

THE CURRENT STATUS OF ADVANCED ENVIRONMENTAL BARRIER COATINGS FOR CERAMIC MATRIX COMPOSITES AT NASA

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Environmental Barrier Coatings (EBCs) are an enabling technology for ceramic matrix composites (CMCs) by protecting CMCs from water vapor-induced recession. The first EBC-coated CMC component entered service in a commercial gas turbine in 2016. Many EBC challenges remain for continued success of CMC components in the next generation gas turbines. Key challenges include environmental durability, such as oxidation resistance, CMAS (Ca-Al-Mg-Silicate) resistance, recession resistance, and temperature capability. Oxidation is one of the most critical EBC failure modes. The upper use temperature current EBCs is limited by the low melting point of the silicon bond coat (1414°C). One promising approach to improve the oxidation resistance is through chemical modifications of EBCs. An oxide-based bond coat is a viable alternative to replace the current silicon bond coat. This paper will discuss the current status of EBC research at NASA in addressing the oxidation and temperature capability challenges.