

# WIPO GREEN

## TECHNOLOGY FORUM 2026

### TECHNOLOGY COMPENDIUM



## Foreword

WIPO GREEN was established to respond to one of the defining challenges of our time – climate change – by connecting environmental needs with innovative solutions.

Since its establishment in 2013, it has strengthened its role as a global platform that links innovation with action, bringing together inventors, enterprises, researchers, policymakers, and communities. Today, WIPO GREEN works with 167 partners worldwide, reflecting a strong and expanding ecosystem for green innovation.

Our goal is clear: to serve as a trusted global partner that enables green technologies to move faster, reach farther, and deliver meaningful impact where they are needed.

Over more than a decade, the WIPO GREEN database has accumulated 140,000 technologies, combining more than 7,000 uploaded innovations with extensive patent data in the field of environmental technologies.

At the same time, further efforts are needed to accelerate technology transfer. Beyond providing a database platform, we must promote more proactive engagement. Initiatives like this WIPO GREEN Technology Forum 2026, where technologies were proactively showcased to potential partners, are expected to further enhance technology transfer and collaboration.

The successful deployment of green technologies cannot be achieved without collaboration. It requires the collective efforts of technology providers and our partners.

We sincerely hope that the technologies presented at this Forum will connect with diverse partners and contribute to the wider dissemination and implementation of green technologies.

Lastly, we would like to express our deep gratitude to the Japan Patent Office, for their continuous and generous support of WIPO GREEN through the Funds-In-Trust Japan Industrial Property Global. We would also like to extend our appreciation to the WIPO Japan Office for their collaboration with WIPO GREEN.

We look forward to seeing the expansion of regional initiatives that invigorate the WIPO GREEN network and promote the deployment of green technology throughout the world.



Assistant Director General,  
Global Challenges and  
Partnerships Sector, WIPO  
Edward Kwakwa

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## Message from the Director

Today, the environmental challenges facing our world—including climate change, resource circularity, energy transition, water security, and sustainable urban development—are becoming increasingly complex, and addressing them requires both innovative technologies and international cooperation. During the 2010s, Japan ranked first globally in the number of PCT international patent applications related to renewable energy<sup>1</sup>, reflecting the country’s long-cultivated technological excellence and strong accumulation of intellectual property. These strengths position Japan to play a significant role in addressing global challenges.

However, the existence of outstanding technologies alone is not enough. What truly matters is ensuring that these technologies reach the regions and communities where they are most needed and are translated into practical, real-world implementation. We believe that connecting technological innovation with pressing challenges around the world is the key to building a sustainable future.

WIPO GREEN aims to serve precisely as that bridge. Rather than viewing intellectual property solely as a means of protecting rights, WIPO GREEN seeks to use it as a “passport” for expanding environmental technologies globally through technology transfer, international collaboration, licensing, and joint research. This is the core mission of WIPO GREEN.

This technology compendium introduces the advanced environmental technologies of 18 Japanese companies, universities, and research institutions participating in the “WIPO GREEN Technology Forum 2026”, an event designed to promote international collaboration in solving environmental challenges. Covering diverse sectors such as semiconductor technologies, waste management, water treatment, renewable energy, smart agriculture, smart cities, and sanitation technologies, these Japanese innovations have the potential to contribute meaningfully to solving challenges across the Asia-Pacific region, the Middle East, Africa, and beyond.

We sincerely hope that this publication will serve as a catalyst for new collaborations and partnerships among companies, government agencies, researchers, investors, and international organizations seeking technology solutions, and that the technologies presented here will be widely utilized across borders to help co-create a more sustainable future.



Director, WIPO Japan Office  
Tomoki Sawai

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<sup>1</sup> WIPO, “Patenting Trends in renewable energy,” WIPO Magazine (2020), Figure 3.

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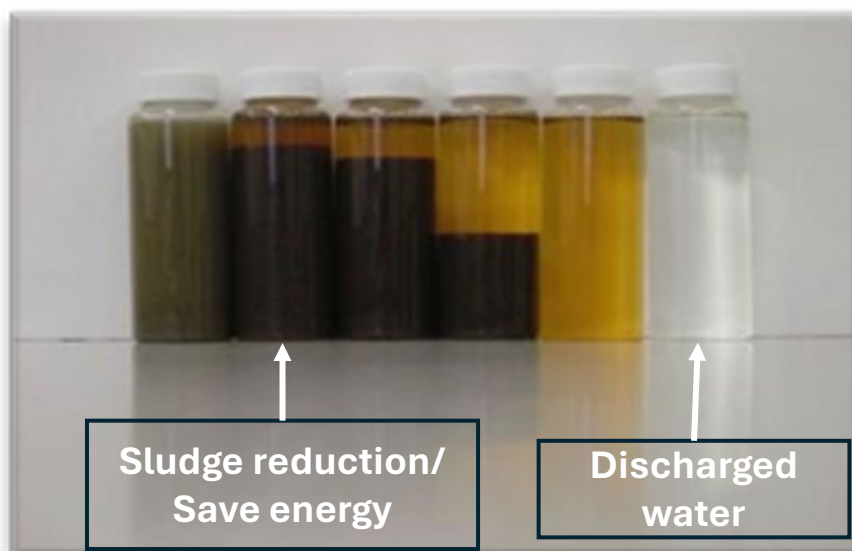
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## Green Blue Corporation

# Fine bubble wastewater treatment actualizes the reduction in cost & CO2 emission



### Organization Profile

Incorporated in 1972, Green Blue Corporation, based on the environmental regulations, has monitored and analyzed Japan's air and water pollutions contributing local and national government. Utilizing the stored data and technologies through such activities, it recently built the fine bubble systems for wastewater treatment. This reduces energy consumption inside the wastewater treatment processes and at the transportation of sludges as well as CO2 emissions at the burning of sludges.

### Technology Name

Nano bubble generator and such applications

### Technology URL

<https://wipogreen.wipo.int/wipogreen-database/articles/178403>



### Contact

PHOON CHAU YEONG,  
 New Business Development, Corporate Strategy  
 Email: [cy-phoon@greenblue.co.jp](mailto:cy-phoon@greenblue.co.jp)

**Q. What environmental or social challenges led to the development of this technology?**

In Japan, activated sludge systems have been widely adopted for wastewater treatment, and it is getting popular in Asia, e.g. Thailand, Vietnam, the Philippines, too. However, they can't satisfy the current decarbonation, energy saving requirements yet. The remaining problems are how to reduce treatment costs by enhancing the activity of microorganisms and reducing the amounts of organic pollutants as well as sludge that must be transported and incinerated at the incineration facility.

**Q. Could you describe the core functionality of this technology?**

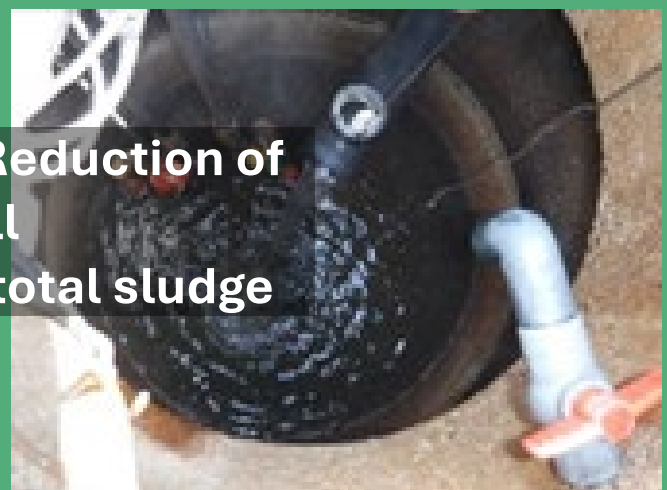
Fine bubbles installed in activated sludge systems, enhance microbial activity to decompose pollutants to reduce them efficiently. Green Blue's fine bubble systems have been installed by lots of manufacturers in Japan, e.g. chemical, food manufacturing plants, plant factory and animal hair processing. It has achieved reduction of around 30 % of oxygen required for pollutant treatment in the systems, as well as reducing volume by around 30%. These have contributed to reduce costs for wastewater treatment and reducing environmental impact.

**Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?**

Through wider adoption of fine bubble systems in industrial wastewater treatment systems across East and South Asia, fine bubble systems can play the principal roles to reduce costs for each manufacturer. Moreover, across industrial park, industries and regional and national economies, energy saving and cost reduction leads to accelerate decarbonization of society. Also, when introduced into plant factories, they can increase the harvest by 20 to 30% which contribute to secure foods and ingredients for increasing population. To realize these, Green Blue looks for the good partner, i.e. EP&C and regional/national government.



Pre installment



Post installment

**Releasing tank: Reduction of  
oil ball  
9% reduction in total sludge**

## TAKENAKA CORPORATION

# Renewable Energy Recovery from Food Waste and Kitchen Wastewater: An Economical Approach to Waste Reduction and CO<sub>2</sub> Emission Mitigation



### Organization Profile

Takenaka Corporation has specialized in building construction for over 400 years. The master builder spirit—"Contribute to society by passing on the best works to future generations"—has been passed down since founder Tobei-Masataka Takenaka and underpins all corporate activities, establishing the company's reputation for superior technology and uncompromising quality. Takenaka's activities have expanded beyond architecture to create safe, comfortable communities, contributing to a sustainable society.

