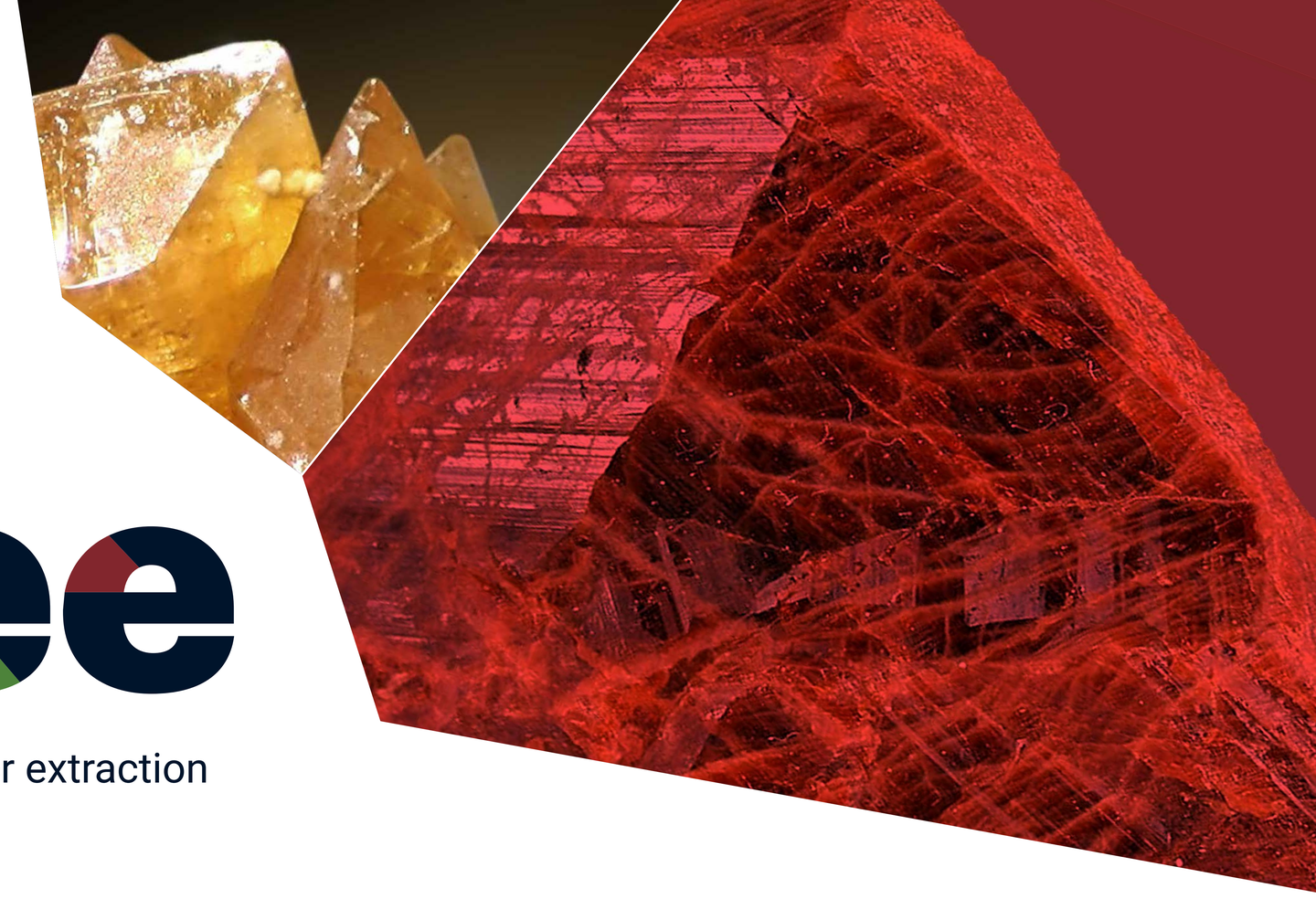
ERA-MIN project 2015-2017, Coordinator: Chalmers University of Technology Sweden



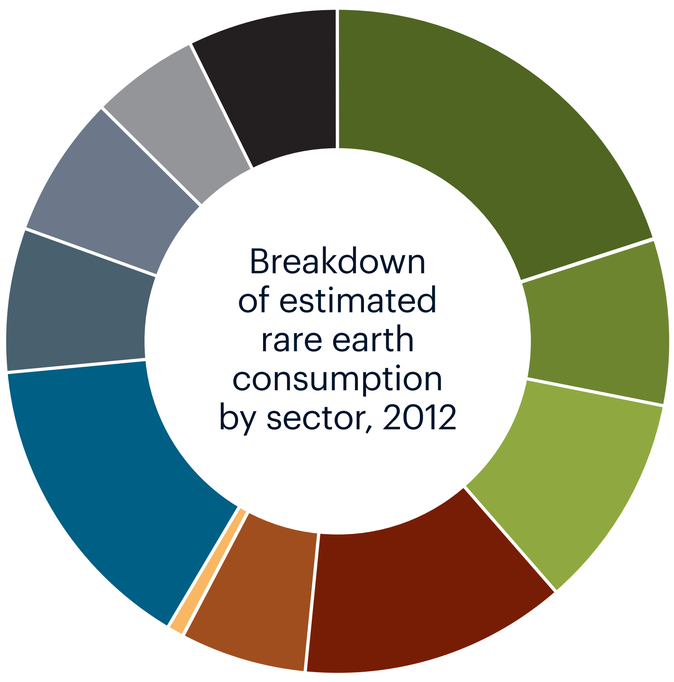
enviree

environmentally friendly and efficient methods for extraction of rare earth elements from secondary sources

why we need REE

Rare Earth Elements (REE) are 17 elements including 15 lanthanides (La to Lu), scandium and yttrium. EU Raw Materials Initiative identified REE as being highly relevant for societal needs while there exists a significant risk of supply.

