Semiconductor Materials Segment

Thin Film Materials Business

Employing world-class nonferrous metal manufacturing technologies, we are a supplier of a wide variety of sputtering targets including targets for semiconductor applications, compound semiconductor materials, high-purity metals, and surface treatments. These and many other materials and services, provided on a global scale, find use cases in end products such as advanced devices, leading-edge IT equipment, medical instruments, and electric vehicles.

Key Strategies

- Establish a dynamic supply system to meet demand
- Strengthen new products and new business development capabilities
- Promote digital transformation (DX) to achieve greater manufacturing efficiency

Review of FY2022

In the first half of fiscal 2022, semiconductor-related markets remained as robust as they had been in fiscal 2021, due to the continued strong demand for semiconductors driven by the growth in digital transformation (DX). However, in the second half of fiscal 2022, demand for consumer electronic devices in general, such as smartphones, tablets, and PCs, began to decline, which led to a marked adjustment of inventory across the supply chain.

Against this backdrop, and in anticipation of medium- to long-term market growth, we are taking steps to strengthen our supply system. These steps include starting construction of a new plant in the U.S. and the decision to increase our production capacity of sputtering targets for semiconductors in Taiwan by approximately 80% from the current level. In addition, while we continue to strengthen our ESG initiatives overall, Isohara Works can be singled out specifically for receiving a perfect 200-point score when audited under the Validated Assessment Program (VAP). This was an evaluation of the facility's compliance with the Responsible Business Alliance (RBA) Code of Conduct and further demonstrates our commitment to the ESGs.

Outlook for FY2023

The adjusting of inventory levels across the supply chain, which began in the second half of fiscal 2022, is expected to continue in fiscal 2023. Furthermore, although intensifying trade friction between the U.S. and China and prolonged Russian aggression in Ukraine, amongst other factors, are raising concerns about the current macroeconomic environment, market growth is still expected in various business areas. In the medium- to long-term, growth is anticipated particularly in semiconductor-related markets due to the full-scale rollout of 5th generation (5G) mobile communication systems, electrification of vehicles, and the acceleration of decarbonization. Consequently, the demand for the division's advanced materials is expected to further increase.

To meet this growing demand, we will make sound, intelligent capital investments, which will include the construction of new plant to raise production capacity and the creation of a flexible supply system. This in turn will earn us the trust of our customers. In addition to contributing to the achievement of the SDGs through our products, we also intend to meet society's expectations by keeping our attention on new development trends in response to various market changes and solving problems through internal and external collaboration.

TOPICS

Increased Production Capacity for Sputtering Targets for Semiconductors in Taiwan

At our Taiwan facility, production capacity of sputtering targets for semiconductors will be expanded, increasing capacity by approximately 80% from the current level. We will have the new line designed, built, and commissioned to begin operating in the second half of fiscal 2024 or later as needed.

Sputtering targets for semiconductors are a mainstay product of our Thin Film Materials Business. They are used in manufacturing various semiconductor devices, including leading-edge logic and memory products. Our decision to increase production capacity is in keeping with our long-term view that demand is expected to increase as the semiconductor industry expands in step with ongoing global digitalization. This expansion will lead to a supply system that can flexibly respond to customer demands and earn us their trust.

Taiwan facility earmarked for increased production capacity

Semiconductor Materials Segment

Tantalum and Niobium Business

Germany-based Group company TANIOBIS GmbH (hereinafter "TANIOBIS") is one of the world's leading manufacturers of tantalum and niobium materials, with manufacturing and sales locations all around the globe. The Group, TANIOBIS, and Tokyo Denkai Co., Ltd., a refiner and processor of tantalum and niobium, work together to contribute to the development of IoT and AI in society by being reliable suppliers of high-quality materials such as metal powders used in capacitors and semiconductor materials, high-purity oxides for SAW devices and optical lenses, chlorides for semiconductors, and superalloy additives.

