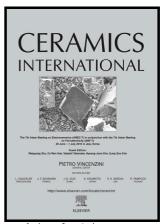
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Bradley L. Wing, John W. Halloran



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Relaxation of Residual Microstress in

Reaction Bonded Silicon Carbide

Bradley L. Wing¹, John W. Halloran

University of Michigan Material Science and Engineering, 2300 Hayward, Ann Arbor,

MI, USA 48109

Abstract

High temperature annealing reduces the residual microstress in the silicon phase

and silicon carbide phase in monolithic reaction bonded silicon carbide and in the matrix

of melt-infitrated composites of silicon carbide reinforced with silicon carbide fibers.

Stress relaxation is related to creep of the silicon carbide with power-law creep exponents

similar to tensile creep in reaction bonded silicon carbide.

Keywords: Composites; Silicon Carbide; Silicon

1. Introduction

Reaction bonded SiC (RBSiC) is a well-established industrial grade of SiC prized

for good high temperature properties, and the ease of manufacturing net shape

components¹. RBSiC is fabricated by the reaction of a liquid silicon alloy with carbon,

usually in the presence of a pre-reacted silicon carbide filler². The reactive silicon is often

introduced by melt infiltration (MI)^{3,4}. The reaction does not go to completion⁵, leaving

unreacted liquid free silicon as a minority phase⁶. Reaction bonding is also used to

¹ present address: Rolls-Royce HTC, Cypress California USA

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