URN etd-0407109-183713-1093
Author Kuan-Hwa Chen
Author's Email Address No Public.
Statistics This thesis had been viewed 40 times. Download 0 times.
Department
Year 2004
Semester 1
Degree Master
Type of Document Master's Thesis
Language zh-TW.Big5 Chinese
Title Study of Carbon Nanotubes Synthesized by Electron Cyclotron Resonance Chemical Vapor Deposition
Date of Defense 0000-00-00
Page Count 77
Keyword
ECR-CVD
microwave

Abstract
The objective of this work is to grow carbon nanotubes (CNTs) by electron cyclotron resonance chemical vapor deposition (ECR-CVD) at low temperature (unheated substrate). The process parameters include the thickness of catalyst films, microwave power, process time and the mixed gases ratio. Under the optimized condition, we have already succeeded in synthesizing carbon nanotubes with controlled diameter and length. However, the carbon nanotubes grown at low temperature contain lots of amorphous carbon, which may influence the field emission properties of CNTs.
In this work, the characterizations of CNTs are performed by Scanning Electron Microscope (SEM) for morphology investigation and by Transmission Electron Microscopy (TEM) and Raman spectrometry for microstructure analysis. The Raman spectrum of CNTs exhibits both the disorder (D-line) and crystallization (G-line) structures. The ratio of ID/IG is varied from 2 to 3.6. The microstructure of CNTs observed by TEM shows the multi-wall character with the diameter varied from 15 nm to 100 nm. Finally, the filed emission properties of CNTs are studied. For the best sample, the threshold electron emission field and current density of grown CNTs with 100 μm gap were 0.3V/μm(0.1mA) and 10 mA at 3 V/μm, respectively
In conclusion, the properties of CNTs synthesized by ECR-CVD on unheated silicon substrate are strongly related with the diameter of catalyst and the microwave power.
Advisory Committee Wen-Tuan Wu - advisor

Files No Any Full Text File.
Date of Submission 0000-00-00