XIV International Congress of the Mexican Hydrogen Society
Cancun, Mexico, 2014

Core-Shell Ni-Pt Supported on Carbon Nanotubes as cathode-catalyst for Fuel Cell Application

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ABSTRACT

In recent years, outstanding advances have been done in increasing the performance of polymer electrolyte membrane fuel cells (PEMFC). However, together with high activity and low cost catalysts, some issues related to durability should be overpass to assure massive application. Slow kinetic for the oxygen reduction reaction (ORR) and the acidic nature of polymer electrolyte, straiten the use of catalyst to noble metal, like platinum, which impose a considerable increase in production cost. Added to this, the inefficient use of Pt in the catalyst layer (CL), and low stability of both catalyst and carbon, commonly used as support material, makes its application even more complicated. Core-shell catalysts (M-Pt), have attracted considerable attention owing to the possibility to have both, specific and mass activity higher than that of commercial Pt/C materials. On the other hand, the use of carbon nanotubes as support material instead of amorphous carbon could increases the stability of the catalysts in normal operating conditions. In this work we propose the design of Ni-Pt core-shell nanoparticles, highly dispersed on multiwall carbon nanotubes (MWCNT) as cathode-catalyst for fuel cell application. The catalysts will be physical characterized by X-ray diffraction, electronic microscopies, X-ray photon spectroscopy and electrochemical techniques, using a rotating ring disk electrode setup (RRDE) and in a single-cell assembly.

Keywords:Core-Shell catalysts; Carbon Nanotubes; Polymer Electrolyte Fuel Cells

Knowledge: This project was supported by Conacyt (grant FOINS 75/2012) and SIP 20144667.