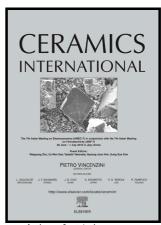
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ACCEPTED MANUSCRIPT

¹Mechanical properties of ZrB₂–SiC ceramics prepared by polymeric

precursor route

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Abstract: ZrB₂-SiC composite ceramics with varying compositions (6.4, 22.3, and

61.5 vol% ZrB₂-SiC) were synthesized and spark plasma sintered (SPS) for 30 min

under argon atmosphere. Ceramics showed relatively uniformly distributed phases

with small spherical crystallized grains. Vickers hardness and fracture toughness of

ceramics were measured, and scratch and tribological behaviors of sintered ceramic

specimens were also investigated. According to experimental results, materials having

different inter- and trans-granular fractures showed different wear loss, friction

efficient, and tribofilm morphology. Ceramics chemically reacted with moisture while

being tribotested, leading to the formation of a tribofilm on the bottom of wear track.

Characteristics of silica/hydride silica revealed the formation of tribofilms with

different morphologies, thereby implying that several key factors are involved in

determining the efficiency of this process.

Key Words: ZrB₂–SiC; Tribological behavior; Tribofilm

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