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May 2012

GREEN Lion

GREENLION is a Large Scale Collaborative Project within the FP7 leading to the manufacturing of greener and cheaper Li-Ion batteries for electric vehicle applications via the use of water soluble, fluorine-free, high thermally stable binders, which would eliminate the use of VOCs and reduce the cell assembly cost

OBJECTIVES

NEW MATERIALS

Development of new active and inactive battery materials viable for water processing

INNOVATIVE ELECTRODE PROCESS

Innovative process leading to reduced electrode production cost and avoid environmental pollution

NEW ASSEMBLY PROCEDURE

Development of new assembly procedures capable of substantially reduce the time and the cost of cell fabrication

ECO-DESIGN BONDING TECHNIQUES

Lighter battery module with air cooling and easier disassembly through eco-designed bonding techniques

AUTOMATED MODULE ASSEMBLY

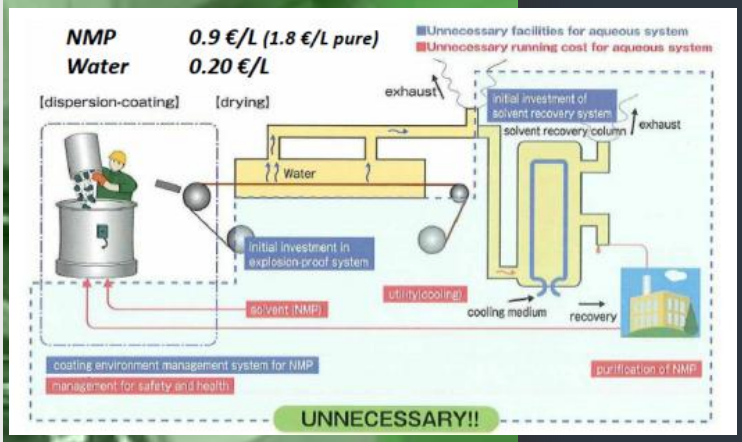
Development of an automated module and battery pack assembly line for increased production output and reduced cost

WASTE REDUCTION

Waste reduction, which by making use of the water solubility of the binder, allows for the extensive recovery of the active and inactive battery materials

EXPECTED RESULTS

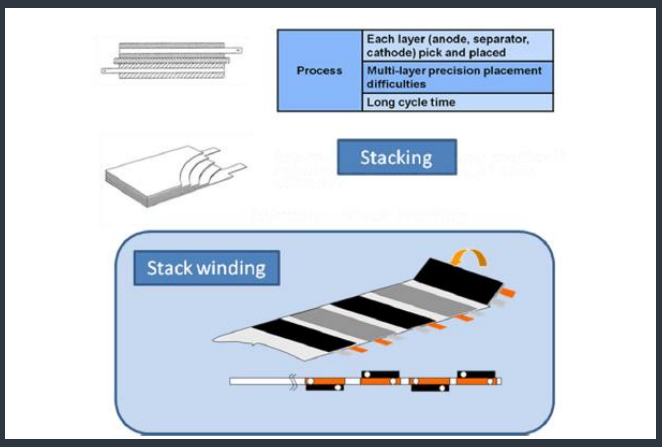
Aqueous Electrode Processing Advantage



As a matter of fact, the binder is not only responsible for the binding of the active materials and the conductive agent to the metal current collectors, but it also strongly affects the electrode processing.
Considering only greener materials for the electrode is not sufficient for the development of new safe and greener batteries, as the binder may require processing Volatil Organic Compound (VOCs).
Consequently, the improvement of the binder must necessarily be considered as a key point.
GREENLION aims to complete the study and development of water-based electrode formulations and coating processes with non-fluorinated polymers oriented to production.

Cell Assembly

Regarding the electrode/separator assembling step, the traditional approach is Stacking. This process however presents a low manufacturing throughput, index feeding and improvements are needed to make the product more cost effective. The Stack Winding process is an innovative solution that incorporates continuous process of Winding with volumetric efficiency and energy density of Stacking and will be developed in GREENLION for the aqueous-based electrodes.



