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# Momentum Technologies

## World Materials Forum

July 2023



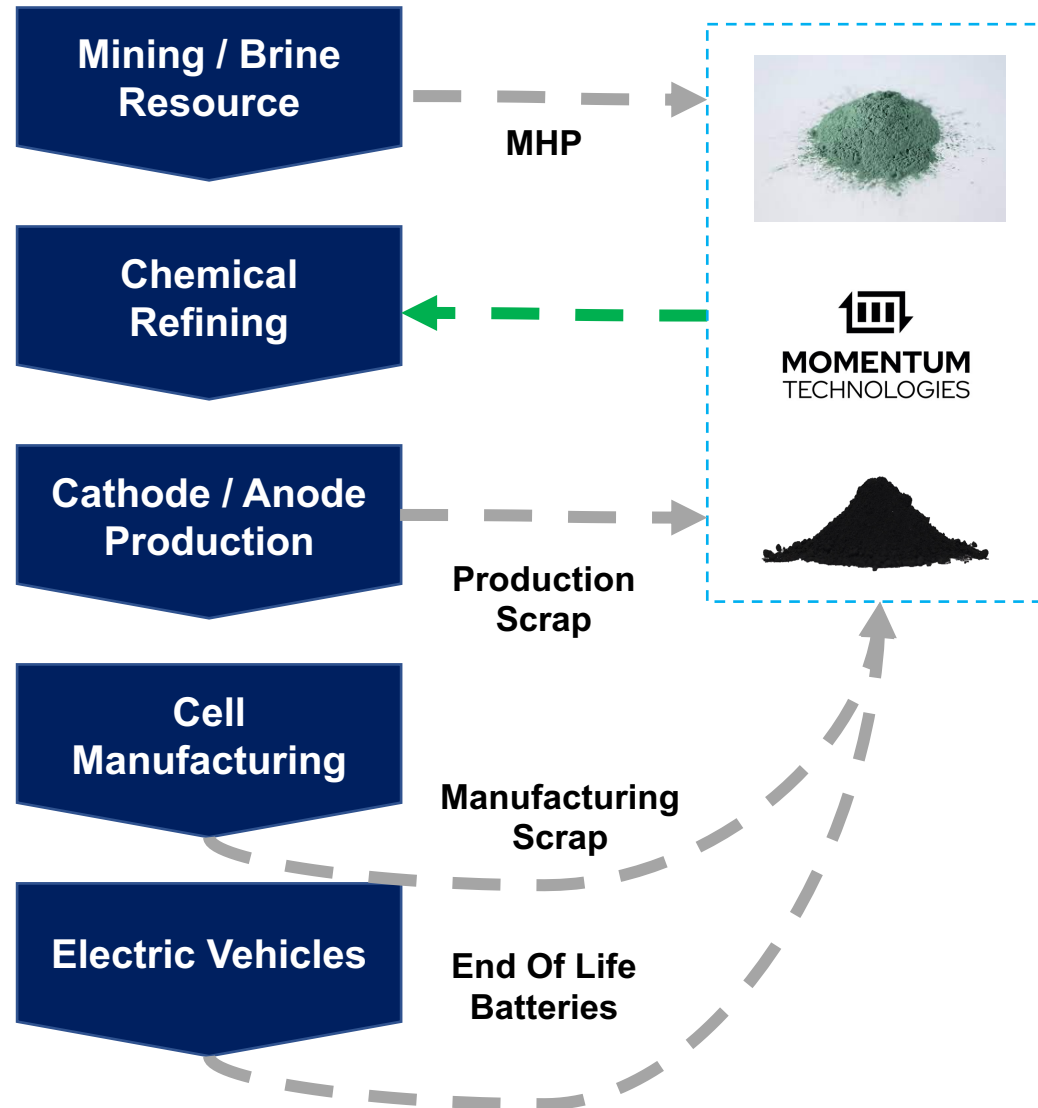
# Overview

Momentum provides a scalable, sustainable, commercially-attractive critical materials processing technology to gigafactories, electronics recyclers and high-end metals manufacturers to help satisfy the mounting demand for critical minerals and metals around the globe.

