

Experimental study of the influence of repetitively pulsed laser radiation on the characteristics of the formed composite material

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A metal-matrix composite based on Ti-6Al-4V-B4C with TiB, TiB₂ and TiC inclusions was successfully obtained as a result of in-situ synthesis using repetitively pulsed laser radiation. For the first time, the phase composition of the obtained metal-matrix composite was studied using synchrotron radiation. A comparison of the effect of using continuous and pulsed-periodic radiation in selective laser melting on the microstructure and mechanical properties of coatings was made. The use of repetitively pulsed radiation made it possible to form more uniform structures and to improve the mechanical properties of metal-matrix coatings in comparison with the continuous mode of exposure. It has been established that the use of repetitively pulsed radiation and the formation of TiB₂, TiB, TiC phases made it possible to increase the wear resistance of the formed composite by a factor of 6 in comparison with the Ti-6Al-4V metal coating. The work is supported by the grant of the Russian Scientific Foundation No. 21-79-10213.