Cobalt: Geology, Geomicrobiology, Geometallurgy

About the project

Aim and objectives

The principal aim of CoG^3 project is to understand the natural behaviour and biogeochemistry of cobalt in order to develop and apply novel bioprocessing strategies for cobalt extraction, recovery and the synthesis of targeted products using an integrated multi-institute and multidisciplinary approach.

The project will deliver:

- New knowledge about **cobalt residence and behaviour** in natural systems
- New **bioprocessing strategies** for cobalt ores
- **Bioengineered** and biomineral **products**
- **'Mine to product'** concept for cobalt
- Improvement of **supply chain**
- Promotion of **public understanding of cobalt** and its place in a modern society

The detailed objectives of the project are:

- To improve understanding of the **residence of cobalt** in reduced, sulfide-rich hydrothermal systems, to better characterise complex ore types and assess the differences in deportment between cobalt and other transition metals such as Ni and Cu.
- To study the behaviour of cobalt in the Critical Zone and in seafloor oxide deposits in order to develop a fundamental understanding of the **mineral residence at the atomic scale** within natural assemblages and synthetic analogues
- To understand the **natural biogeochemistry** of cobalt in both aerobic and anaerobic environments.
- To develop and apply **microbiological bioprocessing strategies** for extracting cobalt from primary ores and using **biomineralization processes** to recover cobalt from the process liquors and synthesise targeted downstream products
- To improve **cobalt recovery** from complex sulfide-oxide ores using a **'geometallurgy' approach** for orebody characterisation
- To improve **cobalt extraction and production** methods in order to accommodate current and future needs of the end user community in the cobalt supply chain