

Materials Science Forum

Laser Based Manufacturing of Ti6Al4V: A Comparison of LENS and Selective Laser Melting

Nana K.K. Arthur ^{1, a}

¹ CSIR, NLC, Laser Enabled Manufacturing Group, Pretoria Campus, 0001, South Africa

^a NArthur@csir.co.za

<https://doi.org/10.4028/www.scientific.net/MSF.950.44>

Abstract

The laser engineered net shaping (LENS) system was used for the laser based manufacturing of a test geometry used to assess the performance of additive manufacturing systems. This system was preferred over a selective laser melting (SLM) system due to certain inherent benefits that would promote the manufacture of the test geometry where the SLM system had failed due to part delamination. The test geometry was successfully manufactured on the LENS system and machined to produce test specimen for mechanical testing and microstructural evaluation. Investigations revealed that the α - β lamellar microstructure was formed via in situ martensitic decomposition of the α' structure. This resulted in promising yield and tensile strengths in excess of 900 MPa and high tensile elongation up to 13%.