does not satisfy employees. At Tosoh, the chief intangible element is Tosoh Spirit. Only if our management team is able to construct systems of imagination and spirit and of an all-encompassing nature am I convinced that it will succeed in fostering a positive atmosphere companywide.

In this era of global business, continuing to operate based on a management philosophy that is uniquely Japanese will not work. I feel that as executives it is our responsibility to boldly adopt new and broader methods of management.

My Role as the Leader of the Organization

As the president of the company, it is my responsibility to champion and coordinate our efforts to revitalize our CSR activities. I want at the appropriate time to share company issues and plans with employees and thereby inspire them. If such sharing does not come from the top, our CSR activities will seem mechanical and soulless. To ensure that Tosoh can continue to enjoy a positive atmosphere, I must lead by example and in this way show that we are not merely paying lip service to CSR.

To Our Stakeholders

Tosoh's 2017 CSR Report provides a clear, easy-to-digest summary of financial and nonfinancial information, descriptions of Tosoh activities, and commentary concerning the direction Tosoh must take going forward. We ask our stakeholders to read through this report so that they may evaluate Tosoh from numerous perspectives, and we welcome any and all opinions and comments.

Toshinori Yamamoto
President, Tosoh Corporation

Message from the Chairman of the RC Committee

Developing a Sustainable Society by Promoting CSR

In recent years, the demand for the disclosure by corporations of information related to their development of a sustainable society has become more pronounced. How corporations work to meet that demand and the other expectations of their stakeholders is also drawing considerable attention.

Tosoh's corporate philosophy serves as the foundation for its CSR activities. The company aims to contribute to the development of a sustainable society by continuing to offer value through its business activities. We believe that our societal responsibility is to continuously provide unprecedented value to the world.

Chemical companies are assuming an increasingly large role in resolving numerous global and local issues. Tosoh will strive to maintain a unique presence and character in that role.

Keiichiro Nishizawa
Director, Executive Vice President, Tosoh Corporation
Chairman, RC Committee

ENVIRONMENT AND SOCIETY

Tosoh endeavors to reduce its environmental loading through the optimal use of the earth's limited resources. Going forward, we will generate additional ideas for advanced activities to this purpose while carrying out our daily business, understanding as we do the importance to society of environmental preservation.

Input and Output

Tosoh combines the reaction, decomposition and distillation of raw materials to manufacture products. The source of heat for reaction and decomposition is the steam from our power-generation boilers. The electricity generated by those boilers in turn powers the equipment for these processes. Industrial-use water and seawater are applied to reduce reaction heat.

We maintain a balance between fuel input and the power generation and product output of each plant. We are also conscious of mitigating our emissions of substances that harm the environment.

Effective Resource Utilization

We recycle almost all of the industrial waste produced by our in-house power generators at our facilities, including coal ash, which we use in the production of cement. Our Nanyo Complex, for example, either reuses or reprocesses almost 100% of the industrial waste it produces. It even uses general and industrial waste from outside sources to fuel its cement plant.

Tosoh's final disposal volumes for fiscal 2017 constituted 0.33% of its overall industrial waste. We continue to pursue more effective uses of finite resources.

Industrial Waste Emissions

The total volume of the industrial waste disposed of by Tosoh in fiscal 2017 was 1,382 metric tons. This was well below our Responsible Care (RC) target of 1,768 metric tons a year. We now have as our objective achieving the Japan Business Federation (Keidanren) target for 2020: a reduction to 30% of the fiscal 2000 industrial waste disposal volume. Tosoh will work toward this target in part by dropping its RC industrial waste disposal goal for fiscal 2018 to 1,515 metric tons.

Class 1 Chemical Emissions

Tosoh seeks to lessen its emissions of Class 1 chemical substances under Japan's Pollutant Release and Transfer Register (PRTR) Law. In so doing, we contribute to a cleaner environment. Our Class 1 chemical emissions in fiscal 2017 totaled 593 metric tons, down 10 metric tons from fiscal 2016.

Atmospheric Preservation

We release smoke containing sulfur oxide (SOx), nitrogen oxide (NOx) and particulate matter into the atmosphere because of operations involving fuel-burning boilers and furnaces. Acid rain and the potential impact of atmospheric emissions on people's health are a concern. As a result, regulatory values for each generating facility and total volume controls for each business unit have been established by Japan's Air Pollution Control Act. We have also established values for each of our business units under regulations or agreements with the municipalities where we operate. In addition, we have independently set values to achieve sustainable environmental preservation.

