J Material Sci Eng 2014, 3:3
http://dx.doi.org/10.4172/2169-0022.S1.017

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference and Exhibition on
Materials Science & Engineering
October 06-08, 2014 Hilton San Antonio Airport, USA

Reducing the scrap rate in lithium-ion battery manufacturing by implementing in-line non-destructive electrode evaluation techniques

Debasish Mohanty, Jianlin Li, Rachael Born, Curt L Maxey, Ralph B Dinwiddie, Claus Daniel and **David L Wood**
Oak Ridge National Laboratory, USA

The cost of current lithium ion battery (LIB) manufacturing (i.e. from raw materials to the battery testing) is nearly three times higher than the target set by US Department of Energy. One of the routes to reducing the scrap rate in battery manufacturing is implementing in-line non-destructive (ND) quality control (QC) techniques. Currently, electrode thickness variation and certain flaws such as pinholes, agglomerates in the electrodes are not detected during electrode coating. Costs can be added until the battery devices are tested, and the associated scrap rates increase the costs of lithium secondary cells to an unacceptable level. If electrode flaws and contaminants could be detected in-line near the particular processing steps generating them and before electrochemical testing, the electrode area consisting of the flaws could be identified, and conditions could be adjusted to eliminate those defects in a timely manner hence, reducing the scrap rate. This presentation will showcase ORNL's effort to implementing in-line laser caliper and thermography techniques to detect the flaws associated during electrode coating process in a slot-die coater and its effect on electrochemistry. This QC demonstration presents the proof of concept for the ND evaluation of LIB electrodes during the coating process in a slot-die coater.

Biography

Debasish Mohanty has obtained his PhD in Chemistry from University of New Orleans, USA and currently is a postdoctoral research associate in Materials Science Technology Division at Oak Ridge National Laboratory. His current research is focused on understanding the structure and structural degradation mechanism(s) in lithium-ion battery electrodes by applying materials diagnostic techniques and non-destructive quality control (QC) evaluation of lithium-ion battery electrodes. He has extensive experience in oxide (nano) materials synthesis and characterizing the oxide cathode materials by x-ray and neutron diffraction, magnetic susceptibility measurements, microscopy techniques.

mohantyd@ornl.gov

The effect of pre-treatment solutions and time on acetylation of wood flour using vinegar

Azeh Yakubu, Abdulkareem Zulehat, Umar Musa Tanko, Peter Ajakaye Egwaikhide and **Mohammed Dagaci Zago**
Ibrahim Badamasi Babangida University, Nigeria

Effect of different pre-treatments and time on acetylation using vinegar was investigated. Similar weight gains in acetyl were obtained despite varied pre-treatment procedure employed and acetylation of samples increased with increasing time. This research work has shown that commercial hypo could be used for fiber pre-treatment as a substitute for NaOH and other solvents used for removal of wood extractives. FT-IR spectroscopy was very vital in providing evidence of the success of acetylation as it was used for characterization of important functionalities of acetylated products. Important absorptions in the acetate group were detected and these include; C-O, C=O, -C-CH_3-, and the reduction in -OH absorptions also showed that some level of acetylation occurred. This work further opens door to new application of vinegar in wood industry for surface modification of wood and lignocellulosic fibers for various applications.

Biography

Azeh Yakubu had his BSc Chemistry in 2000 at the University of Abuja. He obtained an MSc Degree in Chemistry with specialization in Organic Chemistry in 2011 at the University of Ilorin, Ilorin. Nigeria. He is presently a PhD candidate conducting researches on cellulose and nanocellulose modification, cellulose blends, composite and cellulose films/membrane, wood and lignocellulosic resources in the same university. He is currently teaching Organic Chemistry and conducting Researches on modification of lignocellulosic biomass using commercial vinegar at the Ibrahim Badamasi Babangida University, Lapai, Nigeria. He has published two books and more than 9 papers in reputed journals.

yakubuazeh@gmail.com