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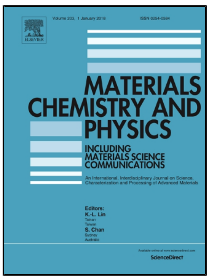

EFFECT OF BORON INCLUSION IN SiOC POLYMER DERIVED MATRIX ON THE MECHANICAL AND OXIDATION RESISTANCE PROPERTIES OF FIBER REINFORCED COMPOSITES

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EFFECT OF BORON INCLUSION IN SiOC POLYMER DERIVED MATRIX ON THE MECHANICAL AND OXIDATION RESISTANCE PROPERTIES OF FIBER REINFORCED COMPOSITES

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ABSTRACT

Effect of boron inclusion in SiOC polymer derived matrix on the mechanical and oxidation resistance properties of fiber reinforced composites was investigated. SiC/SiBOC ceramic matrix composites were fabricated using Nicalon and Sylramic silicon carbide fibers and polyborosiloxane as the matrix resin. Oxidation behaviour of SiC/SiBOC at 1000°C was compared with that of C/C and C/SiBOC composites. Flexural strengths of the composites were evaluated before oxidation and after regular intervals of oxidation. The results indicate that the type of silicon carbide reinforcement plays a crucial role in the oxidation behaviour and flexural property of SiC/SiBOC ceramic matrix composites. After six PIP cycles, Nicalon/SiBOC composite showed a maximum flexural strength value of 108MPa and a corresponding density of ~2 g/cc. Sylramic/SiBOC composite exhibited a maximum average flexural strength value of 88Mpa after first PIP cycle and a maximum density of ~2 g/cc after 6th PIP cycle. SiC/SiBOC composites exhibit superior oxidation resistance at 1000°C, compared to C/C and C/SiBOC composites. From the results, it was concluded that SiC/SiBOC ceramic matrix composites can be used as structural materials under oxidative atmosphere where stress levels are low.

Key words: Polyborosiloxanes; SiC/SiBOC; Ceramic Matrix Composite; Oxidation Resistance

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