



## Postdoctoral Research Position (18 months) Synthesis of GQD-IMAC chromatographic phase and Experimental validation

The *Laboratoire Lorrain de Chimie Moléculaire* (L2CM, UMR CNRS 7053), located in Nancy, France, and the Laboratory of Reactions and Chemical Engineering (LRGP, UMR CNRS 7274) invite applications for a **18-month postdoctoral position** starting in **November 2026**, within the framework of the **B4B (Biomolecules for Bioeconomy)** French national research program.

### Scientific Context

Immobilized metal ion affinity chromatography (**IMAC**) is a cornerstone technique in biochemistry and biotechnology for the purification and separation of biomolecules exhibiting metal-chelation properties. The method relies on coordination interactions between specific residues on the biomolecules core and transition metal ions (e.g.,  $\text{Ni}^{2+}$ ,  $\text{Fe}^{3+}$ ) immobilized on solid supports through chelating ligands. Most commercial materials rely on porous polymeric matrices, typically agarose beads functionalized with chelating ligands such as NTA. In these systems, capture efficiency is governed by the density of immobilized ligands and the accessibility of coordination sites within the porous network. However, metal densities typically remain limited to a few tens of  $\mu\text{mol}\cdot\text{mL}^{-1}$ , while mass transfer within the porous structure can restrict access to active sites.<sup>1</sup>

**GQD-IMAC** project aims to develop a new generation of nanostructured IMAC platforms with enhanced separation performances through increased capture capacity for metal-chelating biomolecules. This strategy relies on the integration of biosourced nanomaterials, namely graphene quantum dots (GQDs) derived from biomass, into the architecture of affinity chromatography supports (agarose beads) to create high-density metal-binding interfaces.

### Research Objectives

The recruited postdoctoral researcher will contribute mainly to:

- The design, synthesis and characterization of finely tuned **graphene quantum dots (GQDs)** and/or **GQDs hybrid materials** as new IMAC supports at L2CM lab.

Once synthesized, these GQDs-IMAC supports will be investigated and evaluated at LRGP lab:

- as analytical-scale IMAC chromatography support
- and through preparative-scale chromatographic evaluation.

### Candidate Profile

Applicants should hold a PhD in **chemistry, materials science, or a related field**, with a strong background in **(nano)materials chemistry**. Knowledge in analytical chemistry for IMAC chromatography analysis and preparative chromatography will be a plus.

**Expected skills:** good knowledge of English and scientific communication skills, oral and written skills. Sense of thoroughness, organization and initiative; capacity of synthesis; reactivity and autonomy and team working.

### Application

Interested candidates should send their application **by email**, including:

- A curriculum vitae
- A brief cover letter describing research interests and relevant experience
- Contact information for references

Application deadline for oral selection: **31/08/2026**

Expected starting date: **01/11/2026**

For informal inquiries or applications, please contact the project coordinator, Philippe PIERRAT, [philippe.pierrat@univ-lorraine.fr](mailto:philippe.pierrat@univ-lorraine.fr)

<sup>1</sup> Riguero, V. et al. *Journal of Chromatography A*, 2020, 1629, 461505.