'TORAY'
Innovation by Chemistry

December 7, 2007

<IT-2010 IR Seminar – No.2>

Toray's R&D Strategy

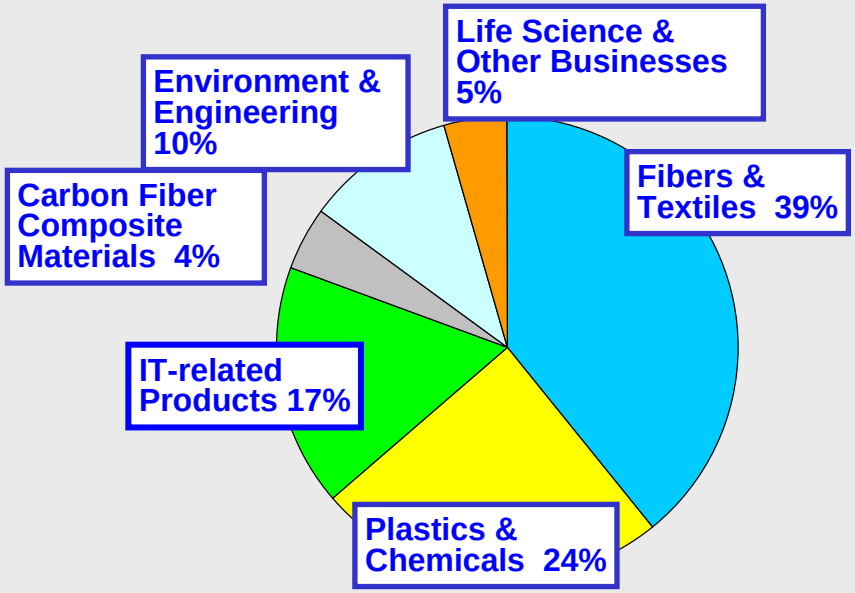
–Focus on Advanced Materials based on Nanotechnologies–

Koichi Abe
Vice President
General Manager, R&D Division
Toray Industries, Inc.

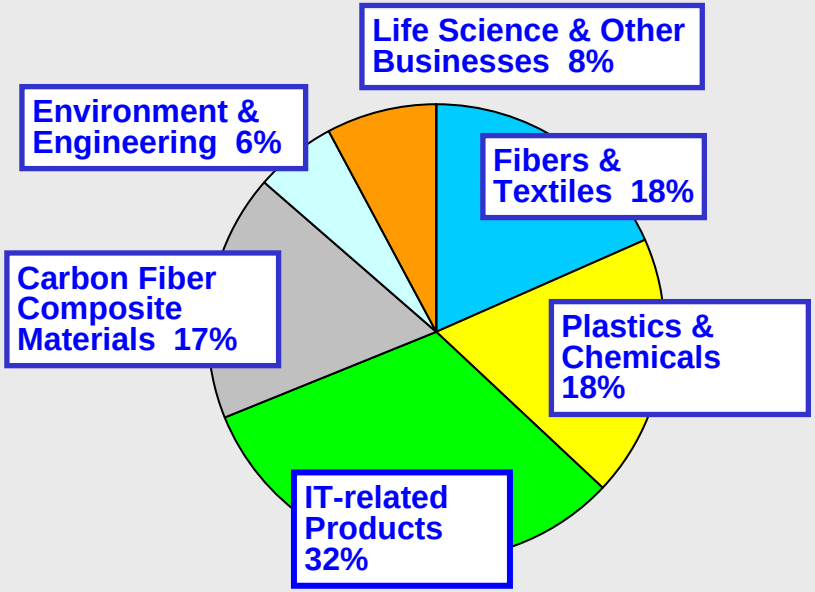
About Toray Group Business

Toray Group is the comprehensive manufacturer, which develop advanced materials by using core technologies such as "Organic Synthetic Chemistry", "Polymer Science", "Nanotechnology" and "Biotechnology" , and have international operations.

Consolidated Net Sales :
¥ 1,546.5 billion (FY Mar/07)



Consolidated Operating Income :
¥ 102.4 billion (FY Mar/07)



Established: Apr. 16, 1926
Consolidated basis: 21 countries & regions, 36,553 employees (as of Mar/2007)

Road Map to IT-2010 and Targets in IT-2010

April 2002

April 2006

Long-term Corporate Vision

Corporate Slogan

CORPORATE BRAND

"TORAY" Innovation by Chemistry

AP-New TORAY 21

AP-Innovation TORAY 21

Mid-term Business Strategies

"NT21"

「Corporate Structure Reinforcement・defensive management postures」

-Breakaway from Crisis -

"NT-Ⅱ"

「Offensive management postures」

-Establish foundation for further growth -

"IT-2010"

「Management based on Innovation and Creation

-Challenges for further growth -

Toward a Global Top Company of Advanced Materials

Goals in and around 2010	Images in and around 2015
Net sales ¥1,800 billion	Net sales ¥2,300 billion
Operating income ¥150 billion	Operating income ¥230 billion
Operating income to net sales ratio 8.3%	Operating income to net sales ratio 10.0%
ROA : 8%	ROA : ≧10%
ROE : 11%	ROE : ≧12%

2002 April	2004 April	2006 October	Around 2010	Around 2015

「IT-2010・R&D Innovation」

NT21 → NT- II → IT-2010

R&D Reform

Advanced Material Businesses Expansion PJ

Innovation of Technologies

- Advanced Material Businesses Expansion PJ
- R&D capabilities innovation PJ
- Manufacturing technology innovation PJ

Progress in Advanced Materials Projects

New optical films, Organic Electro luminescent-related Materials, Chemical Mechanical Polishing Pads, Next-generation high density COF, PLA Film, High-performance DNA Chips etc.

Leap forward

R&D Innovation

"Challenge for Innovative R&D"

Step forward

R&D Reformation - II

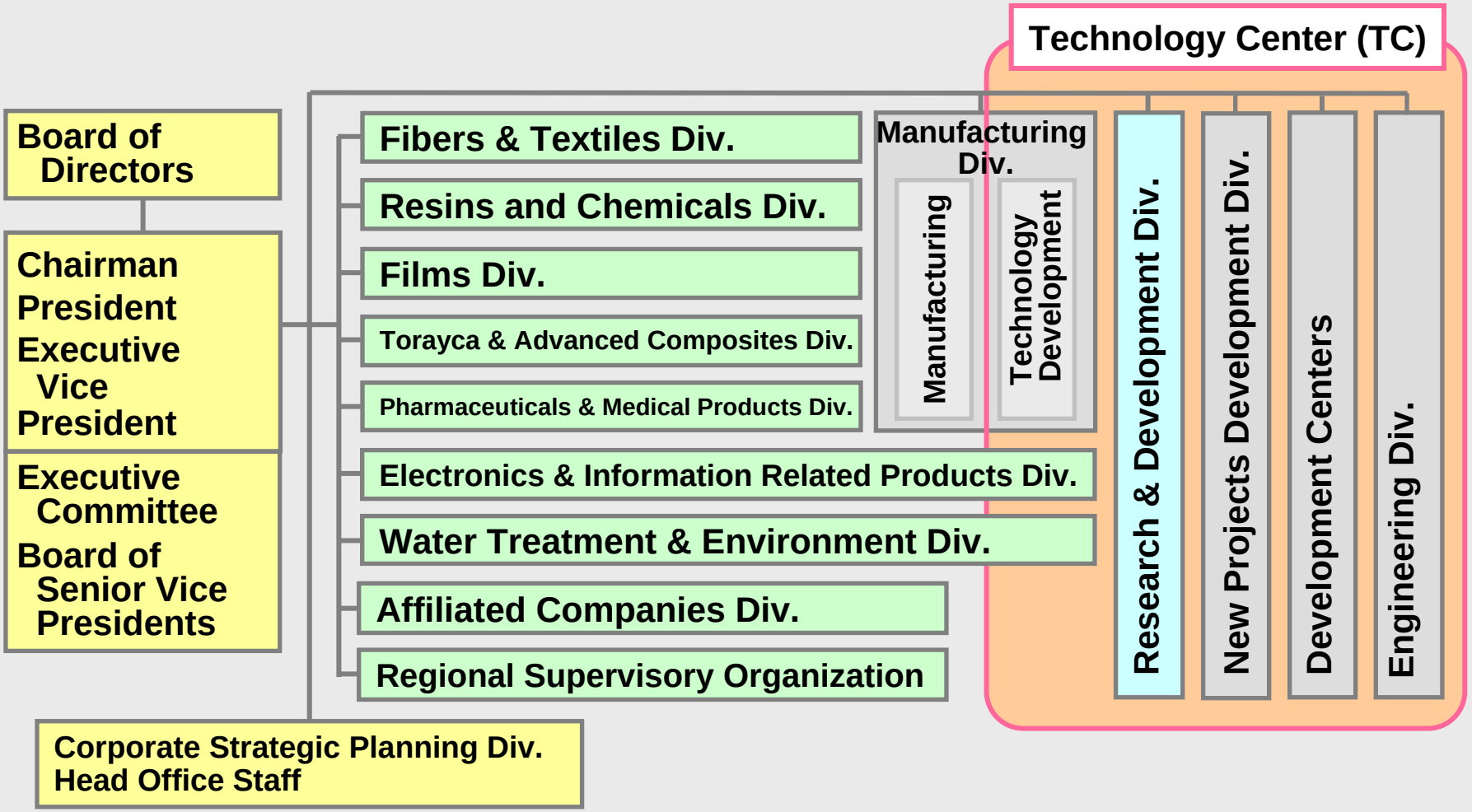
"Strengthen R&D Collaboration & Integration"

R&D Reformation

"Depart from Independent R&D"

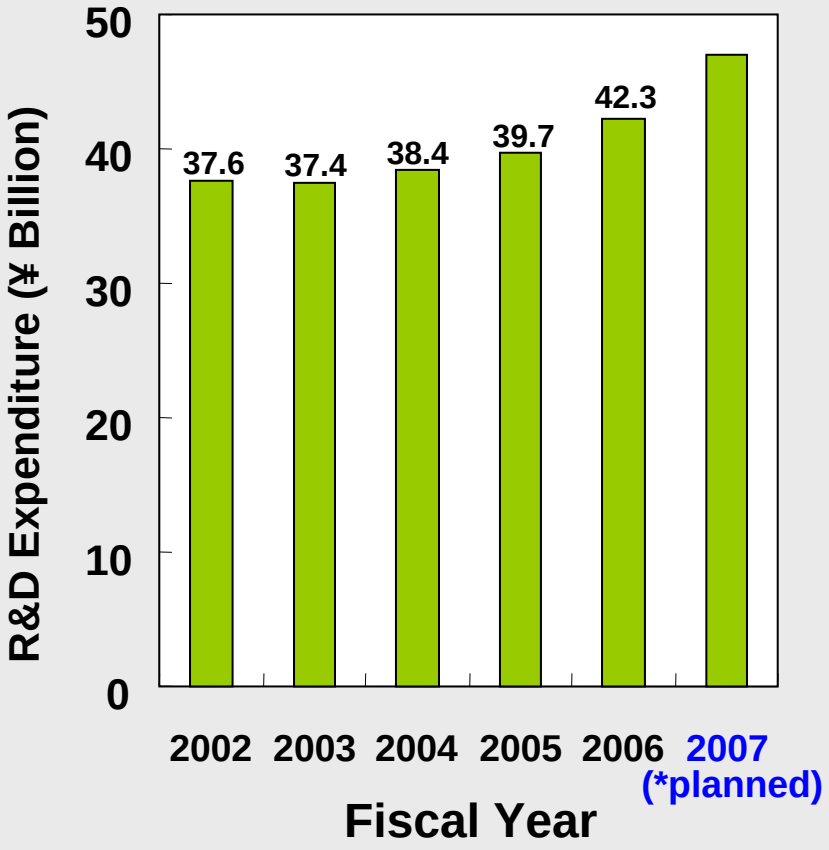
Ⅰ. R&D Strategy

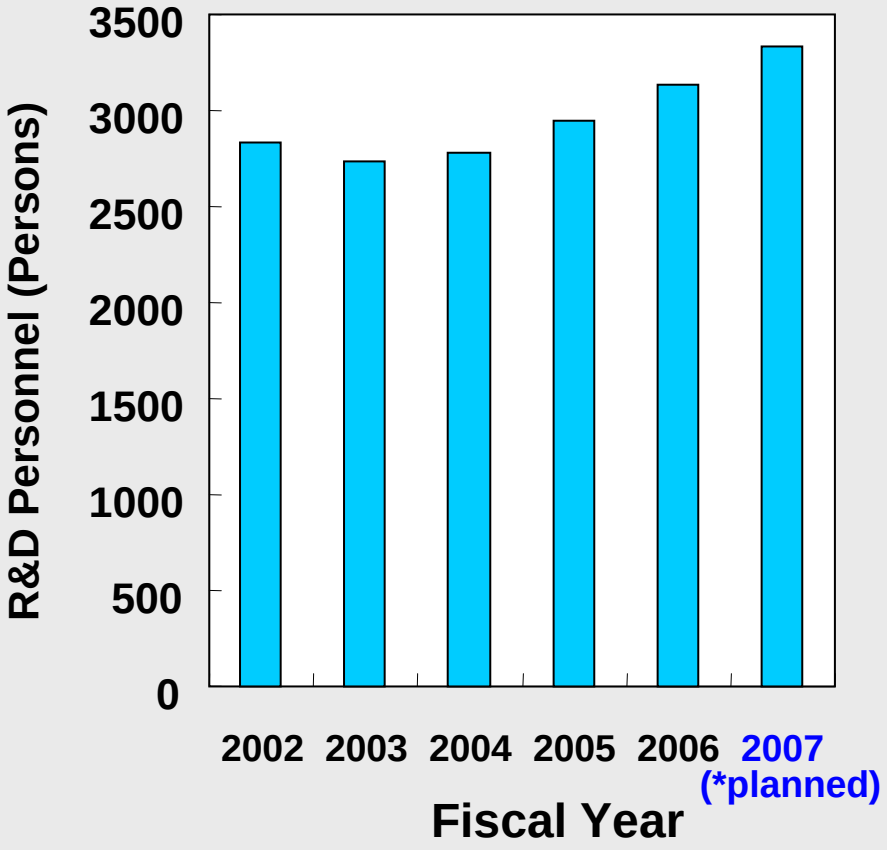
R&D Organization in Toray



★ One of TC functions is deciding corporate R&D strategies and designating TC important projects.
★ The most valuable feature of TC is that it functions as organizing Toray's R&D as one unit, not to be divided into small R&D unit attached to each business unit.

