MAGNETIC EFFECT ON THE SIZE DISTRIBUTION OF CATALYST AND NANOTUBES UNDER ARC DISCHARGE SYSTEM*

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Since the discovery of carbon nanotubes (CNT) by Iijima in 1991[1], their unique properties and useful applications in thermo, mechanics, and electricity have attracted a deluge of interest of scholars and boosted the energy-related research nowadays. Arc discharge generated by plasmas is the most widely used method to synthesize CNT, by which the product has few structural defects, higher purity and better crystallinity comparing to other methods[2].

However, owing to the difficulty in parameters control during experiments, there are few research groups reporting that they can synthesize CNT in a narrow range of chirality and diameter. Considering the important role of catalyst during the growth of CNT, an approach utilizing the size of catalyst particles to control parameters of CNT can be proposed.

In this paper, under arc discharge system, the models of nucleation of CNT in thermodynamics and kinetics are studied based on the vapor-liquid-solid mechanism[3]. Furthermore, via transmission electron microscope, the diameter and morphology of catalyst particles and CNT are investigated. Consequently, the relationship between catalyst particles and magnetic conditions is established, which can provide great potential to manipulate the growth of CNT under arc discharge system.

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