

## Sumitomo Metal Mining IR-Day 2020 | Advanced Materials Business, Creation Of New products In Energy, Environment And Information/Telecommunications Domains

This is a transcription of the contents of Sumitomo Metal Mining IR-Day 2020, a business briefing session held on December 21, 2020.

<Speaker>

Executive Officer, General Manager of Advanced Materials Division, Kazunori Takizawa

### Materials Business Aiming the independence as a core business

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Establish a strategic implementation structure for the battery materials business and sustainable growth for the advanced materials business

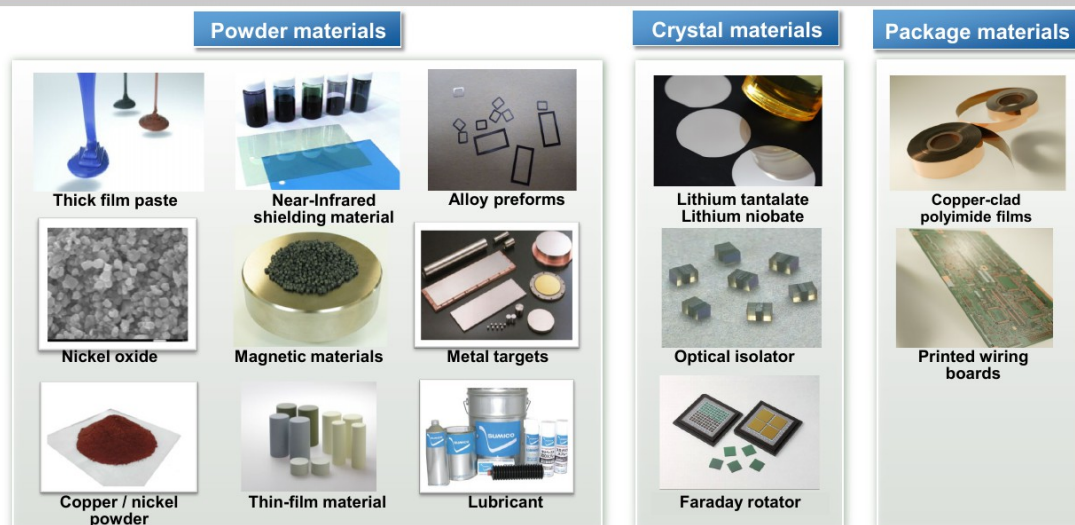


Kazunori Takizawa (hereinafter, Takizawa): I'm Takizawa, General Manager of Advanced Materials Div. Now, let me explain the Advanced Materials Business.

Aiming to become independent as a core business along with mineral resources business and smelting and refining business, our company Materials Business was split into the battery materials business and the advanced materials business in April 2019. In the battery materials business, we will focus on speeding up the implementation of growth strategies, while in the advanced materials business, we will achieve sustainable growth by focusing on strengthening the profitability of existing businesses, creating new businesses, and promoting incubation.

## The three businesses supporting the Advanced Materials Division

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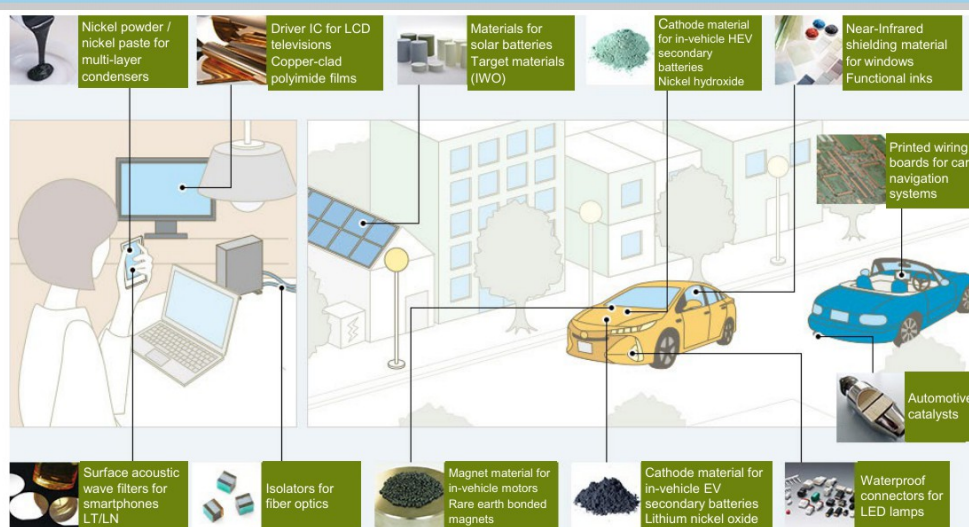
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This division consists of three business units: powder materials, crystal materials, and packaging materials. We manufacture and sell thick film materials, near-infrared shielding materials, rare earth magnet materials, nickel powder, alloy materials, etc., crystal materials such as lithium tantalate, lithium niobate, optical isolators, Faraday rotators, etc., and packing materials such as copper and polyimide double-layer plated substrates and printed circuit boards, respectively.

