## VI INTERNATIONAL CONFERENCE ON SURFACE, MATERIALS AND VACUUM, SEPTEMBER 23 –27 MERIDA, YUCATAN MEXICO.

## [ NSN-173 ] X-RAY DIFFRACTION AND FOURIER TRANSFORM INFRARED SPECTROSCOPY STUDIES OF GRAPHENE OXIDE FABRICATED BY HUMMERS METHOD

Jesus Guerrero-Contreras (guecoju@gmail.com), Felipe Caballero-Briones

Instituto Politécnico Nacional, Laboratorio de Materiales Fotovoltaicos, CICATA Altamira, Km. 14.5 Carretera Tampico-Puerto Industrial Altamira, 89600 Altamira, México.

Graphene is a very promising material for different applications including catalysis, biomedical research and photovoltaics between other. Graphene can be prepared from chemical modification of graphene oxide that is prepared by the Hummers method, an efficient approach to large-scale production of graphene and graphenoids materials with low cost. To achieve more exfoliated graphene oxide and to modify the functional groups that form upon oxidation, some modifications to the Hummers method have been assessed in this work. The volume of the oxidants NaNO3 and KMnO4, the pre-oxidation and oxidation times, and the washed volume were varied. NaCO3\*H2O2 and NaSO3 were introduced as alternative pre-oxidants. X-ray diffraction and Fourier Transform Infrared Spectroscopy were used to evaluate the oxidation process and the quantity of the functional groups. The results show that graphene oxides prepared with NaSO3 present a higher concentration of the carboxyl and carbonyl functional groups. On the other hand, the best exfoliation level was obtained by increasing the heating period of the NaNO3+ KMnO4+ H2SO4+ H2O mixture at 98°C up to 45 minutes.

Financial support by CONACYT 151679 and SIP 20131877 is acknowledged.