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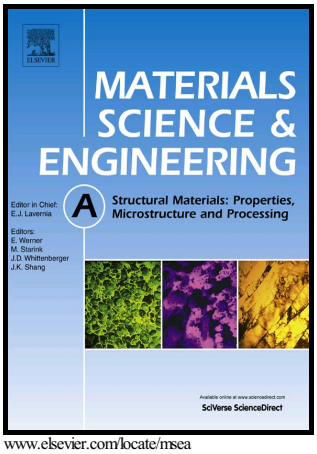

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Microstructures and properties of SiC particles reinforced aluminum-matrix composites fabricated by vacuum-assisted high pressure die casting

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ABSTRACT

The A356-SiC and 6061-SiC composites were fabricated by the vacuum-assisted high pressure die casting (HPDC) process. The distribution of SiC particles, 3D characteristics of pores, particle/matrix interface, and properties of the composites were investigated and compared with the composites prepared by the gravity die cast (GDC) process. In the HPDC composites, it was found that uniform distribution of SiC particles were achieved under the action of high fluid shear generated during the mold filling stage; the fraction and size of pores were significantly decreased; the pores were characterized with low volumes and sphericity values; the dense particle/matrix interfaces were obtained by the affecting of high intensification pressure. The tensile strength and elongation of the A356-SiC composite were 286 MPa and 4.3%, respectively, while those of the 6061-SiC composites were 246 MPa and 6.1%. Both the properties were improved significantly compared to those of the GDC composites.

Key words: Metallic composites; Particle reinforcement; Microstructure; Properties;