Lithium Batteries: Recycling Methods to Reduce their Environmental Impact

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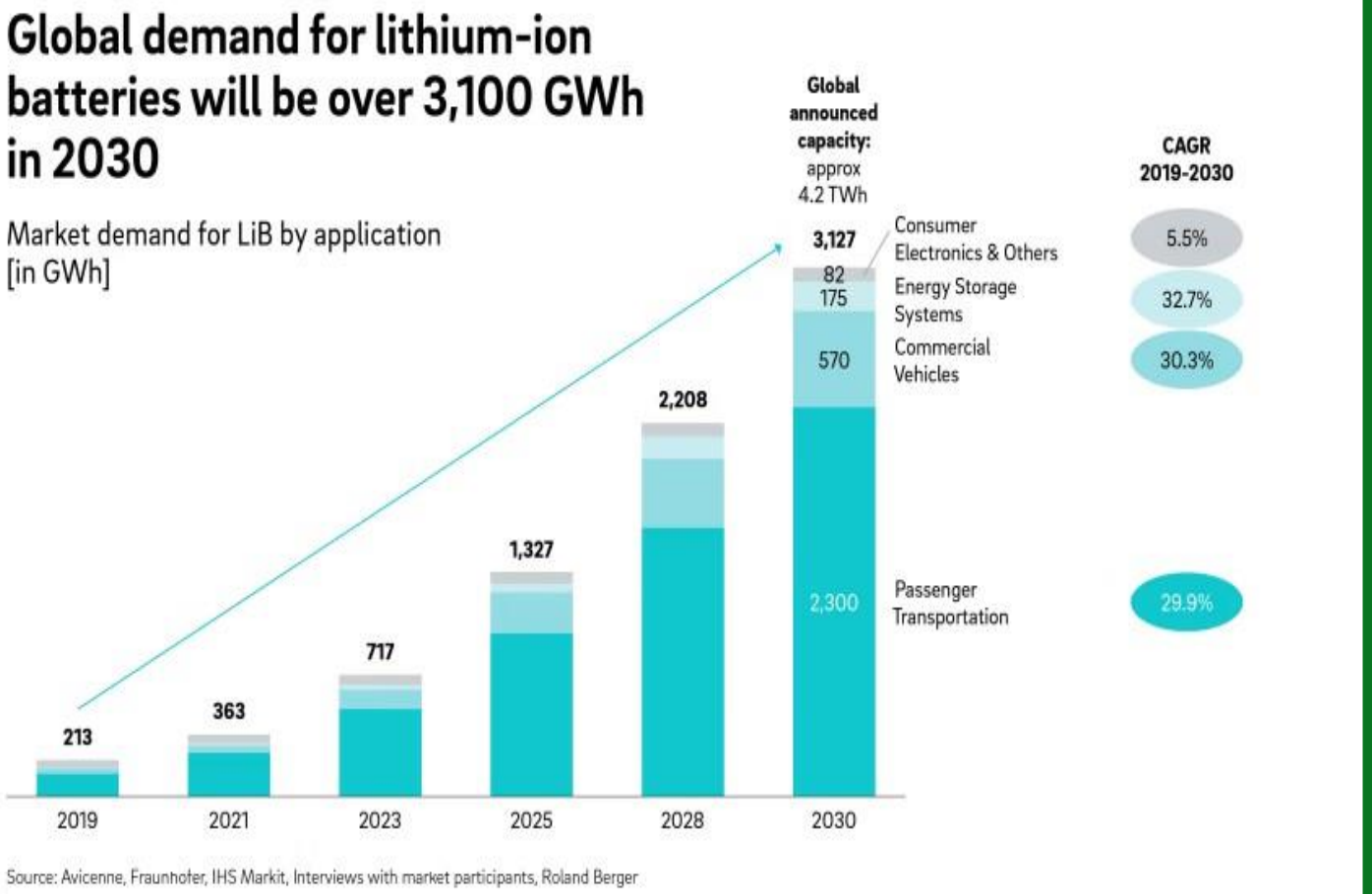
Class: English II

Year: 2023

MAP OF THE PRESENTATION

- INTRODUCTION
- ENVIRONMENTAL IMPACT OF LITHIUM BATTERIES
- RECYCLING METHODS
- ADVANTAGES AND DISADVANTAGES OF NEW TECHNOLOGY
- CONCLUSION

