

# Contribute to Recycling Resources

For sustainable use of resources, we need to reduce the consumption of natural resources while at the same time circulating the resources we have. In addition to waste management and effective use of resources at our offices and Works, Sumitomo Chemical is working on the development and social implementation of recycling technologies for plastics and other resources.

## Circular System for Plastics

### Basic Stance

To realize a circular system for plastics, we are working to reduce, reuse, and recycle (mechanical recycling, chemical recycling) products at each stage of the plastic value chain.

In addition, the Group formulated the Sumitomo Chemical Group Basic Policy Towards a Circular System for Plastics in 2020 to work towards building a circular system for plastics and resolving plastic waste problems.

Sumitomo Chemical Group Basic Policy Towards a Circular System for Plastics

[https://www.sumitomo-chem.co.jp/english/news/files/docs/20200601e\\_policy.pdf](https://www.sumitomo-chem.co.jp/english/news/files/docs/20200601e_policy.pdf)

## Management System

To promote R&D related to chemical recycling, in 2020 we established research groups that deal with technologies to reduce environmental impact at the Petrochemicals Research Laboratory (currently the Essential Chemicals Research Laboratory).

In pursuit of more practical, socially beneficial applications of this research, we are working to cultivate the market for plastic products made possible by securing and recycling plastic waste, especially through the Business Development Office for a Circular System for Plastics, which was established in 2021 and renamed the Business Development Office for Circular Carbon Economy in April 2024.

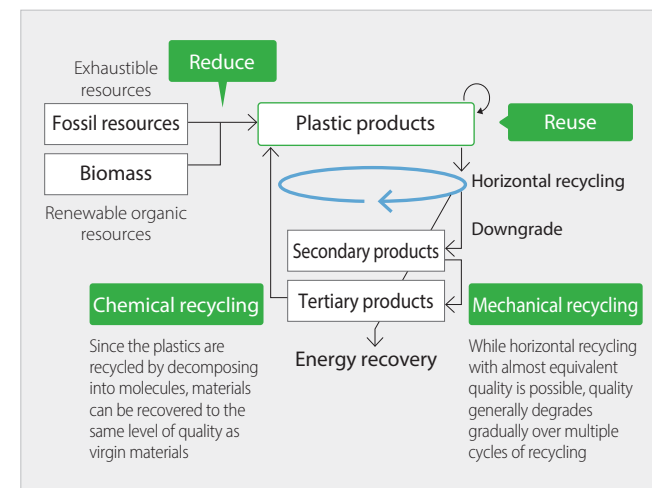
## Targets and Results

Sumitomo Chemical has identified “contribution to recycling resources” as one of our material issues to be addressed as management priorities, and we have set the amount of recycled plastic resources used in the manufacturing process as a KPI for this purpose. We are working to replace 200k tons/year of plastic used in our manufacturing process with recycled resources by 2030.

KPI: The amount of recycled plastics utilized in manufacturing processes	
Target	200k tons/year by 2030
Result	FY2023 Approximately 7,300 tons

## Examples of Initiatives

### Overall Picture of Circular System for Plastics



### Development of the Meguri® brand

Meguri® is a brand of plastic products and chemicals that can be obtained through recycling technology and contribute to reducing environmental impact. Meguri® products are the crystallization of the latest recycling technologies and the environmentally friendly technologies that we have cultivated in various fields as a diversified chemical company. We will expand the Meguri® product lineup and increase production and sales of these products, thereby playing a role in realizing a circular economy.



The brand name Meguri® means “circularity” in Japanese. The design of the icon is a deformed version of the kanji character “廻”, which means “circularity” in Japanese

## Chemical Recycling

We promote development of chemical recycling technologies through multiple routes in parallel, by combining our catalyst design and chemical process design technologies, in collaboration with external parties. Utilization of these technologies will reduce fossil resource use and plastic waste emissions, as well as GHG emissions from plastic waste incineration.

### Examples of chemical recycling through collaboration with other parties

	Technology	Cooperating Partners	Reference
①	Polyolefin production from waste-derived ethanol	SEKISUI CHEMICAL CO., LTD.	Completion of test production facility in April 2022
②	Direct olefination of waste plastics	Maruzen Petrochemical Co., Ltd. Muroran Institute of Technology	NEDO *1 GI Fund Projects *2 (Project scale: approx. 25.30 billion yen)
③	Ethanol production using synthesis gas derived from waste plastics	National Institute of Advanced Industrial Science and Technology (AIST)	(Project scale: approx. 24.08 billion yen)
④	Efficient alcohol production from CO <sub>2</sub>	AIST Shimane University	NEDO GI Fund Projects
⑤	Olefin production from alcohols	AIST	(Project scale: approx. 24.08 billion yen)

Explanation of items ④ and ⑤ continues below.

