

Post-Doctoral position at Université de Pau et des Pays de l'Adour (France)

“Caractérisation analytique des éléments traces dans un biométhane en conditions de terrain”

“Analytical characterization of trace elements in biomethane under field conditions”

« Project: BIOCAT »

Duration: 12 months (+ 6 months renewable)

Location: IPREM and LFCR, [Université de Pau et des Pays de l'Adour](https://www.univ-pau.fr/) (Pau, France)

Beginning: October/november 2022

Compensation: About 2 200 Euros net per month

Description of the Position:

Context

The French Energy Transition Law for Green Growth (LTECV) has set a target of 10% renewable gas in the networks by 2030. Thus, the proportion of biomethane and synthetic methane circulating in the gas network and therefore potentially stored in aquifers will increase with the development of production processes (methanisation, pyrogasification, Power-to-Gas, methanation). The biomass used to generate biomethane has several possible origins: household, agricultural or livestock waste, but also industrial waste. Synthetic methane from pyrogasification can also come from Solid Recovered Fuels (SRF)

Given the diversity of substrates used, it is imperative to ensure that the gaseous effluents produced and any trace compounds that accompany them do not present any risk for storage. Real scientific and technological challenges exist today, for the development of sampling protocols under real conditions, the lowering of detection thresholds and the monitoring of these compounds in a gas.

Objectives

To deal with these problems, researchers of two labs hosted at the Université de Pau et des Pays de l'Adour (LFCR and IPREM) and of one industrial partner, TEREGA, have developed collaborations and obtained a support from E2S UPPA to fund a Post-Doctoral Research Associate position. The research study is carried out in the context of the joint laboratory SENGA (TEREGA-UPPA).

The research study is focused on the technological optimization of pre-concentration systems and on-site operational sampling targeting trace elements in biomethane.

The work will be carried out within the framework of an 12 + 6-month post-doc: this project completes the work carried out in the framework of the previous thesis in collaboration with TEREGA (Aurore Lecharlier, April 2022) 1-3. The methodological and analytical developments developed should make it possible to characterize biogases and biomethanes of different origins, mainly in terms of methanized biomass. It will therefore be a matter of:

- further development of the specific adsorption part by targeting certain trace compounds present in the biomethane, to have samples that are representative of the gas operating conditions and to analyze a broad spectrum of trace compounds.
- to develop a method for quantifying the trace elements present in the analyzed matrices
- to develop measurements on industrial sites and the constitution of a database

Expected results:

Analysis of trace compounds present in various biomethanes via the high-pressure pre-concentration system, finalization of the development of pre-concentration and analysis tools for the trace compounds targeted on a new generation thermodesorber, method for quantifying trace compounds.

Deliverables:

- ● A final report presenting the results obtained during the 12 + 6 months of post-doc.
- ● Two progress presentations to the scientific and technical committee.

References:

[1] Aurore Lecharlier, Hervé Carrier, Isabelle Le Hécho

Characterization of biogas and biomethane trace compounds: A critical review of advances in in situ sampling and preconcentration techniques

Analytica Chimica Acta, (2022), 12, 10071-10087 - [10.1016/j.aca.2022.340174](https://doi.org/10.1016/j.aca.2022.340174)

[2] Aurore Lecharlier, Hervé Carrier, Brice Bouyssié, Guilhem Caumette, Pierre Chiquet, Isabelle Le Hécho
Novel field-portable high-pressure adsorbent tube sampler prototype for the direct in situ preconcentration of trace compounds in gases at their working pressures: application to biomethane

RSC Advances, (2022), 12, 10071-10087 - 10.1039/D2RA00601D

[3] Aurore Lecharlier, Brice Bouyssié, Hervé Carrier, Isabelle Le Hécho

Promises of a new versatile field-deployable sorbent tube thermodesorber by application to BTEX analysis in CH₄.

Talanta Open, (2021), 4, - 10.1016/j.talo.2021.100066

Required qualification:

PhD in Analytical Chemistry, Chemical Engineering or related domain.

Profile sought:

Candidate capable of developing experimental protocols, with experience in analytical chemistry or motivated to strengthen his/her skills in this field.

Application:

C.V. + Motivation letter to (deadline 15 september 2022) to:

Dr. Isabelle le Hecho, isabelle.lehecho@univ-pau.fr

Pr. Hervé Carrier, herve.carrier@univ-pau.fr