

Udomdej Pakdee 2007: Synthesis of Carbon Nanotubes on Thin Iron Film by Thermal Chemical Vapor Deposition Method at Low Pressure. Master of Science (Physics), Major Field: Physics, Department of Physics. Thesis Advisor: Associate Professor Penchantr Singh, M.S. 105 pages.

The carbon nanotubes (CNTs) were synthesized on thin iron film from acetylene gas at 780 °C by the thermal chemical vapor deposition method. Thin iron film was coated on quartz substrate by DC-sputtering. The main purpose of this research is to study the variation of parameters affected by the formation of CNTs.

The morphology of CNTs was studied by a scanning electron microscope (SEM) and a transmission electron microscope (TEM). The X-ray diffractometer (XRD) and Fourier transform Raman spectrometer (FT-Raman spectrometer) were used to study the crystallinity of CNTs.

The SEM images revealed the carbon nanofibers (CNFs) were synthesized at pressure of 1.3 bar but not at pressure of 0.4 bar. It was observed that the diameter of CNTs was proportional to the mass of thin iron film per area. The yield of CNTs decreased when the flow rate of C₂H₂ was decreased. The diameter and crystallinity of CNTs were inversely proportional to flow rate of C₂H₂. The FT-Raman spectrum showed that the hybridization of CNTs were sp² and sp³. The Raman peak of radial breathing mode (RBM) region and TEM image highlighted the hollow tubes of CNTs.

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