



# IBot4CRMs at a glance

*Critical Raw Materials crisis*  
*Europe's Resilience*



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NORCE Research AS



The iBot4CRMs project has received funding from the European Union's Horizon Europe research and innovation program under grant agreement no. 101189783



Co-funded by  
the European Union



# iBot4CRMs

16 April 2026



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# iBot4**CRMs**

Enhancing Europe's resilience in Critical Raw  
Materials supply through AI-driven robotics

# Serious threats on Europe due to supply restrictions

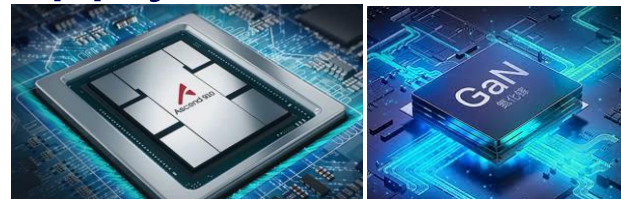


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[www.bis.doc.gov](http://www.bis.doc.gov)

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Office of Congressional and Public Affairs  
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## Commerce Implements New Export Controls on Advanced Computing and Semiconductor Manufacturing Items to the People's Republic of China (PRC)

Washington, D.C.—The Department of Commerce's Bureau of Industry and Security (BIS) is implementing a series of targeted updates to its export controls as part of BIS's ongoing efforts to protect U.S. national security and foreign policy interests. These updates will restrict the People's Republic of China's (PRC's) ability to both purchase and manufacture certain high-end chips used in military applications and build on prior policies, company-specific actions, and less public regulatory, legal, and enforcement actions taken by BIS.



China 2025 making more resilient  
fostering its supply chain in areas incl.



## Export Control to China backfiring



USA breaks alliance  
with Europe



**Europe in a squeeze:**  
***Critical raw materials supply crisis  
with severe impacts on Europe***

Depending on critical raw materials from China (germanium and gallium restricted in 2023, antimony in 2024 and 12 rare earth minerals in 2025 (samarium, gadolinium, terbium, dysprosium, lutetium, scandium, yttrium, holmium, erbium, thulium, europium and ytterbium))



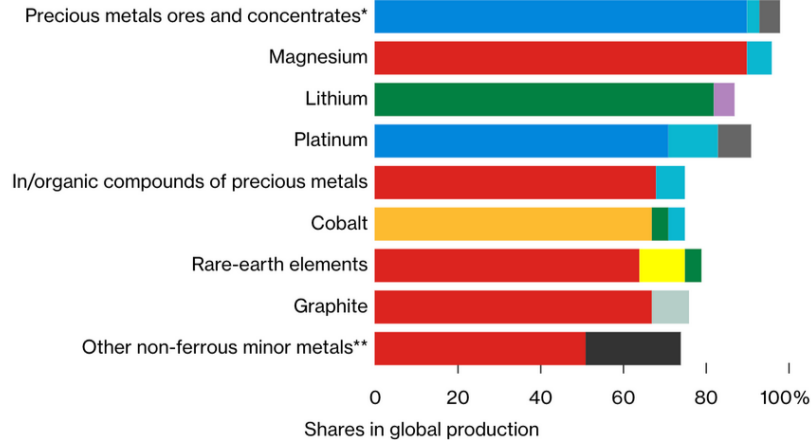
# Why critical raw materials are important?

Critical raw materials are strategic ingredients (metals and minerals) in key technologies, which are essential for the green shift, digitalisation, industrial and military products. They are critical, because our economy is dependent of them and there is a risk with their supply (one country control most of the supply).

