

Toray Industries, Inc.

FY 2015
Intellectual Property Report

April 1, 2015 — March 31, 2016

TORAY

Innovation by Chemistry

Introduction

In February 2011, Toray Group formulated a long-term corporate vision called “AP-Growth TORAY 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 by actively fulfilling our role in social development and environmental stewardship. The “Project AP-G 2013” medium-term management program was established at the same time to promote our efforts for the three-year period starting in FY 2011 as the first stage.

In the “AP-Growth TORAY 2020,” we are aiming to become a “corporate group that proactively contributes to social development and environmental stewardship” and a “corporate group that provides high value to all stakeholders” by further expanding our global business as the economic scale of emerging countries is set to surpass that of developed countries, and further concentrating our efforts on expanding our “Green Innovation Business” that contributes to the solution of increasingly critical global environmental problems as well as resource and energy problems.

In February 2014, the “Project AP-G 2016” medium-term management program was established as the second stage of “AP-Growth TORAY 2020” and is being promoted during the three-year period that started in FY 2014. “Project AP-G 2016” adds a growth strategy from a new perspective while continuing with the results and challenges of “Project AP-G 2013.” With it, we are promoting four Group-wide projects, namely the “Green Innovation Business Expansion,” “Life Innovation Business Expansion,” “Asia, Americas and Emerging Country Business Expansion,” and “Total Cost Reduction” projects.

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 “Asia, Americas and Emerging Country Business Expansion (AE-II) 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 contributed to the amendment of the Patent Act and related laws and trade secret protection provisions of the Unfair Competition Prevention Act in 2015. He also participated in the establishment of the government’s “Intellectual Property Strategic Program 2016” and has 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, 2016)

Name: Toray Industries, Inc.
 Established: January 1926
 Paid-in Capital: ¥147,873 million

No. of Group companies: 158 parent company and consolidated subsidiaries (60 Japanese and 98 overseas consolidated subsidiaries)
 No. of employees: 45,839 (consolidated), 7,223 (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.

Plastics & Chemicals:

(Excludes films and plastic products included in IT-related Products segment, listed below) Nylon, ABS, PBT, PPS and other resins and molded products; polyolefin foam; polyester, polypropylene, PPS and other films and processed film products; raw materials for synthetic fibers and plastics; zeolite catalysts; fine chemicals such as raw materials for pharmaceuticals and agrochemicals; veterinary medicines, etc.

IT-related Products:

Films and plastic products for information- and telecommunication-related products; electronic circuit materials and semiconductor-related materials; color filters for LCDs and related materials; magnetic recording materials; graphic materials and IT-related equipment, etc.

Carbon Fiber Composite Materials:

Carbon fibers, carbon fiber composite materials and their molded products

Environment & Engineering:

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

Life Science:

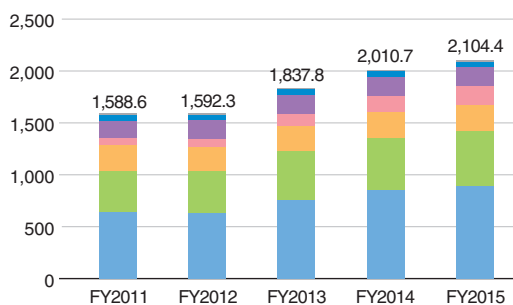
Pharmaceuticals, medical devices, etc.

Others:

Analysis, physical evaluation, research and other services

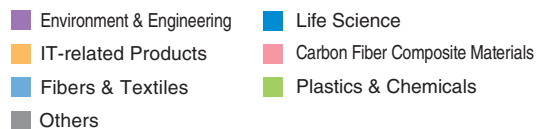
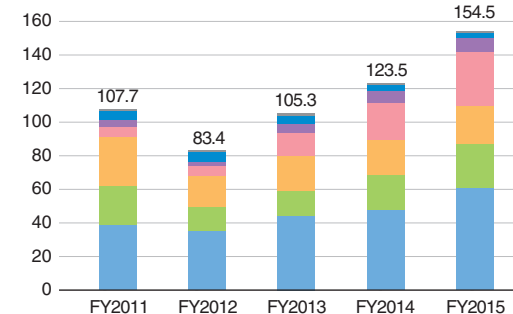
Net Sales

(Billions of yen)



Operating Income

(Billions of yen)



I Core Technologies and Management Strategies

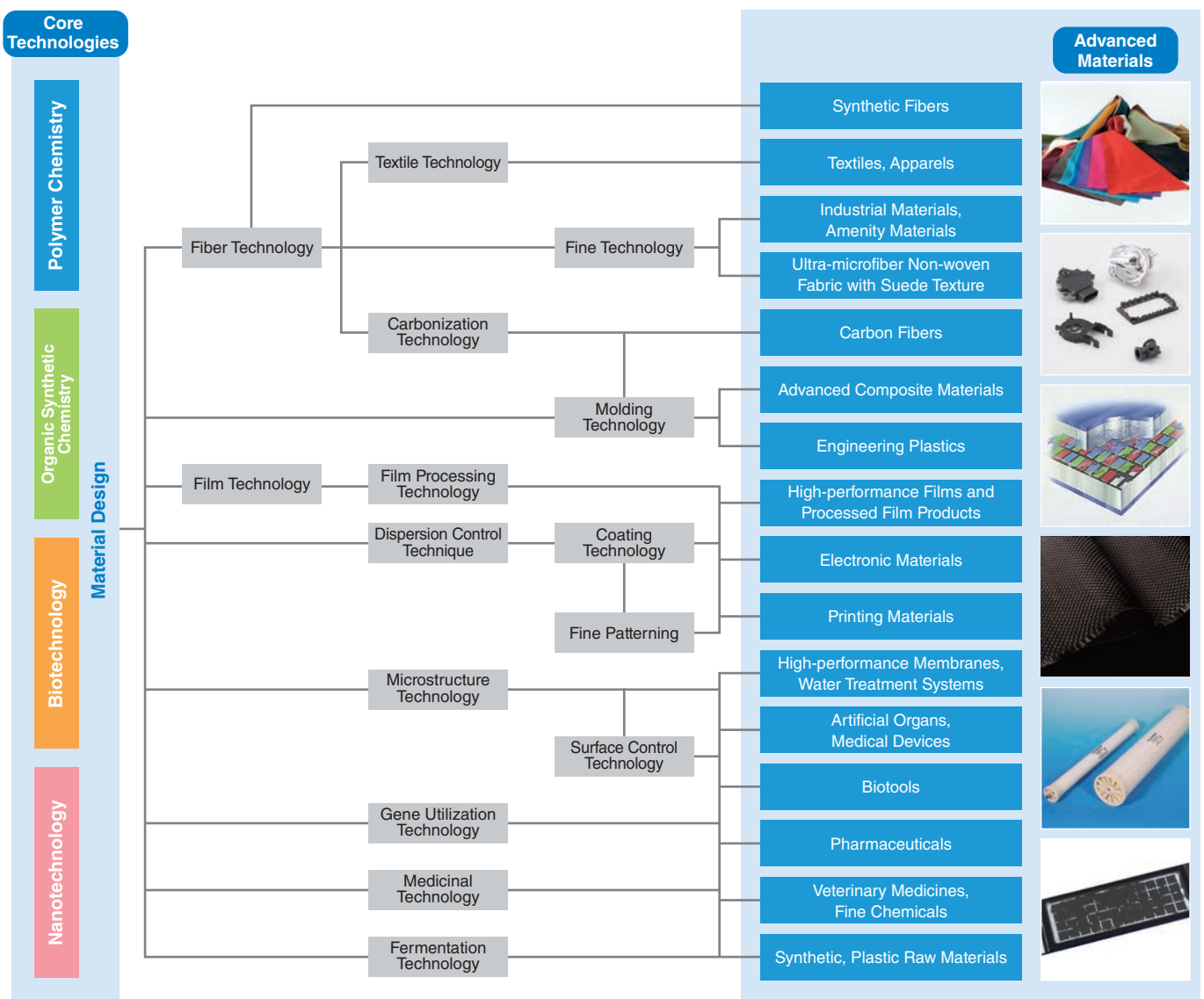
1 Core Technologies

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 electronics & 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

In February 2011, Toray Group formulated the long-term corporate vision “AP-Growth TORAY 2020,” looking ahead to the next decade and a medium-term management program, “Project AP-G 2013,” covering a three-year period (FY 2011 to FY 2013), which served as the first stage.

