Corporate Profile

RESONAC
Chemistry for Change

RESONAC

Chemistry for Change

Purpose

Change society through the power of chemistry

Contribute to the sustainable development of global society by creating functions required of the times as an advanced material partner

Values

- Passionate & Results-Driven
- Agile & Flexible
- Open Minds & Open Connections
- Solid Vision & Solid Integrity

Ideal State

With the aim of realizing the goal of becoming a global top-level functional chemical manufacturer, as stated in our long-term vision (2021-2030), which stipulates the medium- to long-term direction of the newly integrated company, we will strive to be a company that can compete on the world stage in both qualitative and quantitative terms, a company that contributes to the sustainable development of a global society through innovation and the capability to develop new businesses, and a company that attracts the attention of other corporations by developing co-creative talent that represents Japan's manufacturing industry.

Global Top-Level Functional Chemical Manufacturer from Japan

Company that can compete on the world stage	Company that contributes to a sustainable global society	Company that develops co-creative talent that represents Japan's manufacturing industry
World-class competitiveness and profitability	Capability to create innovations and to develop new businesses	Ability to train competitive talent with shared values

Technological progress has enriched our lives from the perspective of physical belongings. However, the price for this progress has been paid by the global environment, which is currently in a state of crisis. Society is thus now faced with the pressing task of finding a way to continue to progress while protecting the environment. Chemistry is a building block of all industries, and the chemical industry therefore has the potential to help find a solution to the dilemma through co-creation with a range of stakeholders.

The power of chemistry can indeed cast light on the fundamental changes that need to be made, but this light may also cast a shadow. Our goal is to use chemistry to ensure that future generations can find happiness in a healthy global environment. Accomplishing this goal will require us to predict and create the technologies and functions required of the times before they arise, and to use the power of chemistry in a responsible manner.

Our foundation remains our wide range of cutting-edge functional materials technologies, which encompass areas spanning from midstream to downstream sectors. We will leverage this solid base to ascertain the roots of today's challenges and take the initiative in finding new solutions. To achieve this objective, we will think beyond the conventional boundaries of our individual business activities.

We are committed to co-creating a better society together with stakeholders who share our ideals, ranging from consumers to industry leaders, and to accumulating the strength expected of a global company as well as acting and making decisions in an agile and flexible manner. As a "Co-creative Chemical Company," Resonac will "Change society through the power of chemistry."

History

Contribute to Society through the Power of Chemistry, a Building Block of All Industries

Showa Denko K.K. and Showa Denko Materials Co., Ltd. were integrated on January 1, 2023 and reborn as Resonac. We are positioning the launch of the newly integrated company as our "second founding," and with the aim of becoming a world-class manufacturer of functional chemicals, we will implement further reforms to continue making innovative developments and proposals that meet the demands of the times and address various issues associated with a changing society.

–1960s

Postwar reconstruction and rapid growth

Stable food supply became a critical issue due to food shortages ongoing since the pre-World War II period. After the war, Japan entered a period of rapid economic growth centered on manufacturing.

*

1970s–1980s

A new era in pursuit of energy conservation and an information society

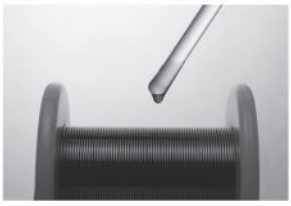
The oil crises of the 1970s accelerated the development of energy-saving products. In addition, advancements in information technology ushered economy and industry into a new era.

*

1912

Started research on the domestic manufacture of electrical insulating varnish essential for electrical products

Commenced research on insulating varnish for motors, which were being imported at the time, and succeeded in its domestic production in 1914



1931

Solved postwar food shortage problem through the manufacture of chemical fertilizers

Succeeded in the manufacture of ammonium sulfate using domestic technology

1934

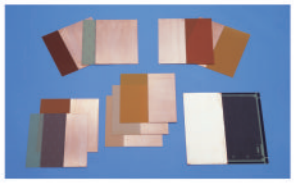
Contributed to the development of Japanese industry with domestically produced aluminum

Started commercial production of aluminum for the first time in Japan

1955

Achieved mass production of electronic circuits and contributed to the proliferation of TVs for the home

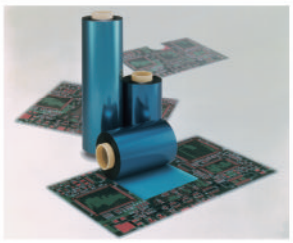
Started production of copper-clad laminates for printed wiring boards (MCL)



1978

Pioneered the eco-friendly manufacture of electronic circuits

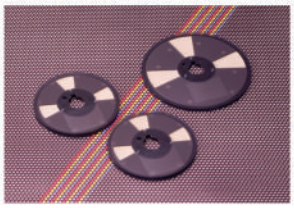
Started sales of PHOTECH, an environment-friendly alkali-developable photosensitive film that does not require solvents



1984

Contributed to evolution of displays with high-definition LCD screens

Started production of ANISOLM circuit connecting film for displays, helping realize high-definition LCD screens, which triggered expanded application from calculators and watches to personal computers



1988

Entered hard-disk business and led the way for high-speed communications in society through material development

Made a foray into the hard-disk business, increased hard-disk capacity in 2005, and started mass production of the world's first perpendicular magnetic recording hard disk

* photo: courtesy of The Asahi Shimbun Company

Showa Denko

Originating in the field of electrochemistry, Showa Denko developed its technological capabilities over the years to expand into the fields of inorganic chemistry, organic chemistry and metal materials. Many of its past technological achievements were passed down to serve the development of a wide variety of products in use today, including materials and components used for IT equipment and mobility devices as well as essential daily items.

