X-MINING™

Next Innovation with you.

Introduction to Partnership Initiatives and New Business Creation with Sumitomo Metal Mining

- Are you facing business or technical challenges?
- Are you seeking co-creation partners?
- Are you interested in Sumitomo Metal Mining's advanced materials and technologies?



SUMITOMO METAL MINING

About Co-Creation at X-MINING

Today's world is shifting toward a demand-driven economy in which businesses must address increasingly complex and diverse needs.

It is difficult for any one company to meet all these demands alone. Against this backdrop, open innovation—collaborating across companies—has never been more important.

X-MINING is Sumitomo Metal Mining's future-focused initiative. We combine our strengths in advanced materials and technologies we have cultivated over many years with cross-industry insights to deliver new value.

Our goal is to bring together uniqueness and perspectives found across companies and industries and to co-design innovative ideas and business models, thereby realizing value that resonates globally.

The key is to share a common goal and stay passionately committed to the journey.

Regardless of the country, industry, or company size, we can create new possibilities if we work together toward the goal.

Our advanced materials offer immense potential. As a company at the forefront of resource development and advanced materials, Sumitomo Metal Mining invites you to explore opportunities and pursue new challenges together.

Let's move forward together to create new value.



Atsushi Tofuku
● Founder of X-MINING
General Manager
Innovation Strategy Dept.
Advanced Materials Div.

X-MINING™

Learn more about X-MINING:

https://crossmining.smm-g.com/

SUMITOMO METAL MINING

Contents

1. Executive Summary

About Co-Creation at X-MINING . . . . . P. 01
Summary of Co-Creation Initiatives . . . . . P. 03
Flow and Collaboration Framework . . . . . P. 04
Three Key Strengths in Co-Creation . . . . . P. 05

CASE STUDY 01
SOLAMENT™ × TAKISADA-NAGOYA . . . . P. 06
CASE STUDY 02
SOLAMENT™ × NOTOSHICHI . . . . . P. 07
CASE STUDY 03
Industry-Academia Collaboration . . . . . P. 08

3. Co-Creation Process

Co-Creation Steps . . . . . P. 09

4. Contact

. . . . . P. 10

Co-Creating New Value by Combining Your Ideas with Our Core Technologies

Through X-MINING, we combine your ideas and our five core technologies to address social challenges.

Industrial Efficiency and Sustainability

Achieving Increased Efficiency and Stable Supply in Agriculture and Resource Utilization



● Use Cases ●

Greenhouse films for agriculture

Low Environmental Impact

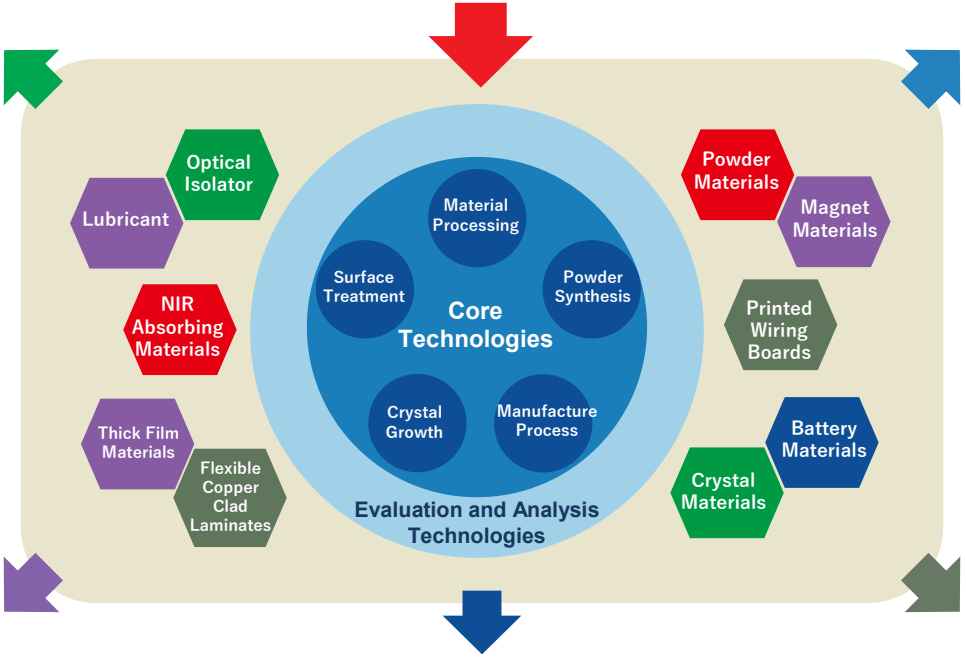
Realizing a Sustainable Society Through Resource and Energy Savings



