

# Maximizing the Profitability of Engineered Materials

[ Engineered Materials Sector ]

In addition to maximizing the profitability of our existing businesses, we, as a market co-creation business entity, will combine the strengths of our engineered materials business, such as core technologies, know-how, and sales channels, with external strengths and intensify our existing and peripheral businesses to materialize new products and create new markets.

New business creation operations, which had been handled by the Engineered Materials Sector until FY2019, were transferred to under control of the Business Creation Sector established as a headquarters function in April this year to make the operations a corporate-wide mission and accelerate them.

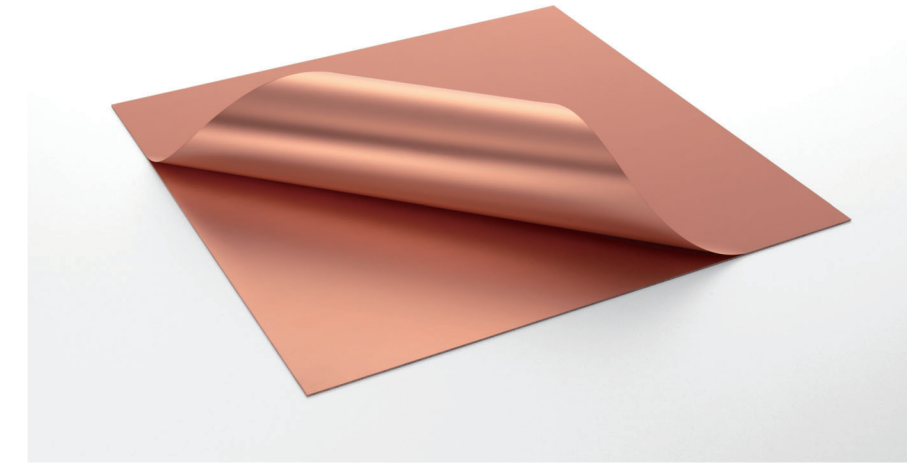
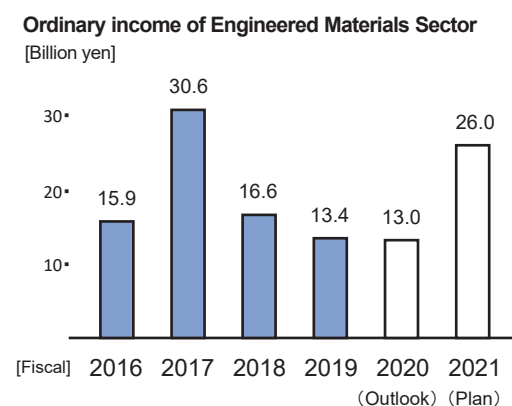
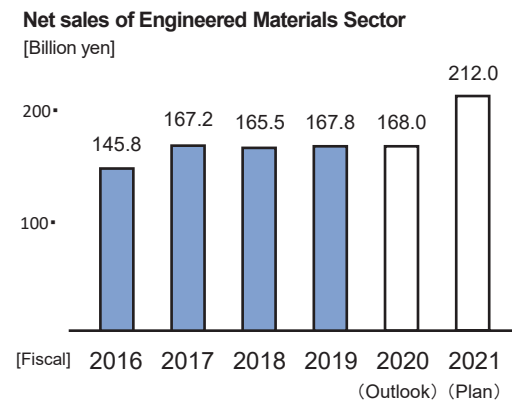
As the new business creation mission was separated, the Engineered Materials Sector now focuses mainly on the business for existing engineered materials. With the shift to the 5G format globally and the COVID-19 spread as a background, communications infrastructure is now undergoing significant, quantitative and qualitative changes at an amazing pace. To respond to these changes in a timely and flexible manner, we are working speedily on the further sophistication of our engineered materials that meet the needs of our customers, development of a mass production system, and enhancement of delivery services.

At the same time, we are also putting our energy into the development of new products and the creation of new markets by capitalizing on a wide lineup of our engineered material products and internal and external networks. Although new business creation is undertaken by the Business Creation Sector as mentioned above, existing businesses need to pursue and take advantage of opportunities offered by the advance of IoT and 5G and the tightening of environmental regulations to expand their business. We will identify these opportunities correctly, as well as promote the development of a system that enables us to utilize the captured information more efficiently, enhance our marketing capabilities, and promote digitization, to achieve the functional enhancement of the Engineered Materials Sector.