R & D Expenditure & Personnel (consolidated)

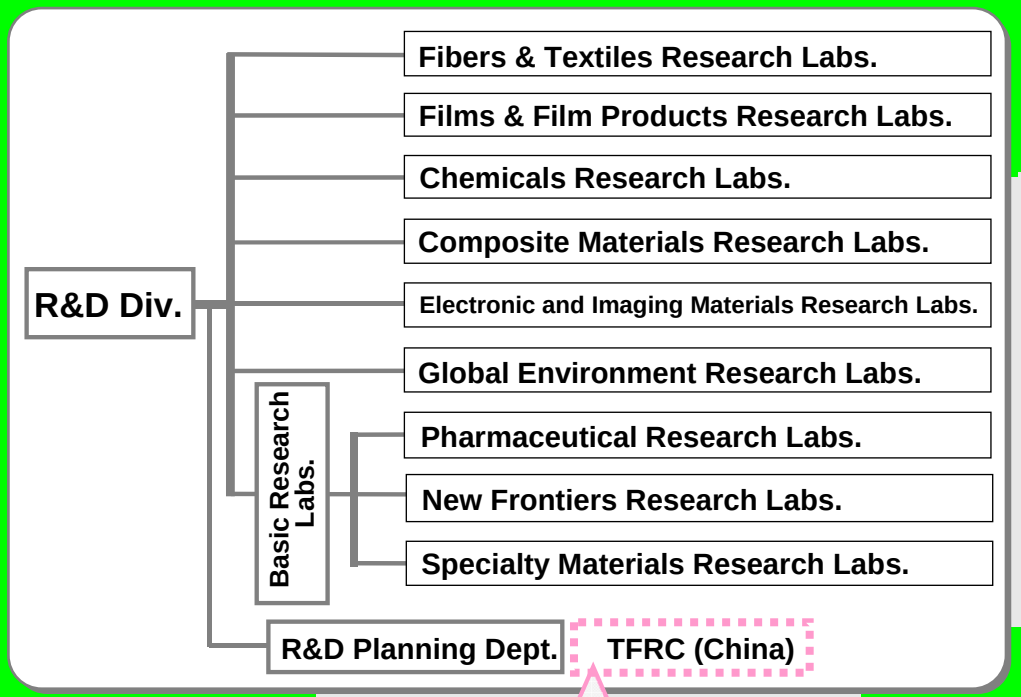




★ R&D Expenditure : ¥ 47 Billion (2007 planned)

★ ¥ 240 Billion of R&D investment planned in 5 years from FY 2006

Organization of R & D Division



Shiga Plant

- Films & Films Products Research Labs.
- Electronic & Imaging Materials Research Labs.
- Global Environment Research Labs.
- [Basic Research Labs.] Specialty Materials Research Labs.
- R&D Planning Dept.

Tokyo Head Office

- R&D Planning Dept.
- Corporate Planning Dept.

Kamakura

- [Basic Research Labs.] Pharmaceuticals Research Labs.
- New Frontiers Research Labs.

Mishima Plant

- Fibers & Textiles Research Labs.

Nagoya Plant

- Chemicals Research Labs.

Ehime Plant

- Composite Materials Research Labs.

Nantong

- Polymers and Fibers R&D Dept.
- Water Treatment Research Labs.

Shanghai

- Polymer Materials Research Labs.
- Water Treatment Research Labs.

Strengthening R&D Activities in China

TFRC：Toray Fibers & Textiles Research Laboratories (China) Co., Ltd.

Basic Concept

- R&D meshed seamlessly with Toray (Japan)
- R&D activity by high-level Chinese researchers
- Promoting collaborations with Chinese universities and government research laboratories
  → utilizing open labs (Shanghai Jiao Tong University, etc.)
- R&D and technical support for Toray's businesses in China
- Developing of global R&D human resources

Personnel Plan (TFRC)

March/02：10 (Established)
July/07 ：~ 210
↓
Mar/08 ：~ 260

Organization

TFRC
Chairman
President

Nantong R&D Center
- Textiles R&D Dept.
  - ◆ Polymerization Research of Polyester
  - ◆ R&D of Fibers

Nantong R&D Center
(Established Mar/02)
(Expanded May/05)
(Expanded Oct/07)

Shanghai Branch Labs.
- Polymer Materials Research Lab.
  - ◆ Research for polymer advanced materials
  - ◆ Research for electronics related materials & Pharmaceutical
- Water Treatment Research Lab.
  - ◆ R&D of Water treatment technology
  - ◆ Technical support for Toray's businesses in China

Shanghai Branch Labs.
(Established Oct/04)

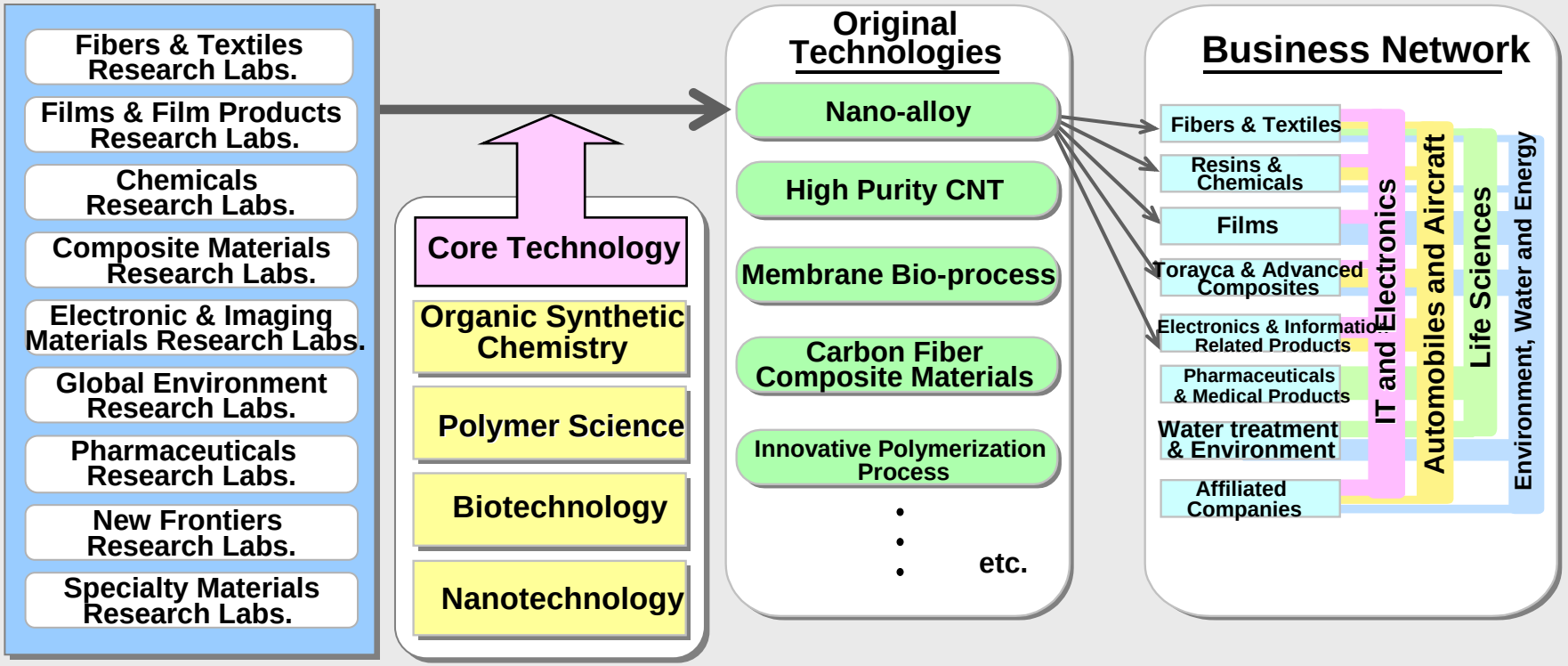
Expanded Oct/07

Toray R&D Strengths

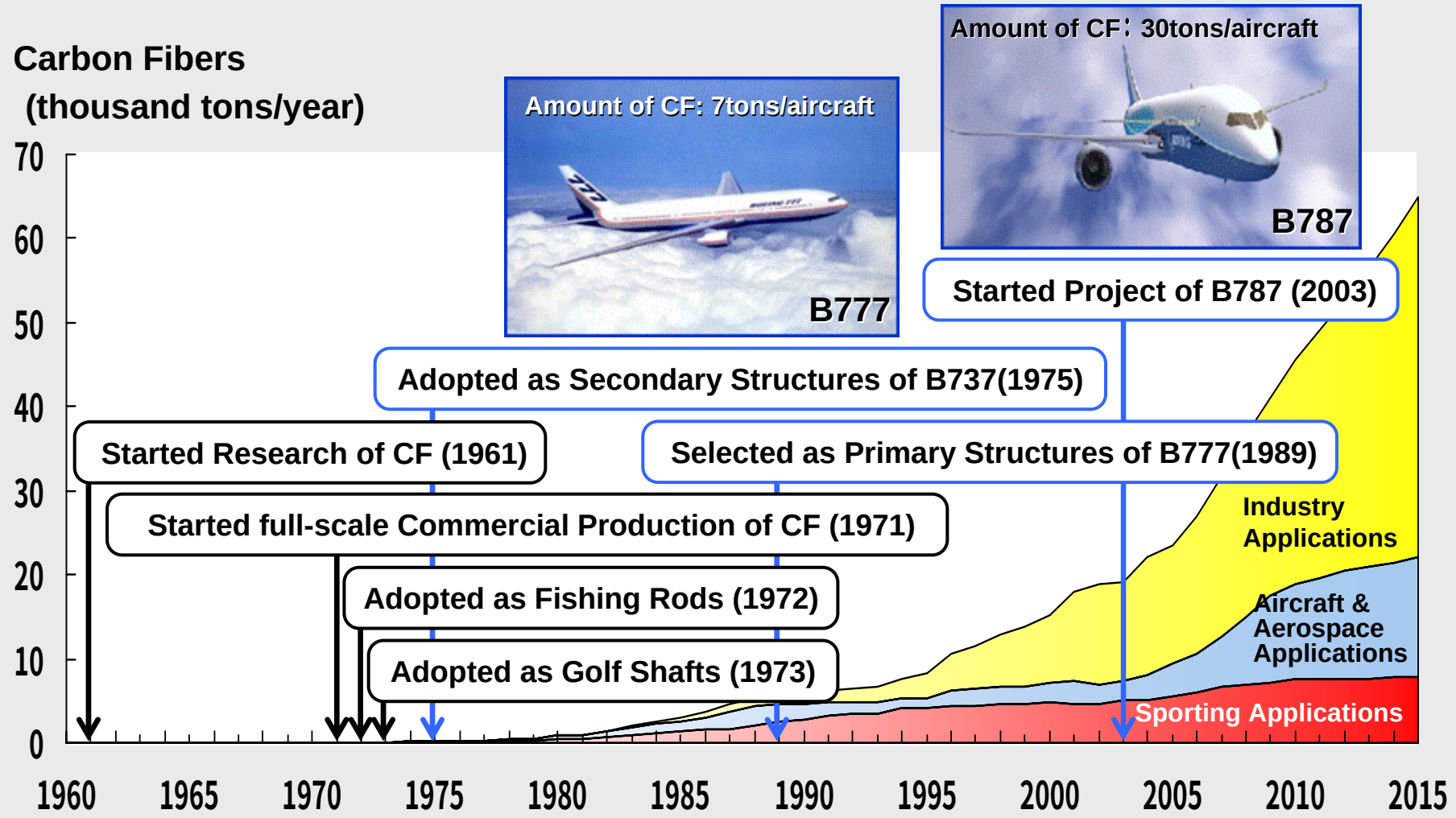
Advantages

1. Culture and history that create innovative technologies : *Attach importance to Basic Research*
2. Various kinds of specialists groups in many fields
3. Unified R&D structure
4. Leading company in academia/industry / government collaboration
5. Advanced analytical capabilities : TRC