Showa Denko Materials (former Hitachi Chemical)

Showa Denko Materials continued to create new functions and value centered on semiconductor materials and other IT and mobility products. These efforts were driven by its proficiency in developing products using the material design technologies it fostered since its foundation that maximize the properties of the materials.

1990s–2000s

Shift from analog to digital speeded up communications

In the 1990s, personal computers and mobile phones increased in popularity in general society. Technological innovation from 3G in 2001 to 4G and 5G has accelerated the digitization not only of information services but of all industries.

*

2000s–

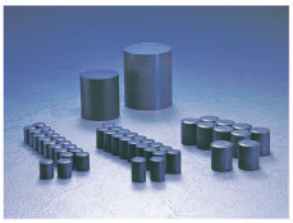
Aiming for a sustainable society

The Kyoto Protocol was adopted in 1997 and the Paris Agreement and the United Nations Sustainable Development Goals (SDGs) were adopted in 2015 with the aim of reducing greenhouse gases. The movement toward environmental consideration and realization of a sustainable society has truly taken hold in recent times.

1992

Contributed to high-density semiconductors that enhance the reliability of electronic devices

Started sales of reflow-resistance epoxy molding compounds that eliminate cracking in semiconductor encapsulants due to heat



1998

Improved the charging efficiency of electronic devices and realized energy-saving and miniaturization

Started mass production of anode materials for lithium-ion batteries that improve charging efficiency

1998

Enhanced productivity of high-density semiconductors essential for telecommunications equipment

Started production of CMP slurries for STI and enabled high-speed polishing when circuits are formed on wafers, realizing increased productivity and higher density in semiconductors

2001

Started production of molded plastic rear door modules

Succeeded in manufacturing molded plastic rear door modules for the first time in Japan using the resin molding technology nurtured over many year

2003

Achieved chemical recycling of used plastics that contributes to decarbonization and resource reuse

Launched plastic chemical recycling business, and in 2022 achieved a recycling volume of 1 million tons in aggregate

2017

Continued contributing to iron resource recycling with the best electrode quality in the world

Acquired SGL GE, a German graphite electrode supplier, and promoted global business development

2023

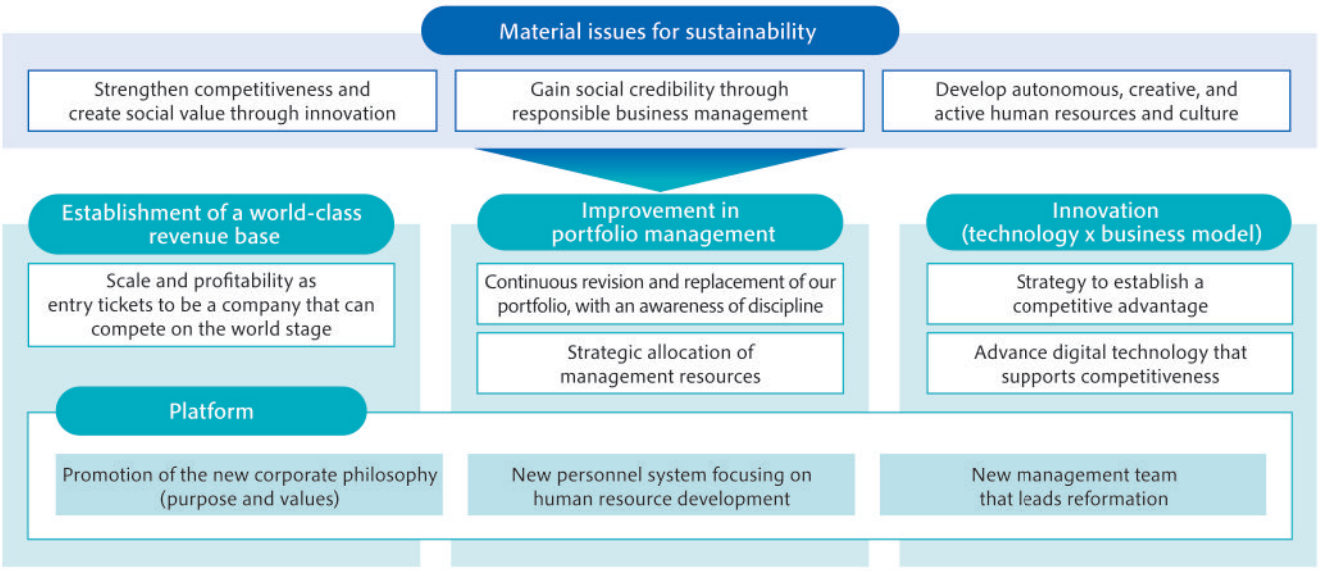
Birth of the newly integrated company

RESONAC
Chemistry for Change

Our Vision for Realizing a Sustainable Society

Main Strategies

Our long-term vision positions sustainability as an essential component of our Companywide strategies. Accordingly, we will establish a platform to become a global top-level functional chemical manufacturer and promote strategies incorporating our material issues for sustainability aimed at establishing a world-class revenue base, improving portfolio management, and spurring innovation.