● Use Cases ●

Electric vehicles, power inverters, power semiconductors

Your Ideas

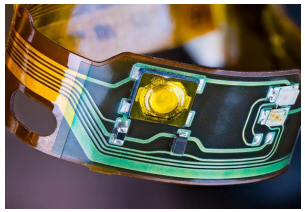


Innovative Technologies

Pursuing Innovation Through Nanotechnology and Next-Generation Electronics

● Use Cases ●

Next-generation printed electronics



Safety and Safe Living

Ensuring the Safety of Everyday Life and Infrastructure with Antibacterial and Monitoring Solutions



● Use Cases ●

Infrastructure safety (monitoring sensors for bridges and tunnels)

Changes in Lifestyles

Enhancing Quality of Life with Comfortable Materials and Solutions for an Aging Society



● Use Cases ●

Heat-shielding clothing and tarp

Co-Creation Process and Collaboration Framework

- In April 2025, we launched the Innovation Strategy Dept. to promote business development through co-creation.
- The Innovation Strategy Dept. is actively involved in every stage of co-creation to advance commercialization.

Co-Creation Process

STEP 1
Inquiry
We welcome all inquiries—even ideas in the conceptual phase.

STEP 2
Consultation/Meeting
Our relevant product marketing managers will engage with you to identify your challenges and needs.

STEP 3
Sample Supply
We fully leverage in-house resources to provide samples tailored to your requirements.

STEP 4
Sample Evaluation
We incorporate your sample evaluation results and develop modified samples for commercialization.

STEP 5
Commercialization Validation / Pilot Production
We can conduct small-scale pilot production for a certain period with a view to commercialization.

STEP 6
Commercialization



Innovation Strategy Dept.

IT Solutions Group

The IT Solutions Group operates the X-MINING website for co-creation partners and handles lead generation.

Global Marketing Group

The Global Marketing Group serves as a point of contact for co-creation partners to engage in open-minded information exchange, and takes the lead in product development based on samples.

Business Development Group

The Business Development Group advances commercialization together with co-creation partners and project branding.

Product Development Dept.

The Product Development Dept. customizes and develops solutions to fulfill the requirements of co-creation partners and arranges small-scale production as needed.

Commercialized project

Business Divisions

We drive co-creation by leveraging three key strengths:

1. Integrated business development structure
2. Proposal capabilities
3. Company-wide technical expertise

1

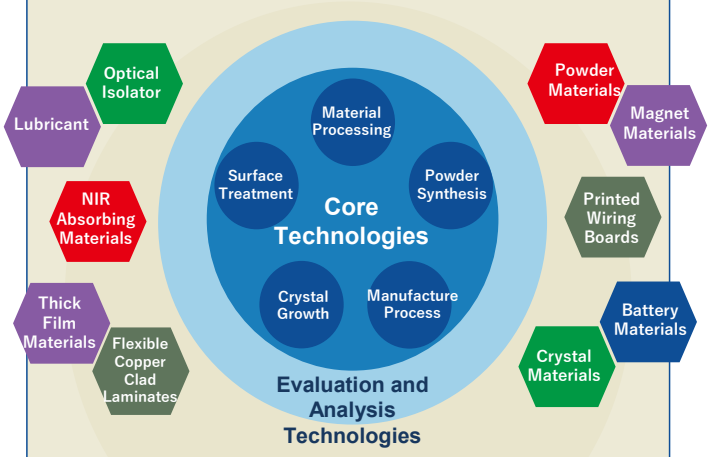
Integrated Business Development Structure (Innovation Strategy Dept.)