Technology Integration



Basic Research has changed the World



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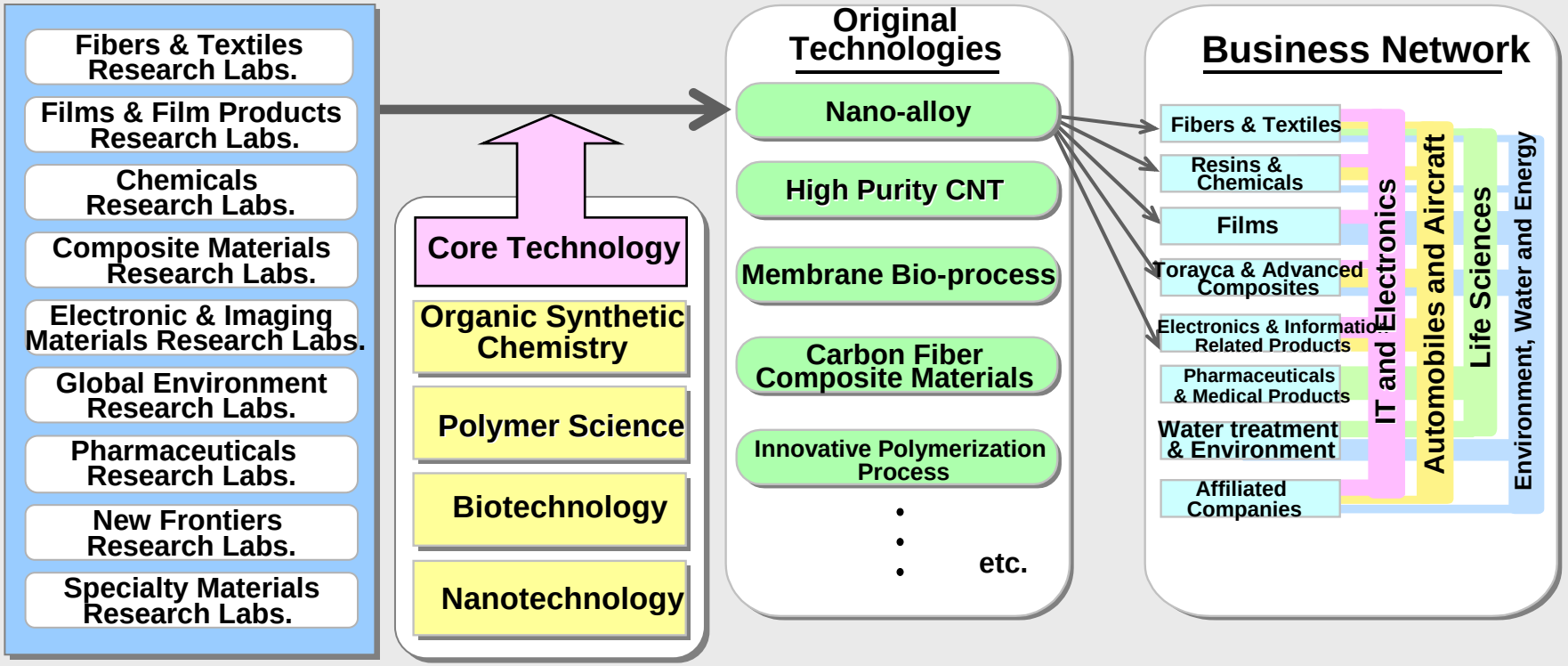
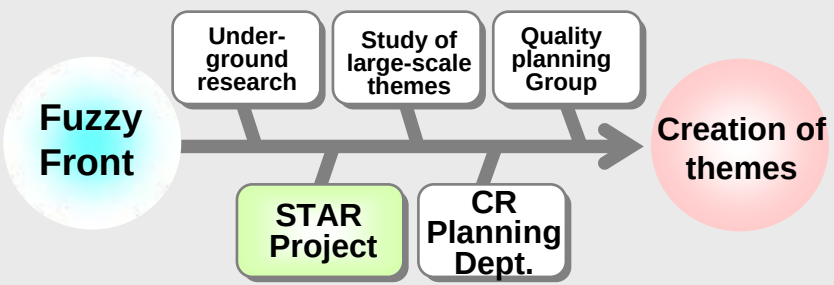
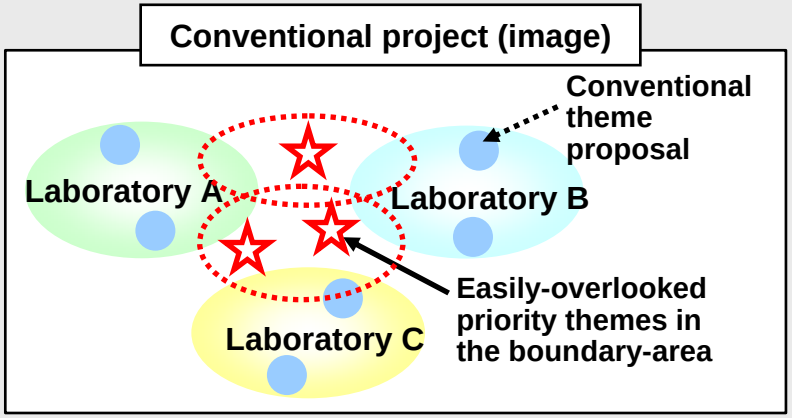


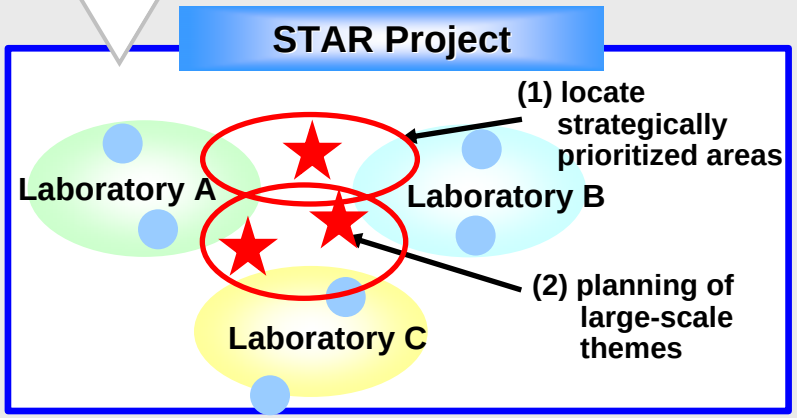
Fusion Theme Planning Project (STAR Project)



STAR Project

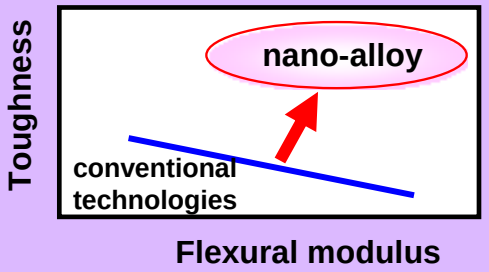
- Locate strategically prioritized areas
- Cooperate among laboratories from the planning stage of the themes
- Promote WG activities consisted of experts of each laboratory





Example of Achievements :
epoxy nano-alloy for composite materials

Nano-alloy technologies (Chemicals Research Laboratories) **X** CFRP technologies (Composite Materials Research Laboratories) →



★Potentially applicable to wide-ranging areas including weight-saving of aircraft, crash safety of automobiles, impact resistance, and vibration absorption characteristics.

Toray R&D Strengths

Advantages

1. Culture and history that create innovative technologies : *Attach importance to Basic Research*
2. Various kinds of specialists groups in many fields
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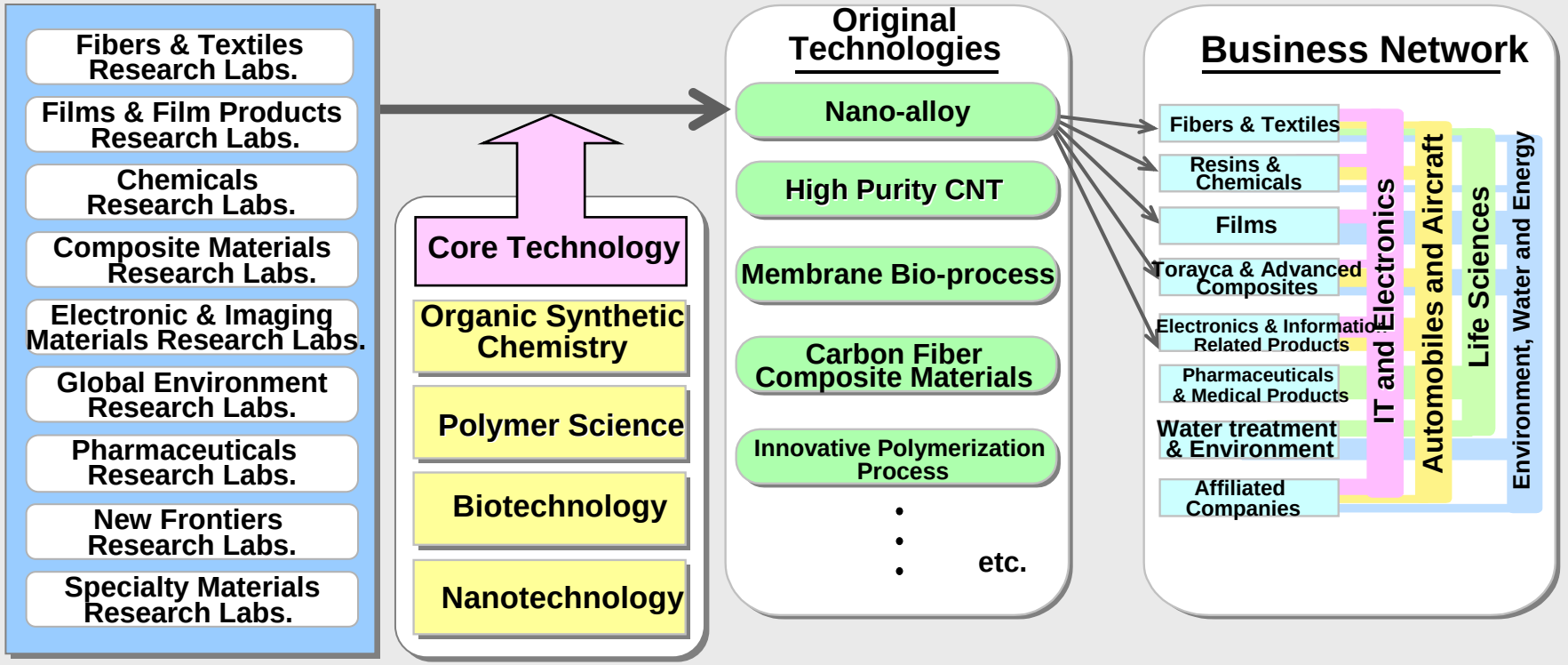
4. Leading company in academia/industry / government collaboration
5. Advanced analytical capabilities : TRC

Technology Integration



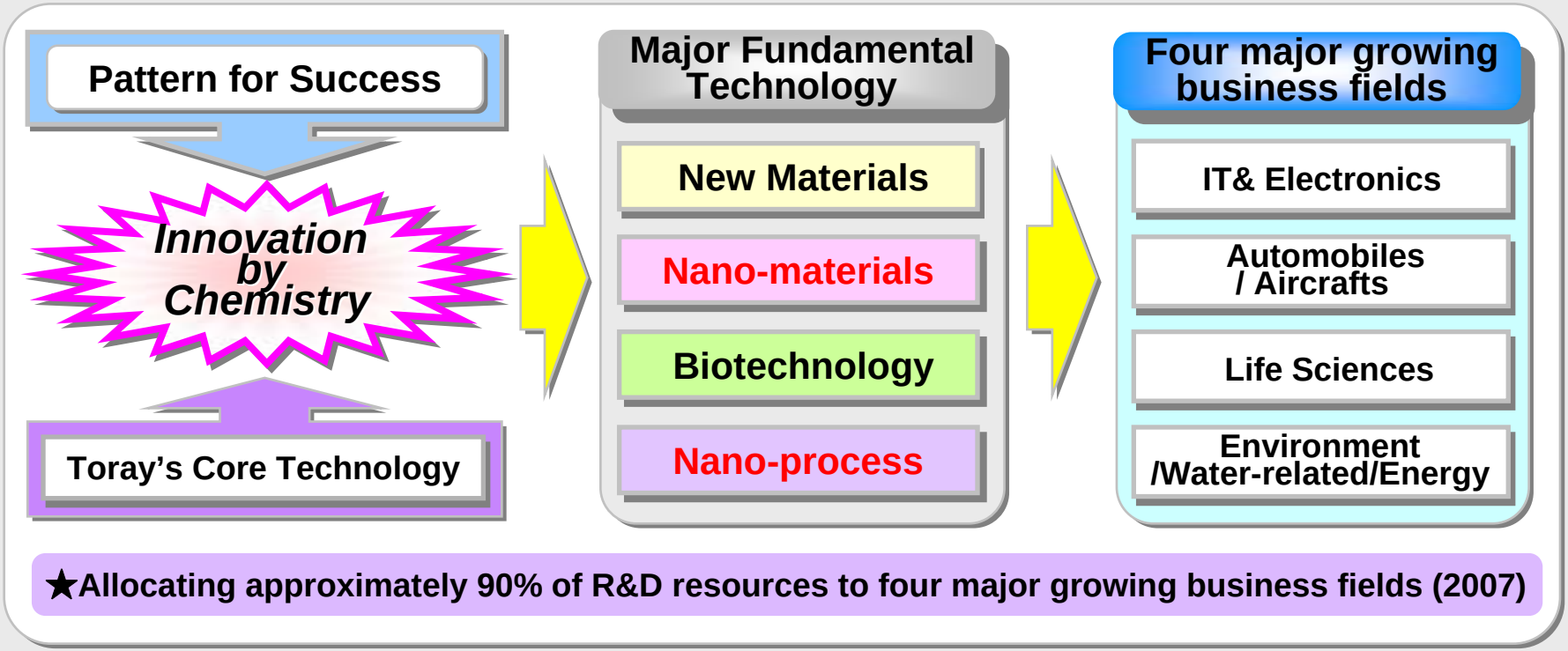
Toray Research Center (TRC)

Guiding principle：	Contributing to the industrial world through advanced technologies
Corporate mottoes：	To provide advanced and reliable technology and to strictly observe complete confidentiality (Technology & Trust)
Business contents：	Contract research on analysis and materials evaluation, Technical surveys, Contract research and development
Establishment：	1978,Jun. (Number of employee：500 (2006)

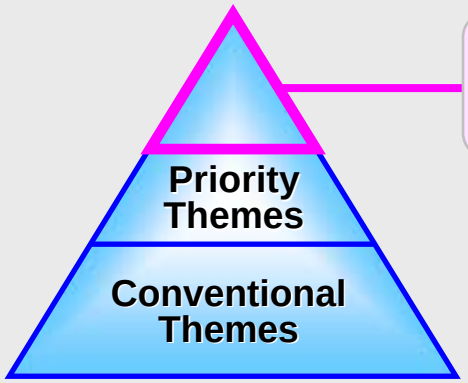
TRC's Proven and Comprehensive Technological Expertise

- Chemical Structure Analysis
- Surface Analysis
- Organic Analysis
- Materials Characterization and Evaluation
- Morphological Studies
- Pharmaceutical and Life Sciences
- Inorganic Analysis
- Environmental Analysis and Energy
- Contract Research Services
- Publication of Research Reports

Toray's Challenge for Technology Innovation



★Allocating approximately 90% of R&D resources to four major growing business fields (2007)



APEX 40

Allocate R&D resources to APEX 40 (top priority 40 themes)

Ⅱ. Toray's R & D Strategy

Toray Nanotech commercial message (on the air in Japan from October 2007)

Toray nanotech R&D is the source of keen interest and anticipation

Toray ranked as top company to watch in nanotech field!

■ Nihon Keizai *Shimbun* newspaper
"Companies to Watch This Year" survey, 2005

Ranking	Name	Votes
1	Toray Industries, Inc.	142
2	Toyota Motor Corporation	84
3	Mitsubishi Chemical Corporation	75
4	Hitachi, Ltd.	69
5	NEC Corporation	65
	Canon, Inc.	
	Showa Denko K.K.	
8	Shin-Etsu Chemical Co., Ltd.	47
9	Toshiba Corporation	45
10	Matsushita Electric Industrial	43
	Asahi Kasei Corporation	
	Toyota Central R&D Labs, Inc.	

