Contribution ID: **167** Type: **Poster**

SYNTHESIS OF DOUBLE-WALLED CARBON NANOTUBES BY THE PEADSA METHOD

The double-walled carbon nanotubes can be synthesized using the pulsed electric arc discharge with the spinning anode method (PEADSA). With this method, the frequency of the pulsed discharge can be controlled, as well as the discharge onset, which directly affects the nucleation and growth of carbon nanotubes. In this work, the experimental diameter of the double-walled carbon nanotubes (DWCNTs) was calculated employing an empirical equation that considers the quantum coupling between inner and outer carbon nanotubes and compared with the theoretical diameter (1% error). From these results the chiral indexes were calculated. The following parameters were used: current discharge at 150 A DC with a carbon disc as anode divided into eight sectors an catalytic mixture C/Ni/Fe/Co/S 95/0.6/1.4/2.8/0.3 mole fraction and angular velocity of 360 rpm. The electrode configuration was point-to-plate, and the cathode was a graphitic rod with a triangular point. The discharges and idle state durations were 20 ms and 22 ms, respectively. The synthesis was done under hydrogen atmosphere at 200 Torr. Scanning (SEM) and transmission (TEM) electron microscopy and Raman spectroscopy were for characterization. The obtained double-walled carbon nanotubes had an internal diameter of 0.82 −1.52 nm and an external diameter of 1.52 −2.33 nm.

Keywords

DWCNTS, Arc Discharge method, Carbon nanotubes characterization

Reference

No references

This work was supported by

No funding

Author approval

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Session Classification: NANOSTRUCTURES

Track Classification: Nanostructures