Key Strategies

- Create resilient supply chains in our existing businesses
- Leverage specific features and strengths of each site to increase productivity and improve quality
- Strengthen our customer-focused business model
- Make sound, intelligent capital investments
- Create and commercialize new products to expand our business base

Review of FY2022

In the strong market of the first half of fiscal 2022, our main existing business supplying high-purity tantalum powder used in capacitors and sputtering targets for semiconductors did well; however, we entered a period of adjustment in the second half due to the effects of a downturn in the electronics sector.

The market is expected to bottom out in 2023 and then recover. To meet the anticipated steady growth in demand that will follow, we have made the decision to expand production capacity at Tokyo Denkai Co., Ltd., a wholly owned subsidiary since April 2022. As an example of how we are creating a raw material procurement portfolio that is resilient to fluctuations in supply and demand, prices, and other risks, the decision was made to invest in the Mibra Mine in Brazil. This decision means that TANIOBIS will now be able to purchase tantalum concentrates produced at the mine on a preferential basis. In addition to the activities described above, we took aim at expanding our global market share by promoting our Customer First Project, a project in which our people in sales, R&D, and manufacturing are working together to develop a customer-focused business model.

Outlook for FY2023

We expect the recession in the electronics sector to bottom out in 2023 and then recover, and we believe that demand for our mainstay product of high-purity tantalum powder used in capacitors and also in sputtering targets for semiconductors, will improve in the same manner. Given that demand is expected to grow, we will promote customer-oriented sales activities, in which sales and engineering are integrated to further expand our market share. At the same time, we will further strengthen our competitiveness by leveraging the specific features and strengths of each of our sites to optimize our product mix and reduce costs. We shall also ensure that our raw material procurement is resilient and implement approved investment projects, such as the expansion of our production facilities in Thailand.

In addition, there will be collaboration between TANIOBIS, Tokyo Denkai Co., Ltd. and other Group companies to strengthen our new-business development system, not only in our tantalum and niobium business, but also across the entire range of minor metals. We shall also seek to quickly make new businesses profitable.

TOPICS

Tokyo Denkai Co., Ltd. Becomes Subsidiary

In April 2022, Tokyo Denkai Co., Ltd. became a wholly owned subsidiary, bringing to the Group its superior technology and production capacity in the smelting and refining of high-melting-point metals. The company manufactures ingots to be used for tantalum sputtering targets and has been an important partner in the sputtering target business of our Thin Film Materials Division. Along with TANIOBIS business of powdered tantalum for sputtering targets, the addition of Tokyo Denkai will further strengthen our vertically integrated supply chain and can only improve the resilience of the supply system we have in place for these products. Furthermore, Tokyo Denkai and our Group will accelerate the creation of synergies across the entire range of minor metals, including the expansion of business related to niobium, a metal that has great potential in innovative technologies such as superconductive materials.

Completed ingots

Information and Communication Materials Segment

Functional Materials Business

Employing advanced metal fabrication technology developed over many years of business, JX Metals has become a global supplier of treated rolled copper foils used in flexible printed circuit boards, as well as of precision Cu alloy products, including titanium copper, Corson alloy, and phosphor bronze, which are used in connectors, semiconductor lead frames, and other components.

Key Strategies

- Expand applications of the rolled copper foil and advanced copper alloy products, and improve profitability
- Strengthen production capacity to expand business

Review of FY2022

Sales volumes of our main products in the first half of fiscal 2022 continued to be strong due to demand created by people telecommuting and their other online activities during the COVID-19 pandemic. In fact, sales volumes reached a half-year record high during the period. In the second half of fiscal 2022, however, sales volumes were significantly lower compared to the same period of the previous year. This reduction was due to the economic slowdown caused by restrictions on economic activity in China, as well as other factors, and the resulting adjustments made to inventory levels in supply chains.

