

Vyacheslav Babayan
V.E. Olishevskaya, research supervisor
O.D. Shvets, language adviser
Oles Honchar Dnipropetrovsk National University

Carbonic Nanomaterials

Nanomaterials have received considerable attention in the last decades in science and technology. The field of nanomaterials involves the study of material where at least one of the constituent phases has one dimension less than 100 nm.

The rapid development of science and technology based on nanotechnology called nanoindustrial revolution. Since 1995, the main focus in the industrialized countries is the creation of devices based on nanostructures and nanotechnological complexes, which can be used both on Earth and in space. It is predicted that the use of nanomaterials and nanotechnologies in science and technology will allow to provide reduction in weight and volume products in 1000 times, reduction in linear dimensions in 10 times, reduction of power consumption in 10,000 times, reduced vibration and noise in 100 times, battery life increase in 10,000 times, and reliability increase in 100 times.

For many years it has been believed that the carbon may have only two allotropic forms - diamond and graphite. Third form of elemental carbon - carbene - was opened in the 60s of the 20th century. Carbene has a linear structure - stitched double bonds or alternating single - triple bonds of the chain of carbon atoms.

In the 60s of the 20th century, researchers have paid attention to the fact that carbon can form not only flat, but concave surface. In 1966, Jones suggested that the high-temperature synthesis of graphite by introducing atoms or fragments, forcing graphite surface deviate from the plane may form carbon spheroids which are hollow inside. In 1970 Osawa theoretically built C₆₀ molecule. Moreover, in the second half of the 80s of the 20th century the real race on the synthesis, identification and isolation of spherical carbon structures was started. Numerous forms of elemental carbon - fullerenes and nanotubes, giant fullerenes and onion structures, toroidal and spiral forms of carbon were discovered. Carbon can form complex enclosed structures consisting of five-, six -, seven - and octagons with masses, multiple weights 20 carbon atoms.

The carbon materials may have different conductive properties and serve as insulators, semiconductors, conductors and superconductors .

Carbon nanomaterials are under study, but today they are made of bulletproof vests, structural elements of aircraft and missiles, rocket engines, suits, heated by electricity and many other products.