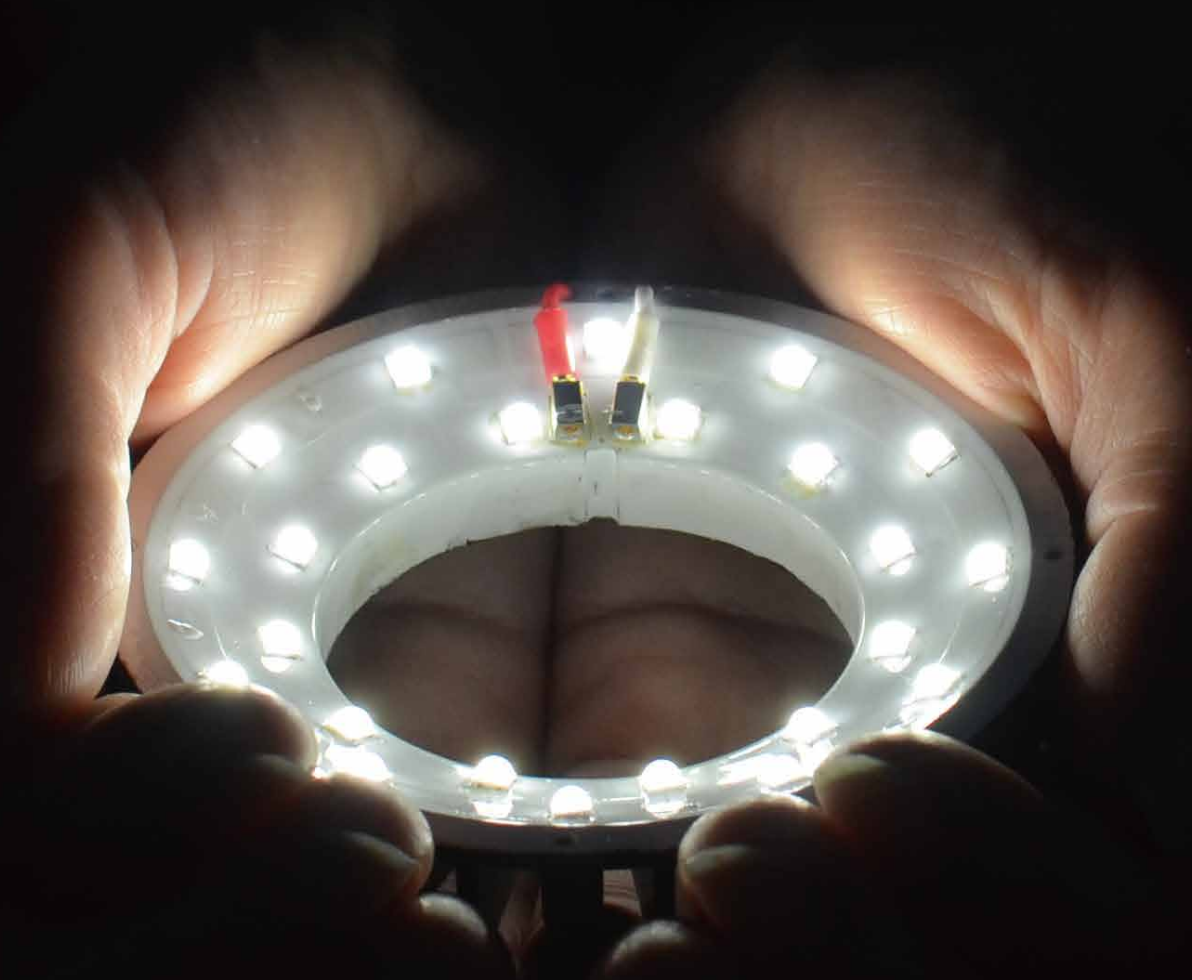


# The industry's first new technology

enables solutions with no circuit boards.



**MARBS changes the common sense of heat dissipation**

The era of making circuit boards and worrying about heat dissipation will soon come to an end.



<http://marbs.pro>

# Q What are the solutions with no circuit boards?

MARBS (three-dimensional wiring technology) is a technology with which three-dimensional mounting without using printed circuit board becomes possible, with which the ideal transfer of heat to the heat sink is realized and it is a technology that overcomes the concept of conventional heat dissipation.



As you can see, even with the LED brightness turned up you can still hold it in your hands!

# Q What is MARBS?

This is an amazing three-dimensional wiring technology combining two patented technologies of "molecular bonding" invented by Sulfur Chemical Laboratory Co., Ltd. and of "three-dimensional wiring" by Hokosha Co., Ltd.



