

Asahi Kasei Group Intellectual Property Report 2019

Organization for IP

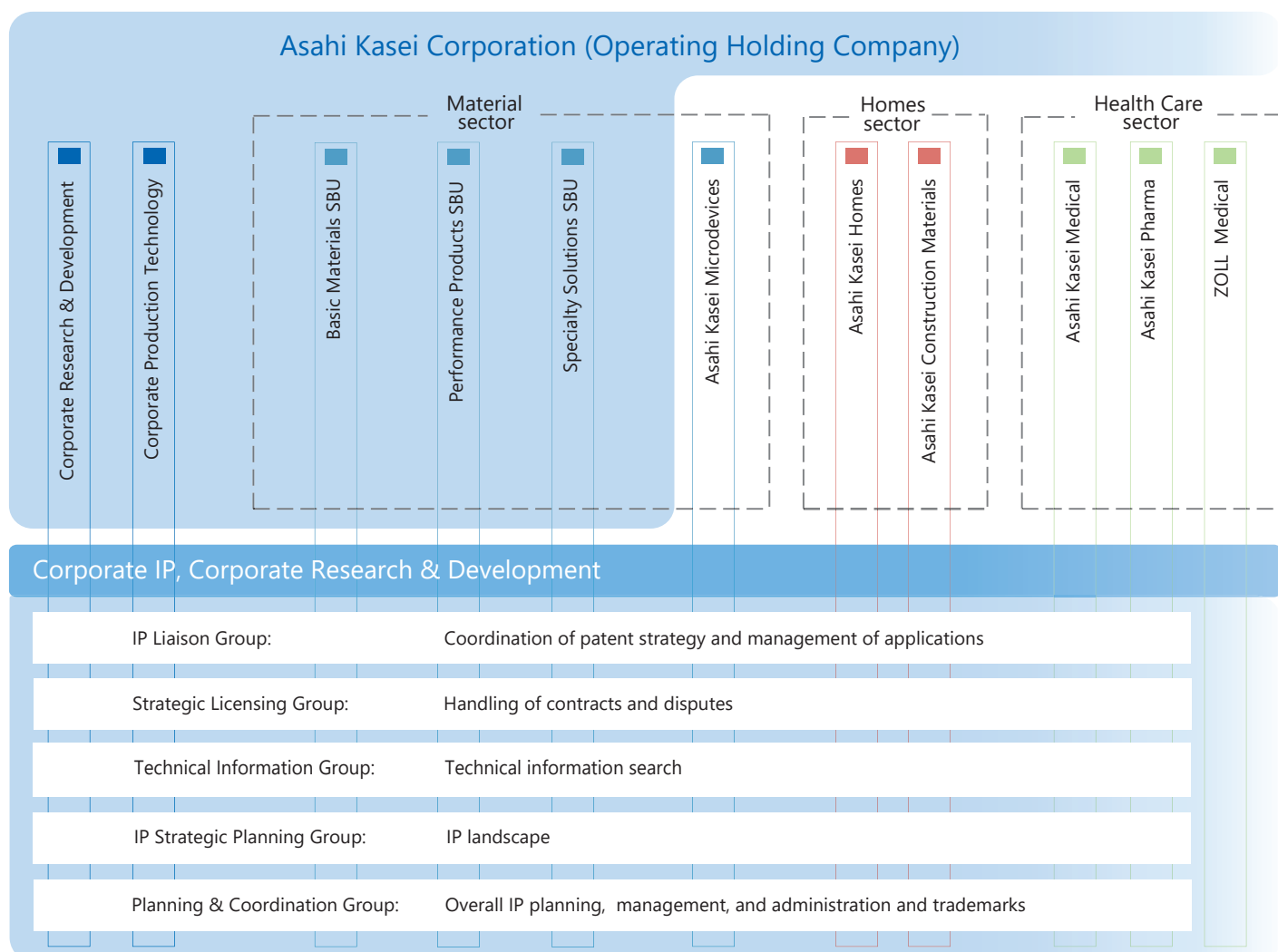
Corporate IP, part of Corporate Research & Development in Asahi Kasei Corp., is the organization responsible for management of intellectual property (IP) for the Asahi Kasei Group. Corporate IP formulates and executes the Asahi Kasei Group's overall IP strategy and provides the shared infrastructure for IP functions.