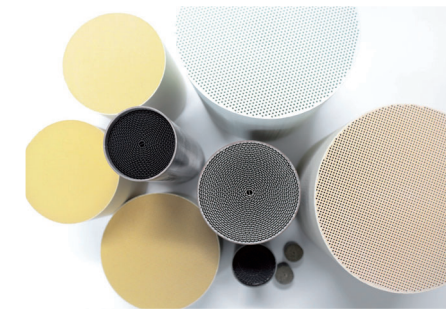
We aim to meet the targets of the medium-term management plan, which was formulated toward the ongoing growth of our business, while contributing to social progress and resolution of social issues through our valuable engineered materials. Please look forward to the growth and transformation of our engineered materials business.



**OKABE Masato**  
Senior Executive Officer, Engineered Materials Sector



Copper foil with carrier film



Catalysts for detoxifying exhaust gases



Functional powders



Sputtering targets IGZO and ITO

## Products with leading share in the global market

<p><b>For Semiconductor Package Substrate</b> <b>Copper foil with carrier film</b></p> <p>Global share <b>90%</b></p> <p>Electro-deposited copper foil is used for wiring material in high-precision circuits. In particular, Mitsui Kinzoku has a high market share in extremely-thin copper foils. These products contribute toward minimizing the sizes of smartphones and enhancing the advanced functions of electronic products.</p>	<p><b>For motorcycle</b> <b>Catalyst for detoxifying exhaust gas</b></p> <p>Global share <b>50%</b></p> <p>We are contributing toward the maintenance of a clean environment by detoxifying toxic substances such as CO and NOX that could cause air pollution. We are also increasing the supply of catalysts for four-wheel vehicles that we offer in the world market.</p>
<p><b>For hybrid car</b> <b>Battery material (Hydrogen storage alloy)</b></p> <p>Global share <b>40%</b></p> <p>Mitsui Kinzoku started providing materials for batteries in the 1940s. Since then, the company started developing materials for rechargeable batteries at an early opportunity, and has been supplying hydrogen storage alloy for batteries used in hybrid vehicles since the 1990s.</p>	<p><b>For LCD display</b> <b>Indium tin oxide (ITO) target</b></p> <p>Global share <b>35%</b></p> <p>ITO, which is oxidized indium and tin, is an essential material for creating the transparent conductive film on liquid crystal displays. We make use of the capabilities held by Mitsui Kinzoku in creating products that offer a high level of purity, sintering technologies, and film formation. We also supply sputtering targets for IGZO.</p>
<p><b>For MLCC</b> <b>Copper powder</b></p> <p>Global share <b>35%</b></p> <p>Demand for MLCC (multi-layered ceramic capacitors) is increasing rapidly with the electrification of automobiles, the increased sophistication of smartphone functions, and the widespread application of IoT. We are contributing to this by providing materials toward the advancement of MLCC, such as in downsizing and increasing their capacity.</p>	<p><b>For glass substrate</b> <b>Cerium oxide abrasive</b></p> <p>Global share <b>40%</b></p> <p>This is a polishing material that is essential for polishing high-performance glass, such as optical lens, hard disk glass substrate, and liquid crystal glass panels. Mitsui Kinzoku's strength is not only in nonferrous metal materials, but also in rare-earth metals.</p>

### <Other products>

- |  |   |                               |
|--|---|-------------------------------|
| Active materials for lithium-ion batteries | Copper foil for PWB                                     | Oxygen absorber               |
| Conductive oxide                           | Embedded Capacitance Materials for PCB                  | Rare earth oxides             |
| Tantalum oxide                             | Various refractories for super-high-temperature furnace | High Precision Grinding Wheel |
| Niobium oxide                              | Filtering equipment for molten aluminum                 | Super-abrasive wheel          |
| Atomized powder                            | Carriers for electrophotography                         |                               |
| Solder powder                              | Ferrite powder  |                               |
| Fine powder                                | Iron powders  |                               |