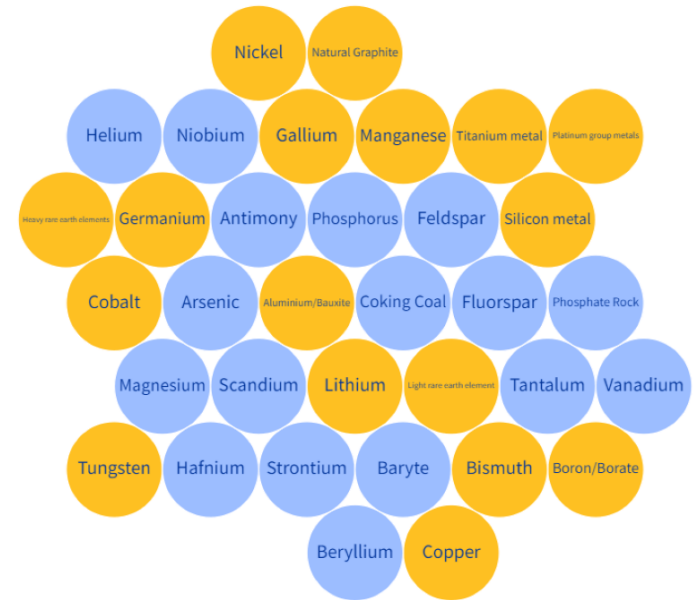
## A Few Countries Dominate Production of Critical Raw Materials

Top producers of the most production-concentrated critical raw materials

■ China 
 ■ South Africa 
 ■ Democratic Republic of the Congo 
 ■ Myanmar 
 ■ Australia 
 ■ Russia 
 ■ Zimbabwe 
 ■ South Korea 
 ■ Brazil 
 ■ Chile



Source: [Organization for Economic Cooperation and Development](#)



Source: [European Commission](#)



# Critical Raw Materials Crisis: How to secure supply?

Foto: <https://fensfeltet.no/>



## Conventional Mining

Europe has natural reserves on critical raw materials.

However,

1. Mining business is costly & maybe not viable.
2. Mining has severe negative impacts on the environment, society and the climate.
3. The process may take few years ahead to get established.

***Solution not immediate and will not solve actual crisis***



## Urban Mining

Exploiting anthropogenic stocks (waste products after use by humans) as a source for recovering raw materials. Collection of discarded products and the return of recovered raw materials to the economy.

***Potentially quicker solution to the crisis?***



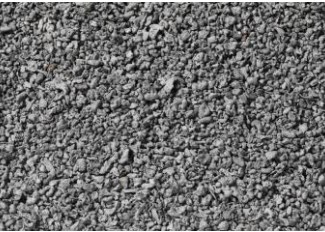
# Urban Mining Value Chain

Urban/ industrial Waste Collection and Management



**The bottleneck**

Mixed materials



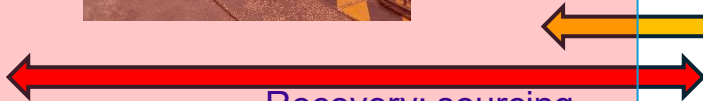
distinct materials



Metallurgical companies



Primary materials



Recovery: sourcing



Recycling: e.g. melting

Processing: separation





63%

of the world's cobalt, used in batteries, is extracted in the Democratic Republic of Congo



97%

of EU's magnesium supply is sourced from China



100%

of the rare earths used for permanent magnets are refined in China



98%

of EU's supply of borate is provided by Türkiye

## 4. CRM Act: a high priority for Europe for its sovereignty and resilience → New markets!!!

Established in March 2023. It also aims to support projects in third countries with a preliminary budget of €300 billion Global Gateway Strategy.

environment.ec.europa.eu/strategy/circular-economy\_en

## Circular Economy Act

**Due for adoption in 2026**, the Circular Economy Act aims to establish a Single Market for secondary raw materials, increase the supply of high-quality recycled materials and stimulate demand for these materials within the EU. It will contribute to the ambition laid out in the [Competitiveness Compass](#) to make the EU the world leader in the circular economy by 2030.

The **circularity rate** is one way to measure how circular our economy is. This number shows how much of the materials we use are recycled or reused instead of being thrown away. Right now, Europe's circularity rate is about 12%, but the goal is to **double it to 24% by 2030**. This target is part of the EU's [Clean Industry Deal](#).

In August 2025, the [Commission launched a public consultation on the upcoming Circular Economy Act](#).

The Commission is also [has also invited young people to share their views on the forthcoming Circular Economy Act](#) as part of the "[Youth Check](#)", a Commission tool to assess how new EU laws and initiatives impact young people.

