Nanocomposites and nanomaterials

Multi-walled carbon nanotubes obtaining by thermocatalytic dissociation of CO molecules

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Carbon nanomaterials (Fullerenes, nanotubes, graphenes, etc.) have high electrical conductivity, sorption ability of various substances, chemical and thermal stability, strength and elasticity. All these properties determine broad areas of their practical application and importance of effective methods creation for the production of these materials with specified properties.

In this work, based on an analysis of the results of previous studies of sorption of CO in C_{60} [1], developed a simple method of obtaining carbon nanomaterials with high percentage of nanotubes. The method based on heating to a temperature T> 300 ^{0}C the CO gas, which is located in a stainless steel chamber at a pressure of 30 atm. As a consequence, occurs a thermocatalytic dissociation of CO molecules and the formation of a carbon powder. The structural features of the condensate are investigated by X-ray diffractometry and electron scanning microscopy. The proposed technology, unlike [2-6], makes it possible to obtain carbon nanomaterials (nanotubes) of rather high purity and morphological homogeneity in a macroscopic amount already at the first production cycle. It is showed that the obtained nanomaterials contain two carbon phases of one morphology (nanotubes), but of different crystallinity degree. The crystallinity is determined by the number of walls in the nanotubes. The influence of the temperature of the catalyst on the structural characteristics and the phase composition of the carbon nanomaterials studied.

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