

Characterization of Aluminium Alloy 6063 Hybrid Metal Matrix Composite by Using Stir Casting Method

Authors : Balwinder Singh

Abstract : The present research is a paper on the characterization of aluminum alloy-6063 hybrid metal matrix composites using three different reinforcement materials (SiC, red mud, and fly ash) through stir casting method. The red mud was used in solid form, and particle size range varies between 103-150 μm . During this investigation, fly ash is received from Guru Nanak Dev Thermal Plant (GNDTP), Bathinda. The study has been done by using Taguchi's L9 orthogonal array by taking fraction wt.% (SiC 5%, 7.5%, and 10% and Red Mud and Fly Ash 2%, 4%, and 6%) as input parameters with their respective levels. The study of the mechanical properties (tensile strength, impact strength, and microhardness) has been done by using Analysis of Variance (ANOVA) with the help of MINITAB 17 software. It is revealed that silicon carbide is the most significant parameter followed by red mud and fly ash affecting the mechanical properties, respectively. The fractured surface morphology of the composites using Field Emission Scanning Electron Microscope (FESEM) shows that there is a good mixing of reinforcement particles in the matrix. Energy-dispersive X-ray spectroscopy (EDS) was performed to know the presence of the phases of the reinforced material.

Keywords : reinforcement, silicon carbide, fly ash, red mud

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