Technology Name    Biogas Generation System "Metafarm"

Technology URL    <https://wipogreen.wipo.int/wipogreen-database/articles/176889>



### Contact

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**Q. What environmental or social challenges led to the development of this technology?**

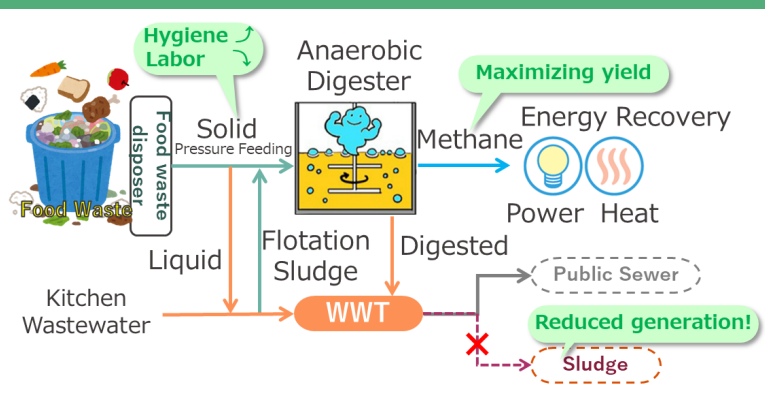
In Japan, the Food Recycling Law was enacted in 2001 to promote food waste recycling. However, recycling rates in the food retail and restaurant industries have plateaued. While these industries are concentrated in urban areas, recycling facilities for compost and animal feed are in suburban areas, making transportation costs and energy consumption problematic. To improve recycling rates, economical and decarbonization-contributing recycling methods suitable for urban areas are needed.

**Q. Could you describe the core functionality of this technology?**

In urban areas, where there is a high demand for electricity and heat, methane fermentation is a suitable recycling method. However, because processing the digestate requires a large amount of electricity, large-scale systems have been considered essential for decarbonization and economic feasibility. Metafarm integrates methane fermentation and kitchen wastewater treatment, comprehensively treating food waste and wastewater to achieve decarbonization and economic feasibility on a scale that fits within a single building.

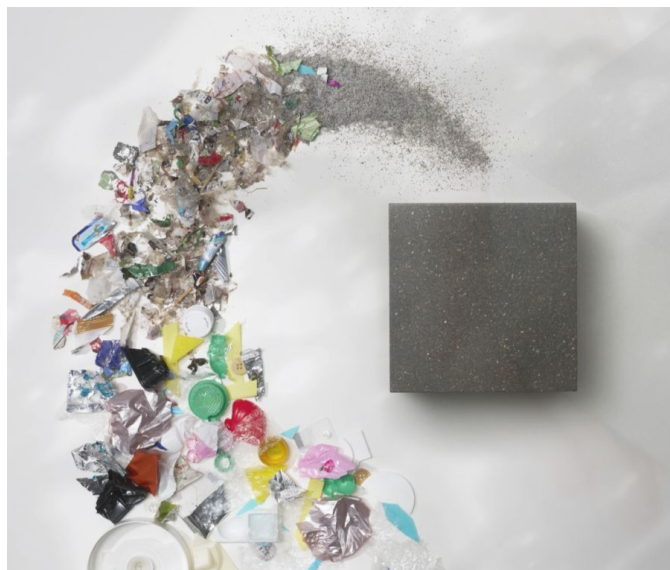
**Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?**

The widespread adoption of Metafarm eliminates the need for landfill disposal of food waste, reducing greenhouse gas emissions, particularly methane. Because waste treatment and energy production occur simultaneously, stable waste management becomes possible even in areas with unstable power supplies. By immediately processing fresh food waste within buildings, local sanitation improves, eliminating the need to expand waste treatment infrastructure in growing regions and benefiting the entire community.



LIXIL Corporation ▪ revia Division

# Giving plastic waste new value. Circular material: revia



## Organization Profile

LIXIL makes pioneering water and housing products that make better homes a reality for everyone. Drawing on our Japanese heritage, we create world-leading technology with meaningful design and an entrepreneurial spirit to transform living spaces responsibly. Our approach driven by industry-leading brands and a commitment to accessibility. Approximately 53,000 colleagues across 150 countries proudly deliver high-quality solutions that touch over a billion lives every day.

## Technology Name

"revia": A circular material created by fusing plastic waste and wood waste.

## Technology URL

<https://wipogreen.wipo.int/wipogreen-database/articles/178072>



## Contact

LIXIL Corporation  
[green\\_jp@lixil.com](mailto:green_jp@lixil.com)

**Q. What environmental or social challenges led to the development of this technology?**

To address the plastic recycling issues and resource depletion, “revia” recycles composite plastics into a new material, reducing CO<sub>2</sub> emissions. This durable solution scales from public facilities to housing, meeting global environmental regulations and circular economy demands.

**Q. Could you describe the core functionality of this technology?**

Our technology blends hard-to-recycle plastics and waste wood, combining plastic’s durability with wood’s natural texture. It uniquely processes waste plastic into versatile materials adaptable for a wide range of applications beyond housing. This low-maintenance solution ensures long-term cost-effectiveness and high design flexibility while promoting a circular economy.

**Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?**

Through WIPO GREEN, we will unlock the potential for local circular models in emerging markets, turning waste plastic into building materials. Partnerships will drive technology transfers, creating jobs while solving deforestation and plastic recycling issues. This global expansion will accelerate decarbonization and the realization of a circular society.



revia panel



Kirara Series Mokucho (revia)

## GOMI Solutions Co., Ltd.

### It's time to shift next level solution for waste



GXB-5 Pyrolysis Waste Treatment System

#### Organization Profile

**Company Name:** GOMI Solutions Co., Ltd.

**Representative:** Kazuta Sekiyama (Representative Director & CEO)

**Location:** 3-8-1 Asano, Kokurakita-ku, Kitakyushu City, Fukuoka, Japan

**Business Description:** Development and Sales of Waste Treatment Equipment Using Pyrolysis Technology

#### Technology Name

Circular and Sustainable Waste Treatment System Utilizing Pyrolysis Technology

#### Technology URL

<https://wipogreen.wipo.int/wipogreen-database/articles/178641>



#### Contact

Email: [k.sekiyama@gomi-solutions.com](mailto:k.sekiyama@gomi-solutions.com)

**Q. What environmental or social challenges led to the development of this technology?**

Our technology was developed in response to growing global waste generation, landfill shortages, and environmental concerns associated with CO<sub>2</sub> emissions from incineration. In many developing countries and island nations, adequate waste segregation, incineration, and landfill infrastructure remain insufficient, leading to serious soil, water, and air pollution caused by open dumping and open burning. To address these challenges, we developed a circular waste management solution based on the concept of “No Burning, No Landfilling – Turning Waste into Resources.” Our pyrolysis-based waste treatment system converts mixed waste into valuable resources by recovering oil, char, and metals.

**Q. Could you describe the core functionality of this technology?**

The core of our technology is waste pyrolysis. By maintaining a low-oxygen environment inside the reactor and heating the waste to temperatures of up to approximately 550° C, the waste is thermally decomposed without combustion and converted into valuable resources, including recycled oil, char, and recovered metals. One of the key advantages of our system is its ability to process mixed waste with minimal pre-sorting requirements. Compared with conventional incineration, it can significantly reduce CO<sub>2</sub> emissions and the generation of harmful substances during treatment. Furthermore, the recovered oil can be reused as boiler fuel, industrial fuel, or a chemical feedstock, enabling a circular waste management solution that transforms waste into valuable resources.

**Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?**

Landfill shortages and environmental pollution caused by open burning remain serious challenges around the world. By introducing our technology, local communities can establish a self-contained waste management system and process their waste within the region. Since the system can operate using energy recovered from the waste itself, it enables continuous operation while keeping operating costs low. In addition, waste can be treated close to its point of generation, reducing both transportation costs and environmental impacts. Particularly in developing countries and island nations, we believe this technology has significant potential to improve public health, create employment opportunities, and support local energy supply, delivering environmental, social, and economic benefits.



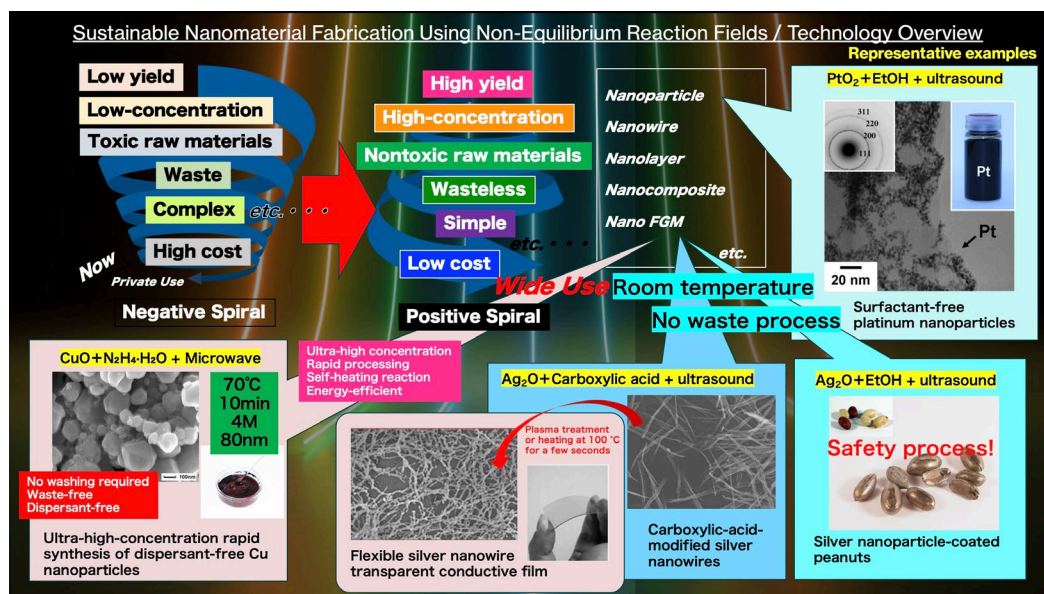
Tuvalu (Pacific Country) Dumping site



Cambodia Siem Reap Landfill site

Tohoku University  
 (Professor Yamato HAYASHI)

# Waste-Free Nanomaterial Manufacturing Enabled by Non-Equilibrium Reaction Fields



## Researcher Profile

Yamato Hayashi is an Associate Professor at the Graduate School of Engineering, Tohoku University. He completed his doctoral program at Osaka University and subsequently served as a JSPS Research Fellow (DC/PD) and a NEDO Fellow before assuming his current position. He also serves as a project leader at Tohoku University's Rare Metal and Green Innovation Research and Development Center, Green Goals Initiative, and Open Innovation Strategy Organization.

