Innovative routes for the recovery of strategic metals from sulfide catalysts – Toward short-loop recycling

---

Contract

- Post-doctoral position

Duration

- 18 months (starting between October 2026 and January 2027).

Working hours

- Full time

Location

- 69370 Solaize (Lyon area)

Context

Faced with the digital and energy transition as well as a growing demographic demand, global metal consumption is expected to nearly double by 2060. At the same time, global supplies of strategic metals are under increasing pressure due to their scarcity, as well as geopolitical and economic constraints. Recycling metals contained in waste is a major response to reduce our dependence on raw materials and strengthen France's industrial and energy sovereignty.

Hydrotreatment catalysts, which enable compliance with environmental standards for fossils fuels, renewable feedstocks from biomass or the upgrading of pyrolysis oils from plastics, contain critical metals such as cobalt (Co), nickel (Ni) and molybdenum (Mo). These metals represent up to 15% of the mass of the catalysts, a concentration well above that of traditional ores, making them a valuable secondary resource.

As part of the CYCLALOOP project of the PEPR Recyclage program, we propose to develop an innovative and environmentally friendly method to recover these metals via a short-loop leaching technique.

We are seeking a highly motivated postdoctoral researcher to join our interdisciplinary team focused on hydrometallurgy, catalysis and characterization

---

Main duties

As a postdoctoral researcher, you will be at the heart of a study aimed at recovering and valorizing the metals contained in hydrotreatment catalysts. Your duties will include:

Development of a metal recovery method:

- Develop a simple, efficient and ecological route to selectively dissolve the metals while limiting deterioration of the alumina support (Al_2O_3).
- Explore the possibility of treating sulfide catalysts directly, without going through energy-intensive steps such as regeneration.

Separation and valorization of the metals:

- Design bimetallic solutions usable as impregnation precursors, avoiding full purification of the metals.
- If necessary, separate the metals from impurities into polymetallic solutions (Mo-Ni or Mo-Co) for their reuse in the manufacture of new catalysts.

Characterization and understanding of mechanisms:

- Thoroughly study the speciation of the elements using advanced techniques (Raman, UV-Vis, XAS, etc.) in order to optimize the process and elucidate the underlying mechanisms.

Your work will be complemented by exchanges with academic and industrial partners, notably BRGM and ICSM, involved in complementary studies (bio-leaching, and metals purification).

Expected skills

Technical skills

- First experience in hydrometallurgy or in the field of metal recovery processes.
- Solid knowledge of solution chemistry. Knowledge of catalysis would be a plus.
- Knowledge of characterization techniques and thermodynamic modeling.

Behavioral skills

- Ability to work in a team on interdisciplinary projects.
- Initiative and autonomy in conducting research.
- Scientific rigor and motivation for applied research.

Travel to be expected

- Occasional trips of a few days within France and abroad, including to BRGM (Orléans) and ICSM (Marcoule)

Languages

- Fluency in English and French

Diploma

- PhD degree in hydrometallurgy or chemistry
- The date of award of the PhD degree must not be more than three years prior to the start of the postdoctoral contract.

For further information and to apply, please contact:

- Anne-Sophie GAY (anne-sophie.gay@ifpen.fr)