Phase transition in amorphous fullerites C_{70}

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It has been shown that at high-temperature annealing of amorphous fullerites, produced by mechano-activation treatment of crystal C_{60}, takes place polyamorphous phase transition from an amorphous molecular phase in amorphous atomic phase [1]. In this work we have tried to find out temperature evolution of pure amorphous C_{70}. After long time milling of C_{70} on the places of Bragg's reflexes, characteristic for initial crystalline fullerites we can observe diffuse gallo, typical for amorphous phases Areas of the coherent dispersion, estimated on gallo widths is about 3-5 nm.

After high-temperature (1300-1500 K) annealing we can observe diffraction picture, that corresponds to amorphous atomic phase, like in the case of C_{60}. Differential thermal analysis gives one sharp signal of thermal emission at 950°C, when the polyamorphous transition from molecular (fullerenelike) phases in atomic (probably diamondlike) phase takes place. At the same time comparison of gallo positions with reflexes of diamond and graphene ((h k 0) graphite peaks)shows that in the measured range of the transferred impulses all these positions are close, so it is impossible to make the conclusion, whether the high-temperature amorphous phase is diamondlike or graphenelike. However the transition between stable amorphous fullerites to amorphous graphites occurs through intermediate diamondlike (metastable) or graphenelike (quasitwo-dimensional) phase.

At high-temperature interaction of this phase to detonation diamond nanopowder there is a disappearance of a reflex of detonation diamond which, apparently, is dissolved in a high-temperature amorphous phase.

[1] S.S. Agafonov, V.P. Glazkov, I.F. Kokin, V.A. Somenkov, *Solid State Phys.* **52**(6), (2010).