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## **Bioceramic hydroxyapatite coating fabricated on Ti-6Al-4V using Nd:YAG Laser**

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### **ABSTRACT**

A method of synthesising a biocompatible HAP coating is presented. In the current study, Nd:YAG laser was used to directly melt pre-plate HAP powder beds on Ti-6Al-4V. The processing parameters used were 750 W laser power, 5 mm/s scanning speed and 27° inclined beam plane. The coating was studied under white light and scanning electron microscope where it was possible to characterise the microstructures. The produced coating was characterised of mixed morphologies of HAP, short and elongated titanium needles at the surface while in the middle of the coating dendrite trunks without arms were observed. This observation is related to the heat inputs, dilution and melting of the substrate and powder during processing. The absence of the arms growing from the trunks indicated low heat inputs. In addition, the microstructure of the HAP after soaking in Hanks' solution indicated octagonal and hexagonal crystals of HAP. The hardness values indicated good metallurgical bonding at the interface. In conclusion, this study was successful in fabricating a desirable coating of HAP on Ti-6Al-4V for biomedical applications. This work highlights that even though laser power and scanning speed are predominantly influential parameter settings, it is also necessary to consider the angle at which the laser beam is scanned across the material.