KURARAY CO., LTD.

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TEL +81-86-423-2271 FAX +81-86-422-4851

Tsukuba Research Center
41, Miyukigaoka, Tsukuba, Ibaraki 305-0841, Japan
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Okayama Plant
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Niigata Plant
2-28, Kurashiki-cho, Tainai, Niigata 959-2691, Japan
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Kashima Plant
36, Towada, Kamisu, Ibaraki 314-0197, Japan
TEL +81-299-96-1011 FAX +81-299-96-3932

Tsurumi Plant
4342, Tsurumi, Bizen, Okayama 705-0025, Japan
TEL +81-869-65-8331 FAX +81-869-65-8341

Affiliates/Subsidiaries (22 in Japan, 83 outside Japan)

In Japan

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Kuraray Noritake Dental Inc.
Ote Center Building, 1-1-3, Otemachi, Chiyoda-ku, Tokyo 100-0004, Japan
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Kuraray Plastics Co., Ltd.
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Kuraray Engineering Co., Ltd.
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Kuraray Techno Co., Ltd.
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Osaka 530-8611, Japan
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Kuraray Kuraflex Co., Ltd.
Umeda Hankyu Building Office Tower, 8-1, Kakudacho, Kita-ku,
Osaka 530-8611, Japan
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Kuraray Fastening Co., Ltd.
Umeda Hankyu Building Office Tower, 8-1, Kakudacho, Kita-ku,
Osaka 530-8611, Japan
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Outside Japan

Kuraray America, Inc. (subsidiary in U.S.A.)
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Kuraray Europe GmbH (subsidiary in Germany)
Philipp-Reis-Straße 4 D-65795 Hattersheim am Main, Germany
TEL +49-69-305-85300 FAX +49-69-305-85399

Kuraray Asia Pacific Pte. Ltd. (subsidiary in Singapore)
10 Sakra Avenue, Singapore 627887
TEL +65-6867-7088 FAX +65-6867-7103

Kuraray China Co., Ltd. (subsidiary in China)
Unit 2207, 2 Grand Gateway, 3 Hongqiao Road, Xuhui District,
Shanghai 200030, China
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Kuraray India Private Limited (subsidiary in India)
Prius Platinum, 2nd Floor B Wing, Rear side, D3 District Centre,
Saket New Delhi-110017, India
TEL +91-11-4610-2900 FAX +91-11-4610-2911

Kuraray South America Ltda. (subsidiary in Brazil)
Av. Paulista, 1636 – Condominio Paulista Corporate,
Sala 405 – Bela Vista, CEP 01310-200 – São Paulo – SP – Brasil
TEL +55-11-2615-3531 FAX +55-11-2615-3529

Official website

http://www.kuraray.com/

2018.06

kuraray

Corporate Sketch

Our Mission

We are committed to developing new fields of business using pioneering technology that improves the environment and enhances the quality of life throughout the world.

For people and the planet – to achieve what no one else can.

In order to make today better than yesterday, and tomorrow better than today, we at Kuraray have made completely new and unique things by harnessing the power of chemistry.
Many industries and people around the world now choose Kuraray's technologies, products, and services.
We take pride in this fact and are deeply grateful to our customers around the world for making this possible.

Since our founding, we have valued the pioneering spirit.
We continually ask ourselves what we can do for the world of tomorrow and the people living in it.
"For people and the planet – to achieve what no one else can."
Passed down through the generations, this has been our constant motivation.

We still maintain this mission firmly today. It is Kuraray's value and our driving force.
We continue to cultivate our unique traits, in order to benefit society and the environment.
Our goal is continual corporate growth, and we have already taken the next step forward.

Overview

Name:
Kuraray Co., Ltd.

President:
Masaaki Ito
Representative Director and President

Established:
June 24, 1926

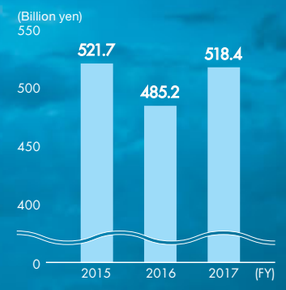
Capital:
89 billion yen (as of December 31, 2017)

Employees:
9,089 (consolidated, as of December 31, 2017)

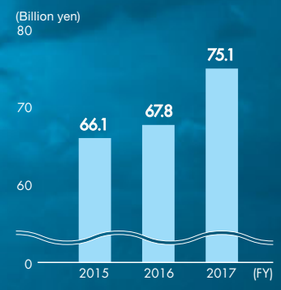
Net sales:
518.4 billion yen (consolidated, fiscal year ended December 31, 2017)

