



TOSOH

ANNUAL REPORT

Tosoh Corporation and consolidated subsidiaries
Fiscal year ended March 31, 2016

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 ¥112.68 = US\$1, the prevailing exchange rate at the end of the fiscal year under review.

Tosoh Corporation's 2016 fiscal year covers the period from April 1, 2015, to March 31, 2016.

RESEARCH AND DEVELOPMENT

Our R&D programs aim to strengthen our core businesses and to enhance our ability to more quickly develop products aligned with the demands of the market. To stay on the leading edge in our priority fields, we stimulate internal cooperation to maximize organizational resources and generate synergies. We also collaborate in joint research projects with external research facilities, at universities and other educational institutions, and at public research laboratories.

Tosoh's R&D team consists of some 890 people focused on product and technology improvements and on laying the groundwork for future business. In fiscal 2016, Tosoh invested ¥13.7 billion (US\$121.6 million) in its R&D programs, up slightly from the prior fiscal year.

Tosoh's priorities in allocating R&D resources are life sciences, energy and environmental conservation, and electronic materials. All of the company's research laboratories focus on these fields.

Life sciences R&D operations strive to give developed and developing economies access to high-end diagnostics and biopharmaceutical technologies. Separation technologies and immunoassay and genetic testing reagents are central bioscience R&D themes. Resources are being devoted in particular to an emerging Tosoh strength in protein modification technology.

Energy and environmental conservation R&D focuses on themes related to shifts in the chemical industry driven by public opinion and regulation. Specifically, this involves R&D programs for high market growth potential rechargeable lithium-ion batteries (LIBs), for catalysts and chelates for removing harmful substances, and for solar power materials.

Electronic materials R&D is dictated by dynamic and sometimes dramatic advances in semiconductors and consumer electronics. R&D emphases revolve around technologies and materials for photomasks and substrates, thin layer deposition, solar power, and electronic displays to keep abreast of and to foster further evolution in the semiconductor and consumer electronics industries.

Discovering ways to combine the strengths of diverse R&D operations for optimum results is an ongoing quest at Tosoh. We constantly explore methods for integrating R&D thematically and for improving collaboration in R&D generally. Our R&D reorganization, in fact, was planned with these goals in mind.

Quality R&D springs from quality people. So we nurture the scientific and leadership skills of our R&D personnel. About six years ago, we introduced a management of technology (MOT) program to develop the skills of our R&D managers. A similar program fosters today's researchers at Tosoh. We also hold events to encourage cohesion among our R&D people and to provide opportunities for them to network and exchange information.

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 Sciences

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

Specialty Group

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

Our 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. Tosoh participates in Japan's Manufacturing and Technology Association of Biologics and is involved in developing innovative processes for the purification and analysis of antibody drugs.

In addition, we are making headway in developing microfabrication technology for early cancer detection. And we are working on developing fashion-use color zirconia for such accessories as watches and those found in automobiles. Tosoh is also developing high-translucency zirconia for dental applications.

Our energy-related R&D work sees us developing improved manganese oxide materials for use in the cathodes of rechargeable LIBs, a sector of the market for which growth is forecasted. And in the interest of environmental conservation we continue to develop zeolites for use in automotive catalytic converters and for new applications. Our ongoing R&D of foam catalyst amine derivatives, meanwhile, led to our commercialization of emission-free reactive amine catalyst RZETA. Similarly, we continue our R&D of heavy metal treatment agents for fly ash processing and wastewater treatment.

Electronic materials R&D sees us pressing ahead with the development of advanced electron and hole transport materials for OLED displays. We have also commercialized sputtering targets for low-temperature, low-resistance thin films used in touch-panel displays and are working on their next generation. In addition, we are responding to increasing demand in semiconductor miniaturization with organometallic compounds and quartz components for

next-generation semiconductors. We are also engaged in the R&D of coating-type organic semiconductor materials, a key material in printed electronics.

Fiscal 2016 Specialty Group R&D spending was approximately ¥7.9 billion.

Chlor-alkali Group

R&D for the Chlor-alkali Group centers on innovations to Tosoh's core vinyl isocyanate chain. We are developing improved manufacturing processes for isocyanates, the raw material for polyurethane, and aggressively developing new formulas for polyurethane foam, elastomers, coatings, and other urethane-related products.

We are also devising new materials in collaboration with scientists in other fields. Specifically, we are combining forces to produce uniquely lightweight, highly durable, and environmentally friendly automobile seat cushions that are thinner, lower in density, and more robust. They are made wholly of MDI using advanced, low-VOC technology.

Our functional polyurethane R&D, meanwhile, is aggressively developing clear, low-viscosity curing agents and raw materials for chemical-resistant coatings for synthetic leather urethane resin and plastic paints for automotive-related applications. We are also pursuing continuous, energy-saving innovation in electrolytic technology.

Fiscal 2016 R&D expenditures for the Chlor-alkali Group amounted to about ¥2.6 billion.

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. In addition, Tosoh is developing and improving new grades of laminate products, food packaging materials, and other related products. We are, for example, 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 Dekamiren[®], 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.

In the meantime, the market for polyphenylene sulfide (PPS) is growing, particularly for its use in smartphone bodies, and this has contributed to increased group sales of PPS. Petroleum resins, too, are contributing to the group's bottom line because they are in demand to boost tire performance as eco-tire modifiers. Also with regard to automobiles, we have been researching and developing grades of chloroprene rubber (CR) that are appropriate for transmission belts, a Tosoh specialty. Customers appreciate the durability of Tosoh's CR-based transmission belts.

Tosoh is the world's top manufacturer of chlorosulphonated polyethylene (CSM). By further improving the functionality of our CSM, we are raising the quality of and expanding the market for an already high-quality product. We are likewise developing new uses for our PVC paste

beyond wallpaper and flooring materials by listening to the market and responding to customers' needs. And we are moving ahead with developing polymer materials based on our unique concepts for their use as LCD materials, flexible display substrate materials, and other applications.

Fiscal 2016 R&D expenditures for the Petrochemical Group were around ¥1.9 billion.

Engineering Group

Tosoh subsidiary Organo Corporation's R&D Center is core to Engineering Group R&D. The facility 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 monosaccharide separation chromatography separating materials and cabinet-type pure water manufacturing equipment.

Fiscal 2016 Engineering Group R&D spending was approximately ¥1.4 billion.