

**PROCEEDINGS**

## The Correlation Between the Cyclic Oxidation Behavior of EB-PVD TBC and Refurbishment Process

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### ABSTRACT

Refurbishment of thermal barrier coating (TBC) has become a valuable technique to prolong the service life of high-temperature components. In this work, the effect of refurbishment process on the oxidation behaviors of TBC was investigated. Before recoating, the soft chemical stripping method was used to remove TBC from DD6 single-crystal superalloy. The results showed that a certain amount of IDZ layer with Cr-rich would be retained in the DD6 superalloy substrate after coating removal. The characteristics of the  $\beta$  phases change from the elongated grain shapes and a high aspect ratio in the ordinary specimens to the equiaxed shape in the refurbished specimens. Moreover, mixed oxides were earlier observed during cyclic oxidation of the refurbished TBC specimens, whose thickness was always higher than that of the ordinary TBC due to the influence of BC layer phase sizes. The growth mechanism of TGO ( $Al_2O_3$  layer) in the refurbished TBC specimens was affected by the refurbishment process. In addition, under cyclic oxidation with water quenching at 1100 °C, the cracks in the refurbished specimens were more likely to occur in the mixed oxides layer, while the cracks in the ordinary specimens were more likely to occur in the TC layer, due to the earlier and thicker mixed oxides layer formed in refurbished specimens.

### KEYWORDS

Thermal barrier coating systems; coating removal; refurbishment; cyclic oxidation; failure behaviors

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