Recovery of Rare Earth Elements from magnetic waste in the WEEE recycling industry and tailings from the iron ore industry

Results in Brief

Green mineral waste recycling

Researchers have developed techniques to make better use of important minerals that would otherwise go to waste in landfills. The elements being recycled will play a crucial role in greening the European economy.

Recycling valuable rare earth elements (REEs) is an essential step in the transition towards resource-efficient, low-carbon circular economies in Europe. This transition will require innovative initiatives in resource and energy efficiency such as with recycling of valuable products.
REEs are currently primarily produced in China, incorporated into products and exported to Europe where these valuable metals end up in a landfill. This is clearly not a sustainable consumption pattern – especially not for elements like dysprosium (Dy), which are very scarce.

The EU-funded REECOVER (Recovery of rare earth elements from magnetic waste in the WEEE recycling industry and tailings from the iron ore industry) initiative worked to help secure a European supply of REEs and to strengthen ties among institutions. The consortium studied various routes for the recovery of REEs by the chemical process of electrolytic reduction.

The researchers studied the viability of recovering REEs from waste, primarily Dy and neodymium (Nd) which are critical to the European economy. They studied recovery options for wastes such as apatite tailings from the iron industry and magnetic waste from electronics waste recycling.

REECOVER developed two separate routes to give value to both apatite tailings and magnetic fractions of electronic waste. The researchers found that apatite tailings need to be concentrated to make REE mineral recovery more cost effective.

Project partners developed technology for REE recovery that can be adapted to industrial waste from the mining and processing industries. The consortium helped recover a significant quantity of REEs (Nd, Dy and others).

The researchers developed a carbothermic route to produce valuable products such as period 4 elements and calcium carbide, and demonstrated it in the lab. The team also developed an integrated value chain for concentrating and recovering REEs for iron-containing electronic waste.

These results have fostered breakthrough innovation in new technologies, products and services with a high potential to achieve a greener economy in Europe.

**Keywords**

Recycling, rare earth elements, dysprosium, REECOVER, magnetic waste, neodymium

---

**Project Information**

REECOVER

Grant agreement ID: 603564

Funded under
FP7-ENVIRONMENT

Overall budget
€790,203,792
Discover other articles in the same domain of application

Targeted educational services get us up to speed for a sustainable energy transition

12 October 2020

Translating consumer choice data into policies that encourage smart choices

12 October 2020

Unlocking the social forces that shape consumer energy choices and behaviour

12 October 2020