

## Synthesis and Applications of Carbon Nanotubes with Prescribed Dimensions

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Carbon nanotubes (CNTs) are the material of increasing concern for the past decade due to their unique chemical, mechanical and electrical properties. Properties of a carbon nanotube are a sensitive function of its structure. Although various synthesis techniques have been developed, precise control of the structure of a carbon nanotube is hardly achieved. In this talk, a simple yet powerful technique of template synthesis will be presented.

CNTs were synthesized in the pores of AAO templates by thermal chemical vapor deposition (CVD) method. A unified mechanism of CNTs synthesis in the pores of an AAO template is proposed.

The packing density of CNTs was readily controlled in the four orders of magnitude. This technique could be applied to the patterned growth of CNTs on a Si wafer. The proposed method provides a useful tool for the fundamental study and potential applications of CNT-based microelectronic devices such as field emitters.