Electronic Supplementary Material (ESI) for RSC Advances.

Supportive information for:

Enhanced Vacuum Sensing Performance of Multiwalled Carbon Nanotubes: Role of Defects and Carboxyl Functionalization

Rajavel Krishnamoorthy[1], Dinesh Muthu[1], Saranaya Rajendran[1], Rajendra kumar Ramasamy Thangavelu[1,2,3*]

[1]Advanced Materials and Devices laboratory, Department of Physics, Bharathiar University, Coimbatore -6410 46, Tamil Nadu, India.

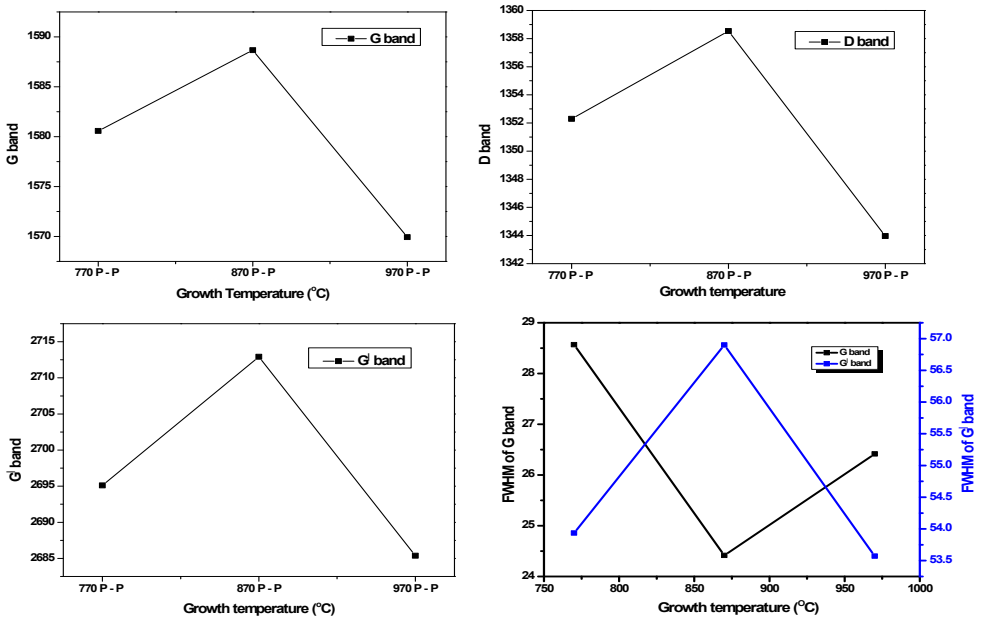
[2]Department of NanoScience and Technology, Bharathiar University, Coimbatore -641046, Tamil Nadu, India.

[3]DRDO-BU Center for Life Sciences, Bharathiar University, Coimbatore -641046, Tamil Nadu, India.

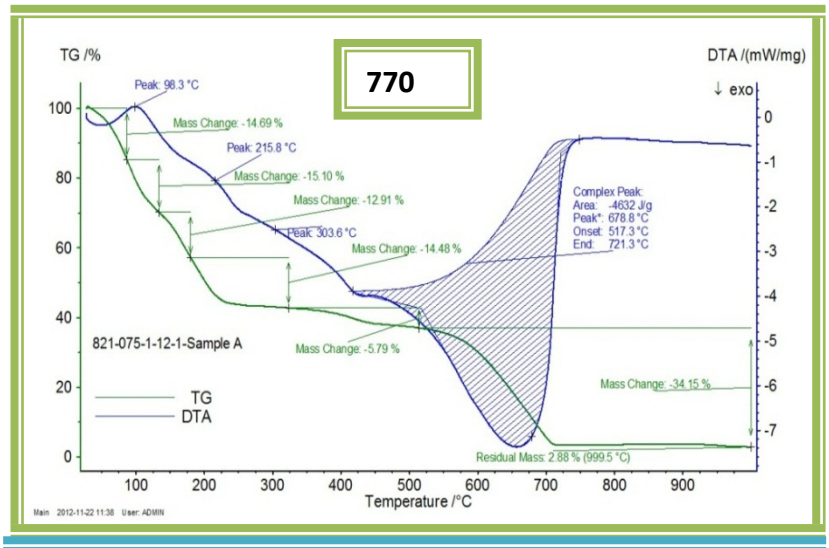
Address for Corresponding Author
Dr. R. T. Rajendra Kumar
Reader
Department of NanoScience and Technology
Bharathiar University, Coimbatore, Tamil Nadu, India - 6410 046
E. mail: rtrkumar@buc.edu.in
Phone: (+91) 9789757888
Tel: +91-422-2428446, Fax: +91-422-2422387.