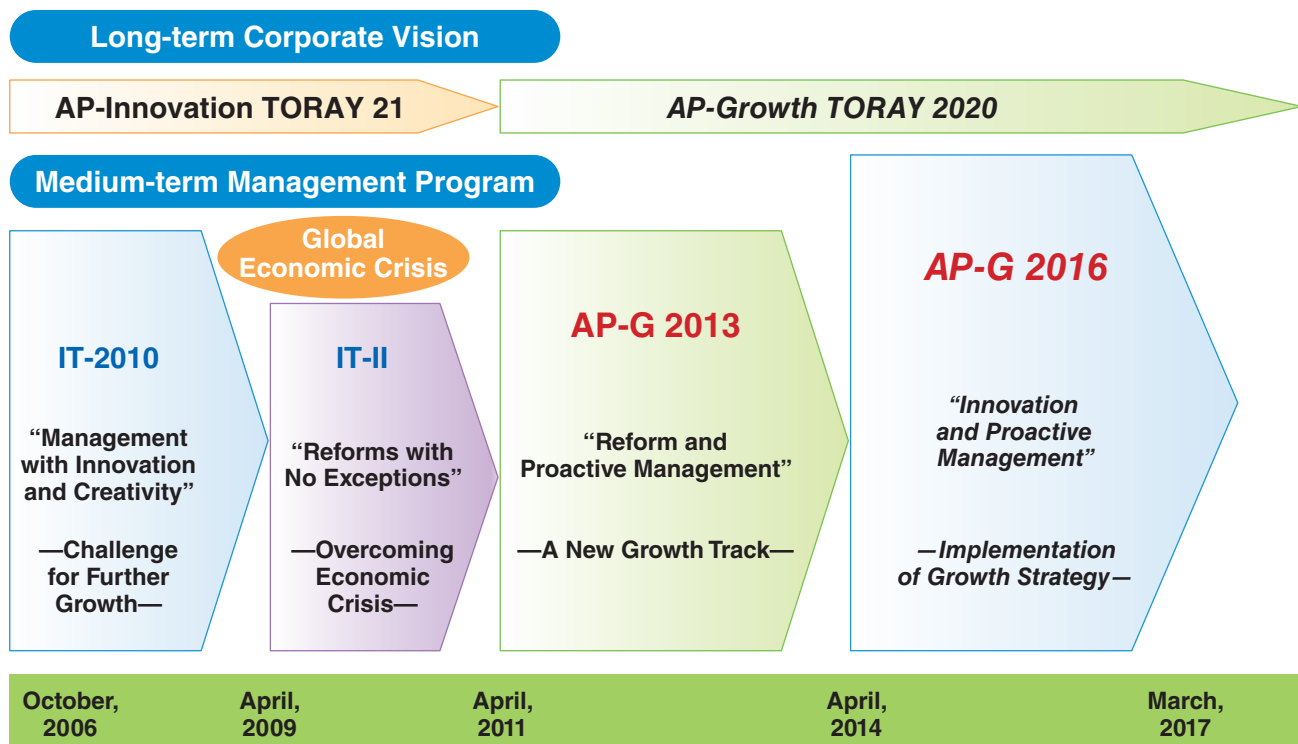
In the “AP-Growth TORAY 2020” long-term corporate vision, we are aiming to become a “corporate group that continually increases revenues and profits,” a “corporate group that proactively contributes to social development and environmental stewardship” and a “corporate group that provides high value to all stakeholders” by promoting further global business expansion and pouring efforts into expanding the Green Innovation Business.

Under the “AP-Growth TORAY 2013” medium-term management program, we worked comprehensively and vigorously to implement our growth strategy and strengthen our

corporate structure in the midst of major changes in domestic and overseas business environments. We also promoted investment in each business field to expand globally and were able to achieve steady results in R&D that will lead to the big new products and technologies of the future.

In February 2014, we established the new “Project AP-G 2016” medium-term management program that covers the three-year period from FY 2014 to FY 2016 as the second stage of “AP-Growth TORAY 2020” and began working on it in April. While continuing with the proactive management strategy of “Project AP-G 2013,” it further improves upon efforts related to the growth strategy, which was added from a fresh perspective, and strengthening the corporate structure. It also further enhances investment and R&D in the aims of business expansion.

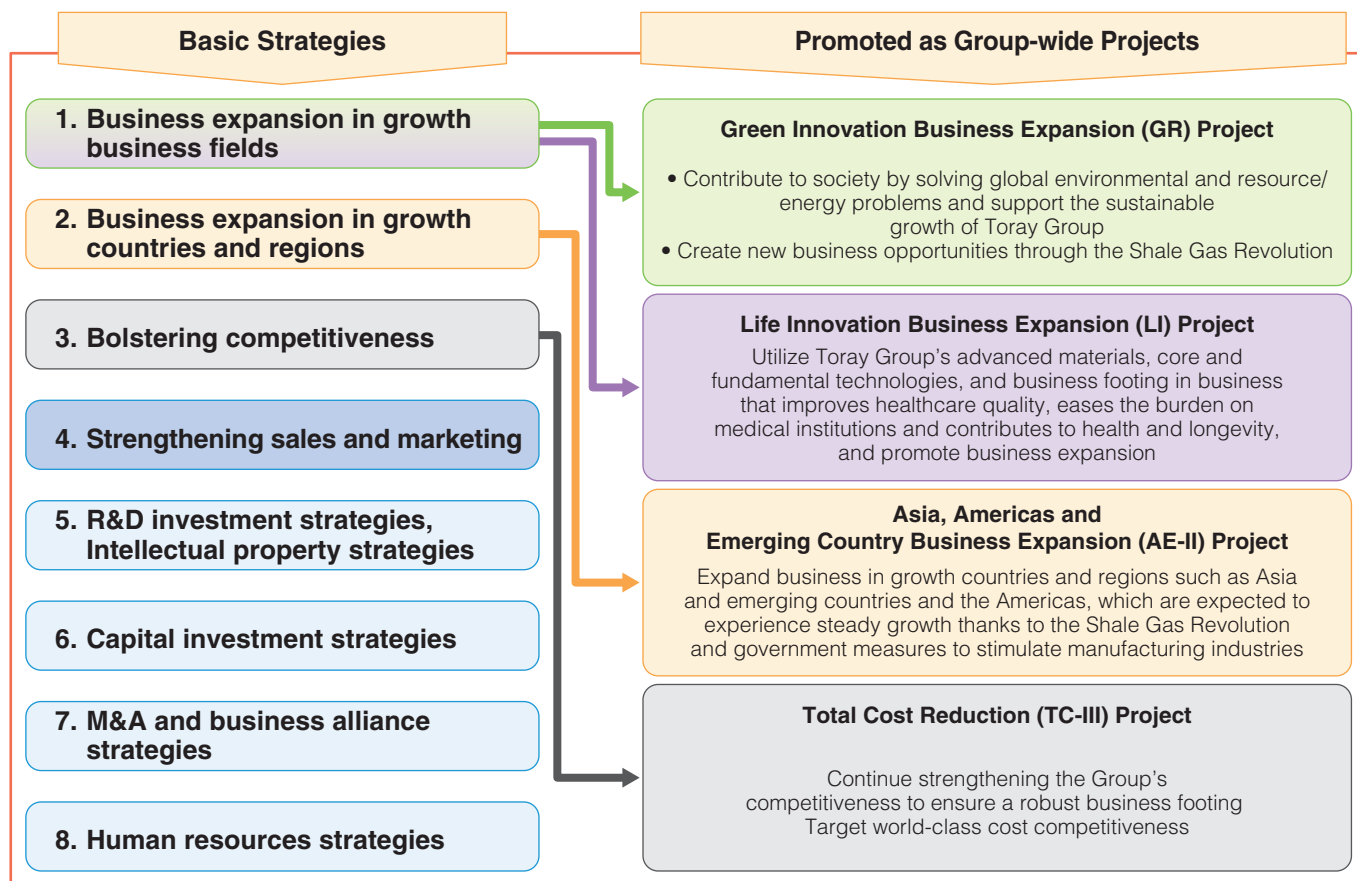
■ “AP-Growth TORAY 2020” Long-term Corporate Vision and “Project AP-G 2016” Medium-term Management Program



As Group-wide, cross-organizational themes of “Project AP-G 2016,” we are vigorously promoting four Group-wide projects, namely the “Green Innovation Business Expansion (GR) Project” that aims to expand business that contributes to solutions for global environmental issues and resource and energy issues; the “Life Innovation Business Expansion (LI) Project” that aims to expand business that improves healthcare quality, eases the burden on medical institutions,

and contributes to health and longevity; the “Asia, Americas and Emerging Country Business Expansion (AE-II) Project” that aims to expand business in growth countries and regions such as Asia and emerging countries and the Americas, which are expected to experience steady growth thanks to the Shale Gas Revolution and government measures to stimulate manufacturing industries; and the “Total Cost Reduction (TC-III) Project” to ensure our robust business footing.

■ **Basic Strategies and Group-wide Cross-Functional Projects of “Project AP-G 2016”**



See the URL below for details on “Project AP-G 2016.”
http://www.toray.com/ir/management/man_002.html

II Business Strategies and R&D Strategies

1 Basic Strategies by Business Category

The Fibers & Textiles and Plastics & Chemicals businesses, 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.

IT-related Products 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 information and telecommunications, automobiles and aircraft, and new energy.

Life Science, which includes pharmaceuticals, medical devices and biotools, and Environment Businesses, centered on water treatment, 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, Plastics & Chemicals

Steadily drive business expansion and profit growth of Toray Group

Strategically Expanding Businesses

IT-related Products, 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 (Water Treatment), Life Science

Develop as the next driver for revenue and profit growth to follow IT-related products and carbon fiber composite materials

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; Electronics & Information Related Products; Carbon Fiber Composite Materials; Life Science (pharmaceuticals and medical devices); and Water Treatment.

The “Business Categories, Segments and R&D Segments” chart shows the relationship between business categories, segments and R&D segments.

Relationship between Business Categories, Segments and R&D Segments

Business Categories	Segments	R&D Segments	Advanced Materials
Core Growth Driving Businesses	Fibers & Textiles	Fibers & Textiles	High-functional Fibers High-functional Textiles
	Plastics & Chemicals	Resins & Chemicals Films	High-functional Resins Functional Particles New Energy Materials
Strategically Expanding Businesses	IT-related Products	Electronics & Information Related Products	High Density Recording Materials High-functional Films Display Materials Semiconductor-related Materials
	Carbon Fiber Composite 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	High-functional Separation Membranes, etc.

3 R&D Strategies

In the “Project AP-G 2016” medium-term management program covering the three years from FY 2014 to FY 2016, Toray Group will focus on “Green Innovation” and “Life Innovation” as priority fields, and will promote R&D based on the following basic strategies in order to support sustainable growth of the Group, through creation of innovative new materials and technologies.

