

Behaviour of Laser Metal Deposited Ti6Al4V/ Cu Composites in Hank's Solution in Terms of Biocompatibility Properties

Abstract

Ti6Al4V alloy is a well-known material for biomedical application due to the very excellent corrosion resistance it possessed. Cu has an excellent antimicrobial property and stabilizes the immune system of the body activities. In this present study laser metal deposition (LMD) of Ti6Al4V/Cu composites has been conducted by varying the laser power of a fibre laser between 600 and 1800 W while the scanning speed of 0.005 m/s and other process parameters as depicted in the experimental matrix were kept constant. The deposits were characterized through the microstructures, the microhardness and the morphologies of the immersed samples. The microstructural evaluation revealed the presence of Widmstätten structures which were observed in all the samples at high magnification and lose their coarseness as the laser power increases. The microhardness values of the deposited composites varied between HV 335 \pm 27 and HV 490 \pm 73. The surfaces showed fracture topography with porous bone-like and snowflake structures.