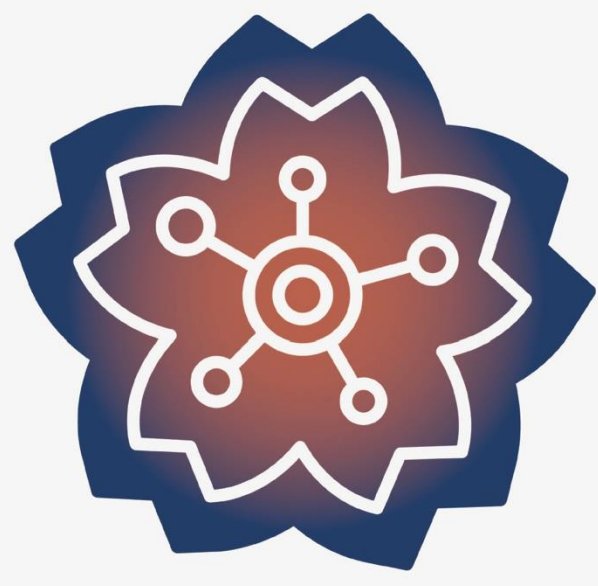




BLOOM

LiBeration anaLysis for Optimising
extraction and prOcessing of CRMs

Pilot Plant:

From mineralogical
insight to smarter
mineral processing

The **BLOOM Pilot Plant** is a modular, containerised mineral-processing facility designed to validate innovative technologies for the more efficient and sustainable processing of critical raw materials. Developed within the Horizon Europe BLOOM project, it provides a representative operating environment in which the **Modular Mineral Liberation Analysis (MLA) system**, process monitoring and AI-assisted optimisation approaches can be integrated, tested and demonstrated under continuous operating conditions.

By connecting advanced mineralogical analysis with real-time process information and automated control, the pilot plant is designed to help bridge the gap between **laboratory research and industrial deployment**. It provides a platform for testing processing configurations, generating operational data and assessing technologies before their integration into larger-scale processing operations.

