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Influence of the Grit size of Silicon Carbide Particles on the Mechanical and Electrical Properties of Stir Casting Aluminum Matrix Composite Material

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Abstract

This paper studies the influence of the grit size of silicon carbide particles on the mechanical and electrical properties of stir cast aluminum matrix composites. A two step-mixing method of stir casting technique at (500 rpm) has been adopted. Type 1170 Al with (99.66 % C.P) and silicon carbide (SiC) particulates of 240 grit size (45 µm), 320 grit size (29 µm), 600 grit size (9 µm) and 1200 grit size (3 µm) were used. The incorporation of weight fraction of SiC ranges from 2.5 %, 5 %, 7.5 % and 10 %. The microstructures of the produced composites were examined using a scanning electron microscope. Mechanical properties were determined by using a universal testing machine of 30 KN load. Microhardness was performed on the composite specimens by using a LECO 700 HT tester with a load of 492.3 N and with a dwell time of 10 seconds. The electrical properties were determined using a Keithley instrument Model 2400 point probe machine. The results show that the modulus, yield strength and hardness of the composite increase at lower grit sizes of silicon carbide of 3 micron. The maximum hardness of 26.1 HVN and maximum modulus elasticity of 1517.6 N/mm^{-2} was obtained at 7.5 % weight fraction of SiC. A boost in the mechanical and electrical properties of the produced alloys was gained by changing the grit size of the silicon carbide.

Keywords

SiC reinforced Grit size Electrical properties Microstructure Stir casting

Preview

References

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