

FY 2017 April 1, 2017-March 31, 2018

Intellectual Property Report

Introduction

In February 2011, Toray Group formulated a long-term corporate vision called “AP-Growth TORAY 2020” (abbreviated as “Vision 2020”). It is a unified roadmap for management activities that focuses on the next roughly 10 years and seeks to ensure that we remain a corporate group of high value for all stakeholders that continually increases revenue and profit by actively fulfilling our role in social development and environmental stewardship. We implemented the medium-term management program, “Project AP-G 2013” that covered the three-year period beginning in FY 2011 as the first stage of the vision and had been promoting the medium-term management program, “Project AP-G 2016” since FY 2014 as the second stage.

In February 2017, we established the medium-term management program, “Project AP-G 2019” that covers the three-year period beginning in FY 2017 as the third stage of Vision 2020. Within “Project AP-G 2019,” there are three basic strategies. The first of these is “Business Expansion in Growth Business Fields,” under which we promote “Expansion of Green Innovation Business” and “Expansion of Life Innovation Business.” The second basic strategy, which targets our overseas business as a whole, is “Expansion and Advancement of Global Business,” under which we work to continually expand and advance our “AE (Asia, Americas, Europe and Emerging Regions) Project.” The third basic strategy is “Strengthening Competitiveness,” under which we promote “Total Cost Reduction,” “Strengthening Corporate Structure” and “Strengthening Sales and Marketing.”

Among these, we believe that innovation of technologies through R&D will be indispensable in promoting the “Green Innovation Business Expansion (GR) Project” and the “Life Innovation Business Expansion (LI) Project.” Therefore, we also promote the strengthening of our intellectual property capabilities as a crucial theme of these projects. Also, strengthening global intellectual property capabilities and intellectual property management is a crucial issue in implementing the “AE Project.”

By adopting a trilateral integrated approach that incorporates its business strategies, R&D strategies and intellectual property strategies to realize sustainable growth, Toray Group will strive to realize our corporate philosophy of “Contributing to society through the creation of new value with innovative ideas, technologies and products,” while continually working to raise Toray Group’s corporate value.

Toray Industries, Inc. President Akihiro Nikkaku serves as the chairman of the Committee on Intellectual Property of KEIDANREN (Japan Business Federation) and expert member of the Cabinet’s Intellectual Property Strategy Headquarters. He provides advice for Japan’s intellectual property policies, and participated in the establishment of the government’s “Intellectual Property Strategic Vision” and “Intellectual Property Strategic Program 2018.” He has also served as chairman of the Industrial Property Council since 2014. He will continue to engage in activities to promote intellectual property policies that will contribute to the enhancement of Japan’s industrial competitiveness.

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Overview of Toray Group

■ Corporate Outline (as of March 31, 2018)

Name: Toray Industries, Inc.
 Established: January 1926
 Paid-in Capital: ¥147,873 million
 No. of Group companies: 162 parent company and consolidated subsidiaries (61 Japanese and 101 overseas consolidated subsidiaries)
 No. of employees: 45,762 (consolidated), 7,625 (non-consolidated)

■ Corporate Philosophy

[Corporate Philosophy]

Contributing to society through the creation of new value with innovative ideas, technologies and products

[Corporate Missions]



[Corporate Guiding Principles]

Safety and Environment

Placing top priority on safety, accident prevention and environmental preservation, ensuring the safety and health of our employees, our customers and local communities, and actively promoting environmental preservation

Ethics and Fairness

Obtaining the trust of society and meeting its expectations by acting fairly while maintaining high ethical standards and a strong sense of responsibility and maintaining transparency in management

Customer Focus

Providing customers with new values and solutions, and achieving sustainable growth together

Innovation

Achieving continuous innovation in all corporate activities, and aiming for dynamic evolution and growth

Fieldwork and Initiative

Strengthening fieldwork abilities and initiative, the foundations of our corporate activities, through consistent learning from one another and constant self-driven efforts

Global Competitiveness

Pursuing competitiveness through global top quality standards and cost management, and achieving growth and expansion in the global marketplace

Global Coalition

Developing global coalition through integrated internal linkages and strategic alliances with external parties

Emphasis on Human Resources

Providing an environment where employees find value in their work, and building positive, energetic relationships between people and the organization

Main Businesses

■ Fibers & Textiles:

Filament yarns, staple fibers, spun yarns, woven and knitted fabrics of nylon, polyester and acrylics; non-woven fabrics; ultra-microfiber non-woven fabric with suede texture, apparel products, etc.

■ Performance Chemicals:

Nylon, ABS, PBT (polybutylene terephthalate), PPS (polyphenylene sulfide) and other resins and molded products; polyolefin foam; polyester, polyethylene, polypropylene and other films and processed film products; raw materials for synthetic fibers and other plastics; fine chemicals; electronic and information materials; graphic materials, etc.

■ Carbon Fiber Composite Materials:

Carbon fibers, carbon fiber composite materials and their molded products, etc.

■ Environment and Engineering:

Comprehensive engineering; condominiums; industrial equipment and machinery; IT-related equipment; water treatment membranes and related equipment; materials for housing, building and civil engineering applications, etc.

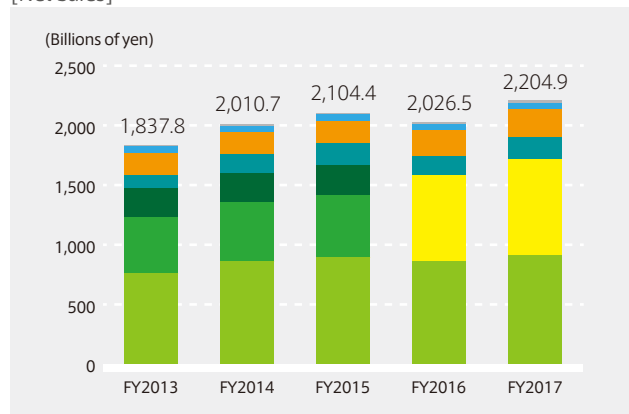
■ Life Science:

Pharmaceuticals, medical devices, etc.

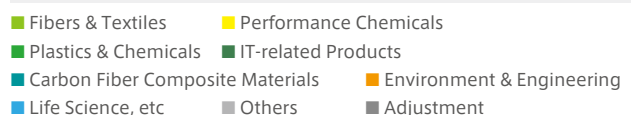
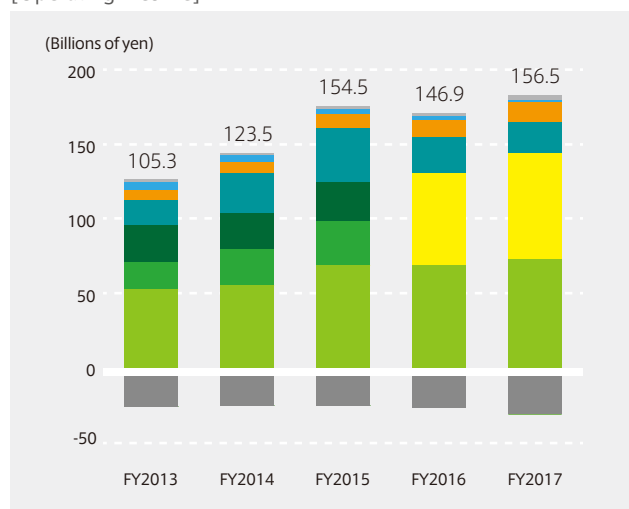
■ Others:

Analysis, physical evaluation, research and other services, etc.

[Net Sales]



[Operating Income]



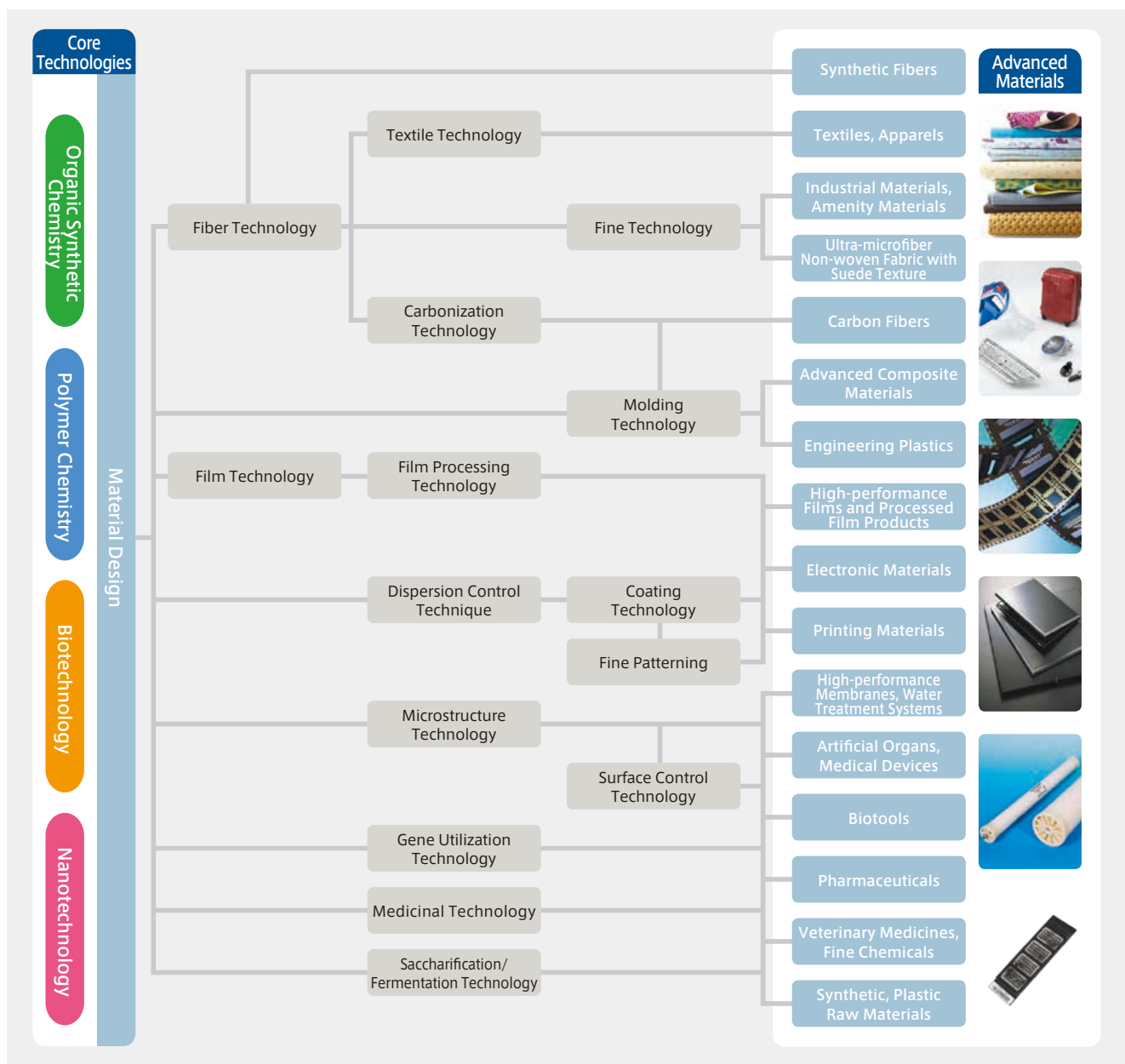
1 Core Technologies

Toray Group's core technologies are "organic synthetic chemistry," "polymer chemistry," "biotechnology" and "nanotechnology." Based on these technologies, we have constantly expanded our businesses from fibers and textiles to films, chemicals and plastics. We have also developed businesses in the fields of electronic & information materials, carbon fiber composite materials, pharmaceuticals, medical devices and water treatment. At the same time, we are

growing and combining these four core technologies to create and commercialize a diverse array of advanced materials.

