

Titanium Alloy Ti-6Al-4V Prepared by Selective Laser Melting (SLM)

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Selective laser melting (SLM) as a representant of additive manufacturing technology brings about many advantages into production, which are appreciated especially in the field of biomedical applications and implantology. Our paper is focused on characterization of titanium alloy Ti-6Al-4V (Ti Grade 5) widely used for orthopaedic implants produced by this novel method. Microstructure and mechanical properties are compared with the same material prepared by conventional way of casting, forging and machining. Results show these are almost equivalent. Microstructure is in both cases formed by two phases $\alpha+\beta$, but possesses different morphology. Yield strength and ultimate tensile strength of SLM material slightly overpassed values obtained by conventional commercial production (950 MPa and 1000 MPa vs. 877 MPa and 985 MPa). Only elongation was reduced resulting from the presence of some porosity. However, by future optimalization of SLM process parameters, porosity is expected to decrease.

Keywords: titanium alloy, SLM, 3D printing, mechanical properties

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