

TO DEVELOP AND INVESTIGATE ALUMINIUM MATRIX COMPOSITE REINFORCED WITH IRON POWDER USING STIR CASTING PROCESS

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Mode of Study : F. Time

ABSTRACT

Aluminium based matrix composites (AMCs) possess tremendous potential for number of applications in addition to their present uses in different engineering fields. In the present work, Aluminum matrix composite reinforced with Iron powder was prepared using an economical stir casting process. Experimental factors used in the making of composite samples were iron content (5%, 10% and 15% by wt.), stirring speed (500rpm, 800rpm and 1000rpm) and stirrer duration (3min, 4min and 5 min) as per Taguchi L9 orthogonal arrays. Specimens were machined out of the castings as per standards for tensile strength, hardness and wear analysis. Scanning electron microscopy (SEM) and optical microscopy was performed to study the particle distribution and grain structure. The fabricated composites showed improvement in mechanical properties as well as wear resistance over the pure aluminium. ANOVA results highlighted that stirring speed and %wt. of Fe was most dominant factor for hardness & tensile strength and wear respectively. Minitab based approach was used to optimize the input factors and final results were further analyzed by photo-micrographs.