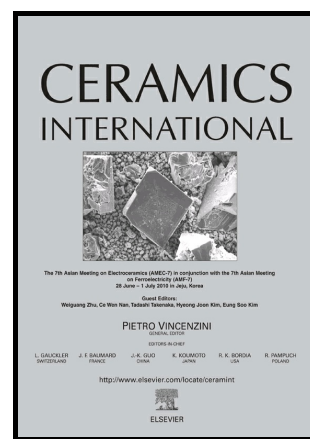


Spark Plasma Sintering and Characterization of ZrC-TiB₂ Composites

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Abstract

ZrC-based composites were consolidated from ZrC and TiB₂ powders by the Spark Plasma Sintering (SPS) technique at 1685°C and 1700°C for 300 s under 40-50-60 MPa. Densification, crystalline phases, microstructure, mechanical properties and oxidation behavior of the composites were investigated. The sintered bodies were composed of a (Zr,Ti)C solid solution and a ZrB phase. The densification behaviors of the composites were improved by increasing the TiB₂ content and applied pressure. The highest value of hardness, 21.64 GPa, was attained with the addition of 30 vol.% TiB₂. Oxidation tests were performed at 900°C for 2 h and the formation of ZrO₂, TiO₂ and B₂O₃ phases were identified by using XRD.

Keywords: Zirconium carbide, titanium diboride, spark plasma sintering

1. Introduction

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