
Creating #Microbial Battery Recycling

Disruptive.
Green.
Scaleable.



B·R·A·I·N

Let's develop a truly green process together for the recycling of lithium ion batteries!

What is key to a sustainable (EV) battery industry? It's the **efficient recovery of lithium and cobalt**, two elements that raw material experts regard as critical due to their scarcity, cumbersome production and risk of supply. They are located in the cathode material of lithium ion batteries and, after discharging and dismantling, they can be recovered in a mixture called "black mass" together with other metal compounds.

Today, metals are recycled from black mass in energy-intensive smelting plants that release climate-damaging gases and fail to recover most of the lithium. Alternatively, hydrometallurgical approaches use aggressive chemicals and produce acidic waste piles that are costly to dispose of.

We believe these strategies belong to the past and envisage a truly green process for the recycling of (EV) batteries.

Our vision

Microorganisms take over lithium and cobalt extraction and lead to a fully environmentally friendly and sustainable battery recycling process.

Our offer

- Broad ready-to-screen selection of high-performance microorganisms
- Optimized microorganisms for the specific needs of metal extraction
- Deep understanding of process development needs in urban mining
- Highly motivated team of biomining experts

Your benefit

Drive a pioneering bio-based innovation process and secure your pole position in the development of a sustainable battery recycling process!

Integrate our proprietary dedicated microorganisms for single process steps into your existing process, or set up a greenfield process.

Current stage of the proposal

This lithium ion battery recycling project is based on three assets:

- our set of proprietary, pre-characterized microorganisms with known capability to produce organic acids, metal-complexing agents or reducing compounds;
- our know-how in the field of microbiology, strain optimization and process development;
- your know-how of the entire recycling flowchart and the battery market.

Proposed project outline

A joint project can be structured as follows:

Research phase

- Screening of a defined set of microorganisms and lab-scale-validation (our task)
- First techno-economical evaluation and basic process design (our task)

