

## Electrochemical Performance of Nitrogen Doped Carbon Nanotubes

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The discovery of fuel cells originates a new generation of high-efficiency devices for production of clean energy. Nowadays, in order to achieve the implementation of this technology at large-scale, it is necessary the development of new catalysts to replace platinum which is rare and therefore expensive. Carbon allotropes as carbon nanotubes (CNT) and graphene doped with nitrogen, have a great potential for electrocatalytic applications in fuel cells, especially in the cathode where oxygen reduction reaction (ORR) takes place. In this work modified chemical vapor deposition (MCVD) technique was used to synthesize CNT doped with nitrogen. Nitrogen precursors as ammonia and acrylonitrile were employed.

The nitrogen precursors were dissolved in toluene, preheated at 240°C and then pyrolysis reaction was carried out at 800°C. In order to determine the nitrogen content, thermogravimetric analysis (TGA) was carried out. The results indicate a nitrogen content of 2 to 4% (wt. %). In addition, the graphitization degree of the samples was determined using Raman spectrometry where the relationship between intensity of the D and G bands (ID/IG) was evaluated. Also, Raman studies indicated that NTC structure was modified and probably doped.

Scanning electron microscopy results show doped-CNT with lengths of some microns (Figure 1). Transmission electron microscopy (TEM) studies show carbon nanotubes multiwalled type. The electrocatalytic activity towards the ORR was evaluated. The electrochemical performance will be discussed.

### REFERENCES

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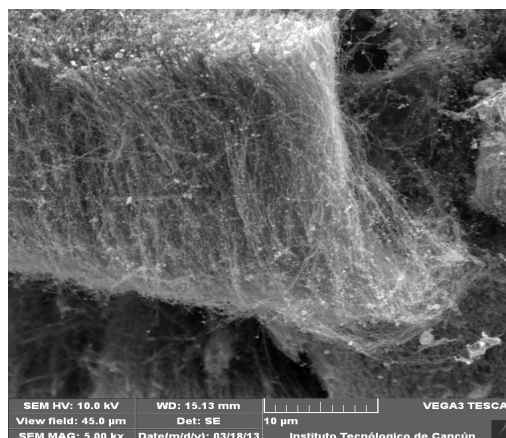


Figure 1. SEM micrograph of Doped-CNT.