PROPERTIES OF CARBON NANOTUBES PREPARED BY THERMAL CHEMICAL VAPOR DEPOSITION (CVD) USING FERMENTED TAPIOCA AS A STARTING MATERIAL

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ABSTRACT

PROPERTIES OF CARBON NANOTUBES PREPARED FROM FERMENTED TAPIOCA

Carbon nanotubes (CNTs) were deposited on silicon wafer (Si) by Thermal Chemical Vapor Deposition (TCVD). The new starting material of fermented tapioca was used as carbon source. The gas flow of Argon (Ar) was constant at 70 bubbles per minute and 20 minutes of deposition time. Before the deposition process, the silicon wafer was coated with Nickel catalyst using spin coater. Various parameters such as vaporization temperature and deposition temperature have been studied. Surface morphology and uniformity were characterized using FESEM while chemical functional groups of carbon nanotubes were characterized using FTIR. The FTIR result shows spectrum attributed to multi–walled carbon nanotubes (MWNTs) vibration modes. The surface morphology and uniformity of CNTs were dependent to parameters.

CHAPTER 1

INTRODUCTION

1.0 General Information

1.1 Carbon Nanotubes (CNTs)

A nanotube contains of one tube of graphite, a one atom thick single-wall nanotube (SWNT) or a number of concentric tubes called multi-walled nanotubes (MWNTs). Nanotubes are unique nanostructures with remarkable electronic and mechanic properties. In 1991, Iijima discovered that the structure is similar to fullerene but while the fullerene's molecules form a spherical shape, nanotubes are cylindrical structures with the ends covered by half a fullerene molecule. [1]

In 1991, since the discovery of carbon nanotubes (CNTs) by Iijima, there have been a large number of studies on this form of carbon. CNTs are well-suited for potential use in applications. The applications include nanocomposites, hydrogen storage devices and field emission displays due to their unique range of excellent electrical, thermal and mechanical properties. [2]

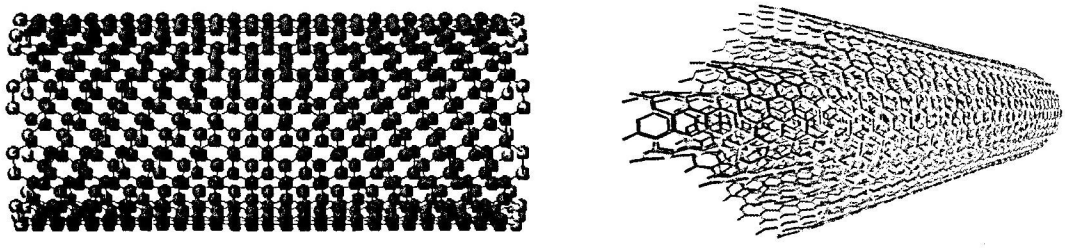

Figure 1: Single-Walled and Multi-Walled Nanotubes