Discover the importance of recovering minerals by-products!

why ION4RAW exists

MINERALS ARE ESSENTIAL...

...to our modern lifestyle.

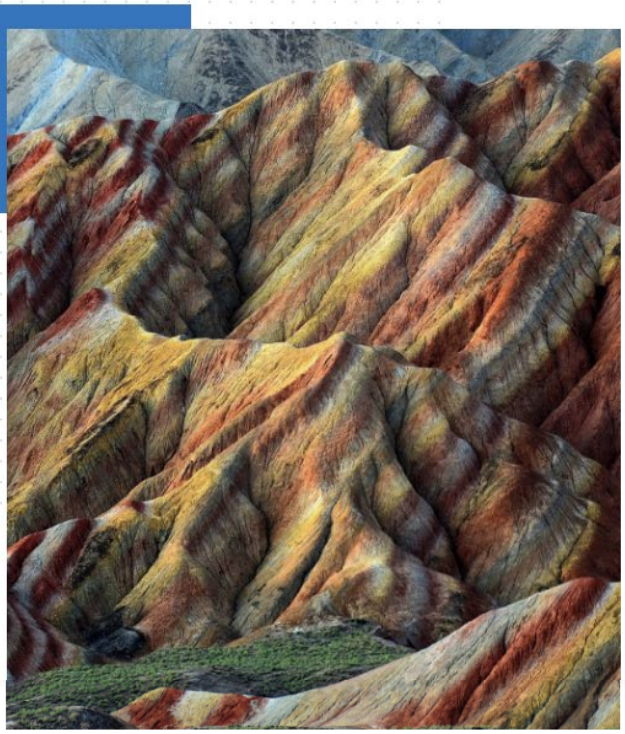
Minerals are omnipresent in the technologies we constantly use, from the electronics of our dematerialized life to our means of transport and the lighting of our houses! Looking for a concrete example? Our smartphones vibrate thanks to tungsten, use gold to connect to the SIM card, tantalum capacitors to charge their battery, and indium-tin oxide-coated glass to recognize our fingerprint!

...for the transition toward a greener Europe.

Our move away from the use of fossil fuels and towards renewable energy sources is highly dependent on minerals. Current green technologies such as electric car batteries, solar panels, and wind turbines are all based on raw materials, creating new dependencies. But, an energy system powered by renewable energy requires more minerals than a fossil-based one. As a matter of comparison, an electric car requires 6 times more minerals than a conventional car!

...for European economic sustainability.

Since raw materials are essential to all European key sectors, the EU economic sustainability depends on this supply. Also, the economic growth of Europe and its competitiveness depend on mineral supply since many new business opportunities are based on minerals



USES OF MINERALS IN EUROPEAN KEY SECTORS

Minerals can be found in all key sectors. Among them, Critical Raw Materials (CRMs) are especially important, such as cobalt, platinum, antimony, bismuth, indium, and germanium that our ION4RAW project tries to recover. Below are a few examples of CRMs' utilisations per sector:

Transport

Nowadays, mobility relies heavily on CRMs. Magnets used in automotive motors are made of REE, as well as batteries used in e-vehicles. Also, platinum is the principal active component in catalytic converters and filters used to reduce harmful exhaust emissions of diesel-powered vehicles. When it comes to vehicle batteries, CRMs are also essential. Vanadium, for instance, allows for the creation of batteries that have a ten-times longer lifespan than lithium batteries, charge and discharge simultaneously and can release a huge amount of electricity instantly. Likewise, antimony is now used to improve batteries' charging characteristics and prevents the production of hydrogen during charging.

Aerospace & Defense

CRMs have specific characteristics essential to the aerospace and defense industries. Beryllium, for instance, very appreciated for its stiffness and lightweight, is used to create high-speed aircraft, spacecraft, and satellites. Titanium, with its high corrosion resistance and ability to withstand moderately high temperatures while being lightweight, is used for missiles and aircrafts.

Medicine

Many CRMs are essential in the conception of vital medical devices. For instance, tantalum can be used to replace bones, connect torn nerves or bind abdominal muscle because it causes no immune response. Likewise, because titanium is biocompatible (non-toxic and not rejected by the body), it is often used in medical implants such as pacemakers, as well as niobium which is physiologically inert and hypoallergenic.

Energy

CRMs are essential in the transition toward sustainable energy. For instance, the photovoltaic industry relies on silicon metal for its production. Today, 90 percent of solar energy is collected by silicon-based technology. CRMs also allow for energy flow stabilization and energy storage. Efficiently exploiting such renewable energy has long been a challenge. Cobalt, among others, is used to create accumulators, where energy can be stored for later use, while vanadium stabilizes the energy flow. CRMs are also useful in the production of nuclear energy. For example, beryllium is used in nuclear reactors as a reflector or moderator because it has a low thermal neutron absorption and a high melting point.