The Circular Economy Act will build on the [second Circular Economy Action Plan](#), reinforcing and broadening its measures to accelerate Europe's shift to a **resource-efficient, low-waste and climate-neutral economy**.



## SETTING 2030 BENCHMARKS FOR STRATEGIC RAW MATERIALS



### EU EXTRACTION

At least **10%** of the EU's annual consumption for extraction



### EU PROCESSING

At least **40%** of the EU's annual consumption for processing



### EU RECYCLING

At least **15%** of the EU's annual consumption for recycling



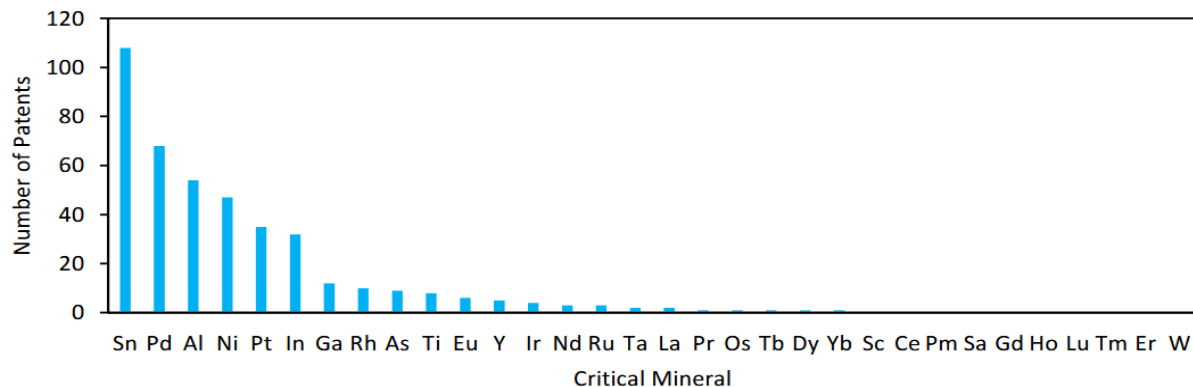
### EXTERNAL SOURCES

Not more than **65%** of the EU's annual consumption of **each strategic raw material at any relevant stage of processing** from a single third country

# Automated recovery of CRMs TRL status?

Technologies maturity level: 0% → 1% (proof of concept) is the most difficult and expensive phase.  
 Scaling up: 1% → 100% needs the primary public investment and risk sharing such as iBot4CRMs.

Recovery level



Nb of patents for CRMs' recovery.  
 Source: US Energy Association: CRM from E-waste (2023)



Aluminum (Al) 76% recycled 2020. [source](#)



Neodymium (Nd) <1%



Tantalum (Ta) <1%



Antimony (Sb): 0% ... many others at 0%



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# Actual status of urban mining



Manual sorting 1



Manual disassembly

Manual processes are not sustainable and will not solve the actual crisis.



Manual dismantling



Recovery of materials from landfill is not fully explored



# Horizon Europe iBot4CRMs



## iBot4CRMs



9,5  
€ mill.