Major overseas bases:
U.S.A., Germany, Belgium, China, Singapore

Net sales



Operating income



History — Trust and Performance Built over More Than 90 Years

In 1926, Magosaburo Ohara focused on synthetic rayon, which was a cutting-edge technology at the time, and founded Kurashiki Kenshoku (current Kuraray) with its business base in Kurashiki, Okayama Prefecture. Following the Second World War, in 1950 we were first in the world to commercialize polyvinyl alcohol (PVA) fiber, under the name *KURALON*. It was the first synthetic fiber invented in Japan, and led the early phase of Japan's synthetic fiber industry. In the 1960s, we succeeded in exporting a PVA fiber production plant to China, which did not yet have diplomatic relations with Japan, and contributed greatly to Japan's postwar period of high growth. Since then, we have accurately identified contemporary trends and have been first in the world to industrialize and commercialize products including high-performance fibers, resins, and chemical products based on polymer and synthesis technology.

1926
- **Kurashiki Kenshoku Co. Ltd. established**

1928
- Production of rayon filament started at Kurashiki Plant (production ceased in 2001)

1949
- **Company name changed to Kurashiki Rayon Co., Ltd.**

1950
- *KURALON* (PVA fiber) commercialized: Production of PVA started at Toyama Plant Production of *KURALON* started at Okayama Plant

1958
- PVA commercialized: Production of PVA for market sales started

1962
- Production of PVA film started at Saijo Plant

1963
- **Concluded a contract to export the PVA/PVA fiber production plant to China**

1964
- Polyester commercialized: Production of polyester staple fiber started at Tamashima Plant
- Hook and loop fasteners commercialized
- *CLARINO* (man-made leather) commercialized: Production of *CLARINO* started at Kurashiki Plant

1969
- Production of polyester filament started at Saijo Plant

1970
- **Company name changed to current Kuraray Co., Ltd.**

1972
- *EVAL* (EVOH resin) commercialized: Production of *EVAL* resin started at Okayama Plant
- Non-woven fabrics commercialized: Production of *KURAFLEX* (dry-laid nonwoven fabric) started at Okayama Plant
- Isoprene chemicals commercialized: Production of polyisoprene rubber started at Kashima Plant

1978
- Dental materials commercialized: Sales of *CLEARFIL* (dental materials) started

1989
- Merged with Kyowa Gas Chemical Co., Ltd., a methacrylic resin manufacturer

1990
- Production of *VECTRAN* (high-strength polyarylate fiber) started at Saijo Plant
- *SEPTON* (thermoplastic elastomer) commercialized: Production of *SEPTON* started at Kashima Plant

1999
- Production of *GENESTAR* (heat-resistant polyamide resin) started at Saijo Plant

2001
- Acquired PVA and PVB business of Clariant AG

2004
- Acquired PVB film business of HT Troplast AG

2011
- Production of *KURARITY* (acrylic thermoplastic elastomer) started at Niigata Plant

2012
- Acquired MonoSol, LLC, which is engaged in the industrial PVA film business

2014
- Acquired glass laminating solutions/vinyls business of E. I. du Pont de Nemours and Company ("DuPont")

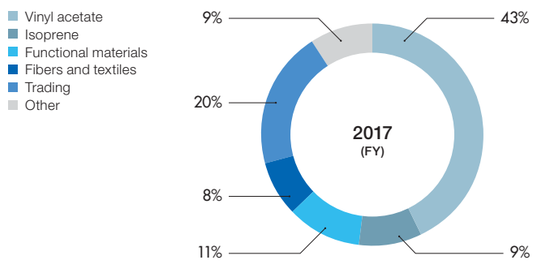
2015
- Acquired Plantic Technologies Limited, which is engaged in the bio-based barrier film business

2018
- Acquired Calgon Carbon Corporation, an activated carbon company

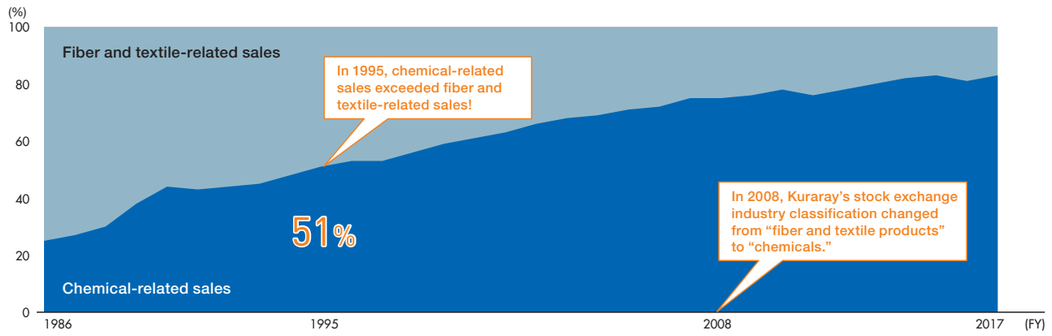
Business — Kuraray Has Been Changing to Meet the Needs of Society