### ④ CCU Technology for Producing Methanol from CO<sub>2</sub>

NEDO GI Fund Projects

We have completed the construction of a pilot facility to establish a highly efficient process for producing methanol from CO<sub>2</sub> at our Ehime Works and have commenced operations at the facility. Carbon capture and utilization (CCU) technology is expected to serve as a game-changing solution to halt global warming and achieve a circular economy for carbon by recovering CO<sub>2</sub> and utilizing it in products, and we are accelerating the development and spread of various new CCU processes. We have resolved issues in development through

joint development with Shimane University Interdisciplinary Faculty of Science and Engineering, leveraging the internal condensation reactor (ICR), a technology that the University has been developing. We aim to complete the demonstration of this technology by 2028, as well as start commercial production using the new process and license the technology to other companies in the 2030s.

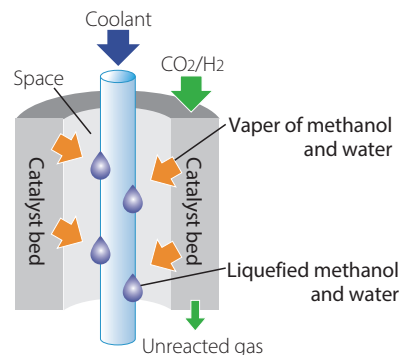
#### Features of this Technology

- Separating generated methanol within the reactor, which leads to improved yield, smaller equipment, and higher energy efficiency
- Separating by-product water, mitigating catalyst degradation



Pilot Facility for Methanol Production from CO<sub>2</sub>

### Principle of the ICR (Conceptual drawing)



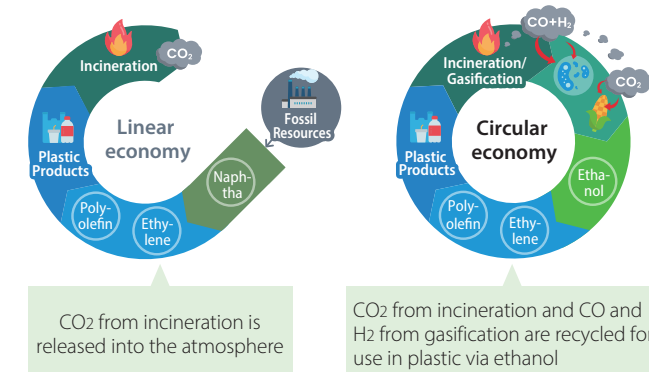
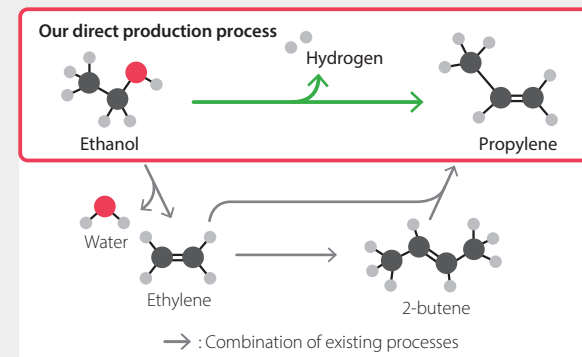
### ⑤ Environmentally Friendly Ethanol-Derived Polyolefin

NEDO GI Fund Projects

We have begun construction of a pilot facility to establish a process for producing propylene directly from ethanol, which is attracting attention as a sustainable chemical raw material. We will work to complete the construction of the pilot facility at our Chiba Works by the first half of 2025 and step up efforts to quickly implement the technology in society.

#### Features of this Technology

- Producing propylene directly from ethanol
- A newly-developed compact and low-cost process
- Producing hydrogen as a by-product, in addition to propylene



\*1 National Research and Development Agency, New Energy and Industrial Technology Development Organization (NEDO)

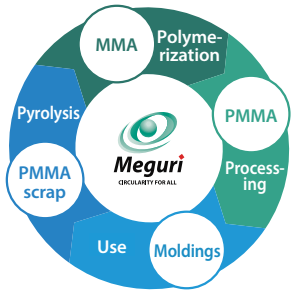
\*2 Green Innovation Fund Project

### Chemical Recycling System for Acrylic Resin

We have jointly developed with The Japan Steel Works, Ltd. a technology for pyrolyzing acrylic resin and recycling it, with high efficiency, into MMA (methyl methacrylate) monomer, which is a raw material for acrylic resin (polymethyl methacrylate or PMMA). We have built the pilot facility at our Ehime Works and aim to complete the demonstration of this technology and commercialization in FY2025.

\* PMMA made from recycled monomers reduces GHG emissions throughout the product lifecycle compared to products derived from fossil resources.

