

Morphological and structural changes of carbon nanotubes, caused by strong shock waves effect.

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A Behaviour of nanomaterials, including the carbon nanotubes, under high pressures and temperature presents both fundamental and applied interest in view of perspective material syntheses. Most likely the carbon nanotubes are converted into the graphite or the diamond under extreme high pressures. but before the new structures are formed From the science literature it is known that nanotubes are converted in like structures as polymeric nanotubes or nanodiamond at moderate high pressures and temperatures. Under shock loading grater then 20 GPa, the multiwall carbon nanotubes (MWCNT) turn into diamond. As to research the investigations of MWCNT at the megabar pressures the researches in this area were not undertaken till now.

In the stated work the complex investigations are executed for morphological and structural characteristics of MWCNT, which have affected the step shock compression up to 100 GPa. The special device with tungsten anvils is developed for recovered of the samples after shock loading up to 100 ГПа. Thermophysical histories of shock compression and the subsequent unloading of MWCNT are calculated. The diffractometry structural researches of the samples are executed before and after shock loading. The morphological researches of the MWCNT are carried out by the method of scanning and transmission electronic microscopy of the initial MWCNT samples and the processed by explosion MWCNT samples. It is shown, that as a result of strong shock compression the MWCNT undergo following changes: a) the MWCNT partially transformed into crystal structures with the increased interplane distance, b) the individual MWCNT are subjected to the irreversible distortions of the form.

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