## Advanced Materials Division products in daily life

### Advanced Materials Division products in daily life



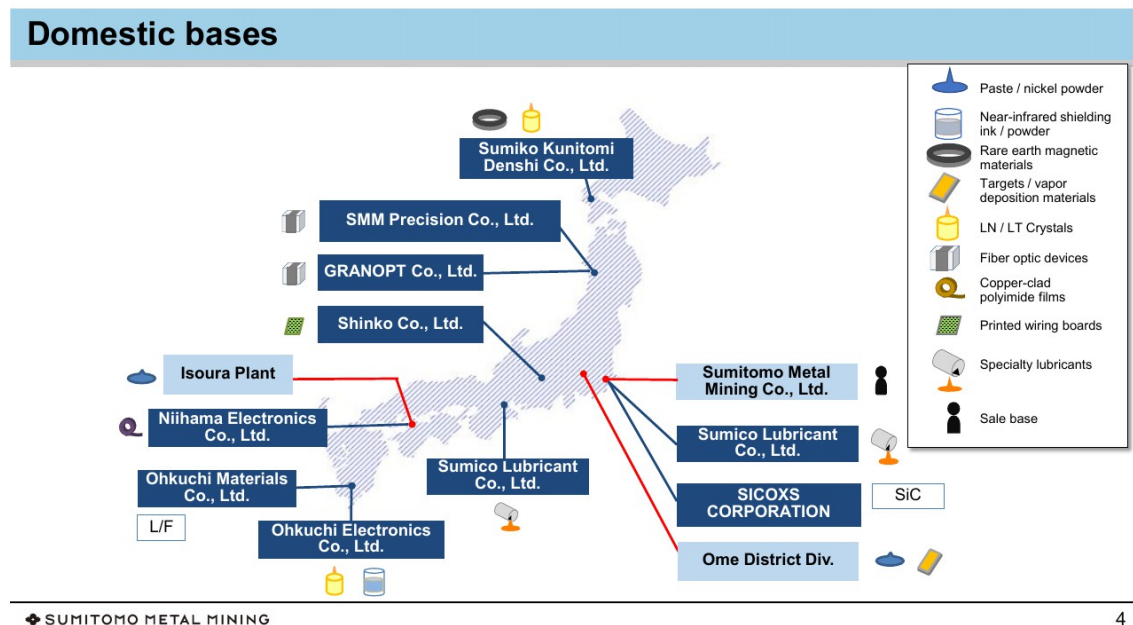
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The materials produced by this division are widely used in our daily lives, including electric parts such as smartphones, personal computers, communication devices, and automobiles,

as well as window glass, LCD TVs, and support daily life, industrial activities, and social infrastructure development in terms of materials. Products made from battery materials that belong to the same materials business are also listed on this page.

## Domestic bases



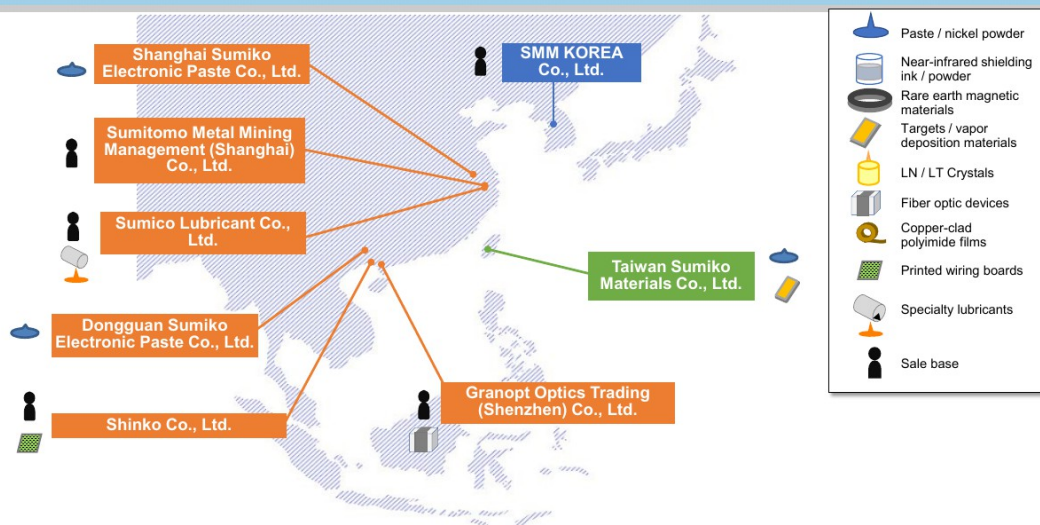
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The Advanced Materials Division has business management functions, sales, and raw materials functions at the Sumitomo Metal Mining Head Office. In addition to the Ome District Division in Tokyo and the Isoura Plant in Niihama City, Ehime Prefecture, we have affiliated companies throughout Japan from Hokkaido in the north to Kagoshima Prefecture in the south.

Many of these bases are located in areas where Sumitomo Metal Mining used to operate mines and smelters, and these operations contribute to local employment and regional revitalization after the closure or closure of the mines.

## Overseas bases

### Overseas bases



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The main overseas bases of the advanced materials business are the powder materials business, which manufactures and sells thick film pastes and thin-film materials in China and Taiwan. The packaging materials business has a sales company in Korea. We will continue to expand our business worldwide.

