

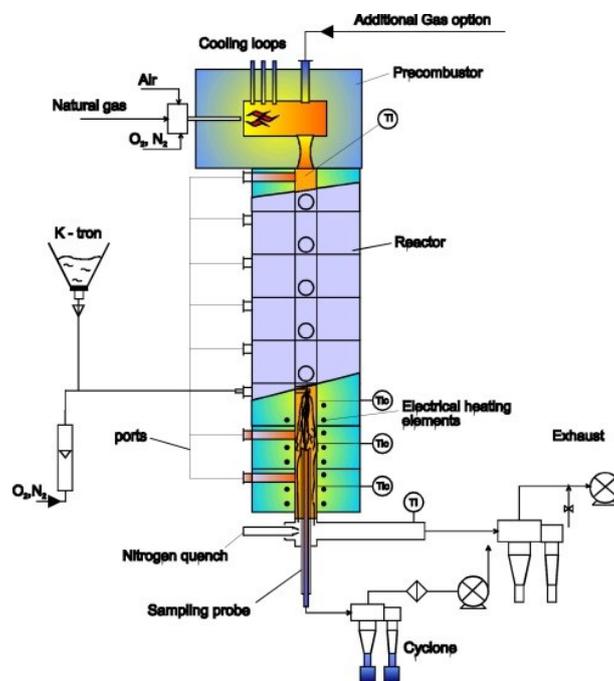
CASE STUDY

BRISK Transnational Access - A first at IFRF



Oskar Karlström is a PhD student from Åbo Akademi University in Finland. His research is about combustion and gasification modeling of single char particles of coal and biomass. In October 2012 he completed a two week collaboration at International Flame Research Foundation (IFRF) in Livorno, Italy. The

visit was financed by BRISK as part of Transnational Access.



Question: What was the purpose of this cooperation?

Oskar Karlström: The scope of the experiments was to investigate the kinetics of thermal conversion of 2nd generation biomasses and chars in the Isothermal Plug Flow Reactor (IPFR) and develop procedures to determine the kinetic parameters needed for single particle models which can be used as sub-models in CFD-codes. Moreover, the objective was to investigate the influence of gasification reactions on the conversion rates of biomass chars. For coal chars, gasification reactions are known to play an important role at pulverized fuel (pf) combustion conditions. However, the influence of gasification reactions on the conversion rate is unknown for biomass chars at pf combustion conditions.

Question: What kind of experimental equipment was used?

Oskar Karlström: Experiments were carried out for two weeks in a 4m isothermal plug flow reactor. In the reactor, combustion and gasification reactions of pulverized fuels are investigated. In the reactor, the heating rate is in the order of 10000 K/s which makes this setup highly relevant as the heating rates are of the same magnitude in industrial combustion and gasification systems.



Figure 1: IFRF isothermal plug flow reactor.

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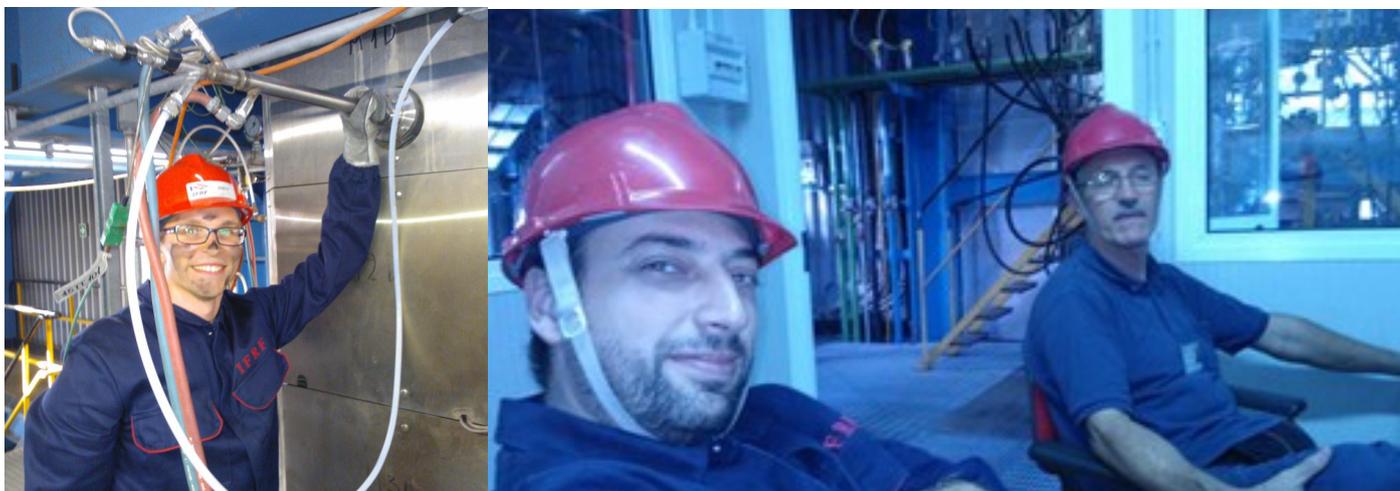


Figure 2: Oskar Karlström (*left photo*), Giovanni Corragio and Marco Faleni (*right photo*) running experiments in the isothermal plug flow reactor.

Question: Did the experimental tests provide what you expected?

Oskar Karlström: It was possible to perform all the planned experiments during the two weeks. This would not have been possible without the excellent support by the IFRF technicians. At present we are analyzing the experimental data and we will draw conclusions from the obtained data within a few weeks.

Question: Was it difficult to take advantage of the BRISK project and of the Transnational access?

Oskar Karlström: Absolutely not! Before sending off the application for this BRISK project, my supervisors, the hosts and I had continuous discussions planning my visit to IFRF. The application form that was submitted was short and easy to fill in. I am very happy that the application was approved and that I had the possibility to stay for two weeks in Livorno.



Figure 3: The isothermal plug flow reactor from below - as seen through a mirror.

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Contact

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

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