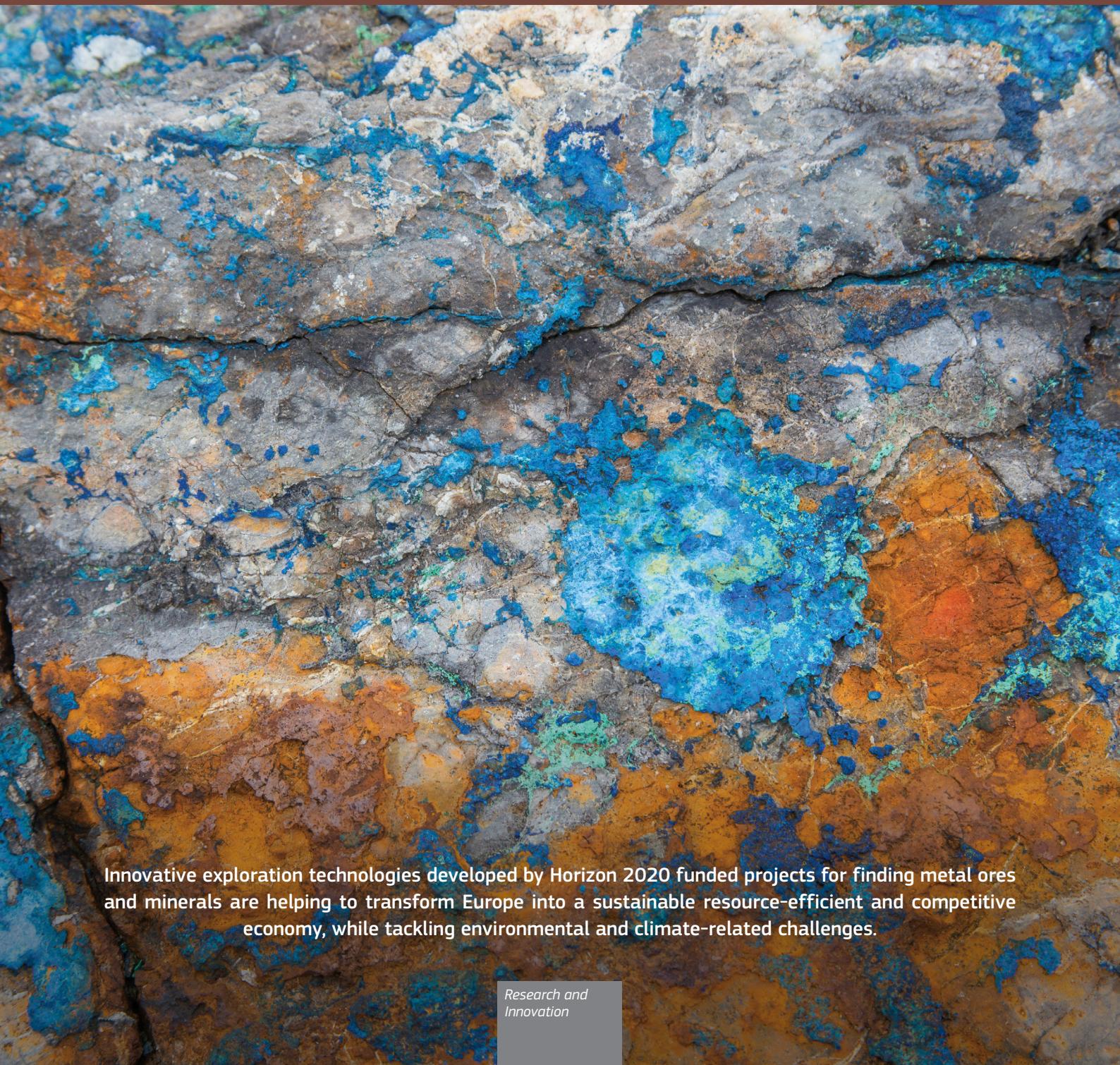




# Mineral exploration

Sustainable innovative solutions for mineral exploration



A large, high-resolution photograph of a mineral rock formation occupies the lower half of the page. The rock is a complex, layered structure with various minerals. Large, bright blue and turquoise-colored veins of chalcocite or malachite are prominent, contrasting with darker, greyish and reddish-brown areas. The overall texture is rough and weathered.

Innovative exploration technologies developed by Horizon 2020 funded projects for finding metal ores and minerals are helping to transform Europe into a sustainable resource-efficient and competitive economy, while tackling environmental and climate-related challenges.

Access to resources is one of the most strategic security questions surrounding the delivery of the European Green Deal. The Green Deal aims to make Europe the first carbon neutral continent by 2050. Furthermore, by summer 2020 the Commission plans to raise the EU's greenhouse gas emission reductions target for 2030 to at least 50 % and towards 55 % of 1990 levels.