magnets	1 %	polishing	15 %
batteries	8 %	glass	7 %
other metallurgy	10 %	phosphors	1 %
FCCS	13 %	ceramics	5 %
autocatalysts	6 %	other	7 %
other catalysts	1 %		



sources of REE for Europe

PRIMARY SOURCES

- EU net importer of cca 8,000 tonnes of rare earths every year
- Europe imports about 14% of the total REE production of China
- no rare earth production is currently located within the EU

SECONDARY SOURCES

- recyclation
- **OTHER SECONDARY SOURCES**

It is necessary to develop clean and efficient technologies for the leaching and separation of REE from the secondary sources in an economical way.

enviree objectives

- develop novel and environmentally friendly leaching processes for different waste materials
- develop environmentally friendly and economical separation processes
- ensure that the above processes comply with normal process optimization
- asure environmental and economic feasibility of the processes
- have an extensive education, training and dissemination activity
- bring the research results to the market

research topics

EXTRACTION

Integrated processes and system approach and Innovative waste management.

MINERAL PROCESSING

Processing of low grade and complex materials in the most efficient and sustainable way; Energy efficiency in the processing (grain size optimization, efficient leaching)

METALLURGY

Treatment of metallurgical by-products and waste with the complete recovery of metal value; New technologies for recovery of accompanying and critical metals for better utilization of natural resources; Tackling the existing challenges in extractive metallurgy.

target materials

- tailings from lead and zinc ores mining and treatment,
- tailings from copper ores mining and treatment,
- tailings from sulphur ores mining and treatment,
- tailings from processing phosphate ore (phosphogypsum)
- tailings from processing alumina ore (red mud)
- waste rock from other mining of rocks possibly enriched with REE.

expected results and impacts

- competitive, environmentally friendly recovery techniques for secondary mineral sources involving holistic approach to the given problem
- existing test bed at CHALMERS involved in order to optimize the processes and bring it closer to industrial application – industrially relevant focus as assured also through involvement of end users
- competitiveness and environmental impacts of the suggested approaches addressed
- extensive training and education programme applied

enviree work structure

WP6 Project Management (Chalmers)

WP5 Training, education, dissemination and market uptake (IST-ID)

WP2 Leaching of the selected materials (CEA)

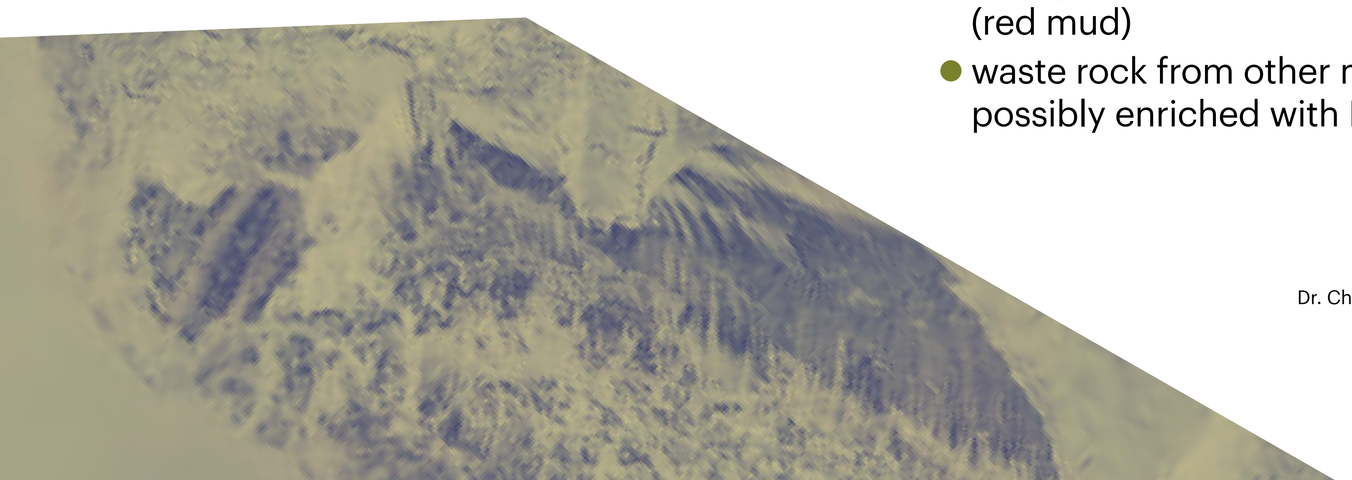
WP3 Separation of the REE (Chalmers)

WP1 Assesment of available materials and their charakterization (AICU)

WP4 Evaluation of envinronmental impact and economic feasibility (AGH)

consortium

CHALMERS Chalmers University of Technology (Sweden)
AGH Akademia Górniczo-Hutnicza im. Stanislawa Staszica v Krakowie (Poland)
AICU The Alexandru Ioan Cuza University of Iași (Romania)
IST-ID Instituto Superior Técnico for Research and Development (Portugal)
KIT Karlsruher Institut für Technologie (Germany)
PIPAS Primus.inter.pares AS (Norway)
EDM Empressa de Desenvolvimento Mineiro (Portugal)
CEA le Commissariat à l'énergie atomique et aux énergies alternatives (France)
CGS Council for Geoscience (South Africa)
SAVONA Savona Project s.a. (Poland)
BRGM Bureau de Recherches Géologiques et Minieres (France)



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