

# Asahi Kasei Group Intellectual Property Report 2015

## Organization for IP

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

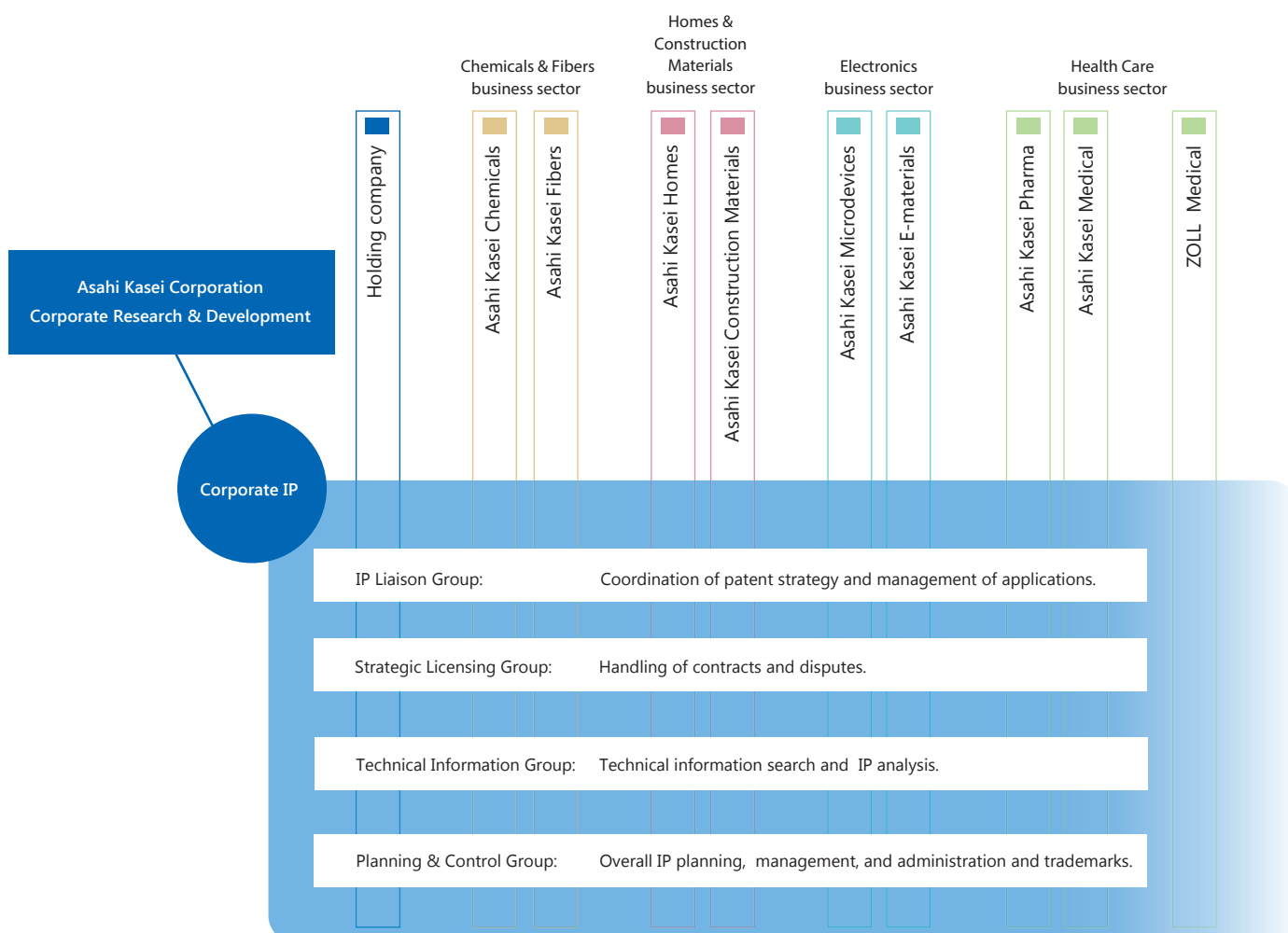
Each core operating company of the Group also has its own organization for management of IP rights, including their acquisition, maintenance, and enforcement. The IP organizations of the core operating companies are staffed with liaison personnel of Corporate IP, and with concurrent positions in the core operating companies, these personnel work to identify IP, secure IP rights, and enforce those rights in concert with each core operating company's own business strategy and R&D

strategy. They also formulate IP strategies for the core operating companies and advance coordination with inventors.

