Specialty Chemicals

Inorganic Chemicals

Primarily focused on cleaning agents for semiconductors

Hydrogen peroxide → Super-pure hydrogen peroxide → Hybrid chemicals

Electronic Chemicals (EL chemicals)

Global market share #1 **Super-pure hydrogen peroxide**

Secures supply capacity matching the growth of customers in response to robust demand from overseas semiconductor manufacturers. Also globally builds development facilities adjacent to customers and continuously provides products contributing to the speedy resolution of problems.

Electronic Materials

Top manufacturer of substrate materials for IC plastic packaging

Cyanate monomers → BT resin → Copper-clad laminates (CCL), Prepreg

BT Products

Global market share #1 **BT products**

Captures new demand as 5G progresses, and steadily responds to robust demand in the semiconductor industry. Establishes and strengthens a marketing system conscious of end customers, and offers a wide range of high-performance products, primarily targeting the mid-range and high end of the market.

Optical Materials

Contributes to higher performance of smartphones with world-leading refractive index

Raw materials (External procurement) → Optical polymer

Refractive index*1 #1 **Optical polymer**

Continues careful technical service along with timely development and introduction of new grades with the aim of further expanding share in the smartphone area, and also focuses on development of materials aimed at applications other than smartphones, such as sensing applications.

*1 As compact camera lens materials

Engineering Plastics

Develops engineering plastics

Methanol → Formalin → Iupital™ (Polyacetal resin) (POM)

MX-Nylon (MXD6) → Reny™ (High performance polyamide resin)

Bisphenol A (External procurement) → Polycarbonate resin (PC) → PC sheet, PC film

Global market share #3 **Polyacetal resin (POM)**

Conducts management globally overseeing production, sales and technological development through business restructuring, and seeks to optimize management resources throughout the entire group while making swift management decisions.

Supply capacity*2 #3 **Polycarbonate resin (PC)**

Performs business restructuring to make MEP*3 a consolidated subsidiary focusing on the PC business, while increasing the percentage of high-added-value products such as highly-transparent grades, and shifting toward a structure less susceptible to market conditions. Promotes research of PC mass-production technology using CO_2 as a raw material.

*2 As the Mitsubishi Group *3 Mitsubishi Engineering-Plastics Corporation

Oxygen Absorbers

Wide range of solutions in daily food, electronic component and pharmaceutical markets

AGELESS™

RP System™
PharmaKeep™
Anaero Pack™

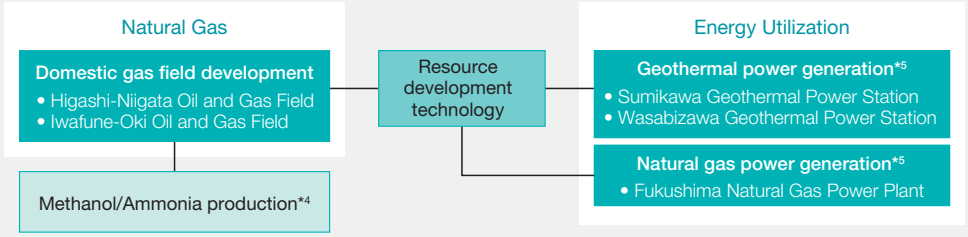
Global market share #1 **AGELESS™**

Aims to expand the food market and also focus on the expansion of sales overseas. Also, provides total solutions for maintaining quality for non-food areas such as pharmaceuticals, medical parts, electronic components, and cultural property protection.