18  
partners



8  
EU countries



4  
Pilots

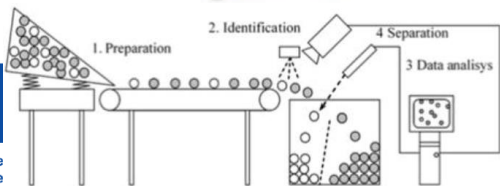


4  
Years  
2024 - 2028

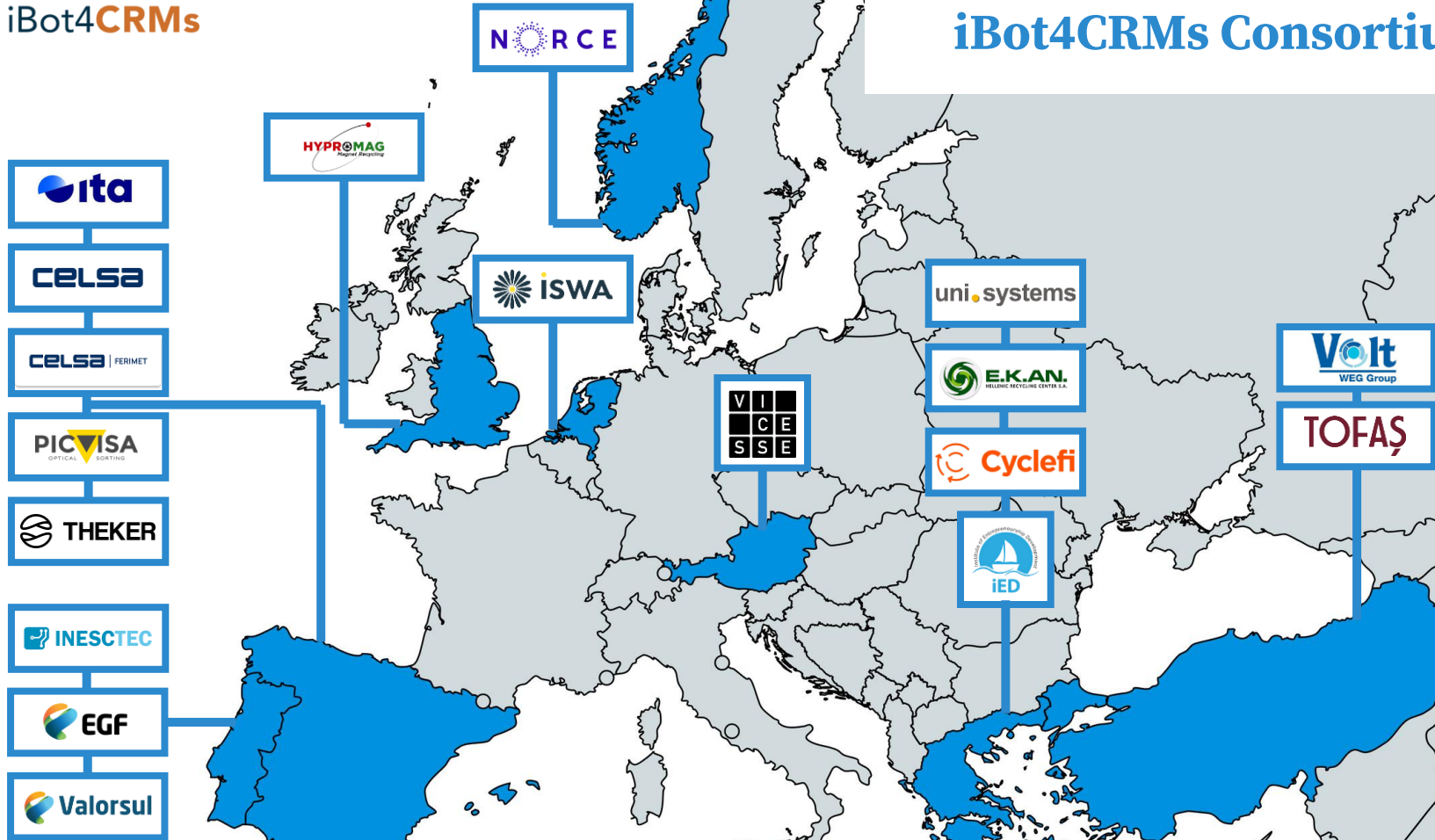


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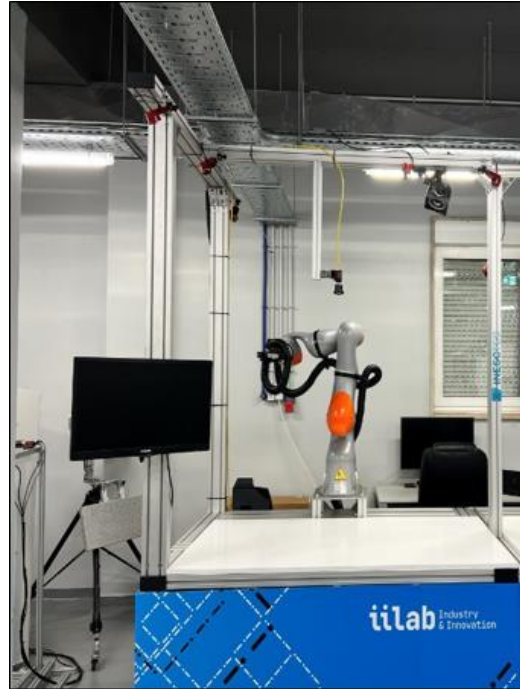


