



G R O U P G U I D E

 MITSUBISHI GAS CHEMICAL COMPANY, INC.



三菱ガス化学株式会社

MGC

Creating value to share with society and realizing sustained growth

As an outstanding chemical company with original technologies and a strong presence in society, the Mitsubishi Gas Chemical (MGC) Group has always challenged the creation of new technologies and value and has grown together with society with the aim of contributing to social development and harmony through the creation of wide-ranging value based on chemistry.

As a result of the advance of globalization in recent years, the business environments and social structures surrounding us are changing day by day in a bewildering manner. Specifically, a wide variety of changes and trends are emerging, including the problems of climate change, resources, and energy, such demographic issues as the low birthrate and aging, and problems relating to health and safety, such as

medical treatment and foods, as well as the advance of information technology and the diversification of customer needs.

The MGC Group is engaged in wide-ranging and diverse businesses, from chemical products and material products like methanol, hydrogen peroxide, high-performance engineering plastics, meta-xylenediamine (MXDA), and MX-Nylon to products with highly specialized functionality like electronic chemicals, optical materials, IC plastic packaging materials, and AGELESS™ oxygen absorbers.

Furthermore, we supply value to society through our Energy Resources Business, which includes geothermal power generation, and our life science products, which includes antibody pharmaceuticals.

To realize sustained growth, meanwhile,

we must create and foster new businesses without being bound by conventional parameters. Through new business domains, we will endeavor to solve the social issues that will emerge in the future and supply new value.

In accordance with our mission of “creating value to share with society,” the MGC Group will aim to create common value, including not only economic but also social value, and to realize sustained growth.

I look forward to your continuing guidance and support in this endeavor.

Masashi Fujii
President and Representative Director

Broader reach, enhanced strengths.
Aiming to be a global leader in the methanol chain.





Starting from the raw material of natural gas, we deploy the methanol chain and ammonia chain across a wide field ranging from basic chemicals to functional materials.



Methanol is a basic chemical feedstock that supports the chemical industry. In recent years it is also attracting attention as a non-petroleum fuel.



MGC manufactures methyl methacrylate (MMA), used in plastics and paints, through its proprietary new ACH method (a green process which produces no ammonium sulfate byproduct). [Photo: MMA Plant at the MGC Niigata Plant]



Direct Methanol Fuel Cell (DMFC) generates electricity from methanol and air. Because electricity is generated by a chemical reaction, the fuel cell is quiet and does not create atmospheric pollutants. It can run communications devices for extended periods (72 hours or more) when used as a backup power supply.



Ammonia is used as a reducing agent for denitration to eliminate nitrogen oxide and help prevent air pollution. (Photo: An ammonia transport ship)

Major products

- Methanol
- Dimethyl ether (DME)
- Ammonia
- Amine
- Methyl methacrylate (MMA), Methacrylic acid (MAA), Methacrylate specialty esters

The MGC Group manufactures methanol in Saudi Arabia, Venezuela, Brunei, Trinidad and Tobago. [Photo: Brunei Methanol Company (Brunei)]

A commitment to originality.
Challenging the impossible.



The superacid HF-BF₃ is used for industrial purposes at the MGC Mizushima Plant under strict safety controls. [Photo: MGC Mizushima Plant]

Centered on technologies using the superacid HF-BF₃, we are developing highly original products as only the MGC Group can, including meta-xylene chain and aromatic aldehydes.

We also handle foaming products for general-purpose resins, such as polystyrene and polypropylene. These products are lightweight, feature excellent thermal insulation and recyclability, and are used widely in daily life.

Major products

- Meta-xylene
- MX Nylon (MXD6)
- Purified isophthalic acid (PIA)
- Plasticizers
- Expanded polyethylene
- Formalin
- Meta-xylenediamine (MXDA)
- Aromatic aldehydes
- Phthalic anhydride
- Expanded polypropylene
- Molded products
- Polyols

High-performance products

- Neopulim™ (Transparent polyimide varnish)
- MAXIVE™ (Gas barrier epoxy-based resin)
- Therplim™ (Thermoplastic polyimide)
- NeoFARIT™ (Raw materials for Semiconductor materials)
- ALTESTER™ (heat-resistant amorphous polyester resin)
- CYTESTER™ (cyanate ester monomer)



With its excellent gas barrier properties (i.e., resistance to gas permeability), MX nylon is also used in bottles for soda, green tea, and other beverages.



