

Accepted Manuscript

Structure and properties of newly designed MAO/TiN coating on AZ31B Mg alloy

Xue-Jun Cui, Jing Ping, Ying-Jun Zhang, Yong-Zhong Jin, Guang-An Zhang



PII: S0257-8972(17)30862-9
DOI: doi: [10.1016/j.surfcoat.2017.08.053](https://doi.org/10.1016/j.surfcoat.2017.08.053)
Reference: SCT 22614
To appear in: *Surface & Coatings Technology*
Received date: 21 January 2017
Revised date: 24 July 2017
Accepted date: 23 August 2017

Please cite this article as: Xue-Jun Cui, Jing Ping, Ying-Jun Zhang, Yong-Zhong Jin, Guang-An Zhang , Structure and properties of newly designed MAO/TiN coating on AZ31B Mg alloy, *Surface & Coatings Technology* (2017), doi: [10.1016/j.surfcoat.2017.08.053](https://doi.org/10.1016/j.surfcoat.2017.08.053)

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.

Structure and properties of newly designed MAO/TiN coating on AZ31B Mg alloy

Xue-Jun Cui^{1, 2 *}, Jing Ping¹, Ying-Jun Zhang¹, Yong-Zhong Jin¹, Guang-An Zhang³

1. School of Materials Science and Engineering, Sichuan University of Science and Engineering,

Zigong 643000, China

2. Shandong Key Laboratory for High Strength Lightweight Metallic Materials, Advanced Materials

Institute, Shandong Academy of Sciences, Jinan 250014, China

3. State Key Laboratory of Solid Lubrication, Lanzhou Institute of Chemical Physics, Chinese

Academy of Sciences, Lanzhou 730000, China

Abstract: A duplex MAO/TiN coating was fabricated on AZ31B Mg alloy through micro-arc oxidation (MAO) followed by a multi-arc ion plating (M-AIP) process. The structure, composition, and corrosion resistance of these coated samples were evaluated using SEM, EDS, XRD, and electrochemical methods. The results showed that the porous MAO layer was effectively sealed by the M-AIP layer, indicating that the MAO layer can act as an interlayer to offer an inert rough surface and necessary hardness for the Mg alloy to bond with the M-AIP layer (especially for a hard coating such as TiN). The MAO/Ti-coated samples exhibited the worst corrosion resistance and lower hardness compared with the MAO-coated samples, while the MAO/TiN coating provided higher corrosion resistance and hardness. It can be speculated that unavoidable defects such as pores and cracks are responsible for the poor properties. Although the MAO layer was demonstrated to improve the interfacial compatibility between the hard coating and the soft substrate, a compact and dense hard coating is still essential to ensure the corrosion and wear resistance of Mg alloys.

Keywords: Magnesium alloy; Coatings; Micro-arc oxidation; Multi-arc ion plating; TiN

Download English Version:

<https://daneshyari.com/en/article/5464475>

Download Persian Version:

<https://daneshyari.com/article/5464475>

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