Basic Chemicals

Energy Resources and Environment

Applies domestic natural gas exploration and development technology, and develops it for other energy businesses



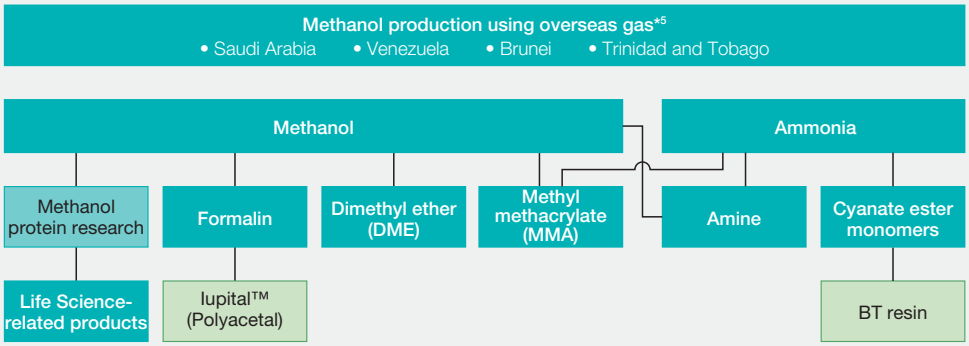
Chemicals company Only 1 **Geothermal power generation**

Utilizing more than four decades of experience and accomplishments that distinguish us as a unique chemicals company, contributes to the reduction of GHGs through the supply of clean energy, and establishes a base for stable earnings.

*4 Only the Niigata Plant's methanol pilot is currently operational *5 Joint venture

Methanol, Basic Chemicals I, Life Science

First in Japan to produce methanol using natural gas as raw material



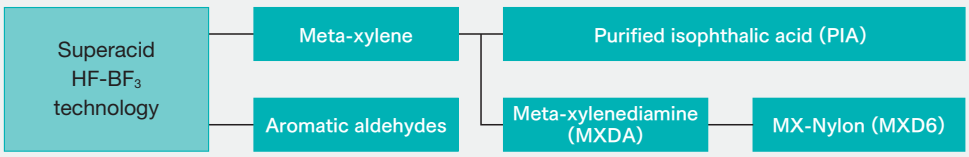
Production capacity*6 #3 **Methanol**

Establishes a competitive position through active overseas expansion and a total business model encompassing the manufacturing process, catalyst technology, a global sales network and the manufacture of derivatives. Uses accumulated technology to focus on the establishment of processes for manufacturing methanol from CO_2.

*6 Total for all affiliates using MGC technology

High-Performance Products, Basic Chemicals II

Manufactures competitive products and derivatives using proprietary technology



Global market share #1 **Meta-xylenediamine (MXDA)**

By building a new plant in Europe, where demand is greatest, establishes a more stable and competitive supply chain. In addition to stable growth of conventional infrastructure applications, accelerating expansion into environmentally friendly applications such as wind power blades.

Global market share #1 **MX-Nylon (MXD6)**

As momentum for extension of quality assurance and food waste reduction increases in the food packaging material field, aims to establish a position by providing recyclable barrier material friendly to the global environment. Also strengthens downstream deployment such as weight reduction of vehicles by replacing metal parts with resin.

Global market share #1 **Aromatic aldehydes**

Decided to increase its production capacity in response to steady growth in demand. Also focuses on marketing activities, aiming to diversify applications, add value, and further strengthen relationships with customers by shifting from seed-oriented development to product development that reflects customer needs.

JSP

Global market share*7 #1 **Foamed plastic**

Backed by the tailwind of weight reduction in automotive parts, supplies next-generation products supporting energy-saving and recycling requirements. Seeks to increase sales backed by heightened needs for energy-saving housing in applications of residential insulation material. Expands overseas operations in flat panel display protective materials.

*7 For automotive use

(Global market share, etc. are estimates made by the Company)

Message from the Executive Officer in Charge

In addition to focusing on the strengthening of differentiating businesses, we will steadily proceed to increase the added value of our foundation businesses.