## SWOT analysis in Engineered Materials Sector

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>High quality and high performance product lineup and sales channels that make use of our core technologies and know-how</li> <li>Manufacturing and sales structure of being “located at the consumption site” with a focus on Asia</li> <li>Establishment of the Business Continuity Plan with multiple production sites</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>Product composition that is susceptible to changes in the economy</li> <li>Short life cycle of products</li> <li>High-cost structure resulting from multiproduct production</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>Pursuit of new levels of quality and create demand through technological innovations</li> <li>Demand expansion for high-functional products arising from increased sophistication of market needs</li> <li>Increased demand in final market due to the emergence of developing countries</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>Increased price competition with manufacturers in developing countries</li> <li>Stagnant demand due to the rise of protectionism and spread of infectious diseases</li> <li>Increased geopolitical risks affecting overseas materials procurement</li> </ul>

## Solutions and initiatives for major business segments in FY2020

### [Engineered powders]

We will increase our efforts to expand sales of 5G-related products that become widespread, and also of abrasives. We will also strive to develop new products. Our business unit that deals with powders, which constitute our core technology, will work to expand our business by launching new products continuously, in accordance with changeable market needs and product cycle.

### [Catalysts]

We will maintain top share in catalysts for two-wheel vehicles and aim to expand sales of catalysts for four-wheel vehicles. We will also continue to evaluate further increasing and strengthening our facilities in response to increasingly stringent global restrictions against emissions. For GPF catalysts scheduled for mass production in 2022, we will continue our efforts to establish the production system.

### [Copper foil]

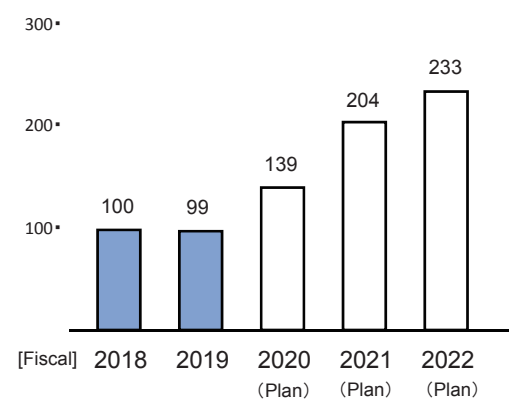
We will continue to working on the sales expansion of MicroThin™ for PKG other than smartphones, such as for external memories and GPUs, and also for 5G related products such as electro-deposited copper foils for high-frequency devices. We will also promote optimization and smartification of our production sites.

### [PVD materials]

We formulated plans for improving profitability because of the deterioration of the business environment. Through measures aiming at strengthening competitiveness, we will aim to recover profitability of PVD materials division.

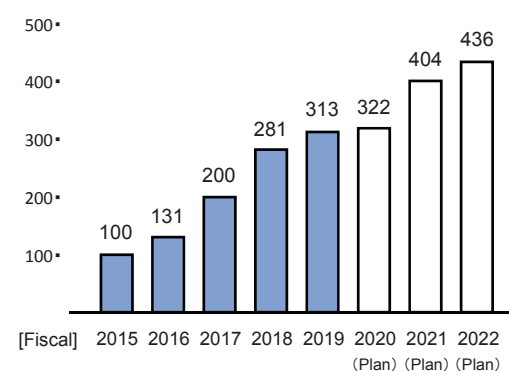
Sales projection for 5G affiliates

(FY2018 = 100)



Sales projection for Automotive catalysts

(FY2015 = 100)



\* The figures for FY2021 and FY2022 in the above graphs do not fully reflect the possible impact of COVID-19 on demand.

## New products required by and useful to society

### [ Business Creation Sector ]

In order to more effectively create products and businesses in ever increasing numbers, we established the Business Creation Sector.

We will create new businesses through market co-creation by combining our own strengths of core technologies, know-how and sales channels with external strengths such as customers and partner companies.

The Business Creation Sector has been established as a corporate function. Our mission is to create new profitable products and businesses in a problem free and efficient manner. Our focal points are market co-creation, creation of new technologies, and development of human resources capable of creating new businesses.

New business creation operations, which the Engineered Materials Sector was formerly in charge of, have been placed under corporate control for two reasons. One is because the Group's investments in new business creation have grown to the extent that they need to be managed more systematically on a corporate level. Investments have been increased about three-fold compared with the previous medium-term management plan.

