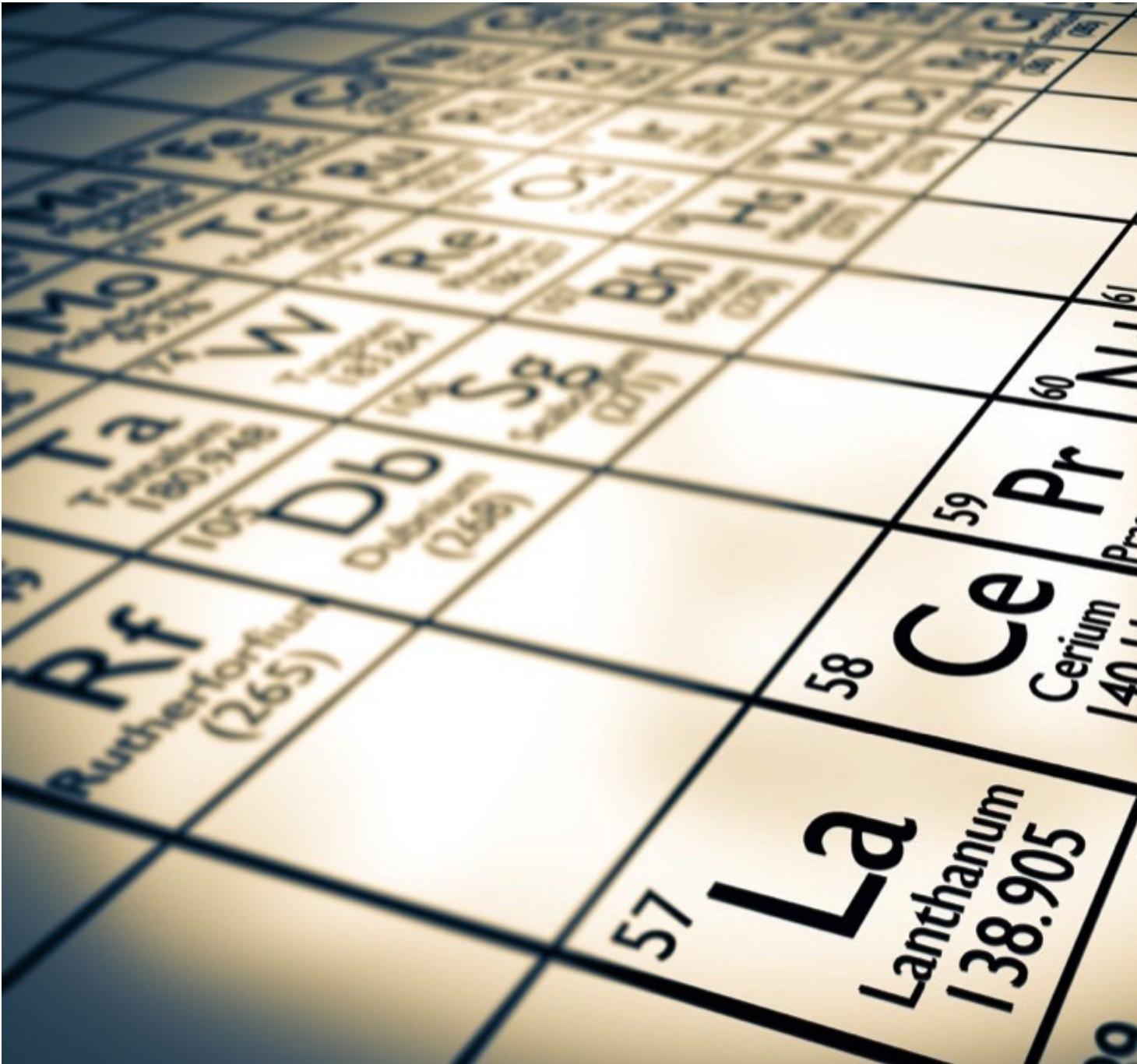


Project News

## **LKAB invests in Pilot Plants for Phosphorus and Rare Earth Metals Production**

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LKAB is investing approx. EUR 4.3 million in pilot plants for production of phosphorus and rare earth metals as part of a pre feasibility study to define a process that enables recycling of mine waste through innovative processing, producing critical raw materials. The pilot phase will continue through 2020, a decision to go ahead with full-scale production may be taken in 2021.



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"We are going to build two pilot plants for development and preparation for full-scale industrialisation: one in the orefields and one in Uppsala. The orefields plant will produce apatite from tailings sand. The plant in Uppsala will be run by the Ragn-Sells innovation company EasyMining, which has developed the patented technology for extracting pure monoammonium phosphate (MAP) and rare earth metals (REE) from apatite," explains Leif Boström, Senior Vice President, Special Products Division. Full-scale industrial production of MAP will correspond to an estimated 500 percent of Swedish demand and production of REE will amount to about 2 percent world production. The pilot phase will continue through 2020. A decision to go ahead with full-scale production may be taken in 2021. A pilot plant

and a part of the full-scale production facilities will be situated close to LKAB's existing plant's in northern Sweden. Subsequent processing will take place in another location, for which three main alternatives are now being assessed. The three main alternatives are Luleå, Helsingborg and Skellefteå. "ReeMAP is a very good example of circular economy, of recovering and reintroducing resources. We will focus on developing an operation in the location that is the best alternative from an environmental point of view, minimises transportation of materials and utilises resources in the best way. If we succeed with the industrialisation process, we will create a whole new industry in Sweden that will supply the agriculture and engineering sectors with critical raw materials while at the same time generating jobs and value for society," says LKAB's President and Group CEO, Jan Moström.

### **Recycling of Mine Waste and Collaboration with EasyMining/Ragn-Sells**

From LKAB's iron ore production, a residual product resembling sand is currently placed in tailings dams. In the ReeMAP project, LKAB intends to recover the residual product and extract rare earth metals (REE) and phosphorus products (MAP) from it. Recovery and upgrading to phosphorus and rare earth metals is enabled by a patented process that has been developed by the Swedish company EasyMining, which is a Ragn-Sells innovation company within the Ragn-Sells Group. EasyMining is a partner in the ReeMAP project.

### **Factors for selecting the Location of a Production Site**

There are several decisive factors for final selection of the site for a production plant for the second stage of upgrading to MAP and REE:

- Good, efficient rail infrastructure for hauling apatite from the orefields to production sites will be necessary.
- The capacity to introduce large volumes of input materials, such as sulphuric acid, and potential for synergies with other, existing chemical industries are important considerations.
- Large volumes of very pure gypsum will be a by-product from production; the possibility of finding a market for this will also have a bearing on the choice of location.
- Access to land, as well as environmental and operating permits.

### **Critical Raw Materials, as defined by the EU**

Europe produces about three percent of the world's raw materials but consumes a quarter of the world's raw materials. Within the framework for the EU raw

material initiative the EU has identified 27 raw materials that are considered crucial to European society and economy. The two main criteria used to determine the criticality of materials are economic importance and security of supply. The supply of raw materials can change quickly depending on trade flows and developments in world trade policy. This places emphasis on the need to diversify supply and increase the degree of recycling for all raw materials. In addition to phosphorus, which is used as a fertilizer, the list of 27 materials includes rare earth metals. Without phosphorus, agricultural production would be halved. *(Source: LKAB)*