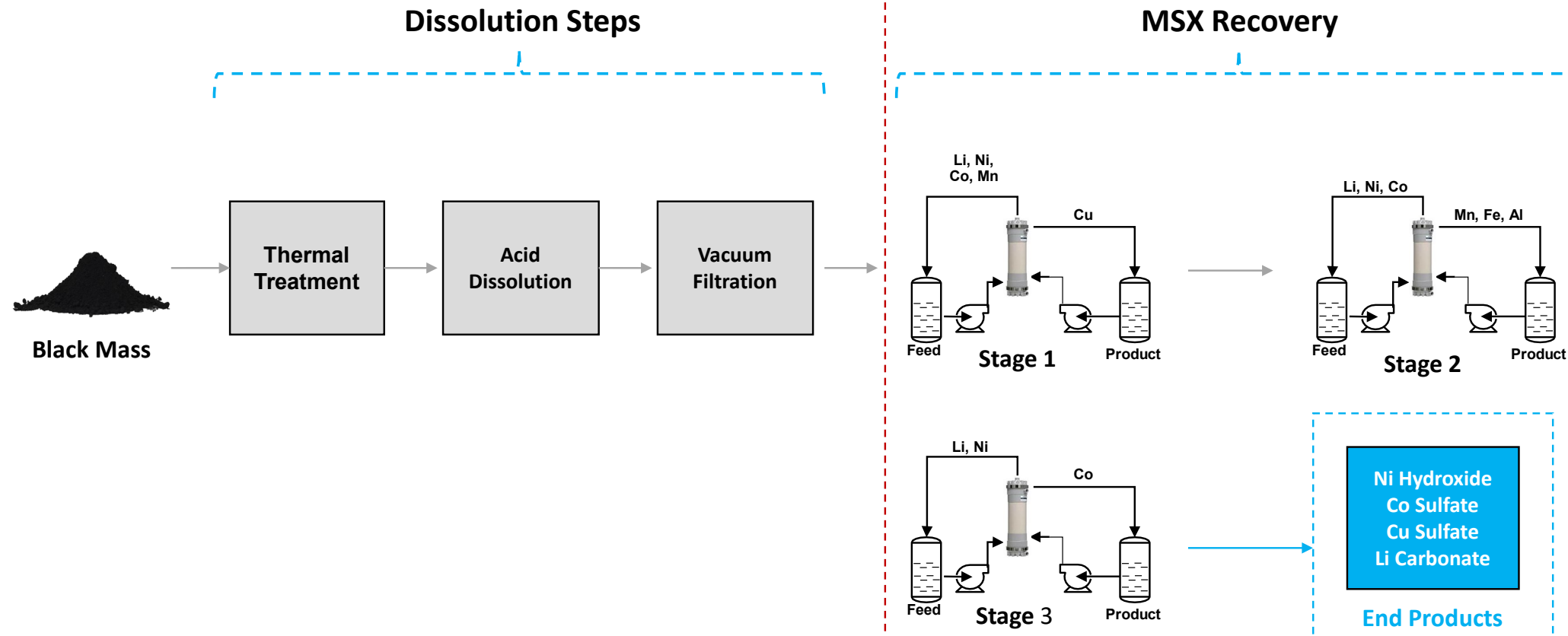
Backed by: **TECHMET**



# Our Place in the Value Chain



# Start-to-Finish



**Patent: PLA 1962**

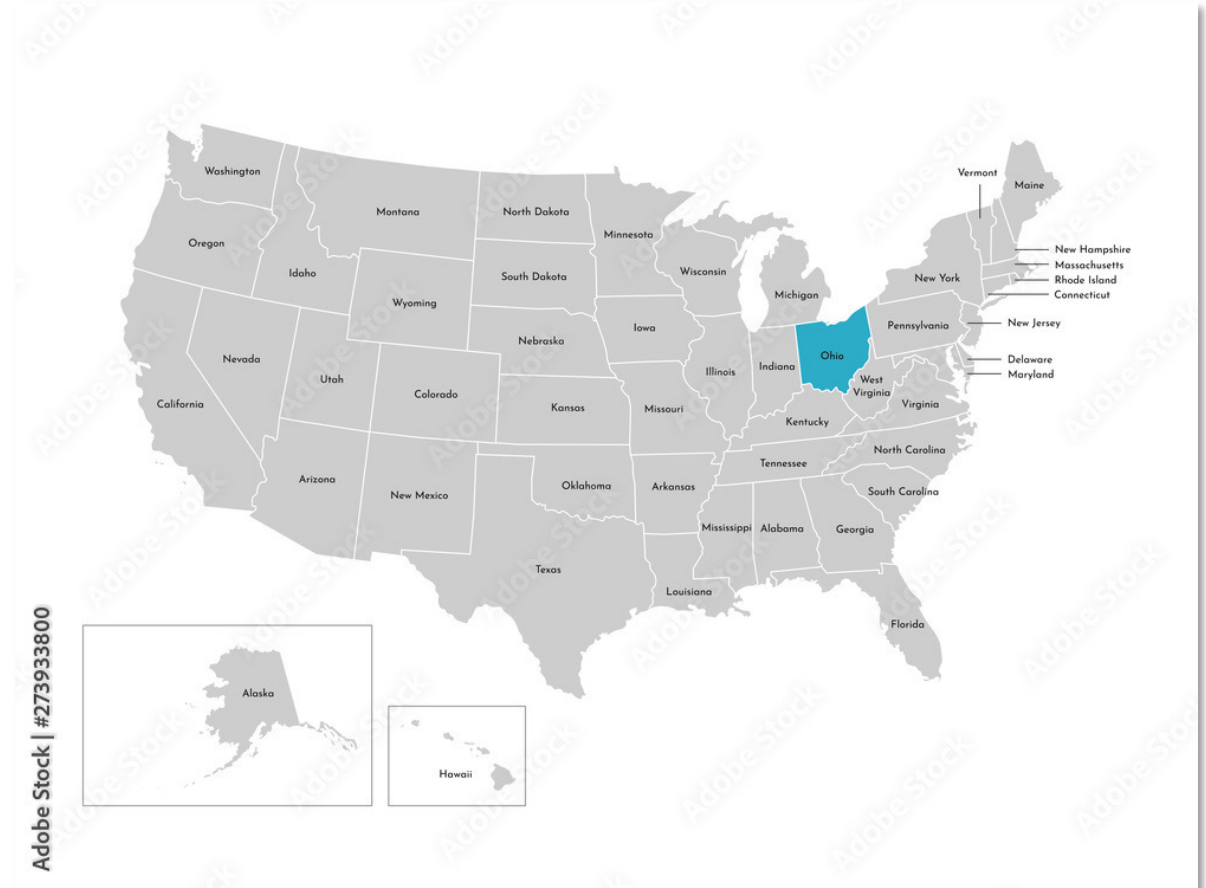


# Start-to-Finish (Visual)

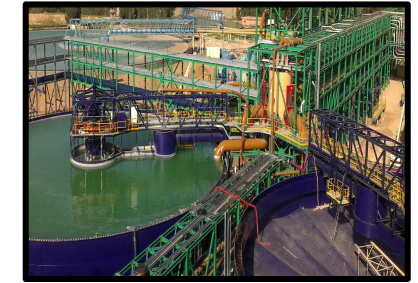


# Plant #1+

- Permitting and engineering have begun for Plant #1 in Ohio
- Momentum received a \$7.5M grant from the US Bipartisan Infrastructure Law w/ Cirba Solutions & 6K
- Operations start in Q1 2024 to process 1,000 t/yr
- Plants #2 and #3 are in the pipeline for US & Europe



# Differentiated Technology = Superior Outcome



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

# Call to Action

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Our call to action is to increase the global e-waste recycling rate from its current 17% to an ambitious 35% by 2030. Achieving this objective requires a unified approach, focusing on the following key areas:

## 1. Role of Governments:

1. Reclassify the regulations around the transportation of black mass to remove its hazardous waste classification.
2. Expedite permit issuance for recycling plants processing critical materials.
3. Incentivize

## 2. Role of Original Equipment Manufacturers (OEMs):

1. OEMs must accept responsibility for the afterlife of their products. For instance, returning waste should be as effortless as shipping used Nespresso coffee pods back to Nestle.

## 3. New Process Technologies:

1. Explore innovative technologies can significantly increase the material available for use in electronics, such as Momentum's MSX (TRL 8)
2. Discontinue research on old ideas that have been looked at again and again
3. Financially support or make introductions to companies, funds, and accelerators for technologies that are at Technology Readiness Level (TRL) 4 or higher.

By harnessing the power of OEMs, adopting new technologies, fostering partnerships, and enforcing effective government regulations, we can collaboratively make significant strides towards our target.

