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A Project Report On

"EFFECT OF Al_2O_3/Gr PARTICULATES ON MECHANICAL AND WEAR PROPERTIES OF Al6061 HYBRID MMC'S"

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ABSTRACT

Metal–matrix composites (MMCs) have been developed to meet demands of lighter materials with high specific strength and stiffness for different applications in various sectors. In recent times, the application of Aluminium Metal Matrix Composites (MMCs) as engineering materials has exceedingly increased in almost all industrial sectors. 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 Al_2O_3 and Gr particulates using liquid metallurgy route in particular stir casting technique. The addition level of Gr is being varied from 0 - 9wt% in steps of 3wt% by keeping 12wt% Al_2O_3 constant. For each composite, reinforcement particles were preheated to a temperature of 200^0C and then dispersed in steps of three into the vortex of molten 6061Al alloy rather than introducing all at once, there by trying to improve wettability and distribution.

Microstructural characterization was carried out for the above prepared composites by taking specimens from central portion of the casting by microstructural studies. Hardness, tensile and wear properties of the prepared composite were studied before and after addition of Al_2O_3/Gr particulates to note the extent of improvement. Microstructural characterization of the composites has revealed fairly uniform distribution of Al_2O_3 particulates 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. Increasing addition level of Gr has resulted decrease in both hardness and wear rate.

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