



### Name of the organization

Commissariat à l'énergie atomique et aux énergies alternatives (CEA)

### Name of the infrastructure / laboratory

EDIP consisting in INAC (Institut NANoscience et Cryogénie) et Liten (Laboratoire d'Innovation pour les Technologies des Energies Nouvelles et les Nanomatériaux)

### Address and country of the infrastructure / laboratory

17 rue des Martyrs, 38054 Grenoble Cedex 9 (France)

### Person responsible of the access / Contact person

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### Main field of activity of the infrastructure / laboratory

► Stationary and Fuel Cells for Power and Heat Generation

### Short description of the infrastructure / laboratory

The EDIP installation and associated procedures allow determining the membrane water content in an operating fuel cell by small-angle neutron scattering using specific cells, transparent to neutrons (25cm<sup>2</sup>, golden aluminum plates with visualization holes along the gas channels and temperature controlled), and a mobile test bench (25 cm<sup>2</sup> single cell capability, humidity and gas flow mass controlled and monitored, temperature monitoring from room temperature to 100°C). Operation conditions such as temperature or current densities can be varied over a representative range. A data analysis protocol has also been developed to extract the water concentration profiles within the membrane during operation. These data can be used either to validate mass transfer models, to measure water transport at given humidity values or to study the water management in specific conditions. In addition all in situ experimentations are prepared using regular normalized test benches available at CEA/Grenoble.

### Main research area(s) of the infrastructure / laboratory

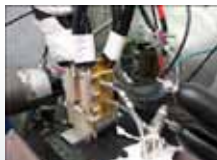
Studies on the structure and water transport properties of ionic conducting membranes along with in-situ water repartition during fuel cell operation by Neutron and/or X-Ray scattering

### Instruments and tools available for the above mentioned research

Fuel cell test bench and single cell test fixtures designed for the study of water management and repartition during fuel cell operation. Laboratory Small Angle X-Ray Scattering (SAXS) beamline. Possibility for help in writing proposals for access to large European facilities such as European Synchrotron Radiation Facility (ESRF), Institut Laue Langevin (ILL) and Laboratoire Leon Brillouin (LLB).



Laboratory Small Angle X-Ray Scattering (SAXS) beamline



Single Cell test fixture and facility at ILL for the study of water repartition during operation by Small Angle Neutron Scattering (SANS)



Single Cell test fixture and facility at ESRF for the study of water repartition during operation by Small Angle X-Ray Scattering (SAXS)

