

Effect of Size of Carbon Nanotubes on the Electrochemical Activity in Basic Medium

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ABSTRACT

The electro-oxidation in alkaline solution (0.5M KOH) of multi-walled carbon nanotubes (MWCNT) with different sizes (85, 45, 35 and 25 nm respectively) was studied. The catalyst for carbon nanotubes was synthesized from a sol-gel suspension in a homemade rod mill applying at the same time a temperature of 350 °C for one hour. The carbon nanotubes were synthesized using the chemical vapor deposition (CVD) process. The structure and composition of the surface of the MWCNT was examined by scanning electron microscopy (SEM), transmission electron microscopy (TEM) and Raman spectroscopy, observing differences in the diameters of the obtained MWCNT. SEM and TEM images confirmed the formation of carbon nanotubes of different diameters and Raman Spectroscopy revealed changes in the structure of the carbon nanotubes. The electrocatalytic activity of the material was measured by cyclic voltammetry, which shows that the activity depends on the behavior proportional to the diameter of the MWCNT obtained, showing activity in the region of the cathodic peak for the formation of oxygen and a slight increase in the anodic region for the formation of hydrogen.

Keywords: MWCNT, Sizes, cyclic voltammetry.

