

## Material Issues for Future Value Creation



# Advance Innovation

We believe that innovation, which is generated by our “ability to develop innovative solutions by leveraging its technological expertise in diverse areas,” one of Sumitomo Chemical’s core competencies, is the source of our future value, and we have designated “advance innovation” as one of the material issues for future value creation. We will continue to strive to enhance our corporate value through innovation, focusing on four priority areas: the related fields of environment, food, healthcare, and ICT.

## Research and Development

### Basic Stance

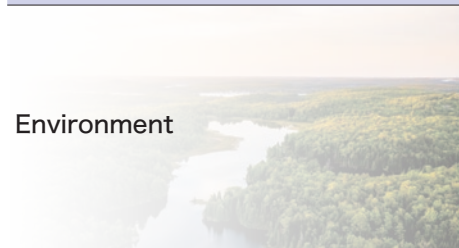



Amid increasing uncertainty about the business environment surrounding Sumitomo Chemical Group, the role played by the chemical industry in solving societal issues, such as environmental, energy, and food issues, is enormous, and our business opportunities are expanding. Our research and development is based on the basic policy shown on the right.

### Basic Policy

1. Early commercialization of development items
2. Building the foundation of next-generation businesses
3. Building and operating a system to continuously create innovation
4. Promoting R&D based on business (commercialization) strategies and intellectual property strategies.

### Four Priority Areas

Sumitomo Chemical has identified four priority areas for the creation of next-generation businesses, and within these areas, we have defined focus domains where we can make the most of our advanced technologies. For each of these domains, we will identify multiple business candidates based on market growth potential and accelerate their R&D and commercialization through the innovation ecosystem and stage-gate management system of research themes.

Research Theme		
Priority areas	Focus domains	Major candidate businesses
 <b>Environment</b>	Energy management	Materials for next-generation battery
	Reduction of GHG emissions	Functional membrane
		Wastewater processing
Resource circulation	Chemical recycling (Plastic recycling) CO <sub>2</sub> utilization processes	
 <b>Food</b>	Sustainable food production	Functional feed Biorational materials
		Food loss reduction
 <b>Health Care</b>	Advanced medical care	Regenerative medicine and cellular therapy business Cellular pharmaceutical materials
		Prevention
	Early diagnosis and health examination	
 <b>ICT</b>	Edge/IoT device materials and components	Display materials Sensor materials
		Communication/Semiconductor materials and components

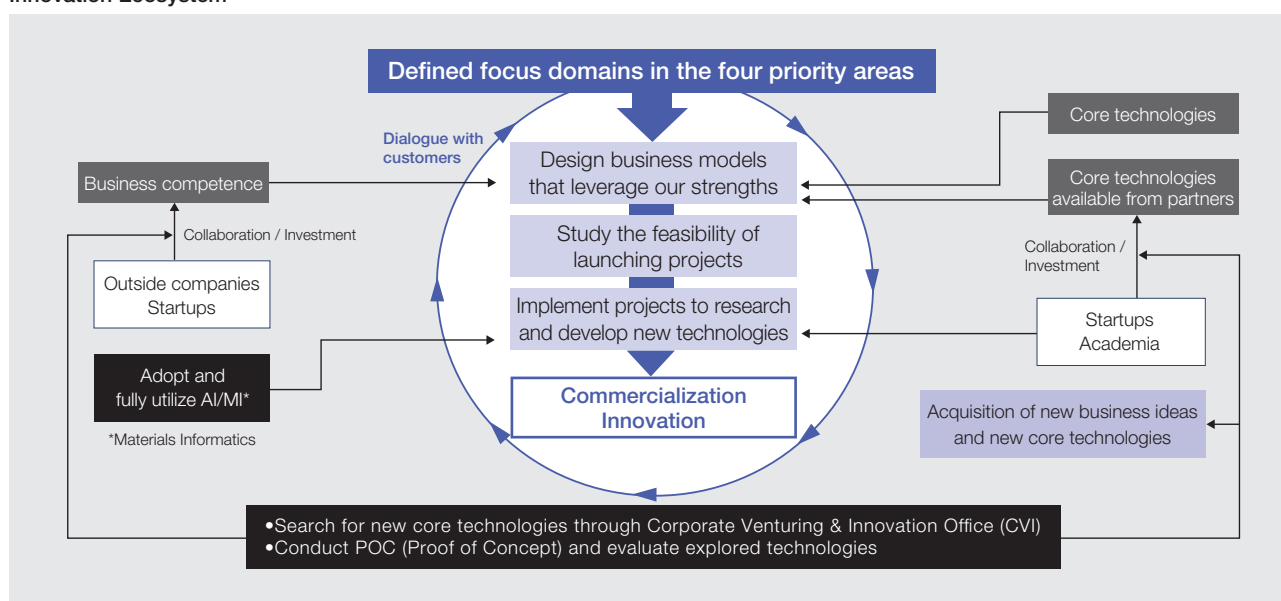
## Sumitomo Chemical's Innovation Ecosystem Accelerates the Creation of Next-Generation Business