- (1) We will prioritize themes that offer essential and long-term competitiveness utilizing Toray Group’s core and fundamental technologies and business footing.
- (2) We will establish mainstay technologies for the future by expanding upon our core products and technologies, actively researching new fields and technologies, and pursuing production process innovations.
- (3) Starting in FY 2014, we will invest ¥180 billion in R&D over a period of three years (with 50% going towards R&D related to “Green Innovation” and 25% towards “Life Innovation”).
- (4) We strive to create innovative solutions by promoting open innovation that straddles industry, government and academia and extends globally and further promote collaboration and integration of research efforts with external organizations.
- (5) We will strengthen the global development of R&D functions, collaborate with leading companies and institutions overseas, and utilize outstanding resources in each country and integrate different cultures to cultivate new research domains.
- (6) We will strategically promote patent rights for the results of our R&D investments with initiatives that include promoting intellectual property capabilities and promoting global patent applications that emphasize constraints.

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 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.

As with Toray’s carbon fibers and reverse osmosis (RO) membranes, having a big picture outlook on the times, recognizing the value of the material and persistently working on it—what can truly be called “super endurance”—is what brings about innovation. It is this persistent basic research that

is our strength and the biggest barrier to entry.

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.

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.

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 2016” to promote Toray Group’s new growth strategies for the realization of “Green Innovation” and “Life Innovation,” we are bolstering initiatives for combining the total strengths of the Technology Center and for promoting collaboration and integrating research efforts.

5 R&D Expenditures

In FY 2015, Toray Group R&D expenses amounted to ¥58.8 billion (total R&D expenses of parent company Toray were ¥42.7 billion). By segment, we allocated 9% of these expenditures to Fibers & Textiles, 14% to Plastics & Chemicals,

19% to IT-related Products, 10% to Carbon Fiber Composite Materials, 4% to Environment & Engineering, 9% to Life Science and 35% to corporate R&D (all percentages approximate).

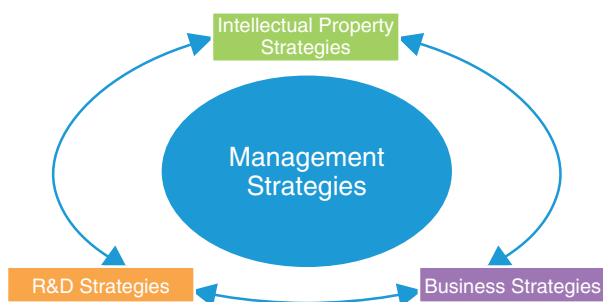
III Toray Group Intellectual Property Strategies

1 Basic Policies on Intellectual Property

The 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 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 cross-licensing with patent rights of other parties.

2 Intellectual Property Strategies in Line with Our Business Strategies

Under the basic strategy of the "Project AP-G 2016" medium-term management program, Toray Group promotes the creation of innovative new materials and technologies with "Green Innovation" and "Life Innovation" as priority fields. We will promote intellectual property strategies consisting of the four points below in order to build barriers to entry that will protect those results and firmly maintain our technological advantage.

- 1) Enhancing the quality of patents
- 2) Building globally competitive patent portfolios
- 3) Firmly maintaining our technological advantage through strategic patent applications and other such efforts
- 4) Developing human resources that support global intellectual property development

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

(1) Enhancing the quality of patents

With a view toward the strict judgments rendered by courts and the Patent Office concerning inventive steps and quality of disclosure of patent specifications since around 2000, Toray Group believes that high-quality patents should have patentability that can stand up to such judgments, be easy to enforce at the same time and be useful as tools for executing business.

From this viewpoint, Toray Group not only conducts thorough prior-art searches before filing patent applications, but also it provides inventors with opportunities to communicate with patent practitioners to perfect patent application documents, and with various tools to facilitate improvements in the quality of the documents. For example, prior-art searches are undertaken by patent searchers assigned to R&D departments charged with the primary role of patent searches.

Of particular note, we have enhanced education of the patent searchers and built a database for sharing know-how in performing searches more efficiently and thereby stringently selecting inventions for which to file patent applications based on their ability to stand up to the strict judgments of the Patent Office.

Our efforts extend beyond merely raising the quality of each individual patent and we have formulated and utilize the Manual for Building a Patent Portfolio that condenses know-how for raising the quality of the overall patent portfolio for protecting a specific theme.

To promote advantageous business development through the effective use of Toray's patents when another company enters one of our markets, we built a patent database arranged by product so that sales and marketing departments can easily ascertain our patents that could be used to defend against the

entry of competitors.

We will constantly work on improving the quality of our patents by continually enhancing the above efforts.

(2) Building globally competitive patent portfolios

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 foreign patent applications and patenting. In particular, under the "Asia, Americas and Emerging Country Business Expansion (AE-II) Project" within the "Project AP-G 2016" medium-term management program, 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 affiliated companies to ensure the appropriate protection of inventions created in our R&D bases in each country, which is growing in importance with the globalization of our R&D.

(3) Firmly maintaining our technological advantage through strategic patent applications and other such efforts

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 "Project AP-G 2016" medium-term management program, 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 to support our businesses in these growth business fields as a powerful barrier to entry in the future.

(4) Developing human resources that support global intellectual property development

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 operations 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 affiliated companies, we are actively implementing such measures as providing support for strengthening the foreign language capabilities of staff and dispatching staff to overseas affiliated companies. As of March 31, 2016, Toray Intellectual Property Division (including Toray Intellectual Property Center, Ltd., a subsidiary that handles intellectual property issues) has 30 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.

3 Selection and Concentration in Patent Administration

In accordance with the spirit of the "Total Cost Reduction (TC-III) Project" within the "Project AP-G 2016" medium-term management program, 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 advanced materials businesses in the four major growing business fields (environment, water-related and energy; information, telecommunications and electronics; automobiles and aircraft; and life science).

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 foreign patents 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 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, 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 Toray's contributions to environmental preservation and the goal of a low-carbon society through the ecodream® brand, which is the business brand mark symbolizing Toray Group's GR products and activities.

On April 15, 2013, the ecodear® brand, which is the all-

encompassing brand for biomass-based polymer materials and products, was established, and the Group announced an intensifying of global deployment. Additionally, on June 22, 2015, the Ecouse® brand, which is the all-encompassing 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://www.nanoalloy.jp/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

GR products and activity brands

LI products and activity brands

TORAY

ecodream

life
innovation

Other main brands

ecodear
Plant-based Product Solutions

ECOUSE

NANOALLOY
TECHNOLOGY

ultrasuede

TORAYCON

Lumirror.

PICASUS

HIGH-PERFORMANCE CARBON FIBER
TORAYCA

3D-Gene

torayvino

IV Analysis of the Marketability and Competitive Advantages of Technologies

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.

TORAY

Innovation by Chemistry

Toray Group has established the “AP-Growth TORAY 2020” long-term corporate vision and, to achieve it, we established the new “Project AP-G 2016” medium-term management program for the three-year period from FY 2014 to FY 2016 and launched it in April 2014.

Under “Project AP-G 2016,” we have incorporated a growth strategy from a new perspective. Gathering the collective strength of Toray Group, we are promoting “Innovation and Proactive Management” with “business expansion in growth fields and growth countries and regions” and “bolstering

competitiveness” as the linchpins. Our aim is to achieve sustainable growth as a highly profitable group and improve our corporate value for all stakeholders.

As part of that, we are engaged in development of advanced materials utilizing Toray Group’s technological competency and strengths such as infrastructure to expand our business in growth fields and create new businesses to capture growing demand. In particular, in the environment and energy field, we are working on the “Green Innovation Business Expansion (GR) Project” to contribute to solving global environmental problems and resource and energy problems. In life science including the medical and healthcare fields, we are comprehensively and vigorously promoting the “Life Innovation Business Expansion (LI) Project” by means of a new Group-wide project.

As for expanding our business in growth countries/regions, we are actively developing businesses featuring our strengths and promote the “Asia, Americas and Emerging Country Business Expansion (AE-II) Project” to steadily capture growing demand.

To bolster our competitiveness, we are promoting the “Total Cost Reduction (TC-III) Project” aimed at achieving world-class cost competitiveness.

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.

We developed ultrahigh-strength nylon using high viscosity polymer design technology and spinning technology for those polymers. GAIFU®, our bag fabric textile using these yarns, has about two times the tear strength and about 1.6 times the tensile strength of bag fabric made from conventional nylon material.

We also developed ULTRASUEDE® nu, a hybrid artificial leather with the luster of the grain side of leather and a suede texture. Using artificial leather with a dense structure developed by optimizing ultrafine fiber technology and base fabric structure design technology as the base material, we apply a special resin finish to the surface. The innovative texture, different from that of conventional ULTRASUEDE®, was well-received, and it was selected for use in fashion items from Tokyo Collection brands like “support surface” and limited edition car seats from RECARO, a global manufacturer of car seats.

Moreover, we also developed UTS® 50+, a new ultrafine polyester fiber textile. This is a textile made using our proprietary advanced island-in-the-sea type conjugate spinning and textile

processing technologies. While maintaining the very soft and delicate texture of a ultrafine fiber textile, we were able to achieve a smooth feel and matte texture.

Our partially plant-based polyester fiber ecodear® PET contains about 30% bio-based synthetic polymer made by polymerization using plant-based ethylene glycol and petroleum-based terephthalic acid. It satisfied the new standard for plant-based synthetic fibers, the first in the world for synthetic material that uses plant-based recycled resources as the raw material, and has been certified as a Type I environmental label (Eco Mark) product. Additionally, the first ever commercial production of our ULTRASUEDE® PX suede-texture artificial leather made from partially plant-based polyester was launched in October 2015, and sales were launched in January 2016.

