

Effect of synthesis condition on the growth of SWCNTs via catalytic chemical vapour deposition

ABSTRACT

Single-walled carbon nanotubes (SWCNTs) were synthesized by catalytic chemical vapor deposition (CCVD) of ethanol (C₂H₅OH) over Fe-Mo-MgO catalyst by using argon as a carrier gas. The reaction conditions are important factors that influence the yield and quality of carbon nanotubes. The effects of temperature and flow rate of carrier gas were investigated to increase the yield of carbon nanotubes. The synthesized carbon nanotubes were characterized by scanning electron microscopy, transmission electron microscopy, X-Ray diffraction and thermo-gravimetric analysis. The results showed that the growth of carbon nanotubes was effectively influenced by the reaction ambience and the synthesis condition. The temperature and flow rate of carrier gas played a key role in the yield and quality of synthesized CNTs. The estimated yield of synthesized carbon nanotubes was almost over 70%.

Keyword: Carbon nanotubes (CNTs); Catalytic chemical vapor deposition (CCVD); Fe-Mo-MgO catalyst; Synthesis; Yield