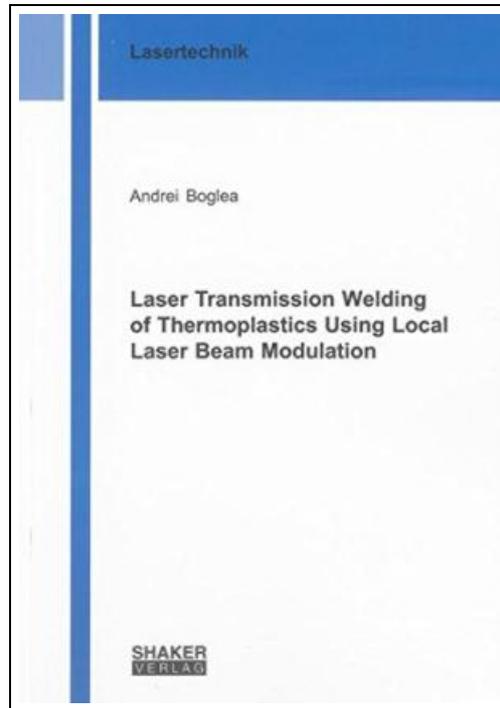


Laser Transmission Welding of Thermoplastics Using Local Laser Beam Modulation



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LASER TRANSMISSION WELDING OF THERMOPLASTICS USING LOCAL LASER BEAM MODULATION



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Shaker Verlag Aug 2013, 2013. Buch. Book Condition: Neu. 208x146x15 mm. Neuware - The results described in the present work show for the first time for the polymer welding that through the use of laser modulations a reduction of the Heat Affected Zone, and therefore a reduction of the thermal load in both joining partners is possible, without losses in the weld seam strength. The evenly distributed laser energy in the joining area leads to a reduced depth of the weld seam compared to the conventional contour welding of polymers. Based on this aspect the experiments described in Chapter 6.3.2 indicate that the welding of parts with reduced material thickness, for applications where plastic parts with high requirements on the surface finish have to be joining, can be welded without any appearance of the weld seam on the visible surfaces. Therefore, a significant material saving of about 33% can be considered. Furthermore, the reduced thermal load of the joining partners enables the welding of fine structures without thermal deformation of these structures. Especially among the biomedical applications there is a variety of products with microfluidic channels that have to be hermetically sealed, usually by welding a plastic foil or cover on top of them. Such microfluidic channels with walls having a thickness smaller than 0.5 mm require a minimal thermal input in the welding area in order to avoid the deformation or the collapse of these fine structures. The possibility to control the size and shape of the HAZ make the welding of polymers using local beam modulations a strong candidate for such applications. The welding results discussed in the present work indicate that concerning the weld seam strength and gap bridging ability the new welding approach reaches a similar performance as the other already established laser welding process variants....



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