

## PhD Project in mining environment **Cement stabilization of acid generating tailings**

Polytechnique Montreal @polymtl / UQAT @UQAT.ca

RIME – Research Institute of Mines and Environment @irme.uqat.polytechnique

#phd #environment #mining #reclamation #cement #fieldwork #modelling

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RIME is presently looking for a **PhD candidate** in mineral engineering to study the hydro-geochemical behaviour of cement-stabilized tailings for the reclamation of acid generating mine sites.

### **Project description**

The Research Institute of Mines and Environment (RIME) and its partners are working on the development of innovative approaches to reclaim mine sites and reduce their environmental impact. The present project aims at evaluating the possibility to treat and stabilize reactive tailings *in situ* with cement. The objective is to create a low permeability protection layer on top of tailings storage facilities to protect the underlying reactive tailings from oxidation and thus to prevent acid mine drainage generation. Preliminary tests in the laboratory have shown a good potential for this technique. However, several challenges need to be tackled before the technique can be applied in the field. For this reason, a research project will be carried out to optimize the choice of cement and the mixing ratio, to evaluate the durability of the cover and its resilience against climate change, and finally to test the construction method in the field and to evaluate the performance of such cover at large scale.

Objectives of the project: **(1) Evaluate in the laboratory the effect of cement, mixing ratios and compaction degree** on the hydrogeotechnical properties of the cement-stabilized tailings (hydraulic conductivity, water retention capacity, oxygen diffusion coefficient). **(2) Construction of a large-scale pilot test** on a partner mine site and monitoring of the hydrogeological properties of the cover over several years. **(3) Experimental and numerical study of the effect of freeze-thaw and wetting-drying cycles** on the hydrogeological properties of cement stabilized tailings and evaluation of several approaches to improve their durability.

**Research fields:** Mine site reclamation, geotechnical engineering, hydrogeology, and geochemistry.

**Candidate profile:** Master's degree in geological, mining, or civil engineering, or any other related field.

**Scholarship:** 22 000 \$/year (not subject to income tax) + exemption from differential tuition fees  
+ scholarship to participate to at least 2 conferences during the PhD studies

**Duration:** 4 years. **Locations:** Montreal and Rouyn-Noranda (Quebec, Canada), field work planned. Some tests will be carried out in France.

**Project start:** Winter 2022.

### **FOR MORE INFORMATION OR TO APPLY (please send cover letter, CV and transcripts):**

Prof. Thomas Pabst, Eng. Ph.D., Scientific Director of RIME Polytechnique

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**Application deadline: July 31, 2021**

# POLYTECHNIQUE MONTRÉAL



## MISSION

Respectful of the principles of sustainable development and attuned to the needs of society, Polytechnique Montréal, in accordance with its values:

- educates engineers and top-level scientists to meet the challenges of an evolving world and make them key agents of change;
- conducts research that addresses major societal issues; and
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TECHNOLOGICAL  
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