

Author's Accepted Manuscript

Improved resistance of lanthanum zirconate coatings to calcium-magnesium-alumina-silicate corrosion through composition tailoring

Changhua Zhu, Yuchen Liu, Duojin Wang,
Yanchun Zhou, Guang Yang, Hongfei Chen,
Yanfeng Gao, Bin Liu



www.elsevier.com/locate/ceri

PII: S0272-8842(18)31115-5
DOI: <https://doi.org/10.1016/j.ceramint.2018.04.239>
Reference: CER118156

To appear in: *Ceramics International*

Received date: 29 March 2018
Revised date: 25 April 2018
Accepted date: 27 April 2018

Cite this article as: Changhua Zhu, Yuchen Liu, Duojin Wang, Yanchun Zhou, Guang Yang, Hongfei Chen, Yanfeng Gao and Bin Liu, Improved resistance of lanthanum zirconate coatings to calcium-magnesium-alumina-silicate corrosion through composition tailoring, *Ceramics International*, <https://doi.org/10.1016/j.ceramint.2018.04.239>

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 galley proof before it is published in its final citable 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.

Improved resistance of lanthanum zirconate coatings to calcium-magnesium-alumina-silicate corrosion through composition tailoring

Changhua Zhu^a, Yuchen Liu^a, Duojin Wang^a, Yanchun Zhou^b, Guang Yang^a, Hongfei Chen^a,
Yanfeng Gao^a, Bin Liu^{a,*}

^aSchool of Materials Science and Engineering, Shanghai University, Shanghai 200444, China

^bScience and Technology on Advanced Functional Composite Laboratory, Aerospace Research Institute of Materials and Processing Technology, Beijing 100076, China

*Corresponding author: binliu@shu.edu.cn

Abstract

Calcium–magnesium–alumina–silicate (CMAS) corrosion resistance is an important issue on the design of next-generation thermal barrier coatings. As one of the promising thermal barrier coatings, the lanthanum zirconate coating has attracted continuous attention. In this work, three lanthanum zirconate coatings with different La/Zr composition, i.e., $\text{La}_{1.8}\text{Zr}_{2.2}\text{O}_{7.1}$, $\text{La}_2\text{Zr}_2\text{O}_7$, and $\text{La}_{2.5}\text{Zr}_{1.5}\text{O}_{6.75}$, are fabricated by laser-enhanced chemical vapour deposition, and their resistance to CMAS corrosion at 1250 °C is investigated. Among them, $\text{La}_{2.5}\text{Zr}_{1.5}\text{O}_{6.75}$ shows the best CMAS corrosion resistance because increased La content is beneficial to the formation of a dense and continuous apatite $\text{Ca}_2\text{La}_8(\text{SiO}_4)_6\text{O}_2$ layer, which effectively slows down the subsequent molten CMAS penetration. This study clarifies the significant role of rare earth on CMAS corrosion resistance and is expected to guide the future design of rare-earth-based thermal barrier coatings through composition tailoring.

Keywords: Lanthanum zirconate, Thermal barrier coating, Laser-enhanced chemical vapour

Download English Version:

<https://daneshyari.com/en/article/7886569>

Download Persian Version:

<https://daneshyari.com/article/7886569>

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