HIGH-TEMPERATURE TEST BENCH FOR THERMAL SHOCK RESISTANCE CONTROL CERAMIC COATINGS

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One of the most important thermophysical characteristics (thermal shick resistance) of the ceramic coatings, in particular thermal barrier coatings (TBC), formed on component used at high temperatures. The surface temperature of the components with the TBC during operation can be cyclically changed over a wide interval in a fairly short period of time, which can lead to the TBC damage due to the occurrence of high mechanical stresses, which usually are caused by the differences in the thermal expansion coefficients of coating materials and the base [1]. For this reason, particular interest is the possibility of controlling the thermal shock resistance of the TBC under conditions close to operational ones. The paper presents the results of the TBC thermal shock resistance control. Coatings were formed by use of atmospheric plasma spraying method. One-sided gas heating by a propane-oxygen burner were used to simulate the operating conditions of the components of the hot paths of the gas turbine engine. Differences in the damage mechanisms of TBCs wich were formed with use of stabilized material (ZrO_2-7.5Y_2O_3) and (ZrO_2-7.5Y_2O_3) stabilized and further modified, during powder preparation process, with carbon nanotubes (0.1 wt. %). The influence of the additionally introduced modifier on the TBC thermal shock resistance is discussed.

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1. *Irene Spitsberg, Jim Steibel* Thermal and environmental barrier coatings for SiC/SiC CMCs in aircraft engine applications. Int. J. Appl. Ceram. Technol., 1 [4] 291-301, 2004.