

PARTNER PROFILE

Paul Scherrer Institute (PSI) - Switzerland

The Paul Scherrer Institute (PSI) is a multi-disciplinary research centre for natural sciences and technology. PSI employs 1300 members of staff, making it the largest of the national research institutions and the only one of its kind within Switzerland. Bioenergy research at PSI is focusing on thermochemical biomass conversion processes towards electricity, biomethane and liquid fuels production. In total, 30 scientists, technicians and PhD students are working in this field at PSI.

PSI is offering the following four facilities for BRISK Transnational Access:

1. Bench-scale Bubbling Fluidised Bed Gasifier with Detailed Gas Diagnostics (BFB Gasifier)

The 5 kW bubbling fluidised bed (BFB) reactor has a diameter of 52mm and a length of 1m. The gasification agent (air) enters through the bottom and passes a frit to ensure no material will fall back into the entrance pipe. The feed enters the reactor just above the frit by means of an auger feeder. Standard fuels are crushed wood pellets and agricultural biomass. Several bed materials can be selected for gasification tests.

The gasifier itself is rather a standard set-up, but the speciality of the installation is the availability of the unique gas diagnostics system. The online sampling train used in this set-up consists of a warm gas filter, a liquid quench sampling system and several online and offline analytical instruments, such as gas chromatograph (GC) coupled with Flame Ionization Detector (FID), Sulfur Chemiluminescence Detector (SCD) or Inductively Coupled Plasma/Mass Spectrometer (ICP/MS). The set-up is therefore suitable to testing different feedstock and different bed materials. The BFB gasifier can also be used as a gas source for testing gas sampling systems or analytical instruments.

2. Set-up for material screening 10g

Testing bed materials for BFB gasification or indirect gasification systems is performed on this set-up. A wide range of synthetic gas mixtures can be simulated, including simulating redox cycles. 10g of bed material can be tested at ambient pressure at temperatures up to 850°C. A unique gas diagnostics system is available.

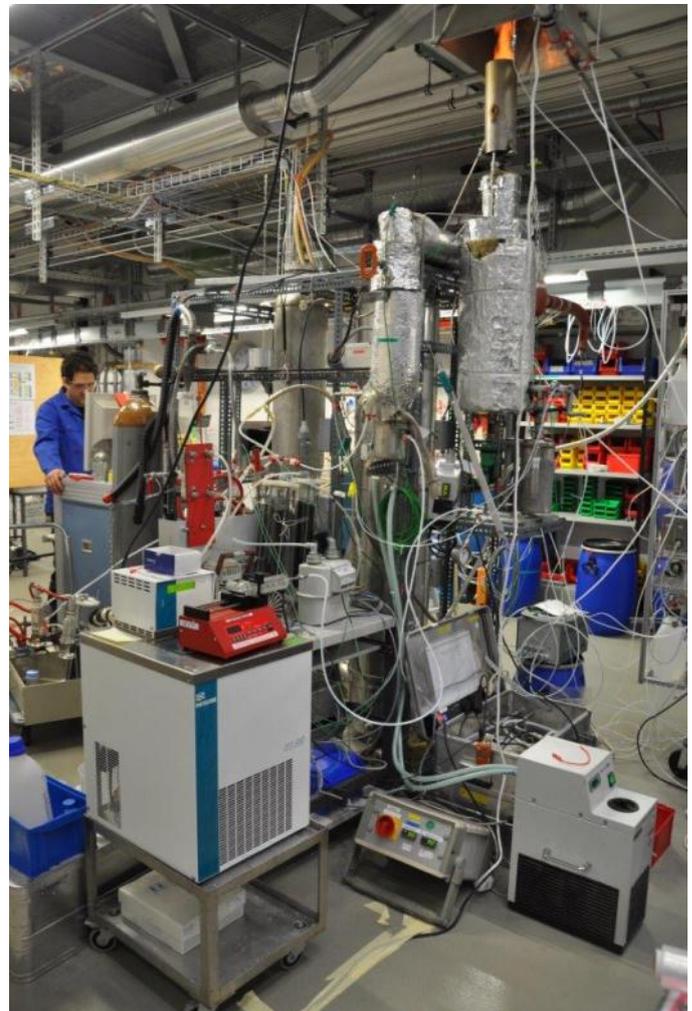


Figure 1: Lab-scale Bubbling Fluidised Bed gasifier with Detailed Gas Diagnostics.

3. Set-up for material screening 1g

With this set-up, 1g of bed material can be tested at ambient pressure at temperatures up to 950°C for fixed bed conditions. It is a supporting set-up of the BFB gasifier and a set-up of material screening at 10g scale. A unique gas diagnostics system is available.

4. Lab-scale hydrothermal gasifier of wet biomass

The hydrothermal biomass conversion laboratory (HBCL) hosts several high-pressure devices (reactors, separators, view cell, analytical devices) for operation up to 40 MPa and 600°C. Current projects focus on the hydrothermal gasification of wet biomass to a methane-rich gas.

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Hydrothermal processing, i.e. in a high-pressure aqueous environment, is an efficient way for converting wet biomass without the requirement to dry the feedstock. A variety of products can be targeted: solids (bio-char, bio-carbon, nutrient salts), liquids (bio-crude, bio-oils), gases (methane - or hydrogen-rich).



Figure 2: Material screening set-up 10g.

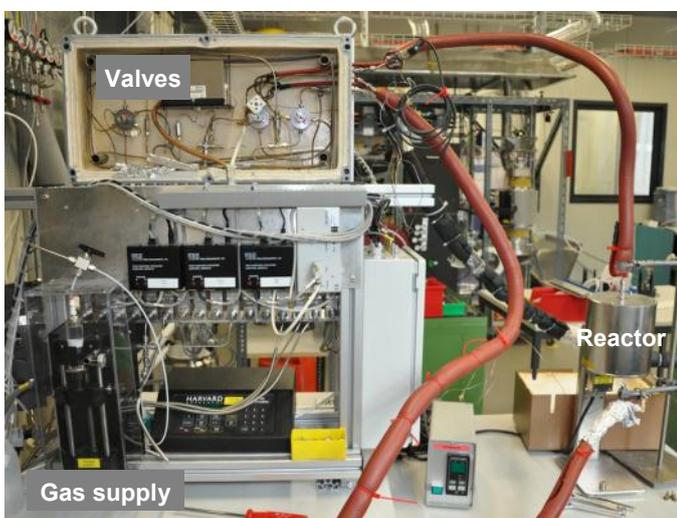


Figure 3: Material screening set-up 1g.

www.briskeu.com



Figure 4: Lab-scale hydrothermal gasifier of wet biomass.

PAUL SCHERRER INSTITUT



Contact

For further details about how to apply to utilise PSI's facilities as part of the BRISK initiative contact:

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