

7th International Conference on

Smart Materials and Structures

July 02-03, 2018 | Vienna, Austria

Effect of nano-zones on thermal shock behavior of mixed composite top coat APS TBCs

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In this study, the effects of nano-zones on the performance of thermal barrier coatings (TBCs) with the mixed composite top coat (MCC) were investigated under thermal shock conditions. To produce MCCs, firstly, the powders are mixed with the specified weight ratio, and then the prepared mixture is fed to the plasma stream of the atmospheric plasma spray (APS) machine. Ceria-yttria stabilized zirconia (CSZ) and micro- and nano-structured yttria stabilized zirconia (YSZ and YSZ-N) were used to produce coating samples. The coatings were grouped in Y-C and YN-C classes, and each class was produced with two different weight ratios and two different thicknesses. The results show that the presence of YSZ-N plays an important role in increasing the life of the samples and decreasing the thickness of the thermally grown oxide layer.

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