With "Innovation by Chemistry" as the corporate slogan, Toray Group will continue striving to contribute to society through the creation of new value by using its four core technologies and their integrated technologies.

Toray Group Technologies and Businesses



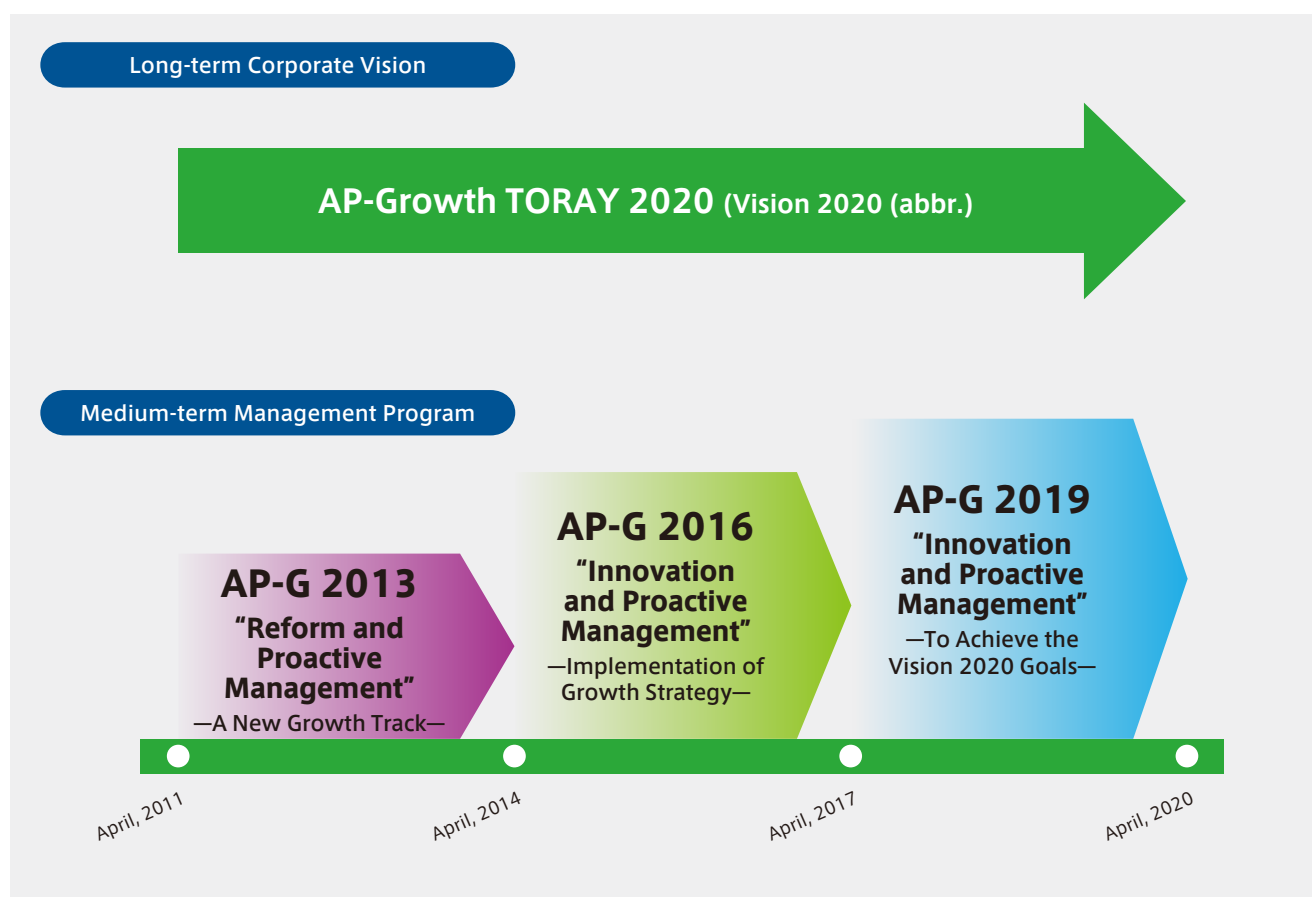
2 Management Strategies

Toray Group has formulated a long-term corporate vision looking ahead to the next decade, and medium-term management programs covering the three- to five-year period. The Group has implemented various management reforms, while at the same time gradually reviewing and revising these plans.

In April 2011 we launched our long-term corporate vision and unified roadmap for management activities, "AP-Growth TORAY 2020," in which we are aiming to become a "corporate group that sustainably increases revenues and profits." As the third stage of that vision, we are currently advancing our medium-term management program "Project AP-G 2019," which hinges around the business expansion in growth business fields and regions.

Under project AP-G 2019, we are making strong efforts to drive four Group-wide projects. These four projects are the Green Innovation Business Expansion (GR) Project, which aims to expand business operations that contribute to resolving global environmental issues and resource/energy-related problems; the Life Innovation Business Expansion (LI) Project, which aims to expand business operations that improve healthcare quality, ease burden on medical professionals and contribute to healthcare and longevity; the AE (Asia, Americas, Europe and Emerging Regions) Project, which seeks to expand global business operations by capturing opportunities for revenue and profit in growth countries and regions; and the Total Cost Reduction (TC-III) Project, which seeks to ensure our robust business footing.

■ Long-term Corporate Vision and Medium-term Management Program



See the URL below for details on "Project AP-G 2019."

TORAY HOME > Investor Relations > To Our Investors > Medium-term Management Program "Project AP-G 2019"
https://www.toray.com/ir/individual/ind_015.html

1 Basic Strategies by Business Category

The Fibers & Textiles Business and part of the Performance Chemicals Business, positioned as Core Growth Driving Businesses, aim to actively expand business revenue and profits, mainly in growth business fields and regions, and will support a steady expansion of business for the entire Toray Group in the future.

Performance Chemicals and Carbon Fiber Composite Materials, designated as Strategically Expanding Businesses, strive to strategically and proactively expand business and drive a medium- and long-term expansion in revenue and profits by implementing measures that include intensively

allocating management resources and strengthening responses to such growth markets as automobiles and aircraft, and new energy.

Environment Businesses, centered on water treatment, and Life Science, which includes pharmaceuticals, medical devices and biotools, are positioned as Intensively Developing and Expanding Businesses. We are making efforts to develop and expand these businesses through prioritized allocation of management resources to establish these businesses as our next pillar for revenue and profit growth to follow “Strategically Expanding Businesses.”

Basic Strategies by Business Category

**Core Growth
Driving
Businesses**

Fibers & Textiles and Part of Performance Chemicals

Steadily drive business expansion and profit growth of Toray Group

**Strategically
Expanding
Businesses**

Performance Chemicals, Carbon Fiber Composite Materials

Drive revenue and profit growth over the medium- and long-term and achieve strategic and aggressive business expansion

**Intensively
Developing
and
Expanding
Businesses**

Environment & Engineering, Life Science

Develop as the next driver for revenue and profit growth to follow the Strategically Expanding Businesses

2 R&D Segments

The R&D activities of Toray Group are divided into seven segments, one for each business domain, as follows: Fibers & Textiles; Resins & Chemicals; Films; Electronic & Information Materials; Carbon Fiber Composite Materials; Life Science (pharmaceuticals and medical devices); and Water Treatment & Machinery and Equipment, etc.

The “Business Categories, Segments and R&D Segments” chart shows the relationship between business categories, segments and R&D segments. As of FY 2017, the Plastics & Chemicals and IT-related Products segments have been combined into the Performance Chemicals segment.

Relationship between Business Categories, Segments and R&D Segment

Business Categories	Segments	R&D Segments	Advanced Materials
Core Growth Driving Businesses	Fibers & Textiles	Fibers & Textiles	High-functional Fibers High-functional Textiles
	Performance Chemicals	Resins & Chemicals	High-functional Resins Functional Particles New Energy Materials
Films			
Strategically Expanding Businesses	Carbon Fiber Composite Materials	Electronic & Information Materials	High Density Recording Materials High-functional Films Display Materials Semiconductor-related Materials
		Carbon Fiber Composite Materials	Carbon Fiber Intermediate Materials Composites
Intensively Developing and Expanding Businesses	Life Science	Life Science	Pharmaceuticals and Medical Devices Biotoools
	Environment & Engineering	Water Treatment & Machinery and Equipment, etc.	High-functional Separation Membranes, etc.

3 R&D Strategies

In the medium-term management program, “Project AP-G 2019” covering the three years from FY 2017 to FY 2019, we are prioritizing “Green Innovation” and “Life Innovation” and promoting the strategies below to create new technologies and materials and bring forth the intrinsic value of those technologies and materials.

- (1) During the three-year period from FY 2017 to FY 2019, we will invest ¥220 billion in R&D (with 50% going towards R&D related to “Green Innovation” and 25% towards “Life Innovation”).
- (2) We will accelerate collaboration between the Technology Center and the R&D teams of our subsidiaries and affiliated companies and promote technical collaboration and

personnel exchange between locations in order to maximize the efficiency of and results from R&D across the Toray Group.

- (3) We will strategically promote global intellectual property initiatives including strengthening of patent applications for intellectual property with an emphasis on defense, as well as strengthening of the barriers to entry by protecting our know-how.
- (4) We will implement pioneering research in pursuit of the ultimate *mono-zukuri* (manufacturing) to create the new materials, devices and systems that should be realized at the R&D Innovation Center for the Future that will be completed in 2019.

4 Scheme for R&D and Commercialization

Japan is a trade, manufacturing and scientific/technical innovation oriented nation. As such, the creation of new industries based on science and technology is essential for sustainable development in Japan. In order to create Japanese-style innovation, it will be necessary to maintain a way of doing things consistent with the characteristics of Japan and Japanese people rather than conforming to the Western way of doing things or current trends. Efforts from a long-term perspective based on a broad view of the times are important.

Since its foundation, Toray Group has adhered to the philosophy that "R&D is the key to the Toray of tomorrow." With this in mind, we have consistently pursued R&D into advanced materials better matched with the demands of the times. Toray's strengths which allow it to draw on its R&D capabilities are: 1) a history and culture of creating innovative technologies (with an emphasis on basic research); 2) engaging in long-term and persistent (super-continuity) efforts to pursue advanced materials and technology to the limit; 3) having specialist organizations in numerous fields; 4) having an integrated R&D organization; 5) actively engaging in industry-government-academia joint research; 6) having strategic partnerships with industry leaders; and 7) possessing advanced analytical capabilities (with links to the Toray Research Center Inc.). These strengths have enabled us to develop and commercialize a wide range of advanced materials.

However, development and commercialization of materials takes a certain amount of time. For that reason, coming up with one theme after another, starting with a theme that will generate profit in the immediate future, and engaging in management centered on research and technological development from a long-term perspective, or pipeline management, is important.

Toray began full-scale research on carbon fibers in 1961. Commercial production was launched 10 years later in 1971, and today, the material is used in many aircraft, including Boeing 787 Dreamliners. Even as many overseas chemical companies withdrew from or downsized their development of carbon fibers, Toray saw their value as a material and created a business using them in applications such as fishing rods and golf shafts, persistently engaging in development while generating cash flows and honing the

technology, seeing their application in aircraft in the long term. The ability to see the value of such materials and maintain resolve is precisely what gives Toray its basic stance and strength in R&D.