By integrating division labs (the Product Development Dept.) into our marketing department (the Innovation Strategy Dept.), we have established a structure with an end-to-end business development process to quickly translate co-creation partner requirements into concrete solutions. We also have extensive experience in brand design and management to support operations post-commercialization.

2

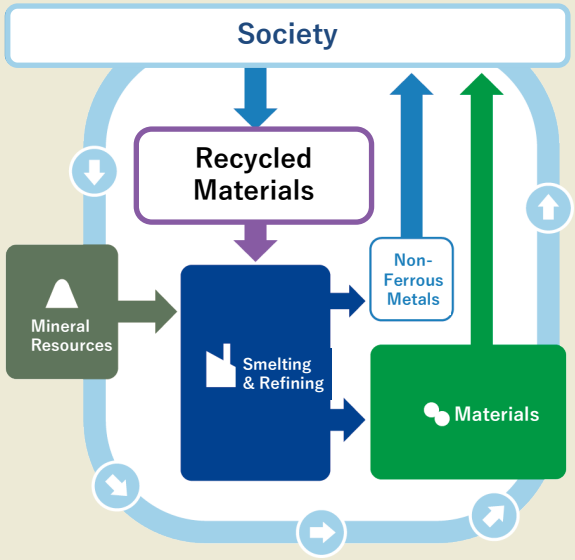
Proposal Capabilities— From Material Synthesis to Application Optimization



We have advanced manufacturing and processing technologies, including powder synthesis and crystal growth for material creation, surface treatment for adding functional properties to materials, and material processing for application-specific customization.

3

Company-Wide Technical Expertise



Beyond vertical integration, our Mineral Resources Business, Smelting & Refining Business, and Materials Business are closely coordinated to maintain a sustainable supply chain. This new three-business collaboration model is our core strength and helps realize a circular economy and carbon-neutral society.

SOLAMENT™ × TAKISADA-NAGOYA

Co-Creation in Apparel with a B2C2B Strategy —Our Approach to Branding

From understanding apparel industry needs to developing and expanding new businesses, this story highlights how we have partnered to embrace the B2C2B strategy in the co-creation project.

A Breakthrough Collaboration with TAKISADA-NAGOYA to Explore Potential in the Apparel Industry

In 2013, TAKISADA-NAGOYA, an integrated textile trading company that was founded in 1864 and covers everything from material planning to sales, approached us for collaboration to explore the potential of SOLAMENT™, a material that controls sunlight, in the apparel industry. By combining Sumitomo Metal Mining's advanced material technologies with TAKISADA-NAGOYA's sales and planning capabilities, we launched a joint effort to expand the SOLAMENT™ business into the apparel industry. TAKISADA-NAGOYA placed high expectations on the potential of SOLAMENT™, but developing products starting from yarn was an entirely new challenge for the company. Although SOLAMENT™ offers outstanding functionality and transparent aesthetics, early market traction was limited.

Shift to B2C2B Strategy to Gain Recognition and Support from Consumers

Through persistent efforts to exhibit at trade shows and engage with customers, it became apparent that the apparel industry requires not only conventional B2B approaches, but B2C approaches to directly communicate material value to consumers. We shifted to a B2C2B strategy, sharing the features and fashion appeal of SOLAMENT™ with consumers and then capitalizing on that recognition and support to amplify demand among partner brands. By winning the support of consumers, we aimed to further expand the brand presence of SOLAMENT™ in the apparel industry.

World-Changing SOLAMENT™ Technology

We incorporated Sumitomo Metal Mining's brand strategy into joint marketing with TAKISADA-NAGOYA. At the Japan Mobility Show in October 2023, we showcased a demo unit that allowed visitors to experience the performance of SOLAMENT™ material in absorbing near-infrared light and converting it into heat. We also exhibited at SXSW in 2024 and 2025 in the United States, and at ISPO, an international trade show for sports and outdoor industries, where SOLAMENT™ drew significant attention as a world-changing technology.