MXDA is also used in anti-corrosion coatings to protect boat hulls.



Aromatic aldehydes are also used in the creation of safe, transparent polypropylene resin.



Lighter weight and enhanced safety are required for automotive parts. Rear seat core materials made from expanded polypropylene contribute to both and are common throughout the world.



Adoption of Neopulim™ is advancing in information and communications field such as smartphone parts, taking advantage of the material's colorless transparency and heat resistance exceeding 300°C.

Life Science and Energy Resources & Environmental Business

Providing energy to people and society. Deriving power from gas.

In the life sciences field

In recent years, we have been developing and manufacturing health food ingredients based on biotechnology by leveraging the technologies we developed over many years.

Major products

- Health food ingredients
Pyrroloquinoline quinone (PQQ)
Dry yeast containing S-Adenosyl Methionine (SAME)
Dry yeast containing Spermidine (SPD)



Pyrroloquinoline quinone (PQQ), which is manufactured using biotechnology, is a food ingredient expected to have brain function enhancement effects.



We supply functional yeasts containing high content of S-adenosylmethionine (SAME) or spermidine (SPD).
[Photo: Yeast containing SAME]



Mobilizing our expertise in animal cell culture technology and manufacturing process development, we handle all processes from initial-stage development of drug substances for antibody pharmaceuticals to their manufacture, contributing to high-quality, reliable treatments.

In energy source development

We are involved in oil and gas exploration thermal power generation using natural gas and geothermal power generation and promote the clean energy business.

Major business

- Natural gas and crude oil extraction and prospecting
- Development of geothermal energy
- Sales of electric power



Geothermal power generation contributes to the stable supply of electricity, as it is not affected by seasonal and weather changes. It is clean energy that has low CO₂ emissions and is effective in preventing global warming.
[Photo: Wasabizawa Geothermal Power Plant in Akita Prefecture]



Natural gas produced from our company's license area in Niigata is used as a feedstock and fuel at the MGC Niigata Plant.
[Photo: Iwafune-oki Oil-Gas Field in Niigata Prefecture]

Inorganic Chemicals Business

Imagination and creativity supporting the evolution of electronics.

The focus of our business is on hydrogen peroxide, which is used as a non-chlorine bleach and an industrial oxidant, and high-purity electronics cleaning agents, which are used mainly in the semiconductor field. We also handle unique fine chemicals such as peracetic acid for food additives (DIAPOWER™ FP), used for cleaning and disinfecting food.



Hydrogen peroxide is commonly used as a non-chlorine bleach in the production of pulp and paper, and also in applications such as household bleach, industrial oxidant, and metal surface treatment.



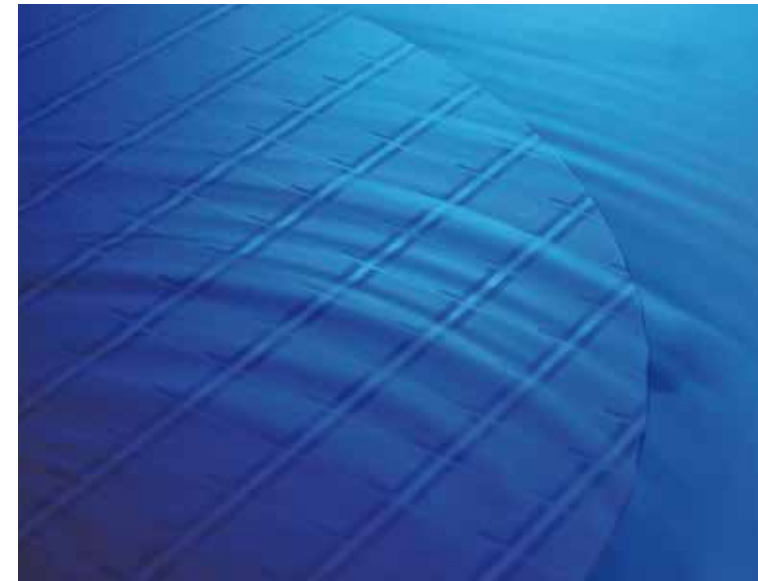
The uses of persulfates include etchants for printed circuit boards and polymerization initiators for plastics.



