Press Information

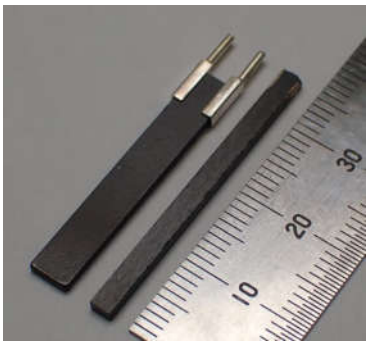
Kyocera develops silicon nitride light source for high-performance FTIR spectrometry

Offers higher spectral emissivity, stable performance over 150,000 cycles.

Kyoto, London 21st November 2023. Kyocera Corporation, the world leader in Fine Ceramic technology, today introduced a Silicon Nitride (SN) light source for high-performance Fourier Transform Infrared (FTIR) spectrometers, developed using its SN heater and glow plug IP portfolio.

Kyocera's SN heaters have been regarded as the most robust and fastest-ramping heaters in the world, durable enough to serve as glow plugs for diesel engines and igniters for industrial boilers, residential gas furnaces and Solid Oxide Fuel Cells (SOFCs).

Applied to spectrometry, Kyocera's SN technology offers a light source with exceptional emissivity, which enables more accurate material identification. In addition, the durability of Kyocera's SN material results in lower failure rates, an extended duty cycle, and reduced maintenance downtime, as compared to conventional light source solutions.



Main Features:

1. Compact size with customizable heating parameters

Kyocera's heater technology features a unique structure, with a printed heating element embedded in silicon nitride ceramic. Because of this design feature, each heater pattern can be uniquely customized to the end application. Heating parameters such as wattage, output temperature and heating area can be designed to meet specific customer requirements.

2. High infrared emissivity

The spectral emissivity of Kyocera's SN heaters in the infrared region is generally higher than that of Silicon Carbide (SiC), a common ceramic material used for FTIR heaters *(Fig. 1)*. Higher spectral emissivity is important in an FTIR light source, as it enables more accurate identification of substances because it produces clear spectral peaks specific to the substance.

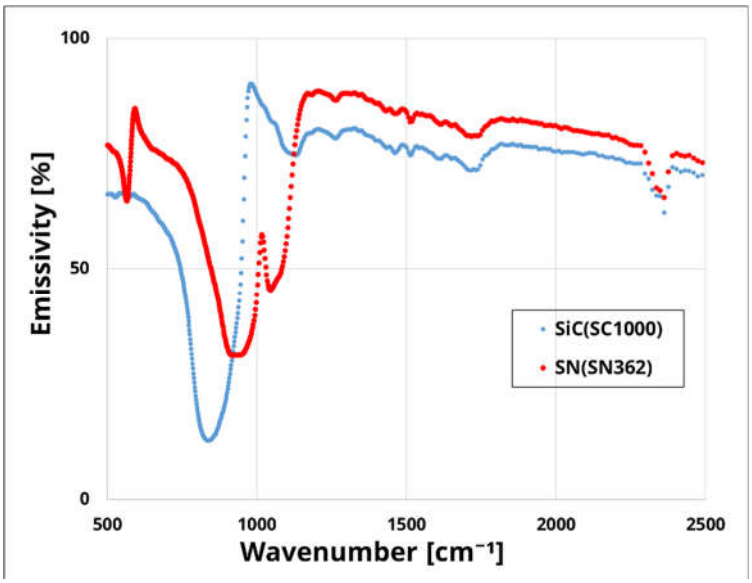


Figure 1: Spectral emissivity in the infrared region at 450°C.

3. Long product life

The unique structure of Kyocera's SN heaters hermetically encapsulates the heating element within the ceramic body, virtually eliminating risk of failure due to heating element oxidation. As a result, Kyocera's SN heaters offer high reliability and long product life, with no significant performance degradation over more than 150,000 cycles.