Sumitomo Chemical is building an innovation ecosystem (a system that continuously creates innovation) to steadily link R&D and business development in the four priority areas to the creation of next-generation businesses.

In each of the four priority areas, we have defined focus domains for our efforts within four priority areas, have identified core technologies that we own and core technologies that we do not own, and we are acquiring non-owned technologies through collaboration with startups and academia. As for business competence, we are also supplementing the lacking areas with alliances and investments with outside companies and startups, considering

designing a business model that leverages our strengths and thematizing. At each stage of promoting themes, we communicate closely with relevant internal departments, external partners, and customers, and appropriately reflect their feedback to promote research and development. We also thoroughly utilize digital technologies such as AI and MI to accelerate development. In addition, we will incorporate new ideas and technologies that emerge in the course of theme promotion and dialogue with partners, and link this to the continuous creation of innovations.

### Innovation Ecosystem



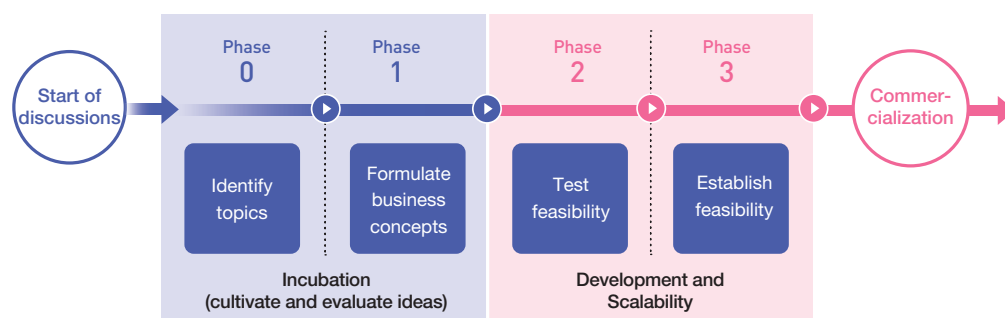
### Stage-gate Management System

In considering thematization, the Stage-Gate Management System for Corporate Research Themes was introduced in earnest in FY2019, and research themes are managed in four stages, from the idea stage to commercialization. Phases 0 and 1, the initial stages, are combined as the "incubation" stage, and Phases 2 and 3, the more advanced stages of research, are designated as the "development and industrialization" stage. We will proactively incorporate internally proposed themes in the idea stage as Phase 0. On the other hand, we clarify the requirements for pass-

ing through the gate in each phase, and determine whether or not to pass through the gate through deep discussions not only with the research division but also with the business divisions.

This has enabled us to promptly create new themes and make decisions on discontinuation of projects, taking into account their future potential. In the past three years, about half of the research themes have been replaced due to the creation of new themes, interruptions, and transfers to business divisions.

### Overall picture of the stage-gate management system



## Material Issues for Future Value Creation



# Advance Innovation

## Message from Researchers

\*Affiliations and positions are as of July 2023.

We have been generating innovations in a variety of fields. Here, our research specialists, who have been at the forefront of their fields for many years, introduce our R&D strengths and our efforts toward future innovation.



### Adding plus one to existing knowledge to create new products and value

IT-related Chemicals Research Laboratory Senior Fellow

#### Koji Higashi

Since joining the company, I have been developing optical products, mainly polarizing films, for more than 30 years. Polarizing films are composed of many components such as retardation films, protective films, and adhesives, in addition to polarizing elements which are responsible for the main function. As a result, I could not be involved in all of them, but I had been involved in a wide range of development from materials to product and product processing.

