EFFECT OF DEPOSITION TEMPERATURE ON THE PROPERTIES OF CARBON NANOTUBES PREPARED FROM PALM OIL AS A PRECURSOR MATERIAL

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ABSTRACT

EFFECT OF DEPOSITION TEMPERATURE ON THE PROPERTIES OF CARBON NANOTUBES PREPARED FROM PALM OIL AS THE PRECURSOR MATERIAL

The carbon nanotubes (CNTs) were synthesized by simple method of spray pyrolysis CVD method and their characteristics were investigated. Palm oil, a plant based precursor was used as source of carbon and Argon gas as the carrier gas. CNTs were synthesized at different deposition temperatures ranging from 500 to 900°C with interval of 100°C. At different temperatures, the characteristics of CNTs markedly changes such as the crystallinity and diameter as was confirmed by Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), and Raman spectroscopy studies. The bimetallic catalyst of cobalt (Co) and iron (Fe) supported on silica gel particles improves the quality, quantity and uniformity of CNTs.

CHAPTER 1

INTRODUCTION

Carbon nanotubes (CNTs) were first isolated and characterized by Iijima in 1991 (S. Iijima, 1991). Since then, CNTs have attracted much research interest due to their unique chemical and physical properties that have been proved in many theoretical and experimental studies (R. Saito et al., 1998; TW Ebbesen, 1997; TW Ebbesen et al., 1996; A de Heer Walt et al., 1995). CNTs are recently discovered allotrope of carbon. This fourth allotrope of carbon has distinguishing properties like mechanical, thermal, electrical, etc. (P Delaney et al., 1998) which make them are good potential candidates for many applications, such as field emission devices (A de Heer Walt et al., 1995), scanning probes (Hongjie Dai et al., 1996), nano-scale electronic devices (SJ Tans et al., 1998), hydrogen storage (AC Dillon et al., 1997), chemical sensors (Jing Kong et al., 2000), and composite reinforcing materials (LS Schadler et al., 1998).