The other is because the need to accelerate new business creation demanded a different management system and mindset from the previous ones. It was also considered difficult for the Engineered Materials Sector to concurrently manage both new business creation and their existing products offered and businesses executed on a global scale.

Mitsui Kinzoku carried out this reorganization at the halfway point in the medium-term management plan, but we will make every effort to ensure that new products and businesses be spawned under this new framework. One of our pressing tasks is to put on the market, as early as possible, prioritized products so that they can be included in the next medium-term management plan starting in FY2022. A second pressing task is to create another large-scale business. It is imperative that we implement these two tasks at the earliest possible date.

We will work tirelessly toward the goal of transforming ourselves into a market co-creation business entity by drawing on Mitsui Kinzoku Group's expertise, technology, and “Material Intelligence”.



**NOU Takeshi**

Vice President, Representative Director,  
Executive Vice President, Business Creation Sector

### Progress of commercialization of products on new priority themes

#### Solid electrolyte for all solid-state batteries

**[Market development]** The material is expected to be put into practical use in a special application in FY2020.

**[Mass production]** The mass production technology is being established in the existing production lines.

A pilot plant is being built aiming to start its operation in January 2021.

#### HRDP® next-generation material for formation of ultra-fine circuit

**[Market development]** Multiple electronic device makers are evaluating samples. The material is expected to be put into practical use in FY2020 by some customers who evaluate the samples faster than others.

**[Mass production]** Currently working on the establishment of mass production with GEOMATEC Co., Ltd.

### Initiatives for Market Co-creation activities in FY2019

#### Cooperation with ventures in the environment and energy fields

Mitsui Kinzoku has invested in Atomis Inc. (Head office: Kyoto-shi, Kyoto), a spin-off from Kyoto University founded by Distinguished Professor Susumu Kitagawa, Director of the Institute for Integrated Cell-Material Sciences (iCeMS)\* at Kyoto University in 1997 to develop new porous materials called metal-organic frameworks (MOFs).

Through this investment of corporate venture capital, we will support the manufacturing of MOFs and the expansion of applications of the materials. MOFs can also be combined with inorganic materials, which are one of our strengths, and applied in various new markets in the environment and energy fields, such as gas absorption, separation, and storage. We will pursue a broad range of opportunities by developing valuable products.

\* iCeMS: A research institute in Kyoto University aiming to create new interdisciplinary research domain integrating cell science and material science.



# Recycle-smelting ~ Implementing materials stewardship ~

[ Metals Sector ]

The strength of the Metals Sector is that it has accumulated smelting technologies and has multiple smelters. We will promote optimization of the whole smelting business, further increasing our business value, by adding copper smelting to the existing lead, zinc, and precious metals smelting and refining network to increase synergies.

Since the early 1900s, we have owned multiple non-ferrous metal smelters in Japan. We also have possessed the consistent process from the mine to the smelter. Similarly in our overseas operations, we have not only invested in mines, but also undertaken mine exploration, development and operation ourselves. We are one of the few non-ferrous metal smelters to have done this in Japan.

Extracting lead from scrap batteries and valuable metals from industrial waste has begun early in the 1990s. We have implemented the process to the downstream activities, leading to “venous industries.” Material Stewardship is included in the 10 Principles for Sustainable Development advocated by the International Council on Mining & Minerals (ICMM), an international organization made up of mining and smelting companies. The aim is to promote the establishment of a material-cycle society through management of the entire industrial supply chain from mining, smelting, and processing to consumption, disposal, recovery and recycling of metal products. We greatly approve of this principle. It is also in sync with our activities to date aimed at creating a sustainable supply chain.

Under our Medium-Term Management Plan, we are speeding up further the transformation of our business structure from a non-ferrous metals smelter, which uses concentrate as raw materials, to a recycling smelter.