DOWN-LESS DOWN JACKET:
A transparent jacket that generates heat from sunlight, despite containing no actual down

This success is the result of the combination of TAKISADA-NAGOYA's sales strength and Sumitomo Metal Mining's technologies and strategy development capabilities. We will continue to take on challenges to expand the market and explore new possibilities.







SOLAMENT™ fabrics are used for various applications.

Learn more about co-creation here.

SOLAMENT™ × NOTOSHICHI

Innovative Collaboration That Led to Aotenjo, A New Heat-Shielding Net for Greenhouses

Amid increasingly severe summer heat, we co-created Aotenjo, a new solution for agriculture using a new heat-shielding net for greenhouses.

Co-Creation for Protecting Greenhouses from Extreme 50 °C Conditions in Summer

Greenhouse temperatures can reach 50 °C in midsummer, creating extreme conditions for both crops and growers. Confronted with this challenge, NOTOSHICHI, a textile manufacturer of insect-proof nets and other agricultural products, sought a new material capable of blocking heat while allowing light to pass. The company has developed and marketed a wide range of greenhouse materials that protect crops from insects and adverse weather conditions. The search to address increasingly severe summer heat was based on their strong desire, “We need the sunlight but not the heat,” which set the co-creation in motion and ultimately led to SOLAMENT™ from Sumitomo Metal Mining.

New Heat-Shielding Net Developed with Dispersion Technology and Product Design

The initial concept was to compound SOLAMENT™ into resin and spin it into fibers for an agricultural sheet. Uniform dispersion in the resin proved difficult, requiring years of trial and error to bring the final product to completion. Sumitomo Metal Mining drew on its nanoparticle dispersion technology and its expertise in selecting suitable dispersants and compatibilizers to develop the optimal formulation. NOTOSHICHI optimized weave design and additive adjustments to strike the ideal balance of durability and cost. Combining these strengths, we created Aotenjo—a high-performance heat-shielding net that transmits the light crops need while blocking unwanted heat.

Future of Agriculture with Aotenjo

At a farm in Kagoshima City, Aotenjo increased yields of greenhouse crops like mizuna and spinach to about 1.5 times those prior to installation.
The net ensures sufficient visible light for the healthy growth of crops and stabilizes germination. Its diffusing effects also improve growth even at the edges of greenhouses, where light was previously weak. Installation of the net significantly reduced the intense summer heat in the greenhouse. Before installation, work was possible only until about 4:30 a.m., but since installation, work can continue until around 9:30 a.m., greatly easing the workload.
A product of NOTOSHICHI’s passion and Sumitomo Metal Mining’s technology, Aotenjo is now being adopted across Japan.



Inside a greenhouse using Aotenjo. This high-performance heat-shielding net blocks sunlight in the 850–1,200 nm range, the main source of heat, while transmitting the 400–850 nm range needed for photosynthesis.







High-performance heat-shielding net Aotenjo and growers at the farm installed the net in Kagoshima City

Learn more about co-creation here.

Industry-Academia Collaboration

Sumitomo Metal Mining partners with universities and companies to advance practical research and technological development of new materials.

Fe-Ga × Kanazawa University

Fe-Ga (iron-gallium) alloy is known for its large magnetostrictive effects, but significant property variability has made it difficult to produce crystals suitable for practical use. By combining its proprietary expertise in crystal growth, material processing, and alloy design, Sumitomo Metal Mining succeeded in growing high-quality single crystals with minimal variability, ultimately achieving a material with stable magnetostrictive properties and high fabrication flexibility.
The use of Fe-Ga single crystals in the V-GENERATOR developed at Kanazawa University contributes to improving and stabilizing power generation performance. Converting ambient vibrations into electricity, this self-powered V-GENERATOR has potential applications for infrastructure monitoring, plant equipment monitoring, environmental sensors, and IoT and wearable devices.



