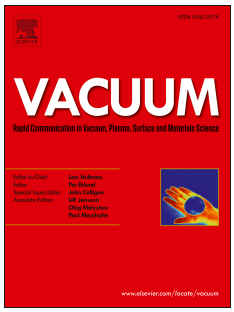
Accepted Manuscript



Effect of Y_2O_3 content in the pack mixtures on the cyclic-oxidation of Y_2O_3-modified low temperature aluminide coatings on 309 stainless steel

Yongdong Wang, Jixiao Wang, Haiting Hu, Junsheng Meng, Xia Zhao

PII: S0042-207X(18)30940-0

DOI: 10.1016/j.vacuum.2018.09.047

Reference: VAC 8260

To appear in: *Vacuum*

Received Date: 1 June 2018

Revised Date: 21 August 2018

Accepted Date: 23 September 2018

Please cite this article as: Wang Y, Wang J, Hu H, Meng J, Zhao X, Effect of Y_2O_3 content in the pack mixtures on the cyclic-oxidation of Y_2O_3-modified low temperature aluminide coatings on 309 stainless steel, *Vacuum* (2018), doi: https://doi.org/10.1016/j.vacuum.2018.09.047.

Effect of Y_2O_3 content in the pack mixtures on the cyclic-oxidation of Y_2O_3-modified low temperature aluminide coatings on 309 stainless steel

Yongdong Wang*, Jixiao Wang, Haiting Hu, Junsheng Meng, Xia Zhao

College of Material Science and Engineering, Heilongjiang University of Science and Technology, Harbin, 150027, China;

Abstract

By using Y_2O_3 nanoparticles, instead of part or all of Al_2O_3, acting as filler, Y_2O_3-modified aluminide coatings were produced on 309 stainless steel using a conventional pack-cementation method at 700℃ for 6 h. Effect of Y_2O_3 content in the pack mixtures on the cyclic-oxidation resistance of different aluminide coatings was comparably investigated. The results show that the phase of aluminide coatings was $Fe_{24}Al_{76.8}$. With the increase of Y_2O_3 content in the pack mixtures, the thickness of aluminide coatings decreased but the cyclic-oxidation resistance at 900℃ in air increased, because of prevention of cavities at the alumina scale/coating interface, and because of mitigation of degradation of the aluminide coating due to decreased outward diffusion and inward interdiffusion between the aluminide and the 309 stainless base. The reasons for the results are discussed.

*Key words***:** High-temperature oxidation; Reactive element effect; Aluminide coatings; SEM; XRD

***Corresponding author.** Tel.: +86451 88036495.

E-mail addresses: wyd04@163.com

(Yongdong. Wang)