

**NEW POLYMER FORMS OF CARBON
FULLERENES AND NANOTUBES: MODELING
AND INTERPRETATION OF EXPERIMENTAL
DATA**

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New carbon forms of polymerized fullerenes or/and single-walled nanotubes (SWNT's) are considered. Such structures can be produced as a result of different cycloaddition reactions: (2+2), (2+4), (3+3), (4+4) and their combinations.

Computer modeling of geometrical and electronic structures of the following polymer forms are reported:

- a) semiconducting solids — close-packed two- and three-dimensional structures based on (D_{6h})- C_{36} (with 12 sp^3 atoms per C_{36} in 2D phase and with 24 sp^3 , and 12 sp^2 atoms per C_{36} in 3D phase) [1];
- b) new semiconducting three-dimensional 3D polymer on the base of C_{60} formed as a result of several cycloaddition reactions [2];
- c) chain and 3D semiconducting structures describing high-pressure and high-temperature C_{70} phases, and C_{70} transformation into (5,5) nanotubes;
- d) semiconducting polymer structures on the base of SWNT including structures of (n,0) and (n,n) nanotubes [3, 4];
- e) crossing polymerized nanotubes [4].

Some of considered polymer structures have good agreement with experiments of A. Zettl (C_{36} [5]), V. Blank (C_{60} [6] and C_{70} [7] materials), and M. Popov (SWNT polymers [8]) groups.

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