

Growth Mechanisms for Single-Walled Nanotubes without Metal Catalysts

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In many papers was shown that single-walled nanotubes could be synthesized only at the presence of catalytic metal particles and tubes have to remain open-ended during growth [1,2].

In these papers the appropriate models of growth single-walled nanotubes were developed. However these models are not adequate to our experimental results. We synthesized the single-walled nanotubes with diameter 0.8 nm without metal catalysts by electron-beam evaporation pure graphite in vacuum[3]. The study of their chemical structure by mass spectrometry and IR-spectroscopy methods has shown their high cleanness.

The single-walled nanotubes can grow without metal catalysts! The role of the metal catalyst during growth nanotubes is not understood yet. In our work the kinetics of the nucleation, the growth nanotubes and the role of catalytic particles in these processes were investigated. The model of fullerence nucleation under conditions of non-equilibrium open system (saturated carbon gas phase) where autocatalysis and self-organization processes are possible will be discussed.

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