Metal mobilisation:

What society knows today, what CHPM2030 will revolutionise tomorrow

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What is CHPM2030?

CHPM2030 (Combined Heat, Power and Metal extraction from ultra-deep ore bodies with an aim of implementation by 2030) is a H2020 project funded by the European Union and working on a unique disruptive technology that will combine geothermal energy development and minerals extraction.

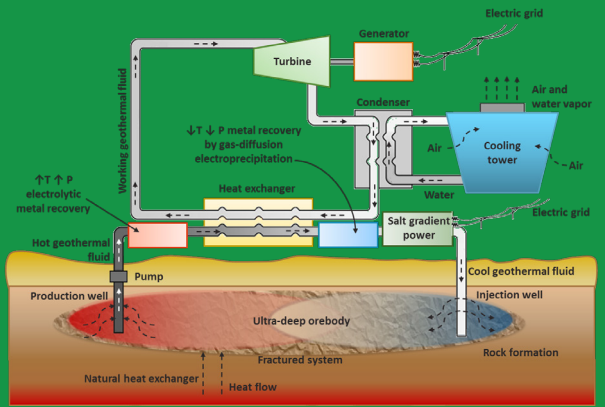
It will respond to two challenges:

The European energy market makes efforts to become less dependent on imported fossil fuels and to reduce the environmental impact of its energy supply. A major option, geothermal energy is already being used worldwide, including in many parts of Europe, because it is clean, renewable and constant.

Europe has another major challenge: securing the supply of critical raw materials, in particular metals, for industry and society. The dependency on metals is growing every year, despite significant efforts in the development of recycling and substitution.

What is the goal of CHPM2030 and how will it be achieved?

CHPM2030 develops an "orebody-EGS (Enhanced Geothermal System)" that will serve as a basis for the development of a new type of facility used for the co-production of energy and metals, in order to improve the economics of geothermal energy production.



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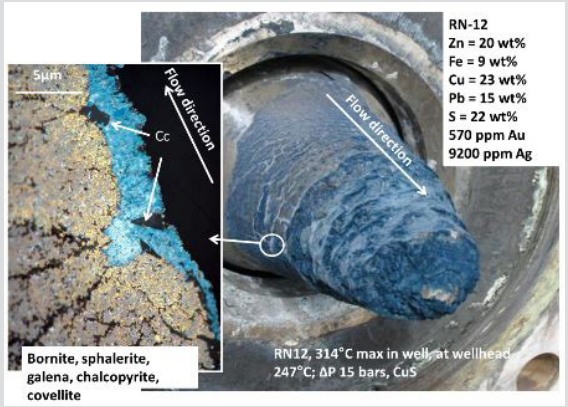
Why start there?

- Ore deposits are generally originated from fluids. We need to work on reversing this process in a controlled way.
- Concentrations of dissolved metals are often low in groundwater, but, higher temperature geothermal fluids can carry a higher dissolved load, and hence more metals.
- Ideally CHPM2030 wants to be able to tailor the chemical conditions of the recirculating fluid to target specific metals of societal need at that point in time.

What are the options?

- Mild leaching is preferred as it will use more environmentally-benign additives, and which could be at lower cost than other alternatives. Moreover, a steady rate of metal production may make surface recovery equipment more efficient and hence more economic, compared to short periods of high recovery.
- Nanoparticles held in suspension in the recirculating fluid may be able to pick up specific metal ions stuck to their surfaces, and prevent initially released metals from re-precipitating underground. This could allow more metals to be brought up to the surface and collected in the recovery equipment.



FFCV= Fluid Flow Control Valve covered with 800 gr of metals which precipitated in one year, concentration of the precipitated metals: Zn 20 wt%, Fe 9 wt%, Cu 23 wt%, Pb 15 wt%, S 22 wt%, 570 ppm Au, and 9200 ppm Ag. © *Vigdís Harðardóttir Ph.D Thesis University of Ottawa 2011.*

What society knows today, what CHPM will revolutionise tomorrow:

Working with those different options, CHPM2030 ideally will be able to tailor the chemical conditions of the recirculating fluid to target specific metals of societal need at that point in time.

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Photo: Courtesy Vigdís Harðardóttir, Iceland Geological Survey