

Production of paper-based flexible Li-ion batteries using printing and UV-curing techniques



1st
year

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Printing Processes

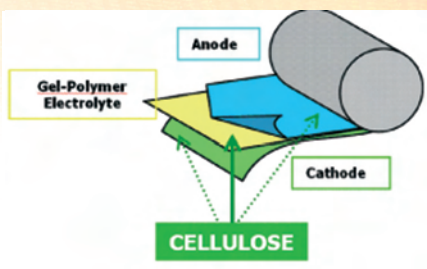
Conventional energy storage devices can not provide peak power without becoming too heavy in addition the production cost is still too high and they can not be recycled.

In this contest the aim of the project is to:

- Develop cheap, thin and flexible gel-polymer Lithium-ion batteries [1] using printing techniques to depose the battery components (anode, cathode and gel-polymer electrolyte [2]) and as a consequence reduce the production costs and increase the throughput.
- Use cellulose fibers or cellulose derivatives in order to increase the mechanical properties of the battery components and obtain a product that can be recycled.

The work program can be outlined as follows:

- Electrode slurries formulation & printing on paper/gel-polymer membrane
- Electrochemical characterization of printed electrodes.
- Search for optimal strategy for battery assembly.
- Battery characterization.



References

- [1] W.A.V. Schalkwijk et B. Scrosati, *Advances in lithium-ion batteries*, Springer, 2002.
- [2] J. Nair, C. Gerbaldi, A. Chiappone, E. Zeno, R. Bongiovanni, S. Bodoardo, et N. Penazzi, "UV-cured polymer electrolyte membranes for Li-cells: Improved mechanical properties by a novel cellulose reinforcement," *Electrochemistry Communications*, vol. 11, Sep. 2009, p. 1796-1798.