Fusion—Accelerating Growth through Innovation and New Business Creation

SEKISUI CHEMICAL Group is committed to innovation that contributes to solving such social issues as decarbonization and resource recycling to achieve our Long-term Vision "Vision 2030" and the realization of a sustainable society. We have positioned fusion as a driver to accelerate innovation to realize our Long-term Vision, Vision 2030. We will work to accelerate innovation at an unprecedented pace by focusing more than ever on the fusion of various internal and external stakeholders as well as companies from the perspectives of technology and business opportunities. We are endeavoring to shift away from a self-reliant culture and approach by promoting projects that extend horizontally across internal companies, collaborating with external institutions and other outside parties, and engaging in open innovation.

Internal and Technological Development Fusion

SEKISUI CHEMICAL Group has identified strengthening fusion at its Corporate Headquarters and is promoting fusion with each divisional company from three perspectives: core technology fusion, planning fusion, and development fusion. In addition, we have taken steps to fuse our 28 technological platforms and launched the ESG Task Force as a forum that transcends organizational boundaries. We are promoting the creation of Products to Enhance Sustainability through an internal cross-sectional system that enables development and business proposals aimed at addressing social issues.

In addition to zero energy house (ZEH) specifications, SEKISUI CHEMICAL Group's unique efforts to build smart & resilient residential housing communities that bring to bear infrastructure materials and systems that stand strong against torrential downpours and the suspension of water services is an example of the Company's business development activities through internal fusion.

MINASE INNOVATION CENTER

Internal and External Open Innovation

In addition to generating exchanges that transcend internal divisional companies, MINASE INNOVATION CENTER (MIC), a research facility established in 2020, is engaging in various activities to accelerate internal and external fusion as well as open innovation including actively promoting technological exchanges with start-up companies that possess low-carbon technologies together with materials and technologies that contribute to resource conversion.

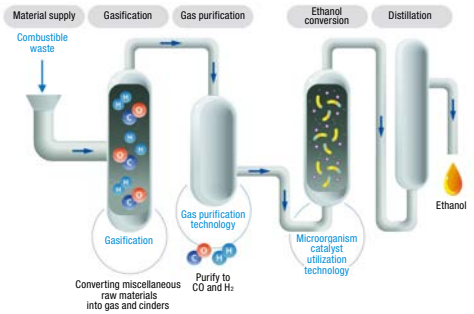
Moreover, we set up a new entity with the goal of spurring on innovation in 2021, and have been promoting efforts to ramp up fusion with external partners. We are seeking opportunities outside the Company, such as CIC Tokyo, the Tokyo site of the Cambridge Innovation Center, the largest focal point of innovation in the United States, and are taking on the challenge of creating new businesses in collaboration with companies' new business departments as well as promising start-up companies. By skillfully leveraging such relationships as trading posts, we use fusion to bring into the Company the technology, ideas, and innovative culture that would be difficult to obtain just on our own, and use those that we incorporate to accelerate the creation of value.

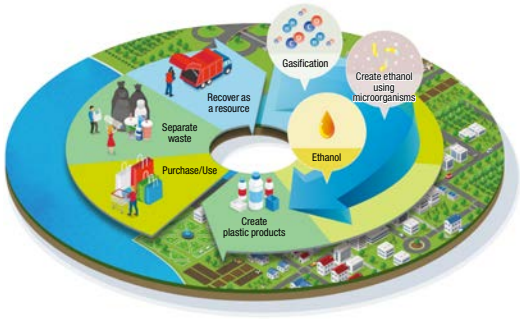
Innovation and New Business Creation

CASE 1: Biorefinery Technology Demonstration

SEKISUI CHEMICAL Group is accelerating efforts toward the social implementation of carbon cycle technologies that recycle the carbon contained in raw materials. In specific terms, we jointly developed a biorefinery (BR) technology that converts combustible waste, including marine plastics, without separation into gas and then converts that gas into ethanol as a raw material for plastic using a microbial catalyst in collaboration with U.S.-based venture company LanzaTech NZ, Inc. Upon receiving investment from INCJ, Inc. (Innovation Network Corporation of Japan), SEKISUI CHEMICAL Group established SEKISUI BIO REFINERY CO., LTD., in April 2020. Steps are currently being taken to conduct a demonstration at a plant that is 1/10th the size of a commercial plant completed in April 2022 in Kuji City, Iwata Prefecture, as the final stage in verifying the technology for practical application and commercialization. The first commercial-scale facility is targeted to begin production in 2025.

Plans are in place for the ethanol produced at the plant to be recycled as a plastic raw material in collaboration with SUMITOMO CHEMICAL CO., LTD., which is already under way. Ethanol is converted to ethylene and then to plastic, and the products from the plastic are used and disposed of, collected as combustible waste, and returned to the BR plant. The aim is to create a resource recycling system that can be repeated over and over.