Liaison personnel of Corporate IP support the business units (strategic business units and core operating companies) by coordinating with inventors, formulating individual IP strategies, identifying IP, securing IP rights, and enforcing those rights in accordance with each business unit's business strategy and R&D strategy.

Corporate IP reinforces key functions through its Strategic Licensing Group, Technical Information Group, IP Strategic Planning Group, and Planning & Coordination Group, which provide Group-wide services performed by dedicated specialist personnel.

Corporate IP actively provides support to our overseas affiliates from Japan. ZOLL Medical Corporation and Polypore International, LP in the United States have their own IP personnel who work to identify IP, secure IP rights, and enforce those rights in accordance with their policies.

Asahi Kasei Group Organization for IP



IP Strategy

Basic Policy

To facilitate the creation of new businesses as an important management task in the Asahi Kasei Group, the management strategy, R&D strategy, and IP strategy of each operation are integrated as one. IP activities directly contribute to the management of operations by acquiring IP rights from R&D results to gain business advantage, enabling the creation of new businesses and securing the profitability of existing businesses.

The business units take the lead in formulating an IP strategy that matches the characteristics of each operation. With a focus on strengthening existing businesses, equal emphasis is placed on the quality and the quantity of patents. Strategic licensing is performed when it is deemed an effective means to heighten the contribution of IP rights to our own business operations.

A relationship of mutual trust and reliance is fostered between the personnel working on IP and those working on R&D, and the IP and R&D functions are advanced in close coordination with a common objective of strengthening business operations.

Thorough Patent Searching

The Asahi Kasei Group considers reliable and effective patent searching to be vital, and thorough patent searches are performed at critical phases in the process of developing IP rights.

Continuous monitoring of patent information related to R&D projects for selective dissemination of information (SDI) is another focus of patent searches. These search and monitoring results are compiled into a strategic database.

Overseas IP Strategy

The Asahi Kasei Group places emphasis on the securement and utilization of IP rights that strengthen global operations. Corporate IP especially focuses on the development and expansion of business in the US, China, and Europe, as well as East Asia, Southeast Asia, and other emerging markets. To support local business activities from the aspect of IP, we have IP personnel stationed in the US, China, and Europe.

As our operations expand globally, China's presence continues to grow both as a manufacturing base and as a market. Meanwhile, the US and Europe have renewed importance for us with the creation of new businesses and M&A. Particular emphasis is therefore placed on our IP activities in China, the US, and Europe.

Strategic utilization of IP information for business innovation

(1) Utilization of strategic database

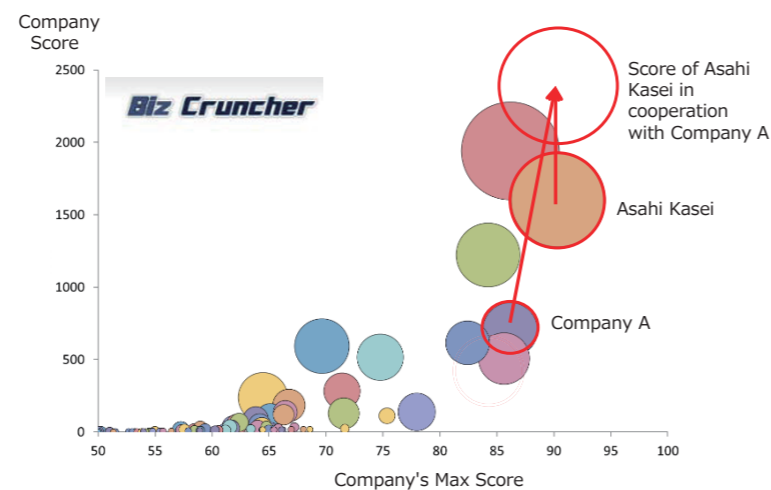
The Asahi Kasei Group maintains a strategic database (SDB) of patent information to enable strategic analysis in the management of its IP portfolio. The information contained in the SDB is used for the advancement of business operations, R&D, and IP activities.

One unique characteristic of the SDB is the inclusion of supplementary information specific to each individual patent (both in-house patents and other company patents) as related to each R&D project. The supplementary information includes a rank of importance, status of use, technology category, and countermeasures to other company patents.