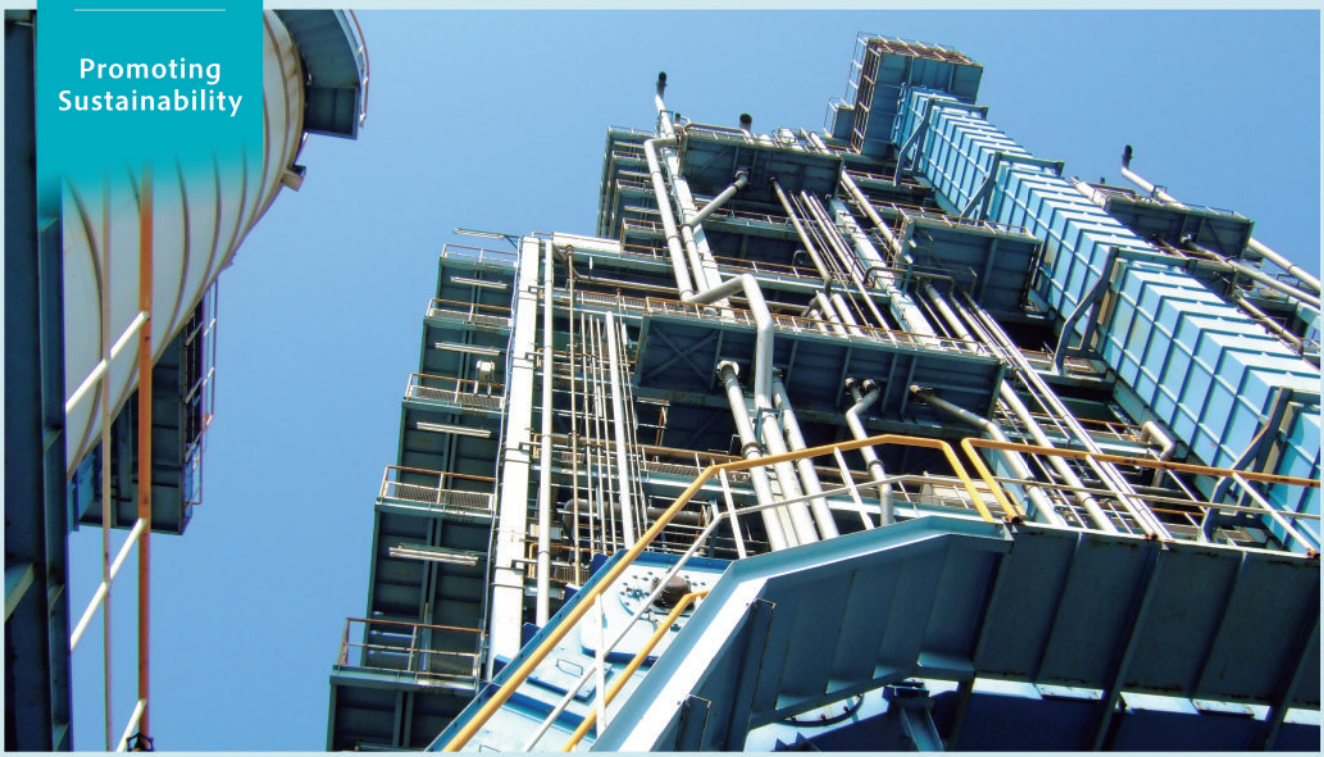


Contribution to the SDGs through businesses

We have positioned the focus of our corporate activities as contributing to SDGs 12 and 17 as a Co-creative Chemical Company that seeks to create a recycling-oriented society. Goals that we contribute to through businesses and products are in the upper part of the semicircle, with goals that we contribute to through our business foundation in the base. Going beyond areas where we already contribute through our businesses, we are looking ahead with the aim to contributing to the creation of a future that we seek to realize through the power of chemistry.

TOPICS

Promoting Sustainability



Change Society through Resource Recycling

Promotion of Plastic Chemical Recycling Business and Co-creation toward Large-scale Hydrogen Utilization

Seeking Ways for the Effective Utilization of Used Plastics

Plastic is all around us in our everyday lives. In the past, plastic has primarily been disposed of in landfills, through incineration or exported.
The generation of harmful substances from incineration and recent regulations on the export of waste plastics have led to growing demand for environment-friendly recycling methods featuring high utility.

