Thermal Barrier Coatings IV

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PERFORMANCE OF COLUMNAR 7-8WT% YSZ COATINGS ON PLATINUM ALUMINIDE BONDCOATS

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Currently, an electron beam physical vapor deposition (EBPVD) 7-8wt% yttria stabilized zirconia (YSZ) thermal barrier coating (TBC) applied on a platinum modified diffusion aluminide bondcoat (PtAl) is the coating of choice for highly stressed airfoils in aero engines. Traditional air plasma spray (APS) coating methods are unable to provide sufficient adhesion on the smooth PtAl interfaces, where the primary bonding mechanism is mechanical in nature. Suspension plasma spray (SPS) columnar coatings have demonstrated the ability to adhere to smooth PtAl substrates, and perform after thousands of hours in FCT. The performance and properties of columnar SPS 7wt% YSZ coatings are presented on PtAl bondcoated substrates are compared with conventional MCrAlY bondcoats, as well as against existing APS TBC coating systems. Further, bonding mechanisms associated with SPS YSZ on PtAl are discussed.