

Post Doctoral Fellowship: Beamline ROCK

SOLEIL, which is located near Paris on the Plateau of Saclay, is a particle accelerator producing synchrotron radiation, an extremely powerful light source shared by 29 beamlines and covering the energy range from the far IR to the hard X-ray. It opens to a large scientific and industrial users community in a very broad range of research fields from life to material science. This multidisciplinary tool welcomes more than 3,000 users per year and runs continuously 24 hours a day, 7 days a week, with uninterrupted periods of up to 7 weeks. Financed by two principal shareholders- the CNRS and the CEA- SOLEIL holds a status of "Public Company".

The Synchrotron SOLEIL opens a 18 months postdoctoral position at the ROCK beamline. ROCK is a dedicated Quick-EXAFS beamline working in the 4-40 keV energy and sub-second time resolution for collection of a XAFS spectrum. The beamline, in operation since 2015, has been funded by the French program "Investissements d'Avenir" to contribute to the development of more efficient catalysts and batteries which should find successful industrial applications in the field of energy generation and storage in compliance with the protection of public health and environment. Recently, hyperspectral quick-XAFS full-field imaging has been developed at the beamline offering micron-meter spatial resolution together with second time resolution for efficient monitoring of reaction kinetics.

This 18-months postdoctoral position is funded by the French National Research Agency (ANR) within the collaborative ANR MULTIPROBE project between different research teams with complementary expertise in spectroscopy techniques: X-ray absorption spectroscopy (SOLEIL Synchrotron), environmental electron microscopy and electron energy loss spectroscopy (IPCMS, Strasbourg) and catalysis (UCCS, Lille). The postdoctoral fellow hosted at SOLEIL will be involved in the *operando* XAS and hyperspectral imaging experiments carried out on catalytic systems studied within the MULTIPROBE ANR project, the development of tools and methods for an efficient data collection and multivariate data analysis of hyperspectral XAS but also EELS/EDX data, as well as their correlative analysis with *operando* TEM.

I.MISSION

The postdoc will work at the ROCK beamline with the following tasks:

- Participate in the hyperspectral experimental campaigns at the ROCK beamline devoted to the study of preparation, activation and reactivity of catalysts used for hydrogenation of CO or CO₂. Modulation Excitation Spectroscopy for unravelling active species will be applied during pulses of reactive gases.
- Optimize the data acquisition strategy to reduce the noise present in XAS or EELS images, thereby improving the efficiency of spectral unmixing multivariate algorithms used for hyperspectral imaging data.

- Actively contribute to the development of data analysis tools for this kind of experiments (using Python/Jupyter) by leveraging machine learning techniques through collaboration with SOLEIL's data analysis group - GRADES.

II. Experience required

The candidate must hold a PhD in Chemistry, Material Science, Physical Chemistry or similar research fields. Experience in scientific programming for data analysis (with python3) is required. A research experience in the field of X-ray and/or electron microscopies would be recommended.

Moreover, the following expertise will be considered with particular attention:

- Research experience in the practice of *operando* characterization of catalysts under reactive atmosphere in temperature or pressure.
- Teamwork skills
- Knowledge of French is not mandatory, but a fluent level of spoken and written English is required

III. General condition

All applications must include:

- Curriculum vitae
- List of publications
- Motivation letter
- Two referees.

Duration of the post-doctorate: 18 months

Start date: as soon as possible

To apply: <https://www.synchrotron-soleil.fr/en/job-offers/post-doctoral-fellowship-beamline-rock>