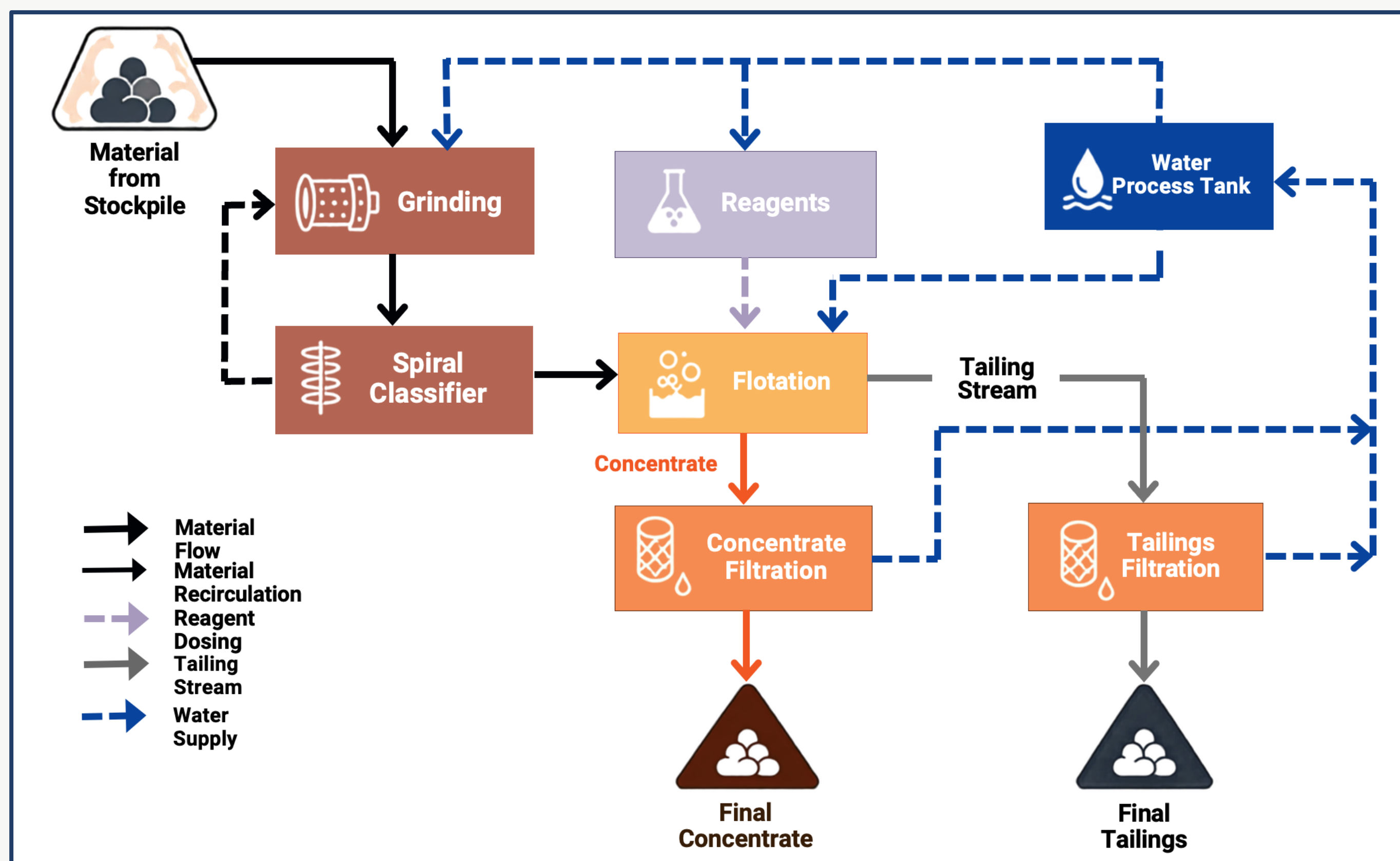
Mineral processing performance depends on understanding both the characteristics of the ore and how those characteristics change throughout the processing circuit. BLOOM combines detailed mineralogical information with process monitoring and intelligent optimisation to support better-informed decisions across grinding and flotation circuits.

The pilot plant provides an environment to:

- Validate innovative mineral-processing technologies at pilot scale
- Integrate the modular MLA sensing system into a continuous process
- Monitor mineral and process parameters in real time
- Optimise grinding and flotation operations
- Test process-control and automation strategies
- Generate operational data to support scale-up and industrial deployment
- Evaluate opportunities to improve resource recovery and process efficiency