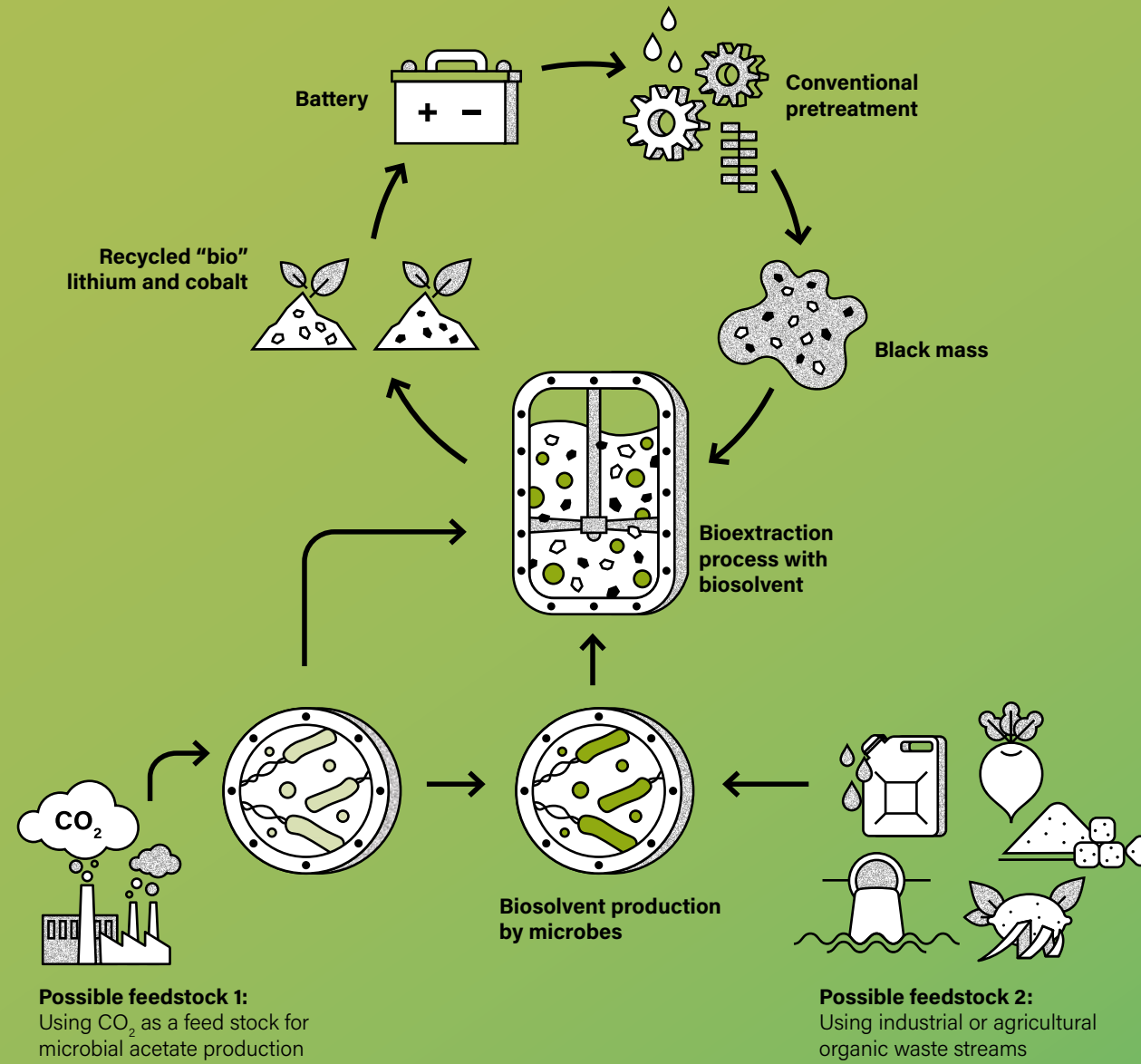
Development phase

- Process development and lab-scale-up, prototyping (our task)
- Process integration (we and you)

Implementation phase

- Process scale-up (we and you)
- Market implementation (your task)

How microbes can make lithium ion battery recycling more sustainable, more effective and even completely CO₂-neutral



Dedicated microorganisms can, by producing organic acids, selectively dissolve lithium and cobalt and leave the remaining bulk material in the solid state. To support this bioleaching activity, microorganisms are fed, i.e. with a simple sugar, a carbon-rich waste stream such as beet syrup, crude glycerol from biodiesel production, or pomace from vegetable or fruit processing. Or even just with carbon dioxide. The latter could compensate for the whole amount of carbon dioxide released during the original production process.

Conventional battery recycling is good – microbial battery recycling is even better

Microbial battery recycling

- ⊕ Small CO₂ footprint and low energy consumption
- ⊕ Biosolvents from renewable resources (sugars, waste streams, CO₂)
- ⊕ No toxic emissions
- ⊕ Selective and efficient metal extraction
- ⊕ Decentralized, modular units, integration into existing flowcharts

Traditional hydrometallurgy

- ⊕ Low energy consumption
- ⊕ High metal recovery
- ⊕ Decentralized, modular units, integration into existing flowcharts
- ⊖ Aggressive chemicals
- ⊖ Toxic emissions

Pyrometallurgy

- ⊕ Established process
- ⊖ High energy consumption & big carbon footprint
- ⊖ Emission of climate-damaging gases (SO_x, NO_x, Cl gases)
- ⊖ Lower rate of metal recovery (Lithium slagging)
- ⊖ Central process and costly logistics

Be a pioneer in sustainable battery recycling

If you want to

- establish a CO₂-neutral circular economy
- increase the sustainability of your battery recycling process
- replace fossil resources by renewable ones
- be a first mover in bio-based recycling

then join us as a development partner and rely on our competencies in the field of biotechnology. We are ready for the challenge. Let's make a difference together!



To contact us send an email to:
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For more information, visit:
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