
Momentum Technologies

World Materials Forum

June 2022



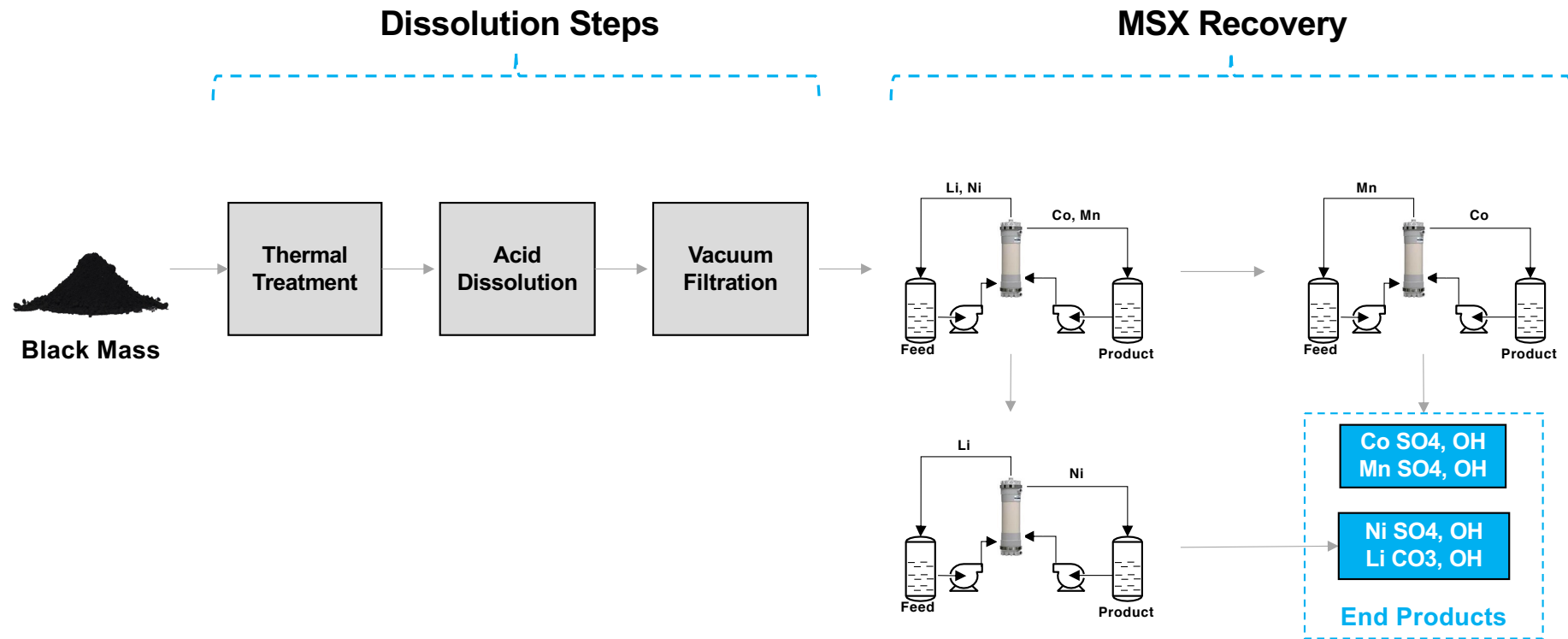
Momentum Technologies Overview

- Texas based lithium-ion battery and Rare Earth permanent magnet recycling company
- Developed a patented modular recycling technology called Membrane Solvent Extraction, or (“MSX”), that can deliver high purity specialty chemicals at significantly lower capital and operating costs relative to competing technologies
- Raised a \$20,000,000 Series A in 2021 from Techmet and Freestone
- MSX scales to current scrap rates while providing the lowest emissions profile of any peers
- Halliburton, the multinational oil field services company, took an equity stake in Momentum in 2021 through Halliburton Labs.
- Halliburton has helped design, build and deploy our MSX skids. They plan to use this knowledge to better serve the new energy frontier.



Commercial MSX Skids

Dissolution & MSX Step-By-Step



Problem Statement

Impending Wave of End-Of-Life LIBs

- Volume of end-of-life lithium-ion batteries will grow exponentially over the next decade

Critical Metals in Short Supply

- Demand for metals related to electric vehicle batteries to experience unprecedented growth
- Next decade to exhibit demand growth from Lithium > 6.0x, Nickel > 2.0x, Cobalt > 2.0x and Copper > 30%

Domestic Resource Scarcity

- Domestic (Both NAM and Europe) resource markets severely under-developed
- High concentration of battery critical resources in South America, Australia, Congo, Indonesia, and China

Carbon Efficiency / Regulations

- Emissions from Lithium-Ion battery manufacturing is a major contributor of EV emissions
- Regulations increase costs of handling, packaging, and transporting batteries across territories



Momentum's recycling solution solves the issues at hand

Differentiated Technology = Superior Outcome



Technology	MSX (Momentum)	Pyrometallurgy / Smelting	Hydrometallurgy
Capital Costs	<ul style="list-style-type: none"> Low capital intensity than can scale in line with customers existing volumes 	<ul style="list-style-type: none"> High capital intensity 	<ul style="list-style-type: none"> High capital intensity and requires specialized equipment
Operating Costs	<ul style="list-style-type: none"> Low energy requirement Located at / near customer High variable cost structure 	<ul style="list-style-type: none"> Power intensive and high fixed costs 	<ul style="list-style-type: none"> Large facility leads to high fixed cost structure
Chemistry Flexibility	<ul style="list-style-type: none"> Applicable to any battery chemistry 	<ul style="list-style-type: none"> Applicable to any battery chemistry 	<ul style="list-style-type: none"> Applicable to any battery chemistry
Recoveries & Product Purity	<ul style="list-style-type: none"> High recoveries ~95% Metals ready to be re-used in cathode manufacturing High purity material can be sold into electroplating market 	<ul style="list-style-type: none"> Low recoveries ~50% Tend not to recover lithium 	<ul style="list-style-type: none"> Recoveries in the 85-95% range Metals have potential for being re-used in cathode manufacturing
Environmental Impact	<ul style="list-style-type: none"> Lowest emissions by virtue of being located near customer, significantly lower power + chemical usage 	<ul style="list-style-type: none"> Requires high temperatures and large amounts of energy Expensive gas clean-up to avoid toxic flue gas emissions 	<ul style="list-style-type: none"> Emissions for logistical requirements, pre-processing, energy consumption, and leaching chemicals



Call To Action

- **In order to procure critical battery materials for the supply chain, we need to develop more domestic mining and refining capabilities coupled with state-of-the-art recycling solutions**
- **Recognize the need for a comprehensive battery recycling solution that addresses the environmental challenges in EV battery production (and end-of-life management), Momentum's MSX technology provides a step change in carbon emissions and cost reductions**
- **Addressing carbon reduction requires a multi-faced approach from all stakeholders, but can be more quickly facilitated through government support, incentives, or mandates**