INTRODUCTION



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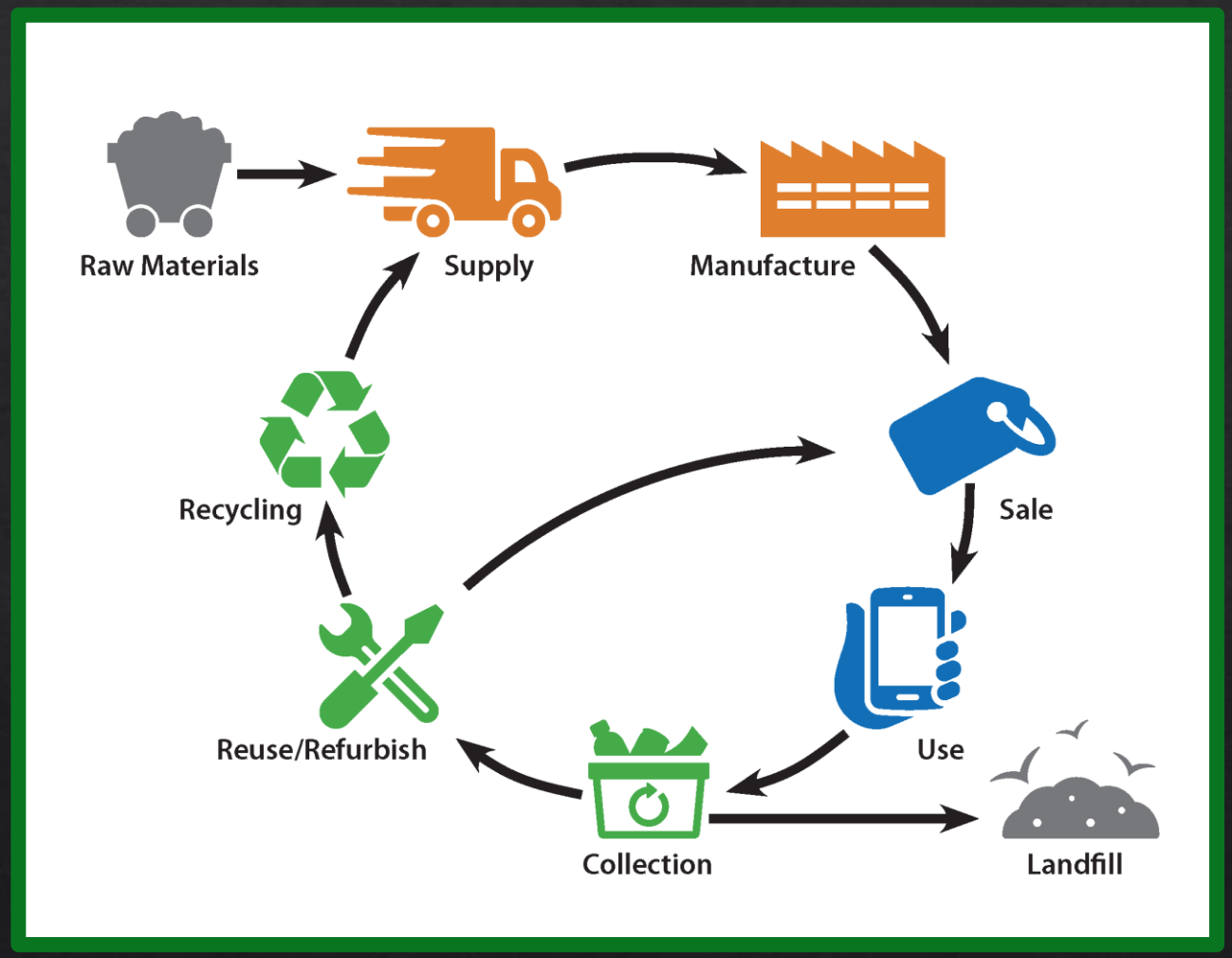

