

Catalyst Composition and Content Effects on the Synthesis of Single-Walled Carbon Nanotubes by Arc Discharge

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Single-walled carbon nanotubes (SWCNTs) in large scale and high purity were prepared by a modified arc discharge using Fe-Ni-Mg powders as catalyst in helium buffer gas at 600 °C. The effects of catalyst composition and content on the production rate and purity of SWCNTs are investigated in this paper. The structural characteristic of SWCNT was studied by using TEM, SEM, HRTEM, XRD and Raman spectroscopy. The experimental results indicate that: when the Fe-Ni-Mg catalyst composition is 2:1:2wt% and the catalyst content is 5wt%, the production of SWCNTs is 12 gram per hour, and the purity of SWCNTs is 70%. The aim of this work is to control the production process of SWCNTs efficiently.

Keywords: Carbon nanotubes, Catalyst, Soot