

Accepted Manuscript

Preparation and corrosion resistance of a three-layer composite coatings on the Mg alloy

Xiaoqiang Zhan, Wei Shang, Yuqing Wen, Yuqing Li, Mingming Ma



PII: S0925-8388(18)33725-3

DOI: [10.1016/j.jallcom.2018.10.059](https://doi.org/10.1016/j.jallcom.2018.10.059)

Reference: JALCOM 47877

To appear in: *Journal of Alloys and Compounds*

Received Date: 25 July 2018

Revised Date: 19 September 2018

Accepted Date: 7 October 2018

Please cite this article as: X. Zhan, W. Shang, Y. Wen, Y. Li, M. Ma, Preparation and corrosion resistance of a three-layer composite coatings on the Mg alloy, *Journal of Alloys and Compounds* (2018), doi: <https://doi.org/10.1016/j.jallcom.2018.10.059>.

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.

Preparation and Corrosion Resistance of a Three-layer Composite Coatings on the Mg Alloy

Xiaoqiang Zhan, Wei Shang*, Yuqing Wen*, Yuqing Li, Mingming Ma

Guangxi Key Laboratory of Electrochemical and Magnetochemical Function Materials, Guilin

University of Technology, Guilin, 541004, China

Abstract:

A composite three-layer coating was successfully manufactured on AZ91D Mg alloy surface, which was attributed to the protection of the Mg alloy. The three-layer(MSE)coatings were composed by micro-arc oxidation coating (MAO), self-assembled film (SAM), and electroless nickel coating (EN). The morphology and structure were characterized by SEM、EDS、XRD、AFM and XPS. The corrosion protection of each sample with composite coatings was tested by electrochemical techniques. The results show that the growth of nickel in the electroless plating process was in a preferred orientation along the Ni (111) direction, indicating that the nickel is amorphous. The MSE composite coatings own the best hydrophobicity and showed the smallest surface roughness. The corrosion current density of the MAO coating was declined by two orders of magnitude compared to that of the Mg alloy. The corrosion potential of the MSE composite coatings was shifted to -0.351 V. The MSE composite coatings own the biggest the AC impedance arc radius and smallest the corrosion current density, indicating that the MSE composite coatings provided the best corrosion resistance for Mg alloy.

Keywords: Mg alloy, micro-arc oxidation, self-assembly, electroless nickel plating,

* Corresponding author, E-mail: shangw13@163.com (Wei Shang)

* Corresponding author, E-mail: wenyuqing16@163.com (YuQing Wen)

Download English Version:

<https://daneshyari.com/en/article/11015826>

Download Persian Version:

<https://daneshyari.com/article/11015826>

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