RESEARCH & DEVELOPMENT

RESEARCH & DEVELOPMENT STRATEGIES

Basic Approach

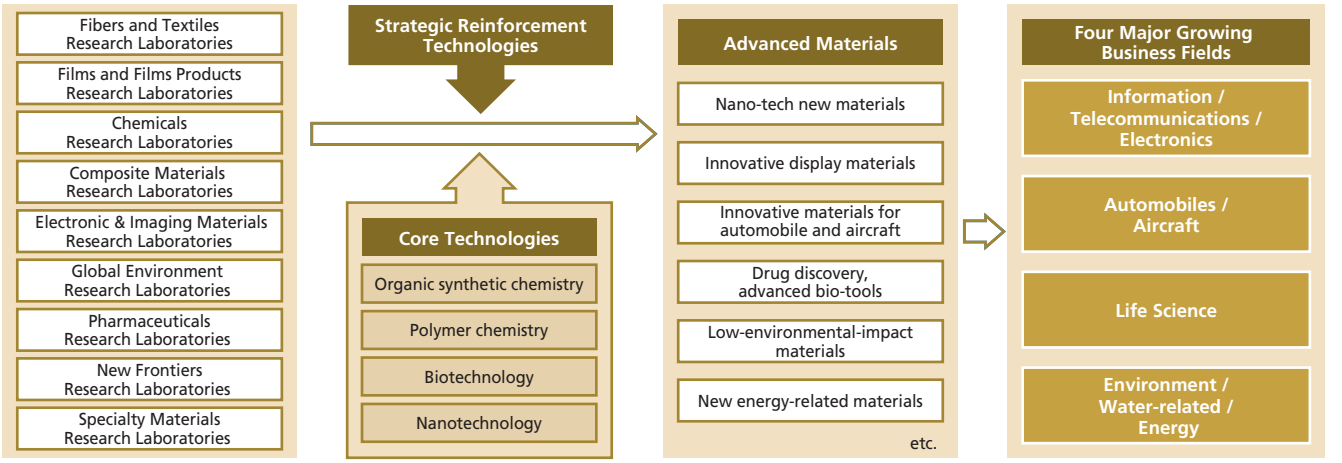
Technological innovations, underpinned by ongoing "materials innovation," offer revolutionary solutions to a wide range of issues society confronts. Such issues include the advancement of highly information-based society, extended healthy life-span, and global environmental issues. Toray Group's mission is to benefit society through the continuous creation of innovative advanced materials by employing its core technologies and their integration.

In line with this philosophy, Toray Group adopted the slogan "Innovation by Chemistry" for its long-term corporate vision, "AP-Innovation TORAY 21," formulated in April 2006. The slogan reflects our goal of evolving into the global top Company of advanced materials by pursuing technological innovation in chemistry.

Core Technologies and Priority Research & Development Themes

Under Project Innovation TORAY 2010 ("IT-2010"), which embodies the company's mid-term business strategies, Toray Group will concentrate on developing advanced materials and bringing these materials to market in our four major growing business fields: Information, Telecommunications, and Electronics; Automobiles and Aircraft; Life science ; and Environment, Water-related, and Energy. To this end we will realize technological innovations in new materials, nano-materials, bio-processes, and nano-processes by strategically reinforcing key elemental technologies, centering on organic synthetic chemistry, polymer chemistry, biotechnology and nanotechnology, which represent four core technologies of Toray Group.

Advanced Materials R&D Strategies



APEX 40 and Promoting Commercialization

To expedite R&D aimed at creating advanced materials, we established APEX 40, in which we selected 40 of Toray's numerous research themes judged to have the great impact on the Group's future businesses. We are now actively allocating managerial resources to those top priority 40 themes.

Seeking to swiftly commercialize the results of our R&D activities, we have initiated "Advanced Materials Projects" for major themes that have advanced from the research stage to the development stage and involve new infrastructure and concepts. Under the projects, we appoint a dedicated leader for each theme and determine which department will be in charge, with the aim of achieving commercialization within a maximum period of two years.

"APEX 40 " and "APEX Challenge"

Mid-term Business Strategies and R&D Strategies

IT-2010 calls for R&D innovation focusing on (1) select strategic focus more intensively, (2) generate next large-scale R&D themes, and (3) create of original distinctive technologies.

From R&D Reform to R&D Innovation

NT21

R&D Reform

Progress in Key Projects at the Technical Center

Next-generation high density COF, chemical mechanical polishing pads, organic electro luminescent materials, new optical films, polylactic acid films, DNA chips, etc.

