

Strengths that Form the Basis for Value Creation

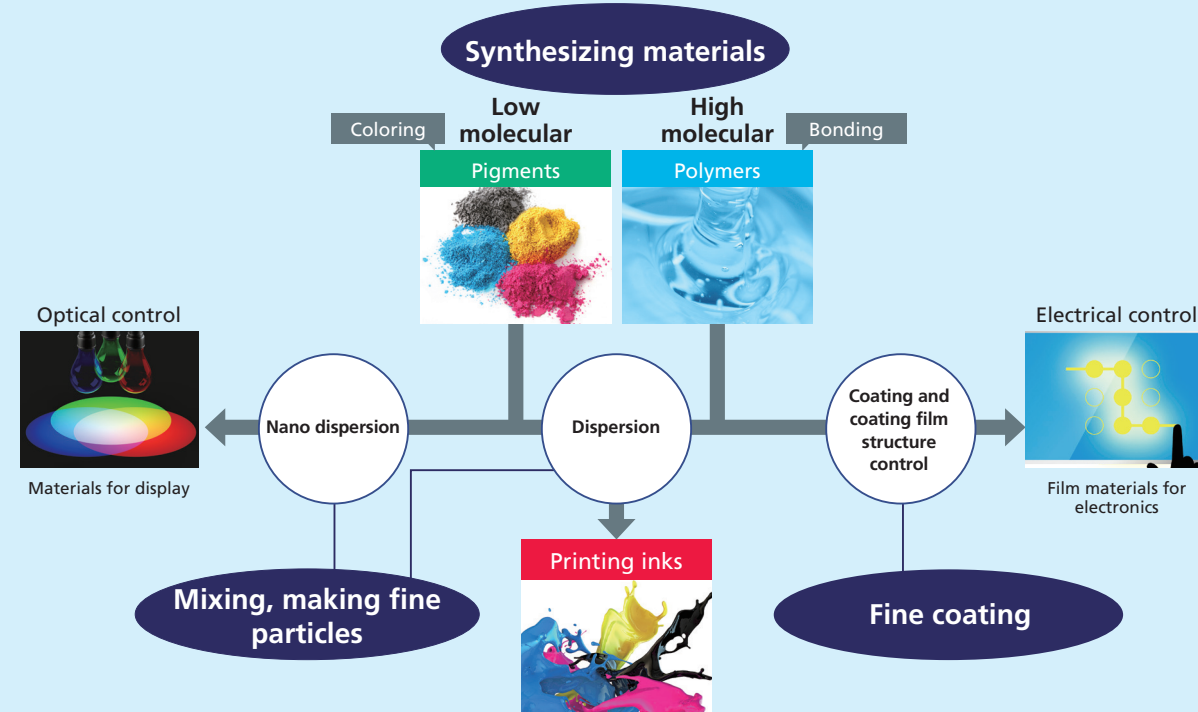
(1) Unique Core Technologies and Growth Potential

The Toyo Ink Group has invested considerable business resources into fields where the Group can leverage its technological strengths—such as technologies for the synthesis of pigments and resins, for integrated production of products using those as raw materials, and processing technologies such as dispersion, coating and coating film structure control. Going forward, we will work to create healthier and more comfortable lives for people around the world by focusing on the creation of new businesses in three key development areas—sustainability, communication and life—which we will set as new social needs.

Unique core technologies

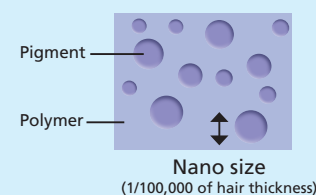
Synthesis technologies

The Toyo Ink Group creates original materials according to the required function using molecular design and synthesis technology. Pigments with controlled chromogenic properties and wavelengths and polymers with controlled adhesive and electrical characteristics are used in materials for sensors and electronic devices.



Dispersion technologies

Dispersion technologies that control the shape and surface state of pigments enhance printability and stability and bring out superior functionality. They are used for printing inks, display materials and materials for lithium ion batteries.



Coating and coating film structure control technologies

We deliver products with functions that meet the needs of our customers by processing sheets and films using coating and coating film structure control technologies. They are used for applications such as electromagnetic wave shielding films and sensor components.

