

## NANOTECHNOLOGIES

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The prefix Nano- comes from Greek word ramos meaning dwarf. Feynman's famous nanoworld “on the head of a pin” inspires scientists to venture in this uncharted nano-terrain to do something big with something small [4.2]. It excites investors and corporations, governments and policymakers to gamble on nanoscience breakthroughs and create new nanotechnologies [4.3].

These new materials are unique. These are very durable materials because the bonds between the carbon atoms in the graphite sheet are the strongest among the known ones. The carbon pipes are two orders of magnitude stronger than steel and about four times lighter! One of the most important tasks of technology in the field of new carbon materials is to create nanotubes of “infinite” longitude.

It is possible to produce light composite materials of ultimate strength for the needs of the new century machinery. These are power elements of bridges and structures, carrying the construction of compact aircraft, turbine elements, power blocks of engines with extremely low specific consumption of fuel. Nowadays bulk materials can be synthesized using nanomaterials in two main ways either by reducing one or more of their physical dimensions to nanoscale, or by providing them with nanoscale porosity [4.4]. For successful nanotechnological research it is necessary to know the structure of the atom, also its ability to interact with other atoms. With assistance of this new technology, a modern substance was obtained in the thickness of one Carbon atom. There is a carbon nanomaterial “graphene” in which carbon atoms are linked with “cells” in the form of a regular hexagon with a side of 0.142 nm. Polymer nanocomposites are made up of a polymer or copolymer

containing nanoparticles or Nano fillers separated in the polymer medium. They do not need to be unequal, but even if one measurement should be in the choice of 1-50 nm [5.1].

This conversion from micro to nano particles drive to change in its physical and chemical belongings. Under these conditions the ratio of surface area to volume and particle size increases. Nanoparticles, the same carbon nanotubes, nanoclays, and graphenes, broadly make use of in the polymer nanocomposites to alter the chemical, mechanical, electrical, optical, and thermal properties [5.2].

However, it is necessary to solve a large number of important problems before the full potential of polymeric nanocomposites can actually be realized. Nanoparticles can be added to improve the mechanical, thermal, electrical and rheological qualities of polymers, but some factors such as processing technology, phases. Nanotechnology allows us to produce light and flexible building materials, high-performance filters for water and air. Medicines made using nanotechnologies allow us to influence only the sick cells without harming the healthy ones, and cosmetics not only act on the skin surface, but also at a deeper level. Nanotechnologies are widely used, in particular, in materials science for the creation of high-strength materials, in electronics for the creation of electronic computers of the next generation, the creation of super-powerful and over miniature computers, in medicine in the manufacture of tools for precisely delivering drugs to certain places of a living organism, for biologically diagnosing, harmful impurities in the production of food products, as well as in other branches of science and technology.

To sum up, as you can see nanochemistry and especially polymer nanocomposites is a very modern and fast developing branch in the science nowadays. Further research of nanomaterials will give the possibility of developing such branches as synthetic chemistry, analytical chemistry, materials science, optics, electronics, environmental science, biology, medicine, product development and support, chemical engineering. Nanotechnologies are our future.

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