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## METAL RECYCLING

### Overview and challenges

Technological innovations developed to support the energy transition make use of **critical or strategic metals**:

These refined minerals and metals are used for:

- **electric vehicles**: cobalt, lanthanum, lithium;
- **fuel cells**: platinum, palladium, rhodium;
- **wind energy** technologies: neodymium, dysprosium, terbium;
- **aviation**: titanium;
- **photovoltaic** solar technologies: cadmium, indium, gallium;

Critical metals include lithium, transition metals (such as nickel, cobalt, titanium or platinum group metals) and rare earths (such as neodymium, dysprosium or terbium; elements with electromagnetic properties that make

them essential to high-tech manufacturing).

Find out more about the geostrategic issues affecting critical metals and rare earths in view of the energy transition

[See our Decoding keys](#)

## Battery recycling and life cycle

Most batteries used in electric vehicles are based on **Cathode Active Materials (CAM)**, consisting of Nickel, Manganese and Cobalt (NMC chemistry). This CAM currently accounts for half of the cost of NMC-type automotive batteries. Consequently, the recycling of car batteries is a top priority issue at both an economic and environmental level.

With electricity making up a growing share of transport, this challenge is effectively twofold:

- securing supply by ensuring industrial sovereignty in Europe,
- meeting European regulations: in 2027, the European Regulation on batteries and waste batteries will impose minimum levels on the amount of cobalt (16%), lead (85%), lithium (6%) and nickel (6%) that must be reused in new batteries.

**IFPEN's objective: to provide eco-efficient rare earth production and recycling technologies that support the development of new energy transition sectors.**

[Our solutions](#)

[Our networks](#)

[Our strengths](#)

### Contacts



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May 2021

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March 2021

## Nickel in the energy transition: why is it called the devil's metal?



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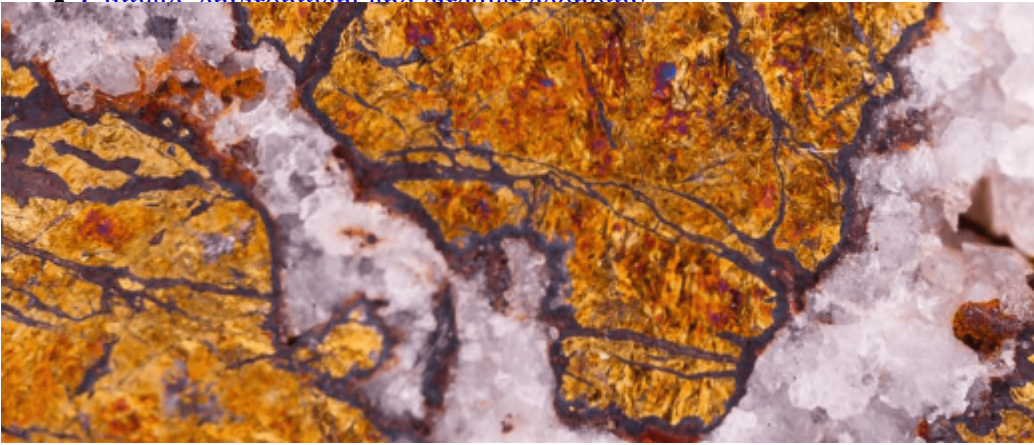
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February 2021

## Lithium in the energy transition: more than a resource issue?



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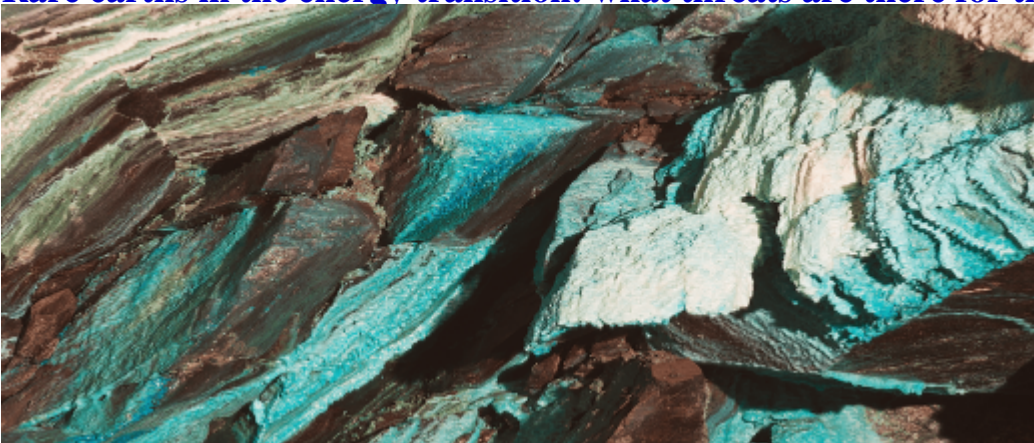


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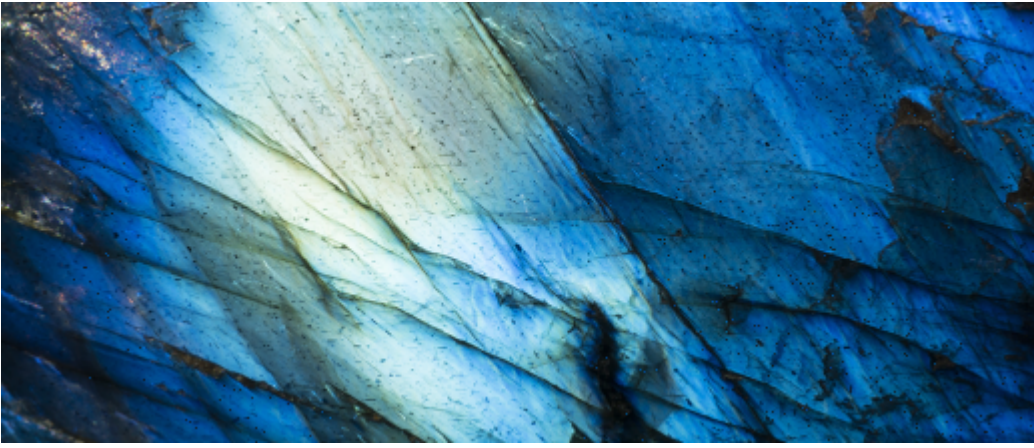
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Metal Recycling

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