# MINERAL RESOURCES AND MATERIAL SUBSTITUTION (MISU)

## FUNDED PROJECTS

## **Primary Mineral Resources**

## Rapid analysis of minerals and rare earth elements by timegated laser spectroscopy - LaseREE

Saara Kaski, University of Jyväskylä, consortium leader Mircea Guina, Tampere University of Technology Heikki Häkkänen, University of Jyväskylä Juha Kostamovaara, University of Jyväskylä

Multiple lines of evidence in assessing ecotoxicological and human health risks of mine effluents and public perception Jussi Kukkonen, University of Jyväskylä, consortium leader Timo Huttula, Finnish Environment Institute Ilkka Miettinen, National Institute for Health and Welfare Rauno Sairinen, University of Eastern Finland

#### Mineral Systems and Mineral Prospectivity of Finnish Lapland

Ferenc Molnár, Geological Survey of Finland (GTK), consortium leader Eero Hanski, University of Oulu

Safe, sustainable and selective methods for dissolution and recovery of noble metals Timo Repo, University of Helsinki

#### "Social license to operate": a real tool or rhetoric? Examining the mining industry in Finland, Australia, and Canada Rauno Sairinen, University of Eastern Finland, consortium leader

Tapio Litmanen, University of Jyväskylä

#### New Chelating Agents for Selective Extraction of Uranium (URAEXT) Heikki Tuononen, University of Jyväskylä

## Mineral Resources and Material Substitution

Identification of potential flake-graphite ores in the Fennoscandian shield and utilization of graphene (FennoFlakes) Nils Olav Eklund, Åbo Akademi University

Thermoelectric Materials based on Earth-Abundant Oxides (TEOX) Maarit Karppinen, Aalto University

Sustainable platinum group metal free catalyst materials Kari Laasonen, Aalto University, consortium leader Tanja Kallio, Aalto University Esko Kauppinen, Aalto University

## New laser and spectral field methods for in situ mining and raw material investigations

Jussi Leveinen, Aalto University, consortium leader Juha Hyyppä, Finnish Geospatial Research Institute FGI Saara Kaski, University of Jyväskylä Juha Kostamovaara, University of Oulu



### Novel synthesis methods for porous ceramics from mine tailings

Jouko Niinimäki, University of Oulu, consortium leader Päivi Kivikytö-Reponen, VTT Technical Research Centre of Finland Ltd Erkki Levänen, Tampere University of Technology

Marja Liisa Räisänen, Geological Survey of Finland (GTK)

## Development of novel electrodeionization system for recovery and recycling precious metals and rare earth elements from mining effluents

Mika Sillanpää, Lappeenranta University of Technology

#### Advanced technologies for sustainable exploitation of uranium-bearing mineral resources

Jouko Vepsäläinen, University of Eastern Finland, consortium leader Aino-Maija Lakaniemi, Tampere University of Technology Vesa-Pekka Lehto, University of Eastern Finland Raisa Neitola, Geological Survey of Finland (GTK)

#### High-performance geoscientific computing in multi-scale mineral potential studies

Jan Westerholm, Åbo Akademi University, consortium leader Eevaliisa Laine, Geological Survey of Finland (GTK)

## **International Joint Projects**

### Academy of Finland and South Africa (NRF)

Towards sustainable mineral processing via plantwide eMPC Sirkka-Liisa Jämsä-Jounela, Aalto University Ian Craig, University of Pretoria

### On-line Risk Management in Deep Mines (ORMID) Mikael Rinne, Aalto University

Alexander Milev, CSIR Natural Resources & Environment Unit

#### Recovery of rare earth elements from phosphogypsum Tuomo Sainio, Lappeenranta University of Technology, consortium leader Pertti Koukkari, VTT Technical Research Centre of Finland Ltd Jason Yang, Geological Survey of Finland (GTK) Volha Yahorava, MINTEK

Protocol development for evaluation of water-saving alternatives in minerals processing - "Bridging North to South" Pekka Taskinen, Aalto University David Deglon, University of Cape Town

## Academy of Finland and Chile (CONICYT)

Particulate matter in mines and mining environments Risto Hillamo, Finnish Meteorological Institute, consortium leader Jorma Keskinen, Tampere University of Technology Pedro Oyola, Centro Mario Molina Chile





# MINERAL RESOURCES AND MATERIAL SUBSTITUTION (MISU) ACADEMY PROGRAMME

2014-2019

The utilisation of mineral resources is a sensitive subject that involves a number of technical, social, environmental and judicial perspectives. The Academy Programme Mineral Resources and Material Substitution, a research programme by the Academy of Finland, explores this topical subject through the use of research.

Non-renewable materials and minerals extracted from the earth are central to the modern way of life. One way to ease the supply problem is to optimise the use and recycling of these materials. Although effective mechanisms are in place for the recycling of basic metals there will continue to be a need in the future for primary production. Another way of tackling the supply problem in mineral resources is to develop alternative materials that will provide the functionality needed in the application. Another central issue is the profitability and sustainability of operations across their life cycle.

Finland is well placed to become a pioneer in sustainable mining, but in order to realise this potential it will have to resolve these questions on the basis of sound research evidence. The aim of this Academy Programme is to strengthen multidisciplinary and interdisciplinary approaches and to move towards a more systemic orientation in the research fields concerned.

The programme includes 19 projects, of which 14 are Finnish projects consisting of one or several research units. International collaborations play an important role within the programme. In international collaborative projects, research units receive funding from their own national research funding agency. Four projects in the programme include research collaboration supported by funding from the Academy of Finland and the National Research Foundation of South Africa (NRF). In addition, one project involves research collaboration funded by the Academy of Finland and the National Commission for Scientific and Technological Research in Chile (CONICYT).

## www.aka.fi/MISU



Hakaniemenranta 6 • POB 131, Fl-00531 Helsinki, Finland • Tel. +358 29 533 5000



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