

Carbon Nanostructured Yarn Based Electrode
Bill L Riehl, Bonnie D Riehl, Craig E. Banks
SCNTE LLC
7278 N US68, Wilmington, OH 45177

The use of carbon nanotube and other similar allotropes of carbon in electrochemical applications have been significantly hindered by the lack of purity and consistency of CVD synthesis techniques. To address this, the conversion of carbides into sp^2 carbon allotropes is used to create electrode materials.

In addition to purity and consistency, the size and shape of CVD and arc grown CNTs have not been conducive to electrode fabrication. To address this issue, a non spun carbon nanostructure is used. An additional benefit to this format is the ability to repeatedly clean the electrode surface using tradition polishing techniques.

Electrochemical characterization of the nanocarbon electrode is shown and discussed, including examination of the electrode using model redox couples such as ferry cyanide. Nearly ideal electron transfer rates are observed, similar to pure edge plane HOPG behavior. Additionally, TEM and Raman spectroscopy are used to characterize the nanomaterial.

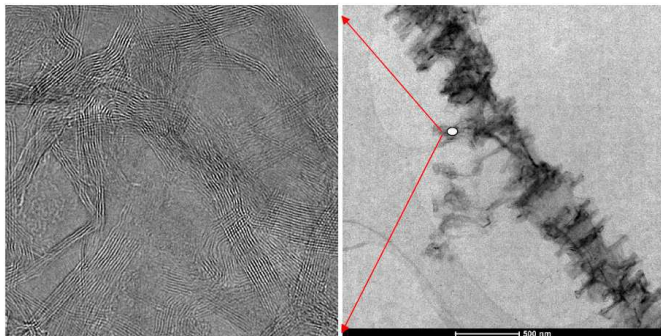


Figure 1. Nano Structure of CNT Yarn Electrode Filaments

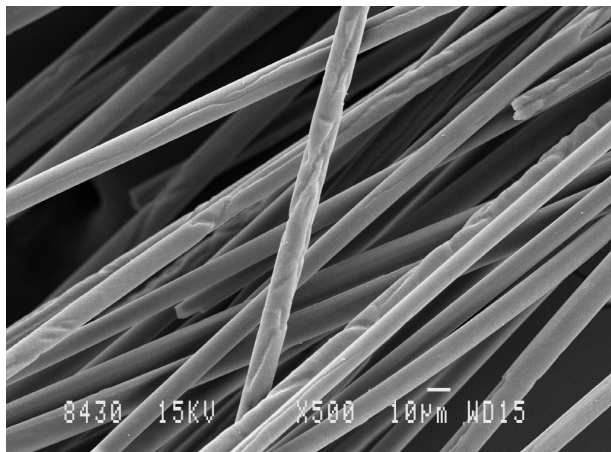


Figure 2. Carbon Nanotube Yarn Tow