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

ZOLL Medical Corporation, which joined in the Asahi Kasei Group in 2012, has its own IP personnel who work to identify IP, secure IP rights, and enforce those rights in accordance with ZOLL's policy. Members of Corporate IP and ZOLL's IP personnel communicate closely with each other for mutual understanding and information sharing to achieve synergy within the Group.

Asahi Kasei Group Organization for IP



# IP Strategy

## Basic Policy

In the Asahi Kasei Group, the management strategy, IP strategy, and R&D strategy of each operation are integrated as one, with the creation of new businesses as an important management task. IP activities are advanced in direct connection with the management of operations to gain business advantage by the steady acquisition of IP rights from R&D results, enabling the creation of new businesses and the securement of profitability in existing businesses.

The core operating companies take the lead in formulating IP strategy for each operation in line with the relevant business characteristics. The primary focus is on strengthening existing businesses, with equal emphasis 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, as the IP and R&D functions advance in close coordination to strengthen 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. Patent searches are conducted by different personnel in correspondence with different purposes. Technical information specialists in Corporate IP conduct key searches related to subjects which significantly impact business operations. Researchers conduct primary searches themselves, which enhances their patent searching ability and heightens their motivation.

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 which is utilized as described under IP Portfolio, below.

IP analysis was recently enhanced to enable more effective support for R&D strategies and IP strategies.

## Overseas IP Strategy

The expansion of world-leading business is one of the main strategies of the Asahi Kasei Group's "For Tomorrow 2015" medium-term management initiative, which began in fiscal 2011. Accordingly, Corporate IP places emphasis on the securement and utilization of firm IP rights that support global expansion of business operations, especially in the US, China, Europe, East Asia, Southeast Asia, and other emerging countries. As our operations expand globally, China's presence continues to grow both as a manufacturing base and as a market. Meanwhile, the US has renewed importance for us with the creation of new businesses and M&A. Particular emphasis is therefore placed on our IP activities in the US and China.

## IP Portfolio

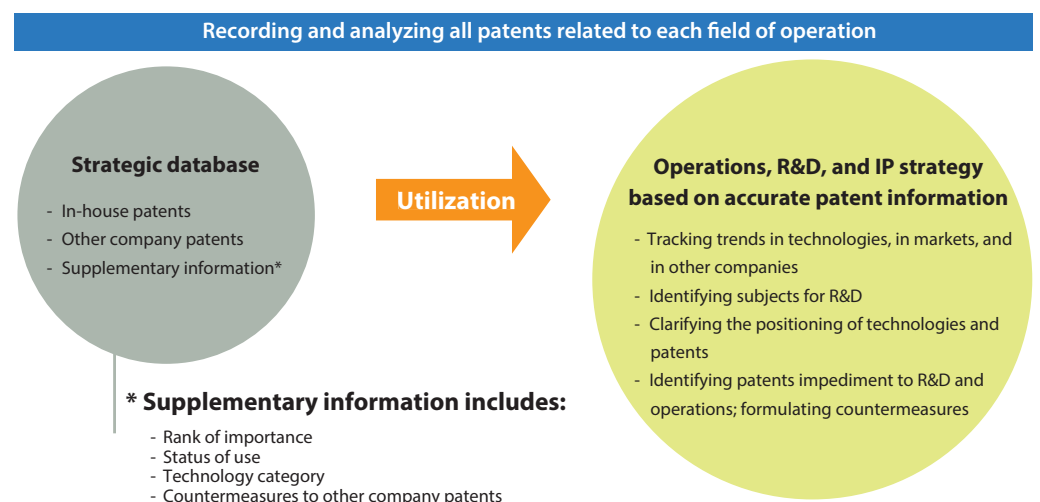
The Asahi Kasei Group maintains a strategic database (SDB) of patent information to enable strategic analysis in the management of its IP portfolio. The information contained in the SDB is used for the advancement of business operations, R&D, and IP activities.

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 and to business operations, and formulating countermeasures.

Through maintenance and utilization of the SDB, the IP Liaison Group and the Technical Information Group of Corporate IP work closely together with each R&D organization to formulate and implement countermeasures in response to other company patents as well as plans for in-house patent applications.