Currently, Kuraray's business portfolio consists of five segments: vinyl acetate, isoprene, functional materials, fibers and textiles, and trading. After its founding, Kuraray mainly operated in the field of fiber and textile materials, and about 80% of sales were related to this field by around 1985. However, in order to respond quickly to changes in society's needs and the business environment from the latter half of the 1980s, we gradually shifted our focus to chemical-related businesses making full use of our proprietary technologies while increasing efficiency in our fiber and textile-related businesses. As a result, by 2009, we had expanded our business fields by changing our business structure, with 75% of net sales related to chemicals and 25% related to fibers and textiles.

2017 composition of net sales



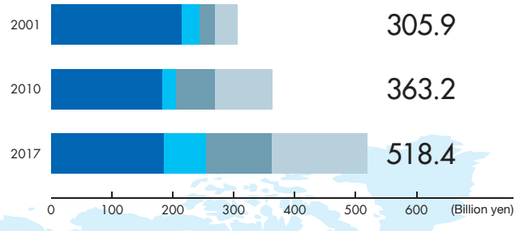
Change in composition of net sales



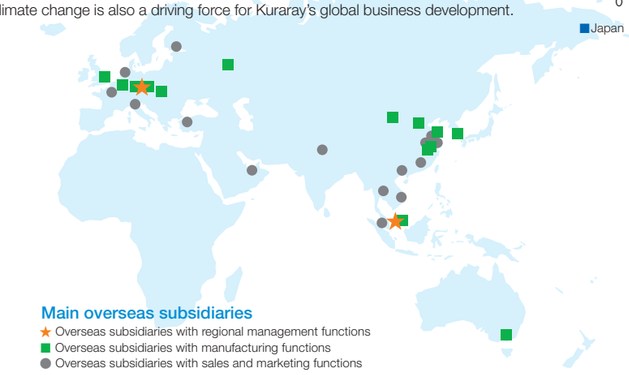
Global — Kuraray Technology at 102 Locations outside Japan in 31 Countries and Regions

In 1986, Kuraray established a foothold in overseas markets through the local production of EVOH resin *EVAL* at a joint venture in the United States and rapidly promoted the localization of production and sales in response to the expansion of the global market. As a result of the acquisition of DuPont's glass laminating solutions/vinyls business in 2014 and Calgon Carbon in 2018, we have expanded our network outside Japan dramatically to 102 locations in 31 countries and regions. We build our overseas business using proprietary technologies, based on a policy of producing in the optimal location and marketing in the optimal location. We have also built our own global sales network, and the ratio of overseas sales to consolidated net sales was 64% for the year ended December 31, 2017. The important mission of contributing to the solution of worldwide issues such as climate change is also a driving force for Kuraray's global business development.

Net sales by region



Main overseas subsidiaries



Quality — R&D and Production Technology Development Support Kuraray's Creativity

Competition is increasing in the chemicals industry due to the entry of companies from emerging countries and the commoditization of specialty chemicals is also underway. Technological development capabilities to create value-added products are increasing in importance as an essential management resource for maintaining and strengthening global competitiveness.

Corporate research and development, the center of the Kuraray Group's technological development capabilities, is conducting activities to fulfill the corporate mission to "Create new businesses," "Strengthen and expand existing businesses," and "Establish and deepen core technologies." We are doing this by closely collaborating with in-house companies, business divisions, and division R&D organizations that belong to subsidiaries, with an eye to expanding the scope of operations and improving earnings.

R&D and production technology organization

R&D

Kurashiki Research Center

- Synthesis Research Laboratory
- VA-related Polymers Research Laboratory
- Analytical Technology and Solutions Laboratory
- Battery Materials Research Laboratory

Tsukuba Research Center

- Polymer Materials Research Laboratory
- Polymer Processing Research Laboratory
- Film and Sheet Project Team

R&D departments in each business division/affiliate company

Kuraray Research and Technical Center (U.S.A.)

