Mechanical properties of ZrB_2–SiC ceramics prepared by polymeric precursor route

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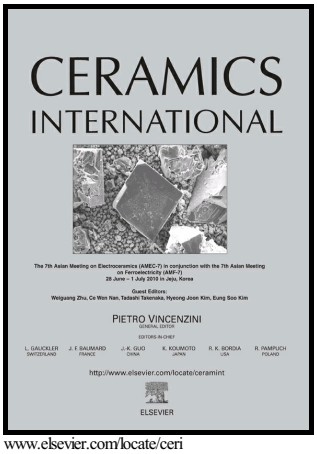

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[1]Mechanical properties of ZrB_2–SiC ceramics prepared by polymeric precursor route

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Abstract: ZrB_2–SiC composite ceramics with varying compositions (6.4, 22.3, and 61.5 vol% ZrB_2–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： ZrB_2–SiC; Tribological behavior; Tribofilm

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