DIAPOWER™ FP is a peracetic composition that satisfies food additive standards. It is highly effective in disinfecting bacterial that cause food poisoning in meat, fruits, and vegetables and is characterized by retention of its disinfection properties.

Major products

- Hydrogen peroxide
- Persulfates
- Water treatment agents
- Environmental agents
- Electronic chemicals (Chemicals for use in the electronics industry)
- DIAPOWER™ FP (peracetic acid for food additives)



Super-pure hydrogen peroxide and other electronic chemicals from the MGC Group are essential chemicals in the production of semiconductor devices, liquid crystal displays, and printed circuit boards.

Beyond metal, beyond glass. A materials revolution that transcends plastics.

Our lupilon™ polycarbonate combines high transparency with over 250 times the impact resistance of glass, plus excellent heat resistance and dimensional stability. Other engineering plastics we offer include the polyacetal lupital™ and the molding compound Reny, based on polyamide MXD6.



The MGC Group is expanding its overseas production bases for engineering plastics.
[Photo: Thai Polyacetal Co., Ltd. (Thailand)]



lupilon™ film and lupilon™ sheet are used in LCD TVs and automobile navigation systems.



lupital™ is also used for important components in automobiles.
[Photo: Fuel pump unit manufactured with lupital™]

Major products

- lupilon™ (Polycarbonate), Polycarbonate Sheet, Polycarbonate Film
- lupital™ (Polyacetal)
- Reny™ (Polyamide MXD6 molding compound)
- lupiace™ (Modified polyphenylene ester resin)

The MGC Group actively develops polycarbonate sheets and films.
[Photo: MGC Tokyo Research Laboratory]

Optical Materials Business

Technology commanding seven sparkling shades, navigating the waters of today's cutting-edge information world

We offer a wide range of optical material products including lupizeta™, a optical polymer used in the camera lenses of smartphones and other products, and a plastic lens material with the world's highest refractive index.

Major products

- lupizeta™
- Optimas™
- LumipluS™
- Monomers for high refractive index plastic lenses



lupizeta™ is used in high-performance compact camera lenses in smartphones. (Image: Optical lens made with lupizeta™ EP)



A high refractive index is the key characteristic of eyeglass lenses made from MGC's materials, offering the ultimate optical properties in plastic lenses.



Optimas™ greatly improves the characteristics that were previously the weak points of acrylic resins-heat resistance and water absorption. It is used in automotive components and various types of lenses (AR, VR, etc.).



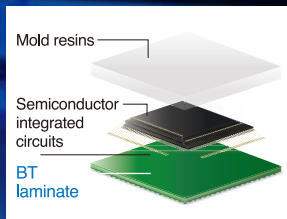
■ Electronics Materials Business

Supporting the future of semiconductors through a solid track record in performance and reliability.

We provide products essential to the electronics industry, with a focus on printed wiring board laminate material used on IC plastic package substrates and multilayer motherboards. These include LE SHEET™, used as an auxiliary material in the small-diameter drilling of printed wiring boards.

Major products

- Laminate materials for printed wiring boards
- LE SHEET™ (auxiliary material for drilling)



BT laminate material boasts the top share among IC plastic package substrates.



High-performance IC plastic packages made with BT laminate materials support cutting-edge mobile devices such as smartphones and tablet computers.



MGC's epoxy laminate material (High Performance FR-4) is used in multi-layer motherboards for Internet servers and routers.



LE SHEET™ is an auxiliary material for drilling that supports increasingly minute circuit patterns.

Oxygen Absorbers Business

Technology that is forever new. Our aim is a total solution for maintaining quality.

