[Special Feature] What is a Co-creative Chemical Company?

Resonac Aims to Become a "Co-creative Chemical Company"

Why? Chemistry is a building block of all industries, and the chemical industry should be able to help find solutions to society's issues through co-creation with a range of stakeholders

In today's global society, the industrial structure is changing at a dizzying pace, and this speed continues to accelerate. Not only that, the challenges faced by various industries are too complex and large to be solved by a single company alone. Since chemistry is a building block of all industries, the chemical industry should be able to solve society's issues through co-creation with a range of stakeholders. Our current strategy is to focus our investment on the Semiconductor and Electronic Materials segment as a core growth area. Not only is the pace of technological innovation for semiconductors extremely fast, the combination of various technologies is essential. Co-creation is thus indispensable both inside and outside the company in order to develop the required functions at a swift pace. As a "Co-creative Chemical Company," we will quickly create new functions together with diverse talent and change society with the power of chemistry.

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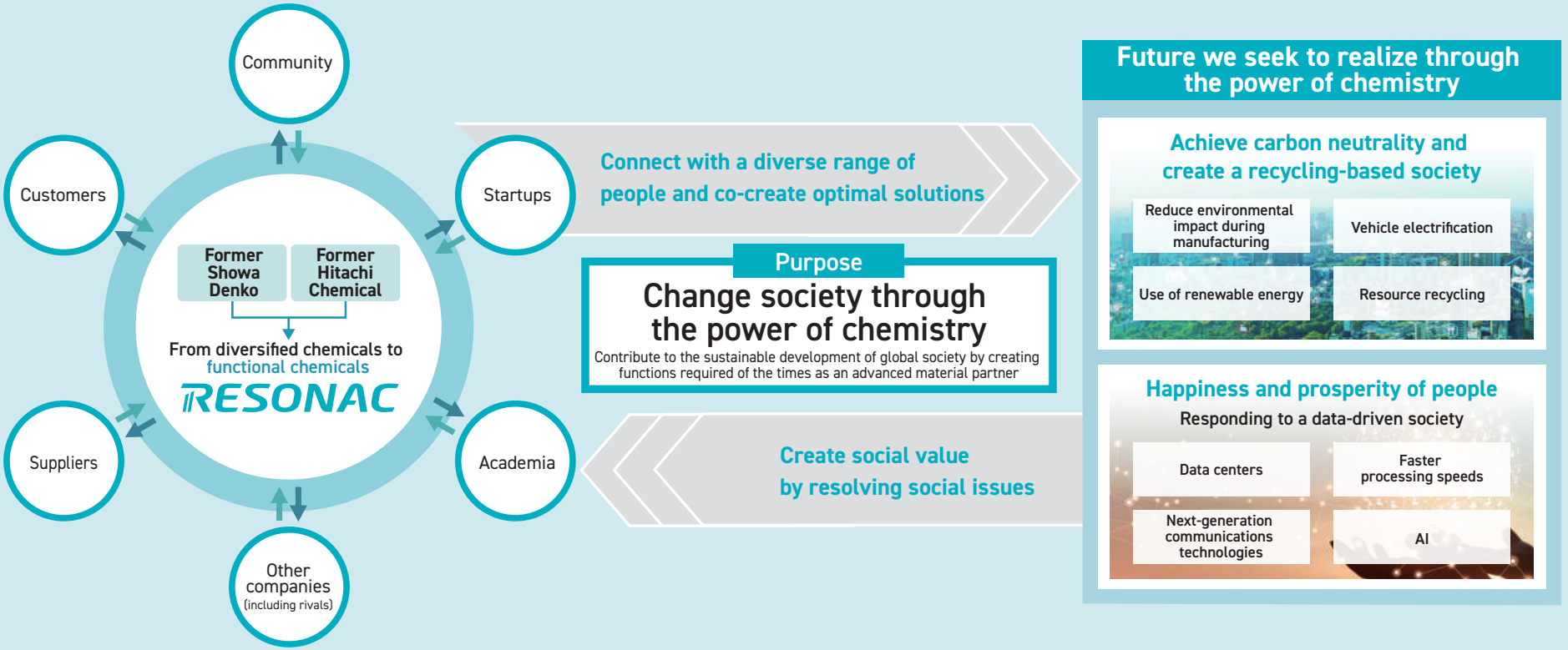

Who? In order to become a "Co-creative Chemical Company" that creates innovation, we need "co-creative talent" that embody our purpose and values

To become a "Co-creative Chemical Company" that creates innovation and changes society with the power of chemistry, we need human resources that embody our purpose and values. In other words, we need "human resources that can innovate and solve problems creatively through co-creation founded on autonomous bonds with people inside and outside the company as we work to resolve social issues."

