

Influence of Exfoliation on Multi-walled Carbon Nanotubes in their Performance as Electrode Support Material

C. A. Campos Roldán^{1,2*}, R. G. González Huerta¹, J. R. Vargas García², E. Franco Martínez³

¹ Laboratorio de Foto-Electrocatalisis, ESIQIE- IPN UPALM, México, DF.

² Departamento de Ingeniería Metalúrgica y Materiales, ESIQIE- IPN UPALM, México, DF.

³ Laboratorio de Energías alternas CIITEC IPN, Cda. Cecati s/n, Azcapotzalco, Mexico D.F.

*E-mail: charly1909@hotmail.com

Telephone: 57296000 ext 54246

ABSTRACT

In this work, we report the physic and electrochemical characterization of multi-walled carbon nanotubes (MWCNT) after exfoliation, where is evident the development of the properties which are of interest for hydrogen technologies. So we compare these results with carbon Vulcan. High Resolution Scanning Electron Microscopy micrographics show the increment of dimensions in the exfoliated MWCNT (e-MWCNT), suggesting a surface area increment. Cyclic voltammetry measurements confirmed the enhance active electrochemical surface in e-MWCNT, showing higher current density (four orders of magnitude) than untreated MWCNT. Capacitance determination confirmed that e-MWCNT have more active electrochemical surface (26866, 370 and 280 mF cm⁻² for e-MWCNT, carbon Vulcan and MWCNT, respectively). In addition, voltammograms exposed two symmetric signals which are attributed to functional groups onto e-MWCNT's surface. Infrared Spectroscopy measurements were used to determinate that there are carbonyl and carboxyl groups. According to references, these functional groups are nucleation sites to catch platinum nanoparticles.

Keywords: Multi-walled Carbon Nanotubes, Exfoliation, Functional Groups