Ryozo Yamaguchi
Director, Managing Executive Officer
In charge of Specialty Chemicals Business Sector

Boosting production capacity for semiconductor materials, and improving profitability through reorganization of the engineering plastics business

The Specialty Chemicals Business Sector offers a wide range of product groups close to end users such as electronics, automobiles and food packaging.
The market environment, business characteristics, and marketing strategies vary in each area, but handling differentiated products with advantages not offered by other companies could be considered a common point. As stated in the Medium-Term Management Plan, this business sector has the mission of clearly establishing the characteristics of each product while further strengthening the differentiation strategy. Meanwhile, we aim to secure stable earnings without falling into pricing competition, by increasing the added value of product groups positioned as foundation businesses, such as polycarbonates.

In fiscal 2021, we executed several strategies, such as sales promotions and the development of new materials, in accordance with the two policies of differentiation and increasing added value. The results of these have been prominent in BT materials for semiconductor packaging. Backed by robust demand, the increase in production capacity at the Thailand plant was completed as planned in spite of the COVID-19 pandemic. In addition, we are proceeding with building a system for integrated production using hydrogen peroxide feedstock in Taiwan as well as the construction of a new plant in China for super-pure hydrogen peroxide, which is used as a cleaning agent for semiconductors. In Japan, we are working to respond to further increases in demand such as expanding an optical polymer plant.

In the engineering plastics business, we spent the year engaged in reorganization aimed at speeding up decision making and improving profitability. In the polyacetal business, positioned as a differentiating business, we established a system enabling integrated operation of development, manufacturing and sales, with the wholly-owned subsidiary Global Polyacetal Co., Ltd. positioned as the company overseeing the business. Under the new system, we expect to improve our market presence and expand applications through collaboration of MGC's lupital™ brand and the brand of our Korean manufacturing subsidiary. Meanwhile, in the polycarbonate business, positioned as a foundation business, we decided to increase our stake in Mitsubishi Engineering-Plastics Corporation and make it a consolidated subsidiary specializing in this business. Through this reorganization, we will speedily achieve an improvement in production efficiency through consolidation of grades while bringing higher added value to our products.

Establishing an environment promoting growth by allocating funding and personnel to workplaces with potential and growing businesses

Going forward, we intend to ascertain the medium- to long-term direction of the business sector and make more essential decisions leading to the next phase of growth. I believe it is my role to prepare an environment conducive to acceleration of growth by allocating funding and personnel to workplaces with potential and growing businesses. Furthermore, I think it will become more important to ascertain which pieces are missing for the promotion of differentiation and improvement of added value, and to fill those gaps by forming an integrated system that includes our affiliates, such as in the business reorganization implemented last fiscal year.

In this sector, conducting business close to end users, it is necessary to always be sensitive to minute signs of change in society, such as by gaining lessons and insight from dialogue with customers. Swiftly acting based on this insight leads, in turn, to the creation of products brimming with functionality anticipating the needs of the time. Products with such value are eventually recognized by the market, and lead to discussions with customers about the development of new materials. In order to create such a virtuous cycle, it is necessary to properly maintain contact points for engaging with the market.

We will continue to focus on the strengthening of our differentiating businesses and steadily proceed to increase the added value of our foundation businesses with the aim of being a business sector that generates a high level of ROIC and stable cash flow.

Overall Policy of Medium-Term Management Plan

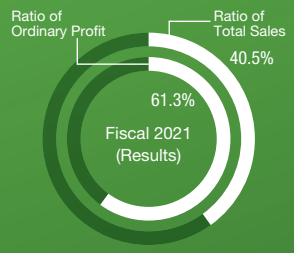
- Increase ratio of high-added-value products, strengthen cost competitiveness
- Continue capital investments in growth markets

Business Lines: Inorganic chemicals, engineering plastics, optical materials, electronics materials, oxygen absorbers

