

## Accepted Manuscript

Title: Hot corrosion behavior and near-surface microstructure of a “Low-Temperature High-Activity Cr-aluminide” coating on Inconel 738LC exposed to  $\text{Na}_2\text{SO}_4$ ,  $\text{Na}_2\text{SO}_4 + \text{V}_2\text{O}_5$  and  $\text{Na}_2\text{SO}_4 + \text{V}_2\text{O}_5 + \text{NaCl}$  at  $900^\circ\text{C}$

Authors: M. Salehi Doolabi, B. Ghasemi, S.K. Sadrnezhad, A. Habibollahzadeh, K. Jafarzadeh

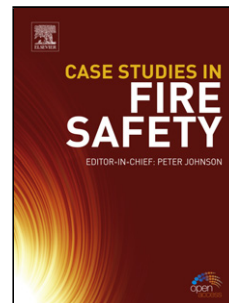
PII: S0010-938X(16)31255-0  
DOI: <http://dx.doi.org/10.1016/j.corsci.2017.09.004>  
Reference: CS 7190

To appear in:

Received date: 27-11-2016  
Revised date: 30-8-2017  
Accepted date: 7-9-2017

Please cite this article as: M.Salehi Doolabi, B.Ghasemi, S.K.Sadrnezhaad, A.Habibollahzadeh, K.Jafarzadeh, Hot corrosion behavior and near-surface microstructure of a “Low-Temperature High-Activity Cr-aluminide” coating on Inconel 738LC exposed to  $\text{Na}_2\text{SO}_4$ ,  $\text{Na}_2\text{SO}_4 + \text{V}_2\text{O}_5$  and  $\text{Na}_2\text{SO}_4 + \text{V}_2\text{O}_5 + \text{NaCl}$  at  $900^\circ\text{C}$ , Corrosion Science <http://dx.doi.org/10.1016/j.corsci.2017.09.004>

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.



# Hot corrosion behavior and near-surface microstructure of a “Low-Temperature High-Activity Cr-aluminide” coating on Inconel 738LC exposed to $\text{Na}_2\text{SO}_4$ , $\text{Na}_2\text{SO}_4 + \text{V}_2\text{O}_5$ and $\text{Na}_2\text{SO}_4 + \text{V}_2\text{O}_5 + \text{NaCl}$ at 900 °C

M. Salehi Doolabia , B. Ghasemia,\* , S.K. Sadrnezhad<sup>b</sup> , A.Habibollahzadeha , K. Jafarzadehc

a Faculty of Materials Science and Engineering, Semnan University, P.O. Box 35131-19111, Semnan, Iran

b Department of Materials Science and Engineering, Sharif University of Technology, Azadi Ave., P.O. Box 11365-9466, Tehran, Iran

c Materials department of Maleke Ashtar University of Technology, Tehran, Iran

\*Corresponding author: Dr. Behrooz Ghasemi , E-mail address: bghasemi@semnan.ac.ir

Tel.: +989122055283; fax: +982333654276

## Highlights

- Hot corrosion behavior of Cr-aluminide coating on the IN-738LC was investigated.
- Effects of  $\text{Na}_2\text{SO}_4$ ,  $\text{V}_2\text{O}_5$  and NaCl on hot corrosion were determined.
- Addition of  $\text{V}_2\text{O}_5$  to the corrosive salt increases severity of the hot corrosion.
- Presence of NaCl in corrosive salt results in severe spallation.

## Abstract

Hot corrosion is a serious problem in gas turbines due to poor quality fuels which contain Na, V, S and Cl. To resolve the problem, Cr-aluminide was coated on IN-738LC superalloy with a two steps pack cementation process. Oxidation behavior and near-surface microstructure of the coating showed consecutive increase in destruction by exposition to  $\text{Na}_2\text{SO}_4$ ,  $75\text{Na}_2\text{SO}_4+25\text{V}_2\text{O}_5$  and  $70\text{Na}_2\text{SO}_4+25\text{V}_2\text{O}_5+5\text{NaCl}$  (wt.%). Kinetic studies indicated parabolic corrosion rate in salt-less samples due to diffusion. Similar expression for salt-covered samples was assessed for oxide dissolution. Plate-like, broken-plate-like and cauliflower-like morphologies attributed to the corrosion products were observed after exposition to above three salts, respectively.

Keywords: A. Metal coating; A. Superalloys; A. Molten salts; C. Hot corrosion

Download English Version:

<https://daneshyari.com/en/article/7894214>

Download Persian Version:

<https://daneshyari.com/article/7894214>

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