Key aspects of the utilization of this SDB include 1) tracking trends in technologies, in markets, and in other companies, 2) identifying subjects for R&D, 3) clarifying the positioning of technologies and patents, including those of other companies, and 4) identifying patents which would pose an impediment to R&D or business operations, and formulating countermeasures.

(2) Implementation of IP landscape

The Asahi Kasei Group actively performs IP landscaping, which leverages IP analysis for business decision-making. Using the latest tools, IP information etc. is collected and processed as Big Data to formulate an IP map which is analyzed by adding industry and market information in order to identify Asahi Kasei's market position and strengths, as well as business opportunities. The resulting information is useful for management decisions to reinforce business, create new business, and perform M&A. Building on Asahi Kasei's rich experience of thorough patent searching together with its established strategic database, IP landscaping will further enhance business strategy and IP strategy.



This shows that Asahi Kasei can obtain an advantageous position by cooperating with Company A, whose patents are fewer in number but of high quality

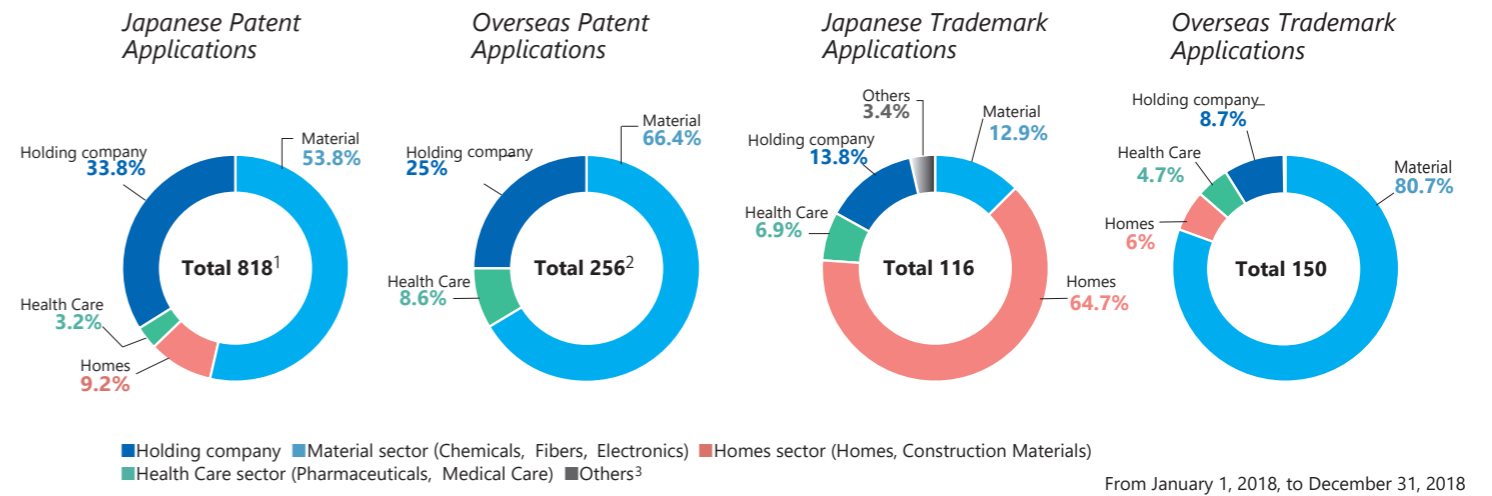
Number of IP Applications and Rights

The Asahi Kasei Group continuously works to maintain an IP portfolio that secures market superiority in business operations. The IP portfolio is reviewed annually to determine whether to file patent applications and whether to maintain or abandon patents and applications, as well as the feasibility of licensing.

Among Japanese patents, those in practice in 2018 amount to 42% of the total (43% in the previous year).

Combined with those scheduled to come into practice, this rises to 64% (65% in the previous year). The 36% of the total which is classified as "defensive and other" includes many strategically essential patents which serve to inhibit the entry of competitors.

The number of patents held overseas is steadily rising with patent protection playing an increasingly important role for global operations.



