

Mechanical properties and morphological analysis of copper filled aluminum alloy hybrid matrix composite

ABSTRACT

This paper presents the characterization of LM6 aluminum alloy with varying copper addition. LM6 is a soft, light-weight and corrosion resistant metal. Due to these characteristics, the material was selected to be added with copper to identify improved properties. The amount of copper addition was varied from 0%wt with intervals of 3%wt for every alloying run. Vibration casting, or vibration molding, was conducted. The vibration process is said to give a better result in terms of the alloy's grain size and arrangement. Mechanical testing and microstructure analysis were performed to prove the theory. Specimens with various amounts of copper were successfully produced and tested. The LM6 alloy specimen casted without copper and with vibration casting at 20 Hz had the highest tensile strength and percentage of elongation, while the LM6 alloy specimen casted with 9%wt of copper without mechanical vibration casting had the best mechanical properties based on the overall results and criteria. The percentage of copper addition that produced the optimum properties was found to be 9%wt of copper without vibration molding (hardness 46.2HRB, 125 MPa).

Keyword: Aluminum composite; Al-Si-Cu; LM6; Hybrid composite; Vibration casting