Technology Name Sustainable Nanomaterial Manufacturing via Non-Equilibrium Reaction Fields

Technology URL <https://wipogreen.wipo.int/wipogreen-database/articles/178531>



## Contact

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 Graduate School of Engineering Tohoku University  
 E-mail: [yamato.hayashi.b6@tohoku.ac.jp](mailto:yamato.hayashi.b6@tohoku.ac.jp)



### Q. What environmental or social challenges led to the development of this technology?

The development of this technology was motivated by the environmental burden of conventional nanomaterial synthesis. Conventional processes often require high-temperature treatment, large amounts of chemicals, and washing or purification steps, which lead to high energy consumption, CO<sub>2</sub> emissions, wastewater generation, and low resource efficiency. To address these issues, we aimed to shift materials fabrication toward a low-temperature, energy-efficient, and low-waste process. This technology uses ultrasonic cavitation and microwave irradiation to create transient high-energy reaction fields in liquids or at solid-liquid interfaces, enabling nanomaterial synthesis without relying on conventional high-temperature treatment.

It can also convert metal resources and by-products into functional nanomaterials, contributing to CO<sub>2</sub> reduction, resource circulation, and effective waste utilization. Since it is applicable to metallic nanoparticles, oxide nanomaterials, and composites, it can serve as a green solution for international markets.

### Q. Could you describe the core functionality of this technology?

The core functionality of this technology is to use ultrasound and microwaves to create transient high-energy reaction fields in liquids or at solid-liquid interfaces, and to utilize these fields for nanomaterial synthesis. Unlike conventional methods that often require high-temperature heating, large amounts of chemicals, and washing or purification steps, this technology locally supplies the energy needed for the reaction, enabling lower-temperature and fewer-step fabrication.

Its advantages include energy savings, reduced CO<sub>2</sub> emissions, decreased wastewater and waste generation, and control of particle size, morphology, and interfacial structure. It can be applied to various materials, including metallic nanoparticles, oxide nanomaterials, and composites, for applications such as conductive materials, catalysts, electronic materials, and energy materials.

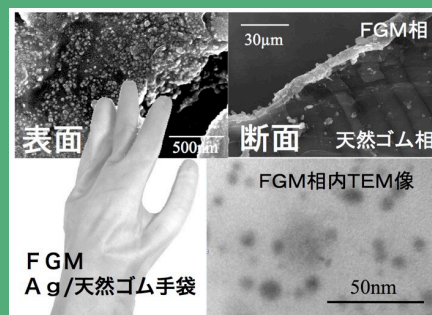
The key difference is that this approach does not heat the entire system, but provides energy only where needed. This enables lower temperature, shorter processing, lower cost, and reduced waste, making it suitable for international green solutions.

### Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?

If widely adopted internationally, this technology could promote circular materials processing by using local metal resources, by-products, and low-grade raw materials to produce functional nanomaterials. It would be especially useful in regions where industrial development and environmental protection must be balanced.

Because it does not require large-scale high-temperature facilities, the technology can be adapted to local resources and industrial needs, including electronic materials, conductive materials, catalysts, and energy materials.

Through platforms such as WIPO GREEN, it could create opportunities for joint evaluation, technology transfer, licensing, and local demonstration, ultimately contributing to CO<sub>2</sub> reduction, lower energy use, waste utilization, and sustainable economic development.



$\text{Ag}_2\text{O} + \text{BaTiO}_3 + \text{EtOH} + \text{ultrasound}$   
→  $\text{BaTiO}_3 / \text{Ag}$  nanocomposite

$\text{Ag}_2\text{O} + \text{Natural rubber} + \text{EtOH} + \text{ultrasound}$   
→ Natural rubber / Ag nanocomposite

Shindengen Electric Manufacturing Co., Ltd.

## SiC (Silicon Carbide) devices, which support the next generation of power electronics



### Organization Profile

Since our establishment in 1949, We have been active in the power electronics sector as a rare type of manufacturer bringing together three core technologies: device technology, circuit technology, and packaging technology.

We hold our mission as “maximizing energy conversion efficiency for the benefit of humanity and society.” Under this mission, we continue to protect the environment by maximizing environmental-friendliness with our combined core technologies while we respond to our customer needs.

### Technology Name

Schottky barrier diodes (SBDs) and MOSFETs utilizing SiC (silicon carbide) support next-generation power electronics.

### Technology URL

<https://wipogreen.wipo.int/wipogreen-database/articles/178451>



### Contact

<https://www.shindengen.com/contact/semi/>



**Q. What environmental or social challenges led to the development of this technology?**

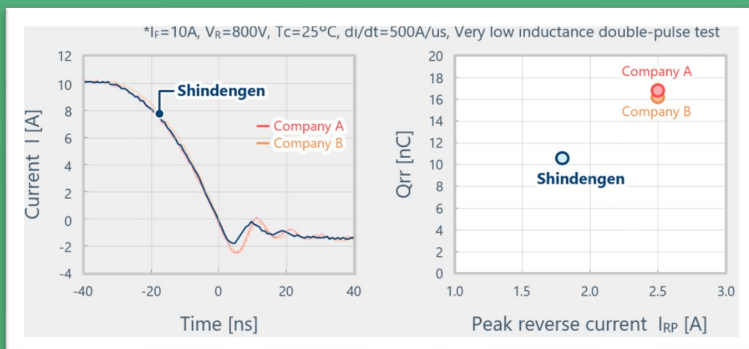
Our SiC device technology development began against the backdrop of environmental and social challenges such as climate change and energy issues. Conventional silicon semiconductors suffer from significant losses during power conversion, limiting energy conservation. Meanwhile, with the spread of renewable energy and the expansion of electric vehicles, the demand for highly efficient and high-voltage power devices is rapidly increasing. We have focused on SiC devices as a technology to address these challenges and are conducting full-scale research and development.

**Q. Could you describe the core functionality of this technology?**

The core of our SiC device technology lies in design techniques that combine a low-loss, high-voltage device structure that maximizes the superior physical properties of the material with the high safety and reliability required for automotive applications. SiC-SBDs significantly improve power conversion efficiency through high-speed rectification that virtually eliminates recovery losses. SiC-MOSFETs achieve stable operation even in high-temperature environments through a structural design that combines low on-resistance and high-speed switching.

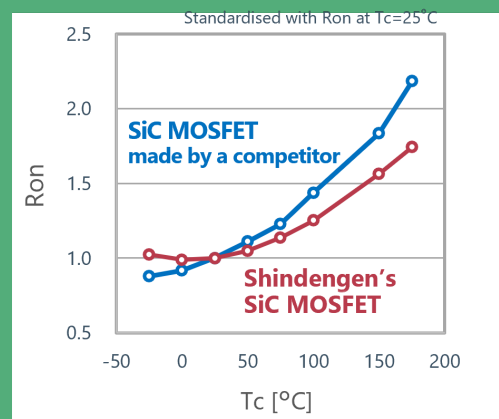
**Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?**

To realize a sustainable society, improving the efficiency of power conversion equipment in the new energy market, which is expected to reduce environmental impact, is essential. By utilizing the unique features of our SiC-SBDs and SiC-MOSFETs in power conversion equipment such as inverters and converters, we expect to accelerate the miniaturization and energy saving of equipment.

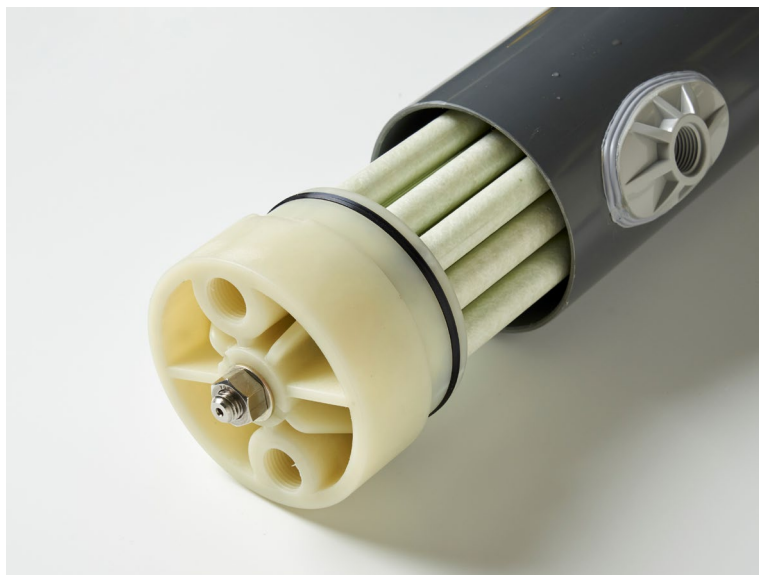


Recovery characteristics of 1200V withstand voltage products

**R<sub>on</sub>-T<sub>c</sub> (1200V model, V<sub>GS</sub>=18V)**



Low loss even at high temperatures

DAICEN MEMBRANE-SYSTEMS LTD.  
(DAICEL Corp.)**Wastewater treatment solution for  
industrial/activated sludge effluent;**Organization  
Profile

Eight celluloid manufacturers in Japan reorganized the industry, and in 1919, eight companies merged to create Dainippon Celluloid Co., Ltd., which is Daicel today. Daicel has continued to research and develop products that meet the needs of the times and offers a variety of products, including cellulose acetate and engineering plastics, which are today's mainstay products. Currently, we have 73 companies in 15 countries and regions around the world as of March 2025, with approximately 10,000 consolidated employees.