Toray Group's R&D team continues to use the catchphrase, "the Deeper, the Newer," which is also the DNA of the Group's researchers and engineers. This expression comes from Kyoshi Takahama, a Japanese poet from the early 20th century. The concept underlying the catchphrase is that when you dig deep into something, the result will be new discoveries and inventions. This concept is the essence of our pursuit of technology to the limit. Through extreme pursuit based on a broad view of the times and societal demands, we will produce innovations having social and economic value.

All of Toray Group's R&D functions are consolidated into a single organization called the "Technology Center." Experts from many fields come together at this "integrated R&D organization," and this makes it easier for new technologies to be born from the fusion of technologies.

Moreover, this "integrated R&D organization" is able to exert collective strength by utilizing technology and knowledge from many fields to solve challenges affecting a single business field. It also has the characteristic of being able to quickly roll out various advanced materials and technology to multiple businesses.

In order to protect production technology expertise and job creation, advanced materials created through R&D in Japan are first produced at Japanese plants. After that, products matching overseas demand are developed overseas based on the basic technology created in Japan for manufacture and sale overseas. The profit made overseas go back to advanced R&D in Japan to create the next advanced materials.

This cycle will enable sustainable growth through the fusion of Japanese-style innovation and global development.

In undertaking the medium-term management program "Project AP-G 2019" to promote Toray Group's new growth strategies and placing further emphasis on the "Green Innovation" and "Life Innovation" businesses, we are bolstering initiatives for combining the total strengths of the Technology Center and for promoting collaboration and integrating research efforts.

5 R&D Expenditure

In FY 2017, Toray Group R&D expenses amounted to ¥66.2billion (total R&D expenses of parent company Toray were ¥48.0billion). By segment, we allocated 8% of these expenditures to Fibers & Textiles, 32% to Performance

Chemicals, 11% to Carbon Fiber Composite Materials, 7% to Environment & Engineering, 6% to Life Science and 36% to corporate R&D and technology development (all percentages approximate).

1 Basic Policies on Intellectual Property

Toray Group has formulated and executes the following four intellectual property strategies as its basic policies on intellectual property.

1 Intellectual property strategies, as a part of the strategy trinity, that conform to management principles

Toray Group regards intellectual property as one of its vital management resources. Based on this rationale, we believe that any intellectual property strategy cannot exist in isolation from business strategies and R&D strategies and that all three strategies must thus be mutually and organically integrated. Therefore, the Group has designated



its intellectual property strategies as one of the most important elements of its management strategies.

2 Promoting the procurement of rights

In terms of intellectual property, it is necessary to actively patent Toray Group's products and technologies and to ensure profits. Therefore, holding as many useful patent rights as possible and building patent portfolios are our most important tasks. At the same time, we also pay close attention to the efficient patenting by raising the quality of each patent and not making needless applications.

3 Respecting the rights of others

Executing business while infringing on patent rights of other parties is not legally permissible. In keeping with the spirit of adhering to such related laws and ordinances, for many years Toray has operated a system for comprehensively investigating the relations between its own products and technologies and patents owned by other companies, and we thoroughly educate employees to prevent infringement on patent rights of other parties.

4 Rightful enforcement of our own rights

When the Toray Group's patent rights are infringed upon by another party, we take proper steps by exercising our patent rights. We not only demand that infringement cease, but depending on the circumstances we also receive monetary profits from licensing as well as use our patent rights for crosslicensing with patent rights of other parties.

2 Intellectual Property Strategies in Line with Our Business Strategies

As one of the five key initiatives of the medium-term management program, "Project AP-G 2019," Toray Group has declared its intention to secure profitability by promoting the creation of innovative new technologies and materials with "Green Innovation" and "Life Innovation" as priority fields and initiatives to bring forth the inherent value of those technologies and materials. Specifically, we will promote intellectual property strategies consisting of the five points below in order to build barriers to entry that will protect those results and firmly maintain our technological advantage.

- ① Promoting Toray Group's global intellectual property strategies
- ② Firmly maintaining our technological advantage through strategic patent applications and other such efforts and rolling them out at subsidiaries and affiliated companies in Japan and overseas
- ③ Executing intellectual property strategies that are

organically linked to our business

- ④ Strengthening utilization of our brand and trademarks
- ⑤ Developing human resources to support global intellectual property activities

We are vigorously promoting intellectual property activities as described below based on these strategies.

1 Promoting Toray Group's global intellectual property strategies

As we always have, we will build and execute intellectual property strategies in cooperation with Toray Group R&D and businesses to support business expansion in growth countries and regions. Specifically, we will promote Toray's patent applications and patenting in countries other than Japan. In particular, under the "AE (Asia, Americas, Europe and Emerging Regions) Project" within the medium-term management program, "Project AP-G 2019," we will proactively focus especially on patent applications and

patenting in these regions where we aim to achieve business expansion in the future. In addition, we will promote patent applications and patenting from overseas subsidiaries and affiliated companies to ensure the appropriate protection of inventions created in our R&D bases in each country, which are growing in importance with the globalization of our R&D.

We will also establish and promote Group-wide intellectual property strategies for each business field. We will strengthen collaboration between companies within Toray Group and work to establish solid patent and trademark management systems at each company and strengthen them.

② Firmly maintaining our technological advantage through strategic patent applications and other such efforts and rolling them out at subsidiaries and affiliated companies in Japan and overseas

In the past, we primarily filed patent applications and established rights in our core growth driving business fields such as synthetic fibers, films and engineering plastics and enjoyed a high market share and profitability.

Today, in keeping with the “Green Innovation Business Expansion (GR) Project” and “Life Innovation Business Expansion (LI) Project,” which are part of the medium-term management program, “Project AP-G 2019,” we have placed emphasis on these two fields and enhanced our efforts at patent applications and patenting of rights. We are working to build patent portfolios with emphasis on these growth business fields. We expect the patent portfolios we build, together with avoiding careless disclosure of technical information through the publication of patent applications, to support our businesses in these growth business fields as a powerful barrier to entry in the future. We will also spread these efforts to our subsidiaries and affiliated companies in Japan and overseas.

③ Executing intellectual property strategies that are organically linked to our business

Toray Group has been using intellectual property rights as a tool for giving our business an advantage by protecting the results of our R&D. Not only that, we will promote the execution of intellectual property strategies linked to our business, delving further into the individual challenges within individual business activities. Specifically, we will strengthen participation in the patent activities of business divisions and work on intellectual property education that includes patents and trademarks according to the needs of the individual business divisions.

④ Strengthening utilization of our brand and trademarks

As described below, we aim to enhance the value of our technology through technology brands, including NANOALLOY™, an innovative microstructure control technology. Additionally, as online transactions rapidly

increase even in the BtoB business field, imitations of Toray Group products are increasingly discovered, mainly online. We will deal strictly with imitation products and other infringements of our trademarks.

⑤ Developing human resources to support global intellectual property activities

With respect to patent education, Toray carries out multifaceted and multilevel education for everyone from general managers and other management to new employees and front line sales representatives on domestic and overseas patent systems and practice for the purpose of improving patent consciousness within the sales and marketing and R&D departments and providing education for enhancing practical skills.

Additionally, to measure the effectiveness of patent education, we carry out annual “Patent Operational Assessment Qualification Test” to objectively evaluate the legal knowledge and practical skills of researchers and engineers with respect to patents. The results of these tests are reflected in personnel evaluations for technical staff.

Intellectual property-related problems are becoming increasingly sophisticated, complex and globalized, and the capability requirements of members of our Intellectual Property Division are thus becoming increasingly stringent.

Accordingly, to raise the legal and patent affairs capabilities of members of this division, Toray is encouraging the acquisition of a patent attorney qualification, which is a national license for handling procedures at the Patent Office and courts. Concurrently, to raise capabilities to deal with global issues as well as capabilities for supporting overseas subsidiaries and affiliated companies, we are actively implementing such measures as providing support for strengthening the foreign language capabilities of staff and dispatching staff to overseas subsidiaries and affiliated companies. As of March 31, 2018 Toray Intellectual Property Division (including Toray Intellectual Property Center, Ltd., a subsidiary that handles intellectual property issues) has 33 patent attorneys.

When it comes to our domestic and overseas subsidiaries and affiliated companies, we pour effort into education for a wide range of employees, from management to inventors, and specialized education for members of departments in charge of intellectual property.

We are also working to raise awareness of intellectual property at the corporate level in our subsidiaries and affiliated companies in Japan and overseas through education provided to the management and managers. Moreover, we will assign intellectual property specialists to companies actively engaging in R&D and work to improve education for researchers and engineers.

3 Selection and Concentration in Patent Administration

In accordance with the spirit of the "Total Cost Reduction (TC) Project" within the medium-term management program, "Project AP-G 2019," we are engaged in various efforts as described below to enhance our patent capabilities while keeping cost-effectiveness in mind.

In the course of shifting to a "Selection and Concentration in Patent Administration" policy, Toray has designated "Rank-A Projects" as top priority issues in the administration of patents. Under this approach, we appoint a leader and supervising executive for each project and provide additional support through regularly scheduled follow-ups by technical division executives. The following three "Rank-A Projects" categories are currently being pursued.

- ① "Rank-A Patenting Projects," with the objective of establishing patent portfolios for new technologies and related peripheral technologies through applications and patenting;
- ② "Rank-A Defense Projects," targeting early clarification of relations of patent rights owned by other companies with

Toray's important R&D, and prompt determination of countermeasures to address patents of other companies having a major impact on Toray's business; and

- ③ "Rank-A Utilization of Rights Projects" structured to cope with infringement of our patents by other companies through proper enforcement of our rights, efforts to curb such infringement by other companies, and to obtain rightful compensation for practice of our patented inventions by other companies. Rank-A Projects are established in many technologies in major fields which are typified by strategically expanding businesses and intensively developing and expanding businesses.

In filing new patent applications, including those covered by the Rank-A Projects, we stringently select inventions to file that can make contributions to our business by means of strengthening collaboration between technical and/or sales and marketing departments, and the Intellectual Property Department.

4 Increasing Incentives for Inventions

For employee invention incentives, Toray has long maintained a compensation system for employee inventions. This system includes fixed-sum compensations at the time of patent application and registration (including patents in countries other than Japan in both cases) and performance compensations based on profits acquired through the use of patented inventions and from license fees. However, we have revised these internal rules to effectively respond to the amended Patent Act as well as recent trends in court rulings in areas concerning employee inventions.

In conjunction with the 2015 amendment of the Patent Act, the compensation system has been changed to the

reward system as of fiscal 2016.

Through this kind of flexible system, we are promoting the creation of excellent inventions inspired by enhanced incentives to innovate and invent to enhance Toray's competitiveness.

In FY 2006, we established an award system for not only inventors but also others in Toray who make a valuable contribution to patent-related activities. We expect that our multifaceted system of incentives will lead to further vitalization of activities related to intellectual properties. Many of our subsidiaries and affiliated companies have a similar compensation system.

5 Brand Strategy

Toray strictly controls the various corporate brands which represent our identification and originality, including the "Toray Industries, Inc." corporate name, its corporate symbol*, business trademarks "TORAY," etc., its domain names "toray.co.jp," "toray.com," and so on, as intellectual property that symbolizes Toray Group corporate activities. We make vigorous use of these names in our corporate brand strategy.