We did not exceed any regulatory values in fiscal 2017. Tosoh will continue to work harder to meet and better the values set forth in regulations and agreements.

Water Preservation

Areas of heavy concentrations of industrial activity along open seacoasts and near more closed bodies of water such as Tokyo Bay, Ise Bay and the Inland Sea are protected by effluent regulations based on drainage standards and by Japan's Water Pollution Prevention Act. Each of Tosoh's business units operate under municipal effluent regulations or agreements. Tosoh also has its own effluent values in pursuit of sustainable environmental preservation.

Tosoh did not exceed any regulatory values in fiscal 2017, and will continue to work with greater effort to meet and improve upon the values established by regulations and agreements.

Minamata Convention Compliance

The Minamata Convention on Mercury was adopted internationally in October 2013. In 2016, the Japanese government enacted revisions to Japan's Act on Preventing Environmental Pollution of Mercury, Air Pollution Control Act and Law Concerning Waste Disposal and Scavenging based on that convention.

Earlier, in 2013, Tosoh had established an RC directive to reduce its number of facilities using mercury by ceasing the use of mercury at any renewed facility. To date, all other Tosoh facilities are confirmed to be within the newly revised mercury concentration standard values set for smoke exhaust emitted from boilers and cement kilns.

Through the use of materials and fuels with low to no mercury content, Tosoh will work to suppress mercury concentrations in its smoke exhaust. The company will likewise protect the environment through the improved processing of industrial waste containing mercury.

GOVERNANCE

Managing with Fairness and Transparency to Enhance Corporate Value

We believe that our contribution to the development of a sustainable society requires that we enhance our corporate value by remaining a company our stakeholders can trust. Accomplishing this makes it imperative for us to work closely with stakeholders to devise various activities that increase our corporate value.

Maintaining a high degree of fairness and transparency through sound corporate governance is the cornerstone of sustainable company operation, as Tosoh is working to reinforce its corporate governance activities. Basic guidelines for employee compliance in the execution of daily duties are outlined in the Tosoh Group Action Policy, and we are making efforts toward company-wide observance.

We will manage ourselves with fairness and the proper and transparent disclosure of information in mind to secure and maintain society's trust and thereby contribute to our continued development.

Koji Kawamoto
Tosoh Corporation
Director, Executive Vice President
Manager of Corporate Control and Accounting

Tosoh Corporate Governance

Tosoh's corporate governance centers on adapting to an ever-changing business world through strong management and a dedication to fairness and transparency.

We work to enhance the effectiveness of our corporate governance by disclosing information to earn the trust of our shareholders and many other stakeholders.

Board of Directors

No. of Directors (as of June 28, 2017) Internal: 8 External (Independent): 2

Tosoh's Board of Directors comprises 10 directors, including two external directors and, in principle, convenes monthly. It discusses key management issues, and supervises the performance of duties by all directors and executive officers. The Board of Directors also determines the selection and dismissal of executive officers and the responsibility for the performance of duties.

Analysis and Evaluation of the Effectiveness of the Board of Directors

Tosoh annually conducts an analysis and evaluation of the effectiveness of its Board of Directors and publishes an overview of the results. In fiscal 2017, the company surveyed its board members for their opinions. The findings show that the Board of Directors is effectively executing its role.

Also in fiscal 2017, Tosoh undertook reviews of discussion criteria and of the frequency of reported items to ensure that its Board of Directors can focus on important matters related to management. Both reviews yielded substantial results. They indicated the necessity of the board's enhancing its discussions of management and business strategies related to Tosoh's medium-term business plan. The Board of Directors will therefore focus on this going forward.

Board of Auditors

No. of Auditors (as of June 28, 2017) Internal: 2 External (Independent): 2

Tosoh's Board of Auditors is made up of four auditors, including two external auditors and, in principle, convenes monthly. The Board of Auditors evaluates the behavior and business execution of the Board of Directors.

The auditors attend such important gatherings as the Board of Directors meeting, receive reports from the directors, and review documentation related to key decisions. They also exchange information and opinions as appropriate with the company's Internal Control Committee and with the accounting auditor to improve the efficiency and effectiveness of audits.

To elevate the performance of its auditors, Tosoh has established a secretariat within its Board of Auditors.

External Directors and Auditors

Tosoh has established proprietary independence evaluation standards for its external directors and auditors. If none of the items under the standards are applicable, the determination is that independence is secured.

The company selects external directors and auditors based on their vast experience and knowledge of corporate management. It also designates external directors in accordance with directives from the Tokyo Stock Exchange (TSE) and reports their appointments to the TSE.