Technology Name TB-RO(Tubular Reverse Osmosis) membrane

Technology URL <https://wipogreen.wipo.int/wipogreen-database/articles/146431>



## Contact

DAICEN MEMBRANE-SYSTEMS LTD.  
Kenichi Nishizaka  
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TEL : +81-6-7639-7351

**Q. What environmental or social challenges led to the development of this technology?**


In recent years, awareness of environmental conservation has increased worldwide, and there has been a demand for reusable treated water quality and non-wastewater for wastewater that is difficult to treat, mainly discharged from factories. Therefore, we have developed a new tubular RO / NF membrane made of cellulose acetate for wastewater treatment, which has high stain resistance, toughness due to a high-strength support, and can secure the required highly treated water quality.

**Q. Could you describe the core functionality of this technology?**

The cellulose acetate membrane is hydrophilic, does not easily adsorb proteins, and oils, and has high stain resistance, so it is particularly suitable for the treatment of wastewater containing oils and surfactants. The surface of the cellulose acetate membrane is excellent in scratch resistance and can withstand high linear velocity cross flow and high frequency sponge ball cleaning.






**Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?**


The volume of oil-containing wastewater will be reduced from 1/40 to 1/20, and the conventional industrial waste treatment cost will be significantly reduced. In ZLD or MLD systems, wastewater can be concentrated or reduced to levels not possible with conventional spiral RO membrane modules. It enables low-cost, high-quality water recycling and contributes to improving the water quality of water sources.



## Use cases

Used in industrial discharge/active sludge separation

<p>Aluminum Die Casting Release Agents</p> 	<p>Water-soluble cutting fluid</p> 	<p>Active sludge</p> 						
		<p>Others</p>						
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="background-color: #92D050;">Discharge treatment</th> <th style="background-color: #92D050;">Process usage</th> </tr> <tr> <td>Concentration of oily wastewater</td> <td>Desalination</td> </tr> <tr> <td>Solid-liquid separation of coagulated treated water</td> <td>Valuable item recovery</td> </tr> </table>		Discharge treatment	Process usage	Concentration of oily wastewater	Desalination	Solid-liquid separation of coagulated treated water	Valuable item recovery	
Discharge treatment	Process usage							
Concentration of oily wastewater	Desalination							
Solid-liquid separation of coagulated treated water	Valuable item recovery							



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HINODE SANGYO CO.,LTD.

## Contributing to a sustainable, circular society through water treatment.

### HMB (Oxygen Supply Device)



Established in 1976

Development, manufacturing, and sales of wastewater treatment chemicals "ELBIC" Series.

HMB: Oxygen supply and microbubble generation device.

Energy-efficient, space-saving, and maintenance-free HMB System, etc.

**Organization Profile** We resolve water treatment challenges through the power of biotechnology. Additionally, we provide comprehensive assistances across all aspects of water treatment, including the planning, design, and construction of wastewater treatment facilities, water quality and microbial analysis, and the development of next-generation talent.

WIPO GREEN Partner Company

**Technology Name**

- HMB: Enhances water treatment capacity through the combination of microbubbles and biotechnology.

- How HMB work: Water drawn from a submersible pump is pressurized to approximately 0.1 MPa via a constricted outlet pipe. Air is then self-aspirated from the decompression section, dissolving into the water under reduced pressure to generate microbubbles.

**Technology URL** <https://wipogreen.wipo.int/wipogreen-database/articles/8312>



**Contact**

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[www.hinodesangyo.com](http://www.hinodesangyo.com)

### **Q. What environmental or social challenges led to the development of this technology?**

- Global Water Scarcity is becoming increasingly severe worldwide, particularly in developing nations. This technology was developed with the objective of transferring energy-saving, trouble-free solutions not only within Japan but also internationally.
- the design is simple and minimizes clogging from foreign matter, the system can be integrated into new constructed facilities but also in existing facilities, significantly reducing capital expenditures. Because it can be customized to comply with the wastewater treatment standards of various countries, it is highly adaptable for nations facing water shortages or lacking sufficient wastewater treatment infrastructure. Furthermore, deployment costs are minimized through a 40% reduction in power consumption, a 60% reduction in equipment footprint, and a 60% reduction in maintenance costs.
- Due to its intuitive operational management, the system can be fully operated with basic training alone, eliminating the need for specialized technicians for routine maintenance.

### **Q. Could you describe the core functionality of this technology?**

- Clogging Resistance: Due to its straight-pipe mechanism, the system minimizes the risk of clogging from foreign matter.
- Suitable for both submerged (submersible) and on land.
- The volume of aspirated air (gas) reaches approximately 90% (V) relative to the water flow rate. At a constant aeration rate, the system achieved dissolved oxygen (DO) levels approximately five times higher than conventional aeration equipment.
- Supports parallel installation, making it adaptable to tank capacities ranging from small to large volumes.
- Installed to promote aeration in hypoxic areas and suppress hydrogen sulfide generation
- Promotes aeration of lake and pond water and eliminates odors
- Installed in aquaculture facilities to maintain a stable, aerobic environment.

### **Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?**

- Prevention of water pollution and infectious diseases
- Reuse of treated water;
- return of sludge and treated water to agriculture
- Technology transfer/training for local residents and job creation
- Empowerment of women (hiring for WWTP maintenance teams)
- By maximizing the use of natural forces (microorganisms), the system is environmentally friendly and can be applied overseas.
- Through technology transfer and the development of business partners, expansion via royalty payments is possible.
- Currently, five HMB units have been installed near Marrakech, Morocco, and in the city of Agadir. Plans are underway to install a retrofitted system at the public market in Cagayan de Oro City on Mindanao Island, Philippines.



Treated water meets water quality standards



Construction of an HMB System in the Rural District of Al Haouz, Morocco

Green Science Alliance Co., Ltd.

## Recycled type Lithium Ion Batteries



### Organization Profile

We focus in developing cutting-edge environmental energy technologies in order to build carbon neutral, sustainable society. More precisely, those are biodegradable plastics, resins, biomass coatings, paints, glue, nanocellulose, biochar etc...all materials made from plant biomass resources. Moreover, next generation rechargeable batteries, fuel cells, materials for perovskite solar cell, organic solar cell, artificial photosynthesis (CO<sub>2</sub> conversion to fuel, materials), quantum dots, MOF (Metal Organic Frameworks), ionic liquid, deep eutectic solvents, solid acid catalysts etc...

### Technology Name

Recycled type Lithium-ion Batteries Utilizing Electrodes Directly Synthesized from Black Mass (Waste of Battery)

### Technology URL

<https://wipogreen.wipo.int/wipogreen-database/articles/171999>



### Contact

E-mail : [info@gsalliance.co.jp](mailto:info@gsalliance.co.jp)

TEL : 072-759-8501

Address : 2-22-11 Obana Kawanishi-city, Hyogo prefecture, 666-0015 Japan

**Q. What environmental or social challenges led to the development of this technology?**

Battery storage plays a critical role in expanding renewable energy to reduce CO<sub>2</sub> emissions. As a representative energy storage system, lithium-ion batteries have high costs and necessitate the extraction of rare metals—including lithium, cobalt, and manganese—from mining operations. We have successfully developed a low-cost, recycled type lithium-ion battery by directly resynthesizing electrodes from waste lithium-ion batteries (known as ‘black mass’) and used graphite which can minimize the need for rare metal raw materials from mines.

**Q. Could you describe the core functionality of this technology?**

While other companies are also developing technologies to extract rare metals like lithium, cobalt, and manganese from black mass, the issue is that they use hazardous chemicals such as sulfuric acid, which is harmful to the environment and highly dangerous. Although cathode materials can be re-synthesized from separated rare metals, this approach ends up being high-cost due to complicated and dangerous process. In contrast, our method is safe and offers significant cost advantages, as we resynthesize cathodes directly from black mass without using any hazardous substances.

**Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?**

It is expected that widespread application of this battery technology will reduce the cost of all rechargeable batteries used in smartphones, computers, and EVs in the world while accelerating the worldwide spread of renewable energy. This method can decrease the mining of critical minerals, and as the synthesis process for regenerating electrodes from black mass is relatively simple, it also enables a reduction in CO<sub>2</sub> emissions. Furthermore, with the upcoming EU regulation mandating the use of recycled materials in lithium-ion batteries starting from 2027, batteries made from recycled materials (black mass and recycled graphite) are the most optimal solution to meet these new standards.



Battery Disassemble Operation at  
Swiss Innovation Park Biel/Bienne

Kanazawa University  
(Professor Toshiyuki Ueno)

# Harvesting Ambient Vibrations into Clean Power



Researcher  
Profile

Prof. Toshiyuki Ueno is internationally recognized for pioneering vibration energy harvesting based on the inverse magnetostrictive effect. His research enables efficient power generation from low-frequency and small-amplitude vibrations, offering a durable and scalable solution for battery-free IoT devices, infrastructure monitoring, and the utilization of unused micro-energy. The technology has significant potential for global deployment and continues to attract attention in both academic and industrial fields.

Technology Name

High-Sensitivity Vibration Energy Harvester Using the Inverse Magnetostrictive Effect

Technology URL

<https://wipogreen.wipo.int/wipogreen-database/articles/178325>



Contact

<https://vibpower.w3.kanazawa-u.ac.jp/vcollabo/contact/>



**Q. What environmental or social challenges led to the development of this technology?**

Most low-frequency vibrations from machines and buildings remain unused, while battery replacement for IoT sensors is a growing burden. Global demand is rising for battery-free autonomous power sources that support climate-friendly energy use. To harvest low-frequency micro-vibrations efficiently—beyond the limits of piezoelectric devices—Prof. Ueno focused on the inverse magnetostrictive effect.

