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Influence of β-SiC on the microstructures and thermal properties of SiC coatings for C/C composites

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Abstract: Two kinds of SiC coatings were fabricated on C/C composites by a two-step pack cementation. The CS-SiC coating was prepared using Si, graphite and Al_2O_3 powder as the raw materials, while the raw materials of FCS-SiC coating were composed of Si, graphite, Al_2O_3 and β-SiC powder. The morphology and phase composition of the coatings were characterized by scanning electron microscopy and X-ray diffraction. The results showed that the FCS-SiC coating possessed a denser surface with smaller grain sizes. Meanwhile, some large open-holes and penetrating cracks could be found in the surface of the FCS-SiC coating. The oxidation and thermal properties of the coatings were investigated and compared. After oxidation at 1773 K for 43 h, the FCS-SiC and CS-SiC coating presented a weight-loss of 0.64% and a weight-gain of 0.44%, respectively. The FCS-SiC coating showed a weight-loss of 0.52% after 30 thermal cycles between 1773 K and room temperature, while the CS-SiC coating exhibited a weight-gain of 0.11% after 50 thermal cycles. The inferior

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