## FY2020 Business Environment 1

### FY2020 Business Environment 1

#### Impact of COVID-19

- Chinese bases, which produce thick film paste, temporarily suspended operations after the Chinese New Year, however, they swiftly resumed and sales have recovered to the level that they were at before COVID-19. On the other hand, there are movements to increase inventory due to apprehensions about the coming third wave, and we are keeping an eye on movements early in the new year.
- In-vehicle and industrial machinery related market bottomed out in August and is gradually recovering. Year-on-year smartphone-related products saw a slump, but the 5G market is starting in earnest.
- The entire division has largely recovered to what it was before the pandemic, and shipments of most products are at a level where they will outstrip the previous fiscal year, which had an inventory adjustment.



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Next, we will explain the business environment for this fiscal year. To prevent the spread of the COVID-19 infection, the Chinese production base of thick film paste temporarily suspended operations for about a week after the Lunar New Year. Shipments recovered steadily after the resumption, and are now recovering to levels before the COVID-19 outbreak.



Sales of automotive and industrial machinery recovered gradually after bottoming out in August. The sales of smartphone-related products declined in the first half of the fiscal year, but the 5G-related market has started in earnest and is now recovering.

As a whole, the situation has generally recovered to the level before the COVID-19 outbreak, and shipment levels are currently higher than those in the previous fiscal year, which was in an adjustment phase.

The right-hand side of the slide shows changes in the China Manufacturing Purchasing Managers Index (PMI). In February, the index fell to a record low, but since then the index has remained above 50%, indicating an economic expansion, indicating that the Chinese economy, the main market for many of our products, has recovered quickly.

## FY2020 Business Environment 2

### FY2020 Business Environment 2

#### Overview by business

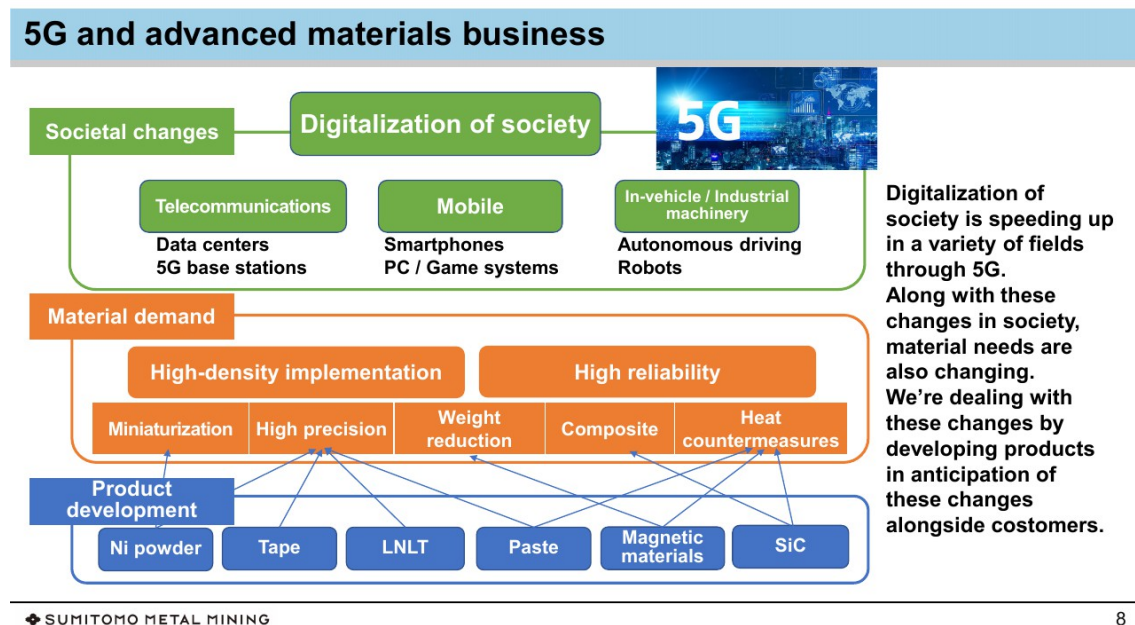
Powder materials	<ul style="list-style-type: none"> <li>Sales to MLCC and resistors market was steady mainly for Chinese market, for computers and game systems through telework, and for 5G base stations.</li> <li>Magnetic materials and ink materials for in-vehicle use bottomed out in summer and turned into recovery phase.</li> </ul>
Crystal materials	<ul style="list-style-type: none"> <li>LTLN for smartphones recovered through the formalization of 5G.</li> <li>Sales of faraday rotators and optical isolators for fiber optics are strong for data centers and 5G base stations.</li> </ul>
Package materials	<ul style="list-style-type: none"> <li>Television LCD panel shipments are steady. Smartphone market has recovered and shipments of copper-clad polyimide films bottomed out in summer and recovering. There were movements in markets related to in-vehicle components, and additionally, the industrial machinery market and China's 5G portable terminal market improved.</li> </ul>

An overview of the business environment by business unit is shown in the table below. In the area of powder materials, sales of pastes for MLCCs and resistors have been strong, mainly for PCs, game consoles, 5G base stations due to telework, and Chinese market. Also, sales of magnetic materials for automotive applications and ink materials bottomed out in the summer and are now on a recovery track.

As for crystalline materials, with the full-scale launch of 5G, LTLN substrates for smartphones have recovered. Sales of faraday rotators and optical isolators for optical communications were solid for data centers and 5G base stations.

