

Effect of Mica on the Properties of ZA-27 Alloy Composites

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ABSTRACT

The mechanical properties and the fracture mechanism of composites consisting of ZA-27 alloy reinforced with mica particles were investigated with the primary objective of understanding the influence of the particulate reinforcement on the behavior of the ZA-27 alloy. The mica particle content in the composites ranged from 2 to 6% in steps of 2% by weight. The composites were fabricated by the stir casting technique in which the reinforcement particles were dispersed in the vortex created in the molten metal. The study revealed improvements in UTS, yield strength, hardness and Young's modulus of the composites, but at the cost of ductility, which decreased with increased in mica, content. The fracture behavior of the composites was influenced significantly by the presence of mica particles. Crack propagation through the matrix and the reinforcing particles resulted in the final fracture. Scanning electron microscopy and fractography analyses have been carried out to furnish suitable explanations for the observed phenomena.