

Vast catalyst free growth of carbon nanotubes in hot filament CVD system

서형기, 김길성, 신형식*, Ansari S. G.¹, 김연수²
전북대학교; ¹JAIST; ²광양보건대학
(hsshin@chonbuk.ac.kr*)

Multi-wall Carbon nanotubes are successfully grown on pure Si substrate without using a catalyst in the hot filament chemical vapor deposition system. High resolution scanning electron microscopic images of the deposited films show a long noodle shape and vertically grown carbon nanotubes distributed uniformly over a large area of the substrate with relative high growth density. The diameters of the nanotubes vary from 20 nm to 100 nm and the thickness of the grown film is $\sim 1.2 \mu\text{m}$. From XRD and EDAX analyses traces of catalyst material is not found except tungsten. X-ray photoelectron spectroscopy (XPS) indicates that presence of Carbon (C1s). Micro Raman spectroscopy reveals that the grown tubes are multi-wall which are in-completely crystallized.