Furthermore, we also developed PENTAS® UF, a new material for uniforms, using high-functional polyester staple fiber PENTAS® α, which has a special cross-sectional shape. This material for spring and summer work uniforms has the texture of natural fibers while also offering high UV protection, heat insulation, less transparency and quick-drying absorbency.

We also developed a comfortable elastic nylon textile with a new feel using a yarn with a bi-component structure combining two types of nylon polymer with different properties. This is an environmentally friendly material made using a nylon polymer partly derived from plant material. Because fibers processing like waterproofing and moisture-permeability allow it to be rolled out into various products, we will roll it out into a diverse range of products from outdoor and other sporting goods to casual wear.

In addition to these, we also developed reinforcement material to prevent damage to buildings from volcanic cinders by applying this material to the roofs of mountain huts and other buildings. This textile uses DuPont™ Kevlar® para-aramid fiber, and by incorporating it into roofing material based on the “Handbook for Enhancing Volcano Shelters” specifications issued by the Cabinet, it softens the impact from volcanic projectiles.

We also developed high-performance flame-shielding paper using polyphenylene sulfide (PPS) fiber TORCON® and polyacrylonitrile-based flame resistant yarn made by American subsidiary Zoltek Companies, Inc. (“Zoltek”). This is the result of Toray’s fiber composite structuring technology, which we have been researching and developing as a strategic priority for these years. By mixing and combining TORCON® PPS fiber and fire-resistant yarn using a special paper making technology, we are able to take advantage of the respective characteristics of both fibers. This allowed us to create flame intercepting paper with excellent workability, high fire-resistance and flame insulation that lasts more than 10 minutes (using our method of evaluation) while still being thin and maintaining adequate strength and flexibility.

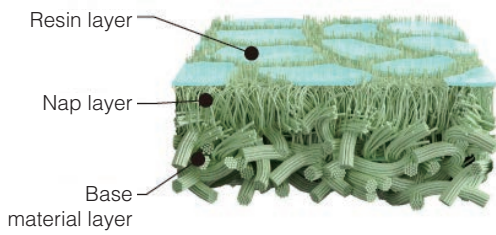
Finally, we developed an environmentally friendly technology for water repellent finish that offers high

water repellency and durability without the use of fluorine compounds. With this technology, the surface of each fiber is coated with a non-fluorine-based water repellent developed using our proprietary polymer blending technology. Combining Toray’s technology for nanoscale and other special function processing and controlling the compatibility between the chemicals and textiles, we increased the chemical absorbency of the textile surface during the water repellent treatment and the homogenous alignment.

■ **GAIFU® Made with Ultrahigh-Strength Nylon Yarn**



■ **Illustration of ULTRASUEDE® nu Material Structure and Example Applications (Left: Support Surface; Right: RECARO)**



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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.

One of our recent successes was the development of high-performance PPS resin with dramatically improved toughness, which was a long-standing challenge for PPS resin, while maintaining its high heat-resistance and mechanical strength. This was made possible by our proprietary NANOALLOY® technology that alloys (combines) two or more resins in nanometer order. We successfully nano-dispersed alloy components within PPS resin in the 10-200 nanometer order. PPS resin made using our NANOALLOY® technology has twice the toughness of conventional flexible polyolefin alloys while maintaining the high heat-resistance, strength and durability of PPS resin. It also offers excellent durability for continuous use under high temperature conditions, showing no signs of brittle fracturing after extended processing at 200°C.

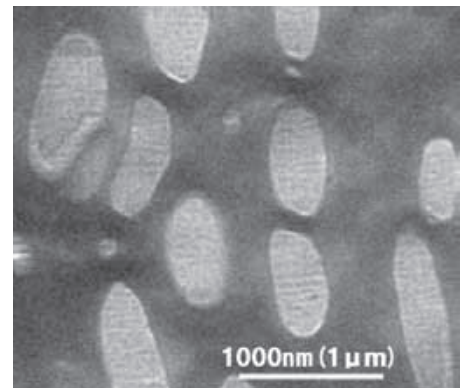
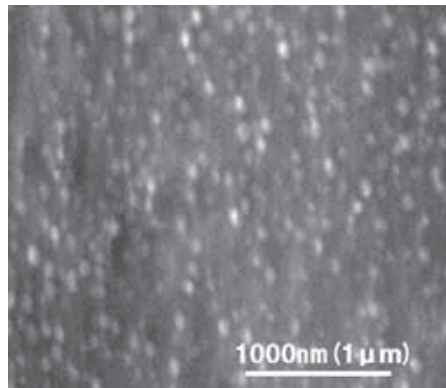
We also developed a high-performance nylon resin with dramatically improved resistance to high temperatures while maintaining the toughness and mechanical strength of nylon resin. We did this by controlling oxidative degradation inside the molded product by nano-dispersing our proprietary durability improver into the nylon resin, chemically capturing degradation products generated during high-temperature processing and forming

a strong shield layer in the molded product's surface layer to block out oxygen, which is the cause of degradation. Molded products with this shield layer have more than three times the oxygen barrier performance of products without it. We were able to achieve high durability in the high-temperature range of 200°C and up, which had heretofore been elusive.

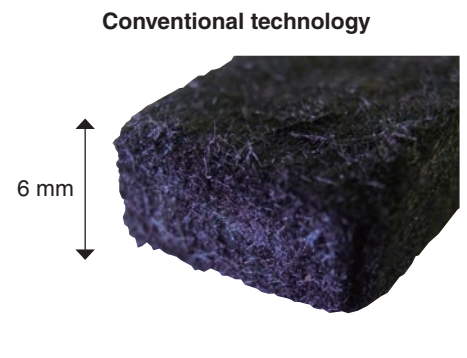
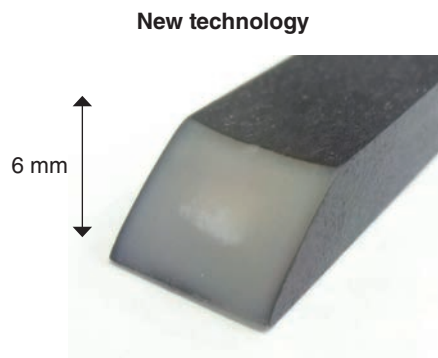
Additionally, we developed a carbon fiber reinforced thermoplastic resin for injection molding with greatly improved impact resistance while maintaining a high level of strength and rigidity by combining carbon fiber with a different kind of flexible fiber. It can be molded with existing injection molding machines and also supports composite molding like insert molding. The flexible fiber resists breaking during injection molding and remains in the molded product two times longer than carbon fiber, allowing the improved resistance to impact.

Finally, we developed TORAYMILL® PPS, the first fine particles of PPS resin to be compatible with 3D printers (powder bed fusion devices), using proprietary polymer design technology based on Toray PPS resin. Sales were launched in February 2016. A wide range of DDM (direct digital manufacturing) application is possible, including automobiles and aerospace, industrial and medical machinery that require high resistance to heat and chemicals and high strength.

■ Comparison of Dispersibility (Electron Microscope Photographs) between High-performance PPS Resin (Left) and Conventional Alloy (Right)



■ Cross-sectional Photograph of Molded Product after Heat Treatment Using High-performance Nylon Resin (Left) and Conventional Technology (Right)



3 Films

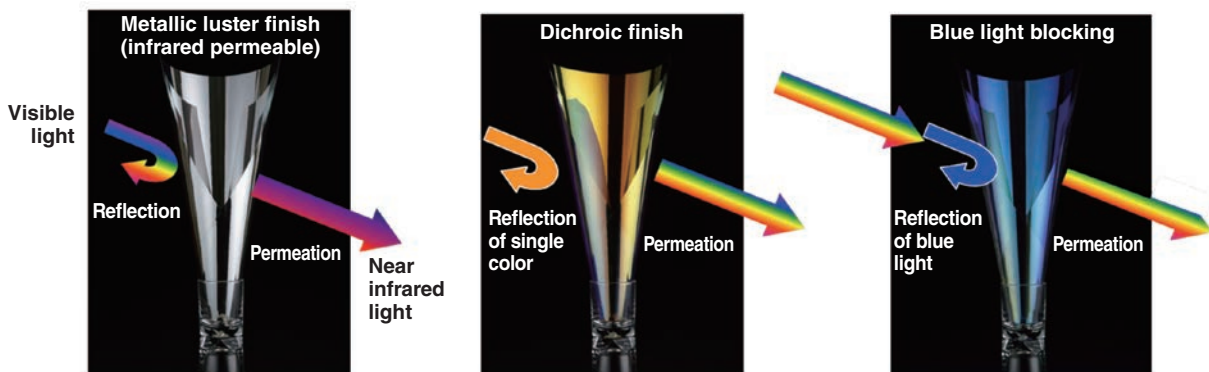
In films, Toray was the first in Japan to commercialize biaxially oriented polyester film and has been leading the world in the field of high-performance and high-function films by advancing the technologies of the polyester film together with biaxially oriented polypropylene film. We are also the global 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 materials applications for computer memory backups.

Recently, we began full-scale rollout of three kinds of nano-laminated film: near infrared permeable metallic luster finish, dichroic finish and blue light blocking. Nano-laminated film is polyester film consisting of hundreds or thousands of

layers of different polymers in the nanometer order. Pursuit of the ultimate limits performance of the technology cultivated with our PICASUS® nano-laminated film, which was brought to market in 2008, gave us greater precision control of nanolamination, allowing us to achieve wavelength selectivity for freely controlling permeation and reflection of everything from visible light to infrared by wavelength.