In the development process, in cooperation with the business divisions, we visited our customers many times, and listened to their needs and even their complaints, in order to realize optical characteristics that they could decide to adopt our products. And in cooperation with our manufacturing and quality assurance departments, we had developed products that satisfy customers' usability like processability and quality requirement in addition to optical characteristics. As a result, we could quickly offer new polarizing films for LCD/OLED displays used in TVs and smartphones, which have now become the de facto standard, and we have established the present position in the polarizing film market. And although the market environment is changing quickly and rapidly, I believe we are now in a situation where we can say that there is at least one product in every household that uses Sumitomo Chemical's polarizing films.

I was mainly in charge of optical design of individual films and laminated products, on the other hand, to create new products that meet customer requirements, no matter how many times I have been involved I was always impressed by our company's comprehensive ability to make a mass production system by collaborating with related departments such as process design, quality control department and others. Unfortunately, some of these products had never been realized, but I believe that these experiences have led us to the success of mass production of new products such as liquid crystal coating materials for OLED displays which are our current mainstay products.

Currently, cooperating with business divisions, we the Information & Electronics Chemicals Research Laboratory are searching for new products/new technologies that take advantage of Sumitomo Chemical's strength by adding "plus one" to our core technologies. This "plus one" is not only a new idea but may also be signifying knowledge of the wide range of technological fields covered by Sumitomo Chemical and the many technological assets accumulated over its long history. Currently, we are studying materials for high-value-added displays, telecommunications, semiconductor post-processes etc. It would be great if we could create new products in these areas by combining current knowledge or technologies, these past assets, and the technologies of universities or startups.



### Using new technology and research infrastructure to realize sustainable agriculture

Health & Crop Sciences Research Laboratory Senior Fellow

#### Shinichi Kawamura

Modern agriculture has evolved supported by various technological advances, and crop protection products, among others, have contributed greatly to food production, not only protecting crops from pests, diseases, and weeds, but also reducing workload and risk to crops. Today, a new challenge is the realization of sustainable agriculture that feeds the world's growing population while ensuring a high level of safety and preserving the environment. In response to this new challenge, our Health & Crop Sciences Research Laboratory is engaged in research aimed at creating even better crop protection products.

Research and development of crop protection chemicals begins with research to find compounds (lead compounds) that have control effects against pests, diseases, and weeds, and then chemical modifications and alterations are made to the lead compounds to create the most superior compounds. Finally, only those compounds that are judged to be worthy of development from all perspectives are put on the market in collaboration with various specialized teams, including efficacy evaluation, manufacturing method development, formulation development, safety evaluation, intellectual property, and registration. The time and cost required to bring one new crop protection chemical to market is increasing every year, requiring on average more than 11 years of development time and testing of approximately 160,000 compounds.

For this reason, our laboratories have actively introduced a wide variety of new technologies in order to improve the efficiency of our exploratory research. For example, various drug discovery technologies that emerged in the 2000s, such

as high-throughput screening methods for rapid evaluation of bioactivity and in silico drug discovery that predicts bioactivity based on computational science, have become powerful tools in crop protection chemicals discovery research by integrating them with the laboratory's own fundamental technologies, and are still producing many results.

In the field of AI drug discovery, which has been attracting attention in the pharmaceutical field in recent years, we have already begun to implement and utilize our proprietary database and AI specialized for crop protection chemicals discovery applications, in collaboration with internal and external research institutions. We feel that the accumulation of such new technologies is our strength that enables us to compete with our competitors on an equal or greater level.

In recent years, the establishment of a food system that is compatible with improved food productivity and sustainability has become a global trend, and new crop protection products that emphasize environmental impact reduction effects are required. This trend is a great challenge for companies and researchers involved in crop protection products, as well as an opportunity to build a new agricultural system. We intend to contribute to crop production and protection in a wide range of fields by fully utilizing both our research base in crop protection chemicals, as mentioned above, and our own research and development base with a competitive edge in biorational fields such as microbial crop protection products.

