

PO3091

**Oxidation Behavior of Thermal Barrier Coatings With Cold Gas Dynamic Sprayed CoNiCrAlY Bond Coats**Abdullah Cahit Karaoglanli<sup>1</sup>, Ahmet Türk<sup>2</sup>, Ismail Özdemir<sup>3</sup>, Fatih Ustel<sup>2</sup><sup>1</sup>Bartın University, Bartın, Turkey <sup>2</sup>Sakarya University, Sakarya, Turkey <sup>3</sup>  
Bartın University, Bartın, Turkey

cahitkaraoglanli@gmail.com

The paper presents the results of investigation into the oxidation resistance and thermally grown oxide (TGO) of thermal barrier coatings (TBC). TGO occurred during in service affect the lifetime of the component by introducing several kinds of degradation mechanisms such as decreasing bonding strength, initiation of stress concentration and thermal stresses which lead to crack initiation and propagation associated with delamination or spallation failure. Therefore, TGO plays important role on TBC durability. In this study, TBCs that consist of a typical bond layer / top layer system (CoNiCrAlY bond layers and YSZ top layers) are deposited on Inconel 718 superalloy substrates. The metallic bond coatings are applied via Cold Gas Dynamic Spraying (CGDS); the ceramic top coatings via Atmospheric Plasma Spraying (APS). Investigations are done concerning the oxidation behavior of this TBC system at 1200 °C in normal atmosphere for 8h, 24h, 50 h and 100 hours. The oxidation behaviour and microstructural properties during the oxidation test were evaluated and compared, and TGO growth behavior was also investigated under high temperature oxidation. The microstructural features and oxidation behaviours were characterized by scanning electron microscopy and energy dispersive X-ray spectroscopy. Phase stability of TBCs were evaluated by means of X-ray diffraction method.

**Keywords**

Thermal barrier coatings

Oxidation

Thermally grown oxide

Cold Gas Dynamic Spraying