TOPICS

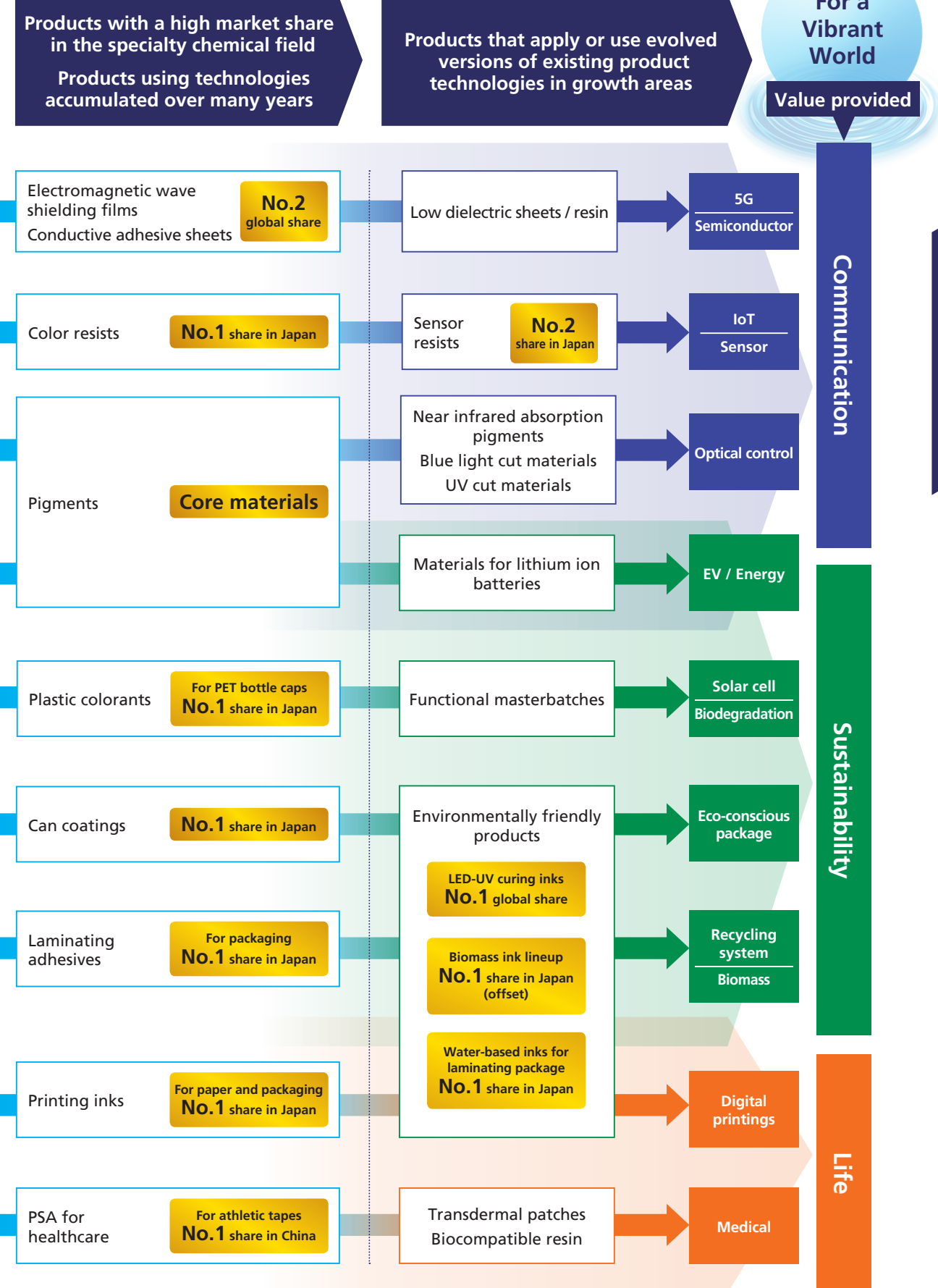
Established Toyo Ink Group Collaborative Research Center in Tokyo Institute of Technology

On January 13, 2022, the Toyo Ink Group and the Tokyo Institute of Technology established the Toyo Ink Group Collaborative Research Center, which conducts cutting-edge research in the fields of the environment, IT and biotechnology. The research center was established with the support of the Tokyo Institute of Technology's Open Innovation Platform. Going forward, the center will take on the challenges of creating value demanded in the new era through efforts such as developing next-generation batteries and CO₂ utilization solutions to solve global environmental problems, developing IT-related material technologies that contribute to the further advancement of digital technologies, and pursuing biotechnologies that will lead to next-generation medical technologies.



Toyo Ink Group's CEO Satoru Takashima (left) and President Kazuya Masu of Tokyo Institute of Technology (right)

Synthesis x Dispersion x Coating and coating film structure control



* Shares according to our research

Strengths that Form the Basis for Value Creation

(2) Co-creation with Customers

Over the course of more than 120 years since the time of its founding, the Toyo Ink Group has built long-term, stable and robust cooperative relationships with a wide array of customers. One of our key strengths is our ability to respond flexibly to changes in contemporary needs and solve problems that provide the value demanded by customers and society through our products.

Turning failure into value and creating new value through co-creation with customers

The co-creation story with Asahi Breweries

On April 20, 2021, Asahi Breweries, Ltd., a major beverage manufacturer in Japan, launched “Asahi Super Dry Nama Jokki Can” (Mug Beer Can) nationwide. Toyochem Co., Ltd.—a member of the Toyo Ink Group—worked together with Asahi Breweries to develop cans that could generate a foam head, which was crucial for the development of the Mug Beer Can. The Mug Beer Can has attracted a great deal of attention in Japan as a product that allows customers to enjoy the excitement of drinking a delicious mug of draft beer with a fine head of foam, just as when it is served at bars and restaurants, simply by opening the lid of the can. As the key technology in actualizing this new product value, Asahi Breweries utilized a “foam-generating beer can coating,” developed in a joint effort between Toyochem and Asahi Breweries after a series of discussions on “the value demanded of beer by customers.”

