

Assegno di Ricerca “Processi sostenibili per il recupero di materiali catodici di batterie litio-ion”

Research Project:

The objective of this Research Project is the design and development of innovative processes with high atomic efficiency, and low economic and environmental impact for the recovery of critical metals of lithium-ion battery cathodes. The study of the recycling/recovery of the cathode will be carried out through two approaches: i) separation of the active material from the current collectors using green solvents (e.g. Cyrene); ii) leaching of the powders using eutectic solvents (DES).

Activity Plan:

The project will include the following experimental activities:

- Optimization of the formulation of the solvent (e.g. citrus juice, cyrene) for a solvent-based green separation process of cathodic active materials from the current collector
- Selection of the acidic and/or neutral DES/NaDES for the soft leaching of Co, Mn, Ni or Fe present in the cathode powders
- Metal separation by selective precipitation through sustainable precipitating agents such as oxalic acid or others with a natural base.
- Analysis of the recovered materials by various analytical techniques such as ICP, XRD, FTIR, Raman.

The procedures will be developed by using commercial cathode powders and cathodes. The activities will take place at the Chemistry Department "Giacomo Ciamician" and at the Environment, Energy and Sea Research Center of Marina di Ravenna (ENERCUBE).