Although these effects are expected to continue in the next fiscal year, in the medium- to long-term, as the data society advances, we anticipate further expansion in the markets for data centers, telecommunications infrastructure, power devices and for various electronic devices, such as smartphones and tablets. In addition, we envisage demand for high-performance metals to further increase with the electrification and automation of vehicles. In response to future growth in demand, we will achieve further improvements in efficiency and productivity, and by bolstering Group manufacturing facilities, will increase manufacturing capacity at each of the Group's sites thus expanding our production structures and strengthening our business foundations.

Outlook for FY2023

We expect that the economic slowdown in China and other overseas countries will continue in fiscal 2023, as will adjustments to inventory levels in the supply chain, with it taking some time for demand to recover. However, over the medium- to long-term, we anticipate demand for the high-performance metals used in IT-related equipment will continue to grow.

Fiscal 2023 will be important for us as we will gain a foothold in this year from which we can strengthen our overall structure so as to expand sales when things pick up in the future. We will make capital investments in rolling mills at the Hitachi New Plant (tentative name) and Hitachinaka New Plant (tentative name), while at the same time increasing production capacity at existing facilities by improving yields and productivity. In addition, we will pursue alliances with other companies, such as outsourcing manufacturing and forming joint ventures to ensure our production system is flexible, and we shall also move forward with our Business Continuity Plan (BCP) and ensure we have risk diversification.

TOPICS

Construction of R&D Tower at Kurami Works

We have constructed a new building for R&D at Kurami Works, our main business base. The goal here is to enhance the way we conduct R&D in response to the further development of the IoT and AI society. The facility was brought online in stages as equipment was installed, and operations started in March 2023.

Kurami Works, one of the main bases of our Focus Businesses, develops, produces, and supplies high-value-added products such as treated rolled copper foil, used in flexible circuit boards, and high-performance copper alloys, which are used in various advanced devices. Such alloys include titanium copper and Corson alloys.

The strength of Kurami Works has always been its highly customer focused, fast-track development capabilities. This allows customer needs to be swiftly identified and products quickly developed and launched that meet these needs ahead of our competitors. In addition to further accelerating our efforts to improve our existing products and develop new alloys and alloy foils, we will also work to improve how we find new applications and develop new materials that have a high degree of affinity with our proprietary technologies. We will also further enhance our core technologies, which include melting, rolling, and heat treating, and this will lead to more efficient material development, productivity improvements, and better designed plant and facilities.

R&D Tower Kurami Works
(Kanagawa Prefecture)

Information and Communication Materials Segment

Titanium Business

Titanium, a light, strong metal resistant to corrosion, has wide-ranging uses, from aircraft to desalination plants, electric power plants, and other applications. Group company Toho Titanium Co., Ltd. is engaged in the smelting of titanium, and leverages related materials and technologies to manufacture such products as catalysts (for propylene polymerization) and chemicals (e.g. materials for electrodes and dielectrics in multilayer ceramic capacitors).

Key Strategies

- Optimize titanium price standards
- Expand production capacity to meet increased demand
- Generate and pursue new businesses

Review of FY2022

Sales of titanium were significantly higher than the previous year due to a recovery in passenger demand for aircraft applications, replacement demand for Russian-made mill products, and steady sales of high-purity titanium for general industrial and semiconductor applications. Profits increased compared to the previous year despite higher costs due to soaring prices of imported raw materials, electricity, and supplementary materials. This improvement was due to price adjustments by some customers, an increase in shipment volume resulting from inventory shipments, and an increase in export revenues due to the weaker yen. One-time positive factors such as the payout and reversal of inventories manufactured before the cost increase also had a positive impact. Sales volume in the catalyst business decreased from the previous year due to softening demand for polyolefin catalysts in Asia, mainly resulting from the economic slowdown in China. Sales volume in the chemical business decreased from the previous year due to lower demand for multilayer ceramic capacitors (MLCCs), which are the main application for ultra-fine nickel powder, our mainstay product. This lower demand is a result of the economic stagnation caused by the rising interest rates in the U.S. and the lockdowns in China.

