

Aiming to solve severe thermal issues in electronics to realize an energy-saving society

U-MAP Co., Ltd.

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Overview

We provide thermal solutions based on material technology developed at Nagoya University. With the expansion of EVs equipped with high-output motors and the increase in communication volume, thermal management has become the key to energy conservation in servers. By providing innovative thermal solutions, we will reduce energy consumption and contribute to a carbon neutral society.

Electron micrograph of Thermalnite

Thermalnite

Fibrous Aluminum Nitride Single Crystal U-MAP's Unique Core Technology

High Strength AIN Composite Ceramics

Addition of Thermalnite to other materials





High thermal conductivity composite resins



Improve the heat dissipation of electronics to contribute to energy conservation

Increase in CO2 emissions due to market expansion of electric vehicles, data centers, etc. Countermeasures against heat generation in electronics have become an important issue

The electronics market is expanding day by including electric mobility such as day, electric vehicles, renewable energy generation, and information processing in data centers.

This has resulted in an increase in the amount and density of heat generated by electronic equipment, and heat dissipation problems are occurring in all industrial fields. Heat generation is a major enemy of electronic equipment, leading to poor performance, reduced equipment life, and deteriorated reliability such as ignition accidents. Air- and water-cooling systems such as fans and chillers are conventionally used to dissipate heat, but these forced cooling systems lead to larger equipment and increased energy consumption.

Therefore, it is important to efficiently dissipate heat by making equipment materials with high thermal conductivity. Ceramics and resin/rubber materials are key materials for equipment components.

in 2030

Power to Cool Data Centers Worldwide

Power consumption of data centers is increasing rapidly due to the rapid progress of digitization and online services.



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Japan's total electricity



Carbon dioxide emissions from power conversion losses in electric vehicles

Due to high heat density environment and localized heat generation



 CO_2 93,800 Thousand t - CO 2

Carbon Dioxide Emissions from Power Semiconductor Manufacturing

Extra semiconductors are needed for heat generation, but the manufacturing process requires a huge amount of electricity.





Additive materials called fillers are key to achieving high performancein ceramics and resin materials. U-MAP has developed an innovative filler material, Thermalnite fibrous aluminum nitride single crystal).

By mixing just a little, it is possible to improve thermal conductivity and mechanical strength to create new functional materials that have never been seen before. Materials will become lighter, easier-to-process materials with higher mechanical strength and less breakage. Smartphones will be lighter, batteries will last longer, and the material can also be used in industrial and aerospace equipment in harsh environments.

Thermalnite is the result of cutting-edge crystal growth technology at Nagoya University's Ujihara Laboratory, and has achieved the world's highest level of heat dissipation performance. As a result, products can be made smaller and more energyefficient than ever before.

Ceramic substrate with Thermalnite Semiconductor performance improvement & miniaturization

Semiconductor temperature reduction



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Improved semiconductor performance due to cooling effect



Smaller semiconductor size = energy savings



"Thermalnite": material with high heat dissipation performance and insulation properties Save energy through miniaturization and reduction of cooling power

AIN substrate

Reduced component thickness by half CO2 emissions during manufacturing also halved



Ceramic substrate with Thermalnite

INPACT STORY



We are an innovative company that pioneers new possibilities for materials and aims to create a more sustainable world.