Our oxygen absorber AGELESS™ was born from the idea of keeping food flavorful by removing oxygen, the cause of deterioration. We've expanded our business from technology for deoxygenating to technology to control formation of gas within packaging, letting us offer a total solution for maintaining quality in a wide range of fields.



AGELESS™ supports safety and reliability in foods, from everyday ingredients to snacks, gourmet foods, and emergency foods.



AGELESS OMAC™ is a film with an oxygen absorbing function that is suitable for liquid products, such as syrup-pickled fruits and soup.



AGELESS™ and PharmaKeep™ are also used for quality control in pharmaceuticals and medical equipment.



Our RP System™, which can maintain oxygen and moisture free condition is also used in the quality assurance for mechanical parts, electronic components, raw material and furthermore the protection for archaeological / cultural assets.

Major products

- AGELESS™
- AGELESS OMAC™ (oxygen absorbing film)
- PharmaKeep™ (for pharmaceuticals and medical equipment)
- AGELESS DRY™ (desiccant)
- Anaero Pack™ (anaerobic cultivation system)
- RP System™ (for mechanical parts, electronic components, raw materials and archaeological / cultural assets)



AGELESS™ is used in Japan and around the world.

Beyond “today” - We are trying to unlock the new business field with inovative technology and products.

As well as making maximum use of the synergy among our businesses and products, the MGC Group considers tie-ups and M&A with other companies and actively engages in the creation of new businesses.

Main development topics and products

Development Fields

- Medical
- Food
- Mobility

● OXYCAPT™ medical packaging



OXYCAPT™ is a new plastic container that boasts outstanding oxygen barrier and oxygen absorption performance. The properties of plastics including break resistance as well as low protein absorption and low levels of substances eluted from the container are utilized in vial products.

● Solid electrolytes



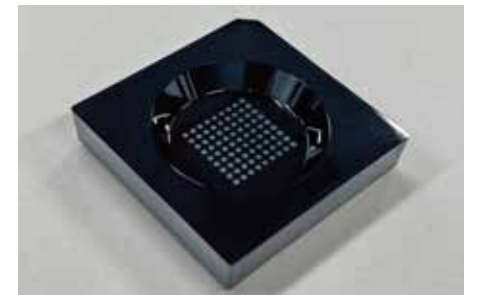
All-solid-state batteries are next-generation batteries that can provide high output and high capacity while maintaining high levels of safety. It is expected that they will be used in applications such as electric vehicles and electronic products.

● Factory-grown vegetables



The MGC Group entered the factory-grown vegetable business in earnest by establishing MGC Farmix Co., Ltd. jointly with a vegetable distribution venture and commencing the production, distribution, and sale of lettuce and other leaf vegetables grown in the largest fully artificially light type vegetable factory in eastern Japan. MGC Farmix, which acquired the international Global G.A.P. (Good Agricultural Practices) certification in 2020, engages in the stable supply of safe and reliable vegetables.

● Allergy diagnostic chips



The MGC Group has developed chips to measure antibodies in the blood that combine with allergic substances to trigger allergic reactions. These chips are expected to contribute toward improving the quality of life. By separating allergic substances into multiple fragments and simultaneously measuring them, the test can examine which parts of the allergic substances the antibodies combine with, thereby providing more accurate information compared with conventional methods.