Major Group Companies:
TAIXING MGC LINGSU CO., LTD., SAMYOUNG PURE CHEMICALS CO., LTD., MGC PURE CHEMICALS AMERICA, INC., MGC PURE CHEMICALS SINGAPORE PTE. LTD., MGC PURE CHEMICALS TAIWAN, INC., MGC Filsheet Co., Ltd., THAI POLYACETAL CO., LTD., MITSUBISHI GAS CHEMICAL ENGINEERING-PLASTICS (SHANGHAI) CO., LTD., MGC Electrotechno Co., Ltd., MGC ELECTROTECHNO (THAILAND) CO., LTD., Mitsubishi Engineering-Plastics Corporation, KOREA ENGINEERING PLASTICS CO., LTD., THAI POLYCARBONATE CO., LTD., RYODEN KASEI CO., LTD., TAI HONG CIRCUIT INDUSTRIAL CO., LTD., GRANOPT CO., LTD., MGC AGELESS Co., Ltd., Yonezawa Dia Electronics Co., Inc.

Number of Employees: 3,872

Ratio of Total Sales and Ordinary Profit



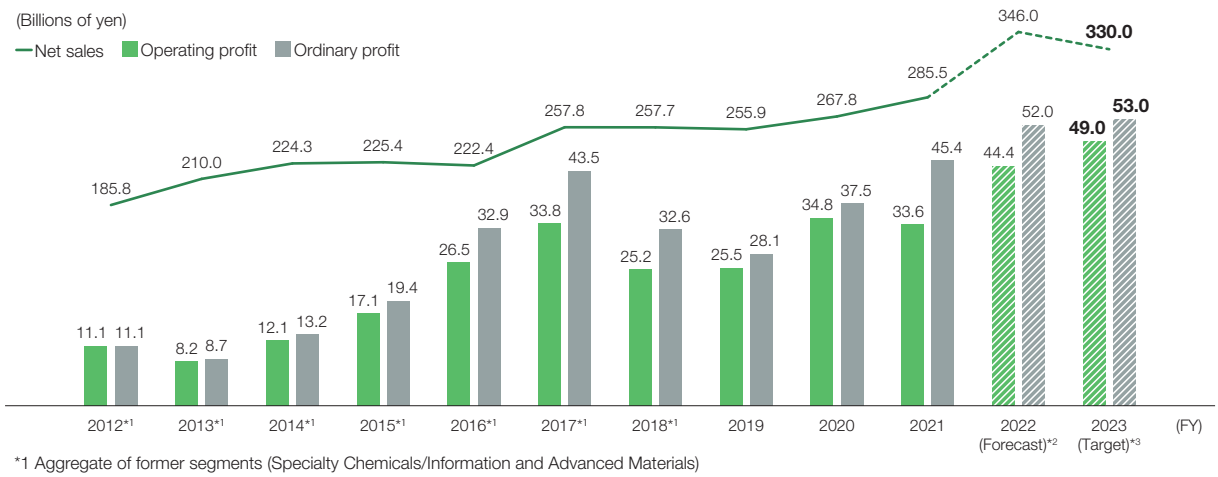
Fiscal 2021 Performance Analysis

- Inorganic chemicals posted increases in net sales and earnings thanks primarily to growth in sales volume of chemicals for use in semiconductor manufacturing
- Engineering plastics saw increases in net sales and earnings, despite deterioration in profitability of polycarbonates, on back of such negative factors as higher raw material and fuel prices, due mainly to robust sales of polyacetals in addition to recovery in sales volumes in automotive-related and other fields
- Optical materials posted decreases in net sales and earnings, despite recovery in demand, which bottomed out in first quarter; decreases due mainly to lower sales volume reflecting inventory adjustment carried out by customers during first half
- Electronic materials saw increases in net sales and earnings, mainly attributed to strong sales of mainstay BT materials for memory devices and 5G smartphones, as well as increase in sales quantity of general-purpose materials widely used in PC and home electric appliances
- Oxygen absorbers posted increase in earnings, thanks mainly to recovery in domestic demand for products used for foodstuffs, achieving improvement from stagnation brought about by novel coronavirus pandemic in previous fiscal year