In 2003, Showa Denko launched a plastic chemical recycling business that reuses plastics as raw materials for chemical products. We gasify used plastics at high temperature, dissolve the produced gas into molecules, and extract hydrogen and carbon dioxide. The hydrogen is used mainly as a raw material to produce low-carbon ammonia, and the carbon dioxide is used for dry ice among other things.

Achieved Recycling of 1 Million Tons of Used Plastics in Aggregate

For a long period of time, Showa Denko has been the only chemical company to produce ammonia by utilizing low-carbon hydrogen extracted from the gas produced through the process of used-plastic chemical recycling. The initiative resulted in the recycling of 1 million tons of used plastics in aggregate by 2022.

The Power of Co-creation in Decarbonization and Resource Recycling

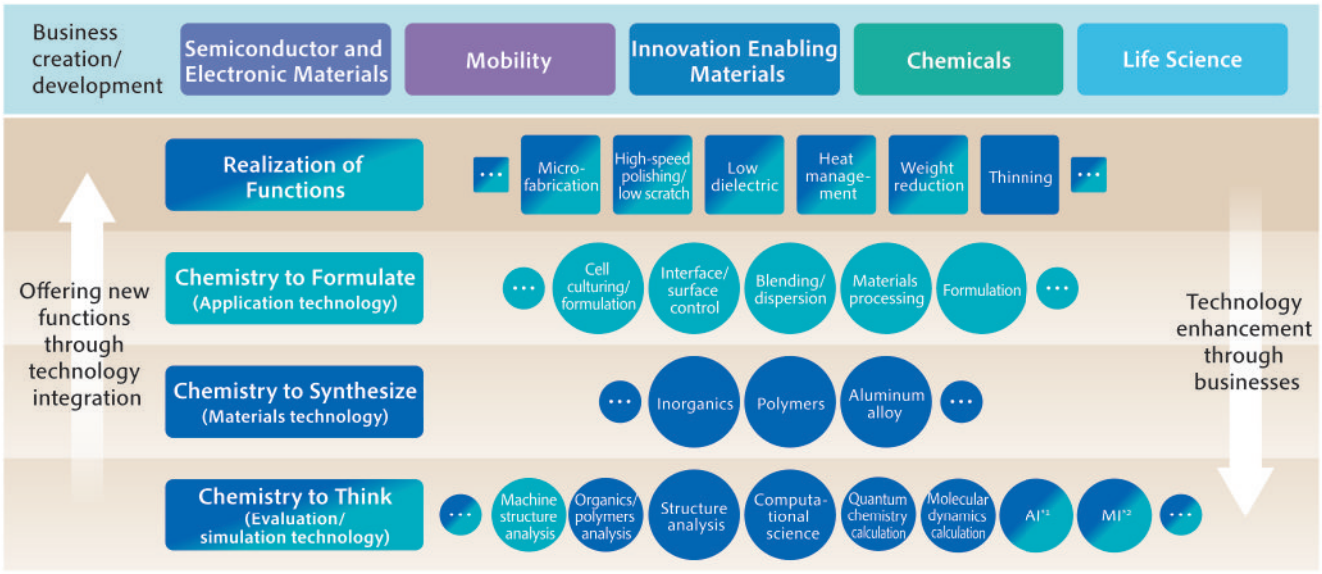
In a demonstration project adopted by the Ministry of the Environment as a model for promoting local consumption of locally produced hydrogen through recycling, used plastic is decomposed and the hydrogen extracted is supplied to fuel cells of a hotel. The initiative is ongoing despite the governmental demonstration project coming to an end. Going forward, we will continue to leverage the knowhow accumulated over the years to make the chemical recycling business into a pillar of our sustainability strategy and contribute to the creation of a decarbonized and recycling-oriented society.

Innovation

Maximizing Synergy from the Integration to Be an Advanced Material Partner

Create New Value through the Fusion of Technology

As an integrated chemical company, we will maximize the synergistic effects resulting from the combination of Showa Denko's materials technology and Showa Denko Materials' application technologies. Through the fusion of three fields of chemical technologies, namely the "Chemistry to Formulate," the "Chemistry to Synthesize" and the "Chemistry to Think," we will continue providing the market with wide-ranging functions, nurturing and creating business and strengthening our technologies through our business activities. By maintaining this virtuous cycle, we will realize autonomous reform of our business portfolio as well as rapid, sustainable growth.



● Strength of Showa Denko ● Strength of Showa Denko Materials

*1 AI = Artificial intelligence *2 MI = Materials informatics

Collaboration in Business Fields

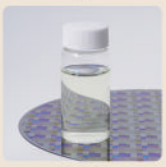
Development of CMP Slurries

Strength of Showa Denko
Chemistry to Synthesize

Fine ceramic particles and chemical synthesis technology

Strength of Showa Denko Materials
Chemistry to Formulate

Compounding technology



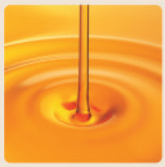
CMP Slurry

CMP slurry that ensures polishing rate, planarity and selectivity at the same time

* Top market share in the world for nano-ceria slurry

Development of Copper-clad Laminates for Multilayer PWBs

Strength of Showa Denko
Raw Materials



Proposals for improvement

Support for back-end processes in semiconductor manufacturing beginning with material development

Share market needs

Strength of Showa Denko Materials
Functional design and commercialization

It is important to minimize transmission loss to realize high-speed, large-capacity communications and to minimize thermal expansion to enhance mountability. Showa Denko has shifted to the use of resins featuring such advanced functionality for its copper-clad printed wiring boards (PWBs), an area in which we command high market share. As a result, we are making solid progress in the development of copper-clad PWBs with properties desired for the next generation.