■ Nikkei Nano Business magazine
"Companies to Watch This Year" survey, 2007

Ranking	Name	Votes
1	Toray Industries, Inc.	36
2	Mitsubishi Chemical Corporation	17
3	Toyota Central R&D Labs, Inc.	15
4	Canon, Inc.	13
	Asahi Kasei Corporation	
6	FUJIFILM Corporation	11
7	Teijin Limited	10
8	Hitachi, Ltd.	9
9	Shin-Etsu Chemical Co., Ltd.	8
	Kao Corporation	
	Olympus Corporation	
	JSR Corporation	

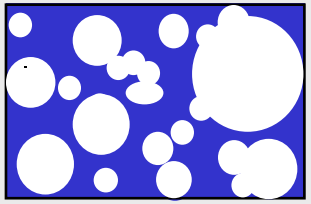
Based on the motto that, "Innovative Products Only Come with Innovative Materials", Toray has utilized chemistry as the focus of its pursuit of technological innovation, integrated with nanotech and other Toray core technologies to spearhead the challenge into the creation of advanced materials.

Polymer Alloy／Nano-alloy

Polymer A + Polymer B

Polymer Design
Compatibilizer Design
+
Nano-dispersing Technology

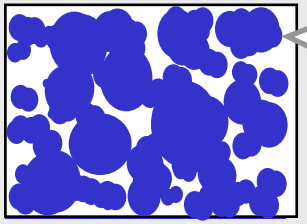
Conventional Alloy

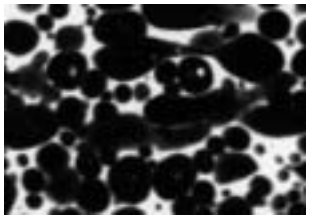


High impact PA
High impact PBT
High impact PPS

Transmission Electron Microscope photo (cross section of polymer)

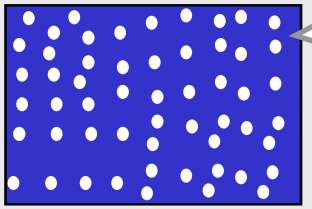
Phase-inversed Alloy





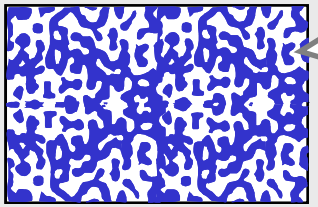
Low water absorption PA

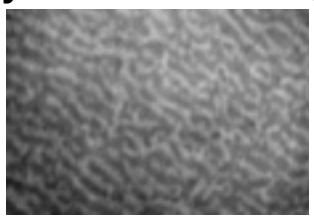
Nano-dispersed Alloy



High thermal resistant PLA
High thermal resistant PET
Flexible PLA

Nano-co-continuous Alloy





High chemical resistant PET
Innovative PBT／PC

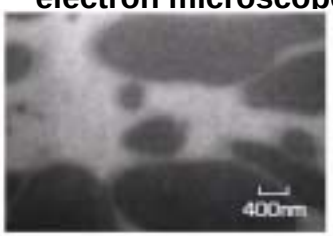
Nano-co-continuous Alloy

We created the new technology for the first time, using the nanotech field, which combines two different types of polymers (into alloys), while bringing out the outstanding properties of both polymers. We started to market nano-alloys for use in automobile parts, electrical and electronic components and other injection molding applications, developing transparent sheets, decorative film and other new applications. This technology is also being applied to polylactide alloys, taking advantage of these inherent properties for moving into electrical and electronic fields in which it was difficult to put conventional polylactide to work.

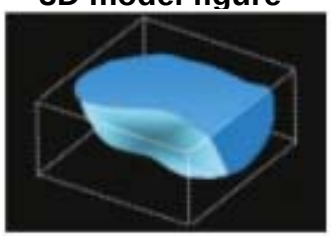
Nano-ally Structure

Conventional alloy

Transmission electron microscope

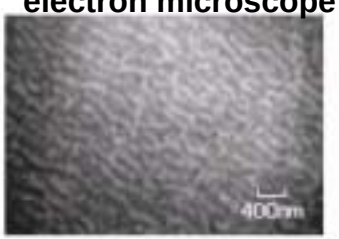


3D model figure

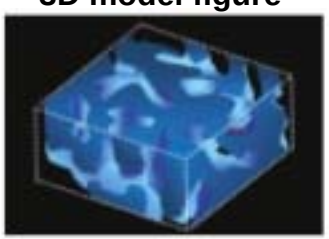


Nano-alloy

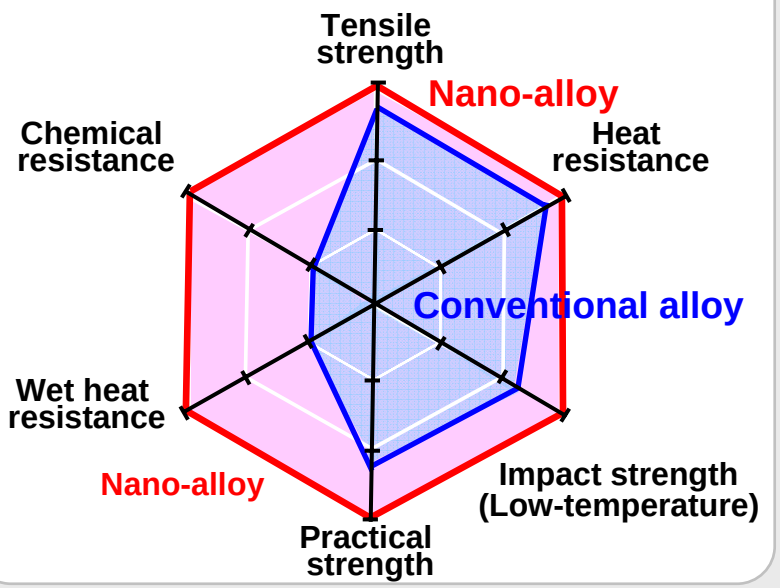
Transmission electron microscope



3D model figure



Performance Comparison

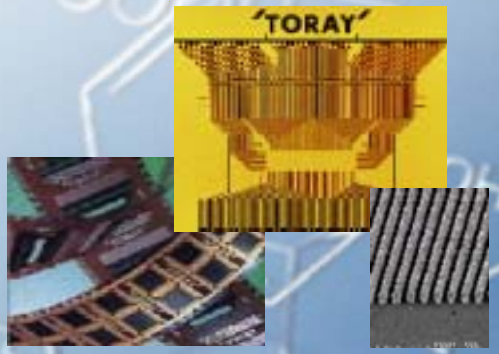


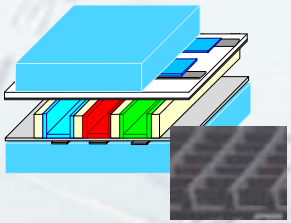
Applications

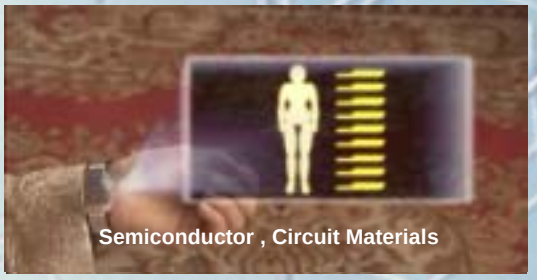
- **Injection molding items:** Balance competing properties for high impact resistance of PC and high chemical resistance of PBT.
- **Films, sheets:** Balance competing properties for the high transparency of PC and high chemical resistance of PBT.

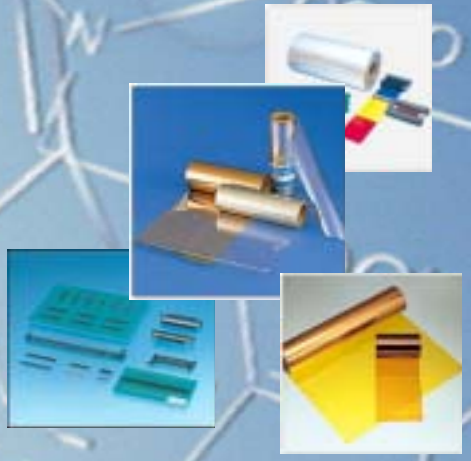
Topics of Advanced Materials

Information/Telecommunications/Electronics



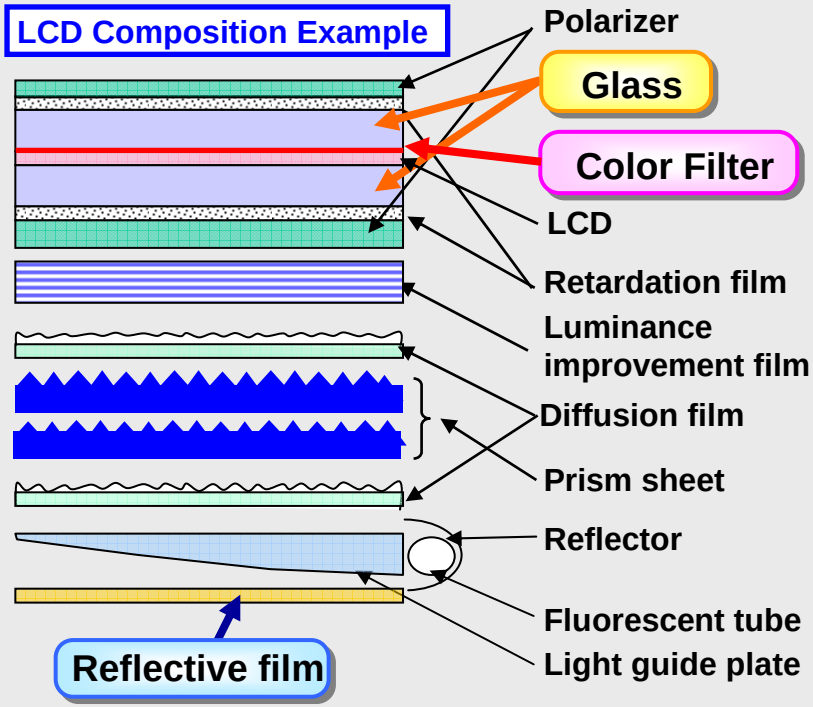






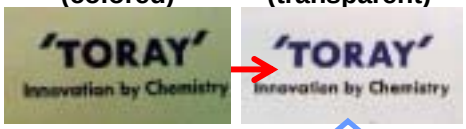
Display Materials (LCD)

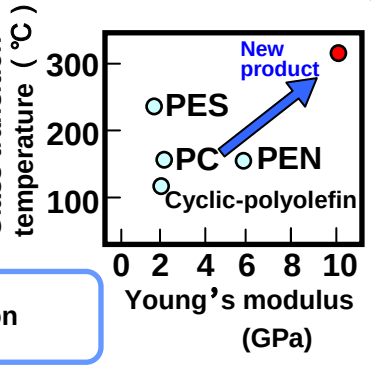
LCD Composition Example



Colorless aramid film

Existing film (colored) → New product (transparent)





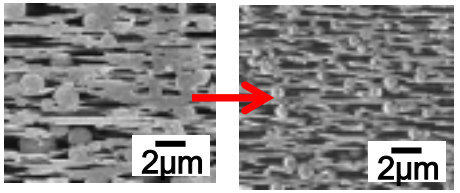
- heat resistance : > 300℃
- coefficient of thermal expansion : similar to glass

	PC	PES	Colorless aramid
Colorless and transparency	○	△	○
Heat resistance	×	△	○
Strength	△	△	○
coefficient of thermal expansion	×	△	○
Moisture absorption	○	○	△

PC : polycarbonate PES : polyethersulfone

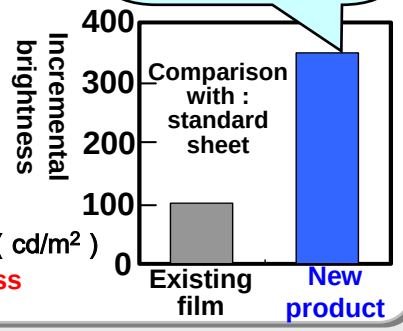
High-performance reflective film

Toray existing film (PET + olefin) → New product



Super-fine olefin dispersion
→realized world-class brightness

Nano-alloy PET + Specific olefin

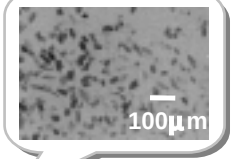


Ink-jet LCF

Toray Group's all-out efforts

material (Toray)

Ink-jet head



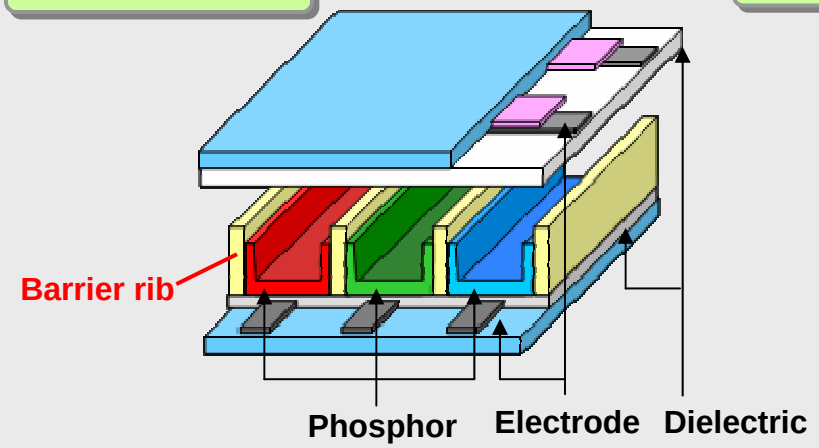
Ink-repulsive black matrix

equipment (TEK)

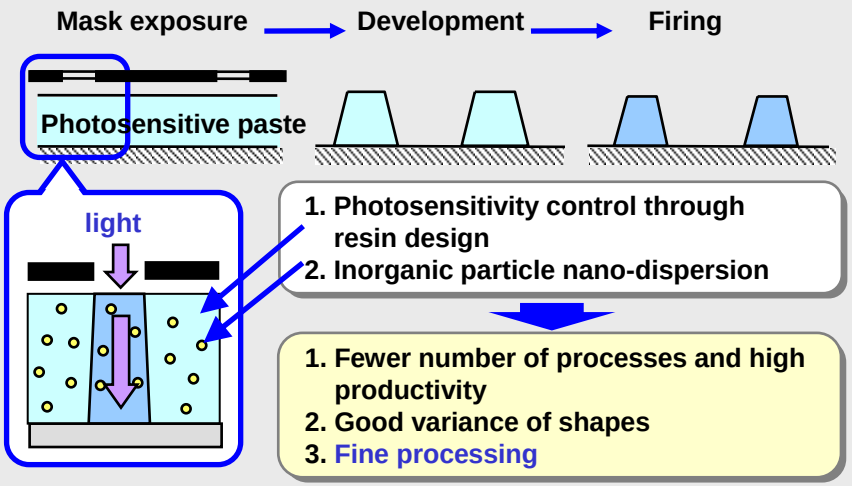
- nozzle
- coating method
- equipment design

