Testing the assemblies for impact loading of a flat recovery ampoules with a continuous pressure hold

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The shock compression of powder materials is used for the synthesis of new materials or phase states [1]. For these purposes are often used the flat ampoules with the studied material inside. To implement a pressure the impact scheme with flat liner is applied [2]. Due to the small liner thickness, the loading time of the material inside the ampoule does not exceed a few microseconds. In some cases, such duration of loading is insufficient to complete a synthesis to a new phase state. This paper describes the probation of schemes for loading the recovery ampoules during longer time. As the test object under loading a synthesis of a cubic structure (γ-phase) of silicon nitride (Si₃N₄) from the original hexagonal structure was chosen. Previously this process was carried out in mixtures of Si₃N₄ with bromide [3] and potassium chloride, and with copper powder, at pressures up to 50 GPa [4]. In addition, it was carried out under filling the initial pores in silicon nitride with liquid bromoform (CHBr₃) [5]. Shock loading was carried out in counter and reflected shock waves, time of loading was evaluated by x–t diagram and the pressure—by the known shock adiabats of the assembly elements. The effective duration of loading depended on the size, strength and mass of assembly elements. The x-ray analysis were carried out on diffractometer DRON-2, CuKα radiation.