Number of Applications, by Business Category

From January 1, 2018, to December 31, 2018

		Holding Company	Chemicals	Fibers	Electronics	Homes	Construction Materials	Health Care	Others ³	Total
Patents	Japanese	264	331	59	118	50	32	30	6	890 ¹
	Overseas	51	120	20	20	0	1	19	0	231 ²
Trademarks	Japanese	10	19	14	0	108	26	4	0	181
	Overseas	7	34	35	3	0	1	14	0	94

Number of IP Rights, by Business Category

As of December 31, 2018

		Holding Company	Chemicals	Fibers	Electronics	Homes	Construction Materials	Health Care	Others ³	Total
Japanese Patents	In practice	280	1,523	209	444	364	110	142	0	3,072
	Scheduled to be in practice	574	412	163	165	250	17	32	0	1,613
	Defensive & other	144	1,305	116	407	203	177	179	0	2,531
	Total	998	3,240	488	1,016	817	304	353	0	7,216 ¹
Overseas Patents	US	190	566	64	205	0	4	108	10	1,147
	Europe	340	948	217	152	0	30	394	5	2,086
	Asia	620	1,779	238	297	3	17	233	8	3,195
	Other	99	181	28	3	0	14	88	0	413
	Total	1,249	3,474	547	657	3	65	823	23	6,841 ¹
Trademarks	Japanese	299	461	1,127	34	687	294	298	40	3,240 ¹
	Overseas	587	1,344	937	98	17	42	490	9	3,524

1 May not equal to sums of individual totals due to sharing of certain IP rights among more than one segment.

2 Overseas applications for a single patent family are counted as one.

3 Others: Asahi Kasei Engineering Corp.

Strategic IP Management

Management of IP Rights

The acquisition, maintenance, and enforcement of IP rights are performed in accordance with the Asahi Kasei Group Intellectual Property Management Regulations based on an understanding that IP is essential for business profitability.

Once IP is identified in R&D, researchers, liaison personnel, and technical information specialists work in concert to acquire IP rights. Application procedures and the storage and management of IP information are almost fully computerized, enabling the swift exchange of information with researchers and IP law firms located around the world. We work in close coordination with IP law firms as important strategic partners in the management of IP.

Managing Trade Secrets and Preventing Unauthorized Technology Outflow

Thorough management of trade secrets and other confidential information in the Asahi Kasei Group is performed in accordance with its Secrecy Maintenance Regulations. Information in digital format is managed in accordance with Basic Regulations for Information Systems and information about individual people is managed in accordance with the Guideline for Personal Information Management. The Asahi Kasei Group implements strict measures to prevent outflow of technological information and know-how in accordance with its basic policy and management standards for prevention of technology outflow. The Asahi Kasei Group also applies internal guidelines summarizing related precautions to take when entering business overseas as well as procedures to ensure the preservation of prior-use rights worldwide.

A wide range of education and training measures are proactively employed to raise awareness and understanding regarding such issues among personnel.

Corporate Brand Strategy

The corporate brand “Asahi Kasei” has been registered in 81 countries, and the current Group Logo combining “Asahi” with “KASEI” in upper case has been used since 2007. The Group Logo is an expression of innovation, and is designed to promote correct pronunciation. In the growing market of China, Chinese characters for “asahi” and “kasei” are added to the logo to enhance recognition of the Asahi Kasei brand.

The Group Logo and Company Logotype represent the identity and reliability of the Asahi Kasei Group. We have established a Group Emblems Guideline to ensure unified usage around the world within a defined style, format, and application range. The unified global Asahi Kasei Group identity is further reinforced by our Information Disclosure Policy and Information Disclosure Regulation requiring

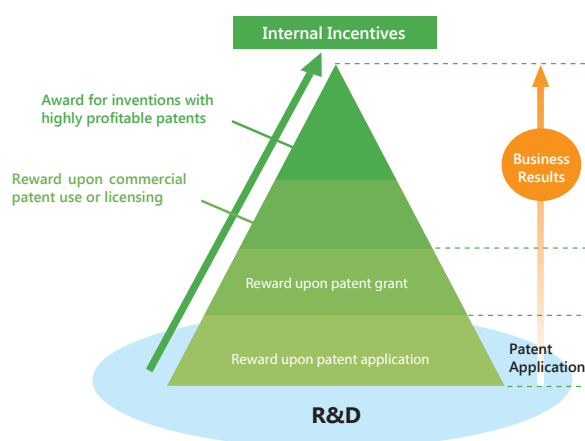


compliance with the Group Emblems Guideline. To confirm adherence to our established brand management standards, Corporate Communications reviews the content of exhibits, advertisements, and external announcements before they are made public.

