

## **PAID DIPLOMA/ MASTER'S THESIS**

### ***Investigation of Industrial Relevant Syntheses in a Continuous Isothermal Reaction Calorimeter***

#### ***Project: CCFlow***

***Ref.Nr. DA 129***

To dedicated students of **chemistry, pharmaceutical engineering, chemical engineering**, or related disciplines, we offer an opportunity to work with us on a paid Diploma/Master's thesis. The project is conducted in close cooperation with the **Institute of Process and Particle Engineering, TU Graz**.

#### **OBJECTIVE:**

The goal of this work is to **investigate reactions** which are problematic or impossible to carry out in common batch laboratory equipment. These reactions should be investigated with a **continuous isothermal reaction calorimeter for milli- and micro-fluidic applications**. This microfluidic device directly measures the heat flux generated within a single or multiphase chemical reaction. Adaptions of the flow calorimeter to the specific reaction cases may be needed and will be achieved by additive manufacturing, i.e., 3D printing of metals, ceramics and polymers. Furthermore, design and evaluation improvements of the calorimeter are planned to be carried out including intensification of mixing within the channel, space- and time-resolved heat flux detection across the reactor as well as improving the evaluation procedure.

In particular the objectives of this work are:

- Characterization of industrial relevant syntheses regarding mixing as well as substance properties, reaction heat, and reaction kinetics with an existing flow calorimeter
- Adaption and improvement of a continuous reaction calorimeter utilizing the advantages of additive manufacturing, i.e., 3D printing of metals, ceramics and polymers
- Monitoring and controlling of the calorimeter via open source electronics and software

#### **WITHIN THE FRAMEWORK OF THIS THESIS WE OFFER THE FOLLOWING:**

- Extensive participation in a top-level and industrially relevant research project in an international environment
- Supervised training in the task
- Assistance of experienced staff with the implementation of innovative ideas
- Access to highly modern infrastructure on campus of Graz University of Technology

If you are interested in realizing your thesis at the interface between university research and industry/business and to contribute to the optimization of product and process development in the pharmaceutical industry, please do not hesitate to contact us!

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