

Accepted Manuscript

Microstructure and oxidation behavior of Al+Cr co-deposited coatings on nickel-based superalloys

R.Q. Lin, C. Fu, M. Liu, H. Jiang, X. Li, Z.M. Ren, A.M. Russell, G.H. Cao



PII: S0257-8972(16)31385-8
DOI: doi: [10.1016/j.surfcoat.2016.12.096](https://doi.org/10.1016/j.surfcoat.2016.12.096)
Reference: SCT 21953
To appear in: *Surface & Coatings Technology*
Received date: 2 October 2016
Revised date: 21 December 2016
Accepted date: 23 December 2016

Please cite this article as: R.Q. Lin, C. Fu, M. Liu, H. Jiang, X. Li, Z.M. Ren, A.M. Russell, G.H. Cao, Microstructure and oxidation behavior of Al+Cr co-deposited coatings on nickel-based superalloys. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Sct(2016), doi: [10.1016/j.surfcoat.2016.12.096](https://doi.org/10.1016/j.surfcoat.2016.12.096)

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 oxidation behavior of Al + Cr co-deposited coatings on nickel-based superalloys

R.Q. Lin¹, C. Fu², M. Liu¹, H. Jiang¹, X. Li¹, Z.M. Ren¹, A.M. Russell³,

G.H. Cao^{1*}

¹State Key Laboratory of Advanced Special Steel & Shanghai Key Laboratory of Advanced Ferrometallurgy & School of Materials Science and Engineering, 149 Yanchang Road, Shanghai 200072, China

²Central Academe, Shanghai Electric Group Co., Ltd., 960 Zhongxing Road, Shanghai 200070, China

³Department of Materials Science and Engineering, Iowa State University and Division of Materials Science and Engineering, Ames Laboratory of the U.S.D.O.E., Ames, IA 50011-2300, USA

Abstract

The microstructure and oxidation behavior were investigated in Al and Cr co-deposited diffusion coatings prepared by the pack cementation process. The composition (in wt.%) of the packs was $3\text{NH}_4\text{Cl}-x\text{Al}-(25-x)\text{Cr}-72\text{Al}_2\text{O}_3$ with different Al levels ($x = 0.5, 1.2, 4$, and 10). After the heat-treatment process, the corresponding microstructure of the coatings was $\text{Cr} + \text{Cr}_2\text{Ni}_3 + \text{Al-rich phase}$, $\text{Cr} + \text{Cr}_2\text{Ni}_3$, $\text{Cr} + \text{NiAl} + \text{Ni}_3\text{Al}$ and $\text{NiAl} + \text{AlCr}_2$, respectively. The isothermal oxidation tests were performed at 950°C for up to 100 h in air, and the oxidation kinetic curves were obtained. It indicated that the coatings formed in the packs containing 1.2 wt.% Al had the lowest weight gain, while the weight gain of the coating formed in the packs having 4 wt.% Al was the largest. The presence of Cr in Al and Cr co-deposited coatings promotes Al_2O_3 generation. The formation mechanisms of Al + Cr co-deposited coatings and the effect of Cr in different types of coatings during the oxidation process were discussed.

* Corresponding author. E-mail address: ghcao@shu.edu.cn (G.H. Cao)

Download English Version:

<https://daneshyari.com/en/article/5465677>

Download Persian Version:

<https://daneshyari.com/article/5465677>

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