Display Materials (PDP)

PDP Structure



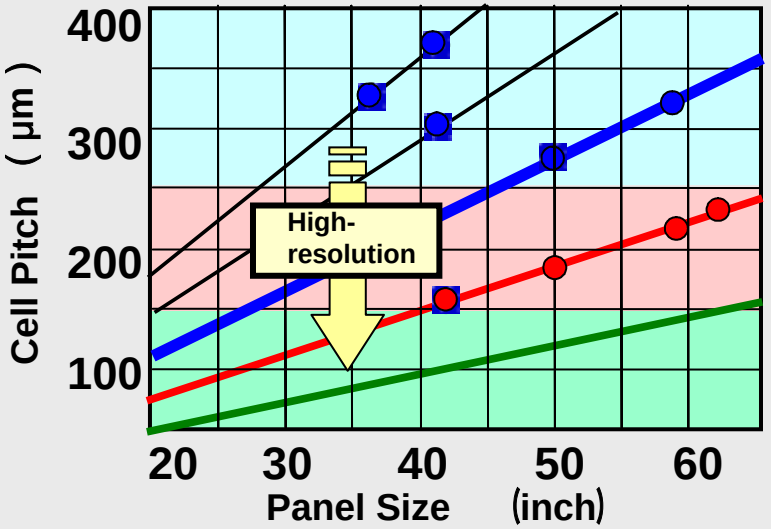
Toray Photosensitive Paste Barrier Ribs Formation Technology



1. Photosensitivity control through resin design
2. Inorganic particle nano-dispersion

1. Fewer number of processes and high productivity
2. Good variance of shapes
3. Fine processing

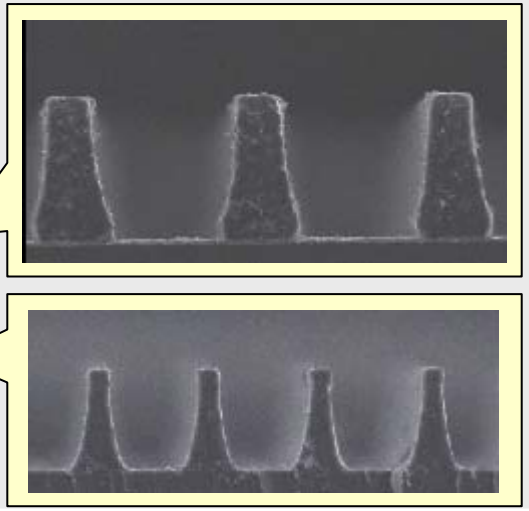
Development of Barrier Rib Materials for Ultra-fine PDP



W-VGA、W-XGA
(400,000~1 million pixel)

Full HD
(2 million pixel)

4k2k*
(8 million pixel)

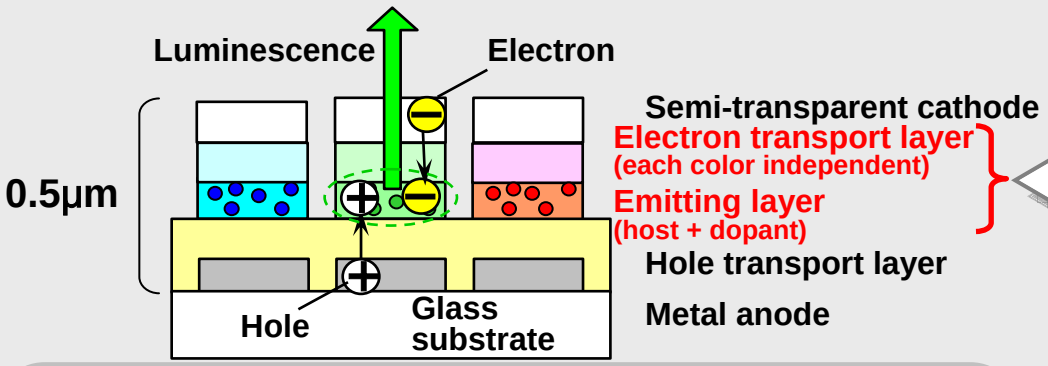


* corresponding to next generation TV

★Explore possibilities for the development of other electronic component applications

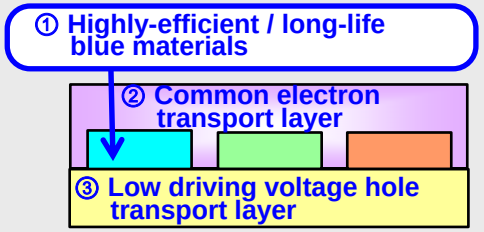
Display Materials (Organic LED)

Organic LED Structure and Toray-developed Materials



- Technological integration of organic synthetics and nano-tech (nano-dispersion technology)
- Red light emissive materials : industry leader in color purity / luminescent efficiency = (Host + Dopant)
- Electron transport materials : industry leader with low driving voltage (power-saving)

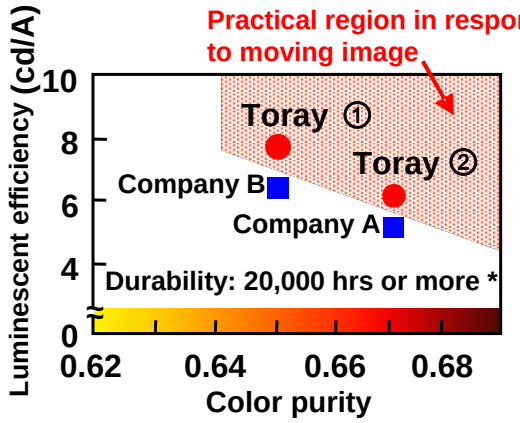
Deepening of technology



Promote de facto standard through the development of materials ①•②•③

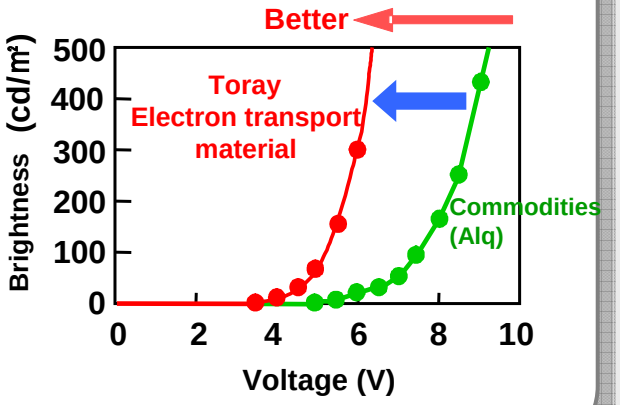
★ Aim to be a comprehensive organic LED material manufacturer (market size of 2011 : 30 billion yen)

Comparison of luminescent performance



* under 1000cd/m²

Low driving voltage effect



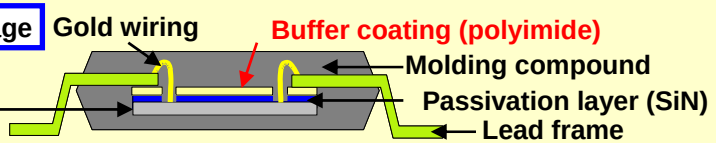
Alq: aluminum complex

Deepening and Expansion of Polyimide-coating Materials

Polymer Design Coating

PI: polyimide

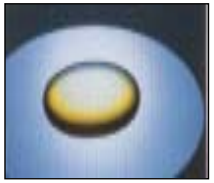
Cross-section of IC package



Non-photosensitive PI

1981~

SEMICOFINE*

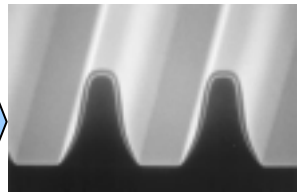


Coating for Semiconductor

Photosensitize + Alkaline developable

Positive-tone photosensitive PI

2000~



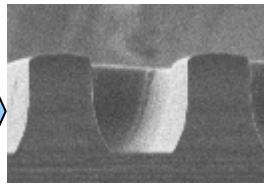
- high-sensitivity high dimensional accuracy → high resolution (5μm)
- outstanding chemical resistance
- high adhesion

World market leader (DRAM half pitch <90nm)

Low temperature processing + Thick coating

Corresponding to next generation

2007~



- low cure temperature (below 200℃)
- thick coating applicable
- low shrinkage
- high adhesion

Under evaluation by world major IC manufacturers
(aim for over 50% market share)

Photo-sensitize

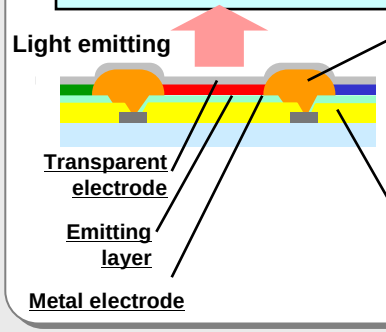
Negative-tone photosensitive PI

1981~

- thick coating applicable
- resolution 10μm

Thinner layer

Development of OLED applications



Insulator

Active type → ~100%

Passive type → about 60%

Planarization layer

new material →accepted

2004~

- low outgass
- low taper angle

- outstanding planarity
- transparent

★ Expected sales of polyimide coating materials : over 10 billion yen (2010)

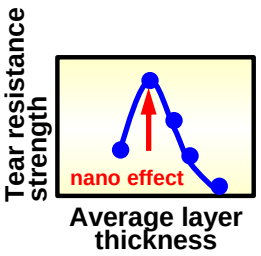
New Electronics

Deepening and Expansion of Nano-multilayer Technologies

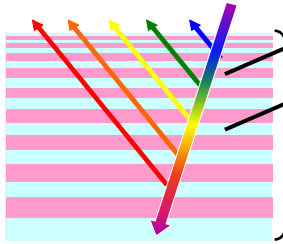
Objective Development of innovative films with multilayer laminate technologies

Technology Expand application through the advancement of multilayer laminate technologies

High-precision multi-layer laminates — Security films



Slant multi-layer laminates — Metal-free metallic luster film



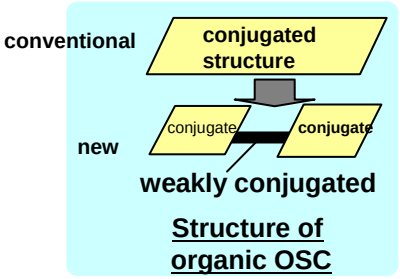
Further deepening… — Film for optical communication (optical waveguide *)

※This research is partially aided by NEDO (New Energy and Industrial Technology Development Organization).

Organic Transistor Materials

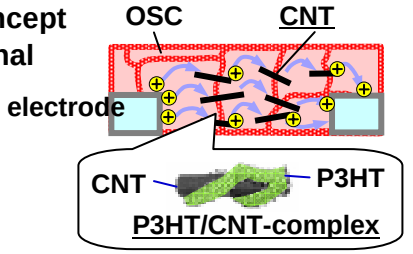
Objective Development of organic transistor materials having high performances comparable to amorphous silicon (target : mobility more than 1cm²/Vs)

Technology



High mobility organic transistor materials by the use of organic semiconductor (OSC) and CNT-complex

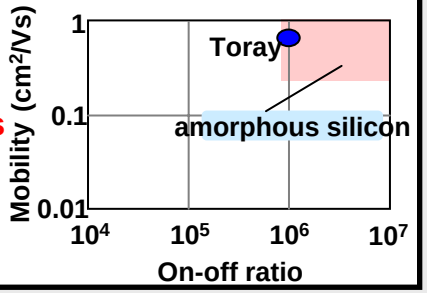
(1) Organic Semiconductors :
- unique molecular design / synthesis based on new concept
- high solubility to conventional solvents (printable)



(2) CNT dispersion :
- CNT-complex can be easily dispersed into OSC solution

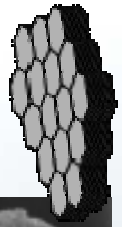
Current status

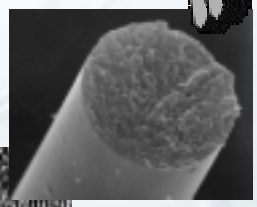
- Mobility more than 0.5cm²/Vs achieved by using CNT -complex and newly developed OSC

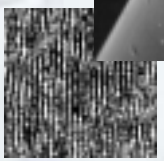


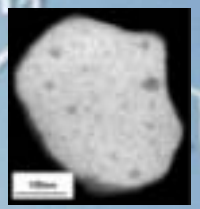
Topics of Advanced Materials

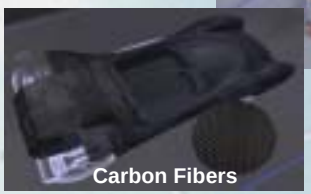
Automobiles & Aircrafts

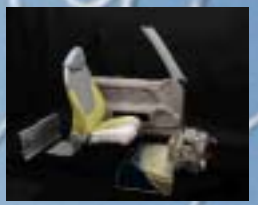












Automotive & Aircraft Center

In Nagoya Plant, Toray will create "A&A Center (Automotive & Aircraft Center)", an integrated technological development base for automobile and aircraft applications. As the first step, Toray will establish "Automotive Center (AMC)" for the development of technologies for automobile applications.


Rendering of AMC

"Automotive Center (AMC)"
will be established in June/08


Skelton car model
(Toray Advanced Materials Exhibition)

"Advanced Composite Center (tentative name)" (planned)

"Resin Applications Development Center" (existing)

Toray will reinforce Nagoya Plant as an integrated technological development base of advanced materials applicable for automobiles and aircraft

Sequentially establish production system for plastic resins, carbon fiber composite materials, and high performance chemical products for automobile and aircraft applications

★Sales of the automobile application business:
FY2006 actual: ¥124 billion → FY2015: aim to expand to ¥350 billion

¥20 billion of capital expenditures

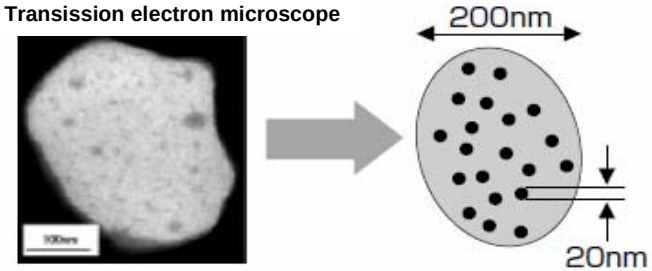
Impact-absorbing Nano-alloy Plastics for Automobiles

Under the "Project on Nano-structured Polymeric Materials" of NEDO, Toray and Professor Inoue Group in Yamagata University co-developed a revolutionary nano-alloy plastic. Normally characterizing as high-performance plastics in terms of strength and rigidity, this impact-absorbing plastic changes its shape like rubbers under fast or powerful impact. As a pioneering material that rewrites the common wisdom on plastic performance, this nano-alloy will pave the way to expansion into totally new applications and fields.

