RESEARCH OF MULTICOMPONENT COMPOSITES DESTRUCTION UNDER POWERFUL PULSE OF A HIGH-CURRENT ELECTRON BEAM [[1]](#footnote-1)\*)

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The active development of materials science leads to the emergence of new polymer and composite materials that are in demand in the space industry and aircraft industry. However, the strength properties of such materials are often poorly understood. At the same time, mathematical modeling of the propagation of shock waves in materials with a complex structure is extremely difficult and requires verification. It was shown in [1-3] that the reaction of materials under pulsed impact, especially in the case of volumetric energy release, can significantly differ from the stationary and surface cases. This paper presents the results of a study of the strength properties of multicomponent composite materials under high-power pulsed impact (200-300 J / cm2) using a high-current electron beam at the “Calamary” facility. Using the methods of scanning electron microscopy, the features of destruction in the resulting crater and in the thickness of the target along the path of shock wave propagation are investigated. The integral electron beam energy flux, the ablation, and, for a number of cases, the rate of expansion of the plasma from the surface of the irradiated samples were estimated. The pressure in the focal spot (in the crater region) was also estimated under the assumption of isochoric energy release, which amounted to 20 GPa. Using impedance spectroscopy, we studied the change in the electrical conductivity of composites.

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References

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLVII/Pt/ru/GS-Kazakov.docx) [↑](#footnote-ref-1)