IBT Thermoprocess GmbH

IBT ist Anlagenbauer für Hochtemperaturöfen für CMC. // IBT is a plant manufacturer for high-temperature furnaces for CMC.

IBT Thermoprocess GmbH specializes in the production of high-temperature furnaces for debinding and sintering of ceramics. Other processes such as CVD processes and pyrolysis can also be realized. IBG GmbH offers heating and sintering systems with microwave heating for ceramics with very low thermal conductivity, which are significantly more difficult to debind and sinter than ceramics with high thermal conductivity. Microwaves, known from the household, penetrate into the workpiece and are only converted into heat in the body. Under the influence of microwave radiation and its distribution, the energy input changes over the component and enables a high temperature uniformity.

Microwave unit of the ThernoLine-HEAT series @ IBT

The figure below shows such a system with a drying or debinding tray as well as a sintering tray. How can ceramics be sintered under temperatures of 3000 °C? IBT's high-temperature furnaces can handle this demanding task. A water-cooled vessel, which can be evacuated to 1*10-6 mbar, hides a lot of thermal insulation made of graphite fibers inside, as well as a heating element made of carbon fiber reinforced carbon (CFC). Since at these temperatures, even under vacuum, the carbon oxidizes with the few remaining oxygen compounds, the container is purged with inert gas (e.g. argon) after evacuation. In this way, the concentration of oxygen is lowered again, and the carbon is deprived of its reaction partner. As a result, the heater can reach temperatures of up to 3000 °C, usually under low voltage.

Vacuum furnace of the ThermoLine-VAC series @ IBT

In today's world, reducing energy consumption is a key issue for cost and

climate reasons. Here IBT, in cooperation with research institutes, is developing new types of thermal insulation - including CMC materials, to reduce heat losses and thus energy consumption. With the heating elements made of CFC (carbon fiber rein forced carbon), a CMC material is also used as a heating source. This closes the circle.

OxiCer: OFC for large-scale production: The network "Development of an innovative large-scale production technology for fiber-reinforced oxide ceramic compo sites" (OxiCer) was launched in January 2020. OxiCer pursues the goal of researching ceramic components for high-temperature applications. The network is a sub network of the Ceramic Composites and is composed of three research institutions, 13 small and medium-sized enterprises and five associated network partners. The network is coordinated by scientists from the Chair of Structural Light weight Design and Plastics Processing (SLK) at Chemnitz University of Technology. The common goal of the network is to develop processes, services, and products from research to marketing in the field of fiber-reinforced oxide ceramics. Wherever high temperatures occur, and metal alloys reach their limits in corrosive environments, fiber-reinforced oxide ceramic components are in demand. They can withstand temperatures of over 1,000 °C and, thanks to their fiber reinforcement, can compensate for rapid temperature changes without functional impairment. The aim is to develop new, efficient, and resource-saving manufacturing technologies with which high volumes can be produced with short cycle times.