

## EBC DEVELOPMENT AND BEHAVIOUR ANALYSIS FOR HIGH TEMPERATURE CMC COMPONENTS

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Silicon carbide fiber reinforced silicon carbide matrix composites (SiC/SiC CMC's) are attractive materials for use in gas turbine hot sections, due to the potential for high temperature mechanical properties and overall lower density than metals. However, SiC/SiC CMCs are damaged under high temperature combustion environments: development of thermally grown oxide and volatilization of silica under water vapor at high temperature. This result is unacceptable recession of the surface. That is why it is necessary to develop an environmental barrier coating (EBC) to prevent accelerated oxidation by limiting oxidant access to the surface of the silica former. This coating requires many criteria in order to be used as an EBC : low oxygen permeability, coefficient of thermal expansion close to that of the SiC/SiC CMC to prevent delamination or cracking, mechanically and chemically stability under thermal exposure.

In this presentation, a brief description of EBC enhancement is proposed, including material proposal and sub-element behavior analysis. A focus is done on specific tests methodologies development, for a better understanding of damage mechanism.

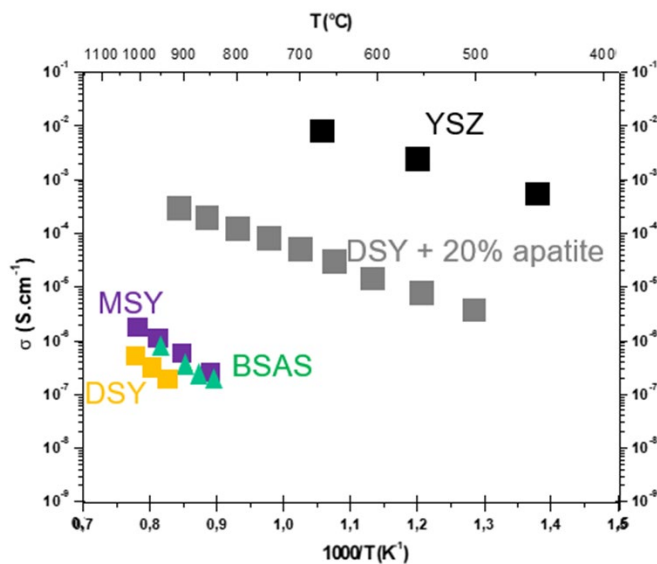


Figure 1. Ionic conductivity measured by complex impedance spectroscopy on different materials [1]

[1] S. Arnal, S. Fourcade, F. Mauvy and F. Rebillat "Design of a new yttrium silicate Environmental Barrier Coating (EBC) based on the relationship between microstructure, transport properties and protection efficiency", Journal of the European Ceramic Society, Volume 42, Issue 3, March 2022, Pages 1061-1076