In the area of packaging materials, shipments of LCD panels for TVs have been strong. The smartphone market is also recovering, and shipments of double-coated substrates are also recovering after bottoming out in the summer. Also, in-vehicle related products have started to move, and the industrial machinery market is also strong in China's cell phone and 5G related products.

## 5G and advanced materials business

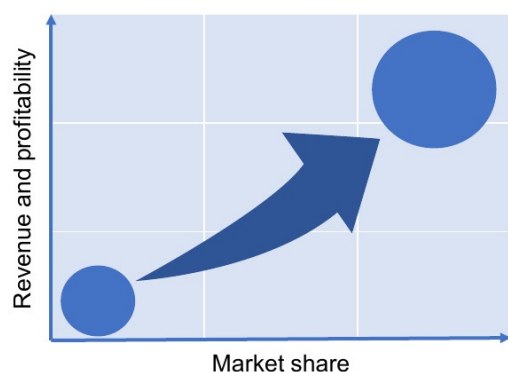


Next, I will explain the relationship between 5G and the advanced materials business. The shift to 5G information and communications is accelerating social change. Its use is expanding and is one of the driving forces for global economic growth. As the communication infrastructure becomes 5G, electronic devices require high-density mounting and high reliability. Also, material manufacturers are required to develop and provide materials that realize elements such as miniaturization, high precision, weight reduction, compounding, and heat protection at a high level.

As you can see, our products supply a wide range of materials for growth fields such as information and communications, mobile communications, automotive and industrial machinery, and support the creation of social value brought about by 5G in terms of materials. We will work with our customers to develop products that anticipate their needs and stay at the forefront of social change.

Vision that advanced materials business is aiming to be

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**A top-runner in each product market;  
keep improving technological ability of material to expected needs in any era; keep profitability and top-class market share.**

In July, 2020, GRANOPT Co., Ltd. was selected for the "Global Niche Top Companies Selection 100" by the Ministry of Economy, Trade and Industry.

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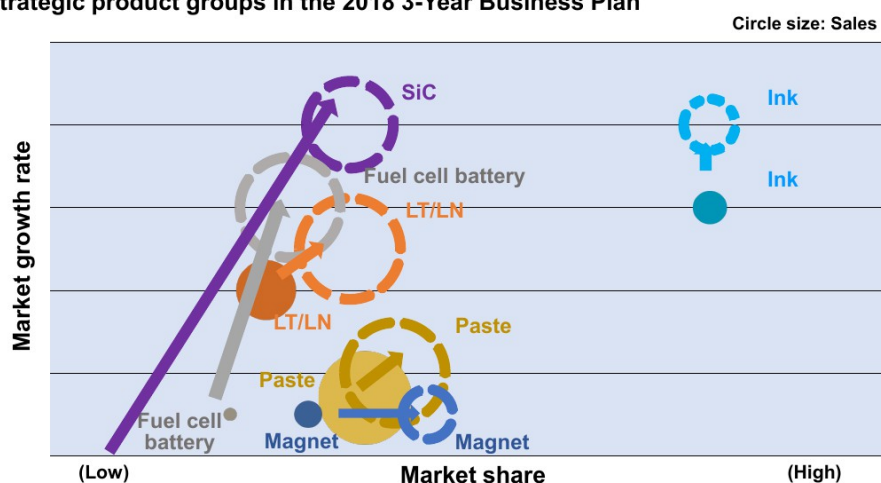
Next, I will explain the vision of the advanced materials business. Our goal is to be the top runner in each product market, securing high profitability and a top-class market share by continuously refining our materials technology capabilities to meet the needs of all times.

In July this year, Granopto Co., Ltd., which manufactures and sells faraday rotators, was selected as the "100 New Global Niche Top Companies" by the Ministry of Economy, Trade, and Industry. This "100 New Global Niche Top Companies" is selected from among companies that have distinguished themselves in niche areas and achieved excellent results, based on such criteria as "Balancing global market share and profits" "Uniqueness and independence of technology" and "importance in the supply chain". Granopto was recognized for its contribution to the construction of the infrastructure for 5G communications.

## Business Strategy 1 Creating a business portfolio

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Strategic product groups in the 2018 3-Year Business Plan



