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Review: AM Ceramics 2017

Ceramic Additive Manufacturing (AM) has the potential to radically change the industry. Available AM systems for ceramics have already reached an advanced level. In addition to prototyping of components, they represent a tangible alternative to conventional manufacturing methods or offer a viable supplement. The annual event AM Ceramics was established in 2016 – 1st event was held 26–27 September 2016 in Nuremberg/DE – in order to provide insights for prospective users into the subject matter and to uncover the potential and limitations of this new production method. AM Ceramics was launched to give the ceramic industry all the relevant information to successfully implement this new technology into businesses. The event is the cooperation between LITHOZ/AT, the German Ceramic Society (DKG) and the DKG Szene Additiv as well as the trade media 3Druck.com, CERAMIC APPLICATIONS and cfi/Ber. DKG.

3D-printing manufacturers have to anticipate and fulfil prospective requirements of the high-performance ceramics industry ahead of demand. Thus, the AM community is searching for information regarding manufacturing speed, reducing time-to-market but also whether process stability can be obtained and reproducibility of results can be assured. Beyond that, constant availability for ceramic materials appropriate for 3D-printing is still not ensured. AM for high-performance ceramics continues to grow at a rapid pace. More and more companies and research institutes have started to take a closer look at this topic in order to identify the advantages and the potentials of AM for ceramics production.

On 11–12 September 2017, more than 80 participants – academics, entrepreneurs and experts from Italy, France, Great Britain, Switzerland, the Netherlands, Belgium, Germany, Israel, USA, Spain and Austria – either working or researching in the ceramic sector came together at the 2nd AM Ceramics 2017 in Vienna/AT to get a deeper understanding of AM for ceramics. The event offered two days packed with conference sessions, product demos, and networking events and provided an overall update on achievements and progress on last year's event. It gave a comprehensive overview to what AM systems are already capable of and which



*Fig. 1
More than 80 participants from 11 countries attended
AM Ceramics 2017 in Vienna*

performance promises can be made at this point. Next to the introduction of enhanced material compositions and state-of-the-art machinery by LITHOZ, the entire process chain was addressed.



Fig. 2
Mirna Bechelany (Safran Group) in discussion with Edmar Allitsch (AM Ventures), and Dr Johannes Homa (f. l. t. r.)



Fig. 3
Breaks between presentation blocks gave participants opportunity for networking and lively discussions

Expertise from AM enterprises that have been successful in implementing AM as well as practical application examples out of the university sector were shared.

Along with AM professionals from all over the world, the organisers provided a realistic outlook on current capabilities and prospective potentials of AM in order to impart the knowledge companies need to prepare for the next level in AM of high-performance ceramics.

Prof. Paolo Colombo, a highly appreciated ceramic expert from the University of Padua/IT, led through a varied program which contained a mixture of economic, application-specific and technology based topics. Renowned speakers from Johnson Matthey/GB, RAFAEL – Advanced Defence Systems/IL, Safran Advance Turbine Airfoils/FR, Mathys European Orthopaedics/CH+DE, and Morgan Advanced Materials/GB provided their first-hand experience on successfully developed AM applications.

Furthermore, experts from AM Ventures/AT and 3Druck.com/AT shared their knowledge on what the market currently demands and which strategic aspects are motivating companies to consider AM as a suitable production method.

Speakers from the Fraunhofer IKTS Institute/DE, and Universidad Politécnica de Madrid/ES presented new case studies and talked about design opportunities given by AM.

International Syalons, GB's leading producer of silicon nitride-based advanced ceramics, shared their experiences with LITHOZ Lithography-Based Ceramic Manufacturing (LCM) technology. Experts from LITHOZ and the University of Vienna/AT showed hardware and software innovations in the field of AM for ceramics. The Montanuniversität Leoben/AT outlined the importance of testing and maintaining quality by conducting diligent performance controls.



Fig. 4
Speakers Dr Tanja Lube (Montanuniversität Leoben), and Prof. Paolo Colombo, Ben Melrose (International Syalons) (f. l. t. r.)



Dr Johannes Homa, Co-founder and CEO of LITHOZ GmbH as well as the event's Technical Director, summarised the goals of AM Ceramics 2017 as follows: "AM of high-performance ceramics hides revolutionizing potential for varied industries. However, not every application and not every company needs an AM system. The technology isn't the all-in-one solution. It is necessary to approach the topic openly and critically. Our goal is to offer the ceramic community a benchmark event to get information and to exchange on that topic."

"AM Ceramics brings industries together by providing the opportunity to gather valuable insights one from another, while learning about product innovations and new technologies. The positive feedback we received, encourages us to continue this event series", complemented Dr Johannes Benedikt, CTO of LITHOZ.

On the following two days, LITHOZ offered to all AM Ceramics 2017 participants the possibility to meet LITHOZ in-house experts to get a deeper insight in the LCM-technology, e.g. development of material, machine and software as well as application development.



Fig. 5
Dr Johannes Benedikt

Due to the high number of international experts attending, the 3rd AM Ceramics 2018 will be held in September 2018 in Vienna. MM

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