Incentives for Innovation

Incentives for employee innovation include lump-sum rewards upon application for and grant of patents as well as commercial patent use or licensing, and special rewards for inventors who make exceptional contributions to business operations. In April 2005, our invention reward system was amended to eliminate any theoretical limits on rewards and to reward inventors when a patented invention is commercialized. Such incentives serve to focus the minds of our young researchers on the objective of obtaining IP rights and further promote inventions which result in commercialization. For researchers based outside of Japan, we have separate incentive systems tailored to the law and customs of each country. These systems are continuously reviewed, with further revisions made as appropriate in accordance with the times and as deemed fair and effective to foster greater motivation to obtain IP rights which make valuable contributions to operations in line with the IP strategy of each business.

System to Reward Innovation (in Japan)



Human Resource Development

Recognizing human resources as an essential key to the execution of its IP strategy, the Asahi Kasei Group implements a comprehensive range of measures for the education and training of personnel in matters related to IP. The systematic program begins with orientation for new employees, and includes uniform training sessions for technical personnel and for marketing personnel throughout the Asahi Kasei Group. In addition, “e-learning” programs are made available on the corporate intranet to enable personnel to further enhance their practical knowledge related to IP rights.

Honorary Fellow Dr. Akira Yoshino Major awards and recognitions

- 1999 - Chemical Technology Prize from the Chemical Society of Japan
 1999 - Battery Division Technology Award from The Electrochemical Society
 2001 - Ichimura Prizes in Industry-Meritorious Achievement Prize, from the New Technology Development Foundation
 2001 - Kanto-block Commendation for Invention-Encouragement Prize of Invention of the Minister of Education, Culture, Sports, Science and Technology, from the Japan Institute of Invention and Innovation
 2002 - National Commendation for Invention-Invention Prize of the Minister of Education, Culture, Sports, Science and Technology, from the Japan Institute of Invention and Innovation
 2003 - Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology-Prize for Science and Technology, Development Category, from the Ministry of Education, Culture, Sports, Science and Technology
 2004 - Medal with Purple Ribbon, from the Government of Japan
 2011 - Yamazaki-Teiichi Prize from the Foundation for Promotion of Material Science and Technology of Japan
 2012 - IEEE Medal for Environmental and Safety Technologies from the Institute of Electrical and Electronics Engineers
 2013 - The Global Energy Prize (Russia)
 2013 - The Kato Memorial Prize from the Kato Foundation for Promotion of Science
 2014 - The Charles Stark Draper Prize for Engineering from The National Academy of Engineering
 2018 - The Japan Prize from The Japan Prize Foundation
 2018 - The Chunichi Cultural Award from The Chunichi Shimbun
 2019 - The European Inventor Award in the Non-EPO countries category from the European Patent Office
 2019 - The Order of Culture, Person of Cultural Merit
 2019 - The Nobel Prize in Chemistry from The Royal Swedish Academy of Sciences



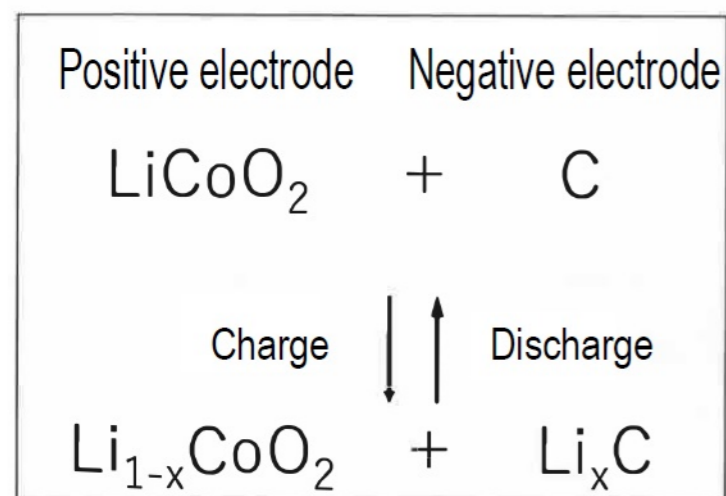
Dr. Akira Yoshino

While developing rechargeable batteries (secondary batteries), Dr. Yoshino established the fundamental technology for composition of the lithium-ion battery, in which a particular kind of carbonaceous material is used as the negative electrode and LiCoO_2 is used as the positive electrode, with a separator in-between the two electrodes. In 1985, he filed an application for patent registration (JP No. 1989293).