### Strategic Database of Patent Information



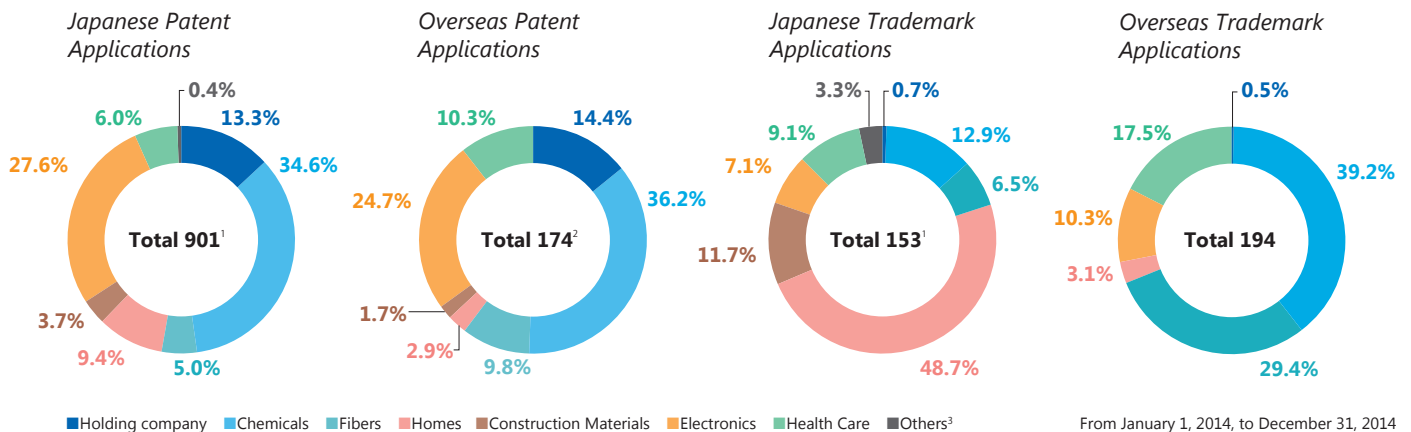
# Number of IP Applications and Rights

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 amount to 37% (40% in the previous year) of the total. Combined with

those scheduled to come into practice, this rises to 61% (63% in the previous year). The 39% 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 Segment

From January 1, 2014, to December 31, 2014

		Holding Company	Chemicals	Fibers	Homes	Construction Materials	Electronics	Health Care	Others <sup>3</sup>	Total
Patents	Japanese	121	316	46	86	34	252	55	3	901 <sup>1</sup>
	Overseas	25	63	17	5	3	43	18	0	174 <sup>2</sup>
Trademarks	Japanese	1	20	10	75	18	11	14	5	153 <sup>1</sup>
	Overseas	1	76	57	6	0	20	34	0	194

## Number of IP Rights, by Segment

As of December 31, 2014

		Holding Company	Chemicals	Fibers	Homes	Construction Materials	Electronics	Health Care	Others <sup>3</sup>	Total
Japanese Patents	In practice	72	1,027	197	334	144	777	131	21	2,703
	Scheduled to be in practice	240	594	105	193	56	491	23	7	1,709
	Defensive & other	148	1,311	179	153	118	727	185	15	2,836
	Total	460	2,932	481	680	318	1,995	339	43	7,181 <sup>1</sup>
Overseas Patents	US	97	564	48	0	4	275	115	9	1,112
	Europe	102	829	149	0	29	229	362	7	1,707
	Asia	131	1,590	168	0	15	641	174	5	2,724
	Other	29	230	19	0	11	24	88	0	401
	Total	359	3,213	384	0	59	1,169	739	21	5,935 <sup>1</sup>
Trademarks	Japanese	212	528	1,428	593	245	131	382	42	3,559 <sup>1</sup>
	Overseas	403	988	806	7	43	300	422	0	2,969

1 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

Based on the view that IP is fundamental to obtain profit in business, the acquisition, maintenance, and enforcement of IP rights are performed in accordance with the Asahi Kasei Group Intellectual Property Management Regulations.

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 unauthorized or unintentional 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 in China.

To raise awareness and understanding regarding such issues among personnel, a wide range of education and training measures are performed.