Classification of Product Lines under Medium-Term Management Plan

New/next-generation businesses	Differentiating businesses
Main Products in Development • AR and VR materials • Post-5G materials • Materials for EVs	• Electronic chemicals • Optical polymers • IC plastic packaging BT materials • Polyacetal • Ultra-high refractive lens monomer
Unprofitable businesses or those needing rebuilding	**Foundation businesses**
None	• Polycarbonate, sheet film • Hydrogen peroxide • Oxygen absorbers

Numerical Targets and Performance for Medium-Term Management Plan



*1 Aggregate of former segments (Specialty Chemicals/Information and Advanced Materials)
*2 Announced in May 2022
*3 Announced in May 2021

Basic Chemicals

Message from the Executive Officer in Charge

We will continue strategic investment enabling responses to future changes in the environment, while putting greater focus on the realization of carbon neutrality.

Naruyuki Nagaoka
Director, Managing Executive Officer
In charge of Basic Chemicals Business Sector

Executing investment in increased production to maintain and strengthen the competitive advantage of MXDA and aromatic aldehydes

In the Basic Chemicals Business Sector, we are steadily executing an investment strategy to "further strengthen differentiating businesses," as set forth in the Medium-Term Management Plan.

First, MXDA, which has excellent corrosion resistance, is mainly used in coatings for bridges and other structures exposed to harsh natural environments. Europe, its largest market, is expected to see an increase in demand for repair material applications for offshore wind turbine blades. In response to this, we decided to establish a new MXDA manufacturing site in Rotterdam in the Netherlands. Producing in proximity to customers will enable us to better respond to the extension of lead times and rising freight charges in marine transportation caused by the global container shortage. The main raw materials, such as ammonia will be procured locally for production. Transportation costs for MXDA that had been transported from Japan to the United States as a raw material for MX-Nylon can also be contained via supplying from Europe. I believe this investment in Europe makes sense not only due to it being economically rational, but also because it increases options available to address future changes in the environment.

As for aromatic aldehydes, the added value of which has become recognized by customers in a wide range of applications, we will be executing concentrated investments to respond to future increases in demand. At the Mizushima Plant, debottlenecking (improvement of the production process) and addition of a new plant will be completed in 2023.

As for the other key strategy stated in the Medium-Term Management Plan, namely, to "reevaluate and rebuild unprofitable businesses," we aim to establish a stable revenue base by creating an integrated production system including downstream adhesive applications that are expected to be profitable, while reducing the production scale in the formalin business by ceasing production in regions with excessive competition. In the xylene separators and derivatives business, meanwhile, we will continue with considerations aimed at the establishment of an optimal production system.

Clarifying the shift to the area of decarbonization, and promoting investment decisions conscious of ROIC, and creating systems based on new ideas

As a medium- to long-term strategy, we will aim for the realization of carbon neutrality by utilizing the strength of possessing a chemical chain starting upstream. In December 2021, we began consideration of four chemical manufacturers for stably securing clean ammonia*1. It is our vision to use clean ammonia as a raw material for MXDA and methylamines in future. Furthermore, we have already established manufacturing technology using CO_2 and hydrogen as raw materials for circular carbon methanol, and have received many inquiries in response. Going forward, we will work with companies in Japan and abroad, as well local governments, as we enter the phase aimed at commercialization. Through such initiatives aimed at carbon neutrality, we will strengthen operations shifting from the current foundation businesses to differentiating businesses.

Meanwhile, we will proceed more concretely with the shift to decarbonization in the energy resources and environmental businesses. The natural gas-fired thermal power plant in Fukushima Prefecture began supplying power to MGC group companies in April 2020 as part of our transition to environmentally-friendly energy, and in March 2022, we decided to participate in a biomass power generation project using 100% wood chips produced in Hokkaido as fuel. Geothermal power generation and this biomass power generation project are positioned as environmental businesses ensuring sustainability using domestically-produced resources.