**Molecular bonding technology**  
Sulfur Chemical Laboratory Co., Ltd.

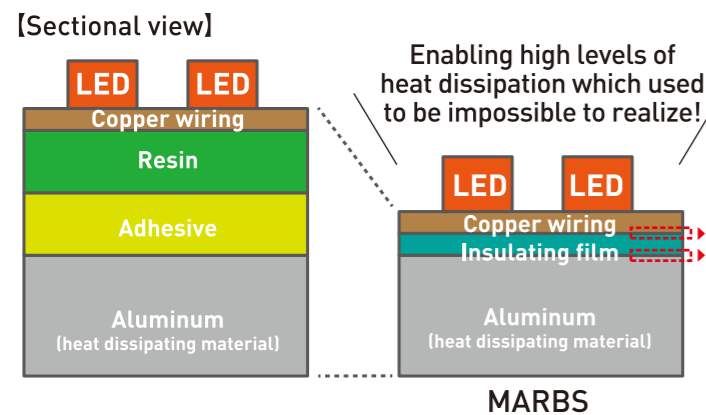
Molecular adhesive bonding is the latest technology bringing about revolution in manufacturing which enables bonding of materials on the molecular level which could not be made to adhere to each other using conventional technologies.

Japanese Patent No. 5624703

**Three-dimensional wiring technology**  
Hokosha Co., Ltd.

It is a pioneer company from Kyushu in the field of printed circuit boards. It is engaged in the total process from board design to fabrication, component mounting, mass production, evaluation and management. Even after 50 years from the times of its founding, the company is constantly challenging itself for various possibilities in the field of manufacturing.

# Q What are the differences from conventional circuit boards?



- Enabling high levels of heat dissipation which used to be impossible to realize!
- Wiring patterns can be formed directly on the curved metal base!
- Freedom of design of LED light distribution!
- LED heat dissipation problem solved!

# This kind of future technology will be realized with MARBS!

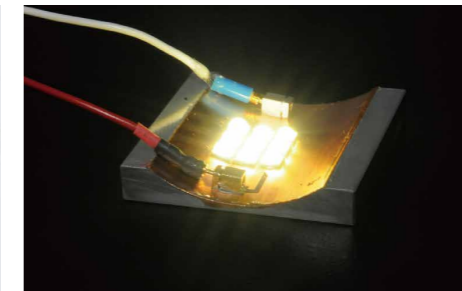
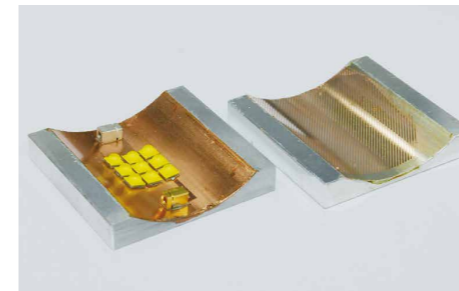
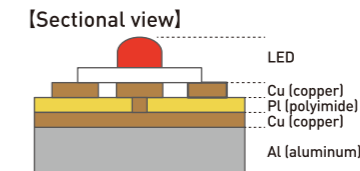
**Industry's first!** The next generation ring lighting in which excellent heat dissipation, high luminance and high uniformity have been achieved

Because it is designed to efficiently transfer heat to the heat sink with no circuit board, it takes out the maximum power out of LEDs. Since the LEDs are mounted on the insulation layer on top of the heat sink without using a flexible circuit board, the uniformity of light irradiation can be achieved.



**業界初!** The next generation high heat dissipation lighting with three-dimensional direct connection of LEDs with the heat dissipation pad and the heat sink

Ideal solution for the LED heat dissipation problem. It is the world's first production method.



Direct formation of antenna patterns on the resin casing using molecular bonding



High strength next-generation plating of metals (Ni, Cu, etc.) on thin polyimide



# The possibilities are endless! It can also be applied to these kinds of things!

## Emblems made of hexavalent chromium-free resin

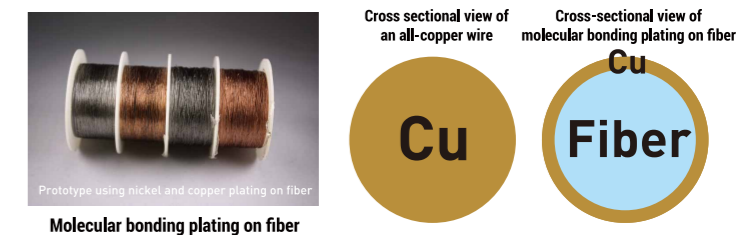


Lighter weight! Lower cost! Low environmental impact!

By using the molecular bonding technology it is possible to plate on any resin from conventional ABS resin to polypropylene and super engineering plastics.

\* This means eliminating the hexavalent chromium used for pretreatment etching in conventional production methods.

## Ideal fiber plating



Because electricity can be passed through the fibers, the weight of signal wires in such applications as wire harnesses can be further reduced!

This is expected to be applied in the future including the possibilities of implementing touch panels in places where fibers are used, such as in clothes and in vehicles' interiors.