V-GENERATOR: Vibration power generation device developed by Kanazawa University

Dispersion Technology × Yamagata University

Uniform dispersion of CWO™, an inorganic material that absorbs near-infrared light, in polymer matrices had long been a performance bottleneck. In collaboration with Yamagata University, Sumitomo Metal Mining developed a proprietary polymer dispersant that enables encapsulation and stable dispersion of CWO™ nanoparticles. CWO™ is expected to be applied in optical and electronic devices and to significantly enhance the performance, durability, and energy efficiency of sensors, displays, and communications equipment by blocking unwanted light and heat.



Former main building of Yonezawa Higher Technical School (nationally designated Important Cultural Property) at Yamagata University's Faculty of Engineering campus

From Inquiry to Commercialization

Sumitomo Metal Mining provides comprehensive support for co-creation, from initial identification of challenges to material selection, sample supply, evaluations under practical conditions, modifications, and preparation for product specifications.
We mobilize not just our technical departments, but experts in business development, intellectual property, and legal affairs to drive projects forward with an integrated company-wide approach.



STEP 1 Inquiry

If you are facing challenges or have topics you would like to address with Sumitomo Metal Mining, we encourage you to reach out. We welcome all inquiries—from requests for detailed information to ideas in the conceptual phase.

STEP 2 Consultation / Meeting

Upon receiving your inquiry, our relevant product marketing managers will engage with you to identify your challenges and needs. When necessary, our Product Development Dept., Intellectual Property Dept., and Business Development Group members will join the discussion to jointly develop concrete approaches for implementation.

STEP 3 Sample Supply

Utilizing our division labs (the Product Development Dept.) within the Innovation Strategy Dept., we provide samples tailored to your requirements. Drawing on our four research and development sites, we utilize our advanced experimental facilities and specialized personnel to support prototyping and the production of evaluation samples.

STEP 4 Sample Evaluation

We evaluate samples under practical conditions, identify areas for modifications, and refine solutions to meet specific applications and market needs. During sample evaluation, our Product Development Dept., Innovation Strategy Dept., and Intellectual Property Dept. work closely to create highly viable solutions.

STEP 5 Commercialization Validation / Pilot Production

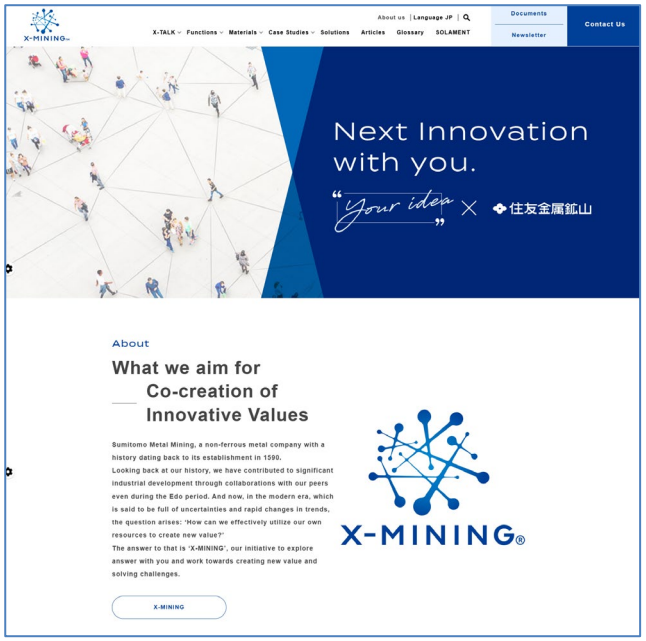
After sample evaluation, we proceed to finalize the specifications for commercialization. We align technical requirements, costs, and intellectual property and legal requirements, and establish a solid foundation for mass production and market introduction, deploying pilot production as needed.

STEP 6 Commercialization

From this point forward, we bring the outcomes of co-creation to society. Following final agreements and contracts, we proceed to mass production and market introduction, launching a business that delivers new value.

Contact

Sumitomo Metal Mining is seeking co-creation partners.
Let’s explore new possibilities together.



X-MINING

Our X-MINING website showcases our co-creation initiatives. Detailed information on our advanced materials and case studies can be found here.

If you are interested in learning more about co-creation, discussing new opportunities, or exploring new possibilities, please contact us using the information provided below.

DOCUMENT LIST ›

CONTACT US ›