Formation of the desired energy impact during laser processing of materials using the radiation focusators

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Abstract

Successful implementation of technological processes of laser processing is possible only if a certain spatial profile of radiation intensity is formed in a given area on the surface of the workpiece, which is achieved by using appropriate optical systems. The most effective processing modes are determined only by solving the inverse heat conduction problem, which allows to determine the specific heat flux through the workpiece surface using the given mathematical model and temperature field, as well as the coefficients included in the main heat conduction equation. A technique has been developed for calculating the spatial distribution of laser radiation power to form the required energy impact on technological objects; the use of this technique allows to create a more uniform temperature field along the length of a moving strip source. It is shown that the use of diffractive optical elements – radiation focusators allows to increase the width of the treatment area without overheating its central parts.

Keywords: laser processing of materials, radiation focusator, optical system, workpiece surface, mathematical model, temperature field, conduction equation.

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Access full text (in Russian)

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