

SOLIDIFICATION ANALYSIS OF ALUMINIUM 11.8% SILICON ALLOY REINFORCED WITH TITANIUM CARBIDE PARTICULATES PRODUCED USING VORTEX MIXING – PERMANENT MOULD CASTING

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In this study, solidification analysis of metal matrix composite (MMC), aluminium-11.8% silicon alloy (LM6) matrix reinforced with titanium carbide particulates (TiC_p) was performed. Combination of vortex mixing – permanent mould casting method was used as the manufacturing method to produce the specimens. Thermal measurements during the casting process were captured and solidification graphs were plotted to represent the solidification characteristic. Solidification analysis was performed by interpreting the solidification graphs. Parameters such as; the nucleation of primary alpha phase temperature, liquidus arrest temperature, liquidus undercooling, eutectic growth temperature and solidification time are presented. The results showed that introduction of second phase particulates into a matrix alloy have affected the various time and temperature parameters of its solidification properties. It is concluded that casting of LM6-TiC_p MMC was successfully achieved using vortex mixing technique and that addition of particulates influence solidification characteristics may affect the mechanical properties of the MMC.

Keywords: solidification analysis, aluminium-11.8% silicon alloy (LM6), titanium carbide particulates (TiC_p), metal matrix composite (MMC)