

Press Information

October 3, 2022

**Developed sintering equipment for power semiconductors
 Uniformly joining SiC power semiconductors by three-dimensional
 pressing using the special elastomer**

NIKKISO CO., LTD. has developed the "3D sintering equipment", a sintering equipment in the manufacturing of power-semiconductor SiC modules.

The "3D sintering equipment" is a system that uses our unique 3D press method to sinter bond SiC chips to substrates in the process of bonding SiC power semiconductors, which are rapidly being adopted for use in EVs.

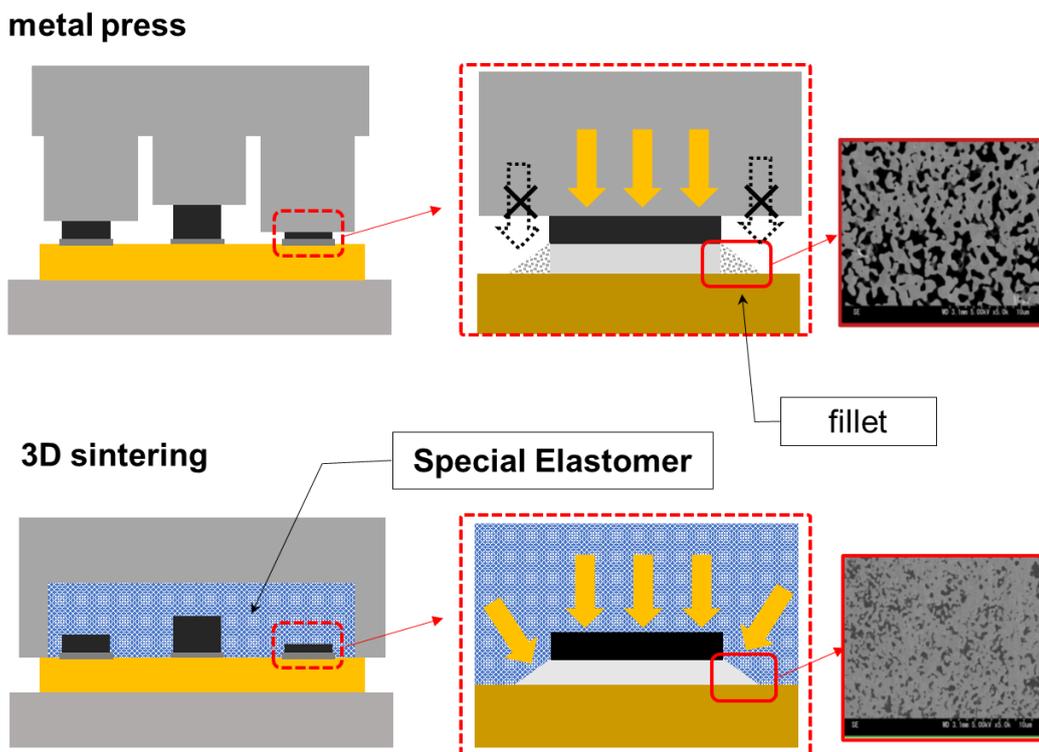
The three-dimensional press using the special elastomer enables uniform batch bonding of chips of different heights to substrates, thus enabling more efficient and higher quality module manufacturing than the conventional metal press method that presses on a flat surface.

■ Characteristics

1. High-quality modules can be manufactured by three-dimensional pressurization

Conventional metal press methods pressurize only to the chip part, so the fillet part cannot be pressurized and fired. As a result, the fillet part became brittle, which could lead to chipping during the molding process, as well as problems with reliability and durability in the heat cycle.

3D sintering equipment prevents chipping and contributes to quality improvement by uniformly pressurizing the fillet part with the special elastomer in a three-dimensional manner.



2. Joining of various sizes in one batch

Conventional metal press methods require changing dies each time to accommodate chips and substrates of different sizes and heights, but this system can uniformly press multiple chips and substrates of different heights at once, thus contributing to improved productivity.

3. Reduction of running costs

3D sintering equipment does not require the production and operation of expensive molds for each substrate or chip type, thus significantly reducing running costs.

■Background of development

In power semiconductors, which will become increasingly popular in the future, the operating environment will be high temperature. Therefore, the use of sintered bonding materials made of silver or copper, instead of solder, which has been commonly used for bonding semiconductors in the past, has been increasing.

We have been providing the " Warm Isostatic Laminator," which is widely used as the industry standard machine in the pressure bonding process of MLCCs (multilayer ceramic capacitors) with a three-dimensional press that uses water pressure. By using the special elastomer based on this technology, we have developed a sintering equipment that matches the bonding characteristics of power semiconductors.

■Future Development

A demonstration unit will be installed at the Higashimurayama Plant in October 2022, and a demonstration room will be opened in Shanghai in January 2023, followed by the sequential launch of sales. We will continue to develop new manufacturing equipment for electronic device production by applying our technologies of uniform pressure and uniform heating.

<Product Overview>

Brand name: 3D Sinter DS Series

Sales date: October 3, 2022



<About Nikkiso>

Company Name: NIKKISO CO., LTD.
Head Office: Yebisu Garden Place Tower 22nd Floor, 20-3, Ebisu 4-Chome, Shibuya-ku, Tokyo 150-6022, Japan
Date of Establishment: December 26, 1953
President & CEO: Toshihiko Kai
Business Overview: Nikkiso provides specialized pumps and systems in the Industrial Business, CFRP (carbon fiber reinforced plastic) aircraft parts in the Aerospace Business and hemodialysis, and healthcare related products in the Medical Business.
URL: <https://www.nikkiso.com/>

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