XPS AND RAMAN STUDIES OF NITROGEN DOPED CARBON NANOTUBES ACROSS THE REACTOR
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Few studies of synthesis in carbon nanotubes by CVD system has a systematic approach for characterization along the entire furnace reactor. Following our systematic investigation [1-3] of nitrogen-doped multiwalled carbon nanotubes (N-MWCNT) across the reactor where we presented important results about profile step-growth of morphology, quality graphitized and composition structure iron phases of encapsulated nanoparticles (Fe₃C, ?-Fe, ?-Fe) obtained by scanning electron microscopy (SEM), high resolution transmission electron microscopy (HRTEM), and X ray diffraction (XRD) patterns.

In this work, we show the different kinds of chemical bonding configurations of nitrogen dopant, oxygen, and carbon are analyzed by X-ray photoelectron spectroscopy technique. The study is performed on selected centimeters along the entire quartz tube that is used as a substrate-reactor; in order to study the structure and electronic and phonon properties, we have performed Raman spectroscopy studies on our selected samples as well. We also present thermogravimetric analysis of the whole 15 representative samples. Our results show that N-MWCNT at the end of the reactor exhibit more nitrogen content with pyrrolic feature but with more disorder and a relationship between quality and nitrogen kind of dopant in the XPS-Raman plot in close agreement with TGA analysis.

Keywords: Synthesis CVD, N-doped Carbon Nanotubes, chemical bonding configurations

References:
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