TOPICS

R&D Activities to Shape the Future

Change Society through Innovation

Stage for Co-creation: A center for R&D in cutting-edge fields
Long-term R&D initiatives through co-creation inside and outside the Group

Develop Co-creative Human Resources to Resolve Social Issues

As the first step toward becoming a co-creative chemical company, it is important to cultivate engineers who possesses an effective understanding of our organizations, are proactive in learning about our new colleagues and can respond nimbly to changes in the operating and social environments. At the same time, many of our engineers have voiced their desire to contribute to the resolution of social issues through a new, cross-organizational network.

Seeking to protect and nurture this self-driven spirit of altruism, we have begun initiatives to cultivate co-creative human resources. In 2022, we established the Stage for Co-creation to lead R&D efforts in cutting-edge fields such as materials development in the environment and energy domains. The venue engages in joint research and personnel exchange as a hub for open innovation that aims to drive advancements in technology with people from inside and outside the Group.

Support and Strengthen R&D and Establish Foundations that Lead to the Creation of Sustainable Businesses

Long-term R&D themes that will contribute to the next generation are set at the Stage for Co-creation in such domains as next-generation high-speed communications materials and plastic recycling. Three platforms have been established at the venue to support and strengthen R&D activities, namely sustainability, technology data, and coaching and mentorship. The purpose of this is to cultivate an atmosphere conducive to fostering sustainability-based mindsets, creating a technological database and supporting ongoing value creation.

A Base for Connecting Diverse Technologies and Contributing to the Realization of a Sustainable Society

In order to leverage the synergies created through the integration to continue creating world-class technology and products, the Stage for Co-creation will also provide cross-business technical support for connecting the diverse technologies of the entire company. Furthermore, the Stage for Co-creation is open to members of the community and even people from overseas, making it a venue for collaboration and co-creation among individuals from inside and outside the Group aimed at accelerating innovation.

Segment Information

Supporting Society and Opening the Way to the Next Generation as a Functional Chemicals Manufacturer

Semiconductor and Electronic Materials Segment

Front-end semiconductor materials / Back-end semiconductor materials / Hard-disks / Silicon carbide (SiC)

This segment offers one-stop solutions through the development of products that broadly cover the front-end and back-end processing of semiconductor manufacturing. We aim to drive innovation in semiconductor technology through the power of materials.

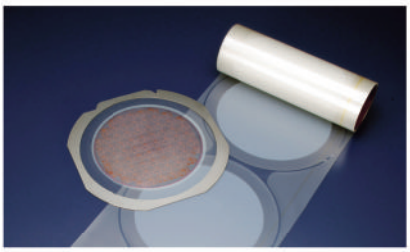
High-purity gases for electronics

We produce 20 kinds of high-purity gases for use in the semiconductor, LCD panel, LED, solar cell and other electronics manufacturing processes, including hydrogen bromide gas, chlorine gas and fluorinated gases.

CMP Slurries

Chemical Mechanical Polishing (CMP) Slurries are polishing materials used to planarize the unevenness of the interlayer dielectric and metal lines formed in the production process of semiconductor devices. In addition to ceria-type slurry that minimizes polishing damage for shallow trench isolation, we also offer a lineup of silica-type slurry for copper wiring formation.

Die bonding films for semiconductors



Die bonding films are used to bond IC chips to semiconductor package substrates. The films also contribute to ensuring the reliability of semiconductor packages by mitigating the distortion of the substrates caused by differences in the coefficient of thermal expansion, in addition to providing high bonding strength.

Glass Epoxy Multilayer Materials

These materials are made by impregnating glass cloth with epoxy resin and then laminating copper foil on both sides. They have high heat resistance, high elasticity and low coefficient of expansion, and are used in printed wiring boards and semiconductor package substrates.

Hard disks

As the world's largest hard disk manufacturer and seller, the Resonac Group is utilizing the leading-edge technologies to expand the storage capacity of its hard disks, while building the optimal production and supply system to help the Group meet the requests of customers in a smooth manner.

SiC epitaxial wafers

SiC epitaxial wafers are used in next-generation power semiconductors, which are expected to contribute to energy saving. These wafers have been increasingly adopted for use in power supplies for data center servers, devices for railroad vehicles, and onboard chargers for EVs.