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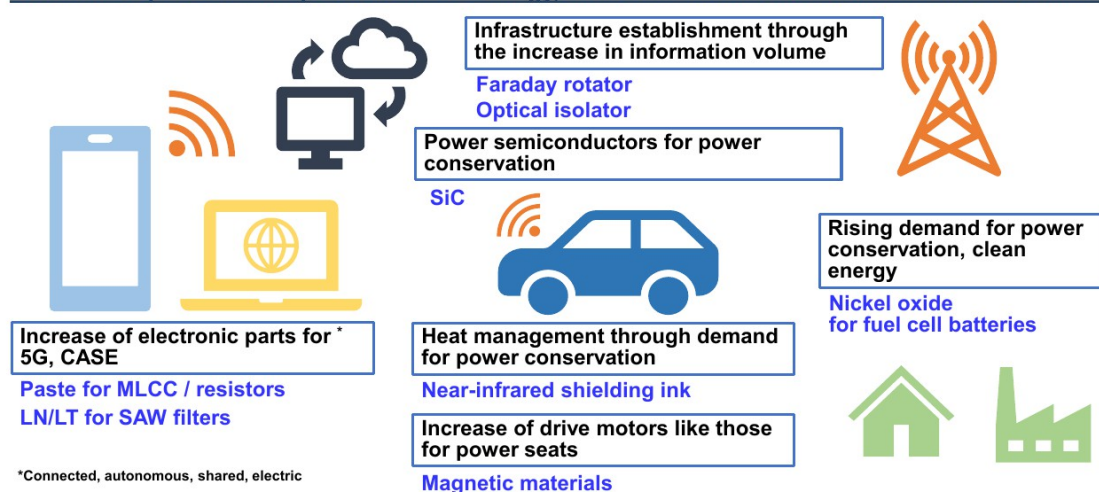
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To realize our vision, we must first "Building a Business Portfolio". To respond to the ever-evolving needs of the times, we will identify the life cycle of each product, continuously replace it, and concentrate management resources on products that are expected to grow. The "2018 3-Year Business Plan" defines the product groups shown from fiscal 2017 to 2025 as "strategic product".

## Business Strategy 1 Products expected growth

### Business Strategy 1 Products expected growth

Continue to produce new products in the energy, environmental and telecommunications domain



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In the "2018 3-Year Business Plan" category, "strategic business" includes "needs of the times" such as energy conservation, clean energy, 5G, and electrification of automobiles. By

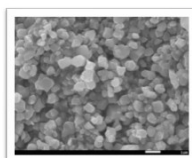


continuing to provide leading-edge materials for these fields and needs, we will continue to grow with the times.

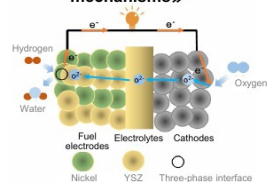
## Examples of products expected growth

### Examples of products expected growth

#### Nickel oxide



#### «SOFC power generation mechanisms»

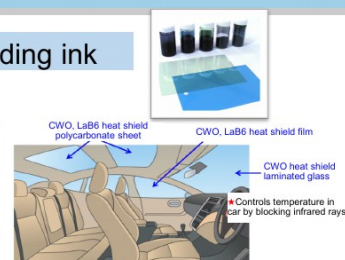
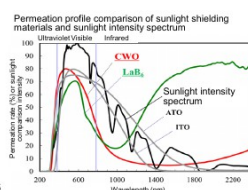


Nickel oxide is used in fuel electrodes

Utilizing their small size and high purity, they have recently been garnering attention for their use in fuel electrodes in solid oxide fuel cells (SOFC), in addition to multi-layer chip inductors.

With fully integrated production that starts from nickel mineral ore, we will realize stable supply and high-quality.

#### Near-infrared shielding ink



Cesium tungsten oxide (CWO) and lanthanum hexaboride ( $\text{LaB}_6$ ), the near-infrared shielding materials we developed at SMM, are able to more effectively draw in the energy-rich light wavelengths (near-infrared rays) selectively in the 800 - 1,200nm range of sunlight.

For example, if applied to materials for windows, they can retain brightness and effectively cut the near infrared ray energy, allowing for a great degree of control in keeping the temperature from rising in the room. They also have the ability to convert light into heat, control light and convert light into electricity.

**Highly advanced materials that make contributions to resolving the social issues, as mentioned in our Vision for 2030**

As an example of growth, we introduce two products for fuel cells: "nickel oxide" and "Near-infrared shielding ink". Nickel oxide is expected to be used as a fuel electrode in solid oxide fuel cells (SOFC), which are suitable for power generation in factories and office buildings with a large capacity. Taking advantage of our integrated production from nickel ore, we are conducting trials of new products that contribute to society.

Our company's proprietary near-infrared shielding material, "Near-infrared shielding ink" selectively and strongly absorbs light with wavelengths from around 800 nm to 1,200 nm (near-infrared rays), which generates a large amount of energy in sunlight.

For example, if this film is attached to the window material, the energy of near-infrared rays can be efficiently cut while maintaining brightness. This greatly reduces the temperature rise in the room or inside the car.

## Business Strategy 2 Continuous creation of new business

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<b>X-MINING</b>	Expand market share and explore new markets (develop new applications) with our <b>existing products and techniques as a base</b>
<b>Creation system</b>	Exploring new fields, starting from <b>discerning the future (finding “seeds”)</b> to <b>new product development</b>

		Product	
		Existing	New
Market	Existing	I. Existing business field	II. New product field
	New	III. New markets	IV. New fields
		<b>X-MINING</b>	<b>Creation system</b>

As a mechanism to sustainably create new products, a **new business creation system** is being developed through cooperation with the Engineering Division, the Battery Materials Division and the Advanced Materials Division, to cover the process spanning from new product research to commercialization proposal.

On October 20, we had the grand opening of the product information site for our powder materials business, “**X-mining**.” “**X-mining**” is a marketing system based in open innovation and cooperative creation that includes cooperative business and mergers in new fields and different industries so that we can break into new fields that have business opportunities for existing products.

