

Post-doctoral position

Hydromechanical behaviour of argillite-based sealing materials

The soil mechanics of LEMTA is seeking a full-time postdoctoral researcher (12 months) with research interests in the thermo-hydro-mechanical-chemical behaviour of clay-based materials.

In the context of deep nuclear wastes storage deep galleries will be backfilled with clay-based materials. The backfill must have specific hydromechanical properties to prevent water circulation along the repository after its closure. The backfill material will be partly made from the excavated material, i.e. Callovo-Oxfordian argillite that would have been stored at the surface during the exploitation period, and mixed with sand or expansive clay to reach the target design properties. The hydromechanical properties of the backfill must remain stable over time. It is thus necessary to determine the relative impact of several factors such as the setting conditions, nature and dosage of treatment product, etc. on the properties of the backfill. The contribution of LEMTA is focused on the understanding of the cross relationship between macroscopic hydro-mechanical properties, the impact of the swelling of clay particles upon hydration, as well as the alteration processes associated to the circulation of alkaline water, with two main actions.

1. Analysis of the thermo-hydro-mechanical-chemical behaviour of bentonite/sand/crushed_argillite-based mixtures to improve understanding of physical and chemical mechanisms governing the material properties.
2. Long term behaviour of bentonite/sand/crushed argillite mixtures. The phenomenon known as alkaline plume triggers the dissolution and modification of clay minerals in the backfill material, altering its structure and, in turn, its performance. The impact of this process will be investigated, considering its impact on the compressibility and transfer properties of the mixtures.

Successful candidate will engage in interdisciplinary research and will contribute to the research work of LEMTA. The work will be of experimental and/or numerical nature, relying on state-of-the art laboratory equipment and numerical modelling resources of LEMTA. The work will also benefit of cooperation with ANDRA and other institutions in the context of the [EURAD2](#) research project funded by the EU.

The post-doctoral position is set to start not later than the 1st of April 2025. Candidates must own, at the time of the start of the position, a PhD Degree in Civil, Geotechnical or Geological engineering, and have a strong interest in mechanics of geomaterials.

Knowledge of the French language is not mandatory.

Conditions

Starting date: not later than 1.04.2025

Duration: 12 months, fixed term contract

Gross Salary: 2600 € per month plus social benefits

Institution: LEMTA (http://lemta.univ-lorraine.fr/comp_thmc_sols.html)

Université de Lorraine (www.univ-lorraine.fr)

How to apply?

Send by e-mail before 15th **January 2025** a CV (2 pages max), the PhD thesis and the articles authored (via an online platform), a one-page research statement, and the name of one referee to both supervisors:

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References

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