Research & Development

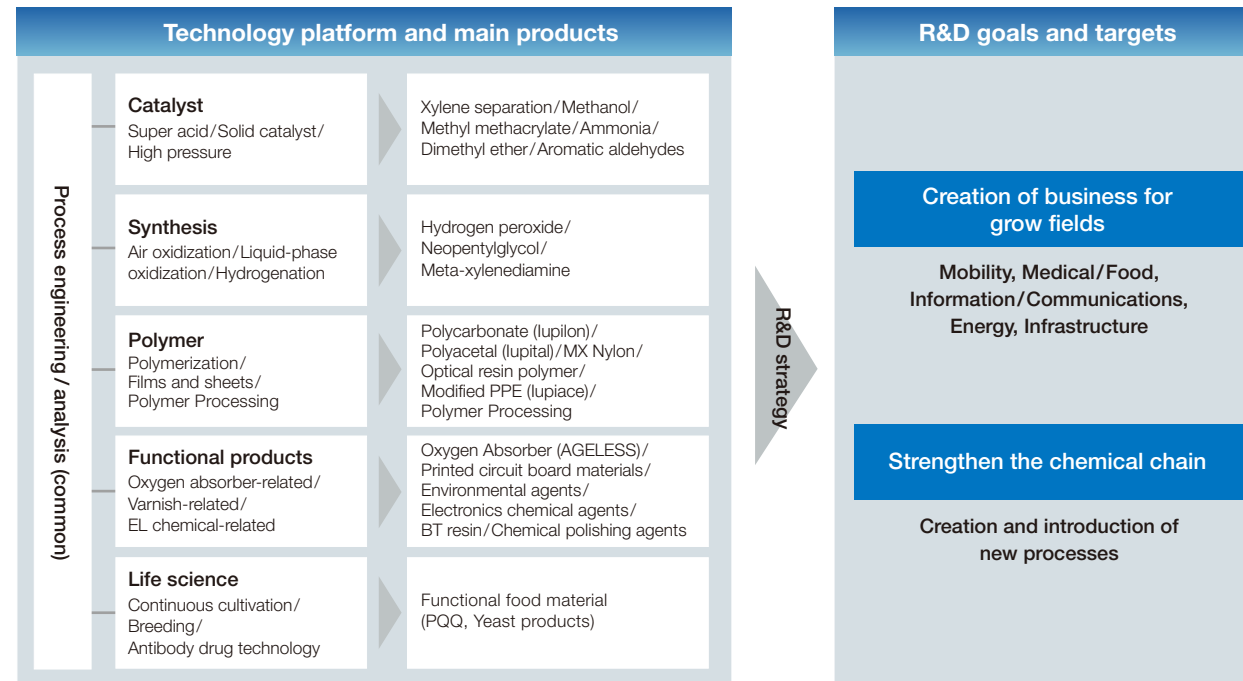
Advancing R&D to “Creating value to share with society”

The MGC Group has a long track record of developing unique, proprietary technologies and products with value that meets the needs of society. Regarding existing products, we endeavor to strengthen our earnings power and lighten the environmental load through relentless efforts to make technical modifications.

Regarding the creation of new products and new businesses, we are constantly thinking about such issues as what the needs of society are, whether there are places where the MGC Group’s technology can be utilized, and whether that technology is environment friendly. By continuing to give birth to new products and new businesses, we will create new value.

Research and Development Strategy

MGC considers research and development plays a pivotal role to being a distinctive and excellent chemical company. MGC Group’s research and development strategy is to leverage our core technologies, strengthen the chemical chain through creation of new processes, and realize new growth, in Mobility, Medical / Food, Information / Communications, Energy, Infrastructure.