In the basic chemicals business, previously we had increased the scale of capital investment emphasizing production efficiency, and there was a tendency toward heavy assets. Going forward, it will be important to change direction to have lighter assets in order to reduce volatility and make management decisions while conscious of ROIC. For example, we will promote social implementation through diverse ideas and new systems, such as small-scale local production for local consumption and on-site production.

*1 Refers to blue ammonia, obtained using technologies such as CCUS for separation, capture and underground storage of CO_2 generated when manufacturing ammonia from natural gas, and green ammonia, produced using renewable energy

Overall Policy of Medium-Term Management Plan

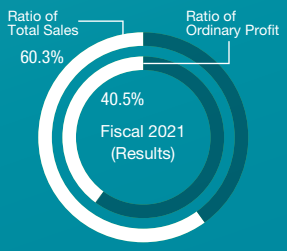
- Turn products and businesses that respond to societal demands into business opportunities
- Reduce volatility through portfolio reforms and rebuilding of unprofitable businesses

Business Lines: Natural gas chemicals, xylene chemicals, energy resources and the environment, life science

Major Group Companies:
JAPAN FINECHEM COMPANY, INC., JSP CORPORATION, JSP International Group LTD., MGC Terminal Company, Inc., TOHO EARTHTECH, INC., Japan U-PiCA Company, Ltd., MGC SPECIALTY CHEMICALS NETHERLANDS B.V., Japan Saudi Arabia Methanol Company, Inc., METANOL DE ORIENTE, METOR, S.A., BRUNEI METHANOL COMPANY SDN. BHD., Japan Trinidad Methanol Company, Inc., Yuzawa Geothermal Power Corporation