Structure

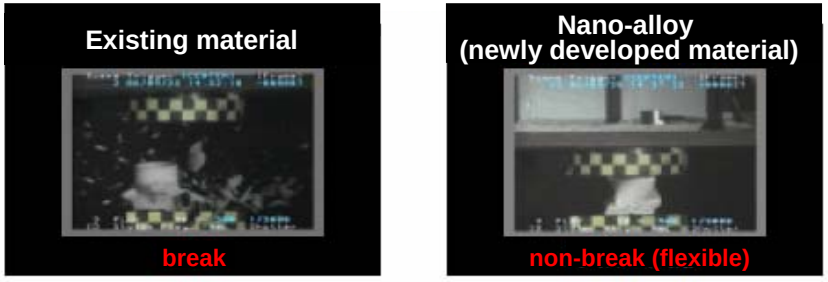
Nano-alloy (newly developed material)

Transission electron microscope



Features

Comparison using high-speed impact testing (JARI)



Applications

Pedestrian protection measure parts : balance competing properties of strength during normal use and impact-absorption upon collision

Electric and electronic components, parts of sporting goods : energy absorbency

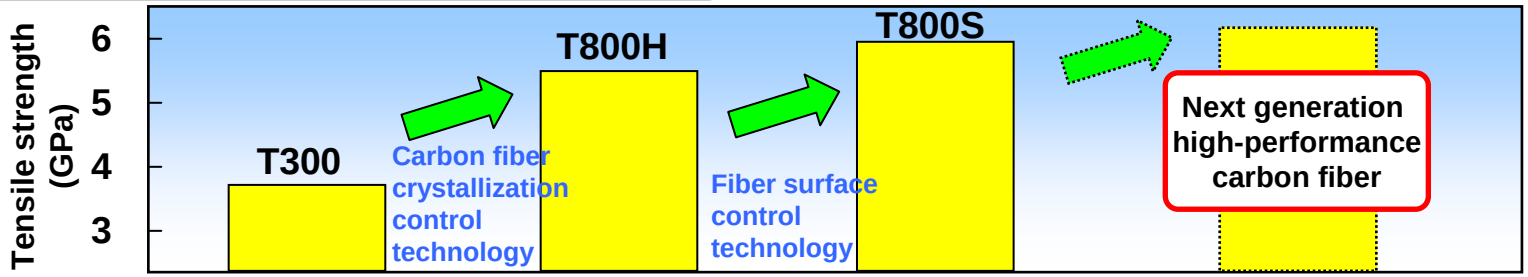
L/D=100 twin-screw extrusion machine
[long retention time by high L/D]

L : screw length, D : screw diameter
co-developed product with Toshiba Machine Co., Ltd. (Yamagata University)

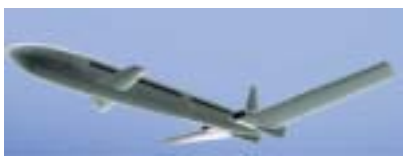
Carbon Fiber (CF)

CF : Carbon Fiber

Performance advances of carbon fiber and development of aircraft applications (e.g. Boeing Co.)

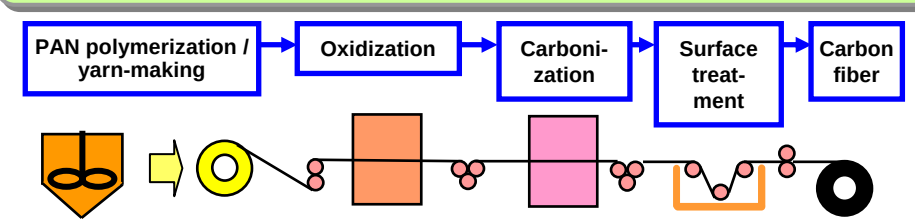


Year to Launch	1982	1996	2008	20XX
Model	B767	B777	B787	
Applied Structure Level	Secondary	Primary / Secondary	Primary / Secondary	
Used CF type	T300H	T800H	T800S	
Amount of CF / aircraft (tons)	1	approx. 7	approx. 30 (estimate)	

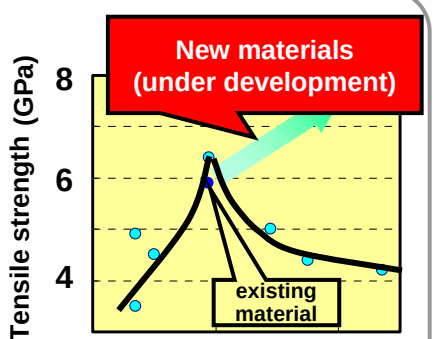


Image

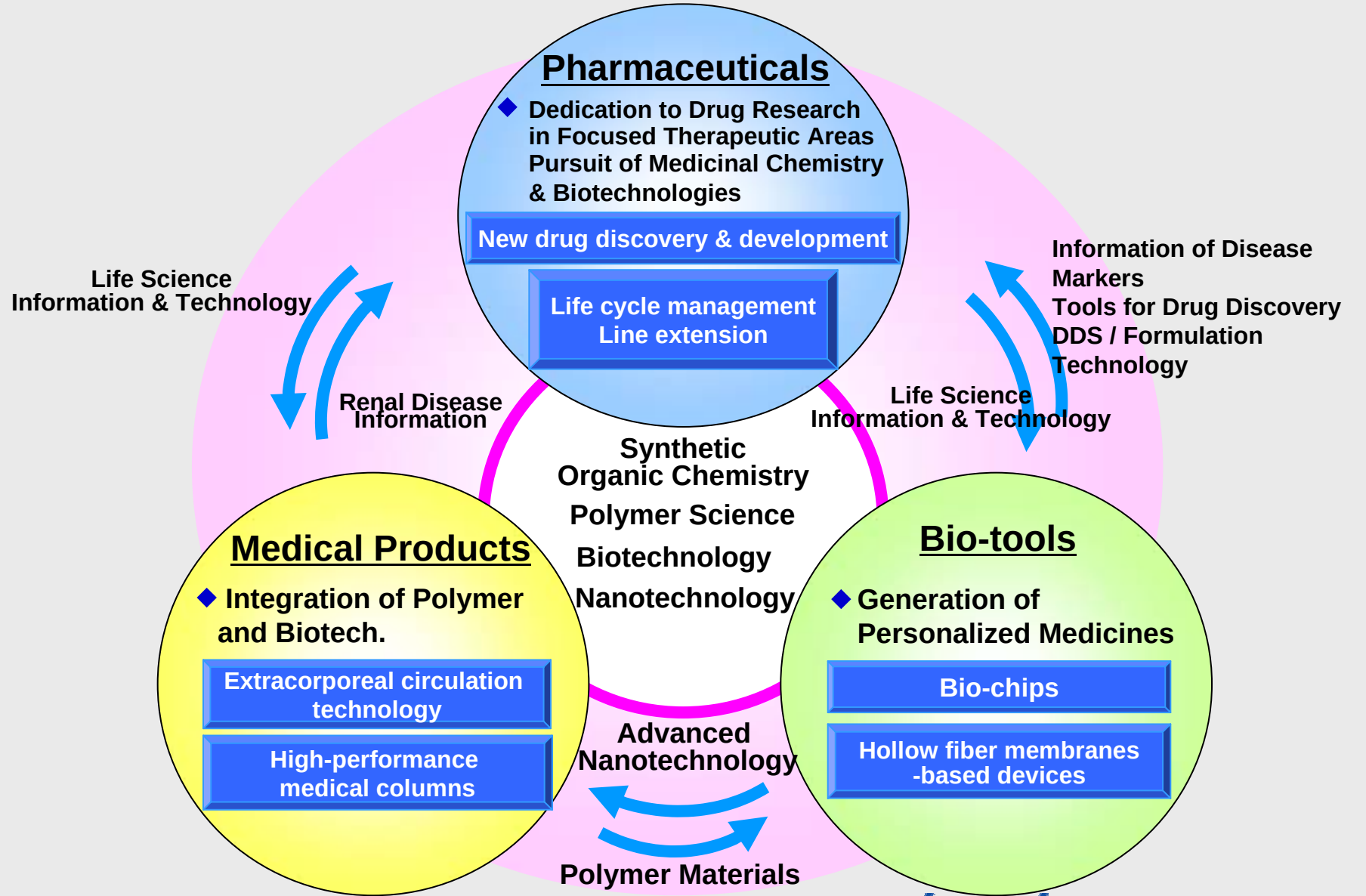
Manufacturing process and fundamental technologies for the pursuit of ultimate properties



Polymer design Fiber structure design control	Defect control Crystalline orientation control	Surface control Sizing agent

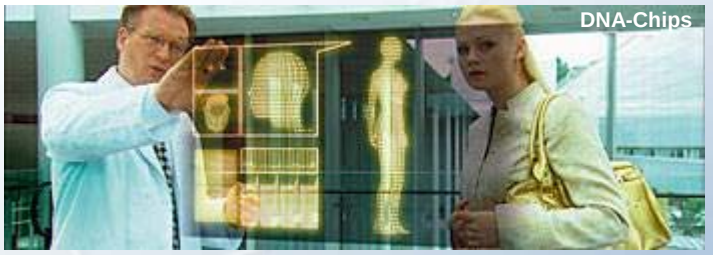


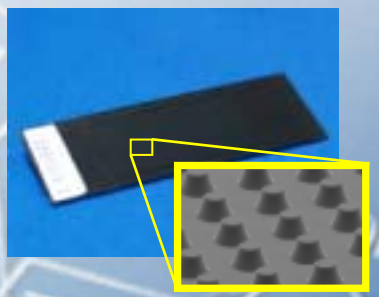
R&D Strategy for Life Science Fields

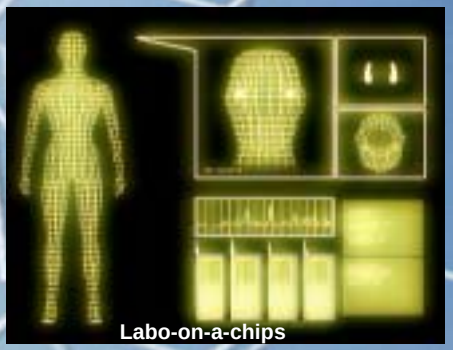


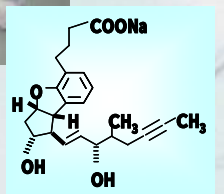
Topics of Advanced Materials

Life Science







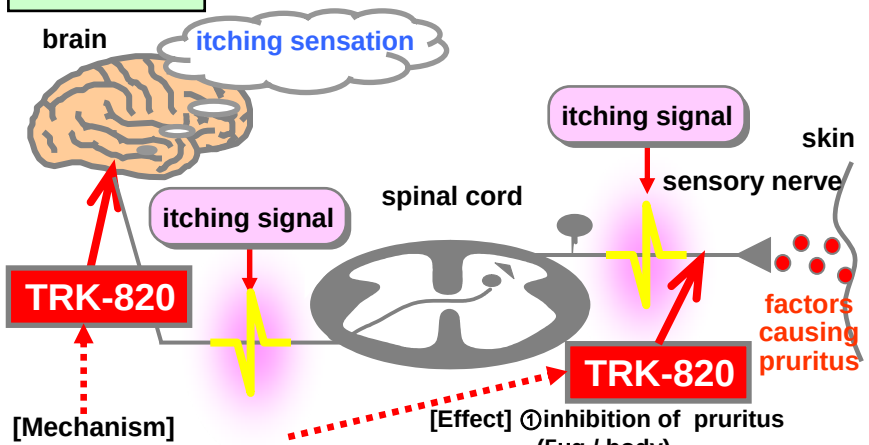


Development of New Drugs

Antipruritic Drug (TRK-820)

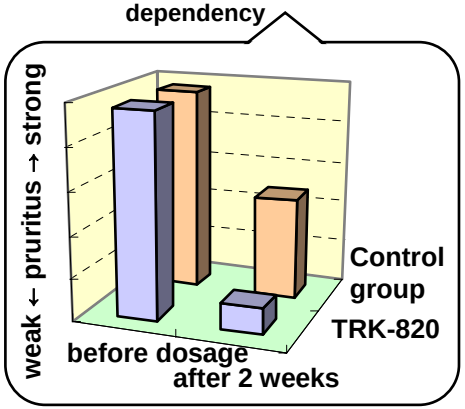
Objective Therapy for intractable pruritus

Technology κ-Opioid agonist



[Mechanism] block the transmittance of itching signal at two places

[Effect] ①inhibition of pruritus (5μg / body) ②no potential to induce dependency



Current status Pre-Registered

- New drug application (Nov, 2006)

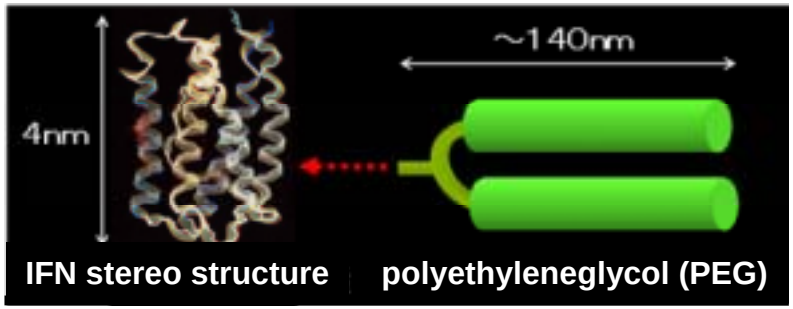
(Toray
Japan Tobacco / Torii Pharmaceutical)

