

THE SYNTHESIS OF EBC LAYER STACKS BY THE COMBINATION OF PVD AND CVD IN A CONTINUOUS VACUUM PROCESS

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SiC-based substrate materials require protective coatings to suppress volatilization in water vapour at high temperatures. In addition, concepts need to be developed which allow thermal barrier coatings to extend the operating temperature beyond the melting temperature of silicon which is utilized as bond coat in current EBC layer stacks. This work describes a new hybrid deposition technology developed for EBC relevant class of coating materials which combines PVD and CVD ("PVD+") processes. The presentation will discuss this new PVD+ approach and show representative coating materials which have been synthesized. This technology allows for the deposition of EBC layers in a single uninterrupted and economical process, with materials similar to those reported in the thermal spray literature. The thermal stability and adhesion of Si-based coatings (including Mullite) has been tested on SiC substrates. The TGO formation on a simple SiC/Si/Yb-Si-O EBC layer stack was investigated in a water vapour test at 1316°C.