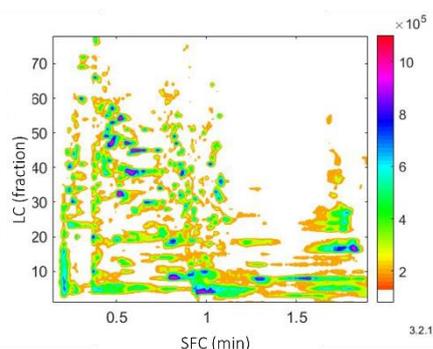


## 2-year Postdoctoral position

### Two-dimensional LC x SFC chromatography for the characterization of lignin depolymerization

The depolymerization of lignin provides a source of oligomers enriched in OH (phenolic) functions which can be used for the formulation of biosourced polyhydroxyurethane polymers (ANR Biopoliol project). The catalysis conditions of this depolymerization lead to extremely complex mixtures of monomers and oligomers which should be operated finely for any chemical functionalization. While the monomers can be characterized by GC x GC-MS, the most common technique for the separation of oligomers via 2DLC relies on the combination of GPC and RPLC. But the orthogonality is limited in this combination because the hydrophobicity of the oligomer is related to its size, leading to correlated 2D information. Neutral molecules, which the oligomers on these we concentrate on, are quite difficult to separate in 2DLC. Comprehensive mode separation involving a combination of RPLC and SFC appears promising [Burlet-Parendel, Trends in Analytical Chemistry 144 (2021) 116422]. Indeed, the reverse phase mechanism in the first dimension separates according to the hydrophobicity of the solutes, while the SFC ensures a complementary separation based mainly on the hydrophilic interactions, but also on the secondary  $\pi$ - $\pi$  interactions. This two-dimensional approach describes a large separation space that increases peak capacity and allows the creation of a sample map represented as a 2D plot. However, neither RPLC x RPLC nor RPLC x SFC separation has been studied for the separation of depolymerized lignin oligomers. The combination of LC and SFC is currently the main axis of research of the chromatography team of the Institute of Analytical Sciences and will therefore be the main axis of development in this project.

The postdoctoral fellow will be in charge of the entire development and optimization of the LC x SFC method, its coupling with mass spectrometry and the comparison of performances with an RPLC x RPLC approach. It will also be necessary to develop the methods of multidimensional data processing (commercial or custom software) and their use, in order to lead to relevant comparisons with the other methods deployed by our partners.



#### Key tasks

- Development of chromatographic methods
- Multidimensional data processing
- Report the progress to the various members of the project (5 laboratories)
- Propose, when necessary, instrumental developments
- Present the research work through the publication of scientific and communication articles at national and international congresses.

### Candidate profile

The candidate must have a doctorate in the field of analytical chemistry. He / she must have strong skills:

- in developing chromatographic methods
- in MS data processing

The candidate must:

- Know how to communicate orally and in writing in scientific English,
- Have at least 2 articles published by 1st author or by corresponding
- Demonstrate autonomy and be proactive
- Have good working skills in a collaboration (contributions to a collective project, meetings and missions outside the laboratory)

The Institute of Analytical Sciences (ISA) is a laboratory dedicated to the development of new analytical techniques applied to complex mixtures. By joining the Chromatography and Coupled Techniques team, the post-doc will have access to a state-of-the-art instrumental platform, including two-dimensional liquid chromatography instruments from various manufacturers, supercritical fluid chromatography, ion mobility and high resolution mass spectrometry instruments (QtoF). The Biopoliol project (ANR project) is based on the collaboration of five laboratories, and the analytical aspects are treated in very close collaboration between the Chromatography and Coupled Techniques team of ISA (project manager K. Faure) and the CATREN team of IRCELYon (D. Laurenti project manager), teams located in the same geographical area and already working together for many years.

The postdoc position is funded by the Agence Nationale de la Recherche for **24 months** starting April 2022 (date can be flexible).

Applications are open until 1<sup>st</sup> December 2022.

The application in a single pdf file must include the following documents:

- A cover letter
- A detailed CV, with mentions of internships or projects in chromatographic development.
- The pdf files of two articles
- Letters of recommendation sent directly by the referees (not compulsory)

This offer is visible on [www.emploi.cnrs.fr](http://www.emploi.cnrs.fr) under the reference UMR5280-KARFAU-001.

Applications will have to be processed via the CNRS platform.

For more information, contact Karine Faure

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