

Accepted Manuscript

Microstructure and properties of in-situ synthesized ZrC-Al₃Zr reinforced composite coating on AZ91D magnesium alloy by laser cladding

Yu Guo, Yingqiao Zhang, Zhiyong Li, Shouzheng Wei, Tao Zhang, Liuqing Yang, Shengyao Liu



PII: S0257-8972(17)31224-0
DOI: doi:[10.1016/j.surfcoat.2017.12.007](https://doi.org/10.1016/j.surfcoat.2017.12.007)
Reference: SCT 22925
To appear in: *Surface & Coatings Technology*
Received date: 27 July 2017
Revised date: 9 November 2017
Accepted date: 2 December 2017

Please cite this article as: Yu Guo, Yingqiao Zhang, Zhiyong Li, Shouzheng Wei, Tao Zhang, Liuqing Yang, Shengyao Liu, Microstructure and properties of in-situ synthesized ZrC-Al₃Zr reinforced composite coating on AZ91D magnesium alloy by laser cladding. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Sct(2017), doi:[10.1016/j.surfcoat.2017.12.007](https://doi.org/10.1016/j.surfcoat.2017.12.007)

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.

Microstructure and properties of in-situ synthesized ZrC-Al₃Zr reinforced composite coating on AZ91D magnesium alloy by laser cladding

Yu Guo, Yingqiao Zhang*, Zhiyong Li, Shouzheng Wei, Tao Zhang, Liuqing Yang, Shengyao Liu

The Welding Research Center, College of Material Science and Engineering, North University of China, Taiyuan 030051, PR China

*Corresponding author: Tel: +86 13546342801 E-mail address: yqzhang1234@126.com

Abstract

In-situ synthesized ZrC-Al₃Zr reinforced composite coatings were fabricated on AZ91D magnesium alloy with a mixture of Al, Zr and B₄C powders by laser cladding. Granular ZrC reinforced phase was synthesized in all 10 wt.%, 20 wt.% and 30 wt.% (Zr+B₄C) coatings, while Al₃Zr with rod-like morphology was found only in the two latter coatings. Al₃Zr was replaced by Al_{9.83}Zr_{0.17} at the content of 10 wt.% (Zr+B₄C) because of relatively low content of Zr. The size of most ZrC and Al₃Zr was less than 3 μm. Al₁₂Mg₁₇, α-Mg, AlB₂ and Al₃Mg₂ were also detected at the composite coatings. The syntheses of ceramic phase and some intermetallic compounds increased the hardness of the coating. The maximum hardness value (346 HV) was obtained at the coating with 30 wt.% (Zr+B₄C), which was 5 times higher than that of the substrate. The composite coatings also had better wear resistance than AZ91D substrate and the friction coefficient of the coatings decreased with the increase of (Zr+B₄C) content. Polarization curves indicated that the composite coatings were harder to corrode than the substrate.

Download English Version:

<https://daneshyari.com/en/article/8024674>

Download Persian Version:

<https://daneshyari.com/article/8024674>

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