**Q. Could you describe the core functionality of this technology?**

This is a power generation method in which, when vibrations are applied to the device through resonance, the magnetization of the magnetic material changes due to the inverse magnetostrictive effect (Villari effect), generating electrical power from the coil.

Advantages: efficient at low frequencies, durable structure, low-cost materials suitable for scaling.

Differentiation: strong performance where piezoelectric harvesters struggle; adaptable design for various environments.

Issues addressed: reduces battery waste, enables autonomous sensors, and utilizes unused vibration energy.

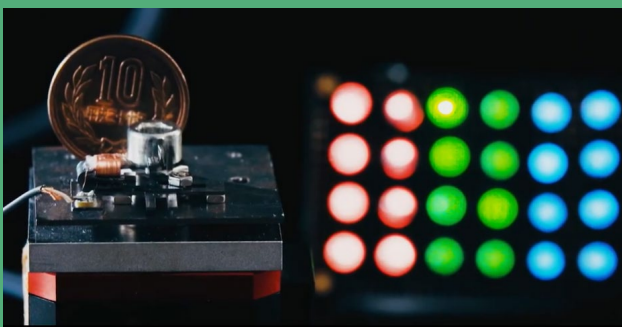
**Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?**

Enables widespread deployment of battery-free IoT sensors in Asia-Pacific, the Middle East, and Africa.

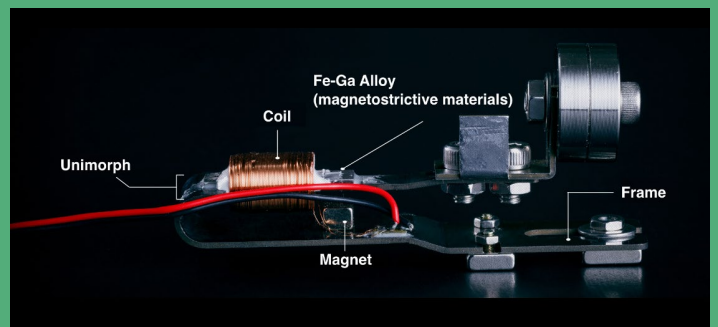
Enhances safety and efficiency in infrastructure monitoring, reducing maintenance costs and preventing failures.

Facilitates international collaboration through platforms like WIPO GREEN, accelerating global green innovation.

Contributes to long-term environmental sustainability by utilizing unused vibration energy.



Even a miniature V-GENERATOR can power wireless sensors

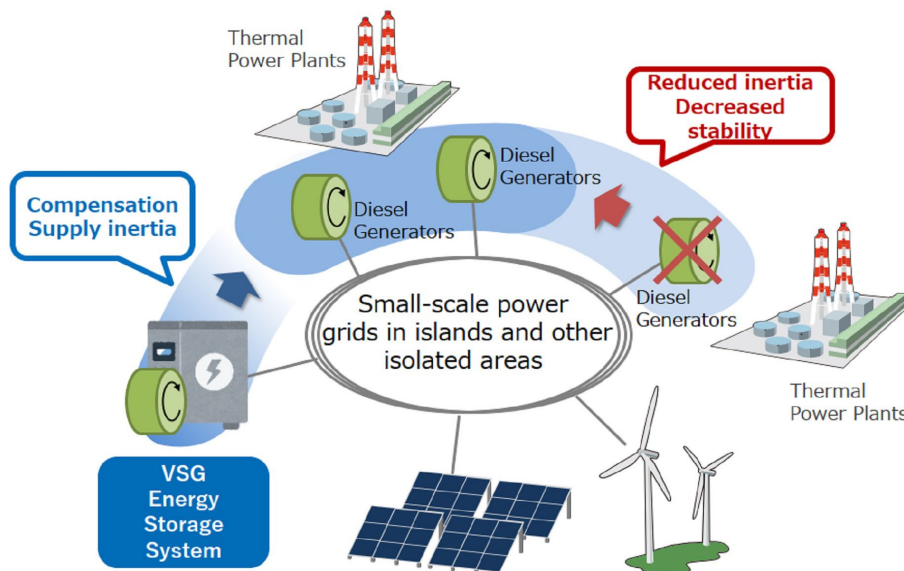


The inverse magnetostrictive effect generates an electromotive force in the coil

# MEIDENSHA CORPORATION

## Power Infrastructure Business Engineering Group

# Contributing to the Improvement of Power System Stability through VSG-PCS



Organization Profile

We provide substation and power transmission equipment, monitoring and control systems that support stable power supply, as well as solution services related to power quality and renewable energy.

Technology Name

Inverters for Battery Energy Storage System with Virtual Synchronous Generator Functions (VSG-PCS)

Technology URL

<https://wipogreen.wipo.int/wipogreen-database/articles/160248>



Contact

Please contact us through the database link above.

### Q. What environmental or social challenges led to the development of this technology?

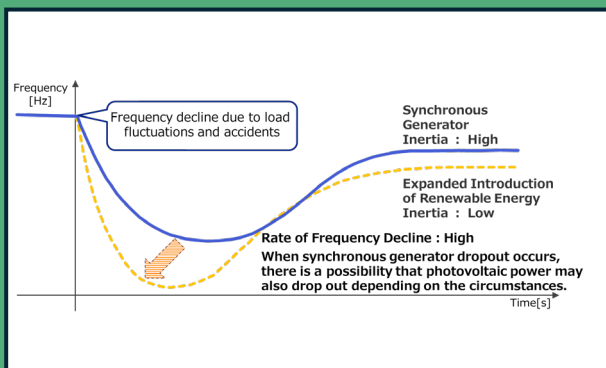
In recent years, the rapid expansion of renewable energy deployment has been advancing as a response to global environmental issues. When renewable energy power sources using inverters are introduced in large quantities into the power grid, the synchronous generators that have traditionally served as the main power sources in the system decrease. As a result, the problem of declining frequency stability maintained by synchronous generators, namely the inertia of the power system, has attracted worldwide attention.

### Q. Could you describe the core functionality of this technology?

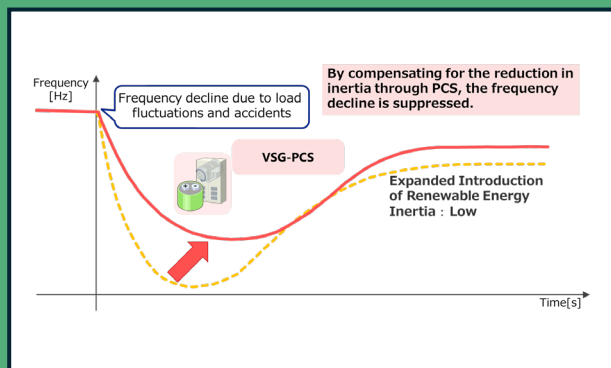
The Virtual Synchronous Generator (VSG) function is a function that enables grid-connected inverters to operate similarly to synchronous generators. Like conventional synchronous generators, it provides inertial force and synchronizing torque, which can contribute to improving the stability of the power system. Additionally, as a main characteristic of this technology, a voltage source (GFM: Grid Forming) method is adopted, making it possible to form a grid using only renewable energy sources.

### Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?

The widespread adoption of inverters utilizing this technology will promote the introduction of renewable energy through improved grid inertia, contributing to the realization of a carbon-neutral society. In particular, its application is expected in island regions and small-scale power systems such as Southeast Asia, and together with the deployment of renewable energy, it will achieve energy independence and stable power supply in these regions.



System Stability (Without VSG-PCS)



System Stability (With VSG-PCS)

Toyo Aluminium Ekco Products Co., Ltd.

## Heat-Absorbing Black Aluminum Foil (Less Energy, Better Taste)



### Organization Profile

Head Office: 4-1 Nishihonmachi 1-chome, Nishi-ku, Osaka, Japan  
 Business: Manufacturing and sales of household goods and food packaging containers for commercial use, etc.  
 President: Daisuke SAKAI  
 Capital: JPY 200 million / Employees: 216  
 WIPO GREEN Activities: Oct. 4, 2025, Presented as a WIPO GREEN partner in the International Forum (hosted by JPO) at the Osaka-Kansai Expo.

### Technology Name

Black Aluminum Foil for Cooking  
 - Enabling fast and tasty baked sweet potatoes in a toaster

### Technology URL

<https://x.gd/66PpV>



<https://x.gd/nY0tr>



### Contact

Technology Development Team Technology Development Unit  
 Person in charge: Hirofumi YAMASAKI Manager of Intellectual Property, Patent Attorney (Japan) [h\\_yamasaki@toyalekco.co.jp](mailto:h_yamasaki@toyalekco.co.jp)

**Q. What environmental or social challenges led to the development of this technology?**

In household cooking, longer heating times lead to increased energy consumption and higher CO<sub>2</sub> emissions. For example, when baking sweet potatoes using conventional aluminum foil in a toaster oven, cooking takes a long time and often results in insufficient sweetness. There has been a need for a cooking method that achieves both reduced cooking time and enhanced food quality.

**Q. Could you describe the core functionality of this technology?**

This technology features a black coating layer (heat-resistant resin with black pigments) applied to one side of aluminum foil, which enhances heat absorption. When the black side faces outward during heating, it improves heating efficiency compared to conventional aluminum foil. This enables: shorter cooking time, more uniform internal heating, and enhanced food flavor. For example, when cooking sweet potatoes, cooking time can be reduced to about half (20 min), while the maltose content can increase to more than double.

**Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?**

This technology improves heating efficiency while utilizing existing cooking appliances such as toaster ovens, enabling easy adoption across various regions regardless of infrastructure conditions. In regions with limited access to cooking energy, such as parts of Asia-Pacific, the Middle East, and Africa, it enables better cooking of various foods with less energy, contributing to improved quality of life. Furthermore, through the partnerships on WIPO GREEN platform, in the long term, it contributes to CO<sub>2</sub> reduction and the achievement of the SDGs.



