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Name of the Topic: Structural and Mechanical behavior of Aluminum 6351-Al2O3/C/SiC/TiO2 Hybrid metal matrix composite

Keywords: Hybrid Metal Matrix Composite (MMC), Stir Casting; XRD; SEM; Mechanical Behavior, ANOVA; TOPSIS; SEM.

Research Highlight:

Recent trends in materials engineering show a significant attention towards the fabrication of hybrid composites so as to meet several demands of high strength to weight ratio, hardness, wear resistance, corrosion resistance and great microstructural soundness. Metal Matrix Composites (MMCs) have high resistance to wear and also shows improved tensile and compressive strength. The popular metallic matrix is aluminium which is currently in demand since it can be reinforced with various ceramic reinforcements so as to the meet required properties. The aim of the present thesis is to examine the effect of Al_2O_3/C/TiO_2/SiC reinforcements on the properties of Al6351. X-ray diffraction (XRD), scanning electron microscopy (SEM) [As prepared], energy dispersive spectroscopy (EDS), density, hardness, impact strength, tensile strength, wear analysis, optimization of wear using ANOVA and TOPSIS and SEM of the worn surfaces for all the fabricated hybrid composite i.e. Al-Al_2O_3-C, Al-Al_2O_3-$TiO_2$and Al-Al_2O_3-SiC has been investigated. The hybrid metal matrix composite Al-Al_2O_3-C/Al-Al_2O_3-TiO_2/Al-Al_2O_3-

SiC were fabricated by stir casting with equal proportion of reinforcements (2.5, 5, 7.5 and 10 wt. %).

Scope for Further Research Work

On the basis of above investigations there is some scope for addition of work in the present field in the following manner:

- Further, this study can be extended by using the advanced fabrication processes like infiltration, plasma sintering, hot pressing and powder metallurgy processes to provide better homogeneity in the final product.
- Further, this study can be extended by using following characteristic such as corrosion resistance, thermal conductivity and electrical conductivity.
- Further, this study can be extended by using various machining processes with different parameter of machining.