Funde  
Europe

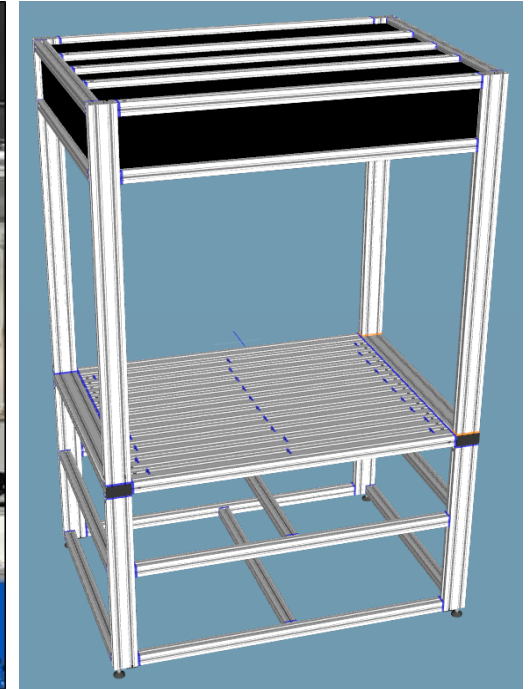


# Selected Highlight 1

## Dismantling Cell Matrix Manufacturing System

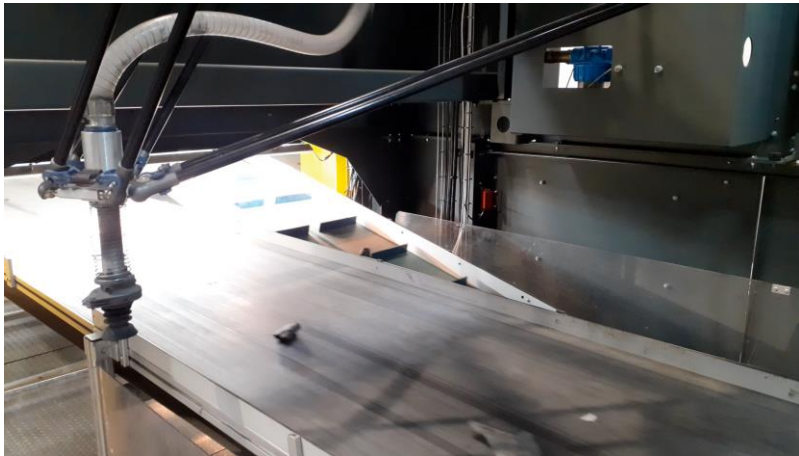


1<sup>st</sup> Version



2<sup>nd</sup> Version

# Selected Highlight 1



Conveyor picking

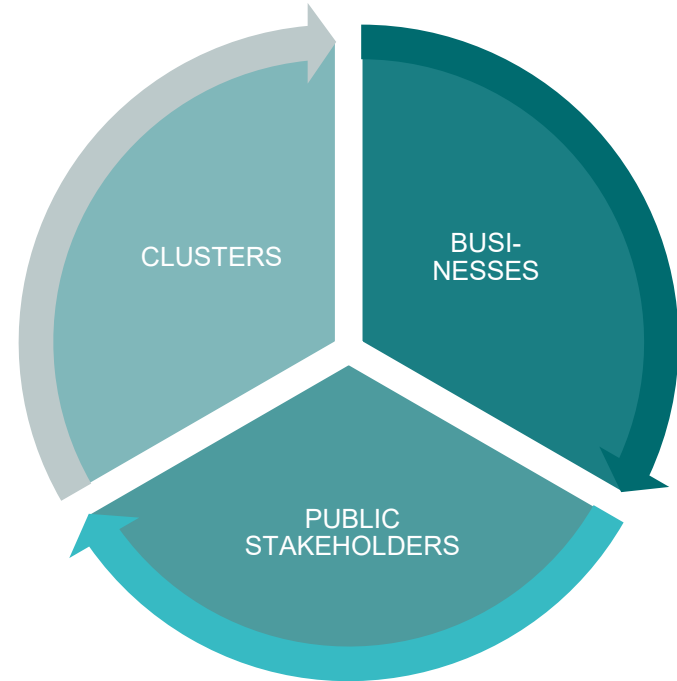


Disassembly

## Selected Highlight 2

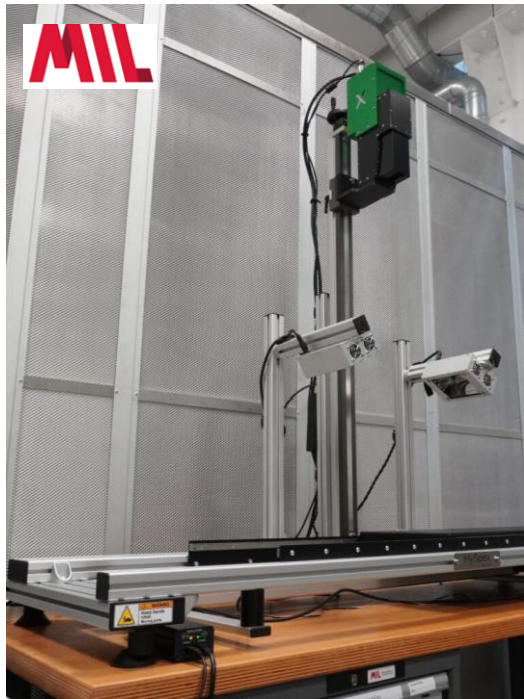
**CARM Centre  
established in Norway**  
First competency  
centre in the Nordics  
for recovery of CRMs

**Two external investments from a  
Norwegian private fond (300k€) and a  
Norwegian bank (400 k€) for  
infrastructure building**



<https://www.carm-centre.com/>

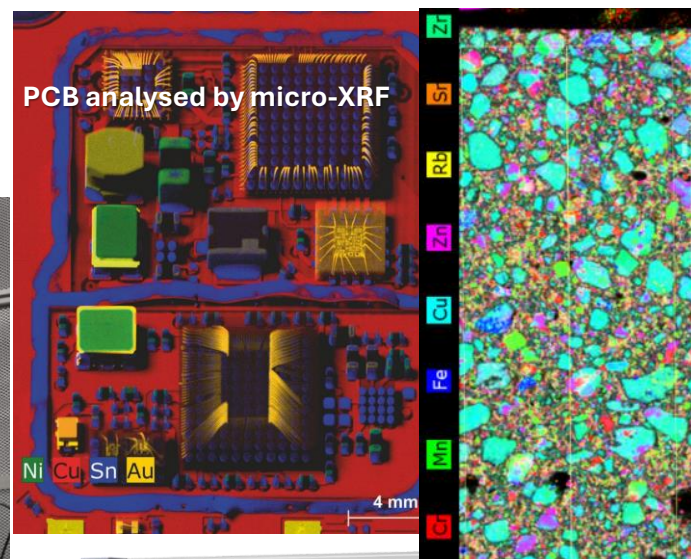
# Selected Highlight 2



Hyperspectral vision on a conveyor



AI-based flexible robot



PCB analysed by micro-XRF



X-ray spectroscopy for screening materials



# Follow our progress

## Website



<https://ibot4crms.com/>

## LinkedIn page



### iBot4CRMs

Project to enhance Europe's resilience on Critical Raw Materials supply through AI-

Engineering - 197 followers · 11-50 employees

3 other connections work here

Message Following

<https://www.linkedin.com/company/ibot4crms>

## Newsletter



### Welcome to the iBot4CRMs project!

This is the iBot4CRMs Newsletter, a bi-yearly catch-up on the project progress, Critical Raw Materials (CRMs) Artificial Intelligence (AI) and Robotics news, project events takeaways, collaboration & synergies insights, pilot scenarios & testing results, news releases in technologies, hardware, software, sensors, operating settings, data models and more!

<https://ibot4crms.com/ mailing-list/>



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