

## MECHANICAL PROPERTIES OF $\text{Yb}_2\text{Si}_2\text{O}_7$ COATINGS PREPARED USING ELECTROPHORETIC DEPOSITION

Esma Yilmaz, University of Manchester, United Kingdom

[esma.yilmaz@manchester.ac.uk](mailto:esma.yilmaz@manchester.ac.uk)

Ahmet Hilmi Paksoy, University of Manchester, United Kingdom

Ping Xiao, University of Manchester, United Kingdom

Key Words: Electrophoretic deposition,  $\text{Yb}_2\text{Si}_2\text{O}_7$ , mechanical properties

$\text{Yb}_2\text{Si}_2\text{O}_7$  is widely used as an Environmental Barrier Coatings (EBC) to protect SiC-based ceramic components from oxidation and steam corrosion at high temperatures. In this study,  $\text{Yb}_2\text{Si}_2\text{O}_7$  was deposited on SiC substrate using electrophoretic deposition (EPD) which is an alternative coating technique to produce EBCs on SiC. EPD allows the production of homogenous and dense coatings in a simple and low-cost way, also controls the microstructure, density, and thickness of the coatings with the variation of process parameters. In contrast to EBCs those produced with the use of air plasma spray (APS) which is an established technique for this industry, EPD is able to coat complex geometry substrate without density and thickness differences with a smoother surface finish. Also, EPD prevents second phase formation that is a common feature seen in as-sprayed APS coatings, due to higher processing temperature silica evaporates from feedstock powder leaving monosilicates behind. Further, as EPD gives better control on the microstructure of EBCs than APS, it allows tailoring the mechanical properties as well. This study will compare these two processing techniques to point out differences between EBCs produced with the use of EPD and those produced with the use of APS. Results within this study suggest that electrophoretic deposition can be an alternative coating technique for EBC production.