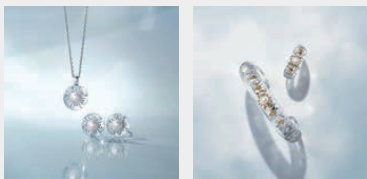
#### ■ Overview of PMMA Chemical Recycling



PMMA Chemical Recycling Pilot Facility

#### An Example of Collaboration

We are supplying the sustainable material "SUMIPEX® Meguri®," produced using our chemical recycling technology, for acrylic jewelry to be released by Star Jewelry Co., Ltd.



Acrylic jewelry made from recycled MMA through chemical recycling  
Photographs provided by Star Jewelry Co., Ltd.

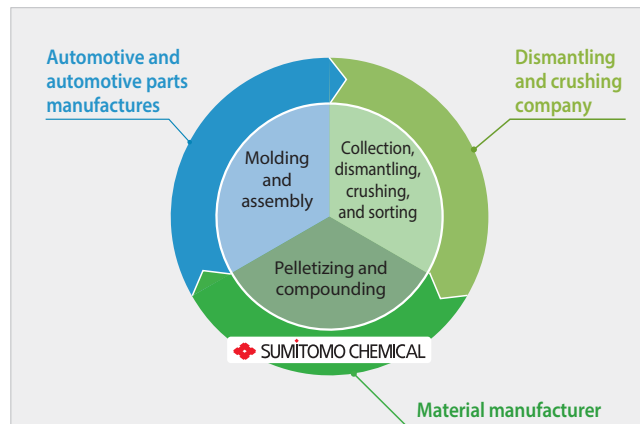
### Mechanical Recycling

We are promoting the development of various technologies to achieve mechanical recycling for plastic products.

#### PP (Polypropylene) Mechanical Recycling

As one of our mechanical recycling initiatives, our company and REVER CORPORATION have concluded a business alliance agreement for mechanical recycling of waste plastics derived from end-of-life vehicles. Through this alliance, the two companies will work to build a circular system for recycling waste plastics that includes the whole process, from collection to sorting to recycling into useful plastic resources, and to accelerate business development for plastic recycling.

#### ■ Overview of PP Mechanical Recycling



In September 2022, we made a decision to introduce a pilot-scale mechanical waste processing facility that performs an integrated process of high-precision sorting and removal of foreign matter according to the type and characteristics of waste plastics.

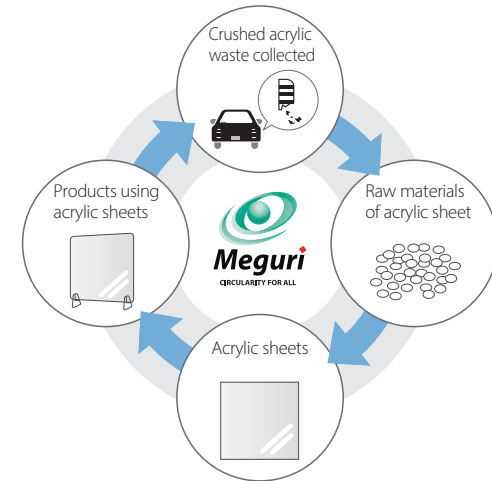
In addition, we will work towards the acceleration of business development.

In July 2024, we began to supply evaluation samples to automotive-related manufacturers.

### PMMA (Polymethyl Methacrylate) Mechanical Recycling

"SUMIKA ACRYL SHEET™ Meguri®" is an acrylic sheet commercialized by SUMIKA ACRYL Co., Ltd., made from mechanically recycled raw materials by collecting, sorting, and crushing waste materials generated in the acrylic resin manufacturing process. Despite being recycled material, this product has excellent optical properties.

#### ■ Overview of PMMA Mechanical Recycling



#### An Example of Collaboration

We are supplying the acrylic sheet "SUMIKA ACRYL SHEET™ Meguri®," produced through mechanical recycling technology, to Koizumi Lighting Technology Corp., a specialized lighting manufacturer.



Lighting sample made using recycled MMA through mechanical recycling

Photograph provided by KOIZUMI LIGHTING TECHNOLOGY CORP.

## Opened Innovation Center MEGURU, a new research facility at our Chiba site

Sumitomo Chemical completed construction of its new research facility Innovation Center MEGURU at its Chiba site in June 2024 and began operations.

The purpose of this research facility is to transform the research area at the Chiba site into an R&D hub for environmental impact reduction technologies and new materials. By consolidating relevant research groups and personnel at the Chiba site and fully utilizing our research resources, we will further accelerate technological development, and this, in turn, will create new value.



