

STRUCTURAL STUDY OF CARBON NANOTUBES PRODUCED BY CHEMICAL VAPOUR DEPOSITION FROM AMMONIA AND ACETYLENE.

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Carbon nanotubes on Co catalyst metal nanoparticles have been deposited by chemical vapour deposition and rf magnetron sputtering, respectively. The growth conditions of the nanotubes were: C₂H₂:NH₃ flow ratio of 1:1; substrate temperature of 650°C and 100 Pa of total pressure. Previously in the same run, a 8 nm thin film of Co was deposited at 2 Pa of pure Ar from a Co target powered at 30 W of rf signal. Differential scanning calorimetry (DSC) was performed on the samples by heating from 50°C to 700°C at a 20°C/min rate in a pure O₂ atmosphere. In order to identify the remaining nanostructure associated with the changes induced by oxidation during the DSC process (Fig.1), scanning and transmission electron microscopy (SEM and TEM) observations were carried out at several temperature stages of the ramp. Selected area electron diffraction (SAED) and high resolution TEM (Fig.2) provided detailed information about the crystalline structure of the nanotubes.

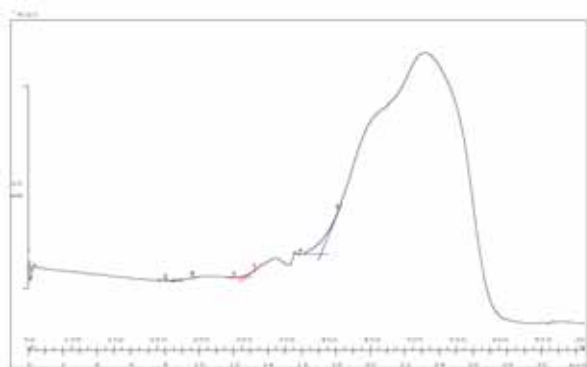


Figure1.- DSC plot of the thermal oxidation of carbon nanotubes, where several structural changes of the carbon nanotubes are evidenced above 250°C.

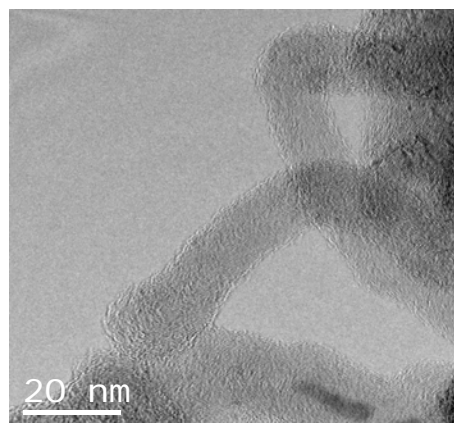


Figure 2.- HRTEM image of a carbon nanotube as-grown, previously to the thermal oxidation.