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Improving the properties of metal-ceramic joints by means of laser pretreatment

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The possibility of using nanosecond laser pulses for perforation of elements of a diffusion-welded joint of the ceramic-metal-ceramic type has been studied. An improvement in the mechanical properties of compounds with elements pretreated by a repetitively pulsed Nd:YAG laser compared to untreated elements has been experimentally demonstrated. In particular, an increase in the tensile strength of the connection with treated elements up to 40 % and tensile strain up to 50 % are shown. Comparative studies of the distribution of strains in diffusion-welded joints with and without preliminary laser treatment were also carried out. The results obtained make it possible to reduce energy consumption for the diffusion welding process and improve the quality of joints of dissimilar materials in general.

Keywords: nanosecond pulses, laser perforation, metal-ceramic joints, copper interlayer, diffusion welding.

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