Block diagram



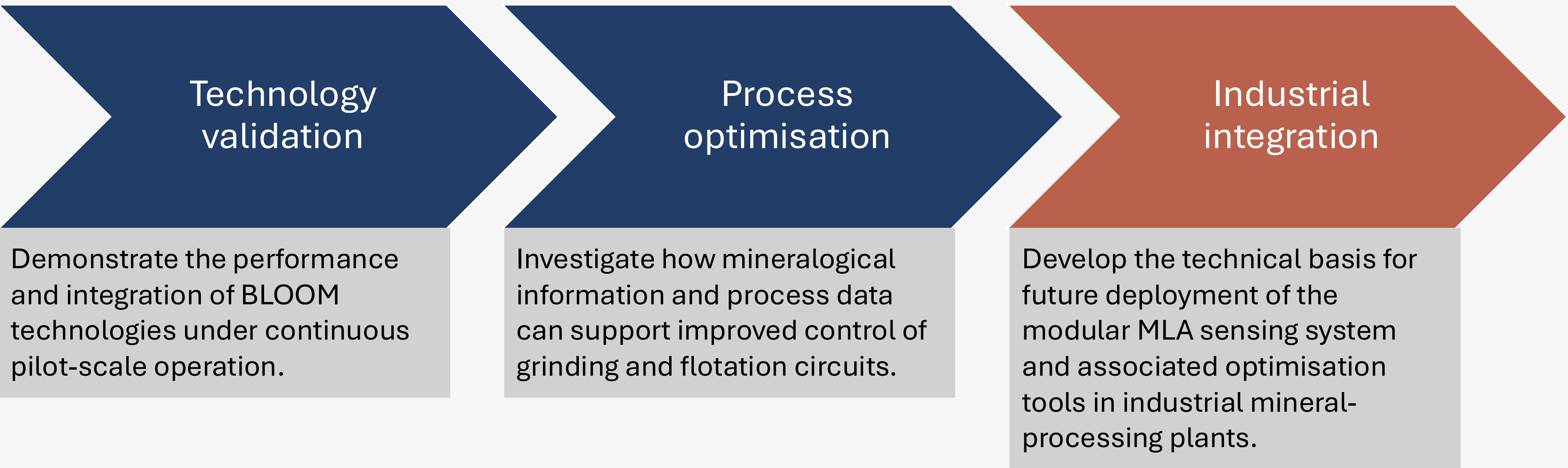
At a glance

- 30–50 kg/h pilot-scale throughput
- 8–10 h/day operating capacity
- Closed-circuit grinding–classification circuit
- Flexible operation at 5–30 wt.% solids
- Closed-loop water recirculation system
- Modular and reconfigurable containerised plant
- Continuous monitoring of level, flow and pressure
- Online slurry solids monitoring
- Automated reagent dosing and process regulation
- PLC–SCADA architecture for supervision, control and data logging

Process stages

<p>1. FEEDING</p> <p><i>Raw material preparation</i></p> <p>Controlled feeding of the ore into the pilot plant under stable operating conditions.</p> <p>Main equipment Hopper Feeder Conveyor</p>	<p>2. GRINDING & CLASSIFICATION</p> <p><i>Particle size reduction</i></p> <p>Closed-circuit grinding and classification to achieve the required particle size for downstream mineral processing.</p> <p>Main equipment Ball Mill Screw Classifier Surge Tank Agitators</p>	<p>3. CONDITIONING</p> <p><i>Slurry preparation</i></p> <p>Controlled reagent dosing and slurry conditioning to prepare the material for selective flotation.</p> <p>Main equipment Conditioning Tanks Reagent Tanks Reagent Dosing Pumps</p>
<p>4. FLOTATION</p> <p><i>Mineral beneficiation</i></p> <p>Multi-stage flotation for the selective recovery of valuable minerals, producing concentrate and tailings streams.</p> <p>Main equipment Rougher Flotation Scavenger Flotation Cleaner Flotation Peristaltic Pumps</p>	<p>5. FILTRATION</p> <p><i>Product dewatering</i></p> <p>Concentrate and tailings are filtered to reduce moisture content while recovering process water.</p> <p>Main equipment Concentrate Vacuum Filter Tailings Drum Filter Pneumatic pump</p>	<p>6. WATER RECIRCULATION</p> <p><i>Sustainable water management</i></p> <p>Recovered process water is stored, monitored and recirculated throughout the plant, reducing freshwater consumption.</p> <p>Main equipment Process Water Tank Centrifugal Pumps Water Distribution System</p>

Key objectives



Scientific & industrial advancements

- BLOOM's research is generating new insights into mineral liberation, mineral associations and flotation behaviour, providing a basis for investigating improved metal recovery and reduced energy consumption.
- The project is also developing Life Cycle Inventory (LCI) datasets and establishing the technical framework for future Product Environmental Footprint (PEF) assessments.
- Industrial validation is supported through collaboration with mining companies and project developers, including: Capacitor Metals Corp. (Canada), Taurus Infinity (Ukraine), Hudbay Minerals Inc. (Canada), MATSA Sandfire (Spain), and Cobre Las Cruces (Spain).
- The industrial partners contribute representative samples, operational knowledge and technical expertise to support the development and validation of the BLOOM approach.



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