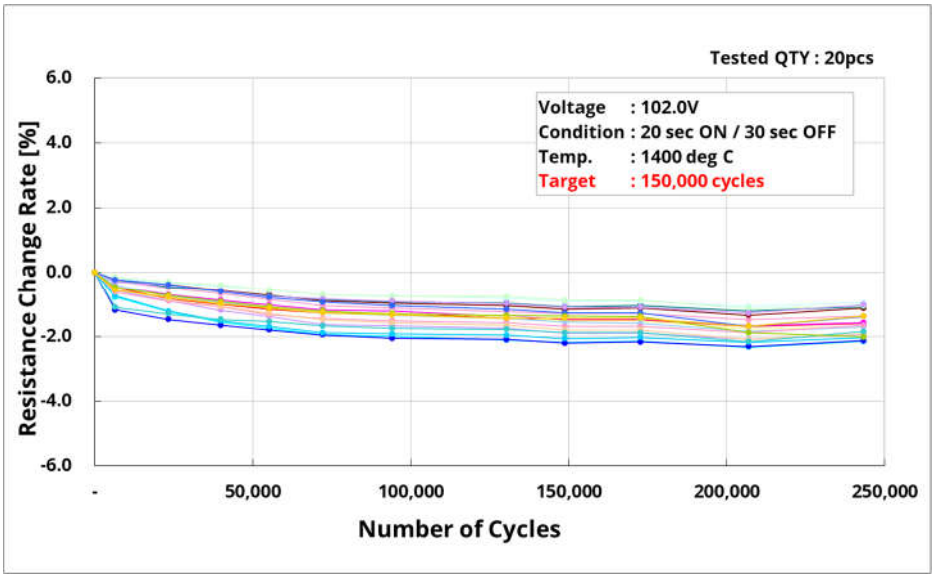


Figure 2: SN plate-type heater cycle test data

4. Excellent Durability

Silicon nitride is well known as a robust material, with a long history of success in igniter and glow-plug applications. One of the reasons for this robustness is its fracture toughness, which is more than twice that of silicon carbide. Silicon nitride's unique resistance to cracking or chipping during handling, installation and replacement makes it an advantageous material.

	Silicon Nitride (SN 362)	Silicon Carbide (SC 1,000)
Fracture toughness MPa/√m	6	2~3

Kyocera's SN glow plugs bring a wide range of new benefits to applications requiring a reliable, high-performance FTIR light source. Because of the unique material and design properties, customers can be assured that Kyocera's SN heaters will meet the performance and reliability requirements demanded by FTIR applications.

About Kyocera's SN Light Source: https://global.kyocera.com/prdct/ecd/heater_sn/index.html

For more information on Kyocera: www.kyocera.co.uk

About Kyocera

Kyocera has been successful in Europe for over 50 years. From its European headquarters in Esslingen am Neckar, KYOCERA Europe GmbH operates 26 sites including manufacturing facilities, with products ranging from fine ceramics, electronics, automotive, semiconductor and optical components to industrial tools, LCDs, touch solutions, industrial printing components, solar systems and consumer goods such as kitchen and office products.

KYOCERA Europe GmbH is a company of the KYOCERA Corporation headquartered in Kyoto/Japan, a world leader in semiconductor, industrial and automotive components as well as electronic components, printing and multifunction systems, and communications technology. The technology group is one of the world's most experienced manufacturers of smart energy systems, with more than 45 years of industry expertise. The Kyocera Group comprises 297 subsidiaries (31 March 2023). In England, Kyocera has a subsidiary in Frimley, KYOCERA Fineceramics Ltd. With around 81,000 employees, Kyocera generated net annual sales of around EUR 13.87 billion in the 2022/2023 fiscal year.

Kyocera is ranked 672 on Forbes magazine's 'Global 2000' list for 2023, and ranked as 'The 100 Most Sustainably Managed Companies in the World' according to the Wall Street Journal. For the second year in a row, Kyocera qualified for the Dow Jones Sustainability Index (Asia-Pacific). As well, Kyocera receives a Gold rating on EcoVadis Sustainability Survey for the second consecutive year and was acknowledged as a 'Top 100 Global Innovator 2023', being one of the world's leading innovators, for the seventh time by Clarivate.

The company also takes an active interest in cultural affairs. The Kyoto Prize, a prominent international award, is presented each year by the Inamori Foundation — established by Kyocera founder Dr Kazuo Inamori — to individuals worldwide who have contributed significantly to the scientific, cultural, and spiritual betterment of humankind (equivalent to approximately €685,000 per prize category).

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