

Effect of scanning speed and powder flow rate on the evolving properties of laser metal deposited Ti-6Al-4V/Cu composites

Abstract

In laser metal deposition (LMD), good bonding between two similar or dissimilar materials can be achieved if the interrelationships between the processing parameters are well understood. LMD was conducted by varying the scanning speed and keeping other parameters constant. The deposited samples were characterised through the volume of the deposited composites, microstructure, microhardness and porosity. The effect of the optimised high powder flow rate and a constant power of 1,000 Watts led to a degree of porosity on the composites. The varying percentages of porosities in the samples which have an advance merit effect in the implantation of bones in animal and human were characterised. The Vickers microhardness was observed to increase with an increase in the scanning speed. At a low scanning speed, the microstructure appears coarse due to the high rate of deposition. The α -phase acicular microstructure decreases in size and thickness with an increase in the scanning speed.