

- Machine downtime costs: during sampling, downtimes regularly occur due to the press being occupied and retooled. Due to the omission of time-relevant factors in conventional molding, this waiting time plays no role.

When employing a CeraMax Vario V900, a production order – from receipt of the order to the finished component – can be entirely processed in approximately one week [1]. Thanks to its quick and easy fit into the established ceramic value chain, the CeraMax Vario V900 offers excellent support in mak-

ing the shaping process far more efficient. Most of the time and resource-intensive aspects of classic pressing processes are eliminated, with components being produced much faster and more efficiently. Parts can then easily be reintroduced into the familiar post-processing steps. 3D-printed parts produced via LIS exhibit guaranteed full density, ensuring all desired ceramic properties are also present in the component. These components open the door to a wide range of possible applications – not only those more suited for industry, such as radomes,

satellite mirrors for aerospace and defence, or rings and nozzles for semiconductor and machinery, but also for sanitary applications.

With its wealth of experience in ceramic AM, materials and software, Lithoz is an important partner to many industrial manufacturers as well as research-based institutions. To learn more about the technical details and the commercial capabilities of the CeraMax Vario V900, visit the technology's world premiere at the Lithoz stand (Booth 234) at this year's ceramitec.

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# Manufacturing of SiSiC Plates for Semiconductor Machines with a Focus on Process Integration

With manufacturing processes in the semiconductor industry becoming increasingly more demanding, component suppliers must offer products of the highest quality to meet current and future demands in chip production. Focussing on both product innovation and process integration, globally leading advanced ceramics manufacturer CeramTec/DE applies a two-fold approach to enable higher chip quality.

In 2020, the global semiconductor industry recorded a turnover of USD 440 billion, driven by increasing digitalization and technologies around AI, 5G or e-mobility and IoT, which all rely on semiconductor technology.

### Keywords

*semiconductor, SiSiC plates, silicon wafer manufacturers, 3D printing*

In recognition of this potential, the European Commission launched its European Alliance on Processors and Semiconductor Technologies in July 2021. The aim is to increase the European share of global semiconductor production to 20 % by 2030 and of expanding manufacturing capacities to develop state-of-the-art chips in the

5–2 nm range. “The current semiconductor market is experiencing considerable growth thanks to new digital technologies.

*CeramTec  
73207 Plochingen  
Germany*

[www.ceramtec-group.com](http://www.ceramtec-group.com)

This affects CeramTec as a component supplier of SiSiC plates, which are used as the basis for electrostatic wafer chucks in semiconductor machines for the production of chips. The product quality of the components and efficiency in production are two key factors for wafer manufacturers. This is what we focus on," said Fabio Lodigiani, Sales Director Machinery at CeramTec.

**More than just a component supplier thanks to process integration**

The manufacturing processes of semiconductors are very complex and require a high level of know-how and state-of-the-art technical solutions. As a component supplier for silicon wafer production, CeramTec offers its customers the possibility to integrate further processing steps into its own manufacturing process. This includes the refinement of SiSiC plates before they are installed in the wafer manufacturers' sophisticated systems. Customers who utilise this process save overall costs, resources,

and machine capacity. For its own production processes, CeramTec also relies on innovative technologies such as 3D printing to make the production of SiSiC components. Unique product geometry can be created by 3D printing that cannot be produced by other manufacturing routes.

**Material composition key for optimal use in semiconductor machinery**

CeramTec's Rocar SiF plates are the result of years of research and ongoing development. Rocar SiF is a high-performance SiSiC, an extremely lightweight silicon carbide ceramic.

Balancing various requirements is a challenge in SiSiC plates production: on the one hand, the material must be extremely homogeneous and refined, and on the other hand, the highest possible conductivity must be maintained.

Rocar SiF plates achieve an optimal balance in material properties and enable high-precision microstructuring of the SiSiC surface.

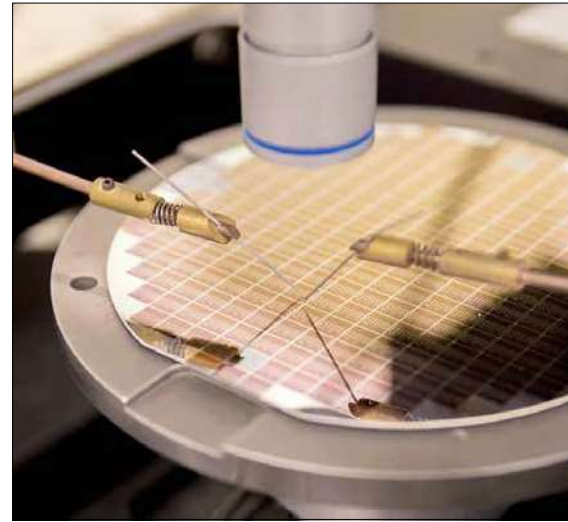


Fig. 1  
Manufacturing of SiSiC plates for semiconductor machines

This allows for a more accurate handling of the silicon wafer which has a direct impact on chip quality.



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