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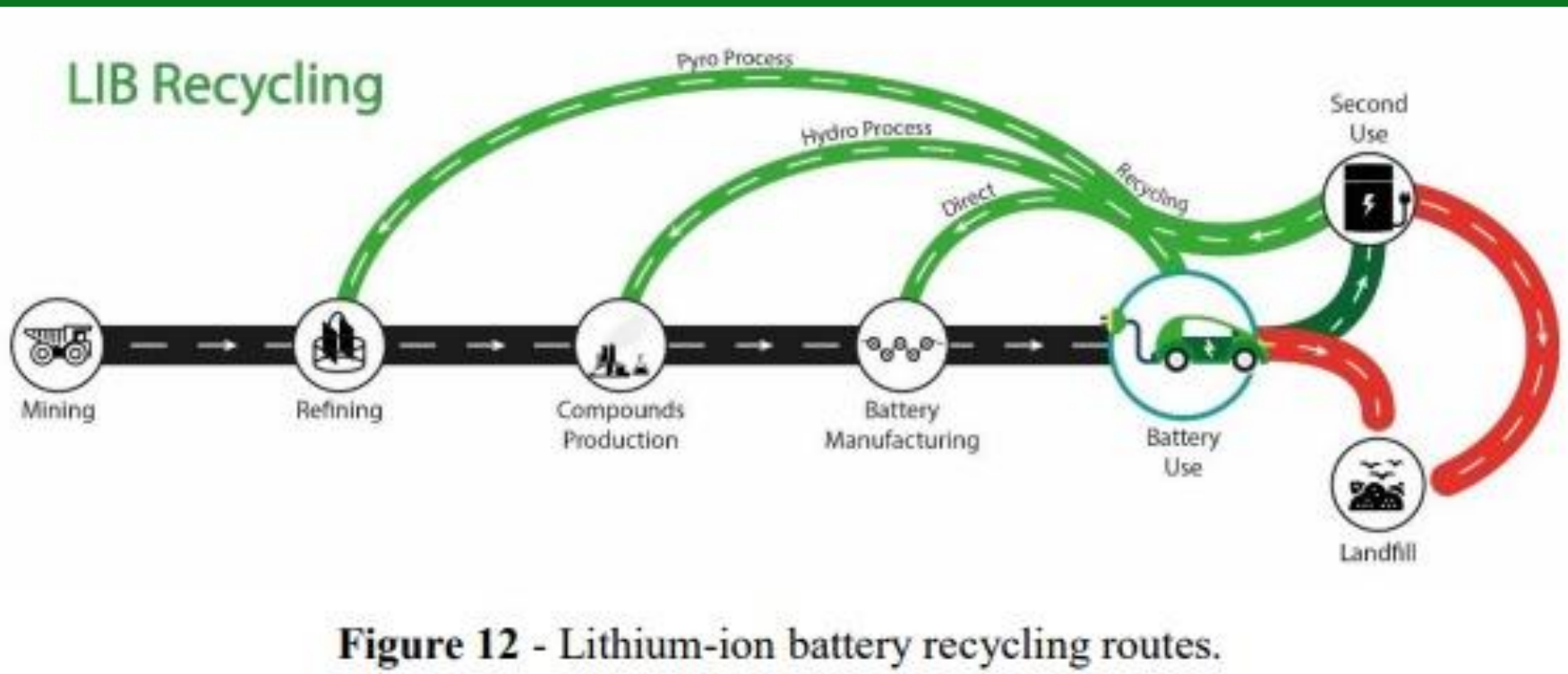