Intellectual Property Department

Development of Production Technology

Technology Development Center

- Chemical Process Technology Development Group
- Plastics and Compounds Technology Development Group

Technology and Maintenance Management Department

- Technology and Maintenance Group
- Engineering Group
- Electrical and Instrumentation Technology Group
- Technology and maintenance department in each plant

- **Production and technology management division in each company**
- **Production and technology development department in each plant**

Market and Business Development Department

New Business Development

Research and Development Division

- Functional Products Development Department
- Molding Component Business Department
- *VECSTAR* Business Promotion Department

A Wide Array of Products Generated through Creativity

We at Kuraray used our unique technical strengths to create products that the world had never seen before. We were the first company in the world to commercialize PVA fiber, the first synthetic fiber produced using made-in-Japan technology. Other businesses we have created include PVA resin, which is a raw material of *KURALON*; PVA film, which is essential for LCDs; *EVAL* (EVOH resin), which features excellent gas barrier properties; and a lineup of the world's only synthetic isoprene chemical products. The worldwide number-one businesses* that we have created using our unique technologies account for more than half of the Kuraray Group's total sales.

Expanding world-leading businesses*

* Businesses that have the world's top market share, or are the only ones in their category worldwide (in-house survey)

Vinyl Acetate-Related Business

KURARAY POVAL (PVA resin)

PVA resin was industrialized as a raw material for the synthetic fiber *KURALON*. It has a number of characteristics: it is water soluble, emulsifiable, resistant to oil and chemicals, and easy to form into film. It is used in a wide range of applications such as paper processing agents, adhesives, and as a stabilizer for the polymerization of vinyl chloride resins.

MOWITAL (PVB resin) *TROSIFOL* (PVB film and ionoplast interlayers)

MOWITAL (PVB resin) has excellent adhesive strength and transparency, and is mainly used for paints, lacquers, varnishes, printing inks, temporary binders for ceramics, and adhesives. *TROSIFOL* is used for laminated safety glass for the architectural, automotive and photovoltaic industries.
TROSIFOL (PVB film) and *SENTRYGLAS* (ionoplast interlayers) enable safety, security, sound insulation, UV control, decorative and UltraClear glazing, and more. *SENTRYGLAS* is five times stronger and up to 100 times stiffer than conventional laminating materials.

PLANTIC (bio-based barrier material)

A bio-based barrier material developed through industry-academia collaborative research in Australia. Since the commercialization of *PLANTIC* film in 2003,* its use as an environmentally friendly material has been rising among major retailers and food manufacturers in Australia, Europe, and North America.

* Kuraray acquired Plantic Technologies Limited in 2015.

Optical-use PVA film

Used in a wide variety of applications such as polarizing film, which is vital to LCD displays such as large flat-panel TVs and tablets.

Water-soluble PVA film

Used in a wide variety of fields including single-use packets for detergents, agrochemicals, and other applications.

EVAL (EVOH resin)

EVAL provides excellent barrier properties against the permeation of gases, superior to those of any other plastics. It is used widely in food packaging materials to block out oxygen and preserve the flavor and quality of foods. It is also adopted in automotive plastic fuel tanks, as it provides a highly effective barrier against fuel vapor permeation. It is being used increasingly in a wide variety of applications, such as vacuum insulation panels for large refrigerators, in order to improve energy efficiency.

Isoprene Business

SEPTON (thermoplastic elastomer)

SEPTON is a styrenic thermoplastic elastomer that has excellent moldability and superior recyclability. Its areas of application are expanding in a wide range of fields with the need for higher performance in automobiles, home appliances, and household products.

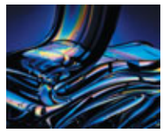
Isoprene chemicals

We apply our unique synthesizing technologies to produce a cleaner MMB that is highly safe and easy to handle, as well as diols, aroma chemical and cosmetic ingredients, pharmaceutical and agrichemical intermediates, and more.

* One-of-a-kind products derived from synthetic isoprene (MMB, MPD, etc.)

KURARAY LIQUID RUBBER

A low molecular weight liquid rubber made from such materials as isoprene and butadiene. Its use is spreading, mainly in such applications as processing aids for automobile tires, high-performance adhesives, and sealants.



GENESTAR (heat-resistant polyamide resin)

GENESTAR is a new heat-resistant polyamide resin created by our proprietary technologies. It is used in electronic parts of mobile phones, computers, and the like, and its application is growing in backlights for LED liquid-crystal TV panels and in the automotive field as well.

* The world's first industrialized PA9T resin

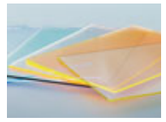
KURARITY (acrylic thermoplastic elastomer)

A unique material offering transparency, elasticity, and more. We were the first in the world to succeed in commercializing this material, using proprietary Kuraray technologies. The market rollout in the field of adhesion and molding materials utilizing these characteristics is very promising.

