

Life LiBat Project

LIFE16 ENV/IT/000389 co-financed by EU LIFE program

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1. Project presentation

The European co-financed project, LIFE LiBat, began in July 2017 and it's expected to end in December 2020. This project involves the research of an innovative process for the recycle of primary Li batteries (Li(0)/MnO₂), and the demonstration activity by the realization of a specific prototype in pilot scale. Project's partners are the following:

Eco Recycling: born as a spin-off of "Sapienza" University of Rome, the company operates mainly in the field of sustainable innovative processes aimed at the WEEE recovery and recycling. The company's activities are mainly related to: the development of innovative processes for the recovery of metals from primary and secondary raw materials; process and plant engineering; support for start-up, management and staff training; chemical analyzes for environmental monitoring and process optimization.

SEVal: Società Elettrica Valtellinese, is a company active since 1987. Born in the field of electrical construction, now includes four specific sectors:

- Research: energetic and environmental studies and analyses;
- Engineering: ecologic plant design for the treatment of WEEE (waste electrical and electronic equipment);
- Production: power lines construction and maintenance;
- Ecology: recovery of refrigerators, electrical and electronic materials (WEEE), batteries and portable accumulators.

The SEVal ecological division was born in 1999 through a new transport and recovery activity for the bulky waste (as refrigerators, TV, end of life domestic appliances) and the opening of a treatment center in Sondrio (Italy). The main goal of this division is to operate in disposal, treatment and waste recovery sector.



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Sapienza University Dep. of Chemistry: the group of “Theory of the Development of Chemical Processes” is involved in the development of innovative hydrometallurgical processes for high tech waste exploitation. During the last years the research group, also collaborating with the interuniversity center HTR (High Tech Recycling), performed R&D activities concerning the treatment of alkaline batteries. These activities led to the completion of a series of European projects aimed at the recovery of metals with high added value, starting from electronic and electrical waste.

2. Recovery process

The main objective of the project is to demonstrate the environmental and economic feasibility of an innovative process for recycling of end-of life primary Lithium batteries (Li(O)/MnO₂). Demonstration of the proposed process at prototype level will be targeted by construction and demonstration of a plant with a processing capacity equal to 100 kg batteries per day. The constructed prototype plant will be installed and operated at the industrial site of SEVal, which is involved in the collection and recycling of batteries and of several different kinds of WEEE. The proposed process integrates mechanical pre-treatment of primary Li-batteries with a hydrometallurgical treatment route developed by researchers of Sapienza University and patented by the coordinating beneficiary. In accordance with this idea, the following project mainly activities have been set:

- Samples cryogenic pretreatment;
- Grinding;
- Stabilization in aqueous phase and separation of the different factions;
- By-products recovery (magnetic and non-magnetic metals, plastics and paper);
- Lithium recovery by controlled precipitation and subsequent filtration;
- Leaching of the electrolytic powder (which contains the Manganese);
- Manganese recovery by precipitation and subsequent filtration.

Demonstration activities will include processing 2850 kg of batteries with recycling efficiency greater than 50%.



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3. Dissemination

In order to disseminate the results obtained during the project, a set of activities have been established. In particular a dedicated website (<http://www.lifelibat.eu>) has been create where, periodically, the information about the project progress will be reported. Some social media (Facebook, LinkedIn, YouTube) has been selected to disseminate the project to a wide range of public both scientific and non-scientific. Furthermore some press release will be communicate at the achievement of important milestones. It is also foreseen to participate in several conferences and exhibition and to make publications in journals of the field, in which the results of the experiment will be announced. At the end of the project a Final Conference will be organized, and a visit at the pilot plant site.