

Casting of A356/TiB_{2p} composite based on the TiB_{2p}/CMC/PPS mortar

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Abstract

Composite materials are among those new materials used for many industrial applications. Many Methods have been proposed to overcome the problem of poor wettability between ceramic reinforcement particles and molten aluminum for metal matrix composite (MMC) production in casting processes.

In this investigation, an innovation procedure has been proposed for casting of metal matrix composites by adding a mortar consist of expandable polystyrene beads, carboxy methyl cellulose paste, water and TiB_{2p} particles as a mould pattern. This process was examined for A356/TiB_{2p} composite. The use of pretreated TiB_{2p} particles, 1wt% magnesium as a wetting agent and mechanical mold vibration while MMC_s slurry is solidifying were found to promote wettability of TiB_{2p} with molten matrix alloys. Produced composites were characterized using optical and scanning electron microscopy. Then mechanical properties of the composites, such as hardness, wear, tensile testing and porosity levels of produced Al/TiB_{2p} composites were measured and results has been discussed. Results show the mechanical properties strongly dependent on the distribution of the TiB_{2p} particles.

Keywords: Casting, Metal Matrix Composite, Wettability, TiB_{2p}/CMC/PPS mortar, Aluminum A356, porosity.