Outlook for FY2023

We expect titanium sales to remain firm due to a recovery in demand for titanium in aircraft applications and continued demand to replace Russian-made wrought products. On the other hand, we expect sales in the catalyst and the chemical businesses to remain soft for the time being, as we anticipate that it will take more time to see a full-fledged economic recovery in China and other countries. We expect profits to be significantly pressured in the titanium business, despite price corrections. Impacts include the disappearance of one-time positive factors that manifested themselves in the previous year, such as the reversal of inventories with low manufacturing costs, as well as the full-scale disbursement of products with high manufacturing costs from the second half of fiscal 2022.

TOPICS

Boosting Production Capacity Through the Construction of a New Catalyst Plant

THC catalyst (Toho High Efficiency Catalyst) is the mainstay product of the catalyst business of Toho Titanium Co., Ltd. This catalyst is a unique high-performance catalyst used in the production of polypropylene and is a magnesium-titanium type called a Ziegler-Natta catalyst. Polypropylene has a wide range of applications, including automotive interiors and exteriors, home appliances, packaging materials, and food containers. Toho Titanium Co., Ltd. develops, manufactures, and sells environmentally friendly catalysts to respond the urgent need to address environmental issues, such as stricter regulations on chemical substances.

New catalyst production facility at the Chigasaki Plant
(Kanagawa Prefecture)

Metals & Recycling Segment

Metals & Recycling Business

We are able to efficiently use our smelting processes to take copper concentrate and recycled raw materials and supply high-quality metal products such as copper and precious and minor metals. These products are then offered through a stable supply in Japan and parts of Asia. We will work to build a sustainable, recycling-oriented society under the concept of the Green Hybrid Smelting process, which maximizes the use of reaction heat from copper concentrate. With this concept, we aim to increase the ratio of recycled raw materials (either in raw material input or in product content) to at least 50% by 2040.

Key Strategies

- Promote various measures to realize Green Hybrid Smelting
- Pursue our total best and improve productivity from a bird's-eye view of the supply chain
- Encourage measures to evolve and establish an industry-wide Sustainable Copper Vision

Review of FY2022

In fiscal 2022, we worked to optimize the composition of raw materials, focusing on increased processing of recycled raw materials. We also pursued our total best from a bird's-eye view of the supply chain, and strengthened our competitiveness by streamlining logistics between locations and increasing the operational efficiency at each manufacturing site.

In the Recycling Business, the volume of recycled materials collected overseas decreased due to higher transportation and processing costs resulting from soaring energy prices. However, this decrease was compensated for by strengthening the collection of materials from Japan. In addition, we acquired all shares of eCycle Solutions Inc., a Canadian E-waste (waste home appliances and electronic devices) collection and processing company, as part of our efforts to strengthen our Recycling Business initiatives.

Copper prices declined in the Metals Business in the first half of the year due to concerns of the global recession. However, prices rose in the second half of the year due to expectations of a recovery in demand in China. Purchase margins copper concentrates increased from the previous year against the backdrop of factors such as production ramp-ups at new mines. In the sulfuric acid market, market prices remained high in the first half of the year due to the ongoing tight environment from the previous year. From the second half of the year, market prices fell sharply and remained at low levels due to a sharp drop in sulfur prices and a deteriorating supply-demand environment.

Outlook for FY2023

The current environment is expected to face further challenges in the procurement of copper concentrates and the collection of recycled raw materials. In response, we will strive to maximize earnings and improve capital efficiency by addressing materialities.

We expect demand for copper will continue to grow, with supply falling short of demand. Therefore, we must expand the use of recycled raw materials, in addition to copper concentrates, to meet this growing demand. We formulated our Sustainable Copper Vision in August, 2022, to fulfill our missions to (1) Establish a stable supply system to support growing demand and (2) Achieve ESG-oriented production and supply (decarbonized, circular economy, etc.). In fiscal 2023, we will pursue the following four measures to evolve and spread sustainable copper:

(1) Reduce carbon footprint
(2) Increase recycling ratio
(3) Promote responsible procurement and ESG initiatives
(4) Form Green Enabling Partnerships

TOPICS

Promoting Responsible Procurement

On December 15, 2022, JX Metals Smelting Co., Ltd. obtained The Copper Mark certification at the Saganoseki Smelter & Refinery and Hitachi Works. The Copper Mark, founded in 2019, is a highly reliable guarantee framework that encourages responsible production practices and demonstrates a commitment to green transition in the copper industry.

