Centre for Nuclear Safety

Clay laboratory

Assessing material performance for geotechnical barrier structural design
Safe permanent geological disposal of radioactive waste requires accurate characterisation of bentonite clay performance.

**Services**

**Our offering:**
- Microstructure measurements of clay matrices
- Chemical analyses of clay matrix (ρ, wt%H2O, EC, CEC, AL, AFe, ASi)
- Online measurements of pH and Eh from clay materials
- Analyses of pore water chemistry and phenomena related to diffusion, pH buffering, alteration, cation exchange, dissolution/precipitation
- Coupled thermal, hydro-, mechanical and chemical (THMC) measurements of clay barriers, including erosion potential and transport properties
- Designing, building, maintaining, dismantling and analysis of customised experiments

**Facilities**

**Environments with simulated conditions**
- Controlled atmosphere boxes with oxic or anoxic conditions (gloveboxes)
- THMC devices including heater, cooler, data acquisition systems, hydration system, sensors
- Diffusion cells, squeezing cells, hydraulic presses

**Microstructure measurements, chemical analyses of clay matrices**
- Small-angle X-ray scattering (SAXS)
- Nuclear magnetic resonance spectroscopy (NMR)
- Spectrophotometer
- Inductively coupled plasma spectrometry (HR-ICP-MS, ICP-OES)
- Chemistry and radiochemistry laboratories

**Computational infrastructure and modelling tools**
- COMSOL Multiphysics
- Hydrogeochemical modelling tools EQ3/6, PHREEQC
- Geochemist workbench, PetraSim
- Molecular modelling LAMMPS

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Ask us more!  
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