Empa
Materials Science and Technology

Empa - the place where innovation starts

Empa is a research institute of the ETH Domain and conducts cutting-edge research for the benefit of industry and the well-being of society. The Laboratory for Air Pollution/Environmental Technology develops measurement techniques and atmospheric modelling tools as a contribution to a healthy and safe environment.

The Laboratory for Air Pollution/Environmental Technology offers a

PhD position on the development of "A novel tracer for the greenhouse gas N_2O"

Nitrous oxide (N_2O) is a strong greenhouse gas and atmospheric pollutant. Therefore, many research groups worldwide are working on the identification and quantification of the most important N_2O sources and sinks. Empa was the first institute developing a technique to analyse the stable isotopes in ambient N_2O online under field conditions. Our laboratory has applied this method in numerous studies to differentiate N_2O processes in wastewater treatment plants, from soil and from industrial processes.

Within this PhD project we will take a major step forward and explore the potential of doubly-substituted "clumped" N_2O isotopes to further investigate the N_2O cycle. This is a completely new and exciting field of research within the N_2O research community, providing molecular-scale and environmental insights.

The PhD thesis will include the following tasks:

Task 1: Development of a laser-based analytical technique for the analysis of the most abundant doubly substituted N_2O isotopic species: $^{15}N^{14}N^{18}O$, $^{14}N^{15}N^{18}O$, and $^{15}N^{15}N^{16}O$.

Task 2: Testing of exemplary research hypotheses on N_2O produced by different processes in microbial, fungal and abiotic sources.

The project has the potential to provide breakthrough results, and therefore publication in high impact journals is foreseen. The PhD candidate will be supervised by specialists in laser spectroscopy at Empa and clumped isotope analysis at ETH Zürich (Prof. Stefano Bernasconi). Further cooperation is foreseen with experts at the California Institute of Technology (USA) and the Thünen Institute (Germany).

We are looking for a highly motivated PhD student with a MSc degree in natural science, chemistry, environmental sciences or a related discipline, and a strong interest in analytical chemistry and its environmental applications. Applicants should send a letter of application, CV, certificates, and addresses of 2-3 potential referees online via **https://apply.refline.ch/673276/search.html**. Only online submissions will be considered.

For questions about this position please contact Dr. Joachim Mohn, Empa, 8600 Dübendorf, Switzerland, +41 58 765 46 87, email: joachim.mohn@empa.ch.