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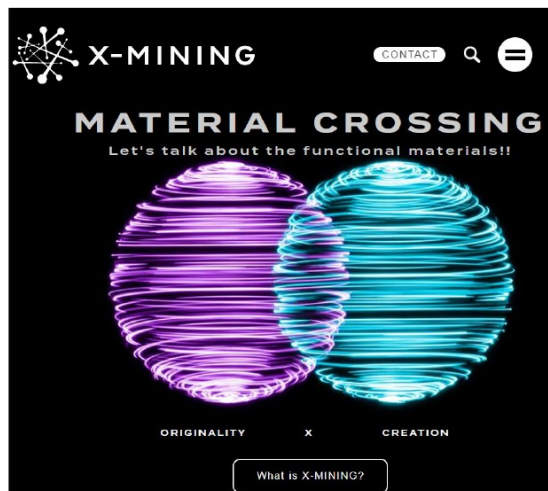
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Our second objective is to continuously create new businesses and products. To this end, our company's Technology Division, Battery Materials Division, and Advanced Materials Division work together to develop a "New business creation system" that covers the search for new products and proposals for commercialization.

Also, in October of this year, we opened the powder materials business's product information website "X-MINING". "X-MINING" is a marketing system based on open innovation and co-creation (create together) thinking with a view to collaboration and integration with new fields and different industries to cut into new areas where business opportunities can be expected in existing products in the powder materials business.

## X-MINING (Cross Mining) ①

### X-MINING (Cross Mining)



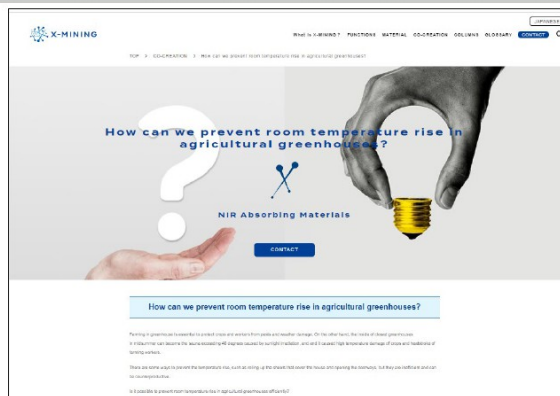
Information communication website for powder materials business products  
**X-MINING (Cross-Mining)**  
Grand opening on October 20

Aimed at a new form of co-creation,  
using SMM's materials and ideas  
from a wide variety of people,  
from researchers imagining  
the future of the environment,  
energy and telecommunications,  
to marketers.

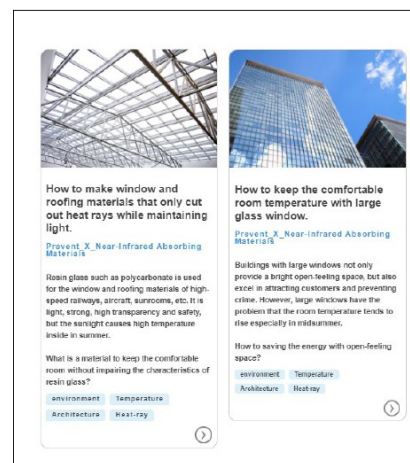
This is the top page of "X-MINING". If you have the chance, please visit "X-MINING".

## X-MINING (Cross Mining) ②

### X-MINING(Cross Mining)



### Introduction of Functions and Co-Creation sections

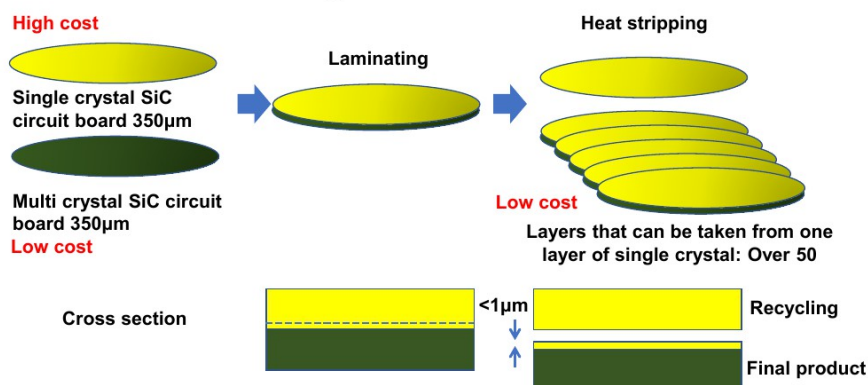


"X-MINING" introduces several adoption cases using various keywords. You can also search by function, such as "absorb", "prevent", and "enhance".

