

International Journal of Surface Science and Engineering, vol. 12(1): 23-39

In-situ formation, anti-corrosion and hardness values of Ti-6Al-4V biomaterial with niobium via laser deposition

<https://www.inderscienceonline.com/doi/pdf/10.1504/IJSURFS.E.2018.090053>

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#### ABSTRACT:

Ti-6Al-4V alloy biomaterials have low hardness, wear resistance, high corrosion rate and toxicity as results of release of aluminium and vanadium ions that led to the premature failure of the implant. In order to overcome some of these problem that lead to laser cladding of Ti-6Al-4V alloy with Niobium. Three laser parameters (laser power, beam diameter and laser scan speed) were used to ascertain the proper operating condition for this laser process. RofinNd: YAG laser was used in the laser cladding. The electrochemical study was conducted using Hank's buffered salt solution an environment similar to the human body. The optimum improvement in corrosion resistance resulted to 81.79% when compared with substrate. It has been established that operating parameter for laser cladding of Nb on Ti6Al4V were obtained at: laser power (1,000 W), beam diameter (1 mm) and scan speed (0.3 m/min)