

# **SURFACE MODIFICATION OF 3D PRINTED TRABECULAR TITANIUM ALLOY STRUCTURE**

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Additive manufacturing by direct metal laser sintering allows to produce implants with trabecular structure [1]. Metal trabecular structure mimics the internal structure of the bone. By adjusting the porosity and surface of trabecular structure, partial or complete bone structure may be restored [2]. Ti-6Al-4V alloy trabecular structure specimens were produced using direct metal laser sintering (DMLS). After manufacturing and annealing specimens, the chemical etching processes were done to modify the micro-roughness of the titanium alloy surface. The topography of the surfaces was investigated using scanning electron microscope (SEM). Chemical composition was done using X-ray photoelectron spectroscopy (XPS). Porosity was set using micro-computer tomography. SEM analysis showed that the surface topography consists of a macro- and microroughness. The results of micro-computer tomography showed of specimen's porosity. This study showed that alkali and acid etching technologies allow to control roughness, topography, chemical composition and cells adhesion of additively manufactured Ti-6Al-4V alloy trabecular structure surface.

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[1] W.-S Lin., T. L. Starr et al. Additive Manufacturing Technology (Direct Metal Laser Sintering) as a Novel Approach to Fabricate Functionally Graded Titanium Implants: Preliminary Investigation of Fabrication Parameters. 1490-1495 (2013).

[2] L. Yuan, S. Ding, C. Wen. Additive manufacturing technology for porous metal implant applications and triple minimal surface structures: A review. *Nature*: **4**, 56-70 (2019).