Functional Materials Business

Methacrylic resin

Taking advantage of features such as transparency, weather resistance, gloss, and abrasion resistance, methacrylic resin is widely used in parts for automobiles and home electrical appliances, and more. It has recently gained a large share of the market for LCD light-guide plates and other optical components.



Activated carbon

In 2018, we made a new start in the activated carbon business as the number-one activated carbon manufacturer in the world. We provide various types of activated carbon, including those made from coal, coconut shell and wood. We contribute to the environment and energy fields with high-value-added products such as water treatment applications, total solutions for air purification including gasoline vapor absorption applications, and electrode materials for capacitors.

Dental materials

Kuraray Noritake Dental Inc. applies polymer-chemistry-based technology and ceramic technology to develop a variety of dental materials that make it possible to restore teeth to a near-natural state. These dental materials have a very good reputation not only in Japan but throughout the world.

* In dental composite resins and adhesives, and in dental ceramics

Fibers and Textiles Business

KURALON & KURALON K-II (PVA fiber)

KURALON is a synthetic fiber based on polyvinyl alcohol (PVA) with several unique properties, including high tenacity, low elongation at break, and hydrophilicity. It is widely used in various industrial fields as a substitute for asbestos in cement reinforcement and as a separator for alkaline manganese batteries. *KURALON K-II* is another PVA fiber made using new production technologies. Water-soluble fibers with different dissolving temperatures and high-tenacity fibers can be obtained.

* Excluding China

Polyester

Applying proprietary polymers and state-of-the-art technology, we have been actively developing distinctive polyester fibers. Our fibers are used in clothing, industrial materials, nonwovens, and other fields.

CLARINO (man-made leather)

CLARINO is a man-made leather that combines our in-depth knowledge of the fine-grained structure of natural leather with high functionality. It is used for school bags and other kinds of bags, shoes, balls, gloves, clothing, interior accessories, and more.

VECTRAN (high-strength polyarylate fiber)

VECTRAN fiber has about 7 times the tensile strength of steel by weight and provides excellent abrasion, flex fatigue and chemical resistance, among other physical properties. It is used in a range of applications including aerospace, composites, electronic components, ropes, and sports goods.

MAGIC TAPE (hook and loop fastener)

MAGIC TAPE fastens firmly with only a light press. It is used in a wide range of fields, from clothing, shoes, bags, and medical products to automotive parts, and other industrial materials.

KURAFLEX & FELIBENDY (nonwoven fabrics)

KURAFLEX is dry-laid nonwoven fabric with excellent absorbency, air permeability, and flexibility. It is used for various kinds of applications such as wipes, masks and first-aid adhesive bandages. *FELIBENDY* is a new type of nonwoven fabric made using steam jet technology. It is used for medical bandages, *shoji* (translucent covering for sliding paper doors), tatami mats, and sound insulation panels.

New Businesses and Others

VECSTAR (liquid crystalline polymer film)

A liquid crystalline polymer film developed using Kuraray's proprietary film forming technology. The film has excellent high-frequency properties for electronic devices. Now its main use is for high-speed signal transmission flexible printed circuit boards, but its application is being expanded to multilayer printed circuit boards.

KURANODE (hard carbon for lithium-ion battery anodes)

This plant-based bio hard carbon (so-called "non-graphitizable carbon") is used as an anode material for lithium-ion batteries. It has good input/output performance, cyclability, and low-temperature performance.

ZECRUS (wastewater treatment system)

Using PVA-gel beads, Kuraray's proprietary high-rate wastewater treatment process allows for efficient operation in a compact system. Unlike conventional activated sludge, this unique system yields almost no excess organic sludge, resulting in reduced operational costs.

High-performance membrane module

Kuraray's high-performance membrane modules are used for water treatment in the industrial, water supply and medical fields. The modules can be used for filtration in a wide range of applications including production of ultrapure, drinking and sterile water, and their filtration efficiency helps to conserve space.

Semiconductor polishing pad (CMP pad)

Polishing pads for semiconductors are made of high-hardness polyurethane, a new material developed by leveraging the polyurethane design and manufacturing technologies cultivated through the development of *CLARINO* man-made leather. Kuraray's CMP pads feature high hardness with excellent properties to polish and planarize devices, very low scratch formation despite their high hardness, and long hours of duration due to their excellent abrasion resistance.

Micro-patterned film for head-up displays

Micro-patterned film composed of a microlens array (MLA) is used for the intermediate screen in projection type head-up displays (HUDs), which realize a wider virtual image and more information than conventional HUDs. Optical performance is controlled by precise MLA shape designed and manufactured using sophisticated technology, contributing to high efficiency and energy saving.