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double-ceramic-layer thermal barrier coating

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Abstract

LaPO_4 powders were produced by a chemical co-precipitation and calcination method. The ceramic exhibited a monazite structure, kept phase stability at 1400 °C for 100 h, and had low thermal conductivity (~ 1.41 W/mK, 1000 °C). $\text{LaPO}_4/\text{Y}_2\text{O}_3$ partially stabilized ZrO_2 (LaPO_4/YSZ) double-ceramic-layer (DCL) thermal barrier coatings (TBCs) were fabricated by air plasma spray. The LaPO_4 coating contained many nanozones. Thermal cycling tests indicated that the spallation of LaPO_4/YSZ DCL TBCs initially occurred in the LaPO_4 coating. The failure mode was similar to those of many newly developed TBCs, probably due to the low toughness of the ceramics. LaPO_4/YSZ DCL TBCs were highly resistant to V_2O_5 corrosion. Exposed to V_2O_5 at 700–900 °C for 4 h, La(P,V)O_4 formed as the corrosion product, which had little

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