CONCLUSIONS

The effect of technological parameters of the process of solidification of Ti - TiB colors obtained in conditions of electron beam melting, realized by the electron beam of a surface layer and by the method of 3D printing with laser heating on mechanical properties, microstructure and phase composition of the material was investigated.

It has been established that the microstructure of the eutectic alloy consists of an α-titanium matrix with chaotic fibers of titanium boride. It was found that the diameter of the fibers increases, and the number of fibers decreases, in across section from the side part of material to the central part, it can be explained that heat overflow is higher on the sides than in center.

It is proved that during the reflow of the surface of the plate TiB with an electron beam, the amount of fibers can be increased in 10 - 40 times as a result of the 100 times higher cooling rate of the melted layer.

It is shown by methods of microscopic and X-ray diffraction analysis that during surface treatment of the material with a laser beam that in formed reflowed layer which is 25 – 55 mcm, is only single-phase titanium and also CSR size increases with holdup time of the laser in one point increase.

It has been found that regardless of the technological parameters of the crystallization process, the Ti - TiB composite hardness is determined by the fibers amount, its size and by the distance between them. However, more anisotropic structure of the composite is formed in the case of electron beam melting,, since the fibers are mainly oriented towards the heat overflow runs through the not reflowed material.

It has been discovered that after heating of the reflowed layer of the composite to temperature lower than the melting point of the material titanium monoboride is not released, but the CSR increases, which indicates an improvement of the structure