STORAGE RESEARCH INFRASTRUCTURE ECO-SYSTEM

RI Information sheet 2022

BRGM, BioREP

Technology(ies) of Energy Storage: Chemical, Thermal, Cross-cutting (specifically: High-pressure and temperature technologies, biogeochemical process)

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Project Acronym	StoRIES
Call	H2020-LC-GD-2020
Grant Agreement No.	101036910
Project Start Date	01-11-2021
Project End Date	31-10-2025
Duration	48 months

1. Photo

Modular and compartmentalised design

2. Geographical coordinates (˚, “, … N/S, E/W)

Orléans, France into the BRGM

47.83075764032636, 1.9397707824171475

3. Description of the research infrastructure for the webpage

The BIOREP facility is a high pressure set up to perform percolation and transfer experiments on fluid-rock interactions under a large range of pressure and temperature conditions, while continuously monitoring geochemical and bio-geochemical evolution. The facility could be used to do classical batch experiments, equilibration or transfer experiment between compartments through columns and also microfluidic percolations in highly pressurized micro-chips. BioREP is composed by several reactors, columns and tools (high-pressure pumps, sensors…) that can be modulated to reproduce each application or process (static or dynamic).

Besides those basic principal characteristics and adaptation, the BioREP facility is divided in four different modules that allow specific approaches:

- TansREP

Three reactors platform with transfer patterns that can be designed according to the desired experiment/process.

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- MicroREP

Microfluidic and analytical lines that allow the transfer of pressurized fluids into microchips and captors/electrodes with low consumption of experimental fluids. The microfluidic approach also allows to perform in situ spectral (IR/RAMAN) characterizations.

- CycloREP

Closed loop build to recirculate fluids into a Hassler cell. This design is particularly suitable to experiment and assess the stabilization phases of an injected fluid through rock percolation. The module also allows to measure any loss or collapsing effect of the rock plug. It is particularly suitable to study injectivity.

- MultiREP

Three Hassler like reactors that allow to handle different types of sample and conditions at the same time. The facility is thus particularly relevant to study interactions between water, rock, microorganisms and gas in subterranean environment (natural or industrial process). Gas storage and thus energy storage are one of the main studied topics with this facility.

4. Availability of the research infrastructure

(Please indicate time periods in which infrastructure will not be available for StoRIES in the next 2 years – if already known)

These periods are not known yet.

5. Special considerations (confidentiality / NDA agreements, insurance requirement, special training, HSE training)

The BioREP facility is available after definition of the user's needs and writing of a protocol between the facility owner and the user. Experiments take place at Orléans (France) and are currently carried out during 4 weeks (according to the application). The user must be assisted during all the experiment due to pressure risks.

6. Energy storage technology that can be analysed/studied by using the research infrastructure

- Electrochemical ☐
- Chemical ☒
- Thermal ☒

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- Mechanical ☐
- Superconducting Magnetic ☐
- Cross-cutting ☒ (Specifically: High-pressure and temperature technologies, biogeochemical process)

7. Key words for the webpage

Biogeochemistry, high-pressure and temperature, batch and/or flow-through experiments, subterranean environment, energy storage

8. TRL level (if applicable):

- 1-3 ☒
- 4-6 ☒
- Above ☐

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