

Ph.D. position in Environmental Geochemistry

The Rock-Water Interaction Group at the Institute of Geological Sciences, University of Bern is looking for a Ph.D. student to contribute to the project “**Mobilization of aluminum under changing alpine climatic conditions**”.

The general topic of the project covers the ongoing, climate change-induced loss of permafrost in high-alpine catchments, which leads to an increased exposure of pyrite-bearing rocks to oxic waters and thereby causing production of sulfuric acid. Based on long-term monitoring studies, it is expected that such acidification will increase the mobility of aluminum and other toxic elements in the future. As a consequence, white Al-hydroxysulfates will increasingly form downstream of areas with sulfuric acid production (see pictures below and [educational film](#)). Their formation is important because they limit the mobility of Al and serve as highly efficient sinks for other toxic elements. For understanding these processes, knowledge of the thermodynamic properties of the secondary Al phases is crucial. To date, however, $\log(K)$ values of the most relevant Al-hydroxysulfates are available only for 25 °C.

In this project, the Ph.D student will (i) experimentally determine the solubility of Al-hydroxysulfates of various compositions at temperatures relevant for alpine climatic conditions (0-25°C) and (ii) investigate the mobility of Al and other toxic elements at several high-alpine catchments affected by sulfuric acid production. Thus, there is a strong focus on conducting laboratory experiments and performing geochemical analyses using IC, ICP-OES, FTIR, NMR as well as synchrotron-based high-energy X-ray diffraction. In parallel, the project includes yearly excursions to high-alpine areas for collecting naturally occurring Al-hydroxysulfates and sampling of acidic streams. Moreover, the collected data will be evaluated and synthesized by performing geochemical modeling.

The project is fully funded by the Swiss National Science Foundation (SNSF) for 4 years. The annual gross salary will be provided as per the University of Bern and SNSF standards, which will cover the high living expenses in Switzerland.

The successful candidate should have a M.Sc. degree in Environmental Sciences, a strong interest for aqueous geochemistry, and preferably experience in conducting geochemical experiments. We are, in particular, looking for self-motivated candidates with great enthusiasm and endurance for hikes to the sampling locations in the Alps. Good communication skills and fluency in English (oral and written) are mandatory.

Please submit your application with the following documents to Dr. Christoph Wanner (wanner@geo.unibe.ch) before November 15 2020:

- Statement of Research / Motivation letter
- CV (max. 2 pages)
- Contact details of 2 references
- B.Sc. and M.Sc. diploma with transcripts



Photographs of Al-hydroxysulfate occurrences along high-alpine streams.

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