ESRF Synchrotron XAS stage/thesis

Synchrotron-based research on metal-loaded zeolites at ESRF Grenoble

At BM23 at the ESRF synchrotron in Grenoble, extremely high-resolution data can be obtained from metal-loaded zeolite samples. These zeolites are studied with operando X-ray absorption experiments. The results are a vital tool for detailed analysis of catalytically active nanosized clusters as well as substituted framework atoms in zeolites and permit us to study the mechanisms in-depth. The extremely high resolution of this synchrotron can help us define what type of metal particles and substitutions are in the zeolite and what their role is in a catalyst. With this knowledge, catalytically active zeolites can be improved, and new types can be discovered.

For this position, we are looking for a master student who would like to do research at the ESRF synchrotron in Grenoble between November-April or January/February-June/July (6 Months)
The student is expected to gain a detailed understanding of XAS, its applications to catalysis, and perform data processing of X-Ray Absorption Spectra.
As a final deliverable, the student is expected to create a report similar in style to a master thesis.

This project is in collaboration with the zeolite research group (CLEAR) at CNRS, which will be measuring samples during part of the time the student is working at the synchrotron. The student will be involved in these measurements and some data analysis but is not expected to contribute to the synthesis of the materials.

We think the synchrotron is an exciting place to gain a lot of connections to various research groups and collaborate in a wide variety of research projects. If you can work with scripts and can learn new skills relatively autonomously, we would love to talk to you!
(Learning python can be done quite quickly, but you can focus more on you research if you know the basics beforehand)

In short, we are looking for:

- Availability between November-April or January/February-June/July (6 Months)
- (Optional) Detailed knowledge of XAS
- (Optional) Python programming experience

A short description of the project from the Dr. Davide Salusso at ESRF:

Tasks : the student will ideally join an operando X-Ray Absorption Spectroscopy experiment aimed to characterize metal-loaded zeolites. The (CNRS) experiment will be performed from the 3rd to the 10th of December (included) at BM23 beamline of the European Synchrotron Radiation Facility (Grenoble, France) under the supervision of Dr. Davide Salusso.
After the experiment the student will work at the XAS data analysis through the use of Larch coupled with Python scripts. Data analysis (XAS spectra normalization, kinetic studies and EXAFS fitting) will be the heart of the research.

Student background : the student should be enrolled in the second year of a master degree in Chemistry, Physics or Material Science (or similar courses). Having followed a course in X-Ray Absorption Spectroscopy would be a plus. Previous (basic) knowledge of python programming will be appreciated. Working language at ESRF is English. Knowledge of French language is not required.

Working Conditions *: the student will be enrolled as Trainee. The working hours will be 9-18. The student will receive an economical support from ESRF between 500 and 800 Euros. The exact amount will be defined based on the available budget.*

Period *: Two options.*

I) The student takes an active part to the (CNRS) experiment. Period of the thesis: ***November to April*** *included for a total of 6 months. The experiment is performed in December so starting in November will be ideal for the student to get a background on XAS measurements.*

II) The student starts the thesis after 2024. Period from ***January/February to the following 6 months****. The student can participate anyway to the experiment as a vising user however, the expenses (travel, guest house, meals) will not be covered by ESRF.*

Extra information *: this type of master thesis is eligible for erasmus traineeship program where ESRF can be the host institution, however, the procedure has to be started from the sending university.*