TOPICS

Co-creation of Next-Generation Semiconductors

Change Society through the Power of Co-creation

Open innovation for semiconductor packaging materials and processes
Initiatives at the packaging Solution Center

Challenging Limits

Semiconductors used in computers and smartphones have advanced alongside efforts toward high integration and reduced cost. Going forward, there will be a need for even more sophisticated semiconductor technology in line with proliferation of a digital society characterized by next-generation high-speed communications such as 5G and 6G, artificial intelligence, machine learning and autonomous driving.

However, it's a fact that limits are being reached in technology to make circuits smaller and more integrated due to increasing complexity. For this reason, 3D semiconductor packaging technology has been gaining attention for its ability to stack multiple chips and enhance performance.

Accelerate Open Innovation

Speed is paramount in the development of semiconductor packaging. To achieve this, the Jisso Open Innovation Network of Tops (JOINT) consortium was established, with participating companies boasting exceptional semiconductor mounting technology.

By sharing technologies and information, member companies can quickly supply customers with integrated solutions that include ideal combinations of materials and processes required for semiconductor package manufacturing as well as never-seen-before processes and structures.

Individuals with Shared Values in a Cutting-edge Environment

A dedicated floor for the consortium has been equipped with state-of-the-art semiconductor mounting equipment with an integrated line for the prototyping and evaluation of advanced packages, thereby enabling total reproduction of the manufacturing process. The speed of development increases when material and equipment manufacturers can share their concerns from the prototype stage and work together to resolve them. Innovation is being born from the co-creation efforts of the JOINT consortium.

Segment Information

Mobility Segment

Automotive products / Lithium-ion battery materials

This segment focuses on the development of products and technologies required for next-generation automobiles, including technologies for weight reduction, electrification and heat control in line with advancements in vehicles of the future that are connected, autonomous, shared and electric (CASE), in particular electric vehicles (xEVs).

Molded plastic rear door modules

We manufacture and sell molded plastic rear door modules, each of which comprises a rear door made not of conventionally used metal materials but instead using resin, as well as various other components. We use composite materials that are excellent in strength, rigidity and shock resistance to manufacture the modules, which help enable greater latitude in car design and reduce vehicle weight.

Plastic gears

Resonac provides high-strength plastic gears made by processing aramid reinforced fiber sheets into which highly strong and highly heat-resistant polyamide resin has been injected and hardened (product name: “KM-9100”). The gears can be used even under heavy loads and harsh environmental conditions in which conventional plastic gears are unusable.

Lithium-ion battery materials

For the lithium-ion battery market, we offer a variety of items, including VGCF unique anode and cathode additive featuring high stability and quality, and SPALF aluminum laminated film produced and marketed.

Chemicals Segment

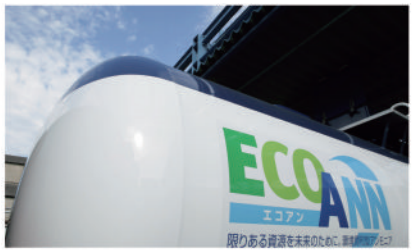
Petrochemicals / Basic chemicals and industrial gases / Graphite electrodes

We provide products that function as the building blocks of various industries and infrastructure and develop technologies to achieve carbon neutrality in such areas as reducing CO_2 emissions at manufacturing sites.

Ethylene

We contribute to effective use of resources and high cost competitiveness by not relying solely on naphtha (raw material diversification) to produce ethylene, which is widely used to produce various petrochemicals.

Ecoann ammonia



Ecoann is a low-carbon ammonia that is partially produced from recycled plastics. This helps reduce CO_2 emissions in the production process by 80% compared with conventional methods of producing ammonia, while maintaining the same quality as traditional products.

Graphite electrodes

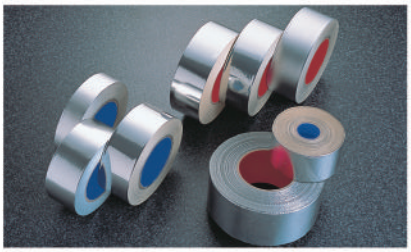
Graphite electrodes contribute to iron and steel recycling as a component to melt iron and steel scraps in electric steel furnaces. Our graphite electrodes are rated very highly by customers throughout the world due to their excellent quality.

Innovation Enabling Materials Segment

Functional chemicals / Resin materials / Coating materials /
Ceramics / Aluminum specialty components

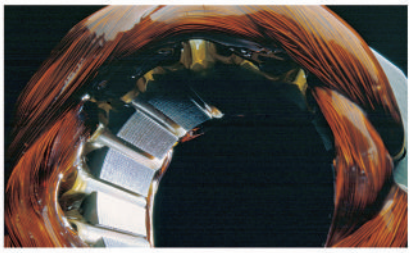
This segment provides a wide range of technologies and materials as a technology platform business supporting innovation and competitiveness improvements in our business groups.

Synthetic resin emulsions "Polysol"



The synthetic resin emulsions have low environmental impact because they are made by using water as a medium and contain no organic solvents or the like. They are used in diverse applications, including housing materials, building materials, fibers and paper processing.

Electrical Insulating Varnishes



These are electrical insulating banishes for impregnating coils in various motors and transformers, and for enameled copper wire. We provide a wide range of products that boast characteristics required for electric appliances, such as high heat resistance, durability and adhesiveness.