Tokyo Research Laboratory



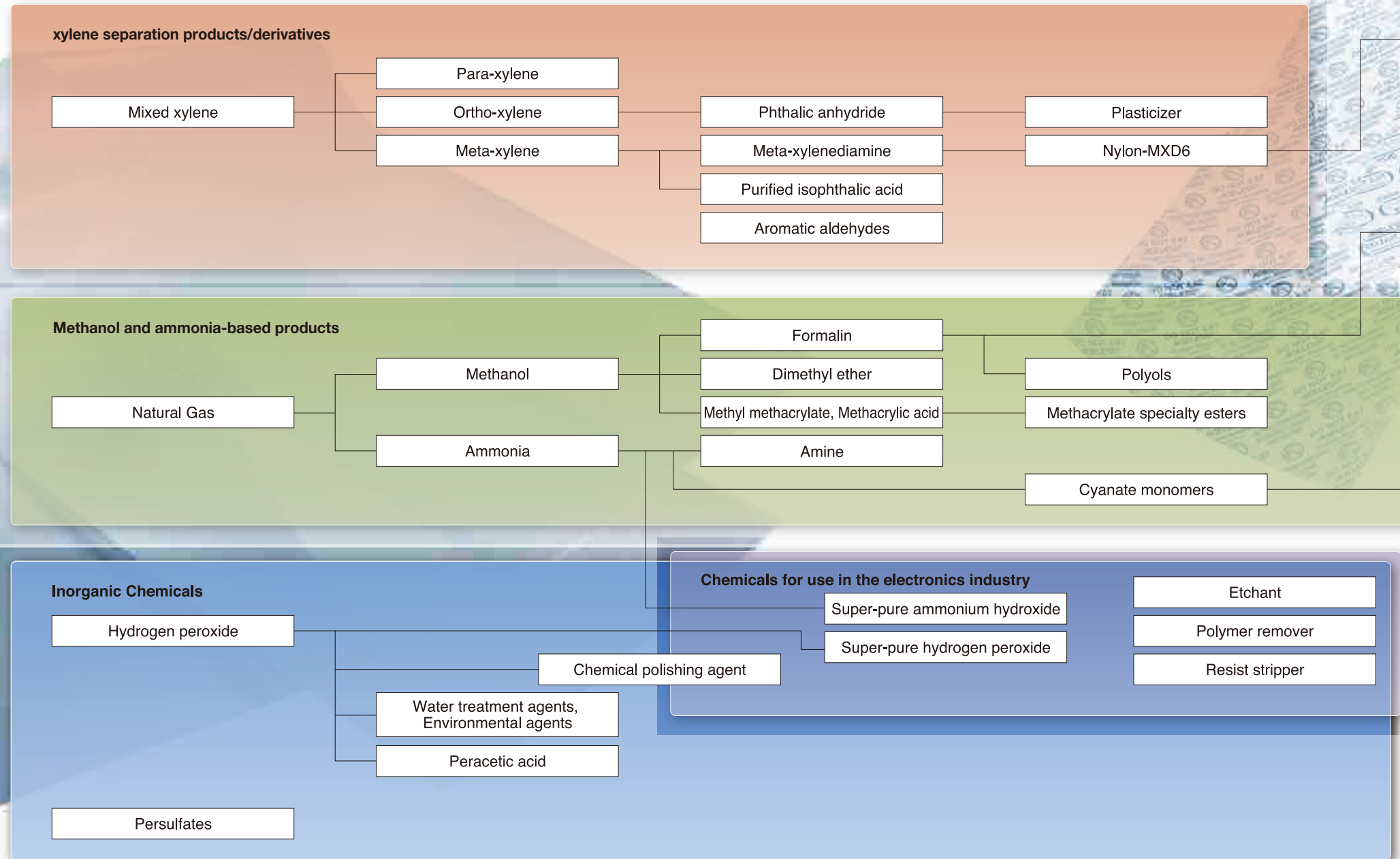
Niigata Research Laboratory



Hiratsuka Research Laboratory

Product Flow

Chemical chain to high performance.



Engineering Plastics

Reny™
(Polyamide MXD6 molding compound)

Polycarbonate

Iupilon™

Polycarbonate Sheet

Polycarbonate Film

Iupiace™
(Modified polyphenylene ester resin)

Iupital™ (Polyacetal)

Bio

Health food ingredients (PQQ)

Optical Materials

Iupizeta™

Optimas™

LumipluS™

Monomers for high refractive index plastic lenses

Electronic Materials

BT Resin

LE SHEET™
(auxiliary material for drilling)

Materials for Printed wiring board

BT Materials

Epoxy materials
(High Performance FR-4)

Oxygen Absorbers

AGELESS™

AGELESS OMAC™
(oxygen absorber film)

AGELESS DRY™
(Calcium oxide desiccant)

PharmaKeep™
(for pharmaceuticals / medical equipment)

RP System™
(for mechanical parts, electronic components,
raw materials and archaeological / cultural assets)

Anaero Pack™
(Anaerobic cultivation system)

Corporate Data

Corporate Information

Company Name

MITSUBISHI GAS CHEMICAL COMPANY, INC.