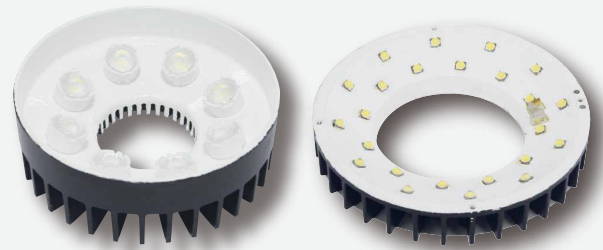
# Why do not we challenge ourselves towards the future together?

We are looking for partner companies.

※ Please make inquiries using the contact information at the bottom of the page.

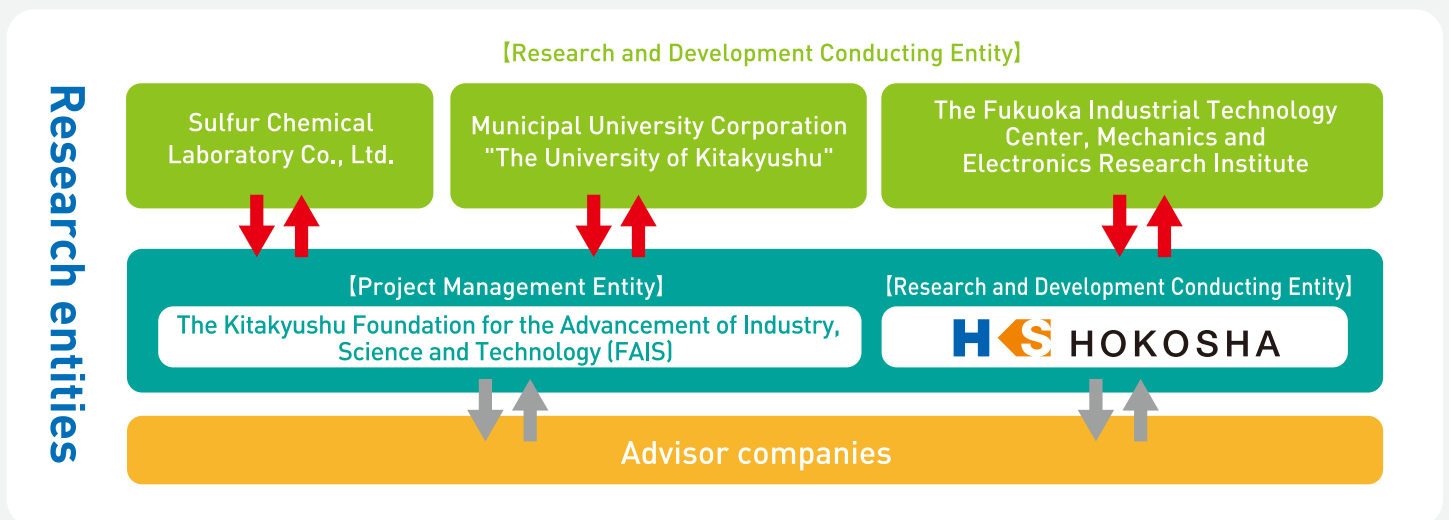
## MARBS is a Supporting Industry Certification Project.

The project for "development of LED ring lighting using curved wiring technology to improve the inspection accuracy of visual inspection equipment" received certification as a 2017 Strategic Basic Technology Advancement Support Project (Supporting Industry).

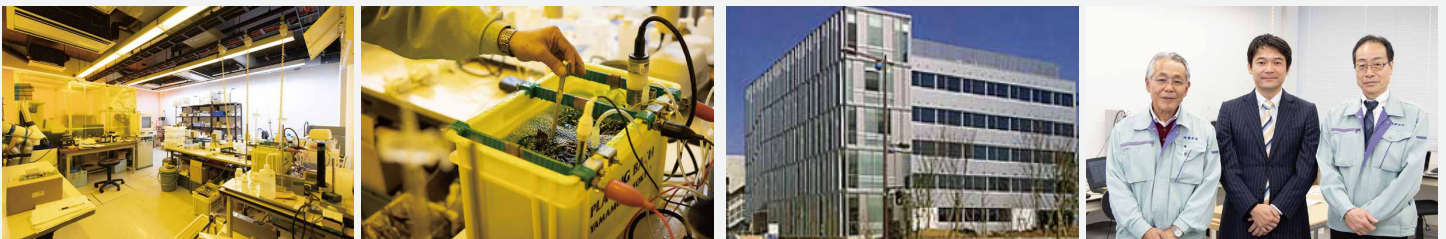


LED ring lighting with a PCB-less structure which excels at heat dissipation  
(three-dimensional wiring, three-dimensional mounting)

## The System of R&D in Supporting Industries



## Advisor companies



# **H S** HOKOSHA

Official website of Hokosha [www.hokosha.co.jp](http://www.hokosha.co.jp)

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Kinoshita**

MARBS Official Website ▶ <http://marbs.pro> ※Written in Japanese