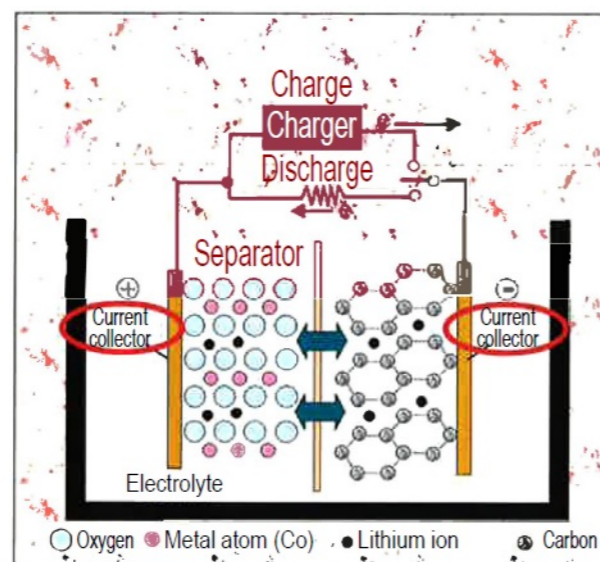
As the lithium-ion battery was put to practical use, it enabled portable devices such as cellular phones to be smaller and more lightweight, creating a great impact on our society.

Operating Principle of Lithium-Ion Battery

Cell reaction formula



Operating principle



Major External Commendations

Fiscal Year	Commendation	Organization	Title
2019	The Nobel Prize in Chemistry	Royal Swedish Academy of Sciences	The Development of Lithium-ion Batteries
	The Order of Culture	Government of Japan	Development of Lithium-ion Battery
	European Inventor Award, Non-EPO Countries	European Patent Office	Lithium-ion battery and its evolution
	The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology	Ministry of Education, Culture, Sports, Science and Technology	Development of Gold-Nickel Oxide Nanoparticle Catalysts with a Core-Shell Structure
	The Chemical Society of Japan	The Chemical Society of Japan	Development of Separator for High-Safety and High-Performance Lithium Ion Secondary Batteries
2018	Japan Prize	The Japan Prize Foundation	Development of Lithium-ion Battery
	The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology	Ministry of Education, Culture, Sports, Science and Technology	Development of Cyclohexene Process for Cyclohexanol, an Intermediate for Production of Nylon
	The Chemical Society of Japan	The Chemical Society of Japan	Development of Amoxidation Catalyst for Propane and Acrylonitrile Production Technology from Propane in the presence of above-mentioned Catalyst
2016	NIMS Award	National Institute for Materials Science (NIMS)	Development of Lithium-ion Battery

Local Commendations for Invention (Japan Institute of Invention and Innovation)

Fiscal Year	Commendation	Area	Title
2019	The Prize of the Chairman of Invention and Innovation	Kyushu	Ultra-Small Quantum Type Infrared Sensor Operating at Room Temperature
	The Prize of the Chairman of Miyazaki Institute of Invention and Innovation	Kyushu	Electrolysis Cell And Electrolysis Tank
	The Encouragement for Invention Prize	Kanto	Connector for 1500 DC Voltage Application in Photovoltaic Systems
2018	The Minister of Education, Culture, Sports, Science and Technology Prize	Kyushu	High-Compactibility and High-Fluidity Cellulose Powder
	The Prize of the Chairman of Shizuoka Institute of Invention and Innovation	Kanto	Photosensitive Resin Composition and Method for Producing Cured Relief Pattern
	The Encouragement for Invention Prize	Kanto	Low-viscosity Polyisocyanate Composition
	The Encouragement for Invention Prize	Kanto	Industrial Process of Acrylonitrile (AN) Production Using Propane
2017	The Prize of the Chairman of Kanagawa Institute of Invention and Innovation	Kanto	Development of Functionalized SBR for Fuel-efficient Tire Tread
	The Encouragement for Invention Prize	Kanto	Digital/Analog Converter and Control Method Thereof
2016	The Encouragement for Invention Prize	Kanto	Hydrogenated Block Copolymer
	The Encouragement for Invention Prize	Kyushu	Highly Functional Cellulose Composite
	The Encouragement for Invention Prize	Kyushu	Body Fluid Treating Device of Hollow Fiber Membrane Type