Address

Mitsubishi Building
5-2 Marunouchi 2-chome, Chiyoda-ku,
Tokyo 100-8324, Japan

Originally founded

January 15, 1918

Incorporated

April 21, 1951

Capital

41.97 billion yen

Fiscal Year

Accounts closed in March

Business Locations

Representative Offices

Shanghai Office

Taiwan Office

Research Institutes

Tokyo Research Laboratory

Niigata Research Laboratory

Hiratsuka Research Laboratory

Plants

Niigata Plant

Mizushima Plant

Yokkaichi Plant

- Naniwa Plant

- Saga Plant

Yamakita Plant

Kashima Plant

QOL Innovation Center Shirakawa

Guide to the Mitsubishi Gas Chemical Website

In addition to providing a clear description of our businesses, we have made it easier to search for product and other information. The website can also be viewed by smartphone.

URL : <https://www.mgc.co.jp/eng>



Major Group Companies

Domestic

EIWA CHEMICAL IND. CO., LTD. [C]
FUDOW COMPANY LTD. [C]
GLOBAL POLYACETAL CO., LTD. [C]
GRANOPT CO., LTD. [E]
JAPAN FINECHEM COMPANY, INC. [C]
JAPAN SAUDI ARABIA METHANOL COMPANY, INC. [E]
JAPAN TRINIDAD METHANOL COMPANY, INC. [E]
JAPAN U-PICA COMPANY, LTD. [C]
JSP CORPORATION [E]
KYOUDOU KASANKASUISO CORP. [C]
MGC ADVANCE CO., LTD. [C]
MGC AGELESS CO., LTD. [C]
MGC ELECTROTECHNO CO., LTD. [C]
MGC ENERGY COMPANY LIMITED [C]
MGC FILSHEET CO., LTD. [C]
MGC TERMINAL COMPANY, INC. [C]
MGC WOODCHEM CORPORATION [C]
MITSUBISHI GAS CHEMICAL TRADING, INC. [C]
MITSUBISHI ENGINEERING-PLASTICS CORPORATION [C]
POLYOLS ASIA COMPANY, INC. [C]
RYOWA ENTERPRISE CO., LTD. [C]
TOHO EARTHTECH, INC. [C]
TOYO KAGAKU CO., LTD. [C]
YONEZAWA DIA ELECTRONICS CO., INC. [C]

Overseas

AGELESS (THAILAND) CO., LTD. [C]
BRUNEI METHANOL COMPANY SDN. BHD. [E]
KOREA ENGINEERING PLASTICS CO., LTD. [E]
KOREA POLYACETAL CO., LTD. [C]
METANOL DE ORIENTE, METOR, S.A. [E]
MGC ADVANCED POLYMERS, INC. [C]
MGC ELECTROTECHNO (THAILAND) CO., LTD. [C]
MGC PURE CHEMICALS AMERICA, INC. [C]
MGC PURE CHEMICALS SINGAPORE PTE. LTD. [C]
MGC PURE CHEMICALS TAIWAN, INC. [C]
MGC SPECIALTY CHEMICALS NETHERLANDS B.V. [C]
MGC TRADING (THAILAND) LTD.
MITSUBISHI GAS CHEMICAL AMERICA, INC. [C]
MITSUBISHI GAS CHEMICAL ENGINEERING-PLASTICS (SHANGHAI) CO., LTD. [C]
MITSUBISHI GAS CHEMICAL EUROPE GMBH
MITSUBISHI GAS CHEMICAL SHANGHAI COMMERCE LTD.
MITSUBISHI GAS CHEMICAL SINGAPORE PTE. LTD. [C]
PT PEROKSIDA INDONESIA PRATAMA [C]
SAMYOUNG PURE CHEMICALS CO., LTD. [C]
TAI HONG CIRCUIT INDUSTRIAL CO., LTD. [E]
TAXING MGC LINGSU CO., LTD. [C]
THAI POLYACETAL CO., LTD. [C]
THAI POLYCARBONATE CO., LTD. [C]



[C] Consolidated subsidiary

[E] Equity-method affiliate

MITSUBISHI GAS CHEMICAL COMPANY, INC.

Mitsubishi Building, 5-2 Marunouchi 2-chome, Chiyoda-ku, Tokyo 100-8324
TEL: +81-3-3283-5000 Fax: +81-3-3287-0833

www.mgc.co.jp