Executive Officer System

In June 2016, Tosoh introduced an executive officer system to improve the efficacy and speed of management by differentiating decision-making duties from supervisory duties. This will help Tosoh respond to rapid changes in its business environment and to prioritize transparency regarding the responsibilities of management.

Compliance Structure

Internal Control Committee

Tosoh's Internal Control Committee assists in designing and developing Tosoh's internal controls to ensure the company's compliance with financial reporting standards as stipulated by Japan's Financial Instruments and Exchange Act.

The committee evaluates internal controls with respect to audits by the Audit Office and adjusts controls accordingly. It also drafts and publicly issues internal control reports.

The Internal Control Committee enhances the awareness of internal controls among Tosoh Group companies regarding the compliance structure and various risks.

Compliance Committee

Tosoh's Compliance Committee ensures that directors and employees comply with the Tosoh Group Action Policy and display high ethical and moral standards, and a high degree of fairness. The committee has also set up internal and external compliance hotlines that assure anonymity to help deter compliance-related indiscretions and to help rapidly resolve issues.

Export Supervision Committee

Tosoh's Export Supervision Committee deliberates on measures ensuring the company's safe and secure management of exports, fulfillment of its duty as an international corporation, and compliance with Japan's Foreign Exchange and Foreign Trade Act. It has also had each business unit designate a head and an export manager for cargo control. In short, it has established an export compliance structure.

Antimonopoly Act Compliance Committee

Tosoh's Antimonopoly Act Compliance Committee endorses a fair, free, competitive business environment. It encourages emerging business activities and corporate development in line with the internal rules, manuals and other instructional materials it prepares to ensure compliance with Japan's Antimonopoly Act.

For more information on Tosoh Corporation's CSR activities, please read the 2017 edition of our CSR Report (<http://www.tosoh.com/investors/annual-reports/2017/downloads-and-faq>).

RESEARCH AND DEVELOPMENT

Tosoh's R&D organization consists of eight facilities plus the Organo Corporation's R&D Center. This structure is designed to strengthen and expand Tosoh's core businesses and to enhance Tosoh's ability to create new business lines at a time of rapid change in technology. Tosoh's R&D efforts are aligned by technical fields and functions that accord with the Tosoh Group priorities of life sciences, energy and environmental conservation, and electronic materials.

Tosoh's Advanced Materials Research Laboratory and Life Sciences Research Laboratory are dedicated to R&D related to the Specialty Group. The Functional Polymers Research Laboratory and Polymers Materials Research Laboratory undertake R&D on behalf of Petrochemical Group products and technologies. Tosoh's Inorganic Materials Research Laboratory, Organic Materials Research Laboratory, and Urethane Research Laboratory serve the Specialty Group and the Chlor-alkali Group. And Tosoh's Technology Center conducts R&D into process development for all products. Organo Corporation's R&D Center, meanwhile, conducts R&D for the Engineering Group.

Tosoh also collaborates in joint research projects with external research facilities, at universities and at public research laboratories, to supplement the group's R&D capabilities and accelerate Tosoh's technology development. In addition, Tosoh invests in venture funds. Furthermore, Tosoh's researchers are sent to the United States to improve Tosoh's access to information about technology that the group hopes, in turn, will foster areas of promising growth.

In fiscal 2017, Tosoh established a plan to strengthen its research organization and its development of products. The company will rebuild its research facility at the Yokkaichi Complex and consolidate the polymer products research that to date Tosoh conducts in three locations. It will also rebuild the research facility at its Nanyo Complex.

Tosoh's R&D team during the year under review consisted of some 900 people. By year's end, Tosoh had invested ¥14.4 billion (US\$128 million) in the R&D programs that they oversee.

Organization

Tosoh reorganized its R&D structure in fiscal 2015 according to technical field and function, giving the company the opportunity to realign its resources according to Tosoh Group priorities. What previously were the company's three main R&D laboratories are now seven facilities, including the Urethane Research Laboratory that was formerly NPU's R&D facility. The new structure is expected to speed the development of a wide array of exciting new products and materials.

Overall, the reorganization places the seven new research facilities into two categories. Some are product and technology development research laboratories, and others are long-term research laboratories.

Product and Technology Development Research Laboratories

Inorganic Materials

Research focuses on developing functional inorganic materials and technologies. Themes include high-performance HSZ for automobile applications, zirconia for dental material applications, and manganese oxide compounds for the cathodes of rechargeable LIBs.

