

Accepted Manuscript

Increasing thickness and protective properties of PEO-coatings on aluminum alloy

V.S. Egorkin, S.V. Gnedenkov, S.L. Sinebryukhov, I.E. Vyaliy, A.S. Gnedenkov, R.G. Chizhikov



PII: S0257-8972(17)31162-3
DOI: doi:[10.1016/j.surfcoat.2017.11.025](https://doi.org/10.1016/j.surfcoat.2017.11.025)
Reference: SCT 22873
To appear in: *Surface & Coatings Technology*
Received date: 26 July 2017
Revised date: 20 October 2017
Accepted date: 9 November 2017

Please cite this article as: V.S. Egorkin, S.V. Gnedenkov, S.L. Sinebryukhov, I.E. Vyaliy, A.S. Gnedenkov, R.G. Chizhikov, Increasing thickness and protective properties of PEO-coatings on aluminum alloy. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Sct(2017), doi:[10.1016/j.surfcoat.2017.11.025](https://doi.org/10.1016/j.surfcoat.2017.11.025)

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.

Increasing thickness and protective properties of PEO-coatings on aluminum alloy**V. S. Egorkin^{1,2*}, S. V. Gnedenkov¹, S. L. Sinebryukhov¹, I. E. Vyaliy¹, A. S.****Gnedenkov¹, R. G. Chizhikov^{1,2}**¹ Institute of Chemistry, Far East Branch, Russian Academy of Sciences, 159, pr-t Stoletiya

Vladivostoka, Vladivostok, 690022 Russia

² Far Eastern Federal University, 8, Sukhanova St., Vladivostok, 690090, Russia

*Corresponding author, e-mail: egorkin@ich.dvo.ru

Abstract. The paper presents results of the study aimed at assessing the effect of duty cycle (D) during plasma electrolytic oxidation (PEO) on morphology, composition, and protective properties of the coatings produced on 5754 aluminum alloy in a mixed electrolyte. It is shown that increasing the duty cycle of a microsecond current pulses leads to a decrease of porosity and an increase of thickness of the PEO-layers, which are composed of γ - Al_2O_3 , β - Al_2O_3 , AlPO_4 , and $\text{Al}_2\text{Mo}_3\text{C}$. This improved the barrier properties and microhardness of the coating. The Young's modulus increased with an increase of the quantity of electricity due to the changes of morphological and chemical structure of the coatings. The PEO-coatings produced at a higher duty cycle and longer oxidation time are more wearproof as compared to ones formed at a shorter oxidation time and lower D values. The obtained data allowed confirming the hypothesis on phase formation mechanism.

Keywords: Plasma electrolytic oxidation, Protective coatings, Chemical composition, Aluminum, Duty cycle

Download English Version:

<https://daneshyari.com/en/article/8024472>

Download Persian Version:

<https://daneshyari.com/article/8024472>

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