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Challenges and future T/EBC for aeronautics applications

Abstract:
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 CMC's are damaged under high temperature combustion environments: development of thermally grown oxide and volatilisation of silica under water vapour at high temperature. This results in unacceptable recession of the surface. That is why, it is necessary to develop an environmental barrier coating (EBC) to prevent accelerated oxidation by limiting species oxidising 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.

This paper proposes to present ongoing challenges, and future directions in the development of environmental barrier coatings for SiC/SiC CMCs, with a focus on the requirements of aeronautics applications.

Biography:
Lisa Pin is a Research and Development Materials Engineer for Safran Group since 2012, in the R&D Ceramics Center based in Le Haillan. She has joined Safran Ceramics after a PhD degree on the thermal barrier coating manufactured by sol-gel route. Since, she is in charge of the development of Environmental Barrier Coating for Ceramic Matrix Composite for Safran.