

Accepted Manuscript

Synthesis, structure and mechanical properties of Ti-Al-Nb coatings formed by electron beam additive technique

S. Valkov, R. Bezdushnyi, P. Petrov

PII: S0042-207X(18)31013-3

DOI: [10.1016/j.vacuum.2018.07.021](https://doi.org/10.1016/j.vacuum.2018.07.021)

Reference: VAC 8112

To appear in: *Vacuum*

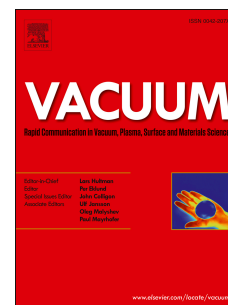
Received Date: 13 June 2018

Revised Date: 14 July 2018

Accepted Date: 14 July 2018

Please cite this article as: Valkov S, Bezdushnyi R, Petrov P, Synthesis, structure and mechanical properties of Ti-Al-Nb coatings formed by electron beam additive technique, *Vacuum* (2018), doi: 10.1016/j.vacuum.2018.07.021.

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.



Synthesis, structure and mechanical properties of Ti-Al-Nb coatings formed by electron beam additive technique

S. Valkov¹, R. Bezdushnyi², P. Petrov¹

¹ Institute of Electronics, Bulgarian Academy of Sciences, 72 Tzarigradsko Chaussee blvd.,
1784 Sofia, Bulgaria

² Department of Solid State Physics and Microelectronics, Faculty of Physics, Sofia
University “St. Kliment Ohridsky”, 1164 Sofia, Bulgaria

Abstract

We present a detailed investigation of the synthesis and mechanical properties of Ti-Al-Nb coatings, formed by alloying of Ti substrates with Al and Nb films by selective electron-beam melting (SEBM) via continuous electron beam. A cycling mixing of pre-deposited bilayer Al/Nb films with a Ti substrate is realized, where the maximum number of the cycles is 3. The first one is a SEBM of a bilayer Al/Nb coating deposited on pure Ti substrate. The obtained after the first cycle specimen is further coated with the same bilayer coating and then subjected to a second SEBM cycle; the same procedure is repeated for the third cycle. The alloyed layers are characterized using Scanning Electron Microscopy (SEM), Energy Dispersive X-ray Spectroscopy (EDX), and X-ray Diffraction (XRD). The microhardness is also studied. The thickness of the coatings obtained after each cycle is about 20 μm . The specimen obtained after the first cycle exhibits an alloyed zone consisting of pure Ti with a small content of Al and Nb, while those manufactured by the following cycles represent Ti_2AlNb based phases. The microhardness increases from 180 HV0.03 for the pure Ti substrate to 570 HV0.03 after the third cycle.

Download English Version:

<https://daneshyari.com/en/article/8044001>

Download Persian Version:

<https://daneshyari.com/article/8044001>

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