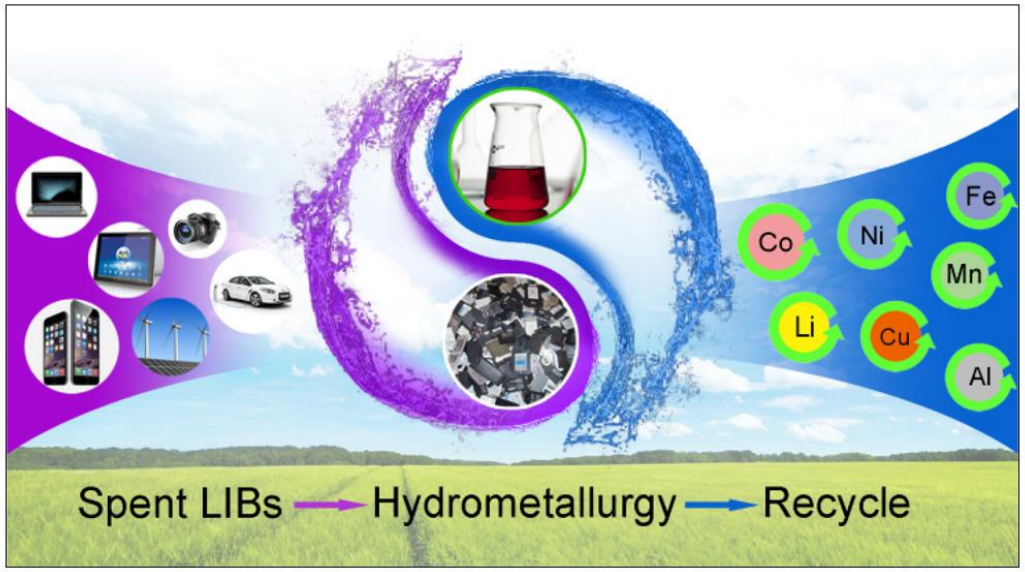
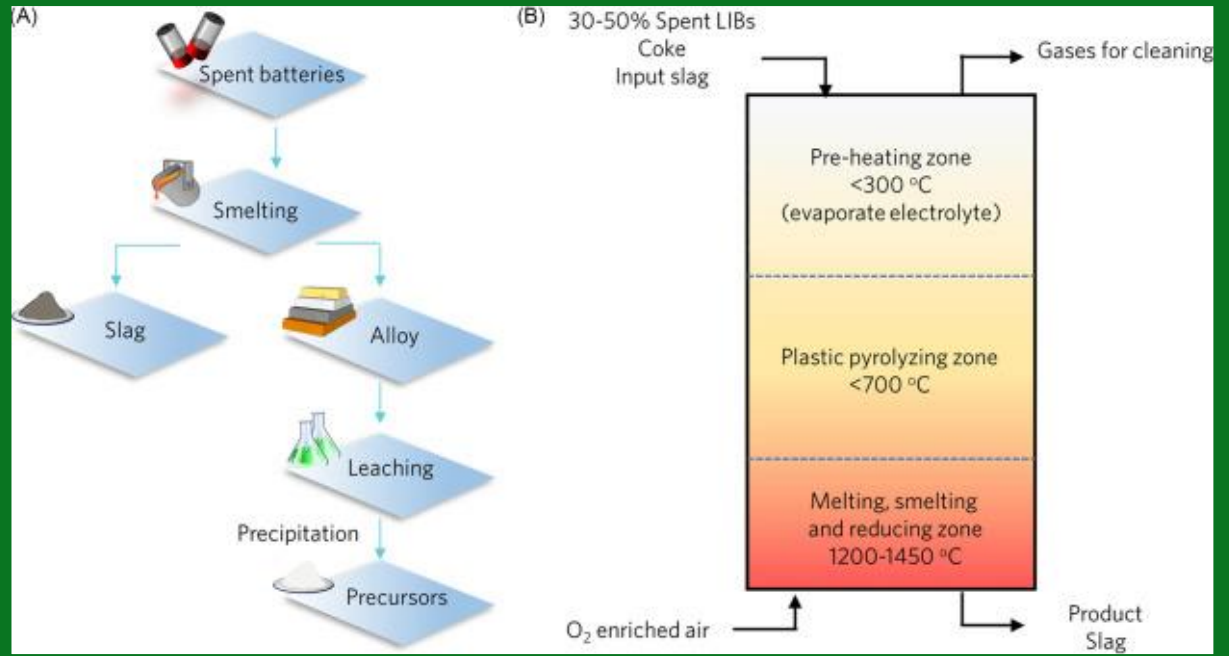