Number of Employees: 5,559

Ratio of Total Sales and Ordinary Profit



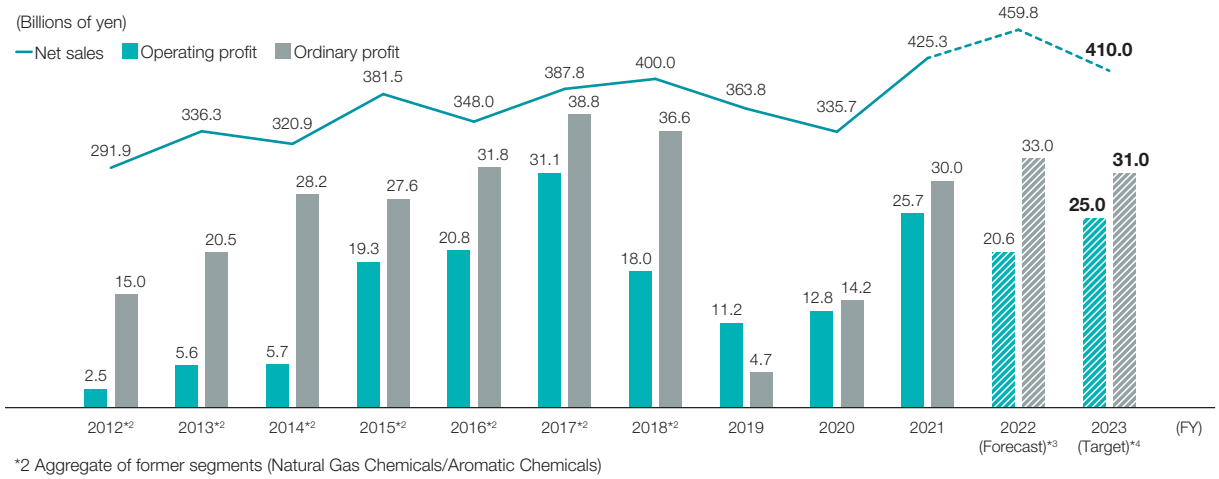
Fiscal 2021 Performance Analysis

- Methanol business saw increases in both net sales and earnings due mainly to significant upturn in market prices compared with previous fiscal year
- Methanol and ammonia-based chemicals posted increases in net sales and earnings reflecting such factors as rise in neopentyl glycol market prices and decrease in repair costs, despite higher raw material prices
- High-performance products posted increases in net sales and earnings thanks primarily to recovery in demand for MXDA, which had been affected by fallout from novel coronavirus pandemic in previous fiscal year, along with firm sales of aromatic aldehydes
- Xylene separators and derivatives saw increase in net sales and earnings due mainly to upturns in purified isophthalic acid (PIA) market prices
- Foamed plastics posted decrease in earnings compared with previous fiscal year, due mainly to higher raw material and fuel prices, despite higher sales volume of flat panel display shields and automotive materials

Classification of Product Lines under Medium-Term Management Plan

New/next-generation businesses	Differentiating businesses
Main Products in Development • Bio-products • Contract manufacturing of antibody drugs • Carbon fiber composite material • Neopulim transparent polyimide resin • Methanol fuel cells	• MXDA • Aromatic aldehydes • MX-Nylon
Unprofitable businesses or those needing rebuilding	**Foundation businesses**
• Formalin and polyol products • Xylene separators and derivatives	• Methanol • Energy resources and environmental businesses • Ammonia and amines • MMA products • Foamed plastic (JSP)

Numerical Targets and Performance for Medium-Term Management Plan



*2 Aggregate of former segments (Natural Gas Chemicals/Aromatic Chemicals)
*3 Announced in May 2022
*4 Announced in May 2021

Specialty Chemicals

BT materials for IC plastic packaging
Differentiating business

Focusing on development of new applications and materials to maintain and improve world-leading presence

Tomoyuki Azuma
Executive Officer
General manager of Electronic Materials Division, Specialty Chemicals Business Sector

The semiconductor industry has been driven by the spread of 5G demand, IoT, the metaverse, and the popularization of EVs; it is certain to continue undergoing evolution and growth. The required level of properties of the electronic materials used in these applications has also been increasing year by year.

The MGC Group has a history spanning almost five decades as a pioneer in substrate materials for IC plastic packaging, and is able to perform material design from highly original raw materials as a comprehensive chemicals company handling diverse substances. While maintaining properties developed over many years and conformance with customers' manufacturing processes, we balance these with additional customer requirements, such as low warpage and low-loss properties, setting us apart from our competitors. In areas of MGC's strengths, we are executing measures to further solidify our current advantageous position, while also implementing differentiation strategies utilizing our development capability to boldly enter areas where the MGC Group does not yet have a presence. Specifically, we will continue to develop new BT laminate materials with dielectric properties suitable for high frequency ranges to capture the new demand arising from the development of 5G business. At the same time, we are also focusing our efforts on development and proposal of materials required in HPC*1 and data center applications, for which future growth in demand is expected.

In response to an increase in demand, we augmented the Thailand Plant in spring 2022, establishing a system for manufacturing not only general-purpose materials, but also highly functional laminates at a high standard. This system is also a means of strengthening BCP, and we will continue to respond to market needs in a timely manner while effectively utilizing sites in both Japan and Thailand in future.

*1 High performance computing

Engineering plastics
Differentiating business　Foundation business

Determined to reorganize business to make products more competitive, while pursuing higher added value and group synergies

Yasuo Teraoka
Executive Officer
General manager of Engineering Plastics Division, Specialty Chemicals Business Sector

Engineering plastics products (polyacetal (POM) and polycarbonates (PC)) are widely used, mainly in electric and electronic devices and in the auto sector, and demand is expected to steadily grow in future. Furthermore, there are heightened needs for more environmentally-friendly products aimed at the achievement of carbon neutrality.

In the POM business, positioned as a differentiating business, Global Polyacetal Co., Ltd., established in 2020, was given supervisory functions, creating a system for integrated management of production, sales and development. Under the new system, we will seek to improve the ratio of high-added-value products and strengthen the ability to respond to customers. In addition, we are also engaged in the development of products that contribute to environmental protection, such as low-VOC (volatile organic compounds) products and products using circular carbon methanol as raw material.