Toray Group is advancing a number of brand strategies to enhance employee engagement and customer confidence and strengthen our ability to attract outstanding personnel by enhancing the value of the corporate brand.

The quotation marks in Toray Group's corporate symbol* express our willingness to engage in dialogue with all of our stakeholders through our people, our products and our technology. The quotation marks also speak of our aspiration to excel as a distinctive presence within society. This corporate symbol is registered as a trademark for the primary businesses of the Group in nearly 150 countries around the world in which we have established exclusive use rights. We have also adopted stringent defensive measures to deal with unauthorized use by third parties.

In 2009, Toray Group pledged to move forward in its corporate activities by focusing its entire business strategy on the global environment. Since 2011, the Group has advanced its Green Innovation Business Expansion (GR) Project. In conjunction with this, the Group seeks to make society at large aware of its contributions to environmental preservation and the goal of a low-carbon society, by seeking to establish business brands that are representative of its GR products and activities. As one such example, on April 15, 2013, the ecodear™ business brand (for biomass-

based polymer materials and products) was established, and the Group announced an intensification of global deployment. Additionally, on June 22, 2015, the Ecouse™ business brand (for recycled materials and products) was established, and the Group announced that global deployment would begin in FY 2015.

The aim of setting up these business brands is to advance and establish Toray's strong determination to provide solutions to environmental issues through the active development of biomass materials and recycled materials/products in fibers, resins, films and a wide range of other business fields and expansion of such sales.

On October 9, 2012, Toray announced its first technology brand, NANOALLOY™, an innovative microstructure control technology that vastly enhances the characteristics of polymers by making nanometer-order alloys of multiple polymers. Toray has started the full-scale development of commercial products based on this technology (<http://nanoalloy.toray/en/>).

NANOALLOY™ is a ground-breaking technology for which Toray holds basic patents and major manufacturing and uses patents. We are moving ahead with a strategy of enhancing the brand value by making the technology more visible and by working with our partner companies that are using our materials based on this technology.

Toray Group has obtained some 1,400 product brands that are protected by approximately 11,000 trademark rights. We actively pursue our brand strategy to strengthen the underpinnings of each of our business while advancing the appropriate management of our trademarks for these individual product brands.

A collection of Toray's brands and logos is shown below.

*Corporate symbol

'TORAY'

Other main brands

ecodear

ECOUSE

NANOALLOY
TECHNOLOGY

ultrasuede

TORAYCON

RAPROS

Lumirror

P!CASUS

HIGH-PERFORMANCE CARBON FIBER
TORAYCA

RAYBRID

PhotoClear

3D-Gene

ROMEMBRA

torayvino.

Toraysee®

With "Innovation by Chemistry" as its corporate slogan, Toray Group creates innovative new materials and technologies based on the core technologies of organic synthetic chemistry, polymer chemistry, biotechnology and nanotechnology to create new value and offer it to society. Our perspective is to protect our planet and ensure safety and confidence for people's lives.



1 Fibers & Textiles

Toray has built a solid position in the Fibers & Textiles field, supplying a host of products—from filament yarns and staple fibers of three major synthetic fibers (nylon, polyester and acrylic) to textiles and garment products—for a wide range of applications from apparel to industrial. In this business field, we are strengthening our stable profit base and expanding profits as a Core Growth Driving Business. At the same time, R&D is focused on the creation and expansion of high-functional products and advanced fiber and textile materials by pursuing ultimate performance.

As one result of this policy, by applying our own oil-resistant processing technology to the fabric of our LIVMOA™ limited-use chemical protective suits, we have successfully increased the suits' capability to minimize penetration by oil from outside, while at the same time maintaining breathability and dustproof performance.

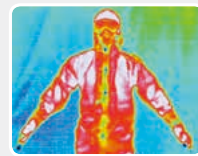
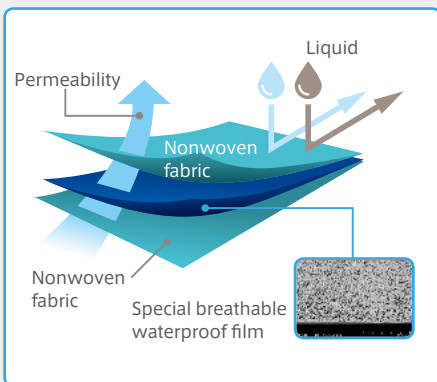
Through the application of our own proprietary nanoscale fiber processing technology, we have succeeded in creating three-dimensional, multi-layered, insect-repellant membrane structures on textile surfaces. This has enabled us to develop the insect-repellant textile WithRelief™, which simultaneously

achieves high levels of both insect-repellant functionality and safety, with consideration for skin irritation, which had not been possible to achieve with conventional insect-repellant materials.

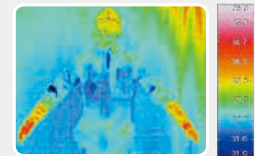
With regard to its high functional waterproof yet moisture-permeable textile ENTRANT™, Toray has made maximum effective use of its membrane manufacturing and processing technologies developed over many years, and succeeded in widening the voids' pore of the waterproof and moisture-permeable layers to the maximum possible extent without degrading the fabric's waterproof performance against rain. By doing so, we have succeeded in developing a high permeable variant that offers approximately 50 times higher breathability than the existing product, while at the same time maintaining ENTRANT™'s characteristic combination of waterproof and moisture-permeable performance.

Finally, to strengthen development of materials for hygiene applications, we made the decision to install spunbond fabric development equipment in Japan. We installed the proprietary equipment on the premises of the Toray Shiga Plant, and commenced operation as of November 2017.

LIVMOA™ Limited-use Chemical Protective Suits

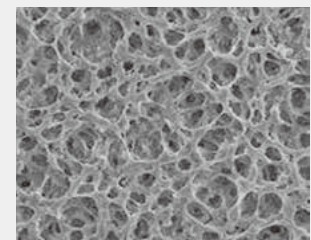


Suit from competitor



Suit from TORAY

Microporous structure of waterproof and moisture-permeable resin layer



2 Resins & Chemicals

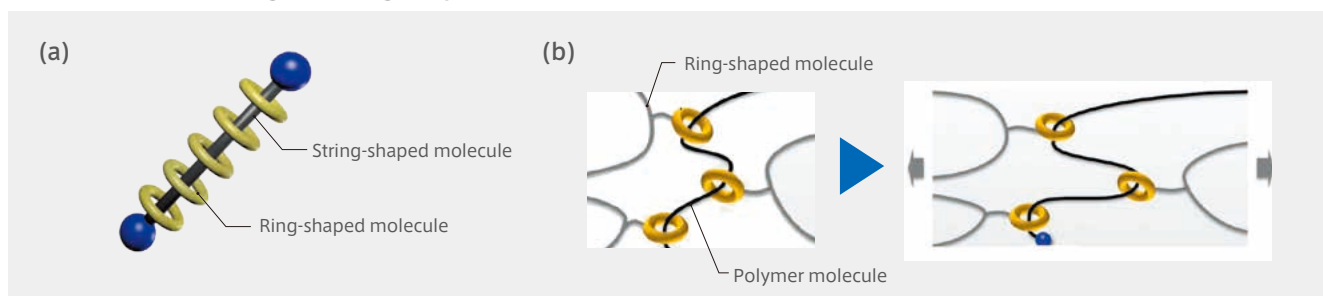
In plastic resins, Toray has exploited advances in polymerization and molecular designs, polymer alloys, composites, polymer processing and other fundamental technologies to achieve excellent performance and function in ABS (acrylonitrile butadiene styrene) resin, nylon resin, PBT (polybutylene terephthalate) resin, PPS (polyphenylene sulfide) resin, liquid-crystalline polyester resin and other engineering plastics. This is paving the way for the use of such plastics in electric and information devices, as well as automobile parts. In the field of chemicals, we offer chemical solutions that contribute to new product development and Toray Group's advanced materials through synthesis of carbon nanotubes (CNTs), polymer particles, fine polymers and so on, based on the fundamental technologies of organic synthesis, inorganic synthesis and catalysts.

An example of recent results is our development of a pliable and tough polymer material with a movable crosslink polymer structure where the molecular bond slides, as part of the R&D program of Kozo Ito, manager of the ImPACT innovative R&D promotion program. By

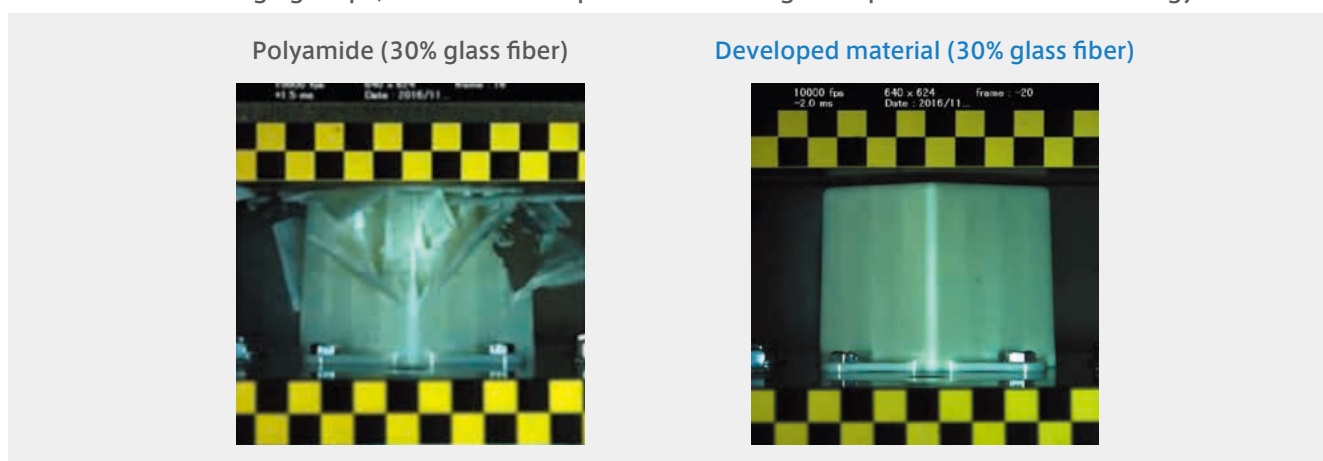
applying NANOALLOY™ technology in addition to molecular design, we succeeded in the world's first implementation of a movable cross-link polymer structure in polymer material. Furthermore, we also created a new technology for introducing moveable cross-link polymer structures to the surface of complex glass fiber (GF) materials, achieving the creation of GF-reinforced resins with a breaking elongation of over 15%; roughly six times that of conventional materials. We are aiming to deploy these technologies for use in metal impact energy absorbing components in the automotive field.

Moreover, our US subsidiary—and also the world's largest manufacturer and supplier of large tow carbon fiber—Zoltek Companies, Inc. made the decision to install new PPS (polyphenylene sulfide) resin compounding production facilities at its Hungarian plant, and commenced operations as of March 2018. This marks the first time that the Toray Group has established a resin compounding location in Europe.

- (a) Diagram of polyrotaxane molecule. Its structure is such that a string-shaped molecule passes through a ring-shaped molecule.
- (b) Diagram of movable cross-link polymer structure crosslinking polyrotaxane. By stretching it, the ring-shaped molecule slides along the string-shaped molecule.



- Impact test using box-shaped molded product. A weight was dropped from a height of two meters. The polyamide broke without changing shape, while the developed material changed shapes and absorbed the energy.