Additionally, Toray and Toray Advanced Film Co., Ltd. developed a new film with a self-repairing coat that instantly repairs fine scratches that occur on the surface through daily use and can even repair deep scratches from accidental heavy impact. It has attained a 2H rating in pencil hardness tests, so it can be said to have hardness comparable to a hard coat. This was achieved by using our interface control technology, which is a further development of our proprietary coating technology, to change the composition of polymers from the surface to the inside to create a coating layer that continuously changes the elasticity by 100 times.

■ Nano-laminated Film Wavelength Selectivity



4 Electronics & Information Related Products

In Electronics & Information Related Products, 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), plasma display rear panel forming technology and organic electroluminescent (EL) light-emitting materials.

As a result, we developed a temporary pasting material that is compatible with semiconductor manufacturing processes that get above 400°C. The temporary pasting material is used to temporarily affix the wafer that forms the device to the glass or silicon support substrate for polishing and thinning. A dual-layer system with a release layer and

adhesion layer having separate functions is generally used, but the newly developed product is a single-layer system that can help simplify the process.

We also developed the TAC-GU8 Toray waterless CTP thermal plate for UV printing (TAC-GU8) and launched sales. Leveraging our proprietary nanostructure control technology, in the TAC-GU8, we precisely control the nanospaces within the surface silicon layer and improve the resilience of the ink compared to previous plates, allowing us to expand the temperature conditions for UV printing. This product is for increasingly popular UV drying offset printers and will contribute to improved printing quality and productivity for our customers as a high-quality and low-cost printing system.

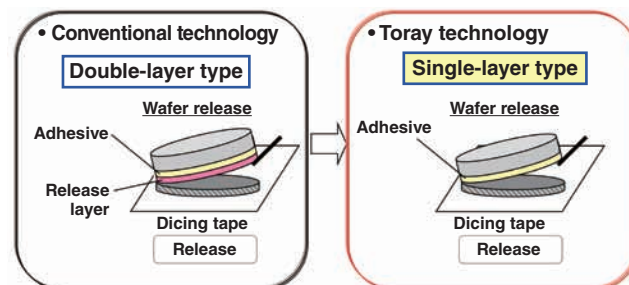
Additionally, we developed a water-soluble polyimide for negative electrode binding to support higher capacities in lithium ion batteries. We set out to apply our high-strength,

high-elasticity polyimides, in which Toray has considerable expertise, as negative electrode binders and improved insoluble and infusible polyimides at the molecular level to make them water soluble and capable of processing at and under 150°C. This allowed us to apply the technology to the negative electrode forming process in the existing lithium ion battery manufacturing line while maintaining the high strength property.

We also achieved electron mobility of 36 cm²/Vs in semiconductor-type single-walled carbon nanotubes (CNT), twice the previous highest mobility in the world for coated-type semiconductors. As a result of working on development of technology for forming our proprietary semiconductor polymers on the surface of single-walled CNT, we were able to discover a new semiconductor polymer that more easily and strongly interacts with single-walled CNT with high semiconductor purity and successfully improved the dispersibility of semiconductor-

type CNT. The mobility of 36 cm²/Vs is about 40 times that of amorphous silicon used in current displays and takes full advantage of the potential of CNT as a semiconductor.

■ **Temporary Pasting Material (Left: Conventional Double-layer System; Right: Single-layer System Developed by Toray)**



5 Carbon Fiber Composite Materials

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. Under "Project AP-G 2016," this is a core business area for Green Innovation, which is contributing to global CO₂ reductions as it makes aircraft and automobiles lighter and therefore more fuel efficient, produces clean energy from windmills, and also reduces the weight of high-pressure tanks for natural gas and hydrogen.

As a result, we signed a formal comprehensive long-term supply agreement with The Boeing Company (Boeing) to supply carbon fiber TORAYCA® prepreg for the production of the new Boeing 777X aircraft, extending the existing supply agreement for the Boeing 787 Dreamliner. This agreement extends the comprehensive supply agreement signed in November 2005 an additional more than 10 years, and the total amount to be supplied by Toray Group for the 787 and 777X programs during the period of the agreement is expected to exceed ¥1.3 trillion (\$11 billion). In conjunction with this, Toray has made a decision to invest approximately ¥50 billion in new construction of an integrated production line for yarn (precursor), high-performance carbon fiber TORAYCA® with an annual production capacity of 2,000 tons, and TORAYCA® prepreg in the new commercial premises it acquired in Spartanburg County, South Carolina. Production will be launched gradually starting with precursor in May 2017, and supply of TORAYCA® prepreg for Boeing will begin in 2019 after approval. The companies will further accelerate their joint development efforts for overall optimization. Joint development is currently underway in a wide range of fields from design to materials and parts production in the aim of further expanding the use of carbon fiber composites in aerospace applications. Fully mobilizing the advanced technology in material sciences, nanotechnology

and other fields available within the Toray Group, we will fuse our material technology with Boeing's aircraft design technology through deeper mutual collaboration.

We also developed tail components (spars, skin-stringer panels, ribs) made from carbon fiber reinforced plastic (CFRP) for the Mitsubishi Regional Jet (MRJ) manufactured by Mitsubishi Heavy Industries (MHI), and the first shipment of components for the mass produced MRJ has gone out from the Nagoya Plant. Since 2001, Toray has been engaged in joint development of a new CFRP molding technology for airplane components called "Advance Vacuum-assisted Resin Transfer Molding" (A-VaRTM) with MHI. A-VaRTM is an innovative CFRP molding technology that allows the efficient production of molded products by multilayering woven carbon fiber substrate and impregnating it with resin using vacuum pressure before heating/curing it in an oven. Toray and MHI have been earnestly discussing the application of CFRP components to the MRJ tail structure using A-VaRTM since 2008, and we have been supplying CFRP tail components for MRJ flying testbeds since 2013.

Additionally, the decision has been made to enhance the production facilities for large tow carbon fibers at USA subsidiary Zoltek Companies, Inc. The plan is to double the annual production capacity of the Mexico Plant to 5,000 tons, and production began in April 2016. In addition to wind power generation-related applications for which demand has been growing rapidly in recent years, we expect further adoption of large tow carbon fiber in automotive structure applications, so we plan to establish a more stable supply system.

Moreover, Toray and USA subsidiary Toray Composites (America), Inc. (TCA) signed a memorandum with Brazil-based Embraer S.A. for the supply of TORAYCA® prepreg carbon fiber for their new E175-E2 regional jet (to be commissioned in 2020).

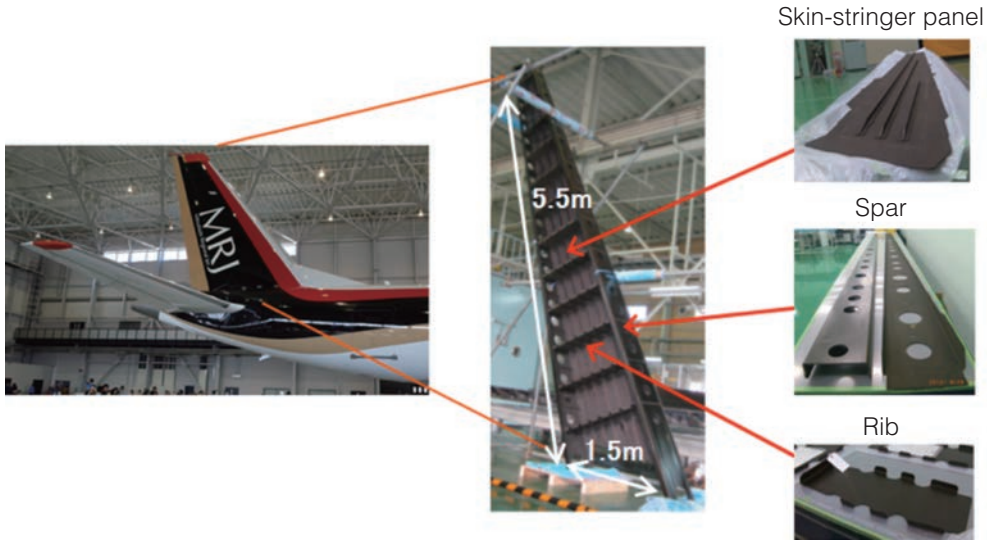
TCA also signed a long-term carbon fiber TORAYCA® prepreg supply agreement of more than 10 years with USA-based Bell Helicopter, Textron Inc. (Bell Helicopter). The

company will begin supplying TORAYCA® prepreg as a structural material for the body and frame of the Bell 525 Relentless mid-sized (18-passenger) civilian helicopter currently being developed by Bell Helicopter.

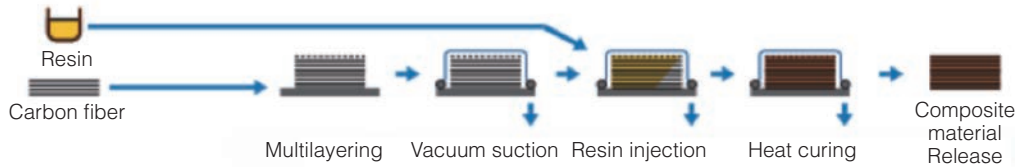
Finally, we developed an innovative carbon fiber reinforced foam (CFRF) structural material offering high rigidity on par with fiber reinforced resin while maintaining low density comparable to regular foamed sheet material. The carbon fiber staple fibers in CFRF form a three-dimensional

network, and the intersections are strengthened by resin, which gives it high rigidity even though it is porous. This newly developed carbon fiber sheet substrate can be molded into three-dimensional shapes using regular press molding and offers high bending rigidity, super lightness of weight and high productivity. We will roll it out in a wide range of fields centering on automobiles and aircraft. The results were partially obtained from NEDO's Research and Development Project for Innovative Structural Materials.