PEGylated Interferon ß

Objective Extension of the effective plasma concentration of interferon (IFN) ß

Technology Integration of biotechnology and synthetic organic chemistry

- PEGylation to the optimum amino acid of IFN ß



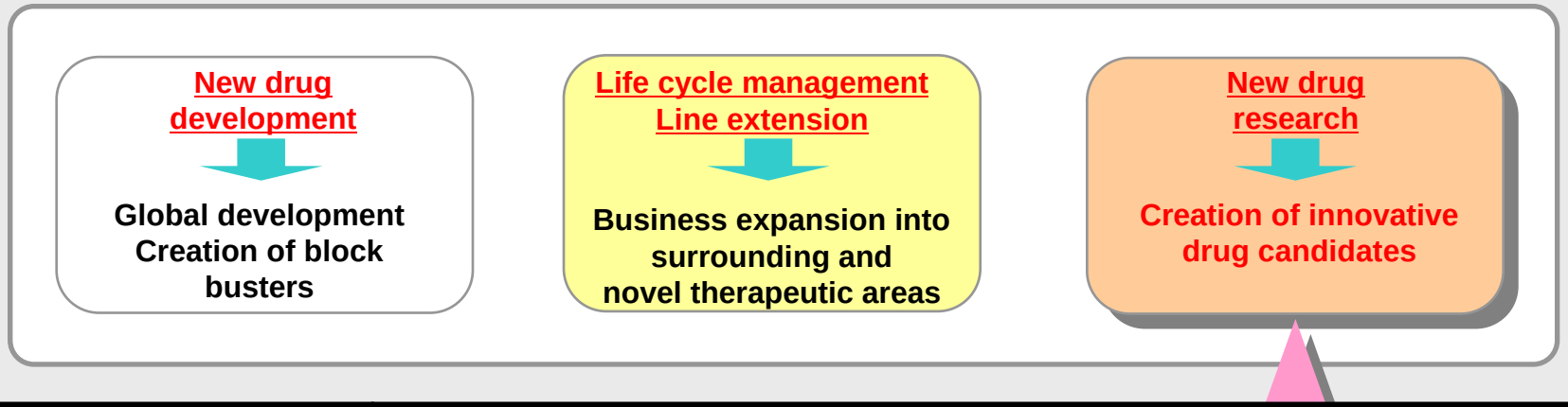
[Effect]
- fewer numbers of doses, high therapeutic effect, extension of the effective plasma concentration
- wide-ranging indications

(clinical study planned to start in 2008)

Effect / IFN type	Therapy-effect: hepatitis	Therapy-effect: multiple sclerosis	Therapy-effect: cancer	Effect duration
IFN-α	○	×	△	×
PEG-IFN-α	◎	×	○	◎
IFN-β	○	○	△	×
Toray PEG-IFN-β*	◎	◎	○	◎

* prediction based on results of animal testing, etc.

New Drug Research Policy



Focused Therapeutic Categories	Technology		Research themes / Characteristics
	MedChem	Biotec	
Neurology (pain / pruritus / urinary frequency)	●		Drugs for urinary frequency, pain relief / antipruritic drug, *etc*. ・utilization of experience / technology in developed drugs (TRK-820 / TRK-130) ・business expansion through innovation of drug formulations (transdermal drug, *etc*.) of existing drugs
Renal Diseases Diabetes	●		Drugs for renal diseases / diabetes ・integration of polymer science and medicinal chemistry ・drug discovery in surrounding therapeutic areas
Immunology (autoimmune disorders / cancers)	●	●	Drugs for inflammatory bowel disease, cancer immunotherapeutic, *etc*. ・utilization of knowledge cultivated through immunity studies of Feron* ・utilization of technology / experience in protein drugs

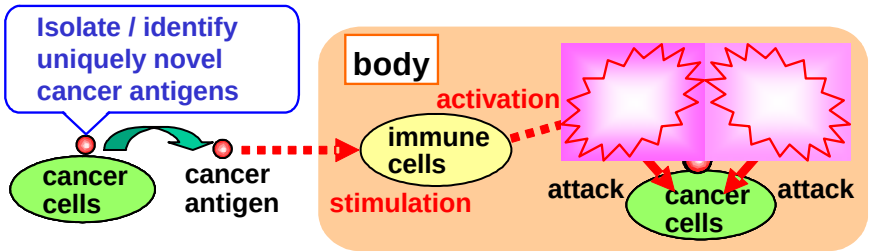
New Drug Research

Cancer Immunotherapeutic

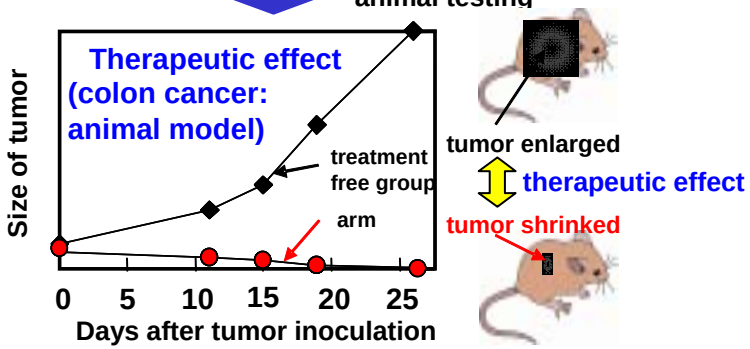
Objectives Develop cutting-edge medical fields / Create innovative drug for cancer treatment

	effect	adverse effect
existing anti-cancer drug	small	large
cancer immunotherapeutic	large	extremely small

Technology
- Identify cancer-specific novel cancer antigens
- Activate immune cells to affect cancer cells only



Effects confirmed through animal testing

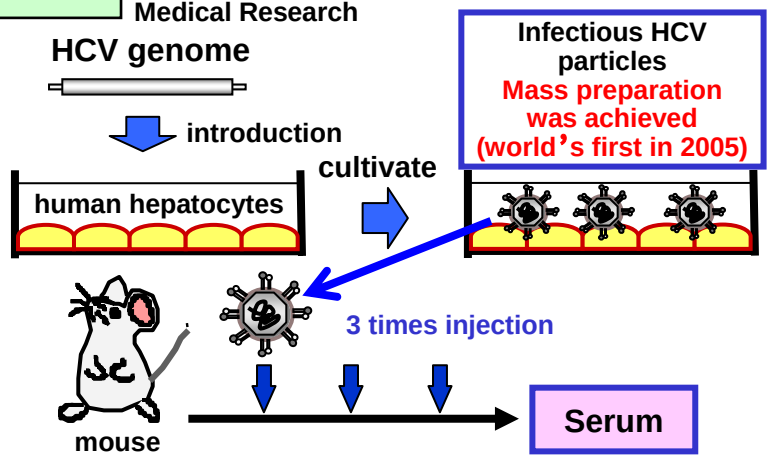


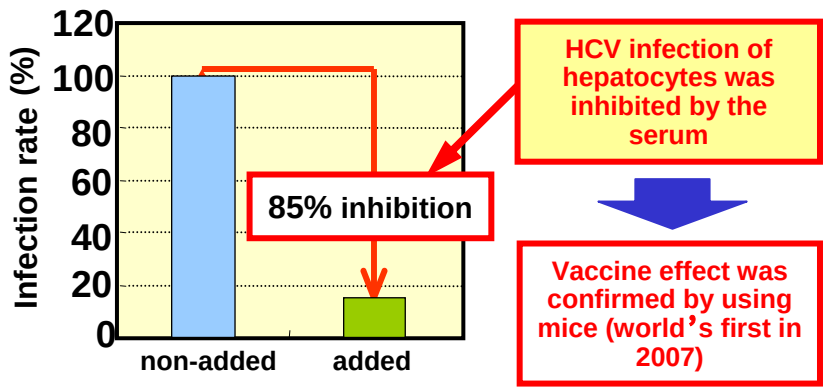
Current status Effects confirmed through doctor-centered clinical trial (at overseas University)

Hepatitis C Vaccine

Objectives Prevention and therapy for hepatitis C

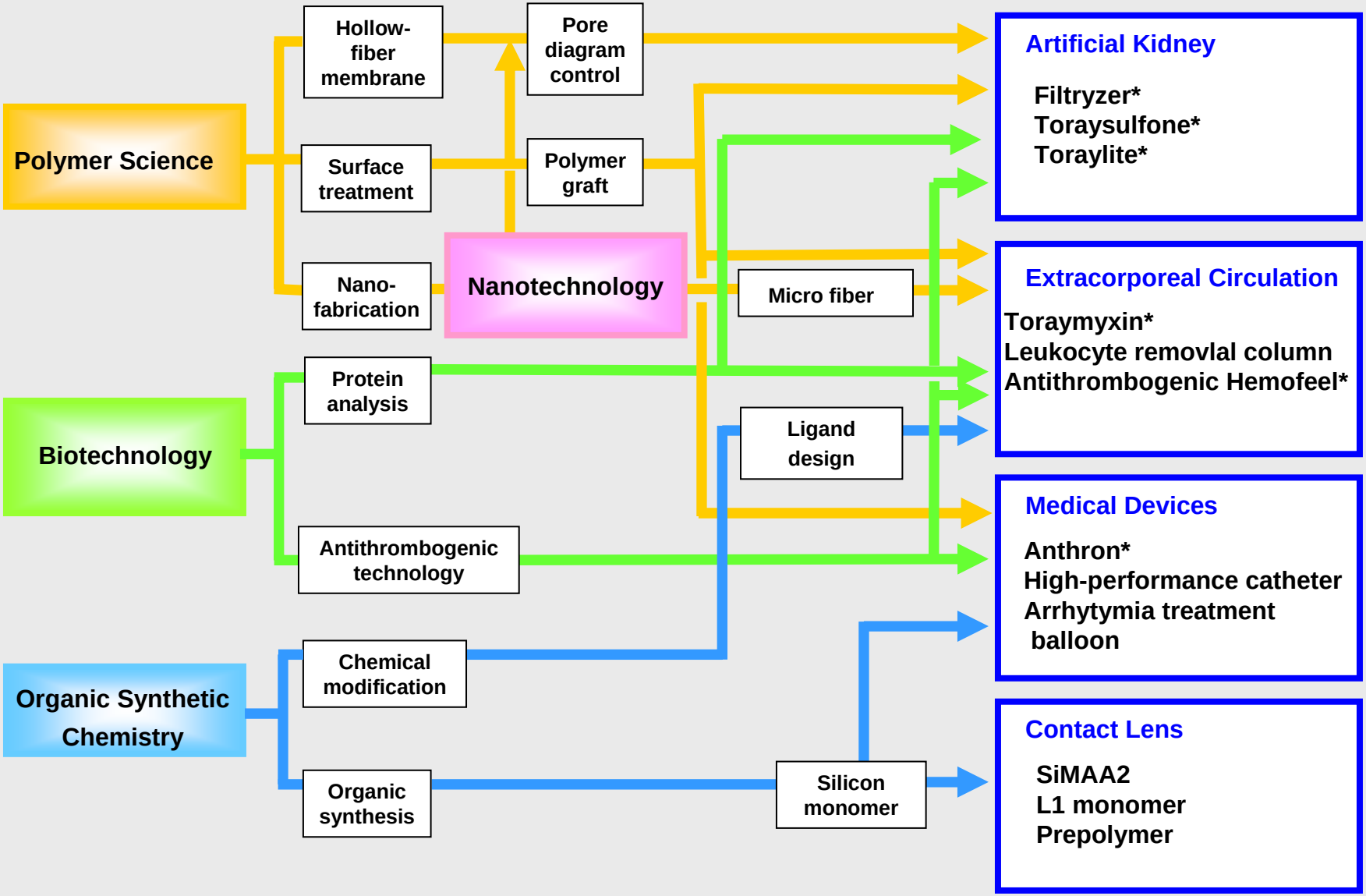
Technology Collaboration with National Institute of Infectious Diseases / Tokyo Metropolitan Organization for Medical Research





※This research is supported by the Ministry of Health, Labour, and Welfare

Technical Field of Medical Products



Strategies for Bio-tools Business

Toray Fundamental Technologies

<Polymer>
- Biocompatibility
- Material Design
- Advanced Materials

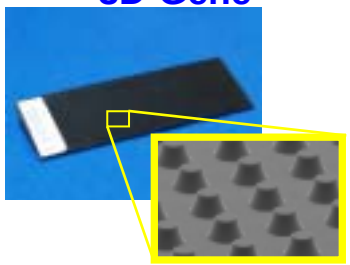
<Bio>
- Ligand Design
- Protein Engineering
- In vitro/vivo evaluation

<Nano>
- Self organization control
- Fine Patterning

<Pharmaceuticals>
- Drug screening
- Pharmacodynamics
- Drug safety
- Quality design

Innovative Bio-tools

High-sensitivity DNA chip
"3D-Gene"



Lab-on-a-chip

Hollow-fiber membranes -based devices

Collaboration with Academia

Clinical information

Gene & protein markers
- Kyoto Univ.
- HS Foundation, etc.

Research application
- marketing by Toray
- analysis on consignment
- collaboration with external distributor: DNA Chip Research Inc.