# Intellectual Property

## ~Promoting Intellectual Property Activities for Competitive Advantage & Co-Creation/Cooperation~

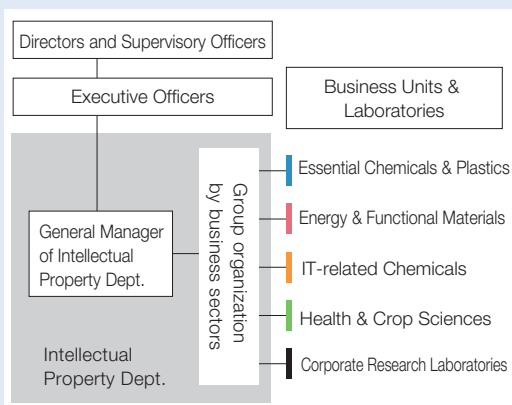
Sumitomo Chemical will enhance its business competitiveness, lay the foundation for co-creation and collaboration, and drive its growth strategy by strengthening our core competencies of solution development capabilities based on a broad technological platform and access to global markets (→page 21) through our IP strategy.

### Basic Policy

We promote intellectual property activities under the following basic policy.

- 1 Promote activities in line with our business strategies
- 2 Create global business value
- 3 Strive to utilize all technological development accomplishments
- 4 Respect rights and comply with the law

### Structure



### Implementation Structure Closer to the Business

The Intellectual Property Department was reorganized in 2019 into separate groups corresponding to each business sector in order to make intellectual property activities more closely aligned with the business. Under this organizational structure, we promote intellectual property activities that are integrated with the business, in cooperation with business divisions, research centers, and intellectual property staff at each site.

## Intellectual Property Activities

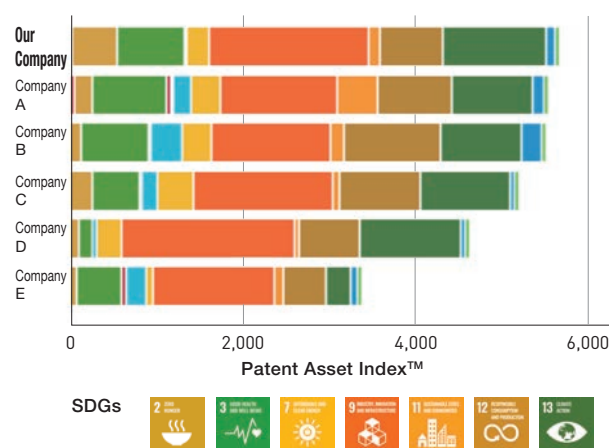
### Strengthening Patent Portfolio

Based on an intellectual property strategy tailored to the increasingly complex global business environment, we are building a patent portfolio with strong barriers to entry and business competitiveness through discussions at pre-filing review meetings for each patent application. In addition, we are working to continuously strengthen our business foundation by promptly disposing of unneeded patents in response to changes in the business environment.

### Sustainability and Intellectual Property: Co-creation and Collaboration

In the four priority areas of environment, food, healthcare, and ICT, it is essential to co-create with companies and universities and build a cooperative business model, including the supply chain, from the perspective of sustainability. We have built a strong patent portfolio related to sustainability, which we will use as a foundation for co-creation and collaboration to drive our growth strategy (upper right figure).

### SDG-related Patents for Chemical Companies in Japan



\*Scale of patent assets (Patent Asset Index™) of SDG-related patents held by domestic chemical companies. Calculated by the patent analysis tool LexisNexis PatentSight® (as of March 2023). Color coding corresponds to each SDG.

### Priority Initiatives ~Strengthening IP Intelligence~

The Intellectual Property Department aims to create social and business value by promoting activities (IP landscape) that help management and business strategies through integrated analysis and visualization of the company's and other companies' intellectual property and markets (see figure below).

### IP Landscape Collaboration Structure and Application Examples

#### ~Creating Social and Business Value~



### TOPICS

### Clarivate Top 100 Global Innovator 2023™

~Selected as one of the Top 100 Innovative Companies in the World for the second year in a row~

We are pleased that our high level of R&D and intellectual property activities has been highly evaluated, and we will continue to promote our activities further.

For more details, click here.

Sumitomo Chemical HP: Release dated February 27, 2023

