icarus

Demo Case 1

Upcycling of waste from the Lithium extraction & refinery

Challenge

Global lithium carbonate production reached 240,000 tonnes in 2024.

Lithium demand is projected to surge over the next decade, driven by battery production and the green transition.

Extracting just a few grams of lithium requires processing tons of rock, resulting in significant waste (LAR).

The characteristics of lithium aluminosilicate residue (LAR) are variable depending on ore composition and treatment.

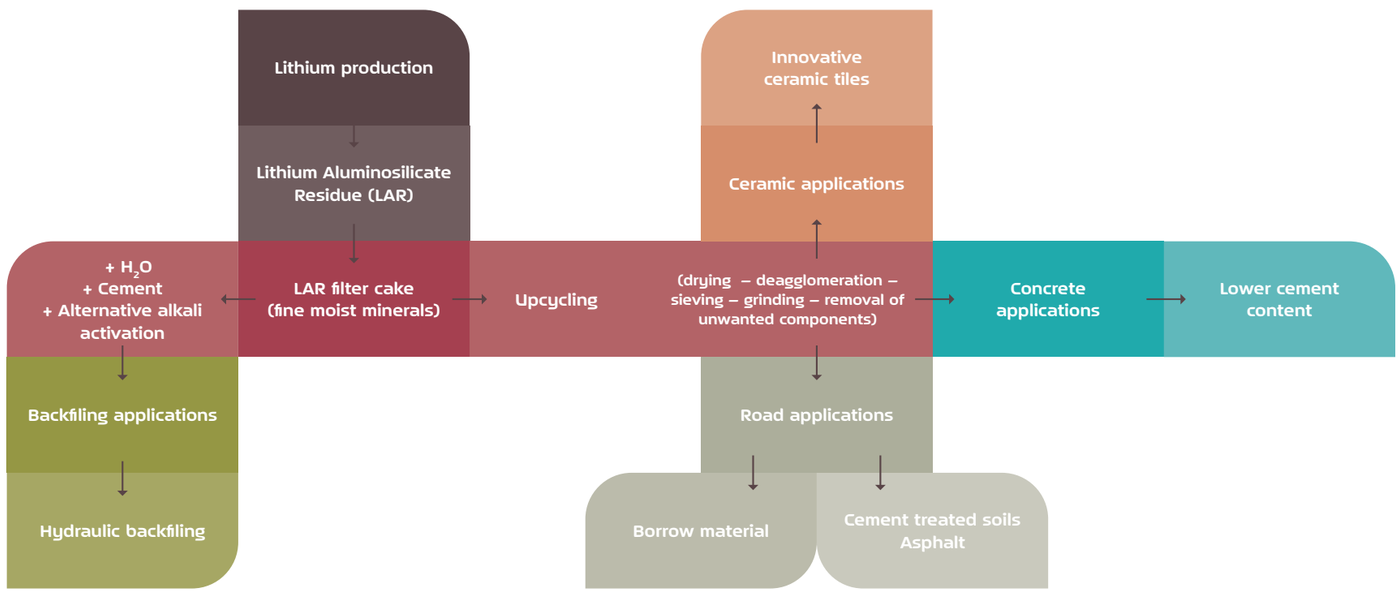
ICARUS investigates the properties and applications of LAR from Lithium Iberia's Las Navas mining project in Extremadura (Spain)

What we do

Demo case 1 investigates upcycling lithium extraction residues (LAR) into construction and ceramic materials, including concrete, road layers, binders, paste backfill, and tiles. The project aims to enhance upcycling processes and develop formulations that meet technical and environmental standards.

LAR

Process



Key results

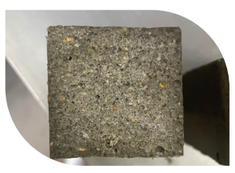
Soil embankments
Mixing LAR with soil results in acceptable particle size and compaction, but soluble sulfates remain problematic.

Asphalt mixtures
Up to 15% LAR can be successfully incorporated, but the fines content must be minimized to maintain performance.

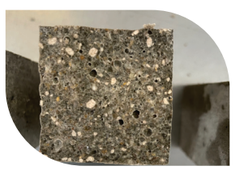
Mortars
LAR agglomeration occurs requiring grinding for cement applications. Potential durability concerns due to sulfate content.

Ceramics
LAR is suitable for tile production provided sulfate is removed to prevent hazardous emissions during sintering.

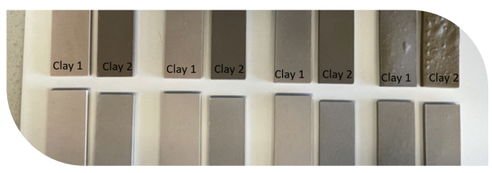
70% soil + 30% LAR



Grinded LAR scattered in mortar



LAR agglomerates in mortar



Replication potential and impact

Reduction of mining waste through integration of ICARUS technologies into ore processing operations.

Appropriate upcycling of LAR enables significant incorporation rates across multiple applications.

Upcycling of LAR preserves primary resources, enabling more circular construction materials.

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Key partners

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