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Chapter 17. Multilayer EBC for Silicon Nitride

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Summary

The lifetime of silicon-based ceramic components in turbine engine applications are limited by hydrothermal corrosion.^{1,2} Materials with adequate resistance to hydrothermal corrosion do not possess the required mechanical properties to be used as engine components, but may perform satisfactorily as coatings'. Reliable coatings of many candidate materials are not possible due to significant property mismatches with potential substrate materials. Likewise, interlayers, and methods of applying them, to accommodate property mismatches, must meet stringent requirements. This paper describes multilayer, environmental barrier coatings (EBC) with sufficient adhesion, environmental and thermal stability, and processing robustness to provide hydrothermal corrosion resistance to silicon nitride components.