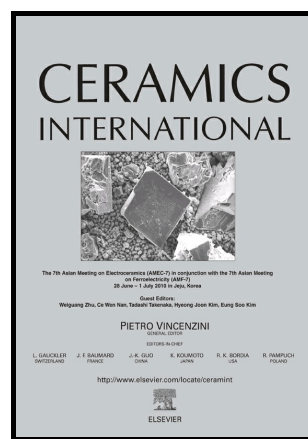


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Microtopography and mechanical properties of vacuum hot pressing Al/B₄C composites

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Abstract

Al/B₄C composites with various volume contents of B₄C (5, 10, 15, 20, and 25%) reinforcing the Al matrix, have been fabricated by vacuum hot press sintering at 680°C, with a soaking time of 90 min and external pressure of 30 MPa. Mechanical properties, phase composition, and microstructure of the Al/B₄C composites are discussed to reveal the physical properties of the composites. Field emission transmission electron microscopy and selected area electron diffraction have been employed to verify the interior structure and crystal growth direction, respectively. The Vickers hardness, fracture strength, tensile strength, and maximum force attained the optimal values of 108.45 ± 4.02 HV, 585.70 ± 23.26 MPa, 196.18 ± 2.48 MPa, and 4.44 ± 0.17 KN, respectively, for 25 vol. % B₄C/Al composites. The static compression strength increased before the 15 vol. % B₄C addition and then decreased,

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