

## Ionizing radiation sensors based on carbon nanotubes, with thermal regeneration capacity.

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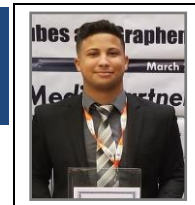
**Abstract:** Detection of ionizing radiation is crucial in different fields including energy, national security, biological and nuclear research, and other applications. One of the key characteristics of SWNTs for electronic and optoelectronic applications is that their metallic or semiconductor behavior, and the conductive properties of the material, depend on the presence of defects in the structure. The presence of a defect in the nanotube walls, i.e. a single atom missing, or the incorporation or interaction with another structure, can result locally in the change of the electronic distribution and, therefore, to the variation of the conductive characteristics of nanotubes. These defects, or the interaction with structures present in the environment, can be induced by the presence of ionizing radiation. The variations of these electrical properties can be measured, and, from these results, a clear correlation can be established with the radiation dose generated by the presence of these local defects in the nanotube. In this research, vertically aligned carbon nanotubes were grown by chemical vapor deposition (CVD) on a silicon oxide substrate with alternating layers of TiN (see Figure). The CNTs were exposed to nitrogen implantation and X-ray radiation to study later the change in resistivity.



**Biography:** Kenneth Fontanez graduated from an AD in Mechanical Engineering at Universidad Ana G. Méndez-Gurabo, Puerto Rico, and then began his studies in Chemistry. Kenneth Fontanez, a member of the Nanomaterials Research Group, is a research student working on different projects related to hydrogen production by electrolysis, photocatalytic hydrogen production by water splitting, ionizing radiation sensors based on carbon nanotubes, development of anodes for lithium-ion batteries, and solar cells sensitized by dyes. Kenneth has presented his research work at multiple international conferences in the United States, Spain, Italy, etc. Email: [kfontanez12@email.suagm.edu](mailto:kfontanez12@email.suagm.edu)

### Publications :

1. Kenneth Fontáñez, María del C Cotto-Maldonado, José Duconge, Carmen Morant, Sergio Pinilla and Francisco Márquez, Development of Ionizing Radiation Sensors Based on Carbon Nanotubes, *American Journal of Engineering and Applied Sciences*, 12 (2019) 185-192.
2. Kenneth Fontáñez, María del C Cotto-Maldonado, José Duconge, and Francisco Márquez, Ionizing Radiation Sensors Based on Carbon Nanotubes with Thermal Regeneration Capacity, *American Journal of Engineering and Applied Sciences* (In press).
3. Sergio Pinilla, Teresa Campo, Jose M Sanz, Francisco M Marquez, Carmen Morant, Highly ordered metal-coated alumina membranes: Synthesis and RBS characterization. *Surface and Coatings Technology* 377 (2019) 124883.
4. Teresa Campo, Sergio Pinilla, Santos Gálvez, José María Sanz, Francisco Márquez, Carmen Morant, Synthesis Procedure of Highly Densely Packed Carbon Nanotube Forests on TiN. *Nanomaterials* 9 (2019) 571.



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