■ MRJ Tail Components Applying CFRP Technology (Skin-stringer Panels, Spars, Ribs)



■ CFRP Molding Technology A-VaRTM Process



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 κ (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 2.5 μg , an oral antipruritus drug for hemodialysis patients.

Recently, on May 20, 2015 it received approval for partial change to the manufacturing and marketing approval of REMITCH® CAPSULES 2.5 μg (hereinafter referred to as the "Agent") to include its new indication for improvement of pruritus in chronic liver disease patients in case of insufficient effectiveness of the treatment using existing drugs (hereinafter referred to as the "New Indication") in Japan.

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

In the medical devices field, we have been working on research and technological development of antithrombotic material for many years. We discovered that the higher the mobility of the water molecules (absorbed water) interacting with the hydrophilic macromolecules, the better the effect of controlling depositing of blood components, and we are developing hemodialysis membranes with excellent antithrombogenicity.

One of the recent topics at Toray is our development of new polymeric material that prevents coagulation of blood and dramatically improves antithrombogenicity through greater control of depositing and stimulation of blood components than previous materials. We ran computer simulations (molecular dynamics calculation) on the parts affecting absorbed water within the molecular structure of hydrophilic polymers and used various measuring methods to conduct analyses on the molecular level, and we applied the results to our molecular design. This allowed us to clarify the molecular structure having an effect on absorbed water, so we controlled the distribution of absorbed water within hydrophilic polymers and further improved mobility. This allowed us to create a polymer

material with dramatically improved antithrombogenicity.

Additionally, Toray Medical Co., Ltd. newly developed the TR-3300S single patient dialysis machine, which received approval for manufacture and sale from the Ministry of Health, Labour and Welfare on November 16, 2015, and launched sales in March 2016. Many dialysis facilities have a combination of dialysis monitors (central systems) and single patient dialysis machines. Combining the TR-3300S with the TR-3300M dialysis monitor, which has already received high marks from the market, makes automated dialysis without the need for saline solution possible at almost all dialysis rooms, greatly contributing to economic and operational efficiency. Moreover, by standardizing the operation of dialyzers and disposables like blood circuits, we expect our products to help prevent human error like operational mistakes and incorrect setup of blood circuits.

Finally, the SATAKE HotBalloon® Catheter ablation system for treatment of paroxysmal atrial fibrillation, the SATAKE HotBalloon® Generator and the TRESWALTZ® developed in Japan received approval for manufacture and sale from the Ministry of Health, Labour and Welfare on November 18, 2015.

■ TR-3300S Single Patient Dialysis Machine



7 Environment/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 a result, in regards to anti-fouling reverse osmosis (RO) membranes that control the deposition of impurities in water, we established basic technology for controlling the deposition of more kinds of impurities than before while maintaining high desalting performance and water permeability. Taking advantage of our global research and technological development system that brings together our research and technological development bases in Japan, China, Republic of Korea and Singapore, we performed structural design for retaining hydration water on the membrane surface based on water quality analyses of various water and phenomenon analysis through fouling visualization. The hydration water on the surface of the membrane serves as a coating, substantially controlling the deposition of various impurities. This technology makes it possible to develop RO membranes compatible with water of more different qualities than before, so we will check applicability in various parts of the world and accelerate development aimed at establishing mass-production technology as soon as possible.

We also received an order for our TORAYFIL® hollow-fiber ultrafiltration (UF) membrane from Yeosu City, Republic of Korea for the largest membrane filtration water purification facility in the country. With this, Toray will treat a total of 220,000 m³/day at membrane water purification systems in Republic of Korea for an overwhelming 50% share (based on our estimate of a total of

water treatment facilities that treat at least 5,000 m³/day).

We also launched sales of our TORAYVINO® Casetty 206SMX faucet connecting water purifier, which comes with our newly developed quick and high removal cartridges capable of filtering about twice the amount of water as our previous products, and our compact TORAYVINO® Casetty 308T faucet connecting water purifier at the end of March 2016. The TORAYVINO® Casetty 206SMX provides the same high removal of the 13 JIS impurities and delicious taste while also reducing the filtration time by about half compared to previous products, helping to reduce the time required for household chores. The compact TORAYVINO® Casetty 308T comes with a basic cartridge for removing seven JIS impurities and is about 2 cm thinner than our previous products, so we recommend it as an entry level product for students and young working people living in housing with small sinks, and others using water purifiers for the first time.

■ Hollow-fiber UF Membrane Used at Water Purification Plant in Gongju, Republic of Korea



■ TORAYVINO® Casetty 206SMX (Left) and TORAYVINO® Casetty 308T (Right)



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) Life innovation promotion system

Under the “Project AP-G 2016” medium-term management program, we are vigorously and comprehensively promoting the expansion of our Life Innovation Business on a Group-wide basis leveraging Toray Group’s strengths of advanced materials, core technologies, fundamental technologies and business footing in the aim of having the Group’s businesses contribute to the medical and healthcare fields through support for an aging society, advancement of medical treatment, etc. Toward that end, we established a Life Innovation Business Strategic Planning Department that will engage in strategic planning for Toray Group’s Life Innovation Business in April 2014.

Additionally, as a measure to strengthen our R&D capabilities with an eye to expanding our business in the life innovation field, we established life innovation bases in the United States and Japan. The former is a global base established within the Medical Devices Center of Minnesota University, which is a medical cluster engaged in R&D on the world’s most advanced medical devices, and the latter was established in the Kobe Biomedical Innovation Cluster in the prefecture of Hyogo, which is developing into one of Japan’s leading medical clusters. These bases promote cooperation with medical institutions, laboratory diagnosis facilities and medical device companies in Japan and other countries for the purpose of accelerating the development of medical devices and expanding application of Toray Group’s advanced materials in medical devices.

(2) Establishment of E&E Center as an integrated technology development base for accelerating Green Innovation

In January 2011, Toray established the E&E Center (Environment & Energy Center) as an integrated technology development base for environment and energy fields. The Environment & Energy Development Center was opened within

the Seta Plant (Otsu, Shiga Prefecture) to serve as the core organization of the E&E Center.

The establishment of the E&E Center is a part of measures for accelerating Green Innovation at Toray Group, with focus particularly on reinforcement of R&D in the environment and energy fields. Toray positions the E&E Center as an integrated collaboration base in the environment and energy fields for the entire Group. It intends to strategically integrate the Group’s R&D functions in these fields to fundamentally bolster its technological development capabilities that leverage the overall Group strengths and push forward with the creation and expansion of new businesses.

E&E Center collaborates with Toray’s Global Environment Business Strategic Planning Department under the direct control of the President and promotes open innovation, a strategic imperative in these fields, to promote dynamic creation of new businesses and innovation of business models.

The priority theme of the core organization Environment and Energy Development Center is the creation and expansion of businesses for “new environment-related materials” such as biomass materials and energy-saving housing materials as well as innovative new components related to “new energy,” especially solar cells, fuel cells and lithium-ion batteries. The center will build a structure that enables functions ranging from planning of technological development strategy to technological development related affairs and technical marketing in an integrated manner.

Along with A&A Center (Automotive & Aircraft Center), Toray positions E&E Center as Toray Group’s new growth engine for achieving a sustainable low-carbon society. Leveraging these centers, Toray will develop and expand businesses in advanced materials and technologies in the core fields of automobiles and aircraft as well as environment and energy.

(3) Building an R&D system in China

Toray has built its R&D bases in Shanghai and Nantong to strengthen the R&D system essential to growing our business in China.

We established headquarters for the Chinese R&D base Toray Fibers & Textiles Research Laboratories (China) Co., Ltd., or TFRC, in 2002 in Nantong, followed by a Shanghai branch in 2004, and have conducted R&D at these two locations since then. On January 1, 2012, we spun the Shanghai branch into an independent entity, known as Toray Advanced Materials Research Laboratories (China) Co., Ltd., or TARC. Thus research is taking place at the two companies TFRC (in Nantong City, Jiangsu) and TARC (Shanghai).

The chief functions of TARC are 1) to conduct R&D that will expand our Chinese business (i.e., provide product development and technical service for Chinese customers) as based on Group strategies in each business field except Fibers & Textiles, and additionally 2) to serve as the China

branch of Toray's Advanced Materials Research Laboratories (in Shiga), which performs basic research.

To promote further growth of Toray Group business in the Chinese market, which we expect to grow dramatically in the future, our local staff are paying close attention to Chinese customers' unique needs and working to develop new products and technologies suited to local needs. We are additionally strengthening our customer response with technological support. To do this, we were not only further strengthening research fields we have long engaged in (resins, films, water treatment, amenities, etc.), but also doing film processing research and starting new R&D services in carbon fiber composite materials, electronics & information materials and so on.

We hire excellent research talent from China to do basic research. They work closely with our Advanced Materials Research Laboratories in Japan to create advanced materials.

Because our Shanghai base offers relatively easy access to important Chinese customers and many elite universities are close to the base, we will strengthen its organization as an R&D center in China in fields other than Fibers & Textiles. The research facility completed in 2014 has laboratories, a test plant, analytical laboratories and other facilities, and we have installed equipment like molding machines and printers for prototyping, analysis and assessment to enhance product development and technical service functions for films, carbon fiber composite materials and electronics & information materials.

We are also enhancing TFRC and positioning it to specialize as a Fibers & Textiles R&D base. Toray Group has established an organization in Nantong that brings production and R&D together, and we will take advantage of this integrated entity in our R&D.

