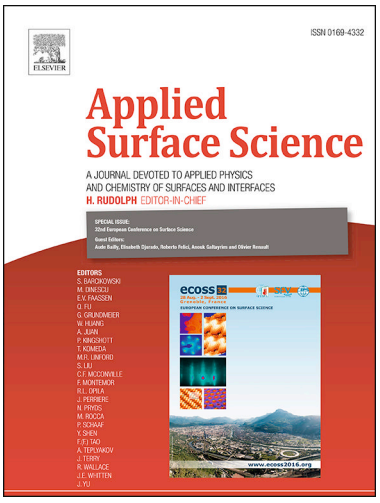
Accepted Manuscript



Full Length Article

Interfacial phenomena and evolution of modified aluminide bondcoatings in Thermal Barrier Coatings

R. Swadźba

PII: S0169-4332(18)30822-5
DOI: https://doi.org/10.1016/j.apsusc.2018.03.137
Reference: APSUSC 38885

To appear in: *Applied Surface Science*

Received Date: 26 November 2017
Revised Date: 5 February 2018
Accepted Date: 19 March 2018

Please cite this article as: R. Swadźba, Interfacial phenomena and evolution of modified aluminide bondcoatings in Thermal Barrier Coatings, *Applied Surface Science* (2018), doi: https://doi.org/10.1016/j.apsusc.2018.03.137

Interfacial phenomena and evolution of modified aluminide bondcoatings in Thermal Barrier Coatings

R. Swadźba[a,1]

[1]Institute for Ferrous Metallurgy, Gliwice, Poland

[a] Corresponding author

Email address: rswadzba@gmail.com

KEYWORDS: Thermal Barrier Coatings, High Temperature Oxidation, Thermally Grown Oxide, Interfaces

ABSTRACT

The paper presents results of microstructural investigations of TBCs on Pt- and PdPt-aluminide bondcoatings with focus on the interfacial phenomena that take place during the pre-oxidation treatment as well as further thermal cycling at 1100 °C. The Pt and Pd coatings were produced using a Physical Vapor Deposition (PVD) method while aluminizing was performed using a high activity Vapor Phase Aluminizing (VPA). The ceramic yttria stabilized zirconia (YSZ) top coating was deposited using Electron Beam Physical Vapor Deposition (EB-PVD) method. Prior to the EB-PVD process the bondcoatings were pre-oxidized at 1140 °C for 2 hours in air atmosphere in order to form a stable and adherent α-Al_2O_3 TGO with minimum transient oxidation. Special effort has been done in order to investigate the microstructure of the Thermally Grown Oxide (TGO) formed during pre-oxidation treatment prior to YSZ deposition and the phenomena occurring at the interface between the YSZ, TGO, and the bondcoatings. Microstructure evolution of the TGOs is described and related to the conditions of the pre-oxidation treatment and the chemistry of the