Figure 12 - Lithium-ion battery recycling routes.

Nowdays recycling methods consume a lot of energy or they generate some toxic waste (leachates). They could also be expensive to implement in order to decrease carbon footprint.

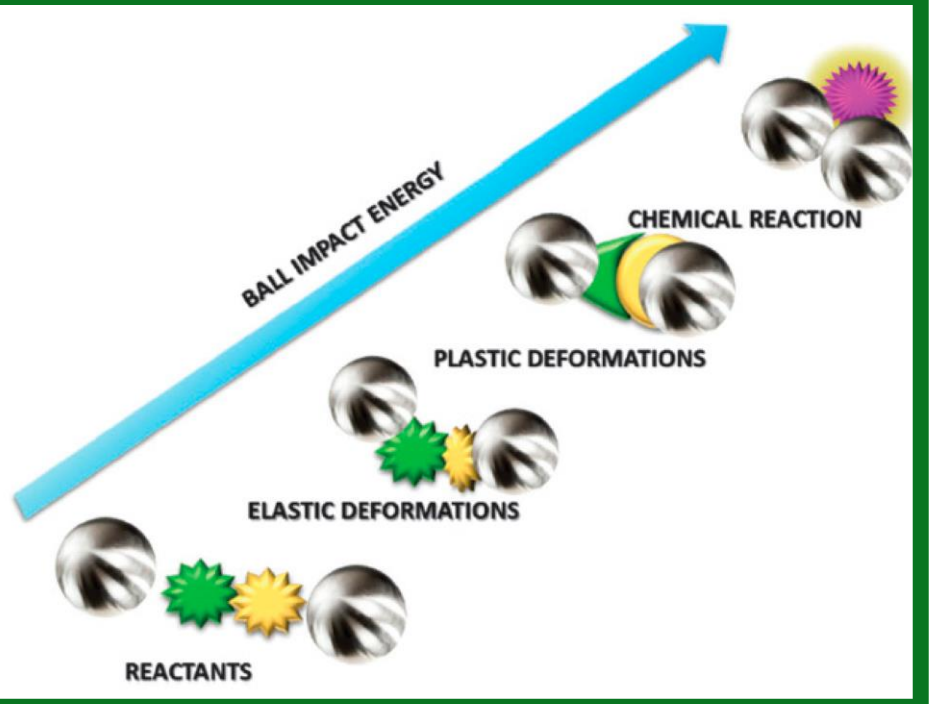
INTRODUCTION

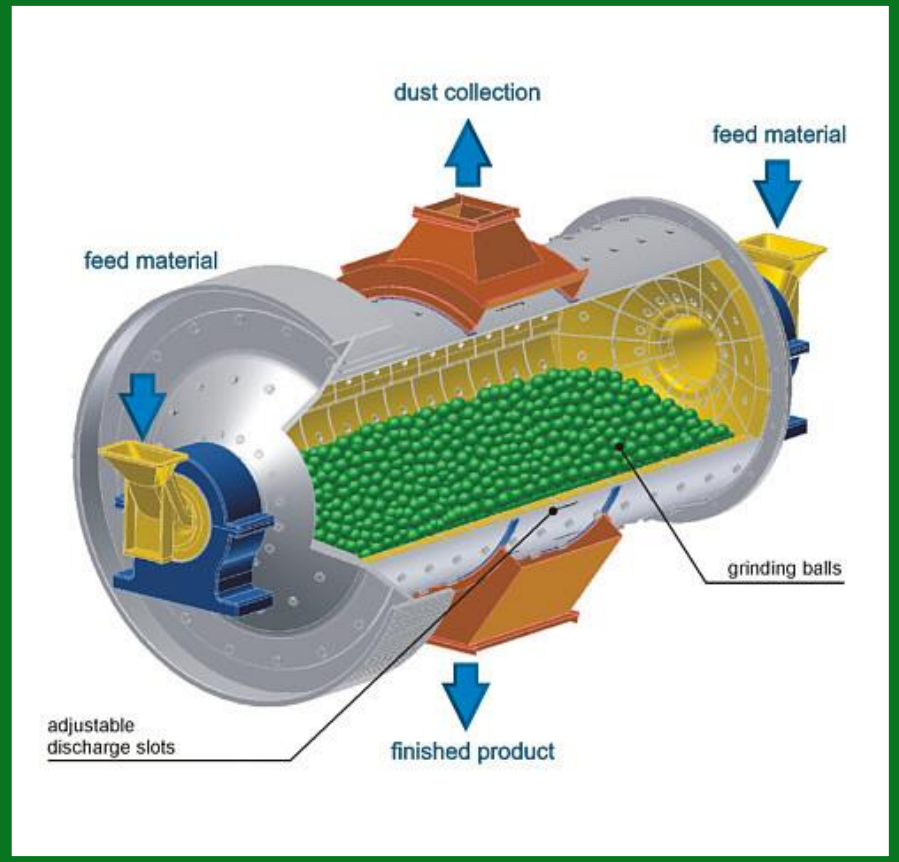


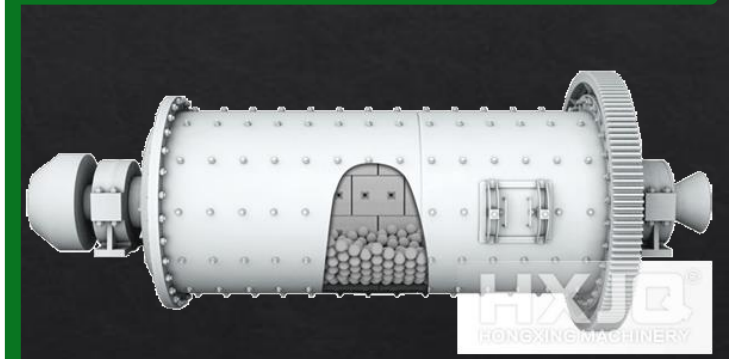


It is important to minimize energy consumption or environmental impact when batteries are recycled, so new recycling methods need to be implemented.

