

PRESS RELEASE

Watercycle Technologies: A Mineral Recovery Company

Watercycle Technologies Ltd is a UK-based climate-tech company specialising in water remediation solutions and critical mineral recovery. Watercycle Technologies was developed to address the need for dramatic increases in the supply of certain materials for low-carbon technologies. Elements such as lithium, nickel, copper, as well as substances like graphite, are essential to technologies in lithium-ion batteries, wind turbines, and nuclear power plants. With demand for these minerals set to outstrip supply, Watercycle's patented technology addresses both the need for primary production to source raw materials and building effective recycling infrastructures to keep materials in circulation. The UK-based company builds and deploys sustainable, high-yield, low-cost mineral recovery systems to treat liquid or solid input streams, such as brines, industrial wastewater or end-of-life batteries.

REVITALISE will utilise Watercycle's **Direct Lithium Extraction and Crystallisation (DLEC™, Figure 1) technology for the recovery of lithium and other minerals from battery wastewater and black mass.** Watercycle's mineral recovery technology is **integrated into end-to-end modular-based systems comprising three main stages:** the first is a pre-treatment step which allows the processing of a range of complex streams. It then passes through a membrane-separation step before a final crystallisation stage, processing this solution into high-purity saleable salts and freshwater whilst ensuring effluent discharge compliance. Upon optimisation of its processes, DLEC™ will be used to treat different waste streams for NMC and LFP-type batteries.

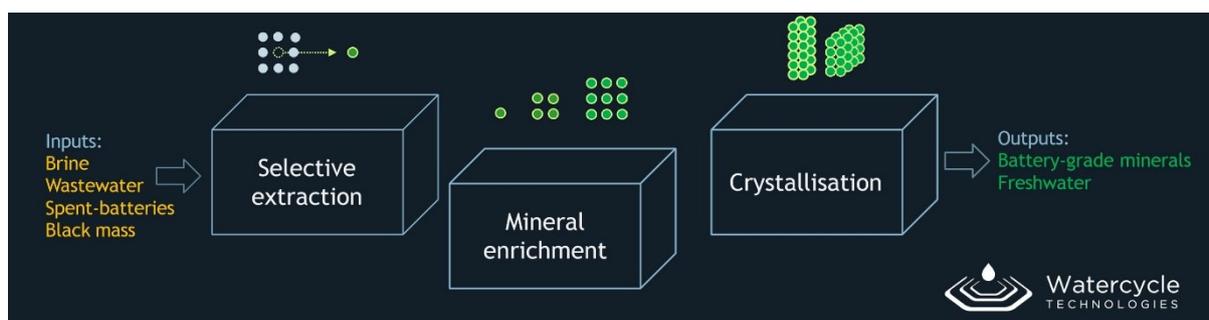


Figure 1 Schematic of Watercycle's DLEC™ process

Lithium recovery from spent batteries is often deemed uneconomical and, therefore, unviable. The adoption of DLEC™ in the REVITALISE project evaluates a cost-effective and high-yield solution to treat low-lithium wastewater to extract the full value of a battery's components.

The company's first DLEC™ pilot system recently achieved the large-scale production of 100kg of battery-grade lithium carbonate from UK brines in a 12-month project with Innovate UK. The DLEC™ approach to treating lithium-containing solutions enables a 10x reduction in CO₂ emissions compared to hard rock lithium mining and saves 500m³ of water per ton of LiCO₃ compared to the conventional evaporation process.

These mineral recovery systems allow companies to recover value from their waste to obtain a saleable product whilst managing their wastewater. This approach can treat wastewater streams to achieve zero liquid discharge to meet the water framework directive.

Watercycle's CEO and co-founder Seb Leaper (*Figure 2*) says: **'Our approach is to ensure every atom going into the system must be saleable, recirculated into the process or compliantly discharged.'**

Obtaining a final saleable salt is an important distinction in Watercycle's processes over other technologies.

Most companies in the 'direct lithium extraction' sector do not crystallise their final product, instead, they end up with a lithium-containing solution, often lithium chloride. Watercycle believes this only partly addresses the problem as it requires a second technology provider to convert this solution into saleable salts (e.g. lithium carbonate) and, potentially, a third to purify these crystals to battery-grade products.

Watercycle's novel DLEC™ technology incorporates all stages and crystallises this lithium-salt solution to obtain the lithium crystals directly. The company's knowledge in crystallisation science offers a more versatile product that can produce different forms of lithium salts and adapt to the changing battery chemistries over time.



Figure 2 Co-founders, Seb Leaper and Ahmed Abdelkarim, pictured in front of Watercycle Technologies' first pilot-scale system

Watercycle Technologies sets itself apart from competitors by applying its technology beyond sub-surface waters for use in other mineral-rich waters or waste. The company is now utilising its pilot system to incorporate more diverse inputs, like solid waste, batteries and black mass for the recovery of valuable battery metals. Future iterations of this technology will expand the range of extractable salts to create a universal mineral extraction machine capable of treating any input stream. The adoption of new input streams presents challenges in managing wastewater containing a complex mixture of valuable metals, harmful fluorinated compounds and high levels of organic material. Novel technologies must address these issues comprehensively to develop efficient and cost-effective battery recycling processes. As part of REVITALISE, the EU-funded project enables Watercycle Technologies to refine and optimise its DLEC™ technology to withstand these conditions and contribute to increasing the economic value of recycling end-of-life LIBs.



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Social Media

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