3 Films

In films, Toray was the first in Japan to commercialize biaxially oriented polyester and polypropylene films and has been leading the world in the field of high-performance and high-function films. We are also the global pioneer in the development and commercialization of biaxially oriented polyphenylene sulfide and aramid films. To date, we have utilized our original film thickness control technology; special drawing technology; surface forming technology backed by film laminating methods; coating, cleaning and static electricity control technologies; and NANOALLOY™ technology. We have used these optimal functions to support various industrial applications in such areas as flat panel displays, packaging applications for retort foods and magnetic recording material applications for computer memory backups.

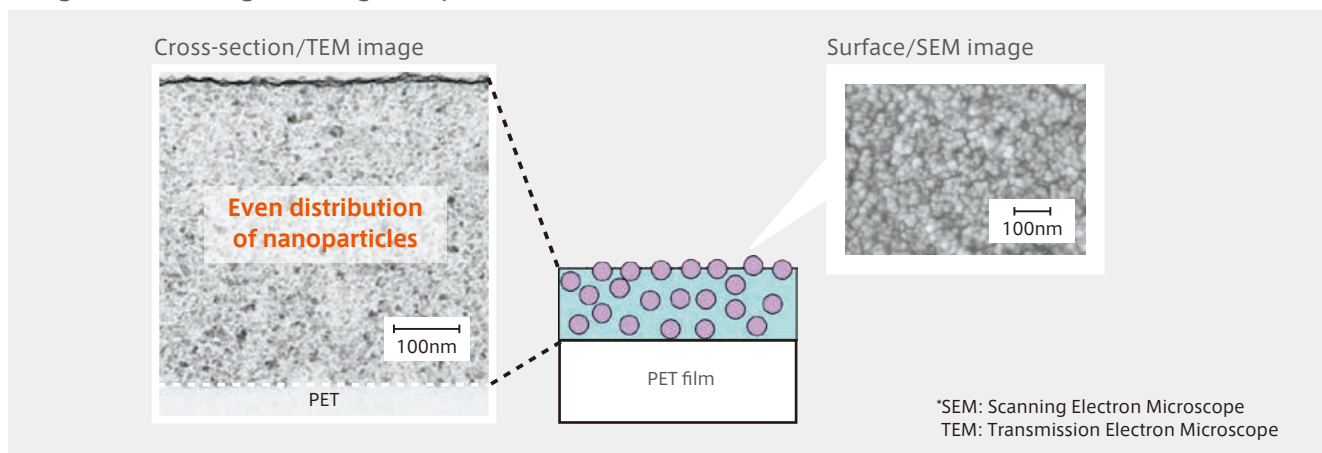
Recent results include our development of a new PET film, which offers hardness and resilience to scuffs and scratches while maintaining a smooth, even surface, achieved through the application of a high functional organic-inorganic hybrid coating that combines super-hard

nanoparticles with a functional polymeric dispersant.

We also succeeded in the development of a biaxially oriented PET film that achieves high thermal conductivity (world class conductivity for a PET film, at approximately 2.5 times that of conventional films) while at the same time maintaining the conventional characteristics of biaxially oriented PET films (i.e. insulating properties, handling and workability/processability).

We also developed and began production of a new type of TORAYFAN™ which achieves a successful high-dimensional balance between high film transparency, low fisheye level (coarse protrusions of around 50µm or greater due to degraded polymers, etc.), smoothness and processability, realized through the high-density formation of microscale protrusions on the surface of a biaxially oriented polypropylene (OPP) film, using our own proprietary raw material design and crystal expansion structural control technology.

■ High functional organic-inorganic hybrid coated film



4 Electronic & Information Materials

In Electronic & Information Materials, Toray mobilizes its fundamental technologies in such areas as polymer design of thermal resistance and optical functionality, organic synthetics, particle dispersion, thin layer-film forming and photolithography to develop semiconductor buffer coatings, insulator and flexible substrate materials for optical devices and packaging, high-k insulator materials, ceramic substrate materials, color filters for liquid crystal displays (LCDs) and OLED materials.

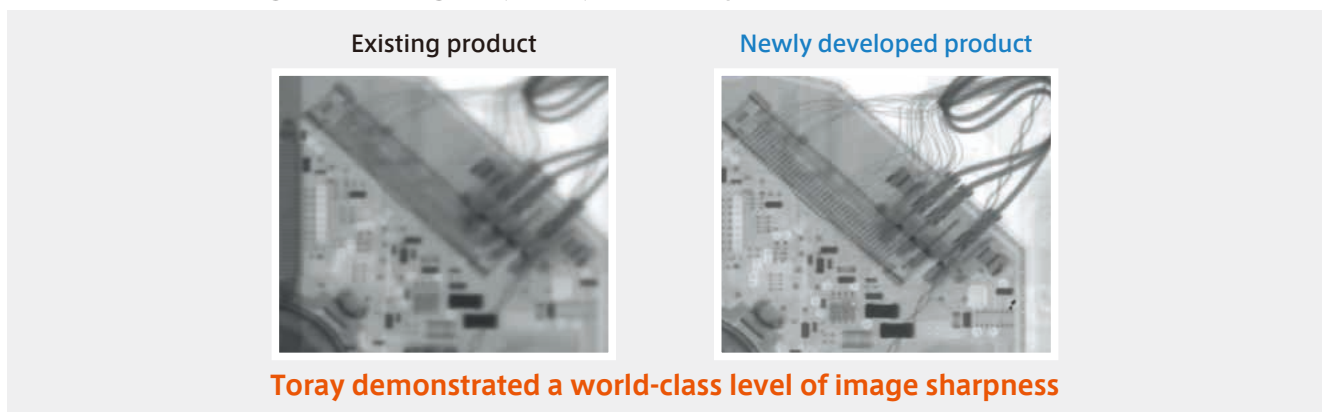
As one result of these efforts, we developed an X-ray scintillator panel which is capable of obtaining images that are between two and four times clearer than with existing technologies, for use in fields such as nondestructive X-ray testing and mammography.

In the field of flexible package printing on packaging films, we developed a VOC-free waterless offset printing system for flexible packaging that enables major reductions

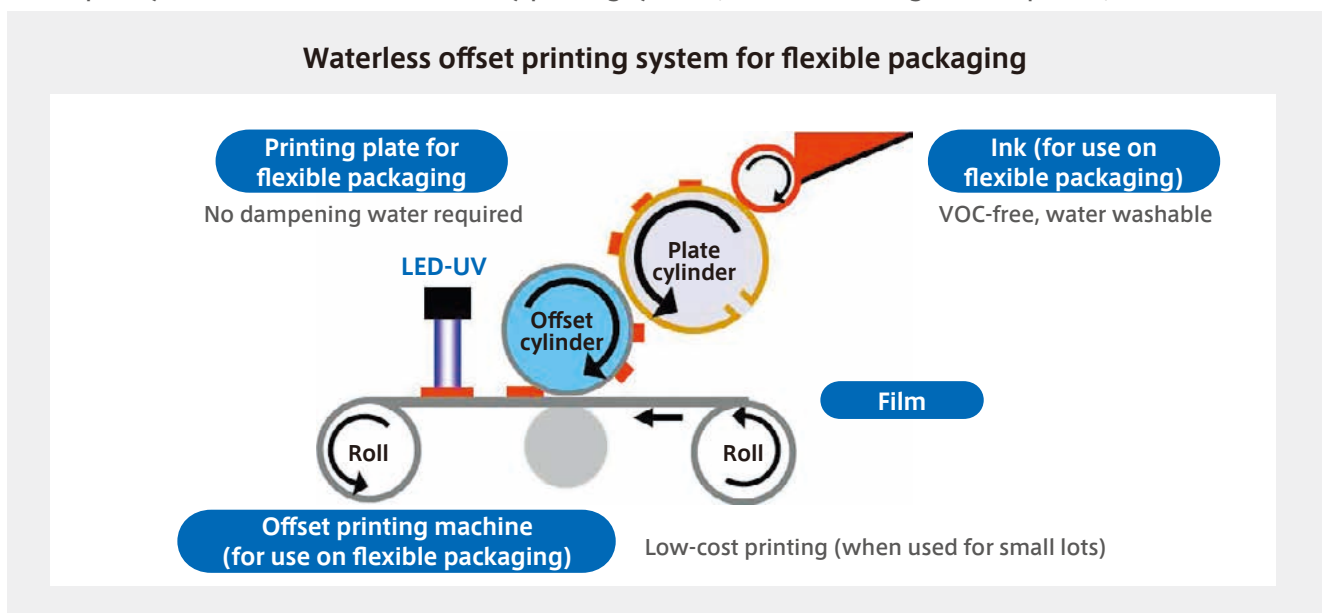
in environmental impact, through the application of offset printing plates that do not use volatile organic compounds and require no dampening water, water-soluble UV inks and cleaning fluids, and electricity-saving LED-UV technology.

Moreover, by developing a composite material combining semiconductor-type single-walled carbon nanotubes (CNTs) with our own proprietary semiconductor polymer, we were able to achieve an electron mobility of $108\text{cm}^2/\text{Vs}$; the highest mobility in the world for a coated-type semiconductor. We were the first in the world to demonstrate the possibility of low-cost manufacturing of semiconductors with coating technologies. Moving forward, we will accelerate our development and deployment of disposable electronic products that can be applied in the fields of IoT, caregiving, medical applications, and other areas expected to show rapid growth and expansion in the future.

■ PC motherboard images taken using Toray's X-ray scintillator panel



■ Completely VOC*-free ultimate eco-friendly printing system (*VOC: volatile organic compound)



