research center pharmaceutical engineering

The Research Center Pharmaceutical Engineering (RCPE) is an interdisciplinary research institute in the area of pharmaceutical process- and product-development in Graz, Austria. Our goal is to establish technology to transform current product and processes development approaches in the pharmaceutical and diagnostics industries into a science-based endeavor together with our partners.

PAID DIPLOMA/ MASTER'S THESIS

Reaction Calorimetry of Highly Reactive Species for Milli- and Micro-fluidic Applications in Continuous Flow

Ref.Nr. DA127

To dedicated students of **pharmaceutical engineering**, **chemical engineering, mechanical 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 experimentally investigate and improve the performance of an existing **reaction calorimeter** for milli- and micro-fluidic applications in **continuous flow.** Directly heat flux measurements during reactions are possible in the calorimeter through utilizing Seebeck elements**.** These Seebeck elements allow space- and time-resolved heat flux detection across the calorimeter. The heat flow through a Seebeck element generates an electrical voltage which is **monitored with an Arduino based circuit** and allows to calculate the **heat of reaction** after calibration. Based on the findings, mechanical and electrical design improvements of the calorimeter as well as improvements in the Arduino code should be made and realized. A special focus will be on intensified mixing within the calorimeter through different channel geometries manufactured by **additive manufacturing**, i.e. 3D printing of metals and ceramics.

In particular the objectives of this work are:

- **Investigation** of the heat of reaction of highly reactive species in continuous flow
- **Design improvements to an existing** continuous reaction calorimeter
- **Advanced monitoring and controlling** of the calorimeter via Arduino

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!

Research Center Pharmaceutical Engineering GmbH
Sandra Resl
Inffeldgasse 13, A-8010 Graz
Tel.: +43 316 873-30904
sandra.resl@rcpe.at