

Nanocomposites and nanomaterials

Structure and sorption properties of carbon nanomaterial obtained by thermocatalytic dissociation of CO molecules

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Carbon nanomaterials have a variety of unique properties, determined mainly by their structural and morphological peculiarities, which determines the broad areas of practical application and the importance of creating effective methods of production of these materials.

In this work suggested a simple and cost-effective method of obtaining carbon nanomaterials. It consists in heating the CO gas under pressure of 30 atm. in a stainless steel chamber to a temperature $T = 300^{\circ}\text{C}$. On the inner surface of the reaction chamber occurs catalytic thermal dissociation of CO molecules and carbon atoms condensation. The structural features of the carbon powder condensate were monitored X-ray studies. This technique allows to obtain carbon nanomaterials with sufficiently high purity and morphological homogeneity in macroscopic quantities already at the first cycle of manufacture, unlike existing methods [1-3]. Defined that the condensate contains up to 90% nanotubes and the rest of it is amorphous soot.

The effect of the dissociation temperature of CO molecules on the structural and sorption characteristics of carbon nanomaterials was studied in the range of $300\text{-}600^{\circ}\text{C}$. Processes of sorption (desorption) of H_2 molecules of obtained powder was studied. The results of these studies were compared with the known effective sorbents.

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