



Optica Applicata 2009(Vol.39), No.4, pp. 853-857

Topography of X39Cr13 steel surface after heat and surface treatment

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Keywords

topography, martensitic steel, heat treatment, plasma nitriding

Abstract

The paper presents results of surface condition examinations of martensitic X39Cr13 steel subject to heat and surface treatment (plasma nitriding). The heat treatment consisted of compressed nitrogen quenching from 1050 °C (1323 K) and two-hours tempering at 300 °C (573 K) and 620 °C (893 K) for specimens subject to nitriding. The plasma nitriding was carried out in an ion-nitriding installation with cooled anode, at temperature of 460 °C (733 K), at pressure of 150 Pa and during $t = 20$ h (72 ks); 25%N₂+75%H₂ was used as the reactive atmosphere. Specimens surface was examined using a profilographometer designed for surface 2D and 3D examinations using a contact method. Surface topography measurements were carried out on specimens taken from 1 mm thick sheet. 1.5 mm×1.5 mm surface was the measurement area. The sampling interval in X and Y axis was 1 μm, while the measuring speed was 0.5 mm/s. The studies carried out allowed evaluating the conditions of examined steel surface through the comparison of stereometric parameters of the surface.



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