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(57) Abstract :

Copper coated steel fibers reinforced LM13 aluminium alloy composites have been prepared using stir casting process. Experiments have been designed using response surface methodology (RSM) by varying wt% of reinforcement (0 - 10), stirrer speed (350 800 rpm) and pouring temperature (700 800 °C). Microstructure, tensile strength and fracture surface of composites have been investigated. Analysis of variance, significance test and confirmation tests have been performed and regressions models have been developed to predict the tensile strength of composites. Response surface plots reveal that tensile strength of composites increases with increasing wt% of copper coated steel fibers reinforcement up to 6 wt%. Further increase in wt% of steel fibers decreases the tensile strength of composites. However tensile strength of composites increases with increasing stirrer speed due to the uniform and homogeneous dispersion of steel fibers in matrix. Optimum stir cast process parameters for obtaining higher tensile strength are found to be 5.9 wt% of reinforcement, 753 °C pouring temperature and stirrer speed of 633 rpm. Fracture mechanism is dominated by steel fibers pull out in composites with higher wt% of reinforcement and dimples are observed in the surface of composites contains lower levels of wt% of reinforcement.

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