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Quo vadis - Industrial scale high precision 3D printing

The demand of sophisticated components is continuously increasing, driven by big data, IoT, and Industry 4.0. Reducing cost and time to market impacts all levels in a vast majority of products. 3D printing is typically restricted to additive fabrication within one material class, structures are limited in size, shape, surface finish, often requiring supporting structures. However, 3D printing is increasingly used in an industrial environment: It provides fast and low-cost prototyping. Many 3D printers are based on laser processing such as selective laser sintering or melting (SLS/SLM), or stereo lithography (SLA). These techniques have in common that they are restricted to a layer-by-layer fabrication of workpieces in additive working steps, thus resembling a more 2D bottom-up method. For high precision structures and high surface quality with an industrial scale throughput as required for photonics packaging and for optics for imaging, illumination, sensor, or medical purposes, respectively, their precision is by far not good enough. This prevents to use 3D printing for high quality photonic components.

High precision 3D printing (HP3DP) is a powerful tool for rapid prototyping of miniaturized designs in automated, scalable processes, providing a real 3D technique suitable for the fabrication of optically high-quality surfaces with industrial scale throughput, highest resolution and a unique degree of freedom of

structure generation. Most of the legacy processes nowadays needed for complex structure fabrication can be simply avoided, enabling a significant reduction of resources, of production cost and time to market. The usefulness of HP3DP to be implemented in industrial work flows will be demonstrated by discussing different application scenarios, ranging from LED to laser die packaging, micro optical elements and arrays for rapid prototyping of novel designs up to the manufacturing level. Finally, the step from prototyping to volume production will be demonstrated, providing a sophisticated level of manufacturing.

Speaker Biography

Ruth Houbertz is the cofounder of Multiphoton Optics GmbH, founded in September 2013 and current function as CEO from August 2014. From 2013 to July 2014, she was CTO of MPO and from 2000 to 2012, she held different technical and management positions at Fraunhofer ISC, where she focused on materials, processes, and technology/equipment development for photonic and biomedical applications. From 1999 to 2000, she worked at Sandia National Labs, Livermore, CA (USA). She invented more than 100 patents, evaluator and referee for international ministries, journals, etc. She has received many awards and nominations, amongst which are the Best of Industry Award 2018, finalist in the Prism Award 2015 and 2017, Cowin Award of Entrepreneurship 2014, Green Photonics Award 2013, Fraunhofer Award in 2007. Active member in SPIE, EPIC, OSA, IEEE, VDI, Bayern Photonics, SPIE fellow, session chair since more than one decade in optical interconnects and emerging technologies at Photonics West, participation in Industrial and Women in Optics Panels, keynote and invited speaker, Senator of Economy.

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