Non-stick coating chemicals

Non-stick coating chemicals are materials that are coated onto consumer goods such as cookware and home electric appliances as well as industrial goods including automotive parts and other industrial equipment for the purpose of preventing scorch marks and stains.

Ceramics for capacitors "SUPER-TITANIA"

SUPER-TITANIA high-purity titanium oxide is used as one of the main materials in ceramic capacitors installed in familiar electronic and electrical devices.

Cast aluminum alloy rods and their forgings "SHOTIC"

We are producing SHOTIC continuously cast rods of aluminum alloy and their forgings. The fine alloy structure contributes to reducing the weight of automobiles and the products are used as parts for compressors of invehicle air conditioners, etc.

Other Segment

In this segment, we conduct the manufacture and sales of in vitro diagnostic kits, as well as development of manufacturing methods and contract manufacturing of regenerative medicine products *.

*Products that are manufactured by cultivation or other appropriate processing of human or animal cells to be used for the treatment and prevention of diseases.

Contract development and clinical/commercial manufacturing of regenerative medicine products

Commissioned by pharmaceutical and other companies, Minaris Regenerative Medicine develops manufacturing methods and provides contract manufacturing services for regenerative medicine at its quality management system-equipped aseptic facilities. We have bases in Japan, Europe and the United States and contribute to the spread of regenerative medicine through our global supply system.

Corporate Information

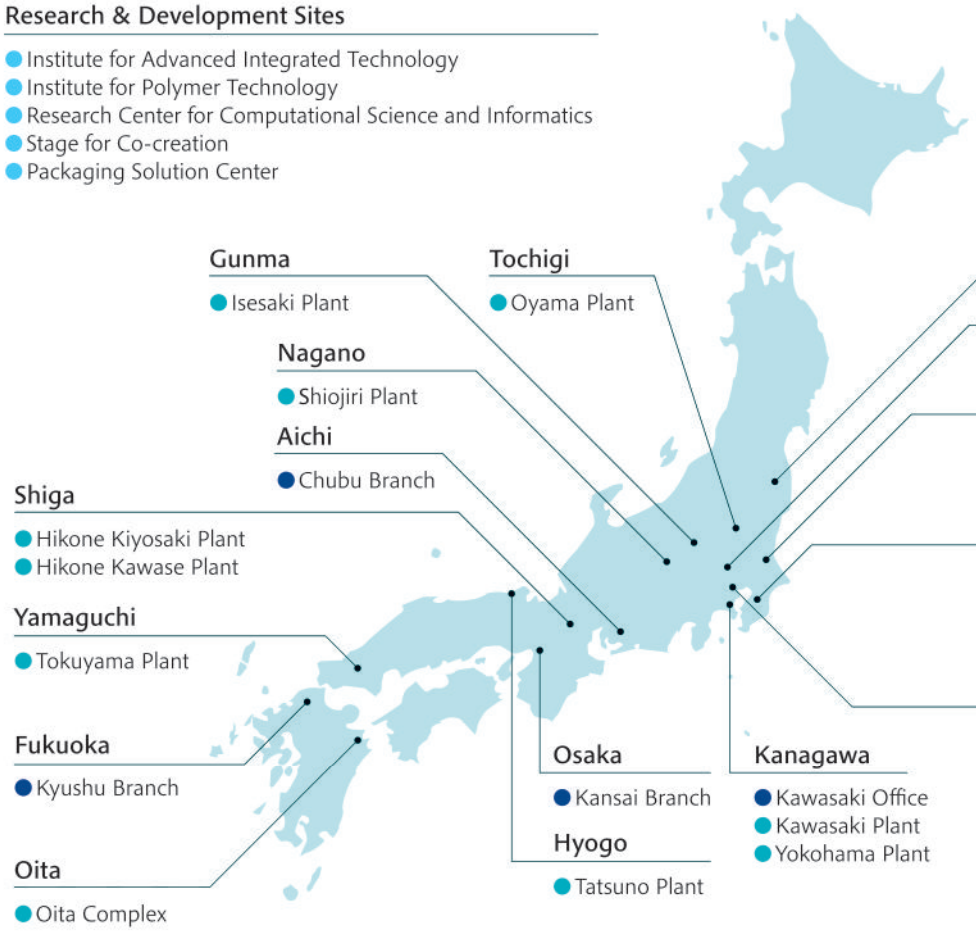
Locations

Sites in Japan As of January 1, 2023

● Commercial Subsidiaries
● Operation Sites

Research & Development Sites

- Institute for Advanced Integrated Technology
- Institute for Polymer Technology
- Research Center for Computational Science and Informatics
- Stage for Co-creation
- Packaging Solution Center



