

A08 - Multi-walled Carbon Nanotubes Grown on Carbon Fiber Produced from Different Heat Treatment Temperature

Anderson Lobo¹, Erica Freire Antunes², Erica Cristina Almeida², Neidenei Gomes Ferreira², Vladimir Jesus Trava-Airoldi², Evaldo Jose Corat²

¹ Instituto Tecnológico de Aeronáutica (ITA) / Instituto Nacional de Pesquisas Espaciais (INPE), ² Instituto Nacional de Pesquisas Espaciais (INPE)

The influence on the morphology of multi-walled carbon nanotubes (MWCNT) is investigated using carbon fiber (CF) substrate obtained at different heat treatment temperature (HTT). CF samples were produced from polyacrylonitrile (PAN) precursor HTT of 1000, 1500 and 2000 °C at temperature steps of 330 K/h, under inert atmosphere with nitrogen flow of 1 L.h⁻¹. The samples were kept at the maximum temperature during 30 min and then cooled down to room temperature. To induce the MWCNT growth the samples were immersed in a Fe(NO₃)₃.9H₂O ethanolic solution ("dip coating" technique) with concentrations of 37 mmol/l and 110 mmol/l, respectively. The MWCNT were produced using the CVD process in a microwave plasma chamber at 2.45 GHz. The nanoclusters formation was carried out during 5 min in N₂/H₂ plasma, at a substrate temperature around 760°C. The MWCNT growth was performed by adding CH₄ carbon source to the gas mixture during 2, 5 and 10min depositions, at a substrate temperature of 780°C. The reactor was kept at a pressure of 30 Torr during the whole process. Homogeneous and uniform MWCNT were observed covering even deep CF planes. Microstructural properties of PAN-based CF are strongly affected by HTT and influence the carbon nanotubes growth.

Contact e-mail: anderson@las.inpe.br