NT-II

Advanced Material Businesses Expansion Project

IT-2010

Innovation of Technologies

- Advanced Material Businesses Expansion Project
- R&D Capabilities Innovation Project
- Manufacturing Technology Innovation Project

R&D Innovation
Pursue Innovative Research

1. Select strategic focus more intensively
2. Generate next large-scale R&D themes
3. Create original distinctive technologies

Leap forward

Step forward

R&D reform-II "Strengthen R&D collaboration and integration"

1. Increase Speed 2. Enhance theme creativity 3. Create original distinctive technologies

R&D reform "Depart from independent R&D"

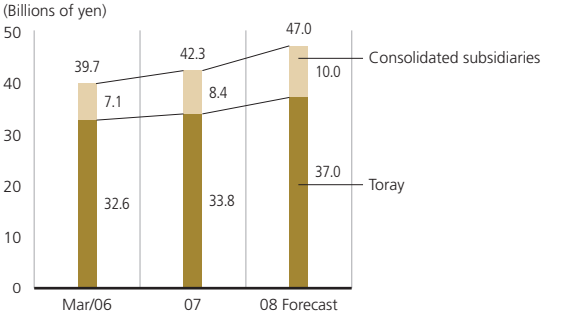
1. Reform basic stance 2. Reform themes 3. Reform personnel & organization

Performance and Outlook

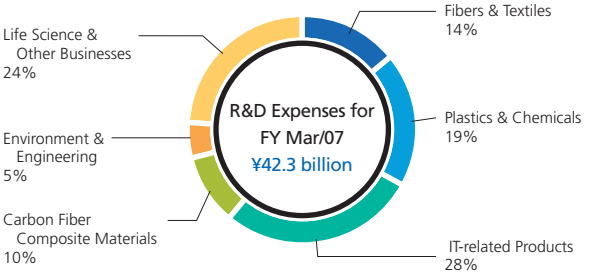
In FY Mar/07, we invested proactively in two Strategically Expanding Businesses (IT-related Products and Carbon Fiber Composite Materials) and two Strategically Developing Businesses (Life Science and water treatment). As a result, consolidated R&D expenses increased 6.5% from the previous year, to ¥42.3 billion. Non-consolidated R&D expenses totaled ¥33.8 billion.

In FY Mar/08, we plan to increase R&D expenditures by a further 11%, to ¥47.0 billion. This is in line with the basic policy under IT-2010 of allocating ¥240 billion to research and development over the five-year period beginning April 2006. In FY Mar/08, we will continue to promote development of advanced materials for our four major growing business fields.

R&D Expenses



R&D Expenses by Business Segments



INTELLECTUAL PROPERTY STRATEGY

Basic Strategy and Patent Applications

Toray Group strives to obtain patents across all of its R&D initiatives, with the key focus on advanced materials. This is particularly true of the Strategically Expanding Businesses and Strategically Developing Businesses, which we have positioned as drivers of earnings growth over the medium and long term. In these businesses, we are reinforcing our competitiveness through rigorous patent applications both in Japan and overseas and use of patent rights.

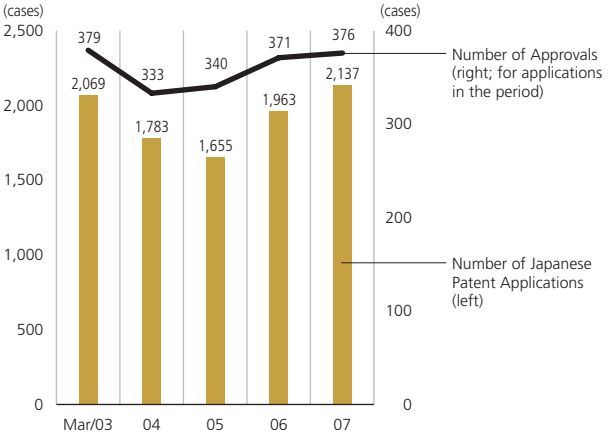
To facilitate selection and concentration in its R&D activities, Toray has designated Rank-A Projects* as top-priority themes. Under this approach, leaders and supervising executives are appointed, and progress is monitored regularly at meetings of technical division executives.

Most research themes related to advanced materials and other major business fields of the Group are accorded Rank-A Project status.

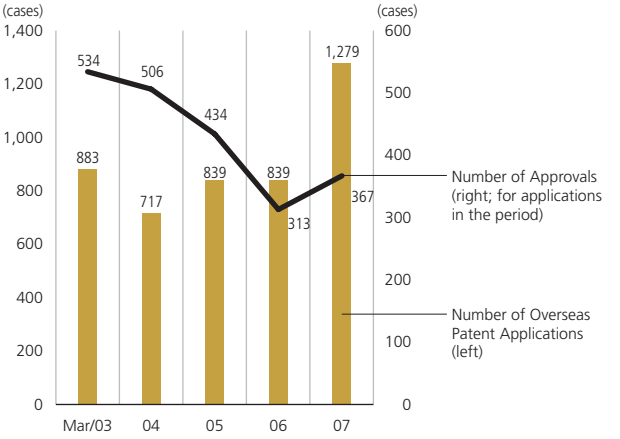
* Rank-A Projects are classified into one of the following three categories, based on their objectives.
1. "Rank-A Patent Rights Projects," with the objective of establishing patent networks for new technologies and related peripheral technologies through application and pursuit of claims for patent rights.
2. "Rank-A Defense Projects," targeting early clarification of the relations with patents rights held by other companies for key research and technology development, and prompt determination of countermeasures for patents of other companies determined to have a major impact on Toray 's business.
3. "Rank-A Rights Utilization Projects," structured to fight infringement of Toray patents by other companies through claims for the legitimacy of Toray rights, efforts to curb such infringement by other companies and the obtaining of rightful compensation for execution of Toray patents by other companies, to make contributions to Toray business.