Innovation Center MEGURU

Sumitomo Chemical Begins Operations of Newly Established Innovation Center, Consolidates Environmental Impact Reduction Technology Research Groups to Accelerate Creation of New Value

<https://www.sumitomo-chem.co.jp/english/news/detail/20240627e.html>

## Reduction of Plastic Used in Product Packaging and Use of Recycled Materials

With regard to feasible cases, including products, raw materials, production sites and other materials, Sumitomo Chemical Garden Products Inc. is working as swiftly as possible to adopt materials that reduce environmental burden and aims to switch over to 100% environmentally friendly products by 2030. (Some examples of applicable products.)

### Soft packaging

The company is contributing to the reduction of the use of plastic.



### Recyclable materials

The company is using recyclable PET.



The company is acting as a registered member of Plastics Smart (use and reduce plastic containers).



Initiatives of Sumitomo Chemical Garden Products for sustainability (Japanese only)

<https://www.sc-engei.co.jp/company/sustainability/>

## Resource Saving and Waste Reduction

### Basic Stance

We are systematically working to reduce the amount of exhaustible raw materials used, quickly and properly dispose of PCB waste, and reduce the amount of waste sent to landfills. Furthermore, we are setting targets related to the recycling of waste and plastic waste, and are promoting resource recycling initiatives.

### Management System

The President serves as the chief coordinator and the executive officer in charge of Responsible Care serves as the coordinator of the Environment and Climate Change Action Group of the Responsible Care Department. This group is responsible for matters related to environmental protection for the Company as a whole and supports the environmental protection activities of Group companies.

Our worksites (head offices, Works, research laboratories, etc.) have established sections in charge of environmental protection operations, appointed coordinators and managers, and execute specific duties. Regarding the execution of duties, the corporate department (Responsible Care Department) formulates Company-wide annual policies and Company-wide medium-term (three-year) policies. Then each worksite, in light of these policies and in consideration of its own characteristics and regional situation, formulates an action policy and undertakes specific activities from the new fiscal year.

Regarding amendments to laws and regulations, the Responsible Care Department vigilantly pays attention to trends related to the enactment and amendment of environmental laws and, as appropriate, provides feedback through national specialized committees and other organizations. All people addressing the problems also establish targets (details of the amendments, possible impacts, visualization of countermeasures, etc.) and commit the Company to addressing the issue being targeted.

Furthermore, with regard to amendments that have a large impact on business, we access the necessary information in advance and notify worksites to prepare for meeting compliance requirements.

**Organization of Responsible Care**

## Examples of Initiatives

### Promoting Resource Saving

We are striving to enhance the economic benefits gained from resource saving activities, such as improving the throughput yield of exhaustible raw materials and product yield.

### Exhaustible Raw Material Use (Sumitomo Chemical and Group Companies in Japan)

(Thousand tons)

	FY2021		FY2022		FY2023	
	Sumitomo Chemical and Group Companies in Japan	Sumitomo Chemical	Sumitomo Chemical and Group Companies in Japan	Sumitomo Chemical	Sumitomo Chemical and Group Companies in Japan	Sumitomo Chemical
Hydrocarbon compounds	1,713	1,429	1,684	1,421	1,451	1,196
Metals (excluding minor metals)	115	111	104	100	85	81
Minor metals	17.4	0.03	16.2	0.07	15.0	0.04

Note: Economic effects are detailed in the [supplementary data \(page 6\)](#)

### Promoting the Monetization of Generated Waste and Increasing Recycling Internally and Externally

We have achieved a major reduction in landfill waste by reducing the amount of waste generated and promoting recycling. In addition, as a specified resource identified by the Act on Promotion of Effective Use of Resources, we are also working to reduce the generation of industrial byproducts (sludge).

### Moving up the Schedule for the Treatment of Waste with Minute Amounts of PCBs before Legal Disposal Deadline Set by the PCB Special Measures Law

We winnowed the external operators jointly contracted to dispose of waste by Group companies in Japan down to just one. Regarding the waste with minute amounts of PCBs (transformers, condensers, etc.) being stored or used by each company, we formulated and are carrying out a plan to treat the waste over multiple years. We plan to treat all applicable equipment by March 2025.

## Direct Recycling Initiatives for Battery Cathode Materials

NEDO GI Fund Projects

We are developing recycling technology that regenerates cathodes collected from used lithium-ion secondary batteries without returning it to metal. By simplifying the conventional process, CO<sub>2</sub> emissions are reduced and recycled cathode materials can be produced at low energy and cost. JERA Co., Inc. and we were selected for NEDO's\* "Green Innovation Fund Project: Development of Next-Generation Storage Batteries and Next-Generation Motors". Both companies will promote development of the recycling technology and social implementation.

\* New Energy and Industrial Technology Development Organization (NEDO)

### Key Points of New Process Construction and Value Creation