Agriculture

Even the agricultural sector can use CRMs to its advantage. Borate, for instance, has fungicidal and sporicidal properties and thus can be used to protect the wood from insects and rots. Another example of CRM useful in agriculture is phosphate, an important plant nutrient involved in energy transfers, roots strength, and photosynthesis. Aside from his fertilizing properties, phosphate is also used in animal-feed supplements and in food preservatives

Electronics

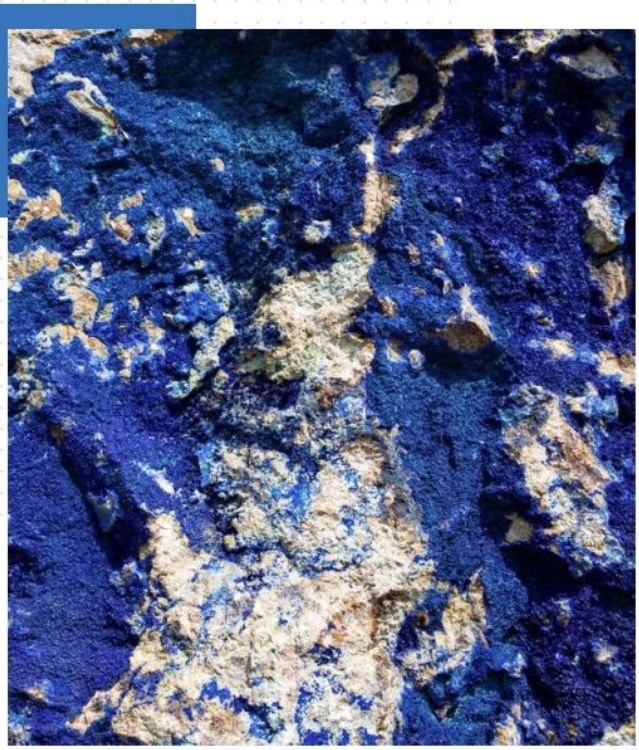
CRMs are *everywhere* in our electronics. We can mention our dependency on indium, used to make touch screens thanks to its capacity to conduct electricity and bond strongly to the glass while being transparent. In the meantime, gallium allows us to telecommunicate with radiofrequency chipsets and fiber-based communication systems. Even our household appliances require CRMs. Fluorspar, for instance, is essential to make coolant systems for our refrigerators and air conditioners.

Construction

In the construction sector, different alloys made of CRMs are used. One example is coking coal, also known as metallurgical coal, used to create coke, one of the key irreplaceable inputs to produce steel. Steel, offering the highest strength-to-weight ratio, is an essential material for the construction sector.

And much more!

Minerals are even used in the textile industry!



WHY IS IT IMPORTANT TO RECYCLE MINERALS?

Considering the growing demand, using minerals in a more sustainable way is crutial to:

Lower Europe's environmental impacts.

Europe's environmental impacts caused by its foreign imports and mining can be decreased through the recycling of waste containing minerals. Indeed, several European countries are starting (or restarting) mining operations to supply these raw materials while many of them can be found in waste produced from mining activities, as well as from landfills across the EU!

Lower Europe's dependence on foreign export.

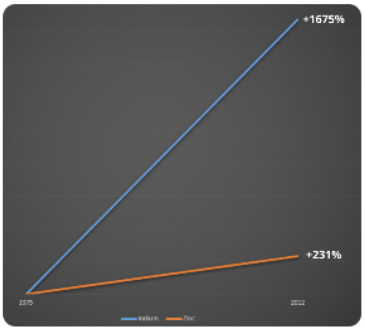
Due to the high level of natural concentration in particular regions of the globe, such as China, for instance, Europe is naturally highly dependent on foreign imports for minerals. But in this context, geopolitical issues could heavily affect Europe's supply, lead to price volatility, and impact market changes. Therefore, securing reliable and unhindered access to certain raw materials is a growing concern within the EU. With this goal in mind, relying more on recycled minerals would decrease Europe's foreign dependence.

WHY IS IT ESSENTIAL TO MAXIMISE THE RECOVERY OF METAL OBTAINED AS BY-PRODUCTS FROM PRIMARY SOURCES ?

When a metal is obtained largely or completely as a by-product, its exploitation is dependent on the availability of the primary source. If disparities in the demand between the by-product and the primary product appear, supply can be affected and price can fluctuate widely. In that regard, in order to ***minimize*** supply risks, we need to ***maximize*** the recovery of metal, largely or completely obtained as by-products of primary sources.

For example, indium is produced as by-product of zinc. Demand for indium expanded significantly over the past few decades, especially with increased demand for flat panel displays that use indium tin oxide. The primary production of indium thus increased a staggering 1675% from 1975 to 2012, whereas for zinc it increased by a more modest 231% over the same time period.

The supply was only possible because of enhanced recovery of indium from zinc-dominant ore.



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