

Effect of Thickness of Nickel Film for Carbon Nanotubes Growth

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In this work, we have synthesized dense films of carbon nanotubes by microwave plasma in $H_2/N_2/CH_4$ environments, on silicon substrates covered by a nickel thin as catalyst. The deposition of nanotubes was carried out in two steps: a) Nanoclusters Formation - previously to the deposition of carbon nanotubes, a nickel thin film, deposited by electron beam evaporator, were broken into nanoclusters by microwave plasma bombardment in N_2/H_2 atmosphere; and b) Synthesis - the synthesis of nanotubes was performed by adding CH_4 , in a temperature of $750^\circ C$. The thickness of catalytic film, were changed (5-10 nm) to study the dependence of carbon nanotubes morphology related to size of nanoclusters [1-4]. The obtained samples were analysed by scanning electron microscopy (SEM), transmission electron microscopy (TEM) and by Raman Spectroscopy (first and second order)[5-7]. In Fig.1 e 2 are shown images of typical carbon nanotubes produced and in Fig.3 in their Raman Spectra (514nm).

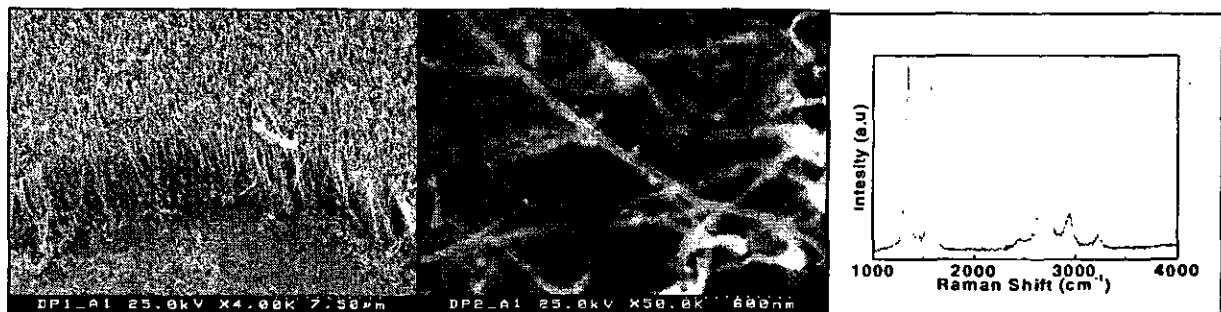


Fig.1

Fig.2

Fig.3

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