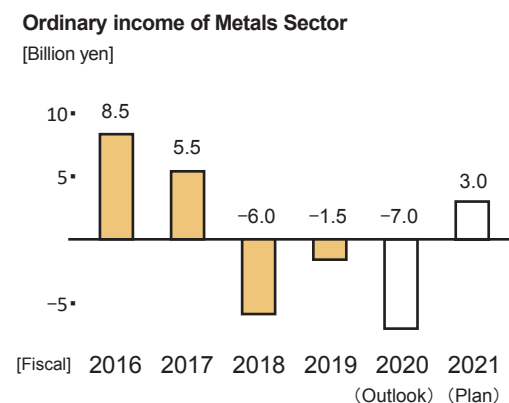
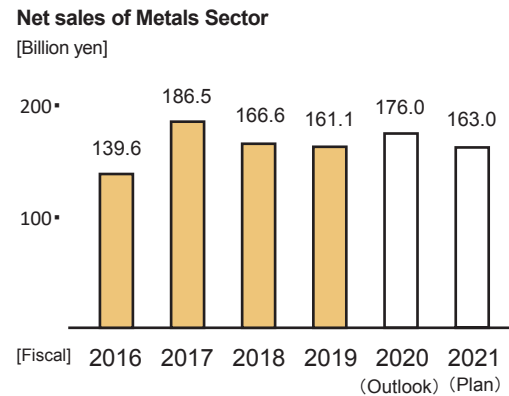
We are actively expanding our processing capacity of complex and refractory zinc ores, increasing lead blast furnace processing, and strengthening our capacity for collecting precious metals.

Also, in order to improve metal recovery rate and recycle more various metals, we will utilize the newly added copper smelting process and the existing zinc and lead smelting processes to process intermediate products generated at our smelting plants.

We aim to expand the capacity of recycle-smelting, to increase benefits for a sustainable business entity, and to contribute to the creation of a material cycling society.



**TSUNODA Satoshi**  
Senior Executive Officer, Metals Sector



## SWOT analysis in Metal Sector

### Strengths

#### Mining

- Know-how of operation of our own zinc mine in Peru over a long period of time
- Production of high quality and clean zinc concentrates

#### Smelting

- Network of eight smelters (Zinc, lead, copper, precious metals) that makes it possible to process a wide variety of raw materials
- Presence as a top manufacturer of zinc in Japan
- Possession of renewable energy (hydropower) facility

### Weaknesses

#### Mining

- Increased costs from deepening of mining locations

#### Smelting

- Aging of equipment



### Opportunities

#### Mining

- Widespread of ICT in operations
- Stable growth of zinc and copper demand, both globally and in the long term

#### Smelting

- Global expansion of the recycled raw materials market due to the enhancement of environmental awareness
- Promotion of the spread of renewable energy worldwide



### Threats

#### Mining

- Increased mining costs caused by lower purity of mined ore.
- Strengthened restrictions due to the enhancement of environmental awareness worldwide

#### Smelting

- Increased presence of Chinese zinc smelting
- Gradual decline in domestic demand for zinc and copper
- Intensifying competition for recycled raw materials worldwide



## Results and plans of Metals Sector

### FY2019

We increased the quantity of processing lead-based recycled raw materials and collecting by-product smoothly almost as planned.

### From FY2020 onwards

We will continue to obtain more diverse raw materials for recycle and increase the quantity of processing the raw materials by organically connecting new processing processes to the existing smelting network.

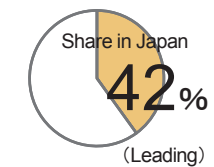
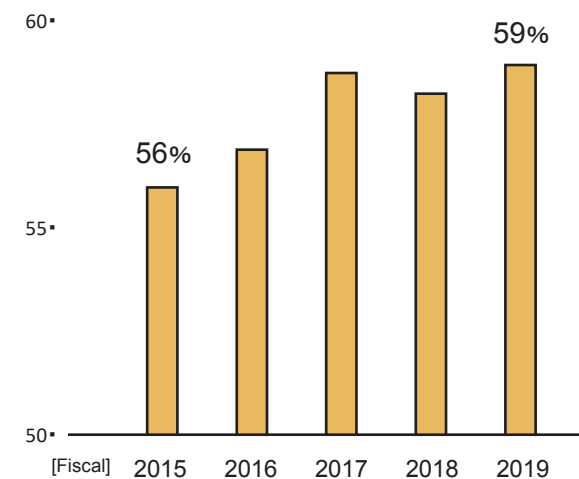
## High share products



Electrolytic zinc

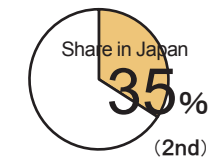
Electrolytic lead  
(Electrolytic smelting process)

### Annual transition of the ratio of recycled raw materials (Total of zinc, lead, and precious metals)



### Zn (Zinc)

Iron is essential as a basic material for use by industries and in our livelihood. In addition, zinc is what protects iron from corrosion. Zinc powder is widely used not only as a coating material for steel, but also for die-casting and other processes of copper.



