

INFLUENCE OF TECHNOLOGICAL PARAMETERS OF SLM ON THE POROSITY OF ALLOY TI-NB

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Selective laser melting (SLM) allows making products with a complex geometry. The laser beam under control of a computer program, selectively affects the particles of the powder. Particles of the powder are heated, sintered, and then fused together. By changing process conditions SLM is possible to obtain products with a given structure and physical and mechanical properties. SLM composite powder in mass proportions of 55% Ti and 45% Nb (Ti-45Nb) is made on an experimental machine of layer by layer laser sintering «VARISKAF-100MVS». As a result of the experiments, it was obtained panel of samples. Samples were made with a side of 10 mm and a thickness of 1.5 mm. The change in the porosity was considered according to the technological conditions of SLM. The used processing parameters for forming 3D specimens were laser power, 100 W; scan speed, 70 mm/s; scan interval, 0.1 mm; temperature of powder, 300 °C. The influences of the thickness of a powder layer of 0.025-0.05 mm and various scanning strategies on the change in porosity are considered. The values of technological parameters of SLM are established at which the minimum porosity in the samples is reached (Fig. 1).

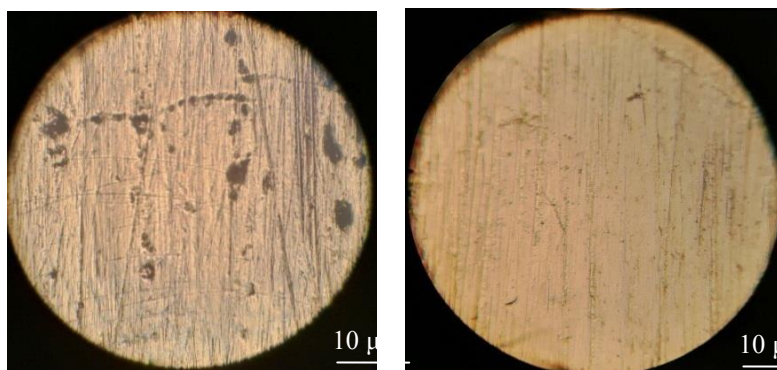


Figure 1. Changing the porosity in the samples

By changing the technological parameters of SLM, a minimum porosity value is obtained in samples of the Ti-Nb alloy. But the problem of the formation of cracks in the volume of samples is not solved.

References

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