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EFFECT OF POWDER DENSITY VARIATION ON PREMIXED Ti-6Al-4V AND Cu COMPOSITES DURING LASER METAL DEPOSITION

Abstract

This paper reports the effect of powder density variation on the premixed Ti-6Al-4V/Cu and Ti-6A-4V/2Cu Composites. Two sets of experiment were conducted in this study. Five deposits each were made for the two premixed composites. Laser powers were varied between 600 W and 1700 W while a scanning speed of 0.3 m/min is kept constant throughout the experiment. Investigations were conducted on the microstructures and microhardness of the laser deposited premixed Ti-6A-4V/Cu and Ti-6A-4V/2Cu composites. It was found that the evolving microstructures of the composites were characterised with the formation of macroscopic banding and Widmanstatten; and disappears as it grows towards the fusion zone (FZ) and this could be attributed to the changes in the distribution of heat input. Sample A2 of premixed Ti-6A-4V/Cu composite gives the highest hardness of $393 \pm 6.36\text{VHN}_{0.5}$ while sample B4 of premixed Ti-6A-4V/2Cu composites depicts the highest hardness value of $373 \pm 9.18\text{VHN}_{0.5}$.