Based on the idea that employees have ownership of their own careers, we have prepared a variety of career paths and educational opportunities to fit each person's individual aspirations, and have launched various systems to support connections both inside and outside the company.

One of these is AHA!, a global award that all Resonac Group employees can submit preliminary entries to. In addition to workplaces, cross-organizational teams establish declarations of action based on our purpose and values, set targets and concrete initiatives based on these declarations, and submit entries themselves. At the subsequent judging events, entrants will talk about their experiences putting our values into practice in carrying out our initiatives. This will result in feelings of mutual understanding (harmony) among employees, thus contributing to co-creation that transcends various boundaries.

We are working to nurture co-creative human resources by introducing unique training programs, such as co-creative leadership training and training sessions to bolster the co-creative collaboration capabilities, so that a wide range of Resonac employees around the world can further realize their purpose as a team.

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Source of value　**Diverse range of technologies and customer base that has been cultivated over many years** held by Resonac

① Problems are large, complex, and unknown　Changes in the external environment　② Changes in value

To create innovation and social value

"Co-creative talent" that embody our purpose and value is necessary

In the pursuit of resolving social issues, we will innovate and solve problems creatively through co-creation founded on autonomous bonds with people inside and outside the company

Passion
for solving social issues

Co-creation
across companies and departments

Leading change
with humility and persistence

Purpose: Change society through the power of chemistry

Values

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

A global award that leads to the development of co-creative talent

AHA!

Entry	Team exchange event	First screening	Final judging event	AHA! Meeting
January to February 2023	June	August	November	March 2024

The name of the award comes from our wish to realize co-creation that transcends boundaries, through creating feelings of mutual understanding (harmony) from Aha moments, which is created by learning about the activities of a wide range of teams and becoming inspired to do things that employees could not do or understand before.

*AHA!: Awards of Harmony, successor to the global awards held by former Showa Denko and former Hitachi Chemical.

POINT 01

Opportunities for personal growth

- Autonomously carry out activities
- Collaboration with various people, cross-departmental activities
- Find new friends
- Engage in activities from a new perspective

POINT 02

A connection of equals

- Interaction between entry teams
- A place you can promote your activities (work) to the people around you

How and Where?

We will establish a "place that fosters co-creation" with various stakeholders, and co-create cutting-edge technologies to help create a better society with a diverse range of people

A platform for open innovation, key to Resonac's R&D efforts

Stage for Co-creation

With an eye to solving social issues by listening to the needs of the world and the views of society, we established the Stage for Co-Creation (in Yokohama City, Kanagawa Prefecture). This venue serves as a platform for open innovation, which stands at the core of Resonac's R&D activities. We are integrating the organizations that house functions related to computational science, material analysis, mass production technology & facility management, and chemical safety management& evaluation, Resonac's areas of strength. In doing so, we aim to develop advanced technologies that can help create a better society through collaboration and co-creation with local communities, as well as with venture companies and universities inside and outside Japan.

P65 / R&D and Intellectual Property Strategies

Function as a central venue for R&D activities

Speed up R&D activities through the consolidation of R&D and research support functions in cutting-edge fields, and the creation of development methods that combine computational science and AI

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A platform function that brings knowledge together

Create value by solving social issues through co-creation both inside and outside the company

- Collaboration with venture companies and universities
- Collaboration inside and outside the company
- Use of AI promotion functions and learning functions (VR equipment, etc.)
- Combination of global conference/training techniques

Launch of the Stage for Co-creation!

On April 4, 2023, Resonac held the Stage for Co-creation's opening ceremony. Executives, guests, and a number of employees involved in the Stage for Co-creation cut the ribbon and talked about their expectations for co-creation initiatives and their enthusiasm for working at the venue. Ahead of the full-scale opening in 2024, most of the development members will move in during 2023 and kick operations into gear.