### Pb (Lead)

Lead is acquired from battery scraps and ores, and because it is easy to process, it is used mainly for lead storage batteries, as well as for solder, lead pipes and sheets, X-ray shielding material, soundproofing material, and more.

### <Other main products>

Copper/Zinc base alloys/Antimony trioxide/Gold/Silver/  
Sulfuric acid/Bismuth/Zinc ore/Lead ore

# Continuous supply contributing to sustainable mobility

[ Automotive Parts & Components = Mitsui Kinzoku ACT Corporation ]

While Mitsui Kinzoku ACT Corporation (hereinafter "ACT") was established in 2010, Mitsui Kinzoku's automotive parts & components business dates back more than half a century. We first launched into the United States in 1987. Currently, there are 11 production and supply sites throughout the world including a site in Morocco that was completed and started operations in January, 2020.

Our system of regional business units which conduct business operations in each region is also established. We have cultivated local human resources at both operational and management level. Currently the percentage of employees holding local nationality in executive officer positions is around 23% and the percentage of women in management positions is around 21%.

In FY2019, the first year of the current medium-term management plan, the business environment deteriorated more than expected due mainly to the trade friction between the United States and China and the spread of COVID-19. To survive this severe environment, in addition to executing the contingency plan, such as the reduction of fixed costs, globally, the corporate headquarters and business units are working closely together to implement the two main strategies under Vision for 2024—continually enhancing quality and cost competitiveness and focusing on winning major contracts to expand sales.

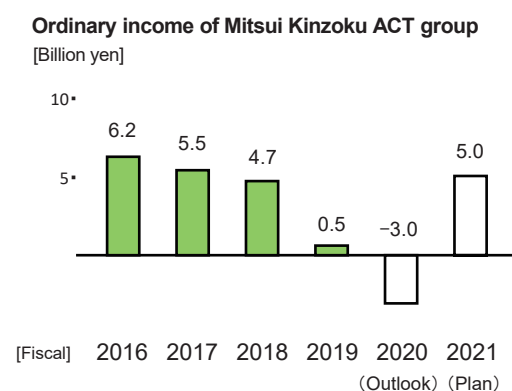
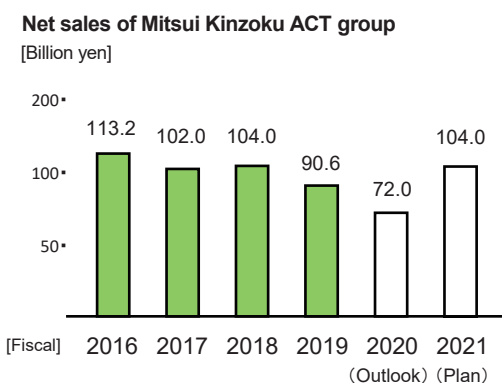
Our vision for 2024 is to be a company that provides products and services focused on safety, comfort, and amazing performance through the utilization of our strength in manufacturing intelligence. We will strengthen our quality and cost competitiveness by implementing ICT and other technologies in our production sites to develop smart factories, in order to improve productivity and enhance the quality of mass-produced items, as well as to reduce costs.

Also, we would like to develop high quality products for door-related components in accordance with CASE, such as the electrification and automation of mobility, and propose such products to our customers worldwide in order to realize the acquisition of large-scale orders and the expansion of future sales.

By establishing the ACT brand and strengthening customer trust, we believe we can contribute to sustainability of the automotive industry.