Polymer Materials

Research emphasizes polymers and petrochemical products and technologies. Themes center on polyethylenes for various applications, including medical and ultrahigh molecular weight polymers and superior grades of chloroprene rubber and PVC pastes, and on applications for polyphenylene sulfide (PPS) and other petroleum resins.

Organic Materials

Research aims to develop functional organic materials and technologies. Themes include polyurethane (PU) foam catalysts and amine derivatives for environmentally friendly reagents and other applications and advanced electron and hole transport materials used in organic light-emitting diode (OLED) displays.

Urethane

Research centers on urethane-related materials and technologies. Themes include PU foam for cushion and flame-resistant and other materials and functional urethane for such products as paints and adhesives.

Long-Term Research Laboratories

Life Science

Research highlights biomedical- and medical-related materials and technologies. Themes include high-performance packing materials for the separation and purification of antibody drugs and early-stage cancer testing technology.

Functional Polymers

Research explores electronic, optical, and biofunctional polymers. Themes involve high-performance film materials for LCDs and heat-resistant substrate materials for flexible displays.

Advanced Materials

Research spans materials and technologies for energy and environmental conservation and for electronic materials, the two other priorities of Tosoh's R&D strategy. Themes include sputtering targets for LCD displays and organometallic materials for the next generation of integrated circuits.

R&D by Business Group

Petrochemical Group

Petrochemical Group R&D is dedicated to developing and improving polymers and related technologies. R&D into unique, high-value-added polyethylene products of superior functionality is ongoing. It includes developing and improving grades of laminate products, food packaging materials, and other related products. A particular focus is on developing medical applications for a high-purity, highly heat resistant grade of polyethylene. That effort has garnered Tosoh a strong reputation worldwide for transfusion bags that are transparent and resistant to heat.

Using Tosoh's new, proprietary catalyst technology, the Petrochemical Group has developed a world-class, ultrahigh molecular weight polyethylene (UHMWPE). Applications being developed for this product are wide ranging and include separators for lithium ion batteries, sliding parts, and more. The group is also developing polyphenylene sulfide to meet the demand for increasingly lightweight and complex automotive components. Its petroleum resins are enhancing the performance of tires as eco-tire modifiers. And its R&D into grades of chloroprene rubber (CR) for transmission belts has led to a Tosoh specialty: CR-based transmission belts whose durability is appreciated by customers.

Tosoh is the world's largest manufacturer of chlorosulfonated polyethylene (CSM). And the Petrochemical Group is enhancing the company's reputation among customers with new mixes that further the water and chemical resistance of Tosoh's CSM and that expand the market for this already high-quality product. The group is likewise developing applications for Tosoh's polyvinyl chloride paste in wallpaper, flooring materials, and elsewhere by listening to the market and responding to customers' needs. In addition, it is moving ahead with developing polymer materials based on its unique concepts for their use as liquid crystal display materials, flexible display substrate materials, and other applications.

Fiscal 2017 R&D expenditures for the Petrochemical Group were ¥1.9 billion.

Chlor-alkali Group

R&D for the Chlor-alkali Group focuses on technical innovations in Tosoh's core vinyl isocyanate chain. The group is improving manufacturing processes for isocyanates, the raw material for polyurethane, and places a priority on developing formulations for polyurethane foam, elastomers, coatings, and other polyurethane-related products. Collaboration studies with other business fields are also important targets. Specifically, in order to comply with reduced weight and improve durability for automotive interior parts, environmentally friendly wholly MDI-based low-density seat cushions have been developed that are thinner, exhibit low volatile organic compounds (VOC), and are more robust than previously.

Functional polyurethane R&D prioritizes the development of clear, low-viscosity hardeners for automotive clear top coats. It also emphasizes raw materials for chemical-resistant coatings for synthetic leather urethane resin and plastic paints. In addition, Tosoh's inorganic materials R&D is pursuing continuous, energy-saving innovation in electrolytic technology for sodium hydroxide production.

Fiscal 2017 R&D expenditures for the Chlor-alkali Group amounted to about ¥3.0 billion.

Specialty Group

Specialty Group R&D focuses on life sciences, energy and environmental conservation, electronic materials, and other areas. In its life sciences R&D, the group is developing next-generation analyzers and reagents for its immunoassay analyzer business. It is also developing products for the diagnosis of infectious diseases in connection with Tosoh's genetic testing business.

The group's emphasis in life sciences R&D is on separation and purification media for the rapidly growing biopharmaceuticals market and on liquid chromatography columns for analysis. This supports Tosoh's participation in Japan's Manufacturing and Technology Association of Biologics and specifically its involvement in developing innovative processes for the purification and analysis of antibody drugs.

