

PREPARATION OF 6061Al-Al₂O₃ METAL MATRIX COMPOSITE BY STIR CASTING AND EVALUATION OF MECHANICAL PROPERTIES

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ABSTRACT

Aluminum MMCs are preferred to other conventional materials in the fields of aerospace, automotive and marine applications owing to their improved properties like high strength to weight ratio, good wear resistance etc. In the present work an attempt has been made to synthesize metal matrix composite using 6061Al as matrix material reinforced with ceramic Al₂O₃ particulates using liquid metallurgy route in particular stir casting technique. The addition level of reinforcement is being varied from 6 - 12wt% in steps of 3wt%. For each composite, reinforcement particles were preheated to a temperature of 200⁰C and then dispersed in steps of three into the vortex of molten Al6061 alloy to improve wettability and distribution. Microstructural characterization was carried out for the above prepared composites by taking specimens from central portion of the casting to ensure homogeneous distribution of particles. Hardness and tensile properties of the prepared composite were determined before and after addition of Al₂O₃ particulates to note the extent of improvement. Microstructural characterization of the composites has revealed fairly uniform distribution and some amount of grain refinement in the specimens. Further, the hardness and tensile properties are higher in case of composites when compared to unreinforced 6061Al matrix, also increasing addition level of reinforcement has resulted in further increase in both hardenss and tensile strength.

KEY WORDS: MMC's, Al₂O₃ Particulates, 6061Al, Stir-Casting