

Master Project (30 ECTS)/Semester Project (10 ECTS)

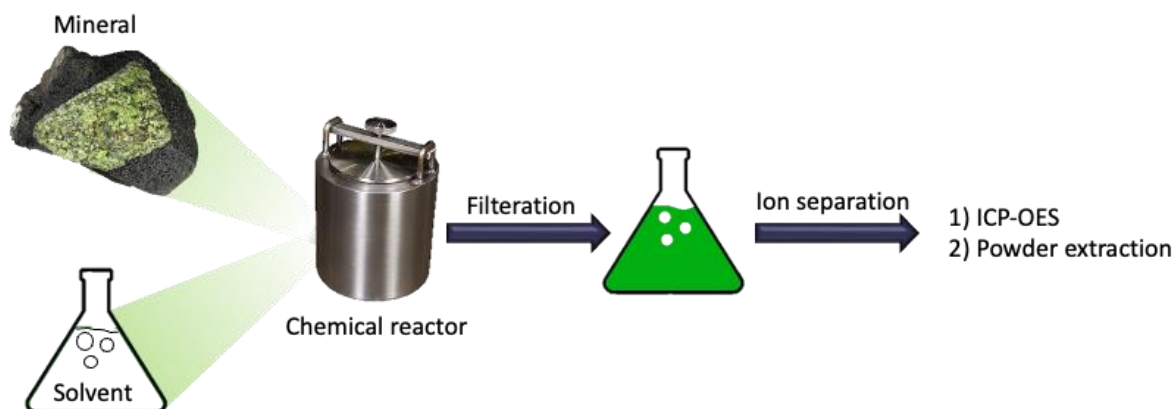
Administrative

Supervision: Dr. Zohreh Akbari, Prof. J. Van Herle
Contact: zohreh.akbari@epfl.ch
Location: Sion EPFL campus (travel allowance offered)
Remarks: If interested, please contact Zohreh.

Project description:

Interested in tackling the material circularity challenges through chemical reactions? We offer you a supportive, friendly working environment. During the project, you will be supervised and guided by experts in the field.

In this project, the aim is to selectively extract metal ions from an industrial mineral that is highly stable. This mineral could potentially be dissolved in a solvent medium; however, the challenge is to accelerate dissolution kinetics and increase surface reaction rates. For this aim, the idea is to design a unique dynamic solvo-chemical reactor system capable of implementing the following schematic.



After selective ion extraction, a filtration step will separate the solid phase from the liquid phase. Later, this liquid will be used as a medium for further chemical reactions. More details will be mentioned in an in-person/online discussion.

To analyze the selective ion extraction and successful ion separation, inductively coupled plasma optical emission spectroscopy (ICP-OES) will be used (a scientific staff member will help you).

The project combines materials science, mechanical engineering, and your creativity!

Your tasks:

- 1- Design a dynamic solvo-chemical reactor (CAD and process design)
- 2- Apply an effective metal ion separation method
- 3- Prepare samples for ICP-OES analysis
- 4- Real-world application-driven decision-making skills