5 Carbon Fiber Composite Material

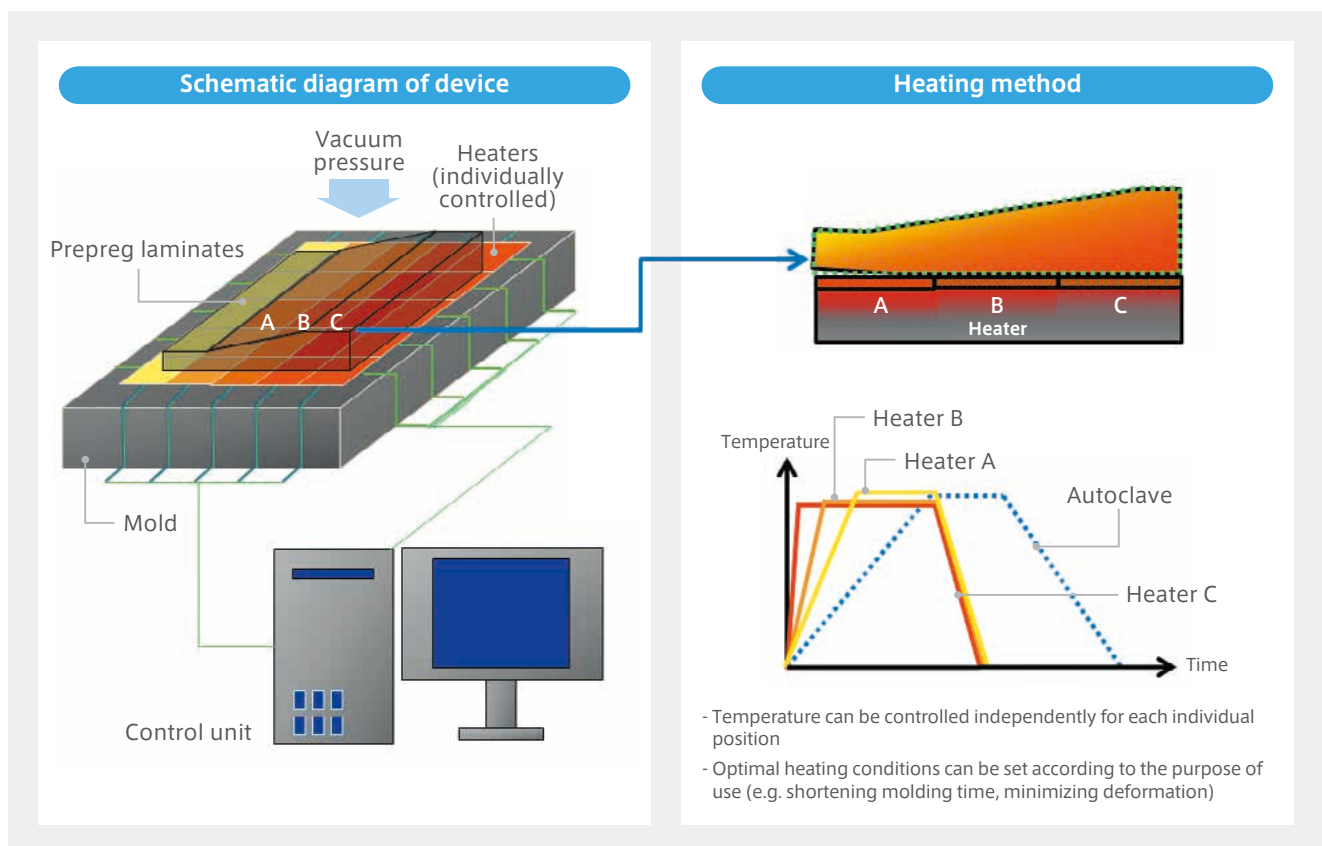
Toray Group is the world's largest manufacturer of carbon fibers and supplies TORAYCA™ carbon fibers and woven fabrics. We also supply intermediate materials such as prepregs (carbon fiber resin-impregnated sheets) and molding technologies of carbon fiber composite materials. Here, we target applications in the fields of aircraft, aerospace, sports equipment, civil engineering, construction, automobile, electronic & information devices and energy industry instruments.

As one result of these efforts, we developed a new fabrication technology for carbon fiber reinforced plastics that enables improvements in both dimensional accuracy and energy saving. By positioning a prescribed number of planar heaters on the surfaces of the mold and using contact heating to heat the material under vacuum pressure, this newly developed technology achieves energy saving of approximately 50% in comparison with existing fabrication technology. Moreover, by making each of the heaters individually controllable and applying an optimal temperature distribution to each part of the mold, the new

technology evens the distribution of residual stress and enables fabrication of components with shapes and dimensions that are closer to those of the original design, promising reductions in workloads and task completion times during assembly.

We also made the decision to introduce innovative process development facilities and equipment to facilitate the creation of the next generation of high-performance carbon fibers. With these new development facilities, we will seek to further increase the strength of our carbon fibers to develop world-class high-strength fibers, and develop innovative new technologies for improving productivity. By doing so, we will aim to achieve greater widespread popularization and expansion of the use of carbon fiber as a material for creating environmentally friendly products as we look ahead to the coming of the recycling-based, hydrogen-based society of the future; and work to achieve even greater levels of high performance while at the same time maintaining cost balance.

■ Schematic diagram of the newly developed fabrication system



6 Life Science

In pharmaceuticals, Toray has commercialized the natural interferon beta product FERON™ (based on biotechnology) and the world's first oral prostacyclin derivative product DORNER™ (based on organic synthesis technology). We furthermore developed "TRK-820," an antipruritus drug that is a highly selective K (kappa) opioid receptor agonist. Toray is an authorized manufacturer and dealer of the drug, which is sold in Japan through Torii Pharmaceutical Co., Ltd. under the trade name REMITCH™* CAPSULES 2.5μg, an oral antipruritus drug for hemodialysis patients.

In recent news, we also developed an orally disintegrating (OD) tablet form of TRK-820, which we have obtained approval to manufacture and sell, and launched sales under the trade name REMITCH™ OD 2.5μg. These 2.5μg OD tablets can be taken with or without water, which promises to increase convenience and ease of medication for elderly people and other patients with impaired swallowing functions, or patients required to limit their intake of water.

We also advanced US Phase 1 clinical trials of our

independently-developed cancer drug "TRK-950," for treating solid cancer. "TRK-950" is a monoclonal antibody drug that binds to cancer cells and attacks them. Moving forward, we will continue to drive global clinical development and aim to acquire early-stage approval of this groundbreaking therapeutic drug.

In the field of medical devices, Toray Medical Co., Ltd. launched sales of its newly developed NEUHAUS PROTECT™ SE, an indwelling vascular catheter for removal of thromboses (blood clots) and other foreign objects. This new catheter adopts a shape-memory alloy in its basket filter portion to increase the stability of its shape. There are various scenarios in which deep-vein thromboses may arise, typically, in the case of cancers and other abdominal tumors, or during childbirth. The NEUHAUS PROTECT™ SE is a basket filter-equipped catheter designed for temporary indwelling inside blood vessels, for the purpose of catching and removing thromboses suspended inside the common iliac vein, or other major veins.

■ The oral anti-pruritus drug REMITCH™* OD Tablet



*REMITCH™ is a registered trademark of Torii Pharmaceutical Co., Ltd.

7 Water Treatment

To solve the water shortages and the water pollution problems around the world, we are working in the water treatment field by developing reverse osmosis (RO), nanofiltration (NF), ultrafiltration (UF) and microfiltration (MF) membranes, based on organic synthetic chemistry, polymer chemistry and nanotechnology, for such uses as producing ultrapure water and seawater desalination achieved by making selective separation possible. We are also endeavoring globally to propose sustainable water resource systems.

As one outcome of this work, we used pilot trial facilities to demonstrate the possibilities of reducing UF membrane operating costs by approximately 30% in comparison with those of conventional processes through the application of Toray's TORAYFIL™ UF membrane in RO membrane pre-processing in the recycling of industrial wastewater, which is expected to become a valuable water resource in the future.

Although TORAYFIL™ already has an existing track record of use in water purification equipment, in light of this validation of its effectiveness in the recycling of industrial

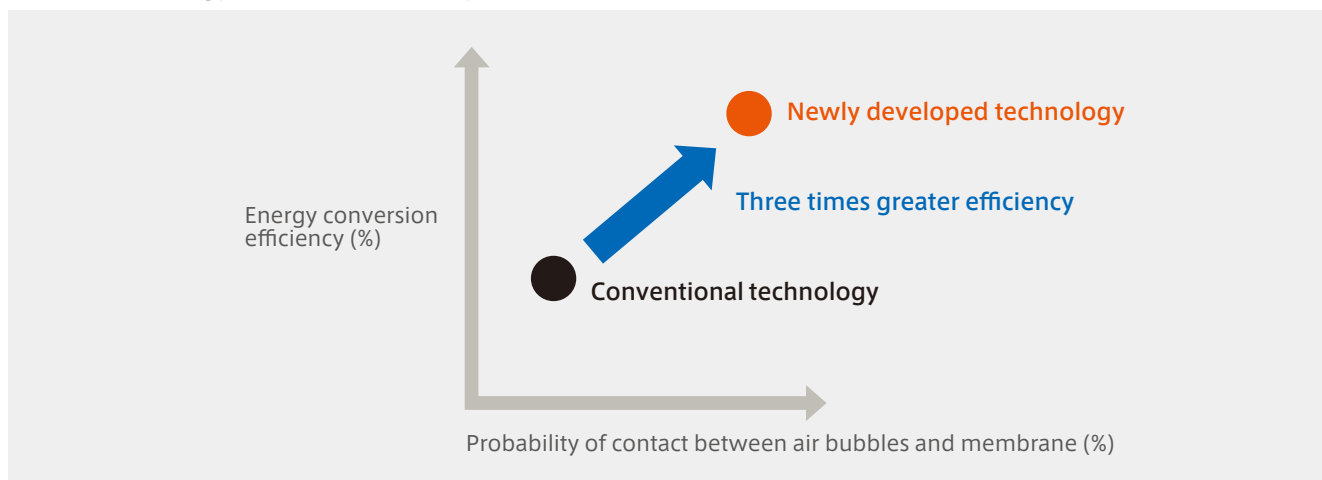
wastewater we will continue to expand its use in such applications in the future.

In a joint effort together with the Japanese national research and development institute RIKEN, we developed an innovative technology for analyzing the phenomenon whereby “fouling” constituents contained in water—such as organic matter and bacteria—adhere to and clog the pores of RO membranes under various conditions. Using this technology as a reference, we linked this on to the development of a new low-fouling membrane (with a high level of antifouling performance).

We also developed a basic technology for efficiently converting aeration energy to cleaning energy in membrane bioreactor (MBR) processing, which is a method of sewage and industrial wastewater treatment and reuse.

Additionally, we were also awarded the Japan Chemical Industry Association (JCIA)'s 49th (2017) Annual JCIA Technology Award for the development of high performance RO membranes.

■ Increased energy conversion efficiency



■ Images of membranes after MBR operation using artificial (simulated) sludge



1 R&D and Intellectual Property Organization

As of 1985, Toray has built an R&D organization centering on its Technology Center. The role of the Center is to draft company-wide strategies and key projects for R&D.

We are also reinforcing global R&D capabilities to deal with changes in the business environment in recent years, and further globalizing ourselves as the growth markets of emerging countries become more and more important. This means not just the type of business expansion that entails moving production from Japan, but transforming overseas bases into “independent development enterprises” that pursue development in line with local needs.

As our R&D is becoming increasingly global, so is our Intellectual Property Division. As an independent organization under the direct control of the President, the Intellectual Property Division is strengthening the intellectual property capacity of the entire Toray Group based on intellectual property strategies that are linked with management strategies.

① R&D Innovation Center for the Future

As one aspect of a series of initiatives to mark the 90th anniversary of its founding, Toray is currently engaged in the construction and development of an “R&D Innovation Center for the Future,” which will serve as our new base of research. The Center is located at our Shiga Plant, which is where our company was originally founded. We have now completed construction of our Demonstrative Research building, which will drive prototyping, evaluation and validation of newly developed products. As the headquarters of our global research, the Center will research

the functions and structures necessary for the society of the future and promote/enhance futuristic research and technological development in the aim of achieving *kotozukuri*, leveraging the strength of our materials.

② Toray Automotive Center Europe

Toray established an Automotive Center Europe (AMCEU) in the suburbs of Munich, Germany. With this center, as one facet of our efforts to strengthen our R&D function related to Green Innovation Business in Europe—which is leading the rest of the world in terms of environmental regulations—we will work to offer total solutions that combine advanced materials (intermediate base materials) such as carbon fiber composite materials, resins and films, technologies that seek to make optimal use of the characteristics of those materials (molding and design technologies), and experiments, evaluation and technological support capabilities.

③ Demonstration plant for a cellulosic sugar-manufacturing process technology using membranes (Thailand)

Toray has completed the construction of a demonstration plant in Thailand for the low-energy manufacturing of cellulosic sugar—a common raw material for producing various biochemical products—from inedible biomass, utilizing the cellulosic sugar-manufacturing process using membranes. The plant has now commenced operation, and is proceeding with the technological demonstration of the process, and considerations for its future commercialization.

