

Germany

1st ceramitec Conference: Future of Ceramics

The ceramitec conference, the new conference format of ceramitec, the world's leading trade fair for the ceramics industry, celebrated its successful premiere on 19 and 20 September 2019 in Munich/DE with over 200 attendees from 21 countries. The focus of the agenda was on new opportunities for the use of ceramic components and the associated new (additive) manufacturing processes in industry.



Fig. 1 Karin Scharrer (CERAMIC APPLICATIONS, Göller Verlag/DE, r.) welcomed the experts (f. l. t. r.) Jens Graf (Kläger/DE), Richard Gaignon (3DCERAM SINTO/FR), Iris Heibel (Cerix Bosch/DE), Johannes Homa (Lithoz/AT) and Hans-Christian Schmidt (DORST Technologies/DE) to the panel discussion headlined "AM – Ready for Industrial Production?"

Introduction

"Ceramic components offer attractive opportunities for more and more applications and sectors. But they are still frequently hidden champions. To improve access to solutions using ceramic for new user sectors in particular, we wanted to give the material an additional forum alongside our trade fairs," said Gerhard Gerritzen, Board Member of Messe München/DE, explaining the motives behind the new event. "The good public response and the quality of the agenda are evidence that we have struck the right chord with this in the 40th Anniversary year of the ceramitec fair", said Gerhard Gerritzen.

The agenda of the ceramitec conference was divided into two tracks. The track entitled "Shape the Future powered by AM

Ceramics" organised by Lithoz GmbH/AT took a detailed look at the use of Additive Manufacturing (AM) processes in high-performance ceramics. The second track was headlined "Industrial Applications".

Plenary talks were presented by Linda Klopsch (DLR/DE) on "Space Aviation Engines Made of Black Ceramics" and Jon Goldsby (NASA/US) on "Concepts and Opportunities for the Application of Additive Manufacturing in Aviation" e.g. for ceramic anodes, electrolytes and cathode cells.

AM Ceramics at the ceramitec conference

The "Shape the Future of Ceramics" talk focused on the different applications for ceramics, including their uses in industry and medicine, as well as in research with speak-

ers from multiple different companies and institutions from around the world, such as from Germany, the USA, Sweden and the Great Britain.

Cathleen Hoel (GE/US) concentrated on the practical considerations for AM from conception to production in her "Insights from AM experts" lecture for complex ceramic components.

Carl Fruth (FIT/DE) expanded upon this topic and spoke about his experiences and offering product solutions. He stated that progress in AM calls for radical innovation. Dieter Nikolay (WZR/DE) compared different AM technologies – vat photopolymerisation, binder jetting and material extrusion – and shared his expertise of best practice. The point of view from the industrial side of things was offered by Mirna Bechelany

(Safran Group/FR), Iris Heibel (Cerix Bosch/DE) and Alan McLelland (Morgan Advanced Materials/GB). They were all very open in their presentation about the challenges there are in implementing a completely new technology in production processes, but also explained how they have overcome these difficulties and focused on the new opportunities created by this freedom of geometry. Josef Schweiger (LMU Munich/DE) and Heinz Redl (LBI/DE) discussed their experience with 3D-printing, not only for dental applications, but also for bone replacements. Their findings highlighted that there is a wide range of favourable possibilities still to be explored.

The first day ended with a panel discussion headlined "AM – Ready for Industrial Production?" moderated by Karin Scharrer (CERAMIC APPLICATIONS, Göller Verlag/DE), who welcomed following experts: Jens Graf (Kläger/DE), Richard Gaignon (3DCERAM SINTO/FR), Iris Heibel (Cerix Bosch/DE), Johannes Homa (Lithoz/AT), and

Hans-Christian Schmidt (DORST Technologies/DE).

They shared their ideas on the industrialisation of ceramic 3D-printing. Experiences from established technologies were related to and compared with those of the AM sector. A special aspect was the digitalization of ceramic process where AM as a digital technology has specific advantages. CIM and AM show similarities regarding their implementation in the industrial sector, which for CIM started 30 years earlier. Further development is on the track for AM production of large-size parts and multi-material components,

The conclusion was that AM is now on the verge of serial production, with the first investments by industries in multiple machines and pre-orders of larger quantities of material.

The second day started with Advenit Makaya (ESA/FR), who discussed developments in the space agency with regards to AM with the focus on saving costs and

manufacturing time for space products and improving their performance.

Uwe Scheithauer (Fraunhofer IKTS/DE) drew attention to the ways in which 3D-printing is supporting and advancing challenging projects. But solutions on thermal processing, mechanical characterisation and optimisation of software tools for the design AM products need further work.

Carlos Grande (Sintef/NO) focused on new potential applications for 3D-printed filters in pharmaceutical development.

In the material characterisation and testing discussion, Tanja Lube (Leoben University of Mining/AT) emphasized that testing must always take the future use of the part into account, because – unlike other technologies – the building direction has an important impact on the strength, and therefore optimisation, of 3D-printed parts.

Holger Friedrich (Fraunhofer HTL/DE) spoke about his experiences with optimising the thermal treatment of green bodies and compared different technologies in this area.

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For the final talk of AM Ceramics 2019, Kambiz Kalantari (Lucideon/GB) summarised the experiences of the British ceramic industry with different technologies and shared his outlook on the future of AM while Thomas Gradl (EOS/DE) spoke about the metal 3D-printing industry and shared some success stories in the medical market.

Industrial Applications

The second track entitled "Industrial Applications" examined new uses for high-performance ceramics in industry. AM processes were also very prominent in this track with contributions from Dror Danai (XJET/IL) on "Use of Ceramic AM in Preventing Breast Cancer" and the ability of this technology to make existing antenna technology for 5G less expensive.

Guillaume de Calan (Nanoe/FR) presented a new line of ceramic filaments for the filament 3D-technology.

"Multi-Material 3D-Printing of Technical Ceramics for Industrial Fabrication of SOFC-Cells" was discussed by Aitor Hornés (IREC/ES).

Jürgen Blumm (Netzsch Gerätebau/DE), Chairman of the Advisory Board of ceramitec, reported on "Digital Transformation in the Ceramic Industry", and explained that AM in particular is increasingly finding its way into the production of ceramic materials.

Further aspects discussed in this track were: new mixing technologies (Eirich/DE), laser processing of ceramics (Fraunhofer ILT/DE), transparent ceramics (MagSpin/TR), laser-induced direct metallization (IFKB/DE), data-driven approaches to material and process development (Lucideon/GB), powder technology for lithium ion batteries (KIT/DE), and CFD modelling for ceramic heat treatment processes (SGL Carbon/DE).

Accompanying exhibition

The conference agenda was accompanied by an exhibition in which a Who's Who in the international ceramic scene presented their solutions and products. Exhibitors with stands included 3DCERAM SINTO, Bayern Innovativ with its initiative Additive Bavaria and the New Materials Cluster, CERAMIC APPLICATIONS, cfi, Linseis, Lithoz, Nanoe, Netzsch, PresTEC, Schenck Process, Springer Nature and Steinbach AG.

After the first day, the ceramitec conference hosted a reception with dinner and music, which was greatly enjoyed and led to lots of eager networking. KS

Remark:

The next event to be held in Germany from Messe München's ceramic trade fair portfolio is the ceramitec trade fair which will take place from Monday 17 May to Thursday 20 May 2021 in Munich. The start of the trade fair has been brought forward by one day and will not take place, as previously announced, from 18–21 May 2021.

www.ceramitec.de

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