MECHANICAL PROPERTIES OF GLASSY CARBON UNDER SHOCK WAVE LOADING IN THE AREA OF ITS ABNORMAL COMPRESSIBILITY.

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The glassy carbon is the nano-structured metamaterial, which has anomalous compressibility (see [1]) under isothermal conditions by static compression.

Previously [2], we have established the formation of shock rarefaction waves in the glassy carbon, as well as the transformation of the shock wave front into a ramp compression wave. This generally means abnormal compressibility of glassy carbon not only in static loading conditions, but also in microsecond shock-wave compression-release cycle.

In the development of results [2] in this paper, we measured the evolution of the mass velocity in one-dimensional compression pulses propagating through the samples of glassy carbon at its abnormal compression. Then, mathematical modeling of free surface velocity experimental profiles was performed within the hydrocode. Hydrocod based onself upon the equation of state of the glassy carbon from 1 . The results of mathematical modeling, together with the initial experimental information, allowed to determine the spall strength and the parameters of the fracture wave in the glassy carbon in the area of its abnormal compressibility.

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1. Zhao Z., Wang E.F., Yan H., et al. // Nature Comm. 2015. V. 6. P. 1.
2. Molodets A.M., Golyshev A.A., Savinykh A.S., Kim V.V. // JETP. 2016. V. 122. No. 2. P. 289.