

Optical method for erosion control of a cylinder placed in a high-enthalpy jet of plasma torch

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Experimental data on the flow and destruction of a tungsten rod by a plasma jet from the slotted outlet of a direct current plasma torch are presented. A technique for online optical diagnostics of changes in the shape and volume of a streamlined sample is proposed based on the shadow method with laser illumination. During the 100 s experiment, pronounced erosion formed on the side (cylindrical) surface of a rod with a diameter of 2 mm, and its mass decreased by 0.2 g when argon gas flowed around (flow rate 2 g/s, average mass velocity about 140 m/s, current 150 A, voltage 44 V). A control measurement of mass on precise scales showed a good agreement between the image processing result and the true value. Using the proposed method, the dynamics of mass changes during the experiment is shown.

Keywords: plasma jet, flooded jet, plasma torch, flow around a rod, tungsten, erosion, diagnostics.

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