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Taking on technological innovation for next-generation semiconductors together with other companies

Packaging Solution Center

In 2019, we established the Packaging Solution Center (Kawasaki City, Kanagawa Prefecture) with the aim of creating cutting-edge technologies that can handle increasingly complex and constantly evolving semiconductor packages. The center's greatest strength is its state-of-the-art equipment, which can be said to be on par with the semiconductor package manufacturing equipment used by semiconductor manufacturers. It enables the mounting, evaluation, and simulation of semiconductors themselves using materials for a variety of semiconductors. The ability to verify the entire manufacturing process greatly contributes to the improvement of material functionality and development speed. The center is open not only for use by Resonac, but also to a wide range of industries. We are taking on the challenge of solving issues faced in next-generation semiconductor manufacturing while interacting with other companies and universities. In addition, JOINT2 was established as a consortium consisting of 12 companies* that manufacture semiconductor equipment, materials, and substrates. JOINT2 is a project subsidized by NEDO, and is working to develop technologies for high-density mounting of next-generation semiconductors, such as through the mutual use of technologies and information. The combination of member companies' materials and technologies allows for the proposal of optimal one-stop solutions for customers.

P77 / Semiconductor and Electronic Materials

*Members: Ajinomoto Fine-Techno Co., Inc., C. Uyemura & Co., Ltd., EBARA CORPORATION, SHINKO ELECTRIC INDUSTRIES CO., LTD., Dai Nippon Printing Co., Ltd., DISCO Corporation, TOKYO OHKA KOGYO CO., LTD., NAMICS Corporation, Panasonic Connect Co., Ltd., MEC COMPANY LTD., Yamaha Robotics Holdings Co., Ltd., ORC MANUFACTURING CO., LTD.

JOINT2

Message from Professor Tadahiro Kuroda of the University of Tokyo Graduate School

Web

Although Japan's share of the global semiconductor wafer manufacturing market has declined in recent years, we still have the ability to compete on the global stage in the fields of semiconductor materials and manufacturing equipment. I am impressed that Resonac, one of the first Japanese companies to focus on the back-end processes of semiconductor manufacturing that possesses the latest equipment and an expansive network, has carved out a very good position for itself.

Now What?

Co-creation to solve various issues has been "started" and steadily advanced to realize the vision we want to be

Case 1 A long-term R&D theme undertaken at the Stage for Co-creation that contributes to the next generation

Development of next-generation high-speed communications materials

In order to achieve next-generation high-speed communication (6G), a new semiconductor material that significantly reduces transmission loss is required to achieve a transmission speed 100 times that of 5G. With the aim of creating new materials for next-generation semiconductors used in 6G, Resonac is working with universities and venture companies to develop ceramics and interface control technologies for resins and fillers from scratch through material synthesis.

By utilizing the power of computational science from the molecular and material design stages, it is possible to verify as many as 90 types of combinations in the three months it previously required to verify a single combination.

Circular Economy; Plastic chemical recycling

In order to reduce the consumption of fossil resources, reduce CO_2 emissions, and eventually achieve carbon neutrality, we are taking on the challenge of establishing plastic chemical recycling, in which used plastics are decomposed, turned back into raw materials, and then used again to manufacture plastics.

Since 2022, we have been jointly developing technology with Microwave Chemical Co., Ltd., and in experiments using model samples of used plastics, we have succeeded in extracting raw material components such as ethylene and propylene with a yield of about 80%, reaching a certain point in establishing the basic technology. We are leveraging AI and computational science to elucidate the decomposition mechanism of plastics and investigate catalysts, which enables us to swiftly move forward with development.

Message from Microwave Chemical

When we were approached by Resonac, which was ahead of the times in launching a chemical recycling business, we were convinced that if we could combine our technology with Resonac's know-how, we would surely be able to create a new, one-of-a-kind chemical plastic recycling business in the world. We believe that the way both companies are always on equal terms and can exchange opinions freely has led to the acceleration of technology development.

Left: Mr. Kitani, Group Leader of Research and Development Department, Microwave Chemical Co., Ltd.
Right: Mr. Kameda, Manager of Business Development Dept. / Head of Chemical Recycling Business Div., Microwave Chemical Co., Ltd.

Case 2 Starting co-creation with customers in the evaluation of power module materials

Web

The Power Module Integration Center (located at the Oyama Plant in Tochigi Prefecture) has started full-scale operations to strengthen the development of materials for power semiconductors, which are essential for vehicle electrification, and the power modules packaged with these semiconductors. As an organization that modularizes and evaluates a wide range of Resonac's power module-related materials, the center has utilized this technology to develop materials and speed up this process. Since 2023, we have been evaluating materials under conditions similar to those set by our customers, and sharing the verification details. In doing so, we provide technological innovation support as far back as customers' material development phases and help shorten the development time for power modules. In fact, there have already been cases where customers have successfully reduced the number of prototype evaluations by half. By 2025, we aim to establish a system for joint evaluations with customers and help shorten development times further.

We have also started carrying out value proposition activities for power module-related materials in the marketing process.

P70 / Marketing Activities in the Automotive Market