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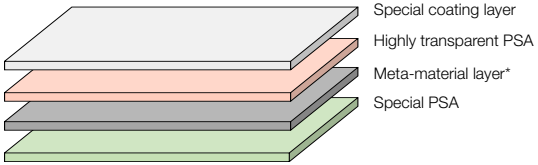
CASE 2: Transparent and Flexible Radio Wave Reflection Film

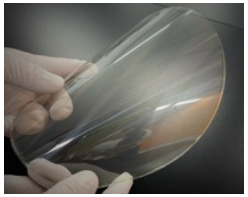
Transparent flexible radio wave reflective films developed from studies of the brilliance of Morpho butterfly wings recognize the importance and necessity of learning from nature's wisdom. Positioning electromagnetic wave management as a business domain, we entered the Electromagnetic Wave Control business as a first step through fusion with the technologies of Metamaterial Inc. (headquartered in Canada).

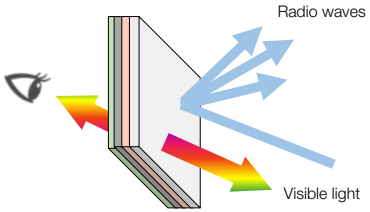
Realizing diffuse reflection characteristics equivalent to or in excess of aluminum plates, our transparent flexible radio wave reflective films are highly effective for such high frequencies as 5G and 6G and also play a role in delivering radio waves to blind spots in rooms.

Looking ahead, we aim to expand into the next-generation components and equipment business and enter the electromagnetic wave environment design service business.



* Technically supported by Meta Materials Inc.





Reference

Innovations Inspired by Nature Research Support Program

As an effective approach to manufacturing that is geared toward solving social as well as environmental issues, SEKISUI CHEMICAL Group has recognized the importance and necessity of learning from nature's wisdom since 2002. Based on this understanding, we established the nature-inspired manufacturing research support program to promote the development of biomimicry technology and have organized forums where researchers can share their results.

While basic science requires time for research and support, we believe that learning from nature's wisdom has the potential to create fundamental innovations that differ from conventional energy-consuming technologies.

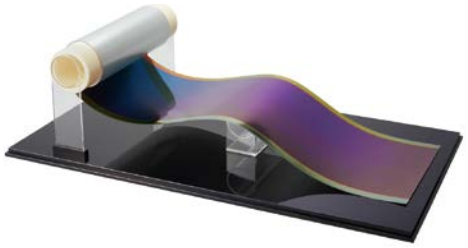
Now in its 20th year in 2022, this program has encouraged the development of a cumulative total of 280 technologies for researchers outside the Company.

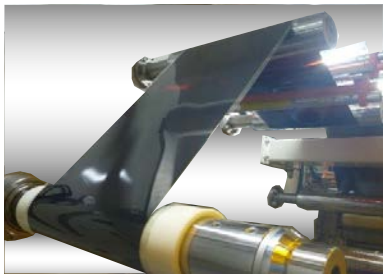
CASE 3: Perovskite Solar Cells

Next-generation solar cells, which are said to be the key to realizing a decarbonized society, use semiconductors with a perovskite crystal structure as materials for power generation. Unlike conventional silicon-based solar cells, materials can be applied to the film as if it were printed. In manufacturing these solar cells, the Company leverages its proprietary encapsulation, process, material, and film deposition technologies. To date, we have conducted accelerated tests according to the standards for solar cell reliability and confirmed durability equivalent to 10 years of outdoor exposure.

Ultra-lightweight and flexible, perovskite solar cells can be installed on the walls of buildings and on roofs with weight restrictions.

Working in collaboration with the University of Tokyo and Ritsumeikan University, our technology has been adopted for a New Energy and Industrial Technology Development Organization (NEDO) project. SEKISUI CHEMICAL Group has also initiated steps to develop a general-purpose width roll-to-roll manufacturing line. Moving forward, the goal is to achieve commercialization, after conducting verification tests, around 2025 while continuing to engage in research to further improve durability.





Case 4: Carbon Capture Utilization (CCU) Technology (Carbon Dioxide Recovery and Effective Use)

Reducing CO_2 emissions in the steelmaking process is a longstanding issue. SEKISUI CHEMICAL Group's innovative CCU technology separates and recovers CO_2 from the gas emitted during steelmaking and converts it to a carbon monoxide rich synthesis gas with a high yield. This synthesis gas with a high carbon monoxide content can be reused as a reduction agent for iron ore, thereby lowering the volume of fossil resource required in the steelmaking process.

The Company concluded a partnership agreement with ArcelorMittal of Spain, one of the world's largest steel companies, for this project. Currently, we are working on the initial study of this technology over a three-year period starting in 2021, after which we will proceed with studies toward practical application while scaling up in stages.