

## Press Release VIII / 2017

# New laser processes for innovative lightweight design

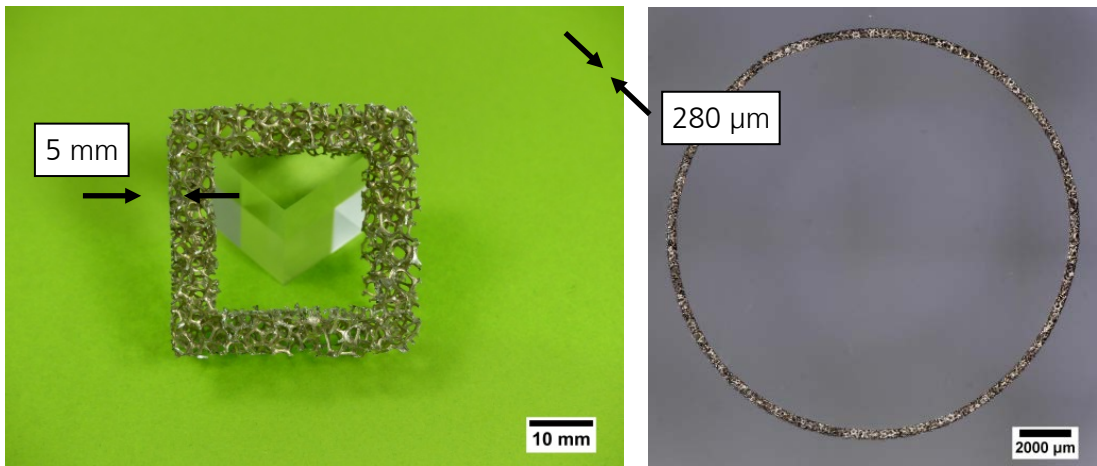
**Lightweight design is one of the mostly progressive research areas involved in accomplishing the transition from fossil fuels to renewable energy sources, as well as the reduction of CO<sub>2</sub> emissions. Innovative materials, such as carbon or glass fiber reinforced plastics (CFRP/GFRP), as well as metal foams, contribute to the successful implementation of the target set by the Federal Government. The Fraunhofer IWS has been researching in this field for many years to provide promising and affordable solutions for our industrial and research partners. One of these solutions is the laser-remote cutting technique.**

Metal foams are the ideal basic material for innovative lightweight design. Combining low weight and high stability, they have a high surface-to-volume ratio and absorb energy and sound almost ideally. They have already been used in various industrial applications, such as battery technology, heat exchangers and filter systems. Cost-efficient cutting of foamed material into parts with a defined shape has been the greatest technological challenge thus far.

The researchers at the Fraunhofer IWS have tackled this task with considerable success. They have achieved impressive results in terms of cutting velocity and quality in cutting open-porous metal foams to shape. »Enabling cutting velocities of up to 300 m/min in contour cutting and for material thicknesses of up to 20 mm, we are setting new standards in metal foam processing« Robert Baumann, the head researcher, explains. »The  $\pm 30 \mu\text{m}$  component tolerances achieved thereby are the best available worldwide; with them, it is possible to create intricate geometries with wall thicknesses of a few hundred micrometers« Baumann continues. At the Fraunhofer IWS, the research team is able to apply the latest laser beam sources of different wavelengths, power and beam quality, as well as commercial optical devices for processing.

The IWS' lightweight design know-how was enhanced through comprehensive R&D projects with regard to the cutting of non-metals and CFRP and FRP materials. Laser-remote cutting of composite materials makes it possible to combine the highly efficient cutting process with extremely high cutting edge quality. The current focus is on the development of the automatable process to rework cutting edges of holes in fiber-reinforced plastics. A barrier layer is useful in carbon fiber reinforced plastics primarily to avoid corrosion in the joint with metals used in lightweight design and to prevent weathering due to environmental impacts. »The results achieved with a prototype-tool are of outstanding quality« says Michael Rose, expert in laser-based cutting to shape of fiber-reinforced plastics at the IWS. »We are convinced that these results will be widely implemented in industry in the near future.«

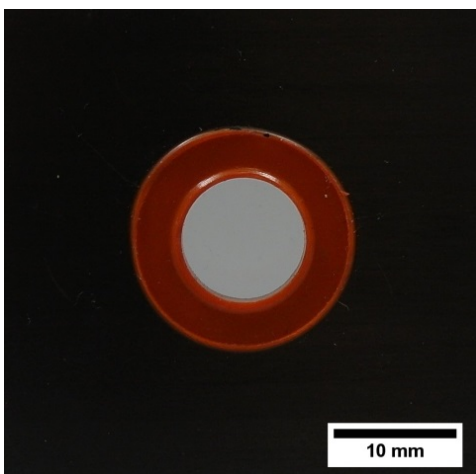
**The Fraunhofer IWS Dresden will present its latest technologies for processing new and composite materials with / without lasers at the this year's Hannover Messe trade show. The digitalization of production engineering via materials science is a central focus. Visit us at our booth in Hall 6 / A30, as well as in the new »Industrial Supply Forum« to be held in Hall 5 on Monday, 24 April 2017.**



Laser-remote cut metallic foam made of aluminum (left) and steel (right)  
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Laser-remote cut fiberglass reinforced plastic and defined surface matrix ablation  
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Laser-remote cut hole, color sealed at the circumference  
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