

Application deadline: 03/04/2023

Start of contract: 01/10/2023

Localisation: Institut des Sciences de la Terre d'Orleans (ISTO), Orleans, France

**We invite applications for a PhD candidate to work on the chemical controls on S, Cu, Zn and Se degassing from arc magmas.**

The transition to carbon-free energy sources relies on a secure and sustainable access to an increasing number of metals. This growing demand for metals requires a fundamental understanding of the processes that enable their concentration in the Earth's crust.

In this framework, the aim of this PhD is to **gain a detailed understanding of how magma composition and the P-T conditions of degassing may favour high solubility of CU, Zn and Se in magmatic fluids**. To do so, the PhD candidate will use a **novel in-situ experimental approach** that enables the identification and quantification of different metallic species in co-existing hydrous melts and magmatic fluids directly under high P-T conditions.

By completion of the PhD, the candidate will have gained a unique expertise in the structural and chemical characterization of high-temperature fluids and silicate melts. He/she will be widely encouraged to present his/her results at national and international conferences.

The project will be supervised by Marion Louvel and Giada Iacono-Marziano, both CNRS researchers at the Institut des Sciences de la Terre d'Orleans (ISTO).

ISTO is laboratory that hosts Earth scientists from the CNRS and the University of Orleans. It is located close by and share numerous collaborations with the BRGM (French Geological Survey).

ISTO is home to a unique experimental platform dedicated to the study of upper crustal magmatic and volcanic processes that includes several IHPV, cold-seal pressure vessels, batch reactors and in-situ apparatus (transparent IHPVs and diamond-anvil cells). Most of the experiments will be conducted in the Experimental Petrology Laboratory at ISTO but the project will also require bi-annual visits to synchrotron facilities, mostly the European Synchrotron ESRF in Grenoble, France.

**Selection criteria:**

The PhD candidate should hold or have completed a Master in Geosciences by August 2023. A good knowledge of magmatic processes, ore-forming processes and geochemistry is required. A previous experience in experimental technics and/or Raman and X-ray spectroscopies would be a plus.

**Selection process:**

The selection process will last few months and involves the following steps:

- 1) Prospective students should apply and provide all required documents on the Adum platform by April 2023 latest (<https://www.adum.fr/>).
- 2) Preliminary interviews and visits of the ISTO facilities will be organized in March-April.
- 3) 3 candidates will be selected for an official interview by the Ecole Doctoral EMSTU d'Orleans. The interview will consist of a 10min presentation +10min questions in front of an independant jury. The interviews will be held on-site in Orleans on May 24th 2023. Online interview may be requested for candidates living abroad.
- 4) The selected candidate will be notified by end of May, to start his/her contract on 01/10/2023.

**All candidates are encouraged to contact PI Marion Louvel directly ([marion.louvel@cnrs.fr](mailto:marion.louvel@cnrs.fr)).**

**Required documents:**

CV including 2 references and motivation letter. If possible Master grades and ranking.