THE DESTRUCTION OF THE TENSILE DISPERSION-STRENGTHENED COMPOSITE MATERIAL

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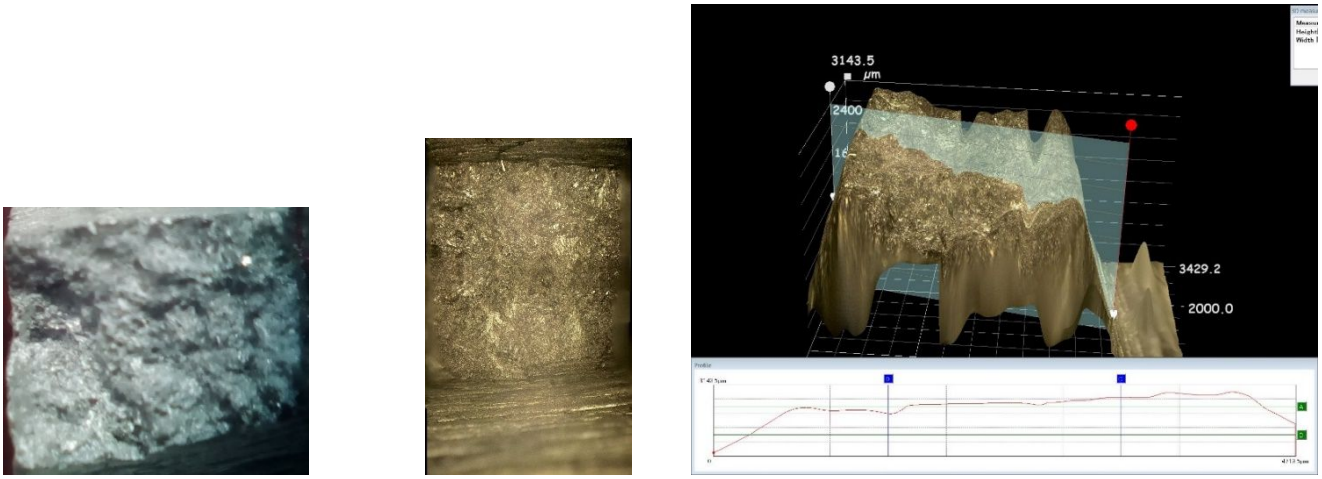
In the presented work we investigated fracture resistance tensile materials made according to fundamentally different technology of producing the dispersed-strengthened composite materials based on aluminum, which is based on the process of burning of the aluminum melt when interacting with oxygen or oxygen – nitrogen mixture [1-4]. The average particle size of the reinforcing phase is predominantly spheroidal morphology is 40-60 μm and the number changed from 10% to 60%. This paper presents the results of the samples with a minimal amount of solid phase.

Study of fractured surfaces was performed using optical microscope KEYENCE VHX-1000 with enhanced capabilities through improved telephoto optical system and digital image processing.



a) *b*) *c*)

Fig. 1. The fracture surface of the sample: *a* – the optical macrostructure x40; *b* - macrostructure in Optimal Image mode; *c* – 3D structure with profilograms on the highlighted section

Figure 1,*a* shows a macroscopic view of the fracture surface of a flat specimen with the smallest number of inclusions of the solid phase, consisting of a fibrous zone with regions of randomly arranged fibers without any preferential orientation. The foci of destruction and the zone of nucleation of the crack are indeterminate (Figure 1,*b*), which is associated with the stability of the process of high-energy propagation of the fracture during destruction. The fracture is characterized by a morphologically uniform destruction surface, i.e. homogeneous in macro geometry without geometric zones that differ significantly in the relief with the presence of the same type of fracture elements, which is shown in Fig.

1, b as a characteristic of the degree of unevenness of the fracture surface in a direction perpendicular to the plane of application of the load. A small amount of dispersed inclusions in the matrix of the material under study at considerable distances leads to the formation of low ridges in some directions, which can be explained by the fact that they are circumvented or bent by the front of the crack propagation, to which this advance is simpler than for the body of high-hard phases. In this case, the polycrystalline nature of the structure (grain structure) determines the fact that the front of material destruction undergoes a slight branching.

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