Journal of Physics: Conference Series 2017 vol.789 N1

Determination of regression materials mircohardness, processed by low-temperature plasma dependence on process conditions

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Abstract

© Published under licence by IOP Publishing Ltd. The influence of conditions of plasma surface treatment on hardening of carbon steel technological process was analyzed. Hardening was carried out in plasma electrothermal line with an electrolytic cathode. When processing, steel crystal grains are crushed and the structure is changed from ferrite-pearlite to bainite-troostite and martensite, depending on the processing conditions. In this case the surface microhardness increase in 2 - 3 times. The dependence of the carbon steel surface microhardness on the discharge current (2 - 10 A), the distance between the heat source and the surface, the plasma gas flow rate and treatment duration was found. On the basis of multifactor experiment planning methods and the method of least squares, the formula that describes this relationship was found. This allowed to conduct a targeted search of optimal conditions of processes of hardening steel and improve the efficiency and quality of research.

http://dx.doi.org/10.1088/1742-6596/789/1/012024

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