Module Design

Lighter module design through air cooled solutions:
Electrical and thermal simulation of GREENLION cells to develop a module including BMS (SOC, SOH algorithms, equalization) and Thermal Management System. Module validation including Hardware- In-the-Loop (HIL) methodology.

- Eco-designed bonding techniques to improve sealing and disassembly: Degreasing and activation/primering of surfaces for structural bonding. Adhesives/glues with additives to activate easier disassembly for maintenance/reuse/recycling.

- **3D design of automatic battery module/pack assembly line**: Pilot line in 3D (validation of a prototype for Key-Processes) as a turn-key production line for Li-ion module manufacturing

EVENTS

European Green Cars Initiative

CIDETEC was invited to present GREENLION at the workshop "Europe's Strenghts, Competencies and Job Opportunities in Electric Vehicle Battery Manufacturing" held in Brussels on 7 December 2011.

Oscar Miguel, coordinator of the project gave an overview of the goals and proposed developments at the electrode, cell and module manufacturing levels. Two other partners within GREENLION consortium also participated in this event: Claudio Lanciotti, from KEMET, talked about "Development of Battery Cell Manufacturing Technologies" and Igor Cantero presented the "Activities on advanced battery for electric vehicles in CEGASA". The University of Muenster was also present with the project LABOHR on Li-air batteries.

CONSORTIUM MEETING

The project Greenlion started 6 months ago with the kick off in San Sebastian and the first technical progress meeting has been held in Bordeaux on the 19th and the 20th of April. 16 companies, laboratories and technical centers - all partners of the GreenLion Project - were present at the meeting. First various and very promising results of the project have been presented.

Within the project, studies will lead to the improvement of the Li-Ion Battery for automotive sector. The specificity of the project is that it involves the whole manufacturing process of the battery (from electrodes to module design) keeping in mind the goal of improving the environmental impact as well as reducing cost production.

UPCOMING WORKSHOPS

1ST eLCAr Stakeholder Workshop

This workshop is organized within the frame of eLCAr project. This project aimed to prepare a guideline for the conduction of LCA on electric vehicles and components. This workshop will thus gather stakeholder of the LCA field in order to get information on critical aspects of LCA, be a place to meet others specialist and discuss LCA on electric vehicle, ...

In the frame of GreenLion project, RESCOLL is invited to attend at this workshop

12 June 2012, Zurich Switzerland

http://www.elcar-project.eu/

UPCOMING EVENTS

16th International Forum on Advanced Microsystems for Automotive Applications

It has been the objective of the International Forum on Advanced Microsystems for Automotive Applications (AMAA) for more than fifteen years to detect novel trends and to discuss the technological implications and innovation potential from day one on. In 2012, the topic of the AMAA conference will be "Smart Systems for Safe, Sustainable and Networked Vehicles".

30-31 May 2012, Berlin Germany

http://www.amaa.de/

16th International Meeting on Lithium Batteries - IMLB 2012

This international meeting provides a forum to discuss recent progress in advanced lithium batteries for energy storage and conversion. The meeting focuses on both basic and applied research findings that have led to improved lithium battery materials.

17-22 June 2012, Jeju Island, South Korea

http://www.imlb2012.org

Advanced Automotive Battery Conference Europe

The third European AABC will examine the rapidly expanding advanced automotive battery market with a focus on the activities and needs of European automakers

June 18-22 2012, *Rheingoldhalle Congress Centrum, Mainz, Germany*

http://www.advancedautobat.com/conferences/automotive-battery-conference-Europe-2012/index.html

Batteries 2012

BATTERIES 2012 promises to be the main pole of exchanges between the whole value chain of the battery market: Raw materials suppliers, electronic devices suppliers, battery manufacturers, industrial users, environment and recycling specialists and universities.

24-26 October 2012, Nice France

www.batteriesevent.com

PARTNERS

16 Partners from 7 members states:

- **10 Industries (8 Large, 2 SME)**
- **3 Research Institute**
- **3 Universities**

Coordinator of the project :
IK4- CIDETEC
Parque Tecnológico de San Sebastián
2009 Donostia – San Sebastian (Gipuzkoa)
Spain

INFO@GREENLIONPROJECT.EU
WWW.GREENLIONPROJECT.EU