

PARTNER PROFILE

Åbo Akademi - Finland

Energy research at Åbo Akademi University (AAU) is focused towards the use of renewable fuels and fuel upgrading. The research is targeted towards a detailed understanding of various chemical phenomena rather than on material and energy balance equations. In combustion chemistry some of the research areas are:

- Thermochemistry in combustion;
- Ash and trace metal chemistry;
- Gaseous emissions and kinetics;
- Biofuel burning characterization;
- Metals corrosion chemistry.

To support this research a large number of laboratory-scale reactors and analytical tools are available. Within the BRISK project, the core installation, referred to as the biomass fuel characterization laboratory is made available to visitors.

Biomass fuels characterization laboratory

The biomass fuels characterization laboratory enables the user to study the reactivity of single particles of biomass. The core of the facility is an electrically heated single particle furnace with optical access. The installation includes gas analyzers for monitoring the product gases. Figure 1 shows the installation in operation, and Figure 2 on the next page shows a schematic drawing of the installation.

The main advantage of this installation is its versatility. The fuel sample is placed in a sample holder or is suspended on a hook. Initially the sample is kept in a cold protective N_2 atmosphere. Then, it is quickly inserted into the hot reactor. The composition of the gas entering the reactor is controlled and can consist of a mixture of O_2 , N_2 , CO_2 and H_2O . This allows for pyrolysis, gasification and combustion characterization.

The sample can be quickly removed from the hot reactor into the protective N_2 environment. It is possible to first pyrolyse the fuel in N_2 at a certain temperature and then study the char behaviour at a different temperature and atmosphere without having the sample in contact with air.

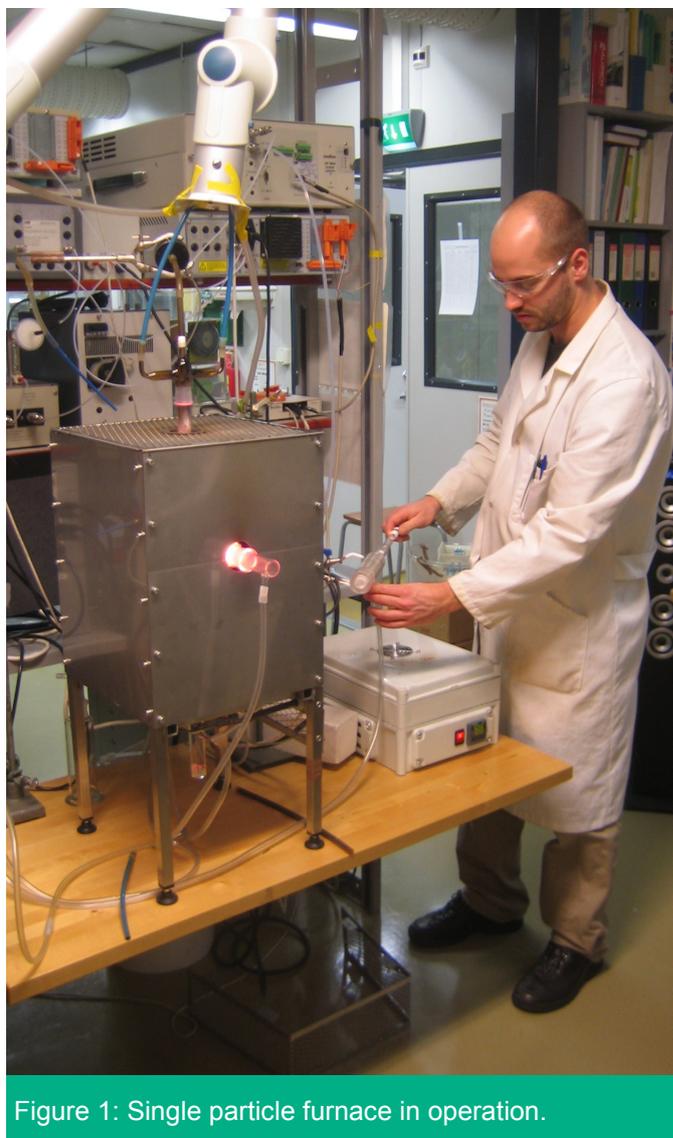


Figure 1: Single particle furnace in operation.

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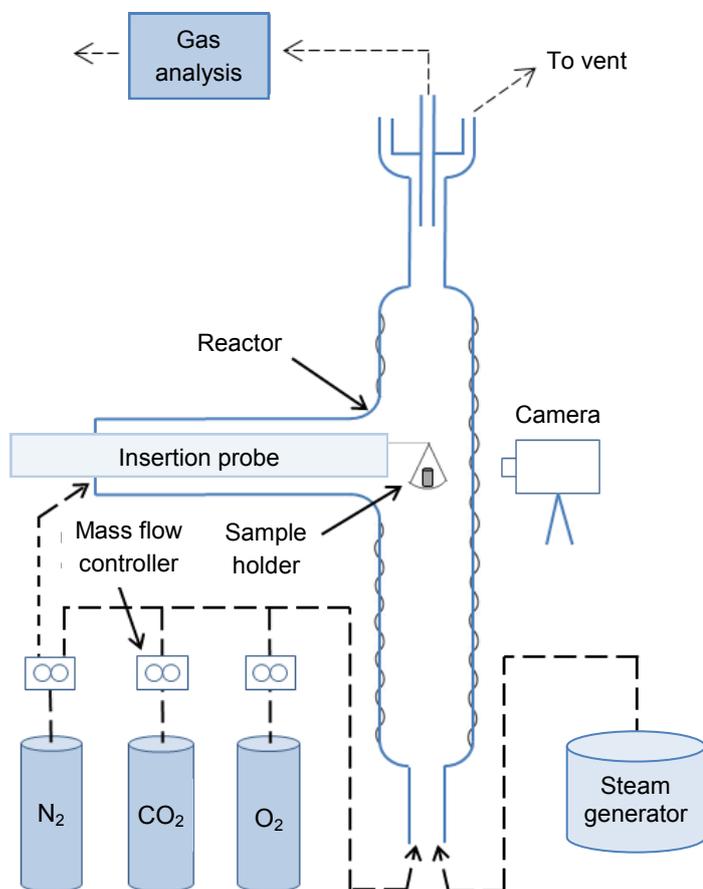


Figure 2: Schematic drawing of the single particle furnace.

Examples of recent studies are

- NO release from biomass char;
- Sulphur behaviour during pyrolysis;
- Release of ash forming elements during combustion;
- Gasification reactivity of biofuels.

In the laboratory a pressurized thermal gravimetric analysis (TGA) is also available. This works in a similar way. The sample is first kept in a protective environment and is then lowered into a hot controllable gas atmosphere.

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Did you know?

Grants for travel and subsistence are available for industrial and academic researchers to visit BRISK partners, including Åbo Akademi.

BRISK will pay for the facility access costs.



Contact

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

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