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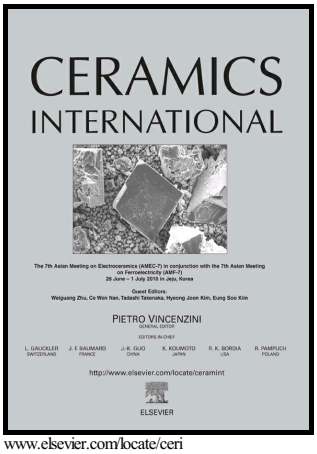


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# Thermal cycling and hot corrosion behavior of a novel $LaPO_4$/YSZ double-ceramic-layer thermal barrier coating

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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). $LaPO_4$/$Y_2O_3$ 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