



## MASTER'S STUDENT WANTED

### M.Sc. Opportunity in Mineral Engineering

#### Title: Recycling of Reagents in Hydrometallurgy – Case Study on Caustic Soda (NaOH) in Graphite Purification

**Context and project overview:** Critical and strategic minerals (CSM) include lesser known elements such as graphite, vanadium, antimony, cobalt and copper. Graphite is a strategic mineral for Li-ion batteries used in electric vehicles. High performance Li-ion batteries require graphite to be purified to levels above 99.95 %, through complex, expensive processes with potential environmental impacts. This project studies caustic soda (NaOH) recycling in graphite purification, a process currently under study at pilot-scale by an industrial partner in Québec, but not yet in full-scale operation. The overall objective is to minimize the environmental footprint and costs associated to the hydrometallurgical purification of graphite.

**Specific objectives:** The student will be responsible for various analyses and laboratory tests with the following goals:

- Characterizing samples of graphite and contaminated NaOH solutions supplied by the industrial partner, in order to assess how impurities reach the NaOH phase;
- Conducting tests on NaOH reconditioning methods, to be modelled and compared to maximize NaOH recycling.

**Location:** The student will be based at the Research Institute on Mines and the Environment (RIME) at the Rouyn-Noranda campus of the Université du Québec en Abitibi-Témiscamingue, under the supervision of Jean-François Boulanger, supported by a team of specialized professionals. RIME supports a research targeting the development of environmentally sustainable solutions for the whole mining lifecycle. This project is part of the activities of the Centre for Excellence in Strategic Minerals, Éléments 08 (<https://elements08.com/>), which targets the responsible extraction of critical and strategic minerals.

**Financial support:** A non-taxable scholarship of 18 000 \$ per year for two years is provided.

**Required profile:** A good or excellent academic record, with a completed bachelor's degree in hydrometallurgy, metallurgical or material's engineering, chemical engineering, mining engineering, geology or any other field deemed fit. Must show a high level of autonomy, curiosity and work well as part of a team.

**Start date:** Fall 2021 or winter 2022 for a period of 2 years.

**To apply:** Send 1) a curriculum vitae, 2) a cover letter, 3) an academic transcript and 4) the name and contact information of two (2) references. The position will be open until filled, with priority given to applications received before **July 15th 2021**.

Send your complete application package (or questions) to [jean-francois.boulanger@uqat.ca](mailto:jean-francois.boulanger@uqat.ca)

Jean-François Boulanger, Ph. D., P. Eng., professor in hydrometallurgy, Phone : 418-262-5271

Université du Québec en Abitibi Témiscamingue (UQAT) | Institut de recherche sur les mines et l'environnement (IRME)



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