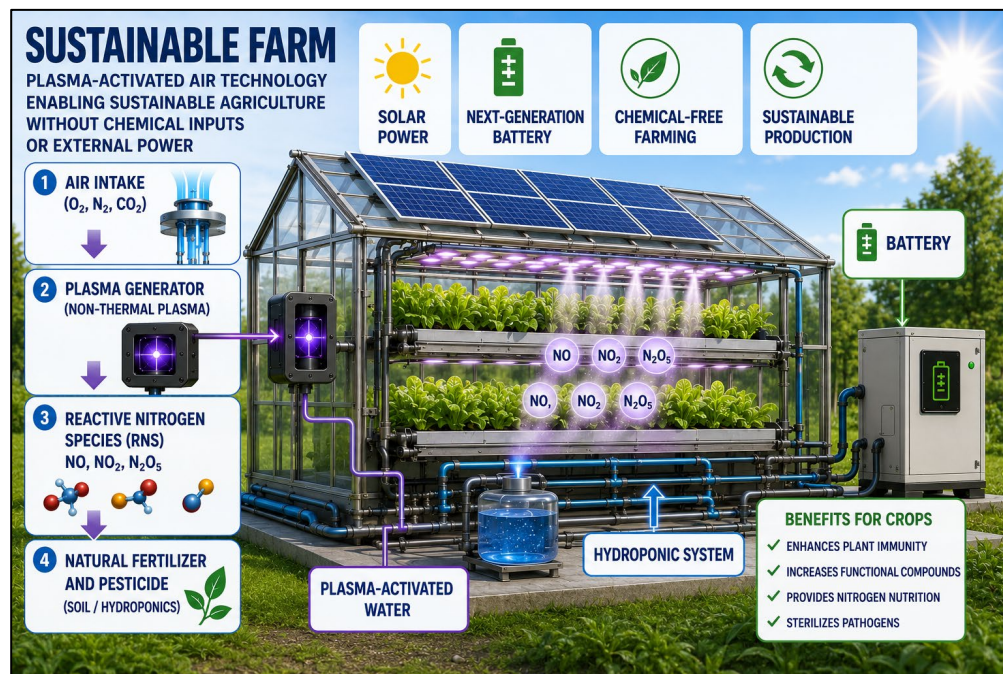
Heating process in a toaster oven



Final cooked result (image)

Tohoku University,  
Graduate School of Engineering  
(Professor Toshiro Kaneko)

## Atmospheric-Pressure Air Plasma for Next-Generation Sustainable Farm



### Researcher Profile

Professor at Graduate School of Engineering, Tohoku University; Director of Interdisciplinary Research Center for Non-Equilibrium Plasma and affiliated with Research Center for Space Cross-Tech. Engaged in research and development of non-equilibrium (low-temperature) plasma technologies and their applications in agriculture, medicine, and environmental fields. As Director of the Interdisciplinary Research Center for Non-Equilibrium Plasma, promotes interdisciplinary plasma research, while at the Research Center for Space Cross-Tech advancing plasma-based space and lunar agriculture. Has published numerous academic papers and holds many patent applications and granted patents.

### Technology Name

A low-cost, on-site agricultural technology that generates highly reactive species ( $N_2O_5$ ) from air using atmospheric-pressure air plasma, achieving fertilization effects and disease suppression.

### Technology URL

<https://wipogreen.wipo.int/wipogreen-database/articles/178528>



### Contact

Toshiro Kaneko (Professor, Graduate School of Engineering, Tohoku University: [kaneko@tohoku.ac.jp](mailto:kaneko@tohoku.ac.jp))  
Hironobu Inoue (Specially Appointed Professor, Intellectual Property Division, Tohoku University: [chizaibu@grp.tohoku.ac.jp](mailto:chizaibu@grp.tohoku.ac.jp))

**Q. What environmental or social challenges led to the development of this technology?**

With global population growth and climate change accelerating, sustainable food production technologies are becoming increasingly important. Conventional agriculture depends heavily on chemical fertilizers and pesticides, causing environmental problems such as soil degradation, water pollution, and greenhouse gas emissions. In addition, rising fertilizer prices and geopolitical instability have increased concerns over fertilizer supply. Our technology addresses these issues by using only ambient air as the raw material and generating reactive species through low-power air plasma, enabling environmentally friendly and sustainable agricultural production.

**Q. Could you describe the core functionality of this technology?**

This technology efficiently generates dinitrogen pentoxide ( $N_2O_5$ ), a highly reactive species, from nitrogen and oxygen in ambient air using atmospheric-pressure air plasma.  $N_2O_5$  reacts with water to form nitrate ions, enabling  $N_2O_5$ -dissolved water to be used as a nitrogen fertilizer. Spraying  $N_2O_5$  gas onto plants also enhances disease resistance and increases functional compounds. In addition, high concentrations exhibit virus inactivation and sterilization effects. The technology requires only air and electricity, allowing low-cost, on-site operation without large-scale facilities or fossil resources, and can be applied from small farms to large-scale greenhouse systems.

**Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?**

The widespread adoption of this technology could promote sustainable agricultural systems based on local resources, particularly in regions with limited fertilizer supply infrastructure such as the Asia-Pacific, Middle East, and Africa. Because the technology uses only air and renewable electricity, it offers strong potential as an environmentally friendly on-site fertilizer production system. Its disease-control capability may also reduce pesticide use. Through international collaboration and technology transfer via platforms such as WIPO GREEN, the technology is expected to contribute to global food security and sustainable agricultural development.



↑ Dinitrogen pentoxide ( $N_2O_5$ ) generation system using atmospheric-pressure air plasma and its application example in a strawberry farm

← Effects of  $N_2O_5$ -dissolved water on rice growth

## Tsubame BHB Co., Ltd. / Institute of Science Tokyo

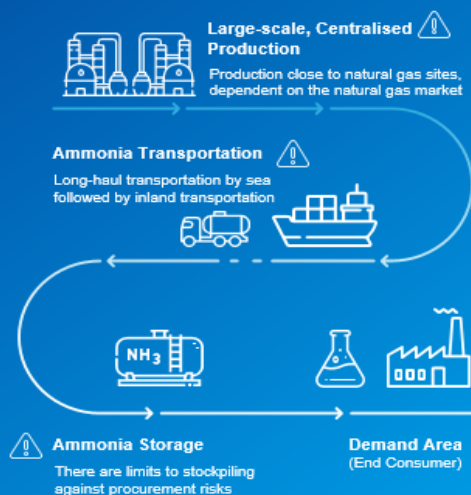
# Feed the World, Fuel the World

## SOLUTION for SUPPLY CHAIN SECURITY:

Tsubame's process enables on-site ammonia production, reduces supply risk

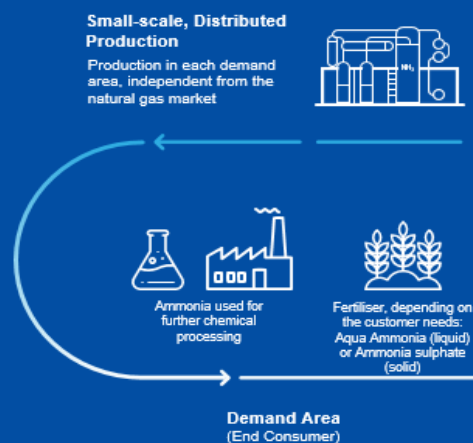
### Current Supply Chain

The current geopolitical situation is creating the instability and price volatility of ammonia procurement



### Tsubames BHB Supply Chain

Tsubame delivers stand-alone solution to ammonia procurement, de-risking the end-user from instability and price volatility



tsubame-bhb.co.jp

**Tsubame BHB**

### Organization Profile

Our journey began with groundbreaking research led by Professor Emeritus Hideo Hosono and his team at Science Tokyo, which focused on utilising a group of materials centred on inorganic electrides as catalysts for ammonia synthesis. In April 2017, Tsubame BHB Co., Ltd. was established with the aim of developing and implementing decentralised small- to medium-scale plants capable of efficiently producing ammonia under low-temperature and low-pressure conditions by utilising this technology.

Technology Name Distributed Green Ammonia

Technology URL <https://wipogreen.wipo.int/wipogreen-database/articles/178452>



### Contact

Toru Inoue: Center for Innovation Management, Institute of Science Tokyo

E-mail: [inoue-toru@cim.isct.ac.jp](mailto:inoue-toru@cim.isct.ac.jp)

Web: <https://www.oi-p.titech.ac.jp/en/>



**Q. What environmental or social challenges led to the development of this technology?**

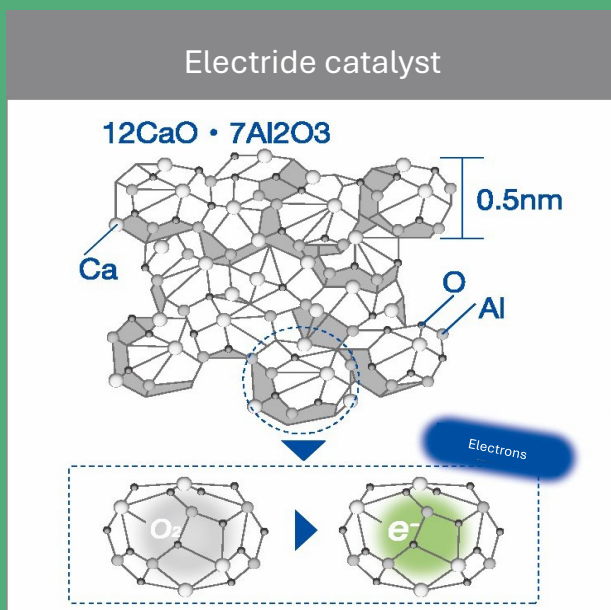
Ammonia is vital to modern society, used in nitrogen fertilizers and as a chemical feedstock. Yet production is concentrated in large plants in oil-producing nations like the Middle East, creating shortages in regions such as South America and Africa and leaving supply vulnerable to geopolitical disruption. Tsubame BHB seeks to improve food security and sustainable industry by decentralizing ammonia production.

