

# News Release

February 13, 2023

## Production of Silicon Nitride Substrates for xEV Power Semiconductors to be Increased

Proterial, Ltd.  
Proterial Ferrite Electronics, Ltd  
(Formerly Hitachi Metals, Ltd. and Hitachi Ferrite Electronics, Ltd.)

Proterial, Ltd. (Headquarters: Koto-ku, Tokyo) and Proterial Ferrite Electronics, Ltd (Headquarters and plant: Tottori City, Tottori, hereinafter “Proterial Ferrite Electronics”) (Proterial and Proterial Ferrite Electronics hereinafter collectively “the Company”) have decided to invest in increased production of silicon nitride ( $\text{Si}_3\text{N}_4$ ) substrates at Proterial Ferrite Electronics. Demand for silicon nitride substrates as key components for power semiconductors that control motors and convert power in xEVs\*<sup>1</sup> and other applications is growing rapidly, and continued growth is expected. The Company aims to contribute to the realization of a decarbonized society by growing the sales of silicon nitride substrates by making investments to increase production.

### 1. Background

Inverters\*<sup>2</sup> and converters\*<sup>3</sup> are used to provide advanced control for drive motors used in EVs. Power semiconductors are used in inverters and converters, and are responsible for the switching (on/off) function for the high voltages and large currents that are needed to operate xEVs. In order for xEVs to become even more widely used, their range must be improved. One of the technologies needed to achieve this is smaller inverters and converters that operate at higher frequencies, and are more efficient. However, as they are made smaller and operable at higher frequencies, more robust countermeasures against characteristic degradation caused by heat generated in power semiconductors (semiconductor devices) become essential.

Silicon nitride substrates (see Fig. 1) are used as insulating substrates (see Fig. 3) for power modules (see Fig. 2) that are incorporated in inverters and converters. In addition to preventing current leakage in the circuit and increasing the strength of the power module, they dissipate heat transferred from the power semiconductor to copper parts, preventing degradation of the power semiconductor's characteristics.

Touted as one of the most effective technologies for reducing carbon dioxide emissions, the shift to xEVs is currently moving forward rapidly. In anticipation of growing demand for xEVs, the Company developed silicon nitride substrates in 2017 and began mass production in 2019. Currently, demand for silicon nitride substrates is growing rapidly, and this trend is expected to further accelerate going forward.

### Proterial, Ltd.

Toyosu Prime Square, 5-6-36 Toyosu, Koto-ku, Tokyo 135-0061, Japan  
[www.proterial.com/e](http://www.proterial.com/e)

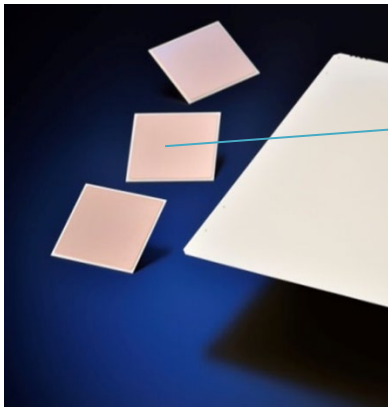


Fig. 1: Silicon nitride substrate

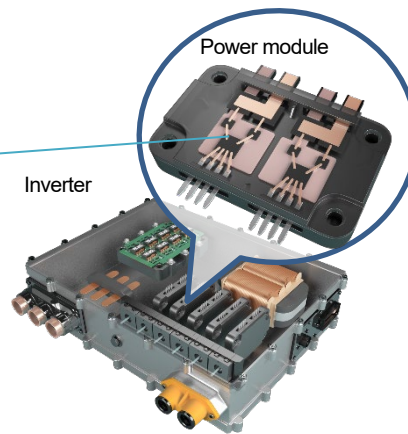


Fig. 2: Inverter and power module

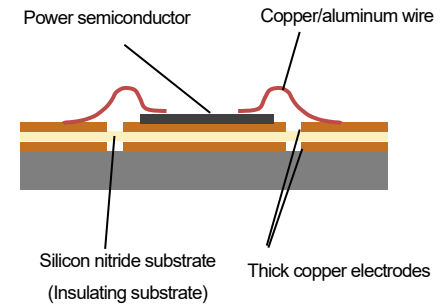


Fig. 3: Partial cross-sectional view of a power module substrate

## 2. Overview

In order to meet the growing demand for silicon nitride ( $\text{Si}_3\text{N}_4$ ) substrates, the Company has decided to invest in increased production at the Proterial Ferrite Electronics plant. Operation is scheduled to begin in the second half of 2023.

1. Location: Proterial Ferrite Electronics, Ltd
2. Investment details: Machinery and equipment, including electric furnaces
3. Scheduled to go on line: Late 2023
4. Production capacity: Approximately twice that of FY2021 levels

End of report

[Customer Inquiries] Web inquiry form [https://www.cntct.proterial.com/contact/publish/inquiry\\_eng?g=01&c=011](https://www.cntct.proterial.com/contact/publish/inquiry_eng?g=01&c=011)

[Media inquiries] e-mail [hmcc.sa@proterial.com](mailto:hmcc.sa@proterial.com)

(Reference)

### Terminology

- xEV: Collective term for electric vehicles (EVs), hybrid electric vehicles (HEVs), and plug-in hybrid electric vehicles. (PHEVs)
- Inverter: A circuit that converts DC to AC.  
In a broader definition, this refers to inverter devices consisting of a combination of an inverter and converter to generate AC with different frequencies.
- Converter: A circuit that converts AC and DC to different DC.

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## Overview of Proterial Ferrite Electronics, Ltd.

1. Business activities: Development and manufacture of electronic components for a wide range of electrical and electronic equipment, including information and telecommunications devices, game consoles, and in-vehicle devices.  
Manufacture and machining of dies, precision machine parts, and jigs and tools.
2. Representative: Hiroyuki Nagatomo, President and Representative Director
3. Address: 70-2 Naneicho, Tottori City, Tottori Prefecture
4. Capital: 150 million yen
5. Shareholder: Proterial, Ltd. (100%)
6. Established: September 1, 1969
7. Employees: 257 (as of April 1, 2022)

### ■About the new trade name PROTERIAL

Hitachi Metals, Ltd. changed its trade name to Proterial, Ltd. on January 4, 2023.

# PROTERIAL

“Proterial” reflects the essence of our corporate philosophy, which consists of three elements: Mission: “Make the best quality available to everyone;” Vision: “Leading sustainability by high performance;” and Values: “Unflinching integrity” and “United by respect.” It combines “pro-” with the word “material.”

“Pro-” represents our “three pros”:

- Professional — work that exceeds expectations
- Progressive — a spirit that keeps challenging
- Proactive —an enterprising attitude

“Material” refers to the high-performance materials that our original technologies produce and underpinned by the three pros. With our focus on solving customer issues and bringing new levels of value, we promise to contribute to the realization of a sustainable society through the products and services that embody our philosophy.

### ■Movie introducing "PROTERIAL"

<https://youtu.be/Q0MKdTh3ofI>

Click here for movie



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