Business Collaboration

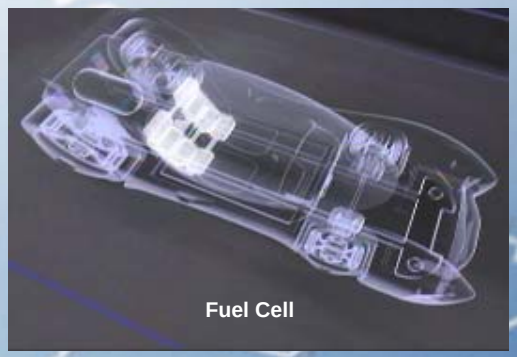
For test drugs / Diagnostic agents
- collaboration with diagnostic product companies
- collaboration with clinical laboratories
- sales of test drugs / diagnostic agents

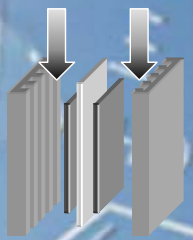
JMCA (Biochip Consortium)
Chair (Toshiba), Vice-chair (Toray)

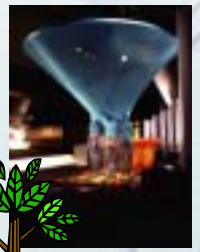
★ Establish Toray characteristic technology platform
★ Develop product line that follows the trend of personalized medicines (with various contents)

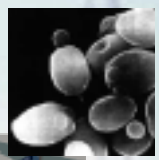
Topics of Advanced Materials

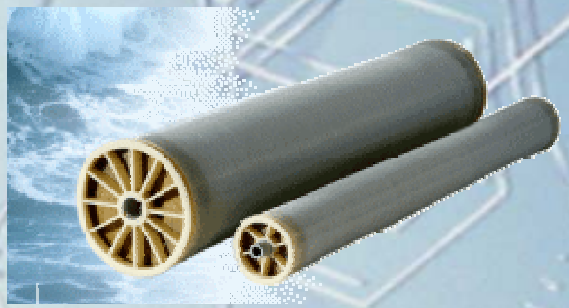
Environment/Water-related/Energy

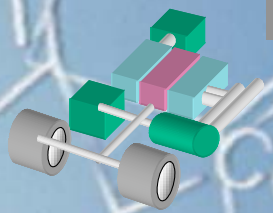












Environment / Water / Energy

PVDF Hollow Fiber Membrane Module

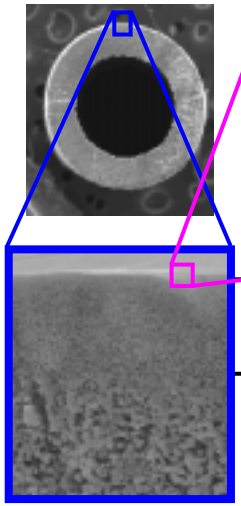
Objective

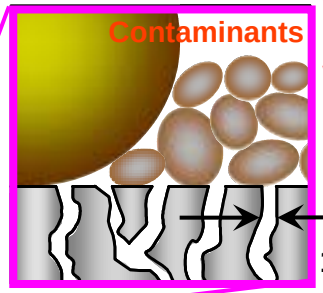
Full lineup of separation membranes for water treatment → membrane HFU for turbid surface water (downstream of estuaries, lakes, etc)

Technology

Form composite hollow fiber membrane with nano-structure control technology

Composite hollow fiber membrane





World smallest pore size (molecular weight cut off : 150,000) as a PVDF hollow fiber membrane for water treatment

10nm

Low fouling separation layer

High-strength, high-permeability Support layer

Nanopores control technology

※operation possible with half the filtration pressure compared to conventional type (energy saving)

Current status

In operation at a drinking water production plant in Japan (5,300 m³/day, equivalent to water for daily use of about 25,000 people)

★Expand scale of water treatment business to 100 billion yen in 2015

Polymer Electrolyte Membrane for Fuel Cells

Objectives

Develop innovative hydrocarbon-type electrolyte membrane with high durability

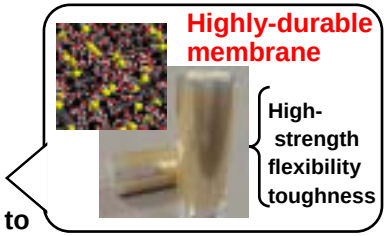
Technology

Nano-level material design based on new concepts

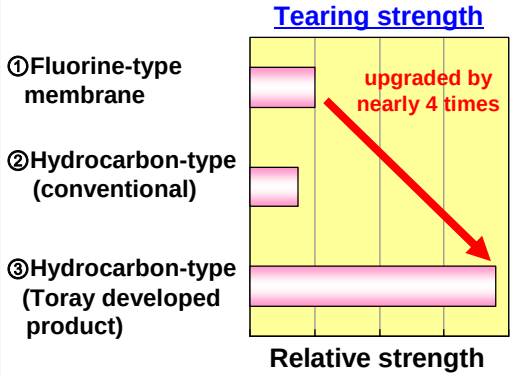
Conventional electrolyte membrane
→ polymer chain is in an entangled structure

Innovative electrolyte membrane
→ strengthened cross-interaction between polymer chains

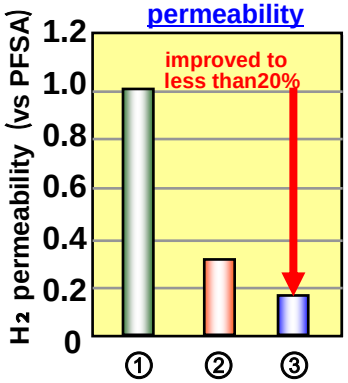
Power generation performance: equal to fluorin-type electrolyte membrane



Tearing strength



Hydrogen permeability

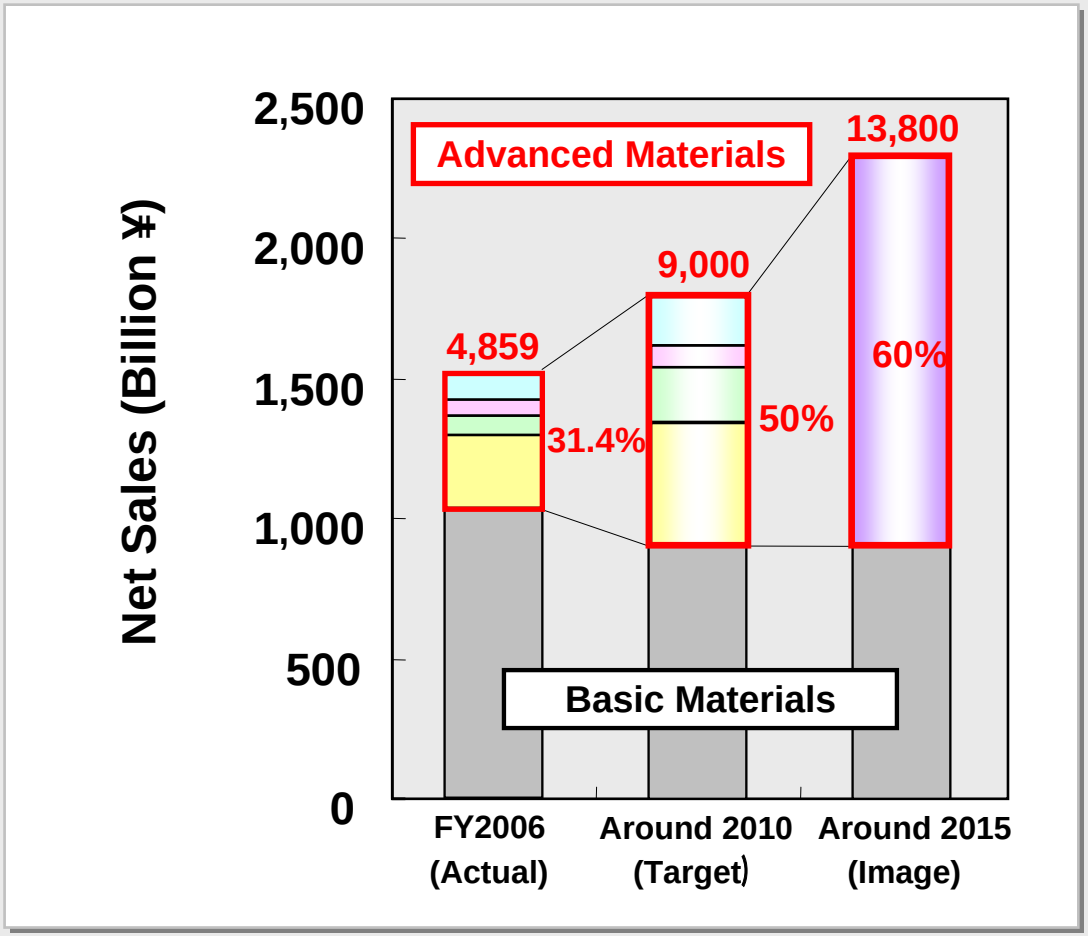


Current status

Under evaluation by electronics companies for DMFC use
→ scheduled completion of technology (FY2007)
→ sequential development of automobile applications

※ this research is part of the project of NEDO (New Energy and Industrial Technology Development Organization)

Target for Advanced Materials Growth



★ Triple net sales of advanced materials in ten years.
★ Increase advanced materials' ratio of net sales from the current 30% to 60%.

III. Recruiting & Developing of Human Resources

Personnel Acquisition and Training/Revitalization

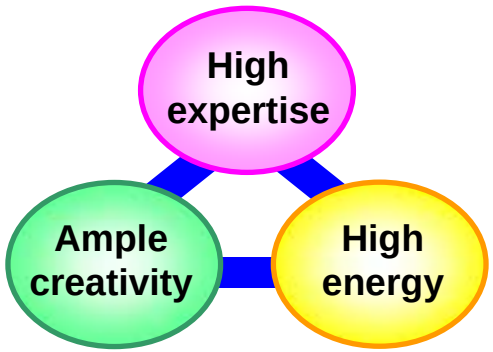
- Personnel must be acquired and trained to strengthen development capabilities
- Increase hiring of capable experienced staff in development units of new business areas

Personnel acquisition

- Early commercialization of Advanced Materials field
- Creation of new products/technologies

- Increased hiring of experienced staff in new fields
  - Building of information/human networks in academia/industry
- Continuation of periodic hiring of new university graduates
  - Strengthen individual recruiting and university rounds

Personnel training



- Selection and training of next leader candidates
  - Merit-based
  - Objective management/assessment
- Active use of young talented researchers
  - Objective/transparent assessment
- Active utilization of women
  - Rotation between research, development, and production
- Improvement/revitalization of Fundamental Technologies Conference
  - Leadership training
  - Manager training

Toray's Research/Technology Specialist System

(1) Research/Technology Specialist System

- Duty, qualification, and position system
- Promotion review for research specialists

(2) Research Fellow System

- Clear indication of researchers who are exemplary specialists
- Establishment of a climate devoted to research
- Establishment of a climate where young researchers work hard to become specialists

(3) Director for specialty field, Senior Director/ Senior Director for specialty field System

- Advanced specialists in their field

(Equal to divisional director or equivalent effects/contributions expected)

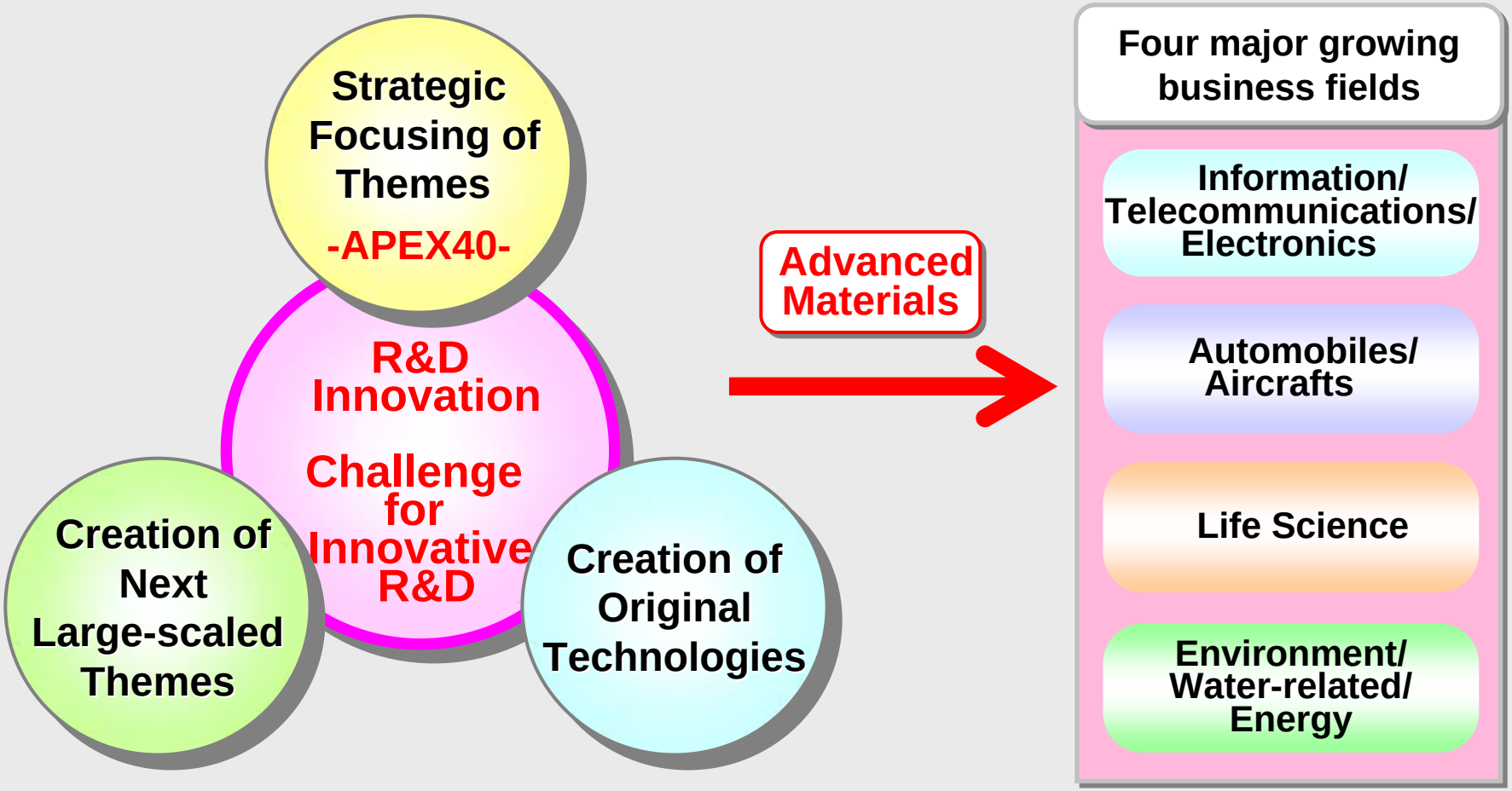
Currently certified research fellows*

Year Author-ized	Specialty	Lab Affiliation
2002	Genome drug development	Pharmaceutical Research Laboratories
2003	Medicinal chemistry	Pharmaceutical Research Laboratories
2004	Polymeric structural design	Films & Films Products Research Laboratories
2004	Polymeric materials design	New Frontiers Research Laboratories
2004	Electronic materials properties	Electronic & Imaging Materials Research Laboratories
2005	Advanced Composite Materials design	Composite Materials Research Laboratories

* Certified by annual review

Management climate that encourages employees to strive to become advanced specialists

“IT-2010/R&D Innovation”



“R&D provide the key to building the Toray of tomorrow. ”

Descriptions of predicted business results, projections and business plans contained in this material are based on assumptions and forecasts regarding the future business environment, made at the present time. The material in this presentation is not a guarantee of the Company's future business performance.