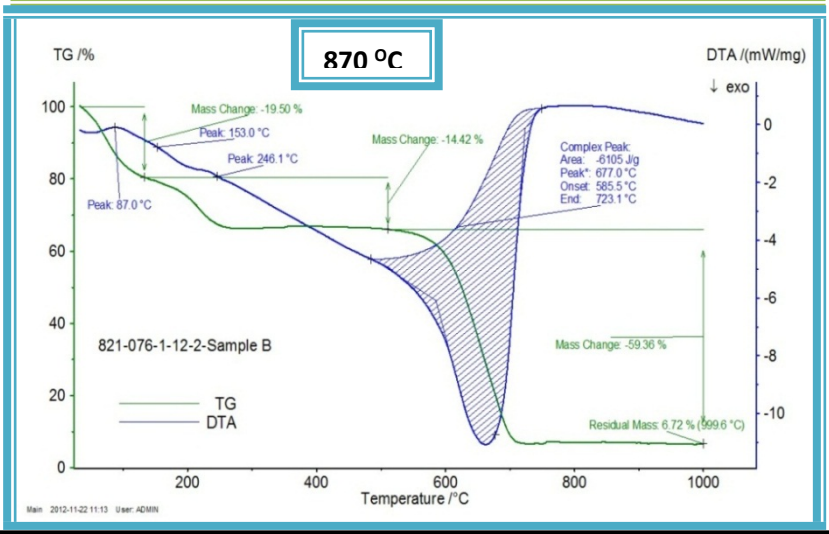
Supportive information

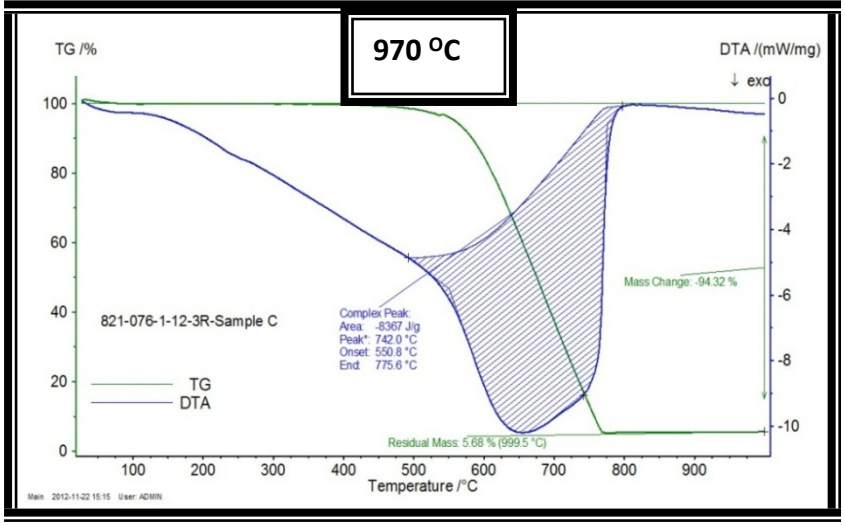
S1. Raman Shift and FWHM of MWCNTs samples with different growth temperatures



S2. TG/DTA weight loss of MWCNTs used in the present study







S3: Weight Loss observed in Dry Oxidation process for three different growth temperatures

Growth Temperature	Starting material (Ferrocene/Xylene) (g)	Product Yield	Dry Oxidation Weight Loss (%)
770°C	7.344	133 mg	16 ±1
870°C	7.344	370 mg	5 ±1
970°C	7.344	462 mg	14 ±1

The quantity of starting materials, product nanotube yield and weight loss in dry oxidation for different growth temperature of CNTs.

S4. CNTs Characterization procedures

The higher resolution TEM imaging is performed on a JEOL 2100 - TEM machine operating at a voltage of 200 kV and EDS data's are obtained on an attached spectrometer. A high resolution X-ray diffractometer (Brukar D8, Advanced diffractometer), equipped with a Cu K_α radiation tube, recorded XRD patterns in 2θ ranging from 20º to 80º with grazing incidence angle of 3º. The Raman spectroscopic measurement (Horiba JobinYuvan Olympus) is carried at room temperature in the spectral range of 50-3000 cm^{-1} with the resolution of 1.5 cm^{-1} using Ar laser (514.5 nm excitation). The purity of CNTs is determined using TGA/DTA (NETZSCH STA 409 PC) analysis carried out at elevated decomposition temperatures of CNTs. Thermogravimetric analysis is carried out in platinum pans at a heating rate of 1°C/min to 1000 °C in an atmospheric air flowing with the rate of 60ml/min.