Monomolecular nanowires and nanosemiconductors based on dopated diamondoids.

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Results

With the help of computer simulation has been optimized geometry, calculated the dependence of electronic properties on the size of diamondoidi, having one or two different substituents in the molecule (external doping), the replacement of carbon atoms in certain positions diamondoids (internal doping) one or two heteroatoms. The methods for the selective introduction of different functional groups in a predetermined position of the molecule diamondoids and synthesis diamondoids with the replacement of carbon atoms in certain positions on diamondoida heteroatom (O, N), synthesized functional derivatives geterodiamondoids. In collaboration with physicists of Stanford and Berkeley, studied the electrical properties of the samples thus obtained, namely, made X-ray and UV photoelectron, Raman and photoluminescence spectra. The experimentally measured band gap of doping diamondoids and other characteristics of the obtained compounds. The properties of self-assembled monolayers of some doped diamondoids on surfaces of gold and silver were stadied. This allowed the identification of areas of application in nanoelectronics diamondoids doping and reveal the dependence of their electrical properties of the method and nature of the dopant. The concept of influence of the nature and amount of doped atoms on the electrical properties of nanodiamonds, methods of synthesis and selective doped diamondoids introduction of various functional groups in a predetermined position of the molecule of diamondoid. The results obtained allowed for the first time a monomolecular conductors and semiconductors with controlled gap size.

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