**IGATA Hiroshi**  
Senior Executive Officer of Mitsui Kinzoku,  
President and Representative Director of Mitsui Kinzoku ACT Corporation



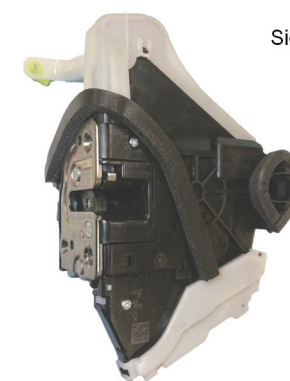
## SWOT analysis in Automotive Parts & Components

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>Technological abilities as a manufacturer specializing in components for the door area</li> <li>Long-term business partnership with outstanding Japanese OEMs</li> <li>Supply chain that enables stable supply on a global scale</li> <li>Integrated production at the major production sites that covers everything from pressing, resin formation, and assembly</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>In-store share among European and American OEMs</li> <li>Lineup of products for electric sliding doors and backdoor systems</li> <li>Alliance with other companies that complement our own technologies</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>Alliance with European OEMs that do not have much business with the Japanese OEMs who are our customers, and increase sales opportunities toward European OEMs through joint purchases</li> <li>Increased sales opportunities for our company's lightweight products and system products due to the electrification and automation of automobiles</li> <li>High barriers to market entry because of strict demands in terms of performance and required quality</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>Emergence of giving priority to one's own country, deceleration of the automobile market due to trade frictions, increased burden of customs expenses, changes in the currency exchange rate</li> <li>Market oligopoly by global mega-suppliers</li> <li>Emergence of new customers and competitors from the major transformation in the automobile industry</li> <li>Deceleration of the automotive market caused by COVID-19</li> </ul>

## Key challenges

### Achievements in FY2019

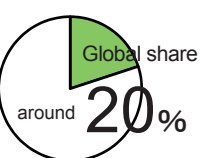
We started full-scale production and supply of the GA Latch, a next-generation side door latch. The GA Latch is smaller, more lightweight, and higher-strength than existing products and can be applied in a number of variations. It is also designed in consideration of assembly workability for both customers and our company.



Side Door Latch (GA Latch)

**0.85**  
Weight of existing products = 1.0

**1.18**  
Strength of existing products = 1.0

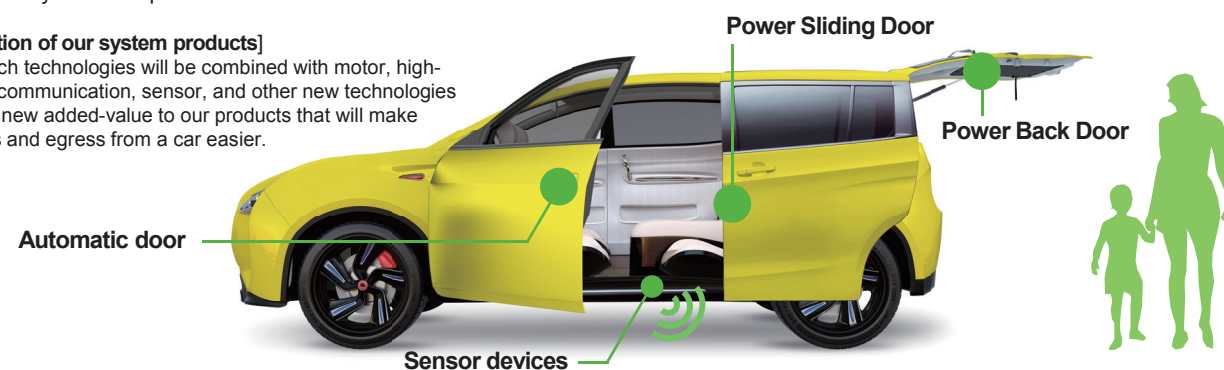


### Door Latch for automobile

Major products offered by Mitsui Kinzoku Act Corporation that have top-level shares in the world market are mechanical components that keep the doors firmly in place on the vehicle body. These parts are constantly required to be made smaller, more lightweight, and with improved performance, while also being required to have the strength to ensure the safety of the people in the vehicles.

## Easy Access Door System

A system that provides safety, comfort, and amazing performance to everyone. It allows the elderly and young children alike to get in and out of the car safely and comfortably.



### Initiatives from FY2020 onwards

#### Solid progress toward achieving our vision for 2024

We will develop high-quality products for use around doors in accordance to the electrification and automation of mobility, and to meet the needs of our customers. We will make proposals on a global level to our customers in order to acquire large-scale orders, and thereby realize expanded sales in the future.

#### [Evolution of our system products]

Our latch technologies will be combined with motor, high-speed communication, sensor, and other new technologies to give new added-value to our products that will make ingress and egress from a car easier.