

CERAMIC APPLICATIONS

Components for high performance

THE **ARTIFICIAL INTELLIGENCE** FOR TECHNICAL CERAMICS



Industrial Production
with C1000 FLEXMATIC powered by

CERIA Set

Maximized Productivity
Decrease production costs



INTERVIEWS Precision Ceramics/UK, Zecha/DE, Oerlikon/Fl, Cramik/ES **EVENTS** ceramitec 2024, IAPK-Colloquium **MARKET PLACE** 3DCERAM Sinto/FR, CeramTec/DE, **TECHNOLOGY INSIGHTS** Boron Nitride, Ceramic Nanofiltration, Firing of Alumina

Revolutionising the Future: 3DCeram Leads with AI-Driven Ceramic 3D Printing

With the advent of 3D printing technology, the promises of innovation seem limitless, especially in the ceramic sector. However, the transition from concept to industrial production reveals persistent challenges. Mastery of the process and limitations of current production capacities often restrict the use of 3D printing to laboratories and research centres. Despite this, the emergence of new markets, driven by sectors such as NewSpace, new mobilities, renewable energies, and defence, shows a growing interest in optimised applications of 3D printing. The industrial vision is shared by 3DCeram, which since it has been marketing 3D printers, has been developing its process to meet the challenges of the new industrial landscape. This development includes integrating advanced AI technologies to enhance precision and efficiency, setting a new standard in the sector.



Fig. 1
C1000 FLEXMATIC with recycling station

Keywords

artificial intelligence, additive manufacturing, industrialization, automatic line

Seeking a New Industrial Paradigm

Indeed, a new industrial paradigm has emerged following the pandemic and is becoming more urgent in the face of current international imbalances, urging us to prepare for new challenges, including ecological ones, and more urgent than expected! 3D printing of technical ceramics will find its place in the new industry by meeting its essential needs.

3DCeram is refining its process and machines specifically to serve this objective (Fig. 1).

Technical Challenges and Innovative Solutions

Technical difficulties, particularly mastering the printing process and the size of the print platforms, pose major difficulties in industrializing additive manufacturing. These issues limit mass production and speed of execution, thus confining the technology to niche applications.

However, the company 3DCeram has taken proactive measures to overcome

these challenges. For example, 3DCeram's stereolithography technology, which prints parts from a top-down approach, leverages gravity to enhance print quality and speed, while allowing for a larger print surface through the use of multiple lasers.

This technological choice offers large bed sizes of 320 mm × 320 mm × 200 mm or even larger at 600 mm × 600 mm × 300 mm. Moreover, the choice of top-down stereolithography also allows for the automation of the printing process. Moreover, precision is fundamental to obtaining parts with complex shapes and fine details, working with a laser means you can obtain very precise contour lines.

Finally, the laser has no limit of workspace and can work on large printing surfaces with equivalent accuracy, then the machines can

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Fig. 2
Run of parts for Semiconductor application on C1000 FLEXMATIC

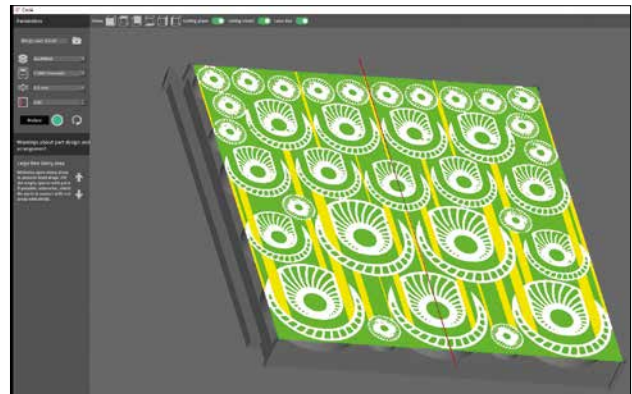


Fig. 3
Optimised build platform with CERIA Set

be equipped with several lasers to ensure printing speed (Fig. 2). Another significant barrier to the adoption of 3D printing by industrial customers is the mastery of the process. That's why 3DCeram has developed CERIA, an artificial intelligence embedded on the machines (Fig. 3).

Focus on CERIA Set, the intelligent tool for 3D printing of technical ceramics

CERIA Set, is an add-on designed to transform the traditional approach to ceramic 3D printing.

As a true assistant, it allows users to adopt and optimise their 3D printing experience, from design rules to optimising the build platform, with ease and efficiency.

- Maximising productivity, the AI allows optimising and rationalising the layout of parts to be printed on the platform, which results in maximising production while significantly reducing the number of iterations. This methodical approach ensures maximum productivity, essential in a competitive industrial context.
- Guarantee of following the right design rules, users can integrate the best 3D printing practices with the assistance of AI, which significantly improves printing results for each project. The system allows for a smooth application of design rules, thus increasing the quality and precision of finished products.
- Proactive to prevent human errors, is actually one of the major strengths of CERIA Set, which lies in its ability to anticipate and propose corrections to potential defects before they affect the production process. Preventing errors will thus minimise any interruptions.

- Enhanced production management, CERIA Set is designed for factory work environments. Users can manage the pre-printing process centrally from a workstation separate from that of the printer. Thus, a single operator can easily supervise several machines simultaneously.
- Intuitive use and resource reduction, the interface of CERIA Set, which is very intuitive, facilitates the workflow. This allows to add value to tasks operated by employees. They can thus focus on innovation and creation while optimising the use of materials and energy.
- Decrease production costs: by streamlining the setup and reducing the number of iterations, it minimises waste and maximises efficiency. This reduction in material use and waste directly translates into cost savings, making it a financially advantageous solution for industrials looking to optimise production cycles and reduce overhead expenses.

CERIA Set leverages 20 years of 3DCeram's mastery in 3D printing, ceramic materials knowledge, and mastering the process, embedding this extensive expertise to provide a deep experience into practical solutions.

CERIA Set offers the possibility to personalise and secure the process, starting from the file and the design of the tank, a next step, to be launched soon, will offer even more features and automation perspectives. Artificial intelligence could really change the game because it would allow industrial "adopters" of 3D printing to minimise the risk of production breaks in the line, to the same level as that achieved by traditional forming processes!

Thanks to artificial intelligence, 3D technology is becoming more and more accessible, and this reinforces the advantages it initially had:

- Realisation of geometry impossible by other processes
- Mass customisation – printing different geometries in a single run
- Agile and easily locatable
- Additive process, less waste ...

Building industrial partnerships: 3DCeram's service and support strategy

Another major point of vigilance for industrial customers is services and reliability. This is what 3DCeram develops as it markets its printer line.

Support made up of training, personalised accompaniment, maintenance, and assistance.

The concern for doing well and having customer services that meets the demands of the industrial clients who is in a production state of mind.

3DCeram is backed by the Sinto group and this is a real strength for the Limoges-based company, as Sinto is a leading global industrial group specialising in manufacturing equipment for industrialists and whose approach is based on the idea of the Smart factory which is conceived across the entire chain.

Innovation is the foundation for the Sinto group with a strong culture of customer satisfaction.

The company 3DCeram continues the development of its Artificial Intelligence solution CERIA and a new phase will be unveiled at the upcoming international Formnext show. To be continued ...