## Progress of the 2018 3-Year Business Plan 1. Development of laminated SiC circuit board ①

### Progress of the 2018 3-Year Business Plan 1. Development of laminated SiC circuit board

Through the adherence of a high-quality single-crystal film on top of a low-cost support circuit board, quality of the SiC single crystal does not deteriorate and manufacturing cost is reduced



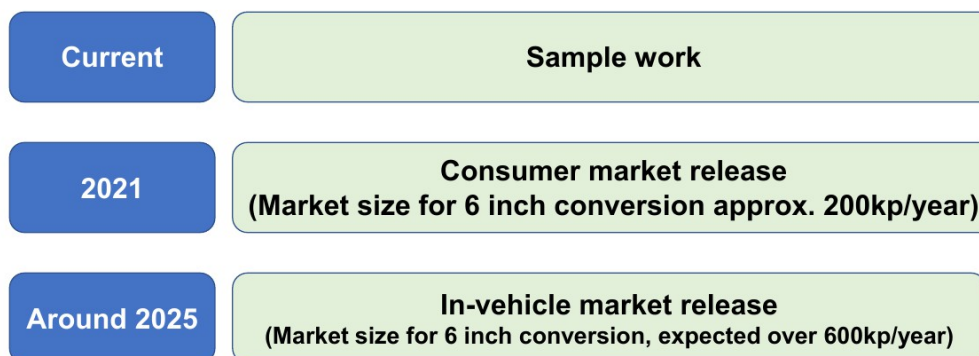
This section describes the topics in the "2018 3-Year Business Plan". The first is "Development of laminated SiC substrates".

SiC substrates are used for power control or power semiconductors. In particular, it is expected to create new markets as a material that can reduce energy loss in the drive controllers of electric and hybrid vehicles. The SiC substrate we work with is made by laminating a single crystal SiC substrate thinly to a polycrystalline SiC substrate and using the polycrystalline substrate as a supporting substrate, thereby reducing the use of expensive single crystals and realizing drastic cost reduction.



## Progress of the 2018 3-Year Business Plan 1. Development of laminated SiC circuit board ②

### Progress of the 2018 3-Year Business Plan 1. Development of laminated SiC circuit board



Currently, the SiC substrate is being used as a sample of a laminated substrate. We are aiming to adopt this system for consumer use in fiscal 2021 and use it in automobiles around 2025.

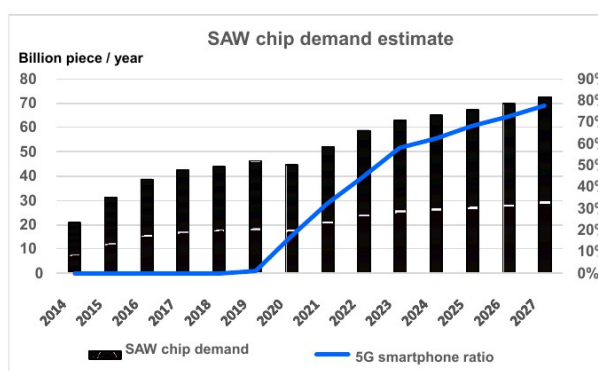
## Progress of the 2018 3-Year Business Plan 2. Crystal materials LT/LN

### Progress of the 2018 3-Year Business Plan 2. Crystal materials LT/LN

#### Crystal materials lithium tantalate/lithium niobate (LT/LN)

Smartphone sales will continue to gradually recover

Additionally, increases in demand for surface acoustic wave chips continue as IoT continues to promulgate



The 2nd is crystal materials, lithium tantalate (LT) and lithium niobate (LN). These crystal materials are used in SAW filters built into information and communication terminals such as smartphones. The number of smartphones sold will continue to grow slowly, and the use of SAW filters is expected to increase with the shift to 5G.

Also, the progress of 5G technology is expected to generate new demand for SAW chips through the widespread use of IoT. Our company will continue to maintain a solid position in the LT/LN market as a major supplier.

This concludes our explanation of the advanced materials business.

### **Q & A 1: Revenue Growth in LT/LN Business**

Moderator: We received the first question. Demand for LN/LT has been sluggish since we made aggressive investments, so we were not able to achieve our original target. Do you think we will soon enter a phase of full-scale profit expansion by expanding sales of 5G smartphones?

Takizawa: This is a question of whether the LT/LN business will enter a period of earnings growth as we originally planned. As for the LT/LN substrates, which we had planned to increase production before 2017, we were not able to expand the market as we had expected.

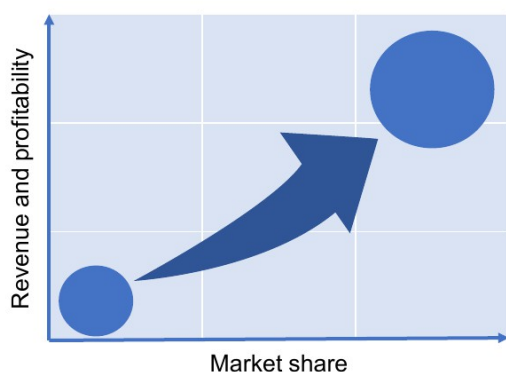
As I explained earlier, the sales volume of smartphones has been growing and we are now enjoying a big growth engine of 5G. 5G itself is mainly used in the high-frequency band, which is not the area of the SAW filter on which the LT/LN substrate is mounted. However, due to the improved performance of the SAW filter, the development of SAW in the high-frequency band, where SAW has been unable to play an active role, is increasing.

As smartphones themselves become more sophisticated, the number of filters installed per unit is also increasing. Also, 5G will soon accelerate the penetration of IoT, and we believe that the market environment surrounding LT/LN substrates is now entering a phase where they will rise from the severe situation they have been in.

At the moment, we are trying to determine how the COVID-19 will rise from the current state of confusion, but it has bottomed out and the number of units shipped and the number of units shipped is increasing. We are now looking at how far this will go. In any case, we believe that LT/LN will soon become a major source of earnings.