**Q. Could you describe the core functionality of this technology?**

Tsubame BHB’s distributed ammonia plant, based on research from Science Tokyo, uses a proprietary process built around its unique “electride catalyst,” enabling ammonia synthesis at lower temperatures and pressures than the conventional Haber–Bosch process. Small plants developed with this technology are easier to operate for users such as agricultural producers in a decentralized, local production-and-consumption model.

**Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?**

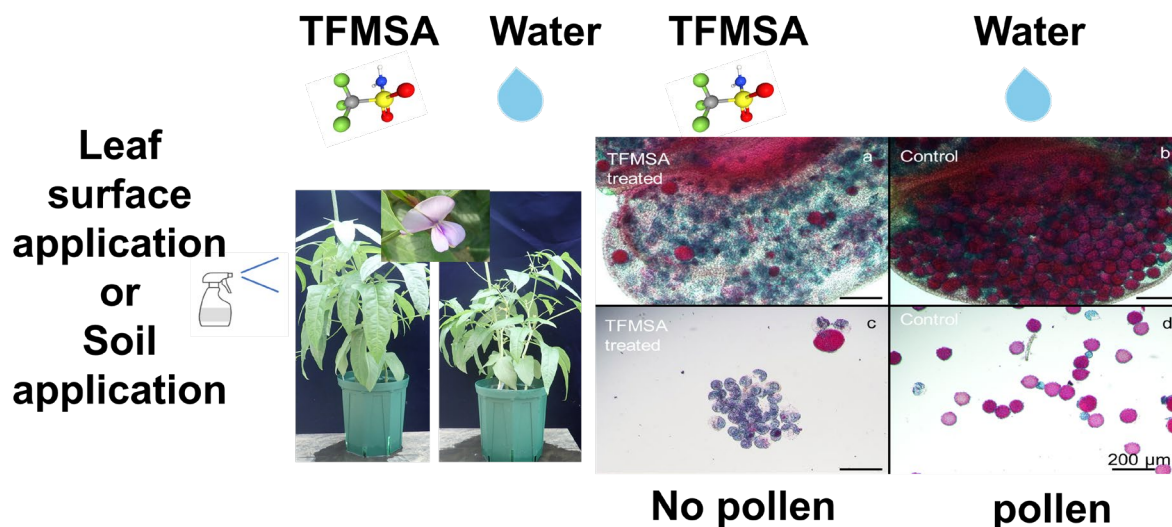
By expanding into fertilizer applications, which account for roughly 80% of ammonia demand, we can improve food security and accelerate decarbonization. For example, decentralized ammonia production can ensure a stable fertilizer supply even in regions such as South America and Africa, where fertilizer is expensive or scarce due to logistics challenges. In addition, using renewable energy to produce the hydrogen feedstock for ammonia enables greener fertilizer production.



Tsubame BHB ammonia plant

Tottori University  
( Associate Professor Takayoshi Ishii)

## TFMSA-Based Emasculation Technology — Enabling Rapid and Large-Scale Hybridization in plants —



Organization  
(Researcher)  
Profile

The Arid Land Research Center, Tottori University promotes research on dryland agriculture and sustainable crop production. In particular, the center is working to improve the efficiency of breeding programs for dryland crops such as wheat, cowpea, pearl millet, and sorghum, and to develop new breeding technologies that will contribute to future food security.

Technology Name

TFMSA induces male sterility in a variety of plant species, paving the way for a novel approach to plant breeding

Technology URL

<https://wipogreen.wipo.int/wipogreen-database/articles/178596>



Contact

Tottori university  
Takayoshi Ishii ([Ishii.T\(ato\)tottori-u.ac.jp](mailto:Ishii.T(ato)tottori-u.ac.jp))  
<https://sites.google.com/tottori-u.ac.jp/plant-breeding-cytogenetics>



### Q. What environmental or social challenges led to the development of this technology?

Global climate change and population growth are increasing the demand for crop varieties capable of stable production under harsh environments, including drylands. However, in self-pollinated crops such as cowpea, conventional hybridization requires labor-intensive hand emasculating before crossing. This limitation reduces breeding efficiency and constrains the rapid development of improved crop varieties, especially in developing regions where food security and sustainable agriculture are critical challenges. The TFMSA-based chemical emasculation technology was developed to overcome these barriers and enable scalable, efficient, and practical pollination control systems.

### Q. Could you describe the core functionality of this technology?

This technology uses trifluoromethanesulfonamide (TFMSA) to temporarily suppress pollen fertility through chemical treatment of plants. Since female reproductive function remains unaffected, treated plants can be efficiently used as female parents for hybridization. In cowpea, two-time applications of 1000 mg/L TFMSA induced up to 99% pollen sterility. The effectiveness of TFMSA was also confirmed in multiple dicotyledonous species, including *Arabidopsis thaliana* and *Nicotiana benthamiana*.

Compared with conventional hand emasculation, this technology offers:

Significant labor reduction (More than 95% reduction of the time)

Scalability for large crossing programs

Applicability to various self-pollinated crops

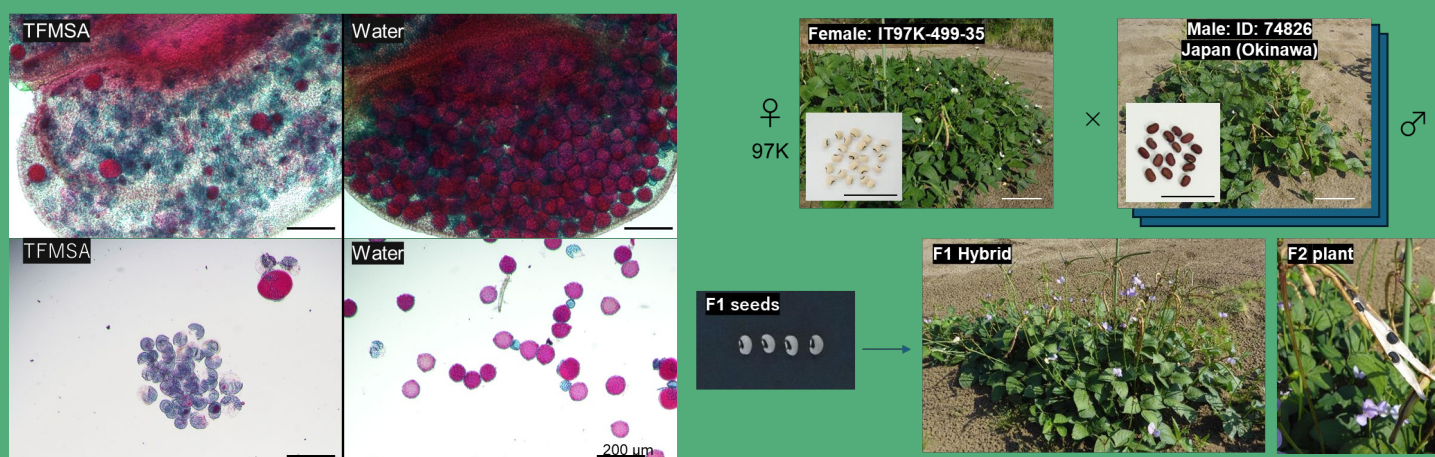
No requirement for genetic modification.

No adverse effects on the environment or human health (low risk of residues, no special protective equipment required, available for purchase as a standard reagent)

These advantages make TFMSA a promising sustainable breeding technology.

### Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?

Widespread adoption of this technology could accelerate breeding programs for climate-resilient and high-yield crop varieties, particularly in dryland regions across Asia and Africa. Because TFMSA treatment is relatively simple and practical, the technology can be adopted not only by research institutes but also by breeding stations and seed companies worldwide, promoting international collaboration and technology transfer. Partnerships facilitated through platforms such as WIPO GREEN could further contribute to sustainable agricultural innovation and long-term global food security.



TFMSA-induced sterile pollen in cowpea

Generation of hybrid plants using TFMSA-treated flowers

Kisui Co., Ltd

# Adam- All-Terrain AI Robotics for Low-Carbon Sustainable Agriculture



## Organization Profile

Kisui Co., Ltd. is an agritech startup based at Tohoku University and Chiba University, developing “Adam”, an autonomous AI-driven agricultural robot that leverages expertise from aerospace engineering and lunar exploration robotics. Equipped with a patented steering and suspension system, Adam enables stable operation on uneven and sloped terrain, automating the transport of heavy materials in orchards and similar environments. Through electrification and field data utilization, the system contributes to CO<sub>2</sub> reduction and environmental sustainability while improving efficiency and reducing labor demands.

## Technology Name

Adam: An autonomous, all-terrain agricultural robot capable of automated crop transport, human-following operation, as well as mowing and spraying.

## Technology URL

<https://wipogreen.wipo.int/wipogreen-database/articles/178633>



## Contact

[contact@kisuitech.com](mailto:contact@kisuitech.com)

<https://kisui.ai/>

**Q. What environmental or social challenges led to the development of this technology?**

The technology addresses critical challenges in agriculture, including aging populations and severe labor shortages, particularly in hilly and mountainous regions where conventional flat-terrain machinery cannot operate effectively. As a result, heavy-load transport tasks remain labor-intensive, reducing productivity. At the same time, reliance on combustion-engine machinery increases CO<sub>2</sub> emissions, and experience-based farming leads to inefficient use of fertilizers and pesticides, exacerbating environmental impact. These challenges highlight the urgent need for solutions that combine productivity improvement with sustainability.