The sustainable utilisation of raw materials, including metals and industrial minerals, and particularly Critical Raw Materials (CRM) such as rare earths, is one of the main prerequisites to making this switch happen. This is due to their vital role in crucial industrial value chains, especially in the energy, mobility and defence sectors, and the production of renewable energy technologies, electric vehicles, and mobile phones among others.

## Spotlight on EU Research

This CORDIS Results Pack highlights 6 projects funded under the Horizon 2020 programme, that are working on exploration technologies for a sustainable supply of raw materials.

### HiTech AlkCarb

New geomodels to explore deeper for High-Technology critical raw materials in Alkaline rocks and Carbonatites  
Coordinated in United Kingdom

The HiTech AlkCarb initiative brought together partners from across Europe and Africa to significantly improve geological models for the exploration of 'hi-tech' raw materials like the rare earth elements associated with alkaline rocks and carbonatites.



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### ROBUST

Robotic subsea exploration technologies  
Coordinated in United Kingdom

ROBUST developed an autonomous robotic survey system for identifying polymetallic nodules at great depth in the ocean, without having to bring them to the surface for analysis.



© ROBUST consortium

### UNEXMIN

Autonomous Underwater Explorer for Flooded Mines  
Coordinated in Hungary

UNEXMIN created a highly sophisticated robot to explore and map flooded mines, retrieve geological data and conduct analysis of water chemistry and mine wall properties.



© Rocky Shore Pictures

## SOLSA

Sonic Drilling coupled with Automated Mineralogy and Chemistry On-Line-On-Mine-Real-Time Coordinated in France

SOLSA combined sonic drilling, analytical equipment and informatics to optimise mining operations performance.



© Le Guen Monique

## INFACT

Innovative, Non-invasive and Fully Acceptable Exploration Technologies Coordinated in Germany

INFACT designed innovative, non-invasive and socially acceptable mineral exploration technologies to help unlock unrealised potential in new and established sites.



© INFACT

## Smart Exploration

Sustainable mineral resources by utilizing new Exploration technologies Coordinated in Sweden

Finally, Smart Exploration produced cost-effective and environmentally friendly solutions for deep mineral exploration in brownfield (abandoned industrial property) and greenfield (area of land that has never been developed or built up) areas.



© Alireza Malehmir

**Two newly funded projects may be mentioned in addition to the 6 projects highlighted in the Results Pack:**

## NEXT

New Exploration  
Coordinated in Finland

NEXT is building new geomodels, novel sensitive exploration technologies and data analysis methods which together are fast, cost-effective, environmentally safe and socially acceptable.



© NEXT

## PACIFIC

Passive seismic techniques for environmentally friendly and cost efficient mineral exploration  
Coordinated in France

Meanwhile, PACIFIC is developing reflection passive seismics, for use in greenfields exploration, plus the multi-array method, which will typically be deployed during exploration campaigns. Both techniques have major advantages over current techniques, namely relatively low cost and minor impact on the environment.



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## ***EU Research and Innovation supports the sustainable supply of raw materials***

As the demand for raw materials is growing, EU research and innovation funded under Horizon 2020 helps to improve access to metals and minerals, while optimising their consumption and improving extraction conditions across Europe.

Innovative and sustainable approaches to the discovery of metals and minerals, such as the autonomous exploration and mapping of flooded mines and seabed terrains, can provide the high-resolution information needed for reliable identification of ore bodies. Other methods involve improving the accuracy of geo-models and economic evaluation of ore reserves.

In addition, reducing high exploration costs and enhancing the participation of civil society from the start of exploration will help raise awareness and trust among local communities and other stakeholders.

### **Learn more about**

Communication on The European Green Deal: <http://bit.ly/20D3NU2>

European Innovation Partnership on Raw Materials: [https://ec.europa.eu/growth/sectors/raw-materials/eip\\_en](https://ec.europa.eu/growth/sectors/raw-materials/eip_en)

Strategic Implementation Plan: <https://bit.ly/2SgafT4>

Critical Raw Materials: <http://bit.ly/31CTB3j>

Raw Materials Information System (RMIS): <https://bit.ly/38ke0N1>

CORDIS Results Pack: <https://cordis.europa.eu/project/id/413488>

<https://ec.europa.eu/easme/>

<https://ec.europa.eu/horizon2020>



@EU\_ecoinno (Environment and resources unit)  
@EU\_EASME (EASME)



<https://www.youtube.com/channel/UCT1kamiquHGbe1xUW-gJkkA>



<https://www.linkedin.com/company/executive-agency-for-small-and-medium-sized-enterprises-easme/>



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