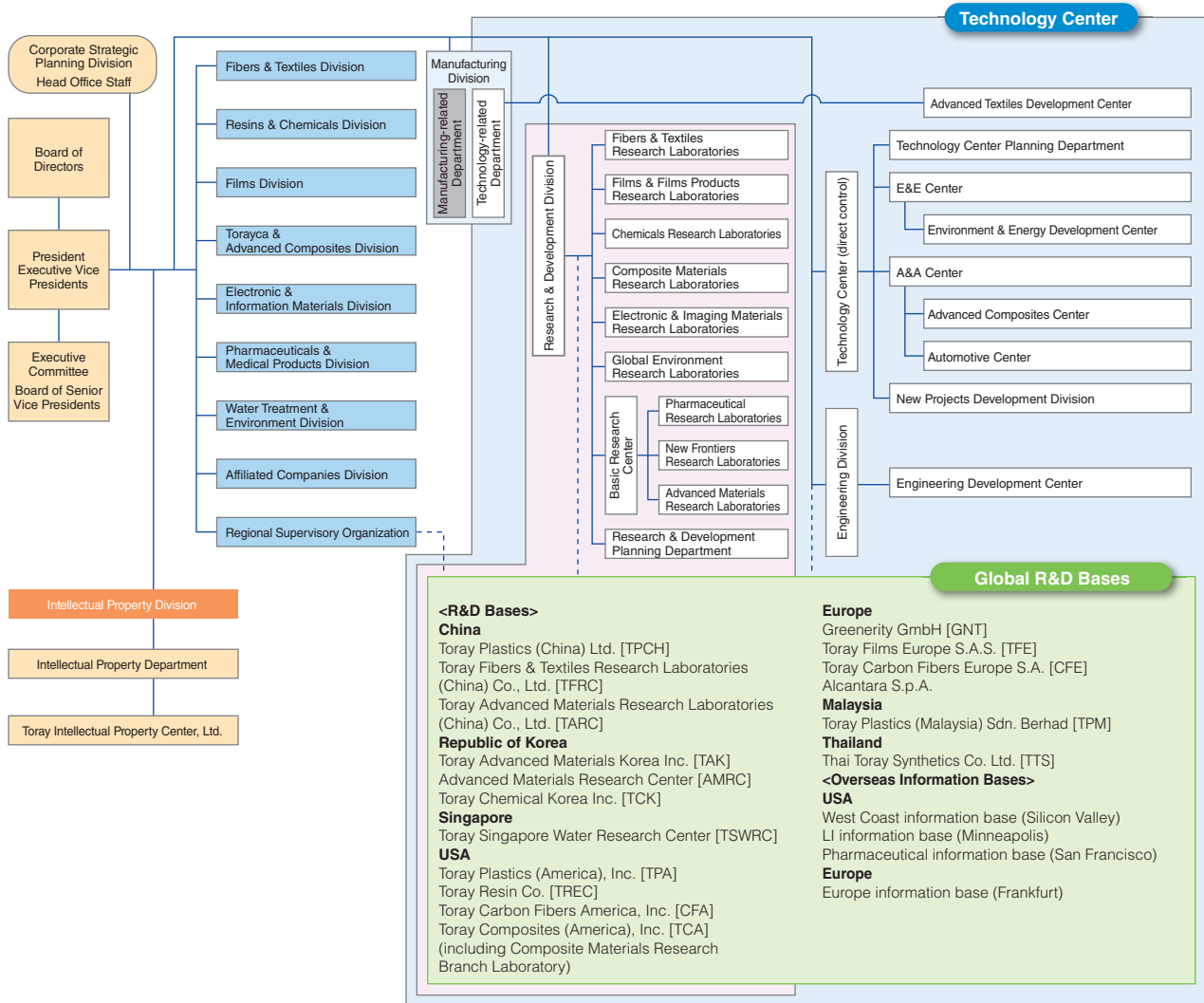
As a result of these initiatives, TARC and TFRC have produced a large number of inventions, and the two organizations together file more than 100 patent applications in China annually.

(4) Enhancement of R&D system in Europe and the USA

We established Toray Resins Europe GmbH (TREU), a new marketing and sales company for high-functional resin products, in Neu-Isenburg, Germany. The new company has installed CAE analyzers and resin evaluation equipment to support design and will also engage in product development/technical support adapted to local needs. Additionally, in the USA we expanded the Resin Technical Center inside resin subsidiary Toray Resin Co. (TREC) and built a new building (total floor area of 1,200 m²). We installed new trial production extruders, scanning electronic microscopes and other equipment to further strengthen local resin compound technology development and technical support functions. The establishment of a new resin company in Germany and the expansion of the Resin Technical Center in the USA will also deepen our relationship with Japanese auto part manufacturers (Japanese Tier 1) and auto part manufacturers with R&D facilities in Europe and North America (European/North American Tier 1), so we will provide more detailed local-based technical solutions to them directly.

Additionally, Toray acquired shares of SolviCore GmbH & Co. KG (SolviCore), which was owned 50/50 by Umicore AG & Co. KG (Umicore) and Solvay GmbH (Solvay) and made it into a new wholly-owned subsidiary called Greenerity GmbH (Greenerity). SolviCore was jointly established in July 2006 through a 50-50 investment by Umicore and Solvay for the purpose of developing, manufacturing and selling catalyst coated membranes (CCM) and membrane electrode assemblies (MEA) as parts for fuel cells and water electrolyzers. The CCM and MEA held by SolviCore are core components of fuel cells and water electrolyzers and are essential products for the achievement of the future hydrogen-based society. By acquiring SolviCore and re-launching it as Greenerity, we hope to take advantage of synergy in fuel cell and related fields using our respective products and technologies and expand our business in these fields. The name of the new company is a combination of greener and -ity and represents our aim of creating a more environmentally friendly society.

Organization (As of June 2016)



2 R&D Partnerships

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, Toray Group offers solutions to its customers. At the A&A Center and E&E Center, which were established as integrated technological development bases in the growth fields of environment and energy and automobiles and aircraft, we bring together the Group's collective strength to conduct faster R&D and work with customers in development partnerships that facilitate new product development, commercialization and business growth. Additionally, in the expansion of the Life Innovation Business, which is promoted under "Project AP-G 2016," the Life Innovation Business Strategic Planning Department (LI Planning Department) is leading efforts to promote development of new products and technologies in close collaboration with the Technology Center and each business division. It is also promoting collaboration with medical institutions, testing/diagnosis facilities and medical equipment-related businesses in Japan and other countries utilizing the Life Innovation facilities established in Kobe and Minnesota.

As a topic from FY 2015, in Fibers & Textiles, we concluded an agreement for a third five-year strategic partnership plan with UNIQLO Co., Ltd. We aim to further strengthen our strategic partnership, which is in its second phase and has continued for 10 years, and create new industries that will drive the times.

Additionally, on August 17, 2015, Japan Airlines Co., Ltd., NTT Communications Corporation (NTT Com) and Toray began joint proof of concept on a safety management system that utilizes the IoT in the aim of developing an environment in which outdoor workers can work safely at airports. This proof of concept is part of our efforts with NTT Com toward practical application of worker safety management services utilizing hitoe® functional fiber material.

In Carbon Fiber Composite Materials, the development of high-efficiency recycled carbon fiber manufacturing technology using an innovative energy-saving thermal decomposition method that we proposed with Toyota Tsusho Corporation (Toyota Tsusho) was adopted by the New Energy and Industrial Technology Development Organization (NEDO) as a fiscal 2015 Strategic Innovation Program for Energy

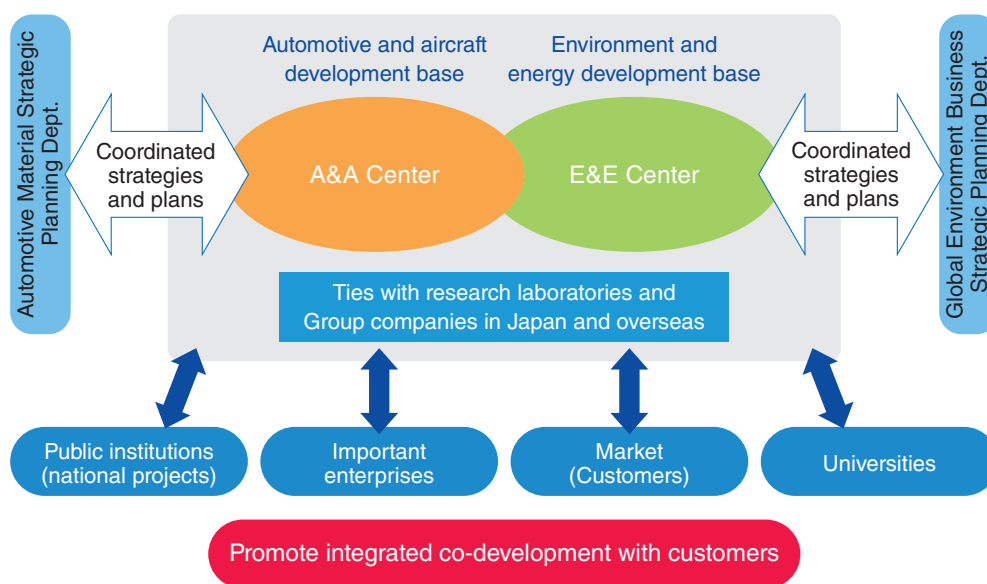
Conservation Technologies. In response, we have launched joint efforts with respect to carbon fiber recycling. Together, we constructed pilot equipment at the Handa Plant of Toyota Chemical Engineering Co., Ltd., a wholly-owned subsidiary of Toyota Tsusho. We will move forward with demonstration of energy-saving recycled carbon fiber manufacturing technology with our sights set on future commercialization and promote development of applications for recycled carbon fiber.

