Research Highlights

Engineered Carbon Nanotube Buckypaper for Highly Sensitive Electrochemical Biosensor

Synthesis and characterization of Natural Polymer Based Electrolytes for Energy Storage Applications

Fabrication and characterization for Polymer/CNT/magnetic nanoparticle composites for various applications

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Objectives

- Fabricating highly sensitive biosensor utilizing unique properties of engineered carbon nanotube buckypaper.
- These biosensors should play major role in diagnosis and detection for disease related biomarkers, environmental pollutants, toxic chemicals and many other important molecules related to health, safety and environment.
- These electrochemical biosensors should be accurate, faster and e easily operated.
- Fabricating natural polymer based electrolytes for energy storage applications.

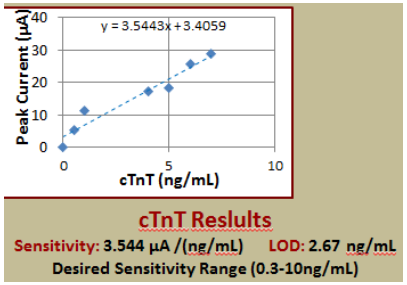
Approach:

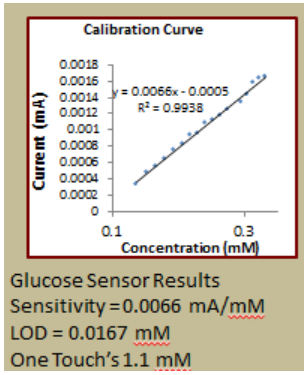
•Both single and multiwalled carbon nanotube(CNT) are functionalized suitable to make electrochemically biosenors sensitive towards a biomolecule

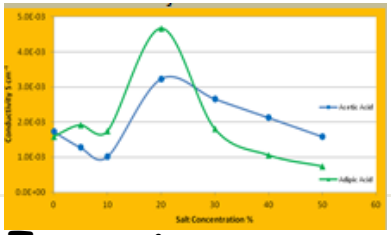
•Functionalized CNTs are used to make a thin (50-60 micron) dimensional entangled mat called buckypaper with enhanced surface area.

•Buckypaper is modified by metal/enzyme/antibody/mediator to make it electrochemically active towards the molecule of interest

•Electrical conductivity, surface morphology and electrochemical responses are measured.







Chitosan/NP Based polymer Electrolytes,Ionic conductivity vs. Salt concentration, **Ionic Conductivity $1x10^{-4}$ - $4x10^{-4}$ s/cm**

Impacts

•Internal grant aimed towards commercialization of research product Grant from NASA-QNA-ESC

•Patent published ; 20130209807 - Functionalized carbon nanotube sheets for electrochemical biosensors and methods(2014)

•Proposal pending: USIEF(Energy) AHA(Biosensor),

Paper: **Engineered Carbon Nanotube Buckypaper: A Platform for Electrochemical Biosensors** Jhunu Chatterjee*, Jose Cardenal, Annadanesh Shellikeri [2] Journal of Biomedical Nanotechnology, 2015 11(1): 150-156.

Synthesis and characterization of poly(vinylidene fluoride)/carbon nanotube composite piezoelectric powders Jhunu Chatterjee, Naomi Nash, Pierre-Jean Cottinet, Ben Wang, Journal of Materials Research 2012; 27(18):2352-2359

Highly conductive PVA organogel electrolytes for applications of lithium batteries and electrochemical capacitors Jhunu Chatterjee, Tao Liu, Ben Wang, Jim P. Zheng Solid State Ionics, 2010; 181:531-535.

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