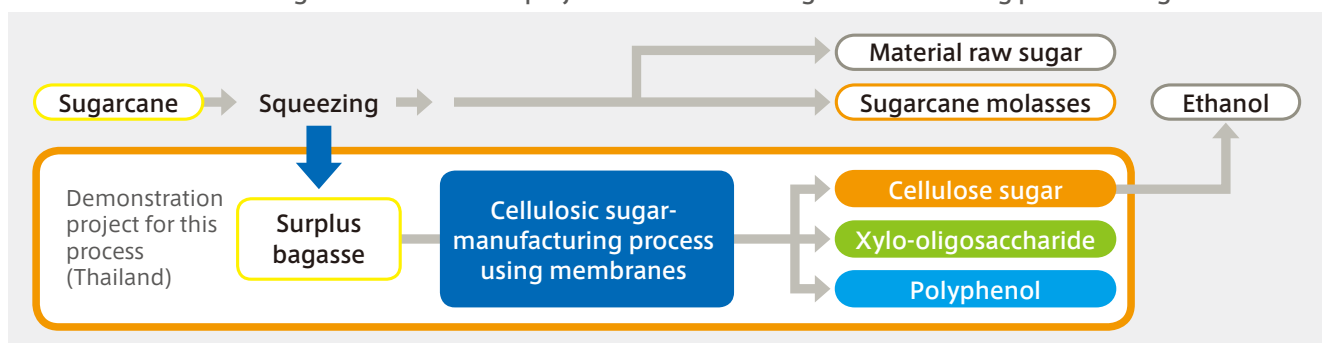
■ Artistic representation of R&D Innovation Center for the Future



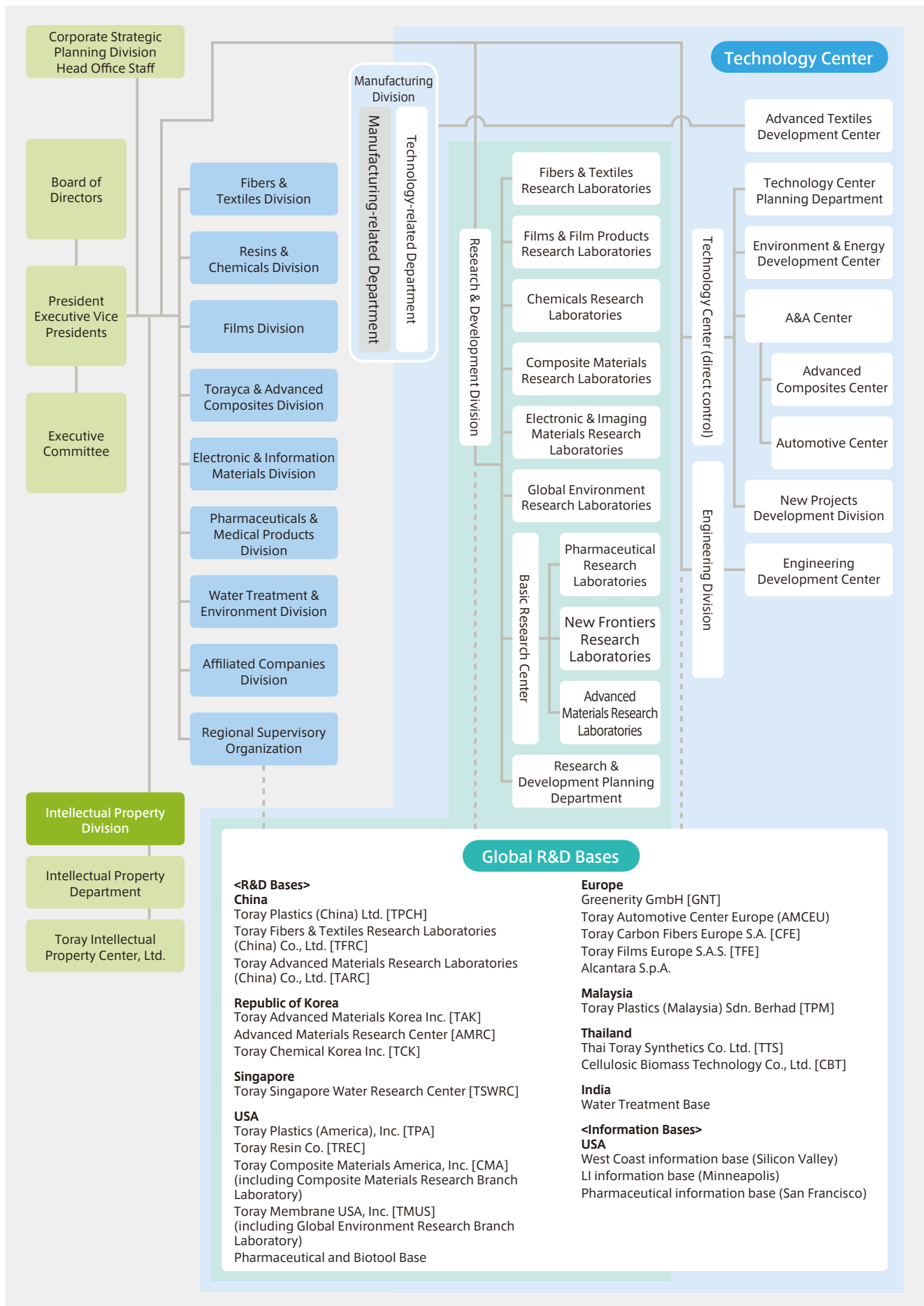
■ Toray Automotive Center Europe



■ Outline of the technological demonstration project for a cellulosic sugar-manufacturing process using membranes



■ Organization (As of July 2018)



2 R&D Partnerships

Toray Group offers solutions to its customers through open innovation, the practice of making full use of the advanced technologies we have developed and advanced materials we have created and working in partnership with a variety of organizations.

As a topic for FY 2017, in Fibers & Textiles, five of Toray's textile materials—offering various characteristics including high sweat-absorption, fast drying, stretchiness and antistatic properties—were newly certified as JAXA COSMODE brand materials, contributing to improved comfort and safety of clothing to be worn onboard spacecraft. The JAXA COSMODE product brand is promoted by JAXA (Japan Aerospace Exploration Agency) as a means of delivering the attractions of aerospace technology to people's everyday lives on Earth. The materials received brand certification in recognition of the fact that their high functionality contributes to improving comfort and safety onboard spacecraft.

In Electronic & Information Materials, in September 2017, Toray reached an agreement with the Japanese petroleum company Idemitsu Kosan Co., Ltd. (Idemitsu) for a technology partnership in relation to OLED materials, which are expected to be an area of future growth. Moving forward, Toray and Idemitsu will make mutual use of their respective OLED materials, technologies and expertise, and cooperate to develop and evaluate new materials; and aim to deliver materials that contribute to improving performance and durability of displays as well as reducing costs.

In Carbon Fiber Composite Materials, Toray signed a long-term agreement with the Italian aerospace company AVIO S.p.A. (AVIO) to supply TORAYCA™ carbon fiber to be used in AVIO's rocket launching applications by 2027 at the latest (including options). AVIO is responsible for the manufacture of major components used in the light-lift Vega rocket and heavy-lift Ariane 5, launched and operated by Arianespace S.A. Toray already currently supplies high-strength carbon fiber to AVIO via its French subsidiary, Toray Carbon Fibers Europe S.A. Based on this long-term agreement, Toray will expand its supply of carbon fiber for use in motor cases for next-generation rockets such as the Ariane 6 and Vega-C, for which AVIO will be participating in the development efforts.

Moreover, in seeking to expand its operations for automotive applications, Toray also made the decision to acquire a stake (11.7% share) in Tokyo R&D Co., Ltd. (Tokyo R&D), which is engaged in various automotive engineering business operations. As an engineering company that specializes in automotive-related research and development, Tokyo R&D boasts comprehensive development capabilities encompassing design, prototyping and evaluation for all manner of automotive projects. By combining these capabilities with CFRP (carbon fiber reinforced plastic) and other Toray Group material

technologies, we will seek to propose new and innovative solutions for automobile manufacturers.

In Life Science, Toray has teamed up with All Nippon Airways Co., Ltd. (ANA), Combi Corporation (Combi) and Nippon Telegraph and Telephone Corporation (NTT) to launch the "Akachan ga nakanai hikoki!?" (literally "Airplanes Where Babies Don't Cry!?") project. Under the project, the partners will work to develop products aimed at equalizing pressure inside babies' ears with external pressure, which may be useful in alleviating ear pain due to changes in air pressure; which is considered one factor that causes babies to cry onboard aircraft. The partners will also consider technologies for predicting when babies will start to cry by monitoring their state of comfort (or discomfort) based on their heartrate and other biometric data measured using wearable biometric sensors utilizing the functional material hitoe™.

In the Environment field, Toray has conducted joint pilot tests with Canada-based H₂O Innovation Inc. using large installations, and received an order to supply its TORAYFIL™ hollow-fiber ultrafiltration (UF) membrane for use in one of the largest sewage-to-drinking-water purification facilities in the United States, located in San Diego, California. UF membranes at the facility being established by the city of San Diego on this occasion will process a volume of approximately 150,000m³ of water per day, and Toray plans to begin shipping TORAYFIL™ for use at the facility from around 2019, to match the facility's schedule for commencing operation in 2021.

■ TORAYFIL™, playing an active role in water supply systems



1 Procurement and Management of Intellectual Properties

For procurement and management of patents, Toray adheres to its Patent Management Regulations and Patent Management Standards. These rules are permanently accessible on our intranet. Trademarks are handled in a similar manner with internal rules, including Trademark Management Regulations; Trade Name, Corporate Symbol and Brand Management Regulations; and Trademark Management Standards. These rules are disclosed throughout Toray.

For patents, we have set up a patent committee within each business to discuss details and complete all required procedures. Participants in these committees are patent practitioners of Intellectual Property Division (including Toray Intellectual Property Center, Ltd., a subsidiary that handles intellectual property issues), as well as members of the research, R&D and business (sales) departments in each business field. In this way, we adopt an integrated approach to the management of intellectual properties, R&D and business strategies.

The patent committees provide a particularly useful forum for making key policy decisions to determine the technological areas on which patent applications are focused, inventions for which applications should be filed, existing applications for which requests for examination are to be filed and patent rights that should be maintained or abandoned. Discussions likewise extend to the enforcement of existing patent rights and other key concerns.

We also established our brand management system as the organization overseeing important trademarks and brands in our business fields. In most cases, the general manager in each of Toray's business divisions is appointed the brand manager. He/she and members of the Intellectual Property Department and other operational staff departments participate in managing brand strategies of the division.

The Technology Brand Committee serves as the organization charged with reviewing and setting policy for the promotion and management of technology brands of which NANOALLOY™ is a representative example.

2 Management of Trade Secrets and Prevention of Technology Leakage

Toray is working to manage trade secrets and prevent technology leaks based on our Confidential Information Management Regulations for systematic information management and for the prevention of information leakage in response to calls for further strengthening of information management, including 1) prevention of unfair competition; 2) protection of personal information; 3) security trade administration; and 4) protection of classified information.

Moreover, in recent years large-scale information leaks have become a problem in the management of digital data, and based on our Electronic Information Security Standards, we are working on thorough information management at the work site, including regular internal audits. We regularly

review our Confidential Information Management Regulations and Electronic Information Security Standards according to the changing risks of information leaks and revise them as necessary.

At the Risk Management Committee, which deliberates and shares information regarding Group-wide risks, information management is positioned as one of Toray's priority risks, and from an integrated perspective considering document control, electronic data control, personnel management and facility/equipment management, we are working on thorough management of trade secrets and technical information and prevention of information leaks.

