

CASE STUDY

How BRISK Transnational Access allowed me to enhance my PhD research



Angelika Lyczkowska of Clausthal University of Technology, Germany, discusses how a BRISK Transnational Access visit to Wroclaw University of Technology in Poland allowed her to conduct experiments that enhanced her PhD thesis

At the beginning of August 2015 I visited the Energy Engineering and Technology Division of Wroclaw University of Technology (WROC) located in the Lower Silesian region of Poland. My visit lasted two weeks, including ten working days. The purpose of my visit was to investigate pyrolysis, combustion and gasification behaviour of two types of biomass on thermogravimetric analysis apparatus equipped for differential scanning calorimetry (TGA/DSC). For my PhD thesis I needed extra experiments to obtain kinetic parameters of both types of biomass: grain residue and sugar beet chips. The BRISK programme was the perfect opportunity to achieve this aim.

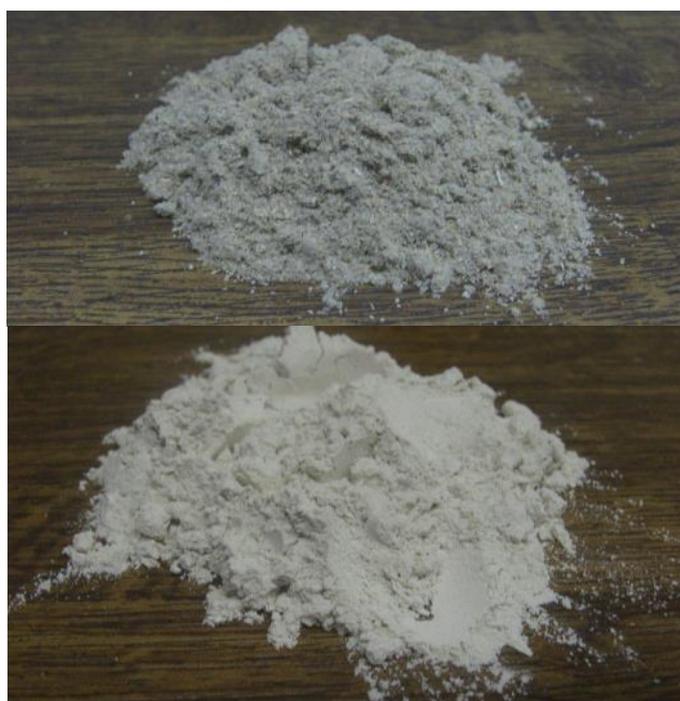


Figure 1: Pulverised biomass samples (Left: Grain residue. Right: Sugar beet) used for TGA measurements.

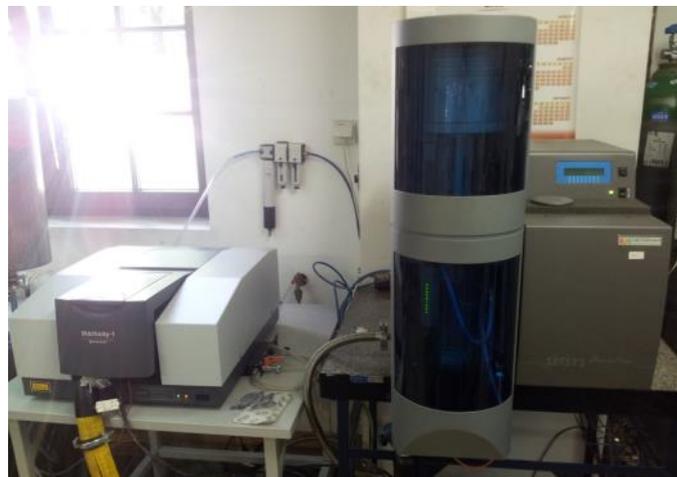


Figure 2: TGA/DSC equipment in the laboratory at Wroclaw University of Technology.

Experiments were carried out at temperatures of up to 900°C and heating rates of up to 30°C/min. Depending on the experiment being performed, different gases (N₂, O₂) and/or mixtures of them were used. The TGA experiments provided data detailing sample weight loss as a function of time and temperature for each experimental run (pyrolysis, oxidation). Determining kinetic parameters is based simply on adjusting the chosen mathematical model for the experimental data. Two models were chosen for mathematical fitting in this case: the Single Step Model for pyrolysis experiments and the Homogeneous Rate Model for char combustion and gasification.

The application process to undertake a BRISK project was quick and easy. Before sending the application, I got in contact with the host organisation in order to plan the experimental part of my visit and my stay in Wroclaw city. Dr Czajka was open to new experimental challenges and very helpful as I prepared the proposal. After I submitted my application form in April, I received approval for my project in less than a month.

Visiting Wroclaw was a pleasant and interesting experience. On the first day of my visit I was warmly welcomed by the whole team. Dr Czajka showed me around the lab and other nearby research stations. It was fascinating to see how experimental work is conducted at another university in another country. I would like to convey my gratitude to Dr Czajka and Anna Kisiela, who were not only an invaluable source of knowledge and experience but who also provided

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Figure 3: Conducting experiments using the TGA.

me with a friendly and pleasant working environment for the duration of my visit to the university. Thanks to their patience and encouragement I learnt how to operate the equipment and analyse its results myself. I'm grateful that I had this opportunity to learn new experimental techniques and to improve my skills in this field of research.

I have benefited from my visit not only scientifically, but also personally. I had the pleasure of exchanging knowledge and experience with other researchers and in my free time, of visiting the beautiful district of Upper Silesia.



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Figure 4: With Anna Kisiela of Wroclaw University of Technology.

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