Exploring the potential of carbon

A huge exporter and supplier of carbon products to the global semiconductor industry, Nippon Carbon has a history of introducing innovations to the Japanese and global markets.

> "Our company's strategy moving forward is to contribute to the business of our global customers in terms of high quality, cost, and delivery (QCD)."
>
> **Takafumi Miyashita**, Representative Director & CEO, Nippon Carbon Co., Ltd.

For more than a century, Nippon Carbon has been a pioneer in the carbon industry, having succeeded in industrializing graphite electrodes for electric arc furnaces, whilst also introducing carbon fiber products for the first time in Japan. With these innovations, the company has continued to devote its experience and know-how in the field of carbon and graphite by developing value-added carbon products that meet changing societal and industrial needs.

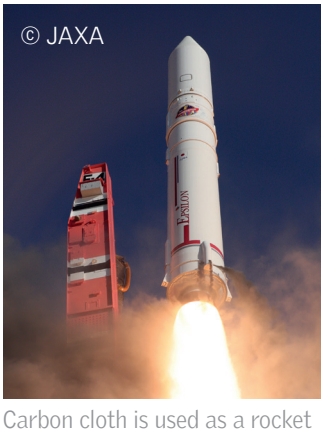
In recent years, however, Nippon Carbon and the Japanese carbon industry have faced increased regional competition. In order to enhance its competitiveness, the company is today proactively exporting insulators for the heat treatment field, targeting the US, Europe, and China.

"According to my estimations, I believe that Nippon Carbon is the greatest manufacturer and exporter of insulators in the heat treatment field," asserts the representative director and CEO of Nippon Carbon, Takafumi Miyashita.

Indeed, Nippon Carbon is today a huge exporter and supplier of carbon products to the global semiconductor market, supplying around 60% of what is used by semiconductor wafer companies. One of the reasons why the company is so strong in this market is because it supplies all three components demanded: insulators, C/C composites, and carbon specialty materials. "However, I imagine that the quality of Chinese competitor's products in this market will start to get better as time progresses and therefore, we are striving to not lose out and must continue to expand and improve our quality even further. That is our general direction," says Mr. Miyashita.

In recent years, we have seen a big change in the materials used for semiconductor wafers because of their applications. Wafers that were traditionally made from silicon are increasing, especially for power electronics. Likewise, compound semiconductors such as gallium nitride or silicon carbide are creating different needs in manufacturing, which makes it necessary for producers to rethink their supply chain and materials. So, how has Nippon Carbon been able to adapt to these changes?

"The semiconductor is the key when you are starting to incorporate IoT into various products," says Mr. Miyashita. "In Japan, there is a shortage of semiconductors and semiconductor makers are indicating that it is a challenge to adequately provide for manufacturers that need them. Due to higher and higher levels of purification needed and demanded by the silicon semiconductor field, we are exerting more energy into our material R&D. Carbon plays a key role, but it is such a simple material, which compels us to increase our R&D strategy to offer more attractive proposals to our clients."



Carbon cloth is used as a rocket nozzle insulator

Artificial graphite electrode

Crucible for semiconductor crystal growth

C/C composite coil spring

In terms of its other innovative products, silicon carbide (SC) continuous fibers like Nicalon and High-Nicalon have been widely adopted for their various characteristics and durability by the aerospace field.

"Nicalon is now being manufactured by NGS Advanced Fibers Co., Ltd, which is part of our subsidiary and a joint venture between Nippon Carbon, GE Aviation, and SAFRAN. There are only two companies in the world that can create SC continuous fibers. Nicalon's greatest application is in jet turbines," explains Mr. Miyashita. "The reason why it works so well is that it does not become distorted and also, it is lightweight, meaning it creates higher levels of fuel efficiency and safety – which is obviously very important for aerospace. I believe that this product is definitely going to be on the rise even in the post-Covid world, with the increased awareness and efforts on cutting down CO2 emissions and becoming more fuel-efficient."

Silicon carbide fiber is used for jet engines

Nippon Carbon Co., Ltd.
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