Nano Res Appl 2018, Volume 4
DOI: 10.21767/2471-9838-C5-021

Ionizing radiation sensors based on carbon nanotubes

Kenneth Fontánez[1], Molina B[1], Cotto M[1], Duconge J[1], Morant C[2], Pinilla S[2] and **Márquez F[1]**
[1]Universidad of Turabo, USA
[2]Universidad Autónoma de Madrid, Spain

Carbon nanotubes (CNTs) are attracting much attention as promising materials for application in nanodevices due to their excellent electrical conductivity, optical, thermal and mechanical properties arising from their quasi-one-dimensional structure. Among these potential applications, the use of SWNTs as ionization radiation sensors is particularly of relevant interest. One of the key features of SWNTs for electronic and optoelectronic applications are that their metallic or semiconductive character depends on the chirality. The presence of a defect in the nanotube walls, i.e. a single atom missing, can result, locally, in the change of the chirality, thus into the variation of the nanotube electronic characteristics (semiconductor-metal junction) within a structure that is only a few nanometers wide. Variations of these electrical properties may be measured and, from these results, a clear correlation with the dose of radiation generated by the local defect in the nanotube can be established. In this investigation, we have deposited CNTs using an inter-digitalized growth pattern (see Figure), which has been connected to two gold electrodes. The morphological and structural properties of the CNTs before and after exposure to ion implantation were characterized by SEM, TEM, and Raman. The conductivity measured by this device was evaluated before and after being exposed to different doses of ion implantation, using an Ar+ gun. The results obtained clearly show a continuous decrease in conductivity, as the time of ion implantation increases. These results open a wide range of applications of these materials in the development of radiation sensors.

kenneth.fontanez@gmail.com