Toray Group actively promotes the procurement and enforcement of intellectual property rights as a way to distinguish its products and technologies and establish a competitive edge in the marketplace. At the same time, we consider cross-licensing as an important strategy in maintaining continuity and expanding the sphere of our business. Promoting open innovation that globally involves

industry, government and academia, Toray Group will more than ever before utilize its intellectual property as extremely valuable tools to maintain its advantageous position.

Although generating income through licensing is not considered to be an optimal approach for doing business, it bears mentioning that patent fee revenues have constituted a profitable arm of our corporate operations for many years.

1 Valid and Enforceable Japanese Patents

(Total for Toray Industries, Inc. and 67 Japanese and overseas subsidiaries and affiliated companies at the end of March 2018)

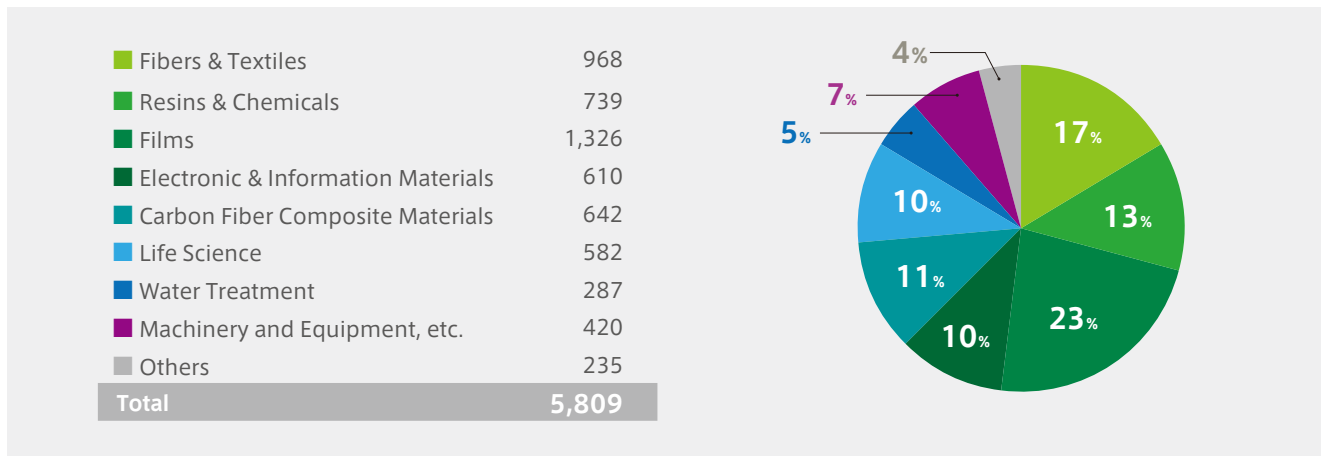
Toray Group takes an aggressive approach to obtaining patents with far-sighted strategies for use in developing advanced materials, and will firmly maintain this stance in the future.

In recent years, we have engineered a pronounced shift in emphasis from quantity to quality, which translates into greater emphasis on improving the quality of patents. This has resulted in a more stringent focus on cost awareness and operational efficiency in determining whether or not to file

patent applications or to file a request for examination for our patent applications as well as when rendering judgments on whether to maintain or abandon existing patent rights.

At the end of March 2018, the number of valid and enforceable patents in Japan was 5,809, of which 2,164 (37.3%) were in current use within the Group; 2,804 (48.3%) were scheduled to be used in the future; and 841 (14.5%) were patents for defense and other purposes. The following chart breaks down these patents by specific R&D segment.

Number of Valid and Enforceable Japanese Patents at the End of March 2018



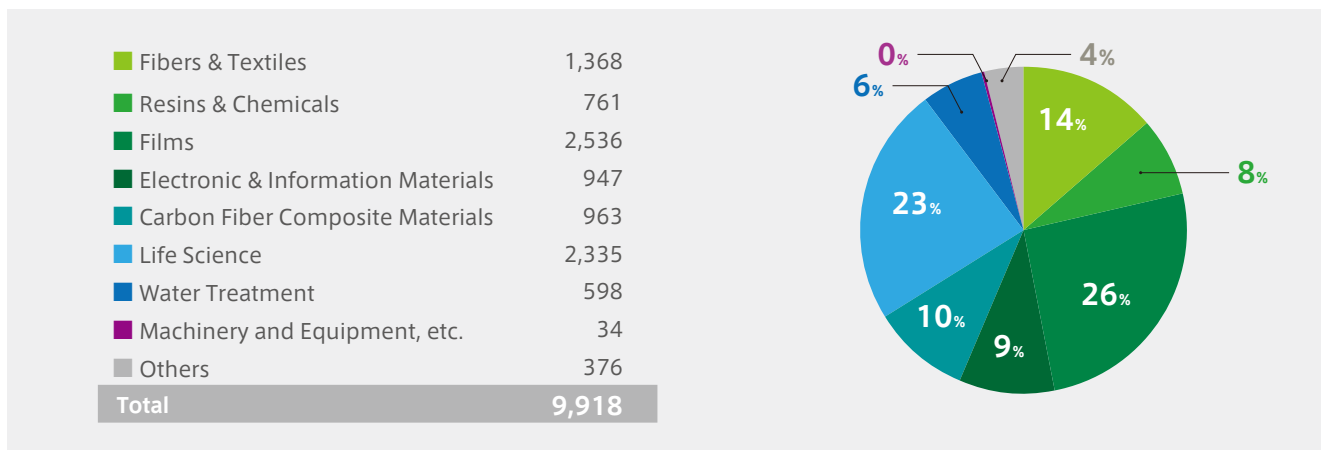
2 Valid and Enforceable Patents in Countries Other than Japan

(Total for Toray Industries, Inc. and 67 Japanese and overseas subsidiaries and affiliated companies at the end of March 2018)

At the end of March 2018, the number of our valid and enforceable patents in countries other than Japan was 9,918, with the following chart breaking down these patents by specific R&D segment. The large proportion of patents in countries other than Japan for Life Science compared with

that of Japanese patents owned in this area reflects Toray's goal of expanding its operations globally in this segment.

Number of Valid and Enforceable Patents in Countries Other than Japan at the End of March 2018



3 Japanese Patent Applications

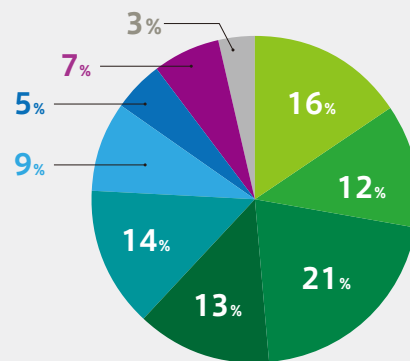
(Total for Toray Industries, Inc. and 67 Japanese and overseas subsidiaries and affiliated companies in FY 2017)

The number of patent applications in Japan in FY 2017 was 1,537, with the following chart breaking down these applications by R&D segment.

The relatively large proportion of patent applications in Carbon Fiber Composite Materials and Life Science compared with that of the Japanese patents owned in those areas reflects Toray Group's policy of actively applying for new patents in its Strategically Expanding Businesses and Intensively Developing and Expanding Businesses.

■ Number of Japanese Patent Applications in FY 2017

Fibers & Textiles	243
Resins & Chemicals	188
Films	320
Electronic & Information Materials	205
Carbon Fiber Composite Materials	210
Life Science	140
Water Treatment	76
Machinery and Equipment, etc.	103
Others	52
Total	1,537



4 Patent Applications in Countries Other than Japan

(Total for Toray Industries, Inc. and 67 Japanese and overseas subsidiaries and affiliated companies in FY 2017)

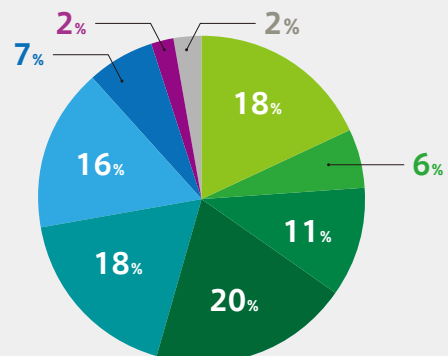
The number of patent applications in countries other than Japan was 3,846, with the following chart breaking down these applications by R&D segment.

Particularly noteworthy, the relatively large proportion of patent applications in Electronic & Information Materials and

Life Science compared with domestic patent applications is an indication that we aim to expand our global business in these fields.

■ Number of Patent Applications in Countries Other than Japan in FY 2017

Fibers & Textiles	695
Resins & Chemicals	234
Films	410
Electronic & Information Materials	762
Carbon Fiber Composite Materials	677
Life Science	624
Water Treatment	253
Machinery and Equipment, etc.	92
Others	99
Total	3,846



5 External Commendations

■ Commendations Received in FY 2017

Local Commendations for Invention			
Commendation	Region	Subject of Commendation	R&D Segment
Kinki	The Prize of the Chairman of HATSUMEIKYOKAI	Ultra-high sensitive positive-tone photosensitive polyimide compound	Electronic & Information Materials
Kinki	The Prize of the Chairman of HATSUMEIKYOKAI of the Shiga Prefecture	Moisture-permeable waterproof textile using lightweight, thin woven fabric	Fibers & Textiles
Chubu	The Encouragement Prize for Invention	PPS resins for both moldability and low gas transmission rate	Fibers & Textiles
Chubu	The Encouragement Prize for Invention	Black-dyed polyamide fiber (dyed black at liquid stage)	Fibers & Textiles
Kanto	The Encouragement Prize for Invention	Postural support inner	Fibers & Textiles

Other External Commendations			
Region	Awarding Institution	Subject of Commendation	R&D Segment
The 50 th Ichimura Industry Achievement Award	Ichimura Foundation for New Technology	Development of a high performance reverse osmosis membrane	Water Treatment
The 32 nd Advanced Technology Award Minister of Economy, Trade and Industry Award	FujiSankei Business i	Research and development of "NANODESIGN"	Fibers & Textiles

IX

Policies for Intellectual Property Portfolio

As noted in Part III of this report, Toray Group manages its intellectual property portfolio with a close eye on the future profitability and technical innovation of each technology and product.

We have established "Rank-A Projects" for technologies assigned particularly high importance, with invention

activities promoted on a prioritized basis. These projects promote activities of the formation of patent portfolios through the creation of patent maps to thoroughly comprehend technologies and patents of other companies, and establishment of subsequent strategies for enforcement of patent rights.

X

Information on Risk Response

As part of its defense-oriented intellectual property activities, Toray regularly researches and examines the patents of others in each technology. Our policy likewise requires mandatory confirmation of others' patents before any new product is commercialized and judgments of whether we might infringe on any of the patents. If any patents having an impact on our business are identified, the next step is to

plan and execute countermeasures to remove such impacts.

As of March 31, 2018, there are no intellectual property related lawsuits pending in the courts deemed capable of having a serious impact on the business interests of Toray Group. There also were no intellectual property related judgments in fiscal 2017 deemed capable of having a serious impact on the business interests of Toray Group.

Note

The plans, prospects and strategies referred to in this report are merely assumptions based on available information at the time of issuance of this report. They are subject to revision in the event of changes to Toray Group's operating conditions, the emergence of new technical innovations and changes to the intellectual property environment.
Product names marked with ™ are trademarks.

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