## Q & A 2: Products that benefit from "2018 3-Year Business Plan"

Vision that advanced materials business is aiming to be



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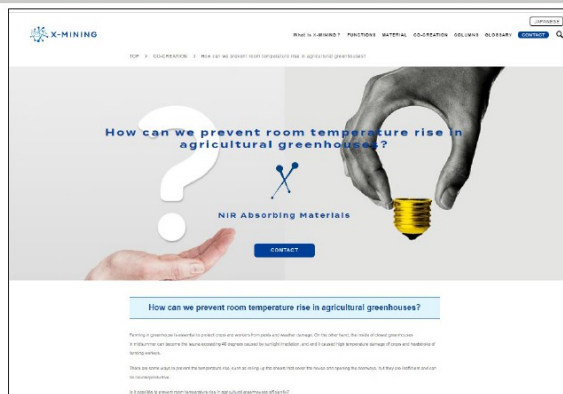
Moderator: Next, let's move on to the second question. Under the current medium-term management plan, what are some of the products that contribute significantly to profit growth? Also, please tell me specifically how it grows.

Takizawa: This is a question of what products and businesses will contribute to the growth of earnings in the "2018 Medium-Term Management Plan" and how big are they? As I mentioned in my presentation earlier, we will discuss which businesses and products we will expand in our "2018 Medium-Term Management Plan".

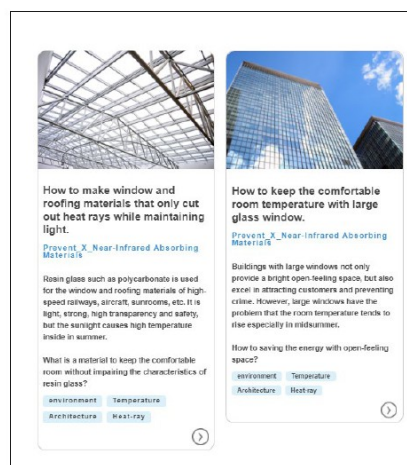
I'm sorry, but I can't tell you about individual product groups or the size of the profit of the business. As you can see, we have positioned businesses with no market, such as SiC substrates, which are starting from scratch, and businesses with growth potential, such as the LT/LN crystal materials business, which is currently lagging slightly, as sources of earnings growth.

## Q & A 3: SiC substrates

### X-MINING(Cross Mining)



### Introduction of Functions and Co-Creation sections



Moderator: Let's move on to the next question. There are 3 points about SiC substrate. First, is there any advantage when compared to the existing SiC substrate? There seems to be a cost advantage, but how much advantage is there? The second point is, what do you expect to be used for consumer use? The third point is epitaxial using only SiC substrate, but what about SAW?

Takizawa: You asked us if we have a cost advantage of our laminated substrates over existing substrates. As I explained, our laminated substrates have a cost advantage by reducing the use of expensive single-crystal substrates. As it is difficult to make an absolute or relative comparison, I would like to refrain from answering here.

The second point is that while there are a variety of applications for the consumer sector, the first area we envisage is the power sector, which uses a large amount of electricity, such as power generation.

The third question is not in our scope at this time.

## Q & A 4: Integrated production of SiC substrates

Moderator: Let's move on to the next question. About SiC substrates, is it correct to understand that your company will carry out integrated production including single crystal and polycrystalline substrates? In that case, how much investment will be needed from now on?



Takizawa: We received a question about the concept of procurement of single crystals and polycrystals, which are the raw materials for SiC substrates, or in-house production. At present, both single crystals and polycrystals are purchased from the market. We plan to study the possibility of in-house production in the future to reduce costs. We have not yet reached the point where we can estimate the investment amount in that case.

**Q & A 5: Target growth rate for each product group and ways to match supply and demand amid difficulties in investment timing**

Moderator: Let's move on to the next question. There are roughly 2. First, you explained that expanding demand for 5G and EVs will change the business environment, including product needs. What is your target growth rate for each of the top lines for powder materials, crystal materials, and packaging materials? I think this question is about the difference in growth rate.

Second, in the materials business, the timing of investment was difficult, and in some cases, preceding fixed costs weighed on earnings. There are a wide variety of products. Do you have any ideas or efforts to match growth in demand with the expansion of supply capacity? I think this is a question about how to match against the difficulty of investment timing.

Takizawa: Concerning the growth rate of each of the first product groups, the growth rate of each product group is not always determined or visible because it sometimes depends on the growth of the target market and the position of the customers we directly supply. However, we believe that the minimum growth rate we must achieve is at least to maintain the market growth rate for end-market such as components.

Second, as you have mentioned, it is very difficult to determine the timing of investment. In the past, there have been cases in which investments were made in the form of waiting for the market to start and ultimately failed for a long time.

We routinely collect information from multiple resources to improve the accuracy of market launch timing and scale. However, there is a sudden increase in demand that does not allow us to launch quickly.

What we can do now is not only to make effective use of our facilities but also to develop and utilize human resources in a fluid manner. As I told you earlier, we handle various products in various places in Japan. Although there are differences in terms of the degree of busyness and the level of capacity, we are working to increase the capacity utilization rate of people and

facilities as a whole by allocating human resources from sites that produce products with a relatively large margin to sites and products where demand is rapidly increasing.