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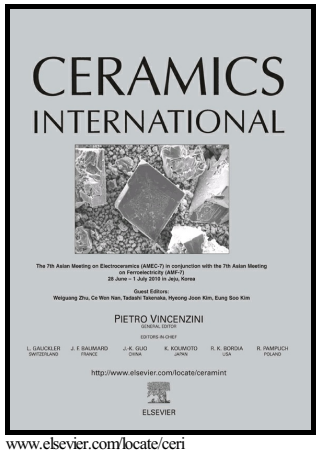

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Net shape CMC components produced by composite flow molding, pyrolysis and reactive silicon infiltration

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Abstract

This paper describes a novel technique to produce net shape ceramic matrix composites (CMC) artefacts by a modified injection moulding technique called composite flow molding, (CFM) followed by pyrolysis and reactive silicon infiltration. The peculiarity of the produced components stands in their microstructure which is characterized by fibres crossing the part without interruption. This new method will open the use of CMCs to complex geometries for structural applications because they can be produced to net shape without machining and thus interrupting the fibres.

A net shape CMC screw was manufactured, but other shapes, such as: bolts, nuts, rivets, springs and even turbine blades can be easily produced.

Keywords: ceramic matrix composites; injection moulding; silicon carbide; silicon; net shape

1. Introduction

A ceramic matrix composite (CMC) combines a reinforcing ceramic phase with a ceramic matrix to create a hybrid material with better mechanical properties than the corresponding homogenous materials [1]. In a CMC the primary goal of the reinforcement is to provide toughness to a brittle ceramic matrix. Furthermore other