The Specialty Group is making headway in its R&D of microfabrication technology for early cancer detection. It has also begun R&D into cell inspection tools for use in regenerative medicine. And it continues to develop high-translucency zirconia for dental applications and colored zirconia for decorative use in fashion products.

Energy-related R&D work by the Specialty Group involves the development of materials for rechargeable lithium-ion batteries, a product for which demand is anticipated to grow. It is also developing conductive polymers that contribute to large-capacity capacitors. In the interest of environmental conservation, the group continues to develop zeolites for use in automotive

catalytic converters and high-performance zeolites for new applications. The group's ongoing R&D into foam catalyst amine derivatives has led to Tosoh's commercialization of its reactive amine catalyst RZETA, which is effective in reducing VOCs. The group also continues its R&D of heavy metal treatment agents for fly ash processing and wastewater treatment, and of engine oil additives that contribute to lower fuel consumption.

The Specialty Group's electronic materials R&D continues to make progress in developing advanced electron and hole transport materials for organic light-emitting diode displays. The group is in addition working on the next generation of sputtering targets for low-temperature, low-resistance thin films used in touch-panel displays. Tosoh began commercial production of low-resistance thin films in fiscal 2017.

The Specialty Group, moreover, is responding to increasing demand for semiconductor miniaturization with organometallic compounds for advanced wiring and quartz components for next-generation semiconductor equipment. It is also engaged in the R&D of coating-type organic semiconductor materials, a key material in printed electronics.

Fiscal 2017 Specialty Group R&D spending was ¥7.9 billion.

Engineering Group

Engineering Group R&D is furnished by the R&D Center of Tosoh subsidiary Organo Corporation. Organo's R&D Center emphasizes basic technologies, new products, and product quality. It also promotes the sale and service of water treatment equipment, such as pure, ultrapure, and clean water producing equipment; large-scale wastewater treatment plants and standard water treatment equipment; water treatment chemicals; and food additives and materials for food processing. The R&D Center has commercialized a new pulsation-based high-speed coagulation basin; cabinet-type pure water manufacturing equipment; and an N-methyl-2-pyrrolidone recovery system.

Fiscal 2017 Engineering Group R&D spending was ¥1.5 billion.

BOARD OF DIRECTORS

Toshinori Yamamoto.....	Representative Director, President
Katsushi Tashiro.....	Representative Director
Keiichiro Nishizawa.....	Director
Koji Kawamoto	Director
Nobuaki Murashige.....	Director
Masayuki Yamada	Director
Shingo Tsutsumi.....	Director
Etsuya Ikeda.....	Director
Tsutomu Abe.....	External Director
Kenji Ogawa.....	External Director

AUDIT & SUPERVISORY

Sukehiro Itoh.....	Internal Auditor
Eiji Inoue.....	Internal Auditor
Tetsuya Teramoto.....	External Auditor
Tsuneyasu Ozaki.....	External Auditor

CORPORATE OFFICERS

Toshinori Yamamoto.....	President
Katsushi Tashiro.....	Executive Vice President
Keiichiro Nishizawa.....	Executive Vice President
Koji Kawamoto	Executive Vice President
Nobuaki Murashige.....	Executive Vice President
Masayuki Yamada.....	Executive Vice President
Shingo Tsutsumi.....	Senior Vice President
Etsuya Ikeda.....	Senior Vice President
Masao Nakano.....	Senior Vice President
Yutaka Kohmoto.....	Senior Vice President
Mamoru Kuwada.....	Senior Vice President

Katsumi Mineshige.....	Vice President
Noriaki Ohshima.....	Vice President
Toshinori Hayashi.....	Vice President
Noriaki Hajima.....	Vice President
Nobuhiro Ogawa.....	Vice President
Akihiro Aiiso.....	Vice President
Jun Oyamada	Vice President
Yoshiyuki Uchiyama.....	Vice President
Akira Hironaga.....	Vice President
Masanobu Kasai.....	Vice President

Haruhisa Nishi.....	Vice President
Shunya Shinohara.....	Vice President
Hisaoki Harada.....	Vice President
Masayuki Kudo.....	Vice President
Toru Adachi.....	Vice President
Hiroyuki Yoshimura.....	Vice President
Satoru Yonezawa.....	Vice President
Toru Doi.....	Vice President
Hideyuki Obayashi.....	Vice President
Akihiro Yoshimizu.....	Vice President