**Q. Could you describe the core functionality of this technology?**

Adam integrates SLAM and AI control technologies to operate autonomously in complex environments, handling slopes of up to 20 degrees and transporting up to 300 kg, achieving approximately 20% labor reduction compared to manual operations. In addition, operational data is collected and integrated into the smart agriculture platform “MyNojo,” which supports key decision-making processes such as optimized fertilization, yield prediction, and automated task planning. Compared to conventional machinery, the system offers superior terrain adaptability, multifunctionality, environmental performance, and cost efficiency, making it a scalable solution.

**Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?**

The technology is currently being deployed in Europe and Southeast Asia, where demand is driven by environmental regulations and labor shortages. Through partnerships and technology transfer, it can be adapted to diverse regional conditions, enabling market expansion. Furthermore, collaboration through international platforms such as WIPO GREEN will support the diffusion of sustainable agricultural models, contributing to both environmental impact reduction and long-term economic development.



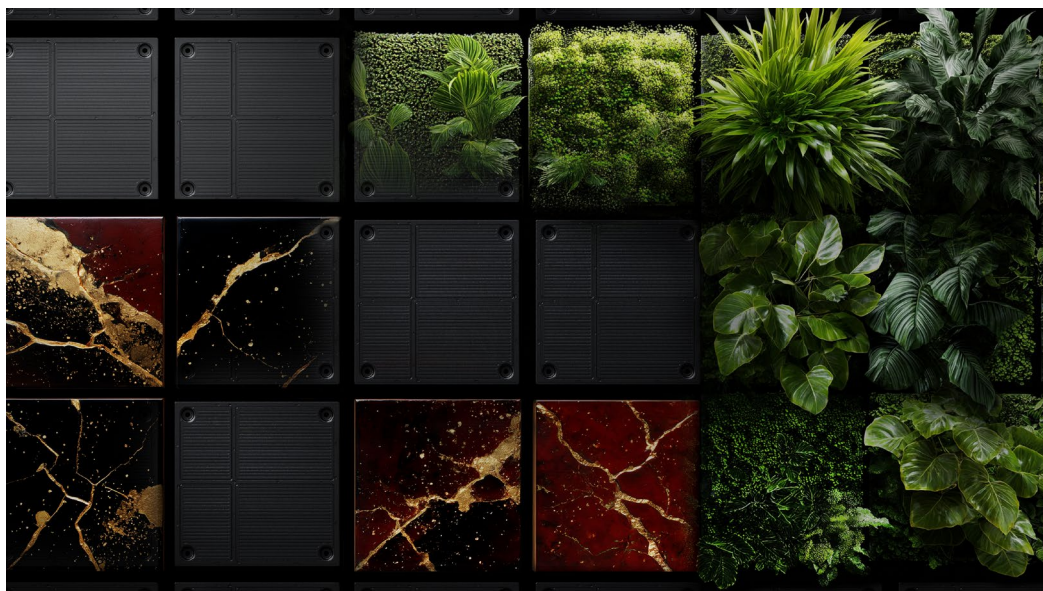
Helping in the harvest of Persimmon



Adam at a winery in Spain

## Pixie Dust Technologies, Inc.

# Creating Sustainable Urban Spaces Through Acoustic Metamaterials and Biophilic Design



### Organization Profile

By integrating computer science with our proprietary wave control technology—which allows us to manipulate sound, light, and other phenomena at will—we are building an environment where computers and non-computers are inseparable, and we anticipate the arrival of “Digital Nature,” which transcends binary oppositions such as language and phenomena, as well as analog and digital, in a cyclical manner. We are developing products with a focus on two key areas: “Personal Care & Diversity” and “Workspace & Digital Transformation.”

### Technology Name

“iwasemi OC-β”: A sound-absorbing module that resolves the trade-off between design and acoustics through the application of acoustic metamaterial technology, and can be integrated into biophilic surface materials.

### Technology URL

<https://wipogreen.wipo.int/wipogreen-database/articles/178324>



### Contact

<https://iwasemi.com/form>



**Q. What environmental or social challenges led to the development of this technology?**

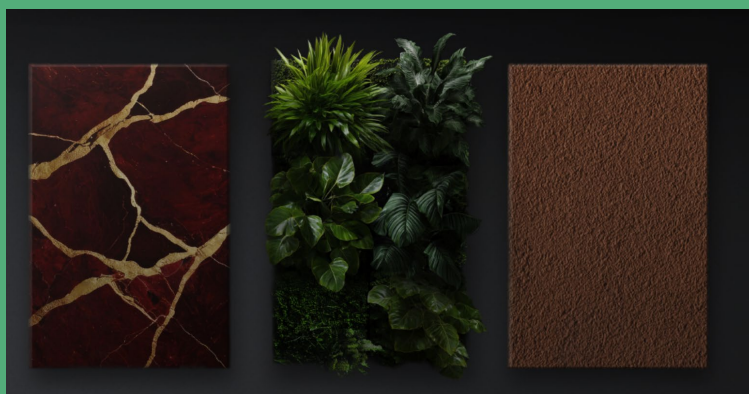
In smart cities, green spaces and rooftop greening serve not only to mitigate the urban heat island effect and preserve biodiversity, but also to improve residents' mental health (well-being). "iwasemi OC-β" allows for the integration of sound-absorbing materials into surface materials made from biophilic materials such as Scandia moss, artificial greenery, and natural wood. By simultaneously providing visual "Greenery" and "Quietness" with minimal unpleasant echoes in indoor spaces such as offices, hotels, commercial facilities, restaurants, and educational and public facilities, it supports the creation of the sustainable urban spaces.

**Q. Could you describe the core functionality of this technology?**

"iwasemi OC-β" is a sound-absorbing module that applies acoustic metamaterial technology. Conventional sound-absorbing materials relied on the inherent properties of the material itself to absorb sound, resulting in a clunky, unattractive appearance that imposed constraints on spatial design. In contrast, this technology achieves sound absorption through the structural design of the modules themselves. This allows the sound-absorbing modules to be integrated behind any surface material selected by the designer—such as plants, wooden louvers, or art panels—creating a pleasant acoustic environment while maintaining a visual design that appears free of sound-absorbing materials.

**Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?**

This technology is designed for spaces such as offices, hotels, commercial facilities, restaurants, and educational and public institutions, where both visual appeal and acoustic comfort are essential. Moving forward, we aim to expand this technology as a means of creating a "synergy between sight and sound" in smart cities by deepening our collaboration with local governments and businesses that handle a variety of surface materials, including plants, humidity-regulating materials, and 100% biomass products. By integrating this deep-tech acoustic metamaterial into society in a way that harmonizes with nature, we will present a vision of richer and more sustainable cities.



Wide selection of surface materials



Backside-mountable sound-absorbing modules

Seiwa-Denko Co., Ltd.

## Seiwa Electric's bio toilet Propose a living environment that does not require sewerage!

Utilization of the new toilet Bio-Lux and the new purification  
system Bio-Lux Water



### Technology Profile

This is a proposal for a patented product developed by Showa Electric.

This is an introduction to a new technology for treating domestic wastewater, including human waste. By installing a bio-toilet and a new purification system, you can achieve a comfortable living environment even without sewerage. Bio-Lux has the themes of "No Water Used", "No Water Pollution", "Sustainable", "Recycling", and "Self-Sufficient". Bio-toilets and new purification equipment can realize a "living environment that does not require sewerage". This technology, which can convert troublesome wastewater and household wastewater into effective resources, can greatly contribute to the SDGs.

This is a new type of toilet that can "not use water", "do not pollute water", "do not require septicism", and "circulate on site" as a method of treating domestic wastewater, including human waste. It is a new technology that can realize a comfortable living environment by "installing a bio-toilet and a new purification device". There are already many installation examples.

### Technology URL

<https://wipogreen.wipo.int/wipogreen-database/articles/178713>



### Contact

Name : Kimitoshi Satou

Email : [seiwa@seiwa-denko.co.jp](mailto:seiwa@seiwa-denko.co.jp)

**Q. What environmental or social challenges led to the development of this technology?**

Humans have put a lot of effort into disposing of their own excrement. There are many areas in developing countries where outdoor excretion is practiced. It is reported that outdoor excretion pollutes rivers and groundwater, and many children lose their lives. It has been pointed out that one of the main causes of the lack of access to clean water and the difficulty of securing drinking water is that domestic wastewater, including human waste, is not properly treated. It is said that there are currently about 8 billion people on Earth, but it is expected to reach 10 billion in the near future. Securing clean and drinking water is a challenge.

**Q. Could you describe the core functionality of this technology?**

By properly feeding the Ogakuzu with three conditions, organic matter will decompose and disappear in the Ogakuzu. Temperature, oxygen, and moisture can "disappear organic matter through evaporation and decomposition". Special fungi are not needed in sawdust. Human waste and food waste "decompose and disappear without producing an odor" in the garbage. Inorganic substances that do not evaporate or decompose will remain in the voids of the ogakuzu, so they can be used as fertilizer. Bio-Lux takes troublesome waste as a useful resource. Bio-toilets are effective technologies for "not polluting water" and "securing drinking water".

**Q. What future possibilities do you foresee if this technology becomes widely adopted internationally?**

Through the WIPO GREEN platform, bio-toilet technology will be spread both domestically and internationally, and domestic wastewater, including human wastewater, will be properly treated without using water. By eliminating outdoor excretion, pollution of rivers and groundwater will be eliminated, and it will greatly contribute to securing drinking water. The introduction of bio-toilets will improve the living environment, and human waste will become a resource, making it possible to achieve a sustainable living environment. You will be able to make a significant contribution to the SDGs.



Log house-style temporary toilet



Temporary toilet



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