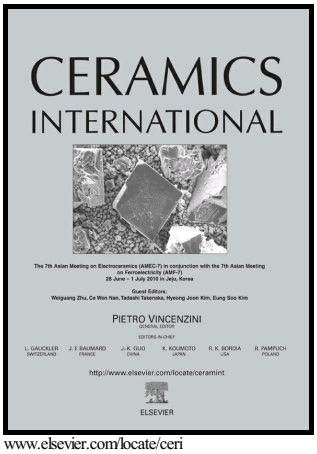

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Tribological Performance of SiC Coating for Carbon/Carbon Composites at Elevated Temperatures

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Abstract:

SiC coating was deposited on carbon/carbon (C/C) composites by chemical vapor deposition (CVD). The effects of elevated temperatures on tribological performance of SiC coating were investigated. The related microstructure and wear mechanism were analyzed. The results show that the as-deposited SiC coating consists of uniformity of β-SiC phase. The mild abrasive and slight adhesive wear were the main wear mechanisms at room temperature, and the SiC coating presented the maximum friction coefficient and the minimum wear rate. Slight oxidation of debris was occurred when the temperature rose to 300 °C. As the temperature was above 600 °C, dense oxide film formed on the worn surface. The silica tribo-film replaced the mechanical fracture and dominated the frication process. However, the aggravation of oxidation at elevated temperatures was responsible for the decrease of friction coefficient and the deterioration of wear rate. The SiC coating presented the minimum friction coefficient and the maximum wear rate when the temperature was 800 °C.