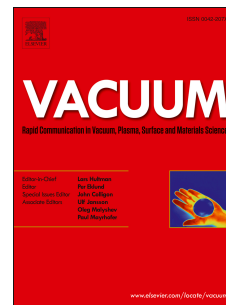


Accepted Manuscript

Alloying of Austenitic Steel Surface with Zirconium Using Nitrogen Compression Plasma Flow

A.H. Sari, V.M. Astashynski, E.A. Kostyukevich, V.V. Uglov, N.N. Cherenda



PII: S0042-207X(15)00043-3

DOI: [10.1016/j.vacuum.2015.01.032](https://doi.org/10.1016/j.vacuum.2015.01.032)

Reference: VAC 6545

To appear in: *Vacuum*

Received Date: 26 August 2014

Revised Date: 29 January 2015

Accepted Date: 30 January 2015

Please cite this article as: Sari AH, Astashynski VM, Kostyukevich EA, Uglov VV, Cherenda NN, Alloying of Austenitic Steel Surface with Zirconium Using Nitrogen Compression Plasma Flow, *Vacuum* (2015), doi: 10.1016/j.vacuum.2015.01.032.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Alloying of Austenitic Steel Surface with Zirconium Using Nitrogen Compression Plasma Flow

A.H. Sari^{1,2}, V.M. Astashynski³, E.A. Kostyukevich³, V.V. Uglov⁴, N.N. Cherenda⁴

¹*B. I. Stepanov Institute of Physics, National Academy of Sciences of Belarus,
70 Nezavisimosti Ave., Minsk 220072, Belarus*

²*Plasma Physics Research Center, Science and Research Branch, Islamic Azad University, Tehran, Iran*

³*A.V. Luikov Heat and Mass Transfer Institute, National Academy of Sciences of Belarus,
15 P. Brovki Str., Minsk 220072, Belarus*

⁴*Belarusian State University, 4 Nezavisimosti Ave., Minsk 220030, Belarus*

Corresponding Author: A.H. Sari, e-mail: amirsari@gmail.com, tel: +982144869630

Abstract:

In this study, the effect of a nitrogen compression plasma flow on the microstructural and mechanical properties, as well as on the elemental and phase compositions of a Zr/chromium–nickel steel system has been investigated. The Zr/steel system was exposed to a single pulse of the compression plasma flow or to a series of pulses. The samples were characterized by scanning electron microscopy, Auger electron spectroscopy, X-ray diffraction, and energy dispersive X-ray analyses, and subjected to a Vickers microhardness test. The findings showed the formation of a surface modified layer alloyed by Zr with the thickness of up to ~12 μm . The modified layer contains α - and γ -iron-based solid solutions, the $\text{Fe}_{23}\text{Zr}_6$ intermetallic compound, and ZrN and Cr_2N nitrides due to nitrogen diffusion. The microhardness of the modified layer increased by a factor of ~2.

Keywords: compression plasma flow; surface alloying; austenitic steel; zirconium

Download English Version:

<https://daneshyari.com/en/article/8045011>

Download Persian Version:

<https://daneshyari.com/article/8045011>

[Daneshyari.com](https://daneshyari.com)