INTRODUCTION







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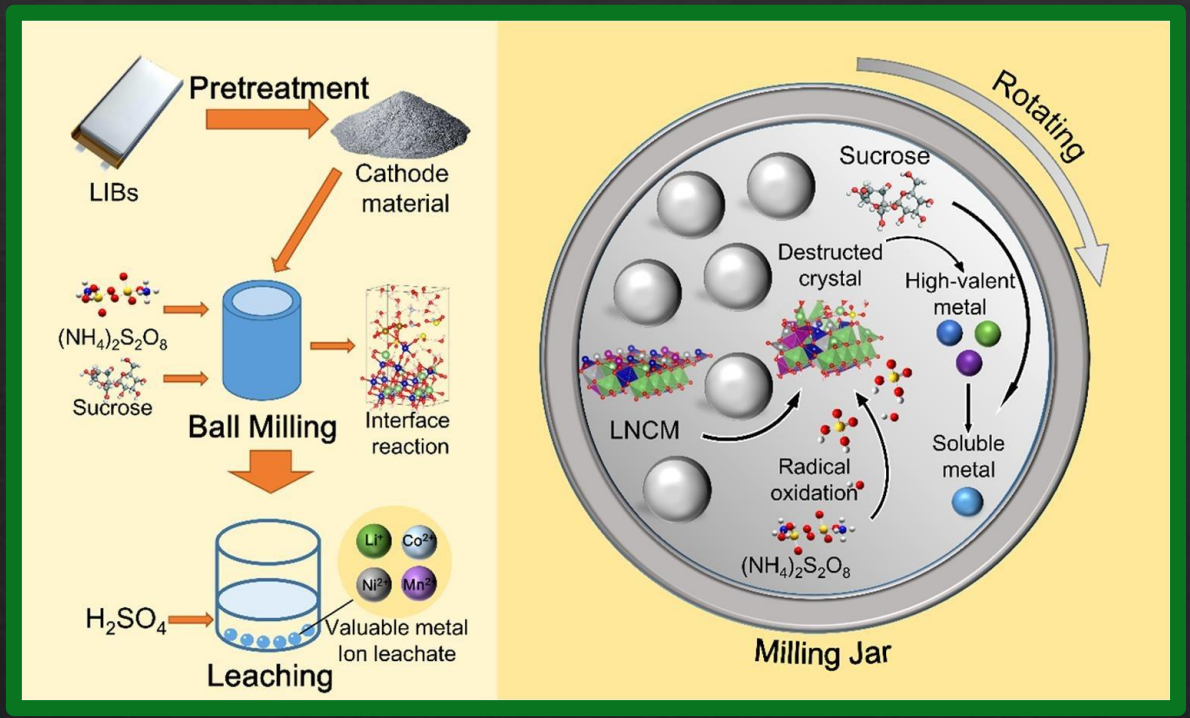


Implementation of new techniques allows for more efficient recycling methods, less environmental impact and better recycling capabilities for lithium batteries.

