Highlight

Aachen,
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High brilliance fiber laser sources with new wavelengths and enhanced optical power output

The fact that polymeric materials show a good absorption of the laser radiation at longer wavelengths in the infra-red spectral range is well known already. However, commercially available laser sources emitting at these wavelengths were not available until recently. In order to extend the limits of polymer welding the laser producer IPG Laser GmbH located in Burbach (Germany) aims within the frame of the European project POLYBRIGHT to further develop such laser sources and to enhance their optical power output. Within the first year of the project two new lasers with an optical power of 120 W have been developed: one Erbium fiber laser (ELR-120) emitting at 1567 nm and a Thulium fiber laser (TLR-120) emitting at 1940 nm.

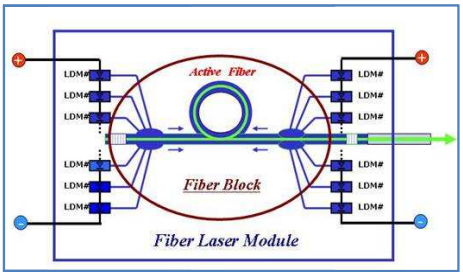

Figure 1: Typical layout for a diode pumped fiber laser


Figure 2: Prototype fiber laser system emitting at λ=1567nm

Currently laser sources for materials processing emitting at wavelengths between 1300 nm and 2000 nm are commercially available for power ranges up to 100 W. However, for further process development higher laser powers are required. Reconsidering the complete design of their actual fiber lasers the company IPG Laser GmbH in Burbach, Germany recently developed two new products with a maximal optical power of 120 W: an Erbium fiber laser - ELR-120 emitting at 1567 nm and a Thulium fiber laser - TLR-120- emitting at a wavelength of 1940 nm. Both systems have a single mode output and therefore an excellent beam quality - M^2 <1.1.

The new design of these systems leads beside the power enhancement also to a reduction of the constructive height of approximately 50% percent compared to previous products. Both lasers are turn-key systems and they are built in a slim 19 inch housing (only 133 mm high). The lasers have been shipped at the end of 2010 to the POLYBRIGHT project partners (www.polybright.eu) and currently they are subjected to intensive tests.

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Applications

The development and use of new high brilliance laser sources in the higher near infra-red wavelength range for the welding of thermoplastics aim to enable the processing of these materials independently of their optical properties. Adapting the laser source to the material to be welded and not vice-versa as it is the case nowadays could revolutionize the development of new products by eliminating the restrictions concerning the color of the materials to be joined and also provide product designers an additional degree of freedom. Furthermore new perspectives and approaches arise for joint configurations that were considered so far ineffective due to the actual limitations of the polymer welding process.

For any further questions our experts will be pleased to provide you assistance:

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