Fukushima
- Kitakata Plant
- Higashinagahara Plant

Saitama
- Chichibu Plant

Ibaraki
- Yamazaki Plant
- Shimodate Plant

Chiba
- Chiba Plant
- Goi Plant
- Matsudo Plant

Tokyo
- Head Office
- Innovation Center

Gunma
- Isesaki Plant

Tochigi
- Oyama Plant

Nagano
- Shiojiri Plant

Aichi
- Chubu Branch

Shiga
- Hikone Kiyosaki Plant
- Hikone Kawase Plant

Yamaguchi
- Tokuyama Plant

Fukuoka
- Kyushu Branch

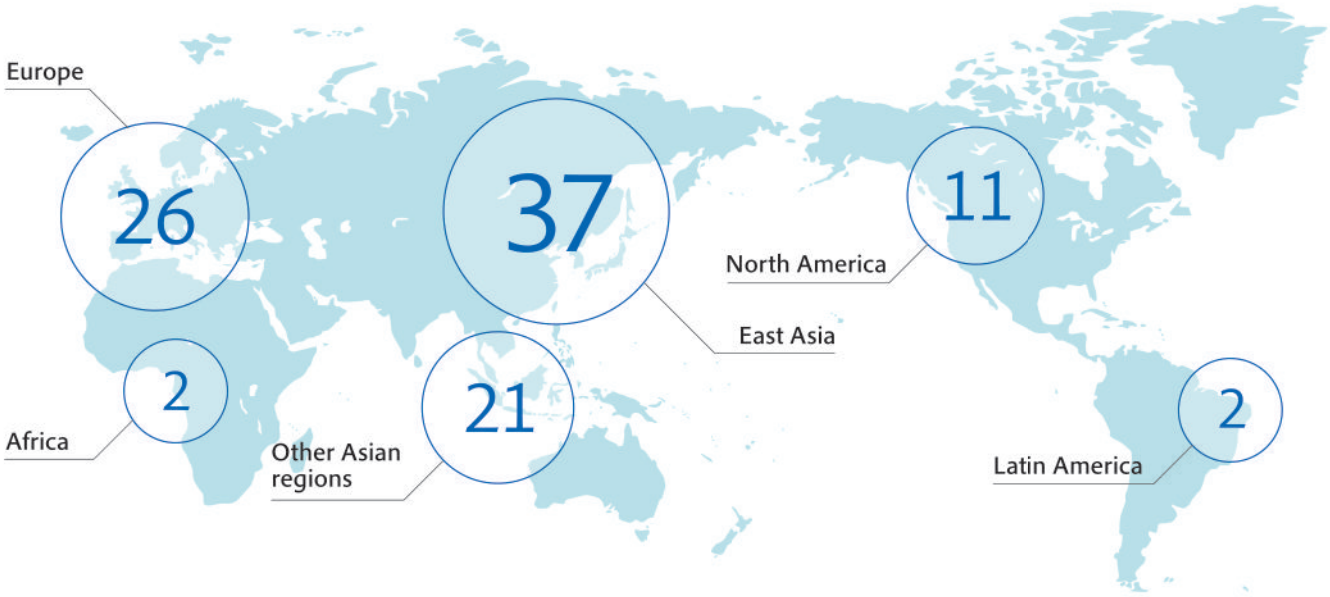
Oita
- Oita Complex

Osaka
- Kansai Branch

Hyogo
- Tatsuno Plant

Kanagawa
- Kawasaki Office
- Kawasaki Plant
- Yokohama Plant

Overseas (Major Consolidated Subsidiaries) As of December 31, 2021



Company Profile

Company Name	Resonac Corporation
Establishment	October, 1962
Capital	15.5 billion yen
Head Office	1-13-9, Shiba Daimon, Minato-ku, Tokyo, 105-8518, Japan
Consolidated net sales*	1,419.6 billion yen **Net sales by segment** Semiconductor and Electronic Materials ¥391.8 billion Innovation Enabling Materials ¥141.3 billion Other ¥121.4 billion Mobility ¥173.8 billion Chemicals ¥431.0 billion Sold businesses ¥160.3 billion
Net sales ratio*	In Japan: 53% Outside Japan: 47%
Consolidated number of employees*	26,054
Consolidated workforce composition*	In Japan: 48.8% Outside Japan: 51.2%
Consolidated subsidiaries*	124

* Fiscal 2021 results

As part of our departure on our journey as a newly integrated company,
we changed our name to Resonac Corporation.
This change in name is emblematic of our symbolic second founding,
which positions us to contribute to the sustainable development of the global society
by creating the functions required of the times as an advanced material partner.
We will make these contributions through co-creation with a range of stakeholders,
both inside and outside of the Group and the chemical industry.

RESONAC

Chemistry for Change

Desire Encapsulated in the New Company Name and Logo

The name "Resonac" was created by combining the word "resonate" with the "c" of "chemistry." This name encapsulates our desire to attract new partners and transform society by creating a movement toward the future that resonates with people, through the combination of our wide range of advanced material technologies and the technical prowess and ideas of our partners. This desire is also expressed through the Resonac logo, with the two-line design of the "R" symbolizing the co-creation born from this feeling of resonance and representing our stance toward shaping the future with an increasingly wide range of partners.

Resonac Corporation
1-13-9, Shiba Daimon, Minato-ku,
Tokyo, 105-8518, Japan

www.resonac.com