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LKAB produces Apatite from mine waste in a new pilot plant

LKAB is developing technology to recycle mine waste to produce phosphorus mineral fertilisers, rare earth elements (REEs), fluorine and gypsum, in a project called ReeMAP. The first step is to use the mine waste to produce an apatite concentrate, something LKAB is now doing in their pilot plant.

Leif Boström, senior Vice President for Business Area Special Products and CEO of LKAB Minerals, which is managing the development within LKAB, explains “We are now up and running with the first step, to produce apatite concentrate, although in a pilot scale. We need to test, verify and plan this production thoroughly to obtain the right yield and cost of production. Additionally, we are planning for a production that is energy efficient and carbon dioxide-free.”

The pilot plant is built on container platforms to allow it to be moved within and between LKAB’s production plants in Malmberget and Kiruna, in Northern Sweden. Tests with tailings sand (waste material which is a by-product of mining) from the two mines and the respective processing plants will be carried out in campaigns. Right now, a production campaign is underway in Malmberget. The process has multiple steps, flotation is the key principle applied to separate the apatite from the non-valuable tailings. This process is repeated in several steps to obtain a high purity product with the right specification for further processing.

The further processing will be done using innovative chemical processing, that LKAB is working intensively to develop. Here, the apatite will be processed into phosphorus mineral fertilisers, rare earth elements, fluorine and gypsum. Phosphorus and REEs are listed by the EU as Critical Raw Materials due to their high economic importance and our import

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LKAB is an international and high-tech mining- and minerals group. Sustainability is core to our business and our ambition is to be one of the industry’s most innovative, resource-efficient and responsible companies. The group had sales of about SEK 31 billion in 2019 and employs about 4,300 people in 12 countries. Other group business include drilling systems, rail transport, mechanical services, rockwork services, explosives and property management.

dependence. But right now, Leif Boström is pleased to be able to inform of the successes with the apatite production that is the needed first step.

"We estimate that a full scale production from Malmberget and Kiruna will produce around 400,000 tonnes of apatite concentrate annually, in two plants that will be of similar size to our existing iron ore concentrating plants. When we can be up and running depends on the technical developments and the pre-engineering, but also relies heavily on external factors such as environmental permits. Our objective is to recycle our mine tailings to critical raw materials, and the sooner the better" Leif Boström concludes.

Press images:

Graphic, process description, Graphic: Anders Humlebo/TT Nyhetsbyrån
Photos, aerial and from the pilot plant, Photo: Fredric Alm
Graphic and photos are free to use in editorial material about the ReeMAP project, include graphic/photo credit.

ReeMAP – Turning today's waste into tomorrow's resources

The project name is constructed from two of the main products we aim to recycle from our tailings sand, REE's (Rare earth elements) and MAP (a phosphorus mineral fertiliser product) that are considered critical raw materials.