

SPACE POWER SYMPOSIUM (C3)
Advanced Space Power Technologies and Concepts (3)

Author: Mrs. Monica LopezdeVictoria

Institute of Functional Nanomaterials, University of Puerto Rico, San Juan, PR, USA, United States,
mony_lopez3@hotmail.comSYNTHESIS, CHARACTERIZATION AND ELECTROCHEMICAL ANALYSIS OF COMPOSITE
CATHODE MATERIAL $0.5\text{Li}_2\text{MnO}_3\text{-}0.25\text{LiMn}_2\text{O}_4\text{-}0.25\text{LiNi}_0.5\text{Mn}_0.5\text{O}_2$ DOPED WITH GRAPHENE
FOR LIB APPLICATIONS**Abstract**

Excellent structural stability, environmentally friendly, good cost effective as well as good rate capability are the major requirements for cathode materials. Li_2MnO_3 based composite cathode materials are one of the broadly investigated positive cathode materials due to their ability to provide high discharge capacity and good electrochemical performance. We have synthesized cobalt-free layered- spinel composite cathode material $0.5\text{Li}_2\text{MnO}_3\text{-}0.25\text{LiMn}_2\text{O}_4\text{-}0.25\text{LiNi}_0.5\text{Mn}_0.5\text{O}_2$ (LLNMO) by sol-gel synthesis method and surface characterized using XRD, Raman, SEM and EDX. Peaks corresponding to layered and spinel structures are identified by both XRD and Raman studies. SEM images exhibit the nano-sized particles and EDX data sustain the presence of constituent transition metals and oxygen. Active cathode material, carbon black, PVDF and synthesized graphene were mixed together in 80:5:10:5 ratio and spread on Al foil (current collector). Electrochemical studies were performed on coin cells, which were assembled in the Ar- filled glove box using Li as anode and spreaded material as cathode. LiPF_6 with EC:DMC::1:2 ratio was used as the electrolyte. Cyclic voltammetry, internal impedance and charge discharge studies shows that the developed cathode material is a promising electrode for Lithium ion batteries.