In Life Science, we signed a licensing agreement with Bonac Corporation (Bonac) for Japan on December 25, 2015 pertaining to nucleic acid pharmaceutical BNC-1021 (Bonac development code)/TRK-250 (Toray development code) produced by Bonac to treat idiopathic pulmonary fibrosis (the drug). Toray and Bonac will promote development and practical application of the drug in Japan in the aim of contributing to the medical industry.

Additionally, working with Nanotheta Co., Ltd. (Nanotheta), a venture company launched by Waseda University, we

applied the polylactic resin polymer nanofilm (nanosheet) researched and technologically developed by Nanotheta to develop a new antiadhesive material to be used in intraperitoneal and other surgical operations (the material). The focus was on convenience and usefulness when developing the product. It is easy to use like gauze and will prevent adhesion after the operation as a barrier film. Toray signed a basic commercialization agreement with Nanotheta in October 2012 and has since been engaged in joint development. Toray also signed an exclusive option agreement with Taiho Pharmaceutical Co., Ltd. for the joint development and sale of the material in Japan in March 2015. A system has been established for collaboration between the three companies, and equipment installation related to the manufacture of investigational products and the basic specifications for product development have come together, so we will accelerate our business development efforts.

■ Initiatives for Technology and Product Development at A&A Center and E&E Center



■ Approach for Promoting Life Innovation



Utilization of Life Innovation facilities



Signing ceremony with University of Minnesota, Medical Devices Center



Kobe Biomedical Innovation Cluster

VI Guidelines on Procurement and Management of Intellectual Properties, Management of Trade Secrets, Prevention of Technology Leakage

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 sector. 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 manages company-wide risk, 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.

VII Contribution of Licensing-related Activities to Businesses

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.

VIII Valid and Enforceable Patents, Patent Applications, External Commendations

1 Valid and Enforceable Japanese Patents

(Total for Toray Industries, Inc. and 45 Japanese and overseas affiliates at the end of March 2016)

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.

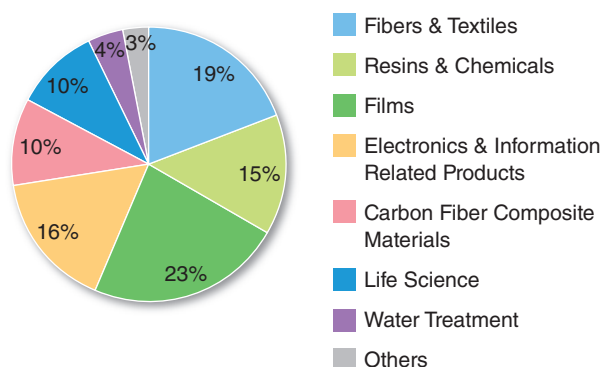
In recent years, we have engineered a pronounced shift in emphasis from quantity to quality, which translates into greater emphasis on improving the quality of patents. This has resulted in a more stringent focus on cost awareness and operational efficiency in determining whether or not to file patent 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 2016, the number of valid and enforceable patents in Japan was 5,646, of which 2,081 (36.9%) were in current use within the Group; 2,825 (50.0%) were scheduled to be used in the future; and 738 (13.1%) 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 2016

Fibers & Textiles	1,046
Resins & Chemicals	817
Films	1,304
Electronics & Information Related Products	902
Carbon Fiber Composite Materials	579
Life Science	590
Water Treatment	216
Others	192
Total	5,646



2 Valid and Enforceable Foreign Patents

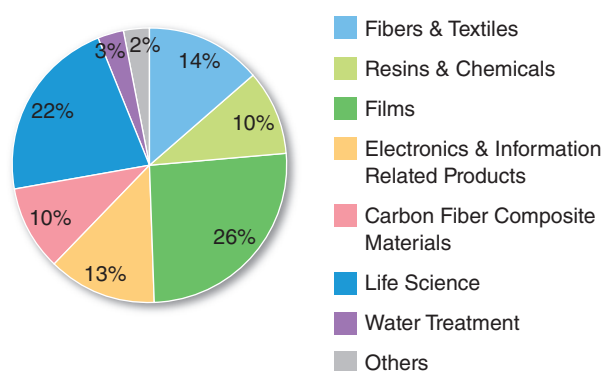
(Total for Toray Industries, Inc. and 45 Japanese and overseas affiliates at the end of March 2016)

At the end of March 2016, the number of our valid and enforceable patents in countries other than Japan was 7,380, with the following chart breaking down these patents by specific R&D segment. The large proportion of foreign patents

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 Foreign Patents at the End of March 2016

Fibers & Textiles	1,028
Resins & Chemicals	751
Films	1,904
Electronics & Information Related Products	965
Carbon Fiber Composite Materials	734
Life Science	1,595
Water Treatment	212
Others	191
Total	7,380



3 Japanese Patent Applications

(Total for Toray Industries, Inc. and 45 Japanese and overseas affiliates in FY 2015)

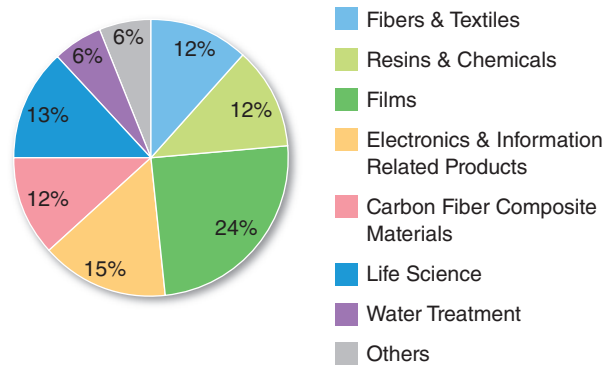
During FY 2015, the number of applications was 1,580, with the following chart breaking down these applications by R&D segment.

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 2015

Fibers & Textiles	188
Resins & Chemicals	186
Films	390
Electronics & Information Related Products	237
Carbon Fiber Composite Materials	195
Life Science	204
Water Treatment	90
Others	90
Total	1,580



4 Foreign Patent Applications

(Total for Toray Industries, Inc. and 45 Japanese and overseas affiliates in FY 2015)

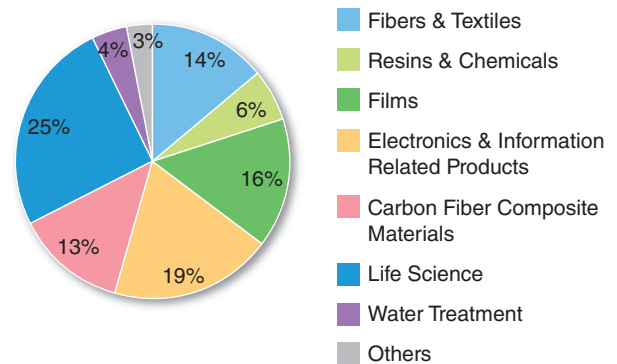
During FY 2015, the number of applications for foreign patents was 3,442, with the following chart breaking down these applications by R&D segment.

Particularly noteworthy, the relatively large proportion

of patent applications in Electronics & Information Related Products, Carbon Fiber Composite 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 Foreign Patent Applications in FY 2015

Fibers & Textiles	486
Resins & Chemicals	209
Films	529
Electronics & Information Related Products	645
Carbon Fiber Composite Materials	448
Life Science	872
Water Treatment	148
Others	105
Total	3,442



5 External Commendations

■ Commendations Received in FY 2015

National Commendation for Invention

Commendation	Subject of Commendation	R&D Segment
The Invention Prize	Invention of polyimide (precursor) coating material for insulating layer in organic electroluminescence	Electronics & Information Related Products

Local Commendations for Invention

Commendation	Region	Subject of Commendation	R&D Segment
The Encouragement Prize of the Commissioner of Japan Patent Office	Shikoku	Prepreg containing halogen-free flame-retardant epoxy resin composition having fast-cure property	Carbon Fiber Composite Materials
The Encouragement Prize of the Chairman of HATSUMEI KYOKAI (JIII)	Kinki	Woven fabric and garment superior in breathability	Fibers & Textiles
The Encouragement Prize for Invention	Kinki	Black formal material superior in black coloring and quality	Fibers & Textiles
The Encouragement Prize for Invention	Kinki	Blade-proof protective plate	Fibers & Textiles
The Encouragement Prize for Invention	Chubu	Epoxy resin composition for high-cycle resin transfer molding	Carbon Fiber Composite Materials
The Encouragement Prize for Invention	Chubu	Nano-structure controlled polymer alloy	Resins & Chemicals
The Encouragement Prize for Invention	Chubu	Anti-pilling artificial leather	Fibers & Textiles

Other External Commendations

Commendation	Awarding Institution	Subject of Commendation	R&D Segment
2015 Award of the Society of Polymer Science Japan (Technology)	The Society of Polymer Science, Japan	Development and industrialization of nano-multilayered polyester film	Films
The 15th Green and Sustainable Chemistry Award Awarded by the Minister of Economy, Trade and Industry and the Minister of the Environment	Green & Sustainable Chemistry Network, Japan	Development of high-functional reverse osmosis membranes	Water Treatment
The Technology Award of The Society of Fiber Science and Technology, Japan	The Society of Fiber Science and Technology, Japan	Innovative Composite Spinning Technology "NANODESIGN"	Fibers & Textiles
Japan Society for Composite Materials Technology Prize	Japan Society for Composite Materials	Development of highly formable prepreg	Carbon Fiber Composite Materials
Product and Technology Award, SAMPE Japan	Society for the Advancement of Material and Process Engineering (SAMPE) Japan	Development of NANOALLOY® prepreg technology	Carbon Fiber Composite Materials

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 its competitors in each technology. Our policy likewise requires mandatory confirmation of competitors' 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.

At the present time, there are no intellectual property related lawsuits in the courts 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 ® or ™ are trademarks.

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