Patent Applications and Approvals

Japan



Overseas



FY MAR/07 R&D HIGHLIGHTS

1 Metallic Luster Forming Film

In September 2006, Toray succeeded in developing the world's first metal-free metallic luster film with easy moldability. The film with high-luminance reflection of light features a luster similar to that of metal. This is achieved using Toray's proprietary nano-multilayer technologies (high-precision multilayer technologies), capable of laminating several hundreds, and even several thousands, of polymers with high precision. The film can be molded together with resin owing to its extremely high moldability, achieved by combining Toray's high-precision multilayer technologies and its proprietary polymeric design technologies.

Previously, applications for conventional metallic luster materials were limited because virtually no radio waves could pass through them, they lacked sufficient moldability, and they were not environmentally friendly. In addition to solving these problems, Toray's new film paves the way for a wide range of applications, including in mobile phones, home appliances, and automobiles. This is attributable to Toray's proprietary technologies, which realize superior thermal resistance, chemical resistance, printability, and surface properties.

The film is Toray's second advanced film developed using its innovative nano-multilayer technologies, the first being a highly transparent, tear-resistant film already available in the market.

Metallic Luster Forming Film

2 Impact-Energy Absorbing Plastic

In January 2007, Toray developed the world's first impact-energy absorbing plastic in collaboration with Professor Takashi Inoue and his group in Yamagata University. This research is sponsored by New Energy and Industrial Technology Development Organization (NEDO*) in terms of project on Nanostrucutured Polymeric Materials, launched in 2001.

Normally characterizing as high-performance plastic, the energy-absorbing plastic changes its shape like rubbers under a drastic impact. This innovative material was developed using Toray's proprietary nano-alloy technology**, which is used to combine two opposing material characteristics, high-strength, high-rigidity plastic, which breaks easily when subjected to sudden impact, and a low-strength, low-rigidity rubber material, which is strong when subjected to sudden impact. The unique mechanical behavior suggests a potential application for the energy absorbing car parts; friendly to both pedestrians and drivers with less injury.

Toray will explore other uses in addition to the energy absorbing car parts. Examples include electric/electronic applications and sporting goods.

* Ministry of Economy, trade and industry, Japan
**Technologies that optimally blend two or more plastics at a nano-meter level.

High-speed impact test for new plastic (200kg, 50cm height)

Change shape flexibly and absorb the impact-energy

3 Innovative Mass-Production Technology of Carbon Fiber Composites

In June 2006, Toray was the first in the world to develop mass-production technology for carbon fiber composites with complicated shapes by applying the new technologies.

The technologies realize a design capability and mass productivity for carbon fiber reinforced plastics (CFRP) comparable with that of other industrial materials, such as plastics and metals by drastically reorganizing the material design, molding processing, and assembly technologies.

1. Innovation of Material Designing Technology: Toray has established an innovative concept, by which the products are segmented into CFRP parts according to their shape and function, so each segmented component design is optimized.
2. Innovation of Molding Technology: Toray has constructed a new press-molding system in order to achieve great reduction of molding time from material charge on the mold to de-molding of parts.
3. Innovation of Assembly Technology: Toray has also developed a CFRP hybrid technology, to combine CFRP parts using thermal welding, realizing short time and highly-efficient assembly.

These innovations exploit diverse possibilities for mass-production, including laptop computers and cellular phone casings, automotive parts, and medical devices.

In 2005, Toray received an award from The Society of Polymer Science, Japan, in recognition of the innovative features of these new technologies.

4 Low Temperature Curable Photosensitive Polyimide Coatings Developed for Next-Generation Semiconductors

In February 2007, Toray developed the world's first photosensitive polyimide coatings that can be cured at temperatures below 200˚C and can be developed with environmentally friendly alkaline developers.

Nanofabrication and faster-speed semiconductors are being developed in response to the increasingly high performance and multi functionality of information technology devices. Enhancing the reliability of such next-generation semiconductors requires photosensitive stress buffer coatings that can be cured at lower temperatures.

Using our proprietary polymeric design technologies, Toray succeeded in developing buffer coatings that achieve an optimal balance between thermal resistance and low-temperature curing – two antinomic properties in conventional polyimide coatings. These new coatings will make a significant contribution to raising the reliability and high yield of next-generation semiconductor devices.

The semiconductor buffer coating market is forecasted to expand to approximately ¥30 billion by around 2010, from around ¥20 billion at present. Toray currently holds the world No.1 market share for the most advanced buffer coatings for sub-90nm circuit line width semiconductors. By adding this new low-cure temperature coatings to its lineup, Toray intends to develop new applications for next-generation semiconductors and gains a market share of at least 30% in the whole semiconductor buffer coating market.