Accumulated can coating technologies

Coatings are applied to the inner surface of beverage and food cans, mainly to protect the can from its contents (corrosion protection) and to prevent the metal of the can from dissolving into the contents and changing the flavor. Our can coatings—developed using polymer synthesis technologies—have the top market share in Japan, and already have a long-running track record in use as internal coatings for beer cans. One of the values we have delivered over the course of that track record is reducing foaming when the can is opened. Canned beer that foams and gushes out unintentionally is typically regarded as a bad thing—a failure. Based on numerous past failures, we researched ways to suppress foaming, discovered that foaming occurs when the coated interior surface of the can is uneven, and accumulated technologies for producing coatings that can form smooth surfaces.

Partnership with Asahi Breweries, Ltd.

At the same time, in order to enhance our product development capabilities, we continued to approach end-product manufacturers, who are most familiar with the needs of consumers. During an R&D division exchange meeting between Asahi Breweries and Toyochem, stories of our past failures—where the foam in beer cans would gush out—proved to be a valuable hint. Although Asahi Breweries’ idea of creating a product that foams up when the lid of a can of beer is opened was the exact opposite of our conventional wisdom, we decided that it was possible to develop a coating to achieve this effect. It was truly a moment



when past failures helped us to create new value. It could even be said that this value that could not have been obtained by our company alone, and that it was created only because there was a deep level of dialogue and partnership with our customers. “The key point in appreciating the deliciousness of draft beer drunk from a mug is the foam. If we could develop a mag beer can, then customers could enjoy the same taste of beer served at bars and restaurants anywhere,” said Asahi Breweries. Toyochem empathized with the enthusiasm to deliver such a surprise and new value to consumers and began to engage in the challenge of developing a new can coating together with Asahi Breweries. The Toyo Ink Group has a corporate policy of being a company that enriches life and culture, and this was truly a challenge to create new value for people’s lives.

Providing new value to beer culture

With the foaming mechanism already understood, it seemed that the development of a new can coating would go smoothly. In reality, however, there were many obstacles to overcome along the way, such as controlling the shape of irregularities on the coated surface to optimize variations in foaming and bubble size, the construction of a quality assurance system, and ensuring the stability of production at factories. During the nearly four-year development period, Toyochem submitted

dozens of sample coatings. In the midst of the last-minute development schedule, employees from all departments—including sales, technology, production and management—came together to engage in the development efforts together with Asahi Breweries, right up until just before the start of production. When the sale of Mug Beer Cans began on April 20, 2021, it was a memorable day, with a real sense that our can coatings had contributed to providing new value to beer culture.

Accumulated can coating technologies

- Protect the can from its contents
- Prevent the metal of the can from dissolving into the contents and changing the flavor



Partnership with Asahi Breweries, Ltd.

- An idea that was completely opposite to our conventional wisdom
- Development of a can coating that forms irregularities on the inner surface of the can to optimize foaming

Turning past failures into value = Creating new value

We have made many mistakes during the course of manufacturing products over many years. Because we took each failure seriously and continued to face up to new challenges, the accumulation of those failures fed our technological capabilities, and became the source of our competitiveness. Above all, the strong and sincere partnerships we have

forged with customers with different perspectives are the key driving force for the creation of new and unprecedented value.

Going forward, the Toyo Ink Group will continue to provide new value that enriches the lives of people around the world, through co-creation with customers.

Voice of Customer

We interviewed Mr. Ryuhei Kuroda and Mr. Hiroaki Nakajima of Research & Development Laboratories for Packaging Technology, Asahi Breweries, Ltd., who were involved in the development together with us, in order to provide the “foam-generating beer can coating.”

The development of beverage cans is typically carried out together with a can manufacturer. It is normal for materials companies to be involved in the development of inner coatings via the can manufacturer. This case was unusual because we developed the coating in direct partnership with Toyochem Co., Ltd., which is a coating manufacturer. Although it was a joint development that resulted from various coincidences, looking back we feel that it was a very fruitful project.

Toyochem was quick to respond, answered graciously to requests for improvements right up until directly before tests using actual production machinery, and had a wealth of scientific knowledge to offer—so it was a really fulfilling technical exchange.

Asahi Breweries has been delivering deliciousness that exceeds expectations of customers for many years, mainly through two approaches: the evolution of beverages (the contents) and aluminum cans (as containers). Through the development of our Mug Beer Cans, we also acquired a new approach: inner coatings. By continuing to refine this partnership in the future, we hope to deliver even more delicious products to consumers.



Ryuhei Kuroda (right) and Hiroaki Nakajima (left)
Research & Development Laboratories for Packaging Technology,
Asahi Breweries, Ltd.