## Corporate Brand Strategy

The corporate brand "Asahi Kasei" has been registered in 76 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

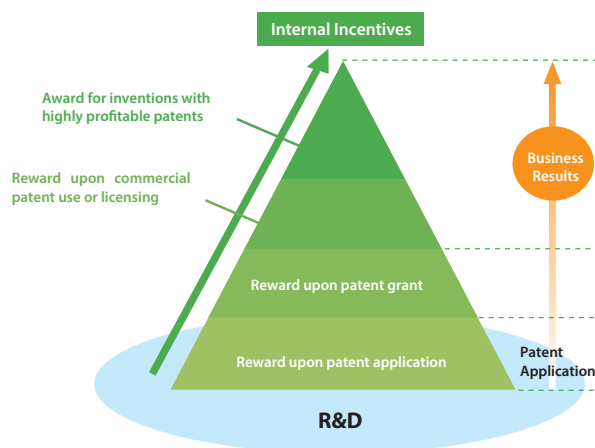


Policy and Information Disclosure Regulation requiring compliance with the Group Emblems Guideline. To confirm adherence to our established brand management standards, Corporate Communications reviews the content of exhibits, advertisements, and external announcements before they are made public.

## 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, we made substantial revision to our invention reward system eliminating any theoretical limits on rewards and rewarding 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.



## Receipt of Medal with Purple Ribbon for development of automatic adjustment function for electronic compasses

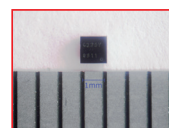
In the spring of 2015, Asahi Kasei Group Fellow Dr. Masaya Yamashita received a Medal with Purple Ribbon in recognition of his development of the electronic compass and the function of automatically compensating for magnetic offset.

Japan's Medals of Honor are high-profile government awards conferred in recognition of outstanding contributions to society, public welfare, culture, etc. Among them, the Medal with Purple Ribbon recognizes scientific and artistic inventions, improvements, and creations.

Dr. Yamashita developed the world's first digital 3-axis electronic compass and the function of automatically compensating for magnetic offset in electronic compasses. These technologies are incorporated as standard features in a wide range of portable devices, and used for functions such as pedestrian navigation systems in smartphones. The medal recognizes the contribution of these achievements to the expansion of the sensor devices market.

Electronic compasses measure geomagnetism to determine azimuth. When the electronic compass is mounted in a portable device, it is influenced by strong magnetic fields from surrounding magnetic parts such as speakers, which introduce error in the calculation of azimuth. With conventional electronic compasses, users are required to perform a complicated adjustment procedure to eliminate such errors and obtain more accurate measurement of the weak geomagnetism.

In contrast, the technology developed by Dr. Yamashita enables automatic collection of geomagnetic data while the device is used in natural manner. After developing the world's first digital 3-axis electronic compass, Dr. Yamashita also succeeded in several successive miniaturizations to maintain the world's smallest size. The size by volume of the latest electronic compass is less than 1/50 that of the initial product. This has not only improved the usability of electronic compasses significantly as the device constantly calculates azimuth and performs error corrections by using statistical estimations, but also contributed to the rapid spread of the electronic compass as a standard function in smartphones around the world.



3-axis electronic compass  
AK09911C



Map application in a smartphone



## Receipt of Prize of the Chairman of HATSUMEI KYOKAI (JIII) for development of gold-nickel oxide (Au-NiOx) nanoparticle catalysts with a core-shell structure

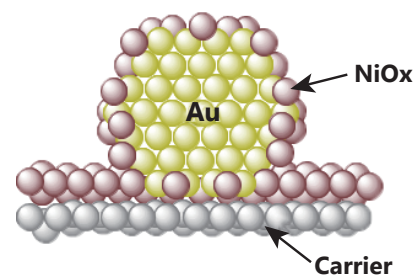
Asahi Kasei Chemicals received the Prize of the Chairman of HATSUMEI KYOKAI (JIII) at the 2015 National Commendation for Invention by the Japan Institute of Invention and Innovation for a patent for the development of gold-nickel oxide (Au-NiOx) nanoparticle catalysts with a core-shell structure. In connection with this award, Asahi Kasei Chemicals also received the Award for Distinguished Contribution for Driving the Invention into Implementation.

This invention relates to the development of Au-NiOx nanoparticle catalysts with a core-shell structure, and the commercialization of a new "direct oxidative esterification" (DIRECT METHA) process for methyl methacrylate (MMA) using the new catalysts.

The Au-NiOx nanoparticles have a core-shell structure, with Au nanoparticles at the core and the surface covered by highly oxidized NiOx. They are supported on a carrier with high dispersion. This novel bimetallic nanoparticle structure provides superior catalytic performance than monometallic nanoparticles.

