

Dionne M. Hernández Lugo
NASA Pre-Doctoral Harriet Jenkins Fellow
Department of Chemistry
Graduate Student
Adviser: Dr. Brad R. Weiner

Self-assembled carbon nanotubes as an Lithium-ion battery anode

**IRG II: Advanced High
Energy Materials**

**NASA collaboration:
Dr. Michelle Manzo
Electrochemistry Branch
NASA GRC**

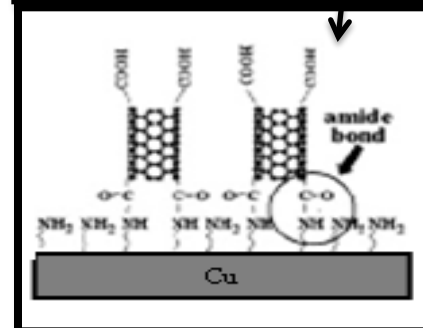
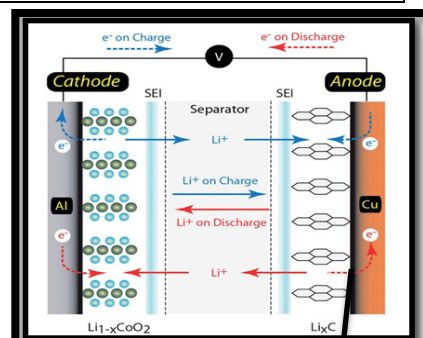
Contact information:

Phone: 787-764-0000

Ext. 1-2602 (lab)

dmhernandezlugo@gmail.com

Space Exploration systems require rugged reliable batteries that can withstand mechanical and thermal stress. For these types of applications, this project aims at developing electrode materials that can result in high energy density and long lifetime batteries. Initial research on Li-based rechargeable battery materials was driven by the consumer electronic industry, continual research and design inventions are required to cope up with the ever-demanding miniaturization and portability. However, the present day requirement of high power/energy source is a challenging field and for this application the rate capability becomes the crucial factor for Li ion batteries. For this project, we will work on nanostructure anode materials attached to copper substrates by means of a self-assembled monolayer. Nanostructure such as; carbon nanotubes because of their unique set of electrochemical and mechanical properties constitute a great alternative as anode material.



Publications: (1) *Carbon Nanofiber Buckypapers for Lithium-Ion Battery Anodes*, Gerard K. Simon, Benji Maruyama, David J. Burton, Tarun Goswami, Dionne Hernandez, 2010, Manuscript in writing. (2) *SiN/bamboo like carbon nanotubes composite electrodes for Lithium ion Batteries*, Katar, S.L., Hernandez, D., Biaggi, A., Vargas, E., Fonseca, L., Weiner, B.R., Morell, G., *Electrochimica Acta*, Volume 55, Issue 7, 28 February 2010, Pages 2269-2274. **Presentations:** (1) "Adhesion of Single Wall Carbon Nanotubes to a Copper Substrate by Means of a Self-Assembly Monolayer as Lithium-Ion Battery Anodes", **15th International Meeting on Lithium Batteries**, Montreal, Canada, June 2010. (2) "Single-wall carbon nanotubes added to a copper substrate by means of a self assembly monolayer for Lithium-ion battery anodes" **218th Electrochemical Society Meeting**, Las Vegas, Nevada, October 2010.