JX Metals Smelting Co., Ltd. became the first copper smelter in Japan to obtain certification after undergoing an audit by an independent third-party organization. The Copper Mark recognizes our compliance with a wide range of criteria, such as environmental, human rights, community, and governance standards across 32 categories. This certification will strengthen the competitiveness of our sustainable businesses in the face of growing international demand for ESG initiatives.

THE COPPER MARK | RESPONSIBLY PRODUCED COPPER

The Copper Mark logo

Metals & Recycling Segment

Mineral Resources Business

The Mineral Resources Business supports the long-term, stable procurement of raw materials for use in advanced materials handled by our Group. To do so, we participate in overseas copper and minor metal mines, and operate domestic auriferous silica ore mines. Not only do we operate and manage mines, we also actively engage in the investigation and development of new projects, such as future exploration activities.

Key Strategies

- Increase the business value of the Caserones Copper Mine through synergies with Lundin Mining Corporation
- Further discover and pursue new projects (exploration, development, operational) that also take into account supplying raw materials to midstream and downstream businesses

Review of FY2022

As announced in our news release issued on March 28, 2023, we decided to transfer our 51% stake in SCM Minera Lumina Copper Chile to Lundin Mining Corporation of Canada. SCM Minera Lumina Copper Chile is now the operating subsidiary of our Caserones Copper Mine. The participation of Lundin Mining Corporation as a management partner of Caserones Copper Mine is expected to generate many synergies, including productivity improvements and enhanced cost competitiveness. In terms of operations, the Caserones Copper Mine reached a cumulative production of 1 million tons of copper to date, despite production declines resulting from heavy snowfall and water restrictions. Production at the Los Pelambres Mine was reduced due to delays in expansion plan progress.

In new mine development projects, we established a cross-divisional project team to ensure stable supply of raw materials for downstream operations. This team evaluated and studied specific projects focused on tantalum and titanium. As a result, we launched a joint venture (JV) with AMG Brasil SA ("AMG") and began production of tantalum concentrate in January 2023. This concentrate is produced from ore at the Mibra Mine operated by AMG.

Outlook for FY2023

Caserones Copper Mine works to improve productivity and strengthen cost competitiveness through their partnership with Lundin Mining Corporation, a company which has an excellent mine operating capacity. The mine will also participate in integrated development in a Lundin Group exploration project nearby, which will enable extended mine life and other long-term business operations. Going forward, the Caserones Copper Mine will continue to support the Copper Smelting Business as an important raw material supplier. The Los Pelambres Mine will focus on increasing production during fiscal 2023 through the completion of the expansion plan.

In addition to our participation in the Mibra Mine (tantalum business), we will move forward with the investigation and survey of various minerals around the world, including minor metals, copper, and silica ore. Here, we aim to achieve stable supplies of raw materials based on future needs in our midstream and downstream businesses, as well as commercialize our business.

TOPICS

Participation in Tantalum Concentrate Production Processes at Mibra Mine

At JX Metals, we decided to participate in the production of raw tantalum materials as our first step toward expanding our resource business into the Minor Metal Business. Since January 2023, we have produced tantalum concentrate at the Mibra Mine, operated by AMG, under a joint venture (JV) between JX Metals and AMG. Tantalum and many other minor metals are expected to become increasingly important as raw materials for use in advanced materials. Securing long-term, stable supplies of these raw materials will be vital, as companies will be required to take proactive steps toward ethical and sustainable responsible procurement that takes safety and human rights into consideration. JX metals will further pursue long-term, stable supply of raw materials and responsible procurement through our part participation in this project.

Overhead view of Mibra Mine and operating plant