

Advanced identification techniques for the indicator minerals in critical mineral exploration

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One of the focuses on the mineral strategy of the EU and Finland is increasing the self-sufficiency of critical minerals in Europe. By decreasing the dependency on imports from outside, the EU ensures the availability of raw materials for high-technology industries. Metals defined to be critical include, for example, rare earth elements (REE), antimony, cobalt, magnesium, niobium and platinum group elements (PGE) used in the electronics industry, smart products, catalytic converters and batteries.

An Indika project (Automated identification of indicator minerals in the exploration of critical minerals, 2016–2018) investigates the suitability of new automated field methodologies for the exploration of indicator minerals. Indicator minerals accompany specific ore types and, therefore, indicates the existence of an ore deposit. Usually, there are more indicator minerals and in a larger area than actual ore minerals, which makes mineral exploration easier. Particularly, in the glaciated terrains glacial sediments like till and fine grained materials including clays give good ground for indicator mineral exploration.

The Indika project produces a new pre-processing and research procedure for indicator mineral samples, which has been documented and tested in practice. By modern field analysers, such as portable XRD and XRF devices, samples can already be analysed mineralogically and geochemically in the field. With a support of hyperspectral imaging and advanced electron optical methods, minerals can be identified fully or semi automatically. Those methods speed up the work process and improves the cost-efficiency of exploration. Another aim is to improve digital data collection and management.

Research partners in the Indika project are the Geological Survey of Finland, Oulu University and Lapland University of Applied Sciences. In addition, the project parties work together with a number of companies operating in the industry. The European Regional Development Fund (ERDF) funds the Indika project.