Summary

Urban Mining: Recycling of Spent Lithium-Ion Batteries chasing raw materials

Target age

Age 14 and over

Level of difficulty

☐ Easy ☒ Medium ☐ High

Key words:

Circular economy, recycling, rechargeable batteries, critical raw materials

Abstract of the activity:

Lithium-Ion Batteries, LIBs, are widely diffused in portable electronics and now even more in electric vehicles. End-of-Life LIBs constitute at the same time a problem (waste to be managed) and a possible resource (as contain valuable Critical Raw Materials, CRMs).

Whit this lab activity the $LiCoO_2$, the first commercial cathode in LIBs will be degraded though the use of organic acids and reducing agents. Li and Co, the most valuable CRMs, will be recovered as pure salts.

Learning Goals

- Create awareness about the diffusion of LIBs and the problem of LIBs waste
- Create awareness about employment of CRM in the production of LIBs
- Educate to the idea of Circular Economy and Sustainability and to consider the upcycling of a waste to a secondary source of CRMs
- Inform about the risks of LIBs waste for human and environmental risks
- Develop critical thinking skills

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Summary

Specific Abilities - *At the end of the activity the student will be able to:*

- Prepare a water-based solution with the correct nominal concentration
- Handle simple glassware
- Perform a precipitation of desired salts
- Work under safe conditions by actively looking for safety information about handling and disposal of the considered reagents
- Compare results from a qualitative and quantitative point of view

Cross-curricula Links*:*

- Ecology/Environment
- Chemistry
- Technology
- Economy

Prerequisites - *Knowledge and skills necessary for carrying out the activity*

- Basic chemistry laboratory techniques

Time requirement *plus eventually other boundary conditions*

☐ 4 h

Instruments*:* *stirring plate, analytical balance, glassware*

Learning and Teaching Support Materials - What you can find in the toolkit

1. Lab Procedure
2. Students' Card
3. Teachers' Card
4. Ppt presentation for preparing a lesson with tutorial videos

RM Ambassadors

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