

Accepted Manuscript

EPR of transition metal ions in microplasma coatings on the surface of Ti-0,3Al and Ti-6Al-4V titanium alloys



V.A. Nadolinny, I.B. Kireenko

PII: S0257-8972(17)30638-2
DOI: doi: [10.1016/j.surfcoat.2017.06.035](https://doi.org/10.1016/j.surfcoat.2017.06.035)
Reference: SCT 22446
To appear in: *Surface & Coatings Technology*
Received date: 14 March 2017
Revised date: 14 June 2017
Accepted date: 14 June 2017

Please cite this article as: V.A. Nadolinny, I.B. Kireenko , EPR of transition metal ions in microplasma coatings on the surface of Ti-0,3Al and Ti-6Al-4V titanium alloys, *Surface & Coatings Technology* (2017), doi: [10.1016/j.surfcoat.2017.06.035](https://doi.org/10.1016/j.surfcoat.2017.06.035)

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.

**EPR of Transition Metal Ions in Microplasma Coatings on the Surface of $Ti - 0,3Al$
and $Ti - 6Al - 4V$ Titanium Alloys**

V.A. Nadolnny^{1*}, I.B. Kireenko¹

¹ Nikolaev Institute of Inorganic Chemistry SB RAS, Acad. Lavrentiev av., 3, Novosibirsk,
Russia

spectr@niic.nsc.ru

Abstract

The study focuses on the EPR examination of titanium oxidation states and doped transition metal ions in microplasma coatings on the surface of details made of $Ti - 0,3Al$ and $Ti - 6Al - 4V$ titanium alloys, depending on the duration and modes of the microplasma oxidation process. No Ti^{3+} states are observed in the anodic mode of microplasma oxidation. When the microplasma process is conducted in the anodic-cathodic mode, paramagnetic Fe^{3+} and Ti^{3+} states are observed in the $Ti - 0,3Al$ alloy, and V^{4+} and Ti^{3+} states are found in the $Ti - 6Al - 4V$ alloy. The removal of the technological layer mostly containing low-temperature titanium oxides eliminates the EPR spectra of the mentioned paramagnetic states of transition metal ions. The anodic mode of microplasma oxidation followed by the anodic-cathodic mode at the final stage does not yield paramagnetic states of transition metal ions, which is very important for many applications of microplasma oxidation of coatings because the Ti^{3+} state is chemically active and may affect many chemical processes occurring on the oxide layer surface. Meanwhile, the inverse sequence of the microplasma oxidation modes gives rise to paramagnetic states of transition metal ions in the technological layer.

Keywords: microplasma oxidation, titanium alloys, EPR spectroscopy

Download English Version:

<https://daneshyari.com/en/article/5464822>

Download Persian Version:

<https://daneshyari.com/article/5464822>

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