World Academy of Science, Engineering and Technology
International Journal of Chemical and Materials Engineering
Vol:10, No:08, 2016

Studies on Plasma Spray Deposited La2O3 - YSZ (Yttria-Stabilized Zirconia) Composite Thermal Barrier Coating

Authors : Prashant Sharma, Jyotsna Dutta Majumdar

Abstract : The present study concerns development of a composite thermal barrier coating consisting of a mixture of La2O3 and YSZ (with 8 wt.%, 32 wt.% and 50 wt.% 50% La2O3) by plasma spray deposition technique on a CoNiCrAlY based bond coat deposited on Inconel 718 substrate by high velocity oxy-fuel deposition (HVOF) technique. The addition of La2O3 in YSZ causes the formation of pyrochlore (La2Zr2O7) phase in the inter splats boundary along with the presence of LaYO3 phase. The coefficient of thermal expansion is significantly reduced from due to the evolution of different phases and structural defects in the sprayed coating. The activation energy for TGO growth under isothermal and cyclic oxidation was increased in the composite coating as compared to YSZ coating.

Keywords : plasma spraying, oxidation resistance, thermal barrier coating, microstructure, X-ray method
Conference Title : ICPSE 2016 : International Conference on Plasma Surface Engineering
Conference Location : Paris, France
Conference Dates : August 22-23, 2016