The successful establishment of industrial catalytic technology with high selectivity, high activity, and long catalyst life was enabled through the development of high-strength silica-based carrier, the use of NiOx for improved chemical stability, and precise control of the distribution of the nanoparticles in the catalysts.

The practical applicability of this catalytic system was verified in a 100,000 ton/year MMA production plant in 2008, which demonstrated its high selectivity, high activity, and long catalytic life, resulting in reduced consumption of energy and resources as well as superior economic performance. With their broad substrate applicability, Au-NiOx nanoparticle catalysts are also expected to be applied to the oxidation of other substances. (Japanese Patent No. 4674921)



Au-NiOx nanoparticle with a core-shell structure



## Major External Commendations

Fiscal Year	Commendation	Organization	Title
2015	Medal with Purple Ribbon	Government of Japan	Development of Electronic Compass and Automatic Adjustment Method
	National Commendation for Invention the Prize of the Chairman of HATSUMEI KYOKAI (JIII)	Japan Institute of Invention and Innovation	Development of gold–nickel oxide (Au–NiOx) nanoparticle catalysts with a core-shell structure
2014	Heroes of Chemistry Award	American Chemical Society	Non-Phosgene Polycarbonate (PC)
	The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology Prizes for Science and Technology	Ministry of Education, Culture, Sports, Science and Technology	Development of Electronic Compass and Automatic Adjustment Method
2013	The Okochi Memorial Technology Prize	Okochi Memorial Foundation	Development of production technology for virus removal filters and the establishment of a market for them
	The CSJ Award for Technical Development	The Chemical Society of Japan	Development and commercialization of gold–nickel oxide (Au–NiOx) nanoparticle catalysts with a core-shell structure for methyl methacrylate (MMA) production
	The Charles Stark Draper Prize	The National Academy of Engineering (US)	Engineering of the rechargeable lithium-ion battery that enables compact, lightweight mobile devices
	The Global Energy Prize	Global Energy Partnership (RU)	Invention of Rechargeable Lithium-Ion Battery, which is An Essential Element for Mobile Electronic Devices, Electric Vehicles and Hybrid Electric Vehicles
2012	National Commendation for Invention The Imperial Invention Prize	Japan Institute of Invention and Innovation	Automatic Adjustment Technology of Electronic Compass
	The Okochi Memorial Technology Prize	Okochi Memorial Foundation	Development of a Genetically-Engineered Thrombomodulin Agent for the Treatment of Disseminated Intravascular Coagulation (DIC)
2011	National Commendation for Invention The Invention Prize	Japan Institute of Invention and Innovation	Polysulfone-Membrane Hemodialyzer
2010	The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology Prizes for Science and Technology	Ministry of Education, Culture, Sports, Science and Technology	Comprehensive Research on Thrombomodulin as An Antithrombotic Molecule on Vascular Endothelial Cell
2009	National Commendation for Invention The Invention Prize	Japan Institute of Invention and Innovation	Non-Fluorocarbon Gases High-Performance Phenolic Resin Foam
	The Okochi Memorial Production Prize	Okochi Memorial Foundation	Development of Separator for High-Safety and High-Performance Lithium-Ion Secondary Batteries

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

Fiscal Year	Commendation	Area	Title
2014	The Encouragement Prize of Invention by the Minister of Education, Culture, Sports, Science and Technology	Kyushu	Cellulose Powder
	The Prize of Okayama Prefectural Governor	Chugoku	Method for Producing Ethylene and Propylene
	The Encouragement for Invention Prize of the Chairman of the Japan Patent Attorneys Association	Kanto	Polymer Electrolyte Membrane Having High Durability
	The Encouragement for Invention Prize	Kanto	Flame Retardant Aromatic Polycarbonate Resin Composition
	The Encouragement for Invention Prize	Kanto	Polyphenylene Sulfide Resin Composition
2013	The Encouragement for Invention Prize	Kanto	Modified Conjugated Diene Polymer for Tire Tread
	The Prize of Okayama Prefectural Governor	Chugoku	Process for Stabilizing Oxymethylene Copolymer
2012	The Encouragement for Invention Prize	Kanto	Ion-exchange Membrane
	The Prize of Okayama Prefectural Governor	Chugoku	Innovative Catalyst for Production of MMA by Direct Methyl-Esterification