In the PC business, positioned as a foundation business, we decided to reorganize Mitsubishi Engineering-Plastics Corporation as a consolidated subsidiary specializing in PC in order to transform the business to have a stronger revenue structure. Under the new system, we will accelerate initiatives such as improvement of the sales ratio of highly transparent products where MGC has strengths, improvement of production efficiency through concentration of grades, and creation of synergies with the Group. Furthermore, we are also engaged in development of PC made from CO_2 selected by the Green Innovation Fund.

MGC will become more competitive by speedily implementing the above strategies to further develop as a business able to contribute to a sustainable society.

MXDA
Differentiating business

Founded a manufacturing company in Europe to establish a supply system using three sites in Japan and Europe, and now working to expand sales in the Americas, the Middle East and Africa

Ryoji Otaki
General manager of High-performance Products Division, Basic Chemicals Business Sector

MGC is currently the world's only supplier of MXDA, used as raw material for engineering plastics and epoxy resin curing agents, and a product that we have continued to produce for over half a century. In applications for structural and floor coating, stable growth is expected in the future due to an increase in infrastructure investment matching global GDP growth. We are building a steadfast presence in the global market by raising barriers to entry through a robust patent network on manufacturing technology and usage technology, while providing customers with a high level of proposal-based technical service.

Increased sales are also expected for its use as a coating material for offshore wind turbines, which will be one of the main sources of renewable energy in future. I am certain that MXDA's excellent resistance to salt water can contribute to prolonging the life of power-generation equipment operating in harsh environments. In addition, research on its usage as a CO_2 catcher from the atmosphere is also progressing, and demand for products like this that contribute to the environment is expected to expand in future.

In 2024, we will commence operation of a new manufacturing site established in Europe, which is the largest market. I think we will also be able to contribute to customers' BCP by establishing a supply system using three sites in Japan and Europe. We will use this European site as a foothold to improve logistics service and expand into the Americas, the Middle East and Africa. Meanwhile, we will further expand sales from existing plants in Japan to China and other parts of Asia, while also strengthening our portfolio of MXDA derivatives.

Energy Resources and Environment
Foundation business

Contributing to resolution of environmental issues through renewable energy, CCS, and natural gas development as a unique chemicals company

Akihiro Takahashi
General manager of Energy Resources and Environmental Business Division, Basic Chemicals Business Sector

Japan is considering new policies to expand the percentage of renewable energy to 36–38% by fiscal 2030. Meanwhile, natural gas-fired thermal power generation will be maintained for power supply adjustment, and it is expected that CCS[*2] technology will be used to offset the GHG emissions.

MGC has performed in-house development of natural gas since the days of Japan Gas Chemical Co., Inc., and has also applied the technologies of drilling and resource development in natural gas exploration to the geothermal power-generation business, which has fewer CO_2 emissions. Furthermore, MGC is also utilizing its natural gas drilling and storage technology to participate in a large-scale CCS demonstration project in Tomakomai. We endeavor to play a significant role in the reduction of GHG by leveraging the uniqueness of being the only chemicals company working on such projects to contribute to the commercialization of CCS and promote renewable energy projects such as the aforementioned geothermal power generation.

The Hokkaido biomass power-generation project, in which MGC invested in 2022, is scheduled to commence operation within the year. The project is significant from a sustainability perspective since it incorporates innovations such as sustainable cyclical use of forests using timber from forest thinning, and energy self-sufficiency. Meanwhile, TOHO EARTHTECH, INC., an MGC subsidiary, commenced new production of water-dissolved natural gas in 2021 for the first time in 50 years. In May 2022, we began a construction of plant to concentrate the iodine obtained when extracting natural gas. This subterranean resource is useful as a medical raw material and industrial catalyst, and we will substantially contribute to the industry through developing this business.

*2 Carbon dioxide capture and storage