

BLOOM aims to deliver a step change in mineral processing by integrating advanced mineralogical information with intelligent process control, enabling more efficient, competitive and sustainable extraction of critical raw materials.



Looking Ahead

The next phase of the project will focus on:

- Construction and commissioning of the modular MLA system
- Deployment of the containerised pilot plant
- AI-assisted process optimisation
- Pilot-scale demonstrations under industrial conditions
- Sustainability assessment and techno-economic validation



**18 months of progress towards
smarter, more sustainable
mineral processing**

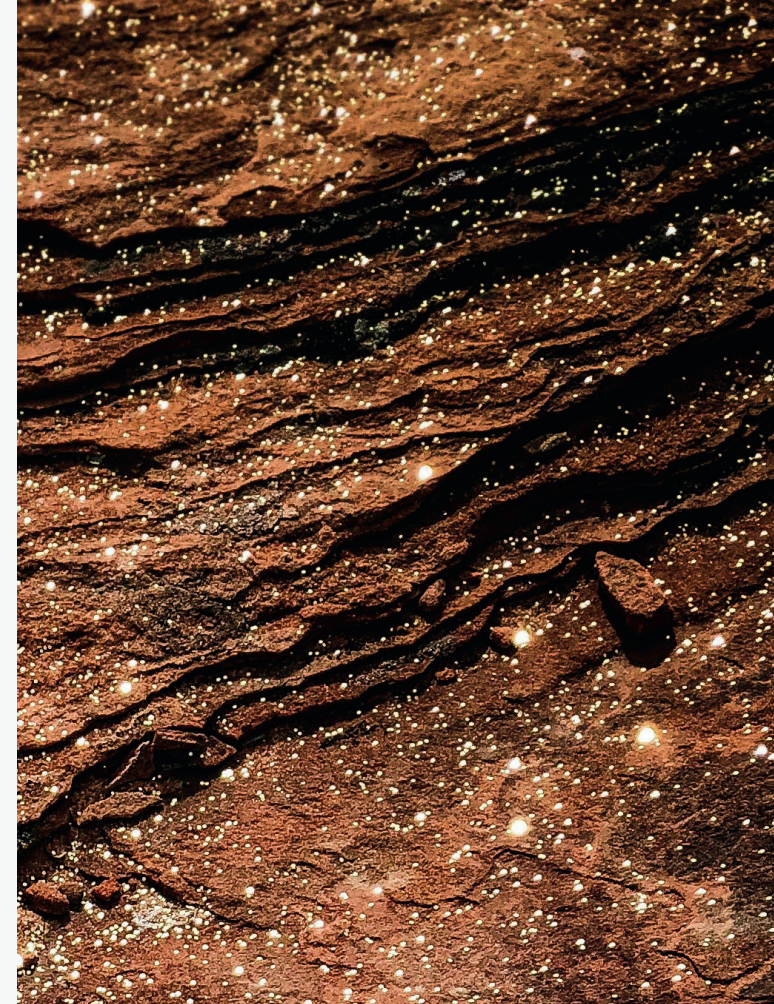


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Eighteen months after its launch, the EU-funded BLOOM project has successfully established the scientific, technological and engineering foundations needed to develop a new generation of intelligent mineral processing technologies for Critical Raw Materials (CRMs).

The project is developing an integrated Mineral Liberation Analysis (MLA) system combining artificial intelligence (AI) and advanced process control. The objective is to provide mining operations with real-time mineralogical information to optimise extraction and processing, improve resource efficiency, and support more sustainable mining practices.

During the first project period, BLOOM has made significant progress across several technical areas:

1. Comprehensive mineral characterisation

The project has completed extensive mineralogical characterisation of representative CRM deposits by combining:

- / Particle size distribution analysis
- / Chemical characterisation
- / Advanced mineralogical analysis
- / Comminution and flotation testing

These datasets provide a detailed understanding of mineral liberation behaviour and mineral associations, forming the basis for optimising grinding and flotation circuits.

2. Development of the modular MLA system

BLOOM has translated scientific requirements into the engineering design of its modular analysis platform by:

- / Developing a mineralogical database
- / Designing sample preparation workflows
- / Defining the analyser architecture
- / Developing software integration and communication interfaces
- / Establishing key performance indicators (KPIs)
- / Creating techno-economic modelling tools linking mineralogy with process performance

These activities lay the groundwork for future AI-assisted optimisation.

3. Engineering the BLOOM pilot plant

A major milestone has been the development of the containerised pilot plant, which will bridge laboratory research and industrial implementation.

The pilot plant integrates:

- / Advanced mineral sensing
- / Automation
- / PLC-SCADA control architecture
- / Real-time process monitoring
- / Intelligent process control strategies

Once operational, it will validate BLOOM technologies under representative industrial conditions.

4. Industrial validation across international mining sites

To ensure industrial relevance, BLOOM collaborates closely with mining companies and exploration projects representing different critical raw material value chains.

Tantalum & niobium

Working with Capacitor Metals Corp. (Blue River, Canada) and Taurus Infinity (Mostove, Ukraine), BLOOM is developing new approaches to improve recovery of tantalum and niobium through advanced mineralogical characterisation and data-driven process optimisation.

Copper & polymetallic ores

Industrial partners including Hudbay Minerals (Canada), MATSA Sandfire (Spain) and Cobre Las Cruces (Spain) provide representative samples and operational expertise.

Supporting Europe's Critical Raw Materials Strategy

BLOOM directly contributes to the objectives of the European Critical Raw Materials Act by strengthening scientific knowledge, digitalisation and sustainable resource management.

The project is already generating:

- / Validated mineralogical datasets
- / New process characterisation methodologies
- / Engineering solutions for industrial deployment
- / Frameworks for Life Cycle Inventory (LCI) and Product Environmental Footprint (PEF) studies
- / Innovation and exploitation strategies supporting technology uptake

Through collaboration with partners from Europe, Canada, Ukraine and Brazil, BLOOM is also reinforcing international cooperation and supporting more resilient and diversified raw material supply chains.