ENVIRONMENTAL IMPACT OF LITHIUM BATTERIES

EXTRACTION

DISPOSAL

ENVIRONMENTAL IMPACT OF LITHIUM BATTERIES

ACCIDENTS

EMISSIONS

RECYCLING METHODS

PYROMETALLURGY

- LOW EFFICIENCY
- HIGH TEMPERATURE
- HIGH ENERGY CONSUMPTION
- INDUSTRIAL APPLICATION
- MIXED ALLOY

RECYCLING METHODS

HYDROMETALLURGY

- MEDIUM EFFICIENCY
- LOW TEMPERATURE
- LOW ENERGY CONSUMPTION
- INDUSTRIAL APPLICATION
- USE OF ACIDS

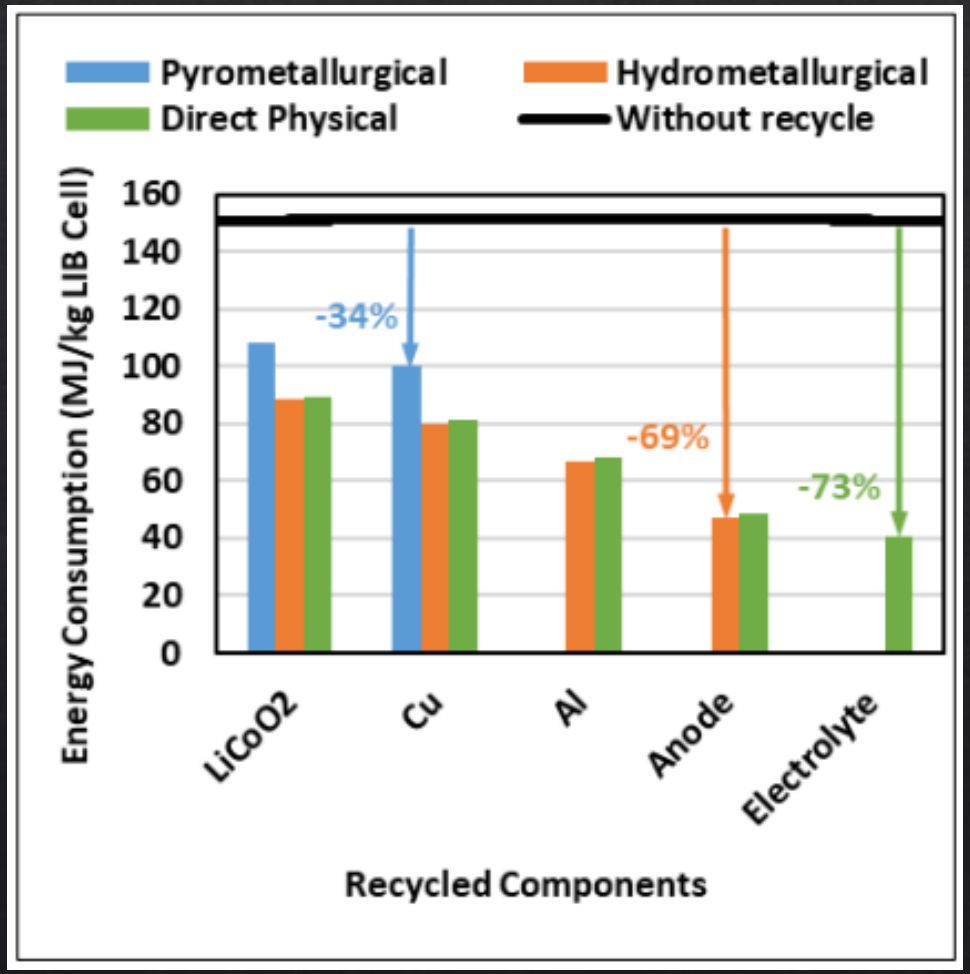
RECYCLING METHODS

DIRECT RECYCLING

- HIGH EFFICIENCY
- LOW TEMPERATURE
- LOW ENERGY CONSUMPTION
- INEXPENSIVE IMPLEMENTATION
- NO CHEMICAL CHANGES

RECYCLING METHODS

ENERGY CONSUMPTION COMPARISON



RECYCLING METHODS

MECHANOCHEMICAL TECHNOLOGY

- MECHANICHAL ENERGY
- LINKABLE WITH HYDROMETALLURGY
- LITTLE CRYSTAL PIECES
- CHEMICAL REACTIONS
- EASY SEPARATION OF COMPOUNDS

ADVANTAGES AND DISADVANTAGES OF NEW TECHNOLOGY

ADVANTAGES

- VERSATILE WITH SPECIFIC MATERIALS OR METALS
- PROCESSES OPTIMIZATION
- LOW ENERGY CONSUMPTION

MECHANOCHEMICAL TECHNOLOGY

DISADVANTAGES

- LOW ENERGY EFFICIENCY (25%)
- EXPENSIVE IMPLEMENTATION
- LOWER ECONOMIC BENEFITS

CONCLUSION

ECONOMICAL AND ECOLOGICAL SOLUTIONS

THANKS FOR YOUR ATTENTION

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