

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

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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

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